Final Program Environmental Impact Report for the Construction and Management of an Artificial Reef in the Pacific Ocean Near San Clemente, California

Prepared for:
California State Lands Commission
Sacramento

Prepared by:
Resource Insights
Sacramento

May 1999
Volume I I– Response to Comments and Appendices

State Clearing House Number 9803127

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9.0 Response to Public Comments

Comments

Responses

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December 28, 1998

Via Fax (916) 574-1810

Mary Griggs, Project Manager
California State Lands Commission
Division of Environmental Planning and Management
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

Re: Comments - Draft Program EIR for SCE Artificial, Reef Project (EIR No. 685) (SCH 98031027)

Dear Ms. Griggs:

As a public affairs consultant to Nelson and Sloan, a potential supplier of reef materials for the above referenced project, I wish to supplement my oral comments of December 10 with the following written comments (in non-bold italics). Based on my the review of the Draft Program Environmental Impact Report (PEIR), I respectfully submit that the worst case scenarios which describe San Diego as the least favorable source for materials are based on incorrect assumptions and/or conclusions, especially with respect to the air quality analysis.

4.2.1.2 Study Area

Par. 3, line 2: The Ports of Los Angeles and Long Beach are approximately 59 miles away.

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Par. 4, line 4: However, Catalina Island is located offshore in Los Angeles County about 58 miles from the project site. Catalina Island is the, closest quarry rock source to the project lease area.

Par, 5, line 1: The Port of San Diego is approximately 60 miles from the proposed lease area.

A1. It is not stated whether the distance from the ports to the project site (sometimes referred to as the lease area) is measured from the northern, southern or mid-points of the site. The point from which the distance is measured is significant because the site is 2.5 miles long and because, according to Figure 3-4 "Experimental Reef Site Map", (no page number), most of the construction work will occur in the southern end of the leave area.

Depending on where the distance between a port and the project site is measured, Catalina Island may not be the closest port to the site where the construction work will occur.

A2. Also, for ease of reference, the distance should be described as from port to project site or from port to lease area, but the terms "project site" and "lease area" should not be used interchangeably since the project site encompasses only part of the lease area.

Par. 4, line 7: The quarries are directly adjacent to the loading dock and do not require any trucking for loading.

Responses

A1. Page 4.2-5, Section 4.2.1.2, Paragraph 5, line 1 in the Draft PEIR is incorrect and has been corrected in the Final PEIR. The correct distance between the Port of San Diego and the San Clemente site is estimated to be about 69 miles as described in Chapter 3, Project Description. This is 10 miles greater than the 59 miles between the Ports of Los Angeles/Long Beach and the San Clemente site. This distance is also 11 miles greater than the 58 miles between Catalina Island and the San Clemente site These distances are estimates to the middle of the 2.5-mile long site. In response to comments the proposed project has been modified slightly to spread the blocks of test modules evenly throughout the 356-acre project site at the San Clemente.

A2. In the Draft PEIR, the terms project site and the project lease area were considered to be the same 355-acre area. However for the Final PEIR, the lease area is now 862 acres based on the project proponents amended application of March 22, 1999 The project site is now 356 acres of suitable sand substrate for artificial reef construction. The experimental reef also has been changed slightly to spread the modules throughout the project site rather than mostly in the southern portion of the site. A glossary of project terms has been added at the end of Section 3.1, to help reduce confusion about different terms used throughout the document.

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A3. This may not be an accurate statement. I am informed that the Catalina Island quarries use large, diesel-powered trucks known as "Euclids," to transport rock from the quarry to the dock. The emissions from these vehicles should be calculated and included in the air quality analysis for this source.

Par. 5, line 5: Only a few of the rock and concrete sources are located within 20 miles of the Port of San Diego.

A4. Nelson and Sloan's rock quarry and recycled concrete yard is located within 8 miles of the Port of San Diego's 24h Street Terminal. This significantly reduces the air emissions and traffic impacts that were estimated for San Diego suppliers assuming a 40-mile round trip to the port.

4.2.2.4 Recreational Fishing Business

Par. 1, line 8: The interference of construction with recreational fishing businesses is considered a potentially significant impact for both the experimental reef and the mitigation reef.

A5. Based on information contained in the PEIR, it could take up to eight times as long to construct the Mitigation Reef from rock as compared to concrete. This is an unacceptable disparity in view of the additional emissions, traffic, interference with fishing and other adverse impacts that would result from using rock instead of concrete. The increase in impacts should be deemed sufficient grounds upon which to revise SEC's mitigation program, removing quarry rock from consideration as reef material altogether.

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A3. The rock quarry operator on Catalina Island does own and operate trucks to transport rock from the quarry to the barges at the dock. The distance traveled is anywhere from 200 yards to a quarter of a mile. The trucks are part of the existing operations and run only on roads under lease to the quarry. In this case, emissions from these trucks would be included in the quarry's existing air quality permits. The project description has been amended to reflect this (Section 3.4.3, Sources of Materials).

A4. It is recognized that some of the rock and concrete brokers are located closer to the ports than the worst-case scenario of 20 miles each way. However, for the analyses in Chapter 4, a conservative, worst-case scenario was used assuming that materials would be transported 20 miles to the ports. Using suppliers closer to the ports is included in the air quality mitigation measures recommended for the experimental and mitigation reef projects (see Table 4-22).

A5. Although the use of quarry rock for the mitigation reef may have greater environmental impacts than the use of recycled concrete, there is no assurance at this time that a mitigation reef constructed of recycled concrete would satisfy the performance criteria of the SONGS Permit, particularly with regard to creation of habitat to replace the lost resources of the San Onofore Kelp bed. A primary objective of the proposed experimental project is to evaluate and compare the performance of quarry rock and recycled concrete. The only low-relief reefs currently in place are those located at Mission Beach, which are constructed of recycled concrete. There are few quantitative data on which to evaluate the success of these reefs. Data collected to

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4 2 2 5 Commercial Fishing Activities

Par. 1, line 3: There could be disruptions to commercial lobster fishing activities for sea urchins and crabs during the construction of the reefs, as these species are fished year-round. The experimental reef would take only 21 days to construct, but the mitigation reef could take anywhere from one to eight construction seasons to complete. The exclusion of commercial fishermen from a proven fishing ground during construction could impact their livelihood if they did not have an alternate site to fish for that period. In addition, if fishing equipment was on the ocean floor during construction, it could be destroyed by the placement of reef materials. This is a potentially significant impact for both the experimental reef and the mitigation reef

A6. If it could take up to eight times as long to construct the Mitigation Reef from rock as compared to concrete, this should be considered an unacceptable disparity in view of the additional emissions, traffic, interference with fishing and other adverse impacts that would result from using rock instead of concrete. The overall increase in impacts should be deemed sufficient grounds upon which to revise SCE's mitigation program, removing quarry rock-from consideration as reef material for either phase.

4.4.1 2 Air Districts

- *South Coast Air Quality Management District* (par. 2, line 7): Quarry rock obtained from suppliers on Catalina Island does not require trucking and can be loaded directly onto the barges for

Responses

date indicate that benthic invertebrates on these reefs have not achieved abundances that would be required for the mitigation reef project under the CCC permit. The CCC has required that the two reef materials be tested before selecting one for the full mitigation reef. If the experimental reef demonstrates that both materials perform at acceptable levels, then recycled concrete would be preferred, given the reduced impacts associated with its use.

As discussed in the Introduction to the Final PEIR, revised estimates for the weight of recycled concrete and quarry rock needed for artificial reef construction show a much smaller difference than previously discussed in the Draft PEIR. Where the Draft PEIR stated that 4.5 times as much rock as concrete by weight, would be needed for construction, the corrected weights show that 1.3 times as much quarry rock would be need as recycled concrete to achieve the same level of coverage. This reduces the differences in environmental impacts as well.

A6. The PEIR identifies a number of significant impacts related to the construction of the artificial reefs, including impacts to commercial fishermen. The PEIR also recommends specific mitigation to reduce all significant impacts to a less-than-significant level. In addition, while there may be temporary disruptions for commercial fishermen, this is balanced by the likelihood that the artificial reef will provide a substantial amount of new habitat that will greatly enhance fishing grounds within a fairly short amount of time.

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towing to the site.

A7. This may not be an accurate statement. I am informed that the Catalina Island quarries use large, diesel-powered trucks, known as "Euclids," to transport rock from the quarry to the dock. The emissions from these vehicles should be calculated and included in the air quality analysis for this source.

4.4.5.2 Significance Criteria

- *SDAPCD Emission Thresholds* (par. 1, line 1): The SPAPCD does not have any established thresholds of significance for consideration under CEQA. However, the district recommends using the SCAQMD thresholds for this analysis (SDAPCD 1998) and the following impact evaluation adopts the SCAQMD thresholds in determining whether the potential project-related emissions in the SDAD are significant.

A8. This approach does not seem scientifically valid or legally sound. The SDAB and the SCAB are under the jurisdiction of different air pollution control districts, each having its own standards and rules, for construction emissions.

Although it is alleged that the SDAPCD "does not have any established thresholds of significance for consideration under CEQA " (4.4.5.2 Significance Criteria p, 4.4-13), it is stated elsewhere in the PEIR that "[t]he SCAQMD and the SDAPCD are responsible agencies for the CEQA review of the potential air quality impacts of the proposed project. Each agency provides: (1) rules and guidelines that project applicants should follow to determine the level of analysis required (2) methodologies that should be applied to quantify project-related air emissions, and (3) thresholds of significance to help determine if a proposed project would have a significant impact

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A7. See response to comment A3 above.

A8. The SCAQMD and SDAPCD have regulatory/permitting jurisdiction over stationary sources of air emissions in their respective air basins. They have adopted air quality regulations that apply to stationary sources of emissions (this would include mobile equipment used on-site at a stationary facility, e g. trucks, loaders etc.). The air districts do not regulate most mobile sources (transportation vehicles and mobile construction equipment), except where these sources are operated as a stationary source (such as a tugboat that is idling or a crane loading or unloading material in one location). The SDAPCD was consulted early in the process to gather their recommendations for the CEQA evaluation. Where the SDAPCD does not have permitting authority over project activities, the agency does not provide thresholds of significance to use in evaluating projects under CEQA. SCAQMD, on the other hand, does provide a CEQA Air Quality Handbook that

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on air quality" (4.4.4 Applicable Regulations, p. 4.4-10, par. 2). (Emphasis added.)

Later in the same section, it is stated that "emissions from idling engines working cranes and equipment on the tugboat and barges used to load and unload reef material are regulated under the visible emissions, nuisance, PM_{10} and fugitive dust rules for each district (4.4.4 Applicable Regulations, p. 4.4-10, par. 3). (Emphasis added.) The rules affecting construction emissions for each district are summarized in Table 4.4-5 (p. 4.4-11).

It is unfair to apply the more stringent air quality standards of Los Angeles to suppliers in the San Diego area. It was stated at the recent public hearing that this was done to make things "more fair," but no other impact analysis in the PEIR, such as traffic or noise, was done this way. In an effort to make things more fair, the PEIR has done just the opposite, while at the same time abandoning science and ignoring the jurisdictional boundaries of regulatory agencies.

- *Air Emissions Among Basins* (par. 1, line 6): The impact evaluation contained in this PEIR does not consider shifting emissions among the basins to be an appropriate way to mitigate impacts. Accordingly, the impact evaluation considers the SCAB and the SDAB as a single, combined planning area and uses the SCAQMD thresholds for significance

A9. The project is located within the SCAB and all emissions from construction of the reef related to off-loading and placement of materials (by crane or track loader) and monitoring would occur within the SCAB. If recycled concrete is obtained from

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provides guidelines to other lead agencies on how to evaluate air quality impacts. The SDAPCD staff member we met with recommended using the SCAQMD CEQA guidelines for evaluating the project related activities in the San Diego Air Basin (Arthur Carbanero, SDAPCD, June 19, 1998)

For the artificial reef project, the PEIR evaluated air quality impacts in the San Diego Air Basin for construction related activities including: 1) hauling material by truck from the rock or concrete brokers to the port, 2) loading materials onto barges, 3) transporting materials to the project site or alternative sites, and 4) unloading materials at alternative sites. As discussed above, the SCAQMD and the SDAPCD generally do not regulate or permit mobile sources and SDAPCD does not provide thresholds of significance for CEQA analysis where they do not have permitting authority. The air districts would only issue permits for stationary activities involving operating cranes and idling tugboats during loading and unloading of materials if the contractor did not have an active permit in place for the equipment (these permits are normally issued for a year at a time). Since the project proponents have not determined who their construction contractors will be, it is unclear whether either air district would issue any permits and as a result whether they would actually be a responsible agency for this project. The language in Section 4.4.4 has been modified to make this clear. SDAPCD did not submit any comments on the Draft PEIR and Arthur Carbanero informed us that they do not comment on CEQA documents where they do not clearly have a permitting role.

A9. The air quality thresholds of significance and the proposed mitigation measures included in the PEIR are not intended to penalize suppliers in the San Diego area, but to present a conservative analysis of air quality impacts within the Southern

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suppliers in Los Angeles and shipped from the Ports of Los Angeles or Long Beach and quarry rock is obtained from Catalina Island then all loading, hauling, storing, re-loading and shipping activities would also occur within the SCAB.

If rock and concrete for the project were obtained in San Diego, the emissions from construction activities, and the majority of emissions from tug operations, would occur entirely within the SDAB. According to Tables 4.4-3 and 4.4-4 (page 4.4-9), overall air quality in the SDAB is significantly better than air quality in the SCAB. In fact, the SCAB is the only extreme non-attainment area for ozone in the United States. The cumulative impacts of air emissions from the project, therefore, would be less significant in the SDAB than they would be in the SCAB.

Although it may not be appropriate to consider splitting emissions as "mitigation", it cannot be disputed as a matter of science that distributing the activities and emissions between the air basins would significantly reduce impacts on the SCAB.

It is unfair to apply the more stringent air quality standards of Los Angeles to suppliers in the San Diego area. It was stated at the recent public hearing that this was done to make things "more fair, " but no other impact analysis in the PEIR, such as traffic or noise, was done this way. In an effort to make things more fair, the PEIR has done just the opposite, while at the same time abandoning science and ignoring jurisdictional boundaries of regulatory agencies.

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California region and different ways of mitigating these impacts The approach in the PEIR was based on the premise that it is not appropriate to create a preference for polluting in either basin. Given the nature of the construction activities and the fact that much of the activity occurs offshore, most of the NOx air emissions are regional in nature. This makes it difficult to easily divide emissions between air basins. Emissions do not stop traveling at the county borders when tugboats are traveling offshore and across county lines. Because the San Clemente site is adjacent to the northern San Diego County line, emissions generated in Los Angeles and Orange counties from tugboats traveling to the site and at the site during unloading activities may also travel into San Diego County. Depending on the prevailing winds it is also possible that emissions from San Diego County would travel into Orange County. Both air basins are in non-attainment for State and federal ozone standards (NOx is a precursor to ozone), and as the PEIR states, the SCAB is also in extreme non-attainment for federal ozone standards.

The majority of the PM_{10} emissions are more localized due to the trucking of materials, as with the traffic and noise impacts. However, both air districts are in non-attainment with State PM_{10} standards and increased PM_{10} emissions from the project are considered significant impacts that must be mitigated in either case. As described above, SDAPCD does not provide recommendations for thresholds of significance on mobile sources. As a conservative analysis, the impacts were evaluated using the SCAQMD recommended thresholds for significance.

The project proponents will have the ability to select from a number of different mitigation measures to reduce significant impacts associated with the experimental reef project to a less-than-significant level. This does not necessarily mean they have to select a contractor in Los Angeles/Long Beach. The document

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4 4.5.3 Reef Construction Assumptions

- *General Assumptions*

1. All quarry rock and recycled concrete are obtained from the San Diego area within 20 miles of the Port of San Diego...

A10. Nelson and Sloan's quarry and recycled concrete yard are located within 8 miles of the Port of San Diego's 24th Street Terminal. Port of San Diego is 10 miles farther from the lease area than the Ports of Los Angeles/Long Beach and 11 miles farther than Catalina Island,

A11. It is not stated whether the distance from the ports to the project site (sometimes referred to the lease area) is measured from the northern, southern or mid-points of the site. The point from which the distance is measured is significant because the site is 2.5 miles long and because, according to figure 3-4 "Experimental Reef Site Map", (no page number), most of the construction work will occur in the southern end of the lease area. Depending on where the distance between apart and the project site is measured, Catalina Island may not be the closest port to the site where the construction work will occur. Also for ease of reference, the distance should be described as from port to project site or from port to lease area, but the terms "project site" and "lease area" should not be used interchangeably since the project site encompasses only part of the lease area.

In addition, the rock in the San Diego area requires hauling by truck to the port, where the Catalina rock can be loaded directly onto the barges.

A12. This may not be an accurate statement. I am informed that the Catalina Island quarries use large, diesel-powered trucks,

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simply presents one scenario to demonstrate how significant impacts can be reduced to a less-than-significant level.

A10. See response to comment A4 above.

A11. See response to comment A1 above.

A12. See response to comment A3 above.

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known as "Euclids," to transport rock from the quarry to the dock. The emissions from these vehicles should be calculated and included in the air quality analysis for this source.	
• *Assumptions of Construction Components* 1. Truck Loading, Truck Hauling, and Barge Loading - The estimated daily and quarterly air emissions are calculated based on the following: • a total of 91 truck loads per day would occur to fill one barge per day;	
A13. It may not be possible to get 91 truck loads per day to the Ports of Los Angeles/Long Beach given the 9:00 a.m. to 4:00 p.m. time constraint deemed necessary to mitigate for impacts to traffic in the Los Angeles area. • a maximum forty miles round trip is assumed for each of the 91 truck loads, which is within range of several concrete brokers and rock quarries in the San Diego area;	**A13.** It is true that the 91 trucks a day schedule may not be feasible depending on the restrictions imposed by air quality, transportation, and noise mitigation measures. This will be determined once a contractor is selected and the specific mitigation measures are selected and applied.
A14. Nelson and Sloan's quarry and recycled concrete yard are located within 8 miles of the Port of San Diego's 24th Street Terminal. The decrease in mileage from the assumed distance would significantly reduce air emissions from trucking activities in San Diego. Also, Nelson and Sloan trucks are already hauling rock and concrete to the 24th Street Terminal on a regular basis. This should be factored into the impact analysis for emissions from Nelson and Sloan as a supplier of reef material for the project. 2. Worker Commuting - This includes consideration of daily and quarterly emissions produced by vehicles used by workers to	**A14.** The assumptions and analyses in the PEIR assume a worst-case or maximum impact scenario. Once a construction contractor has been selected, it is possible that the actual distance for truck hauling will be less than assumed and the number of trips per day may change. Mitigation measures have been developed to reduce significant impacts associated with the worst-case scenario to a less-than-significant level. The amount of mitigation required may be less once the specific construction details are identified.

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commute to the project job sites in the San Diego area and San Clemente.

- 25 workers would travel 25 miles per day, on average, to commute to and from work for the experimental reef, while there would be 35 workers for the mitigation reef.

A15. The PEIR does not mention the fact that commuting by project workers in the San Diego area would be preferable to the same workers commuting in the Los Angeles area in terms of air emissions and traffic impacts. From the data contained in the PEIR it would seem that emissions and traffic from the project should take place in the SDAB instead of the SCAB to the extent possible.

4.4.5.4 Daily and Quarterly Air Emissions

Table 4.4-8 EXPERIMENTAL AND MITIGATION REEFS
Daily Truck and Barge Loading Emissions (p. 4.4-18)

A16. Footnote 1, regarding truck loading emission factors for San Diego, assumes a 15.34 hour service day using 5 trucks to load one barge per day. This would not be an accurate assumption for Los Angeles because it would not be possible to operate a truck to/from the Ports of Los Angeles/Long Beach for 15.34 hours per day given the 9:00 a.m. to 4:00 p.m. time constraint deemed necessary to mitigate for impacts to traffic in the Los Angeles area. Accordingly, emissions and traffic from trucking activities in Los Angeles would be greater because it would be necessary to use more than 5 trucks per day to fill one barge per day. To reduce impacts from emissions and traffic related to trucking activities in Los Angeles, suppliers of reef material would have to take more days to fill the barges, thereby increasing the cost and length of time needed for construction of

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A15. See responses to comments A8 and A9 above.

A16. As discussed in responses A13 and A14 above, once the contractor is selected many of these assumptions may change, which will be reflected in the adopted mitigation monitoring plan.

Comments

the reefs.

- *Mitigation Reef Emissions*

Par, 1, line 5: For a 133.2 acres of construction, 755,910 tons of rock and 173,160 tons of concrete would be needed. This would require 378 days and 87 days respectively to complete the reef. A 300-acre reef would require 1,702,500 tons of rock and 851 days to construct or 390,000 tons of concrete and 195 days to construct.

A17. If it could take up to four times the material and number of years[i] to construct the mitigation reef from rock as compared to concrete, this should be considered an unacceptable disparity in view of the additional emissions, traffic, interference with fishing activities and other adverse impacts that would result from using rock instead of concrete.

Also, concrete should be preferred over rock because rock is a natural resource whereas concrete is recycled. Using concrete as reef material saves landfill space and avoids impacts from landfill operations, such as air emissions and truck traffic. These factors, as well as the emissions from blasting and other rock extraction activities, should be factored into the impact analysis. The overall increase in impacts due to reef construction using rock should be deemed sufficient grounds upon which to revise SEC's mitigation program, removing quarry rock from consideration as reef material for either phase.

4.4.5.4 Recommended Mitigation Measures

(The comments set forth above should be taken into consideration in revising the proposed changes in construction activities and other recommended mitigation measures.)

Responses

A17. See response to comment A5 above.

Comments

4 5.1 1 Ground Transportation

"*San Diego Area.* Primary regional transportation routes likely to be used for project related travel in the San Diego area include Interstate 5 (I-5), Interstate 805 (I 805) and State Route 905 ... San Diego area streets likely to be used for project materials hauling include Otay Valley Road/Main Street, Heritage Road, Otay Mesa Road, 24th Street and Tidelands Avenue."

A18. Nelson and Sloan would use the following route from it's facility to the Port of San Diego: Otay Valley Road (west) to I 805 (north) to SR 54 (west) to 1-5 (north) to 24th Street off-ramp (west) to Tidelands Avenue (south) to R.E. Staite entrance.

- *Existing Traffic Volume and Level of Service Conditions*

San Diego Area. During the p.m. peak hours, all but three of the San Diego area study intersections operate at acceptable of better levels of service: Heritage Road and Otay Mesa Road; Main Street and the 1-5 northbound ramps; and 24th Street and the 1-5 southbound ramps. Most of the freeway facilities operate at acceptable or better levels of service during a.m. and p.m. peak hours. Exceptions to this include the northbound segment of 1-5 from Palm Avenue to 24th Street during a.m. peak hours and the same segment of 1-5 southbound during the p.m. peak hours.

Nelson and Sloan would use the following route from it's facility to the Port of San Diego: Otay Valley Road (west) to I 805 (north) to SR 54 (west) to 1-5 (north) to 24th Street off-ramp (west) to Tidelands Avenue (South) to R.E. Staite entrance.

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A18. As discussed in responses A13 and A14 above, once the contractor is selected many of these assumptions may change, which will be reflected in the adopted mitigation monitoring plan.

Comments	**Responses**
4.5.1.3 Project-Related Traffic and Materials Transport Routes • *Quarry Rock Transport* Quarry rock for the reef would originate either at a Catalina Island quarry or from an inland quarry in the San Diego Region. Quarry rock from Catalina Island would not required (sic) trucking, as the quarries are located next to the barge loading facilities...	
A19. This may not be an accurate statement. I am informed that the Catalina Island quarries use large, diesel-powered trucks, known as "Euclids," to transport rock from the quarry to the dock. The emissions from these vehicles should be calculated and included in the air quality analysis for this source.	**A19.** See response to comment A3 above.
4.5.2.1 Methodology • *Haul Traffic Trips* Construction-related truck trips were calculated using the values outlined in the Project Description. For both the experimental reef and mitigation reef, 91 truckloads would be conveyed per day. This equates to about 12 truckloads per hour...	
A20. This may not be an accurate assumption for Los Angeles because it may not be possible to operate 12 trucks per hour to from the Ports of Los Angeles/Long Beach, even during the 9:00 a.m. to 4:00 p.m. time period deemed necessary to mitigate for impacts to traffic in the Los Angeles area. Accordingly, emissions and traffic from trucking activities in Los Angeles would be greater because it would be necessary to use more trucks per day to fill one barge per day. To reduce impacts from	**A20.** As discussed in responses A13 and A14 above, once the contractor is selected many of these assumptions may change, which will be reflected in the adopted mitigation monitoring plan.

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emissions and traffic related to trucking activities in Los Angeles, suppliers of reef material would have to take more days to fill the barges, thereby increasing the cost and length of time needed for construction of the reefs.

Since Nelson and Sloan is only 8 miles from the Port of San Diego, this significantly reduces any impacts to air quality and traffic from hauling activities in San Diego.

4.5.2.3 Roadway Conditions with Project-Related Traffic

- *Experimental Reef Construction*

Freeway Operations

San Diego Area. With the exception of a.m. peak hour traffic on northbound 1-5 between Palm Avenue and 24th Street and p.m., peak hour traffic on the same segment of southbound 1-5, all project study area freeways considered are currently operating at acceptable or better levels of service. As indicated in Table 4.5-5, the addition of experimental reef construction traffic would alter the level of service during the a.m. peak hour on northbound 1-5 between L and J Streets from LOS E to LOS F. This exacerbation of an existing deficiency on I-5 is considered a significant impact.

A21. As indicated above, Nelson and Sloan would only use I-5 from SR 54 to the 24th Street off-ramp (a distance of 1.1 miles) to reach the Port of San Diego. This would be not be a significant impact on freeway traffic from hauling activities. Accordingly, there would be no need to mitigate by restricting truck trips to off-peak travel hours. Nelson and Sloan trucks could operate from 5:00 a.m. to 7:00 p.m., six days per week, if necessary.

Responses

A21. See response to comment A14 above.

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Responses

- *Mitigation Reef Construction*

Freeway Operations

San Diego Area. With the exception of a.m. peak hour traffic on northbound I-5 between Palm Avenue and 24th Street and p.m. peak hour traffic on the same segment of southbound I-5, all project study area freeways considered are currently operating at acceptable or better levels of service. As indicated in Table 4.5-5, the addition of experimental reef construction traffic would alter the level of service during the a.m. peak hour on northbound I-5 between L and J Streets from LOS E to LOS F. This exacerbation of an existing deficiency on I-5 is considered a significant impact.

A22. As indicated above, Nelson and Sloan would only use I-5 from SR 54 to the 24th Street off-ramp (a distance of 1.1 miles) to reach the Port of San Diego. This would be not be a significant impact on freeway traffic from hauling activities. Accordingly, there would be no need to mitigate by restricting truck trips to off-peak travel hours. Nelson and Sloan trucks could operate from 5:00 a.m. to 7:00 p.m., six days per week, if necessary.

A22. See response to comment A14 above.

4.6.8.1 Reef Construction

- *Derrick Barge*

The derrick barge used to place the reef material at the lease site would be held in place with a system of six anchors that are moved and adjusted by tightening and loosening winches, with the assistance of an attending boat. The anchors would inevitably drag along the bottom, destroying sand bottom habitat and biota in the process. The

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anchors could also disturb some existing hard substrate habitat and biota...	
A23. If it could take up to eight times as long to construct the mitigation reef from rock as compared to concrete (see section 4.2.2.5), this should be considered an unacceptable disparity in view of the destruction of habitat and biota, additional emissions, traffic, interference with fishing and other adverse impacts that would result from using rock instead of concrete. If concrete is used for the mitigation reef, the construction period and, therefore, impacts to habitat and biota, would be significantly reduced. The overall increase in impacts should be deemed sufficient grounds upon which to revise SEC's mitigation program, removing quarry rock from consideration as reef material for either phase.	**A23.** Impacts related to emissions, traffic and interference with fishing have been addressed in the responses to previous comments in this letter (see above). The destruction of habitat and biota of the sand bottom community due to anchors dragging along the bottom is considered to be a less-than-significant impact even under the worst-case conditions (see Section 4.6.8 in the PEIR). Also see response to comment A5 above.
• *Suspended Sediments*	
The construction of the experimental reef and mitigation reef could affect the levels of suspended sediments and the turbidity of the water in the lease site...	
A24. If it could take up to eight times as long to construct the mitigation reef from rock as compared to concrete (see section 4.2.2.5), this should be considered an unacceptable disparity in view of the increased levels of turbidity and suspended sediments, destruction of habitat and biota, additional emissions, traffic, interference with fishing and other adverse impacts that would result from using rock instead of concrete. If concrete is used for the mitigation reef, the construction period and, therefore, impacts to habitat and biota, would be significantly reduced. The overall increase in impacts should be deemed sufficient grounds upon which to revise SCE's mitigation program, removing quarry rock from consideration	**A24.** Impacts related to emissions, traffic, interference with fishing and destruction of habitat and biota have been addressed in the responses to previous comments in this letter (see above) The effects of the project on suspended sediments and turbidity of the water in the project site is considered to be a less-than-significant impact even under the worst-case conditions (see Section 4 6 8 in the PEIR). Also see response to comment A5 above and response to comment F29 in the letter from the League for Coastal Protection.

Comments

as reef material for either phase.

4.14.2.4 Turbidity

A25. If it could take up to eight times as long to construct the mitigation reef from rock as compared to concrete (see section 4.2.2.5), this should be considered an unacceptable disparity in view of the increased levels of turbidity and suspended sediments, destruction of habitat and biota, additional emissions, traffic, interference with fishing and other adverse impacts that would result from using rock instead of concrete. If concrete is used for the mitigation reef, the construction period and, therefore, impacts to habitat and biota, would be significantly reduced. The overall increase in impacts should be deemed sufficient grounds upon which to revise SEC's mitigation program, removing quarry rock from consideration as reef material for either phase.

Throughout the PEIR there is a high concern for air quality and timeliness of construction. Based on the above comments, I would submit that San Diego is actually the best source of reef materials, rather than the probable worst-case scenario as concluded in the PEIR.

Please feel free to call me if you have any questions or if you require any additional information about Nelson and Sloan. Thank you for the opportunity to submit these comments.

Sincerely,
Steven Aceti, J,D.

c: Resource Insights (via fax) (916) 921-1977

Responses

A25. See response to comment A24 above.

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1 Elsewhere in the PEIR, it is mentions that it could take up to eight times longer to construct the mitigation reef from quarry rock as compared to concrete (See, e g., sections 4 2 2 5 and 4.11.2 4)

Comments

American Sportfishing Association
Conservation Network

December 21, 1998

Ms. Mary Griggs
California State Lands Commission
Division of Environmental Planning and Management
Sacramento, CA 95825-8202

Re: The need to emphasize testing the effect of location during the experimental phase of the artificial reef component of the SONGS mitigation

Dear Ms. Griggs:

We continue to be concerned that at the end of the 5 year experiment, the California Coastal Commission (the Commission) still will not know how to invest the reef mitigation funds, and that little useful mitigation will have been accomplished.

B1. It is improbable that the current 17 acre experiment will demonstrate a method of meeting condition C, specified in 1991, because the San Clemente site may be a poor choice for growing sustained kelp and because kelp beds along the mainland coast of southern California generally do not persist. Water temperature and storm damage may have played a greater role than SONGS, in the changes in the San Onofre kelp bed.

Responses

B1. While there is always a risk that kelp may not do as well at the San Clemente site as compared to some other site, results of geological and biological surveys conducted by SCE contractors suggest that San Clemente is a good site for kelp. Information obtained from these surveys indicates that kelp frequently occurs on emergent rock in the San Clemente region. Repeated marine geological surveys conducted since the 1980s show that areas without persistent kelp in the project site generally lack emergent hard substrate. These observations suggest that giant kelp is likely to persist at the San Clemente site if persistent emergent hard substrate is provided. However, in response to this and related comments concerning the risk associated with conducting the experiment at the San Clemente site, two separate plans were

Comments

Responses

considered to reduce this risk. One plan was to expand the experimental reef to include a site at South Carlsbad and the other was to add kelp transplanting treatments to the experiment The plan to expand the experimental reef to include a site at South Carlsbad was rejected because, as explained in the Final PEIR Introduction, information from sonar surveys conducted in March 1999 along the coast of Carlsbad indicated that substrate conditions in this area do not meet the sand depth criteria for artificial reef construction. However, as described in the Final PEIR Introduction, the plan to add kelp transplanting treatments was accepted. The Mission Beach site is no longer being considered for the experimental phase of the project because of its great distance from the San Onofre Kelp bed, the site of the impacts that are being mitigated. Also, please see responses K1 and K2 in the San Diego Oceans Foundation's first comment letter.

B2. There is little or no scientific justification for believing that quarry rock provides a better substrate for kelp than does concrete. In contrast, there is reason to believe that concrete provides a better, more practical, and environmentally friendly substrate. These include:

B2. There are no scientific data allowing one to conclude that quarry rock or slab concrete is the superior substrate for obtaining the project objective ("to provide adequate conditions for a community of reef associated biota similar in composition, diversity, and abundance to the San Onofre Kelp bed") It stands to reason that a reef designed to resemble the physical characteristics of SOK has a better chance of compensating for the lost resources than does a reef having physical characteristics that are very different from SOK. This reasoning is the basis for the CCC requirement that quarry rock be used to build the mitigation reef; quarry rock resembles the cobble/boulder substrate at SOK more closely than concrete slabs or other types of reef materials (e.g. tires, cars, reef balls, etc). The reason for the experiment is to test whether project built from recycled concrete performs as well as a reef built from quarry rock. The question remains as to which of these materials will better meet the objectives and this is the reason that both materials are being

Comments

B3. Kelp has been persistent at the Mission Beach concrete reef for the last 7 years. This is the only successful artificial kelp reef comparable to the planned mitigation reef. In contrast, although the quarry rock reefs at Pitas point, Topanga beach, and Carlsbad were designed to support kelp, they have demonstrated less success than the Mission beach reef Only the gavel filled bags at Pitas Point supported sustained kelp. The location is relatively protected by the Channel Islands and the substrate is unlike that being considered for mitigation. Other artificial reefs, both quarry rock and concrete are not at suitable depths or locations for growing kelp.

Responses

tested in the experiment.

B3. Determining the persistence of kelp on an artificial reef and the reef's performance with respect to resource enhancement is problematic because artificial reefs in southern California are not routinely monitored. Mission Beach Artificial Reef (MBAR) is no different in this regard. Quantitative surveys of MBAR were done only in 1997 and 1998. The results of these surveys (done by SCE contractors) give some reasons to doubt whether a reef constructed of recycled concrete slabs will meet the performance criteria required of the SONGS mitigation reef. The greatest concern is the finding that densities of benthic invertebrates on MBAR were generally 1 to 3 orders of magnitude less than in the San Onofre Kelp bed. While giant kelp was present on MBAR, it met the SONGS performance criteria (> 4 plants per m^2) in only one of the two years and only in areas where the coverage of concrete > 60 %. Because no data were taken on fish, the degree to which the reef supports kelp bed fish populations remains unknown. There are no other comparable concrete reefs on which to base such evaluations.

Anecdotal information tells us that populations of giant kelp can also persist on reefs built of quarry rock. For example, kelp has been relatively persistent on quarry rock at the Pitas Point Reef since the reef was built. (B. Harger, personal communication). Gravel-filled bags were never a part of Pitas Point Reef, but were used as a substrate to anchor kelp on a test farm off Ellwood near Santa Barbara. Also, relatively persistent populations of giant kelp have been growing on quarry rock adjacent to the quarry at Catalina Island (J. Engle personal communication) and on quarry rock placed in the sand to anchor the municipal outfall off Goleta, California (D. Reed personal communication).

Comments	Responses
B4. Concrete provides a more reliable substrate because it is less likely to sink into the sand than is the denser quarry rock.	**B4.** There is no scientific evidence that concrete is less likely than quarry rock to sink in sand. To the contrary, the mass densities of the quarry rock and recycled concrete evaluated for this project do not differ appreciably (1.42–2.72 vs. 2 04–2.48 for quarry rock and concrete, respectively). The degree to which the shape of the reef material influences its sinking rate in sand has never been evaluated. The shape of the materials will be one of the factors evaluated during the experimental reef monitoring.
B5. Many good reasons to prefer concrete over quarry rock were provided at the December 10 meeting including the advantage of using surplus concrete, much of which would otherwise be destined for landfills, over quarry rock which diminishes natural habitat such as Catalina island.	**B5.** This point has been noted in the PEIR.
B6. The report failed to consider the air pollution avoided by not trucking concrete to landfills or other sites. Concrete also provides great advantage in substrate area provided/ ton of material used. This has added value considering the EIR's emphasis on the need to minimize air pollution. Most involved scientists emphasize the important relationship of location with respect to kelp success. The proposed inclusion of an experimental module near the San Mateo Rocks does not provide a sufficient understanding of the San Clemente site. There is also a need to develop a better understanding of other locations. We suggest the following experimental design which requires little (or no) quarry rock, provides a more useful test of the location effect and does so with less environmental degradation:	**B6.** The air quality analysis in the PEIR takes into account the direct and indirect air quality impacts associated with the construction of the artificial reef. This approach is required under CEQA, the CEQA Guidelines and CEQA case law, see *Kings County Farm Bureau et al v. City of Hanford* (5th Dist. 1990) 221 Cal App 3d 692 [270 Cal.Rptr. 650]. Local air districts do not issue permits for the operation of mobile air emission sources such as for commercial trucks hauling materials or tugboats while under way. The California Air Resources Board regulates mobile sources to some degree through engine performance standards and the types of fuels allowed. Under CEQA, impacts must be analyzed for activities once they are specifically related to the proposed project. For the SONGS artificial reef this analysis begins once construction materials have been purchased and are being delivered to the project site. It is true that recycled concrete may be crushed, sold and trucked to other users, or sent to a landfill However, the air emission impacts from these activities would be evaluated and mitigated in other CEQA reviews. For example, a major demolition would require permitting and CEQA review

Comments

Responses

where these same evaluations would take place.

It may be possible to establish some baseline emissions associated with the ongoing operations of contractors for the project. However, the project proponent has not yet identified the specific contractors and sources of materials that will be used for the construction of the experimental reef. As a conservative approach, the PEIR has evaluated the worst-case air quality impacts by attributing all emissions to the project. Once the contractors have been selected and the specific operations can be evaluated, it may be possible to identify "incremental" emissions attributable to the project and to reduce the amount of mitigation required. This would most likely require certain verifications and conditions in the contracts with suppliers regarding their operations.

B7. Each complete experiment could include 18 replicate modules consisting of 6 replicates of each of 3 treatment blocks. Each block tests 3 treatments and will contain 3 modules with approximately 17, 33, and 67% density (coverage) of recycled concrete. The first experiment should be located in the vicinity of the currently proposed experiment including the 2 additional blocks of treatments near the San Mateo rocks. Two additional pairs of blocks of treatments should be evaluated at locations between the first experimental site and the 2 blocks near the San Mateo rocks. These complete and partial experiments consisting of 36 modules will provide a more complete understanding of the suitability of the San Clemente site for the mitigation. Otherwise the proposed experiment might succeed and the mitigation reef fail due to location effects within the area proposed for the mitigation reef. There is evidence that the northern portion of the proposed site may not support kelp. The San Clemente experimental reefs will cover approximately 14.4 acres (6 modules/ treatment block x 6 blocks+2 treatment blocks +2

B7. The spatial arrangement of the experimental blocks within the 356-acre project site in the proposed project has been changed to provide more information on location effects within the San Clemente site. The blocks will now be placed fairly evenly throughout the project site.

Comments

treatment blocks x2 additional locations).

Comparisons of low relief substrates at depths appropriate for supporting kelp were unable to identify a single or set of structural elements which explained why some reefs supported relatively persistent kelp and others did not. Location appears to be much more important than structure, therefore the experiment should be replicated at other locations. The Carlsbad and Mission beach sites would be suitable. These two experimental replicates will cover a total of approximately 14.4 acres (6 treatment blocks x 2 sites x0.4 acres/block)

B8. The information provided by the additional sites will enable the Commission to better locate the mitigation reef with respect to kelp success and distance from SONGS.

The experimental results may indicate that only a portion of the San Mateo site is appropriate for the mitigation reef, yet substantially better success is likely at other sites. The Commission may decide that the public is best served by building part of the mitigation at one or both of the other sites.

B9. If the Commission feels compelled to test the relative efficacy of quarry rock, they can do so at less than 1/3 the environmental cost of the quarry rock component of the proposed experiment. There is no reason that the contrast would be affected by either density or location, therefore the experiment should be conducted at the Mission beach site which is the only proposed artificial reef site which has been proven to support kelp. This component of the experiment would require up to 6 replicates at a single density covering up to 2.4 acres.

As indicated in the draft EIR, the additional sites are closer to San Diego, so the environmental costs of delivering concrete (and

Responses

B8. Please see response to comment B1 above.

B9. There are many unknowns with regards to how the coverage of hard substrate affects subsidence and burial in sand and the degree to which these processes vary from site to site. It is difficult to resolve these issues unless both rock and concrete are tested at different levels of coverage, preferably at all potential sites Unfortunately, replicating the balanced experiment planned for San Clemente in its entirety at other sites would significantly increase the environmental impacts and the costs of the project, but would provide SCE no more assurance of receiving mitigation credit (mitigation credit towards the 150 acres will be assigned only for those test modules that meet the performance standards) As discussed in the Final PEIR Introduction, consideration was

Comments

possibly a small amount of quarry rock) will be less that for the San Mateo site. If necessary, quarry rock can be barged from a location near and south of Mission beach, possibly from Baja California.

The Commission has indicated a desire to mitigate for any damage caused by SONGS to the adjacent cobble founded kelp reef habitat by requiring SCE to create a reef that closely mimics the damaged habitat. However, it is not possible to do so because the San Onofre site is not considered suitable and the creation of a cobble founded reef is not practical. The Commission has decided to accept out of kind mitigation at a different site and founded on non cobble substrate. The benthic communities are likely to differ from those at the San Onofre. The Commission also indicated a desire to have the mitigation reef built ASAP. After the experiment, the Commission is going to be asked to recommend the out of kind mitigation compromise which will provide the greatest public benefit consistent with the Coastal act. The alternative experiment outlined above will create up to 31.2 acres of new substrate suitable for growing kelp. It will provide the Commission with more relevant information than does the project under review, and it would create more habitat and produce less air pollution in the process.

Recycled concrete has become the material of choice for those of us involved in creating artificial reefs. It has provided for a constructive alliance between the businesses supplying the surplus materials and marine conservation organizations building the reefs. The knowledge gained from the concrete portion of the experiment will be of greatest relevance for the design of future reefs. "LET'S ENHANCE THE RESOURCE WHILE SEARCHING FOR THE BEST DESIGN FOR HABITAT ENHANCEMENT."

A balance should be achieved between the value of providing the desired coverage and the costs, both environmental and financial,

Responses

given to expanding the experiment to South Carlsbad, but it was found that the site does not have the appropriate sand depth characteristics. The other sites are not longer considered feasible for the experimental project.

Comments

required to obtain that coverage. The lack of precision can be compensated for during the process of evaluating the experiment. Also, there is little point in a detailed evaluation of the benthic communities. They can be expected to differ from those of the San Onofre kelp, yet they will be consistent with the substrate and location of the proposed experiment. We are available to substantiate our statements and clarify our suggested experiments. Also, the National Institute for Coastal Ecology (NICE) has been founded by the UCLA Office of Research. Its mission is consistent with helping to insure that the project has the best chance of success by convening a management and oversight panel of experts drawn from southern California colleges and universities.

Sincerely,
Daniel Frumkes
(for the UASC/ASA Conservation Coordinating Committee)

Responses

Comments

California Lobster & Trap Fishermen's Association

December 17, 1998

Mary Griggs
California State Lands Commission
Division of Environment Planning & Management
100 Howe Ave., Suite 100-S
Sacramento, CA 95825-2202

Re: Song's Mitigation Project
San Onofre (Dana Point Area)

Dear Ms. Griggs:

C1. The California Lobster & Trap Fishermen's Association is concerned with the placement of the proposed Song's reef for the San Onofre, Dana Point area. The Association would like to recommend Mr. Ken Nielsen as the representative for the commercial fishermen of the impacted area. Mr. Nielsen has a solid foundation of the needs and concerns of the commercial fishermen, as well as knowledge of the scientific concerns. Mr. Nielsen has operated a marine research company out of Dana Point for years, doing much of the research work in the San Onofre area. Mr. Nielsen would be a good liaison between fishermen and the parties involved with this project. His local knowledge of the area would be a valuable tool for the success of this project. Thank you for your consideration of this suggestion.

Sincerely,
John Guth, President

Responses

C1. Thank you for designating Ken Nielsen as the liaison to represent your organization. As stated in the PEIR mitigation measures (see Section 4.2.2.6), local fishermen in the San Clemente/Dana Point area will be consulted on two occasions. during preconstruction surveys to identify existing hard substrate and proven fishing grounds, and two weeks prior to the onset of construction activities for the experimental reef at the San Clemente site. Mr. Nielsen will be contacted for implementation of these measures.

Comments

Responses

Coastal Marine Technology
713 S. Kerunore St.
Anaheim, Califomia 92804
(714) 236 9131

December 21, 1998

California State Lands Commission
Division of Environmental Planning and Management
100 Howe Ave., Suite 100 South
Sacramento, California 95825-8202

Subject: Comments from Program Environmental Impact Report for the Construction and
Management of an Artificial Reef in the Pacific Ocean near San Clemente, California

Introduction

Coastal Marine Technology (CMT) is a relatively new organization presently operating under the Algalita Marine Research Foundation (ANIRF). The AMRF is a non-profit organization dedicated to the protection and restoration of ocean, coastal and near shore ecosystems. AMRF also provides services utilizing the 50 foot ORV Alguita. ANIRF provided funding for the Kelp Reforestation Project (KRP), an ongoing project, being worked on by the advanced diving class of the North Orange County Regional Occupations Program (NOCROP)/Aquatic Marine Diver Occupation (AMDO).

Coastal Marine Technology is co-founded by Gordon Lehman, President, and Cliff Noland, Vice President. Both are active SCUBA Instructors for the AMDO. Gordon Lehman is founder, Project Coordinator and engineer of the KRP for NOCROP and a board member of the AMRF. Cliff Noland is Technical Staff Leader of the

Comments	Responses
KRP. The Mission of CMT is to actively participate in working with projects for involved in the restoration of the California Giant Kelp (Macrocystis Pyrifera) along the Southern California Bight coast line. CMT provides services for kelp restoration through sporing, transplanting and protection against kelp predators. CNIT also works with the training AMDO of students in studying and working with kelp and the restoration process.	
PEIR Comments	
D1. The reef construction and material is not of significant importance to the growth of kelp. California Giant Kelp (Macrocystis Pyrifera) will attach to either of the substrates presented, concrete or quarry rock. Kelp grows in abundance at the quarry rock dive site at Catalina Island and on the concrete dump site reef of Mission Bay in San Diego. The main goal should be the recruitment and growth of kelp on the reef and the establishment of a self-sustaining kelp bed. This should be done in a timely and economical manner.	**D1.** Reefs built from quarry rock and recycled concrete differ in more than just substrate type. In particular, reef topography can also differ drastically between reefs built of concrete and rock and topography can greatly influence species composition and abundance. Currently, there are no quantitative data comparing the establishment and persistence of giant kelp and its associated biota (algae, fish, and invertebrates) on concrete and quarry rock reefs. Consequently, it is uncertain which of these two reef materials will best meet the objectives of the project. The proposed experiment will be the first to provide such data, which according to Dennis Bedford, the head of the California Department of Fish and Game's Artificial Reef Division, will be extremely useful to his agency in the planning of future artificial reefs.
D2. The plan calls for natural recruitment on the new substrate. This is of major concern. Why is natural recruitment expected to take place on the test reef when it isn't taking place on the existing reef? In fact, the surrounding kelp beds have been in a declining trend with increased sea urchin populations, which will hinder natural recruitment even further! Natural recruitment alone is of high risk to the project. National recruitment is influenced by conditions such as, water temperature, nutrient levels, up welling, prevailing currents, El	**D2.** It is true that kelp recruitment on natural reefs has been low in recent years near the San Clemente site. However, long term data indicates that recruitment waxes and wanes in the area and that over the long run, kelp persistence has been high for some of the natural kelp reefs in the region (SCE 1996b) Nevertheless, in response to the concerns raised in your letter and others, kelp planting as a treatment in the experimental reef has been added to the proposed project. The kelp transplantation treatments have been added to insure that a

Comments

Nino, the proximity to the sporing plant, current direction, plankton feeders, turbidity, light and substrate condition. If recruitment does succeed, and the plant reaches the sporophyte stage, it is then subject to grazers such as sea urchins, wavy top turbans, opal eye perch and half-moon perch.

In natural sporing, 100,000 spores will produce some gametophytes; 1000 gametophytes, might produce 1 to 10 sporophytes; 100 sporophytes, might produce 10 juveniles, which, in turn, might produce 3 to 5 adult plants. As the distance increases from the sporing plant, the resulting number of adult plants produced by this process drops. Dr. Wheeler North thinks these odds of recruitment, as stated, is very optimistic and would probably take millions of spores to produce this result.

Dr. North went on to state, in tests he had ran with only one adult sporing plant, the farthest sporophyte found was only a meter or two away. In a second test, using a small bed of a dozen plants, the farthest sporophyte found was maybe 5 to 7 meters away, while in a third test, using a very thick kelp bed, the farthest sporophyte found was only 100 meters away. All of these tests were done on a prepared substrate with no sea urchins. What is the density of the San Mateo Kelp bed?

Dr. North also expressed concern. about collecting gametophytes on slides in an area lacking plants to verify possible recruitment. This would only be valid if the gametophytes were allowed to reproduce and produce sporophytes. This is the first stage that you can tell the difference in various species of algae and be able to identify it as Macrocystis pyrifera. Visually the sporophyte would have to mature to where the first blade splits and starts to fork.

Providing sporophytes from laboratory sporing improves the odds of success dramatically. Sporophytes could be provided by the

Responses

meaningful experiment can go forward even if natural recruitment is low during the 5-year experiment. Although management of invertebrate and fish grazers is not a part of the proposed project or of mitigation in general, the proposed monitoring plan will detect instances of catastrophic grazing

Comments

thousands and attached directly to the reef on an ongoing basis until the specified quota is met. These over whelming numbers would increase the survival rate and reduce the over all cost per plant. In addition, a minimal number of adult plants could be transplanted on to temporary floating anchors, helping to attract grazing fish away from the new sporophytes and juvenile plants. This would also enhance the area through possible sporing for a natural recruitment. This technique is a tried and proven method of re-establishing a reef.

D3. The Executive Director might consider the following:

1. Kelp should be started on the new substrate before it becomes covered by sediment, predators and other growth.

2. Doing both natural and enhanced methods of recruitment in parallel and utilizing opposite ends of the reef or designated test areas. A comparison of growth rates and densities of both approaches under the same ocean conditions can then be made. In addition this would reduce the risk of reef failure and minimize the time commitment to obtain the kelp density specified for the test reef.

3. An alternate approach might be to do the enhancement method on the existing reef in parallel with natural method on the test reef. Any success in recruitment on the existing reef could be added to the kelp acreage and enhance the rate of success for the project. Kelp recruitment on the existing reef might serve to attract grazers away from the test reef, thereby increasing the ability of the reef to become established sooner.

4. Given the present declining condition and the over population of sea urchins at the San Mateo Kelp bed, where natural recruitment is to originate from, enhancement may

Responses

D3. Kelp transplantation is now included in the proposed project The details are as follows: Kelp transplantation techniques will be added to each block using one concrete and one quarry rock module at 34% coverage. Kelp performance on these modules will be compared to that on modules with the same coverage and substrate type, but without kelp transplants, at each replicate location distributed more or less evenly throughout the proposed 356-acre project site near San Clemente. There is no compelling evidence that suggests transplanting kelp will accelerate the development of other reef organisms and the general consensus among kelp biologist consulted for this study is that five years is a minimum time period for studying the experiment.

Comments

be necessary. Under this condition, adding more reef, as may be proposed, would have little or no effect on kelp recruitment, thereby increasing both time and monetary commitment to the project.

5. As stated, the main goal is to end up with a viable self-sustaining kelp bed. Consider combining both methods of recruitment and shortening the 5 year test period and utilizing the time saved for technique enhancement and program modifications for an earlier completion date.

Survival and propagation of kelp beds, especially in stressed conditions, depends on a viable biomass. As this bio-mass declines, so does the survivability of the bed. Meeting that viable mass and expanding from it will increase its survivability. The goal here is to re-establish a selfsustaining kelp bed off the coastline of San Clemente. This project needs to be done in a timely and effective method.

CMT, given the opportunity, can be a major contributor to the success of SONG's mitigation project. We look forward to your response and inquiries.

Other comments

D4. 1. Consider research into harvesting, processing and marketing the smaller purple sear urchins which is doing so much damage.

Responses

D4. Research on the development of fisheries is beyond the scope of this mitigation project.

Comments

D5. 2. As to the beached kelp, if the reef is successful, there will always be kelp on the beach throughout the year. There maybe markets for this kelp such as Mari-culture farms like abalone or sea urchins, or fertilizers. Burying it in the sand or in landfills is not a good solution.

Thank you,

Gordon Lehman
President
Coastal Marine Technology

Responses

D5. It is not known at this time how much additional keelp will be washed onshore as a result of the mitigation reef. A monitoring plan has been proposed to determine the need to clean up kelp from the beaches. How to dispose of the kelp will be determined at that time, although various uses of kelp by other agencies have been discussed in the PEIR.

Comments

Frederick Fisheries, Inc.
34298 Camino El Molino
Capistrano Beach, CA 92624
949-661-7039

December 14, 1998

Mary Griggs
State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

Dear Ms. Griggs:

I would like to thank the California State Lands Commission for the consideration they have taken toward the Commercial Fishermen in the Draft Program Environmental Impact Report.

E1. I would like to propose the experimental reef area extended to include a portion of the up coast site I referred to in my letter dated April 2, 1998, and the California Lobster and Trap Fishermens' Association suggested in their letter dated March 31, 1998.

The first placement of modules is for experimental purposes. A placement of one to three blocks (each block containing 6 types of low-relief reef) would prove or disprove our position. If over the five year period of monitoring this site would in fact grow kelp, the reef site could be expanded so as to include our proposed site thereby avoiding possible danger to preexisting hard bottom.

Please feel free to contact me at any time.

Responses

E1. The CSLC has consulted with the project proponent and CCC staff regarding the placement of the experimental reef modules at the San Clemente site. In response to concerns raised by commercial fishermen the proposed project would place the replicate blocks of modules fairly evenly throughout the 356-acre project site. One of the blocks (containing eight 0.4-acre modules of different reef designs) would be placed offshore of the San Clemente pier at the far northern end of the 356-acre project site. SCE consultants continue to believe that the larger area north of the San Clemente Pier (outside the 356-acre project site) that you identified in previous scoping comments, is not suitable for the artificial reef project for the following reasons: 1) much of the area to the north has a thick overburden of sand (greater than 1 meter), making it much less appropriate for the reef construction; 2) this area has finer sediments and is in close proximity to the potential adverse influences of discharges from nearby San Juan

Comments

Sincerely,
Paul R. Frederick President

Naf

Responses

Creek (causing higher turbidity and a higher sedimentation rate); 3) dive surveys conducted in 1993 found that little kelp grows on exposed hard substrate in this area; and 4) this area is designated as important for recreational boaters, with whom construction of an artificial reef and the related, ongoing monitoring activities might interfere.

Comments

Responses

LEAGUE FOR COASTAL PROTECTION
1120 Chinquapin Avenue
Carlsbad, CA 92008
(760) 729-3261
FAX (660) 729-3963

January 5, 1999

Mary Griggs, Project Manager
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento California 95825-8207

Dear Ms Griggs,

The League for Coastal Protection is pleased to have the opportunity to submit comments on EIR Number 685 (SCH 98031027): Construction and Management of an Artificial Reef in the Pacific Ocean Near San Clemente, California (December 10, 1998).

We were disappointed to discover that the PEIS did not adequately respond to a number of comments that we submitted in response to publication of initial Notice of Preparation. We are resubmitting those comments in an attachment to this letter.

Thank you for the opportunity to comment on this project.

Sincerely,
Joan Jackson, Secretary

REQUEST FOR PUBLIC COMMENTS ON EIR NO. 685 (SCH 98031027): CONSTRUCTION AND MANAGEMENT OF AN ARTIFICIAL REEF IN THE PACIFIC OCEAN NEAR SAN CLEMENTE, CALIFORNIA (December 10, 1998)

Comments

COMMENTS:

A. The PEIS did not adequately respond to a number of comments that we submitted in response to publication of the initial Notice of Preparation. The following comments are resubmitted:

F1. 2. Considering the heavy wave conditions that have occurred this winter, any baseline studies should be updated to determine if the thickness of the sand layer at the site proposed experimental reef has increased substantially. If the sand layer has increased it might preclude use of this site, especially if the accumulated sand is at a depth beyond resuspension.

- The PEIS contains no updated information on the post-winter status of the study site.

F2. 3. Please include a detailed description of the proposed construction process for both the experimental reef and the final reef, e.g. number of barges and tugs, number of barge trips, method of anchoring, number of anchors, frequency of anchoring, and specifically how the percentage distribution densities of rock will actually be achieved. Pushing boulders off a barge with a bulldozer is unlikely to achieve replicated modules.

Responses

F1. Sonar surveys to determine the type of substrate surface and sand thickness in the lease area were last completed in 1997 prior to the heavy storms in 1998. It is possible that some minor changes in the bottom occurred as a result of these storms. Studies were conducted of the ocean bottom after the 1987/88 storms, which were the largest storms in recent years. These studies looked at changes in sand distribution and found that there were major changes in the intertidal and beach area, but at depths over 30 feet (which includes all of the 356-acre project site) there was little change in the bottom or sand depth. Preconstruction sonar surveys will be completed prior to the placement of the experimental artificial reef modules to determine the ocean bottom conditions in the lease area and to finalize plans. This was not specifically stated in the Project Description and has been added (see Section 3.4, 2nd paragraph). It would not be useful or cost-effective to conduct additional surveys prior to this time.

F2. Additional information has been added in response to your questions on the operation of the barges and anchors during construction (see Section 3.4.3 - Material Placement; and Section 4.6.8.1). The impacts of the anchors remain a less-than-significant impact, but measures to minimize these impacts are included.

Comments	Responses
• The PEIS provides minimal information. What is the size of the anchoring footprint? What is the number, length, configuration, and management of the anchor chains? How many reef modules can be constructed with each mooring set of the anchor chains? Will subsequent anchoring events drag over constructed reef modules? The PEIS acknowledges that dragging the anchors along the bottom would be damaging, but why is this not explained?	
F3. 4. How will construction of the modules be verified so that module replicates are true replicates. What is the sensitivity of the proposed method of verification? If some of the modules are a disaster will they be rebuilt or will additional modules be constructed? • The PEIS does not discuss methods for remediation of poorly constructed modules or if rebuilding will occur? Please verify that the accuracy of the side scan sonar surveys is several cm, and should therefore be able to detect the distribution of all rock and concrete materials used.	**F3.** Verification will be by post-construction surveys that will likely use high-resolution side scanning sonar that is ground-truthed by divers (see Appendix C of PEIR). High-resolution side-scanning sonar with resolution of several centimeters is commercially available. The CCC coastal development permit for the operation of SONGS (SONGS Permit 6-81-330-A, p 32) specifies that "If the Executive Director determines that the reef was not built to specifications, the permittee shall modify the reef to meet the approved specifications within 90 days of the post-construction survey." The permit does not specify remediation methods, but these are likely to include adding material to modules with insufficient coverage or adding new modules. Also, please see response AM19 in the afternoon Public Meeting transcript minutes.
F4. 5. If the experimental reef should prove to be colonized by giant kelp, how will additional modules for the final reef be constructed (i.e. maneuver barges and multiple anchors without destroying the experimental kelp reef? • The PEIS did not answer this question.	**F4.** The likelihood that installation of the mitigation reef will destroy kelp resources that have developed on the experimental reef must be determined from the outcome of the experimental reef studies. Once this information is available, it will be used in planning the construction of the full mitigation reef. Measures to minimize damage to the experimental reef during construction of the final reef will likely include avoidance Avoidance should be more feasible with the changes to the proposed project, which provide that the experimental modules are more widely spaced throughout the 356-acre project site

Comments

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However, if avoidance is not fully effective, then the amount of kelp and associated biota that are destroyed will be estimated and used in evaluating compliance with the CCC permit. Whatever the scenario, the CCC permit requires SCE to build an artificial reef(s) large enough to support at least 150 acres of kelp forest community for the full operating life of SONGS. "Full operating life" as defined in the CCC permit includes past and future years of operation of SONGS Units 2 & 3, including the decommissioning period to the extent that there are continuing discharges. Damaged portions of the reef would likely be recolonized with reef biota and SCE would obtain mitigation credit once the recolonized reef attained the standards specified in the SONGS Permit.

F5. 9. If maturation of artificial reefs is so site specific and if the final reef is built at any of the alternative sites, then the outcome of the experimental reef may not be a good indicator of the expected outcome of the final reef, in which case these other sites may not be real alternatives at all?

F5. The extent to which maturation of artificial reefs is site specific is not known. Clearly some locations are better than others with respect to supporting a persistent kelp forest community. The project site at San Clemente is thought to be a suitable location for an artificial reef designed to support a persistent kelp forest community. As described in the Introduction to the Final PEIR, the alternative sites discussed in the Draft PEIR are no longer thought to be viable options. Further sonar surveys were conducted in March 1999, which indicate the alternative sites along Carlsbad do not meet sand depth characteristics thought suitable for reef construction. The Mission Beach site is not preferred because of its great distance from the San Onofre Kelp bed.

F6. We believe that location is a significant factor and has been omitted in the project design. The experimental reef should be tested at a number of locations, not just at San Clemente. If San Clemente Kelp performs poorly during the experimental phase the entire project will be jeopardized.

F6. Location was given much consideration prior to selecting the San Clemente site as the preferred site for the project. The project proponent conducted numerous studies on the physical, oceanographic and biological characteristics of many different sites prior to choosing San Clemente as the preferred site for the project. Replicating the experiment at numerous locations

Comments

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without changing the experimental design would provide more information, but would result in greater environmental impacts than the proposed project and would come at a much higher cost. However, in response to this and related comments concerning the risk associated with conducting the experiment at the San Clemente site, two separate plans were considered to reduce this risk. One plan was to expand the experimental reef to include a site at South Carlsbad and the other was to add kelp transplanting treatments to the experiment. The plan to expand the experimental reef to include a site at South Carlsbad was rejected because, as explained in the Final PEIR Introduction, information from sonar surveys conducted in March 1999 along the coast of Carlsbad indicated that substrate conditions in this area do not meet the sand depth criteria for artificial reef construction. However, as described in the Final PEIR Introduction, the plan to add kelp transplanting treatments was accepted. The Mission Beach site is no longer being considered for the experimental phase of the project because of its great distance from the San Onofre Kelp bed, the sites of the impacts that are being mitigated. Also, please see responses to comments K1 and K2 in the San Diego Ocean Foundation's first comment letter.

F7. 16. Construction of at least one experimental module (using the highest rock distribution density) should be done at each of the four proposed alternative sites for the final reef during the experimental phase of the project.

- We wish to reiterate our support for implementing Alternative 2 as the project design.

F7. See response to comment F6 above.

F8. 17. Development of kelp on the concrete artificial reef at Mission Beach could be an unrepeatable success. We recommend that the experimental phase should include construction of both a rock and a concrete module adjacent to

F8. As discussed above, the alternative sites are no longer felt to be viable choices. The Mission Beach site has been rejected because of its great distance to the San Onofre Kelp bed. To enhance the likelihood of success at San Clemente, kelp

Comments	Responses
the Mission Beach artificial reef to test if the proposed methodology and distribution density can at least be repeated at a successful kelp growth site. This effort should be included as an alternative in the experimental phase. • We wish to reiterate our support for implementing Alternative 2 as the project design.	transplanting treatments have been added to the proposed project.
F9. 18. Please identify what natural reefs and kelp beds will be used as reference sites during the experimental phase of the project and why they were selected. • The PEIS does not identify the names of any of the reference sites? Why not?	**F9.** Evaluating the performance of the experimental reef is not a CEQA requirement, but rather a requirement imposed by the CCC as part of the SONGS Coastal Development Permit. A draft of the monitoring plan for evaluating the performance of the experimental reef was included in the PEIR in response to requests from the public. The final plan will be developed following approvals for construction of the experimental reef. The reference sites for monitoring the performance of the artificial reef will not be chosen until the project has completed the environmental review process and the project design has been finalized. The monitoring plan for evaluating the experimental reef (including the choice of reference sites and the rationale for choosing them) must be approved by the CCC and the public will be allowed to comment on the content of the monitoring plan at that time.
F10. B. How will the NEPA review occur? Please provide specific contact information within the U.S. Army Corps of Engineers.	**F10.** The project proponent has filed an application for the artificial reef project with the Army Corps of Engineers, which will be the lead agency for the NEPA review. The project manager is David Zoutendyk at (619) 674-5388. He has indicated that the Corps will be reviewing and permitting the experimental artificial reef project upon completion of the CEQA PEIR. The process involves issuing a public notice and the preparation of an Environmental Assessment (EA) for circulation and comment. This process usually takes between 60 and 90 days.

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F11. C. The impact assessment is based on only two levels of impacts, significant and less-than-significant, when in fact adverse impacts (but not significant) can occur. It is possible that numerous adverse impacts could have a cumulative consequence and become a significant effect! Why does the PEIS lump all less-than-significant impacts? Beneficial impacts are not identified as a category.	**F11.** The CEQA Guidelines require that a lead agency identify significant effects on the environment and develop feasible mitigation measures for reducing these impacts to a less-than-significant level (Section 15002 (a)(3) and (g)). In response to this comment, we would direct you to review Table 2-1 Summary of Environmental Impacts and Mitigation Measures for the Proposed Project contained in Chapter 2. Executive Summary. The PEIR for the SONGS artificial reef project identified one significant unavoidable impact and a number of significant impacts where recommended mitigation measures would reduce these to a less-than-significant level. In addition, numerous less-than-significant impacts were identified that do not require mitigation under CEQA, however, in some cases mitigation measures were recommended to help reduce the impacts where appropriate. Less-than-significant impacts were also considered in the cumulative impacts analysis, Chapter 5.1. Finally, the PEIR states that the goal of the artificial reef project is to benefit the natural resources of the ocean by replacing lost resources at the San Onofre kelp bed. The document identified two specific benefits of the artificial reef, which are listed at the end of Table 2-1.
F12. D. The preferred project is the proposed project because it involves less construction and less impacts initially. However, the proposed experimental project could be a complete failure because San Mateo Kelp crashed or the site performed inadequately for a diversity of other reasons. We may have accomplished nothing after 5 years! Why is it not better to accept greater impacts during the experimental phase and increase our chances of making better decisions about the design and construction of the final mitigation reef?	**F12.** Please see the response to comment K1 in the San Diego Oceans Foundation's first comment letter.
F13. E. We concur with the use of waste concrete materials because of lower costs and reduced air quality, etc. impacts, but we want	**F13.** The experiment has always been designed to test the two materials.

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to see both quarry rock and concrete substrates to be tested in the experimental phase. The performance of concrete must be tested against that of quarry rock!

F14. F. Alternative 2 only addresses 3 test sites; San Clemente, South Carlsbad, and Mission Beach. North Carlsbad, Leucadia, and Encinitas sites could also be included by not conducting the full experimental design at all sites.

F15. G. If San Mateo Kelp bed is going to be used as one of the reference sites, please provide a rationale for its use and why was it not included in the PEIS?

F16. H. Because construction of the final mitigation reef could be as much as 8 years, and since maturation of a productive kelp bed that would actually yield resources, when does day one start for maintenance of the kelp bed for the operational life of the power plant (at the end of the construction period)?

F17. I. How and where will the final mitigation reef actually be constructed? Please show foot prints of the experimental reef modules and the final mitigation reef modules. How will the final mitigation reef be constructed without damaging the experimental reef?

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F14. The CCC and CSLC feel it is unreasonable and unnecessary to require the project proponent to install experimental reefs at every alternative site given the cost of this plan and the added impacts associated with this request. As discussed above (see response to comment F6), the alternative sites no longer represent viable choices for the experimental reef.

F15. Please see the response to comment F9 above.

F16. Additional environmental review will be done under CEQA following the completion of the experimental reef monitoring and once the design of the full mitigation reef is completed. At that time, the design of the mitigation reef will be defined and a monitoring plan will be developed to answer questions concerning its performance as required in the SONGS Permit

F17. The design and location of the mitigation reef would be determined following completion and monitoring of the experimental reef. The project proponent would present details on how the mitigation reef would be constructed in their final plan for the mitigation reef, which must be approved by the CCC and CSLC prior to constructing the reef. This plan would be subjected to additional environmental review under CEQA The experimental reef design is shown in Figure 3-4. However, the final placement of the modules would be determined after preconstruction sonar surveys are completed, which would help ensure that existing hard substrate is avoided in the placement of the modules. Also, see response to comment F4 above for

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questions concerning damage to the experimental reef during construction of the final reef.

F18. J. Why are impacts to the soft bottom community not considered in the evaluation?

F18. Impacts to the soft bottom community are addressed in Section 4.6.8.2 of the PEIR. The following potential impacts were evaluated: 1) destruction of habitat and biota as a result of dragging the derrick barge anchors; 2) increased turbidity resulting from the placement of reef material; 3) burial of sand-dwelling biota and their habitat by reef materials; 4) alteration of sediment characteristics as a result of effects of reef materials on local currents (e.g., scouring); 5) increased detrital food material originating from kelp and other organisms produced on the experimental reef modules; 6) increased predation from fish and other predators colonizing the experimental reef modules; and 7) damage to the sand bottom community resulting from experimental reef monitoring activities. All of these potential impacts were considered to be less-than-significant because the sand bottom habitat at the site is relatively unproductive and limited in extent, similar habitat is extensive in the region, and none of the species affected is listed as threatened or endangered.

F19. H. If 25% of the bottom in the project vicinity consists of exposed bedrock and 5% consists of cobble, why is the existing hard rock community not included in the evaluation?

F19. This comment may reflect confusion regarding the different terms used in the PEIR to describe the area where the project would be located. A glossary of project terms has been added at the end of Section 3.1 to reduce such confusion. The project vicinity as used in this sentence consists of the general area offshore of San Clemente and includes the specific lease site (also referred to as the project site) within which the experimental reef project would be constructed. Although the bottom in the project vicinity consists of about 25% exposed bedrock and 5% cobbles, the bottom at the 356-acre projectsite, as indicated in Section 4.6.2 of the PEIR, consists of about 96% sand. Sections 4.3.1 and 4.6.2 have been revised to clarify this

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distinction. Existing hard rock community was not included in the evaluation because so little of it occurs at the project site. Furthermore, the SONGS Permit conditions for the project indicates that the project will be sited so as to cause "minimal disruption of natural reef or cobble habitats and sensitive or rare biotic communities." The PEIR (Section 4.2.2.6) suggests conducting preconstruction surveys to determine exact locations of existing hard substrate before finalizing the exact placement of the artificial reef materials.

F20. I. The list of references is incomplete, for example Moffat and Nichol 1990 is missing.

F20. A number of references were accidentally left out and have now been included. Please see the references added to Chapter 8.

F21. J. Is there any evidence of sand scour in any of the proposed reference sites?

F21. The reference sites have not yet been chosen (also see response to comment F9 above).

F22. K. Sec. 4.6 Biological Resources contains very little site specific information. This section is filled in with mostly regional information on the southern California Bight. Why isn't the region defined on the basis of the local littoral cell. The project site description of the subtidal sand bottom community (Sect. 4.6.2.7) is minimal, highly variable, and inadequate for a real assessment of impacts.

F22. The littoral cell in which the project site lies is the Oceanside cell, which extends from Dana Point to La Jolla Canyon Although some highly specific information has been collected on biological resources at San Onofre Kelp bed and a few other sites within the Oceanside cell, general information on biological resources in the cell is limited. The information on the sand bottom community at the project site presented in the PEIR is the only information that was found regarding biological resources in the project vicinity. Although site specific information is limited, the preparers of the PEIR feel that readers can effectively evaluate the potential impacts of the project on biological resources if they understand the physical and biological processes that affect the biological resources regionally. These processes are generally similar throughout the southern California Bight, so descriptions compiled from observations throughout the Bight should be satisfactory. While more site-specific information on biological resources in the project vicinity would be helpful, such information is not

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	essential for evaluating the impacts. Note that the description of the sand bottom community at the project site has been moved to the Section 4.6.2.4 in the Final PEIR.
F23. L. Item H. above indicates that hard substrate comprises 30% of the project site, yet elsewhere it is described as consisting of 96% sand. How does this discrepancy affect the impact assessment?	**F23.** This discrepancy is explained in the response to comment F19, above. It has no effect on the impact assessment.
F24. M. What are the differences between project area, project vicinity, lease area, study area, etc? Please revise text.	**F24.** To avoid confusion a glossary of project terms has been added at the end of Section 3.1.
F25. N. Information presented on bottlenose dolphin is outdated. Contact R.H. Defran at SDSU for current information on behavior.	**F25.** The additional references have been added.
F26. O. The beach habitat is not barren or inhospitable nor is it defined as the intertidal zone. This interpretation is outdated.	**F26.** The terms "barren" and "inhospitable" in the text refer to the fact that few vascular plants are able to grow in the upper surf zone. The beach habitat was not defined as the intertidal zone in the PEIR.
F27. P. The significance criteria, presented in the PEIR, lifted out of Sec. 15065(a) and Appendix G, are so general that they can not really be used for evaluation of specific projects. Please define what "substantially" means. Specifically explain how this project will be evaluated? Has the impact assessment presented in this PEIR been based on the term "substantially"?	**F27.** CEQA and the CEQA Guidelines provide general statements and a range of definitions of significance criteria for evaluating impacts in a variety of resource areas. The significance criteria in some disciplines are more specific based on adopted laws and regulations, such as with air quality or cultural resources. In other resource areas, determining significance criteria is more open to the judgement of resource specialists. The criteria used in environmental documents are often unique to the specific project and the circumstances surrounding that project, such as with aesthetic impacts. The PEIR has developed significance criteria based on all the available information, laws and regulations and using standard environmental practices.

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F28. Q. The sand bottom habitat at the lease site (?) is described as unproductive, yet there are no data to justify this conclusion.	**F28.** That sand bottom habitat is unproductive as compared to most other nearshore marine habitats is evidenced by the relatively low abundance of animals and even lower abundance of primary producers (macroalgae and sea grasses) that occur in this habitat. In addition, the sand bottom habitat at the lease site has a low abundance of organisms as compared to the sand bottom habitat at other sites that have been surveyed in the southern California Bight. The data supporting the latter statement are presented in two reports cited in the PEIR, Eco-M 1977 and SCE 1997a.
F29. R. The grain size distribution of the sediments in the project site is not described so we can not assess the potential problems of resuspension.	**F29.** The grain size distribution of surface sediments at a site just north of the project site consisted of about 67% silty fine sand (62.5 microns to 125 microns) and about 32% silt clay (<62.5 microns) (Eco-M 1995). Particle less than about 10 microns may remain in suspension for a long time, depending on current speeds (SCE 1996d). A significant fraction of the sediments at the project site are probably in this size range and would therefore be readily resuspended if disturbed. However, ocean currents would quickly transport sediments resuspended during construction of the reef and mix locally turbid water with clearer water elsewhere, keeping turbidity from increasing significantly above background levels.
F30. S. The treatment of sediment movement within the experimental modules is confusing. Sediment is thought to accumulate amongst rocks yet also pass through, and is needed to make new substrate available for settlement of kelp. How will the dynamics of sediment mobility be monitored?	**F30.** The reef modules are complex structures and sediments are expected both to move through and accumulate in the modules, depending on wave and current conditions at the time. On occasion, high wave surge is expected to drive large amounts of sediments over the reef material, causing scouring Such conditions often remove organisms competing with kelp for substrate, thus providing new substrate for kelp settlement. Sediment accumulation in the experimental reef will be monitored using high-resolution side-scanning sonar and diver surveys, as described in section 5.1 of the CCC Draft

Comments

Responses

Monitoring and Management Plan for the SONGS Experimental Reef, which is provided in Appendix E of the Draft PEIR.

Comments

Responses

MARINE FORESTS SOCIETY

Mary Griggs
California State Lands Commission
Sacramento Office
100 Howe Ave., Suite 100 South,
Sacramento, Ca. 95825-8202

November 17, 1998

Dear Ms. Griggs,

EIR FOR THE SONGS MITIGATION.

The November 1998 EIR draft by Resource Insights Inc. states that our "Kelp Planting" alternative does not meet the project purposes which are said to be

> *to build an artificial reef for kelp constructed of rock, concrete, or a combination of these materials*
>
> and
>
> *to provide adequate conditions for a community of reef-associated biota similar in composition, diversity, and abundance to the San Onofre kelp bed.*

This letter, respectfully, contests the above-mentioned allegations and asks for a new consideration of the "Kelp Planting" alternative.

Our reasons are as follows:

G1. 1. The alternative comprises the deployment on the sea bottom of concrete-made hollow structures for sheltering fish and

G1. Reefs built from quarry rock and recycled concrete typically provide crevices that serve as shelter for fish and invertebrates.

Comments

offering hard substrates for the fixation of sessile animals and plants including kelp. These concrete structures are called "Reef Balls". They will create an artificial reef according to the SONGS permit conditions which have been adopted by the California Coastal Commission.

G2. 2. The alternative will provide "adequate conditions for a community of reef-associated biota .... "due to kelp being planted above the sand and concrete structures being placed on the sand.

The "Kelp Planting" alternative is well within the scope of the CCC permit. Therefore, we ask the California State Lands Commission to further consider this alternative.

Moreover, we deplore that the actual CCC permit prevents the proposing of other valuable alternatives. The permit conditions restricting the project to the use of quarry rock and concrete materials are unjustified. They are contrary to CEQA Guidelines, Section 15126 (d) which rule that alternatives to *be considered in an EIR are actions which can feasibly attain the basic objectives of the project* (see my April 01,1998 Fax to Ms. Griggs).

We suggest that the State Lands Commission, as lead agency in charge of the project, ask for the annulment of the restrictive conditions in the CCC permit.

Responses

These reef materials are readily available in the large quantities needed for this project. Unlike the hollow reef balls, the pieces of rock and recycled concrete planned for use in this project are relatively heavy, which is needed for this project because the weight helps to securely anchor giant kelp to the bottom. Giant kelp is very buoyant and its large surface area causes a tremendous amount of drag during periods of high water motion. If kelp is not anchored to a heavy substrate it tends to get dragged off the reef and onto the beach during large swells. Such would likely be the fate of giant kelp if it were to colonize the relativity light reef balls (a likely scenario). For these reasons the project proponent, the CSLC staff and the CCC staff have decided not to include reef balls in the experiment.

G2. In response to the concerns raised by the Marine Forests Society and others, kelp transplanting treatments have been added to the proposed experimental reef project. This includes kelp transplanting on two modules in each experimental block using 34% coverage for recycled concrete and quarry rock. However, planting kelp on floats above the sand is not proposed because this method would require continuous maintenance, which is not advocated in this project. The management and maintenance requirements of the planting above sand alternative are more in keeping with an aquaculture operation than a mitigation project aimed at restoring a natural ecosystem. The CSLC does not have the regulatory authority to change the SONGS Permit conditions. These conditions were approved by the CCC after lengthy public debate and consideration of numerous alternatives.

Comments

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By considering further the "kelp planting" alternative, an objective analyst will see the many advantages of proposing light structures instead of heavy hard substrates such as quarry rock. The light structure concept is an innovation which makes works at sea benign to the environment and allows the removal of materials which inadvertently create adverse impacts.

The cumulative unavoidable impacts on air quality, water quality, and transportation that have been found with the Edison/CCC project would not exist if light materials were to be used. As a law of physics the reduction of weight entails a reduction of energy consumption which entails a reduction of pollution.

The economy of weight in the kelp planting alternative is great compared to the quarry rock-concrete materials alternative.

For one acre of kelp reef, the difference in weight is as follows:

2,029 tons / acre with unremovable quarry rock and concrete materials
(permit is unchanged)

170 tons / acre with removable concrete Reef Balls and iron Racks
(permit is unchanged but "kelp planting" alternative is not eliminated)

12 tons / acre with removable sand anchors and iron Racks
(if permit is amended)

Less than one ton / acre with removable sand anchors only
(if permit is amended)

Comments

In San Clemente on the 10th of December 1998 we will have more comments to make on the Edison/CCC project, and on our kelp planting project. We will show that the "Kelp Planting" alternative is the environmentally superior alternative. And we shall ask for the removal from the CCC permit of the unjustified conditions which since 1991 have prevented the mitigation of the San Onofre lost marine resources.

Sincerely,
Rodolphe Streichenberger

CC: Resources Insights Inc.

Responses

Comments

Responses

MARINE FORESTS SOCIETY

California State Lands Commission
Mary Griggs, Project Manager
100 Howe Ave., Suite 100 South,
Sacramento, Ca 95825-8202

December 12, 1998

Subject: SONGS Mitigation

Dear Ms. Griggs,

COMMENTS AFTER THE EIR HEARING IN SAN CLEMENTE
Following the recent issue of the Environmental Impact Report, please find attached our request for changes in the proposed project.

Our request summarizes as follows:

1 . Rejection of the proposed quarry rock.
2. Rejection of the proposed experimental reef.
3. Consideration of the kelp planting proposal.
4. Proposition by Edison of a feasible mitigation project with recycled concrete, reef balls, and kelp planting.

Sincerely
Rodolphe Streichenberger
President Marine Forests Society

Comments

COMMENTS

requesting changes in the SONGS mitigation project

WE REQUEST

H1. The rejection of the proposed quarry rock.

Early identification of adverse environmental impacts by quarry rock, and through the EIR a more recent identification of significant unavoidable impacts to air quality, water quality, and transportation lead to the rejection of the proposed quarry rock mitigation measure.

Responses

H1. Although the use of quarry rock for the mitigation reef may have greater environmental impacts than the use of recycled concrete, there is no assurance at this time that a mitigation reef constructed of recycled concrete would satisfy the performance criteria of the SONGs Permit, particularly with regard to creation of habitat to replace the lost benthic community resources of the San Onofre Kelp bed. A primary objective of the proposed experimental project is to evaluate and compare the performance of quarry rock and recycled concrete. The only low-relief reefs currently in place are those located at Mission Beach, which are constructed of recycled concrete. There are few quantitative data on which to evaluate the success of these reefs. Data collected to date indicate that benthic invertebrates on these reefs have not achieved abundances that would be required for the mitigation reef project under the Songs Permit The CCC has required that the two reef materials be tested in an experiment before selecting one for the full mitigation reef If the experimental reef demonstrates that both materials perform at acceptable levels, then recycled concrete would be preferred, given the reduced impacts associated with its use

Since the Draft PEIR was issued, further discussions with material suppliers have lead to corrections in the assumptions for the weight of quarry rock and recycled concrete. The quarry rock is approximately half the weight previously estimated, while the concrete is 1.7 times heavier than previously estimated. With these revised weights, about 1.3 times as much quarry rock as recycled concrete would be needed to construct

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The quarry rock adverse impacts are summarized as follows.

a) Destruction of existing ecosystems at the sites of quarry rock extraction.
Contrary to the Environmental Protection Policy of the State (CEQA Chapter 1)

b) Elevated cost amounting to more than $1,000 per kelp plant. *Contrary to CEQA. 15126 which says that a feasible alternative must take into account economic factors.*

c) Remote and speculative implementation which cannot be reasonably ascertained. Studies did not uncover a specific design that would be certain to support persistent kelp populations (1997 Preliminary Plan). According to CEQA the quarry rock measure is not *feasible* because it cannot be

Responses

the experimental and mitigation reefs. This reduces the differences in impacts between the two materials substantially.

a) Materials for the artificial reef would be purchased from existing rock quarries that have already undergone environmental review in receiving permits to operate. As a result, the impacts of the quarry operations are not part of this project evaluation.

b) The fact that one alternative is more expensive than another is not the basis for determining a significant environmental impact. Section 15126(d)(1) of the CEQA Guidelines states "*...the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly*"

The CEQA Guidelines, Section 15131 details the role of economic and social effects in an EIR. Economic effects are not the basis for determining significant impacts unless it is shown that the economic effects lead to a physical change in the environment. For example, if a company recruits a large number of new employees that in turn results in population growth and new housing development, this could have a significant impact on the environment due to the physical impacts of the development. The focus in CEQA is on the physical changes.

c) There is no absolute certainty about any of the design proposals for an artificial reef for kelp that have been suggested for this project. However, SCE and the Marine Review Committee studies did reveal the benefits of a number of design features for a persistent kelp forest reef, including a low profile

Comments

"accomplished in a successful manner in a reasonable period of time" (CEQA 15126 and 15364)

d) Generation of "significant unavoidable impacts to air quality, during the construction of both the experimental and mitigation reefs" (EIR, page 5-10). Also, generation of considerably more air quality, water quality, and transportation impacts that could be considered significant on a cumulative basis" (EIR, page 5-9).

Contrary to the Environmental Protection Policy of the State (CEQA Chapter 1)

e) Generation of much larger adverse impacts than with recycled concrete, reef balls, and kelp planting mitigation measures (EIR. Kelp Planting, page 6-4).

Contrary to CEQA 15021. (a). 2. which says that "A public agency should not approve a project as proposed if there are feasible alternatives or mitigation measures available that could substantially lessen any significant effects that the project would have on the environment"

H2. The rejection of the proposed experimental reef.

This rejection is the logic consequence of the above rejection of

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configuration for the reef material. However, the studies could not determine the benefits of other design features (e g. type and shape of reef material and its coverage). The purpose of the experimental reef project is to evaluate these factors The experimental phase will delay by about five years the implementation of the full mitigation phase of the reef project, but given that the experiment should greatly increase the likelihood of providing successful mitigation, this delay would be considered not only reasonable, but prudent.

d) Cumulative significant unavoidable air quality impacts were identified for the experimental and mitigation reefs. This is a factor of the location of the project in the South Coast Air Basin. It is very difficult to mitigate for cumulative impacts in a highly urbanized area, where the air basin is out of compliance with State and federal air emission standards CEQA does not require decision-makers to reject projects on the basis of significant unavoidable impacts, but only to make Statements of Overriding Considerations as to why the project should be approved with these impacts (CEQA Guidelines, Section 15093).

e) The CSLC, CCC, CDFG and project proponent have concluded that all feasible project alternatives that meet the SONGS Permit criteria have been evaluated in the PEIR Kelp transplanting treatments have been added to the experimental reef to gain valuable information on how to increase the likelihood of success in growing kelp This information will help to minimize impacts associated with the mitigation reef build out.

H2. There are no scientific data allowing one to conclude that quarry rock or recycled concrete is the superior substrate for obtaining the project objectives ("to provide adequate conditions for a

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the use of quarry rock for the construction of artificial reefs.

Also, it must be said that there is no need for an experimental reef in order to compare the results with quarry rock and recycled concrete. Previous studies by Patton (1991) and Bedford (1992, 1993) have shown that quarry rock have no biological advantage over recycled concrete. The studies involved the artificial reefs of Ocean Side #1 and #2, Carlsbad, Pacific Bay, and Mission Park. The conclusion by the California Department of Fish and Game (CDFG) was that recycled concrete reefs *"appear to be performing as well as the quarry rock in all of CDFG's experimental reefs"*. Since 1992 the CDFG's Artificial Reef Program has no more plans for the use of quarry rock.

Even without said environmental handicap the comparative research program between quarry rock and recycled concrete could not be justified because of the cost in time (five years) and money ($3,000,000). It must be remembered that research is not mitigation.

The proposed experimental reef is irrelevant in the SONGS's environmental mitigation program.

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community of reef associated biota similar in composition, diversity, and abundance to the San Onofre kelp bed") It stands to reason that a reef designed to resemble the physical characteristics of SOK has a better chance of compensating for the lost resources than does a reef having physical characteristics that are very different from SOK. This reasoning is the basis for the CCC requirement that quarry rock be used to build the mitigation reef; quarry rock resembles the cobble/boulder substrate at SOK more closely than recycled concrete and other types of reef materials (e.g. tires, cars, reef balls, etc). A major objective of the experimental reef is to test whether a reef project built from recycled concrete performs as well as a reef built from quarry rock. Recycled concrete may potentially be less expensive and result in fewer construction impacts. Differences in the amount of material needed to construct the artificial reef with the two materials result from variations in the size and shape of concrete versus rock. The question remains as to which of these materials will better meet the project objectives.

We could not evaluate the findings of Patton (1991), as the Marine Forest Society (MFS) was unable to provide the citation for this reference. We did contact Mr. Dennis Bedford, (Coordinator of the CDFG Artificial Reef Program). Mr. Bedford states that CDFG has not ruled out the possibility of using quarry rock in future artificial reefs. Moreover, Mr. Bedford has been enthusiastic about testing the performance of rock vs. concrete in the proposed experiment because of its potential to provide valuable information to the CDFG on how to better design and build artificial reefs in the future

The experimental reef will provide partial mitigation inasmuch as it meets the project objectives. The experimental phase will delay by about five years the implementation of the full

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H3. The consideration of the kelp planting proposal.

Scientific reports of 1967, 1968, 1972, 1973, 1974, 1976, 1980, 1981, 1982, 1990 1991, and 1993 have all shown that special measures must be taken to succeed in a kelp restoration program in order to compensate for lack of recruitment, grazing, and inter species competition. The authors of theses studies described the measures to be taken as:

1. Kelp transplantation (wild kelp and cultured kelp)
2. Control of grazers (urchin, opaleye, half moon .....)
3. Control of competitive seaweed (Pterigophora, Cystoseira, Sargassum, Eisenia, Laminaria ....).

The kelp planting method which was proposed on May 20, 1998 by the Marine Forests Society (MFS) has been successfully experimented as a method of compensation for lack of recruitment, grazing, and inter species competition. The method consists of

- Positioning kelp plants above the water bottom
- Seeding massive quantities of kelp spores
- Utilizing a number of kelp plants has decoys

The consideration of the kelp planting method is a due and necessary consideration. This method is based on past experience and recommendations coming from the best kelp experts of California (North, McPeak, Foster, Wilson, Leighton, Barilotti,....).

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mitigation phase of the reef project, but given that the experiment should greatly increase the likelihood of providing successful mitigation, this delay would be considered not only reasonable, but prudent.

H3. In response to the concerns raised by the Marine Forests Society and others, the proposed project will now include kelp planting as a treatment in the experimental reef. The control of grazers and competitive seaweeds is not proposed because these methods require continuous maintenance, which is not advocated in this project. Although enhancing the growth of one species by controlling others may be needed to insure success in aquaculture, it is generally not environmentally acceptable for mitigation projects aimed at restoring natural ecosystems.

Comments

H4. The proposition by Edison of a feasible project with recycled concrete, reef balls, and kelp planting

The mitigation for the losses of kelp and fish on the Sovereign Land of San Onofre is the responsibility of SONGS and of the California State Lands Commission (CSLC) much more than the responsibility of the California Coastal Commission (CCC).

However, since 24 years (1974) it is the CCC which decides for the SONGS mitigation program. Since 24 years the CCC has imposed the conduction of studies for an amount of $75,000,000 paid by EDISON. Surprisingly enough, the CCC did not urge the start of a mitigation operation. Now again, the CCC asks for more studies and more money, and still does not want the mitigation to begin. And, the CCC keeps on imposing the planning of a quarry rock mitigation which is technically unsatisfactory and not permissible by law

This abnormal situation must be seen as an administrative disorder, an environmental failure, and a financial scandal.

Nevertheless, and in spite of the obvious mishandling of the situation by the CCC Agency, the principal responsibility for the loss of natural resources in the Sovereign Lands of California rests with SONGS/EDISON, the offendant, and the CSLC which holds the Sovereign Lands in public trust.

Therefore, after the finding of the quarry rock impacts by the present EIR, we suggest that Edison on its own presents to the CSLC: a new mitigation program cleared of the quarry rock that the CCC has mistakenly imposed. After 24 years of non-mitigation it is time to stop losing kelp and fish every day at San Onofre. Somebody has to be responsible.

Responses

H4. The respective roles and jurisdiction of the CSLC and the CCC are beyond the scope of the PEIR. Both agencies have authority to review and approve this project and decision-makers will fully consider the environmental impacts identified in the PEIR in this capacity.

See responses to comments H1 above, and G1 and G2 in the Marine Society letter dated November 17, 1998 for discussions of the use of reef balls and kelp planting.

Comments

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We suggest that the CSLC makes the EIR fully describe and appreciate these mitigation measures which are known to be feasible and not harmful to the environment i e. recycled concrete, reef balls, and kelp planting Eventually, the CSLC could require a peer review. According to CEQA. 15126 (d) (3). *"The discussion of alternatives shall focus on alternatives capable of eliminating any significant adverse environmental effects or reducing them to a level of insignificance, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly"*

Then, the CSLC will permit the feasible alternatives and ask for an immediate beginning of action. And, the staff of the California Coastal Commission (CCC) will not obstruct any longer the realization of the SONGS mitigation.

The Lead Agency CSLC has the duty and the power to require the changes which will finally accomplish the long due mitigation. In CEQA are all the legal means:

Section 15041 (a) "A *Lead Agency (CLSC) for a project has authority to require changes in any or all activities involved in the project in order to lessen or avoid significant effects on the environment... ".*

Section 15041 (b) *"When a public agency acts as a Responsible Agency (CCC) for a project, the agency shall have more limited authority than a Lead Agency . ".*

The Marine Forests Society will continue to help the California State Lands Commission and S.C. Edison in the task of accomplishing an environmental duty and abiding by the law.

Rodolphe Streichenberger
Marine Forests Society

Comments

Wendy Morris
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San Clmente, CA 92672

The following are the comments I made on the draft program environmental impact report for the construction and management of an artificial reef in the Pacific Ocean near San Clemente, Ca. On Dec. 10, 1998 at the meeting in San Clemente.

I1. The impact on commercial fishing sites is significant. The mitigation proposed is not enough to make it an LTS.

You will be interfering with and possibly damaging an already proved good fishing area while not guaranteeing that the proposed artificial reef will grow kelp. The construction of the artificial reef may even destroy the already existing good fishing area. How exact can you place the artificial reef material?

I would like to suggest an alternate.

I2. Since phase I is an experiment and not doing mitigation, I propose adding to the experiment a study that would start the mitigation process:

What I propose is to plant kelp in the area of the thin veneer sand without the artificial reef material and on the natural reef

Responses

I1. The SONGS Permit Conditions state that every effort will be made to avoid existing hard substrate in the siting of the artificial reef. To help in this effort, the PEIR suggests mitigation measures (see Section 4.2.2.6) to reduce impacts to local fishermen in the San Clemente area due to construction of the experimental and mitigation reef. The fishermen would be consulted on two occasions: 1) during preconstruction surveys to identify existing hard substrate and proven fishing grounds before finalizing the exact placement of materials, and 2) two weeks prior to onset of construction activities of the experimental artificial reef at the San Clemente site. This mitigation does reduce potentially significant impacts to a less-than-significant level. Another source of mitigation for the short-term construction effects are the likely long-term increases in reef biota, which will include crabs and lobsters, and thus enhance the local trap fishery.

I2. An alternative that relied entirely on kelp planting on existing sand and hard substrate was not considered feasible for meeting the SONGS Permit Conditions and project objectives for the reasons described in the PEIR (see Section 6.3). Restoration attempts to increase the long-term abundance of giant kelp in the sand have not been successful. As a result, recent mitigation

Comments

that exists in the project area. The proposed experiment would still be going forward and the mitigation process could also be starting. You would be more likely to have success over all. If the transplanted kelp were to establish itself on the natural reef you would achieve the goal of the kelp bed with associated kelp bed biota without the negative impacts of 133 additional acres of artificial reef. It is very likely that if any kelp is going to grow, it would grow in the area of historical kelp beds. Historically kelp thrived here from San Mateo point to north of the pier.

Planting kelp right away increases the likelihood of success and could decrease environmental impacts.

Problems

I3. 1) Debris impacts not studied

The PEIR did not adequately study the impacts of the artificial reef, it only looked at the impacts of the kelp bed that might grow on the reef.

You have no way of telling how the reef will affect sediment transport; it's too complex a system to model.

I4. Also the reef will cause waves to refract towards the shoreline which might have a negative impact on surfing. Waves do feel the bottom. The waves could be more parallel to the shore rather than at an angle.

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for adverse impacts to sand-based kelp populations off Santa Barbara has required the addition of hard substrate. Information regarding kelp beds that were located near San Clemente in earlier years is largely anecdotal, but it appears that growth of kelp in this area has been highly variable (SCE 1996a; K. Nielsen, pers. comm. [CSLC Public Meeting 12/10/98]). However, it is recognized that kelp transplantation on artificial reef substrate could increase the likelihood of success in generating kelp growth. The experimental reef design has been modified to include two additional treatments of 34% coverage of rock and concrete to which kelp will be transplanted (resulting in a total of seven replicate blocks of eight reef designs).

I3. The reef is not a solid structure Sediment can move in the interstitial spaces between the reef substrate components The ocean engineers who have examined the project have concluded that the effects of the reef on sediment transport will not be measurable.

I4. The height of the experimental and mitigation reef will not exceed 1 m (the majority of the reef will probably be <0 5 m high). The water depth that the reef will be placed in ranges between 12 to 15 meters. Given the relatively small proportion of the water column occupied by the reef, ocean engineers who examined this project have concluded that the reef will have little to no effect on swell height and direction.

Comments

I5. 2) Contradiction

There seems to be a contradiction in the area of bottom material.

4.3-1 says 25% of the area is exposed bedrock.

App. B p20-21 says the area doesn't grow kelp because "its not of big enough chunks of material. There's some pebbles and small patches of small stone such that its just not conducive for a stable long lasting kelp bed."

If 25% is big solid bedrock materials and the kelp isn't growing there, why would it grow on the artificial reef.

I6. 3) Mapping

The materials of the bottom of the project do change in particular with large storm events. Please note that last winter had many note worthy storms. The bottom has undoubtedly changed as compared to the mapping (App C p. 12 &13). A new mapping should be done after this winter but before the project begins. P2-39 says "The lease area is a high energy dynamic environment in which the thin cover of sand is readily moved by waves and currents."

I7. 4) Table of + and - (App.G p. 13+14)

The table of advantages and disadvantages at various sites shows that being near a historical kelp bed is an advantage, but that a historical kelp bed in the area is a disadvantage. This is a contradiction that raises doubts about the findings of potential sites.

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I5. This apparent contradiction reflects differences in the composition of hard substrate in the project area at different spatial scales. While hard substrate, particularly exposed bedrock, is fairly abundant in the general vicinity of the project site, it is much less common within the project site itself and consists only of small cobbles and pebbles. Sections 4 3 1 1 and 4.6.2 have been revised to clarify this distinction. Although its abundance is highly variable, kelp does grow on exposed bedrock in the area (also see response to comment I2 above). Kelp does not grow well on pebbles and small cobbles because these substrates are easily moved by waves, particularly after kelp attach to them. The materials of the artificial reef will be large enough to provide a stable substrate for kelp.

I6. Sonar surveys will be completed prior to constructing experimental artificial reef modules to determine the ocean bottom conditions in the lease area and to finalize plans. This was not specifically stated in the Project Description and has been added (see Section 3.4, 2nd paragraph).

I7. Table 1, as you noted, presents contradictory information for several potential reef sites about whether there is an advantage or disadvantage in having an existing or historical kelp bed nearby. This is because there are potentially both advantages and disadvantages in having a nearby kelp reef. The principal advantages are: 1) it demonstrates that the area in the vicinity of the site supports or has supported kelp and therefore would be likely to support kelp on an artificial reef, and 2) it provides a

Comments

Monitoring

I have a few problems with the proposed monitoring:

I8. 1) Timing

The biweekly monitoring of the beach should run through the month of March. Our biggest storm in this area occurred on March 25 last winter.

I9. 2) Policy

Most of the area on shore of the project site is State beach which does not clean up kelp wrack, so in order for your mitigation measures to make any sense, you must change their policy or have someone else clean up.

This was stated as a significant impact.

I10. 3) Access with vehicles

Another problem with the mitigation is that much of the State beach is hard to access with vehicles much of the time. How would you get the special equipment for clean up to the site and

Responses

local source of spores for natural recruitment of kelp on the reef. The main disadvantage of having a nearby kelp bed is that construction of an artificial reef at the site would risk disturbing the existing kelp bed. Whether the potential advantages or the disadvantages of a nearby kelp reef would weigh more heavily at a particular site depends on factors such as the relative positions of the kelp bed and artificial reef with respect to depth and prevailing currents, whether an existing kelp bed could be easily avoided during construction, and other factors The information that is currently available at most sites is insufficiently detailed to determine the effects of such factors

I8. You have a good point regarding the monitoring of reef materials and kelp that might wash onshore and into the surf zone. In response to this comment, the mitigation measures will be changed to reflect the need to monitor biweekly through March and to coordinate these visits to follow immediately after very large storms through this period (see Sections 4 8 2 4, 4.10.2.4, and 4.13 2.6).

I9. Any monitoring and clean-up efforts at State beaches will be at the discretion of the State beach managers. This mitigation monitoring is available to the State beaches if they wish to implement this.

I10. Mitigation monitoring and clean up at the State beaches would be implemented under the direction of the State beach managers. Depending on their wishes, any clean up efforts would use the methods they allow

Comments

where would it be stored? Currently the State will not cross the RXR tracks with their sand moving equipment and there is no storage area nearby.

I11. 4) Trust fund

Page 2.14 states there is a significant level of impact from the potential for reef building materials to be moved ashore. Yet, App Hp17, says the monitoring would basically be for 5 years or as long as needed. I believe there could be the potential for artificial reef debris to wash up for the next 100+ years. We're talking about 150 acres of concrete and rocks with a minimum 17% coverage. That is a lot of rocks. They will probably only wash up during big storm events and a lot during every El Nino winter. That is about once every 15 years. But each time it could be a significant impact that would need to be cleaned up for public safety. There needs to be an indefinite trust fund set up for this impact.

I12. 5) Health hazard

Page 2-16 says " People wading, swimming, or surfing could be injured and become incapacitated leading to drowning." This is a significant impact that is not mitigated. First, if monitoring finds that the experimental artificial reef is likely to be washed ashore, the only thing that will prevent this hazard is to not build the mitigation reef.

The supposed mitigation for this does not address the problem stated. It only removes the rocks and concrete from the beach, App.H pl 1. It does not take the danger out of the surf zone where people are wading, swimming or surfing and could become incapacitated in the water, leading to drowning.

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I11. The mitigation measures in the PEIR call for a monitoring program for five years to determine if a problem exists with reef materials and kelp washing onshore. At this time, it is felt there is a very low probability of this occurring. If it is determined that an ongoing clean up effort is needed, then a trust could be established at that time to cover these costs in the future Language to this effect has been included in the mitigation measures for Sections 4.8.2.5, 4.10.2.4 and 4.13.2 6

I12. This discussion in the PEIR has been revised somewhat (see Section 4.8.2.4). The hazard to people of being injured in the surfzone has an extremely low probability for the following reasons: 1) as stated previously, any rocks or recycled concrete material that could be moved by large storm events are likely to be no larger than 15 inches and 6 kilograms (13 pounds) based on previous studies discussed in the report in Appendix F; 2) human injury would occur only while the rocks are being carried by very large waves during extremely heavy storms or immediately after they have been deposited on the bottom near shore. Under these conditions very few people would be expected to be swimming or surfing in the ocean; and 3) materials that land in the surf zone will be buried by sand the same day and most likely within a half an hour (H. Elwany pers. comm.). In addition, the mitigation measure calling for

Comments	Responses
	monitoring of materials on the beach has been expanded to include removal of any obvious rocks or concrete visible in the surf nearshore (see mitigation measures in Sections 4 8 2.5, 4.10.2.4 and 4.13.2.6).
I13. 6) Monitoring Provide an easy means for residents and visitors to contact someone when clean up/rock removal is needed. Some of the best monitoring can be done by people who daily walk, jog or surf this beach. These monitors need easy access to responsible parties.	**I13.** In response to your comment, a contact person will be designated and the public will be noticed of the name and telephone number to contact. This has been added to the mitigation measures (see mitigation measures in Sections 4.8.2.5, 4.10.2.4 and 4.13.2.6).
Questions?	
I14. 1) Where is the funding for this project coming from? Have we already paid for it through our electrical bills? Are we still paying? How long will we be paying for it?	**I14.** The California Public Utilities Commission allowed the regulated project proponents (SCE and San Diego Gas and Electric) to collect $126 million from ratepayers for the cost of mitigation marine impacts from the operation of SONGS. This covers the artificial reef project, the wetland restoration project and the fish hatchery project. Any cost exceeding this amount will be paid by the utility shareholders.
I15. 2) Historically there was kelp in the proposed artificial reef project site. The site has the desired depth and features for growing kelp and there is currently the San Mateo kelp bed adjacent to it. Yet kelp does not grow there presently. 1) Why will dumping rocks or concrete to create an artificial reef adjacent to the natural reef make kelp suddenly grow there'? 2) Why not transplant kelp to the location instead of adding debris? By adding debris and not discovering why there is no kelp there now will not make kelp appear. 3) Why should it grow on the new debris when it's not growing on the existing natural reef now? 4) Wouldn't it be better to try planting some	**I15.** See responses to comments I2 and I5 above.

Comments	Responses
kelp, or to run experiments to find out why the kelp isn't growing there now?	
I16. 3) If the experimental reef does not succeed in growing adequate kelp beds, the mitigation reef should not be built here. There would be no benefits only negative impacts.	**I16.** If the experimental reef project at San Clemente is determined to be a failure due to the site characteristics at this location (rather than because of special circumstances such as an El Nino) then the full mitigation reef would not be constructed at San Clemente. Depending on the circumstances, some other site might be given consideration at that time. However, at present, as explained in the Introduction to the Final PEIR, most of the alternative sites identified in the Draft PEIR are no longer considered viable options. Information from sonar surveys conducted in March 1999 along the coast of Carlsbad indicated that substrate conditions in this area do not meet the sand depth criteria for artificial reef construction. Mission Beach is not being included in the experimental phase because of its great distance from San Onofre Kelp beds, which is the site of the impacts that are being mitigated by the project.
I17. 4) Who will be made aware of the monitoring results? How will the public and interested parties be notified of those results? How could we make comments or suggestions?	**I17.** The CCC will be holding workshops and informing the public of their monitoring results during the five year monitoring program for the experimental reef.

Comments

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VIA FACSMLE

December 8, 1998

Mary Griggs
State Land Commission

Division of Environmental Planning and Management
100 Howe Avenue, #100
Sacramento, California 95825

Dear Ms. Griggs:

The Natural Resources Defense Council (NRDC) has followed with growing impatience the protracted efforts to mitigate the negative impacts on the marine environment caused by the operation of the San Onofre Nuclear Generating Station (SONGS). We write today to request that the State Lands Commission work in conjunction with the California Coastal Commission to ensure that all reasonable alternative s be given fair consideration when determining how best to mitigate these negative impacts.

J1. In particular, w e have been contacted by interested parties who are concerned that the alternatives under review for creation of a reef to mitigate for the loss of kelp forests off the coast have not received equal consideration. NRDC urges the Commission to consider all alternatives fairly. While we consider this mitigation effort long overdue, we believe that the permit

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J1. The PEIR did consider all feasible alternatives that met the basic project objectives of the artificial reef project. Some alternatives were eliminated because they did not provide feasible methods of creating reef habitat to replace the natural resources of San Onofre Kelp bed. The reasons for eliminating these alternatives are described in Section 6.3 of the document.

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objectives must be met in order to bring some closure to this process and to move, forward in the State's efforts to mitigate for the damages to the marine environment caused by SONGS' operation. Please give fair treatment to all alternatives that meet the permit objectives. Thank you for your consideration of our views.

Sincerely

Ann Notthoff
Senior Planner

Responses

Also, please see the discussion in the Final PEIR Section 1.1.2 on changes in the evaluation of the alternative sites for an artificial reef.

Comments	**Responses**
San Diego Oceans Foundation November 30, 1998 Ms. Mary Griggs California State Lands Commission Division of Environmental Planning and Management 100 Howe Avenue, Suite 100 - South Sacramento, CA 95825-8202 RE: Comment on Draft Program EIR -"Construction and Management of an Artificial Reef in the Pacific Ocean Near San Clemente, California. Dear Ms. Griggs:	
K1. We have some preliminary comments on the above EIR relative to the alternatives. Specially, we believe and can easily technically justify not putting all your "rocks in one basket," i.e., serious consideration should be given to placing a portion of the experimental and "final" mitigation reef off Mission Beach in the City of San Diego.	**K1.** In response to this and other related comments, additional work was done to determine if the experimental reef project could be expanded to include another site. The first choice for this alternative site was South Carlsbad. South Carlsbad, North Carlsbad, Leucadia and Encinitas were identified as alternative sites in the Draft PEIR based on earlier studies that showed sandy bottom and a lack of persistent kelp reef. However, these sites were not included in the sonar surveys done previously as part of the siting studies for the artificial reef. The project proponent conducted sonar surveys in early March 1999, along the entire coastline offshore from the City of Carlsbad, including both the North and South Carlsbad sites. These sonar surveys found the coast here has small to medium sized areas of sandy bottom interspersed with patches of hard substrate. However, the area of sand bottom with the appropriate sand depth (0 to 0.5 meters) was limited to a very small and narrow band that runs parallel to shore. The majority of the sandy

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bottom area (approximately 60 to 100 acres) has sand depths of 0.5 to 1 meter. This depth of sand has a much higher risk that the artificial reef material would be buried. For this reason, an experiment at the Carlsbad sites was not pursued.
Mission Beach is not being included in the experimental reef project because it is not a preferred site. This is due to its greater distance to the San Onofre Kelp bed and the fact that the immediate area already has the two largest kelp beds in San Diego County.

K2. Section 6 and Appendix G continually refer to Mission Beach as an alternative site, however, it did not rate highly due to what appears to be misinformation and/or lack of thorough analysis If the purpose of the mitigation reef is to grow kelp (i.e., 4 plants/100m) and enhance the marine life in the Southern California Bight, Mission Beach is a much superior site than San Clemente. Likewise, if air pollution, marine safety, conflicts with commercial fishers, etc. are primary concerns, Mission Beach is a superior site.

K2. The primary reason Mission Beach does not rate highly as a site for the proposed project is its distance from San Onofre, where the impacts to kelp occurred. The site selection criteria for the mitigation reef in the SONGS Coastal Development Permit requires that the site be as close as possible to San Onofre (but outside the influence of SONGS) and preferably between Dana Point and Carlsbad. The rationale for requiring that the mitigation reef be placed close to San Onofre is based on the widely accepted goal that mitigation occur as close as possible to the site where resources are lost. Mission Beach is farther from San Onofre than any of the sites considered in the PEIR.

Briefly, some topics that should be more thoroughly/carefully examined include:

K3. Demonstrated ability to grow kelp on waste concrete at various alternative sites;

K3. The issue of concern in this project is not whether giant kelp can grow on recycled concrete (there is plenty of evidence that indicates it does), but whether a reef built of concrete would adequately compensate for the marine resources lost at the San Onofre Kelp bed. This has not been demonstrated (see response to comment B2 of the letter from the American Sportfishing Association).

K4. Demonstrated sustainable and persistent kelp beds in the vicinity of the alternative sites;

K4. The persistence of kelp beds from Newport Beach to the US/Mexican borders was evaluated using annual maps of maximum kelp abundance produced by Dr. Wheeler North for

Comments

K5. Persistence of waste concrete "on top of" a thick sand (unconsolidated) substrate and the validity of site selection criterion #2. "Presence of a thin sand layer over hard substrate.";

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the entire region dating back to 1967. SCE contractors (Coastal Research Associates) digitized these maps into a Geographical Information System (GIS) database and analyzed this database to assist in siting decisions for the SONGS mitigation reef The results of these analyses can be found in SCE 1996b.

K5. The engineering studies done to date on this project determined that hard substrates placed on thick unconsolidated sediments would sink and disappear (SCE 1996e). Therefore, the CCC suggested that site selection be restricted to those areas where only a thin layer of sand covers consolidated substrate This suggestion was made by the CCC to avoid excessive impacts to air quality and undue costs to the project proponent that would result from placing large amounts of reef material on deep sand. It was felt that a thin veneer of sand would insure that a sufficient amount of reef material would remain exposed after any amount of subsidence into the sand.

The observation that low relief concrete reef has not sunk offshore of Mission Beach where the sand layer is several meters thick runs counter to the predictions of the engineering studies. There are three points to consider in evaluating this observation. First, detailed geotechnical surveys at the Mission Beach Artificial Reef (MBAR) (Ecosystems Management, Inc. 1998) showed the presence of a compacted layer of coarse sand mixed with shells 0.5 to 1 m below the finer sands underlying the concrete reef. The degree to which this compacted layer serves as a barrier that prevents waste concrete from sinking is uncertain. It is also uncertain as to whether other hard substrates such as quarry rock or rubble concrete, that is similar in shape and size to quarry rock, might also have persisted above the sand surface. Second, MBAR occurs deeper than the other alternative sites and wave-induced scour that leads to subsidence of reef material decreases with depth. Third, geo-

Comments	Responses
	technical surveys done at MBAR before and after the severe 1997/98 winter storms (Ecosystems Management, Inc. 1997 & 1998) showed that approximately half of the concrete material in the survey area subsided or was buried by sand during these storms. This raises the possibility that the persistence of MBAR might have been due in part to the fact that it was not challenged by significant wave action until the 1997/98 winter storms.
K6. The assumption that Mission Beach has only "85 acres of suitable substrate" (page 6-9);	**K6.** The 85-acre Mission Beach site represents the suitable area between the two existing CDFG artificial reefs, where the depth range is 35 feet to 55 feet.
K7. Validity of site selection criterion 96, "Area distant from rivers which are sources of sediments and turbidity" relative to the San Diego River and the Point Loma and La Jolla kelp beds;	**K7.** All else considered equal, areas close to river mouths tend to have greater turbidity and higher rates of sedimentation than sites far from river mouths. Impact assessment studies done at San Onofre Kelp bed and elsewhere have attributed low kelp recruitment to high turbidity and increased sedimentation Indeed, the large kelp beds off Point Loma and La Jolla are located relatively close to streams or rivers. However, the reefs at Pt. Loma and La Jolla consist of extensive bedrock, much of which is relatively high relief. Sedimentation and turbidity in these types of habitats tends to be much lower than in the discontinuous, low-relief cobble reefs that are characteristic of the San Onofre/San Clemente region.
K8. Use of waste concrete only in light of the greatly lessened number of tug/barge trips relative to quarry rock; and	**K8.** There are no scientific data allowing one to conclude that quarry rock or recycled concrete is the superior substrate for obtaining the project objective ("to provide adequate conditions for a community of reef associated biota similar in composition, diversity, and abundance to the San Onofre kelp bed) It stands to reason that a reef designed to resemble the physical characteristics of SOK has a better chance of compensating for the lost resources than does a reef having physical

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	characteristics that are very different from SOK. This reasoning is the basis for the CCC requirement that quarry rock be used to build the mitigation reef; quarry rock resembles the cobble/boulder substrate at SOK more closely than recycled concrete and other types of reef materials (e.g. tires, cars, reef balls, etc). A major objective of the experimental reef is to test whether a reef project built from recycled concrete performs as well as a reef built from quarry rock. Recycled concrete may potentially be less expensive and result in fewer construction impacts. The densities of quarry rock and concrete are slightly different but similar. Differences in the amount of material needed to construct the artificial reef with the two materials result from variations in the size and shape of concrete versus rock. The question remains as to which of these materials will better meet the project objectives, and as a result both are being tested in the experiment. Since the Draft PEIR was issued, further discussions with material suppliers have lead to corrections in the assumptions for the weight of quarry rock and recycled concrete. The quarry rock is approximately half the weight previously estimated, while the concrete is 1.7 times heavier than previously estimated. With these revised weights, about 1.3 times as much quarry rock as recycled concrete would be needed to construct the experimental and mitigation reefs. This reduces the differences in impacts between the two materials substantially.
K9. A reassessment of depth in which "scouring" and total annual kelp biomass are thoroughly addressed.	**K9.** The experimental reef modules will be placed within a depth range of 39 to 47 feet on a thin layer of sand (0 to 0.5 m) over hard substrate. The transport of sand at this depth by wave action is not significant, but during large storm events sand scour can be substantial. The sand scour may kill many invertebrates and algae living on hard substrates. However, as waves subside, new algae, particularly kelp, recruit more

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quickly than invertebrates and thus compete more effectively for substrate. Kelp biomass is an important objective of the experimental reef project. Generally, the higher the density of adult kelp, the higher the kelp biomass. The purpose of the experiment is to choose a reef design that provides sufficient kelp to meet and exceed the kelp density performance criteria of the permit.

K10. Finally, we believe there should be a total re-evaluation of the Mission Beach alternative as presented in Tables 1 through 4 in Appendix G. Furthermore, if other criteria such as air pollution, were included in the matrix of Table 2 and some of the criteria data were updated, it is clear that Mission Beach would rate very highly as a SONGS mitigation's reef site.

K10. Tables 1 through 4 in Appendix G were meant to provide a general screening and ranking of alternative sites based on the criteria in the SONGS Permit. These criteria were developed to help ensure that the mitigation reef site will succeed in meeting the project objectives of replacing lost resources at the San Onofre Kelp Bed.

Factors such as air quality and other environmental impacts are evaluated in the PEIR on a comparative basis. The Mission Beach site compares favorably in terms of environmental impacts, but ranks low with respect to meeting the project's goals.

K11. Although not a CEQA requirement, there should be consideration for project costs. Or to put it another way, if this entire reef project is on a fixed budget of $ 100,000,000, it would be desirable to create the most kelp at the lowest cost per acre, then there could be a larger reef or more reefs. The current long-term cost will most likely exceed $600,000 per acre. If a reef were placed in the most cost effective location with the least expensive materials, it should be possible to substantially reduce the per acre cost. We believe the gross long-term cost should be no more than $300,000 per acre and thus the SONGS mitigation budget could be used to create a much greater positive impact on the Southern California Bight's living marine resources. The San Clemente site is problematic and the

K11. In response to comments, a range of cost figures for the experimental reef project and alternatives have been included. Because the full mitigation reef is not being permitted at this time and due to the uncertainty of future costs and the final reef design, estimates have not been included for the full mitigation reef build outs (see Sections 3.8 and 6.6). However, per unit costs for the delivery of recycled concrete and quarry rock have been provided so parties may do estimates of various build-out scenarios in current dollar values

Comments	**Responses**
use of quarry rock is very expensive and negatively impacts terrestrial sites. We expect to submit additional comments at a later date. Sincerely yours, Richard D. Glenn, Ph.D. Executive Director	

Comments

San Diego Oceans Foundation
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San Diego, CA 92169-2672
(619) 523-1903/Fax (619) 523-1979

December 23, 1998
Ms. Mary Griggs
California State Lands Commission
Division of Environmental Planning and Management
100 Howe Avenue, Suite 100 -South
Sacramento, CA 95825

RE: Draft PEIR for SONGS Mitigation Artificial Reef, 2nd Comment Letter

Dear Ms. Griggs:

L1. The Foundation's 1st Comment Letter (November 30, 1998) addressed the inaccurate assessment of Mission Beach as an alternative site. Further investigation by this office revealed the Mission Bay site to be far superior to the San Clemente site and thus should receive serious consideration by the California Coastal Commission as an area to place a major piece or all of the mitigation reef.

This 2nd Comment Letter examines various deficiencies, errors, and other problmes within the PEIR and the project as a whole.

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L1. The choice of San Clemente as the preferred site for the proposed project was based on its close proximity to the San Onofre Kelp bed (SOK), its relatively large size that can accommodate the entire project, and its high potential to meet the physical and biological objectives of the project as determined by studies conducted by SCE. Since the objective of the project is to replace lost biological resources at SOK, it is preferable to have the resources replaced as close as possible to the site of damage. For this reason, one of the criteria for site selection in the CCC permit is that the "*Location be as close as possible to San Onofre Kelp bed (SOK), and preferably between Dana Point (Orange County) and Carlsbad (San Diego Co), but outside the influence of the SONGS discharge plume and water intake, and away from Camp Pendleton.*" (SONGS Permit #6-81-330-A, p.31). However, in order to consider a full range of alternatives, the PEIR evaluated sites outside of this geographical range that were thought to be viable for artificial

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	reef construction. Dennis Bedford, Coordinator of the CDFG Artificial Reef Program has concluded that Mission Beach is not an acceptable site for the mitigation reef and recommends against pursuing this alternative site (see March 19, 1999 letter, Appendix I). CCC staff scientists concur with the CDFG opinion that Mission Beach is not a good site because of its distance from SOK and the need to provide mitigation as close as possible to the lost resources.
L2. It is not clear that reef shape has been considered within the experimental design, i.e., there should be consideration given to the "edge effect."	**L2.** Reef shape is not a factor in the proposed project, but it was considered. The decision to make all modules similar in size and shape was made in an attempt to optimize replicate size and number while balancing impacts to air quality and cost. Making all modules as similar as possible in size and shape should cause any "edge effects" to be similar among all treatments, and thus not substantially alter the results of the experiment. Monitoring of permanent transects on each module should allow the extent of edge effects to be determined.
L3. Similarly, reef orientation relative to currents, surge, and other water movements does not seem to be considered.	**L3.** The proposed experiment was designed to make sure that replicates in each experimental treatment were oriented similarly to currents, surge, distance offshore, and sand depth. A goal of the proposed design was to avoid confounding the effects of these oceanographic factors with the experimental treatments (substrate type and coverage, and location within the larger experimental site).
L4. Use of waste concrete only should be given serious consideration as it is cheaper, has no land form impacts (in contrast to quarry rock), and, is now known to support kelp growth very well (probably better than quarry rock). Also, as shown in Table 3-4, the quantity would be 23% of that required for quarry rock only and thus most of the truck trips and barge loads would not be required. This equates to major reduction in	**L4.** Evaluating the performance of recycled concrete is an important objective of the project and is given full consideration in the experiment. The experiment will test whether a reef built from slabs of concrete mixed with larger pieces of rubble performs as well as a reef built from quarry rock of various shapes and sizes, which more closely mimics the size and shape of natural boulders found at SOK.

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air pollution and hazards related to transportation and installation.	Since the Draft PEIR was issued, further discussions with material suppliers have lead to corrections in the assumptions for the weight of quarry rock and recycled concrete. The quarry rock is approximately half the weight previously estimated, while the concrete is 1.7 times heavier than previously estimated. With these revised weights, about 1.3 times as much quarry rock as recycled concrete would be needed to construct the experimental and mitigation reefs. This reduces the differences in impacts between the two materials substantially.
L5. Relative to Table 3-5, it seems inappropriate for a single individual to establish reef material criteria for a project that could easily have a budget similar in size to that of the entire Fish and Game Department for one year, i.e., the policy and financial implications are such that there must be very substantial scientific evidence to support these criteria and the policy should be subject to public review.	**L5.** The CDFG Material Specification Guidelines were developed based on 40 years of experience with artificial reefs constructed from all types of materials. The Guidelines have been revised periodically based on new information and experience with new artificial reefs. The guidelines were developed by staff and reviewed internally and represent the policies of the Department.
L6. Section 3.4.3 does not take into account an alternative location such as Mission Beach, which could be used year round to install a reef Because of its proximity to the Port of San Diego, the shortened barge trips would allow for more rapid installation of the reef materials.	**L6.** Mission Beach was considered as an alternative site in Chapter 6, however in the Final PEIR this alternative site is not recommended for the experimental or mitigation reefs.
L7. On page 3-16, the construction period is restricted to May 1 through September 30 because of not wanting to interfere with lobster fishing. The season ends in mid-March - why is April excluded? If the Mission Bay site is used, this lobster season problem would be substantially eliminated.	**L7.** The construction period designated in the PEIR represents consideration of several factors, including: 1) the lobster fishing season, and 2) information from potential contractors regarding the time of year when ocean conditions are best suited for construction. Although different contractors had varying opinions and much depends on the weather conditions in April, we made a conservative assumption that construction was not feasible until May 1.

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L8. Relative to commercial fishing (Section 4):

- There is disagreement between statements on page 4.2-3 and the data in Tables 4.2-1 and 4.2-2;
- If there are commercial fisheries resources in the San Clemente site, will the project have an adverse impact upon them;
- What will be the long-term impact as a result of more habitat for lobsters, urchins, etc;
- Should urchin divers be retained to control urchins because of their kelp eating habits; and
- Although socioeconomic impacts are "optional" in EIRs, it seems prudent to explore this much further relative to fisher employment, landing taxes, secondary impacts on fuel docks, bait suppliers, etc.

The biological section (4.6) has so many inaccuracies, deficiencies, superfluous data, and lack of quantitative analysis that it should be totally redone. As examples of problems:

L9. Table 4.6-1 should present those animals that actually live in the project site including both hard and soft substrate habitats, i.e., barnacles do not attach to sand;

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L8. The disagreement in the text and tables have been corrected (see Section 4.2.1.1 Commercial Fishing and Tables 4.2-1 and 4.2-2). The only potential adverse impact of the project on fisheries resources is disturbance during reef construction to areas of hard substrate currently fished by commercial fishermen. To avoid such disturbance, the PEIR (Sections 4.2.2.5 and 4.2.2 6) suggests the following mitigation: commercial fishermen in the San Clemente/Dana Point area will be consulted on two occasions: 1) during pre-construction surveys to identify existing hard substrate and proven fishing grounds before finalizing the exact placement of materials and 2) two weeks prior to onset of construction activities of the experimental artificial reef at the San Clemente site. This mitigation reduces a potentially significant impact to a less-than-significant level. In the long term, the project is expected to have a highly beneficial effect on lobsters, urchins, and other fisheries resources. Natural increases in sea urchin populations that result in loss of kelp and the creation of urchin "barrens" is a common occurrence in kelp forest communities worldwide.

L9. A list of the animals that actually live in the project site is presented in Table 4.6-3. The more general list of animals of sand bottom communities in the southern California Bight (Table 4.6-1) is included in the PEIR because impacts to the community could result in changes leading to colonization by new species. For example, while it is true that barnacles do not attach to sand, barnacles are commonly found in sand bottom communities attached to hard structures created by other organisms such as architect worms (*Diopatra ornata*) (as described in Section 4.6.2.6 Biological Interactions, of the Final PEIR). As noted in Section 4.6.8.2, Food Resources, of the PEIR, *D. ornata* mats often form near kelp reefs, creating opportunities for habitation by organisms (such as barnacles)

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that would otherwise not be present in the sand bottom community.

L10. Table 4.6-2 has a "shopping list" of both fish and rays but excludes sharks and a variety of fish which should exist in the project site during part or all of the year;

L10. The fish listed in Table 4.6-2 are those judged, on the basis of the sources cited, to be most common in subtidal sand bottom communities of the Southern California Bight. The list is not intended to be exhaustive.

L11. Table 4.6-4 lists 32 whales and dolphins only two **of which** are noted as likely to occur in the project area - what's the point?

L11. There are two objectives for Table 4.6-4: 1) The table lets readers know which marine mammal species were evaluated for impacts. This information is especially important for this group of animals because all marine mammals are federally protected. 2) As indicated in Section 4.6.10.1 of the PEIR, marine mammals potentially could collide with the barges hauling reef material. This is a potential impact that could occur outside of the project site. The table lists all species that could be affected by the project. More detailed information is provided in the text for the species that are most likely to be affected.

L12. Likewise, Table 4.6-5 lists dozens of extraneous bird species.

L12. Table 4.6-5 does not list extraneous bird species. The table lists all species that could be affected by the project. More detailed information is provided in the text for the special status bird species that are most likely to be affected. Just because a species does not occur in the project site does not mean it would not be affected by the project. For instance, as noted in Section 4.6.10.2 Marine Birds of the PEIR, kelp wrack originating in the new reef could washed up on the beach and affect a variety of species. As indicated in Table 4.6-5, state and federal statutes protect many of the bird species.

L13. However, there are no scientific names so one can not be sure of the writer's interpretation; and

L13. The names of birds given in Table 4.6-5 are from the *Check-List of North American Birds*, a list of common names of birds sanctioned by the American Ornithologists Union. Because of their official status, these names are as unambiguous as

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L14. The overall biological generalities serve no purpose especially in light of the fact that the project is to mitigate for loses of living marine resources.

L15. The long-term impacts on biological resources should be given a thorough quantitative analysis regarding those resources destroyed by the reef installation process and "created" by the new/changed 150 acre habitat. There are criteria already established to assess the success of the reef, i.e., four kelp plants per 100 square meters, a standing fish stock of 28 tons (English or metric?), and biological assemblages which are similar to natural reefs. However, without a quantitative listing of what is already in the project site, it will be quite difficult to judge the impact of the mitigation reef.

It seems that after decades of analysis and tens of $1,000,000's spent on surveying and monitoring the San Onofre area, the Draft PEIR could be much more precise regarding biological impacts. It would be most appropriate to predict the numbers of individual organisms, their weights/biomass, their locations, etc. within the project site.

L16. How much time is necessary for an artificial reef to achieve parity with a natural reef?

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scientific names and are commonly used in ornithological publications.

L14. One purpose of the environmental setting in an EIR is to provide the *average* reader a general understanding of the context within which a proposed project or action would occur. Therefore, general descriptions of the different disciplines, including biological resources, are valuable, even if they risk boring the expert reader.

L15. A quantitative listing of the benthic invertebrates already in the project site is provided in Table 4.6-3 of the PEIR. This table has been moved forward in the text of the Final PEIR to make it more apparent. The CCC certainly agrees that it would be useful to have precise information concerning the types, numbers, weights and locations of organisms that would be present at the project site after the project is constructed However, while it would be possible to make predictions about this information, to do so would be highly misleading because the ecosystem processes that affect these organisms are too poorly understood to make any such predictions reliably. The SONGS Permit recognized this uncertainty in developing performance standards and therefore, except for giant kelp (*Macrocystis pyrifera*), did not include specific species and abundances in the standards (see pages 35 and 36 of permit in Section 3.0 insert of PEIR.

L16. There are few data that provide information on the length of time needed for an artificial reef to achieve parity with natural reefs. The proposed experiment should provide valuable information in this regard. Recent surveys at Mission Beach Artificial Reef (MBAR) indicate that populations of sedentary invertebrates on this reef are still far below that of natural reefs

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	in the region. Continued monitoring of MBAR is needed to determine whether this is a temporary or permanent condition.
L17. How will sport and commercial fishing be factored into the assessment of mitigation success?	**L17.** There will be no restrictions on fishing in the project site Because the same will be true for areas chosen as reference sites, there is no reason to believe that fishing will bias either the results of the experiment or the long-term success of the mitigation reef (which will be evaluated relative to natural reefs in the region). The degree to which fishing is enhanced by the mitigation reefs will not be used as a criterion for judging its success. Rather the success of the mitigation reef will be judged according to the performance criteria identified in the CCC Coastal Development Permit for SONGS. (# 6-81-330-A)
L18. How were the criteria developed relative to natural oceanographic and biological cycles?	**L18.** Most of the performance criteria are relative standards meaning that the performance of the mitigation reef will be measured against that of nearby natural reference reefs, which will be monitored concurrently with the mitigation reef (see CCC permit # 6-81-330-A). A few criteria (e.g., kelp and fish) are fixed standards in which a certain density or biomass needs to be attained. In the event that those standards are not met and information from reference sites indicates that the reason for noncompliance of these standards is due to natural oceanographic and biological cycles within the region, then determining compliance will take these factors into account
L19. What is the impact of the sewage outfall to the north? On March 23, 1998, the Foundation submitted a brief and general six point letter regarding the Notice of Preparation (NOP). It is not clear that the Draft PEIR thoroughly addressed the six points/concerns. It is the Foundation's belief that the purpose of the NOP is to determine all possible concerns and address them in the EIR. If the concerns are not relevant or appropriate, it is incumbent on the EIR preparers to so	**L19.** Proximity to sewage outfalls was a criterion used in the site selection process and the potential effects of the SERRA sewage outfall to the north was considered in the evaluation of the San Clemente site. Because the outfall is located approximately 6.5 km from the northern border of the San Clemente site, its effect on the project was considered to be insignificant. The proposed design, which positions replicates at different distances from the outfall, will provide some

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state and provide a rationale for not addressing the concerns.

In closing, the complexity, uncertainty, and bureaucratic nature of the project makes it rather difficult to assess. The "bottom line" from the Foundation's perspective pertains to stewardship. Will the ocean and its users benefit from this project? If so, to what extent? Is this the best way to use a large quantity of "public" money to benefit marine resources?

Please send the Final PEIR to this office. Thank you for your consideration.

Sincerely y ours,
Richard D. Glenn, Ph.D.
Executive Director

RDG/cd

Responses

information about the possible influence (or lack of an influence) of this outfall.

Comments

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FAX TO: Ms. Mary Griggs

December 28, 1998

California State Lands Conservancy, Fax #: 916-574-1885

RE: Artificial Kelp Reef near San Clemente, (SONGS Mitigation)
EIR No. 685, SCH 98031027

To whom it may concern:

On behalf of the San Diego Chapter of the Sierra Club I would like to express our support for the proposed kelp mitigation project. We offer the following thoughts and concerns.

M1. 1) EXPERIMENTAL REEF LOCATION
a. More comprehensive reports by Dr. Wheeler North, (1990 -1994), indicate that the preferred site, (San Clemente), was the largest giant kelp bed off the Orange County Coastline until 1959 when most of the kelp disappeared. Most of this kelp has not returned. This suggests that this site might not be successful for kelp restoration. The EIR does not indicate what may have caused the loss of giant kelp at San Clemente nor that conditions have changed in recent years such that kelp restoration at this site is now feasible.

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M1. The ultimate cause of the disappearance of the kelp population off San Clemente is not known, but it is believed to have been due in part to adverse growing conditions associated with the 1957-58 El Nino. Reasons for the lack of recovery of giant kelp at San Clemente are also unknown, largely because this area went unstudied until SCE began its recent investigations. It is possible that prior to 1959 giant kelp at San Clemente grew in the sand. Natural recovery of kelp populations growing on sand is a slow process that can take decades. For example, the sand-based kelp beds off Santa Barbara have yet to recover from the 1982-83 El Nino (in contrast, kelp populations on rocky reefs in the Santa Barbara area recovered rapidly from the 1982-83 El Nino). Restoration attempts to increase the long-term abundance of giant kelp in the sand off Santa Barbara have been

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M2. b. Smaller, perhaps 5-10 acre sized experimental reefs, should be considered at several locations along the southern California coastline. This would increase the probability of finding a successful site during the experimental reef phase.

unsuccessful. As a result, recent mitigation for adverse impacts to sand-based kelp populations off Santa Barbara has required the addition of hard substrate. Similar rationale has factored into the determination that the addition of hard substrate is the best method for restoring kelp to the San Clemente region. The recent studies by SCE suggest that the paucity of kelp off San Clemente results from a paucity of emergent rock. The observation of kelp growing on emergent rock scattered about in this area lends support to the belief that the creation of an artificial reef off San Clemente would greatly increase the standing stock of giant kelp and associated biota.

M2. Location was given much consideration prior to selecting the San Clemente as the preferred site for the project. The project proponent conducted numerous studies on the physical, oceanographic and biological characteristics of many different sites prior to choosing San Clemente as the preferred site for the project. Repeating the experiment at numerous locations with less area of coverage would require use of fewer or smaller modules. However, the individual reef modules need to be large enough to adequately represent the much larger mitigation reef with respect to the important physical and biological processes affecting kelp forest ecosystems. Also, the number of modules of each reef design needs to be large enough to provide sufficient statistical power for making informed decisions on the relative performance of the different reef designs. Decreasing module size or replication in order to increase the number of locations tested compromises the experimental design at any particular site by reducing the power to detect differences among experimental treatments.

In response to this and related comments concerning the risk associated with conducting the experiment at the San Clemente site, two separate plans were considered to reduce this risk One

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plan was to expand the experimental reef to include a site at South Carlsbad and the other was to add kelp transplanting treatments to the experiment. The Mission Beach site is no longer being considered for the experimental phase of the project because of its distance from the San Onofre Kelp bed The plan to expand the experimental reef to include a site at South Carlsbad was rejected because, as explained in the Final PEIR Introduction, information from sonar surveys conducted in March 1999 along the coast of Carlsbad indicate that substrate conditions in this area do not meet the sand depth criteria for artificial reef construction. However, as described in the Final PEIR Introduction, the plan to add kelp transplanting treatments was accepted.

M3. 2) HISTORY OF KELP OFF SAN CLEMENTE SHORES
a. The EIR does not include important information on water clarity, turbidity, or the history of kelp in the San Clemente area.

M3. See responses to comments M1 above and M4 below regarding the history of kelp in the San Clemente area. The only available information related to water clarity and turbidity in the San Clemente area is data on irradiance and seston flux obtained from five sites ranging from north of the lease site to San Mateo Kelp (SMK). The data were collected from May 1993 to January 1994 (SCE 1994).

Irradiance, a measure of the intensity of light, was measured at the sea bottom and two meters above the bottom. Water clarity is one of several factors that affect irradiance. Irradiance varied little among the five measurement sites. Irradiance at all the sites peaked during August and was lowest during the winter. Maximum irradiance at most sites was about 8 Einsteins per square meter, whereas the minimum was near zero.

Seston flux is a measure of the amount of sediment that accumulates in seston traps (tubes) placed on the sea bottom. It provides an index of the amount of particulate matter in suspension and is related to turbidity, but seston flux and

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	turbidity are not the same thing. Seston flux in the San Clemente area was greatest at the SMK site and the closest site north of SMK. The remaining sites had similar levels of seston flux. Temporal variation in seston flux was high. The index was greatest at most sites for a three-week period beginning July 1st, and during one week in October, one week in November, and one week in December.
M4. b. Is the kelp type proposed for the project consistent with the kelp that grew historically in this area?	**M4.** It is uncertain what type of kelp was historically present at San Clemente. There are anecdotal reports that the type of giant kelp found growing in the sand off Santa Barbara occurred at San Clemente prior to 1959. This type of kelp has a broad, relatively flat holdfast that helps to anchor the plant in the sand. There are no plans to use this type of kelp in the present project because the objective of the project is to grow kelp on hard substrate not on sand. Attempts to permanently restore populations of giant kelp to sand without adding substantial amounts of hard substrate have failed.
M5. 3) SUBSTRATE DESIGN a. Will the flat, 6" thick, concrete slab substrate design, size, and weight, sufficiently anchor the growing kelp system and keep wave action from moving it toward the shore?	**M5.** The issue of materials washing onshore was discussed in the PEIR based on the report contained in Appendix F. The likelihood of rock or concrete coming onshore is very small and if any pieces do wash ashore, they would be very small (less than 13 pounds). A mitigation measure was included to cover this possibility, which includes monitoring the beaches during the year and removing any project related materials.
M6. b. Will the cement substrate be sufficiently porous containing cracks and crevices which would support and encourage kelp recruitment and anchoring?	**M6.** It is not known at this time if the recycled concrete will provide all substrate habitats necessary to meet the SONGS Permit conditions. The experimental reef is designed to answer such questions.
This EIR was reviewed by the our Sierra Club chapter Coastal Committee with benefit of a member that worked in marine geology, physical oceanography, and near shore processes for the last 30 years.	

Comments

Thank you for considering our questions and concerns. It is our hope that the project will be a complete, and timely success.

Sincerely,

Eric Bowlby
Coastal Committee Co-Chair, San Diego Chapter
SIERRA CLUB, 619-284-9399

Responses

Comments

Responses

Southern California Edison
P.O. Box 800
2244 Walnut Grove Avenue
Rosemead, CA 91770

December 24, 1998

Mary Griggs
California State Lands Commission
Division of Environmental Planning and Management
100 Howe Ave., Suite 100 South
Sacramento, California 95825-8202

Subject: Southern California Edison Company's Comments on the "Draft Program Environmental Impact Report (EIR) of the Construction and Management of an Artificial Reef in the Pacific Ocean Near San Clemente, California"

Dear Mary:

Enclosed are Southern California Edison Company's (SCE) comments related to the draft EIR on SCE's proposed artificial reef project. We recognize that many of the issues related to this project are complex and that preparation of the draft EIR was not an easy task. The California State Lands Commission staff and its contractor, Resource Insights, are commended for their efforts.

Our comments were formulated after considering testimony presented during the December 10, 1998, public meeting on the draft EIR held in San Clemente, and are being forwarded to you with the intent of assisting with completion of the environmental review and permitting process as soon as practical. We hope these comments assist you in producing a Final EIR which identifies a preferred project that will 1)

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achieve cost-effective compliance with permit conditions as quickly as practical, 2) require little, if any, adverse environmental impact and construction mitigation, 3) result in the lowest possible public opposition and the greatest public support, 4) have the lowest possible need for remediation, and 5) enable the implementation of a kelp reef project that will become a model for, and encourage, future reef construction efforts.

Our comments focus on several issues raised during the December 10, 1998, public meeting that we feel need further consideration in the EIR. These fall under the following general areas:

1. The Project Description, Project Phases and Permitting Issues: Especially as related to a) the actual phased components of the overall project, and b) the determination of the potential size of the mitigation reef based on the evaluation of the experimental reef.
2. Air Quality Impacts and Costs: Testimony was provided pointing to the advantages of using recycled concrete, and basing operations for transport of the material in San Diego. The draft EIR overestimates impacts associated with the use of recycled concrete because it considers more than just the incremental increase in emissions resulting from the reef project. Moreover, it was emphasized that the EIR should give greater consideration to the reduced air quality impacts and costs associated with using recycled concrete.
3. Environmental Benefits From Use of Recycled Concrete: The other environmental benefits from using recycled concrete for reef construction, besides air quality, were not fully considered in the EIR. Concrete is either recycled for other purposes, resulting in greater air emission, or is a waste product which must be placed at landfill disposal sites. Its use in reef construction is a beneficial use with attendant environmental benefits which would not be associated with quarry rock. Moreover, testimony was presented which provides strong evidence that recycled concrete can result in the construction of

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a reef in much less time than would quarry rock and still meet the performance standards of the SONGS coastal permit.

4. Experimental Reef Phase and Monitoring: Comments were made at the public meeting that the 5-year experimental reef component of this reef project is unnecessary. Information exists today which provides strong evidence that kelp will grow on recycled concrete and quarry rock. Research should be focused on those parameters important to a persistent kelp community, and substrate type is not one of them. Moreover, it is unclear from the description of the monitoring plan in the EIR, as drafted by the Coastal Commission staff (EIR Appendix E), how decisions as to construction of the full mitigation reef would be made, based on evaluation of results from the experimental phase.

5. Proposed New Alternative to the Experimental Reef. At the December 10th public meeting, it was suggested that SCE reconsider the use of kelp transplantation in the experimental reef plan. We agree that it would be advantageous to modify the plan to include transplantation, and we provide an alternative project which includes transplantation. This new alternative is a refinement to the experimental reef project. It adjusts the modules so the overall experimental project size remains about the same as the present preferred project, but it includes modules specifically for kelp transplanting to test the feasibility of kelp transplanting methodologies.

6. Kelp Transplantation: Comments were also made at the public meeting strongly encouraging the use of kelp transplantation, either in lieu of or in conjunction with construction of the artificial reef, to ensure establishment of kelp plants on the reef and compliance with the kelp density performance standards set forth in the SONGS permit. The question was further raised during the December 10th meeting as to why one would expect kelp to grow on an artificial substrate such as quarry rock or concrete when it is currently not growing on natural substrate in the San Clemente area. The EIR should consider the use of kelp transplantation onto both natural

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substrate and artificial substrate in the San Clemente area as an alternative means of creating the kelp community necessary for mitigating SONGS impacts.

7. Economic Evaluation: Comments were raised at the public meeting regarding the draft EIR's lack of an economic evaluation of the proposed project and the various alternatives. We concur that this evaluation is necessary.

8. Other Comments: Miscellaneous issues we feel the EIR should address.

We believe many of the comments made during the December 10th hearing have merit, and that the EIR should fully address them. Our enclosure also provides comments on miscellaneous issues and on what appear to be minor errors or omissions.

We look forward to working with you in completing the environmental assessment of this kelp mitigation project to enable commencement of project implementation.

Sincerely,

Frank L. Melone
SONGS Mitigation Project Manager

cc: Elaine Russell, Resource Insights

Southern California Edison Company Comments on the "Draft Program Environmental Impact Report of the Construction and Management of an Artificial Reef in the Pacific Ocean Near San Clemente, California"

Responses

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N1. 1.Project Description, Project Phases and Permitting Issues:

The project description (Section 3.0, p. 3-1, p.3-2, p.3-4, p. 3-9) as well as the draft monitoring and management plan (Appendix E), and Section 6.2 (p. 6.3), imply that the mitigation will be carried out in two phases: 1) an experimental reef and 2) the mitigation reef. It is also implied that the design of the mitigation reef, including its size, will be determined based on the results of the five year experimental phase. However, this was clearly not the intent of the original permit or the subsequent amendment (copy of actual Permit shown between pages 3-3 and 3-4, and Appendix D). Instead, the permit indicates that, after the experimental phase, a 133.2 acre reef will be constructed, and dependent on how that reef performs, a third (remediation) phase, which may include expansion of the hard substrate area or kelp augmentation, may be required (see Section 3.5.2, p. 3-23). The experimental reef plan was not designed to provide an estimate of the size of the reef required to provide 150 acres of mitigation, but only to indicate what materials to use and what percentage coverage of the bottom with these materials would likely allow the reef to meet performance standards for a 150 acre reef

A more proper description of the Project for environmental assessment purposes would be as follows:

Phase I Permitting and Construction: The experimental reef will be 16.8 acres [Permit Section 1.3 - p.32], to be built within one year of permitting [Permit Section 1.4 - p.32]. The Permit approval process is estimated to be completed in Spring 1999; and the experimental reef is expected to be built between May and September 1999. Experimental Reef remediation, if necessary, will occur within 90 days of the post-construction surveys [Permit Section 1.4 - p.32].

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N1. The phasing described in the project description of the PEIR is correct. The CCC staff acknowledge that the experimental reef is not designed to determine the ultimate size of the mitigation reef. Nonetheless, information obtained from the experiment will provide valuable insight into whether a 150-acre reef is likely to support 150 acres of medium to high density kelp and associated biota. The Permit calls for the development of the mitigation reef in three possible phases as described in your comment letter and the PEIR's project description describes this as well. The approach of the PEIR was to evaluate a worst-case analysis with a range of reef development for the full mitigation reef. Given the uncertainty of the need or timing for a third phase, the analysis in the PEIR assumed a conservative, worst-case scenario of immediate reef development of up to 300 acres. It is not too speculative to discuss the possible outcome of additional reef development of up to 300 acres, as the information to evaluate this scenario is available. The reason for preparing a PEIR at this time was to consider all possible future development scenarios.

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Remediation is assumed to be adding material to certain modules that the surveys show to be deficient, and possibly adding new modules if the initial ones are just too far askew in some way. The remediation could also include adding modules if existing hard substrate has been unintentionally impacted. It is assumed that the remediation will not include either dismantling, moving, or removing newly built experimental modules or any of their parts.

Phase I Monitoring: To begin once the experimental reef is built, and lasting for five years [Permit Section 1.5 - p.32]. This monitoring is estimated to be conducted from Fall 1999 through 2004. A draft monitoring plan proposed by the CCC Staff is attached to the EIR as Appendix E. SCE comments on that plan are attached to this document as Appendix A.

Phase II Permitting and Construction: The assessment of the experimental reef results and design of the mitigation reef will take 6 months [Permit Section 2.1 - p.33] and the permitting will take about one year [Permit Section 2.1 - p.33]. This results in the construction of the mitigation reef being initiated at the earliest, in mid-2006. The construction of the reef will take from one to four years; completion will be sometime between 2007 and 2010.

Phase II Monitoring: Monitoring will last for at least 10 years [Permit Section 2.4 - p. 3 7], through about 2017-2020, and possibly with a lesser intensity annually after that period [Permit Section 2.4 - p.37], through the operation fife of the generating station. Therefore Commission-staff monitoring of the mitigation reef will continue through the year 2037 [Permit Section 2.4 - p.34].

Phase III - Remediation: The permit states that remediation will include independent studies to assess why kelp may not be growing on available substrate, and to determine any corrective actions [Permit Section 2.4 - p.35]. The permit then states that additional hard

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substrate may be added if failure is due to insufficient hard substrate [Permit Section 2.4 - p.35]. The permit further clearly states that if sufficient hard substrate appears to be available, but kelp recruitment is low, then kelp transplanting experiments will transpire to determine the best method of establishing kelp on the reef [Permit Section 2.4 - p.36]. If there are five years of unsuccessful kelp establishment or augmentation activity, then the effort will cease, and/or if the Executive Director determines that oceanographic conditions are unfavorable, then the kelp establishment effort may be deferred [Permit Section 2.4 - p.36].

Clarification of Phase III: In Section 3.5.2, Mitigation Reef Monitoring and Remediation, p. 3-23, there is mention of an additional reef building activity as a "third phase". This section continues on to describe activities that may result in up to 300 acres of artificial reef for kelp (based on the observations of kelp at San Mateo kelp bed), more material put into the kelp bed at a later time, and enhancing the coverage of kelp plants. Appropriately, these possible additional activities are not included in the events phases listed on p.3-25. The possibility of a Phase III is purely speculative, as it would be based upon the results of the Phase II mitigation reef, which results cannot now be predicted with any accuracy. Thus, the EIR should not bother to describe these hypothetical outcomes.

2. Air Quality Impacts, Mitigation, and Costs:

Air Quality Impacts and Costs

The air emissions discussion for use of broken concrete (page 2. 11 and Chapter 4.4) has assumed that the assessment for mitigation must take into account all truck related emissions from the point of collection to the point of barge-loading. However, the recycling of concrete from road and building sites is a mature industry in this region. The activity is already permitted, and the emissions are part of the regional inventory. This industry collects used concrete, and

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then either stores it at central holding sites, crushes it for reuse, or delivers it in bulk where needed. If it is not sellable, the concrete rubble is placed in sanitary landfills. Landfill space is typically far from urban centers or the ports and is rapidly disappearing in the South Coast Air Basin.

N2. A re-assessment of the air emissions using the "incremental impact" of the use of recycled concrete in this project may find that there are no additional air emissions, and in fact could find a possible reduction in air emissions resulting from elimination of steps in ongoing recycling processes when recycled concrete is used for reef construction. For example, the SCE project will use concrete that would already be collected and trucked within the air basin. The use of recycled concrete in the SCE project would avoid either the grinding of the concrete into aggregate base or the disposal of the material in landfills. The air emissions for the crushing operation and/or the truck trips to licensed land fills need to be compared to the truck trips for hauling the concrete from the collection areas to the barge-loading area. The EIR needs to address all the engine and dust emissions of the crushing operations and the typical trucking distances to available landfills.

Mike Krause of the CEQA Planning Staff of the SCAQMD (telephone conversation with Martin Ledwitz - SCE, on 12/2/98) strongly agreed that the SCAQMD would consider *only the incremental impact of the project in a CEQA review.* He has indicated that the concrete trucking impact should be incremental. To determine the baseline emissions, the EIR should consider where the concrete has been collected, stored and delivered historically, or as forecasted for the future by the concrete recycling industry.

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N2. The air quality analysis in the PEIR takes into account the direct and indirect air quality impacts associated with the construction of the artificial reef. This approach is required under CEQA, the CEQA Guidelines and CEQA case law, see *Kings County Farm Bureau et al v City of Hanford* (5th Dist 1990) 221 Cal.App.3d 692 [270 Cal.Rptr. 650]. Local air districts do not issue permits for the operation of mobile air emission sources, such as commercial trucks hauling materials or tugboats while under way. The California Air Resources Board regulates mobile sources to some degree through engine performance standards and the types of fuels allowed. Under CEQA, impacts must be analyzed for activities once they are specifically related to the proposed project. For the SONGS artificial reef this analysis begins once construction materials have been purchased and are being delivered to the project site. It is true that the recycled concrete may be crushed, sold and trucked to other users, or sent to a landfill. However, the air emission impacts from these activities would be evaluated and mitigated in other CEQA reviews. For example, a major demolition project would require permitting and CEQA review where these same evaluations would take place.

It may be possible to establish some baseline emissions associated with the ongoing operations of contractors for the project, however, the SCE has not yet identified the specific contractors and sources of materials that will be used for the construction of the experimental reef. As a conservative approach, the PEIR has evaluated the worst-case air quality

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	impacts by attributing all emissions to the project. Once the contractors have been selected and the specific operations can be evaluated it may be possible to identify "incremental" emissions attributable to the project and to reduce the amount of mitigation required. This would most likely require certain verifications and conditions in the contracts with suppliers regarding their operations.
N3. Southern California Edison is concerned with the air quality impact that might be caused by the use of quarry rock rather than recycled concrete. Independent of assumptions of the use of project incremental emissions, based on the discussion in Section 4 of the draft report, the use of quarry rock produces 4.4 times the amount of material to be moved, 4.4 times the number of days to move it, and results in 4.4 times the total amount of emissions. Since the health impact of ambient air quality is important in Southern California, and the ambient air quality standards have both short term and long term criteria, we believe that the use of quarry rock for this project would be unacceptable to both the public and to the air quality agencies responsible for their health and welfare. The objective should be to lessen or minimize the public's short term and long term exposure to harmful levels of air pollution contributed to or caused by any project alternative when finally selected and implemented for this project.	**N3.** See response to comment A5 in the letter from Steve Aceti.
N4. Also, the air quality impact assessment assumes that the two local air basins, Los Angeles and San Diego, are one air basin with the air quality requirements of the South Coast Air Basin. The standards for the Los Angeles area South Coast Air Basin are then applied to all project activities. However, the San Diego Air Basin has better air quality than the South Coast Air Basin and associated less stringent air quality requirements.	**N4.** See responses to comments A8 and A9 in the letter from Steve Aceti.

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Therefore, the EIR must separately analyze the operations originating in each of the two basins (Section 4.4.5).

N5. Table 4.4-2 (page 4.4-6) uses the latest EPA standard for fine particulate matter PM2.5, but does not use the latest primary Ozone standard (adopted 1997) of >0.08 ppm per 8 hour averaging time. This should be corrected.

N6. Air Quality, Section 4.4.5.5, Mitigation Measures
Certain mitigation measures described for air quality impacts are not feasible. The draft EIR lists a number of standard mitigation measures and emission offsets which apply specifically to the concrete and quarry operations, trucking companies, and tugboats. SCE has no control over these operations because they would be obtained through contractors. CEQA requires that adopted mitigation measures "are fully enforceable through permit conditions, agreements, or other measures". SCE has no authority over existing concrete yards, quarry operations, trucking companies, and tugboats. Imposing mitigation measures to be applied to their operations and equipment is outside of the scope of this EIR. Because the air quality impacts are significant and unavoidable (cannot be mitigated to an insignificant level), it is important that projects alternatives be evaluated which can avoid or lessen air quality impacts.

N7. 3. Environmental Benefits From Use of Recycled Concrete:

The use of recycled concrete is beneficial in ways that are not sufficiently described or quantified in the draft EIR (Section 4.7). The use of recycled concrete for reef construction would eliminate the air emissions of concrete crushing operations that is an accepted and permitted method of disposing of this material at the present time (see Section 2., Air Quality Impacts

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N5. Table 4.4-2 and the related text have been corrected.

N6. Air quality mitigation measures can be incorporated as conditions of contracts awarded to suppliers of materials and services for the construction of the experimental reef Language to this effect could be included in the Request for Proposals to potential contractors.. These mitigation requirements are not outside the scope of the PEIR, but are standard practice. The air quality impacts associated with the experimental reef are significant, but mitigation measures are available to bring these impacts to a less-than-significant level.

N7. Trying to identify and quantify the comparative benefits of different uses of recycled concrete in general is beyond the scope the PEIR. It would be speculative at this point to try to identify other uses of the material that will be used in the SONGS experimental reef since the suppliers have not yet been selected. It is not known if the supplier selected will have a concrete crusher as part of their operations.

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and Costs, above). Landfill space could also be conserved because the reef presents another option for use of this material. In addition, it is generally accepted that the use of recycled material (such as concrete rubble) is environmentally preferred over the use of virgin material such as quarry rock. Such use is consistent with state and federal policy which encourages recycling as a means of waste reduction.

There could also be significant socioeconomic benefits from directly using recycled concrete as reef-building material. During the past year we have been approached by a variety of private concerns and government agencies that would like to recycle concrete for the reef project as a way of avoiding disposal costs for other projects. These organizations include: Tom Raftikan, United Anglers (714/840-0227); John Bourget, Bourget Bros.- a concrete product and building supply company (310/450-6556, ext.210); Jini Pendergast, SCE - Construction Supervisor, Transmission and Distribution Department, (818/601-4975); the US Air Force (Vandenberg base housing redevelopment); the Port of Long Beach and the US Navy (redevelopment of the Long Beach Naval Yard); and the City of San Diego (Naval Training Center redevelopment). There appears to be many mutually beneficial arrangements that could be developed to supply concrete material for artificial reef projects.

4. Experimental Reef Phase

N8. Adequate information exists today which provides strong evidence that a kelp community will grow on recycled concrete reefs. A recent report was presented at the December 10, 1998, public meeting: "Reassessment of the Mission Beach Kelp Reef After the El Nino Storms of the Winter of 1998", a study done for SCE by Coastal Resources Associates, Inc., dated 13

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N8. See response to comment A5 in the letter from Steve Aceti.

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October 1998. This report describes a diverse algal and invertebrate community on the Mission Beach Kelp Reef since its construction in 1991, and concludes "The performance of the Mission Beach Kelp Reef with regard to Macrocysitis populations has strengthened our belief that low relief reefs are the best design for artificial kelp reefs" (p. 9). It also describes kelp and developing communities on the Oceans Foundation Artificial Reef, located 500 meters southeast of the Mission Beach Kelp Reef, installed in April 1998. These most recent observations, coupled with other comments made during the December 10th meeting, point to the viability of recycled concrete as a suitable substrate for establishing a persistent kelp community, and raise questions concerning the prudence of the experimental reef (with quarry rock) as proposed.

N9. Several questions were raised during the December 10th meeting as to why kelp transplantation was not considered as an alternative to the proposed experimental reef plan. Evaluating kelp transplantation as an alternative in the environmental assessment has merit. Kelp transplantation could simply be incorporated into an experimental reef project such that it would augment natural recruitment and enhance kelp densities to provide greater assurance that permit performance standards are met. Thus, SCE suggests that the CSLC consider project alternatives that 1) use the best features of kelp transplanting and the best features of the preferred experimental reef project, and 2) kelp transplantation onto natural substrate in the San Clemente area.

Because the monitoring period for the experimental reef is only 5 years, it is unlikely that the reef will have time to naturally develop a mature biological community prior to the final evaluation of the reef s performance. Recent observations confirm that there has been a recent reduction in kelp in the area of San Mateo Point, near the

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N9. The CSLC and CCC staff have agreed with SCE to modify the proposed experimental reef project to include transplanting kelp on a number of test modules at the San Clemente site. Transplanting was listed in the SCE experimental reef plan as a potential measure, but this alternative makes it an explicit part of the testing. This has been incorporated in the Project Description and throughout the evaluation of the project in the Final PEIR.

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proposed location of the experimental reef. Incorporation of kelp transplantation into the experimental design may reveal how to enhance the rate of kelp bed development, and enable better decisions within the 5 year period about how to successfully build the mitigation reef, and how to maintain compliance with the kelp density performance standards.

5. Proposed New Alternative To The Experimental Reef

N10. Following is a brief outline of one possible alternative experimental reef project. It is a variation of Edison's proposed experimental reef project which incorporates kelp transplantation. These changes were developed after considering all of the public input at the December 10, 1998 public meeting. Although the alternative set forth below retains elements of the existing proposed experimental design which allows comparison between quarry rock and concrete, we believe that an alternative which evaluates kelp transplantation only on natural substrate and on recycled concrete should be evaluated in the EIR.

N10. See response N9 above.

The alternative design would consist of the following, and does not result in appreciably different environmental impacts associated with experimental reef construction.:

- 7 replicate modules of each of 4 treatments (34 and 67% quarry rock and 34 and 67% concrete).

- 7 additional 34% and 7 additional 67% concrete modules to which kelp (spores, juveniles, and possibly larger subadults or adults) would be transplanted

- The modules would be arranged such that there would be 7 blocks, with one module of each treatment type per block. The

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blocks would be evenly distributed over the reef site and there would be equal spacing of modules within blocks. Module type (i.e., treatments) would be randomly assigned within blocks.

The difference between SCE's proposed experimental reef project and this alternative can be summarized as follows:

- The treatments with 17% coverage of concrete and quarry rock would be eliminated. While an evenly dispersed coverage of 17% may be adequate in meeting performance requirements for kelp, recent observations of construction techniques suggest that spacing substrates evenly may not be practical. Also, it seems unlikely that a coverage of 17% will be able to meet performance standards with respect to invertebrates that live attached to rock.

- A kelp transplanting treatment would be added to the design. The addition of this treatment will lead to a much better understanding of how different substrates will eventually perform and provide insights as to the potential use of transplanting as remediation.

- The change will result in a slight decrease, and a redistribution of impacts associated with reef construction. Tonnage of quarry rock will be reduced from 28,000 to 23,940
short tons, and concrete will be increased from 6,090 to 10,640 short tons. This would result in an overall increase of 4,550 short tons of recycled concrete, and a 4,060 short ton decrease in quarry rock (a net increase of only 490 short tons of total material). There would be no change in the number of modules (42) or to the footprint of the experimental reef (16.8 acres).

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6. Kelp Transplantation on Existing Hard Substrate:	
N11. Comments were also made at the public meeting strongly encouraging the use of kelp transplantation, either in lieu of building an artificial reef, or in conjunction with construction of the artificial reef on existing hard substrate, to ensure establishment of kelp plants on the reef and compliance with the kelp density performance standards set forth in the SONGS permit. The question was further raised during the December 10th meeting as to why one would expect kelp to grow on an artificial substrate such as quarry rock or concrete when it is currently not growing on natural substrate in the San Clemente area. The EIR should consider the use of kelp transplantation onto both natural substrate and artificial substrate in the San Clemente area as an alternative means of creating the kelp community required by the SONGS permit.	**N11.** Kelp transplantation on test modules has been included as part of the proposed experimental reef project in the Final PEIR. Transplanting on existing hard substrate has not been considered viable because the amount of emergent hard substrate is far less than that needed to obtain the project's objective of creating 150 acres of kelp forest community Furthermore, the SONGS Permit conditions state that every effort will be made to minimize disturbance of natural reef or cobble habitats in the siting of the artificial reef. Reasons for avoiding these habitats are that existing hard substrate often sustains relatively sensitive or rare biotic communities, and many of these substrates already provide important fishery resources.
7. Economic Evaluation:	
N12. Cost Evaluations for the Project and Alternatives: There were comments in the public meeting on December 10, 1998, which questioned the costs of the project components and the project alternatives, and suggested that the draft EIR did not properly tabulate project costs. We agree that an economic evaluation is a necessary part of the CEQA evaluation. Chapter 4.2, Socioeconomics, appears to be where these cost concerns need to be fully disclosed and evaluated. It would be of use to compare and discuss the cost of the preferred project, the mitigation reef, and the various alternatives. We suggest that this be included. SCE is available to help provide any estimates that we have already developed if this would be of help in completing this necessary evaluation.	**N12.** In response to comments, a range of cost figures for the experimental and mitigation reef projects have been included (see Section 3.8).

Comments

N13. Commercial fishing (p. 4.2-3): The lobster catch and the kelp harvest figures described on page 4.2-3 both come from California Fish & Game reporting blocks that are much larger than the project area. This is discussed in the EIR text, but it would be better to represent these blocks on a map of the local area so that the reader can visualize the relative area of the project location with the reporting blocks.

N14. In addition, Table 4.2-2 should have headings of "Block 756 & 757" rather than "Project" because the catch is from an area larger than project area. There is also a discrepancy between the 1996 lobster catch given in the text with that provided in Table 4.2-2. In the Table, the lobster catch in the "Project" area in 1996 is listed as being 5.0% of the California total with a value of $289,786. In the text, however, it states that the catch in the project vicinity represents 15% of the statewide total with a 1996 value of $819,616. This difference in values needs to be resolved.

8. Other Comments:

Material placement methods (p. 3-15):

N15. The EIR needs to comparatively evaluate the three methods of rock placement, which would include the real "live boat" method (no anchors or destructive cables) against the crane-derrick barge method and the two-point mooring with tug method.

Socioeconomics (Chapter 4.2) References:

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N13. In response to your comment, a map has been included (Figure 4.2-1) that shows the blocks in relation to the project lease area. The area incorporating the blocks is considerably larger than the lease area, but this is the only level at which these data are available.

N14. The heading on Table 4.2-2 has been changed as you suggest The discrepancy between the text and the table has also been corrected.

N15. The information provided by potential contractors that were interviewed by SCE's consultants indicates that even the "live boat" method would require a two-point mooring system to insure enough stability for placing material offshore. Potential contractors have indicated that not using anchors would make it too difficult to manage the barges. The use of anchors was not identified as a significant impact; however, if at a future date it becomes possible to eliminate the use of any anchors, this would be beneficial.

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N16. There are references in this section that appear to be inaccurate, and some are unlisted in the bibliography: "Hanson 1997", p. 4.2-3 (misspelled); and "Hanson 1997", p. 4.2-5 (this is not accurate).	**N16.** The spelling error on page 4.2-2 and the reference on page 4 2-5 of the Draft PEIR have been corrected in the Final PEIR.
Geology (Chapter 4.3) References:	
N17. There are some references in the text that appear to be not listed in the bibliography, such as: "McNey 1979", p. 4.3-1 "Daly et al. 1993", p. 4.3-2; "Real et al. 1978", p. 4.3-2; "Moffatt and Nichol", p. 4.3-2; "Griggs and Savoy 1985", p. 4.3-3;"Edison 1990", p. 4.3-6.	**N17.** The references have been added to Chapter 8.
N18. Discussion on need for a 300-acre reef verses 150 acres due to insufficient kelp density on the Experimental Reef (Introduction, p. 1-2; and throughout the Draft EIR): Kelp transplanting, if demonstrated to be feasible, may negate the need to expand the reef and provide evidence that the reef can be managed to achieve and maintain the performance standards. Without kelp transplanting as an effective management tool if the experiment shows that the kelp density performance standard is not being met, one would have to question the prudence of building the artificial reef larger, since there is no guarantee that the larger reef would achieve the kelp density requirements. Possible final reef size of potentially 300 acres (p. 3-5 and p. 3-23): The EIR states that CCC Staff maintains that kelp has been seen to grow on about half of the available hard substrate at SMK (p. 3-23). Some years, such as this year, 1998 (personal communication, EcoSystems Management, Karel Zabloudil),	**N18.** The CSLC and CCC staff have agreed with SCE to incorporate transplanting kelp on a number of test modules at the San Clemente site. The transplanting was added to test how it would assist in accelerating kelp growth and recruitment on the reef. It may also be possible to use periodic kelp planting to sustain the necessary density of kelp plants required in the SONGS Permit Conditions and eliminate the need for additional construction beyond the 150-acre mitigation reef.

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and other previous years (personal communication, Larry Deysher) it appears to grow on even less than half.

N19. If the Experimental Reef has kelp growing on only 25% of the substrate, SCE assumes the CCC staff would propose that the final mitigation reef will have to be 450 acres. However, no evidence exists to support the notion that simply building the reef to a larger size would result in the required 150 acres of kelp community with a kelp density of at least 4 plants per 100 square meters. More importantly, speculating on possible remediation of the reef is inappropriate. No one can accurately determine at this time, the kelp reef density. Thus, the draft EIR should not engage in such speculation.

Alternatives and Remediation, Section 6.0:

N20. We are concerned that the alternatives eliminated from further consideration, especially the "Kelp Planting Experimental Project and Mitigation Project" (p. 6-5) were eliminated for reasons that will not be supported by Section 15126(d) of the CEQA Guidelines for an EIR. As described on p. 2-6, Alternatives That Avoid or Lessen Impacts, Section 15 126(d) specifically states: *"reasonable alternatives [should be evaluated] . . which would feasibly attain <u>most</u>* [underlining added] *of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project..."*. It seems that it would be prudent to retain these alternatives in the evaluation, if they are technically feasible, so objections to their elimination will not delay the process.

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N19. The PEIR presents a worst-case scenario to examine possible impacts, which looked at a range of reef construction between 150 acres to 300 acres.

N20. The reasons for excluding the alternatives that were eliminated from further consideration are given in section 6 3 of the PEIR As noted in this section, "The primary purpose of the first phase of the proposed project is to create an experimental artificial reef project to test quarry rock and recycled concrete materials, levels of coverage and location factors." The Kelp Planting Experimental Project and Mitigation Project on existing substrate alternative that was eliminated, did not provide for such testing, whereas all the alternatives that were further evaluated did include experiments designed to test these factors. Furthermore, as stated in the CCC permit, "*The primary objective of the artificial reef project is*" to provide adequate conditions for a community of reef associated biota similar in composition, diversity and abundance to the San Onofre Kelp bed...." It was considered unlikely that the Kelp Planting Experimental Project and Mitigation Project would attain these project objectives. As indicated in the discussion in Section 6.3:

Comments

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"[The kelp planting] proposal does not adequately address the project purposes as described in the SONGS Permit conditions adopted by the CCC....The habitat of the San Onofre Kelp bed consists of kelp forest on low-relief, cobble-boulder reef. The habitat produced by the kelp planting project would be quite different, consisting of a large grid of floats supporting giant kelp plants. Therefore, the algae, invertebrate and fish species associated with this project would likely be quite different from the assemblage of species found in the San Onofre kelp bed Finally, the kelp planting project would not create a rock reef, as required by the permit, and would result in a project more similar in appearance [and function] to a kelp farm than to a natural kelp forest ecosystem." Therefore, although the kelp planting alternative would, as indicated in the PEIR, largely mitigate the significant air quality impacts of the project, it was considered unlikely that the alternative would "feasibly attain most of the basic objectives of the project".

N21. Further, we are concerned that the range of alternatives evaluated in the draft EIR is too limited. CEQA requires a range of alternatives to the project that would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project. The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. None of the alternatives evaluated in draft EIR would avoid or substantially lessen the air quality impacts associated with the project. The draft EIR needs to evaluate alternatives which would specifically avoid or reduce the air quality impacts associated with the project.

One possible reason the range of alternatives is limited is because compliance with the SONGS permit requirements was

N21. The PEIR evaluated a reasonable range of feasible alternatives to the proposed project that meet the project objectives, including several alternatives that reduce air quality impacts Some of the alternatives included alternative sites for the experimental reef. However, based on the sonar surveys completed by SCE consultants in March 1999, it appears that the alternative sites are not viable because of sand depth at these sites. The Mission Beach site is not a preferred site because of its great distance from San Onofre Kelp bed (see Appendix I in the Final PEIR, Letter from Dennis Bedford, CDFG Artificial Reef Program).

Comments

apparently used as a constraint in selecting the alternatives to be evaluated. SCE's proposed project was formulated using the requirements of the SONGS coastal permit. The alternatives considered in the EIR need not be so constrained. There may be a better project that meets the primary objective of the artificial reef project; i.e., to provide adequate conditions for a community of reef associated biota similar in composition, diversity and abundance to the San Onofre kelp bed, with less environmental impact. CEQA requires that project alternatives feasibly attain most of the objectives (i.e. not necessarily all of the SONGS permit conditions) but would avoid or substantially lessen any of the significant effects of the project. The intent is to find the best project that meets the broad project objectives. The new alternative set forth above is one example of how the EIR could be improved.

N22. Mitigation for rocks and kelp wrack washing up on the beach (p. 2-17 to 2-2 1):

In the public hearing on December 10, 1998, a representative of the City of San Clemente expressed concern about kelp and possibly rocks or concrete washing up on the beach as a result of this project. The EIR needs to do a better job of expressing the probability of this occurring, and quantifying the incremental increase likely to occur from the proposed project. Kelp beds occur naturally both north and south of the project area and periodically within the project area. Natural hard substrate is also a common feature in the project area. The percentage of kelp added by a 150 acre kelp artificial reef is expected to be minimal compared to the nearby natural kelp beds and natural exposed hard substrate in the area.

N23. The EIR should acknowledge that the mitigation kelp reef is designed to replace 150 acres of local kelp bed. Hence, the area

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N22. Please see the response to comment M5 in the letter from Wendy Morris.

N23. The San Clemente area will be experiencing a distinct shift in the location where kelp washes ashore. The San Onofre kelp

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will not really experience additional kelp on the beach over what is being replaced. Although the location of the impacted bed is a few miles to the south of the mitigation site, the area in front of south San Clemente has had natural kelp over its recent history.

N24. The EIR should also discuss the State policy which calls for no removal of kelp from State beaches (statement made by State Beach representatives at a project meeting at the City of San Clemente, November 12, 1997). Therefore, requiring mitigation in the form of cleanup is inconsistent with current State practices for beach maintenance.

N25. The EIR should acknowledge that occasional rocks on the San Clemente beaches are a natural occurrence, just as sand bars and natural rocks in the surf zone are a natural occurrence. The document should consider whether Edison should be required to mitigate for unpleasant beach conditions that would be difficult, if not impossible, to distinguish from natural occurrences. The presence of rock from the existing railroad track rip rap along the beach as well as the existing artificial reef just south of the San Clemente pier should be discussed. Concrete and rock are already present at times on the south San Clemente beach (personal observation by Bob Grove, March 3 0, 1998; and Dr. Elwany, personal communication). Moreover, it seems unfair to require SCE to mitigate for rocks and concrete that may be

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bed is too far south of San Clemente to create much kelp washing onshore on the City of San Clemente beaches. Currently the beaches experience only minor amounts of kelp. The placement of the artificial reef directly offshore from San Clemente beaches would result in an increase in kelp on these beaches, which are used extensively by recreationists. Kelp would be considered a nuisance for these users. The State currently does not remove kelp from State beaches and in this case more kelp may not be considered a negative impact. Whether this would be a significant impact would be determined through monitoring and consultation with the State beach managers.

N24. The PEIR does discuss the State policy for leaving kelp on the beaches (see Section 4.10.2.1). It will be up to the Department of Parks and Recreation as to whether they wish to participate in the monitoring program and any potential kelp cleanup.

N25. As stated in the PEIR, the likelihood of rocks or concrete washing onshore is considered very low. The document refers to the City of San Clemente's statements that some large rocks have been washed ashore in previous years after large storms (see Section 4.10.1.2, last paragraph). Recycled concrete from the experimental reef project would be easy to identify. Depending on the type of quarry rock that is selected to build the experimental reef, it may also be easy to distinguish these rocks washing on shore from naturally occurring rocks in the area. Significant impacts resulting from the project must be mitigated.

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washed up on the beach, when SCE is designing and constructing the reef under the direction of the CCC.

N26. Additionally, results of Mission Beach Artificial Reef studies should be referenced. This concrete reef is similar to the one proposed for San Clemente, and no concrete used in reef construction has been observed washing up on Mission Beach. In addition, just north of the Mission Beach Artificial Reef is the Pacific Beach Artificial Reef, some of which is in water as shallow as 37 feet MLLW. No rock or concrete material has been observed washing up on the beaches from either of these reefs (Dr. Elwany, personal communication).

N27. Potential artificial reef sites (p. 6-6)

The alternative sites discussion needs to include an analysis of potential conflicts with the San Diego County offshore sand barrow pits intended for future beach restoration projects.

SCE Comments, Appendix A

Responses

N26. The PEIR already acknowledges that no concrete has been found on the beaches from the Mission Beach artificial reef (see Section 4.13.2.6, Mitigation Reef, 4th paragraph).

N27. The PEIR addresses potential conflicts offshore with areas that have previously been identified as possible sand or gravel borrow sources near the South Carlsbad and Mission Beach sites (see Section 6.4.1, Offshore Mineral Resources at the Alternative Sites). Since the Draft PEIR was published, new studies have been conducted by the San Diego Association of Governments (SANDAG) on sources of offshore sand for beach replenishment in San Diego county (the San Diego Regional Beach Sand Project). SANDAG has just completed field explorations collecting 125 sediment core samples from ten offshore sites. Two of the sites that SANDAG is studying overlap with the South Carlsbad and Mission Beach alternative sites identified in the Draft PEIR. The sites should not be in direct competition for these two uses. Sites appropriate for artificial reef construction require hard substrate with a thin sand veneer, while SANDAG is looking for deep sand areas for beach sand replenishment. SANDAG has not identified which sites are appropriate for beach replenishment and they are just beginning the environmental review and permitting process While the two uses are not in direct conflict, dredging near an

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artificial reef could cause turbidity affecting the growth of kelp. In any case, this is a mostly moot issue given the results of the recent SCE sonar surveys at South Carlsbad and the opposition of CDFG to the Mission Beach site. The South Carlsbad and Mission Beach sites are no longer considered viable or preferred alternative sites for the experimental reef project and mitigation reef (see Appendix I in the Final PEIR, Letter from Dennis Bedford, CDFG Artificial Reef Program)

Comments

EIR Responses

State of California - Business and Transportation Agency
Department of Transportation
District 12
2501 Pullman Street
Santa Ana, Ca 92705

November 20, 1998

File: IGR/CEQA
SCH# 98031027

Mary Griggs
California State Lands Commission
Environmental Planning and Management
100 Howe Avenue, Suite 100 South
Sacramento, CA.95825-8202

Subject: Artificial Reef in the Pacific Ocean

Dear Ms. Griggs:

Thank you for the opportunity to review and comment on the Draft Program Environmental Impact for the Construction and Management of an Artificial Reef in the Pacific Ocean Near San Clemente California. The proposed project is for the construction and monitoring of an artificial reef in two phases.

Phase 1. Construction and monitoring of a 16.8 acre experimental artificial reef consisting of 42 low-relief modules.

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Phase 2. Design and construction of a minimum of 133.2 additional acres of low-relief artificial reef, supporting a total of 150 acres of sustainable, medium to high density kelp beds and associated kelp bed biota.

Caltrans District 12 is a reviewing agency and has no comment at this time.

Please continue to keep us informed of future developments that could potentially impact our State Transportation Facilities. If you have any questions, or need to contact us, please call Aileen Kennedy on (949) 724-2239.

Sincerely,
Robert F. Joseph, Chief
Advance Planning Branch

C: Tom Loftus, OPR
Ron Helgeson, HDQTRS Planning
Roger Kao, Hydraulics
Raouf Moussa, Traffic Operations South
Praveen Gupta, Environmental Planning

EIR Responses

Comments

Comments of Draft EIR for the Construction and Management of an Artificial Reef in the Pacific Ocean Near San Clemente, California

State Clearing House Number 9803127 November 1998 by
Rimmon C. Fay, Ph.D. December 1998
Pacific Bio-Marine Labs., Inc.
P.O. Box 1348
Venice, CA 90294-1348

James Enright, Ph.D. of the Scripps Institution of Oceanography predicted at a hearing before the California coastal Conservation Commission in 1973 that the operation of the San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 would cause the formation of a marine dessert on the coast at the location of this discharge. The Marine Review Committee (MRC) documented some of the damage caused by the operation of SONGS 2 & 3 and predicted that during episodes of warm water, this damage would become more severe.

In fact, the marine dessert now extends from above San Mateo Point to well east of San Onofre and where once lush stands of kelp were found once is now a barren.

Recent changes in discharge practices at the SONGS have resulted in a higher temperature of the effluent. In addition, the plant operators have applied for permission to discharge unknown amounts of unidentified substances with presumably detrimental environmental effects. The result of these added burdens on the environment will result in a wider area of shoreline being degraded. This additional pollution was not studied by the MRC.

At the present time all benthic algae including giant kelp are at an all time minimum in southern California. This appears to be a part of a

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long term trend associated with global warming. It is possible that giant kelp may become extirpated in southern California.

Comments:

R1. p 3-1 There is a statement that the Draft EIR has been done at the expense of the State Lands Commission but no explanation of why a State Agency assumed this responsibility.

R2. Also of importance, if the reef does not meet the objectives states, what is the significance this possibility? In the event of a failure of the first phase reef, and explanation will be needed. What will be the fate of this failure to meet stated objectives? Will amelioration be required or removal of the experimental reef? Who will bear the expense of removal and cleanup of the site? What will this sequence of events mean to the condition that requires 150 acres of established kelp bed to be developed?

EIR Responses

R1. The project proponent pays for the cost of all permitting and CEQA/NEPA compliance, including the PEIR, with funds collected from the utility ratepayers.

R2. The CCC permit places a great emphasis on strategies to ensure that the experimental reef project identify a design that, when implemented with the full mitigation reef will result in replacement of lost resources. The project includes mechanistic studies of alternative reef designs, substrates and management techniques (CCC permit 6-81-330-A, pp. 82-84). Assuming, for the sake of argument, than none of the designs and techniques studied in the experimental phase showed evidence of producing the lost kelp resources, the experimental reef would have still have produced some amount of marine resources, including fish and benthic invertebrates. The materials used in the experimental reef are the same as those used in the California Department of Fish & Game's Artificial reef program. Failure of the reef to meet the standards for the SONGS permit (e.g. failure to produce the requisite amount of giant kelp and associated biota) would not result in a failure to produce any valuable marine resources. Therefore, the presence of the reef material on the sea bottom would not cause significant adverse impacts and there would not be an incentive to remove it. The project proponents are responsible for constructing the experimental and full mitigation reefs and maintaining them for a time equivalent to the life of SONGS.

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R3. In Section 3, in B, Condition C, p. 31, Section 1.2 "Final Site Selection" #2. "Minimal disruption...of...rare biotic communities" is called for. I have observed live abalone both at San Onofre and off San Clemente. Are there still living abalone in this area? If live abalone can be found here, what measures are being taken to assure their protection? Is it possible to restore their abundance?

R4. P 4.6-6 There are a number of anecdotal observations on specific organisms found in/on/over the subtidal sand bottom habitat in the southern California Bight (SCB). Substantial changes in the over burden of sand are reported at many sites, e.g., Santa Barbara, Seaside, Ventura, Oxnard, Point Mugu, Santa Monica Bay, San Pedro, Long Beach, Seal Beach, Oceanside, Encinitas, San Diego, and other locations. Among marine life that is depressed in abundance on sand bottoms there are sandcrabs, clams (several species), sharks, surf perch, and croakers that readily come to mind.

The MRC documented changes in the abundances of many groups of animals including the soft and hard bottom which is surveyed in the area impacted by the discharge from the SONGS. Decreases of abundance in these habitats were substantial and significant.

R5. p. 4.6-14 I have not observed an offshore limitation of sand dollars by predators and no predation on sand dollars by snails.

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R3. Abalone live in the project vicinity in kelp beds and other areas of hard substrate. No kelp beds and little hard substrate occur in the lease site and no abalone were observed in the two biological surveys done in 1997. Precautions will be taken to avoid any areas of hard substrate that are present. These precautions include consulting local fishermen in the San Clemente/Dana Point area and preconstruction surveys to identify existing hard substrate and proven fishing grounds (see pages 4.2-9 and 4.2-10 of the PEIR).

R4. The changes in over burden of sand that you report are probably more in the intertidal rather than the subtidal zone. In any case, it is acknowledged that local changes in subtidal sand bottom habitat have occurred, but there is no evidence that the total amount of this habitat in the SCB has changed. Although there are many anecdotal reports of reduced abundance of species in subtidal sand bottom communities, few long-term studies have been conducted that demonstrate such a reduction.

R5. See page 407 of Dailey et al. (1993), which references the work of Kastendiek (1975, 1975, & 1982), Morin & Kastendiek (1988) and Morin et al. (1988) regarding factors structuring sand dollar communities.

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R6. p. 4.6-18 Add abalone to the list of important animals found in kelp beds.

R7. p. 4.6-18 Lobsters are not major predators on sea urchins.

R8. p. 4.6-37 A low abundance of kelp has resulted in a low abundance of kelp wrack and associated scavengers, e.g., isopods, amphipods, grapsoid crabs, etc.

R9. Appendix B: p. 8 Correction: The actual loss of kelp from the San Onofre and San Mateo kelp beds has been far greater than estimated by the MRC.

R10. Appendix B: Second to the comments of Joan Jackson, League for Coastal Protection. There are many artificial reefs in the SCB. Of those in the euphotic zone, the only fish which appears to have increased in abundance is the Blacksmith a grazer of plankton which orients to rock habitat.

EIR Responses

R6. Abalone are already in the list.

R7. According to the references cited in the PEIR, reduced lobster predation probably contributed significantly to increased sea urchin abundance in the 1940's.

R8. Comment noted.

R9. Determining losses of kelp is beyond the scope of the PEIR. The mitigation reef that is being proposed in this project is intended to compensate only for the loss of kelp and associated biota caused by the operation of SONGS. The CCC recently commissioned an independent scientific panel to review all available information on these losses. Upon reviewing the panel's findings the CCC concluded that SONGS has caused a 179-acre reduction in the San Onofre kelp bed.

R10. Joan Jackson's comment (see next to last letter in Appendix B of the PEIR) addresses the controversial issue of whether artificial reefs actually increase fish production or merely create local concentrations by attracting fish from surrounding habitats. Although this issue is beyond the scope of the PEIR, it seems reasonable to expect that an artificial reef that is successful at growing kelp would result in increased fish production. The large biomass and high rates of primary production of kelp cause kelp reefs to be among the most productive ecosystems in the world (Mann 1973). Kelp-derived carbon contributes to virtually all trophic levels in the nearshore food web and can account for over 50 % of the carbon in tissues of fish and birds that live in

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	kelp beds (Duggins et al. 1989). . Thus, there is a high expectation that the mitigation reef will increase productivity of both primary and secondary consumers provided it meets the performance standards. Note that increased fish production is not a performance standard that will be used to judge the success of the mitigation reef. Rather the CCC permit simply requires that fish production on the mitigation reef be similar to that of natural reference reefs within the region (see page 36 of the SONGS permit). It is also important to note that the mitigation reef is not intended to compensate for fish production lost as a result of entrainment and impingement of early life stages in the SONGS intakes. These losses will be mitigated by a wetland restoration project and a fish behavioral barrier project (see SONGS permit).
R11. The critical question of what will be done if the reef fails to sustain kelp must be answered...	**R11.** See response to comment #R2 above.
R12. and there must be an answer to the potential for over grazing by sea urchins.	**R12.** Natural increases in sea urchin populations that result in loss of kelp and the creation of urchin "barrens" are natural feature of properly functioning kelp beds and wax in wane in response to a number of factors. One such factor is heavy kelp recruitment, which can provide enough food to cause sea urchins to switch from grazers, which destroy plants, to stationary drift feeders, which subsist on drift algae and do not graze on attached plants (Harold, C. and D.C. Reed, 1985). One goal of the experimental reef is to find a design that will replace lost resources by producing a self-sustaining "natural" kelp bed with a minimum of human intervention, such as controlling sea urchin numbers. If, in the future, sea urchin population outbreaks were of such magnitude that they looked like they were limiting kelp populations for long periods of time, then the need to control sea

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R13. It is the continuing unmitigated irreversible destruction of marine resources by the SONGS that is difficult to abide with. The fact that this reef is so small compared to the damage and that it has little or no chance of being successful which brings this whole process into question.

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urchin populations might be re-examined.

The success of the mitigation reef in compensating for kelp bed losses will be evaluated relative to other reefs in the region. Grazing by sea urchins will not be considered problematic as long as the effects of sea urchin grazing on the mitigation reef are similar to those measured on natural reference reefs. In the event that only the mitigation reef experiences over grazing by sea urchins, then remedial measures will be required to bring the mitigation reef into compliance.

R13. The determination that 150 acres of medium-to-high density giant kelp forest would be required to mitigate the damage done to the San Onofre Kelp forest was based on many years of field study, data analysis, and discussions among marine resource scientists as well as independent review completed recently. Although kelp forest restoration on the scale mandated by the SONGS Permit is larger than heretofore undertaken, most experts feel that the two-phased project has a reasonably good chance of succeeding.

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CALIFORNIA STATE LANDS COMMISSION
PUBLIC MEETING

For the Program Environmental Impact Report
San Onofre Nuclear Generating Station
Experimental and Full Mitigation Artificial Reef Project

San Clemente Community Center
Ole Hanson Room
100 North Calle Seville
San Clemente, California
Thursday, December 10, 1998
2:12 p.m.

Reported by: Melini A. Carreon, CSR 7511

California State Lands Commission Public Meeting for the Program Environmental Impact Report, San Onofre Nuclear Generating Station, Experimental and Full Mitigation Artificial Reef Project, taken before Melini A. Carreon, a Certified Shorthand Reporter, Certificate Number 7511, for the State of California, commencing at 2:12 p.m. and concluding at 4:00 p.m., Thursday, December 10, 1998, in the San Clemente Community Center, Ole Hanson Room, 100 North Calle Seville, San Clemente, California.

PRESENTATIONS AND APPEARANCES:

CALIFORNIA STATE LANDS COMMISSION:
MARY GRIGGS
DR. MARY BERGEN
JANE SMITH

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CALIFORNIA COASTAL COMMISSION:
STEVEN SCHROETER
DAN REED

SOUTHERN CALIFORNIA EDISON:
FRANK MELONE
DR. LARRY DEYSHER
DR. TOM DEAN
DR. HANY ELWANY
BOB GROVE

RESOURCE INSIGHTS:
ELAINE RUSSELL
PHIL UNGER

PRESENTATIONS AND APPEARANCES: (Continued.)
PUBLIC SPEAKERS:
FRED COLIN
PAUL R. FREDERICK
STEVEN ACETI, J.D.
KEN NIELSEN
DANIEL FRUMKES
RODOLF STREICHENBERGER
RIMMON C. FAY
LYNN HUGHES
JAKE PATTON

ALSO PRESENT:
UNIDENTIFIED PUBLIC

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San Clemente, California
Thursday, December 10, 1998
2:12 p.m.

(Proceedings commenced.)

MS. GRIGGS: Well, hi, everyone.

I'd like to thank you all for coming, taking the time out of your busy schedules to come and provide us with some comments on the Draft Environmental Impact Report that's up for review.

I'm going to do some introductions.

Well, I'm going to do a few housekeeping things first.

There's going to be discussions from 2:00 to 4:00, and then we'll break, and then there will be a second this after -- this evening from 7:00 to the close of comments.

Most of you probably saw the sign-up sheets

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in the back of the room. If anybody missed them, if you want to speak or if you want to be on the mailing list, if you'd please fill those out.

There is going to be a three-minute limit -- a three-minute time limit put on comments this afternoon. We have quite a few people signed up to speak, so we are

going to limit it to three minutes and -- and see how that works for everyone.

The purpose of our meeting is to receive comments on the Draft Environmental Impact Report on the SONGS artificial reef that is being proposed in two stages offshore San Clemente.

When we do this kind of a hearing, it's to receive comments on the document, and I would appreciate it if that's what people would limit their comments to, comments on the document, either things that you like, things that you -- that you don't agree with, other new evidence, maybe, that you think that we weren't aware of that should have been included that wasn't.

This is -- the forum is not a question-and-answer forum. What we're here to do is receive your comments, and if there are people in the audience that don't want to get up and speak but would like to provide comments, the comment period is open until December 28th, and those comments will come to the California State Lands Commission, and they'll be -- all the -- all the comments that we receive will be answered in the final Environmental Impact Report that will be prepared and -- and sent out to everybody that commented and everybody that was on our regional mailing list, so they will -- there are those two ways to comment on this

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project.
We have a court reporter that's going to be taking notes. That way we have an accurate record of what was said, so that we can make sure that we respond to the exact concerns or comments that you made.
I would really ask everybody, when they get up to speak, if they would try to come forward a little bit, so that she won't have any trouble hearing you, especially because we don't have a microphone, and let her have your name and address for the record, and then keep in mind, especially if you're reading something -- sometimes that gets a little bit fast for the reporter, and if you have an extra copy you can provide that to her, too, that's helpful to her.
So for introductions, we have Steve Schroeter from the California Coastal Commissions, is up here at the table with me.
Dan Reed from the -- representing the Coastal Commission is also in the audience.
From State Lands Commission, Dr. Mary Bergen is right there, and Jane Smith from our leasing and land management office is here. Her -- her division takes care of leasing the lands that Edison will need to construct this project offshore San Clemente.
Resource Insights, the consultants that

prepared the document for the California State Lands Commission are right here, Elaine Russell and Phil Unger, and last, but not least, Southern California Edison, Frank Melone, and I think Frank is going to go ahead and introduce some other people.
MR. MELONE: Yeah. We're -- we're very

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appreciative of everybody showing up today to make comments on this document, and as you know, we're obligated to undertake this project as a condition of our coastal permit for San Onofre. I'm sure everybody here has at least reviewed the executive summary of the Draft Environmental Impact Report.

Our whole team is here today. We've got Drs. Larry Deysher and Tom Dean; Dr. Hany Elwany, who are some of the technical people that we used on the project; Bob Grove, with Edison, who's the principal one managing this particular project.

I'm the manager of the mitigation program for San Onofre.

We've got some of our air quality people here, and if you have any questions at all, we'll be try -- we'll be glad to try to respond to them today.

Our goal, obviously, is to get this project moving as quickly as possible, do it in a manner which will result in a minimal adverse environmental impact.

The whole idea of this project is to enhance Coastal marine resources.

We're fairly confident we'll be able to do that with this project, but I know a lot of you have expressed some concern, and we'll do our best to deal with those concerns and move ahead with this project in an expedient manner to the satisfaction of everybody involved.

Thank you.

Let me introduce Bob Grove. He's going to -- do you want to do that now, Mary, sort of an overview of the project?

MS. GRIGGS: Is there anybody that hasn't read the

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project description, that would benefit from having just a -- kind of a thumbnail sketch of the project?

I'm going to ask you whether that would be beneficial or -- so everybody's pretty familiar with the project?

Okay. So that means no -- nobody has any questions either then. Not only do you not need a presentation, but nobody has any questions that maybe we should answer before we start receiving comments?

No. Great. That means that they all read it.

(Laughter from the audience.)

MS. GRIGGS: Okay. So we have people that signed up, and I'm just going to call them in the order that they signed up.

The first person is Fred Colin.

MR. COLIN: Colin.

MS. GRIGGS: Colin?

MR. COLIN: Yes.

I'm Fred Colin. I'm with Nelson & Sloan in San Diego. The Post Office Box is 488 Chula Vista, 92912.

I'd like to kind of touch upon a couple of subjects that were brought up in this very, very cumbersome report.

AM1. One, of course, is the transportation that was -- that we talked about briefly on the telephone, and -- and I don't think that I invade the full picture as to what we can do in San Diego, because this -- the report kind of puts us in somewhat of an unfavorable light, and I'd like to clear that up: Being, when you're talking about the worse-case scenario, as far as traveling in San Diego County, to an appropriate dock area, you're

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AM1. This comment is the same as found in Steven Aceti's letter written on Nelson and Sloan's behalf. Please see the response to comment A4 from Mr. Acceti's letter.

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talking about a 16-mile, worse-case scenario.
Now these 16 miles are encompassed basically in -- in a network of freeways that we will avail ourselves of. We would be in the contrary traffic pattern, so that the -- the im- -- there is no real impact

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there, as far as additional load; understanding that this comes and originates from a quarry which is fully licensed and has existing business, so that it's not an adjunct or it's not an add-on.
So, in that light, I think that we offer tremendous -- a tremendous venue or -- or -- or an avenue for us to -- to pursue getting this material, and the material that I'm talking about is -- since we do have a quarry, it would be, one, under recycled concrete, and the other would be the rip-rap and/or rock that is -- is to -- you know, indigenous to that quarry.
That quarry, again, is licensed to receive recycled concrete in just about any dimension that you'd want. Again, there is no impact there, because this is what we do. This is our current business.
What we would do, at that point, would be size grade and weight to -- to -- to deliver this material.
The -- the -- the report, as such, cites that the -- that there's two ways to go, and one of the best ways is just recycle concrete because of its weight and because of its configuration, and also it's quicker to place. Now I would have to agree with all of this.
Now it's a very friendly, friendly system because of the fact that, when this rubble comes into our

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quarries, it is then processed to create a product called crushed rock base, which is 100 percent recycled material for roadbeds and other things.

AM2. When we eliminate that process, we eliminate one other very unfriendly -- environmentally unfriendly step, and that is the crushing that it has to go through and habit, so we have it available. We size grade it. We cut off the rebar, and we deliver.

AM3. When you talk about quarry rock, you're talking about a blast operation. There is no alluvial. There is no finding rocks out there and just picking them up and putting them in the trucks. You have to run a drill and blast these. These are not -- that's not a friendly environmental situation at all, as far as I'm concerned.

So I think the concrete, at this point, has -- has a lot just to -- to offer to -- and apparently the kelp will -- will thrive on the concrete, from what I have seen evidenced by the different sources.

AM4. We can, in San Diego, operate in a larger window, if you will, to deliver, because we're not restricted to the 710 Freeway, which is a nightmare starting early, early until about 10:00 o'clock in the morning and then starting again at 3:30 in the afternoon until, you know, 9:30 at night, so your window there is

very restrictive, where we, I think, offer a larger window, since we're not into residential -- we're not into any kind of a residence area, so consequently we're -- we can go as long as a City ordinance will allow us to go without impacting that situation.

So three times are occurring: One, we have environmentally friendly material called recycled

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AM2. This comment is the same as found in Southern California Edison's (SCE) letter. Please see the response to comment N7 from the SCE letter.

AM3. The PEIR assumed that the construction materials would be purchased from rock quarries and recycled concrete brokers with operations that are already permitted. The process of extracting rock is not part of the project evaluation.

AM4. Once a contractor is selected for the construction of the experimental reef project, it is possible that certain impacts may be less than analyzed under the worst-case scenario in the PEIR.

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concrete; two, we have free access to a port that is very, very close to us, and, three, we were fully licensed to handle this.

Now we're, at present, delivering to that port, because they're ongoing -- ongoing project, and so it's not something that would be unusual or out of the ordinary, which is very, very good, as far as we're concerned.

We can stock pile for as long as we want to.

Other things that come into play: One, we can eyedropper our -- our particular material to whatever needs are needed on a given point -- at a given time.

In other words, if we have a day where we would need to -- to -- to "aport" 91 loads at 25 tons a piece, this can be done, but, also, if you needed ten, that can be done, too.

The nice thing about it is: You don't have to have a warehouse situation that occur on the

waterfront, where land is very, very expensive and hard to come by. Also, it obviates the -- the need to water it down and to additionally take care of it or maintain it, so we feel very lucky, in that respect, that we can deliver to, as we call it, eyedropper service, if you want to refer to 25 tons as an eyedropper service, but that's about what we have there.

AM5. Bang for your buck -- and this is my last point -- I think that you will see, in coverage, that you will probably gain a lot of additional coverage with concrete rubble or modules, or whatever you want to call it, adverse rip-rap in the footprint itself. We can pretty much govern the size of the -- of the rubble or recycled concrete, as I'd like to call it, and deliver in

Responses

AM5. This comment is the same as found in Steven Aceti's letter written on Nelson and Sloan's behalf Please see the response to comment A5 from Mr. Aceti's letter.

Comments

given modular sizes. That is no big problem, because we have that -- that versatility, once it's delivered.

When you're -- when you're drilling or blasting, you're at the mercy of the largest size, because the larger the size the -- the -- the singularity of purpose that you have, but what will happen, many times you create so many little sizes that it -- it -- it's very cumbersome, and it implies a big, big inventory tax, and it's just not environmentally sound, so that is -- those are my three points that I would like to bring up, and if I could be of any assistance, let me know.

MS. GRIGGS: Thank you.

Our next speaker is Paul Frederick.

MR. FREDERICK: Yes. I'm Paul R. Frederick. I'm President of Frederick Fisheries. I fish out of Dana Point Harbor, and I would like to thank everyone for taking into consideration the commercial fishermen in the area, with this E.I.R.

AM6. My only comment would be that we would like to -- it is noted in that E.I.R. that the hard bottom is not going to be placed on, and that's one of our main concerns, along with -- I was also wondering if there would be a possibility if -- through the experimental period, if -- if there would be a portion in the northern part of the area that we had set -- set up to be used as an experimental area, with so many blocks, whatever it takes, for the scientists to do some research, as were previous comments with this project.

Thank you.

MS. GRIGGS: Thank you, Mr. Frederick.

Steven Aceti.

MR. ACETI: Hi. I'm from the San Diego area,

Responses

AM6. This comment is the same as you submitted in your letter to the CSLC. Please see the responses to comment E1 from your letter and comment C1 from the California Lobster and Trap Fishermen's Association.

Comments

Encinitas, and I'm a government affairs consultant here on behalf of Nelson & Sloan Company. I also am heavily involved in coastal issues. I'm the director of the American Coastal Coalition and California Shore and Beach

15

Preservation Association, so I'm -- I'm a lawyer who knows a little bit about coastal issues, enough to be dangerous.

It's obvious that a lot of work has gone into the P.E.I.R., and it's an excellent document.

There are some things that I would urge you to revisit in the document, and most of those deal with the -- the largest impact in the document is -- discussed is air quality, and -- and some of the construction assumptions that were made, that led to what are referred to as the "worse-case scenarios," I think need to be reviewed and -- and revised.

We're going to submit a written document that will detail those, because I can't do that in three

AM7. minutes, but -- but generally, I believe that the -- what's been identified as "worse-case scenarios," which would be taking material out of San Diego County, is actually the best-case scenario, when the look at the -- all of the impacts, particularly the air quality impacts.

AM8. I -- I disagree with the analysis that was done on the air quality in one major aspect, and that's the -- discounting the splitting of emissions. I think that that's actually the best way to evaluate the impacts of this project, and I don't think that you can ignore the fact that it's better for overall air quality in Southern California if the emissions related to trucking

16

Responses

AM7. The worst-case scenario assumed both the rock and concrete material would be purchased in the San Diego area resulting in the greatest amount of PM_{10} emissions. This scenario also assumed all materials would be shipped from the Port of San Diego to the San Clemente site since travel from this port creates the greatest amount of NOx emissions.

AM8. This comment is the same as you submitted in your letter to the CSLC. Please see the responses to comments A8 and A9 from your letter.

Comments

and shipping take place in the San Diego air basin, where -- where air quality is much better than in the Southern California air basin, and most of the tug operations would take part in that air basin, also, if you come out of San Diego with material.

AM9. The P.E.I.R., as it stands today, recommends that all of the activities related to construction take place in the Southern California air basin, which I think -- or south coast air basin, which I think is an erroneous conclusion or/and recommendation.

AM10. The other thing that I noticed, in reviewing the P.E.I.R. is the -- now that we know what the impacts are of using rock, quarry rock over concrete, I think that it makes absolutely no sense to even consider quarry rock as a reef material for this project. It's indicated in the P.E.I.R. that the use of quarry rock for the mitigation reef five years from now would involve four times the amount of emissions and impacts. It would take four times as long to build, and under one scenario, if -- if the Coastal Commission wanted a 283-acre reef, in addition to the experimental reef, that would take eight years to build out of quarry rock, as opposed to two years

Responses

AM9. The PEIR analyzes a worst-case scenario for construction activities that result in the maximum air emissions. Shipping materials from Los Angeles/Long Beach and Catalina Island to the San Clemente site results in fewer NOx emissions. The PEIR presents one example of how mitigation measures could reduce impacts to a less-than-significant , which includes obtaining materials from these locations. However, the possible mitigation measures in the PEIR cover a wide range of possible ways to mitigate significant impacts to a less-than-significant level. The final mitigation measures adopted are open to negotiation with the project proponent once the contractor has been selected. Nothing in the PEIR prevents the project proponent from selecting a contractor in the San Diego area as long as significant air quality impacts are mitigated to a less-than-significant level.

AM10. This comment is the same as you submitted in your letter to the CSLC. Please see the response to comment A5 from your letter and the response to comment B2 from the American Sportfishing Association.

Comments

with recycled concrete. That's eight years of additional impacts -- or six years of additional impacts that I think this region cannot afford.

17

AM11.1 The other aspect of that is, instead of building the reef out a natural resource, such as quarry rock, I think we're better off using a recycled product that would normally have to be either land filled or crushed and split to be used; this way it comes right out of the salvage project, goes into the mitigation project, and we avoid a lot of impacts that way, and we use something that's being recycled, instead of using up a natural resource, such as quarry rock, and all the impacts that are associated with the way quarry rock is manufactured.

So that's kind of an overview of where I'll be going with my written comments, and I appreciate the opportunity to present that.

MS. GRIGGS: Thank you, and we'll look forward to receiving your written comments then.

The next speaker is Ken Nielsen.

MR. NIELSEN: Hello. I'm Ken Nielsen. I'm a 50-year resident of San Clemente. I was a commercial abalone diver when I was younger and sports fisherman, 20 years a commercial fisherman in this area, and I have some concerns about the artificial reef, but I also am involved through environmental work. I have a company called Sea Ventures, with my partner, Bob Lohrman, and I've been involved with a lot of kelp monitoring and kelp studies,

18

and I'm pretty familiar with the kelp work that's been done in this area.

Responses

AM11. This comment is the same as found in Southern California Edison's (SCE) letter. Please see the responses to comments N2 and N7 from the SCE letter.

Comments

Anyway, I'm not opposed to the mitigation
AM12.4 reef. However, I'm concerned about the vagueness of the Environmental Impact Report regarding the positioning of the artificial reef and surrounding reef rock and ledges that are not addressed in this report.

I've made a geo-reference map showing some of the sensitive rocks and reef areas, and I would have included the artificial reef, but I couldn't find any geo-referencing in the report to be able to do that. I could have put it on my map, but I couldn't do that, and I didn't have too much time, if I didn't get involved with calling to find out, so maybe that's there, and maybe it's not.

Let's see here.

There's a lot more sensitive areas in this area that -- that -- than I included on my map, and I can point out a lot more of them to you with more time, and I just hope that you would consider the areas that I'm going to show you and look into it a little further, so that you can identify these areas, and maybe I can help you do that.

I know, as I read the Environmental Impact Report, the only thing that they really referred to is

San Mateo kelp. That's the only thing that's environmentally impacted.
AM13.3 There's a lot more things in our area than San Mateo kelp. Even though this reef is designed for kelp, I think that there's a lot more things that we have to look into to make sure that we do it sensibly and -- and place the reef in the proper spots.

The area, that I -- I am assuming that they're going to put the reef, grows kelp very well when

Responses

AM12. In response to your comments, SCE consultants talked with you and used your map to help identify key areas of existing hard substrate that should be avoided in the San Clemente vicinity. Many of the sites you identified are outside the project lease area. In addition, the California Lobster Fishermen's Association has designated you as their official liaison. As stated in the Draft PEIR mitigation measures (Section 4 2 2 5 and 4.2.2.6), local fishermen in the San Clemente/Dana Point area will be consulted on two occasions: 1) during preconstruction surveys to identify existing hard substrate and proven fishing grounds, and 2) two weeks prior to onset of construction activities of the experimental artificial reef at the San Clemente site. You will be contacted for implementation of these measures.

AM13. The experimental reef project was designed to test a number of important variables including location within the site and different types of substrate type and coverage. The experimental reef project would help provide information to design the full mitigation reef to ensure that it would be as successful as possible.

Comments

you're -- when the kelp is there. I mean, as most of you that know about kelp know, when there's kelp, there's lots of it, and if it wants to grow, it grows, and that particular area is very, very good for growing kelp, and I think a reef there would definitely support a kelp bed, because it does already.

I do the trawling for Edison, and we have a 40-foot station that starts right inside Barge Rock, which I have on my map, which is at the beginning of your -- the lower end of your -- your experimental reef, and we -- originally, when we set that up, we tried to we trawl through that area, and we couldn't trawl there, because we kept snagging the kelp, snagging the kelp, and snagging the kelp, so that area supports kelp really well, and I think it's attached to some rock down there somewhere, so that's -- that's one thing I want to make sure that

we're -- we understand how much rock really is there.

AM14.2 And I agree with you that there's rock and sand and rock and sand. There's plenty of areas that you could put more rock. I just want to make sure that you put it on the sand and not on a rock that's already there.

And we moved our trawl station outside, to the 50-foot area that doesn't have any kelp, just outside the area. I can -- it's on the map. If you'd like the map, I can give you a copy of it. If not, I can show people after the meeting, if they'd like to talk about it, so...

MS. GRIGGS: Okay. Well --

MR. NIELSEN: Did you want a copy?

MS. GRIGGS: -- maybe you -- you may want to talk --

MR. SCHROETER: Yeah.

Responses

AM14. See response to comment AM12 above.

Comments

Responses

MS. GRIGGS: -- about it afterwards.
Are you going to submit a copy of the map?
Do you --
MR. NIELSEN: Yeah, I'll give --
MS. GRIGGS: -- have it --
MR. NIELSEN: -- it to you.
MS. GRIGGS: -- here or --
MR. NIELSEN: Yeah.
MS. GRIGGS: -- if you -- okay. Because --

MR. NIELSEN: And -- and --
MS. GRIGGS: -- you had said you were going to put some additional details on it.
MR. NIELSEN: Well, there's lot of things that I could do, but it takes time and money, and I did this at my own experience, and --
MS. GRIGGS: Okay.
MR. NIELSEN: -- and if someone wants to get involved in it, I can help them do it.
MS. GRIGGS: Okay.
MR. NIELSEN: And it -- to do it -- do it properly, to really cover the area, it will take more time.
MS. GRIGGS: So between now and December 28th you were weren't planning on putting any more effort into --
MR. NIELSEN: No.
MS. GRIGGS: -- that than you've already taken so --
MR. NIELSEN: No.
MS. GRIGGS: -- far.
MR. NIELSEN: If --
MS. GRIGGS: Okay.
MR. NIELSEN: -- someone wants to -- to call me and get involved, I'd be more than happy to help.

Comments

Responses

24 MS. GRIGGS: Okay.
25 MR. NIELSEN: But I mean I know that people that

1 are doing this for a living, so --
2 MS. GRIGGS: If --
3 MR. NIELSEN: -- if they'd like to get involved,
4 I'd be happy to get involved with them.
5 MS. GRIGGS: If you -- yeah. If you could leave a
6 copy of it --
7 MR. NIELSEN: Yeah.
8 MS. GRIGGS: -- we could find --
AM15.9 MR. NIELSEN: There's one -- there's one rock
10 there, and that -- I don't know if it's in this immediate
11 area, but it's called Barge Rock, and it's almost a sacred
12 rock to people that have lived here all their life. It
13 supports everything, black sea bass, white sea bass, every
14 kind of fish you can think of. It's a beautiful rock, and
15 if that ever got covered up or damaged, it would be a bad
16 deal, and, you know, those of you that have dove -- and I
17 know there are some people here who have dove on the rock,
18 it's really something, and it's not very far from your
19 reef site.
20 MS. GRIGGS: Okay. Okay.
21 MR. NIELSEN: And it needs to be addressed.
22 Thank you.
23 MS. GRIGGS: Thank you, Ken.
24 The next speaker is Daniel -- is it Frumkes?
25 MR. FRUMKES: Frumkes, yes.

1 I'm -- I'm here representing the conservation
2 coordinating committee for the United Anglers of
3 Southern California and the American Sports Fishing

AM15. Barge Rock is not within the proposed project lease area and it will be avoided during the construction activities.

Comments

Association.

We have been involved in, before the commission, on this process -- this project for a number of years. We've submitted a number of books, like this, that were apparently not made available to people doing the E.I.R. I guess they were too thin, and they slipped through the cracks. They represent work by some of the leading scientists who were involved with this project over the last 20 years, in association with U.C.L.A.

A few comments about the E.I.R.: One is there's a big emphasis in here to -- to evaluate the differences between kelp and concrete as substrate for kelp -- I mean for -- for quarry rock and concrete as a substrate for kelp.

AM16.18 We've heard a lot of the reasons why people would rather use concrete. The organizations I work with are involved in building reefs, and we use concrete, and there's some -- a lot of questions we'd like to have answered, but one of them is not which you should use, and I wonder how that got to be a priority. I'm aware of no evidence that indicates a significant difference between the two, in terms of growing kelp, and the only evidence

that I know is that there's an advantage in concrete because it's lighter, and there -- some people in Japan have suggested that there's an advantage in concrete because it has sharp edges, but I'm aware of no evidence that suggests that quarry rock is better. Yet we know we have been hearing about all the -- the prohibitions and problems with using it.

Now there are a couple of areas that we know of that are important, that are really not being well addressed.

Responses

AM16. This comment is the same as you submitted in your letter to the CSLC. Please see the response to comment B2 from your letter.

Comments

AM17.11 Location, where -- where we're working in one
12 relatively small location; the other locations down the
13 coast have been identified, and relief. We know that
14 the -- that how high a -- a reef is very important.
15 Southern California Edison would be more than
16 happy to provide -- to, during the experimental phase,
17 testing of these additional locations and testing the
18 reef, instead of having to test quarry rock, and that's
19 the rational thing to do.
AM18.20 The -- the second thing is, if -- if you
21 insist, for some reason -- as I say, somebody is going to
22 have to come up with some evidence, because there is
23 nothing published that -- that tells us why we should be
24 testing quarry rock.
25 If you have to do it, you don't have to do a

1 fully replicated design, like -- like they -- like they
2 have right now in seventeen thirty-eight, sixty-seven, six
3 replicates and so on. With -- with a -- a very little bit
4 of loss in power you could use one-fourth as much quarry
5 rock, and if you forget about doing those percentages with
6 the quarry rock, you could do it with even less. So if
7 you had to, to save face or something, you could do a
8 little bit of quarry rock testing, but you could also get
9 the additional sites in the -- and -- and test the relief.
AM19.10 Also, I can't conceive of doing seventeen
11 thirty-four and sixty-seven percent coverage. I don't
12 know who's going to stand down there and place these
13 pieces of concrete, so we're likely to end up with more of
14 a continuum, in which case we're really not dealing with
15 an analysis of variance at all. We're dealing with a
16 regression, and that's what makes sense, is that you
17 distribute the material trying to get somewhere between

Responses

AM17. This is the same as the comment in your letter, please see response B1.

AM18. This comment is the same as you submitted in your letter to the CSLC. Please see the response to comments B2 and B3 from your letter.

AM19. Your comment raises a legitimate concern. The nominal coverage densities for the treatments of the experimental reef (17%, 34% and 67%) represent target densities: the realized densities would certainly be different. Density would vary within modules as well as among modules of the same treatment group. The within modules variability is not important as long as it is reasonably consistent for all the modules of a treatment group. However, if the among modules

Comments

six -- seventeen and sixty-seven percent. You go down there, and you find out what you've got, and each one of your areas you write down the data as to which percent coverage is, and you get your percent coverage of plants, and you have a data point for the regression.

So the design is -- I'm sorry, gentleman -- unrealistic.

There was a -- a statement that said that all

AM20.1 these pollution problems, with bringing in concrete and bringing in quarry rock -- bringing in the concrete, they didn't account for the pollution saved by not taking it to a landfill. They only said what happens if they bring it to the site, so there's no offset in the -- in the pollution, a very superficial -- I'm sorry to say it appears very -- it appears to be a very superficial looking at it here.

There's another statement in there.

I've done a lot of work trying to find concrete for reefs. There's a statement in there that says most concrete goes to -- recycled concrete goes to road base. Now if they are saying that that which gets ground up for road base gets used for road base, then it's true, but if they say that most concrete that comes from demolition goes to -- goes to road base, I would like the evidence for that, because I know where there's a million tons of it at Vandenberg, and they can't get it and put it to road base.

The person that runs the quarry, is it a true statement that most of the concrete that comes from demolition goes into road base?

MR. COLIN: Base superior, not road base, per se,

Responses

variability for a treatment group was large, it might invalidate use of analysis of variance. In that case a different procedure, such as regression analysis, would be used. The contractors that have been interviewed regarding the experimental reef project have expressed confidence that they would be able to place the reef materials on the bottom at close to the nominal densities Surveys would be conducted during reef construction to determine coverage densities of placed materials and placement procedures would be refined as necessary to improve the accuracy of the placement operations.

AM20. This comment is the same as you submitted in your letter to the CSLC. Please see response to comment B6 from your letter.

Comments

24 but some kind of a base. Base is used in -- in unstable
25 landfill or unstable conditions --

27

1 MR. FRUMKES: So --
2 MR. COLIN: -- so you --
3 MR. FRUMKES: So it doesn't -- it doesn't go to
4 landfill?
5 MR. COLIN: Or it can go to landfill.
6 MR. FRUMKES: Does most of it actually get ground
7 up?
8 Most of the concrete --
9 MR. COLIN: Most of it --
10 MR. FRUMKES: -- which is --
11 MR. COLIN: -- will --
12 MR. FRUMKES: -- provided to
13 Southern California ---
14 MR. COLIN: -- will be ground, yes.
15 MR. FRUMKES: Well, then there's a million tons for
16 you in -- in Vandenberg.
17 MR. COLIN: Any time -- any time you want to bring
18 them down to San Diego, we'll take it off your hands.
19 MR. FRUMKES: And that's my point. If -- if you're
20 close to your site, you grind it up, but the concrete that
21 isn't close has to be trucked a long distance to your
22 site --
23 MR. COLIN: This is true.
24 MR. FRUMKES: -- adding up to an environmental
25 damage.

28

1 Okay. That's not being accounted for at all
2 in the E.I.R.
3 We'll give our -- our -- more details, but

Responses

Comments

the most important thing is no evidence that testing -- the difference between concrete and quarry rock is an important test.

Lots of evidence that location is important and the -- and relief is important.

AM21.9 Also, the E.I.R. said that our method of wanting to build a reef that had high relief mixed in with low relief was going to use something like "N" time -- six times as much material.

We were -- our proposal was exactly the same amount of material, but with an even distribution, so some of it was filed, and some of it was not, and I made that very clear in communications, so that was somewhat inconvenient to -- to buying, no doubt, I'd say.

MS. GRIGGS: Thank you for your comment.

Are you going to be submitting comments in writing, also?

MR. FRUMKES: If -- if it will be actually used. This was not made available last time. I gave something like 50 copies to the commission.

So if -- if these comments actually go to these people and they are read, yes.

29

MS. GRIGGS: Well, we have to respond. We will be responding to all of the comments that we hear today and that come in in writing in the document.

MR. FRUMKES: Okay.

MS. GRIGGS: It's required.

MR. FRUMKES: Then I would be very happy to submit this.

MS. GRIGGS: Okay. Mr. Streichenberger.

MR. STREICHENBERGER: Yes. Thank you, ma'am, for the invitation.

Responses

AM21. A draft of the assumptions used for Alternative 4, High and Low Relief at Multiple Locations, was sent to you for comment to determine if the configuration met your expectations prior to the release of the Draft PEIR. We never received a response to the draft alternative description. The assumptions used were estimated by reviewing the specifications for existing high relief reefs detailed in the CDFG's artificial reef publication.

Comments

I'm Rodolf Streichenberger of Marine Forests Society.

For my comments, first thing's simple, is just a list of what I think is missing, you know, in the E.I.R. There is -- it has very good work, you know. I must say that, but some things are missing, so if we have something missing, it's very important to the marine forest, too, you know.

AM22. The kelp planting alternative has been eliminated. It should not have been eliminated, and the reason is -- the main reason is that kelp planting, as we proposed, you know, with the reef wall, you know, as a house substrate, and planting kelp, you know, for the forest of kelp is not in the scope of the permit, the conditions of permit written by the Coastal Commission.

This is not true.

We are fully in the scope, because we propose a house substrate. We proposed, you know, the reef bowls. While they are known everywhere in the State, ten agencies use that. That's concrete. This is a beautiful, experimental, little concrete device, you know, and this is something you can carry with that.

AM23. Of course, we would be happy, also, to plant our kelp on recycled concrete, and I think there's a proposal planning that.

AM24. So the eliminations, you know, of the kelp planting alternative, I think, is unlawful. You have to respect the law, which is very clear about that, CEQA fifteen one to six, you know, and the real reason says that you have to take care of it, and don't think there is some conditions of a permit who can -- who can stop the State Lands to examine, you know, the kelp planting

Responses

AM22. This comment is the same as you submitted in your letter of December 12, 1998, to the CSLC. Please see response to comment H3 from your letter.

AM23. Please see the response to comment H3 from your letter of December 12, 1998.

AM24. This comment is the same as you submitted in your letter of December 12, 1998, to the CSLC. Please see the response to comment H3 from your letter and the response to comment J1 of the Natural Resources Defense Council.

Comments

18 alternative. Certainly not.
19 First, because State Lands is the lead
20 agency, and the lead agency, I read -- you know, this is
21 in the role -- the lead agency for a project has authority
22 to require chandlers in any or all activities involved in
23 the project.
24 So State Lands, don't think, you know, you
25 are restrained to examine -- you know, to consider an

31

1 alternative or a condition of a permit. This is not true.
2 You have all of the authority.
3 Now I can say that our proposal of kelp
4 planting with the house substrate of concrete, without
5 quarry rock is absolutely sure, the -- we don't need any
6 concrete, you know. It is our proposal, so please reverse
7 this decision -- I think it was not tried -- and consider
8 our kelp planting alternative.
AM25. 9 Also, there is a little list of things, you
10 know. The E.I.R. did not make any identifications, you
11 know, of -- of impacts of the quarry rock extraction, you
12 know. You have to extract. You have to destroy the site,
13 natural site, you know, if you want to -- to -- to ex- --
14 to extract quarry rock. You destroy an existing
15 ecosystem.
AM26. 16 Also, you destroy, when you throw that on the
17 sea, suppose the same for -- also for the rock. You --
18 you des- -- you lose, you know, the biota of the sandy
19 bottom, so you -- you lose, you know, a sandy bottom
20 biota, and this loss should be accounted in the E.I.R.
AM27. 21 You did not look at the toxic release
22 eventual nor out of the quarry rock or also out of some
23 recycled concrete, but I would have liked to read that,
24 because in any permit we asked to the Coastal Commission

Responses

AM25. The PEIR evaluates impacts that are directly attributable to the proposed project. This assumes that materials are purchased from existing, permitted rock quarries and recycled concrete brokers. The extraction of rock would not be a new activity generated by the project, but part of the ongoing permitted operations of the quarry.

AM26. Please see the response to comment F18 from the League for Coastal Protection letter.

AM27. We have no scientific data demonstrating toxic releases from the type of quarry rock and recycled concrete material that would be used for the experimental and mitigation reefs The materials used must meet the Department of Fish and Game's

Comments

25 is that -- over and over again, is "What about the
32

1 release?"
2 So I think, Coastal Commission, you have to
3 consider also the release out of an emerging quarry rock.
4 Certainly you have to do that.
AM28. 5 Finally, I was a bit surprised not to see in
6 the E.I.R. any identification of cost.
7 It is the law to -- to take account of the
8 cost. It is a law. I don't know where it is, but you
9 know it as well as me, and of course, there is such a
10 difference in -- in cost with the quarry rock with the
11 recycled concrete or with the little reef, also with the
12 kelp planting, enormous difference of cost. You have to
13 count the economy, because you don't make any
14 environmental job without counting the economy in it.
15 Know the environment works hand in hand with the economy.
16 I have the approach, you know, the economy,
17 not to take care of the environment, but the report's
18 addressed to the industry.
19 Are we going now to -- to take -- to see the
20 environmental agencies not take care of the economy. It
21 would be the reverse, but the same mistakes, so we have to
22 consider the economy, when you talk about quarry rocks,
23 while an extravagant, extravagant cost, you know, $200,000
24 an acre, and some other proposal for ten times less.
25 So this is what's missing in the E.I.R., and
33

1 I would like, please, if you want, to complete, you know,
2 your analyzing with us.
3 Now, second point, I have something to say
4 about kelp planting that especially goes in marine

Responses

Material Specification Guidelines for artificial reefs.

AM28. In response to public comments, estimates of a range of costs have been added for the experimental and mitigation reef projects. (see Section 3.8).

Comments

forests.
With a rock, you know, you might forget
planting for a good reason. It is one since exactly 1967,
when you look at all the study, all the experimental, all
the tests, trial, you know, done to restore kelp in
California, you know, since 1967, the work of Dr. Knowles,
Dr. McPeek, Dr. Foster, Dr. Beralotte, or Wilson, you
AM29. always have the same thing, you know. You have to help
nature to grow that kelp.
It's -- it's said in any of this literature,
and you have to help the kelp with the better recruitment,
because nature is short of recruitment most of the time,
you know, so you have to help the recruitment with the
seeding. This is exactly what we propose.
AM30. Second, you know, in all this, these experts
have said we have to protect the kelp, you know, against
grazers, the bottom grazers, like urchins or the grazers,
you know, we call swimming fish. This is -- you have to
do that, and I can't understand a project -- seems so many
years we never thought about that, in all the literature,
all the report of all scientists, that says, "Please think

about recruitment. Help the recruitment of the kelp or
protect your kelp that you expect from grazing and from
grazers," and we don't see that in the actual project,
which is the project of the California Coastal Commission.
So we propose, Marine Forests Society, assist
them to grow the kelp, you know, off bottom, you know, and
to be the decoy, you know, some kelp to be eaten by the
grazers to help the little -- the little plants to take
off and to -- and to prosper, to grow up.
So we have a special method. I don't want
to -- to -- to be too long on that, but we wrote that to

Responses

AM29. In response to public comments, two treatments of kelp planting have been added to the experimental reef project. Each block of modules would now include one quarry rock and one concrete module at 34 percent coverage with kelp planting. The experimental reef would now have 56 modules total of which 14 have kelp planting.

AM30. Please see the response to comment H3 from your letter of December 12, 1998.

Comments

you in May 20th, and you have this document, so this is why kelp planting of this other technical reason and scientific reason has to be considered.

There is --

MS. GRIGGS: Mr. Streichenberger --

MR. STREICHENBERGER: -- and absolute --

MS. GRIGGS: Mr. Streichenberger, I just wanted to let you know that you have been speaking for eight -- for eight minutes, and I'm going to ask you to finish in -- in two minutes, please.

MR. STREICHENBERGER: In two minutes.

MS. GRIGGS: In two minutes, please.

MR. STREICHENBERGER: Okay. So I would just say that kelp planting we have to reconsider science interest.

35

Now quarry rock.

Quarry rock has been put, you know, as a proposal in 1991. It was a big error, big error to consider to -- to -- to mine, you know, an island as Catalina Island. No environmentalist can have that in mind. I don't know what was in the mind of the people who proposed that. Also, that is awfully costly, and more we go, more we discover, you know, the impact, the disadvantage of the quarry rock, the last impact, a considerable one discovered was by E.I. -- your E.I.R. That's the air and water, transportation, pollution, and because of that, only because of that, you know, you have to look for another alternative, because it is the law.

AM31. You cannot -- you cannot keep an alternative which is -- makes more impact, you know, that other alternative, feasible alternative. It is the law, you know, that CEQA 15021 and 15126.

Third things. You know, third thing is this

Responses

AM31. Please see response to comment H1(e) from your letter of December 12, 1998 and response to comment J1 of the Natural Resources Defense Council.

Comments

experimental reef.
AM32. This experimental reef after 24 years has no sense to spend now five years and to spend three million to compare, you know, the diatribe, you know, on the house substrate of rock and the hard substrate of -- of the -- of recycled rock makes no scientific sense.
You want me to be brief. I cannot explain

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more, but you -- scientifically, you can ask such an experimental to any sea grant, any university. They are not going to give you one dollar to do that.
This experimental reef has no sense.
So to finish what you have to do State Lands, what we ask you to do is now to start, after 24 years, to plan and to mitigate. Since 24 years, Edison's grant, you know, is -- is cooling, damaging, you know, the kelp and damaging the fish.
Till now no mitigation has been done. There's no more time to talk about experiment or study. You have to mitigate, and you can do that, because you have visible, visible measures to apply. You have the concrete rock, the physical measure. We don't see so big, you know, trouble with that. You have the reef bowl. I show that to you. That's concrete. That's very well experimental, and you have the kelp we're planting that is every scientific, so you have enough many visible measure to start to plant now, and I think this is your sovereign land. You know, you hold that land for the public, and after 24 years, it is time, you know, that on the sovereign land, you know, the rock fills, you know, caused by industry start to be mitigated. You have the possibility to do it. Please do it.
MS. GRIGGS: Thank you for your comments.

Responses

AM32. Please see responses H1 and H2 from your comment letter of December 12, 1998.

Comments

Responses

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If you have other comments that you don't feel you were able to make, because of the short time period, I --

MR. STREICHENBERGER: It was a --

MS. GRIGGS: -- hope --

MR. STREICHENBERGER: -- short time.

MS. GRIGGS: I hope that you will send them to us in writing.

MR. STREICHENBERGER: I will send a writing about that, certainly, you know. You have my prepared -- but if somebody would ask a question, I --

MS. GRIGGS: No.

MR. STREICHENBERGER: -- would try to ---

MS. GRIGGS: We --

MR. STREICHENBERGER: -- answer --

MS. GRIGGS: Well, if anybody --

MR. STREICHENBERGER: -- as you want.

MS. GRIGGS: If anybody has any questions, we can do it -- they can talk to you after the hearing. Okay?

MR. STREICHENBERGER: Very good, ma'am.

MS. GRIGGS: Okay.

MR. STREICHENBERGER: Thank you.

MS. GRIGGS: Okay. The next speaker is Rimmon Fox.

MR. SCHROETER: Fay.

MS. GRIGGS: Oh, Fay. I'm sorry. I'm sorry.

38

MR. FAY: That's quite all right. I've gotten used to it by now.

MS. GRIGGS: Oh, okay.

MR. FAY: I'm Rimmon C. Fay. I've written out the bulk of my comments, and I can give these to you, but

Comments

AM33. 6 before I get into them, I would like the draft E.I.R. to
7 reflect on why a State Lands Commission is doing this
8 E.I.R. and why they've assumed the financial
9 responsibility for it, if they have, and Edison hasn't
10 financed it. Maybe they have. It's not clear.
11
AM34. 11 You have to realize that the recommendation
12 by the Marine Review Committee to plant the reef was based
13 on the studies of the San Onofre nuclear power plant
14 during the 13 years which the M.R.C. was studying the
15 problem, and the discharge has changed and will change
16 further, so the report of damage estimated by the
17 Marine Review Committee is short and less than what is
18 happening now, because they're discharging at a higher
19 temperature, and they've applied to discharge apparently
20 corrosion waste from the reactor, which will also have an
21 adverse environmental impact on the receiving waters.
22 In any event, the area impacted by the
23 discharge, even with the rise in temperature, will be
24 greater and more severe than was appraised by the
25 Marine Review Committee.

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1 This is taken in the context of the fact when
2 kelp is at an all time minimum, in Southern California,
3 and if you look back at the 1911 kelp survey, to all the
4 kelp surveys done in between, there's a long-term trend in
5 the decline and abundance of all benthic algae, in
6 Southern California, with one exception that I'm aware of,
7 padina, an exotic species from a tropical habitat which
8 has become established in the Marina Del Rey.

AM35. 9 The question is: What happens if this reef
10 doesn't work?

Responses

AM33. The project proponent pays for the cost of all permitting and CEQA/NEPA compliance, including the preparation of the PEIR, with funds collected from the utility ratepayers.

AM34. The amount of mitigation required to compensate for losses at San Onofre is beyond the scope of this PEIR. The determination to require a 150-acre mitigation reef was made by the CCC after extensive research and public debate before that Commission.

AM35. The experimental reef project would help provide information to design the full mitigation reef to provide the greatest possible

Comments

AM36. 11 It may be that concrete serves as a good
12 substrate for kelp to attach to, but the concrete that
13 I've observed on the bottom, in the vicinity of kelp beds,
14 has never served as an attachment anchor for kelp. In the
15 areas where I've seen concrete on the bottom, which
16 were -- some of these reefs were established by the kelp
17 bed and even -- by the Department of Fish and Game and
18 even the Pendleton Artificial Reef never supported kelp.
19 So it's a kind of a crap shoot to make us
20 think that you're going to put this kelp in there and have
21 it survive.
22 One of the things the E.I.R. doesn't address
23 is when you place the reef, very important in succession
24 to -- if you're going to target a particular species or
25 group of species, to specify when you put that reef in and

1 document what the conditions are, because the question on
2 this one is going to be, if it works, why it works, but if
3 it doesn't work, why doesn't it work, and if it doesn't
4 work, whose reef is it then?

AM37. 5 Is it the public's reef?
6 If a decision that there's adverse impacts
7 from this reef, if those conclusions are made, is the

Responses

likelihood of its success. If the experimental reef failed and the full mitigation reef could not go forward, the CCC would most likely consider some type of out of kind mitigation as an alternative. This is discussed in the No Project Alternative (Section 6.4.2). If the mitigation reef is built and it does not meet the performance criteria set out in the SONGS Permit conditions, then the CCC would consider other remediation as described in the last paragraph of Section 2 4 of the Permit

AM36. A principal objective of the experimental reef is to test whether a reef built of recycled concrete performs as well as a reef built of quarry rock. The outcome of the experiment will determine which material is used for the final reef.

AM37. The project proponents are responsible for constructing the experimental and full mitigation reefs and maintaining them for a time equivalent to the life of SONGS. The reef would not be

Comments

8 public liable for restoring the seafloor and removing
9 whatever is put down there.

AM38.10 And I was more than surprised --
11 Dr. Schroeter has told me this is wrong, but I just got a
12 draft study of reefs from John Stephens, a Professor
13 Emeritus from Occidental, and he talks about this reef
14 being completely concrete.
15 It's my understanding, from the E.R.I., that
16 the reef was supposed to be 50 percent concrete, 50
17 percent quarry rock, which -- what's it going to be?
18 I can give you a citation to Stevens'
19 statement. I just got it yesterday.

AM39. 20 There was a statement in the E.I.R. that
21 there's not very much documentation of changes in sandy
22 bottom on the sea floor in Southern California, and I only
23 grabbed two references out of my library on the way down
24 here this afternoon, "Assessment and Atlas of Shoreline
25 Erosion Along the California Coast," "State Department of

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1 Navigation Ocean Development," "National Shoreline Study,"
2 "California Regional Inventory," "Corps of Engineers,"
3 both of these cite many examples of the erosion of sand,
4 shoreline in Southern California.
5 It's been my observation that rocky sub-tidal
6 reefs, which have a hard bottom link into the intertidal,
7 so that there's significant intertidal rocky area and a
8 corridor of rock leading to the offshore reefs, support a
9 larger diversity of marine life than isolated sub-tidal
10 reefs offshore with a barrier, and maybe the E.I.R. might

Responses

removed even if it does not meet the performance criteria in the SONGS Permit conditions. The presence of the reef material on the sea bottom would cause no significant impacts, so there would be not need to remove it.

AM38. The experimental reef that is currently being permitted would test both quarry rock and recycled concrete at different levels of coverage (17, 34 and 67 percent). It is not known at this time whether the full mitigation reef would be constructed of rock or concrete.

AM39. These studies and reports primarily address sand transport and erosion processes within the shore face or closure depth, which is at about 30 feet of depth in the project site (SCE 1996d). The proposed project site is located a half mile offshore at a depth of 39 to 47 feet. Information on changes to the sand bottom at this depth is limited. Also see response to comment F1 from the League for Coastal Protection.

Comments

address that point.
There are certain comments in the E.I.R. you can get out of my written remarks here, some deficiencies and -- in the biological statements, some biological statements, which I believe are flat-ass wrong, so you can -- you can give those some consideration, but the real problem is what happens if it doesn't work, and who's going to bear the expense of that, or is Edison going to be required to do even more extensive attempts at mitigation for the impact of this structure?
That -- that's good enough for my comments. Here's a copy of my remarks and --
MS. GRIGGS: Thank you.
MR. FAY: -- I'll look forward to the draft, the final E.I.R. That's going to be interesting.

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Thank you.
MS. GRIGGS: Thank you.
And the last person that we have signed up to speak is Lynn Hughes.
MR. HUGHES: Hi. My name is Lynn Hughes. I'm the City of San Clemente's Marine Safety and Recreational Manager, and I'm here to represent the City's interest.
AM40. Our primary concern is that this reef doesn't end up, in some fashion, on our beaches. As I indicated to you, at your last public hearing, rock and rubble and other debris washes up onto the beach. We're sort of the ring around the collar of the ocean, and material that might be particularly small, a specific gravity configuration, or even one that is buoyed by a hold-fast and a tether of kelp is potentially destined for our beaches.
Now, in the Environmental Report, it -- it

Responses

AM40. The PEIR does address the City of San Clemente's concerns regarding reef construction materials on the beach with a monitoring program and removal of all materials that might create a hazard. The mitigation has been modified slightly to ensure that the monitoring for materials takes place immediately after large storms. Please also see response to comment 111 from Wendy Morris.

Comments

mentions mitigation by having people, I assume, walk the beach, monitoring and retrieving any material that might wash up on the beach. This is, though, if it happens, probably the best that we can do, but I find, from my standpoint, unacceptable to have that real potential, because by the time it comes up and can be physically retrieved, it's already been trampled on or potentially a hazard to the many people that are in the water. Plus, a

lot of this material can get sanded in very quickly and covered over and then uncovered or be just below the surface or a whole bunch of different scenarios.

AM41. So considering that we are in a very mild wave climate, compared to what we may have seen along our coast during the Richard Henry Dana's time, the mid 1800s, we've really got to anticipate the kind of monstrous waves, the chubascos and other types of storm systems, that could possibly dismantle this reef, and my concern is that the people in the future that come to the beach, that they aren't put in the position where they have to walk around or negotiate these things, if they, in fact, can, since most of this debris is going to be hidden from their view before it becomes evident on the beach, and that the taxpayers, in no way, shape, or form, are going to be responsible for cleaning up this debris from a structure that apparently has an indefinite lifespan.

And that would be my comments. Thank you.

MS. GRIGGS: I don't have anybody --anybody else that's signed up to speak.

Is there anybody that would like to add their names?

Yes, sir.

Responses

AM41. It is of course impossible to know what would happen in the kind of storm event you have described in your comment. However, the project proponent is responsible for mitigating for the impacts of the experimental and full mitigation reefs for a time equivalent to the life of SONGS. If it is determined that there is an ongoing need to fund clean up efforts, this may be handled through a trust fund.

Comments

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MR. PATTEN: I'm Jake Patton.
All right. I'm Jake Patton, from

Rainbow Environmental, and I'm sort of responsible for a lot of the science that went into the reef plan, but I'm out of the loop now.

I might have missed something, but I was reading about the monitoring of the experimental reef.

The idea was that they were going to use the experimental reef to determine just exactly how much rock to put down there to get the required hundred and fifty acres of kelp. If you put down ten acres of kelp, you only get --

THE REPORTER: Sir, I'm sorry. Can you --

MR. PATTON: Yes. Yes.

THE REPORTER: I just can't hear if there's anybody else talking, so could you speak up a little bit?

Could you repeat that last section?

Because I couldn't really hear.

Thank you.

MR. PATTON: All right. How's that?

AM42. Okay. The idea is that we put down, say, "X" acres of experimental reef, and then if kelp grows on half of it, then we have to put down 300 acres of mitigation reef, to get our hundred and fifty acres of giant kelp, but I didn't see any reference in the report, the E.I.R., to the fact that giant kelp is affected by a lot of things that have nothing to do with substrate.

It's affected by El Ninos. It's affected by urchins.

AM42. The monitoring of the experimental reef conducted by the CCC staff will certainly take into account conditions such as an El Nino. Performance of the experimental reef will be compared to that of a number of natural "reference" reefs. Adverse oceanographic conditions leading to failure of the experimental reef would likely cause kelp to decline in the reference reefs as well, and such information would certainly be considered in evaluating the success of the project. The PEIR evaluates a maximum of 300 acres of artificial reef construction as a worst-case scenario. The SONGS Permit does not anticipate placing an infinite amount of material for the full

Comments

It's quite possible that in the five years of the experimental period we'll have an El Nino, and then no kelp at all would grow on the experimental reef. If we follow the formula given, that means we would have to put out an infinite -- infinitely large mitigation reef, and that strikes me -- it -- it just won't do. It's not common sense.

We need to provide, officially and in writing, some sort of provision for such things as urchin plagues in the El Nino and to adjust our -- our estimate of the amount of rock that's going to be required to give us a hundred and fifty acres of kelp accordingly, and I think -- yeah. I think that change should be made.

Thank you.

MS. GRIGGS: Thank you.

Anybody else?

Since nobody else, because we advertised that we would be here from 2:00 to 4:00, we're going to leave the hearing room open. We can use this opportunity for people to talk or just kind of get out of their seats and go ahead and have some discussions, if you want to.

That won't be part of the record, but if anybody has questions of things -- yes, sir.

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MR. DEAN: Yes. I'm Tom Dean with Coastal Resources Associates, and we're consultants with Southern California Edison.

I just wanted to point that we have some graphics here showing you some underwater pictures of the reef off Mission Beach. That might just give you some indication of what the reef's going to look like in the future, so people are welcome to take a look at those.

We also have a report on the Mission Beach

Responses

mitigation reef to achieve the permit performance standards If the experimental reef does not succeed at all, the CCC could consider some form of out of kind mitigation.

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reef. It's more of a technical report, but if people are interested in it, they can either contact me or Larry Deysher, and we'd be happy to give you that, so you have some more peripherals that maybe might explain --

MS. GRIGGS: Thank you.

MR. DEAN: -- reef structure.

MR. MELONE: Yes.

MS. GRIGGS: Yes, Frank.

MR. MELONE: Yeah, I'd just like to --

MS. GRIGGS: Would you stand up, Frank --

MR. MELONE: Sure.

MS. GRIGGS: -- for the record, please?

MR. MELONE: I'd just like to comment, since Tom mentioned the report by the Mission Beach reef, that that is some evidence that strongly suggests that a concrete reef will support a kelp bed, and I know the State Lands

Commission has not had an opportunity to review this report, and we would like to enter it into the record as part of this hearing, and Dr. Dean will give you a copy of it for that purpose.

MS. GRIGGS: Thank you.

So I'm going to just -- we're just going to call a break in the hearing, and we'll be here. Feel free to stay or feel free to leave. This evening's session is basically a repeat. You know, different people, we assume, will come, but there's not going to be anything different that happens this evening. I just thought I would mention that. Sometimes people think that there's going to be a different presentation or something in the evening, but that's not the case, so we'll just kind of adjourn for now and be here until 4:00.

(A break was taken from

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3:10 p.m. to 4:00 p.m.)

MS. GRIGGS: It's 4:00 o'clock, and nobody else has indicated an interest to speak, so we're going to close the meeting, the afternoon meeting, now; then reopen it at 7:00 o'clock tonight.

(End of afternoon session: 4:00 p.m.)

* * * * *

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CALIFORNIA STATE LANDS COMMISSION
PUBLIC MEETING

For the Program Environmental Impact Report
San Onofre Nuclear Generating Station
Experimental and Full Mitigation Artificial Reef Project

San Clemente Community Center
Ole Hanson Room
100 North Calle Seville
San Clemente, California
Thursday, December 10, 1998
7:02 p.m.

Reported by: Melini A. Carreon, CSR 7511

California State Lands Commission Public Meeting for the Program Environmental Impact Report, San Onofre Nuclear Generating Station, Experimental and Full Mitigation Artificial Reef Project, taken before Melini A. Carreon, a Certified Shorthand Reporter, Certificate Number 7511, for the State of California, commencing at 7:02 p.m. and concluding at 7:45 p.m., Thursday, December 10, 1998, in the San Clemente Community Center, Ole Hanson Room, 100 North Calle Seville, San Clemente, California.

Comments

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PRESENTATIONS AND APPEARANCES:

CALIFORNIA STATE LANDS COMMISSION:
MARY GRIGGS
DR. MARY BERGEN

CALIFORNIA COASTAL COMMISSION:
STEVEN SCHROETER
DAN REED

SOUTHERN CALIFORNIA EDISON:
FRANK MELONE

RESOURCE INSIGHTS:
ELAINE RUSSELL
PHIL UNGER

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PRESENTATIONS AND APPEARANCES: (Continued.)

PUBLIC SPEAKERS:
GORDON LEHMAN
WENDY MORRIS

ALSO PRESENT:
UNIDENTIFIED PUBLIC

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San Clemente, California
Thursday, December 10, 1998
7:02 p.m.

(Proceedings commenced.)

MS. GRIGGS: I think we'll go ahead and start the meeting.

MR. SCHROETER: We're going to start the meeting.

MS. GRIGGS: I think I'd like to ask, before we get started, is there anybody that has signed up to speak?

MS. RUSSELL: Yes, we do.

MS. GRIGGS: Do you have some?

MS. RUSSELL: Yeah, I've got some. Yeah.

MS. GRIGGS: Oh, okay.

Hi. I'm Mary Griggs from the California State Lands Commission.

I'd like to thank you all for coming and participating in this hearing, especially this time of the year, when everybody is busy, getting ready for the holidays.

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I don't know if everybody is aware; we did have another session this afternoon, from 2:00 to 4:00, and probably had -- I don't know -- eight, nine, ten speakers at the time, and the purpose of our meeting this

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evening is to receive comments on the program -- the Draft Program E.I.R., and so this is not intended to be a question-and-answer period. We want to hear your comments, concerns, criticisms of the document and things that you think that we may not have couched correctly or new information that you may want to bring to our attention, so those are the kinds of things that we're looking for.

After the speakers that have signed up to speak do so, there will be some opportunity for everybody to just kind of mill around, because I think we'll leave the hearing open for a little bit and see if others come. We have it scheduled from 7:00 until close of comments, but I don't want to close it down too early, in case somebody is a few minutes late getting here, so there will be an opportunity again, if somebody just has some general questions, either of the agencies or the -- or Southern California Edison or want to talk to the consultants, too, they'll be here, and you'll have that opportunity.

If anybody hasn't signed a sign-up form, that would like to speak, if you would do that, or if you didn't sign one and you want to be on the mailing list and you're not already on the mailing list, if you'll do that for us, then we can make sure that you -- we add your

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names. Then you'll get a copy of the final -- the final

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Environmental Impact Report that's going to be prepared.
I'd like to do a few introductions so you know who is here.
From the California Coastal Commission, Steve Schroeter is up here at the table with me, and Dan Reed is in the audience.
From State Lands Commission, Dr. Mary Bergen is here. She's on our staff.
And from Resource Insights, Elaine Russell is here and Phil Unger.
And Southern California Edison, Frank Melone is here from Southern California Edison.
Frank.
MR. MELONE: Yeah. We -- we also have other members of our technical team, so we'll be happy to try and address any questions about our proposed project, if anybody has some.
MS. GRIGGS: Now does anybody have any questions on the proposed project before we get started with comments?
MS. MORRIS: Just one last time, one last question, is there anywhere in this project that you're actually going to plant or transplant kelp?
MS. GRIGGS: I'll get her name.
MR. MELONE: The proposed project that State Lands

is evaluating now currently does not contain a kelp transplanting component, but we're certainly interested in that, and we'll entertain that.
It seems like there's a lot of interest on that, based on comments that were provided earlier today, so that's something that we would entertain, to see the value in it.
MS. MORRIS: Great.

Comments

MR. REED: It's like little external phases where you're only looking at deciphering of the monitoring experiment. There will be studies conducted during the experimental phase which will -- if kelp does not colonize and return, there will be studies that will be done to determine why it didn't colonize, and in the phase of that growth experience, there will be experimental types of planting to determine, but not planting at a scale of -- of meeting performance standards, so there is that aspect that is planned.

MS. GRIGGS: Could I ask you to give your name? And you can -- she -- for the court --

MS. MORRIS: Wendy --

MS. GRIGGS: -- reporter.

MS. MORRIS: -- Morris.

MS. GRIGGS: And if everybody, when they get up to speak, would state their name and address for the record,

please, and -- and stand up, so that -- that she can hear. She will let us know if she can't hear us, but...

Okay. Well, we're going to go ahead.

And I have Gordon Lehman.

MR. LEHMAN: Hi. My name is Gordon Lehman, Anaheim, California.

We don't want to take issue with the -- the reef project, the way it presently is. Our main interest is in that of the -- of the kelp growth, in that the reef in the -- that meets the end goal of having a self-sustaining restored kelp bed.

EM1. One of our concerns is that the natural recruitment and will it take -- will it take place?

As part of the monitoring process of the experimental reef, enhancement -- enhanced recruitment

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EM1. This is the same comment as was contained in your letter to CSLC. Please see the responses to comments D1 and D3 for that letter.

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should be ran in parallel. With this, it gets -- this would provide three different -- be able to verify three different things: Compare the growth rate and density of both approaches under the same conditions.

If you run the natural recruitment and then run enhanced recruitment later, you're not -- you're not comparing apples with apples. You're working with a very dynamic system, in that the ocean currents change. The water temperature change. The nutrient levels change. A whole bunch of things change to one side.

9

Now you've got this big, long reef there, and the capabilities of being able to -- on one end of the reef, be able to do enhanced -- do enhanced seeding, if you will; the other end using natural improvement.

In the case of -- in case of adverse ocean conditions, would the enhancement offset the conditions of the -- of bad conditions?

In other words, if you're going to get -- if you're going to get bad improvement -- recruitment naturally, if you're -- and the conditions go bad -- like, for example, one -- the things that are happening right now is that the Mateo point is in a declining process.

If you're going to get natural recruitment off of that kelp bed and it is in declining, what's to say that that is going to happen?

You're subject to ocean currents and which way the -- the spores are going to drift, and you don't have a real good control over that, and you may not have a good viable source of the spores.

Enhancement of the reef, one that would help increase that process, so the -- after all, the end goal is to get kelp back; not necessarily to run scientific

Comments

Responses

23 experiments that are going to last for years.
24 So those --those are kind of the things.
25 So, as is stated, the end goal there, we want

1 to have a self-sustaining kelp bed, and would consider you
2 shortening the five-year period and running -- running the
3 process and use a proven and -- or use the proven and
4 tried techniques that are already available.
5 These techniques work, and it doesn't
6 particularly matter, in our experience, what substrates
7 you're using, whether you're using the concrete or natural
8 rock. Both of them work, and they work equally, as well,
9 and it -- there are some conditions that -- that somebody
10 was -- that people were pointing out earlier, the
11 different kind of reefs, where you have a low level reef
12 or high level reef. That part of it is immaterial, as far
13 as the kelp was concerned.
14 If you have kelp, you're going to get the
15 fish that are naturally to that environment that you have.
16 You want to reproduce the reef that is already here, is my
17 understanding of the intent -- intent of this reef that
18 you're putting in.
19 I'm trying to remember all the notes here.
20 The shortening of the time of the five-year
21 program, if you utilize that time to -- while you're doing
22 both natural and enhanced recruitment, if you utilize the
23 time that you save there working on the mitigation reef
24 and use modifications of techniques as you learn, either
25 modifying the techniques of enhancement or finding out

1 what else that can be done during that period of time, but
2 work on the main -- the whole main project, so that you're

Comments

still working towards the end goal of having the reef go in there, not just working on little segments at a time.

It's okay to start out -- start off with that one personal section of doing the experimental stuff, but you'll get -- like in a lot of our -- and I don't mean to knock any scientists that may be in the wrong, but some of these things we've studied to death, and it's time to take some of this knowledge that we've been doing on, since Dr. Norris started back in -- in 1958 -- '57, when he started, and start applying some of the stuff that we've learned.

Some of the stuff that we've done, we've already learned, taking the same methods they use, and have very big success with them.

One reason is we have different materials today to work with than they did when they started doing this, so you have different opportunity to do things, and while you're doing this project, working along, everything can be updated as you're working, even as you're tending to work on the mitigation reef, as you've already stated, after the three-year period.

EM2.24 So one recommendation we would have would be to combine the test reef with some of the mitigation reef.

As to the report that you have, there was one other area that we -- I had some concern with that -- and this is offered that you might consider as to beached kelp.

If you're going to have an offshore kelp bed, you're going to have beached kelp. During the summertime, when the water temperatures rise, the surface kelp and the surface canopy deteriorates and comes off, and it does end up on the beach. This happens all up and down the

Responses

EM2. The project proponent and the CCC have agreed that an experimental reef project should be implemented first to help ensure that the design of the full mitigation would be as successful and cost-effective as possible. The SONGS Permit places a great emphasis on strategies to ensure that the experimental reef project identify a design that, when implemented with the full mitigation reef will result in replacement of lost resources at San Onofre Kelp bed. The project includes mechanistic studies of alternative reef designs, substrates and management techniques (CCC permit 6-81-330-A, pp. 82-84)..

Comments

coastline on a dol- -- a valuable -- or a viable kelp bed. It always has been. It always will be. It's just a characteristic of the kelp.

EM3.13 Kelp washing up on the beach, maybe somebody can take advantage of that. Kelp can -- there's a lot of people doing mariculture right now. Abalone, sea urchins all eat kelp, and it doesn't have to be ideally fresh kelp to do that.

If there is a program set up to discuss, this stuff can be collected, and possibly -- there's a whole new industry there that possible could be used in mariculture, things like that.

Also, during the turn of the century, when -- during World War I, kelp was gathered and processed for potash. You can use kelp for fertilizer. You can use it for all different kinds of things like that. It worked at

13

that time.

Why doesn't it work now?

It is not necessarily in the same abundance that it was then, but if an industry is started on a small bases, that is collecting kelp, even it has to be financed to some way, at least you're not throwing it in landfills. You're not burying it in the sand.

And this might be a consideration you might take and put that into the report, please.

Thank you.

MS. GRIGGS: Thank you.

Our next speaker is Wendy Morris.

MS. MORRIS: Do you want my address?

MS. GRIGGS: I'm sorry?

MS. MORRIS: Did you want my address on the record?

MS. GRIGGS: No. We have it on your --

Responses

EM3. Possible uses for kelp removed from the beaches as a result of the artificial reef project are outside the scope of the PEIR. The environmental setting does report what other beaches managers in the area do with kelp when it is cleaned off their beaches.

Comments

MS. MORRIS: Okay.
MS. GRIGGS: -- form. Thank you.
EM4.19 MS. MORRIS: I have several aspects of the -- of the project that I'd like to talk to. The first is the impact of the commercial fishing sites, which is a significant impact that I believe is not being mitigated in a proposed way to a less than significant impact, and I feel that you would be interfering with possibly start -- possibly damaging already proven good fishing grounds,

while not guaranteeing the proposed reef will grow kelp and that the structure of the artificial reef will destroy an already existing good fishing area.
And I would also like to make an alternate suggestion to the phase one experiment.
Since phase one is an experiment not doing mitigation, I propose adequate experiments that would start the mitigation process similar to the -- the speak -- excuse me -- the speaker that spoke ahead of me.
What I propose is to plant kelp in the area of the thin veneer sands without the artificial reef material and also on the natural reef that exists in the project area currently.
The proposed experiment would still be going forth, and the proc- -- mitigation process -- process could also be starting. You would be more likely to have success overall. If the transplanted kelp were to establish itself on the natural reef, you could achieve the goal of the kelp bed with associated kelp --
THE REPORTER: Excuse me. I'm sorry.
Could you move up a little bit?
It's just the door's open, so I'm hearing outside noises --

Responses

EM4. The comments from Ms. Morris in these transcripts are the same as those in her letter to the CLSC. Please see the responses to comments in Letter I.

Comments

Responses

MS. MORRIS: Oh, okay.
THE REPORTER: -- when you're speaking, so could
15

you just slow down and just speak up a little bit?
That --
MS. MORRIS: Okay.
THE REPORTER: -- will help.
MS. MORRIS: Okay. Whereabouts are you then?
MS. GRIGGS: You can come forward a little bit, if you don't mind. I think that would help her.
Thank you.
MS. MORRIS: What do you have?
THE REPORTER: I have "natural reef. You can achieve."
MS. MORRIS: How about if I just start at this one point?
Because I'm not sure --
THE REPORTER: Okay. Go ahead.
MS. MORRIS: -- exactly what you caught, where you left off.
What I propose is to plant kelp in the area of the thin veneer sands without the artificial reef material and on the natural reef that exists in the project area.
The proposed experiment would still be going forward, and the mitigation process could also be starting. You would be more likely to have success overall. If the transplanted kelp were to establish
16

itself on the natural reef, you would achieve the goal of kelp bed with associated kelp bed biota, without the negative impacts of the hundred and thirty-three

Comments

Responses

additional acres of artificial reef.
It is very likely that it -- it -- that -- that any kelp is going to grow, it would grow in the -- the area of the historical kelp bed, and historically kelp thrived here, from San Mateo Point to north of the pier.
Planting kelp right away increases the likelihood of success and could decrease the environmental impacts.
And would I like to go on to problems that I saw with the environmental -- excuse me -- the Program Environmental Impact Report.
The -- the paper did not adequately study the impact of the artificial reef. It only looked at the impacts of the kelp bed that might grow on the reef.
You have no way of telling how the reef will affect sediment transport, because it's too complex of a system to model.
Also, the reef will cause waves to refract towards the shoreline, which might have a negative impact on surfing. Waves do feel the bottom, and the waves could be -- would be more parallel to the shore, rather than at an angle.

Second problem: There seems to be a contradiction in the area of the bottom material. Section 4.3, dash, "1" says 25 percent of the area is exposed bedrock, and in Appendix "B," page 20 and 21, says the area doesn't grow kelp because -- and I quote -- "It's not of big enough chunks of material. There's some pebbles and some patches of small stone such that it's not conducive for a stable, long-lasting kelp bed," end quote.
So I'm saying if it's 25 per- -- if 25 percent of the area is big, solid, bedrock material,

Comments

Responses

and the kelp isn't growing there, why would it grow on the artificial reef material?

The third problem I have is: Materials on the bottom of the project do change, in particular with large storm events. Please note that last winter we had many noteworthy storms. The bottom has undoubtedly changed, as compared to the mapping in Appendix "C," pages 12 and 13. The new mapping should be done after this winter, but before the project begins.

Page two, dash, thirty-nine says, "The lease area is a high energy, dynamic environment in which the thin cover of sand is readily moved by waves and currents.

Okay. The next problem I saw was the table of advantages and disadvantages to the various sites. The table shows that being near an historical kelp bed is an

advantage, but that a historical kelp bed in the area is a disadvantage.

What's the difference?

You're just saying one time it's an advantage and one time it's a disadvantage. I did not understand that table. It's a contradiction that raises doubts about the findings of the potential sites.

The next section was monitoring, and the first problem I had was -- have is the timing. The biweekly monitoring of the beach should be run through the month of March.

Last year our biggest storm in this area occurred on March the 25th, so I -- I believe the biweekly monitoring of the beach should at least go through the month of March.

Next is about policy. Most of the area on the shore of the project site is State beach, which does

Comments

not clean up the kelp wrack, so in order to miti- -- so in order for your mitigation measures to make any sense, you're going to have to change their policy or have someone else clean it up, if that's what you intend to do as a mitigation practice, because the State beach does not clean up the kelp wrack.

Also, in regards to the cleanup of the kelp wrack, access of vehicles. Much of the State beach is not

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accessible to vehicles much of the year or much of the time, and so I don't understand how you would get the special equipment for the clean up to the site and where it would be stored.

Currently the State will not cross the railroad tracks with their sand-moving equipment, and there's no storage area nearby, so that mitigation measure, again, is worthless.

Number four, trust fund: Page two, point, fourteen states -- or -- yeah, two, point, fourteen states that there is a significant level of impact for the potential for reef-building materials to be washed ashore. Yet Appendix "H," page 17, the monitoring could basically be for five years or as long as needed.

Well, I believe there could be the potential for the artificial reef to be washed up for the next hundred plus years. We're talking about a hundred and fifty acres of concrete and rocks, with a minimum of 17 percent coverage, and that's a lot of debris. They will probably only be washing up on big storm events and a lot probably during an El Nino year, which is about every 15 years, so if every 15 years we have a big storm event season and we have a lot of debris on the beach, then there needs to be clean up -- excuse me -- clean up done of the rocks, and so I think this is a significant impact

Responses

Comments

Responses

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that is needed for public safety, and I think a trust fund would be needed to simplify this, and it would have to go on indefinitely, as I see it, if you have a hundred and fifty acres.

Another impact on, page two, dash, sixteen, it says, "People wading, swimming, or surfing could be injured and become incapacitated, leading to drowning " This is a signifi- -- end quote. This is a significant impact that is not mitigated at all.

The mitigation that it calls for is -- is a cleanup of the beach, of the rocks, but it doesn't call for cleaning it up in the surf line, and that's where this would be, in the surf zone, so that -- that health hazard is not at all taken care of in the mitigation.

Okay. And then I have a few questions, and I don't know if -- is it appropriate to ask them now or --

MS. GRIGGS: Why --

MS. MORRIS: -- just --

MS. GRIGGS: -- don't you ask them, and then we'll see?

MS. MORRIS: Okay.

MS. GRIGGS: Okay?

MS. MORRIS: Okay. Who will be made (sic) of the monitoring results, and how will they -- will -- be they -- how will they be notified of the results?

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It talked about a yearly going over of the results of monitoring.

Would people like the -- like myself be made aware of this, and would we be able to participate?

MS. GRIGGS: Why don't you -- yeah.

Comments

Responses

MS. MORRIS: I mean --
MS. GRIGGS: I think that's --
MS. MORRIS: -- I'm just -- I don't need to have an answer.
MS. GRIGGS: Okay.
MS. MORRIS: If the experimental reef does not succeed in growing adequate kelp beds, the mitigation reef should not be built here, and -- because -- because there would be no benefits, only negative impacts.

Historically, there was kelp in the proposed artificial reef project site. The site has desired depths and features for growing the kelp, and there is currently the San Mateo kelp bed adjacent to it, yet kelp does not grow there presently.

So why would dumping rocks or concrete, to create an artificial reef adjacent to the natural reef, make kelp suddenly grow there?

Why not transplant kelp to the location, instead of adding debris?

By adding debris, and not discovering why

there is no kelp there -- why there is no kelp there now, will not make kelp appear.

Why shouldn't it -- why should it grow on the new debris, when it's not growing on the existing natural reef now?

Wouldn't it be better to try to plant some kelp on the -- kelp or to run experiments to try to find out why the kelp isn't growing there currently?

And my last question is: Where -- for -- for the project, where are the funding coming from, and have we already paid for this through our electrical bills?

Are we still paying, or will we be paying in

Comments

Responses

the future?
Thank you.
MS. GRIGGS: Thank you.
I don't have any other sign-up sheets. I know a few people came in later.
And was there everybody that wanted to sign up to speak or anybody that their form disappeared getting from the back to the front?
No.
Wendy, I was wondering if you have an extra copy of that, your -- what you read. I --
MS. MORRIS: I --
MS. GRIGGS: -- think it would help the court

reporter.
Could --
MS. MORRIS: How about --
MS. GRIGGS: -- you --.
MS. MORRIS: -- if I send it to you?
MS. GRIGGS: Would you?
Thank you.
How should she send it to you?
Would you like her to --
THE REPORTER: Yes.
MS. GRIGGS: Okay. The court reporter will give you her card after the -- the hearing, and you could send it directly to her, and then she'll have it.
MS. MORRIS: Right. Thank you.
MS. GRIGGS: Thank you.
Well, why don't we -- since it's a little bit early, I think I'd like to leave this open probably for another 15 minutes, in case people are going to come in late. That will give everybody an opportunity, if they

Comments

Responses

want to talk to any of the folks from Edison or the Coastal Commission or State Lands Commission, and we can do that. Then I will reconvene at quarter of 8:00, and if nobody wants to speak at that time, we'll just go ahead and close the hearing, so thank you.
////

(A break was taken from 7:30 p.m. to 7:45 p.m.)

MS. GRIGGS: It's quarter of 8:00 now, and I'd like to ask if there's anybody that would like to make any additional comments in here.

Anybody that would like to make any additional comments, who didn't have an opportunity?

No?

So I'm going to go ahead and close the hearing now, and I want to thank everybody for coming. Keep in mind that there's -- you have until December 28th to comment in writing on the document, and so if anybody didn't feel quite ready to comment tonight, we'll be looking forward to receiving your comments in writing.

And, once again, thanks for coming.

(End of evening session: 7:45 p.m.)

* * * * *

Appendix A

Notice of Preparation, Notice of Scoping Meeting for an Environmental Impact Report, and Notice of Availability of Draft Program EIR

Notice of Completion Appendix F

See NOTE below

Mail to State Clearinghouse, 1400 Tenth Street, Sacramento CA 95814 916/445-0613

SCH _____

Project Title: San Onofre Nuclear Generating Station (SONGS) Artificial Reef

Lead Agency·	State Lands Commission	Contact Person	Mary Griggs
Street Address	100 Howe Avenue Suite 100-South	Phone	(916) 574-1814
City	Sacramento Zip. 95825-8202	County	Sacramento

Project Location

County·	Orange	City/Nearest Community·	City of San Clemente
Cross Streets:	Offshore from the City of San Clemente	Total Acres·	355 Acres
Assessor's Parcel No		Section. Twp Range Base	
Within 2 Miles:	State Hwy #·	Waterways:	Pacific Ocean
	Airports	Railways:	Schools·

Document Type

CEQA
- X NOP
- __ Early Cons
- __ Neg Dec
- __ Draft EIR
- __ Supplement/Subsequent
- __ EIR (Prior SCH No.) _____
- __ Other _____

NEPA.
- __ NOI
- __ EA
- __ Draft EIS
- __ FONSI

Other·
- __ Joint Document
- __ Final Document
- __ Other _____

Local Action Type
- __ General Plan Update
- __ General Plan Amendment
- __ General Plan Element
- __ Community Plan
- __ Specific Plan
- __ Master Plan
- __ Planned Unit Development
- __ Site Plan
- __ Rezone
- __ Prezone
- __ Use Permit
- __ Land Division (Subdivision Parcel Map, Tract Map, etc.)
- __ Annexation
- __ Redevelopment
- __ Coastal Permit
- __ Other _____

Development Type
- __ Residential: Units _____ Acres _____
- __ Office: Sq Ft _____ Acres _____ Employees _____
- __ Commercial. Sq Ft._____ Acres _____ Employees _____
- __ Industrial: Sq.Ft _____ Acres _____ Employees _____
- __ Educational _____
- __ Recreational _____
- __ Water Facilities· Type _____ MGD __
- __ Transportation: Type _____
- __ Mining Mineral _____
- __ Power Type _____ Watts __
- __ Waste Treatment: Type _____
- __ Hazardous Waste: Type _____
- X Other: Artificial Kelp Reef

Project Issues Discussed in Document
- X Aesthetic/Visual
- __ Agricultural Land
- X Air Quality
- X Archeological/Historical
- X Coastal Zone
- __ Drainage/Absorption
- __ Economic/Jobs
- __ Fiscal
- __ Flood Plain/Flooding
- __ Forest Land/Fire Hazard
- X Geologic/Seismic
- __ Minerals
- X Noise
- X Population/Housing Balance
- X Public Services/Facilities
- X Recreation/Parks
- __ Schools/Universities
- __ Septic Systems
- __ Sewer Capacity
- __ Soil Erosion/Compaction/Grade
- __ Solid Waste
- X Toxic/Hazardous
- X Traffic/Circulation
- __ Vegetation
- X Water Quality
- X Water Supply/Grndwater
- __ Wetland/Riparian
- X Wildlife
- X Growth Inducing
- X Landuse
- X Cumulative Effects
- __ Other _____

Present Land Use/Zoning/General Plan Use

Project Description

Lease of 355 acres of offshore State Lands for the construction of the San Onofre Nuclear Generating Station (SONGS) Experimental and Mitigation Artificial Reef in two phases. An experimental reef of 16.8 acres would be built and monitored over a five year period Following this, the full mitigation reef would be constructed to achieve 150 acres of persistent kelp beds.

Note· Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g from a Notice of Preparation or previous draft document) please fill it in.

Reviewing Agencies Checklist

KEY
S = Document sent by lead agency
X = Document sent by SCH
√ = Suggested Distribution

___ **Resources Agency**
_S_ Boating & Waterways
_S_ Coastal Commission
___ Coastal Conservancy
___ Colorado River Board
_S_ Conservation
_S_ Fish & Game - Long Beach
___ Forestry
_S_ Office of Historic Preservation
_S_ Parks & Recreation
___ Reclamation
___ S.F Bay Conservation & Development Commission
_S_ Water Resources (DWR)

Business, Transportation & Housing
___ Aeronautics
___ California Highway Patrol
_S_ CALTRANS District #12
___ Dept of Transportation Planning (Headquarters)
___ Housing & Community Development

___ **Food & Agriculture**

Health & Welfare
___ Health Services _____

State & Consumer Services
___ General Services
___ OLA (Schools)

Environmental Affairs
_S_ Air Resources Board
_S_ APCD/AQMD - South Coast
___ California Waste Management Board
___ SWRCB· Clean Water Grants
___ SWRCB Delta Unit
_S_ SWRCB Water Quality
___ SWRCB Water Rights
_S_ Regional WQCB # 8 (Santa Ana)

Youth & Adult Corrections
___ Corrections

Independent Commissions & Offices
_S_ Energy Commission
_S_ Native American Heritage Commission
___ Public Utilities Commission
___ Santa Monica Mountains Conservancy
___ State Lands Commission
___ Tahoe Regional Planning Agency
_S_ Other Dept of Toxic Substances Control
___ Other _____
___ Other _____

Public Review Period (to be filled in by lead agency)

Starting Date. March 9, 1998 Ending Date. April 8, 1998

Signature Mary Griggs Date March 6, 1998

Lead Agency (Complete if applicable)

Consulting Firm· Resource Insights
Address· 555 University Ave Suite 275
City/State/Zip: Sacramento CA 95825
Contact: Elaine Russell
Phone (916) 921-1910

For SCH Use Only:
Date Received at SCH.
Date Review Starts:
Date to Agencies:
Date to SCH:
Clearance Date:

Notes

Applicant: Southern California Edison
Mr. Frank Melone
Address 2244 Walnut Grove Ave
City/State/Zip Rosemead CA 91770
Phone (626) 302-9775

STATE OF CALIFORNIA PETE WILSON *Governor*

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100 South
Sacramento, CA 95825-8202

ROBERT C. HIGHT, *Executive Officer*
(916) 574-1800 FAX **(916) 574-1810**
California Relay Service From TDD Phone **1-800-735-2922**
from Voice Phone **1-800-735-2929**

Contact Phone (916) 574-1890
Contact FAX (916) 574-1885

NOTICE OF PREPARATION AND NOTICE OF SCOPING MEETING FOR AN ENVIRONMENTAL IMPACT REPORT

DATE: March 6, 1998

TO: Responsible Agencies and Interested Parties

PROJECT: Lease of 355 acres of offshore State Lands for the construction of the San Onofre Nuclear Generating Station (SONGS) Experimental and Mitigation Artificial Reef in two phases. An experimental reef of 16.8 acres would be built and monitored over a five year period. Following this, the full mitigation reef would be constructed to achieve 150 acres of persistent kelp beds.

APPLICANT: Southern California Edison Company (for the SONGS owners)

PROJECT LOCATION: Orange County offshore from the City of San Clemente

The State Lands Commission, as Lead Agency under the California Environmental Quality Act (CEQA), is preparing an Environmental Impact Report (EIR) for the project identified above.

The purpose of the Notice of Preparation (NOP), is to obtain your views as to the scope and content of the environmental information and analysis which should be included in this EIR. Responsible Agencies, which will use the EIR in their own permitting decisions, should respond in a manner germane to their statutory responsibilities for the proposed project.

The project description, location and the potential environmental effects are contained in the attached materials. A copy of an Initial Study is not attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Mary Griggs, Project Manager, at the address shown above. (916) 574-1814. We will need the name for a contact person in your agency.

Pursuant to Section 15083, Title 14, California Code of Regulations, this is to advise that the State Lands Commission (SLC), is conducting an environmental scoping meeting for the proposed project described above.

MEETING LOCATION:	San Clemente Community Center - Ole Hanson Room 100 North Calle Seville San Clemente, CA 92672 (714) 862-8264
DATE:	Monday, March 30, 1998
TIME:	2:00 p.m. - 4:00 p.m. 7:00 p.m. - Close of Comments

SONGS Experimental and Mitigation Artificial Reef

Project Description

Southern California Edison Company (Edison), acting on behalf of the owners of the San Onofre Nuclear Generating Station (SONGS), filed an application with the State Lands Commission on March 2, 1998, to lease 355 acres of offshore land in southern Orange County near the City of San Clemente. Edison is proposing to construct an artificial reef in two phases to comply with the California Coastal Commission's mitigation requirements for SONGS under Permit No. 6-81-330-A.

The first phase of the proposed project is an experimental reef consisting of 16.8 acres of artificial reef construction. The Coastal Commission approved Edison's Preliminary Plan for the experimental reef on May 14, 1997. A total of 42 separate 0.4-acre experimental modules would be placed throughout a 200-acre area. The modules would test different materials (quarry rock and recycled concrete) and densities of materials (17% to 67% coverage of substrate) for their success in growing persistent medium- to high-density kelp beds (defined as 4 plants per 100^2 meters). The experimental reef would then be monitored over a five-year period.

The second phase of the proposed project involves construction of a larger mitigation reef to achieve a minimum of 150 acres of persistent kelp beds (including the 16.8-acre experimental reef). At this time, it is expected that the larger reef would be built in the same location as the experimental reef along the coast of the City of San Clemente. The 150-acre mitigation reef would be constructed within the 355-acre lease area. The exact design and location of the larger reef will not be determined until the results of the experimental reef are evaluated. If the experimental reef is not successful, or significant unavoidable impacts are found at the San Clemente site, other locations in the region near San Onofre might be considered for all, or part, of the larger reef.

State Lands Commission will prepare a Program EIR to evaluate the two phases of the proposed project.

Project Location

The location of the proposed experimental and larger mitigation reef is approximately 0.6 miles off the coast of southern Orange County near the City of San Clemente. The project area is located between San Mateo Point and the San Clemente Fishing Pier. The attached maps detail the experimental and larger reef project location.

Probable Environmental Effects

The construction and implementation of the artificial reef project could result in environmental effects in a number of areas as follows:

1 Air Quality

Construction of the reef would involve the use of various heavy equipment and tugboat/barge transportation resulting in potentially significant air emissions.

2 Biological Resources

The creation of a minimum of 150 acres of persistent kelp beds would affect local currents and patterns of sedimentation. The changes could adversely affect San Mateo Kelp and other existing kelp forests in the vicinity of the project area.

The construction of the reef would temporarily displace wildlife and fish species occurring in the vicinity of the project. However, the creation of the reef would have a beneficial effect on biological resources over the long term.

3. Cultural Resources

There is a slight chance that the construction of the artificial reef would have a significant effect on cultural resources in the project area.

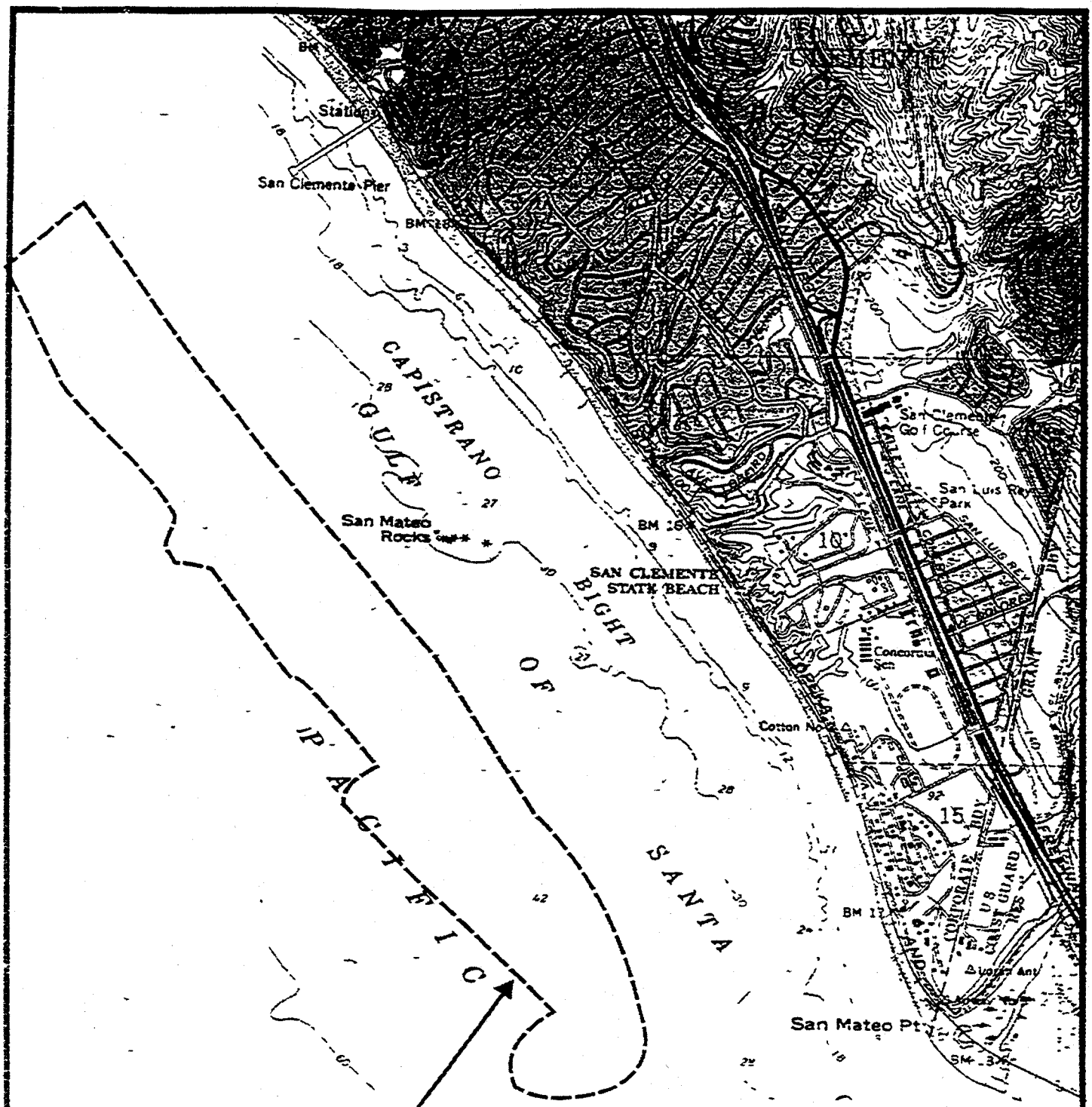
4. Recreation/Public Services

The creation of 150 acres minimum of persistent kelp beds would substantially increase the amount of kelp that may wash ashore. This may result in recreational impacts and the need for additional public services for kelp cleanup.

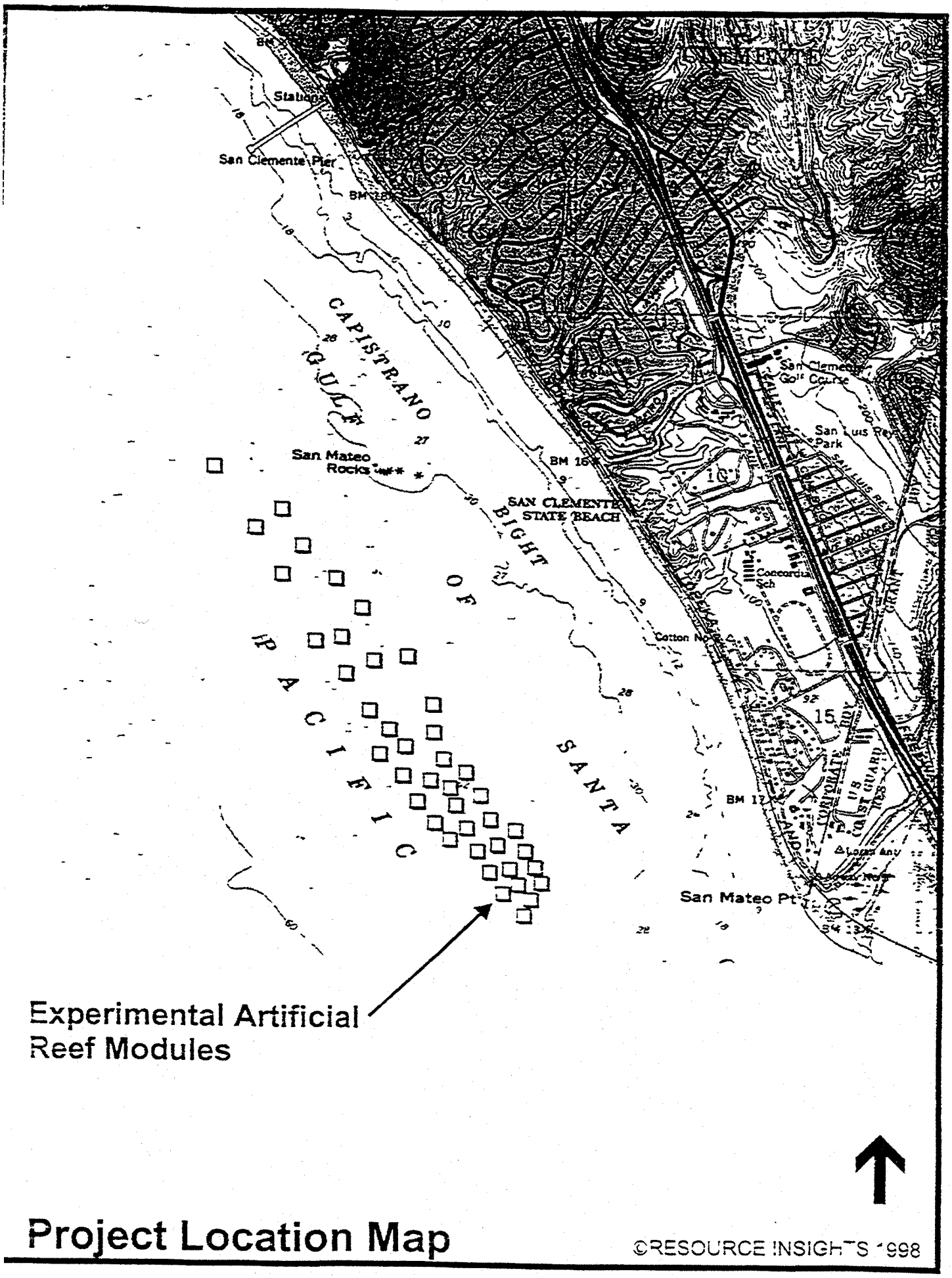
The use of various sizes of quarry rock and recycled concrete to construct the artificial reef would substantially increase the amount of material located offshore. Smaller rocks and pieces of concrete could be washed ashore in major storm events creating a safety hazard and inconvenience for recreational users.

5. *Socioeconomic Effects*

The construction of the artificial reef could temporarily interfere with commercial and sport fishing activities in the project area, particularly for lobster, crab and sea urchin harvesting.



Project Location Map



Project Location Map

STATE OF CALIFORNIA

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CALIFORNIA STATE LANDS COMMISSION

GRAY DAVIS, *Lieutenant Governor*
KATHLEEN CONNELL, *Controller*
CRAIG L. BROWN, *Director of Finance*

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(916) 574-1800 Fax (916) 574-1810
California Relay Service from TDD Phone 1-800-735-2922
from Voice Phone 1-800-735-2929

November 6, 1998
EIR No. 685
SCH 98031027

NOTICE OF AVAILABILITY OF DRAFT PROGRAM EIR

(Section 15087 CAC)

Project Title: Construction and Management of an Artificial Reef in the Pacific Ocean near San Clemente, California.

Project Proponent: Southern California Edison Company (for the San Onofre Nuclear Generating Station (SONGS), owners)

Project Location: Orange County offshore from the City of San Clemente

Project Description: Construction and monitoring of an artificial reef in two phases.

Phase 1: Construction and monitoring of a 16.8 acre experimental artificial reef consisting of 42 low-relief modules (0.4 acre each.)

Phase 2: Design and construction of a minimum of 133.2 additional acres of low-relief artificial reef, supporting a total of 150 acres of sustainable, medium to high density kelp beds and associated kelp bed biota.

The CALIFORNIA STATE LANDS COMMISSION is the Lead Agency on this PEIR and copies may be obtained from, or reviewed at, the following location:

California State Lands Commission
Division of Environmental Planning and Management
100 Howe Ave., Suite 100 South
Sacramento, California 95825-8202

Review Periods: The State CEQA review period begins on November 9, 1998, and ends on December 28, 1998.

Contact Person: MARY GRIGGS Telephone: (916) 574-1814

Anyone interested in this matter is invited to comment on the document by written response or by attendance at the following public meeting:

MEETING LOCATION.	San Clemente Community Center – Ole Hanson Room 100 North Calle Seville San Clemente, CA 92672 (714) 862-8264
DATE:	Thursday, December 10, 1998
TIME.	2:00 p.m. – 4:00 p.m. 7:00 p.m. – Close of Comments

Appendix B

Oral and Written Responses to Notice of Preparation

CALIFORNIA STATE LANDS COMMISSION

PUBLIC SCOPING MEETING

For The Program Environmental Impact Report

San Onofre Nuclear Generating Station

Experimental and Full Mitigation Artificial Reef Project

San Clemente Community Center

Ole Hanson Room

100 North Calle Seville

San Clemente, California

March 30, 1998

2:10 P.M. - 3:40 P.M.

Reported by: Paula J. Becker, CSR 4453, RPR

PRESENTATIONS AND APPEARANCES

California State Lands Commission
MARY GRIGGS

California Coastal Commission
JOHN DIXON
DAN REED
DENNIS BEDFORD

Southern California Edison
ROBERT S GROVE

SAN CLEMENTE, CALIFORNIA, MONDAY, MARCH 30, 1998

2:10 P.M.

MS GRIGGS I think we will go ahead and get started. It's a little bit after 2:00 o'clock. And I would like to introduce some of the people that you will be hearing from today.

First of all, I'm Mary Griggs from the California State Lands Commission, and the commission is the lead agency for preparation of the Environmental Impact Report.

Also with us is John Dixon from the California Coastal Commission, and he will be presenting some information on the Coastal Commission's requirements for this project.

In the audience are Dan Reed and Steve Schroeter, and Dan is going to talk to us later on in the program about the five-year monitoring plan that is required by the California Coastal Commission.

Also with us today is Bob Grove with Southern California Edison, and he is going to be making a presentation to explain the project to you.

And so we will follow along, and after -- if you have any questions on the project itself, the project description, or if something is unclear to you, you can

ask those now as we are going through. But comments on the project itself we'll hold till we get the comments from the public and agency representatives, after all the presentations have been made.

We do have a court reporter here to -- that will prepare a transcript, and the reason that we do this is so that we make sure that we capture what you have said and what your concerns are so they can be addressed in the Environmental Impact Report. So when you get up to speak, especially if you are in the back of the room, if you would just come up a little bit closer. I don't -- we don't have a microphone, but I don't think we need it in here. And identify yourself for her transcript so she will know who was speaking, and we can get that into the record. We would really appreciate that.

I would like to tell you first a little bit about the environmental process that we went through. State Lands Commission and the Coastal Commission talked at some length about whether -- what kind of a document we should prepare, and the decision was made to prepare a Program -- what we call a Program Environmental Impact Report or EIR

And the reason we felt the reason necessary to do this was because we are talking about a two-phased project right now: An experimental reef that will be

built, 16.8 acres that will be built -- is proposed to be built off San Clemente and then monitored for a number of years, and John will go into that -- into those details for us. And because the Coastal Commission is very familiar with this project, it's been a project that's been -- that has been working through their system for some number of years.

So we decided to do a Program EIR because we felt that that was the only way we could have enough information and one document so that you, the public, and the agencies, the other permitting agencies, would understand the impacts from the experimental reef, and then we would also be able to provide you information on the full buildout reef, even though that's not going to occur for some years down the road, because we didn't want to build an experimental reef and not have looked at, to some level, all of the potential impacts that the full buildout reef could present. That way the public would have the whole -- the whole picture of the process.

So that's why we decided to do a Program EIR, keeping in mind that if something was discovered during the monitoring on the experimental reef and that meant that we had to do some kind of a supplemental document to address those things before the full buildout reef could go ahead, that we could do that and we could prepare some

sort of a supplement. But the Program EIR would have looked at the majority of the potential impacts.

So we sent out a notice of preparation that either you received in the mail or you heard about or you perhaps saw the notice in the newspaper that we were having this scoping meeting. There are some notices of preparation in the back of the room, along with a copy of the project description, for anybody that didn't notice them back there, and there's also a sign-up sheet that we would like you very much to sign up and give us your address so that we can send you a copy of the draft EIR when it's prepared so you can have an opportunity to take a look at that and comment on it.

The comment period on the notice of preparation will end on April 8, and we urge you, anybody that has any comments, to get your comments to us in writing if you have comments that you are not prepared to give today but you would like to still send some in later, as long as we receive them by April 8; and then anything that you say today will be in the record, and then we will use that as our formal -- formal comment by you.

And that's the purpose of the scoping meeting, is to just hear your concerns, your comments on the project. It's not so much an opportunity, you know, once we go through the presentation and explain to you about

the project -- the purpose of the meeting isn't to really to debate the project in any way. It's to provide you with information, to hear about your concerns, and then if you go home and think about what you heard today and you've got some additional concerns that you may not have thought about before, that's why there's a little bit more time to send us those concerns in writing.

The schedule for the environmental process: We are trying to get the environmental process completed by the end of August for presentation to the State Lands Commission in the beginning of September for their consideration. And the probable construction period of the experimental reef, right now we are aiming for September, and that's something that will become clearer as we proceed through the process.

So with that having been said, John Dixon, from the California Coastal Commission, is going to give us some history on the process, how we ended up where we are, and lots of other good stuff.

MR DIXON Well, I think it will be useful to briefly go over some of the history of the project, both in order to understand the purpose of the project that's going to be presented to you today, and also the project has been described in the past in the press and it has changed somewhat, and so you can also understand what

those changes are and how they happened to come about.

In 1974 the California Coastal Commission approved the application for construction of San Onofre Nuclear Generating Station, or SONGS as we are all in the habit of saying now; but they conditioned that project and required that a semi-independent panel be assembled who would oversee environmental studies to determine what the actual effects of the plant would be, and this was the Marine Review Committee, and they were extant until about 1993 and were responsible for guiding the scientists who were actually doing the work to make sure that they examined all the appropriate areas.

And it was further conditioned that if significant impacts were detected, that there could be significant changes in the actual design of the power plant, as drastic as putting in cooling towers.

Later, in 1979, the commission acknowledged that it would also be appropriate, in addition to any kind of plumbing changes, to require some sort of compensatory mitigation.

In 1989, the Marine Review Committee completed their studies and made the report to the Coastal Commission, and they concluded that there had been substantial reductions in the abundance of kelp, in the abundance of kelp bed fish, of kelp bed invertebrates that

live on the bottom of the ocean; that there also had been substantial reductions in adult fish as a result of juvenile stages being intaked into the plant and killed; and that there were also some reductions of the, quote, midwater fish species in the local vicinity.

At that time, the Marine Review Committee recommended that these losses be mitigated by compensatory mitigation rather than requiring some sort of changes in the design of the plant, and they suggested creating an artificial kelp reef, improving the systems within the power plant that excluded fish or return fish in the environment, and restoring or creating a wetland.

In 1991, the commission acted and adopted conditions to mitigate these adverse impacts due to San Onofre Units 2 or 3. And the conditions were to restore or to create 150 acres of wetlands within the Southern California bight; to install, maintain behavioral barriers within the power plant in order to prevent additional fish losses; to construct a kelp reef; and to fund independent monitoring of these programs so that they would be monitored by someone who had no vested interest in the results.

And then also, they were to maintain the data and make publicly available and partially fund a fish hatchery.

That kelp reef was to be a 300-acre kelp reef, and that the actual acreage was specified. 200 acres of it was supposed to be actually covered with hard substrate, and 60 percent of the reef was supposed to maintain medium to high density kelp. And that was -- that was defined as a certain number of plants per hundred meter squared. And they were also -- it was also to maintain 28 tons of fish biomass.

After the Marine Review Committee concluded their studies, Southern California Edison continued appropriate studies of kelp -- of the kelp forest using the same sorts of methods that the Marine Review Committee had and, as a matter of fact, some of the same contractors.

And after several years, they felt that the estimates of kelp loss were overestimates based on the additional data they had. So the Coastal Commission and the applicants cooperatively selected an independent review panel to review the data and to come up with conclusions.

They did so. They agreed qualitatively that there had been a reduction in the effect, based on the larger amount of data, and they recommended a method for quantitatively estimating the size of the effect. The Coastal Commission staff applied their recommendations,

and they came up with an estimate of 179 acres of kelp forest that -- and the original estimate had been 200 acres.

So in 1997, April of '97, the Coastal Commission adopted a new set of conditions intended to compensate for the loss of 179 acres of kelp, and they required 3.6 million dollars to be put into a fish hatchery through the Ocean Resources Enhancement and Hatchery Program and for Edison to design, construct, and fund the independent monitoring of a kelp reef that would produce 150 acres of medium to high density kelp.

So the requirement was not to build a reef of a particular size and put a particular number of rocks out, but the requirement was to -- it was a biological requirement to replace these resources.

And this is -- construction was going to be in two phases. The first phase was -- is to be an experimental reef, and the intent of that is to come up with design criteria that would maximize the chances of the larger reef producing the biological attributes that were intended. And Edison is interested in building a reef that will have the greatest cost benefit, and they were interested in looking at not only quarry rock but other materials and different configurations. So they will explain that to you.

So the experimental reef is going to be a 16.8-acre reef.

The second phase then that will follow after the results of this have been analyzed will be a minimum of 103.2 additional acres of substrate intended to produce the necessary 150 acres of high-density kelp. So because of the way the conditions are written, one cannot say the size of this reef is going to be exactly so much. The initial size will no doubt be 150 acres. But after it's been monitored, if it's determined that this is not producing the amount of kelp that's necessary, then it may require additional rocks being put in the ocean.

And I will actually just read a section from the amendment, and it says, "It should be noted that the average area of medium to high density kelp produced by a 150-acre reef will, in all probability, be less than 150 acres. This is because typically only a portion of the reef area, whether artificial or natural, supports a sustained population of medium to high density kelp. For example, on average, only about 50 percent of the hard substrate in the control site, San Mateo kelp bed, has historically supported medium to high density kelp. If this turns out to be the case for the mitigation reef, then the appropriate remediation would be to double the size of the reef to 300 acres in order to meet the

requirement of 150 acres of medium to high density kelp. If on the other hand it was determined that 75 percent of the mitigation reef area supported medium to high density kelp, then the appropriate remediation would be a reef that is 1.25 times as large as the 150 acre reef," in other words, the addition of 37 and a half acres.

So because of the focus on the biological resources instead of the hard substrate, the possible size of the buildout reef, minimum would be 150 acres and the maximum would be the size of the site, which is 355 acres.

I think that's pretty much it.

MS GRIGGS Thanks, John. Now Southern California Edison is going to explain their process and their project, and Bob, are you going to do that? Bob Grove from Southern California Edison.

MR GROVE Thank you, Mary. Welcome, everyone. Just kind of exciting to get to this stage in the process. It's been since, as John said, 1991 this project was first put on the books, so to speak, and we had a couple of hearings right away back in the fall of '91 and in the spring of '92, and we were ready to move. But these things take a long time.

And so today, we are at the point of being able to show you through a lot of science that's been done between 1991 and today exactly what the project is being

proposed to look like. And it's just nice to be here. Nice to get this far along. So with that.

So as John mentioned, our mitigation obligation for the kelp reef project is 150 acres, and what we are proposing to do right off the bat is Phase I, the experimental reef of 16.8 acres, and then that would be followed up after the experimental stage is completed with 133 acres. And then, you know, John explained all the nuances that happened from there.

I've got some posters. This was multimedia at one point. We will continue with the two dimensional. It's just a quick review of John's introduction, you might say.

The reason for the kelp project, the Marine Review Committee determined that there would be an impact in the kelp bed and that there would be concomitant reduction in fish and invertebrate populations in the kelp bed. And it was also determined that mitigation would be more cost effective than actually prevention, and in this sense, prevention would be turning off the power plant, as I would understand it, or at least turning it into some kind of unit that runs just certain seasons, and that's not how nuclear power plants were designed.

And also, it's certainly, we think, better than cooling tubs which have their own set of environmental

constraints and obligations.

And also in-kind mitigation -- this is the good news. We really think it is possible here, and that's the idea of kelp bed is impacted and we really are comfortable with the idea of creating a new kelp bed using artificial reef technology.

What's the Edison spin on this? The Edison project objectives include complying with the Coastal Commission permit. As John showed you, I mean, if you don't mind --

MR DIXON Help yourself.

MR GROVE. This is it. I mean, we are following this. So the permit is pretty specific in what's needed, and that's why we are here today.

And we really would like to go ahead with the Phase I, the experimental reef, in 1998, as Mary mentioned. We think September is a doable date to start construction. And we think we can fairly maximize some resource enhancement by doing this type of a project.

And so going back to 1991, '92 time frame, you really can't see that, but conceptually, the idea is in Southern California there are a lot of -- I'm sorry. There are some artificial reefs. There are a lot of natural reefs that grow kelp, and one of them happened to be near San Onofre, the San Onofre kelp bed. And so we

are here today, San Clemente, and around the corner from San Mateo Point, near the nuclear power plant, is the San Onofre kelp bed. And a chunk of that is what the power plant affected.

And so the permit called for kelp mitigation, as we were saying, and hopefully within the local vicinity. And so in 1991, we set out to look at how is kelp growing in Southern California? And there was a preliminary siting study and two year siting and design study, and we went into great detail: What is the substrate that kelp grows on naturally and at what depths? And specifically in Southern California, in northern San Diego County and southern Orange County, how do these natural reefs respond with the kelp on them?

And so -- let's see. In the specific area of San Clemente, which is the closest area to the power plant that we are allowed to look at for this mitigation reef, we saw that the kelp has grown close to the pier during some years, and more often than not down at San Mateo Point. And these darker colors, the reds and the greens, are showing that the kelp over the life of this study that we did, looking at kelp beds from 1967 to '94 -- the kelp is common nine to eleven years in some areas and maybe three to five years in other areas.

So there's a persistent kelp bed down here and

some persistent kelp near the pier; and in between, it looks like an area that has had some kelp to start, but maybe with the right enhancement techniques, could use some more help.

So that was part of the siting work that went on, just an example of the type of work we have been doing for the last few years. And just kind of summarizing some of the siting criteria from the permit, these words are paraphrased right out of the permit, that the area that Edison should be looking at to build the artificial reef would be between or near San Onofre and between Dana Point and Carlsbad and then later it was really confirmed to us to not build it at Camp Pendleton.

And even though Edison had an experimental research reef in Camp Pendleton, the Marines figured out they didn't really want to see more kelp beds near where their offshore -- where they are doing their exercises. So not at Camp Pendleton.

And also we were not to disrupt existing reef or hard cobble type areas. And a further criteria was to keep the artificial reef away from mud or silt areas. That's maybe a fancy way of saying near the mouth of rivers. Or of any other areas that might be overly abundant with these fine materials.

And then in depth, of course, suitable for

kelp, and from this area from our studies and just general literature, it's clear that's a 12 to 14 meter depth range.

Also, it would be nice to locate them near existing natural reefs. And the idea there is the ecology from the natural reefs might be able to transition nicely over to the artificial reef and away from major sediment deposits, again, the river mouth area.

Minimum interferences with other water uses. In our 1992 hearing or public meeting, the yachting group was there and made it clear they didn't want us to set up an artificial reef on one of their sail boat regatta courses. We said, yeah, stay away from the harbors or stay away from the nearness of harbors. And locate away from waste discharge points, including the San Onofre plume. And keep -- due to historical archeological checks, make sure the reef wouldn't be put on top of some valuable resources in the way of shipwrecks and other possible archeological sites.

And I won't go over all the details of the history of the project, but we have been making slow and steady progress since the permit came out in 1991, with some of the preliminary field work that went on, and by 1992, we had a good idea how to set up the more specific siting and design study.

And Larry Deysher is here in the front row from the Resource -- Coastal Resources, and he helped us, with two or three other top scientists from the area, on getting that study together. So if there are specific questions, probably refer to Larry.

And then here, we really did quite a bit of work with this idea of kelp resistance. We had to understand kelp before we raced off and hope that kelp would grow on. So we have a comfortable idea now how the reef should be done.

By last summer, we went to the executive director of the Coastal Commission with the plan for the experimental reef. And that's -- the rest of my talk really is contained in this. And you are welcome to pick it up after the -- the talks today. It's the preliminary plan as presented to the Coastal Commission, and it was approved last summer by the executive director, describing some of the specifics on how the 16.8 acres experiment will be done.

So with that as the background, some of the ideas that came out of the studies we have done are the high relief reefs don't necessarily seem to grow persistent kelp. That was found on the natural reefs, as well as the artificial reefs, we looked at.

That when the reefs get over, say, a half meter

or meter high, they seem to have other communities that are more stable than kelp, and those communities preclude kelp from growing on the hard substrate. Again, both the natural and artificial reefs.

And so in our design for the experimental reef that we are going to be testing -- and again, it's not that this is a slam-dunk scientific fact. That's why we have an expert. We think that low relief will really be better for kelp.

And also, we see that the minimum size that kelp seems to grow on and stay on is chunks of rock or hard substrate that's, you know, like a foot and a half, two feet long or square, however you want to say it. So kelp, when it comes out, it seems to grow -- grab on to anything hard and start growing, but the little pebbles and stones don't really seem to be what you really want the kelp to grow on because they seem to disappear.

So that gave us an idea of how to design for the materials that we will be putting in.

Also, as I mentioned, 12 to 14 meters, we see that kelp in the area does grow 35, 45, 55 foot range.

And also, it was confirmed that it would be nice to have it near an existing reef, and that's another thing we will be testing as part of the experiment.

And about this time when we were coming out

with these preliminary results in the study -- I remember it was late 1994. Our first draft preliminary study report came out. I remember going -- sending a copy to Dennis Bedford at California Fish & Game in Long Beach, and he's here today in the audience. Dennis.

And he called me right back and said, "You know, I'm scanning through this draft report, and it's kind of interesting that the kind of reef you are talking about, a low profile reef with spread out chunks of these hard substrate materials, either concrete or rock, one of those was built actually by Fish & Game." And the people that put the rock in were supposed to build mounded fishing reef modules, which is what Fish & Game is more comfortable having as artificial reefs in Southern California.

And the barge operator that Fish & Game gave the specifications to did not understand the coordinates of what was really asked for. Instead of making four mounds of these broken concrete material, it ended up spread out over the ocean floor over about nine to eleven acres.

And it -- lo and behold -- this was done I guess in '91. This reef was built, and it's down in Mission Beach. Lo and behold, by '94 when our preliminary results were coming out, unknown to us, the reef that we

were saying that we think could work, which was sort of a radical departure from the mounded rock idea reefs from before, had already been in the water for three years. And this is a picture from one of Dennis's videos and we picked off for a still shot of the Mission Beach reef.

And you can see the kelp density is pretty significant. These are going to be hard to see because they are pictures from pictures, but it gives you an idea, not only of what the proposed experimental reef is going to look like in front of San Clemente and in 35 to 45 feet of water, but also shows you what the kind of reef looked like that's at San Onofre because that's exactly the kind of reef that's naturally there that we effected with our cooling water discharge.

And it's a real low profile reef, scattered cobble. In this case -- these are broken chunks of concrete, and the kelp is attached to it. So, to us, that's pretty encouraging that unknown to our preliminary study, we think we are on the right track.

So switching over to the actual location and what the experiment or where the experiment is being proposed, I put it on that board and you can see it over there if you don't like looking at that screen. That's San Mateo Point toward the south and here up at the top of the picture. The area that we are considering is in the

red. And this represents the 355 acres that John Dixon mentioned earlier.

And peppered in here are black areas, and the black is the hard substrate area that already exists within this zone. And the idea -- it's right in the permit. We cannot build an artificial reef on top of existing hard substrate. That was part of the criteria that I showed you earlier. And so we will be careful to not put the reef in where it shouldn't be.

But inside of the red area is -- is bottom depths that are too shallow. So the blue area and then everything in shore, of course. And then just outside the red area on the offshore side, the green is possibly the right depth, and yet it's got too much sand. We don't want the rocks -- and this was part of the study that was part of the engineering aspects of the study that was done in the early '90s for us. You don't want rocks put in where they are going to sink into sand and disappear. This project is going to potentially cost Edison millions of dollars, and the last thing we want is to put it on top of a soft bottom where they all disappear. So it's -- we aren't comfortable putting things in deeper sand areas.

But the red area, in between the two shallow and the too much sand area, has just a thin veneer of natural sand on top of underlying hard bedrock or cobble

substrate, and that's what we think is the prime location to put this experimental reef.

And also, one of the concerns of the Coastal Commission last summer is, yeah, there might be enough room for the experimental reef, but in fact, would there be enough room for a buildout reef that would satisfy this 150-acre kelp requirement. And we have concluded, and the Coastal Commission staff agrees at this point, that yes, this area in red really could be used for the entire buildout or mitigation reef once the experiment is done.

So we think this is a desirable area, and again, the existing reefs would be avoided. I can give you a sideline. One of our real concerns, in the middle of this study back in about '94, '93, '94 time frame, yeah, this area is near San Onofre. It seems to satisfy a lot of requirements. If there's already substrate here and you don't see much kelp -- because you saw this on this other picture. You don't see kelp persisting here. Why would dropping more rocks in the area do any better? And the studies that we went back and did last summer demonstrated to us with a high degree of confidence that in fact the areas that aren't growing persistent kelp really don't have the right kind of bottom substrate and the few areas that do have the hard substrate seem to give kelp.

So we think we are in a good area, in an area that, just by ramping up with more hard substrate, would really provide an opportunity for the kelp to expand and enhance the whole area with more biodiversity and better fishing and more places for lobster to hang out and other things.

So we are excited to start the experiment. We think good things could come to this area. And we would like that at this point.

Just -- yeah. Quick idea on the specifics of the experiment itself -- if it looks like one of those ink drawings you are supposed to imagine what it is, that's about what it is. The idea is we are going to test two materials, concrete and quarry rock, because those are the most available type of substrate material that kelp like in Southern California, California Fish & Game is comfortable dropping in the water. They have had 30, 40 years experience with artificial reefs using these types of materials.

And we are concerned -- as John said, Edison wants to get as much bang for the buck here. We want to use the resources as prudently as possible. So we would like to see if a thinner scatter -- 17 percent scatter of hard substrate would do as well or better than the higher density substrate scatter, the 67 percent. So we will

test two substrate types, three substrate densities or hard density types, and also we will be keeping in mind that some of this reef is going to be very near the existing San Mateo area kelp bed, and then some of it will be pretty far away from existing persistent kelp. See if that has an influence on what kelp does over time.

Just in concluding then, we hope to see that. And that's another -- that's the third shot that I'm showing you again today of Mission Beach, which is made from broken concrete chunks, just spread thinly over the ocean floor off of San Diego.

So that's what I have. Thank you.

MS. GRIGGS Thanks, Bob. In our last -- last speaker is Dan Reed from the Coastal Commission who is going to talk to us and explain the five-year monitoring plan.

MR REED Well, the primary goal of the experimental reef is -- as Bob pointed out, is really to determine the types of reef materials and the amount of the bottom that they actually have to cover. It will provide for adequate conditions for not only establishing but sustaining a kelp forest community and the associated biota of fish and algae and invertebrates.

And originally, in '91, the SONGS' Coastal Commission Permit called for there to be two thirds of the

bottom be covered by quarry rock.

And this past April, they have changed that to allow the executive director to alter that configuration of the reef if the results of the experimental reef prove that other types of reef material or other types of coverages could support the resources necessary to compensate for the losses incurred by SONGS operations.

So a major objective of the monitoring program is to collect information needed to determine the types of substrate, whether it's concrete or quarry rock, and the amount that they need to cover the bottom that are needed to meet performance standards of the larger mitigation reef.

And information obtained from this experimental reef then will be used by the executive director to determine what the actual requirement of the substrate -- requirements are going to be for the larger reef.

There's a lot of uncertainty in -- there's some uncertainty in using the results of the experimental reef to come up with what's going to work for the larger reef, and they stem largely from the relatively small size of the reef, the experimental reef, relative to the larger mitigation reef, as well as to the time frame of the experiment. It's possible that five years is not sufficient time to develop a mature kelp forest community

on a virgin rock substrate or concrete substrate.

It's also possible that given that many of the organisms that live in the kelp forest, given their generation times are longer than five years, it's possible that even if some of these designs show that they are going to be successful, there's no guarantee they will be successful over the long-term. Something that works during a five-year period, it's not a guarantee it's going to work over 20 or 30 years or so.

There's also concern with the size of the experimental reef, being able to scale up with modules that are, say, .4 acres in size, whether that's what works on those size scales is really going to work over a reef that's 150 acres.

So there's a concern that these concerns are such that it's going to make it difficult to just automatically assume what you see on the experimental reef is what you are going to get on the mitigation reef.

So given that, the executive director, in making his decision, he's going to have to have information that is going to allow him to predict what is going to work over the long-term. And the Coastal Commission staff, which is responsible for overseeing the monitoring program, the way they are going to try to deal with that issue is they are going to take a couple

different approaches and collect information during the experiment.

And one of the approaches is simply to monitor what is going on out there in relation to how these different reef designs, how they relate not only relative to each other, but relative to some of the biological and physical standards that are going to be applied to the larger mitigation reef. And those standards have to deal with things like the amount of rock that must remain available for things to grow on, you know; that stuff just can't sink into the sand and disappear. There's a lot of biological standards to deal with. The abundance of certain organisms, the diversity of fish and invertebrates out there. And so those types of criteria are going to be applied to these different designs to some extent to see how they perform.

In addition, there's going to be more fine scale monitoring as well as experiments that are going to be used to look at how certain processes influence the development of the reef. Things will be measured such as birth rates and death rates of certain organisms and how they influence the development of the reef in general. And while the monitoring is going to really tell us what's there on these modules, some of these experiments and more fine scale studies are really going to help us predict

what is going to be there over the long-term.

And so the product of this experiment -- of this experiment, five-year experiment, is ultimately going to be a report that is going to have some recommendations to the executive director of the Coastal Commission as to which reef designs are likely to be successful in the larger buildout phase, and that report will be made available to not only Edison, but to all interested parties, as well as the data within it, and it's going to be available for comment. And the comment on that report, as well as the report itself, which the executive director is going to use to come up with his decision as to what the actual configuration of the larger buildout reef is going to be. Once the larger buildout reef gets built, then there's going to be a monitoring program for that as well. According to the permits, it needs to go on for the operating life of the power plant.

The purpose of the monitoring of the larger reef is very different from the experimental reef in that the monitoring of the larger reef is simply to determine whether or not compliance with the permit is met, whether or not these performance standards are actually achieved, whether the reef is performing the way it's anticipated. And the monitoring will show whether or not that will occur.

If it doesn't, if it turns out after a period of ten years or so that that has not occurred, then some decision will be made as to what, if any, corrective action needs to be made to bring the reef into compliance.

And that's all I really have to say about the monitoring. It's not exactly -- given we are not -- the design of the reefs have not been determined yet, it's hard to come up with specific plans at this point as to exactly how everything is going to be monitored until we know what the final design and site locations of these areas are going to be.

MS GRIGGS Thanks, Dan.

I need the sign-up sheet. I need the sign-up sheet from the back of the room.

Did everybody that wanted to make comments today have a chance to sign in the sheet? Did you sign?

(Interruption.)

MS GRIGGS First person that signed up, and I'm not sure -- some of the earlier people may have signed up thinking it was just a sign-up sheet and not intending to speak, and that's fine. When I call you, if you didn't want to speak, you don't have to.

And we will also use this list, I think I mentioned earlier, to make sure that you get a copy of the Environmental Impact -- the draft Environmental Impact

Report when it's ready.

The first person is Don Hansen.

MR HANSEN: Real quick, two comments. I've been fishing in this area since 1947 from the pier south. I'm in support of what you are doing here, but I have a question for somebody who might be a lot smarter than I am. You showed the kelp disappearing from the pier area south. That kelp used to be solid all the way from San Onofre. Where it went, how it disappeared, I don't know.

But to mitigate, maybe we can figure out how to get the kelp back in the areas that it was, instead of artificial reefs to create them where kelp may not live at all.

And not also to dump rock on top of rock which, as a fisherman, running off the pier as I have been fishing for many years in and out of Dana Point Harbor, now it's -- that doesn't gain anybody anything, dumping rock on top of rock.

So as far as I'm concerned, we already sent our comments to you people, written, but I support what you have there now. Thank you.

MS GRIGGS. Thank you, Mr. Hansen.

David Prior.

MR. PRIOR: Yes. Actually, I have a couple questions, too, if that's possible at this time for this

collection of experts right here.

Is any of this kelp coming up for harvest? Will it be available to be harvested offshore like many other places? Is that a consideration at any point?

MR BEDFORD I don't know the answer to that question right now. There's lots of traps up and down the coast, but I'm sure that the area in San Mateo is part of those traps, but whether this -- I can't answer that. But --

MR PRIOR But it's an option?

MR BEDFORD It's a possibility.

MR REED I think while the experiments are going on, we have to have some --

MR PRIOR Probably not, but I am thinking the full buildout.

With recruitment from these natural areas, is there a good understanding of offshore currents that may be driving propagules off the reef off of San Mateo Point up coast or from the pier area down coast? Is there sufficient information on local currents at that depth that would help spread?

MR GROVE: You certainly have --

MS GRIGGS: It makes it really hard for the court reporter. So I think that probably the best thing to do is to state your comments for the record so that we can

respond to those comments in the draft EIR.
MR PRIOR Okay.
MS GRIGGS And then of course, it's always an opportunity, if you have some -- a few questions, to talk to either Southern California Edison, Coastal Commission, whoever, to get that kind of clarification. But what our main interest is to get your comments or concerns and so these comments that you raised would be responded to in the document, because it makes it hard for the court reporter to have three people talking and she can't get anything down then.
MR PRIOR Okay.
MR GROVE. We will talk to you at the break.
MR. PRIOR· Okay. Good. There's a question about the significance of the success criteria, whether four plants per 100 square meters is enough. Is a plant a two-meter plant or is it a full canopy up to the surface and how is that measured over time?
One of the concerns with the state parks, and I'm sure with the city beaches also, is that there's -- there's potential for significant -- we will call it natural debris landing on the beach. It's -- it could then become a maintenance concern at that point with our crews. We have a relatively narrow beach at that point, at least through the area, and it limits, then, public

access and public use if there is significant debris over time. Especially if you have a warmer water period, El Nino, something like that, that could then devastate and undo all of the preparations and work.
Some of the other concerns include change of the ocean -- oceanographic concerns, change in the surf and current profiles, and more importantly, the deposition or removal of sands to the local beach literal cell.
And then some of -- the big question that's got some comment in your brief here shows what happens during big catastrophic storms. Does this create -- will it walk around, or will it hold fast to rocks into shallower areas or deeper areas and make it unavailable for long-term reef production?
Thank you.
MS GRIGGS Thank you.
Mr. Streichenberger.
MR STREICHENBERGER Yes. My name is Rodolph Streichenberger. I'm the president of the Marine Forest Society, and we founded 12 years ago with Dr. Wheeler North from Cal Tech. I came from France at the request of the Cal Tech.
And we started a research, you know, to redo, replace those lost marine habitats. We -- you know that without marine habitats, you know, there are no fish. So

we started that -- excuse my accent. I do my best. We started that 12 years ago, and we founded Marine Forest Society. We made a lot of job, and we have an experimental site in Newport Beach, and we look for something new, completely new. Not talking about artificial reefs and rocks and so on. It was done since 20 years with Fish & Game, again by Coastal Commission, and was not our job to do a job already done. We wanted something completely new, and this is what we have done.
So I want to -- you are going to see that we do not support, you know, your project. Sorry, but I am going to tell -- to tell why we do not support this project and we are proponents for alternative.
We need alternatives since 20 years. What has been done? Very little, you know. We heard about quarry rocks since many, many times. And from what I know on this quarry rocks, you know, we have never seen a kelp bed establish permanently, never. So we can look for something else. This is what we have done.
My first question is curiosity, but I want to know numbers. And Coastal Commissions, you know, with technical services has made since years a lot of work, you know. And under direction of CEO Peter Douglas, you have been directed, you know, to make technical services, you know, for to mitigate, you know, the impact.

First question: What is the cost of your technical services? That's the question to Coastal Commission. You have been paid for that. I would like to know that cost. If you want to evaluate a project, evaluate the project, you will have to talk numbers. So my question is to Coastal Commission, how much -- what was the cost? How much did you bill, you know, to Edison for your technical services? Same question to Fish & Game. Can you answer it now?
MR DIXON No, I can't.
MR STREICHENBERGER You don't know.
MR DIXON I don't know.
MR STREICHENBERGER Mr. Bedford, what is your cost for your technical services six years?
MR BEDFORD My technical services to Edison?
MR STREICHENBERGER I beg your pardon?
MR BEDFORD You are asking for my technical services to Edison?
MR STREICHENBERGER Yes, to this project.
MR BEDFORD I can't give you an exact number.
MR STREICHENBERGER I'm sorry, but this is information. It's important information and the public certainly will know what is interest and special interest of action. So I'm sorry not to have the answer, but, well, we are going to ask this answer to you officially

and to Coastal Commission.

After that in the same order of things, you know, in the future, you know, it's going to be also, you know, interest to you, you know, delivering, giving, you know, practically exclusivity your technical services to Edison. So what is going to be the bill? You know. What is the -- what is the money going to be paid to you? Also paid by Edison to Fish & Game? I want to have an indication of that because it's very important information to know where are the special interest.

And if you cannot answer that, perhaps you can give me an idea of some things which is known, you know. Coastal Commission like to ask buyout. Is it going to be a buyout asked by Coastal Commission to Edison?

Well, you have the responsibility to redo what you have destroyed. You have destroyed the marine not on purpose, but kelp has been lost, you know. And fish has been -- has been lost. That's the responsibility of Edison, first.

And I understand that's administration is just to review if everything is done according to law. But the responsibility to reduce, it is Edison. And I will be sorry -- I think it has not to be forgotten because like this, if everyone, you know, has his own responsibility, does not pass the baby to somebody else and especially to

the administration, it's better that they keep themselves responsible.

But if there is a buyout, because Coastal Commission asked for buyout on the part of the mitigation, to give you an idea -- I know the number. It was public. The buyout has been asked by -- to make part of the fishery, the buyout to Edison was 117 million dollars.

So on this project, which is different is apart, I want to ask Coastal Commission, not Fish & Game, to Coastal, are you going to propose a buyout to Edison? And for that, how many tens of millions of dollars? That's my question. Can you answer that, Mr. Dixon?

MR. DIXON. My understanding was that one of the options was a buyout and that that option was not chosen and that the intent of Edison is to build the artificial reef and to do what was mitigation.

MR STREICHENBERGER Can you give me a number on this eventual buyout?

MR DIXON. I don't think there is going to be a buyout.

MR STREICHENBERGER It will never be a buyout?

MR. DIXON· As it stands now, as I understand it, there is not an intent to be a buyout. There was an option at one time.

MR STREICHENBERGER It has been an option.

MR DIXON. Yes.

MR STREICHENBERGER.· What was the number?

MR DIXON I don't know. It's in here. Do you remember offhand, Bob? We will note this, and we can look this up later, but I won't take the time now.

MR STREICHENBERGER Okay. Okay.

MR DIXON We can do it today.

MR STREICHENBERGER. Yeah. Or tomorrow. It's not in a hurry. We work with nature. So we work with years and years. We are thankful for that.

Just my curiosity, but this numbers, you know, and this interest are so huge that we have to do something about that. We are interest; we have special interest. Okay. That's over.

Now, I have to tell you why marine foresters and almost every environmentalist oppose the project to build an artificial reef with quarry rock.

You know, you talk to environmentalist about mining, you know, Catalina Island, extracting from the earth a virgin material, you know. And it's a provocation for environmentalist, and I must tell you, Coastal Commission and Edison, you are going to have a huge opposition from environmentalists because the rule -- you know, the rule in all the environmentalist -- you can read that in the literature -- don't touch a virgin material if

you are not obliged to do it. Don't take rocks out of a bed river. Don't take rocks out of a mountain to be preserved. Don't -- because they are virgin materials, not to be used if you are not obliged, absolutely obliged to do that. So when you choose, you know, a virgin materials to be mined out, you know, from Catalina Island, you -- you deal with provocation, you know, of environmentalist, and be sure you are going to have it. And I don't know why you do that.

So it's one -- it's just the general things, you know, we have on this. When you read Worldwide Institute. This was a mining industry, you know, is harmful to the environment. You read that everywhere. When -- even the vice-president, Al Gore, of the United States, he has written don't touch virgin material if you are not obliged to do that.

And in this case, you are not obliged to do it. You can have alternatives. I don't understand why CEO Peter Douglas, in 1991 -- I said, okay. You are going -- you, Edison, you are going to use quarry rocks. For me, it was absolutely not appropriate, but -- and I told them. And I told you -- I told your management. And it was decided you do quarry rock.

We had a meeting in '91. And the meeting was at the request of Edison, and I think it was Fish & Game.

I said to everyone, we have to mitigate for the damage to the kelps, the damage to the fishery, and Edison has organized, you know, a large meeting in '91 to say we want to hear all the advice, what is possible. How can we do the best to restore the kelp and fishery?

And it was a full room. You know, five times of professionals who were there. And they all said please don't touch the quarry rocks. That's virgin material. We can do something else. There was several alternative proposed. People who wanted to propose alternative, while more natural, more going with the environment.

MS GRIGGS. Excuse me, Mr. Streichenberger. Do you have some suggested alternatives that you think we should be looking at?

MR. STREICHENBERGER: Yes.

MS GRIGGS· Would you tell us what those are, please?

MR STREICHENBERGER· Yes. I am going to tell the alternative proposed by the Marine Forest Society. I am going to give you an idea of what we propose.

But first I want to say that this quarry rocks are very bad for environmental and more. But to come back to this meeting in '91, everyone there looking for alternative, and we have been deeply shocked when somebody raised up and said, guys, you are losing your time here.

We don't talk about alternative. The sea -- or Coastal Commission has taken this decision; it's going to be quarry rocks.

I think -- I think it was very shocking, very inappropriate, and it's not in the minds -- not in the spirit of the Coastal Act and of CEQA, but it has been done.

And since this time, you know, every study, everything is rocks, rocks, rocks. Study with quarry rocks in Catalina and after that concrete, but it's about rocks and artificial rock. Nothing else. So no alternative. But anyhow, we look for other positions about the rock, about this project.

And this project is going to use heavy equipments. Equipments, you know, of course with barges and all that makes a lot of fuels, and it's going to pollute the area. In every project, you know, when you choose the project, you burn lots of fuel. It's a rule that environmentalists and the administration in charge should respect. You will choose a project; we use very heavy equipment. Okay. We know that. That's fine.

After that, you destroy ecosystem. You destroy the ecosystem in Catalina Island because you mine rocks. So ecosystem out. When you throw your rocks, all your concrete on the bottom of the sea, you destroy the

existing ecosystem, even if it is sand. You destroy a second ecosystem, which is, you can say, it's kind of insult for the environment for environmentalist.

After that, did you look at leaching of chemicals out of this concrete? When you have concrete, it's filled with chemicals, of course full of them. You are going to full up with in the sea and, of course, the leaching is going out.

And what about the bioaccumulation. I can tell you, I don't think you have a big problem with that, because we have studied leaching a lot under the request of Coastal Commission. So we know what is toxicity. I don't think we have a large problem with that. But where is your study about it? And I'm sure the study has to be done because you have to answer the public.

You are going to put things in the sea. They are going to leak. Even the natural rock, you know, leaks something. Every time you put something in the sea, there is leaching. We want to know if you spend so much time for so much money, I can tell you for millions of dollars, you can look at that because you should.

After that, economically. Economically, the program of quarry rock is a sheer absurdity. Because what? Because I called in your writings. You know. If you succeed -- and you are not certain to succeed because

nobody has succeeded until now to put chemicals. But if you succeed, it's going to cost, calculation, more than $1,000 for one seaweed, one plant of kelp. This is a sheer absurdity. I'm sorry to tell you that.

And we said that long before. Not to you, Mr. Dixon. I'm sorry I didn't tell that to you, but it's a sheer absurdity, and how are you going to present to the public that this project, if successful, is going to cost -- you devise $170,000 by 160 plants, you know, by acre, and you come to -- you come to 1,062.5 dollars for one plant of kelp. This is not serious. It's an economical absurdity.

Finally -- finally, about what we think is impossible -- I'm very sorry -- it is the uncertainty. Now, you do years of work on -- on the -- with your rocks, you know. It has been 20 years you have been with that, 20 years. And you said now, we don't know it's going to succeed. There is a huge uncertainty. We have not discovered a method. You write it. And you want to go like this with more millions in five years, and after that, another thing and another thing? And the kelp is not restored, and the fishery is not restored.

So I think we should have some alternative to be looked at. I have finished with my second point. I have only one point now which is alternative, and I see

Mrs. Griggs, that's -- you want to have an alternative. Okay.

We work for the alternative when we started with Dr. Wheeler North, and there is no alternative. You don't hear about that. Why? I'm sorry to tell because obstruction from the Coastal Commission. They have decided one thing. You do that. It's a dictate. And I'm very sorry that it is as accepted as dictate. It's accepted dictate of the seawater. I would have preferred to keep the money.

And -- but there has been obstruction. And the facts are there because we wrote that to Edison. We have alternative. What is our alternative? No answer. And since, we can't understood that. We can look at that because we are prescribed to do this -- what's -- we cannot -- we cannot look at other things. We have pressed out to work on that and to work on that.

We went to Coastal Commission and we have sent extensive letters, you know, to Coastal Commission and said we have to look for alternatives to build marine habitats that are better than this quarry rock and rock of the sea. They are not satisfactory. And the staff of Coastal has never answered. So we push, we push, and we wanted to develop our side. We want applications, you know, and we were completely obstructed till -- till we

got hearing one year ago.

We went to the commissioners, and we explained to the commissioners that we have been obstructed, you know, to make our research, research for marine habitats, nonprofit research. We did that. And the commission is impressed because we went with photos and look at what we do. Look at our kelp. Look at our fishery on the mussel reefs. What we do, it's completely new.

The commissioner has been so impressed, he said, we cannot give you a permit now, but we order a study of the Marine Forest technique to be done by our staff of the Coastal Commission, and the commissioner said, marine foresters, you are going to work with their staff. We are going to work with Mr. Grass. You are going to do this research and this study because we want to know about this study of the Marine Forest Society. Thank you to your commissioners. But not thank you to you, staff.

So it was one year ago. One year ago, the gentleman of the commission said, you staff, you Mr. Glass, you have to do that study and that workshop with the Marine Foresters. When? He look at his man. When? He was not happy at all. We can do that in August. Okay. Fine. August fine for me. And today we are just before April, one year after that story, and we have seen

nothing of the staff of the Coastal Commission. Still the same obstruction. They don't want to hear about that alternative. This is my conclusion.

And I says that to the public because we have prisoners, and they are facts. And it's not -- it's not appropriate. It's against the law. Clearly, that you have to call for alternative. You have to listen to the people. You cannot dictate the things.

The responsibility is Edison. Of course Edison has still responsibility. Edison lost the kelp, lost the fishery. You know, they have a debt to mother nature. So they have to build the debt to mother nature before -- before to pay you, if you don't lose the job. I'm sorry to have this harshness, but the door has to be opened. You cannot close the door and to see no alternative.

Okay. So despite the obstruction, we work in a corner, you know, although the embarrassment is done against us. But we work and research. So we research now, and what we are ready to expose we will present to the commissioner, we have presented that to Edison. It's about that.

I want just to make a short design, you know, of what we propose. It's a forest. First there is -- there is guidelines, you know. We propose something which is reversible. The damage done is the impact done by the

nuclear plant, you know, it's not forever. You know that's impact comes from -- there's an outtake of the water. Big, big plant, you put out water, you know, which is opaque and it's big effluence, you know, go with the plume, you know, and they make turbidity so the turbidity goes with a plume over the old kelp, and the kelp doesn't has a -- photosynthesis cannot be done because of this turbidity.

But this is temporary in the history of nature. It's not for so long. When does a nuclear plant stop because it's worn out and they are to do something else.

So we want something reversible. When you do your rocks, it's irreversible. You make an irreversible change on the bottom of the sea. I'm sorry. It's not environmentally smart. And it's not environmentally permanent to make an irreversible change to the environment when you can do something else which is reversible. So what we propose is totally reversible.

And what we propose also is something proposed with certainty. High dose of certainty. We propose things that has always been done. We have experimental. So we can do it with much, much less money. Infinitely less of money. And we don't want to waste money in 20 years, you know, by projects that never finish. We want something done. We want to see the kelp. We want to see

the fish quick, you know, and with less money. Because there is a reason with less money. But I will come back to this.

Now, what was this guidelines, you know, of reversibility and certainty. What we are -- first, you know, you have to -- and we have to produce juvenile kelp plant in laboratory. It is almost certain that this is done since years and years. You produce juvenile plants in the laboratory. It goes in the field. You can make your nursery in the field. We can do that. Or you can make your nursery on land. At San Diego, they have already nursery. They would be very happy to do that.

So you make a good production of juvenile plant. And it is well known, there is -- when you have that, you transplant. You transplant on the sand or on the rock. I mean rock, natural rock, existing rock. Rock that does not have kelp now, and the transplantation of this juvenile plants, we do it because we have done it. So the first thing you have to do is that. Produce juvenile plant. It's very well known.

It's not expensive, and you transplant the kelp, you know, easier on the sand. Not under the plume, you know, because the plume of the plant, there's no life, you know, but there's a place near or convenient, and you do that easily.

If we want to do as well as your project, you know, what you propose, your project of 16 acres, your project of 16 acres, you know, to be satisfying, just mean that at 160 plant by acre is what you want, what you said in your paper, it means you need 2,000 -- you need 2700 plants. 2700 plants. To transplant 2700 plants on the sea bottom when out of the nursery, you know, we can do it in one week. And if it does not work, we do it a second time in one week. And you can do that every season. So you have the kelp back, you know. And we can do it not expensive, in a very reversible way, without changing. You can do that. That's what we propose. And that is alternative. Something more --

MS. GRIGGS Mr. --

MR. STREICHENBERGER You can say this alternative is not exactly perfect in an environmental way, because what we would like in an environmental way, we would like to see the kelp where it was before. We redo exactly how it was.

If you transplant kelp from juvenile, you are going to not grow under plume. You are going to in someplace, other place or place on the sand or the rock. But the good -- the good techniques, the technique would give Edison a reputation in the world. The technique would be applauded -- is to -- to have the kelp where it

was before. You respect nature. How can you do that in the plume of turbid waters? You shut down the turbid waters. You correct -- you correct the difficulty.

The difficulty is that out of the outtake, a plume, you know, of turbid waters comes organisms and particles of sands, minerals making opacity. Then you shut -- you shut then this out between the outtake of water and between what you want to project, you know, for your kelp. You put a screen. You put a screen, a biological screen of mussels, high relief habitat of mussels. And if you have this high screen, you know, of mussels, you shut down the turbidity. A forest of mussels is going to absorb all this turbidity.

And we know it's going to do this because we know the effect of mussels, you know. It's like this, and we have all the example in the world where the turbidity of the water has become clear. It has been made by this one.

So we propose this. It's a simple. It's biological. It is reversible because when it's finished, you know, well, you shut up your high -- you shut it up, and the last advantage, you know, is that because of the habitat of mussels, you make a lot of fish.

MS. GRIGGS: Mr. Streichenberger, excuse me. Two things. Your comments on the impacts of the project as

proposed are the kinds of comments that we wanted to hear.

As far as this alternative, the place for that to have been decided was before the Coastal Commission when they issued their permit to allow construction of the -- of the reef. And so this isn't the place to argue -- to make that argument because it's not the purpose of this scoping meeting.

And it sounds like you made your argument before the Coastal Commission and they went ahead and issued their permit for rock quarry and for concrete, and that's the project that we are looking at the environmental impact of imposing. So this is not the proper forum for your argument.

It's not that it's not good information for everybody to listen to, but that's not the purpose of the meeting. And we have other people that are waiting to testify; so if you could wrap up your comments --

MR STREICHENBERGER Yeah. I can wrap that. Thank you. I have become accustomed to tell me I have finished. So I am not going to be frustrated because I can't tell you what I had to say six years. And I'm glad this is -- I could say that we wanted alternatives to come up for -- to get an example, to come and review by Dr. Murdock, Dr. Fried, they said it. We want what's going to be done for Edison to be an example for all California. And

Edison can do it because Edison can bring this invaluable, you know, realization would be retained, you know, as an example in California and the world. Do that and study and experiment. This is what we have to do in the spirit of alternatives.

Thank you very much.

MS. GRIGGS Thank you.

Our next speaker is Paul Frederick.

MR. FREDERICK: I'm Paul R. Frederick, president of Frederick Fisheries, Incorporated. I'm a commercial fisherman out of Dana Point. Also representative from Dana Cove Commercial Fishermen's Association.

And we would like to have the project looked at about as far as the area you are proposing now. We feel it's -- it's in an area that's already hard bottom, and that is a concern of ours. And that immediate area where you are putting it now, we would like to have it looked at as possibly moving it from 50-foot zone out to between 50 and 55 foot so we wouldn't impact any of the hard bottom that's there now. Or possibly moving the project to the Dana Point side of the San Clemente Pier in the proposed depth that you have the project in now, towards Dana Point, from the pier to Dana Point, just short of the trailer parks.

I understand the concern about doing this is

that it's soft bottom out in that area and the rock possibly wouldn't -- would not stay in the depth you want. It might sink down into the sand. But basically, our concern is that putting the rock on top of what already is hard bottom.

Thank you.

MS GRIGGS Thank you.

And our last speaker is Lynn Hughes from the City of San Clemente.

MR. HUGHES. Hi. The remaining concern that I have, beyond what's already been mentioned, is to make sure that the size, density, and shape of this reef is not such that if you have monstrous waves that we haven't seen within our lifetime, but we know have existed along our coast, would not destroy the reef and possibly turn it into rubble that could present difficulties, whether it be littoral flow or the use of the beach by bathers.

MS GRIGGS Thank you. Is there anybody else that didn't sign up that would like to say anything?

Well, we thank you all for coming. In case you were wondering, the meeting this evening is a duplicate of this meeting. Obviously, people's concerns will be different, but the presentation by the commissions and by Edison will be the same. Some people wonder if it's going to be an entirely different meeting, and it's not. So I

just thought I would say that.

And we want to thank you all for coming. If anybody didn't speak, like I said earlier, please feel free to send your comments in writing to the State Lands Commission.

And I think that we are finished for this afternoon. Thanks a lot.

(Meeting concluded 3:40 P.M.)

STATE OF CALIFORNIA)
) ss
COUNTY OF ORANGE)

I, Paula J. Becker, Certified Shorthand Reporter #4453, licensed by the State of California do hereby certify:

That the foregoing scoping meeting was taken before me at the time and place therein set forth and was taken down by me stenographically and thereafter transcribed by computer-aided transcription, and I hereby certify the foregoing is a full, true, and correct transcript of my stenographic notes so taken.

Executed in Dana Point, California, on this 9th day of April, 1998.

CERTIFIED SHORTHAND REPORTER #4453

CALIFORNIA STATE LANDS COMMISSION

PUBLIC SCOPING MEETING

For The Program Environmental Impact Report

San Onofre Nuclear Generating Station

Experimental and Full Mitigation Artificial Reef Project

San Clemente Community Center

Ole Hanson Room

100 North Calle Seville

San Clemente, California

March 30, 1998

7:03 P.M. - 8:28 P.M.

Reported by: Paula J. Becker, CSR 4453, RPR

PRESENTATIONS AND APPEARANCES:

California State Lands Commission
MARY GRIGGS

California Coastal Commission
JOHN DIXON
DAN REED
DENNIS BEDFORD

Southern California Edison.
ROBERT S GROVE

SAN CLEMENTE, CALIFORNIA; MONDAY, MARCH 30, 1998

7:03 P.M.

MS. GRIGGS: I think we will go ahead and get started. I would like to thank you all for coming. And my name is Mary Griggs. I'm from the California State Lands Commission, and I am going to introduce the people from the other agencies that are here and are going to be presenting information.

This is John Dixon from the California Coastal Commission. Dan Reed from the Coastal Commission and Steve Schroeter. And then Bob Grove from Southern California Edison is here, and he's going to be providing us information on their project.

Has everybody that wants to speak had a chance to sign up on the sign-in sheet in the back of the room? And if you haven't, I would encourage you to do that. We will be taking in the order that they have signed up. And to expedite the meeting, we are going to have a five-minute time limit on comments and on testimony. So if you keep that in mind when you are presenting your information, I would appreciate that.

I would like to tell you just a little bit about the environmental process and why we are preparing a program data. The State Lands Commission and the Coastal

Commission decided that a Program EIR would give the greatest flexibility for the project and because the project is to be built in two phases, an experimental reef and then the full buildout reef, and in order to give the public at least an understanding of what the potential impacts would be from the full buildout reef, even though that's years down the road, those impacts will be presented in the document.

And because the feeling was there was no reason to just look at the experimental reef, if we didn't go ahead and look at the full buildout, too, there might be something in full buildout that would preclude us from doing that in this location, and we needed to assess that now. So we were looking at the full project, which is required by the California Environmental Quality Act.

So once we had made that decision, we sent out a notice of preparation. Some of you may have gotten that in the mail or you saw in the newspaper that this meeting was going to take place. We have some copies of the NOP in the back of the room, along with some copies of the project description. If anybody didn't get one and you didn't notice them back there, please help yourself.

The purpose of the scoping meeting is to hear your comments and concerns on the proposed project. It's your opportunity to give us some information about things

that you want to make sure are addressed in the document. And so this is your opportunity.

If you haven't sent -- if you are not prepared to make a comment this evening, but you would like to send a comment in writing, the end of the comment period is April 8; and so I would urge you to get your comments in as soon as you can.

The -- as far as the schedule for the environmental process, we hope to be able to take this project to the State Lands Commission to certify the EIR and issue a lease to Southern California Edison for the property that they will need to construct the artificial reef. Hopefully in -- whoops. In one ear and out the other. By the beginning of September.

And right now, we are aiming for -- Edison is aiming for construction of the reef in September. So it's a pretty expedited process, and we are going to try very much to keep it on schedule.

So having said that, John Dixon from the Coastal Commission is going to give us some information, provide us with some background information about how we got to here and the long process that the Coastal Commission and Southern California Edison have gone through for years to get us to this point.

John.

MR. DIXON: Well, I would like to give you a little bit of the history of the project, both so you -- kind of give you an appreciation of their rationale behind the mitigation requirements that -- of the project we are talking about this evening and also, in case you have been following this, to give you an understanding of why things have changed in the last year or so.

In 1974, the California Coastal Commission approved a construction permit or application for San Onofre Nuclear Generating Station, but they conditioned the permit and they required that the applicants fund an independent panel, review committee, to oversee scientific studies to determine what the actual effects of the power plant were on the marine environment and, if significant effects were detected, then they could require significant changes in the design of the plant, as drastic as having cooling towers.

A few years later, 1979, the commission also explicitly recognized that some sort of compensatory mitigation would also be the appropriate remedy, in addition to -- or in place of requiring design changes.

Well, the Marine Review Committee oversaw the studies and made their final report in 1989, and they concluded that there indeed had been substantial reductions in the number of organisms, including giant

kelp, kelp bed fishes, the invertebrates that live on the bottom of the seafloor within kelp forests, and there also had been a reduction in regional fish abundances that was assumed based on the number of juveniles that was taken into the plant and killed.

And they recommended mitigating these losses by creating an artificial kelp reef, by improving the fish exclusion devices at the plant to prevent fish from coming into the plant, and by restoring a wetland.

In 1991, the Coastal Commission acted on these recommendations, and they adopted conditions to mitigate the adverse impacts of Units 2 and 3 that included restoring or creating 150 acres of wetland within the Southern California bight; to install and maintain behavioral barriers at the power plant to prevent additional adult fish losses; to construct kelp reef; and to fund independent monitoring of these mitigation measures by people who had no vested interest in the outcome of the mitigation; to maintain data, to make it publicly available; and to partially fund the fish hatchery.

Now, the kelp reef was to be -- it was estimated that about 200 acres of kelp had been lost, and the reef was to be 300 acres and extant with about 200 acres of exposed rock; and it was also to -- 60 percent of

that was to maintain medium to high density kelp, which was defined as four plants per hundred meter squared.

It was to take place in two phases, and the first phase in the 1991 permit was to be a trial reef that was to be large enough that the normal processes could take place, and it would be watched for three years in order to see if it was going to behave as expected.

If not, some alterations could be -- could take place before the large reef was built.

And then, within -- it was also -- the reef was also designed for fish and within ten years, 28 tons of standing stock biomass of fish would be present.

Now, after the Marine Review Committee studies terminated in the late '80s, Southern California Edison continued to monitor the kelp forest, and their kelp -- giant kelp monitoring program was very similar to that which had taken place in the Marine Review Committee, and some of the same contractors were involved.

And after several years, they reanalyzed the data, and they suggested that the earlier estimates of kelp loss were larger than appeared with additional data. So Southern California Edison and the Coastal Commission staff worked together to appoint an independent review panel to analyze these data, and they concluded that qualitatively that indeed the effect was smaller than

originally estimated, and they made a recommendation for the way in which the actual magnitude of the effect should be calculated.

Coastal Commission staff used their recommendation and recalculated the loss and came up with 179 acres of kelp instead of 200.

In 1997, the Coastal Commission adopted a new set of conditions, and to mitigate these 179 acres of lost kelp resources, they accepted requirements for 3.6 million dollars to go to a fish hatchery program, and to design, construct, and the independent monitoring of a kelp reef that will produce 150 acres of medium to high density kelp.

Now, the language here is rather different than from the 1991 language in that they didn't specify actual acreages of rock that had to be placed out there, but rather focused primarily on replacing lost resources. And so what has to be done is to replace these 150 acres of medium to high density kelp, but there must be a minimum of 150 acres of hard substrate placed.

And this will be in two phases, but again, it would be -- the phases have a little different intent than the initial conditions. The first phase is an experimental reef, and it is going to be 16.8 acres, and the intent is to try different kinds of substrate and

different configurations and also make subsidiary observations and experiments, try to determine what the best kind of design would be for the larger reef.

This will be monitored for five years, and then will be a minimum of 133.2 additional acres of rock put out to bring it up to 150 acres minimum. This is the minimum, and there's no statement of the maximum because the focus is on the kelp resources, and I will read that little section out of the permit. It says, "It should be noted that the average area of medium to high density kelp produced by 150 acres reef will, in all probability, be less than 150 acres. This is because typically only a portion of the reef area, whether artificial or natural, supports a sustained population of medium to high density kelp. For example, on average, only about 50 percent of the hard substrate in the controlled site, San Mateo kelp bed, has historically supported medium to high density kelp. If this turns out to be the case for the mitigation reef, then the appropriate remediation would be to double the size of the reef to 300 acres in order to meet the requirement of 150 acres of medium to high density kelp. If on the other hand if was determined that 75 percent of the mitigation reef area supported medium to high density kelp, then the appropriate remediation would be a reef that is 1.25 times as large as the 150 acre reef. In

other words, the addition of 37 and a half acres for a final reef size of 187.5."

So, you see, the minimum is 150 acres and the maximum could be the size of the appropriate plot there which, in this case, the site that's being considered now is 355 acres. So somewhere in there would be the ultimate reef.

So that's -- that's the basis of the kelp plan that Bob Grove is --

MR. GROVE: That's my cue. Thank you.

MS. GRIGGS: This is Bob Grove from Southern California Edison, and he's going to explain about the two phases of the project.

MR. GROVE: Thank you, Mary. Before I begin, so I don't forget, I brought along some extra copies of the experimental plan. The preliminary plan was approved last summer by the Coastal Commission, and it describes the 16.8 acre -- the first phase. So there's -- I think there were some in the back, but there's more up here and one of the maps showing where the reef is. There's extra copies of that.

And then I brought along a few copies of our printout from the web site. So we even have a web site on the project. So you are welcome to use this to key in to what's going on with the project over the web site.

Southern California Edison is pretty excited to get this project going. We have been working on it since really the first permit came out in 1991, and we considered it a real positive step in being able to do something to enhance the local marine environment. So we think it is a pretty neat deal. And I just wanted to go over and kind of review what we have done to date and where we hope to go from here.

And right away, you can see that, as John said, our obligation permit is to restore kelp, and the exact size would be 150 acres, and the first phase, as said, was 16.8, and we would propose that the second phase, at least to get things moving, as 133.2 acres. That gets you up to 150. I will get back to that in a minute.

And from our perspective of why we are doing the project, as John mentioned, the Marine Review Committee that was around from 1974 to 1993 did come up with a finding that there's a reduced kelp bed alongside of the diffuser system just south of the San Onofre power plant. And with the reduction in the kelp bed, there's a concomitant reduction in the kelp fish and invertebrates.

And the idea is the mitigation for this environmental impact makes more sense to us in -- and it certainly did to the Coastal Commission, as recommended by the Marine Review Committee, as opposed to prevention.

Prevention is always nice, but in this case, that would mean, you know, adjusting the way the power plant runs or even turning the power plant off. And it just makes more sense to mitigate. And it's certainly more environmentally friendly than cooling towers; I think most would agree.

So also, with kelp, there is the opportunity to do in-kind mitigation. Kelp has been lost. We think the technology is there to bring kelp back in an artificial reef, and we can do that almost in an in-place situation, and that is, part of the permit also is to restore kelp as close to the power plant as practical, and we think that can be done.

Again, from the Edison perspective, we are in this project primarily, of course, to comply with the permit. And as John read -- and if I can grab this again -- you know, this -- this is John's copy, but -- this is a big guy, and it's sort of like our owner's manual of what needs to be done. And so we are trying to comply with that.

And we would like to implement Phase I in 1998. And also, our objective would be to maximize the resource enhancement. Certainly, we want to do this in such a way as to get the greatest advantage in enhancing the environment.

So since the 1991 permit came through -- it's kind of hard to see, I know -- it's -- Edison had gone through the path of quite a few scientific studies, and we are doing a few things in parallel. Since 1991, we have been looking at the various potential places that an artificial reef could be constructed in the Southern California area, and again, near -- nearest San Onofre as practical. And we have also been studying kelp beds in trying to determine how the natural beds in Southern California, and specifically in northern San Diego County and southern Orange County, behave. You know, what depth range do they grow and what kind of bottom substrate. How high is the hard substrate that kelp plants really need to attach to an anchor properly? And just, you know, all the various aspects of growing kelp so as to better our understanding on how to do the reef.

And if I can turn your attention to the first chart -- and this is a specific in the area between San -- or the San Mateo Point to the south and San Clemente Pier to the north, and in this area, the shadowy offshore areas that you see in blue and down here in red and green, are noting areas where kelp really is persistent, where over time, naturally, kelp has done a pretty good job of hanging around and being a resource.

And what we are interested in is in the area

from the pier to the existing kelp bed. Is there an opportunity to put in an artificial reef, new hard substrate that would allow or give kelp an advantage to where we can, you know, have the mitigation take place?

And -- let me grab one more board here. You are welcome, after the talk, to come up and see where you live and things. These are the aerial photos that were done at San Onofre, and one of them at the bottom, you can see the actual picture in case where the kelp bed is pretty heavy. It's a shadow area offshore. Like I say, after the meeting, please feel free to come up and put that in perspective.

And we would hope to put it between, again, the pier, mitigation reef, and the point.

And also, if you are wondering what San Onofre kelp will look like according to one picture, here is San Mateo Point and the city's off the map to your right. And our power plant, San Onofre, is in this area. And this is what we mean by an impact in the close proximity of the existing San Onofre kelp bed. The offshore diffusers are out in this locale, and the area outlined in white is the hard substrate area with the existing San Onofre kelp. You can just see the shadow of the kelp plants themselves. Again, feel free to come up and take a closer view of this tonight.

So that's -- that's the setting and some of the studies that we started in '91, looking at kelp, and I will get back to the map that is up there.

Again, in the front row is Dr. Larry Deysher who has been pretty instrumental, as a consultant and expert that Edison has hired, in looking at the kelp plants and doing a nice job of putting all the different kelp data that was obtainable through Dr. Wheeler North from Cal Tech and from some of the marine review studies and as well as some of the sonar studies -- all of the different kelp data went into a database, and it was real helpful, Larry's group, the Coastal Resources, in getting the study, where we feel pretty comfortable how kelp is behaving in Southern California.

And getting back to siting, some of the specifics that are in the permit that we are following, we have to make sure to locate the mitigation reef somewhere near San Onofre, and between Dana Point and Carlsbad is the optimal area, and not near the San Onofre discharge; and to have minimum disruption of existing cobble or reef habitat; and avoid the rare and sensitive habitat that are in the areas; suitable substrate. That means be nice to stay away from silts and clays and things that can interfere with kelp growth. And locally suitable depth, and that through our studies and common knowledge from

scientific papers, 12 to 14 meters in San Onofre are a good depth to put kelp or to have kelp grow.

And also, it would be nice to locate the artificial reef near an existing natural reef that grows kelp, with the idea being that the ecology, the flora and fauna that are on the natural reef can shift over and be enhanced and the whole area be more productive through the direct transfer.

Also, to locate the reef away from major sediment deposits, and that would certainly include river mouths, and make sure there's minimum interference with waterways uses such as the boating groups having regattas. Maybe the kelp bed is not a good thing to sail through, so if we can work with that aspect. And keep away from discharges and no interference with historical or cultural resources.

So all those things are taken into consideration, and San Clemente seemed like a real opportune site, and we -- again, we think it's a pretty advantageous thing to have in a community as far as the positive aspects of this kind of environmental enhancement really should have.

And again, starting back with the permit as it initially came out in 1991, we started our work with the public meeting in November of '91, and by December had

gotten underway with sonar studies of the region, trying to make sure we had different sites that would be compared in picking the optimum site.

And by 1992, we were at the specific siting and design work. And this is the work that really got into looking at the natural reefs, like I said, and also the artificial reefs that do exist in Southern California.

And then through the next two, three years, the work went on, and by 1997, after a few twists and turns as far as, you know, getting the data together and getting the different agencies comfortable and having review comments come in on a technical level, we got our site and preliminary plan approved by the Coastal Commission in June. So June '97. And then we continued with even further detailed siting sonar work in the San Clemente area.

And that's -- that data that we just collected last summer is what appears on this chart, and looking at the kelp mitigation reef area in front of the San Clemente beaches, we see that if you put the kelp bed too close to shore, which would be anything inside of the red area, that the depth is too shallow and there would be too much turbidity from the wave action on the bed.

And then you have the optimum depth area that is portrayed in the red, and then on the outside edge of

this area, we were limited and felt that wouldn't be a good place for kelp for another reason. And that is offshore in the deeper area, it's a zone where kelp could still grow potentially, and yet this area has real deep sand. And the difference between the red zone and the deep sand zone is the red zone is noting that the bottom has a veneer of sand that is still pretty thin, less than a half a meter, you know, less than 18 inches, such that if you put hard rocks or broken concrete on this area, even if it sinks a bit, it would hit the hard bottom below, the thin veneer of sand. So this is more of a sure thing than trying to locate a reef in deep sand.

And when we went to our coastal engineers in our sitings and design study and asked for assurance on can you design a reef such that it won't -- you can guarantee that it won't sink into the sand, the answer is really close to no. I mean it's -- you know, the engineers just aren't comfortable putting hard substrate on a soft sand bottom. So we liked that this area is pretty wide compared to some areas like Carlsbad where you have a real thin kind of ribbon of kelp naturally and we have to try to tuck in little bits and pieces of mitigation reef, and that this wider area really has a nice bottom that will sure -- we would be dropping rock such that we don't lose it. So we think that this area

really is opportune for enhancement.

And the red area is the area that John Dixon mentioned. There's 355 acres. So that is what you are really looking at here in red. And then you see in the red there's some black, and those areas being noted by black in this picture are areas where there's already existing hard substrate, and those areas of existing hard substrate, in that sense, they are already enhanced areas compared to a sandy bottom.

And the permit states we cannot drop artificial reef rock on top of existing hard substrate. So those areas would be specifically avoided, and we are pretty confident we can avoid those areas. There's enough georeferencing with the satellites and the little positioners that we can -- we can avoid those areas.

And one of the other issues that came up -- and we felt much more comfortable by taking this detailed look last summer. The issue was: Isn't there already a lot of hard substrate off of San Clemente such that dropping more rocks just doesn't make sense? Either there's already kelp out there or putting more rock, if there's not kelp, there's hard substrate; so why would dropping more rock create more kelp? So this was an issue that had been back in our minds as our studies went on for the last two, three years, and last summer, we had enough data finally.

We convinced ourselves, and through meetings with the Coastal Commission staff and Cal Fish & Game and reef experts, concluded that yes there is some hard substrate as noted here, but it's not of big enough chunks of material. There's some pebbles and small patches of small stone such that it's just not conducive for a stable, long-lasting kelp bed.

And so in fact, we were all very encouraged that that means we were really considering putting the larger chunks of stone, and we are meaning, you know, pieces that are a foot or two in diameter, as the best part of the mix of the stone we are to put in, that that will kind of tip the balance and create a much lusher habitat that's conducive for kelp growth. So suddenly we are hoping you will see a really nice kelp bed out there.

So that's what the experiment is going to try to demonstrate. And that's why we are calling it -- as John said, the emphasis changed from the 1991 permit to the 1997 amendment that now there's some -- a better understanding, and yet we need an experiment. And so we will demonstrate over the five years that yeah, some of these principles and ideas are true before we go on with the rest of the buildout and the full mitigation reef.

So we have a little locale that we are comfortable with, we have a depth range, and we have an

understanding of kelp.

And then Dennis Bedford from Fish & Game was here earlier today, and he provided actually the next two pictures. I know they are hard to see, but just kind of conceptual here anyway.

In 1994, late in the year, we came out with our first preliminary comprehensive siting and design report of some of the work we were doing. And this draft report that we hadn't really sent around for formal review, I sent a copy to Fish & Game and the reef expert at Fish & Game, Dennis. And I said this might sound kind of strange, Dennis, but we think we have a different understanding now based of this new science we did where before artificial reefs were built before as big piles of rocks, and the hope was kelp would grow on it, and even if kelp didn't, fish would be attracted to it so the Fish & Game would be happy and fishermen were happy with these kinds of reef, big mounded structures. We said, you know, for a kelp bed, we think we are finding that having real low relief, even just one rock high off the sand bottom, is more conducive for kelp plants to grow for a number of reasons concerning stability and scour and just -- the kelp like kind of a disruptive habitat. You know, if the storm comes through and rips everything out, sometimes the first thing back is kelp.

And one of our biologists, marine biologists, even termed that kelp is a weed. If things are just disrupted, maybe kelp is the first thing back. The giant kelp. And that persisted.

I said with all that, Dennis, I said, I don't know if this makes sense. He said not only does it make sense, but in that same month, about November 1994, Fish & Game, on a routine survey of some of their artificial reefs, found out that one of the reefs that they thought was built as one of the giant mounded piles of rock was in fact going to stay built as one of these scattered low relief, you know, one layer thick, low profile reefs, and why they stopped their boat to survey this reef was there's kelp growing there. And they went down, and this is what they saw.

So unknown to us, one of the few reefs in Southern California that's successfully growing on an artificial reef -- I mean kelp beds growing on an artificial reef is this habitat here, and this is from Mission Beach down in San Diego. Here is another shot of Mission Beach. That was installed in 1991, and it was a -- Fish & Game told them build the mounds. And the contractor didn't understand and he took the four coordinates that were supposed to be the mounds and spread them. This is broken concrete.

So this is very hopeful to us. And that's why we want to do an experiment and try this again in the San Clemente area and see if we get the same result.

So the experimental reef, the five-year program -- we are shooting to start construction in September -- is the yellow boarder area. That's a 200-acre area within this red zone which is 355, and we would be avoiding the existing hard substrate and putting 42 modules in this area.

And in putting those modules in, we will be testing two different hard substrate types, two different kelp anchorages, in a sense. One would be the broken concrete that we saw at Mission Beach working effectively, and two, we will try quarry rock which is the material of choice of Cal Fish & Game who have had 30 to 40 years experience building artificial reefs, and they prefer either of these materials actually for this type of reef.

So we want to just compare the material types, and then we want to do three different density spreads on the bottom: 17 percent hard substrate or the material, 34 percent, and 67 percent. And the idea there, of course, we would be delighted to maximize the bang for the buck that if in fact 17 percent bottom coverage works as well as 67 percent, we could build a bigger reef for at least -- you know, save a lot of resources in going with

the lower percentages. So we will do those comparisons as part of the study.

And then the last thing that we would study, of course, is location, and that meaning distance from existing kelp bed. The San Mateo kelp is in the bottom of the frame here. And the modules, the 42 modules will be spaced further and further away from the existing kelp bed. So there will be the ability to sense if distance really does play a factor.

So that's -- that's really the extent of where we are today. Like I say, if you have questions, if you want to take a closer peek. I guess Mary will run questions here.

Thanks, Mary.

MS. GRIGGS: Do you have a question on the project itself, sir?

MR. GAHAN: I do, yeah. There were a lot of comments there about what you guys are testing and everything relates to how well we can grow kelp. Has there been any studies done on what the impact of placing those reefs offshore along the coastline will do to the wave action on the coastline or -- you know, San Mateo Point is right in front of one on the best surf spots in the world that's utilized by hundreds of thousands of people yearly, and if you place a reef out there, is that going to affect the

surf at Trestles?
MS. GRIGGS: That will be --
MR. GAHAN: Have you studied that?
MS. GRIGGS: That's one of the things that will be looked at in the Environmental Impact Report, that we are here to get those comments and concerns from the public. And that's one of the things we already are going to include in the -- in the EIR, and there may be others that -- we hope not -- that we haven't thought about, but that's why we are here. So that is going to be addressed.
MR. GROVE: Maybe I should have mentioned that. That we -- there was a two-year study that the Coastal Commission permit in '91 said that is an issue. It comes up on every reef. Fish & Game has put in over 30 reefs, and they put in reefs that are as high as 15 feet off the bottom and in 35 to 55 feet of water, as far as in-shore kind of limit.

And yeah, we had a two-year study and Dr. Hany Elwany, who is with us tonight from Scripps, did that study for Edison. We think that's -- I mean that's what is going to be reported in the EIR.
MR. GAHAN: So that's the section of the EIR, will be the existing study right now?
MR. GROVE: Yes.
MR. GAHAN: So it won't look at the particular

contours on our shoreline. It will be a study that's already been performed somewhere else.
MR. GROVE: You want to -- would it be okay for Dr. Elwany to mention --
DR. ELWANY: We would like --
MS. GRIGGS: She can't -- she can't hear what you are saying. So you need -- could you come up here?
DR. ELWANY: Sure. Okay. My name is Hany Elwany, and I'm coastal engineer and oceanographer, and we conduct in 1991 study for Southern California Edison to check the effect of the kelp on the waves.

And what we plan to do with this EIR is utilize the information which we gained from this study to address -- to address sites, the future sites of the kelp reef. We are taking the consideration the investigation, what specific about this specific locations. Okay. And apply what we learn from other locations, this location, so we can find out whether this is impact or no impact.
MR. GAHAN: I'm less concerned about the kelp's effect than about the changing on the contour of the bottom and the effect that might have on the size of the waves and the way those waves --
DR. ELWANY: We will address. Sure.
MR. GAHAN: -- bounce off the reefs and et cetera.
DR. ELWANY: We will address the effect of kelp on

the wave regime and we include the salient points. Is that what you're worried about?
MR. GAHAN: Would it be specific to the shoreline?
DR. ELWANY: Yes.
MR. GAHAN: Because the area that you have outlined, I mean, impacts the only populated area in, you know -- up and down the coast, and I noticed your exhibit said that you have to locate it off of -- off of Camp Pendleton. So they specifically have excluded you from doing anything along the Camp Pendleton and shove it up our way?
MR. GROVE: Yeah.
MR. GAHAN: I mean that's the bottom line, it sounds like.
MS. GRIGGS: Thank you.
MR. GROVE: You want to see an overview of that?

When we -- when we asked if it would be okay to put the reef there in their base, they said no. That -- these are the activities offshore that have to be avoided. So they gave us -- they gave us this map and a stern letter saying not to interfere with their activities. So it's either, you know -- here is Edison's power plant and San Mateo Point. And to don't put it anywhere further south than that. So.
MS. GRIGGS: I think we are going to save questions because I think what they really are are the comments and

things that we would like to hear on the project. So we have one more presentation by Dan Reed of the Coastal Commission. He is going to explain the five-year monitoring plan, and then I will invite people that have signed up to testify, or if you haven't signed up, you can. And we will hear your comments and concerns during that, and the court reporter will be recording those so we can respond to them in another document. So if I can just ask you to hold your comments for just a minute, please.
MR. REED This won't take long. As Bob pointed out, the goal of the experimental phase of this project is really to determine the types of reef materials and the amount of bottom that they cover that best provide for adequate conditions for establishing and sustaining a viable kelp force and associated community of fish and invertebrates and algae.

Well, back in 1991, the permit called for the reef to be built of quarry rock and grit, to cover at least two thirds of the bottom in quarry rock. And last April, the commission changed the permit to allow the executive director of the Coastal Commission to change that requirement if the results of the experimental reef suggested that other types of material and other configurations of the reef could actually compensate for the losses that have been incurred by SONGS' operation.

So the -- the monitoring then of the experimental reef is really designed to collect the information that can be useful in determining which reef designs in this experiment will actually be useful to apply the mitigation.

Now, the fact that there's never been an artificial reef of this type built on this scale, there's clearly some uncertainties involved here that will make it not a sure bet if the results of the experimental reef are going to actually tell us exactly what's going to work on the larger scale reef, and that stems from uncertainties that relate to the small size of the experimental reef and the fact that it's only going to be studied for a five-year period.

It's possible that on a newly constructed surface, that within five years, a mature kelp force community may not ultimately develop. It's also possible that if one does develop, given that the generation times of some of the organisms that live out there are longer than five years, it may be that, even though these things develop in five years, there's no guarantee that they will be sustained over the long-term.

There's also concern that the size of these modules, which is -- are .4 acres in area, that what we learn on a .4 acre module -- I mean, the hope is that it's

going to tell us the right information, but there's always the concern that it's going to be difficult to scale that up to a larger reef, and that concern comes from some information that most natural reefs in the area that support persistent kelp tend to be larger than these small scales.

So there's some uncertainty involved in this, and what the -- due to that uncertainty, it's possible that after a five-year period, we may not have sustainable populations on these experimental modules, in which case the executive director is going to need information that's going to allow him to predict, based on the information that's collected, which reef design is going to work the best.

So the Coastal Commission staff, which is responsible for overseeing the monitoring program, is trying to take a varied approach to -- a multiple approach to collect information that will provide the executive director with the information he needs to make this decision.

And the type of monitoring that's going to be done is one that there will be just regular monitoring of organisms that are out there that largely will be used to determine if certain criteria of these -- if these experimental reef designs meet certain criteria that are

ultimately going to be applied to the larger reef, and these criteria are not only criteria that relate to the reef itself, such as the amount of rock that has to remain uncovered and the like; it's also as well if the abundances and diversity of organisms that have to be on these reefs. The monitoring will be geared towards actually going out and getting information on what grows on these reefs.

And in addition to that type of monitoring, there's going to be more detailed studies and experiments that will be done that are really geared at predicting what is going to be there over the long-term. And those things are going to focus on things like various biological and physical processes that affect development on these reefs, such as birth rates and death rates of kelp, and not just kelp, but a lot of the fishes and invertebrates and stuff and, in fact, in determining the extent to which they develop on these reefs.

So all that information together is going to ultimately be written up into a final report, which will be made available to anyone who is interested. The data will be available to anyone, and it will be available for comments, and it will be the comments on that report, along with the report, that will go to the executive director who will then make his decision as to what types

of substrate and coverages can be used for the larger buildout reef.

Now, the larger buildout reef will also be monitored, but the purpose of monitoring that is going to be different from the experimental phase. The purpose of monitoring the larger phase is really to see if, in fact, the reef lives up to its expectations and meets these performance criteria that are set in this permit document here.

And what the monitoring data will be used for then is to determine whether or not those performance criteria are met; and if they are not met, ultimately, what type of remedial action could be used to ensure that, in fact, the resources are compensated for.

So that's kind of what -- and monitoring and the mitigation phase will go on for the operating life of the San Onofre power plant, which is as long as Edison is kind of on the hook for ensuring compensation. Yes.

MS. MORRIS: Can I ask a question? You are talking about monitoring just the kelp and organisms around the kelp beds. But you haven't mentioned at all monitoring what it's going to do to the shoreline, sand flow, wave projection, any of that. You are not going to be bothered with that at all?

MR. REED: Well, I will tell you --

MR. DIXON: That is not part of the monitoring program, and it should be part of the process now. And the expectation is that enough is understood about the processes that during the EIR process, where these specific things are looked at, that there will be -- either be a conclusion that there's no significant impact or that there's a danger of such an impact, in which I have no doubt that monitoring requirements will be put in to allow us to go forward at all.

MR. REED: Certainly the physical parts of the reef are going to be monitored, and if they disappear, there's going to be studies that will be done to determine whether they disappeared because they are sinking in the sand or whether they are getting exported out on to the beach. So that kind of information as far as whether rocks and stuff end up on the beach, that kind of information is going to be taken in the monitoring plan. As a biologist, I -- we haven't yet considered, you know, looking at the impact using the monitoring plan to look at the plan to see how the surface has changed.

MS. MORRIS: You know, I'm a beach-goer, and if all these rocks go up on the beach --

MS. GRIGGS: That's something -- that's something that will be looked at in the EIR, and as Dan said, if the conclusion that's drawn based on the study that is being

done and will be presented in the document indicates that there's going to be a significant impact, then some mitigation would be required to mitigate that significant impact.

And if it's not shown to be a significant impact, then -- then that kind of monitoring probably won't be required. And of course, we are going to be looking for people with information and knowledge to comment on the study, comment on the EIR, and new issues may be raised that haven't been looked at, and then we would need to look at those, too.

But our aim is to look at everything in the EIR, and we have to wait until all the analysis is completed before we can decide or determine if there's going to be a significant -- potential significant impact that would need mitigation.

MS. MORRIS: I'm just a little confused. I guess maybe I missed this issue. Are you in the EIR process right now or just gathering information and asking for the questions?

MS GRIGGS: No, no. We are in the EIR process. This is a scoping meeting. We sent out a notice of preparation and to get people's comments. We are having the scoping meeting to get comments that need to be addressed in the EIR. So we are -- the EIR is in the

process of being prepared by the consultant now.

Why don't we --

MR. GAHAN: How can you start that when you are just having the scoping meeting? How does the consultant know the scope of work?

MS GRIGGS: One of the things that the consultant needs to do is do background information, existing conditions, and that can be done up-front. The existing conditions are a matter of record and can be -- you know, they need to do that. They have a lot of other work that they have to do.

As far as identifying what's a significant impact, no, that hasn't been done.

MR. GAHAN: I understand that, but I'm saying that the scope of work -- and I understood this meeting to be determining the scope of work as to what would be studied, and if you are saying that the consultant is already working on the EIR and he will decide based on what he's decided the scope is --

MS. GRIGGS: No. That's not what I said.

MR. GAHAN: This should be step one, I think. The scoping meeting --

MS. GRIGGS: Step one is sending out a notice of preparation and getting comments from the public. A scoping meeting is not required by CEQA, but the State

Lands Commission always does a scoping meeting when we are preparing an EIR and many times when we are preparing a negative declaration also.

So there's a lot of preliminary work that a consultant can be working on, gathering information. You know, we have been down here, meeting with state parks and with the city and with a variety of people to gather information on land use and information on recreation and so forth. So what's called the existing setting, the environmental setting. So that is set and that -- all that information can be gathered and the process can be started to write that up.

MR. GAHAN: Has a notice of preparation been sent out then?

MS. GRIGGS: Yes. It was sent out on March 7.

Why don't we start going through the list and --

MR. BROWN: This is a question. Are we supposed to wait for questions?

MS. GRIGGS: You know, what's happening is the questions are turning out to be comments on the process, and I would like to have the people come up, identify themselves, and give your comments at that time.

MR. BROWN: Can we ask questions during that period?

MS. GRIGGS: Yes. We may not have the answer for you

here. To the extent that we can, we will answer the questions. So we will -- we will play that by ear. Typically a scoping meeting is to hear the concerns of the public.

MR. BROWN: Sometimes we don't know our concerns until our questions --

MS. GRIGGS: I know. We will play it by ear. Why don't we go -- I don't know if everyone has had an opportunity to sign up to speak or not. If you have not signed up to speak, we will go through the people who have, and those of you who haven't, you can raise your hands.

John Riordan. Would you state your name for the record so that the court reporter can identify you, and she will tell us if she's having any trouble hearing you.

MR. RIORDAN: Okay. John Riordan, and it's like the mayor of Los Angeles, R-i-o-r-d-a-n. And he's not related to me, but maybe way back in Ireland someplace.

I'm coming here as a representative of United Anglers of California and the Dana Point Fishery Enhancement Program which is part of the hatchery program that was mentioned previously.

And I just wanted to thank Edison, the representatives from Edison, for the 3.6 million. It has

come in handy to build a hatchery. It is working. We just released 4200 fish about four weeks ago. 22 inside Dana Point Harbor and 2,000 white sea bass We went down to Pochie Beach and released them. One of those fish with a tag on it showed up on the California Edison plant about two weeks ago. So they do migrate up and down the coast.

So I guess my only comment and wish is that we can go forward and have this artificial reef process take place because the fish need a place to live and that kind of habitat. It does appear to be working.

This is our fourth batch of fish and the largest batch so far. Our grow-out pens are located in Dana Point Harbor near the Harbor Master's office. If anybody would like to take a look at them, usually on Sunday is my day to go down and feed the fish and take care of the pens.

Right now, we are fishless because we released them, and we are waiting for the next batch to come up from the hatchery.

So I'm all for this. I guess I do have some concerns on what the wave action is going to be because, days of my youth, I used to go out there and schlep around on a board. I don't want the waves to go away, but I want the fish to have a habitat.

MS. GRIGGS: Thank you.

The next person is Trevor Rathfon.

MR. RATHFON: Yes. I wanted to ask if there was a kelp deficit from maybe 30 years back in this area. That was my concern, as to whether we are adding more kelp to the area or if there is in fact a deficit due to harvesting or natural circumstances.

MR. DIXON: I will take a crack at that. I'm not sure what you mean by deficit. The fact of the matter is that natural kelp forests come and go. Barn kelp, for example, further south along the beach was one of the most persistent beds around following this '57, '58 El Nino where many, many beds were gone; and then about 20 years ago, it disappeared while the beds were coming on. And I think it was probably 1987, all of a sudden, this whole section of the coast was chock-a-block full of kelp.

And so the -- these kind of temporal and spatial changes are natural events that are probably -- that aren't particularly well understood in any specific. So -- and this area along here is an area that doesn't have the most persistent kelp bed, and those light blue areas that you looked at are areas that where in 18 years, it was a year or two. And so, as far as natural process, I don't know quite what you mean by deficit. But --

MR. RATHFON: Well, if there's been a loss over the last few years, because of harvesting or storms.

MR. DIXON: There's probably been some loss to storms. I don't know about harvesting.

MR. RATHFON: My second question was has there been a study or do you plan to do a study on interdependency of kelp and the sea otter? I know there used to be sea otters in Dana Point, and they had been tried to reintroduce with little success.

MR DIXON: No.

MS GRIGGS: The next speaker is Chris Harrison.

MR. HARRISON: Chris Harrison, resident of San Clemente. I have a few questions. One for the Edison representative. What is the projected shutdown date for SONGS and if -- probably keeps changing, I'm sure.

MR. GROVE: I work in the general office. Maybe I can refer that to the man behind you, Ray. You want to take a hot seat on that?

MR. GOLD: My name is Ray Gold, and I'm the manager of nuclear communications. The San Onofre nuclear plant is currently licensed to operate to the year 2013. As probably most of you, I hope, are aware, we are getting into a new era in the electric and utility industry as restructuring or deregulation of the industry. Between now, 1998, and the year 2003, San Onofre has an exemption in that any electricity regenerate automatically has to be provided to the power exchange where the people will be

buying the power from.
In that time, we are going to be basically writing off the asset, writing off the capital investment that remains on the plant. From 2003 going forward to 2013, San Onofre, like any other generating source, will have to compete in the open market. We don't know what that market will be come 2003.
If it cannot compete, competition will have it. We are not going to operate noncompetitive power. That's basically where it goes.
MR. HARRISON: If the monitoring program is based on the life of the plant in terms of once they shut down the plant, if I understood it correctly, the monitoring program itself is over? Is that -- did I understand that correctly?
MR. DIXON: That's actually a very good --
MR. REED: The plant has been operated since '83. And so say it shuts down in 2003, there will have been 20 years of operation. The mitigation monitoring would go on for the operating life of the plant would be 20 years.
MR. HARRISON: Oh, I misunderstood that.
MR. REED: It's not when the plant shuts down; it's --
MR. HARRISON: How long the plant --
MR. REED: Assume as long as the plant is operating,

the impact is going on while it's operating.
MR. HARRISON: Okay. There was another question. I think I just probably misunderstood the terminology. I believe Mr. Dixon said something about exposed rock. I thought I heard something about 200 meters of exposed rock. Maybe I just don't understand that terminology or --
MR. DIXON: Oh, in the original permit, that required a 300-acre reef, and that's the overall area, and within that area, there was to be 200 acres of actual hard substrate.
That's not the case now. The case now is there will be a reef that will provide 150 acres of kelp. The minimum size of the reef will be 150 acres. Currently, the amount of exposed hard substrate will be 67 percent quarry rock. Based on the experiment, that may be changed to a different material or a different coverage.
MR. HARRISON: Exposed rock, meaning not covered with sand, but definitely up above the water; right?
MR. DIXON: Not covered by sand.
MR. HARRISON: I think this goes with what this gentleman was saying --
MR. DIXON: I see what you mean. They are all relatively small pieces of chunks of rock that would be in the order of, I think, actually run a meter which would

run three feet. Most of them would be smaller than that.
MR. HARRISON: One of my next questions, on the reef, I know you said they were going to go for a single layer. So I would imagine that no more than maybe a meter or two high?
MR. GROVE: Right.
MR. HARRISON: Is there any kind of height limitation that the Coastal Commission has said or has been examined already?
MR. DIXON: The intent is to have a lower reef, and that's understood to be meter or less is the intent.
MR. HARRISON: Meter or less?
MR. DIXON: Undoubtedly, there's going to be places where rock piles are going to be bigger than that, higher than that.
MR. HARRISON: Is the reef going to be protected, special classification, for example, from commercial fisheries if, you know, the fish population soars?
MR. DIXON: No.
MR. HARRISON: It will not have any special designation or anything?
MR. DIXON: We don't plan to do that.
MR. REED: In the long-term, but in the short-term, while the experiment is going on.
MR. HARRISON: There will be.

And if it is determined --
MR. DIXON: Dan will have somebody out there to spear people.
MR. HARRISON: For the experimental reef section, 16.8 acres is the experimental --
MR. GROVE: Yes.
MR. HARRISON: -- amount? If during this experimental period it is determined that it does have negative impacts in terms of -- what do they call that? Onshore flow?
MR. DIXON: Longshore transport of plant --
MR. HARRISON: Yeah, that, and negative impacts on waves, I guess how -- what would be the proposed method of mitigation, I guess, or if this is determined to be an unacceptable side effect of this reef, would it be -- all the material would have to be removed or how would that -- what would happen in a situation like that?
MR. DIXON: Well, as it stands, these are questions that are going to be examined in an EIR process. And there are studies that have been done and studies will be applied to this particular situation.
And if it's determined that there are potential negative impacts, then that changes things, and the commission would have to act on that.
If it's determined that there are no

significant impacts, then there probably would be no plans to monitor. If in the unlikely event -- I mean, I can't imagine, but if this low relief causes some drastic change in wave or current matters in the area that are obvious, I'm sure that it would -- a flashlight would shine on it and things would be done. But based on previous experience, that's probably pretty unlikely in that the studies that are being done on the EIR should point out any sort of magnitude of the effect that you would expect.

MR. HARRISON: Just have one more question. Just get a rough estimate as to the closest distance to shore that the reef will be and most likely the shallowest depth of the water that will be in?

MR. GROVE: Roughly half a mile.

UNIDENTIFIED SPEAKER: Forty feet shallow.

MR. HARRISON: Half mile and 40 feet is the shallowest.

UNIDENTIFIED SPEAKER: So 12 to 14 meters is about 46 feet.

MR. HARRISON: That's it. Thank you.

MS. GRIGGS: The next person is Nevil James.

MR. JAMES: Hello. I'm -- I've been a resident of the community for about 25 years, and I worked at San Onofre for about three and a half years. And also happen to be a member of the Sierra Club.

But out of curiosity, the Phase I prototype reef that you are mentioning that's going to be monitored for five years, does it appear on a portion of the map as it's illustrated there and just where?

MR. DIXON: The -- I believe these are meant to be the sort of markup of where they are going to be. I'm not -- that's not to scale, I don't think, is it Bob?

MR. GROVE: No.

MR. DIXON: But this is to indicate that they are going to be at various distances from the kelp bed and they will be grouped in according to modules.

MR. JAMES: The density of the quarry rock, or whatever is decided on, in the 16-acre prototype reef appears to be from what -- if I am understanding you correctly, is going to be quite spread out and really isn't going to reflect the condition of the Phase II? I mean in terms of the placement of the quarry on the bottom? The quarry rock --

MR. DIXON: That's certainly true because there's going to be two -- the treatments include two substrate types and three coverages, and if it is determined that one of those combinations is best, obviously the other ones won't be how to build a reef.

MR. JAMES: You mentioned that there are have been approximately 30 artificial reefs that have been

constructed over the years in Southern California area?

MR. GROVE: Yes.

MR. JAMES: There's a reef off of Santa Monica, if I am correct, that consists of old Pacific electric red cars dumped up there back in the '60s, I believe. I am assuming there's quite a body of knowledge that's --

MR. DIXON: A lot --

MR. JAMES: -- that can be drawn from the experience, you know, on those reefs. And also with the work of Wheeler North at Cal Tech, oceanographer. I guess off of Catalina Island.

MR. DIXON: Yeah. A lot of those Fish & Game reefs were in quite deep water. And most all of them were designed to be high relief and to be fishing reefs. So there are certainly things that can be learned from them, but there has been a large attempt, as Bob mentioned, at Mission Bay that was sort of inadvertent would probably be the closest of what is being determined here.

MR. JAMES: The damage to the kelp beds that has occurred from the plant has been as a result of the ocean water being heated and returned?

MR. DIXON: No. Actually, the plant was designed to prevent heating of the ocean water. So although it's pretty warm when it comes out the port, it mixes turbulently and very quickly is cooled down. But in order

to do that, you have to move a lot of water, and the water is turbid and so you end up increasing turbidity and reducing like levels over the kelp ports.

MR. JAMES: Okay. Thank you.

MS. GRIGGS: Thank you.

Our next speaker is Wendy Morris.

MS. MORRIS: I had a question about the history of the area. I may be wrong, but please correct me. Did there used to be -- I'm saying in the last hundred years or so. Were there large kelp beds in the area before? It's my understanding there were, but I could be wrong. And if there were, why aren't they there now?

Also, could they be replanted in such a way that they would not need an artificial reef because if they were there prior to this reef, if for some reason they have disappeared from a storm or some reason, why would not -- why couldn't they be replanted out of the artificial reef?

MR. DIXON: Larry, you want to talk about the history there?

MS. MORRIS: These questions I'm asking for the EIR I don't necessarily expect you to answer them right now. I would like to have those included. Along with the -- I'm assuming that all the questions that have been raised so far are going to be addressed in the EIR; is that

correct?
MS. GRIGGS: Yes.
MS. MORRIS: Okay. Because many of my questions have not been addressed.
The one other question I have is how does this affect the whale migration, or will it affect the whale migration, because the whales travel along there?
And how will it affect water quality or have it improve it or make it -- will be a degrading factor?
That's it. Thank you.
MS. GRIGGS: Thank you.
Jerry -- is it Gahan?
MR. GAHAN: Jerry Gahan. San Clemente resident. I just want to clarify something.
You are talking about a reef that would be no closer to the surface than roughly 46 feet deep, and that you might adjust that by one meter at the maximum so that it would be maybe 42 feet from the surface?
MR. GROVE: Yeah.
MR. GAHAN: And that's on all three of the options that you are going to study? So it wouldn't make any difference whether it was option one, two, or three; it will still be a maximum of one meter.
MR. GROVE: If you get up to the 67 percent density cover, the chances are, when the barge drops the rock,

some would pile on top of each other.
MR. GAHAN: Sure. But the engineer of design is that it will be a meter.
MR. GROVE: Yeah.
MR. GAHAN: You know, some of the reefs that -- I'm not real familiar with, but I know there are reefs there that are artificial reefs are at Carlsbad and Oceanside. But both of those cities in the last ten years or so have kind of rough times with the reef. Whether they have anything to do with it or not, have had severe changes in the way the sand is deposited on the beaches, and in fact they have gone out and now had to, you know, transport sand from the Oceanside Harbor to replant the beaches. And I don't know if it has anything to do with the reefs or not, but I mean, that's one of my concerns.
I have less concern now that I know we are talking about a one-meter change than I did before, but I'm still concerned. Carlsbad, in particular Cardiff reef, which is a spot we have gone to a couple times in the last year, and I have yet to go there when there's any sand at all on the beach. You get from the parking lot down to the beach, is solid, not big rocks that would wash up, but the small cobblestones. There's just a lack of sand to cover it up, and I hate to see that happen to our beach.

And I have been here for 35 years, and I've never seen our beaches in bad shape. If we do manage to grow kelp and it breaks up and washes up on the beach, with the city's budget, who is going to clean that kelp up all the time? Because it does. I was here in the early '60s, and there was quite a bit of kelp. But I wasn't here in the '50s. I don't know whether there was or not. But it would wash up on the beach and it was a pretty big mess.
MS. GRIGGS: Thank you. And I just -- for your information, we met with the city, oh, way back in last November when we first got started on this project, and they certainly expressed the same concern that you did. So we are aware of that concern, and it's something that -- as far as the kelp on the beach and cost of cleanup. So it's something that's going to be looked at, and if there's an impact, there would be a mitigation measure to -- to address that.
Tim Brown.
MR. BROWN: My name is Tim Brown. I live here in San Clemente.
Some of the questions I had were asked earlier, but one question I had specifically related to the studies that are going to be conducted is what are they going -- what's going to be done to protect human interference from

the types of studies you are doing? Are you going to have restrictions from access from fishers and divers and that kind of thing to protect the fish? How are we going to do -- how are the studies going to be able to demonstrate how well this is working and actions in the period?
MR. DIXON: There are no plans to prevent access, and even if there were, I don't think it probably could be done. There's no expectation, I think, that there would be more human interference in one treatment than there would be in another. And as a matter of fact, people couldn't even recognize what the treatments were so that the danger of any kind of interference is greatest if it happens to one treatment and not the other one.
If the interference that went on affected all places -- and I don't know exactly what you are thinking about, but perhaps anchor dragging or something of this nature would probably be affecting all of it.
MR. BROWN: My comment in relation to that, if you have a healthy growth with mature population of animals, critters, would it be able to adequately grow, you know? I mean, you are not going to be able to determine when you are not -- what the impacts really are. There needs to be some period of time of keeping -- keeping human intervention away from this so that things have a chance to grow and develop.

MR. DIXON: Well, I suppose under ideal conditions, it would be nice to have it fenced off where you wouldn't have anybody out there. I don't think there's -- that's a plan, and I don't know if it's possible. I can tell you that there were a great many experiments that were conducted at San Onofre and San Mateo over a ten- or fifteen-year period that provided a great deal of information, and there were people out there all the time.

MR. BROWN: I personally would like to see commercial fishing stopped and not -- not where you are going to put the reefs, and I would also like to see some sort of moorings established out there to do private fishing or diving so there would be less anchor dragging, those kinds of things, and damage the marine situation.

I had a question, too, since I am here, what it is that we are addressing tonight. Is it specifically the issues that are raised in the EIS, or do we have the ability to address in total what the SONGS is doing to meet the mitigation requirements? I mean is it just this plan and the -- the impacts associated with this plan or do we have an ability to say we think a plan should be delivered --

MS. GRIGGS: Do you -- I'm not quite sure what you mean when you say -- are you saying the plant?

MR. BROWN: The plan. The plan for, you know,

dumping the rocks out here to establish reefs. There's other ways of establishing reefs. What I'm asking, is this hearing to address the impacts associated with this specific plan or is this hearing to provide input into what might be a superior plan in people's estimation?

MS. GRIGGS: Well, the Coastal Commission has already issued their permit for construction of the reef. So the appropriate time to have posed those questions or had input to the process would have been when they were issuing the permit. Because the permit they issued has spelled out what the plan -- what the plan is going to be, now what the project is going to be.

MR. BROWN: So we are only dealing with environmental impacts with this specific plan?

MS. GRIGGS: That project.

MR. BROWN: I wish that weren't the case, but since that is the case, I would like to make a couple of points.

I think that what I would like to see is the issue of recreation, public service, and socioeconomic effects expanded significantly. I would like to know what the -- I would like the EIS to not deal only with the what you are contending to be or said to be some negative impacts but positive impacts.

What are the benefits associated with increased fish life that would supposedly come from all of this?

Opportunities for recreational scuba diving possibly, and what would those socioeconomic effects be locally here to -- in San Clemente and this general part of the world? And what alternatives could increase the recreational -- the recreational -- recreational potential --

MS. GRIGGS: Benefit?

MR. BROWN: Yeah. Benefit potential associated with the site and what those alternatives would do in terms of socioeconomic impact to the area. Would we be able to have more dive charters, more scuba diving, get some local diving going on here? And what would those impacts be?

And secondly, I would like the report to address what would need to be done to the plan specifically to accommodate that. For instance, I would like to see if you are going to put some reefs out there, I would like to see some diving capabilities out there. Maybe dump a scuba tank -- I mean an old tank, you know, make it a Camp Pendleton dive. Like people go look at an old plant or tank so there are things to look at besides the fish.

That's all I have to say. Thank you.

MS. GRIGGS: Thank you for your comments.

Is there anybody that wanted to make comments that didn't get a chance to sign up? Well, once again, if there are additional comments that you want to make that

you either didn't make tonight because you want more time to think about it, keep in mind that the comment period on the notice of preparation ends on April 8, and feel free to send written comments also if there are other things that -- that you didn't present tonight because we want to hear those.

UNIDENTIFIED SPEAKER: I have a question, how do we get on the list to receive a copy of the document? That's it?

MS. GRIGGS: Sure. Everybody that's signed up. If there's anybody that didn't sign up because they didn't want to speak -- I think everybody in the room spoke or spoke this afternoon. You have to sign up so we can get you a copy of the draft.

Well, I want to thank you all for coming and for your comments and for your attention, and we will see you back here in probably May.

(Meeting concluded 8:28 P.M.)

STATE OF CALIFORNIA)
) ss
COUNTY OF ORANGE)

I, Paula J. Becker, Certified Shorthand Reporter #4453, licensed by the State of California do hereby certify:

That the foregoing scoping meeting was taken before me at the time and place therein set forth and was taken down by me stenographically and thereafter transcribed by computer-aided transcription, and I hereby certify the foregoing is a full, true, and correct transcript of my stenographic notes so taken.

Executed in Dana Point, California, on this 9th day of April, 1998.

CERTIFIED SHORTHAND REPORTER #4453

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Ms Mary Griggs
Project Manager
California State Lands Commission
100 Howe Ave
Sacramento CA 95825-8202

3/15/98

Dear Ms. Griggs,

Re: SCH 98031027

I received a copy of a Notice of Completion for this project (Appendix F.) Since I am a private individual and do not represent any agency, the opinions herein are strictly my own.

It seems to me that Southern California Edison is making a good and sincere effort to replace kelp-producing reefs in the San Clemente area.

I think that the environmental impact of the project would not be of paramount concern. (a) It will take place quite a way offshore, (b) the adverse possible effects may not occur -- some of them seem like worst case scenarios. Has Edison considered the use of tires as an artificial reef? Recycled concrete may be all right, as might quarry rock, but tires, according to my understanding, are quite stable and might not become displaced in the case of storms.

For every environmental goodie there are drawbacks. Should the city and/or state have to remove somewhat more kelp from the beach, that is not a serious problem. Most other drawbacks mentioned were temporary in nature.

Personally, I would approve this plan, with the possible exception of the time frame. Five years before the whole project is completed? It seems to me that a two year test should be sufficient.

Thank you for your interest.

Sincerely yours,

Marlene Carey

SIERRA CLUB, SAN DIEGO CHAPTER
San Diego and Imperial Counties
3820 Ray Street
San Diego, CA 92104-3623

Office (619) 299-1743
Conservation (619) 299-1741
Fax (619) 299-1742
Voice Mail (619) 299-1744
EBBS (619) 299-4018

California State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, CA 95825-8202

Attn: Mary Griggs, Project Manager
Lease of 355 acres of offshore State Lands
Ref: State Lands Commission NOP of March 6, 1998

Dear Commissioners,

The San Diego Chapter of the Sierra Club wishes to express its appreciation for your consideration of our comments on the two artificial reef projects planned for a sea floor area along the City of San Clemente shoreline. We are happy to see that this mitigation requirement is finally moving forward.

It is most important at this stage that the Environmental Impact Report carefully and completely consider any anticipated impacts at all alternative locations. The EIR should consider and study at least two alternative locations for the project in addition to the preferred site. We strongly support the proposed reef construction, as long as reasonable efforts are made to minimize or eliminate all adverse impacts

It is disconcerting to learn that the original 300 acre mitigation requirement for the San Onofre Nuclear Generator Stations (SONGS), has been reduced by 50% when we are also aware that Southern California Edison has collected over $100 million from its rate payers in order to fund mitigation efforts for SONGS.

1) As beaches along northern San Diego County are being depleted of sand, one of our main concerns is how the project will effect littoral currents which carry sand southward and deposit it on these beaches

2) We are also concerned about the preferred project site. It is our understanding that natural kelp is declining in the area off shore of San Clemente We suggest that the studies consider determining the cause of kelp reductions in this area before undertaking the project What will the artificial reef provide, other than added rock and concrete, that is different than the natural conditions?

3) A study should also be provided that would indicate what frequency of extreme wave conditions would move the rock and concrete and possibly wash them on shore.

Our contact persons for this project are:

Joanne Pearson, Co-Chair of the Coastal Committee,
Paul Blackburn, Conservation Coordinator, ...PH# 619-299-1741

We are looking forward to seeing the draft EIR for this project.

Sincerely,

Joanne Pearson
Co-Chair Coastal Committee
Sierra Club, San Diego Chapter

San Diego Oceans Foundation

March 23, 1998

Ms. Mary Griggs, Project Manager
California State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, CA 95825-8202

RE. SONGS Artificial Reef EIR, Notice of Preparation (3-6-98)

Dear Ms Griggs

Thank you for the opportunity to provide comment on the above EIR In general, your check off list seems to be adequate, but you might consider adding economic/jobs, fiscal, solid waste. and vegetation

The design of the project is somewhat nebulous, but it appears that it might involve 200,000 to 400,000 tons of quarry rock and/or concrete rubble The acquisition and movement of these materials could create significant impacts and should be thoroughly analyzed for traffic, air quality, safety (both on land and at sea), and localized effects at the source of the artificial reef materials

Additional considerations should be

1 Cost· benefit analysis for concrete rubble disposal relative to recycling, land fill. and artificial reef·
2 Benthic impacts relative to non-mobile and mobile species.
3 Substrate impacts relative to quarry rock and/or concrete rubble stability, scouring, etc ,
4 Alternatives which should include as a minimum a) other coastal locations. b) deeper areas, c) doing nothing (no project), d) other potential artificial reef materials, and e) other means to achieve the same desired biomass increase and/or ocean benefit,
5 SONGS decommissioning, and
6 Prolonged elevated water temperatures relative to the 4 kelp plants per 100 square meters criterion

If you have any questions, please do not hesitate to contact me

Sincerely yours,

Richard D Glenn, Ph.D
Executive Director

STATE OF CALIFORNIA—BUSINESS AND TRANSPORTATION AGENCY PETE WILSON,

DEPARTMENT OF TRANSPORTATION

DISTRICT 12
2501 PULLMAN STREET
SANTA ANA, CA 92705

March 30, 1998

Mary Griggs
State Lands Commission
100 Howe Avenue Suite 100-South
Sacramento, CA. 95825-8202

File IGR/CEQA
SCH# 98031027

Subject San Onofre Nuclear Generating Station Artificial Reef.

Dear Ms Griggs:

Thank you for the opportunity to review and comment on the Notice of Preparation for the San Onofre Nuclear Generating Station Artificial Reef. The proposed project involves the lease of 355 acres of offshore State Lands for the construction of the San Onofre Nuclear Generating Station An experimental reef of 16.8 acres would be built along the Coast of the City of San Clemente and monitored over a five-year period. Following this, the full mitigation reef would be constructed to achieve 150 acres of persistent kelp beds. Caltrans District 12 is a reviewing agency and has no comment at this time

Please continue to keep us informed of future developments that could potentially impact our State Transportation Facilities If you have any questions, or need to contact us, please call Aileen Kennedy on (714) 724-2239

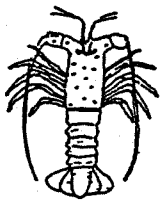
Sincerely,

Robert F. Joseph, Chief
Advance Planning Branch

C Tom Loftus, OPR
Ron Helgeson, HDQTRS Planning

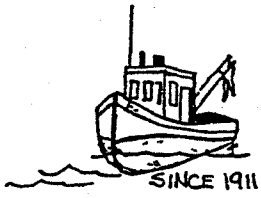
DANA COVE COMMERCIAL FISHERMAN'S ASSOCIATION

1660 CARMELITA ST.
LAGUNA BEACH, CA 92651
(714) 494-3758
April 1, 1998



HONORARY CHARTER MEMBERS

ART POBAR	1911
LORRIN HARRISON	1929
DALE SEAMAN	1950
DAVE TOMPKINS	
BOB LOMBARD	
WOODY PAINE	
HANK BOYD	
PETE TRESSELT	1960
SPANKY AUNGER	



CURRENT VESSELS

FILIBUSTERO	FG30858
RENE GADE	23045
WILD TIMES	35562
CAROL E	39624
T ANN	34443
NORA JEANNE	34993
CON SUERTE	27981
EARLY BIRD	33528
AVISPA	27698
REEL HIGH	40148
HARVEST	40716
EL JEFE	36079
KATIE JO	41182
QUERIDA	32830
MOONSHINER	31741
LESLIE ANN	39544
GOAT FISH	31690
DANA LYNN	23276
BOAT	36768
BLUE MARLIN	31849
PALISADE	40119
SKIFF	39626
SKIFF	38735
SKIFF	08819
SKIFF	39133
SKIFF	40292
SKIFF	46186
SKIFF	42152

Mary Griggs
Environmental Services
State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

Dear Ms. Griggs:

RE: SAN ONOFRE ARTIFICIAL REEF

On March 30, 1998, the Commercial Fishermen of Dana Point met with representatives of the Coastal Commission and the State Lands Management to discuss the proposed placement of an artificial reef in the vicinity of San Mateo Point by the Edison Company.

Based on our discussion, the commercial fishermen are concerned with two aspects of this project. 1) the time schedule for placement of the reef rock and, 2) the proposed location of the artificial reef.

1) Time of Placement

We were informed that the schedule for placement of the artificial reef rock was to be in the first week of October. This timing has the worst impact possible for the lobster fishing industry as the 1998 lobster season begins October 7, and the placement of lobster traps prior to the season begins October 1.

The movement of barges through the fishing area would result in the potential destruction of hundreds of lobster traps. In addition, fishermen would be restricted from fishing this area during the first week or more of the season which is typically the most productive period of the season.

2) Location of Artificial Reef

Based on our fishing experience, we believe that the proposed reef area already has in excess of 50% in area of natural reefs, rocks and ledges. This area is consistently one of the

more productive areas fished by the Dana Point lobster fleet and the sport fishing fleet from this harbor.

We would like to propose two alternate areas for reef placement, either of which would benefit the fishing industry by creating new fishing areas rather than modifying and experimenting in an already proven excellent fishing area.

The proposed alternates are:

A) Adjacent to but just offshore of the proposed reef site. This would require placement of rock in the 50-60 foot depth range instead of the proposed 39-47 foot range.

B) North of the proposed site at the same 39-47 foot depth range. There exists a break in the natural reef from a bearing due south of the end of the San Clemente Pier at 40-50 foot depth trending northwest at this depth to a point offshore of the southeast end of the San Clemente trailer park.

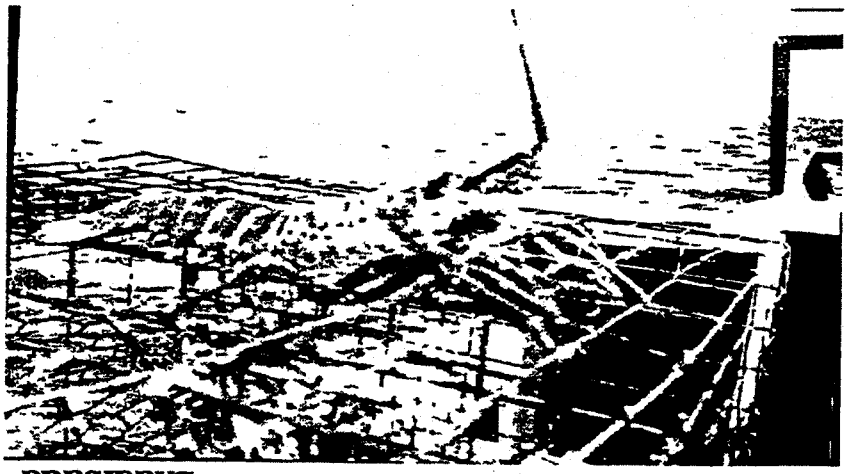
It appears more logical to us to build an artificial reef in an area that would give the fishing industry and the public an increase in the area of fishing grounds instead of modifying existing proven grounds.

Respectfully Submitted,

Pete Tresselt, Secretary

PT/naf Pete Tresselt

copies: Elaine Russell
Phil Unger
Robert S. Grove



California Lobster & Trap Fishermen's Asociation

PRESIDENT
John Guth
2955 Robbie Lane
Vista, CA 92084
760-631-7438

Vice-president
Floyd Corkill
693 Shadowtree Dr
Oceanside, CA 92054
760-967-0967

Secretary/Treasurer
Roberta Corkill
693 Shadowtree Drive
Oceanside, CA 92054
760-967-0967

Mary Griggs, Progject Manager
California State Lands Commission
100 Howe Avenue - Suite 100 South
Sacramento, CA 95825-8208
March 31, 1998

Dear Ms. Griggs,

Thank you for involving us in the location process for the experimental and full mitigation artificial reef. Our Association and its members are concerned with the current proposed location for this reef as discussed on Monday, March 30th at the meeting in Dana Point's commercial fishing dock. Our main concern is that the proposed reef would be located on existing hard bottom and traditional fishing grounds. We understand the criteria for placement of this reef is complex and that a number of conditions must be met in order to improve chances for the reef's success. We do oppose the placement of this reef as long as it doesn't go into an area that is already heavily fished.
With this concern in mind our suggestions would be as follows:
1) Locate the reef Northwest of the San Clemente pier in 42' of water to the Northwest to approximately Pico Street. This would be about the same amount of area as proposed originally
2) Locate the reef directly offshore from original proposed site in the depth of 52-55' thus eliminating the covering of existing hard bottom in the original proposed site.
Either of these locations would be acceptable to the fishermen who work in this area.

Another major concern would be the timing involved in the actual placement of the reef. As you are aware we need to have this work completed before the lobster season starts. Placement of traps begins October 1 and opening day is October 7th, 1998

I personally thank you for your concern in this issue. You made a great impression on the fishermen at the dockside meeting.

Respectfully,

John Guth

John Guth, President
jg/rc

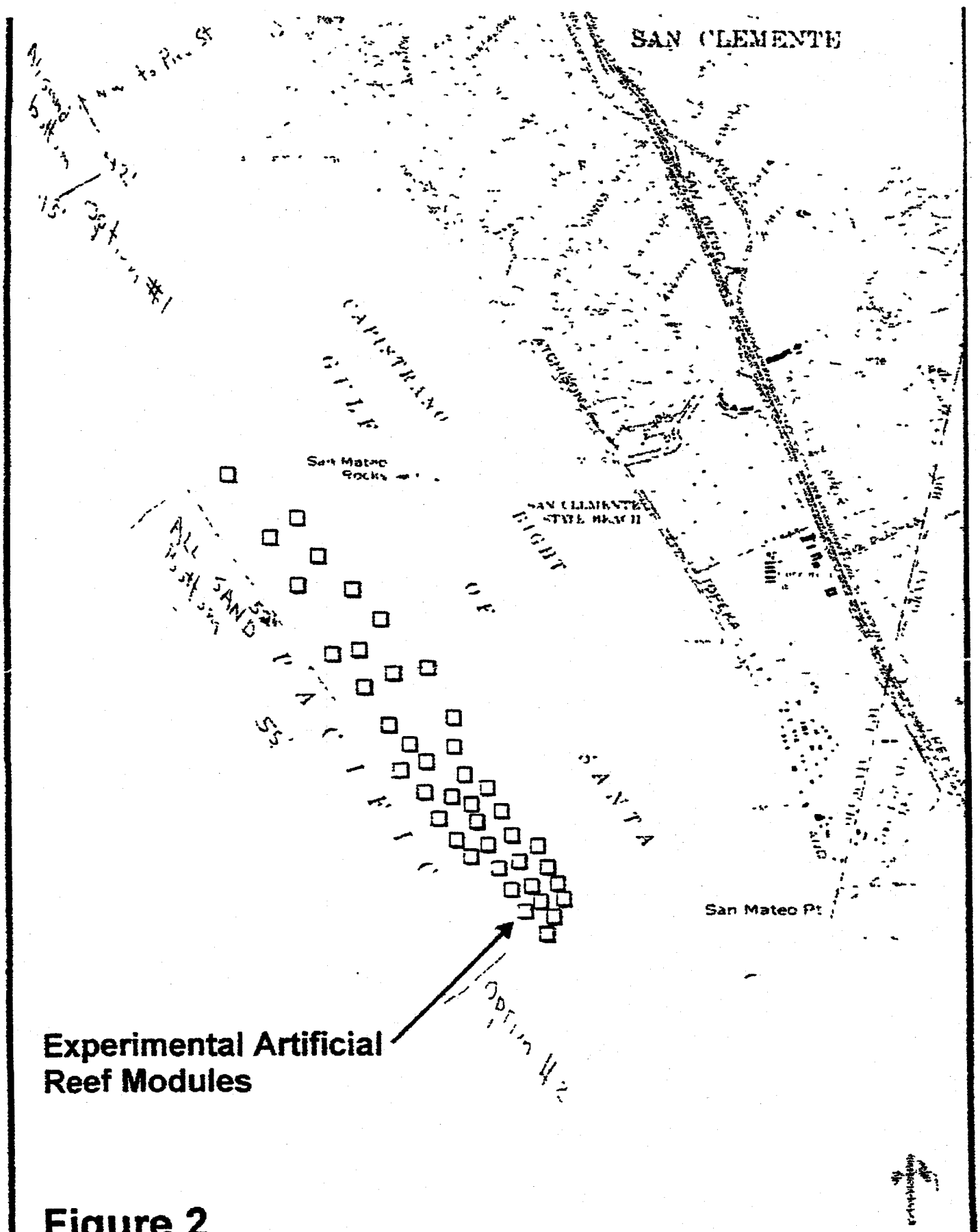


Figure 2
Project Location Map

South Coast
Air Quality Management District
21865 E. Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • http://www.aqmd.gov

March 27, 1998

Mary Griggs
State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

Notice of Preparation (NOP) for An Environmental Impact Report for the San Onofre Nuclear Generating Station (SONGS) Artificial Reef

Dear Ms. Griggs:

The South Coast Air Quality Management District (AQMD) appreciates the opportunity to comment on the above document. The AQMD's comments are recommendations regarding the analysis of potential air quality impacts from the proposed project that should be included in the Draft Environmental Impact report.

Air Quality Analysis

The AQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. The AQMD recommends that the Lead Agency use this Handbook when preparing its air quality analysis. Copies of the Handbook are available from the AQMD Subscription Services Department by calling (909) 396-3720.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the project and all air pollutant sources related to the project. Air quality impacts from both construction and operations should be considered. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment for grading, earth loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment), and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions, entrained dust). Air quality impacts from indirect sources, that is, sources that generate or attract vehicular trips should be included in the evaluation. An analysis of all toxic air contaminant impacts due to the decommissioning or use of equipment potentially generating such air pollutants should also be included.

Mitigation Measures

In the event that the project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures be utilized during project construction and operation to minimize or eliminate significant adverse air quality impacts. To assist the Lead Agency with identifying possible mitigation measures for this project, please refer to Chapter 11 of the AQMD CEQA Handbook for sample air quality mitigation measures. Additionally, AQMD's Rule 403 - Fugitive Dust, and the Rule 403 Implementation Handbook contain numerous measures for controlling construction-related emissions that should be considered for use as CEQA mitigation if not otherwise required.

Data Sources

AQMD rules and relevant air quality reports and data are available by calling the AQMD Public Information Center at (909) 396-3600. Much of the information available through the Public Information Center is also available via the AQMD's World Wide Web Homepage (http://www.aqmd.gov).

The AQMD is willing to work with the Lead Agency to ensure that project-related emissions are accurately identified, categorized and evaluated. Please call Charles Blankson of my staff at (909) 396-3304 if you have any questions regarding this letter.

Sincerely,

Kathryn Higgins for CLW

Catherine L. Wasikowski
Director, Transportation Programs

CLW:KH:CB

ORC980313-06
Control No

Surfrider Foundation

1 April, 1998

California State Lands Commission
100 Howe Avenue
Suite 100 South
Sacramento, CA 95825-8202

Attention: Mary Griggs, Project Manager
Lease of 355 acres of offshore State Lands
RE: Sate Lands Commission NOP of March 6, 1998

Dear Commissioners,

The San Clemente Chapter of the Surfrider Foundation wishes to express its appreciation for your consideration of our comments on the two artificial reef projects planned for a sea floor area along the City of San Clemente shoreline. We are happy to see that this mitigation requirement is finally moving forward.

It is most important at this stage that the Environmental Impact Report carefully and completely consider any anticipated impacts at all alternative locations. The EIR should consider and study at least two alternative locations for the project in addition to the preferred site. We strongly support the proposed reef construction, as long as reasonable efforts are made to minimize or eliminate all adverse impacts.

1) As beaches along Soutnern Orange County and Northern San Diego County are being depleted of sand, one of our main concerns is how the project will effect littoral currents which carry sand southward and deposit it on these beaches.

2) A study should also be provided that would indicate what frequency of extreme wave conditions would move the rock and concrete and possibly wash them on shore.

3) Lastly, a concern is how the project will impact the waves

Our contact person for this project is: Mark Cousineau

NATIONAL OFFICE • 122 SOUTH EL CAMINO REAL, #67 • SAN CLEMENTE, CA 92672 • (714) 492-8170 • FAX (714) 492-8142
www.surfrider.org • E-MAIL surfrider0@aol.com

April 1, 1998

Surfrider Foundation

We are looking forward to seeing your draft EIR for this project.

Very truly yours,

Mark Cousineau
Chair, San Clemente Chapter
President, Surfrider Foundation

cc: Michelle Kremer

NATIONAL OFFICE • 122 SOUTH EL CAMINO REAL, #67 • SAN CLEMENTE, CA 92672 • (714) 492-8170 • FAX (714) 492-8142
www.surfrider.org • E-MAIL surfrider0@aol.com

Frederick Fisheries, Inc.
34298 Camino El Molino
Capistrano Beach, Ca 92624
714-661-7039

April 2, 1998

Mary Griggs
State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

Dear Ms. Griggs:

I would like to thank you for taking time from your busy schedule to meet with the commercial fishermen in Dana Point. We do understand that much time, money and energy has gone into this project. We also understand that the proposed reef is restricted to areas with respect to depths and bottom composition.

We as commercial fishermen are very sensitive about our traditional fishing areas; our area is limited and our livelyhood depends on it. The proposed reef will indeed be a benefit to us, provided it is not put on top of any existing hard bottom.

I hope one of our two proposals will be considered. They are: 1) push the proposed area out to the depth of 50-55 feet, or 2) move up the coast in the same proposed depth to an area between the San Clemente Pier and the south end of the trailer park.

Lobster season is October 1 through March. Any work done at this time would result in a gear conflict with us. However, the months of April through September would not be of any conflict.

Thank you. Please feel free to contact me at any time.

Sincerely,

Paul R. Frederick
President

naf

MARINE FORESTS SOCIETY

California State Lands Commission
Mary Griggs, Project Manager
100 Howe Ave., Suite 100 South,
Sacramento Ca 95825-8202

March 7, 1998

Dear Ms, Griggs,

COMMENTS ON AN EIR FOR SONGS

Please find attached a summary of our views on the preparation of an Environmental Impact Report for the San Onofre Marine Mitigation Program by the Southern California Edison Company.

Also these comments are sent to you by Fax today.

Sincerely

Rodolphe Streichenberger
President Marine Forests Society

P.O. BOX 5843 • BALBOA ISLAND, CA 92662 • USA • PHONE (714) 721-9006 • FAX (714) 721-9509
e-mail: usmfs@marinehabitat.org • url: http://www.marinehabitat.org

Marine Forests Society
April 5, 1998

COMMENTS

for the preparation of an EIR for the SONGS mitigation project

The following comments are a continuation of those presented verbally by the Marine Forests Society (MFS) at the State Lands Commission's meeting held in San Clemente on March 30,1998.

COMMENT 1

DELAYS IN THE REALIZATION OF THE PROJECT

SONGS has been in operation for over 15 years and its industrial activity causes a loss of marine resources which is not yet being offset by the permittee.

Recently, it was officially announced *(Permit Amendment on May14,1997)* that 5 more years are needed for experimentation and another 10 years to determine if the chosen measure of mitigation, an artificial reef for kelp, will indeed restore the depleted marine resources.

Undoubtedly, the Executive Director of the California Coastal Commission (CCC) who decided upon the mitigation for SONGS has made an error Instead of opting for a proven technology, as for example kelp transplants, the CCC Executive Director has chosen the unproven technology of the artificial reef.

After 15 years of nonexistant mitigation and in view of 15 years of uncertainty, it is time to declare, according to CEQA, that the proposed mitigation for SONGS is unfeasible.

CEQA Section 15364, "feasible" mitigation measures are measures which can be "accomplished in a successful manner within a reasonable period of time".

CEQA Section 15126 . Application of the "Rule of Reason ".....A feasible alternativet is one which can be "accomplished within a reasonable period of time,..... ".

> (5) *An EIR need not to consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.*

COMMENT II

RESPONSIBILITY OF PUBLIC TECHNICAL SERVICES

An analysis of the unaccomplished mitigation project must take into account the role and cost of public technical services that the owner of SONGS, S.C. Edison, has paid and continues to pay Regretfully, information on the latter could not be obtained by the Marine Forests Society (MFS) at the March 30, 1998 meeting in San Clemente. The most important decision-makers on the project, the representatives of the Coastal Commission (CCC) and the Department of Fish and Game (CDFG), did not answer the question.

According to CEQA, Section 15003, the EIR process should enable the public to determine the environmental and economic values of their elected and appointed officials.

COMMENT III

THE PROPOSED MITIGATION PROJECT MUST BE REJECTED BECAUSE

1. The use of quarry rock is inappropriate. Quarry rock is a not-to-be-used virgin material and a product of the environmentally destructive mining industry . . .. (destruction of existing land ecosystems) *(see World Watch Institute, Vice President. Al Gore's book "Earth in the Balance", and listen to all environmental groups. Sierra Club, Green Peace, etc).* The CCC's decision to use quarry rock extracted from the nature preserve, Catalina Island appears a provocation to the environmental movement.

2. Quarry rock and concrete will necessitate various heavy equipment (for extraction and/or transportation on land and sea) which will cause significant emission of fuel gas and will add unnecessarily to air pollution

3. The use of quarry rock and concrete will cause the destruction of existing ecosystems on land and on the ocean bottom.

4 The use of quarry rock and concrete will cause significant irreversible environmental changes with unknown effects both to the sea floor and possibly to the sandy beaches.

5. The leaching of chemicals out of quarry rock and concrete in immersion may contaminate marine organisms.

6. The economics of the proposed project are absurd since the cost per kelp plant is estimated at $1,062 00, without guarantee of success. This figure of cost is based on the CCC and CDFG estimate of $178,000 for 160 kelp plants per acre. And, it does not include the cost for the CCC's oversight ($1.9 million) and monitoring ($2.3 million) of the first artificial reef to be built (16.8 acres), which finally will more than triple the cost per kelp plant.

The extravaganza of this superimposed cost contradicts the CEQA "Rule of Reason", and the wish of the people who once wanted the SONGS mitigation to be an example for future marine mitigation in California. If continued as is, the SONGS mitigation will make history only as an environmental fiasco and a financial scandal.

7 Uncertainity in the proposed project. Most surprising is the official declaration of uncertain results. In the 1997 Preliminary Plan, the Permittee, the CCC, and the CDFG note that "*studies did not uncover a specific design that would be certain to support persistent kelp populations*". The fact is that after thirty years of artificial reef building by the CDFG the development of kelp on artificial reefs has always failed. For kelp restoration, the expertise claimed by CDFG agents does not exist

8 The proposed mitigation project was pepared in violation of the law This is explained in the following comments.

COMMENT IV

THE PROPOSED PROJECT HAS BEEN DICTATED

For unsaid reasons, the use of quarry rock and now possibly concrete has been dictated by the staff of the CCC. Warnings against the choice of quarry rock have been ignored by the staff of the CCC.

In its quarry rock decision the CCC staff was supported by the staff of the CDFG Artificial Reef Program Based on unsubstantiated and deceptive reports, the CDFG staff has recommended quarry rock for more than 30 years for the building of artificial reefs, (for fishing, not for kelp) The CDFG agents have written "we believe quarry rock is the best material for constructing artificial reefs" *(CDFG Fish Bulletin 124. 1964),* "Quarry rock was determined to be the preferred reef building material (based on cost and handling) ..." *(CDFG Fish bulletin 146. 1969),* "More recent studies have further substantiated the value of quarry rock, due to its greater potential for colonization by, and production of, food organisms" *(CDFG 1989 "A guide to the Artificial Reefs of Southern California"),* and "quarry rock is the material of choice" *(CDFG K. Wilson, Japan-Us Symposium on Artificial Habitats for Fisheries, in Tokyo, 1991).* These statements were not supported by scientific information.

After 1991, the falsely proclaimed advantages of quarry rock began to be scientifically questionned *(Patton 1991, Ambrose 1991, CDFG 1992, 1993, and 1994)* Then, what had been an exclusive recommendation for quarry rock until 1991, after 1997 became a mixed recommendation including concrete *(CCC Adopted Findings of 1997).*

However, and despite growing concerns, the CCC's staff never considered the use of anything other than quarry rock and concrete.

COMMENT V

ALTERNATIVES WERE OBSTRUCTED

From 1991 until today, the California Coastal Commission (CCC) has continuously ruled mitigation measures obligating the use of quarry rock and recently concrete. The various CCC rulings, amendments, and approvals never complied with the policies and intents of the California Coastal Act of 1976 and the California Environmental Quality Act of 1992 (CEQA). The CCC rulings were distorted rulings resulting from wrong reports and a wrong process of the law.

According to the 1989 Final Report of the Marine Review Committee (MRC), prepared by Dr. Murdoch, Dr. Fay, and Dr. Mechalas, the impact of the SONGS water effluent results in the loss of a kelp resource. This basic finding is not contested and the need to replace the lost kelp has always been agreed upon by permittee, scientists, and public. Nevertheless, the CCC staff never sollicited or even accepted research and discussions on how to replace the kelp other than with an artificial reef built with quarry rock and possibly concrete By misruling and mishandling the kelp mitigation project, the CCC's management has committed a serious mistake. One consequence of this is the non restoration of marine resources for more than fifteen years so far.

However, independant, non-governmental, attempts were made to discover alternatives for the replacement of lost kelp. Among these attempts were the 1991 and 1992 Edison workshops in Long Beach and the 1991 to 1998 MFS research and experimentation offshore from Newport Beach. There is evidence that the independant search for alternatives has been discouraged, obstructed, and sometimes sabotaged by the CCC and CDFG governmental agencies. More serious is that the public grief could not be openly expressed because of fear for retaliation. Blacklisting is a current practice of public agents involved in the proposed mitigation project. It takes some courage to openly oppose the CCC's Executive Director, Peter Douglas, and CCC's Deputy Director, Susan Hansch. Documents and testimonies supporting the above allegations are available.

The above-mentionned wrongdoings by the CCC contradict the law.

See California Coastal Act. Section 30320 "Fairness and Due Process". CEQA Section 21001 (g) "Policy", CEQA Section 15002 (j) "Public involvement" , CEQA Section 15021 "Duty for public agencies", CEQA Section 15126 "environmental impact, ... (d) basic objectives of the project" ... . and other

COMMENT V

THE MFS ALTERNATIVES

Principles of Economy, Certainty, and Reversibility.

In its research of alternatives the MFS was guided by the following principles:

"Economy" Costly mitigations must be rejected because they are not worth repeating in other programs. Economical considerations are as important as environmental considerations.

"Certainty" Uncertain and speculative expectations must be avoided. They are not worthy of lengthy studies and costly experiments.

"Reversibility" Environmental Irreversible changes can ultimately be found counter productive and be deplored. Irreversible mitigation measures have no reason to be selected when reversible measures are available to mitigate adverse impacts It is particularly true for SONGS whose activity is limited in time

Basic objectives.

According to the 1989 Final Report of the Marine Review Committee the basic objectives of environmental mitigation for SONGS are.

(1) the replacement of 20 tons of fish per year, killed by the water in-take system.

(2) the replacement of a 200 acre kelp resource, depleted by the turbid plume of the water out-take system.

The KelpTransplanting Mitigation Option for basic objective (2).

This alternative consists of:

1. Cultivating juvenile kelp in a nursery on land or in open waters.

2. transfering juvenile kelp to a location unaffected by the turbid water plume of SONGS.

3. selecting a suitable sea bottom, either sand or rock.

(a) On a sandy bottom, the juvenile kelp is affixed on a single float anchored in the sand.

(b) On a rocky bottom, the juvenile kelp is affixed on a rock.

The cost of these two different transplanting techniques for kelp is at least ten times or more smaller than the cost of building an artficial reef for kelp with rock or concrete as wanted by the CCC.

The Photosynthesis Option

This alternative consists of building a **Mussel Screen** between the SONGS water out-take and the San Onofre kelp bed.

The SONGS's effluent turbid waters passing through the mussel screen will be cleansed. The cleansed waters passing over the kelp bed will then allow the photosynthesis which is essential to the growth of kelp.

NOTE. The unparalleled water treatment capacity of mussels is well-known. Also the superior biological productivity of a high relief mussel habitat has been demonstrated. The proposed mussel screen will function not only as a water treatment plant but also as a fish production plant.

*A successful mitigation with the proposed **Mussel Screen** would be of immense benefit serving as an example for the cleansing and enhancement of depleted coastal waters.*

COMMENT VI

CONCLUSION

Environmental history is marked by governmental errors. The price to pay by human communities when governmental errors occur is enormous. The environmental disasters which have been inflicted by bureaucrats to people of the Aral Sea and Nile River illustrate how dramatic the abuse of state powers can be

In California, at San Onofre, we deplore the wrongdoings of a few public agents. A program for the restoration of a 200 acre kelp bed and the restoration of 20 tons of fish per year has not ben accomplished in 15 years. 70 million dollars have been wasted and 117 million dollars are now requested for the continuation of this failure.

However, the restoration of the San Onofre marine environment is feasible otherwise. After changing the politics, it can be accomplished in a few years and for less money It is an opportunity for SONGS, with its technical, financial, and human resources, to demonstrate how a marine resource can be restored and how an industry can become an invaluable contributor in the advancement of marine science.

Why should a responsible industry give up its environmental obligations to a state agency at fault?

We hope that these comments will help to protect the California marine environment against adverse impacts of the bureaucracy as well as the industry.

LEAGUE FOR COASTAL PROTECTION

April 9, 1998

Mary Griggs, Project Manager
Califoria State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, California 95825-8208

Dear Ms. Griggs,

The League for Coastal Protection welcomes the opportunity to respond to your publication of the Notice of Preparation of Programmatic Environmental Impact Report (March 6, 1998) and the request for comments on the scope and content of the environmental information and analysis that should be included in the PEIR. We are attaching our detailed comments to this letter.

The League is concerned that although many artificial "fishing" reefs have been constructed they continue to remain controversial because it is not known whether such reefs actually produce fish or only attract fish from surrounding habitats. Few artificial reefs have been constructed specifically for creating a viable, productive habitat to mitigate for habitat losses elsewhere. Because the construction of "mitigation" reefs is still an unproven method we are pessimistic that the proposed artificial reef will actually mitigate for the environmental damages caused by operation of SONGS.

Although we applaud the effort we want to know what is the contingency plan if the experimental reef does not provide the needed answers and, worst case, fails entirely? The proposed alternatives based on location alone are not adequate. We also request that the raw data and interpreted results of the monitoring program be made available to the public regularly, at least on an annual basis.

Thank you for the opportunity to comment on this important project.

Sincerely,

Joan Jackson

1120 CHINQUAPIN AVENUE, CARLSBAD, CALIFORNIA 92008 •
PHONE. 760 729 3261 • FAX. 760.729.3963

These detailed comments are submitted in response to your publication of the Notice of Preparation of a Programmatic Environmental Impact Report (March 6, 1998) and request for comments on the scope and content of the environmental information and analysis that should be included in the PEIR.

1. Please provide a complete copy of the Initial Study

2 Considering the heavy wave conditions that have occurred this winter, any baseline studies should be updated to determine if the thickness of the sand layer at the site proposed experimental reef has increased substantially If the sand layer has increased it might preclude use of this site, especially if the accumulated sand is at a depth beyond resuspension.

3 Please include a detailed description of the proposed construction process for both the experimental reef and the final reef, e.g. number of barges and tugs, number of barge trips, method of anchoring, number of anchors, frequency of anchoring, and specifically how the percentage distribution densities of rock will actually be achieved Pushing boulders off a barge with a bulldozer is unlikely to achieve replicated modules.

4. How will construction of the modules be verified so that module replicates are true replicates. What is the sensitivity of the proposed method of verification? If some of the modules are a disaster will they be rebuilt or will additional modules be constructed?

5 If the experimental reef should prove to be colonized by giant kelp, how will additional modules for the final reef be constructed (i.e maneuver barges and multiple anchors) without destroying the experimental kelp reef?

6 The four alternative sites for the final reef (i.e. Leucadia, Encinitas, North Carlsbad, Mission Beach) should be fully described and treated throughout the EIR (i e. baseline, maps, numbers of modules, impacts, mitigation, expected kelp acreage, etc.)

7 Provide a complete description of the statistical design and analyses that will be used, number of treatments and replicates, and anticipated best and worse case power.

8. What management techniques will be tested on the experimental reef, when during the five year period, and how? For example, what happens if the reef is colonized by sea urchins?

9. If maturation of artificial reefs is so site specific and if the final reef is built at any of the alternative sites, then the outcome of the experimental reef may not be a good indicator of the expected outcome of the final reef, in which case these other sites may not be real alternatives at all?

10. The approach to alternatives should include consideration of some parameters beside location

For example, several of CD&G's fishing reefs could be reconfigured by dispersing the high relief piles to yield lower relief more suitable to establishing kelp.

11 Since this is a PEIR will the State Lands Commission require preparation of a new complete EIR for the final reef project or only a supplemental EIR? Please specify the legal steps for the environmental review procedure.

12 Growth of giant kelp at a density of about 4 plants per square meter is not the only success criterion for development of the persistent, healthy, giant kelp forest. Development of the associated ecosystem (i.e. kelp forest biota) is also important. Please specify the criteria that will be used for assessing development the benthic and fish communities

13 It seems as though the size and density distribution of rocks being proposed is being driven primarily by the goal of establishing kelp. What are the targeted abundances, acreage of benthic organisms, and for which species?

14 Please provide a detailed description of the design of the proposed monitoring program (physical and biological) and how it will be implemented (e g numbers of sample units per module, number of modules per treatment, fixed or random unit areas, etc. For example, how will the monitoring program document actual production of fish?

15. The Mission Beach artificial reef that currently supports giant kelp should be sampled using the proposed monitoring program, as well as any field data accumulated by CDFG to date on this reef, and presented in the PEIR. Mission Beach may be a better site to construct the experimental reef.

16 Construction of at least one experimental module (using the highest rock distribution density) should be done at each of the four proposed alternative sites for the final reef during the experimental phase of the project.

17 Development of kelp on the concrete artificial reef at Mission Beach could be an unrepeatable success. We recommend that the experimental phase should include construction of both a rock and a concrete module adjacent to the Mission Beach artificial reef to test if the proposed methodology and distribution density can at least be repeated at a successful kelp growth site This effort should be included as an alternative in the experimental phase

18 Please identify what natural reefs and kelp beds will be used as reference sites during the experimental phase of the project and why they were selected.

19 How will construction impact migration of gray whales and transit behavior of bottlenose dolphin.

Mary Griggs, Project Manager
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, Ca. 95825-8208

April 5,1998

Please include the following comments on the scope of the Program EIR for the SONGS Experimental and Full Mitigation Artificial Reef.

Given that in the proposed vicinity for the artificial reef there already exists a natural reef and that there used to be kelp beds here in the past, how will the artificial reef provide an environment for the kelp? Would it not be better to plant kelp on the already existing reef?

If after the 5 year life of the experimental reef it is found that none of the different designs provides a suitable kelp habitat will 1) the mitigation reef still be built or 2) the experimental reefs be removed?

What will be done if the reef creates impacts to the beach? These impacts could include sand flow variations, wave projection disruption, debris (rock, concrete, and kelp) within the surf zone and on the beach.

The gray whales migration path is directly through this area. What impacts will the construction, monitoring and existance of the artificial reef have on them?

How will the impacts on ocean water clarity during construction be mitigated?

Thank you for giving me this opportunity to submit my comments.

Sincerely,

Wendy Morris
2310 Plaza A La Playa
San Clemente, CA 92672

Appendix C

San Onofre Marine Mitigation Program: Experimental Reef for Kelp, Preliminary Plan

SAN ONOFRE MARINE MITIGATION PROGRAM:

EXPERIMENTAL REEF FOR KELP

PRELIMINARY PLAN

SUBMITTED TO THE CALIFORNIA COASTAL COMMISSION

Submitted by:

SOUTHERN CALIFORNIA EDISON COMPANY
2244 Walnut Grove Avenue
Rosemead, California 91770

June 16, 1997

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EXECUTIVE SUMMARY

The owners of the San Onofre Nuclear Generating Station (SONGS), which includes Southern California Edison Company, the San Diego Gas and Electric Company, and the cities of Anaheim and Riverside (hereinafter jointly referred to as the "Permittee"), are submitting this Preliminary Plan for an Experimental Reef for Kelp Resources (Plan) to the California Coastal Commission (Commission). This Plan focuses on the design specifications for the various reef modules that will be developed in the artificial reef program. This Plan has been developed with the cooperation of SCE staff and consultants, California Coastal Commission staff, California Department of Fish and Game, and engineers familiar with the construction of offshore rock structures in southern California.

Briefly, Condition II-C, as amended, requires the Permittee to site, design, construct, and test an experimental reef for kelp. The experimental reef will provide significant knowledge toward the science of constructing artificial reefs for kelp and for the materials and design of a larger mitigation reef which in combination with the experimental reef will replace 150 acres of medium to high density kelp and associated ecosystem.

To develop suitable designs for use in the experimental reef program, the Permittee conducted a two-year study involving ecological and geologic field studies, engineering studies, and a review of available data on natural kelp and artificial reefs in Southern California. While these studies allowed the Permittee to focus more narrowly on potentially successful design parameters, they did not uncover a specific design that would be certain to support persistent kelp populations. Therefore, an experimental artificial reef development program has been designed that will answer key questions about how to build an artificial reef that will not become buried in sand and will support a persistent kelp population.

This Plan calls for locating experimental reef sites in the area just north of San Mateo Point at the southern end of San Clemente and just offshore of San Mateo Rocks. This site was selected because it has physical characteristics suitable for kelp, is in relatively close proximity to the San Onofre area, and there are no other uses that would be incompatible with a reef.

The experimental reef will evaluate several different designs to determine which designs are logistically feasible and cost effective means of providing suitable kelp habitat. Specific questions to be addressed include: 1) What coverage by rock will support medium to high density giant kelp (defined as $\geq$ 4 plants per 100m^2) and an associated kelp forest biota that is similar in cover and density to natural reefs within the region? 2) What size of rock will perform best in a reef design where rocks are placed in a monolayer over a thin (approximately 30 cm) veneer of sand? 3) Will reefs composed of recycled concrete perform as well as reefs composed of quarry rock? and 4) Do reefs that are isolated from large kelp populations perform as well as those adjacent to persistent kelp populations? The plan calls for the placement of six types of low-relief reefs, three of which are to be constructed of quarry rock and three constructed of recycled concrete material. All of the reef types will be placed on seafloor that has thin layers of sand covering harder substrates. The three quarry rock designs will consist of scattered rock with a cover of 17, 34, and 67% of the bottom.

The remaining three module designs will be scattered recycled concrete material, again with cover of 17, 34, and 67% of the bottom.

Experimental reef modules will be placed in the region between the San Mateo kelp bed and San Mateo Rocks, a distance of approximately 2.5 km. One module of each substrate type and coverage will be placed within each of seven blocks arranged at progressively farther distances from San Mateo kelp bed. Modules will be evenly spaced within the blocks and treatments (modules with unique combinations of substrate type and coverage) randomly assigned. Care will be taken to ensure that there are no biases in the placement of different treatments with respect to depth, distance from San Mateo kelp, or proximity to natural rock outcrops. Each module will be approximately 40 by 40 m (about 0.4 acres) and will be separated from other modules by a minimum distance of 40 m. The exact coverage of rock within each of the modules will be determined after further consultations with the construction engineers. Preliminary discussions with potential construction contractors have indicated that a uniform monolayer of material will be difficult to obtain. Some piling of material, especially in the high density treatments, can be expected, as well as regions of very low substrate cover. Each module will be placed on thin layers of sand, and no more than 10% exposed rock.

The extent of burial by sand, and the colonization and survival of kelp and other kelp forest biota (i.e. algae, invertebrates, and fish) will be evaluated on each module over a period of a minimum of five years. These data will be evaluated to determine the extent to which exposed substrates persist within each module type, and the effect of substrate type (i.e. quarry rock vs. concrete) and coverage in meeting the performance standards for Condition C: (kelp reef mitigation).

1.0 INTRODUCTION

1.1 Background

Southern California kelp beds, dominated by giant kelp *Macrocystis pyrifera*, host hundreds of species of algae and provide habitat for hundreds of species of fish and macroinvertebrates (Limbaugh 1955, Foster and Schiel 1985, McPeak et al. 1988, DeMartini and Roberts 1990). In addition to the habitat the kelp beds provide, kelp contributes substantially to the food chain both directly and by contributing organic material through the decomposition. For instance, Duggins et al. (1989) showed that over half the carbon in certain predatory fish and birds in a kelp-dominated habitat can be traced to carbon ultimately fixed photosynthetically by kelp plants.

The San Onofre Kelp Bed, located offshore of San Onofre State Beach (33°23' N, 117° 32' W), grows on a cobble-boulder reef which rises off the bottom a moderate extent (1-m over an along-shore distance of about 1 km). There are several cobble-boulder areas in the vicinity of San Onofre. Three areas of special relevance lie adjacent to and southeast of the discharge structures of the San Onofre Nuclear Generating Station (SONGS). Sonar studies of this reef area define a hard-substrate area of 425 acres that on average supports a moderate-density kelp area ($\geq$4 plants per 100 m^2) of 175 acres (this average kelp bed size was calculated from downlooking sonar mapping data collected between Jan. 1982-July 1983). The presence of kelp contributes to a much larger diversity and standing stock of fish than would otherwise occupy this low-relief reef (Quast 1968, DeMartini and Roberts 1990).

SONGS discharges cooling water to the nearshore marine environment and is alleged to have been the cause of adverse impacts, including the loss of kelp habitat. The California Coastal Commission's Permit for SONGS, Condition II-C, as amended, requires the Permittee to locate, design, construct, and monitor an experimental artificial reef for kelp before the construction of the full mitigation reef.

1.2 Purpose Statement and Summary of Preliminary Plan

The purpose of this document is to summarize a plan for an experimental reef program that will answer key questions about how to build a artificial reef that will support a persistent kelp bed. More detailed descriptions of the studies that provide a basis for this Plan are presented in the August 1996 Edison amendment package to the California Coastal Commission. Volume 3 describes in detail the siting and design work and results that lead to this Plan. Also in Volume 3 are presented: Appendix 1, the main text of the 1991-92 geotechnical and biological siting report (Eco-M 1993); and Appendix 2, a summary of siting assessments made in 1993-94. In addition, Volume 3 included Appendices A through E, reprints of the original technical appendices from the Permittee's Siting and Design Specifications Working Report (MEC 1994): Appendix A describes and presents the Geographic Information System (GIS) database of kelp persistence Appendix B contains methods and results of the field studies for this project. Appendix C summarizes data and studies relevant to sediment movement at kelp bed depths. Appendix D analyzes engineering options, and Appendix E presents related work concerning sea fans and substrate disturbance. These siting issues

and the technical work described in these appendices were first submitted to the Commission in December 1994 (letter from F. Melone to S. Hansch, dated December 28, 1994).

1.3 Siting and Design Studies

The Permittee conducted a kelp reef siting and design study that addressed the following questions: 1) where, within the constraints of Permit criteria, could a kelp reef be placed to best ecological advantage; 2) what would be the best design of an artificial reef to support a kelp bed; and 3) what, from a practical engineering viewpoint, is a reasonable approach to this ecologically derived design? The study consisted of four elements: a GIS database, field ecology studies, physical monitoring, and engineering studies.

Siting options were examined by overlaying information on historical kelp abundance, substrate distribution, depth, and human uses in a GIS (Geographic Information System) database (MEC 1994). This analysis led to the selection of an experimental reef site just north of San Mateo Point in the southern San Clemente region. This site was selected based on its physical characteristics, its relatively close proximity to the San Onofre area, and its suitability with respect to other uses. The site had a large area where there was a thin layer of sand overlying rock or other hard substrate within a depth range suitable for kelp, had temperature, light, and wave regimes that appeared suitable for kelp, and was in close proximity to persistent kelp beds (Figure 1). Sites off Camp Pendleton (to the south of SONGS), and at Carlsbad had comparable physical characteristics, but were rejected because of interference with Marine operations (Pendleton) or because of the uncertainties of the effects of nearby wetland restoration and beach replenishment projects (Carlsbad and other north San Diego County sites.)

The Permittee also investigated the appropriate design features for an artificial kelp reef. A two-year study was conducted involving ecological and geologic field studies, engineering studies, and a review of available data on natural kelp and artificial reefs in Southern California (MEC 1994). These studies revealed that existing artificial reefs, most of which are relatively high-relief piles of quarry rock, did not support persistent kelp populations and were often dominated by sessile invertebrates (Table 1). High densities of kelp have been observed on some reefs, but these have only been present within the first several years of reef construction, before reefs become dominated by sessile invertebrates. The few kelp plants observed on older artificial reefs appeared more frequently at the edges than on the slopes and crests of these rock-pile structures. Evidence further suggested that dense populations of sessile long-lived invertebrates (especially sea fans) can out-compete kelp. Furthermore, field investigations indicated that most natural kelp reefs were generally of much lower relief than the artificial reefs. Those natural reefs that supported persistent kelp populations were generally of low to moderate-relief with a moderate amount of sand interspersed among the hard bottom substrate. Very low-relief reefs, with a very high proportion of the substrate covered with sand, did not support persistent stands of kelp. These observations led to the working hypothesis that the development of kelp populations requires moderate levels of substrate scouring by sand that inhibits colonization by sessile invertebrates, but is not so frequent as to preclude colonization by kelp. The Permittee concluded that a successful kelp reef design would be of relatively low relief and would have a moderate proportion of sand-rock interface that would provide intermediate levels of disturbance.

Engineering studies indicated that single rocks placed on thick layers of sand would soon become buried. There are alternative ways of insuring that rocks will not become buried, including the placement of a gravel or filter fabric base prior to placement of reef rock. However, these alternatives are costly. The potential for rock burial can be alleviated somewhat by placing reefs in areas where the sand layer is thin. The placement of rock on thin veneers of sand will be the primary approach in this artificial reef program.

While these studies have allowed the Permittee to focus more narrowly on potentially successful design parameters, they did not provide sufficient information that would allow for development of a specific design that would be certain to support persistent kelp populations. As a result of the remaining uncertainties with respect to reef design, this Plan will provide a test of several alternative designs.

Table 1. Summary of information on southern California artificial quarry rock reefs.

Reef	Year Built	Reef Size (acres)	Substantial Kelp Last Observed	Sea Fans First Observed	Sea Fans Dominant or Abundant	Kelp Condition	Kelp Density > 4 plants/100 m^2
Torrey Pines	1975	1.0	1976-1977	1977	1986	none	no
Pendleton	1980	3.5	Never	1982	1984	few plants on fringe	no
Pitas Point	1984	1.1	1986-1987	1987	?	buried, no kelp	no
Oceanside	1987	3.6	1990-1992	1990	1993	none	no
Pacific Beach	1987	4.0	1990-1992	None[1]	No	few plants on fringe	no
Carlsbad	1990	4.0	1992-1993	None[1]	No	abundant	yes[2]

1 These reefs may not be old enough for the development of sea fan populations.

2 Qualitative surveys in 1993 suggest that kelp density probably exceeded 4/100m^2. However, it is uncertain whether this density will persist as the reef matures.

2.0 THE ARTIFICIAL REEF FOR KELP - A DESIGN EXPERIMENT

2.1 The Experimental Reef Program - Overview

The Permittee's siting studies have resulted in the selection of a site for the experimental reef at the southern end of San Clemente, just north of San Mateo Point. This site was selected because it has physical characteristics suitable for kelp, it is in relatively close proximity to the San Onofre area, and there are no other uses of the site that would be incompatible with a reef. The Permittee proposes to build a series of low-relief substrate modules at this site, with a maximum of sand-rock interface that will approximate the sand-scour disturbance levels present at natural reefs with persistent kelp beds. The proposed reef area is 16.8 acres. This area should be sufficient to test several design concepts, and to provide experimental replication of each concept. We propose a test of the six promising designs discussed in Section 2.3 below. These designs include variations in the amount of rock and recycled concrete placed on a thin veneer of sand. The design will address questions regarding subsidence of rocks in sand, the coverage by rocks that is necessary for persistence of kelp and associated biota, the relative performance of quarry rock versus recycled concrete, and the suitability of sites located over 2 km from large populations of *Macrocystis* as compared to sites directly adjacent to large kelp beds.

2.2 Construction Materials

The Permittee proposes to use both quarry rock and recycled concrete as the material for constructing the different reef modules. There is a long history of reef construction using quarry rock. It is readily available and it has proven to be an environmentally acceptable material for use in reef construction.. However, a recently constructed concrete reef off of Mission Beach has shown promise as a kelp habitat and we propose to test this material for use in building a kelp reef (Dennis Bedford - CADF&G pers. com.).

2.3 Reef Design Detail

The experimental reef will evaluate several different designs to determine which of these will provide suitable kelp habitat. This study will focus on the following questions: 1) What coverage by rock will support medium to high density giant kelp and an associated kelp forest biota that is similar in cover and density to natural reefs within the region? 2) What size rock will perform best in a reef design where rocks are placed in a monolayer over a thin (approximately 30 cm) veneer of sand? 3) Is there a significant difference between reefs composed of recycled concrete and those composed of quarry rock? and 4) Do reefs that are isolated (i.e. ≥ 2 km away from a large kelp population) perform as well as those that are adjacent to persistent kelp populations?

The plan calls for the placement of six types of moderate to low-relief reefs, three of which will be constructed of quarry rock and three of recycled concrete material. All of the designs are to be placed on thin layers of sand and will consist of scattered rock or concrete that will cover 17, 34 and 67% of the bottom respectively. The highest cover of rock will use 5,685 tons/acre to provide 67% coverage (Table 2). This rock will be normal quarry stone which will have primarily 30 cm stones and 60 cm boulders with some 1 m boulders seeded into the mixture. Table 3 summarizes the

weights of different size rocks from two quarries on Catalina Island. Coverage is calculated assuming a 1 m boulder has a cross-sectional area of 0.89 m^2 (average of cross-sectional areas of a 1-m cube and a 1-m sphere), a 60 cm boulder has a cross-sectional area of 0.32 m^2, and a 30-cm stone has a cross-sectional area of 0.08 m^2. The 67% coverage figure can be achieved using 21, 75 to 125 cm boulders; 67, 50 to 75 cm boulders; and 336, 15 to 50 cm stones per 100 m^2. Tonnage is based on rock from the Pebbly Beach quarry on Catalina Island which has a specific density of approximately 2.7.

Studies on the survival of young *Macrocystis* sporophytes by Dean (1985) showed that survival rates were highest on boulders greater than 30 cm in size. The habitat for giant kelp, therefore, appears to be defined, in part, by this size of substrate. The substrate coverage provided by the 67% cover of quarry rock, with over 201 boulders greater than 30 cm in diameter per 100 m^2, therefore provides potential habitat more than 46 times the number of attachment sites necessary to support a density of 4 kelp plants/100 m^2. This density is a common kelp density used to portray a viable kelp bed. The 34% cover design with 2,843 tons of rock per acre will provide approximately 44 boulders per 100 m^2. The lowest cover of 17% will provide approximately 22 boulders per 100 m^2.

The recycled concrete material has a lower specific gravity than the Pebbly Beach quarry rock, 2.2 (Oberg et al. 1984) versus 2.7, and, therefore, the same tonnage of material will cover more area. For the 67% coverage, 4,632 tons of material per acre will be required, the 34% coverage will require 2,316 tons per acre, and the 17% coverage will require 1,158 tons (Table 4.) This recycled concrete will most likely be "curb and gutter" material from construction projects which is generally three to six inches thick with no rebar. The average size of the pieces is two by three feet. There is a large stockpile of this material at Vandenburg Airforce Base which may be available for the cost of transporting the material to the reef site. Material can also be obtained from material brokers who would accumulate the material at a storage facility until sufficient material is available for constructing the reefs. One broker estimated that it would take three to four months to accumulate sufficient material for the full mitigation reef.

Table 2. Proposed coverage for three reef designs based on quarry rock

Design	Rock/Acre (short tons)	Cover of Substrate (% Rock)	Approximate number of boulders (> 30 cm) per 100 m^2
Scattered Rock Low Density (SRLD)	1,421	17	22
Scattered Rock Medium Density (SRMD)	2,843	34	44
Scattered Rock High Density (SRHD)	5,685	67	201

Table 3. Weight of rock from the two Connolly-Pacific quarries on Catalina Island

Rock Diameter (cm)	Pebbly Beach Quarry Weight (lb.)	Empire Quarry Weight (lb.)
30	165	148
60	1,320	1,182
100	4,455	3,991
130	10,000	9,400
160	20,600	18,400
200	35,600	32,000

Table 4. Proposed Coverage for three reef designs based on recycled concrete

Design	Material/Acre (short tons) [1]	Cover of Substrate
Recycled Concrete Low Density (RCLD)	1,158	17 %
Recycled Concrete Medium Density (RCMD)	2,316	34 %
Recycled Concrete High Density (RCHD)	4,632	67 %

[1] This estimate is based on the average ratio between the specific ratio of concrete and Pebbly Beach quarry rock. Differences in the composition of the recycled concrete, both in size of the material and density, may cause the amount of material required to produce the desired coverage to vary from this estimate.

Table 5. Technical specifications for quarry rock reef designs

	Low Density	Medium Density	High Density
Rock Size (Range)	15 - 125 cm (6 - 50 in)	15 - 125 cm (6 - 50 in)	15 - 125 cm (6 - 50 in)
Rock Size (Mean)	50 - 75 cm (20 - 30 in)	50 - 75 cm (20 - 30 in)	50 - 75 cm (20 - 30 in)
Coverage by Rock	≥17%	≥34%	≥67%
Rock Distribution	Dispersed	Dispersed	Dispersed
Reef Height (Maximum)	1.25 m (50 in)	1.25 m (50 in)	1.25 m (50 in)
Reef Height (Avg. Max./100 m^2)	0.5 - 1 m (20 - 40 in)	0.5 - 1 m (20 - 40 in)	0.5 - 1 m (20 - 40 in)

Seven treatment blocks containing one module of each treatment (unique combinations of low, medium, and high density scattered rock and recycled concrete designs) will be placed in the region between the San Mateo kelp bed and San Mateo Rocks (Figures 1, 2, and 3). This site has been chosen after careful consideration during the two year siting and design study (MEC 1994), and has been judged to be acceptable by Coastal Commission staff and the California Department of Fish and Game. The blocks within which modules are to be placed were laid out in successively greater distances to the north from the San Mateo Kelp bed. This design will help to insure that most modules are near to the source of kelp spores at San Mateo, yet allow for the complete coverage of the potential reef area. Clustering most of the modules nearer the kelp bed will help offset any potential effect of distance from natural kelp beds on the recruitment and survival of kelp on the artificial reefs, and help to insure that there is sufficient statistical power to distinguish potential differences between quarry rock and concrete, and between different densities of rock.

Modules will be placed within a depth range of 12 to 14.5 m, and spaced as evenly as possible within each block. Areas of hard substrate will be avoided. Treatments were randomly assigned to modules within each block, and then reassigned if there were apparent biases in their placement with respect to depth, proximity to the San Mateo kelp bed, or proximity to naturally occurring reef outcrops.

Each module will measure approximately 40 m by 40 m and will cover about 0.4 acres. Each module of the six reef designs will be the same shape and configuration in order to facilitate comparisons between the reef types. We envision that the modules will be roughly triangular to trapezoidal in shape with an area of 0.16 ha. A major factor determining the final shape will be the logistics of offloading the rocks and concrete from the barges in a manner that is both cost effective

and capable of being replicated from module to module. The exact reef shape and distribution of substrate will be finalized in further discussions with the construction contractors.

2.4 Pre-Construction Site Assessment

The preferred site for the experimental reef was chosen as part of a very rigorous siting and design study as summarized in Section 2.1. A preliminary survey has been made of approximately 20 of the selected module locations. These surveys have been designed to characterize the sites with regard to sand thickness and the presence of sensitive biological communities. Coordinates were selected that marked the southwest corner of each of the preliminary module sites. Diver surveys were then conducted on 30 m long transects extending east from this location and a site approximately 30 meters north of this location. This configuration provided maximum coverage of the module site location. The divers noted all epibenthic invertebrates, algae and fish within 1 m of each side of the transect and determined the sand thickness at 5 meter intervals along the transect. Sand thickness was determined with a 1 m long steel rod (1 cm thick) to a resolution of 10 cm.

A total of 48 potential experimental reef sites have been surveyed within the last two months in the siting studies. The invertebrate communities on the sand substrates have consisted primarily of *Diopatra* (maximum density 10 per m^2) and scattered individuals of *Renilla*, *Stylatula*, *Astropecten*, *Kelletia*, and *Olivella*. Individuals of the nudibranch, *Flabellina*, the brachyuran crabs *Loxorhychus* and *Randallia*, the seastar, *Patiria*, and the heart urchin, *Lovenia*, were also noted. No individuals of the sand dollar, *Dendraster*, or the urchin, *Lytechinus*, were noted on any of the transects. Organisms on the scattered boulders noted in the surveys included the red algae *Acrosorium*, *Gigartina*, and *Gelidium*; and the brown algae *Desmarestia*, *Laminaria farlowii*, *Pterygophora*, *Macrocystis*, and *Cystoseira*. Invertebrates on these hard substrates included the seafan, *Muricea*, various bryozoans, tunicates, and sponges. Densities of organisms from these transect studies are now being compiled and will be presented when all module sites have been surveyed. In addition, more detailed species lists from previous studies in this region are being summarized.

Module sites that had an average sand thickness over 0.5 meter have been relocated and will be re-surveyed within the next month. Surveys of historical, archeological, and paleontological resources within the region are also being conducted.

2.5 Construction Phase Scheduling and Permitting

The schedule for completing the construction of the experimental artificial reef is dependent on a number of factors. These include the time required: 1) to receive Commission approval of the site and design, 2) for permitting, 3) to select contractors, and 4) the construction of the reef itself. The California Department of Fish and Game has obtained the necessary State and Federal approvals for many (over 30) artificial reefs, of varying sizes from less than one acre to over 200 acres. The Department of Fish and Game typically builds reefs at a 3 or 4 acre size, but they permit them to allow for future possible expansion. Therefore, the Permittee's proposed 16.8 acre experimental reef for kelp is of a size that should allow for a negative declaration prepared in

accordance with CEQA as done in all previous reef permitting situations in Southern California. The proposed reef will be built from the same materials and in a similar habitat type as previous artificial reefs. The Permittee, therefore, expects environmental impacts of this reef to be no different than for previously built reefs. Therefore, obtaining a negative declaration is likely. Assuming the Commission approval can be obtained by July 1997, and that a negative declaration can be prepared within 6 months (in lieu of an Environmental Impact Report), the Permittee would be ready to select contractors and award a contract by the first quarter of 1998. Reef construction can then begin during the second quarter of the year and the reef will be completed within one year of approval of the permit by the Executive Director.

Based on discussions with contractors with experience in building reefs and other structures in the coastal zone, the Permittee believes a 6 month period to award a contract for construction and completing the reef would be the minimum realistic time involved. It should be noted that the construction contractors have indicated that the late summer and fall may be the best time to construct the reef because of calmer sea conditions and better visibility for diver surveys of the rock placement.

2.6 Post-Construction Site Assessment

Post-construction surveys will be conducted for three purposes. 1) To insure that the reefs were built to specifications, documenting the module shapes, locations, and substrate coverage, 2) As a baseline to assess each reef design with respect to their persistent physical attributes, how their substrate characteristics change over time, and 3) As a baseline to compare designs with respect to biological communities that colonize the reef.

A survey of the physical characteristics of the reef will be completed immediately after construction, as weather permits. This will consist of a side-scan sonar survey of substrate distribution at the site and a diver survey to examine finer scale bathymetric and substrate features. The surveys will be conducted using a Global Positioning System so that maps can be produced that have horizontal positioning accurate to 5 m or less.

Diver surveys will document the substrate type and the height of the substrate above the sea floor. In addition, the Permittee will perform video transects and note any organisms on the transects. The position of each transect will be marked for future observations of community development.

2.7 Reef Monitoring and Evaluation

The reef designs described in the previous sections will be field-tested for both biological and physical performance over a period of at least 5-years. This time period will begin to provide information to assess the effects of severe storm events that are likely to affect the subsidence of rocks. It will also begin to provide sufficient time for the normal developmental processes that lead to a mature biological community.

The final specifications for the mitigation reef will be determined by the results of the experimental reef program. Southern California Edison, therefore, is very interested in having the best possible design of the reef monitoring program. The specific questions that SCE anticipates will be addressed by the monitoring program are:

1. Do the designs provide stable, exposed hard substrate (do the rocks sink or get covered with sand)?
2. Will the reefs support kelp with an average density of greater than 4 plants/100m^2?
3. Are the reefs likely to become dominated by sessile invertebrates that exclude kelp?
4. Is the distance from a large and persistent kelp population a significant factor in the development of kelp populations on the artificial reefs?
5. Is there any effect of local physical conditions on the recruitment success of kelp populations?
6. Are the reefs likely to support an algal, invertebrate, and fish community typical of area kelp beds?

The experimental reef program has been designed through cooperative workshops and interaction between scientists representing SCE, the California Coastal Commission, and the California Department of Fish and Game to address the above questions which are critical for building a successful artificial reef for kelp. Specific components of the reef design are to be used to address the questions listed above. For example, the effects of distance from a large kelp bed (question number 4) will be addressed primarily by comparing the biological performance (e.g. kelp recruitment and survival) on reefs near San Mateo Pt. as compared to those further upcoast in the vicinity of San Mateo Rocks. The San Mateo Rocks area is approximately 2 km north of the San Mateo Kelp Bed. The different potential experimental designs and statistical analyses to address each of the above questions are summarized in Appendix 1. The final Monitoring Plan will be developed by the Coastal Commission staff with interaction and review by all interested parties.

3.0 References

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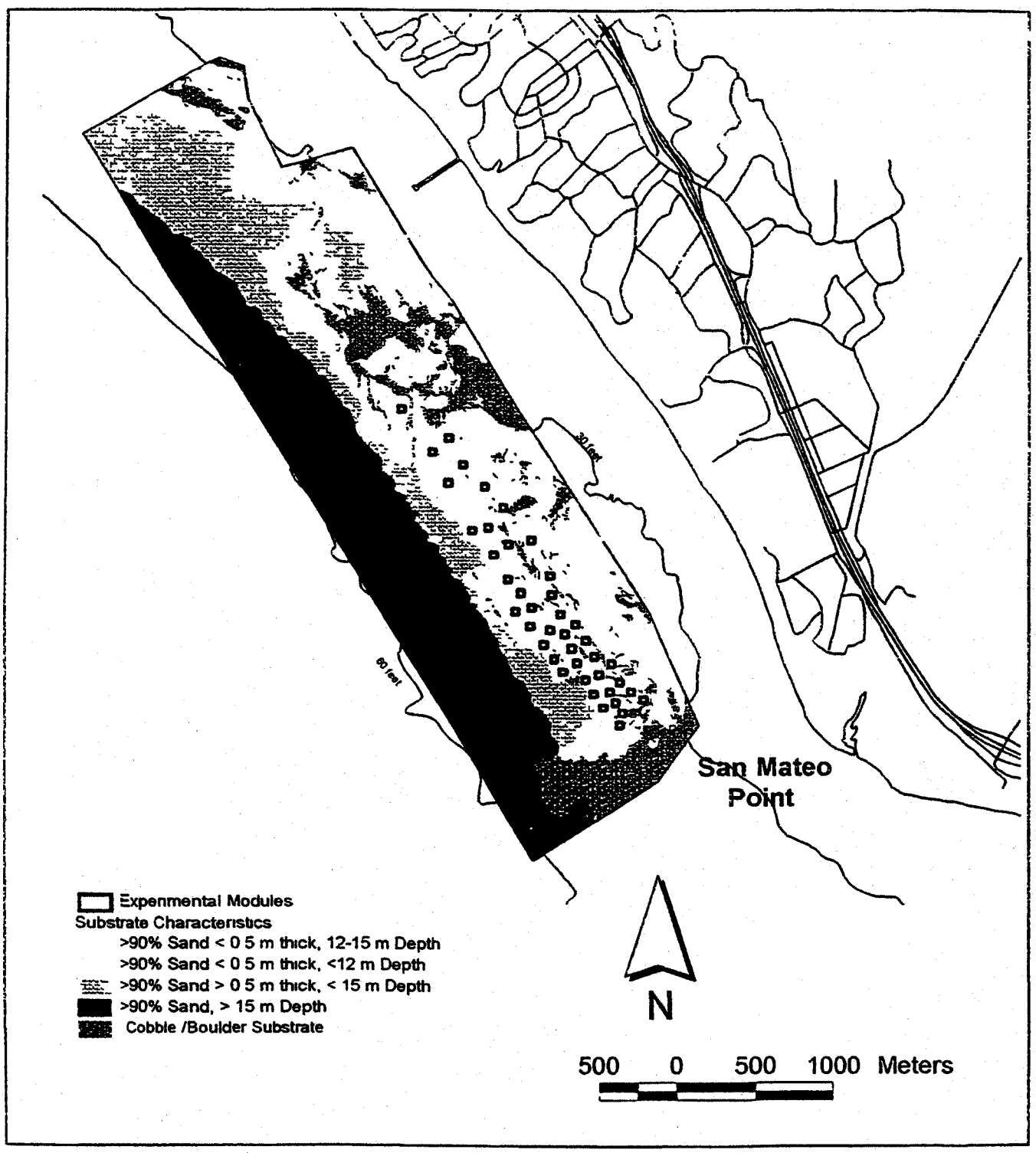

Figure 1. Placement of experimental reef modules in relation to entire geophysical mapping area

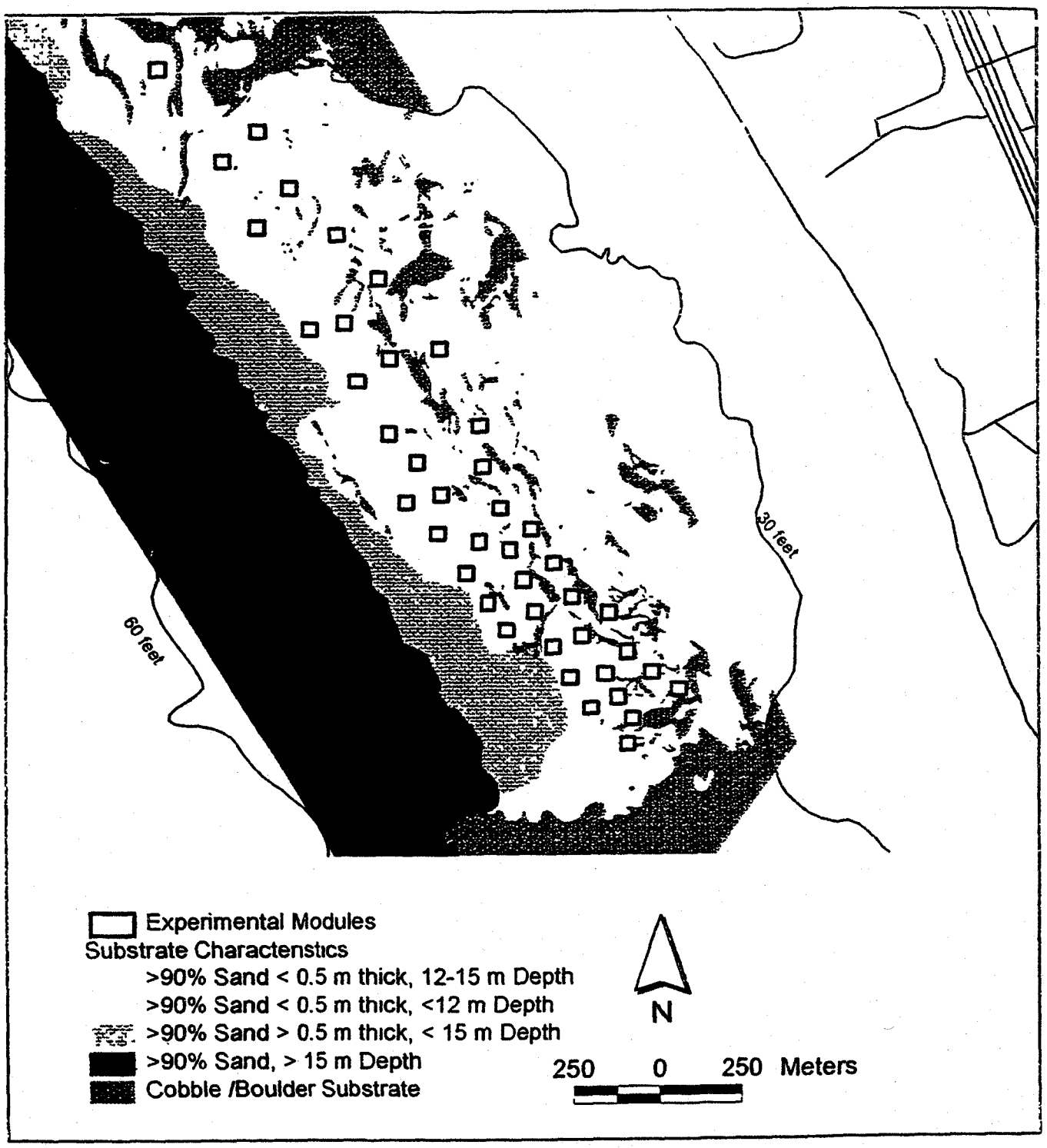

Figure 2. Detail of area with all experimental reef modules.

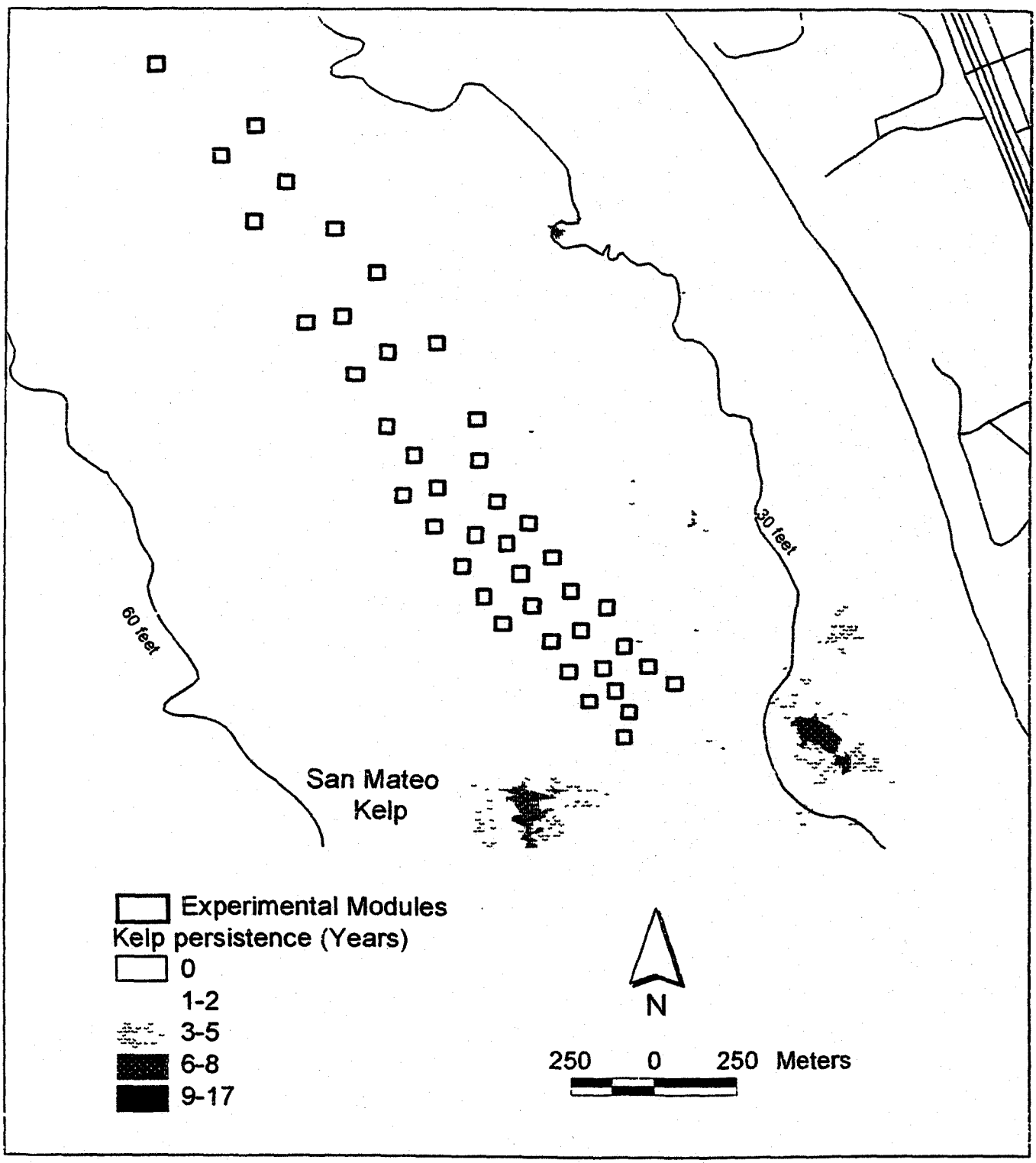

Figure 3. Positions of experimental reef modules in relation to kelp persistence (years of kelp presence in period from 1967 to 1994).

Appendix 1. Edison's Suggestions for the Design of the Experimental Reef Monitoring Program.

Critical questions to be answered by the experimental reef program.

1. Is the substrate stable?

Twice yearly diver surveys will be conducted on each module. The first measurements will be made immediately after the rocks are placed on the bottom. Divers will evaluate the percent cover of sand and sand thickness along two permanently marked transects on each module. In addition, divers will conduct quantitative observations on the boundaries of each module to assess possible burial and scour patterns. The question of substrate stability will be addressed independently for each design by comparing patterns of substrate cover over time.

2. Will the reefs support kelp?

The ability of reefs to support kelp with an overall density of greater than 4 plants/100m^2 will be tested by monitoring the density and survival of naturally recruited kelp on each module, and by examining survival of transplanted juvenile kelp. Diver surveys of naturally recruited kelp will be conducted twice yearly along permanently established transects on each reef module, and on a nearby natural "reference" site within the San Mateo Kelp bed. Juvenile kelp will be transplanted to reef modules within the San Mateo Pt. area, and to a nearby natural "reference" site as well. Density of naturally recruited plants, and survival of the transplanted juveniles will be compared among module types.

We will test the statistical hypothesis that kelp recruitment and survival does not differ between reefs of different rock density or concrete material using an ANCOVA. This analysis will be especially important if there is a great deal of variability in the material coverage between modules.

3. Will reefs become dominated by sessile invertebrates?

The likelihood of dominance by sessile invertebrates will be examined by monitoring the density of *Muricea*, and other sessile invertebrates (e.g. *Cryptoarachnidium* and *Bugula*) on each module on a yearly basis. In addition, the survival rate of transplanted sea fans (*Muricea californica*) will be monitored on modules near San Mateo Pt. Density of naturally recruited sessile invertebrates, and survival of the transplanted sea fans will be compared among module types. The statistical hypothesis that density and survival do not differ between reefs of different rock density or reef material can be tested using an ANCOVA.

4. Can areas distant from a large and persistent kelp bed support kelp?

Nearshore areas in southern California suitable for kelp reefs may be very limited if the reefs need to be constructed adjacent to large kelp beds. Areas adjacent to kelp beds may be more successful because they are closer to a source of kelp propagules and they may be less vulnerable to grazing by fishes. The ability of reefs distant from a large kelp bed to support kelp populations will be

tested by comparing the reef modules near San Mateo Point with those located near San Mateo Rocks. The reefs near San Mateo Point will be adjacent to adult populations of *Macrocystis* that will provide a good source of zoospores which are required for recruitment of new individuals. The reefs located near San Mateo Rocks will be over 2 kilometers from large populations of adults. This increased distance from adult plants may restrict the number of zoospores reaching these reefs and lower the probability of successful recruitment. Distance from spore source will used as a covariate in the ANCOVA comparing kelp performance of the two substrate types.

5. Is there any effect of location on the recruitment success of kelp populations?

The effect of local physical conditions will be examined by comparing the survival of outplanted gametophytes and transplanted juvenile sporophytes on the scattered rock modules at San Mateo Pt. and San Mateo Rocks. The success of transplanted populations will be used as an indicator that physical conditions are suitable for the development of stable kelp populations. This evaluation will also help provide better control for the experiments outlined in Question 4. The statistical hypothesis that survival and growth of outplanted and transplanted kelp do not differ between reefs at San Mateo Pt and San Mateo Rocks will be tested using a paired t-test.

6. Will the reefs support a typical community?

The density of invertebrates, *Macrocystis* and other algae, and fish will be determined in annual surveys. A random sampling will be conducted for each reef module, and at nearby sites within the San Mateo Kelp forest. Large invertebrates (e.g. sea urchins and sea stars) and fish will be counted on 2 random transects per module. Algae will counted in quadrats (0.25 m^2 to 1.0 m^2) placed at regular intervals along the transects. Densities can be compared among reef designs using an ANCOVA.

Appendix D

Adopted Findings and Conditions Permit Amendment and Condition Compliance: Executive Summary

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Guide to Reading this Report

This is a complex permit and a complicated amendment package involving a project with a long and involved history. All this makes for a large and detailed report. To make reading this report a manageable task we suggest the following steps:

1. Read the **Executive Summary.**
2. Focus on the **Summary Table** in this Executive Summary. This Table provides a summary of:
   - The 1991 Commission conditions — the existing mitigation package.
   - The permittee's proposed amendments.
   - The Commission's adopted package of conditions.
   - Permittee's progress on condition compliance.
3. Review the Table of Contents which provides a guide to locating the approved conditions, the findings, and the supporting materials, correspondence, and Appendices.

EXECUTIVE SUMMARY

Southern California Edison (SCE)(the permittee) as majority owner and operating agent sought to amend the coastal development permit for the San Onofre Nuclear Generating Station (SONGS) Units 2 and 3. The permittee submitted an amendment package that contains numerous significant revisions to the conditions that were adopted by the Commission in 1991 to mitigate the adverse impacts of the power plant on the marine environment. The permittee's submittal also included for Commission review the preliminary plans intended to comply with the conditions as revised by the permittee. In its August, 1996 application, the permittee asked that the Commission consider the entire submittal as one amendment package.

On April 9, 1997, the Commission:

1. Adopted a resolution approving amended conditions as revised by the staff recommendation and by the Commission, and

2. Adopted a resolution: (1) rejecting the preliminary plan for San Dieguito Wetlands; (2) rejecting the preliminary plan for Ormond Beach Wetlands; and (3) approving the preliminary plan for the experimental kelp reef.

Although the Commission adopted a resolution approving amended conditions, most of the permittee's proposed revisions are not included in the amended conditions. The effect of the Commission's action is to deny most of the revisions proposed by the permittee on the ground that they are inconsistent with the Coastal Act. However, since the permittee submitted one amendment package and because the Commission approved some revisions to the conditions, the resolution the Commission adopted is structured as an approval of amended conditions.

The amendments approved by the Commission are primarily to Condition C–Kelp Bed Mitigation. The revisions reflect that the size of the mitigation kelp reef required by Condition C can be reduced, although not to the degree proposed by the permittee, consistent with the Coastal Act. The Commission found that the permittee's proposed revisions to Condition A–Wetland Mitigation and Condition D–Monitoring and Oversight would result in inadequate mitigation of the impacts of SONGS Units 2 and 3. The only revisions to Condition A that the Commission approved are the establishment of new deadlines for condition compliance, the allowance of up to 35 acres of partial credit for permanent inlet maintenance at San Dieguito, and the addition of a trust fund option to implement the wetland project. The only revision that the Commission approved for Condition D is the addition of a trust fund option that would enable the permittee to pay a specified amount of money into special accounts to enable all the permit conditions to be implemented by third parties.

The Commission denied the permittee's preliminary plans for wetlands restoration at San Dieguito and Ormond Beach. The plan for San Dieguito was rejected because the owners/managers of most of the property identified in the plan had withdrawn their authorization to use the land. The Ormond Beach plan lacks sufficient detail to evaluate its consistency with Condition A. Finally, the Commission conditionally approved the experimental kelp reef plan.

In summary, the Commission found that most of the permittee's proposed amendment package as submitted does not fully mitigate impacts to the marine environment caused by the construction and operation of SONGS Unit 2 and 3, and is therefore not consistent with the Coastal Act. The approved conditions incorporate elements of the permittee's submittal that are consistent with the Coastal Act, and retain most major elements of the 1991 conditions. The Commission adopted findings that deny the plans submitted in compliance with Condition A–Wetland Mitigation, and findings for approval for the experimental reef plan to implement a portion of Condition C–Kelp Bed Mitigation.

The Summary Table in this Executive Summary provides a compilation and comparison of the 1991 permit conditions, the permittee's requested amendments, key components of the Commission's approval, and the permittee's progress towards full condition compliance.

HISTORY AND BACKGROUND

In 1973, the California Coastal Zone Conservation Commission (CCZCC, now the California Coastal Commission) denied a permit for the construction of SONGS Units 2 and 3. In 1974, the Commission approved a permit for the construction of the SONGS Units 2 and 3 with conditions that:

1) established a three-member independent Marine Review Committee (MRC) comprised of members appointed by the Commission, the permittee, and an environmental coalition that had opposed the project, to carry out a comprehensive field study to predict and measure the impact of the SONGS on the marine environment; and

2) authorized the Commission to require the permittee to make future changes in the SONGS cooling system (as extensive as the installation of cooling towers) to address adverse impacts to the marine environment identified by the MRC.

The 1974 coastal development permit authorized the construction and operation of SONGS Units 2 and 3 prior to a complete analysis of, and mitigation for, marine resource impacts. In 1979, based on recommendations from the MRC, the Commission recognized that compensatory mitigation measures could be appropriate in addition to, or in-lieu of, changes to the SONGS cooling system (e.g., mitigation by avoidance, such as cooling towers).

In 1989 the MRC submitted its final report and recommendations. The recommendations in the MRC Final Report (concurred with by the permittee's MRC representative) documented significant impacts to fish populations in the Southern California Bight, and to the San Onofre kelp bed community. The MRC's Final Report also included recommendations for mitigating adverse impacts to the marine environment caused by the SONGS.

The 1974 permit is still in full force and effect, and its conditions gave the Commission the authority in 1991 to further condition the coastal development permit to require the existing comprehensive mitigation package based on the findings and recommendations of the MRC.

The Commission's Adopted 1991 Conditions

The Coastal Commission staff presented a recommended mitigation package (based on the MRC's comprehensive study and final report) to the Commission at a public hearing on July 16, 1991. The Commission concluded that a compensatory mitigation program was the most cost-effective means of dealing with the impacts of SONGS Units 2 and 3. The Commission found that because costs would be lower, and unlike the impact avoidance options considered but rejected, compensatory mitigation would not interfere with plant operations or result in reduced plant efficiency. The Commission therefore further conditioned the SONGS permit to require implementation of the following mitigation program elements:

- creation or substantial restoration of at least 150 acres of Southern California wetlands (Condition A);
- installation of fish barrier devices at the power plant (Condition B); and
- construction of a 300-acre kelp reef (Condition C).

The permit conditions adopted by the Commission also require the permittee to fund administrative and scientific oversight and independent monitoring of the mitigation program (Condition D), to be conducted by a small mitigation monitoring program team and necessary scientific contractors under the direction of the Commission's Executive Director. Condition E requires public availability of the MRC data.

In approving the 1991 permit conditions, the Commission found the mitigation, monitoring, and remediation program to be a **minimum** package, and that the only way the permittee should be allowed to mitigate adverse impacts through compensation rather than to make extensive changes to the SONGS cooling system to prevent adverse impacts was through the full adopted mitigation package.

The Commission then directed the staff to consider the need for additional mitigation, identifying specifically that consideration be given to a fish hatchery program. On March 23, 1993, the Commission added a requirement (Condition F) for the permittee to partially fund ($1.2 million) construction of an experimental white seabass hatchery program. Due to its experimental nature, the Commission did not assign mitigation credit for the hatchery.

In 1992, at the permittee's request and after an extensive selection process established by the 1991 permit conditions, the Commission approved the San Dieguito Lagoon as the site for 150 acres of wetland restoration.

1995 AMENDMENT APPLICATION

Criteria for Filing Amendment Application

The Commission's regulations governing permit amendments require that, in order to be accepted for processing, amendments to coastal development permits must not " lessen or avoid the intended effect of a ... conditioned permit" unless the applicant provides "newly discovered material information" that could not have been produced before the permit was granted (Section 13166(a)(1)).

In 1995, the permittee submitted an amendment request that was rejected by the Executive Director as not meeting this standard. After a public hearing at its November 1995 meeting, the Commission did not overturn the Executive Director's determination. The 1991 adopted conditions remain in full force and effect.

Commission Staff and Permittee Attempt to Develop a Consensus Alternative Mitigation Package

During the November 1995 hearing, the Executive Director stated his high priority objective of getting the mitigation implemented as soon as possible by working with the permittee to develop an alternative amendment package that could be accepted for filing and be brought to the Commission for a public hearing and decision. The Commission also gave the Commission staff and the permittee the charge to get the mitigation plan implemented as soon as possible.

Since November 1995, the staff has worked intensively with the permittee and others to try to develop an acceptable amendment package that is consistent with the Coastal Act. Numerous meetings with the permittee, staff from California Department of Fish and Game (CDFG), United States Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and other agencies, and outside scientists have been required to discuss the permittee's concerns relating to implementation of the 1991 permit conditions and the appropriateness of any amendments to the mitigation program. The permittee states that the staff has required numerous studies and technical meetings above and beyond what is required by the current permit. However, these studies and meetings were necessary to allow informed decisions regarding appropriate changes based on the permittee's desire to reduce the mitigation package stipulated in the 1991 permit. Some of the staff's attempts to develop a consensus alternative mitigation package include:

Partial Credit for Enhancement

- The staff has worked with the wetland resource agencies (CDFG, USFWS, NMFS) to try and meet the permittee's desire to satisfy some of the wetland mitigation obligation through partial credit for enhancement of existing functioning wetlands by

inlet maintenance. The 1991 permit calls for **creation or substantial restoration** of at least 150 acres of coastal wetland **and** the maintenance of continuous tidal flushing. Thus, allowing partial credit for enhancement activities (e.g., inlet maintenance at San Dieguito Lagoon that in the 1991 permit conditions is a required component) requires a permit amendment. The staff supported Commission approval of an amendment to allow partial credit toward the 150-acre requirement for enhancement activities. The permittee's amendment requests **full** credit for enhancement of existing wetlands by inlet maintenance.

The Commission **denied** the permittee's proposed amendments to the wetland conditions and the permittee's proposed wetland plan. The Commission approved revisions to Condition A that allow up to 35 acres of partial credit for enhancement at San Dieguito. This is also reflected in the cost figures used for wetland restoration for the optional trust fund.

Interagency Wetland Advisory Panel's Recommendations

- As a way to reach an agreement on the amount of partial credit for inlet maintenance at San Dieguito Lagoon, the staff and the permittee sought the advice and recommendations of the Interagency Wetland Advisory Panel (IWAP) (Exhibit 3). However, the permittee's mitigation plan for San Dieguito Lagoon has not addressed the IWAP recommendations and requests substantially more credit for inlet maintenance than either the IWAP or staff can support. Commission staff used the majority of the IWAP recommendations in developing the cost estimates used in the staff recommendation for wetland restoration in the optional trust fund.

Independent Review Panel for Kelp Studies

- The permittee collected additional data on the San Onofre kelp bed after the MRC field studies were terminated. The permittee used some of the same contractors that the MRC used. The permittee's contractors used the same methods as the MRC, but did not look at the same factors studied by the MRC. The permittee's contractors confined their work to documenting changes only in kelp abundance. The MRC's work was more comprehensive and included measurements of the influence of sea urchins, light levels, and turbidity, and looked at the entire kelp bed community.

- Commission staff sought (based on the 1993 Commission resolution regarding MRC dissolution) to have the MRC scientists review the permittee's new kelp data. The permittee objected and in the spirit of moving the mitigation project along staff agreed with the permittee's proposal to establish a three member Independent Review Panel. The permittee and the Commission staff jointly selected the three member scientific panel and jointly framed the questions for the panel to consider.

- The staff agrees with the Independent Panel's **qualitative** conclusion that the adverse impacts to the San Onofre kelp bed from the SONGS operation are less than originally estimated by the MRC. The staff also used the Panel's suggested methods to **quantitatively** determine the level of impact.

Design of Experimental Kelp Reef

- The staff has worked diligently with the permittee to develop a mutually acceptable design for the experimental artificial reef through meetings with the permittee, Department of Fish and Game staff, and potential construction contractors. The permittee's proposed experimental reef plan reflects this work.

Alternative Materials for Kelp Reef Construction

- Although the 1991 permit requires that the kelp mitigation reef be constructed of quarry rocks, the permittee has expressed interest in using concrete because it is cheaper. The staff has agreed to consider the possible use of concrete as a construction material for the kelp mitigation reef. The staff suggested the incorporation of concrete into the design of the experimental kelp reef to determine whether it would be a suitable building material for the larger kelp mitigation reef. Use of concrete to construct the artificial reef requires a permit amendment. The Commission's approval of the amendment package allows the consideration of the use of concrete in construction of the artificial reef, and thereby potentially reduces mitigation costs if the use of concrete proves successful in the experimental phase of the artificial reef.

Monitoring

- The staff has offered numerous revisions to the intensity and breadth of the required monitoring programs to reduce monitoring costs and to maximize the use of funds for construction of the mitigation projects. The staff has also suggested numerous monitoring strategies generally consistent with the extensive performance standards spelled out in and that uphold the intent of the 1991 permit, but do so at a lower overall cost to the permittee. Independent monitoring is critical in order to ensure that the mitigation works and that, if needed, remedial steps are taken.

Trust Fund

- The Commission and staff are mindful that although 23 years have passed since the 1974 approval of the SONGS, 14 years have passed since SONGS Units 2 and 3 began operating, and 6 years have passed since the Commission imposed mitigation requirements for SONGS, and still little significant mitigation for lost coastal resources has occurred. This delay in the implementation of mitigation led Commission staff to propose and the Commission to strongly endorse and approve

a trust fund solution that would cap the permittee's total costs and provide the means to effectively and efficiently build the required reef and wetland mitigation projects as quickly as possible.

- A trust fund approach has numerous advantages and is strongly supported and encouraged by staff. Once the trust funds are fully funded, the permittee would have no continuing responsibility for the wetland restoration components of the mitigation program. Utilization of the trust funds would provide the permittee with certainty with respect to the overall cost of the mitigation program. In particular, certain costs of the program, such as the remediation requirements for the wetland and kelp reef projects, are currently open-ended. The trust funds would establish a cap on the remediation costs for which the permittee would be responsible, as well as limit the permittee's financial responsibility for the overall project to a specified monetary amount.

- In adopting a trust fund approach, the risk to the implementing entities, the Coastal Commission, and the public is that there could be unanticipated costs. A resulting shortfall of funds would preclude full compensation for lost resources. However, there are costs and delays associated with the permittee's continuing disagreement with the Commission and others on condition interpretation and implementation that do not translate into public benefits. On balance, the staff believes and the Commission concurred through its action that the benefits to all parties outweigh the risks of a trust fund approach.

- The Commission's approved findings and conditions and Appendix F include details on costs used to determine the trust fund amounts and the proposed structure for implementation.

COMMISSION REVIEW OF 1996 AMENDMENT APPLICATION

The permittee's pending application for the proposed amendments to CDP 6-81-330 was submitted August 1996, filed on September 17, 1996 and placed on the Commission's October 8, 1996 agenda. In August of 1996, the staff reviewed the permittee's current amendment request for compliance with the regulations governing permit amendments and determined that, although many components of the proposed amendments do not meet the criteria for acceptance, the overall package does. The amendment application before the Commission now is different in several ways from the rejected 1995 amendment request. The current amendment request includes a review of the permittee's new kelp data by the Independent Technical Review Panel (a three-member panel jointly selected by the permittee and the Commission staff) who concluded that SONGS's effect on kelp abundance is less than originally predicted by the MRC. The CCC staff accepts this conclusion by the independent scientists and believes this new information reviewed

by a group of independent scientists warrants Commission approval of this part of the amendment as recommended.

The Commission heard public testimony and continued the item to its November 13, 1996 hearing. At the November 1996 hearing, the San Dieguito River Park Joint Powers Authority (JPA) cited deficiencies in the permittee's proposed plan for San Dieguito Lagoon that, in the JPA's view, invalidated agreements between the permittee and the JPA, thus nullifying the permittee's authorization to use key JPA owned and managed lands. Because the permittee's resultant lack of authority to use these lands rendered many aspects of the proposed amendments and mitigation plans unworkable, the Commission staff's written recommendation was withdrawn at the hearing and a verbal recommendation for denial was given. After a long public hearing the Commission continued the matter, to the February 1997 meeting to give the JPA, the State Coastal Conservancy and the staff time to review engineering information relating to the feasibility of a restoration plan more in keeping with the JPA preferred plan. The JPA representatives agreed to work with the permittee to resolve outstanding concerns during the intervening months. Due to delays in the engineering studies, the matter was further postponed to the April 1997 meeting.

In the wake of the Commission's November 1996 continuation, Commission staff requested that the permittee clarify whether its amendment application had been formally revised to reflect any of the modified proposals presented by the permittee at previous hearings. In the absence of any changes identified by the permittee, staff would conduct its review of the amendment based only on the permittee's August 1996 submittal. (See letter dated January 29, 1997, Exhibit 8.) On February 21, 1997 Commission staff received a letter from the permittee dated February 14, 1997 (Exhibit 9). The letter did not provide the requested information and instead sought further postponements.

The permittee and several other interested persons have asked for yet another postponement of this matter. The staff is of the opinion that further delay of a decision on this matter is not warranted. The issues relative to the kelp reef and administration conditions of the 1991 permit amendments have been fully reviewed and discussed and the permittee should now be directed to implement them. The information based on additional engineering work relative to wetland restoration at San Dieguito, is sufficient to enable staff to conclude that implementation of the Condition A at San Dieguito is feasible and should be carried forward with all deliberate speed. The JPA property is, unlike the situation in November 1996, now available to implement a wetland restoration project that meets the terms of Condition A.

Units 2 and 3 have been in operation for over 14 years and the public resources lost as a result have not been offset by the permittee. The Commission and the permittee have

been subjected to extensive criticism for delays in carrying out the required mitigation measures.

The Commission's April 9, 1997 action makes clear that the permittee is expected to promptly carry out the permit mitigation conditions or choose the trust fund option by June 8, 1997. Relative to the wetlands condition (Condition A), if the permittee elects not to utilize the trust fund option and does not believe a restoration project at San Dieguito for the full 150 acres of restored wetlands is feasible, the lengthy process of qualifying an additional mitigation site or sites could be requested. To avoid any misunderstanding on this point however, the Commission is of the strong opinion that the full mitigation identified in Condition A is feasible at San Dieguito and that any effort to identify an additional location would result in an unnecessary and unjustifiable expenditure of resources by the permittee, the Commission, the JPA, and everyone else having a direct interest in this matter.

Standard of Review: Coastal Act and the Original 1974 Coastal Development Permit

The Commission's standard of review for amendments is "whether the proposed development with the proposed amendment is consistent with the requirements of the Coastal Act of 1976" (Commission regulations section 13166(4)). In this case the "proposed development" — the SONGS Units 2 and 3 — already exists and through its construction and operation has been causing unmitigated impacts to the marine environment since the early 1980s.

The original 1974 coastal development permit (and later modifications), which authorized the construction and operation of the SONGS Units 2 and 3, is in full force and effect and enforceable. The Commission approved the permit with the unequivocal requirement that significant adverse impacts to the marine environment would be eliminated or mitigated through compensation when they were identified. The 1991 mitigation package provides for full mitigation of the adverse marine resource impacts caused by the SONGS, thereby keeping the original approval of the SONGS Units 2 and 3 consistent with the Coastal Act.

For the Commission to approve any amendments to the existing, adopted 1991 mitigation program, the Commission must find that the changes continue to fully mitigate all identified impacts to the marine environment caused by the construction and operation of SONGS Units 2 and 3. Then, and only then, can the amendments be found consistent with the Coastal Act and with the underlying original permit.

KEY COMPONENTS OF THE COMMISSION'S APRIL 9, 1997 ACTION ON AMENDMENT

Condition A – Wetland Mitigation

The Commission's April 9, 1997 action:

- Resulted in denial of SCE's August 1996 proposed amendments to the Condition A– Wetland Mitigation.
- Reaffirmed Commission's prior 1992 decision that San Dieguito is the site that best meets the standards and objectives of this Condition A.
- Allows up to 35 acres credit for enhancement of wetland habitat at San Dieguito Lagoon.
- Established a 6-month deadline for submission of a preliminary wetland mitigation plan.
- Offered an option for the permittee to pay $55.63 million for wetland mitigation as part of the trust fund. If the permittee selects this option and pays the amount as specified, the permittee's obligations under Condition A will be completely satisfied. The amount specified for wetland restoration is based on a conceptual plan developed by the Coastal Conservancy and the San Dieguito JPA for the creation, enhancement, and substantial restoration of 150 acres of wetlands at San Dieguito (the permittee's selected and Commission approved site).

Condition B – Fish Behavioral Mitigation

- No requested amendments.

Condition C – Kelp Reef Mitigation

- The Commission approved conditions that revised SCE's August 1996 proposed amendments. The result is a recognition that new information shows kelp bed impacts of 179 acres caused by SONGS. Based on earlier information the MRC projected 200 acres of impact requiring 300 acres of kelp bed mitigation (included 1.5 multiplier).
- The permit conditions require (1) the design, construction, independent monitoring and remediation of 150 acres (at least 67% rock coverage) of medium to high density kelp bed community to be accomplished in two components a 16.8 acre experimental reef to test reef design option, and at least 133.2 additional acres of mitigation reef, and (2) $3.6 million payment to OREHP to fund a mariculture/marine fish hatchery program.

- Condition C also includes an option for the permittee to pay $43.84 million for kelp reef mitigation as part of the trust fund. If the permittee selects this option and pays the amount specified the permittee's obligations under Condition C will be completely satisfied.

Condition D – Administrative Structure

- The Commission **denied** SCE's August 1996 proposed amendment to the scientific oversight and monitoring condition. SCE's amendment would eliminate the key component of the 1991 Commission permit condition that requires scientifically based monitoring and oversight independent of the permittee. The Commission's approval of the staff recommendation results in the 1991 version of permit Condition D remaining in full force and effect, except as modified to add the funding option.

- The Commission approved revised Condition D to offer the permittee an option to pay $8.08 million for monitoring and $6.50 million for scientific oversight that will be carried out for the operating life of SONGS. The costs in this trust fund are absolute minimums based on the best estimates of university costs and under the assumption that the trust funds for the wetland and kelp reef will be funded by the permittee and the permittee will no longer be involved in the implementation of the projects. As approved by the Commission, the funding option has to be accepted by the permittee in its entirety for wetland, reef, and monitoring and oversight. If the permittee selects this option by June 8, 1997 and funds the trust fund fully as specified, the permittee's obligations under Condition D will be completely satisfied.

- The total cost for the Trust Fund option is $114.05 million. The cost for the separate mariculture/fish hatchery funding to OREHP is $3.6 million. The total cost for all mitigation if the permittee chooses the trust fund option is $117.65 million. (See Appendix F — Funding Option.)

SUMMARY TABLE

Existing Commission Conditions (1991), Permittee's Proposed Amendments and Proposed Plans for Condition Compliance, and Commission Approved Revised Conditions.[♦]

CONDITIONS IN THE COMMISSION'S 1991 SONGS PERMIT ACTION	PERMITTEE'S PROPOSED AMENDMENTS TO PERMIT CONDITIONS AND CONDITION COMPLIANCE	COMMISSION APPROVED REVISED CONDITIONS
Condition A: Wetland Restoration Mitigation		
1991 Permit Condition: Permittee shall create or substantially restore 150 acres of coastal wetland habitat and maintain tidal flushing No credit for enhancement of existing wetland Condition includes detailed performance standards and independent monitoring to evaluate success and need for remediation for full operating life of the SONGS Permittee to select mitigation site from specific list with approval of Commission The Commission approved the San Dieguito Lagoon site in June 1992	*Proposed Amendments:* Amendment proposes: 1) payment of costs up to $3 million to fund wetland restoration at Ormond Beach to provide mitigation that permittee states is in excess of the required 150 acres; 2) the addition of an uncontrollable forces clause; 3) reductions in the size of buffer zones; 4) permittee to self-monitor and evaluate success; 5) reduce monitoring and remediation to 10 years; 6) to delete or change most performance standards, and 7) to change most reporting deadlines	***Commission Denial of Amendment and Approval of Funding Option:*** The Commission approved the staff recommendation with revisions resulting in denial of all of SCE's proposed amendments to Condition A The majority of 1991 Condition A remains in full force and effect. The Commission's amendment of Condition A adds an option that would allow the permittee to pay $55.63 million as a part of the trust fund for use by a third party or parties to carry out the wetland mitigation project. The fund would be used to create, enhance, and substantially restore 150 acres of wetlands at the permittee's selected site, San Dieguito Lagoon approved by the Commission in 1992. The Commission revised Condition A to. 1) Reaffirm the Commission's 1992 selection of the San Dieguito River Valley as the site for the wetland restoration project; and

[♦] On August 19, 1996, the permittee submitted for Commission consideration a 3-volume combined package of proposed permit amendments and two plans (Experimental Kelp Reef and San Dieguito Wetlands) as condition compliance. The staff has analyzed the submittal as a package, but has separately developed findings and conditions 1) for the proposed amendments; and 2) for approval of the plans and findings as condition compliance. The staff's approach to analyzing this submittal is necessary because the standard of review for the condition amendments is the Coastal Act, while the standard of review for condition compliance (i e , plan approval) is the wording of the adopted conditions.

CONDITIONS IN THE COMMISSION'S 1991 SONGS PERMIT ACTION	PERMITTEE'S PROPOSED AMENDMENTS TO PERMIT CONDITIONS AND CONDITION COMPLIANCE	COMMISSION APPROVED REVISED CONDITIONS
		2) Approve up to 35 acres of enhancement credit for permanent inlet maintenance at the San Dieguito site; 3) Add a funding option in the amount $55.63 million to satisfy the permittee's wetland restoration responsibilities; and 4) establish October 9, 1997 as the new deadline for submission of a preliminary wetland mitigation plan.
Basis for 1991 Condition: The MRC Final Report documents significant ongoing fish losses caused by the operations of SONGS Units 2 and 3 Data available ***after*** the MRC completed its studies suggest fish losses may be higher than calculated by the MRC. The wetland mitigation component of the 1991 Commission-approved conditions is designed to provide valuable and balanced wetland ecosystem that compensates for bight-wide losses in marine fish standing stocks due to the SONGS operation.	***Permittee's Basis for Proposed Amendments:*** The permittee proposed these amendments to address cost and design constraints it identified during the development of a preliminary wetland mitigation plan for the initially selected site, San Dieguito Lagoon Amendment does not request credit for enhancement of existing wetland because the permittee contends that enhancement is the same as substantial restoration. The permittee's analysis of the San Dieguito project is that the 225-acre project yields 150 acres of newly created or substantially restored wetlands. Commission staff and the IWAP members dispute this analysis. To end this long-standing dispute, the permittee is proposing to augment the San Dieguito project with the additional obligations at Ormond Beach	***Basis for Commission Approval of Amendment:*** The permittee's requested amendment would render the SONGS project inconsistent with the Coastal Act.
	Condition Compliance: Wetland Mitigation Plan The permittee submitted a preliminary mitigation plan for San Dieguito Lagoon, which the permittee	***Condition Compliance: Wetland Mitigation Plan*** The Commission denied the permittee's wetland plan for San Dieguito Lagoon and Ormond Beach.

CONDITIONS IN THE COMMISSION'S 1991 SONGS PERMIT ACTION	PERMITTEE'S PROPOSED AMENDMENTS TO PERMIT CONDITIONS AND CONDITION COMPLIANCE	COMMISSION APPROVED REVISED CONDITIONS
	evaluates as creating or substantially restoring at least 150 acres of wetland. The staff's evaluation — based in part on a recommendation from Interagency Wetland Advisory Panel (DFG, USFWS, NMFS, ACOE, Coastal Conservancy) — of the permittee's plan shows the proposed project creates, or substantially restores approximately 92 acres of wetland. To address this dispute and the approximately 58-acre mitigation deficit, the permittee proposes to amend Condition A to provide up to $3 million for the Coastal Conservancy to implement a mitigation project at Ormond Beach wetland.	In November 1996, the San Dieguito Joint Powers Authority (JPA) withdrew their authorization for the permittee to use the JPA property the permittee needed to implement its proposed wetland mitigation project. At the November 1996 Commission meeting, the Commission staff made a verbal recommendation of denial of SCE's wetland mitigation plan. SCE has not revised its plan since its original August 1996 submittal. The permittee's proposed Ormond Beach plan is inadequate to meet the 150 acres of required wetland mitigation, is not a site approved by the Commission, and does not meet the requirements established by the 1991 permit for the wetland restoration plan. Also, based on new information supplied in March 1997 by the JPA and the Coastal Conservancy it appears that it is feasible to carry out the full 150 acres of needed wetland mitigation at the approved San Dieguito site.
Condition B: Fish Behavioral Mitigation		
1991 Permit Condition: Permittee responsible to install fish behavioral barrier devices within the power plant in order to reduce fish losses due to impingement, and monitor effectiveness; and retention or change of devices determined by the Executive Director.	***Proposed Amendments:*** No requested amendments.	***Condition:*** No changes. Conditions in 1991 permit remain as is. Progress towards compliance with this condition continues.

CONDITIONS IN THE COMMISSION'S 1991 SONGS PERMIT ACTION	PERMITTEE'S PROPOSED AMENDMENTS TO PERMIT CONDITIONS AND CONDITION COMPLIANCE	COMMISSION APPROVED REVISED CONDITIONS
Condition C: Kelp Reef Mitigation		
1991 Permit Condition: Permittee required to construct 300-acre artificial reef designed to grow kelp and establish a productive kelp bed ecosystem Reef to be built in two phases Information obtained from the smaller 1st phase shall be used to test designs for the larger 2nd phase Conditions include detailed performance standards and independent monitoring with Coastal Commission oversight to evaluate success and need for remediation for full operating life of the SONGS Permittee to select site within specific area with approval of Commission	***Proposed Amendments:*** Amendment request would replace requirement to construct a 300-acre kelp reef with an experimental 16 8-acre reef. Eliminates all performance standards, independent monitoring and remediation. All studies of experimental reef would be completed by permittee	***Commission's Approved Revised Condition:*** The Commission approved amendment of this Condition C to: 1) accept the 16.8-acre experimental reef, 2) require an additional mitigation reef that will produce a total of 150 acres of kelp and associated biota to compensate for adverse impacts caused by the SONGS operation; 3) retain the requirement for independent monitoring with Commission staff oversight; 4) provide $3.6 million to fund OREHP for the purpose of funding a mariculture/marine fish hatchery program; and 5) offer an option for the permittee to pay $43.84 million for kelp mitigation as a part of the trust fund and thereby cap the permittee's funding responsibilities for the reef project. Information obtained from the experimental reef shall be used to design the larger (133.2 acre) mitigation reef. The $43.84 million is exclusive of the $3 6 million to be provided to OREHP.
Basis for 1991 Condition: The MRC Final Report (1989) estimated that the area of medium to high density kelp in the San Onofre kelp bed is reduced on average by 200 acres as long as the SONGS continues to operate The Commission required a 1 5 ratio for mitigation because of the uncertainty involved with re-creating a kelp bed community with resource values similar to a natural kelp bed community and the fact that kelp does not completely cover a rocky reef Therefore, the total requirement in the 1991 permit conditions is for the construction of 300-acre kelp reef.	***Permittee's Basis for Amendment Request:*** Kelp studies prepared by the permittee's own contractors and completed after the MRC studies support an estimate of 48–110 acres of kelp bed impacts An Independent Panel of three scientists (jointly selected by permittee and Commission staff) came to the **qualitative** conclusion that the "impact of SONGS on kelp abundance is much less than originally predicted by the MRC." The permittee believes that the adverse impacts to San Onofre kelp bed is decreasing to a level of insignificance.	***Staff's Basis for Revised Condition:*** Although the Independent Panel did not make a **quantitative** determination of the level of impact to the kelp bed caused by SONGS, the Panel recommended an approach to determine the number of acres of kelp bed lost as a result of operations of SONGS. Following the recommendations of the Independent Panel, Commission staff scientists calculated the size of the reduction in the San Onofre kelp bed based on the MRC data and the permittee's data collected after the MRC was terminated. This calculation shows that the area of medium to high

CONDITIONS IN THE COMMISSION'S 1991 SONGS PERMIT ACTION	PERMITTEE'S PROPOSED AMENDMENTS TO PERMIT CONDITIONS AND CONDITION COMPLIANCE	COMMISSION APPROVED REVISED CONDITIONS
		densily kelp in the San Onofre kelp bed is reduced by 179 acres as long as the SONGS continues to operate (see Appendix D). Neither the permittee's own studies nor staff's estimates using the Independent Panel's approach support the permittee's estimate of 16 8 to 56 acres of kelp bed impact, or the conclusion that the adverse impact is decreasing to a level of insignificance.
	Condition Compliance: Experimental Kelp Reef The staff worked with the permittee to develop an experimental reef plan that would satisfy the 1991 experimental reef requirement The permittee now requests that the 16 8 acre experimental reef be considered as complete condition compliance to offset all kelp bed impacts During the November 1996 and April 1997 hearings the applicant verbally stated that the impact could be as much as 56 acres The permittee did not officially revise its amendment request to reflect this testimony.	*Condition Compliance: Experimental Kelp Reef* The Commission approved the permittee's current design for the 16.8 acre experimental reef as meeting the 1991 permit conditions for the Phase I reef. The Commission found that the impact to the kelp bed is well above 16.8 acres (179 acres) Therefore, the 16.8-acre reef **only provides partial compliance** with Condition C.
Condition D: Administrative Structure		
1991 Permit Condition: Permittee must pay for Commission retention of independent scientists to oversee and monitor the wetland and artificial reef mitigation projects; and public opportunity to review and comment on progress of mitigation projects No specific cap on costs Budgets require Commission approval.	***Proposed Amendment:*** Permittee's amendment would delete the administrative structure and replace independent monitoring of the entire mitigation program with self-monitoring No funds would be provided for Commission oversight or technical advice. All monitoring to determine success in meeting performance standards and whether remediation is necessary would be completed by the permittee.	***Revised Condition:*** The Commission denied all SCE proposals to amend Condition D. The 1991 condition remains in full force and effect. The Commission approved an amendment of Condition D to add an option that would allow the permittee to pay $ 8.08 million for monitoring and $ 6 50 million for scientific oversight as part of a trust fund. This covers monitoring and scientific oversight for the operating life of SONGS.

CONDITIONS IN THE COMMISSION'S 1991 SONGS PERMIT ACTION	PERMITTEE'S PROPOSED AMENDMENTS TO PERMIT CONDITIONS AND CONDITION COMPLIANCE	COMMISSION APPROVED REVISED CONDITIONS
Basis for 1991 Condition: In its findings for 1991 resolution, the Commission stated "[t]he most effective and reliable means of achieving the compensation objectives described in this permit is through independent, third party monitoring and adaptive management "	***Permittee's Basis for Amendment Request:*** Permittee states that it should be treated as other permittees carrying out similar mitigation projects. Permittee believes that self-monitoring with Commission review (without any funding from permittee) is adequate. Permittee believes independent monitoring would be too expensive.	***Basis for Commission's Revised Condition:*** The Commission found that independent monitoring removes all doubts and concerns about objectivity in judging the success of the mitigation program and is no more costly than self-monitoring. Further, the permittee fully embraced and supported the requirement for monitoring and remediation independent of the permittee at 1991 permit hearing. Permittee has already obtained the benefits of the original 1974 permit by the construction and operation of SONGS since the early 1980's. To address permittee cost containment concerns the Commission's approval offers the permittee the option to pay a grand total of $114.05 million into a trust fund to cap the costs and satisfy the permittee's responsibility for the wetland project implementation, the reef project implementation, and independent monitoring and Commission scientific oversight. The permittee is also required to pay $3 6 million to OREHP for mariculture/marine fish hatchery program.
Condition E: MRC Data Maintenance		
1991 Permit Condition: Condition E requires that the permittee provide adequate funding to make MRC's valuable scientific data available for public use.	***Proposed Amendments:*** No proposed amendments.	***Recommended Revised Condition:*** Permittee is in compliance with this condition.

CONDITIONS IN THE COMMISSION'S 1991 SONGS PERMIT ACTION	PERMITTEE'S PROPOSED AMENDMENTS TO PERMIT CONDITIONS AND CONDITION COMPLIANCE	COMMISSION APPROVED REVISED CONDITIONS
Condition F: Marine Fish Hatchery*		
1991 Permit Condition: In November 1991 when the Commission adopted the mitigation package (Conditions A–E above) the Commission directed the staff to "explore and bring back to the Commission the possibility of a fish hatchery program for ocean release." On May 13, 1992, the Commission required the permittee to provide $1 2 million toward the construction of a marine fish hatchery On March 17, 1993, the Commission adopted Condition F. Marine Fish Hatchery which includes a detailed description of how the $1 2 million in funds will be paid and spent and specifies a required memorandum of agreement with Department of Fish and Game and others to assure that important protocols for the marine fish hatchery are implemented. The Commission found that a marine hatchery cannot serve as "stand-alone mitigation" because of insufficient scientific evidence regarding the effectiveness of a fish hatchery in enhancing marine fish populations	*Proposed Amendments:* No requested amendments	*Recommended Revised Condition:* No Changes. Permittee has paid the full $1.2 million and therefore is in full compliance with this condition. The marine fish hatchery has been constructed (in part with funds from the permittee) and has begun operations.

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* The Marine Fish Hatchery condition was mislabeled as Condition E when approved. The Marine Fish Hatchery condition should actually be Condition F.

Appendix E

Draft Monitoring and Management Plan for the SONGS Experimental Kelp Reef

DRAFT MONITORING AND MANAGEMENT PLAN FOR THE SONGS EXPERIMENTAL KELP REEF

California Coastal Commission Staff

May 1998

1.0 INTRODUCTION

Through its 1991 and 1997 coastal permit actions, the California Coastal Commission (CCC) adopted permit conditions that require Southern California Edison (SCE) and its partners to select a site and construct an artificial reef as partial mitigation for the resource losses at the San Onofre Kelp Bed (SOK) caused by the operation of San Onofre Nuclear Generating Station (SONGS) Units 2 and 3. The reef is to be located in the vicinity of SONGS with the goal of replacing a minimum of 150 acres (= 60.75 hectares) of kelp forest community. Performance standards for reef substrate, giant kelp, fish, and benthos specified in the permit condition will be used to evaluate whether this goal has been met.

Mitigation for losses of kelp bed resources through the construction of an artificial reef is to be done in two phases, a five year experimental phase followed by a mitigation phase having a duration equivalent to the operating life of SONGS Units 2 and 3. A preliminary plan ("San Onofre Marine Mitigation Program: Experimental Reef for Kelp") describing the location and design of the experimental reef was submitted to the CCC by SCE on June 16, 1997 and approved by the Executive Director of the CCC on June 26, 1997. The preliminary plan was developed by SCE staff and consultants in cooperation with the CCC staff, California Department of Fish and Game, and coastal engineers and represents a consensus of all participants. Specific details of the siting and design of the experimental reef are given in the preliminary plan. Briefly, the plan calls for 16.8 acres (= 6.8 hectares) of hard substrate to be placed in a 2.5 km long x 0.5 km wide area between San Mateo kelp bed (SMK) and San Mateo Rocks. Six reef designs consisting of two types of hard substrate (quarry rock and recycled concrete) and three levels of substrate coverage (17%, 34% and 67%) will be tested in the experimental phase. One 0.4 acre module of each substrate type and coverage will be placed within each of seven blocks arranged at progressively farther distances from SMK.

The coastal permit requires that Coastal Commission scientists develop a monitoring plan for the experimental reef that describes how the effectiveness of alternative reef designs, materials, and management techniques will be assessed. This document serves as the conceptual basis for the monitoring plan for the experimental reef. It will be the basis for a detailed work plan to follow.

2.0 RATIONALE FOR MONITORING APPROACH

The primary goal of the experimental reef is to determine the substrate types and configurations that best provide: (1) adequate conditions for giant kelp recruitment, growth and reproduction, and (2) adequate conditions for establishing and sustaining other reef-

associated biota, including benthic algae, invertebrates and fishes. Originally the SONGS coastal development permit required that the mitigation reef be constructed of quarry rock, and that the rock cover at least two-thirds of the sea floor within the boundary of the mitigation reef. On April 9, 1997 the Commission agreed to allow the Executive Director to change these requirements if the results of the experimental reef indicated that a different coverage or substrate type would replace a minimum of 150 acres of medium to high density giant kelp and associated kelp forest biota. Thus, a major objective of the experimental reef is to determine whether substrate coverages less than two-thirds and substrate types other than quarry rock (e.g., recycled concrete) can be used to meet the performance standards for the mitigation reef. Information obtained from the experimental reef will form the basis of the Executive Director's decision on the type and percentage cover of hard substrate required for the mitigation reef to meet the permit conditions.

Deciding upon a design for the mitigation reef using information from the experimental reef entails uncertainties that stem from the length of the experiment (five years), which may not be sufficient for the development of a mature kelp forest community on a newly constructed reef. Moreover, because five years is short relative to the generation times of most kelp forest species (other than giant kelp), there is no guarantee that reef designs that appear successful at the end of the experiment (i.e. meet the performance criteria) will continue to perform successfully in the future. Given these uncertainties, it is possible that none of the experimental modules will develop a sustainable kelp community that meets the performance criteria for the mitigation reef. In this event the Executive Director will need to rely on information that best *predicts* which of the reef designs will meet the performance standards when applied to the mitigation reef.

To address this possible need, the Commission staff scientists will take a three-part approach to evaluating the results of the experimental reef. First, physical and biological variables will be monitored to determine the degree to which the six reef designs achieve the performance criteria. Second, monitoring data will be used to evaluate the performance of the six reef designs relative to each other. Finally, additional data will be collected and, along with existing information about reef ecology, used to predict which design(s) will most likely be successful if applied to the mitigation reef. These data will relate key physical and biological processes to: (1) specific aspects of community development, and (2) the degree of success in achieving the performance criteria. This last approach acknowledges that there are both processes that facilitate the development of kelp and related biota and those that suppress it. An example of the former is an adequate rate of dispersal and successful settlement of kelp spores. An example of the latter is too high a rate of recruitment and development of species (e.g., sea fans) which can monopolize space on hard substrates and prevent the establishment of kelp.

Results of the process studies will be used, to the extent possible, to establish quantitative relationships between physical and biological site conditions and each process. The measured relationships between site-specific processes and degree of development of

reef biota will then be used to predict the likely success of the various experimental designs.

Our three-fold approach depends in part on the idea that the dynamics of a kelp forest community can be predicted from: (1) the values of the variables that describe the state of the kelp forest community on which the performance standards for the mitigation reef are based (e.g. the area of medium-to-high density kelp, the density of fish and number of fish species, etc.), and (2) a knowledge of the physical and biological processes that control the average values and dynamics of the state variables (e.g., the effects of sand scour on community structure, lack of giant kelp due to insufficient spore dispersal, etc.). Information on the values of the variables that describe the state of the community will be obtained from spatially representative monitoring of the experimental modules and reference reefs to describe "what's there." Insight into processes will be obtained from focused sampling and experiments aimed at predicting "what will be there over the long term."

3.0 CRITERIA FOR EVALUATING THE EXPERIMENTAL REEF

Although success of a particular reef design does not depend on the achievement of specific performance standards, the criteria by which the experimental reef will be evaluated are a subset of the permit performance standards by which the performance of the larger mitigation reef. This choice of criteria was motivated by the need to predict which of the reef designs is most likely to produce a full-sized mitigation reef whose performance will meet the standards of the permit. These standards fall into two categories: absolute standards, which require that the variable of interest attain or exceed a predetermined value, and relative standards, which require that the value of the variable of interest be similar to that measured on natural reference reefs.

Not all of the performance standards to be applied to the mitigation reef are appropriate for evaluating the results of the experimental reef. For example, because fish are likely to move among different reef modules, the relatively small size of the modules (0.4 acres) precludes obtaining reasonable estimates of fish production, reproductive rates, and standing stock that can be scaled up to the size of the mitigation reef. Given these kinds of constraints, only the following subset of the performance standards for the mitigation reef will be used as criteria to evaluate the performance of the different experimental reef designs:

1) at least 90% of the area of hard substrate (as determined by the first post-construction survey) must remain available for attachment of reef biota.

2) there must be a sustained giant kelp density of at least 4 adult plants per 100 m^2.

3) adult and young-of-year fish assemblages must be similar in density and species number to natural reefs within the region (although fish may move among modules, the extent to which their density and species number varies with module type should provide some insight into the ability of the different reef designs to meet the other performance standards for fish required of the mitigation reef).

4) algal and macroinvertebrate assemblages must be similar in abundance (density or % cover) and species number to natural reefs within the region.

It is important to note that the four performance criteria listed above are not the only ones by which the different reef designs will be evaluated. Information on the performance of different designs relative to each other, and on the biological and physical processes that affect their performance will also be used to evaluate their potential to meet the performance standards of the mitigation reef over the long term.

4.0 REFERENCE SITES

The rationale for requiring that the value of a resource be similar to that on natural reefs is based on the requirement that to be successful the mitigation reef must provide the types and amounts of resources that occur on natural reefs. Resources on natural reefs, however, vary tremendously in space and time. Differences in physical characteristics of a reef (e.g., depth and topography) can cause plant and animal assemblages to differ greatly among reefs while seasonal and inter-annual differences in oceanographic conditions can cause the biological assemblages within reefs to fluctuate greatly over time. Ideally, the biological assemblages on a successful artificial reef should fluctuate in a manner similar those on the natural reefs used for reference. One way to help ensure that this will be the case is to select reference reefs that are close to and physically similar to the experimental reef. The premise here is that nearby reefs with similar physical characteristics should support similar biota, which should fluctuate similarly over time. Temporal variability, especially of the sort associated with changes in oceanographic conditions, can be accounted for more easily by sampling the experimental and natural reference reefs concurrently. Concurrent monitoring of the natural reefs will help ensure that regional changes in oceanographic conditions affecting the experimental reef will be reflected in the performance criteria, since nearby natural reefs will be subjected to similar changes in oceanographic conditions.

Plots with spatial dimensions similar to experimental modules will be selected from kelp beds within the region near SONGS and used as natural reference reefs. Coverage of hard substrate will not be an explicit criterion for selecting reference reefs. Instead, the criteria to be used in choosing plots within reference reefs shall be that they: (1) currently support giant kelp and have a history of sustaining it at medium to high densities, (2) be located at a depth similar to the experimental reef, and (3) be primarily low relief, preferably consisting of cobble or boulders. The criterion that the reference reef module have persistent stands of giant kelp is important because communities on reefs without giant kelp can differ dramatically from those with kelp. Because medium to high density giant kelp is required of the mitigation reef, it is necessary that it be present on the natural reference reefs.

5.0 DATA COLLECTION

All experimental modules and natural reference reefs will be monitored for the entire five year experiment. The purpose of collecting data throughout the experiment is to assess differences in rates of development (and processes affecting development) between the different reef designs, and to determine whether the biota on the different reef designs has stabilized. Monitoring reference reefs for the duration of the experiment is critical. If the biological assemblages on any of the experimental modules have not stabilized after five years, then data collected from natural reference reefs will be used to determine whether the lack of stability reflects natural variability in the region. Permanently fixed quadrats and transects will be used to ensure that differences observed over time reflect temporal rather than spatial variability in the performance of the experimental modules. Additional randomly placed quadrats and transects will be sampled periodically to ensure that the permanent areas sampled provide an accurate description of each reef module.

Described below are the monitoring activities and process-oriented studies proposed for each of the four criteria (which are subsets of the permit compliance standards for the mitigation reef) used to evaluate the performance of the different reef designs. Information obtained from both monitoring and process studies will be used to determine the best design for the mitigation reef. Monitoring will be done on experimental modules and natural reference reefs. Process studies will be done mainly on experimental modules, although in some cases natural reference reefs will be studied as well. Modifications in these activities may be necessary to accommodate new information obtained during the course of the five-year experiment. The work schedules for the monitoring and process studies described below are summarized in Table 1 and Table 2 on page 19.

5.1 *CRITERION 1:* AT LEAST 90% OF THE INITIAL AREA OF HARD SUBSTRATE (AS DETERMINED BY THE FIRST POST-CONSTRUCTION SURVEY) MUST REMAIN AVAILABLE FOR ATTACHMENT OF REEF BIOTA.

Monitoring. High-resolution surveys using sidescanning sonar (or other technology if found to be more appropriate) will be done twice each year (winter and summer) to map the boundaries of each module, and to determine the topography and coverage of hard substrate and the coverage and distribution of sand. Sonic positioning buoys will be used to ensure that vessel tracks are within +/-1 meter on repeated surveys. This will allow for synoptic side-scan pictures of each module (which will include module area or "footprint", percent coverage of hard substrate and sand, and topography) that will reflect temporal rather than spatial variability. The high-resolution sidescanning sonar has a resolution of several cm and includes sophisticated image analysis software that allows one to distinguish between sand and hard substrate at that scale. Initially, diver surveys will be done in combination with the sidescanning sonar surveys to ground truth the maps and substrate coverage of each module.

Process studies. The loss of available hard substrate on a reef can result from subsidence of reef material or burial due to sediment accumulation. While high-resolution side-scanning sonar can be used to accurately measure both small and large physical attributes of the reef modules, it may not be able to distinguish between burial due to subsidence vs. burial due to sediment accumulation. Therefore, data on subsidence and sediment accumulation will be collected by divers during winter and summer, which is when these processes are at their maximum and minimum rates. Sampling will be designed to determine the degree to which the rates at which subsidence and sediment accumulation vary as functions of substrate size and shape, substrate type, proximity to adjacent boulders, location within a module, and module location within the experimental site. Winter and summer surveys are likely to capture the effects of extreme oceanographic conditions that affect burial. Additional opportunistic sampling will be done to take advantage of any rare oceanographic events.

5.2 *CRITERION 2:* THERE MUST BE A SUSTAINED GIANT KELP DENSITY OF AT LEAST 4 ADULT PLANTS PER 100 M^2.

Monitoring. Adult kelp plants will be monitored by divers in 450 m^2 areas on each module. This is size of the replicate sampling areas used in the Marine Review Committee's down-looking sonar estimates of adult kelp, which were used to calculate kelp losses. Each 450 m^2 area will be made up of a number of permanently marked transects that will be 2 meters wide. The exact lengths and positions of these transects will be determined after the boundaries of the modules have been determined from the post-construction side-scan sonar surveys. The fixed transects will ensure that the counts reflect temporal rather than spatial variability. Diver surveys will be done in the winter and summer each year

(corresponding to the periods of minimum and maximum kelp density) to count adult giant kelp on each module.

Process studies. The types of studies of giant kelp will depend on whether kelp becomes quickly established. If giant kelp fails to become established quickly on the experimental modules, then studies and experiments will be done to determine the cause(s) of this failure. The lack of kelp on an experimental module can result from: (1) insufficient settlement of kelp spores, or (2) processes occurring after spore settlement that adversely affect the survivorship of microscopic and macroscopic kelp stages.

To determine whether the absence of kelp on an experimental module is due to insufficient spore settlement, microscope slides will be placed in the field for short periods of time (1–2 weeks) to measure kelp spore settlement and gametophyte recruitment[1]. These studies will determine the extent to which spore settlement and gametophyte recruitment vary as a function of substrate type, substrate coverage, location within a module (i.e., edge vs. middle) and distance from SMK.

Factors influencing the survivorship of microscopic and juvenile macroscopic benthic stages of kelp will be investigated by monitoring their abundance at spatial scales appropriate for their small size, and through the use of transplant experiments. Samples collected in the field and grown out in the laboratory will be used to estimate natural densities of early life stages during the spring, which is the time of peak abundance. Sampling of natural populations will be supplemented with transplant experiments to evaluate factors affecting stage-specific survivorship[2]. Field sampling and experiments will be designed to determine the extent to which survivorship and growth of microscopic and macroscopic stages of kelp vary with substrate type, substrate coverage, boulder size, location within a module (i.e., edge vs. middle), location within the experimental site, and interactions with other species (e.g., sea urchins, or sea fans).

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[1] Reed, D. C., D R. Laur, and A. W. Ebeling. 1988 Variation in algal dispersal and recruitment: the importance of episodic events. Ecological Monographs **58**.321–335.

Reed, D.C , A.W. Ebeling, T.W. Anderson, and M. Anghera. 1997. Role of reproductive synchrony in the colonization potential of kelp. Ecology **78**:2443–2457.

[2] Dean, T. A., and F. R. Jacobson. 1984. Growth of juvenile *Macrocystis pyrifera* (Laminanales) in relation to environmental factors. Marine Biology **83**:301–311.

Dean, T A., and F. R. Jacobson. 1986. Nutrient-limited growth of juvenile kelp, *Macrocystis pyrifera*, during the 1982-1984 "El Niño" in southern California. Marine Biology **90**:597–601.

Reed, D C. 1990. The effects of variable settlement and early competition on patterns of kelp recruitment. Ecology **71**.776–87.

Reed, D. C., R. J. Lewis, and M. Anghera. 1994. Effects of an open coast oil production outfall on patterns of giant kelp (*Macrocystis pyrifera*) recruitment. Marine Biology **120**:26–31.

In the event that kelp quickly colonizes the experimental modules, studies will also be done to evaluate how reef design and location interact to affect adult mortality, growth, and reproduction. This will be done by measuring the growth, mortality, and spore production of marked plants over time and comparing these parameters among the experimental modules and natural reference reefs much in the same way as proposed for the transplanted kelp plants.

5.3 *CRITERION 3:* ADULT AND YOUNG-OF-YEAR FISH ASSEMBLAGES MUST BE SIMILAR IN DENSITY AND SPECIES NUMBER TO NATURAL REEFS WITHIN THE REGION

Monitoring. Fish diversity and abundance on each module and in each reference reef plot will be estimated along four permanent 40-m transects installed parallel to one another (approximately 10 meters apart) on each 40 m x 40 m module (transect length and spacing will be adjusted to accommodate the actual dimension of each module as determined by sidescanning surveys immediately following reef construction). Divers will record all fish occupying a 1 m x 1 m x 40 m volume at the bottom, and a 1 m x 2 m x 40 m volume at mid depth. Counts will be grouped into different age categories (e.g., young-of-year, subadults, and adults) for every species encountered. Sampling will be done in the fall when water clarity is greatest. Because fish abundance can vary greatly over short time periods, each module will be surveyed once a month for three months. All six m*odules within a given block plus one control site will be surveyed on the same day to avoid introducing bias in estimates of the different reef designs as a result of daily variability in fish abundance. Within-day variability is believed to be small as the abundances of most kelp-bed fish vary little during daylight hours (M. Carr personal communication).

Process studies. Due to the mobility of fish and the small size and close spacing of experimental modules, it will be difficult to predict how fish production and reproductive rates will be influenced by the different reef designs. One solution to this problem is to measure attributes that are easily sampled and which are correlated with production and reproductive rates. One such attribute is fish feeding activity, which can easily be quantified by the number of bites a fish takes per unit time. Species most amenable to this type of sampling are planktivores and benthic microcarnivores, which feed often. Fish feeding observations will be done on at least two species in each of these guilds during the fall sampling period. Sampling will be aimed at determining the extent to which fish feeding rates vary with substrate type, substrate coverage, location within a module (i.e., edge vs. middle), and distance from SMK.

5.4 *CRITERION 4:* ALGAL AND MACROINVERTEBRATE ASSEMBLAGES MUST BE SIMILAR IN ABUNDANCE (DENSITY OR % COVER) AND SPECIES NUMBER TO NATURAL REEFS WITHIN THE REGION.

Monitoring. Algae and macroinvertebrates will be monitored once a year in the summer. Large solitary algae and mobile macroinvertebrates will be counted in four permanent 5m x 2m quadrats placed systematically along each of the four permanent transects of each experimental module and reference plot. Counts for certain species will be categorized according to size class (i.e., young-of-year, subadult, adult). Subsampling will be done as needed for species that are too abundant to easily count in the 5m x 2m quadrats.

The abundance of understory algae and sessile invertebrates (which are generally difficult to distinguish and count as individuals) will be estimated from measurements of percent cover using a point contact method that takes into account vertical layering. At every 25 cm interval of each of the four transects a diver will record all understory algae, sessile invertebrates and substrate type contacted by an imaginary line perpendicular to the bottom. Using this method the percent cover of all species combined can exceed 100%. Table 3 on page 20 lists the species of algae and macroinvertebrates that are likely to be monitored for criterion 4.

Process studies. Focused monitoring and experiments will be used to determine how different reef designs affect the recruitment and survival of species known to inhibit the development of a mature kelp forest community. One such species is the sea fan, *Muricea* spp., which has been shown to monopolize space and exclude kelp on other artificial reefs. Because *Muricea* grows slowly it is unlikely to dominate any of the experimental modules even if it were to recruit during the first year following reef construction. Therefore, it is unlikely that the transect monitoring of large individuals will reveal a *Muricea* "problem" within the five year experiment. To address this concern, studies aimed at *predicting* how the different reef designs will enhance or inhibit *Muricea* and other non-desirable species will be done.

To make accurate predictions about population size and structure requires information on patterns of recruitment, growth and mortality and the factors that affect them. Information on patterns of recruitment, growth and mortality will be obtained from focused monitoring; information on the factors that affect these patterns will be obtained from experiments.

Monitoring will be done to determine densities of all age/size classes of *Muricea* and other species deemed to be important. Densities of new recruits will be monitored monthly on artificial or natural substrates to estimate recruitment rates of new individuals. Densities of larger/older stages will be monitored in permanent quadrats. Individuals will be identified and their growth and mortality will be followed over time. Sampling of natural populations will be supplemented with transplant experiments to evaluate factors affecting stage-specific growth and survivorship. Field sampling and experiments will be designed to

determine the extent to which recruitment, growth and survivorship of *Muricea* and other species are dependent on substrate type, substrate coverage, boulder size, location within a module (i.e., edge vs. middle), location within the experimental site.

6.0 DATA ANALYSIS

Information from previous studies of artificial and natural reefs suggests that community development proceeds to one of several biological configurations or endpoints. From the viewpoint of this project, the most desirable of these configurations is a forested community characterized by giant kelp and a diverse assemblage of other algae, invertebrates and fish. Less desirable configurations include densely vegetated communities lacking giant kelp, and sparsely vegetated communities dominated by invertebrates such as sea urchins, sea fans, and bryozoans. The hope is that development of the reef community will follow a relatively deterministic path that leads to one of these biological configurations within five years. The reality is that this may not happen. Moreover, the dearth of data on the development of kelp communities on artificial reefs makes predicting their ultimate biological configuration problematic.

Data collected from the experimental kelp reef will be used primarily to address three questions: (1) Which of the six experimental reef designs meet the four performance criteria? (2) How does performance vary among experimental reef designs? (3) What biological and physical processes explain differences in the observed and predicted performance of the different reef designs?

6.1 METHODS FOR EVALUATING WHICH EXPERIMENTAL REEF DESIGNS MEET THE FOUR PERFORMANCE CRITERIA

Determining whether a particular reef design has met the four performance criteria is only appropriate if community development on the experimental modules has reached or appears to be reaching an endpoint. The following sections describe the analytical procedures that will be used to evaluate each of the four performance criteria in the event that biological endpoints are reached.

6.1.1 *CRITERION 1:* AT LEAST 90% OF THE AREA OF HARD SUBSTRATE (AS DETERMINED BY THE FIRST POST-CONSTRUCTION SURVEY) MUST REMAIN AVAILABLE FOR ATTACHMENT OF REEF BIOTA

The objective for the analysis of criterion 1 will be to determine the fractional loss of hard substrate associated with each reef design as well as the rate at which such loss occurs. This will be done using data collected from semi-annual sidescanning sonar and diver surveys of the coverage of hard substrate of each module. Results of these analyses will be useful in determining the extent to which the nominal coverage of hard substrate

required by the mitigation reef will need to be adjusted to meet the substrate standard that at least 90% remain unburied.

6.1.2 *CRITERION 2:* THERE MUST BE A SUSTAINED GIANT KELP DENSITY OF AT LEAST 4 ADULT PLANTS PER 100 M^2

The permit requires the mitigation reef to produce a sustained abundance of 4 adult giant kelp plants per 100 m^2. This translates into a sustained population of 20 adult giant kelp plants for each 450 m^2 area censused on each module. A particular reef design will meet criterion 2 if all seven of its modules sustain a giant kelp density of at least 20 adults per 450 m^2 area. The proportion of replicate modules in a particular design that achieves a density of > 20 adult kelp plants per 450 m^2 will be useful in determining the acreage of reef necessary to produce 150 acres of medium-to-high density adult kelp. For example, if all seven modules of a particular reef design sustained at least 20 adults in the 450 m^2 survey area, then one might assume that 150 acres of that design would be sufficient to support 150 acres of medium to high density kelp. If on the other hand only 5 out of 7 modules achieved a density of ≥ 20 plants, then one would expect that 210 acres of that design (150 acres/(5/7)) would be needed to sustain 150 acres of medium to high density kelp.

6.1.3 CRITERION 3: ADULT AND YOUNG-OF-YEAR FISH ASSEMBLAGES MUST BE SIMILAR IN DENSITY AND SPECIES NUMBER TO NATURAL REEFS WITHIN THE REGION

CRITERION 4: ALGAL AND MACROINVERTEBRATE ASSEMBLAGES MUST BE SIMILAR IN ABUNDANCE (DENSITY OR % COVER) AND SPECIES NUMBER TO NATURAL REEFS WITHIN THE REGION.

In contrast to the fixed performance criteria for hard substrate and adult giant kelp abundance, the performance criteria for fish, understory algae, and macroinvertebrates inhabiting the kelp forest are "relative." The permit requires that these assemblages be "similar in density and species number to natural reefs within the region." Thus, the standards do not require that the mitigation reef have the same species as natural reefs, or that each species occurs in the same abundance. The CCC required only that the total density and number of species to be similar, in part to avoid making the performance standards too difficult for the mitigation reef to achieve. If similarity is defined too stringently, then a given reef design might not be considered for the larger mitigation reef even if it has a high chance of producing abundant resources. On the other hand, if similarity is defined too loosely, then incorporation of a substandard experimental design could result in the mitigation reef meeting all legal obligations, but being a biological failure because it doesn't provide adequate compensation for lost resources.

Judging whether a module's performance complies with the permit requirements with regards to the fixed standards measured by criteria 1 and 2 requires little analysis. By

contrast, evaluating the relative standards measured by criteria 3 and 4 involves measures of similarity, which rely on statistical comparisons for evaluation. Unfortunately, there is no single best approach for determining similarity in criteria 3 and 4. Therefore, we will use three approaches; one using univariate statistics and two using multivariate statistics. Because we are most interested in detecting effects that are biologically meaningful, analyses will emphasize high power to detect a failure to meet the criteria rather than the level of statistical significance.

6.1.3.1 Univariate tests.

The univariate analysis to be used to test for similarity between a particular reef design and natural reference reefs will be a series of one-tailed t-tests on each of 10 dependent variables. The ten dependent variables to be evaluated in separate t-tests are:

1) number of species of fish
2) total density of fish
3) number of species of young-of-the-year fish
4) total density of young-of-the-year fish
5) number of species of invertebrates
6) total coverage of colonial invertebrates
7) total density of solitary invertebrates
8) number of species of benthic algae
9) total coverage of clonal benthic algae
10) total density of solitary benthic algae

These variables are those listed as performance standards in the permit with the exception that abundance of invertebrates and algae are separated into solitary and colonial/clonal forms. This separation is necessary to solve the analytical problem of combining abundance estimates of solitary forms that are based on counts with those of colonial and/or clonal forms that are based on percent cover.

Each t-test will test the null hypothesis that the mean value of an independent variable for a given reef design is equal to or greater than the mean of the reference reefs. Replication for these analyses will come from the seven blocks arranged at increasing distance from SMK. Separate analyses will be done for each sample period and the use of repeated measures analyses will be explored if the criteria are met for more than one survey. A design will be considered to have met criterion 3 only if the results of the t-tests show no significant difference between that design and the reference reefs for all four of the independent variables that pertain to this criterion (i.e., variables 1 through 4 above).

Similarly, a design will be considered to have met criterion 4 only if the results of the t-tests show no significant difference between that design and the reference reefs for all six of the independent variables that pertain to this criterion (i.e., variables 5 through 10 above).

The variables listed in the permit and used in this univariate approach combine the abundances of all species and thus weigh them all equally (e.g., three barnacles have the same value as three sea stars). However, species naturally occur in different abundances, especially those that occupy different trophic levels (e.g., barnacles are typically more abundant than the seastars that prey on them). Consequently, spurious conclusions may be reached if evaluation of the criteria is based solely on this approach

6.1.3.2 Multivariate similarity analyses

An alternative to the univariate approach above is to use analyses that deal with all of the components of criteria 3 and 4 simultaneously. A variety of methodologies have been developed to evaluate the similarity of ecological communities, the most common being cluster analysis. These techniques can be used to evaluate the degree of similarity between the various reef designs and the natural reference reefs. While these analyses would be useful for understanding the nature of the similarity between communities on the experimental modules and natural reefs, they unfortunately cannot be used to evaluate whether a reef design has met performance criteria 3 and 4.

6.1.3.3 Binomial tests.

A multivariate approach that can be used to evaluate whether a reef design meets criteria 3 and 4 is one that evaluates similarity using a binomial model. In this approach we will assume interactions exist among all three experimental factors (i.e., substrate type, substrate coverage, and distance from SMK) and test each of the 42 experimental modules separately against each criterion. Moreover, rather than using the few broad categorical variables listed in the permit to evaluate similarity such as proposed for the univariate approach, the binomial approach will use many relatively small taxonomic groupings as variables in testing whether a given criterion has been met (e.g., the variables used to evaluate criterion 4 using the binomial approach might be the abundances of the different taxa listed in Table 3).

The null model in the binomial approach is that the resource value of an experimental module represents a sample from the same population as the seven reference reefs. It follows that each of the eight sites (i.e., the experimental reef module and the seven natural reefs) has an equal 12.5% chance (i.e., 1/8) of having the poorest (which is generally the lowest) value for any variable. Therefore, based on chance alone, the probability of the value for a single variable being lower on a given experimental module than on any of the natural reefs will be 0.125. In a case where a criterion was estimated

from 40 variables an experimental module would fail to meet the criterion if it had the lowest values for significantly more than 5 variables (i.e., 40 variables x 0.125 = 5).

In contrast to the univariate approach which groups trophically diverse species into a few large variables, the binomial approach to assessing similarity uses many individual species or small taxonomic guilds as variables. Moreover, unlike the univariate approach the binomial approach does not require that the value of *every* variable be as high as on natural reefs, but instead evaluates the variables collectively to determine whether a particular reef design is likely to provide fish or algal/invertebrate resources that are similar to those provided by natural reefs in the region. If it is determined that some variables are considered to be more important than others, then they can be weighted accordingly. For example, species richness may consist of a single variable while species abundance will be estimated using a variable for each taxon. Thus, it may be necessary to weight species richness more heavily than the abundances of individual species to meet the goals of the permit. Similarly, it may be necessary to weight species that have a disproportionate influence on community structure (e.g., sea urchins, *Muricea*, etc.) differently than less influential species (e.g., anemones, sponges, etc.).

6.2 METHODS FOR COMPARING THE PERFORMANCE OF DIFFERENT REEF DESIGNS.

Comparisons among the different reef designs will be particularly useful in the event that the biological configurations of the modules do not reach an endpoint within the five year experiment. Such comparisons will be done using a series of univariate repeated measures analyses of variance that evaluate the main effects of, and interactions between, substrate coverage, substrate type and distance from SMK. Planned and unplanned comparisons will be done to evaluate differences among treatments. As in the analyses described in section 6.1, emphasis will be placed on maintaining high power to detect differences among reef designs rather than on levels of significance.

ANOVAs are appropriate for comparing experimental treatments if the design of the experiment adheres to that described in the preliminary plan for the experimental reef. However, vagaries of construction may cause this not to be the case. Therefore, depending on the actual physical configuration of the experiment, it may be more appropriate to regard some of the treatments (i.e., substrate coverage and distance from SMK) as continuous rather than categorical variables, and thus employ analysis of covariance rather than ANOVA.

6.3 METHODS FOR EVALUATING PROCESS STUDIES.

In approving the amended permit, the Coastal Commission specified that the experimental phase last five years rather than the ten years recommended in the staff report. The Commission was advised that five years would likely not be sufficient time to determine

the long-term performance of the experimental reef based on monitoring data alone, and they approved the use of additional experiments and studies to aid in predicting the long-term performance of the different designs tested in the experimental reef. These "process studies" will be designed to determine: (1) sources of variability in the recruitment and survivorship of key species that influence the long-term biological configuration of a reef, and (2) whether the processes that control recruitment and survivorship of these key species are affected by specific features of reef design.

The specific analysis to be used in the process studies will undoubtedly vary with the experiment or study undertaken. Studies that use time series data to evaluate how certain physical and biological process vary with reef design and location will be analyzed by repeated measures ANOVA (or ANCOVA if it is determined to be more appropriate). For example, the extent to which fish feeding activity varies among reef designs and distance from SMK could be determined by a three factor repeated measures ANCOVA where substrate type and substrate coverage are considered fixed factors, survey date a random factor, and distance from SMK a covariate. Similar analyses could be used to evaluate recruitment, growth, and mortality in kelp, gorgonians, or other organisms. Again, emphasis in these analyses will be placed on high power to detect differences among treatments rather than on levels of significance.

7.0 DISSEMINATION OF RESULTS

In order to meet the goals and objectives of the experimental reef project, close interaction with SCE and state and federal resources agencies during the experimental phase of the artificial reef mitigation project is essential. Three procedures will be followed to ensure efficient and effective communication with the above entities: (1) copies of the data will be made available as soon as it has been verified, (2) regular meetings will be held to discuss results and potential changes in monitoring design, and (3) annual meetings will be held with all interested parties.

The product of this monitoring program will be a final report to the Executive Director on all findings gathered during the artificial reef experiment. The report will include a recommendation on the substrate types and coverages deemed suitable for the mitigation reef. The final report and the data sets contained within it will be made available to SCE and other interested parties for review and comment. The final report and comments on it will form the basis for the Executive Director's decision on the type(s) and coverage(s) of substrate allowable for the mitigation reef.

Table 1: Annual work schedule for monitoring activities.

SAMPLING METHOD	VARIABLES SAMPLED	TIME OF YEAR SAMPLED											
		J	F	M	A	M	J	J	A	S	O	N	D
Sidescanning sonar	% cover and height of hard substrate		X						X				
Diver surveys of adult kelp	giant kelp abundance		X						X				
Fish transects	Abundance and age class of fish									X	X	X	
Benthic quadrats	Abundance and age class of large solitary algae and macro invertebrates						X	X	X				
Line intercept	% cover of substrate types, understory algae, and sessile invertebrates						X	X	X				

Table 2: Annual work schedule for process studies.

CRITERION	VARIABLES SAMPLED	TIME OF YEAR SAMPLED											
		J	F	M	A	M	J	J	A	S	O	N	D
1. Substrate	Subsidence and sediment accumulation	X	X	X				X	X	X			
2. Giant kelp	spore set, gametophyte recruitment	X	X	X	X								
	juvenile survivorship				X	X	X	X	X				
	adult size, reproduction, mortality	X	X			X	X			X	X		
3. Fish	feeding rates								X	X			
4. Invertebrates/Algae	recruitment	X	X	X	X	X	X	X	X	X	X	X	X
	size, mortality		X						X				

Table 3: Organisms and substrates likely to be sampled and the method of sampling that will be used. q = counted in quadrats. pc = percent cover estimated with point contact.

TAXON	SAMPLING METHOD
ALGAE	
Macrocystis pyrifera,	q
Pterygophora californica	q
Eisenia arborea	q
Laminaria farlowia	q, pc
Desmarestia ligulata	q, pc
Cystoseira osmundaceae	q, pc
foliose brown algae	pc
erect fleshy red algae	pc
erect calcified red algae	pc
crustose fleshy red algae	pc
crustose calcified red algae	pc
green algae	pc
MACRO-INVERTEBRATES	
Styela monteryensis	q
Strongylocentrotus purpuratus	q
Strongylocentrotus franscıscanus	q
Lytechinus anamesus	q
Parastichopus parvimensis	q
Pisaster giganteus	q
Asterina miniata	q
Dermasterias imbricata	q
Astrometis sertulifera	q
Orthosterias koehleri	q
Pycnopodia helianthoides	q
Panulirus interruptus	q
Haliotis spp.	q
Astraea undosa	q
Kelletia kelletii	q
Conus californicus	q
Pteropurpura festiva	q
Muricea californica	q
Muricea fruticosa	q
Tethya aurantia	q
Diopatra ornata	pc
Phragmatopoma californica	pc
colonial tunicates	pc
bryozoans	pc
barnacle spp	pc
bivalve molluscs	pc
hydroids spp	pc
anenome spp	pc
sponges	pc
SUBSTRATE	
concrete	pc
rock	pc
sand	pc
silt	pc

Appendix F

Possible Impacts of the Southern California Edison Kelp Reef Off San Clemente on the Marine Environment

POSSIBLE IMPACTS OF THE SOUTHERN CALIFORNIA EDISON KELP REEF OFF SAN CLEMENTE ON THE MARINE ENVIRONMENT

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1. INTRODUCTION

Southern California Edison (SCE) is proposing to construct both an experimental and a full mitigation artificial reef for giant kelp (*Macrocystis* species) This report presents the possible physical impacts of the proposed reef on waves, beaches, currents, and nearshore sedimentation A description of the project is given in Chapter I of the EIR. The proposed artificial mitigation reef will be constructed in two phases, the first phase is a 16.8-acre experimental reef about 0 6 miles offshore from the City of San Clemente (Figure 1-1) The final mitigation build-out reef will be approximately 133.2 acres, designed in accordance with the results of the experimental reef (Figure 1-1). This project is proposed by the owners of the San Onofre Nuclear Generating Station, to mitigate for the loss of kelp offshore from San Onofre, California. The benefits of the mitigation kelp reef include a new area of giant kelp, increased numbers of species and individuals of fish, increased algal and invertebrate diversity, and increased productivity of the area evidenced by more drift algae on the surface and along the bottom.

The proposed experimental reef will be constructed with quarry rocks ranging in size from 0.3 to 1 m (1 to 3 ft) in diameter and recycled concrete slabs approximately 0 6 m by 0.9 m by 0.15 m (2 ft x 3 ft x 6 in) (SCE, 1995, and Coastal Resources Assoc., Inc., 1997). The rocks and concrete will be laid down on sand less than 0.5 m (20 in) thick overlying hard substrate in water depths from about 10 to 15 m (33 to 50 ft). The layout will comprise seven plots, each with a set of six modules of 0.4 acres each, separated by at least 46 m (150 ft) Each set of six modules will have six reef designs: quarry rocks covering 17%, 34%, and 67% of the area of the module, and recycled concrete slabs with the same coverage levels The area off San Clemente with suitable depth and substrate for these reef designs is about 500 m (1,650 ft) wide across the shelf and 2,250 m (7,500 ft) long alongshore, amounting to about 355 acres, representing the proposed lease area (Ecosystems Management Assoc. 1997; Elwany and Deysher, 1998).

This report examines potential impacts to specific areas of the full 150-acre mitigation reef. T:.e report relies primarily on existing data and studies prepared for other similar areas to determine the likelihood of these impacts. The physical impacts of the proposed artificial kelp reef are the same as those of natural kelp beds. Offshore kelp beds could impact nearby beaches by dampening the height and altering the direction of sea and swell waves, and by slowing coastal currents Since waves and

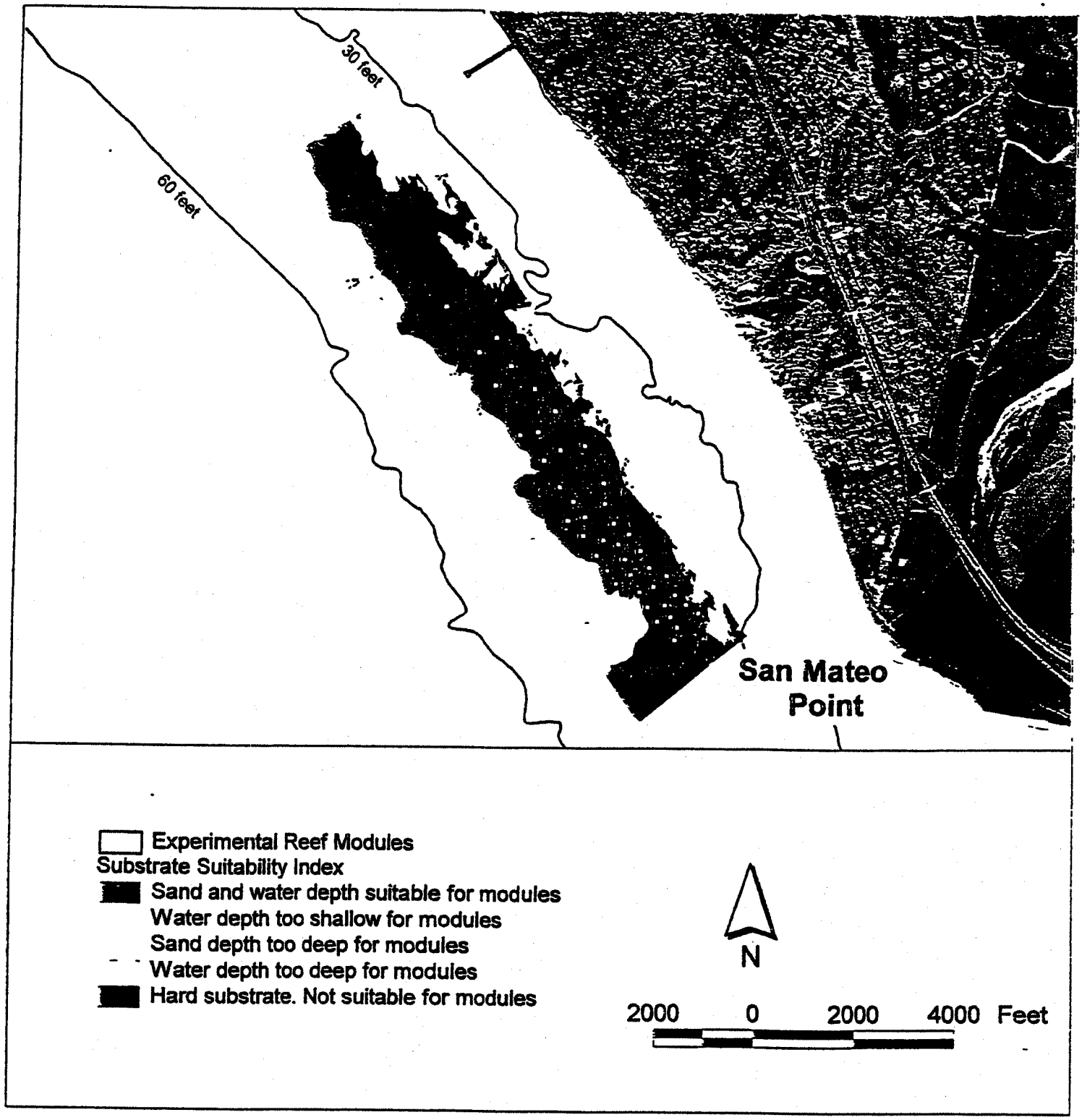

Figure 1-1. Location map of the Southern California Edison Kelp Reef off San Clemente. Yellow squares indicate the location of the 42 experimental modules. The red area shows where the sand thickness is less than 0.5 m (1.6 ft), the possible area for the build-up reef.

wave-induced currents transport sediments alongshore in the nearshore zone, a new kelp bed could cause erosion or accretion of the inshore beach These impacts are the subject of this report

To investigate the impacts, field experiments were performed in the North Carlsbad Kelp Bed, with wave gauges located inshore and offshore from the kelp at impact and control stations, and current meters located inside and outside of the kelp (Elwany et al , 1993a, 1993b, and 1995) The results from these experiments are described and discussed below, and are useful to address the possible impacts of the new kelp reef.

2. EFFECTS OF A KELP BED ON WAVES

As stated, a field experiment was undertaken to assess the impact of a kelp bed on shoreward propagating waves. The purpose of the field experiment was to measure the wave field offshore and onshore of a kelp bed and to measure the wave field in the same two water depths at a nearby control site. Observations at the kelp and control stations are compared to identify kelp-induced changes in the wave field. Surface gravity waves are the principal cause of sediment transport within and shoreward of kelp beds located in shallow waters. If wave energy is not significantly reduced or the direction of propagation altered through the kelp, then the kelp is unlikely to cause either erosion or accretion to the area beaches.

The North Carlsbad Kelp Bed is a typical southern California bed with average density of about 10 plants per 100 m^2 and maximum density of about 25 plants per 100 m^2 lying between bottom depths of 8 and 13 m (Figure 2-1). The kelp bed is located about 450 m from shore, with length alongshore about 700 m and width about 350 m (Elwany et al., 1995). Inter Ocean Systems S4DW and S4 wave gauges (Tragesar and Elwany, 1990) were deployed at two stations immediately midway along the inshore and offshore sides of the kelp, on the depth contours of 8 m and 13 m, respectively Two control stations were established on the same contours, 750 m up-coast from the kelp stations.

Extensive numerical simulations of waves propagating across the continental shelf, following O'Reilly and Guza (1993), suggested that the wave field at the 13-m depth control and kelp sites would be very similar, as was subsequently observed There were two deployments (about one

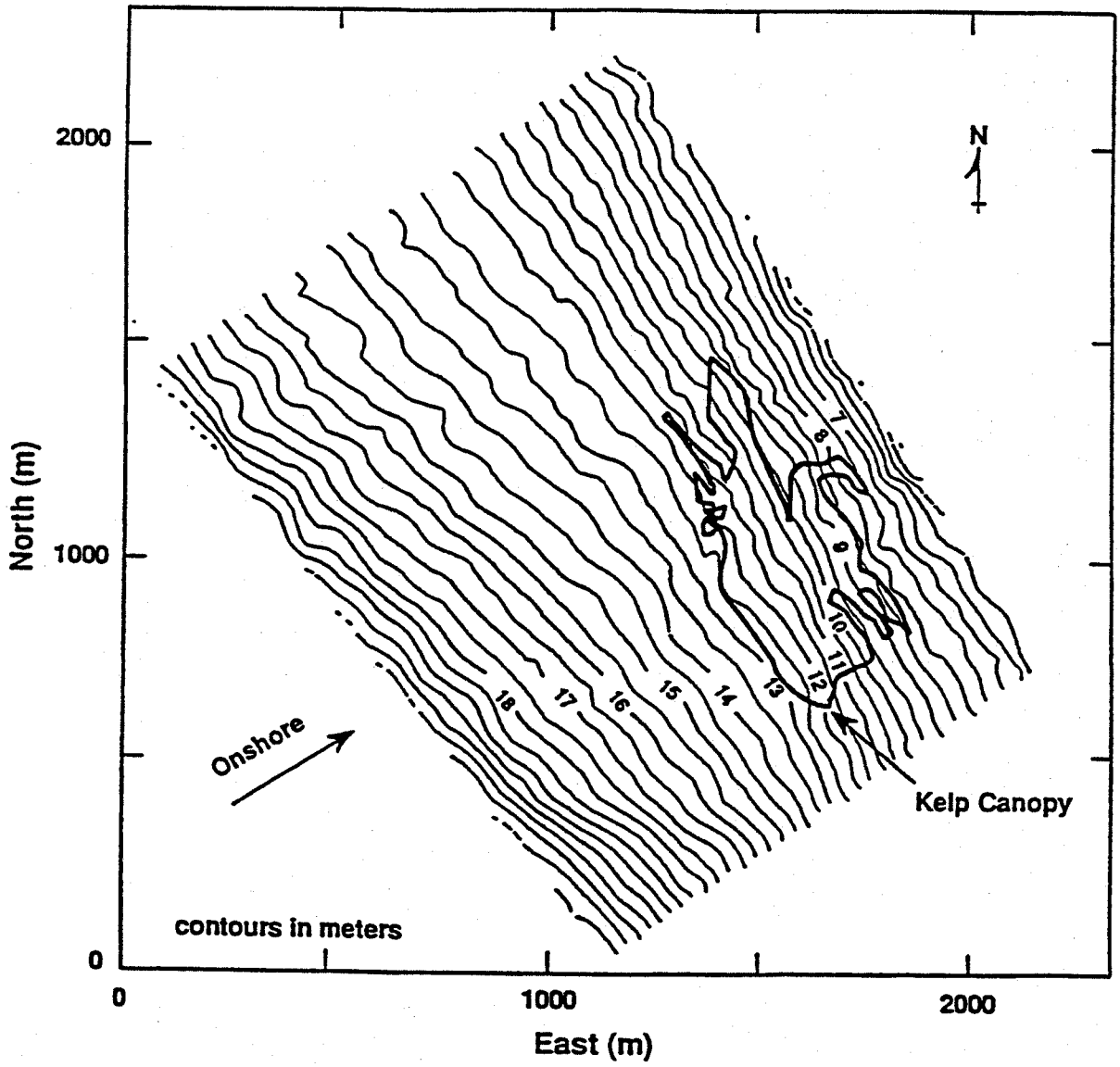

Figure 2-1. Bathymetry and kelp canopy coverage at Carlsbad Kelp Bed.

month each) with instrument locations shown in Figure 2-2 Three directional wave gauges (PUV) and one pressure sensor (P) were deployed for this study The duration of the experiment was 67 days The wide range of wave conditions measured during the experiment is shown in Figure 2-3

Results are shown in Figures 2-4 through 2-7 Figures 2-4(a) and (b) are plots of daily significant wave heights at the kelp station versus those at the control station If wave heights were identical at the kelp and control stations, all the data-points would lie on a line of slope 1 1 The results show that all data-points (except one) lie close to the 1.1 line

Figures 2-5(a) and (b) show plots for wave direction at peak period, with all data-points lying close to a line of slope 1.1. Here, though, the data-points from the first deployment lie about the same small distance below the line, suggesting a constant compass difference of about 3-5° between the kelp and control stations at 13 m Figures 2-6(a) and (b), and Figures 2-7(a) and (b) show energy spectra at the offshore and inshore stations The outer kelp and control stations differ by 5-10% at frequencies above 0 10 Hz (periods shorter than 10 sec), whereas the spectra at inshore stations are nearly identical in this range The small energy differences are likely instrumental or analytical uncertainties The similarity of the wave field at the onshore kelp and control sites shows this typical southern California kelp bed, with an average density of 10 plants per 100 m^2 (330 ft^2), does not have a significant effect on waves for wave periods of 3 to 20 seconds The wave gauges had an effective cutoff for waves of frequency greater than 0.3 Hz (period shorter than 3 seconds), so it is possible that short waves can be damped by kelp. These short waves, though, have small amplitudes off southern California and attenuate rapidly with depth, resulting in negligible effects on sand movement.

The conclusion that the kelp bed did not measurably affect waves is based on the assumption that the bathymetry between the 13 m and 8 m kelp stations was similar to the bathymetry between the 13 m and 8 m control stations. It is assumed bathymetry-induced differences between wave fields at the kelp and control sites are negligible. It is possible, albeit unlikely, that this assumption is false and the similarity between waves at the 8-m sites is due to bathymetry-induced reduction of wave energy at the control site. Therefore, a numerical model was implemented to show that bathymetry did not introduce such effects (Elwany et al., 1993a and 1995). The numerical model neglected any possible effects of kelp in order to focus on bathymetry. The results of the numerical model effort (Elwany et al., 1993a, and O'Reilly and Guza, 1993) show agreement between the predicted and observed

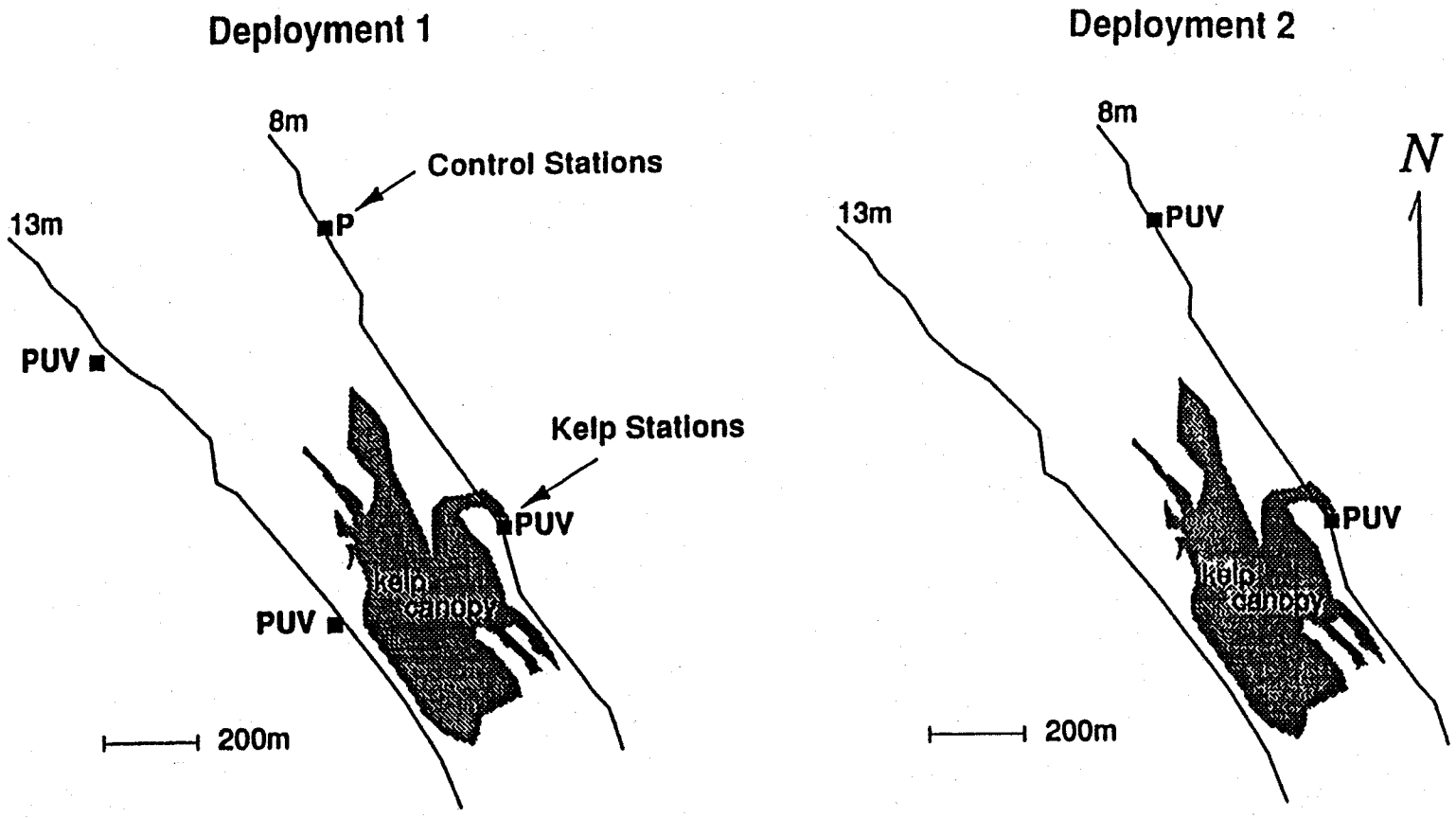

Figure 2-2. Instrument positions at Carlsbad Test Site, 8-m and 13-m depth contours are indicated.

ratios of wave height offshore and inshore of the kelp bed This quantitatively supports the conclusion that the kelp had no measurable effect on the waves

The results from the Carlsbad experiment are applicable to the San Clemente Kelp Bed Although the Carlsbad Kelp Bed may be narrower (350 m) than the proposed San Clemente Kelp Bed (maximum width = 500 m), the San Clemente Kelp Bed is likely to be less dense than the Carlsbad Kelp Bed with a target density of 4 plants per 100 m^2 It is likely that even if the Carlsbad Kelp Bed was twice as wide (about 700 m), it would not have measurable effect on waves In addition, the Carlsbad Kelp Bed is a dense bed with mean density of 10 plants per 100 m^2 Therefore, the San Clemente Kelp Bed should not have a detectable effect on the waves even though it is longer than the Carlsbad Kelp Bed The difference in the length of the kelp beds has no effect on our conclusions since the kelp reef width is the prime factor in determining the effect of kelp on waves.

A very wide kelp bed (much greater than 500 m) would have an effect on waves Unfortunately, state-of-the-art numerical models cannot accurately predict the width at which a kelp bed would affect waves, because the effective drag exerted by individual or grouped kelp plants is unknown (Dalrymple, et al., 1984, Kobayashi, et al., 1993, and Seymour, 1996) and the hydrodynamic interaction between waves and the compliant kelp plants are not well understood Kelp plants have apparently evolved a hydrodynamically streamlined form, which enables them to comply with the flow, both at the small scale of individual fronds and at the larger scale of the plant stalk that spans the water column There are no models that accurately estimate the net drag of these hydrodynamically-complex plan structures; so, wave propagation models cannot be used for accurate predictions as yet.

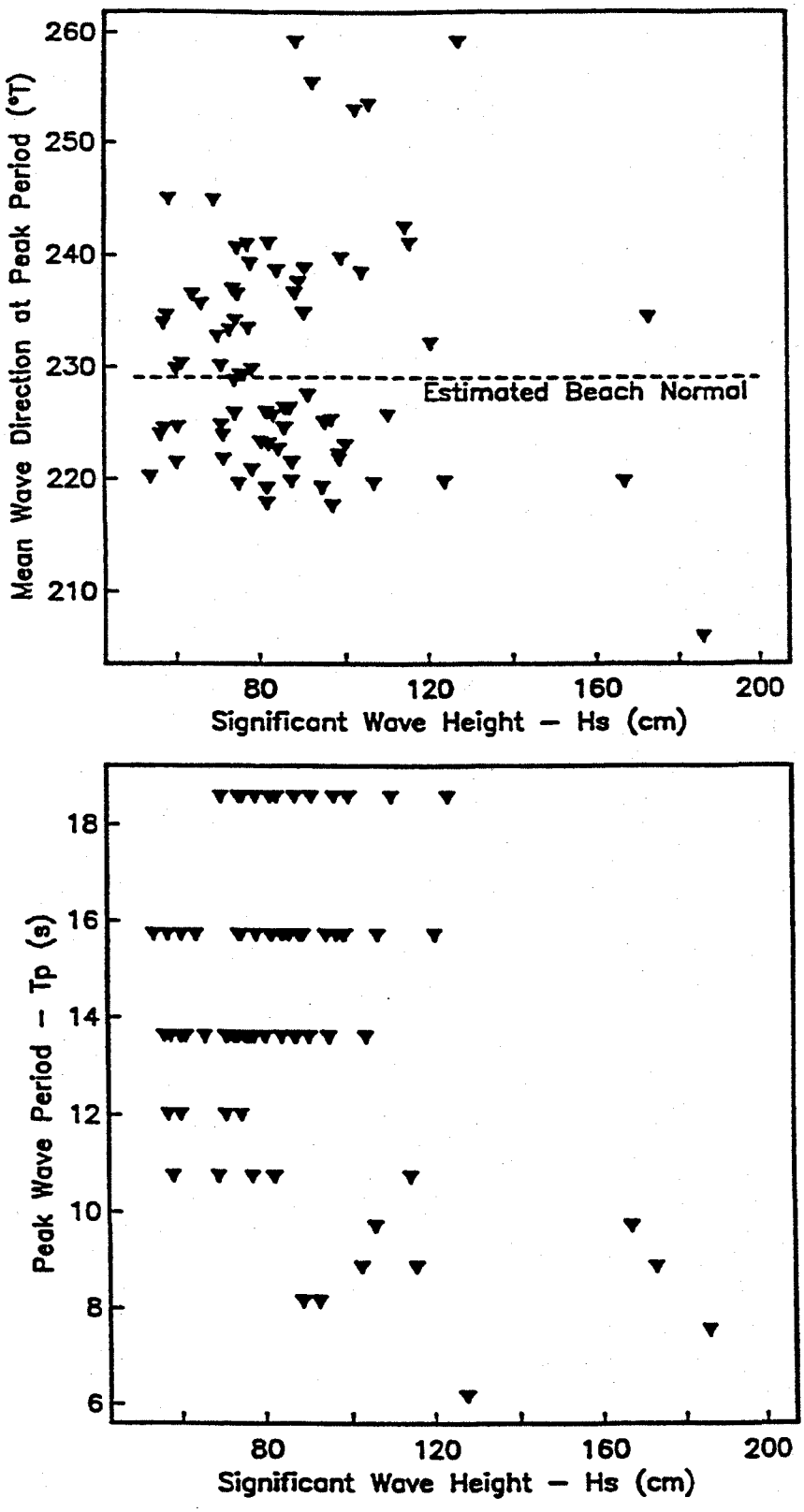

Figure 2-3. Range of wave conditions measured (daily) at the 8-m kelp station.

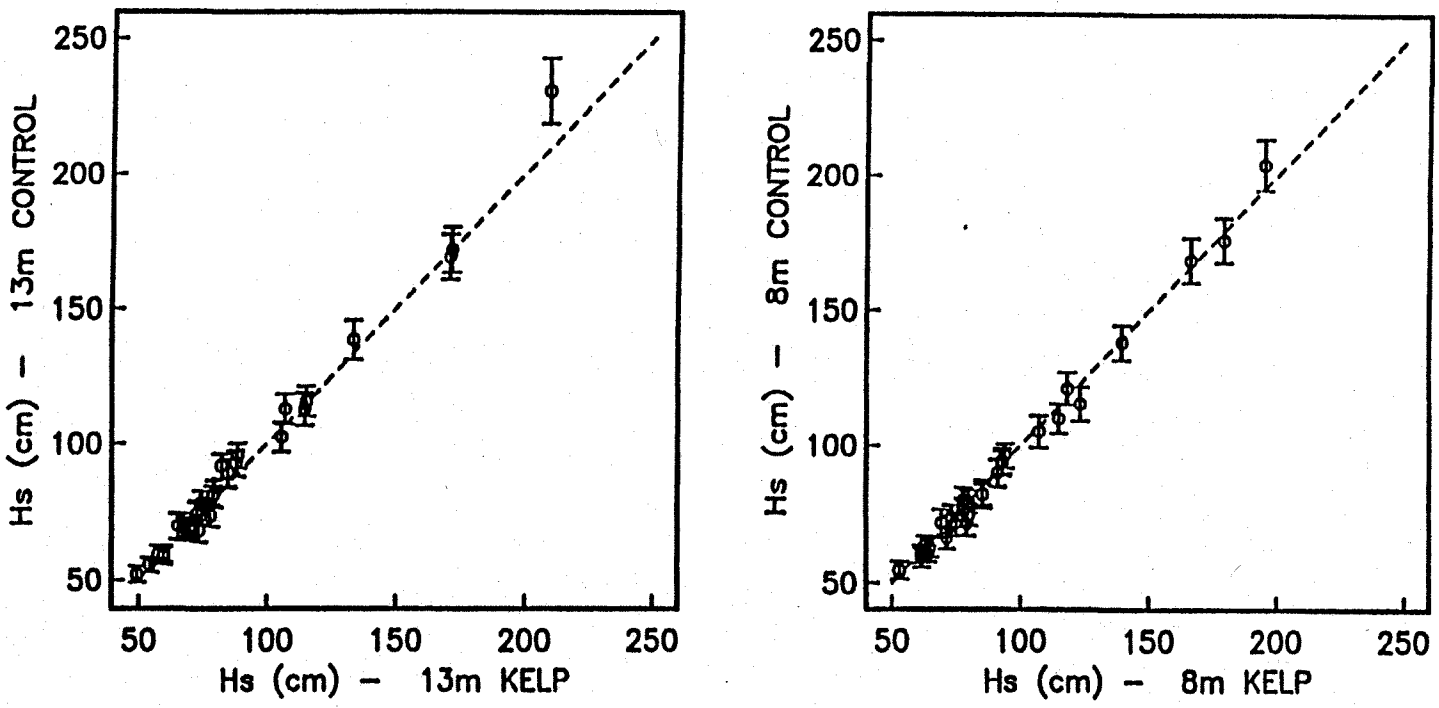

Figure 2-4. (a) Significant Wave heights at 13-m Stations; (b) at 8-m Stations during Deployment 1.

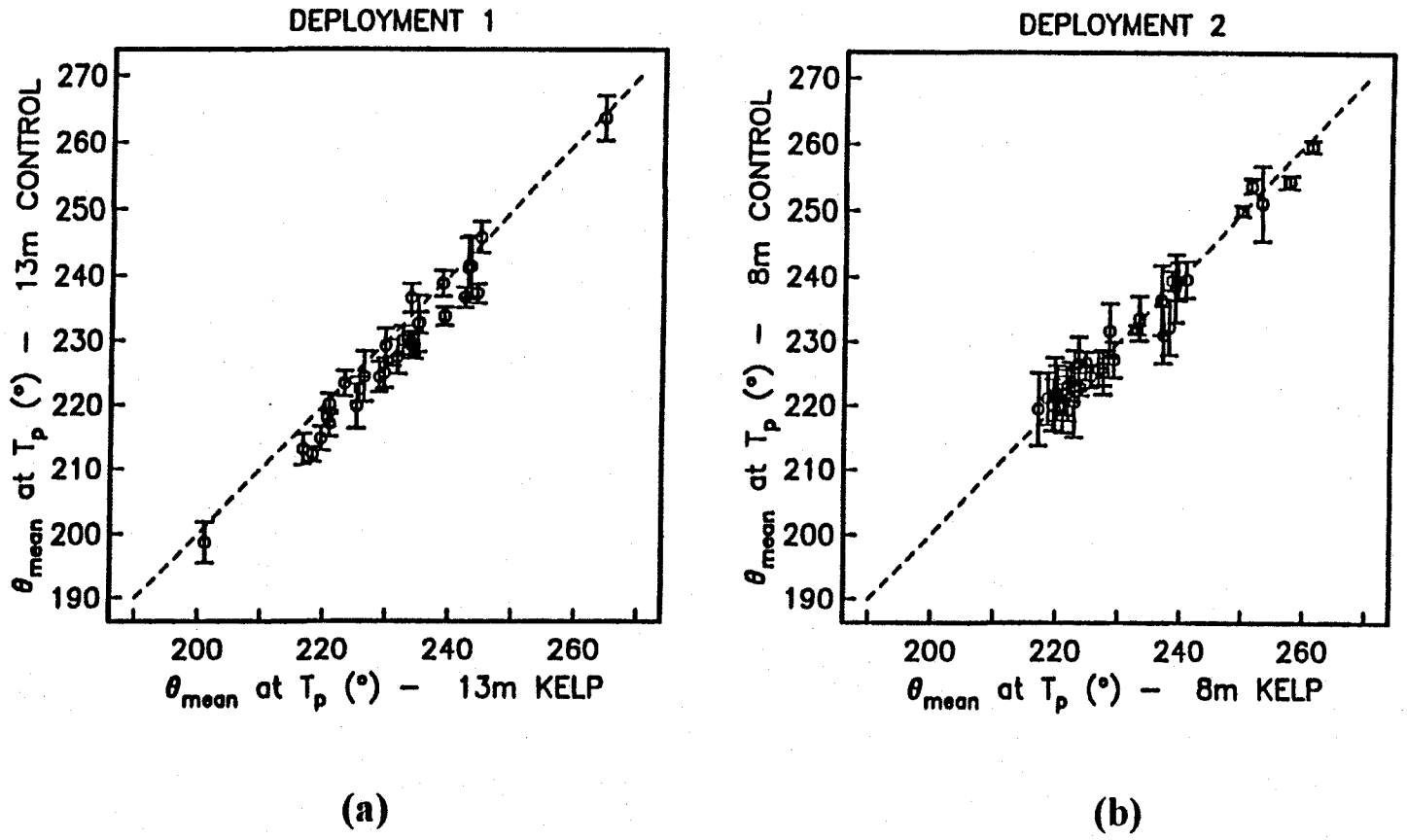

Figure 2-5. (a) Mean wave directions at peak wave period at 13-m Stations; (b) 8-m Stations

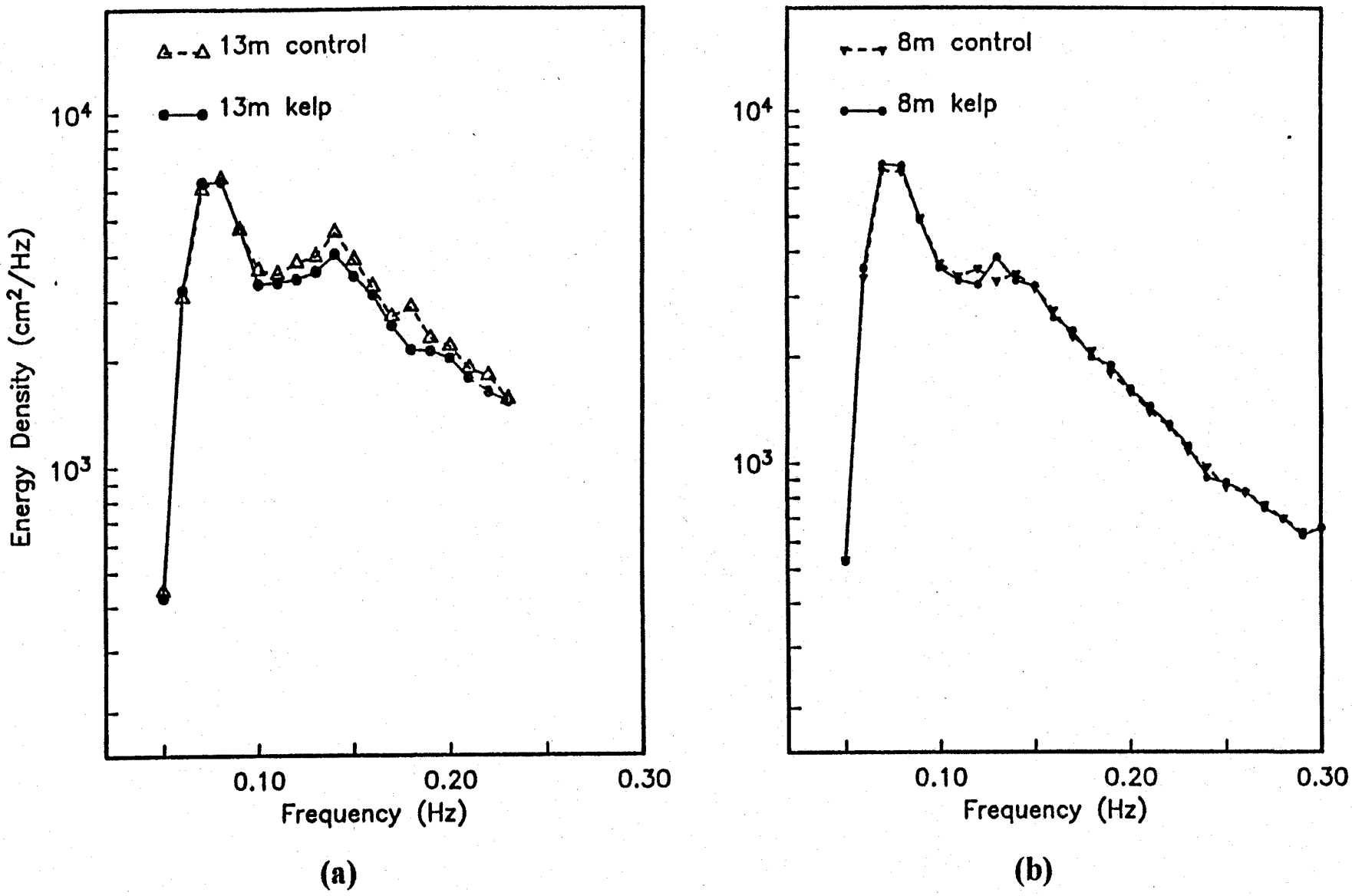

Figure 2-6. Averaged spectra of sea surface elevation during Deployment 1.

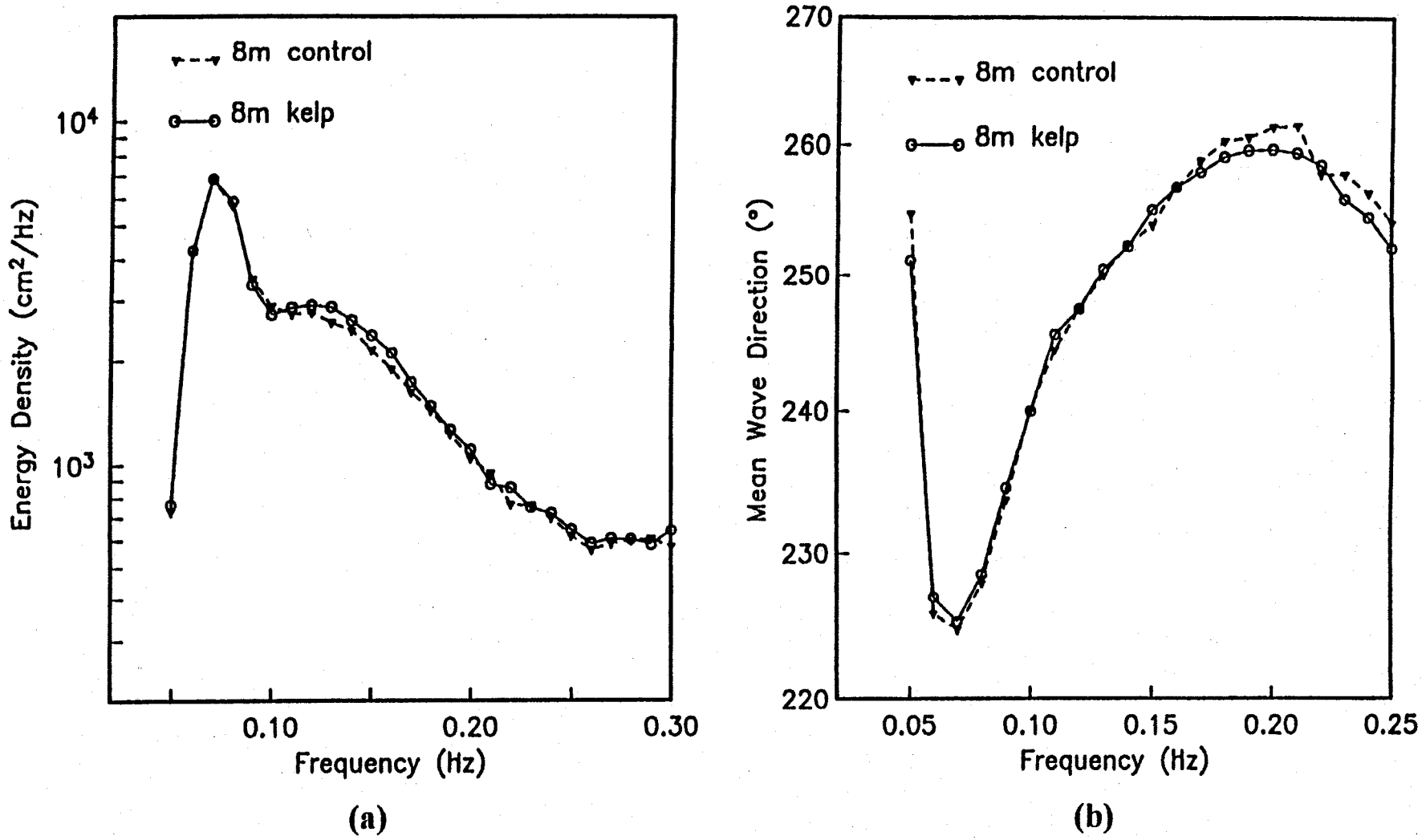

Figure 2-7. (a) Averaged sea surface elevation spectra; (b) Mean wave direction at 8-m stations during Deployment 2

3. EFFECTS OF KELP ON COASTAL CURRENTS

The speed of coastal currents flowing through a kelp bed is reduced by the drag of the kelp plants, and part of the flow is excluded from the bed and diverted around the bed (Jackson, 1983, Jackson and Winant, 1983) Kelp-induced changes in coastal currents may effect transport, erosion, or deposition of nearshore sediments

Useful estimates of the increase of speed in longshore currents between the kelp and the shore are provided by two-dimensional potential-flow solutions for the flow around an impervious elliptical kelp bed, combined with the longshore flow in the absence of the kelp (Elwany et al., 1993a). The potential-flow solutions are approximately applicable to the real problem because the horizontal distribution of flow around a kelp bed or other partial obstacles is largely governed by the continuity equation.

Taking the origin at the center of an impermeable elliptical kelp bed (Figure 3-1), with positive x directed upcoast and positive y directed shoreward, the ratio of longshore current u to the uniform longshore current at distance $-U$ (directed downcoast) on the y-and x-axes are given by·

On the y-axis (x=0), $$u = \left[\frac{U}{(a-b)}\right]\left[by(y^2 + a^2 - b^2)^{-1/2} - a\right] \qquad (1)$$

At the middle of the inshore and seaward edges of the kelp (y = b), where u is maximum, equation (1) can be written as:

$$u_{max} = -U\,(1+b/a) \quad \text{at } y = b$$

If a permeable kelp bed excludes a fraction, F, of the longshore flow leaving the remaining fraction (1-F) unchanged, the longshore velocity outside this bed can be written as·

$$u' = -(1-F)U + Fu\,,$$

where u is the velocity around the impermeable ellipse. The maximum velocity for this bed, at x=0, $y = \pm b$, is:

$$u'_{max} = -U(1 + Fb/a)$$

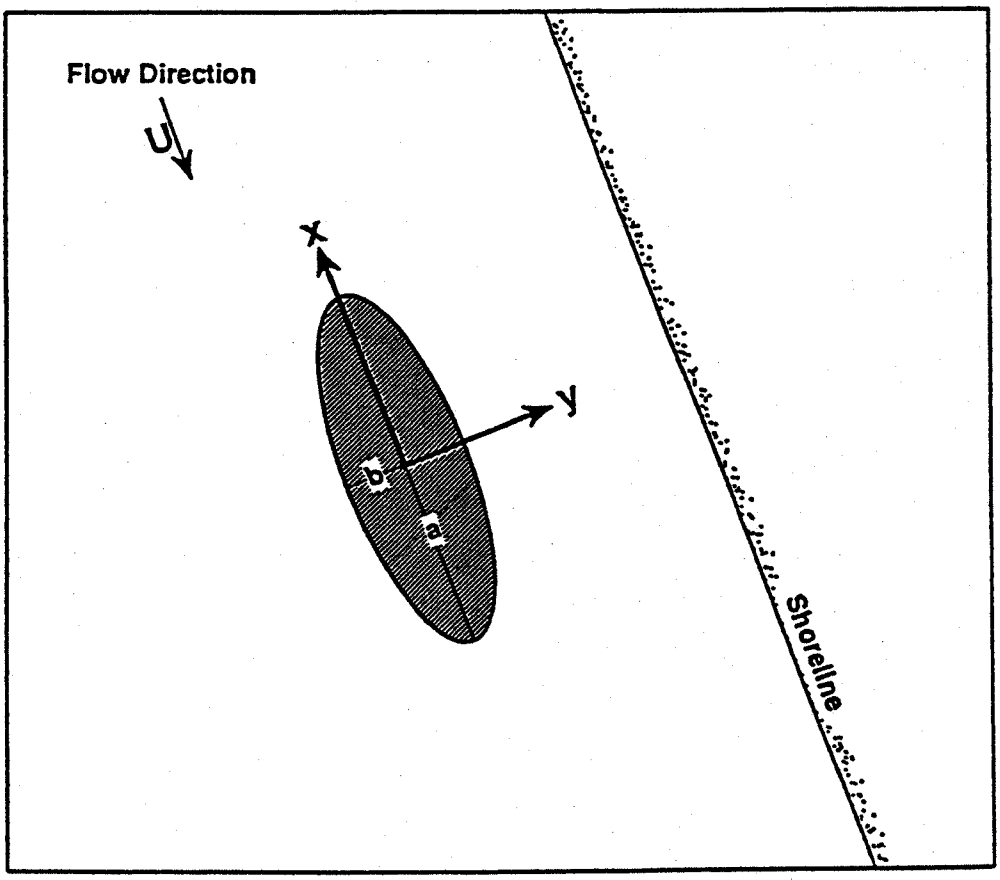

Figure 3-1. Approximation of kelp canopy by an ellipse with semiaxes *a* (alongshore in the direction x), and *b*, (in the cross-shore direction y).

The excluded fraction, F, can be calculated by measuring currents within and outside of the kelp bed. These measurements were collected in the field experiment at the North Carlsbad Kelp Bed. One current meter was deployed in the middle of the kelp bed and another outside the bed, half a bed-length upcoast, with both current meters located on the 11-m (36-ft) isobath (Figure 3-2). Current speeds observed over two months inside the bed were about one-third the speed of currents outside the bed (Figure 3-3). The regression coefficient was 0.37 (Figure 3-4), corresponding to an excluded fraction of F = 0.63. Using this number and $b/a = 0.5$, the maximum increase in current speed induced by the North Carlsbad Kelp Bed is 33% at the inshore edge of the bed, falling off to 9% at a distance of one bed-length shoreward. The semi-axes of the Carlsbad Kelp Bed, a and b, are 350 m and 175 m, respectively

The 42 separate modules of the experimental reef, each about 40 m (135 ft) across and separated by more than 40 m (135 ft), will not have long-range effects on the currents between the reef and the shore due to their size A completely impervious circular bed would produce a maximum increase of 100% at its shoreward edge, falling off to 11% one bed-diameter (about 40 m (135 ft)) shoreward (Elwany et al., 1993a).

However, the full mitigation reef of 150 acres could have appreciable effect on currents, depending on the kelp density and shape. The suitable area off San Clemente is about 2,500 m (8,250 ft) long alongshore and 500 m (1,660 ft) wide, amounting to 300 acres (Figure 1-1) The siting and design of this final reef will depend on the results from the experimental reef. It is likely that the final reef will occupy the downcoast (southeastern) half of the suitable area, and will be about 1,250 m (4,200 ft) long and 500 m (1,650 ft) wide, giving $b/a = 0.4$, and the maximum percentage increase in current speed $Fb/a = 0.26$ or 26% (assuming dense kelp and $F = 0.63$). A second option is a narrow reef extending the full 2,500-m (8,250-ft) length of the area. The width would be 250 m (825 ft), b/a would be 0.1, and the maximum increase Fb/a would be 0.066 or about 7%.

The reason that kelp has no effect on waves, but has a notable effect on currents, is that the canopy and upper parts of kelp plants can move back and forth with the waves without exerting drag (except from the stipe near the holdfast, where the cross-section of the plant is small). Persistent currents, unlike waves, will stretch the kelp plant out, pulling the canopy under, so that the plants exert maximum drag.

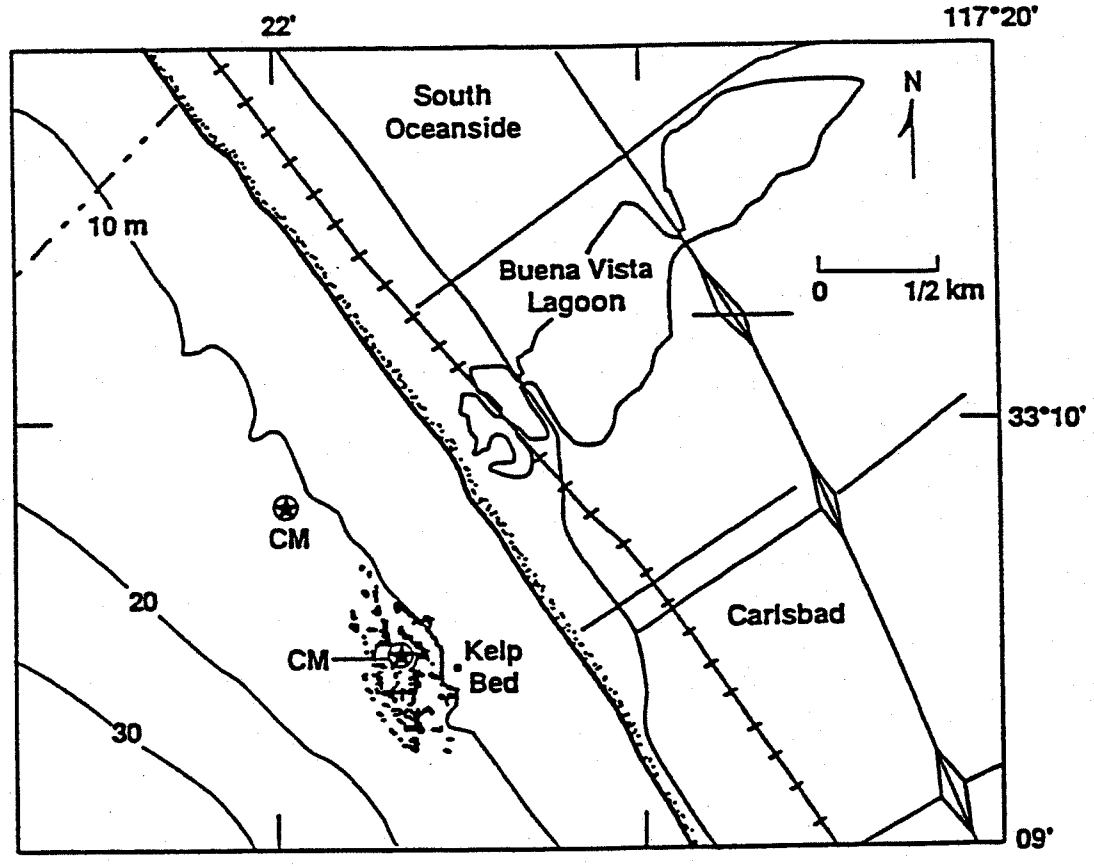

Figure 3-2. Location of current meters inside and outside North Carlsbad Kelp Bed are indicated by CM. The measurements were taken simultaneously for 64 days and were collected with InterOcean S4 current meters positioned 3 m below the surface in 11-m water depth.

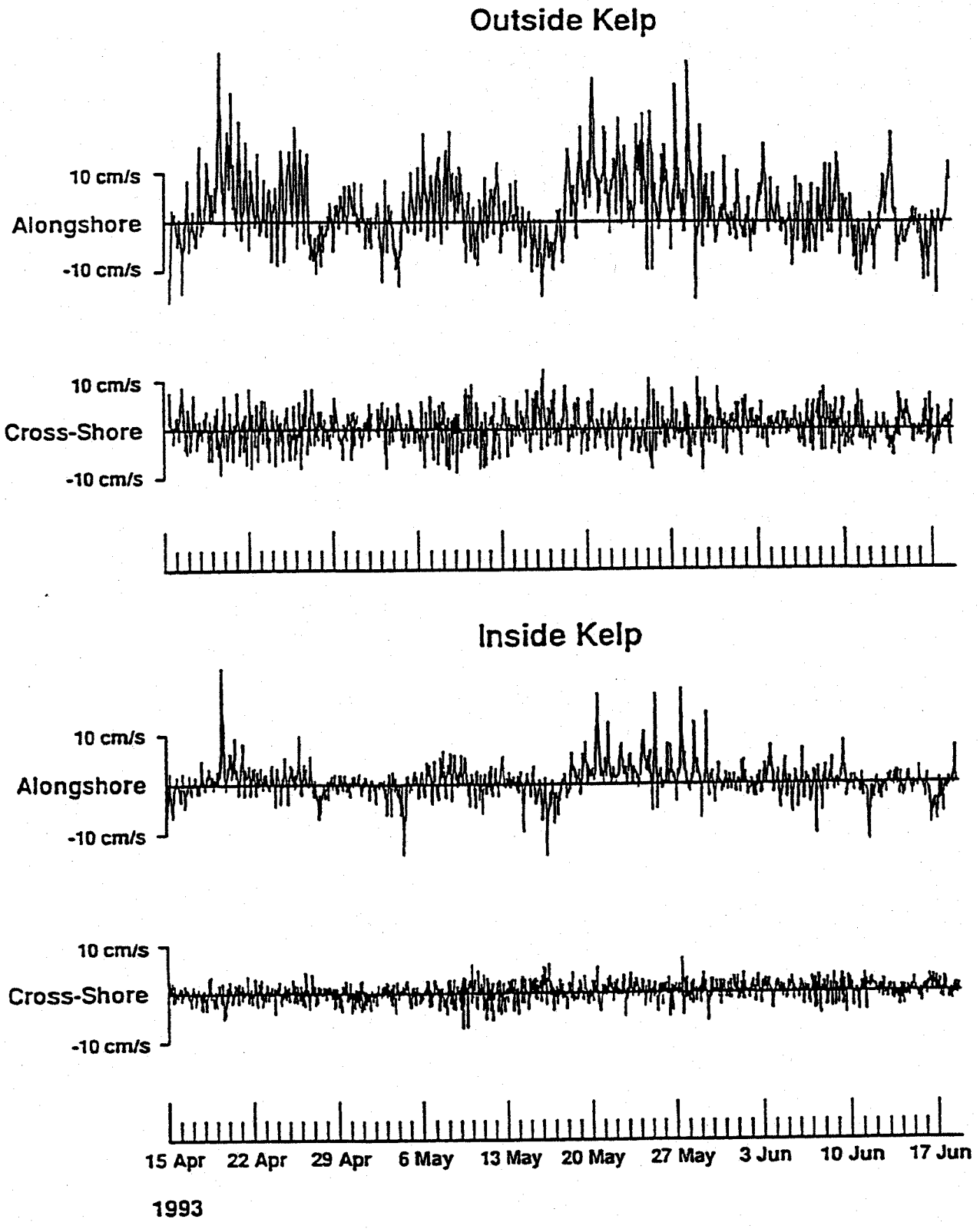

Figure 3-3. Time series of hourly-averaged alongshore and cross-shore currents inside and outside the North Carlsbad Kelp Bed.

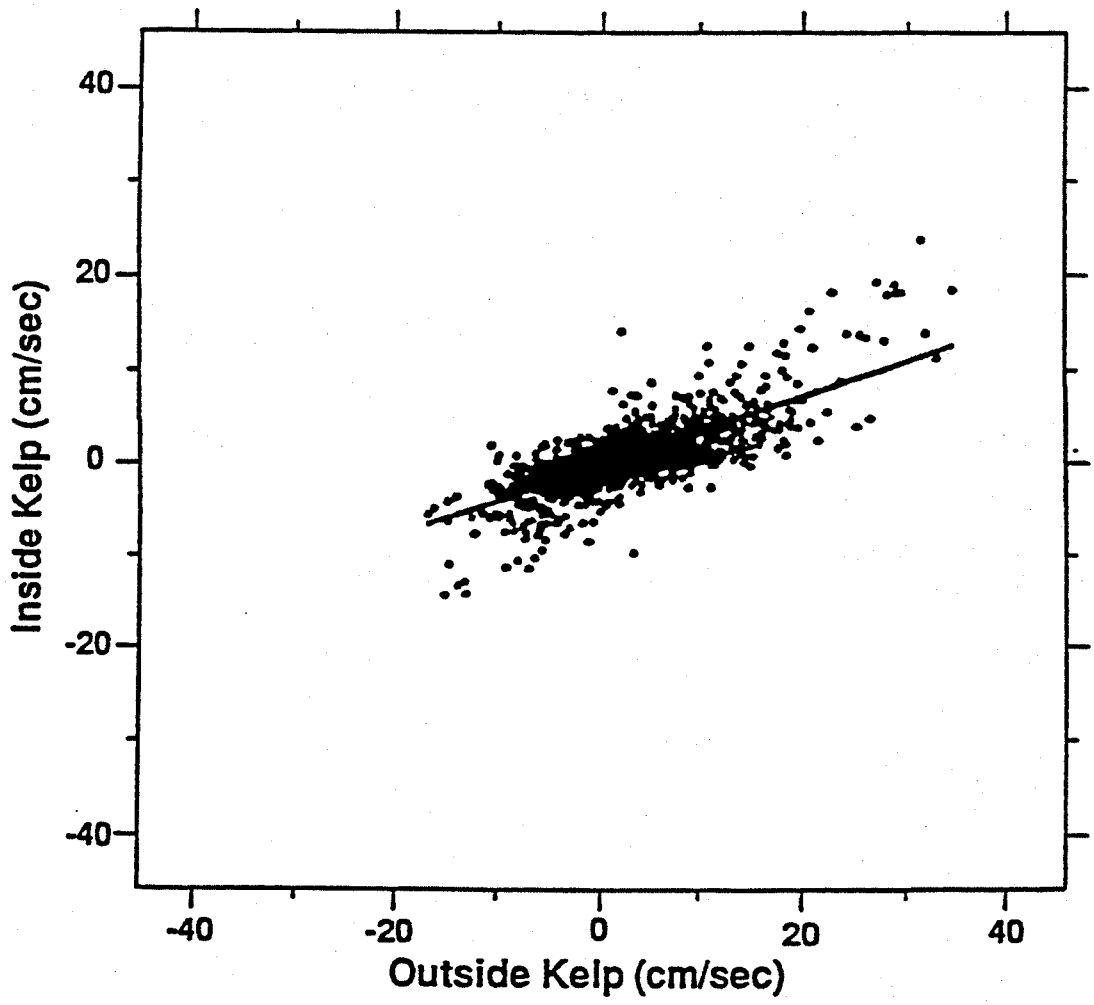

Figure 3-4. Scatter plot of hourly-averaged alongshore coastal current (cm/sec) inside and outside kelp bed. Solid line is the best-fit linear regression line (slope = 0.37).

4. EFFECTS OF KELP ON NEARSHORE SEDIMENT DEPOSITION AND EROSION

A decrease in the speed of a steady current results in the deposition of a portion of the suspended load, while an increase in speed can re-suspend the sediments and erode the bottom At the North Carlsbad Kelp Bed, a 63% reduction of current speed resulted in deposition of fine sediments within the bed The reason kelp beds, in general, are not silted to the point of extinction over the years is the deposits from reduced velocity are periodically re-suspended high into the water column by storm waves and removed from the bed by strong currents associated with storms (North and Jones, 1991)

Inshore of a typical kelp bed, where water depth is less than 13 m (40 ft) and moderate wave height is 1 m (3 3 ft), the near bottom velocity is greater than 30 cm/sec (1 ft/sec) for wave frequencies less than 0.1 Hz, which typically dominate the southern California wave climate Orbital velocities are larger during storms. In this same depth-zone, coastal current speeds on the coast infrequently (less than 5% of the time) exceed 10 cm/sec (0.3 ft/sec) near the sea floor (Elwany, 1993) Because orbital velocities are larger than steady flows, waves are expected to dominate the re-suspension within and inshore of kelp beds

If the redistribution of waves and currents by kelp beds had significant cumulative local effects on the sedimentary regime over several years, these effects would be apparent in and around natural kelp beds Since the current velocity inside a kelp bed is reduced by the drag of the kelp, some suspended particles fall out of the water column However, these particles do not remain on the bottom long enough to be incorporated into sediments or natural kelp beds would become covered with silt and recruitment would be diminished. Waves and the floor of their associated near bottom velocities keep kelp beds from silting up. Similarly, increases in current velocities between a kelp bed and the beach have not been observed to produce erosion. Evidence that kelp beds do not affect local sedimentation comes from the absence of measurable long-term accretion or erosion within and inshore of existing kelp beds.

The main mechanism by which sand moves along beaches is the longshore current produced by waves that approach the shore obliquely. Longshore currents occur within the surf zone, inshore of the kelp beds, and are a separate mechanism from wind- or slope-driven coastal currents The

observation that waves are not affected by traversing 350 m or more of kelp leads to the important conclusion that the kelp will have no effect on the longshore transport of beach sand.

5. EFFECTS OF KELP ON BEACHES

5.1. BEACH WIDTH

To evaluate the relation between kelp beds and beach width in southern California, Elwany, et al. (1996) performed a statistical analysis. Figure 5-1 shows the locations of the major kelp beds in the San Diego Region Beach width for 265 segments of coastline, each 500 m (1,650 ft) in length, were estimated for 1983-88 from U.S. Army Corps of Engineers (1991) data and kelp bed widths were calculated from data in North and Jones (1991) Kelp-bed widths were calculated as the ratio of area to length of canopy.

Of the 265 coastline segments, 173 (65 % of total) have no kelp and vary in beach width from 0 m to 200 m. The primary reason for the absence of kelp in these segments may be the lack of a hard substrate necessary to anchor adult kelp plants In some locations, the lack of a hard substrate may be a corollary to a plentiful sand supply, which also favors wide beaches The large range of width in beaches without an offshore kelp bed illustrates that other factors affect local beach width. A second group of 40 coastline segments (15%) represents La Jolla and Point Loma. These segments contain San Diego's widest kelp beds, with an average width of nearly 200 m, and these segments have no beach onshore. The third group with 52 coastline segments (20%), has both kelp beds and beaches.

A correlation analysis was performed between the beach width and kelp width data. When all the data (all three groups) shown in Figure 5-2 are included, there is no statistically significant correlation. Plausible arguments can be made to exclude the first two groups of data from the correlation analysis, since there is clear evidence that the lack of beaches or the lack of kelp in these groups can be ascribed to other causes. The absence of beaches inshore of the wide La Jolla and Point Loma kelp beds relates to their isolation from sources of sand. Similarly, the widest beaches in Coronado have no exposed hard substrate, and, therefore, have no kelp.

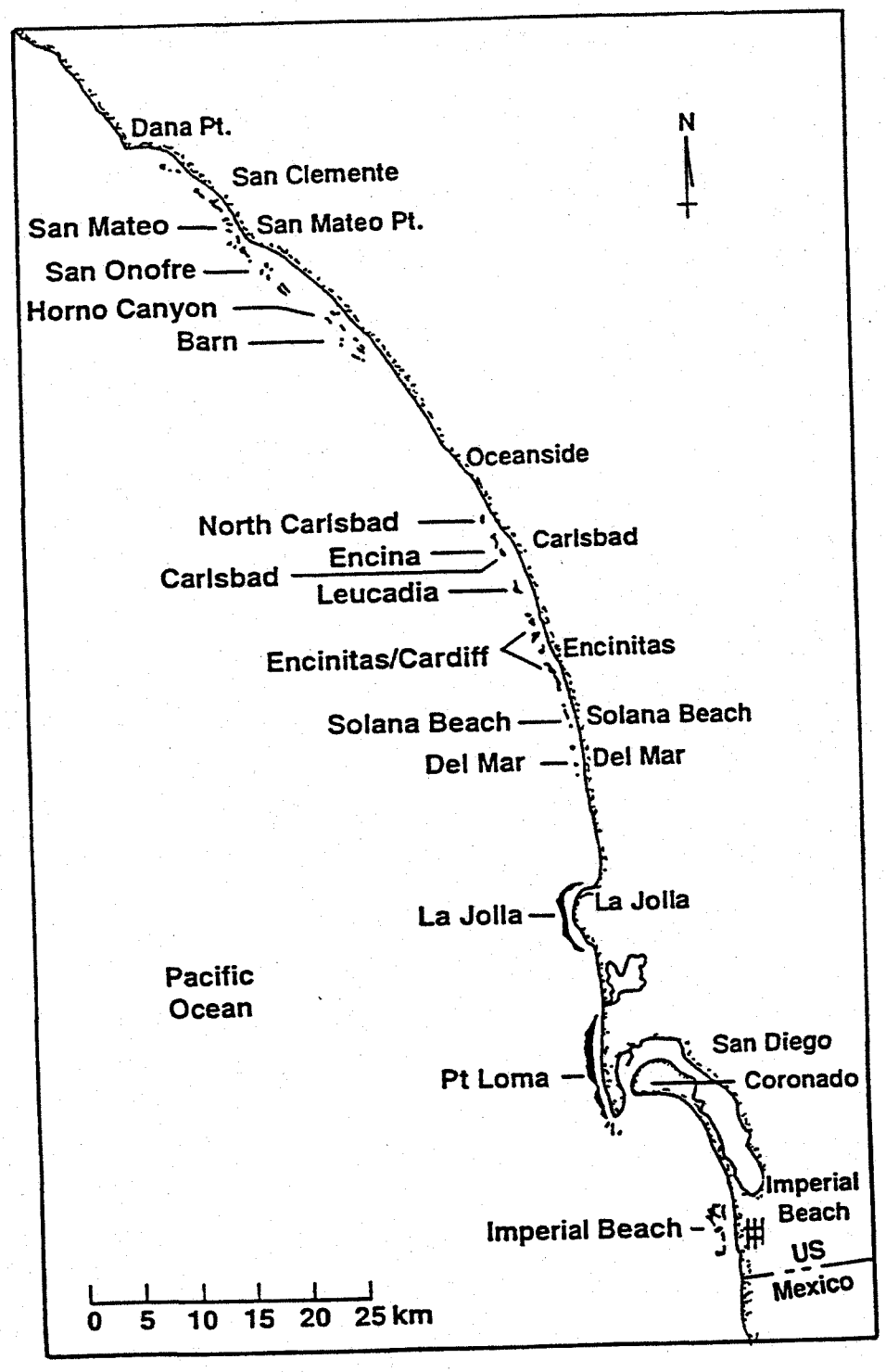

Figure 5-1. Major kelp beds in the San Diego Region.

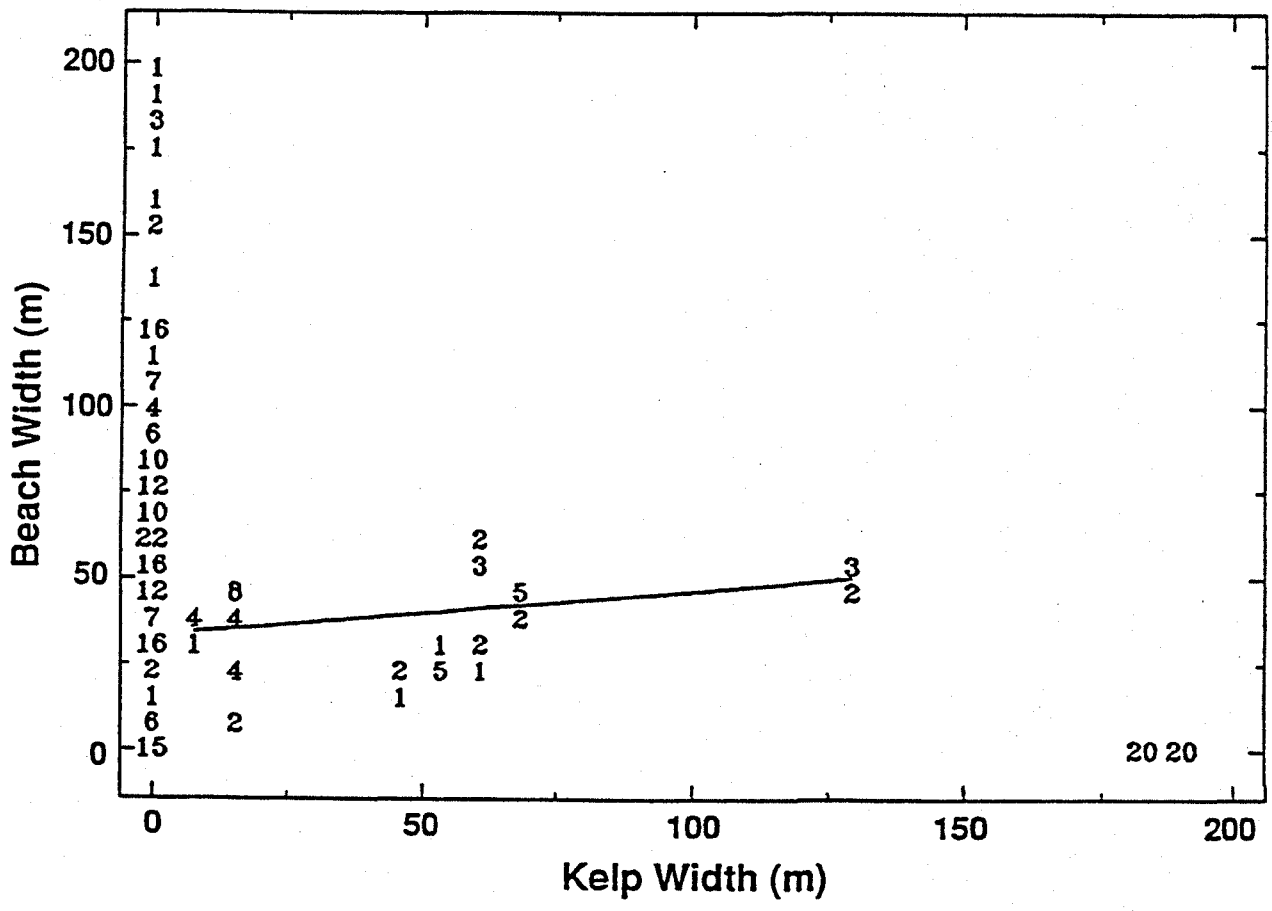

Figure 5-2. Beach width as a function of kelp-bed width for each 500-m-long coastal segment (Numbers indicate how many coastal segments fall within each beach-filp bed width (combination)).

Correlation analysis of sites with non-zero kelp-bed and beach width (the third group), shows a weak, but statistically significant (95% confidence level) positive correlation of 0 3 The solid line in Figure 5-2 is the best-fit linear regression for this case This suggests that beach width is weakly associated with offshore kelp-bed width The result, however, is ambiguous, given that it depends on neglecting 80% of the shoreline segments comprising the first and second groups mentioned previously Furthermore, the mean width of all beaches without offshore kelp beds (group 1) is 72 m, which is much wider than the 24 m mean width of all beaches with offshore kelp beds (groups 2 and 3), and considerably wider than the 40 m mean width of the group 3 beaches (excluding La Jolla and Point Loma) This suggests a negative relationship between beach width and kelp-bed width.

As a second approach to the problem, the beach widths inshore of 11 kelp beds were compared with the widths of adjacent beaches one kelp-bed length away A one-sample t-test was used to test the null hypothesis that the width differences are equal to zero The resulting p-value represents the probability of rejecting the null hypothesis when it is true. All reported p-values are greater than 0 05, which means that we cannot reject the null hypothesis. That is, the differences between the width of beaches with kelp and the adjacent control beaches without kelp are to small to detect (Table 5-1)

5.2. KELP WRACK

High waves during storms have been known to reduce kelp beds in a relatively short time (Tegner, et al., 1987, and Seymour et al., 1989). This occurs both from breaking up of the plants and by their dragging anchor. The kelp holdfasts may be torn loose from the substratum, or the rock anchor itself may be lifted up or pulled apart. If one plant is broken loose and drifts against its neighbor, the combined pull of both may cause the second plant to break loose. Also, throughout the natural cycle of a kelp plant, mature fronds continually develop, then die and breakaway, giving way to new fronds shooting up from the holdfast. Fronds only survive for about six months and individual blades for about four months. When these loose plants reach the shore they are often washed up on the beach as kelp wrack.

The expected frequency with which kelp wrack appears on beaches in San Diego County may be estimated from the observations by ZoBell (1959 and 1971). A set of 10,208 bi-weekly observations, spread over 12 years over the 1940's and into the 1950's, at 49 beach stations (35 from Scripps Pier downcoast to Mission Beach, 14 extending upcoast to Laguna Beach) are summarized in Table 5-2.

Table 5-1. Results of *t*-Test on beach width differences between beaches with offshore kelp beds and adjacent control beaches with no kelp.

Test Case	Beach width difference		*p*-value
	Mean (m)	Standard Deviation (m)	
North – inshore	0.85	5.30	0.62
South – inshore	4.26	7.60	0.16
Average north and south – inshore	2.49	4.35	0.08
North and south as replicates - inshore	2.34	6.45	0.14

Table 5-2. Volume and occurrence of seaweed wrack reported by ZoBell (1971, p. 288-289).

Wrack volume		% of occurrence	No. of days / year
m^3 / 15 m	ft^3 / 50 ft		
>2.8	>100	0.9	3
>0.28	>10	11.6	42
>0.028	>1	13.3	49
Trace (<1 ft^3)		37.8	138
None		36.4	133
Total		**100**	**365**

One-third of the time the wrack accumulated on the beach in small volume, two-thirds of the time there was less than 0 028 m^3 (1 ft^3) of kelp wrack per 15 m (50 ft) of beach, and seven-eighths of the time there was less than 0.28 m^3 per 15 m (10 ft^3/50 ft) of beach The greatest abundance of wrack was found in November, followed by January, February, and December (Figure 5-3) Therefore, during the summer, swimmers and sunbathers would generally encounter kelp-wrack volumes less than 0 028 m^3/15 m (<1 ft^3/50 ft)

An estimate of how much wrack reaches the beach in one year from a given area of kelp canopy can be made from the amount of wrack removed from beaches near La Jolla in the years 1955-57 (ZoBell, 1971, Table 43). The average for these three years came to 23,259 yd^3/yr. Since about half of this wrack was algae other than *Macrocystis*, this left 12,000 yd^3/yr of *Macrocystis* wrack. Most of this came from the La Jolla Kelp, which is nearest to most of the beaches in question. The canopy area of the La Jolla kelp varied over these years from about 280 to 160 ha (hectares) (Deysher, 1998 personal communication) with a mean of 220 ha (Figure 5-4). Dividing the volume of kelp wrack by the area of kelp canopy shows that 1 ha of the La Jolla kelp supplies approximately 38 m^3 (50 yd^3) of wrack to the nearby beaches.

Since 1 hectare = 2.47 acres, approximately 20 yd^3/acre of kelp bed per year may wash up on the beaches For the proposed 150-acre mitigation reef at San Clemente, this could mean as much as 3,000 yd^3 a year on the beaches nearby. It is estimated that kelp lasts on the beach for two weeks and then disintegrates (ZoBell, 1959 and 1971). The kelp that drifts from the San Clemente Reef will likely move shoreward up and down the coast. Some of the drifting kelp will reach the beach, others will loose their buoyancy after about seven days and sink to the sea floor (Yaninek, 1980, and Harold and Lisin, 1989). The kelp that sinks to the bottom serves as an important source of food to the offshore benthic communities. In the surf zone, drifting kelp masses may become entangled in the back and forth movement of the water, forming larger masses of kelp to wash onto the beach

At San Clemente, drifting kelp wracks will be distributed along the coast between Dana Point and San Mateo Point. Since minimal information exists about the spread of kelp wrack on beaches, it is reasonable to assume that the maximum concentration of kelp wrack will be found along the beach correlating to the mid-point of the kelp bed. The amount of kelp wrack on the beach will then decrease with distance towards Dana Point and San Mateo Point.

Another potential impact of kelp wrack involves the possibility of pebbles and cobbles washing onto the beach if kelp is attached, creating greater buoyancy Emery and Tschudy (1941) found 46 *Macrocystis* and *Pelagophycus* holdfasts along a 1/3-mile stretch of beach north of La Jolla Of these, 17 had pebbles attached Along about a 1/2-mile stretch of Pacific Beach (south of La Jolla), they found 47 holdfasts, 7 of which had rocks fragments attached. The largest rock they obtained was about 15 inches long, and the heaviest weighed about 6 kg (13 lb)

While constructing the San Clemente Reef, several small rock or concrete-block fragments may be produced as a result of their handling. These fragments are likely to be dispersed and buried before kelp can attach and grow on them. The rocks remaining stable at the reef site will be heavier than 6 kg (13 lbs) Therefore, rocks washed onshore to San Clemente beaches are expected to be at a minimum.

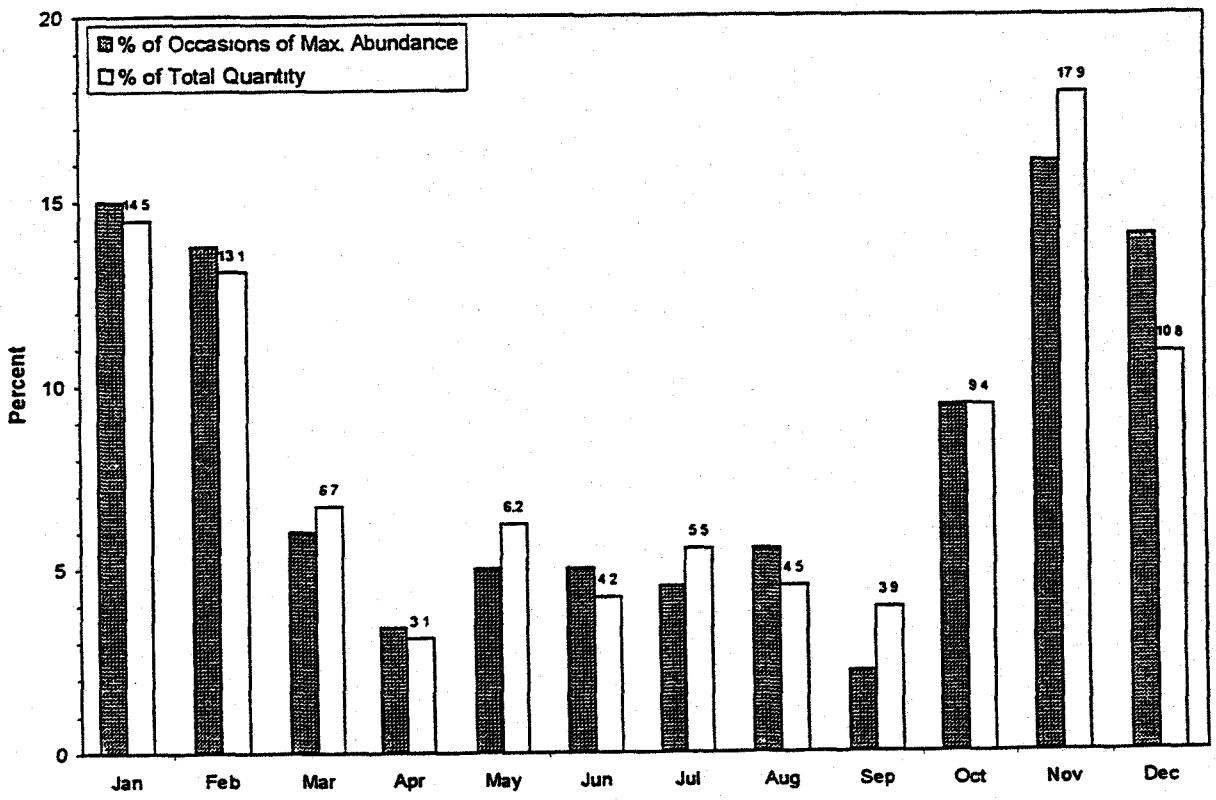

Figure 5-3 Seasonal abundance of seaweed on San Diego County beaches. Solid bars show the percent of the occasions when the maximum abundance during the year occurred in the month indicated. Open bars show the percent of the total quantity occurring each month of the year. (recreated from ZoBell, 1971, p.290)

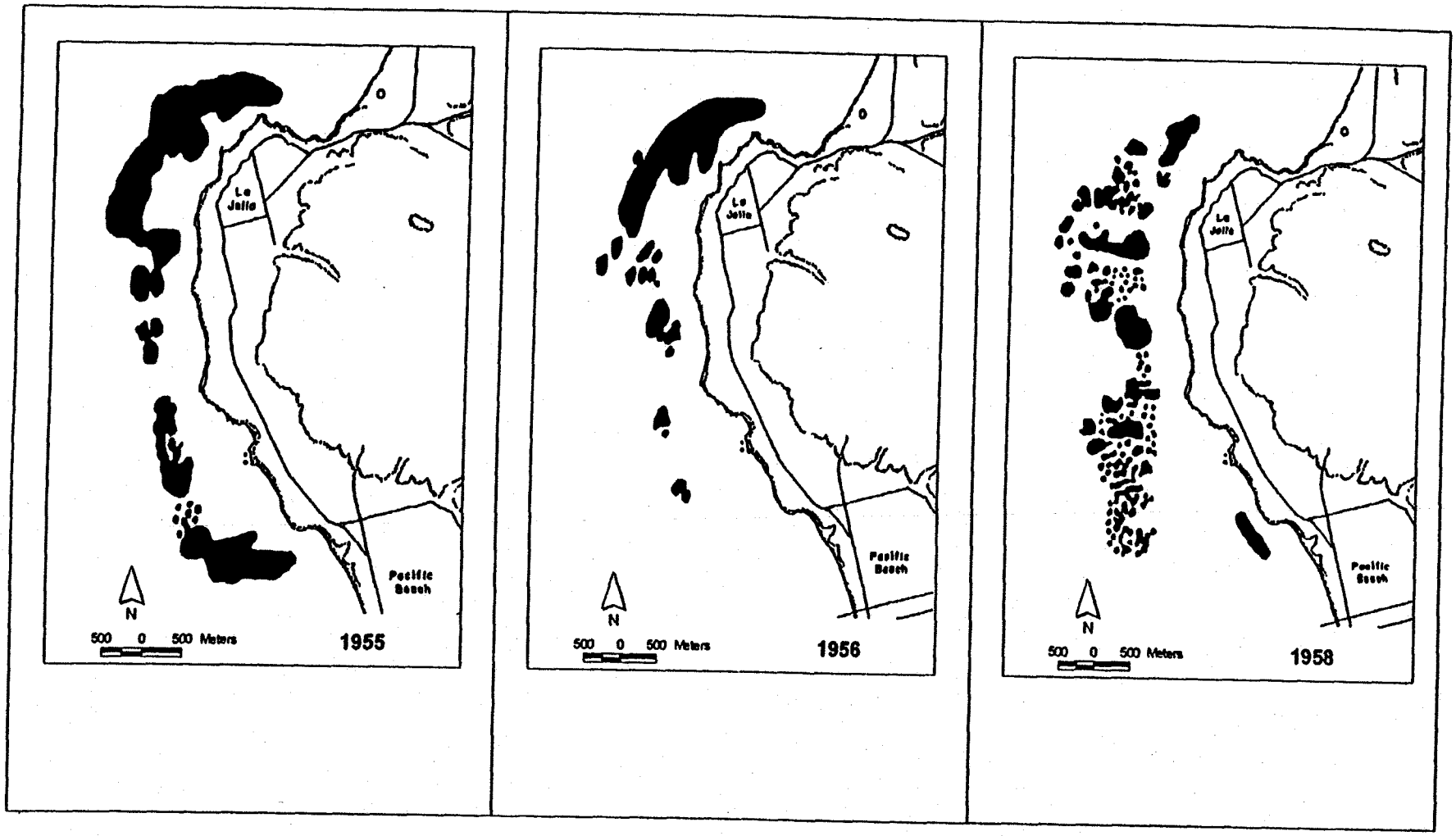

Figure 5-4. Kelp canopy in La Jolla during years 1955-1958.

6. CONCLUSIONS

The study of possible impacts from the experimental and build-out mitigation reef has provided the following conclusions

1 Waves at San Clemente will not be significantly impacted by the proposed 150-acre artificial kelp bed This conclusion is based on observations made over a 67-day period at four locations around a 350 m -wide (1,200 ft) kelp bed off Carlsbad, California (Elwany et al., 1993a and 1995) Comparing the dimensions and density of the Carlsbad Kelp Bed, with the expected kelp area and density of the proposed San Clemente Kelp Bed, as well as the wave climate and bathymetry of the two sites, leads to the conclusion that the results from the Carlsbad experiments are applicable to the San Clemente site

2 Coastal currents will be affected by the presence of kelp beds, based on results from the North Carlsbad Kelp Bed experiment. Current speed is reduced by the drag of the kelp plants excluding part of the flow from the bed and diverting the excluded flow around the bed. Currents slow within the kelp to about one-third the ambient speed. Currents diverted around the kelp bed increase about 26% at the inshore edge of the bed, falling off to 7% at a distance of one bed-width shoreward. This may cause an increase in the nearshore sedimentation. However, nearshore sedimentation and erosion will not be affected by the presence of kelp beds, based on the absence of measurable long-term accretion or erosion within and inshore of existing kelp beds. Larger waves are likely to keep the kelp beds from silting up. In addition, waves rather than currents dominate the suspension of sand.

3 Beach widths are not affected by kelp beds, based on the results of two statistical approaches. The first simply determined the correlation between kelp-bed width and adjacent beach width. A small (0.3), but not statistically significant, positive correlation was found in the 20% of shoreline that had both a non-zero beach width and an offshore kelp bed; however no correlation was found when the entire shoreline was considered. The second method examined differences in width between beaches inshore of the kelp beds and those immediately to the north and south. No statistical differences were found. The overall conclusion is that in southern California, there

is no strong correlation or consistent pattern indicating that beaches directly inshore of kelp beds are either wider or narrower than beaches not fronted by kelp beds

4 Storm wave energy will wash kelp plants to the beaches in the San Clemente area Kelp wrack on the beach creates an aesthetically poor situation and decaying material attracts flies and birds This impact is normally remedied by collecting the kelp wrack The temporal fluctuations in quantity of wrack washed to the beaches are high This makes it difficult to estimate how much wrack might wash onto City of San Clemente beaches from the proposed artificial kelp reef An approximate volume of 20 yd^3/acre is the best estimate available, based on 3 years of measurements off La Jolla beaches.

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Appendix G

Review of Site Selection Process for Southern California Edison's Mitigation Reef

REVIEW OF SITE SELECTION PROCESS FOR SOUTHERN CALIFORNIA EDSION'S MITIGATION REEF

By

Hany Elwany, Ph.D
Coastal Environments

Larry Deysher, Ph.D
Coastal Resources

Submitted to

Resource Insight
555 University Ave, Suite 275
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810 Third Street, Suite A
Encinitas, CA 92024

17 March, 1998
CE Reference No. 98-4

REVIEW OF SITE SELECTION PROCESS FOR SOUTHERN CALIFORNIA EDISON' S MITIGATION REEF

1. INTRODUCTION

The site selection for the SONGS mitigation reef has been an evolutionary process that started in 1990. The first steps in this process were to identify areas along the coast where kelp has occurred in the past and to identify the substrate characteristics of offshore regions that would be suitable for construction of the reef. The identification of areas with historical kelp populations is important to meet the Coastal Commission permit criterion that the reef be situated near an existing kelp bed area, but not negatively impact existing or potential kelp bed area. The characterization of the offshore bottom types is important to insure that the reef will be stable and resist burial by sand and finer sediments. The sediment characterization will also insure that the construction of the reef will not negatively impact sensitive communities on hard substrate as mandated by the Coastal Commission permit.

The work on historical kelp persistence was conducted by Coastal Resources Associates, Inc. and is summarized in the Final Report of the Artificial Reef Siting and Design Specifications (MEC, 1994). The offshore sediment characterization was conducted by ECO-systems Management Associates, Inc (1993, 1997).

Other factors considered in the siting of the mitigation reef included the effects of the reef on nearshore military operations, navigation and boating effects, the presence of turbidity sources such as rivers and sewer discharges which could influence kelp growth, and the location of parks, natural reserves, and cultural resources that could be negatively impacted by the construction of the reef.

In this report we will summarize the results of the previous reef siting studies by identifying

the important factors for siting the reef and then use these factors to prioritize sites that have been identified as potential reef site locations.

2. SITE SELECTION CRITERIA

The two most important criteria for siting the reef, as identified above, are the locations of historical kelp beds and the presence of thin layers of sand (less than 1 m) over hard substrate. The kelp persistence maps which summarize over 25 years of kelp canopy data from Dr. Wheeler North are presented in Figures 1-7. Potential reef sites cannot be placed in regions of historical kelp, but should be placed nearby to take advantage of the reproductive propagules of *Macrocystis*, other algae, and invertebrates that will be available from the established kelp bed. In addition, some evidence indicates that larger kelp beds are more stable than smaller more isolated kelp bed areas (Figure 8). A mitigation reef that adds to the size of an existing kelp bed area may be more successful than a more isolated kelp bed area.

The various substrate surveys conducted by ECO-systems Management Associates, Inc. are summarized in Appendix A. The earliest surveys used rather wide surveys lines which provided only a generalized view of the substrate characteristics. More detailed surveys on the sites with the highest potential for a reef were made in 1997.

We have also considered various political influences on the site selection process. One of the most important political considerations was the use of the nearshore area off of Camp Pendleton for Marine amphibious training operations. The Marines were very adamant that a reef not be built offshore of Camp Pendleton because of potential disruption of the amphibious training operations conducted in this area. A letter and map sent by the Marine Corps showing the area of amphibious training operations is shown in Appendix B.

The criteria used in the site selection process, and their relative ranking of importance, include:

1. Absence of historical kelp .
2. Presence of a thin sand layer over hard substrate.
3. Area distant from offshore military operations
4. Area adjacent to existing kelp bed area
5. Adequate area in the 35 to 55 ft depth range
6. Area distant from rivers which are a sources of sediments and turbidity
7. Areas distant from sewer discharges
8. No impacts on boating or general navigation
9. No impacts on cultural resources
10. Area distant from parks and natural reserve areas
11. Proximity to San Onofre

A summary review for various sites is given in Table 1.

3. RANKING OF POTENTIAL REEF SITES

The above selection criteria were used to produce a ranking of potential sites where the mitigation reef could be placed. Each of the criterion were graded on scale from 0 to 10 in which excellent characteristics were graded from 8 to 10, good characteristics ranged from 5 to 7, and average characteristics from 1 to 4. A grade of zero indicates that this site was precluded from the selection process based on this criterion. The grading of each site is summarized in Table 2. This table shows that of the 15 sites considered for the siting of the mitigation reef only 5 sites were not eliminated based on the above criteria. The sites are listed in geographic order ranging from north to south. The San Clemente site received the highest total score of 69 while Salt Creek received the lowest score of 38. Other high ranking sites included the Leucadia and Encinitas sites with scores of 62 and 61, respectively, and the North Carlsbad site with a score of 59.

Table 3 summarizes the potential reef sites in order of preference, with the San Clemente site having the highest priority and the Mission Beach site having the lowest. Table 3 also shows the area of reef that could be constructed in each of these areas. The Leucadia and Encinitas sites are rather limited in the amount of reef that could be built, while the lowest ranked Mission Beach site offers 85 or more acres for reef construction. The Mission Beach site would only be suitable for a reef constructed from recycled concrete because this area has sand depths consistently greater than 2 meters (ECO-systems, 1997). A concrete reef constructed in this area in 1992 should be re-surveyed after the current set of winter storms to see if the concrete material has persisted above the sand and continues to support kelp populations as shown in surveys made in the summer and fall of 1997 (Coastal Resources Associates, 1997). A list of permitted artificial reefs in Southern California is given in table C-1 (Appendix C). Table 4 presents recommendations for project alternatives.

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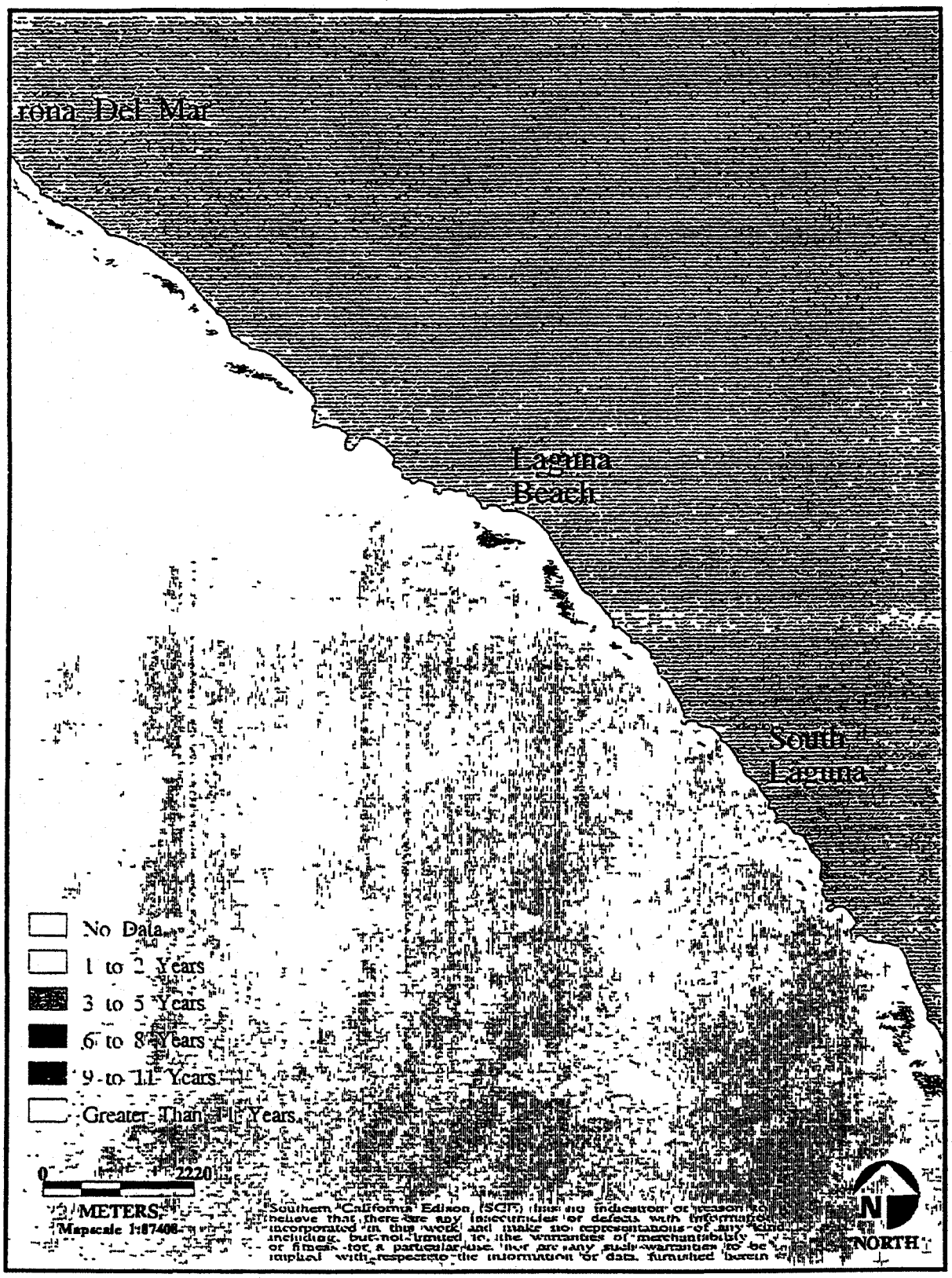


Figure 1. Map of kelp canopy persistence in the region from Corona del Mar to South Laguna. Persistence values span the years 1967 - 1992.

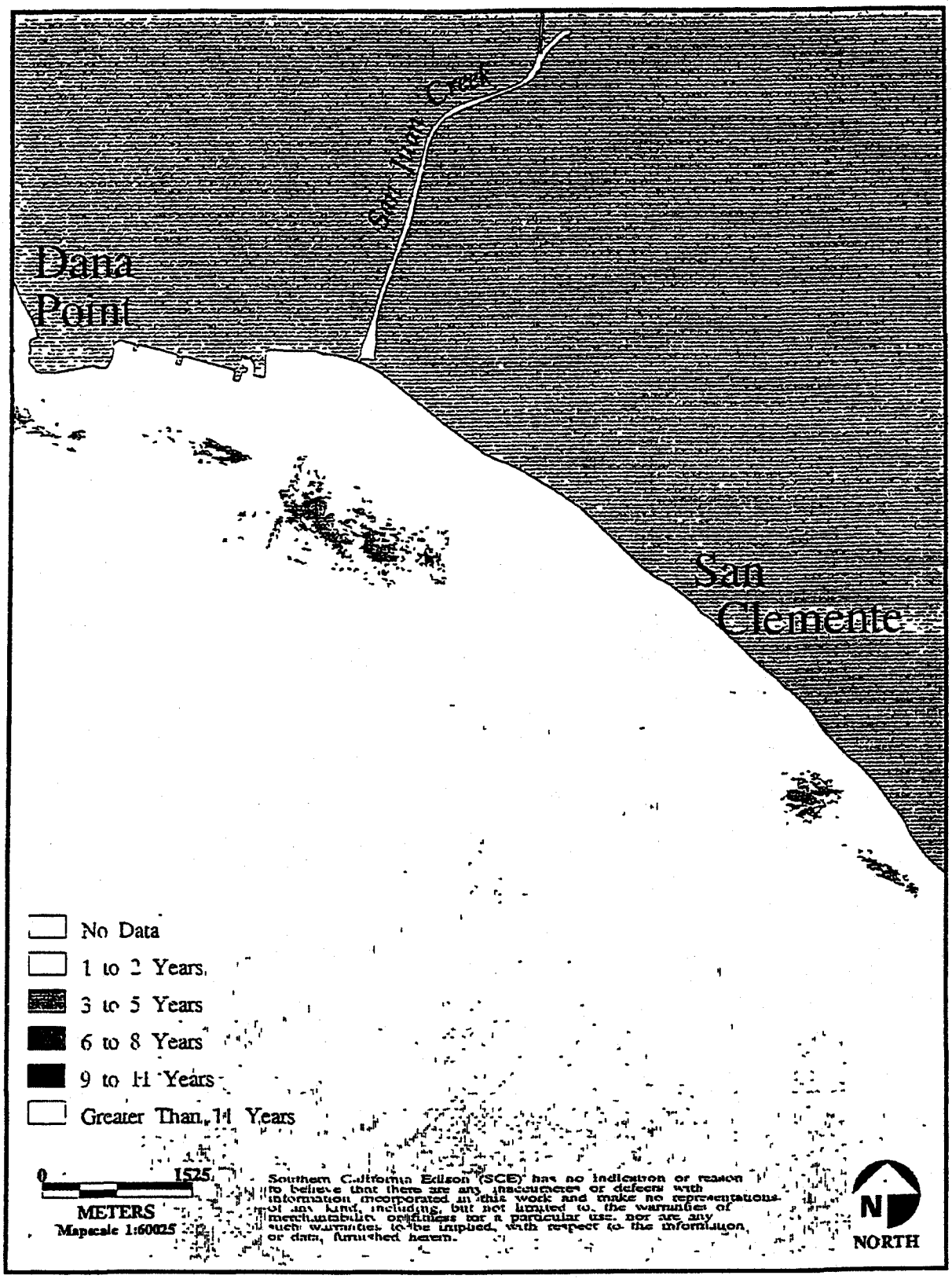


Figure 2. Map of kelp canopy persistence in the region from Dana Point to San Clemente. Persistence values span the years 1967 - 1992.

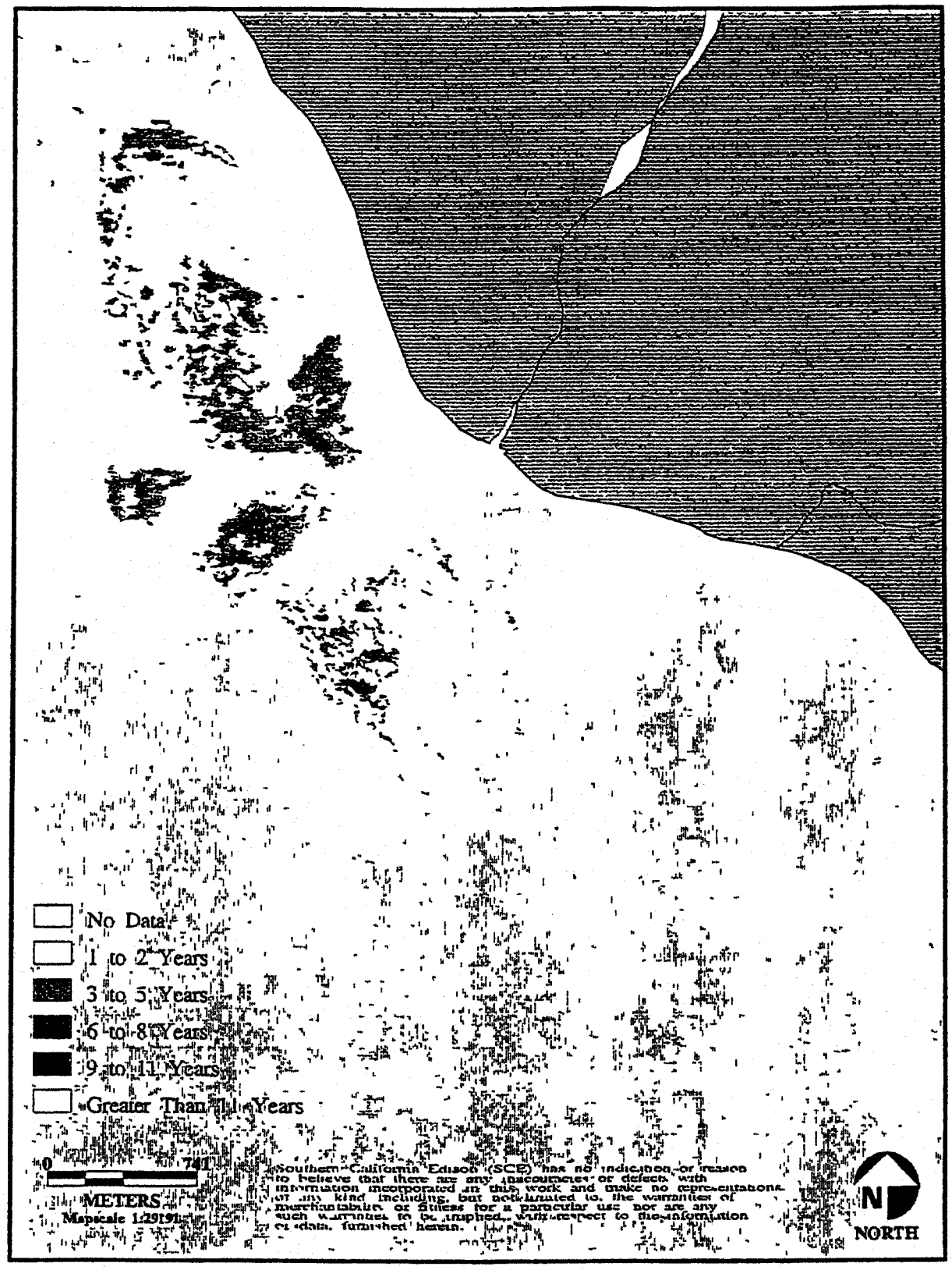


Figure 3. Map of kelp canopy persistence for San Mateo Point. Persistence values span the years 1967 - 1992.

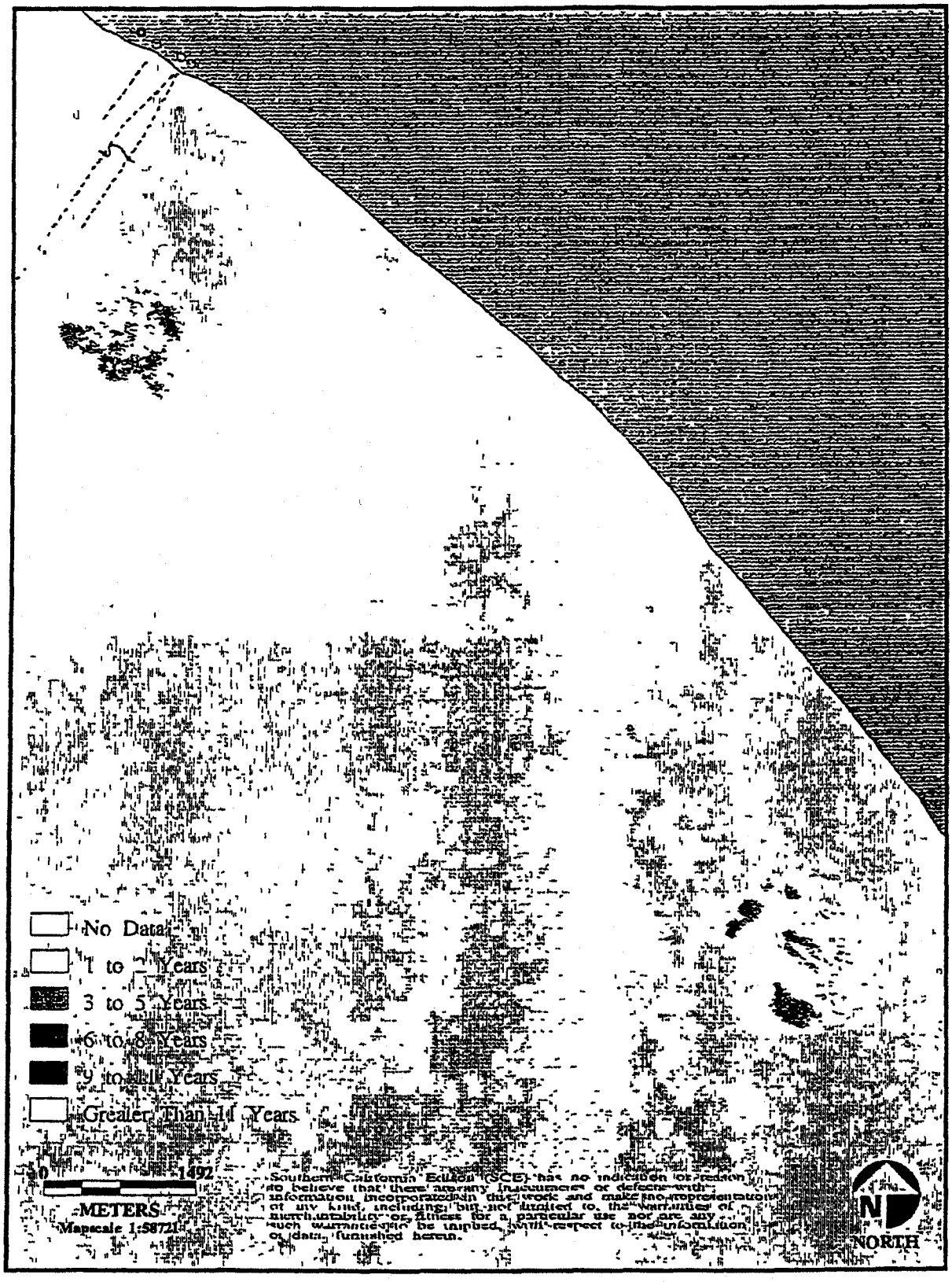


Figure 4. Map of kelp canopy persistence in the region from San Onofre to Point Loma Kelp. Persistence values span the years 1967 - 1992.

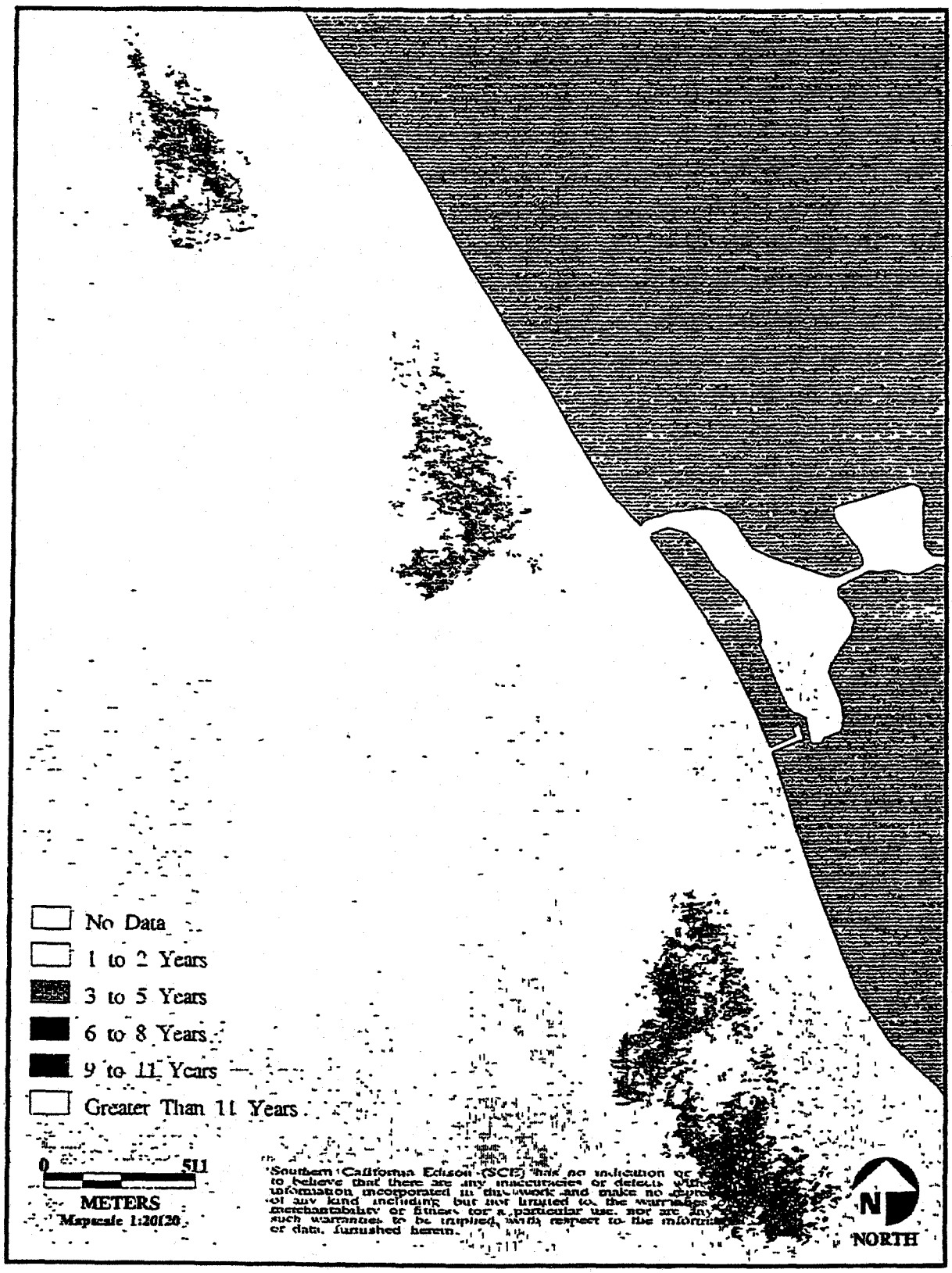


Figure 5. Map of kelp canopy persistence in the region of Carlsbad. Persistence values span the years 1967 - 1992.

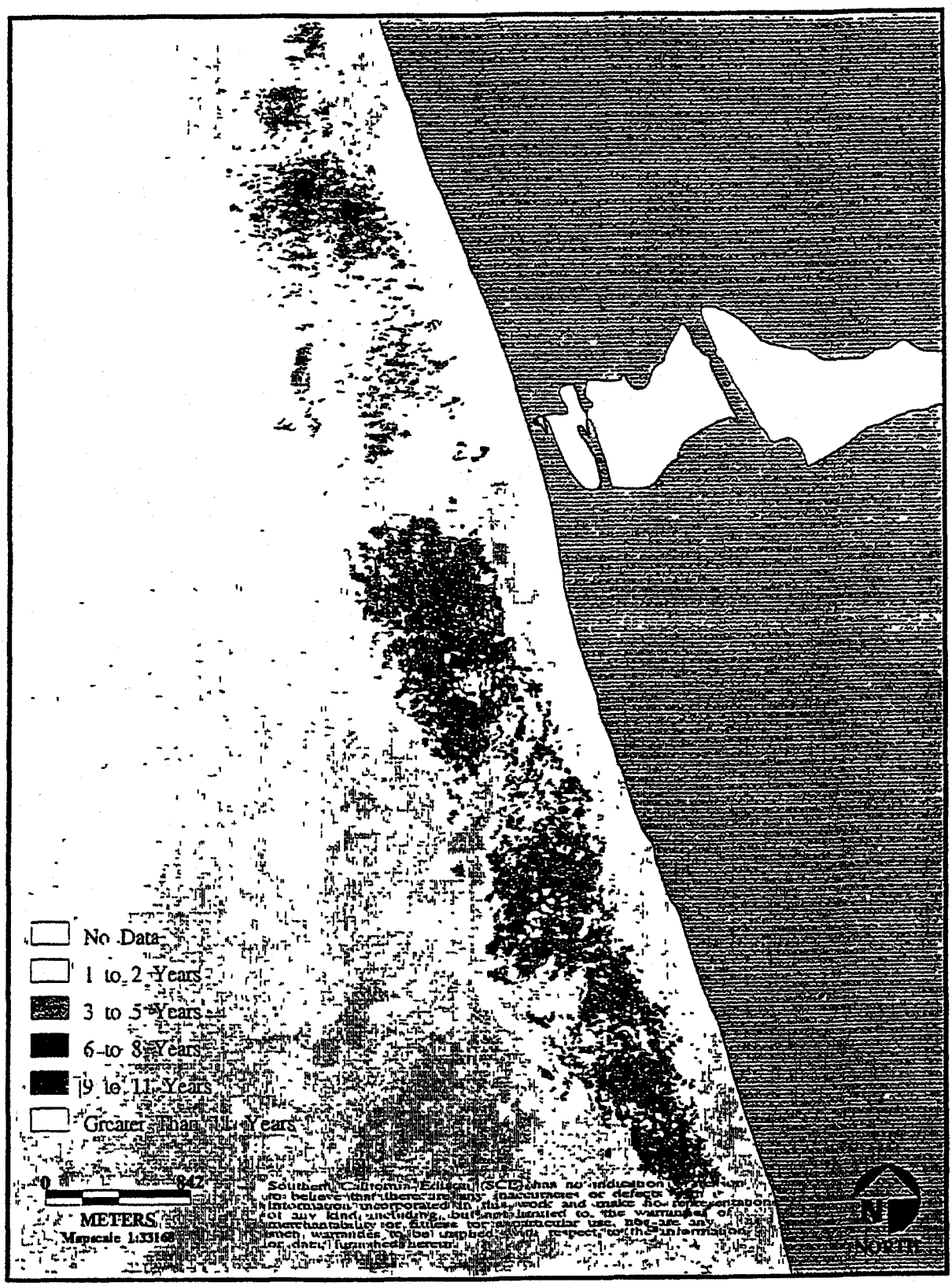


Figure 6. Map of kelp canopy persistence in the region of Carlsbad State Park to Leucadia. Persistence values span the years 1967 - 1992.

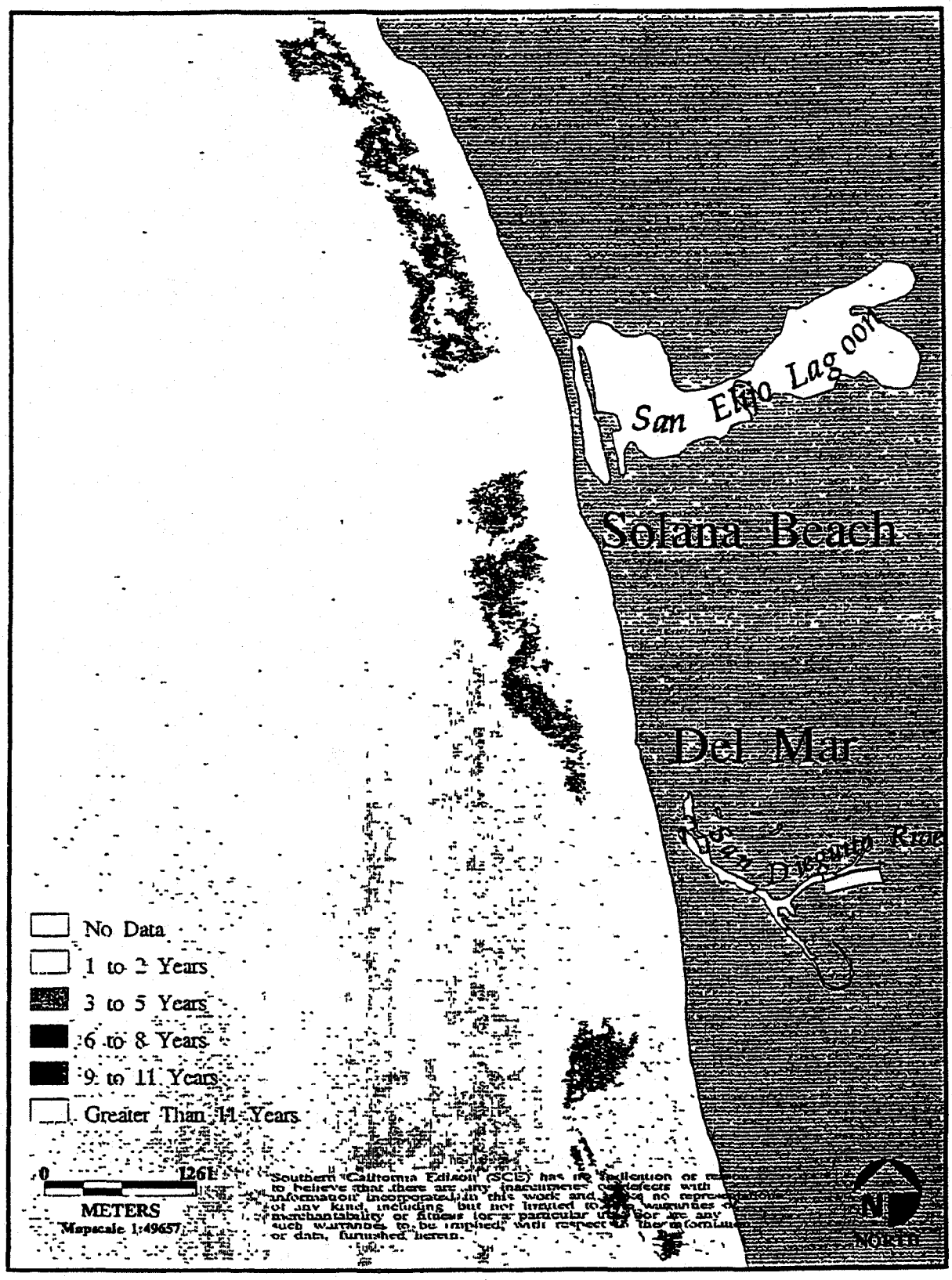


Figure 7. Map of the kelp canopy persistence in the region from Encinitas to Del Mar. Persistence values span the years 1967 - 1992.

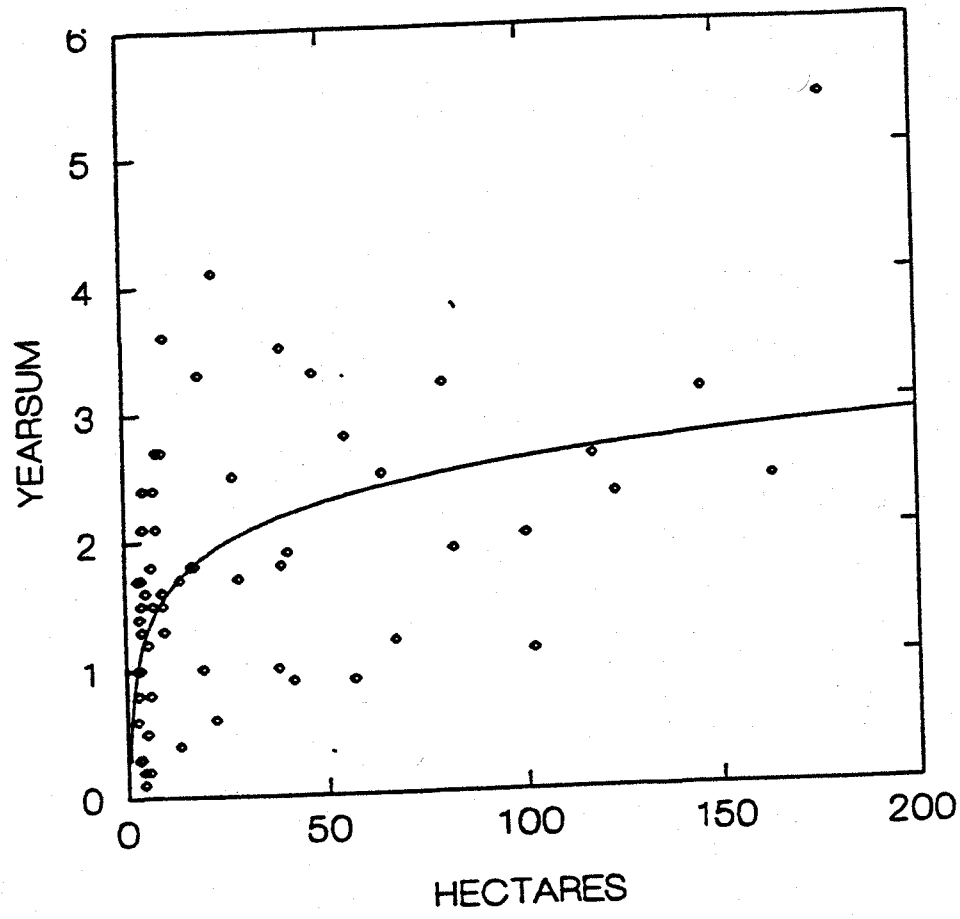


Figure 8. Scatterplot of kelp persistence (YEARSUM = number of years canopy was present between 1975 and 1991) and area of reef unit (HECTARES). The curve is a logarithmic regression fit to the data.

Table 1. Advantages and disadvantages of various available sites for Southern California Edison's kelp reef mitigation sites

Location	Advantages	Disadvantages
South Laguna	-Absence of historical kelp -Far from military operations -No impact on Navigation	-Sandy sea bottom -Small new Reef Area -Near sewage discharge
Salt Creek	-Rocky substrate -Far from military operations -close to existing kelp -No impact on navigation	-Large existing kelp bed -Small new reef area -Near sewage discharge
San Clemente	-Presence of thin layer of sand -Large reef area is available -Near historical kelp bed -No impact on navigation -Near the San Onofre Power Plant	-Sewage discharge pipe present
South San Mateo	-Large reef area is available -Near San Onofre Power Plant -Adjacent to existing kelp bed	-Near military operations -Impact on Navigation -Near San Mateo Creek
South San Onofre	Large reef area is available -Near San Onofre Power Plant -Adjacent to existing kelp bed	-Near military operations -Impact on navigation -Near San Mateo Creek
South Oceanside	-Large reef area is available -Near San Onofre Power Plant	-No kelp in the area -Sandy sea floor -Impact on navigation (Oceanside Harbor)
North Carlsbad	-Near Kelp Beds -Far from sewage discharge	-possible impact on navigation
South Carlsbad	-61 acres is available for new kelp bed -Near existing kelp beds -No impact on Navigation	-Historical kelp bed exist in the area -Near entrance of Batiquitos Lagoon -Possible impacts on archeological sites

Table 1. (Continue)

Location	Advantages	Disadvantages
Leucadia	-Near historical kelp bed -Far from river and sewage discharge -No impact on navigation -No beach in the area	-Small area (25 Acres) is available for this project
Encinitas	-Near existing kelp bed -No impact on navigation -Far from river and sewage discharge	-Historical kelp bed exist in the area -Small area (25 Acres) is available for this project
Cardiff	-Near historical kelp bed -No impact on navigation	-Possible small area is available for this project -Near river (San Elijo Lagoon)
Solana Beach	-Presence of historical kelp bed -No impact on navigation -Far from river discharges	-Not enough area available for this project
Del Mar	--Large area available -No impact on navigation -Sandy sea bottom	-Near river discharge -Possible future beach nourishment project in the area
Torrey Pines	-Large area available -No impact on navigation -sandy sea bottom	-Natural reserve (underwater La Jolla park preserve)
Mission Beach	--Large area available --Between two largest kelp beds in San Diego (Point Loma and La Jolla)	-Thick sandy layer on sea bottom -San Diego River presence at the southern boundary of the area -Impact on navigation -Far away from San Onofre Power Plant

Table 2. Score per criteria (0 to 10) for various potential sites for San Onofre Kelp Mitigation Reef

Site Location	Criteria Number											Total Score (Points)
	1	2	3	4	5	6	7	8	9	10	11	
South Laguna[a]	8	3	7	4	1	5	2	6	4	1	5	46
Salt Creek	0[b]	6	6	6	4	3	6	6	6	0	5	38
San Clemente[a]	6	6	6	7	8	5	5	6	6	7	7	69
South San Mateo[a]	6	7	0	7	6	2	5	6	6	7	8	60
South San Onofre[a]	8	2	0	7	6	6	7	4	7	7	9	63
South Oceanside	7	2	5	3	6	3	3	3	4	5	6	47
North Carlsbad[a]	7	5	5	8	4	6	4	4	4	6	6	59
South Carlsbad[a]	6	5	6	8	4	3	6	6	3	5	6	58
Leucadia[a]	5	5	6	6	2	7	7	7	6	6	5	62
Encinitas[a]	5	5	6	6	2	7	7	7	6	5	5	61
Cardiff	5	5	6	6	2	5	4	7	6	3	4	53
Solona Beach	0	4	6	6	2	6	7	7	6	3	4	54
Del Mar	2	0[c]	6	6	2	4	7	7	6	5	4	54
Torrey Pines	7	3	5	2	6	5	7	5	6	0	3	49
Mission Beach[a]	7	2	5	2	6	4	6	4	7	7	1	54

[a] Sites evaluated in technical reports (ECO-systems, 1993, 1997; MEC, 1994)
[b] Grade 0 indicates that this site will be precluded from selection based on this criterion
[c] Possible future beach nourishment projects in the area

Table 3. Best five sites for San Onofre Mitigation Reef

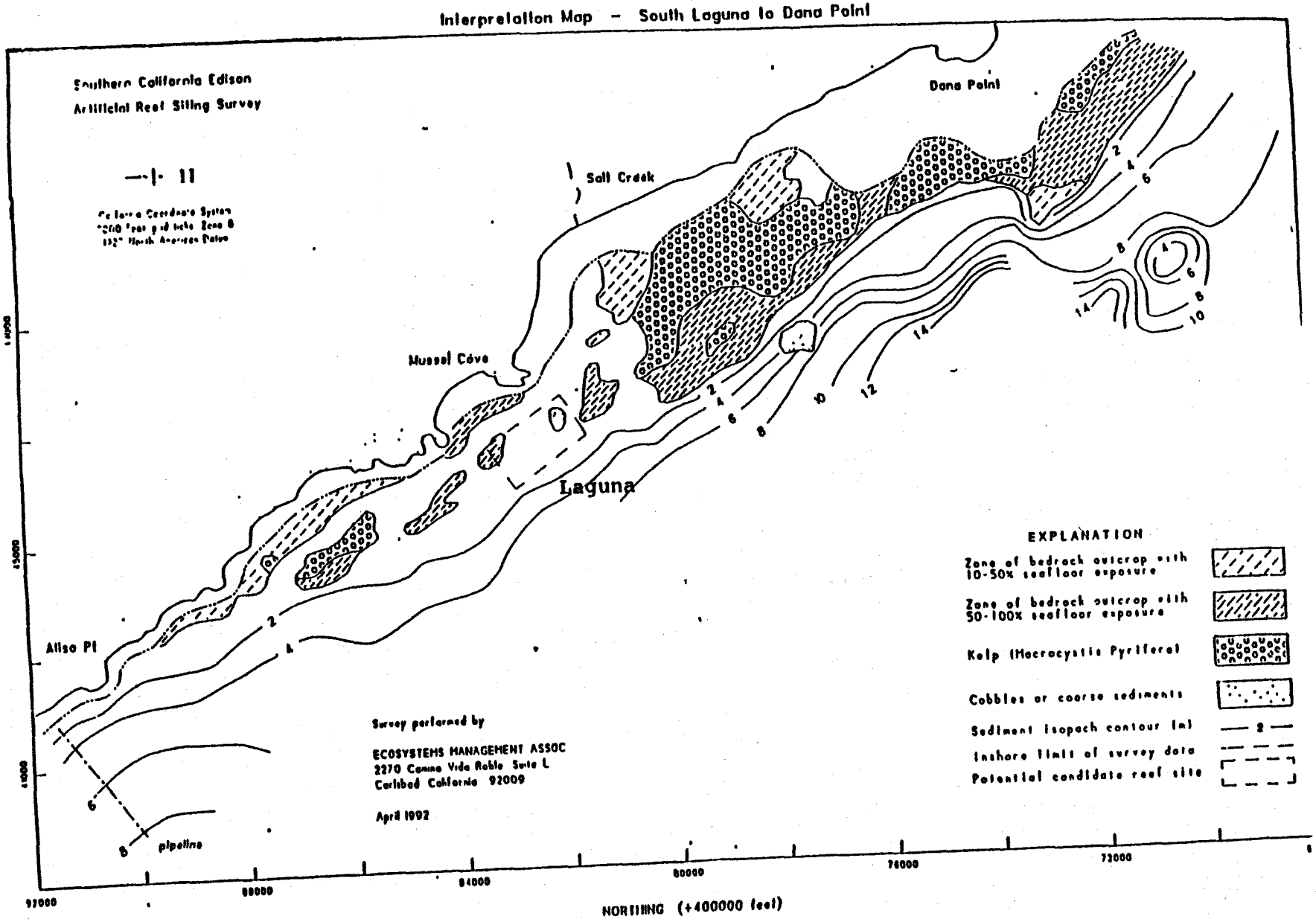
Location	Rank	Score (Points)	Available Area (acres)
San Clemente	1	69	355
Leucadia	2	62	25
Encinitas	3	61	25
North Carlsbad	4	59	30
South Carlsbad	5	58	64
Mission Beach	6	54	85

Table 4. Recommended Project Alternatives

Alternative	Description	Total (acres)
1	San Clemente (150 acres)	150
2	San Clemente (100 acres), Leucadia (25 acres) and Encinitas (25 acres)	150
3	San Clemente (120 acres) and North Carlsbad (30 acres)	150
4	San Clemente (75 acres) and Mission Beach (75 acres)	150

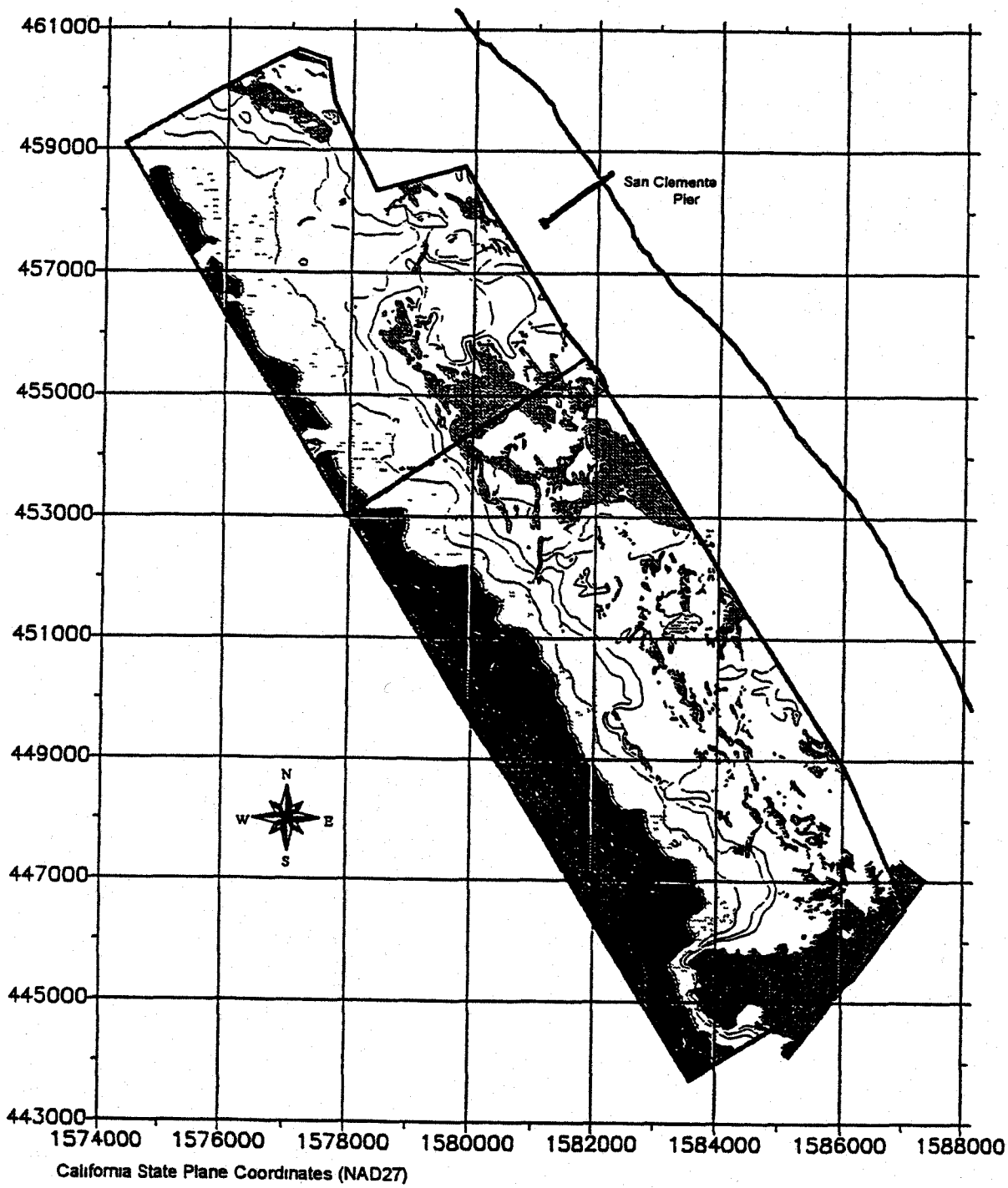
APPENDIX A

SUMMARY OF SONAR SURVEYS



Potential site for an artificial reef near Laguna, Site 5.

Artificial Reef Sediment Thickness & Substrate Map
North SMK - May 1997



California State Plane Coordinates (NAD27)

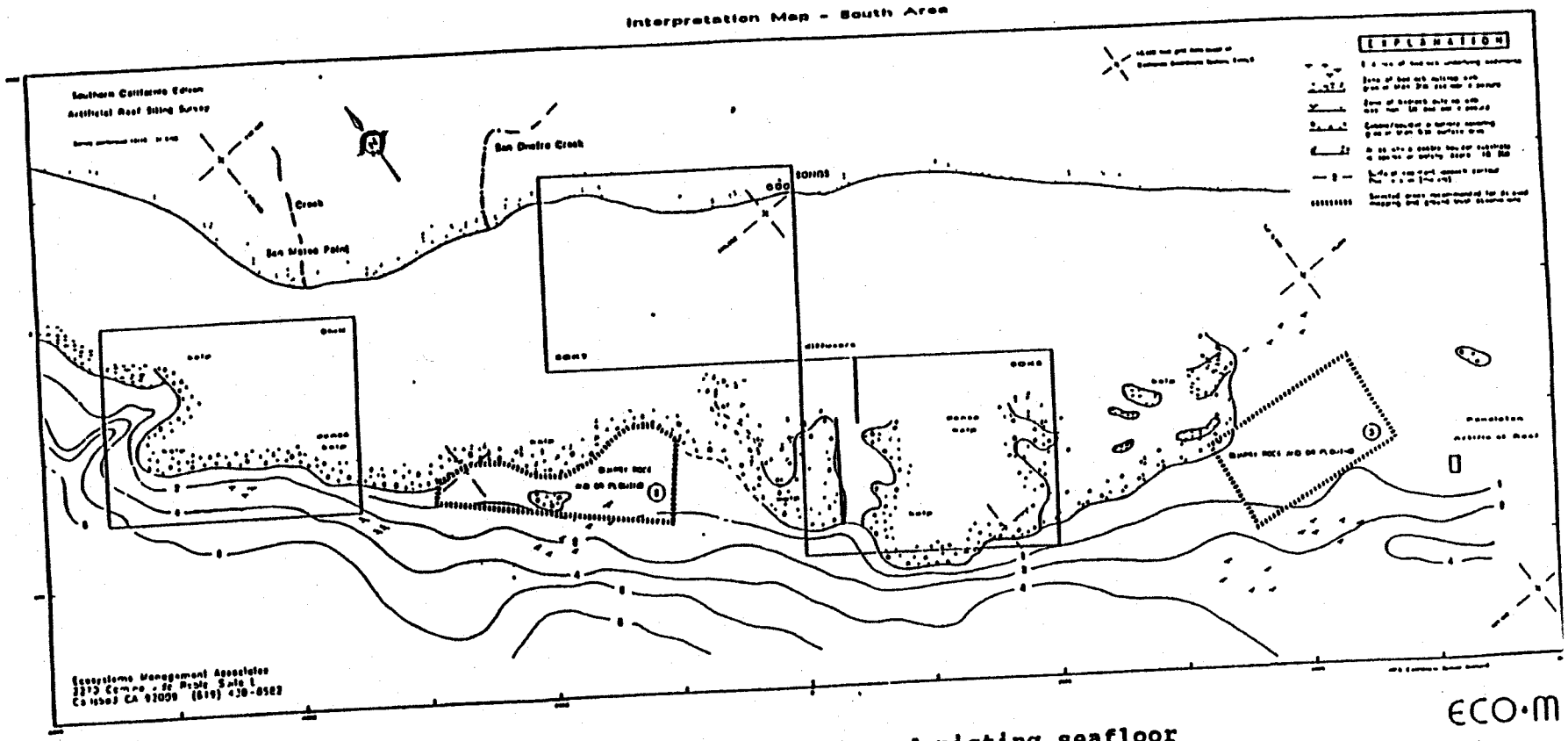
Coastline & Piers for North SMK Region

Art. Reef Substrate Map - State Plane (May 1997)
- 10 to 30% HARD SUBSTRATE
- 30 to 60% HARD SUBSTRATE
- 60 to 100% HARD SUBSTRATE
- 60 to 100% HARD SUBSTRATE - Survey 42
- <10% Hard Substrate - Probable Shallow Sand

Art. Reef Sediment Thickness Polygons - State Plane
- 0.3 Meters and Less Sediment Thickness
- 0.5 to 0.3 Meters Sediment Thickness
- 1.0 to 0.5 Meters Sediment Thickness
- 2.0 to 1.0 Meters Sediment Thickness
- 3.0 to 2.0 Meters Sediment Thickness
- 4.0 to 3.0 Meters Sediment Thickness
- 5.0 to 4.0 Meters Sediment Thickness
- 6.0 to 5.0 Meters Sediment Thickness

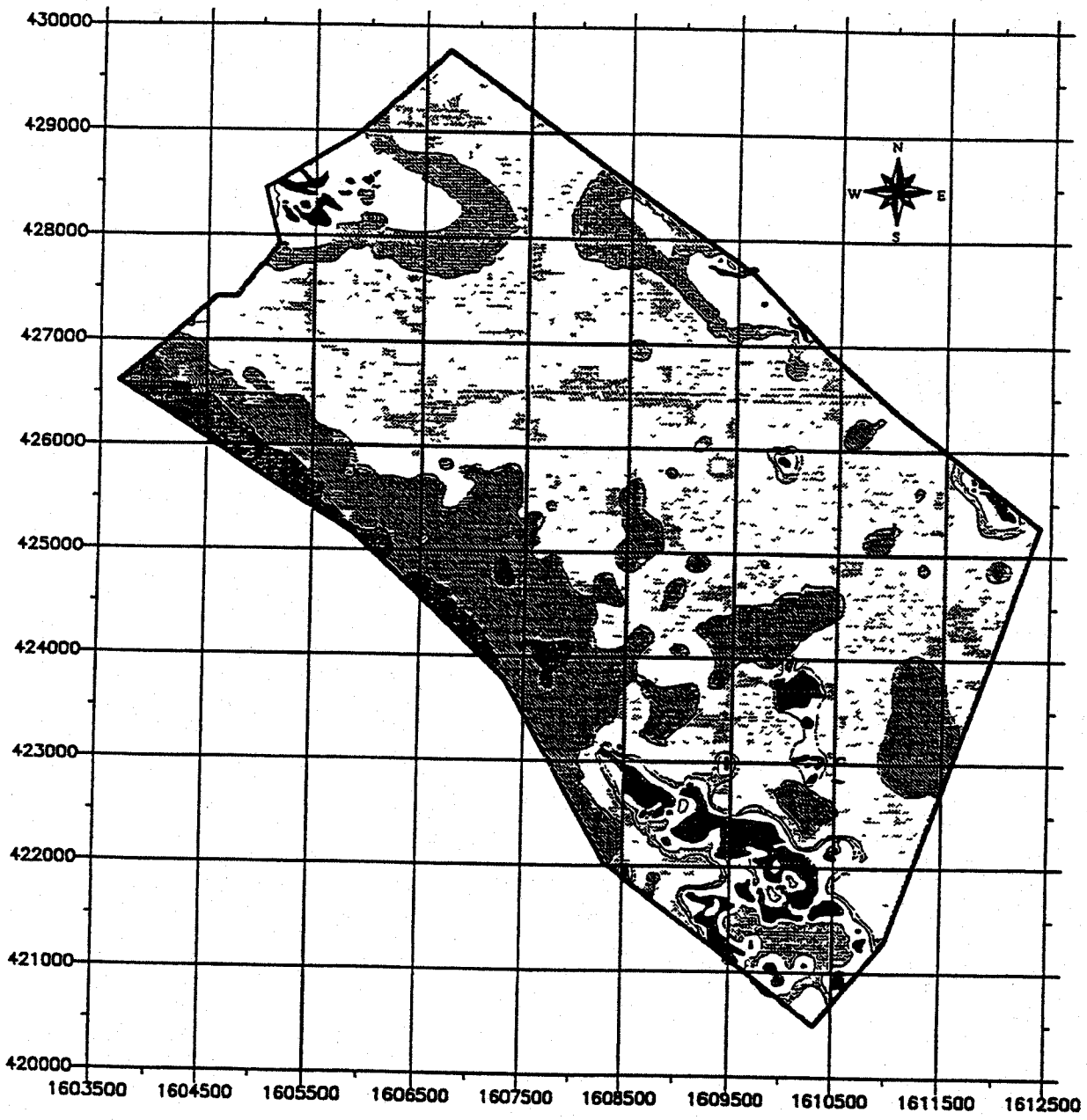
0 2000 4000 6000 Feet

Map: NSMK Sediment Thickness Map
Projection: StatePlane (NAD27)
Survey Date: May 1997
Map Creation Date: July 12, 1997
EcoSystems Management Assoc., Inc.



Interpretation map depicting seafloor characteristics for the southern portion of the survey area, San mateo Point to Pendleton artificial reef.

Artificial Reef Sediment Isopachs & Substrate
South SOK - May 1997



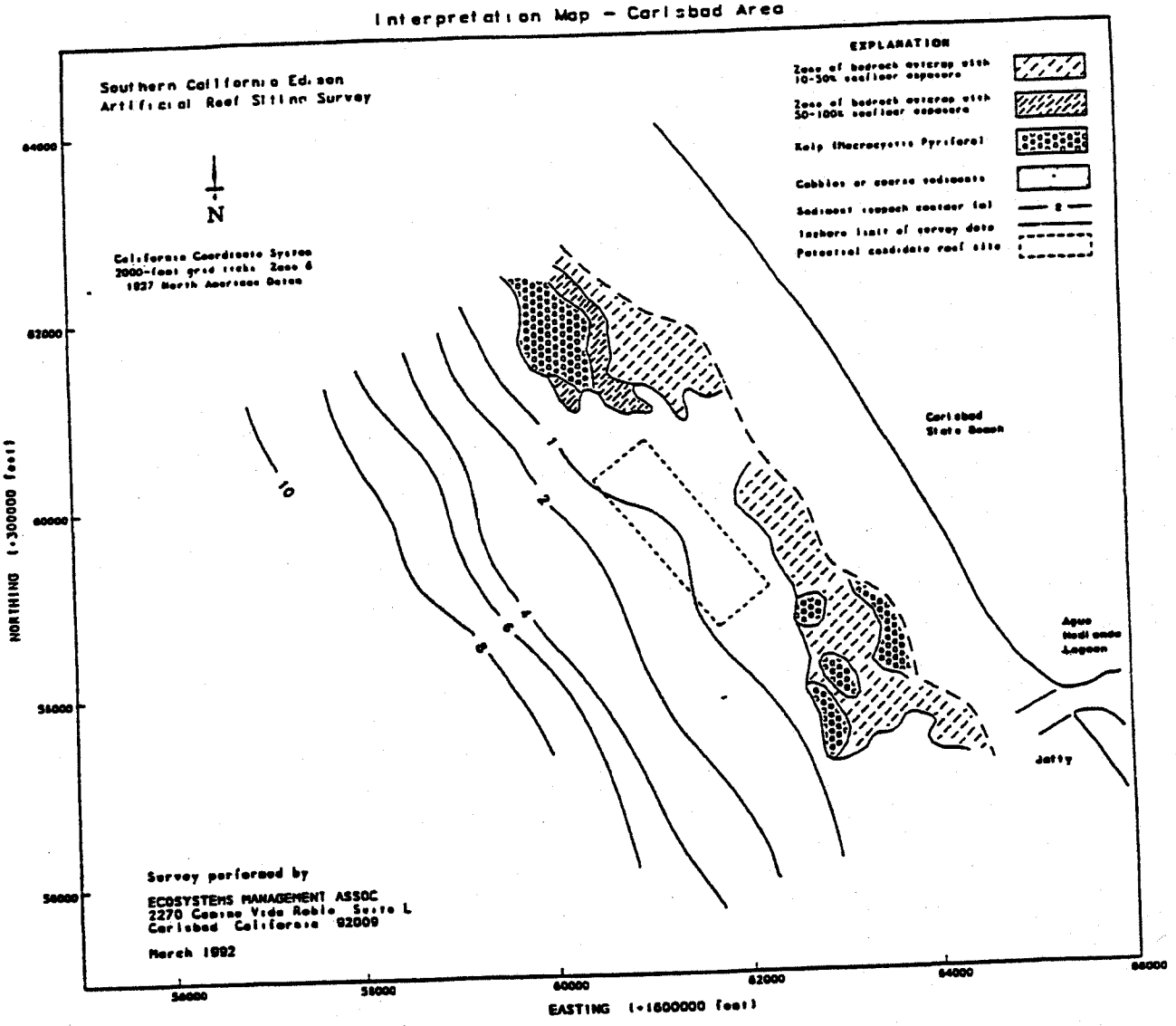
California State Plane Coordinates (NAD27)

South SOK Substrate Map - State Plane
- 30 to 60% HARD SUBSTRATE
- 60 to 100% HARD SUBSTRATE
- GREATER THAN 90% SAND
- PAR REEF LOCATION

South SOK Sediment Thickness - State Plane
- 0.3 Meters and Less Sediment Thickness
- 0.5 to 0.3 Meters Sediment Thickness
- 1.0 to 0.5 Meters Sediment Thickness
- 1 5 to 1 0 Meters Sediment Thickness
- 2.0 to 1 5 Meters Sediment Thickness
- 2.5 to 2.0 Meters Sediment Thickness

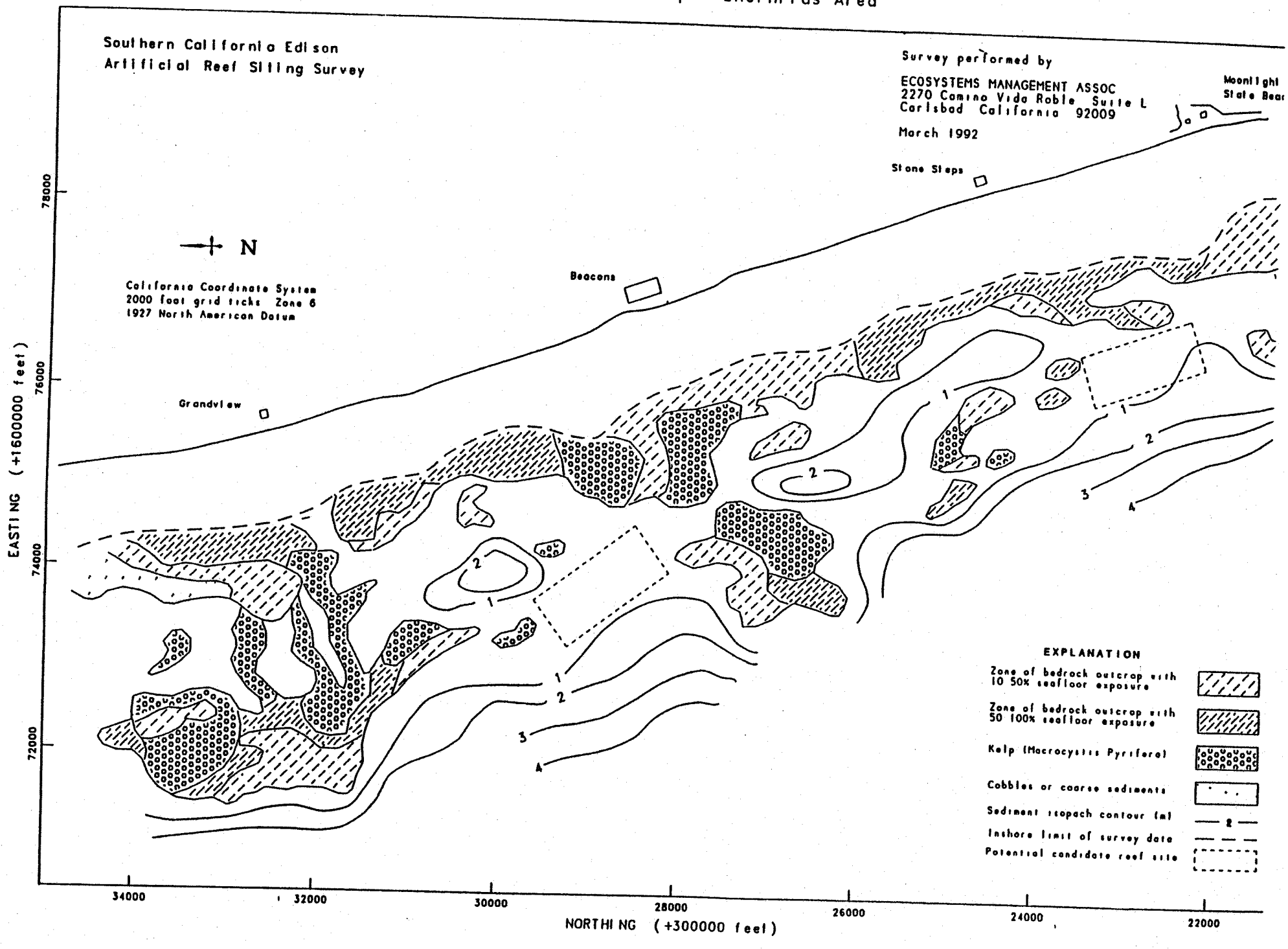
0 1000 2000 Feet

Map: SSOK Substrate & Sed. Thickness
Projection: StatePlane (NAD27)
Survey Date: May 1997
Map Creation Date: Aug. 25, 1997
EcoSystems Management Assoc., Inc.



Potential site for an artificial reef near Carlsbad, Site 4.

Interpretation Map - Encinitas Area



APPENDIX B

LETTER AND MAP FROM CAMP PENDLETON

UNITED STATES MARINE CORPS
MARINE CORPS BASE
CAMP PENDLETON, CALIFORNIA 92055-5001

IN REPLY REFER TO:
11000
BF8/Kew
15 July 1992

Coastal Resources Associates
ATTN: Dr. Lawrence Deysher
2270 Camino Vida Roble, Suite L
Carlsbad, CA 92009

Dear Dr. Deysher:

Marine Corps Base, Camp Pendleton has received your proposed plan to place a 300 acre artificial reef somewhere between Dana Point and Oceanside to mitigate for kelp beds destroyed by the San Onofre Nuclear Generating Station.

Camp Pendleton has several concerns that must be resolved in order to ensure the continuation of training operations aboard this Base. These items specifically include:

a. The construction of the artificial reef will interfere with regularly scheduled amphibious training operations. This training includes the use of Landing Craft Air Cushion (LCAC) as well as other amphibious vehicles such as Assault Amphibian Vehicles and light Navy boats.

b. The physical features which will include 200 acres of exposed rock as well as kelp which will be on the surface will pose a hazard to navigation in the area.

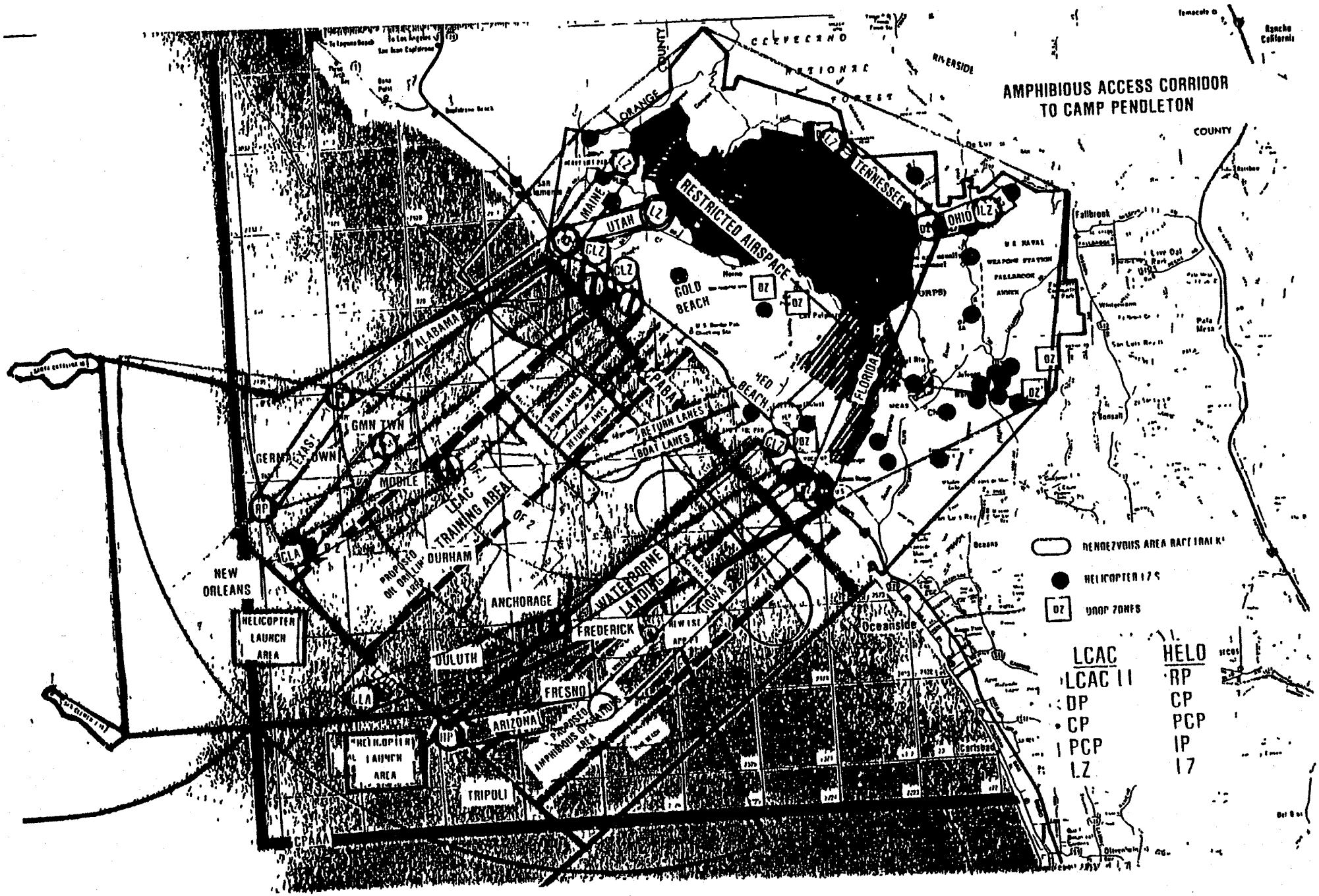
Although San Onofre Nuclear Generating Station is located on Camp Pendleton land, the required mitigation would interfere dramatically with Marine Corps and Navy training operations. For these reasons we highly recommended that you consider other alternatives not located off the shore of Camp Pendleton.

If I may be of further assistance please do not hesitate to contact me at (619) 725-6513.

Sincerely,

Clifford O. Myers

CLIFFORD O. MYERS III
Lieutenant Colonel, U.S. Marine Corps
Community Planning Liaison Officer
By direction of the
Commanding General


AMPHIBIOUS ACCESS CORRIDOR
TO CAMP PENDLETON
RESTRICTED AIRSPACE
ORANGE COUNTY
RIVERSIDE COUNTY
CLEVELAND NATIONAL FOREST
MAINE
UTAH
TENNESSEE
OHIO
GOLD BEACH
RED BEACH
ALABAMA
TEXAS
FLORIDA
GEORGIA
MOBILE
NEW ORLEANS
LCAC TRAINING AREA
PROPOSED OIL DRILLING AREA
DURHAM
ANCHORAGE
WATERBORNE LANDING
FREDERICK
DULUTH
FRESNO
ARIZONA
IOWA
TRIPOLI
HELICOPTER LAUNCH AREA
PROPOSED AMPHIBIOUS OPERATIONS AREA
RETURN LANES
BOAT LANES
Oceanside
Carlsbad
Fallbrook
Rancho California
RENDEZVOUS AREA RACETRACK
HELICOPTER LZS
DROP ZONES
LCAC
LCAC LI
DP
CP
PCP
LZ
HELO
RP
CP
PCP
IP
LZ

APPENDIX C

ARTIFICIAL REEFS PERMITTED IN SOUTHERN CALIFORNIA

Table. C-1. Permits Obtained For Artificial Reefs In Southern California

Reef Name	Location	Description	Year	Acres	Depth (ft)	Habitat
Pendleton	San Onofre, San Diego County	10,000 tons of quarry Rock will be placed covering 8 acres, 10 feet above the ocean floor in 40 feet of water approximately one mile south east of San Onofre.	1980	8	40	Fish/ Kelp
Newport Beach	Newport Beach, Orange County	16,600 tons of concrete rubble will be added to enlarge the Newport artificial reef 1.75 miles west of Newport Pier	1982		72	Fish
Big Scycamore Canyon/Point Mugu	Ventura County	160,000 tons of quarry rubble, heavy steel structures will cover 10 acres os sea floor 2000 feet offshore of Big Sycamore and Point Mugu Ecological reserves.	1996	10	NA	Fish
Carlsbad	Carlsbad, San Diego county	10,000 tons of quarry rock will be placed 0.5 miles offshore of Carlsbad State beach near Batiquitos Lagoon. 3/4 acre of sea floor will be covered in 12 modules 50ft by 50ft, 6ft high arranged in 4 lines perpendicular to the shore	1989	0.75	33 45 57	Fish/ Kelp

Reef Name	Location	Description	Year	Acres	Depth (ft)	Habitat
Point Vicente Palos Verdes Peninsula	Palos Verdes Peninsula	Placement of sunken vessel 2 kilometers offshore of Point Vicente. Vessel no longer than 500ft. by 100ft. and will cover 1 acre of ocean floor	1989	1	100	Fish
Santa Monica Bay	Santa Monica Bay	20,000 tons of quarry rock placed 5 Nautical miles NE of Marina Del Ray Entrance in 16 modules	1987		42 57 72	Fish
Oceanside	Oceanside	10,000 tons of quarry rock placed in 24 modules, one nautical mile offshore of Del Mar Boat Basin covering <0.6% of ocean floor at three depths. Overall size 6000ft long by 3000ft wide.	1986		42 57 72	Fish
Pacific Beach	Pacific Beach	10,000 tons of quarry rock placed 1.8 nautical miles north of mission bay jetty. 24 modules spaced 600ft apart arranged in 4 groups covering <0.6% of sea floor over a 0.4 nauticla miles wide by 0.6 nautical miles long area.	1986		45 60 75	Fish/ Kelp

Reef Name	Location	Description	Year	Acres	Depth (ft)	Habitat
Mission Bay	Mission Reef, San Diego County	5,000 tons of viaduct (bridge), demolition debris and a scrapped kelp harvester vessel 100ft long 32 ft wide 36ft high will be placed 8 nautical miles NW to 8 nautical miles SW of the seaward end of Mission Bay North Jetty	1986		90	Fish
Marina Del Rey	Marina Del Ray	10,000 tons of quarry rock to expand existing artificial reefs one mile offshore from Marina Del Ray breakwater. 90% will be 2.5-3.5ft diameter boulders and 10% 1.0-1.5ft quarry rocks	1984		NA	Fish
Topanga Canyon	Topanga Canyon, Santa Monica Bay	10,000 tons of quarry rock will be placed 5.5 miles north of Marina Del Ray and 0.7 Nautical Miles offshore of Pacific Palisades. Consisting of 3 modules each 300ft long and 100ft wide	1987		28	Fish

Reef Name	Location	Description	Year	Acres	Depth (ft)	Habitat
San Luis Obispo	San Luis Obispo	15,000 tons of quarry rock 1 to 6ft in diameter and concrete tribar fragments 6 to 8ft in diameter will be used to construct four artificial reefs in state tidelands in two paired modules 60ft wide by 200ft long with maximum of 9ft from ocean floor, 0.5 miles offshore of San Luis Obispo County and 4.5 nautical miles NW of Point San Luis.	1984		40-45	Kelp/ Fish

Appendix H
Mitigation Monitoring Plan

Mitigation Monitoring Plan

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Section 2 Socioeconomics				
Recreational Fishing Businesses – Experimental and Mitigation Reefs				
The construction phases for both the experimental reef and the mitigation reef could potentially impact recreational sportfishing operators by restricting use within the project area during construction	Recreational fishing businesses that conduct operations in the project area shall be notified of project-related activities two weeks prior to the onset of construction Notification shall include a map of the project site, hours and duration of operation, and the predicted path of barge travel into and out of the construction site	Two weeks prior to onset of construction of the experimental and mitigation reefs	Project proponent to implement/monitoring by CSLC/CCC	
Commercial Fishing Activities – Experimental and Mitigation Reefs				
The construction of both the experimental reef and mitigation reef in the project lease area is planned to occur between May 1 and September 30, which is outside of the commercial lobster fishing season However, there could be disruptions to commercial fishing activities for sea urchins and crabs during the construction, as these species are fished year-round	Commercial fishermen that conduct operations in the project area shall be notified of project-related activities two weeks prior to the onset of construction Notification shall include a map of the project site, hours and duration of operation, and the predicted path of barge travel into and out of the construction site	Two weeks prior to onset of construction of the experimental and mitigation reefs	Project proponent to implement/monitoring by CSLC/CCC	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Commercial Fishing Sites – Experimental Reef				
There is concern that proposed project activities would place rock or concrete material on existing hard substrate and kelp bed resources, which could impact known fishing sites However, the experimental reef would cover only 22 4 acres of the 356-acre project site/862-acre lease site, allowing flexibility in the choice of module locations, and the use of a crane would allow a fairly high level of precision in placing the material The SONGS permit conditions clearly state that no rock or concrete material is to be placed on existing hard substrate or kelp bed resources	Commercial fishermen that utilize the project area shall be consulted prior to the location of the 22 4-acre experimental reef During consultations, proven fishing grounds shall be identified so that they can be avoided, if possible, during the construction of the mitigation reef	Prior to the location of the experimental reef	Project proponent to implement/monitoring by CSLC/CCC	
Commercial Fishing Sites – Mitigation Reef				
Permit conditions for the mitigation reef specifically state that reef material will not be placed on existing hard substrate or kelp beds However, the placement of material over 127 6 to 277 6 acres increases the possibility of some of these resources being accidentally covered by reef material Accidental coverage of hard substrate or kelp forest could reduce suitable habitat for target species	Commercial fishermen that utilize the project area shall be consulted prior to finalization of the location for the 127 6-acre mitigation reef During consultations, proven fishing grounds shall be identified so that they can be avoided, if possible, during the construction of the mitigation reef	Prior to finalization of the mitigation reef location	Project proponent to implement/monitoring by CSLC/CCC	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Section 3 Geology				
Movement of Reef Building Materials onto Beaches – Experimental and Mitigation Reefs				
There is a potential for the reef building materials to be moved during extreme storm events, particularly if the attached kelp creates a degree of buoyancy. The smaller rocks and pieces of concrete associated with the experimental and mitigation reefs could be washed up on the beach or into the shallow surf zone adjacent to the lease area during typical storm events No conclusive evidence precludes the possibility that substantial rock or concrete might be moved ashore during an extreme storm event.	Both the experimental and mitigation reef will be monitored for movement of construction material during storm events The monitoring will be on a biweekly basis from November through March and monthly during the rest of the year, consistent with the program outlined under the public services section Any recycled concrete or quarry rock from the reefs, which is found on the beaches or shallow surf zone will be removed by the project proponent	Experimental Reef Ongoing for the five year monitoring after construction of the experimental reef, on a biweekly basis from November through March and on a monthly basis during the other months Mitigation Reef Ongoing for five years or as long as needed after construction of the mitigation reef is completed, or until a conclusion can be reached regarding the impacts of kelp and other materials washing onto the beaches or into the shallow surf zone on a biweekly basis from November through March and on a monthly basis during the other months	Project proponent, to implement/monitoring by City of San Clemente, CDPR, CSLC, and CCC Project proponent to implement/monitoring by City of San Clemente, CDPR, CSLC, and CCC	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Section 4 Air Quality				
Experimental Reef Construction Emissions	*Combination of Following Possible Mitigation Measures*	*Final Mitigation Package to be Negotiated Once the Construction Contractor has been Selected*	*Project Proponents and Contractors, CCC, CSLC, and Air Districts*	
The combined construction activities for the 22 4-acre experimental reef would produce daily emissions of NOx and PM_{10} that exceed the thresholds of significance Quarterly NOx emissions would also exceed the threshold of significance	*Standard Mitigation Measures* *1 Reducing PM_{10} Emissions* • Apply water sprays to the concrete piles and graveled areas at least twice daily Water down quarry rock and conveyer belts if soil is visible Increase the frequency of watering when wind speeds exceed 15 miles per hour • Extend pavement from roads or access ways to concrete piles to remove at least three-quarters of the gap Apply quality gravel to the remaining unpaved area so that vehicles and mobile equipment never maneuver on dirt • Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip	Measures to be applied prior to or during project construction	Project proponent and contractor to implement/monitoring by CCC, CSLC, and Air Districts	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Experimental Reef Construction Emissions (cont)	• Plan routes and schedules for truck trips that reduce trip times and slowdowns • Sweep streets manually or with water sweepers at the end of the workday if visible soil material is carried onto private or public paved roads Reclaimed water shall be used, if available with the water sweepers (35 percent reduction of PM_{10} from paved roads) • Keep traffic speeds on unpaved roads and access ways to 15 mph or slower • Pave a dirt road or lot that is currently generating PM_{10} emissions, which is unrelated to the proposed project but in the vicinity of the truck hauling operations 2 *Reducing to NOx Emissions* • Instruct truck drivers to not idle their engines for more than two minutes (except when caught in traffic) Spot checks shall be periodically performed as part of the Mitigation Monitoring Program to verify success • Implement a trip reduction strategy to achieve a 1 5 AVR (average vehicle ridership) for construction employees • Retard injection timing on diesel engines to two degrees Before Top Center • Use high pressure injectors on diesel engines to reduce NOx emissions by approximately 40 percent			

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Experimental Reef Construction Emissions (cont)	• Retrofit tugboats used on the project with CAT 3606 series high efficiency diesel engines or other engine retrofit technologies currently being tested *3 Purchase Emission Offsets* • Purchase or lease NOx emission offset credits for project related emissions for the length of the construction period *Potential Changes in Construction* • Finding reef material sources closer to the ports • Obtaining quarry rock from Catalina Island where minimal trucking is required • Taking more time to load barges • Obtaining recycled concrete closer to the project site • Obtaining quarry rock closer to the project site	Measures to be applied prior to or during project construction	Project proponent and contractor to implement/monitoring by CCC, CSLC	
Mitigation Reef Construction Emissions	*Combination of Following Possible Mitigation Measures*	*Final Mitigation Package to be Negotiated Once the Construction Contractor has been Selected*	*Project Proponents and Contractors, CCC, CSLC, and Air Districts*	
The combined construction activities for any of the mitigation reef build out scenarios (either 127 6-acre or 277 6-acre with all concrete or all rock at 67%) would produce daily emissions of NOx and PM_{10} that exceed the thresholds of	*Standard Mitigation Measures* *All of those measures listed above for the experimental reef*	Measures to be applied prior to or during project construction	Project proponent and contractor to implement/monitoring by CCC, CSLC and Air Districts	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Mitigation Reef Construction Emissions (cont)				
significance. In addition, the quarterly emissions for NOx and PM_{10} would also exceed the thresholds of significance Looking at the breakdown of emissions by the type of construction activity helps identify mitigation opportunities: PM_{10} emissions for the truck loading, hauling, and barge loading activities would be the same on a daily basis as for the experimental reef and would substantially exceed the daily threshold of significance In addition, the mitigation reef emissions would also exceed the PM_{10} quarterly threshold for significance due to the longer periods of construction with the different scenarios Daily NOx emissions for tugboat shipping would substantially exceed the daily threshold of significance. In addition, the mitigation reef emissions would also exceed the NOx quarterly threshold for significance due to the longer periods of construction	*Potential Changes in Construction* • Finding reef material sources closer to the ports • Obtaining quarry rock from Catalina Island where minimal trucking is required • Taking more time to load barges • Obtaining recycled concrete closer to the project site • Obtaining quarry rock closer to the project site • Using less building material to construct the reef • Using concrete instead of quarry rock to construct the mitigation reef • Taking more time to construct the project • Using less building material to construct the reef • Using concrete instead of quarry rock to construct the mitigation reef Using the live boating method of off-loading	Measures to be applied prior to or during project construction	Project proponent and contractor to implement/monitoring by CCC, CSLC, and Air Districts	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Mitigation Reef Construction Emissions (continued)				
The barge off-loading element of the mitigation reef would produce daily emissions that are the same as for the experimental reef In addition, the mitigation reef construction would result in quarterly NOx emissions that exceed the threshold of significance				
Section 5 Transportation				
Experimental Reef Construction				
Intersection Levels of Service Los Angeles/Long Beach Area Project construction traffic during the p m peak hour would reduce the LOS at two intersections, Ocean Boulevard and Atlantic Avenue, and Ocean Boulevard and Cherry Avenue, to unacceptable levels	The project proponent and all project contractors shall restrict truck trips to off-peak travel hours (9 00 a m to 4 00 p m)	Ongoing during any experimental reef construction activities in the Los Angeles/Long Beach area	Project proponent and project contractors, with monitoring by CSLC/CCC	
Freeway Operations Los Angeles/Long Beach Area The addition of experimental reef construction traffic would alter the level of service during the a m peak hour on southbound I-710 between Pacific Coast Highway and Willow Street from LOS D to LOS E	The project proponent and all project contractors shall restrict truck trips to off-peak travel hours (9 00 a m to 4 00 p m)	Ongoing during any experimental reef construction activities in the San Diego area	Project proponent and project contractors, with monitoring by CSLC/CCC	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Experimental Reef Construction (continued)				
Freeway Operations - San Diego Area The addition of experimental reef construction traffic would alter the level of service during the a m peak hour on northbound I-5 between L and J Streets from LOS E to LOS F	The project proponent and all project contractors shall restrict truck trips to off-peak travel hours (9 00 a m to 4 00 p m)	Ongoing during any construction activities in the San Diego area	Project proponent and project contractors to implement/monitoring by CSLC/CCC	
Mitigation Reef Construction				
Intersection Levels of Service Los Angeles/Long Beach Area Project construction traffic during the p m peak hour would reduce the LOS at two intersections, Ocean Boulevard and Atlantic Avenue, and Ocean Boulevard and Cherry Avenue, to unacceptable levels	The project proponent and all project contractors shall restrict truck trips to off-peak travel hours (9 00 a m to 4 00 p m)	Ongoing during any construction activities in the Los Angeles/Long Beach area	Project proponent and project contractors to implement/monitoring by CSLC/CCC	
Freeway Operations Los Angeles/Long Beach Area The addition of experimental reef construction traffic would alter the level of service during the a m peak hour on southbound I-710 between Pacific Coast Highway and Willow Street from LOS D to LOS E.	The project proponent and all project contractors shall restrict truck trips to off-peak travel hours (9 00 a m to 4 00 p m)	Ongoing during any construction activities in the Los Angeles/Long Beach area	Project proponent and project contractors to implement/monitoring by CSLC/CCC	
Freeway Operations San Diego Area The addition of experimental reef construction traffic would alter the level of service during the a m peak hour on northbound I-5 between L and J Streets from LOS E to LOS F	The project proponent and all project contractors shall restrict truck trips to off-peak travel hours (9 00 a m to 4 00 p m)	Ongoing during any construction activities in the San Diego area	Project proponent and project contractors to implement/monitoring by CSLC/CCC	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Section 6 Biological Resources				
Existing Kelp Forest Community				
Experimental and Mitigation Reefs				
Nutrients and Plankton Supply The kelp forests associated with the experimental reef and the mitigation reef could adversely affect the supply of nutrients and plankton to the San Mateo kelp forest community, which could result in damage to the existing kelp forest	During the experimental reef phase of the project, conduct research to determine effects of the kelp forest perimeter on the supply of nutrients and plankton to, and the rates of nutrient uptake in, the interior portion of the kelp forest The research shall be conducted in natural kelp forests similar in size and kelp density to the proposed mitigation kelp reef and during periods when nutrient stress of kelp plants would be likely If the research suggests that the mitigation reef, as currently planned, would adversely affect the San Mateo kelp forest, then the location of the mitigation reef would be shifted north to avoid these effects If the scientific research results indicate that the mitigation reef would have no adverse effect on the San Mateo kelp forest, no further mitigation would be required	During five year monitoring period for experimental reef	Project proponent to implement/monitoring by CCC	
Section 8 Hazards				
Health Hazards				
The experimental and mitigation reefs have the potential to introduce quarry rock and concrete onto the beaches and into the shallow surf zone nearest the lease site In concept, large wave events could result in the transport of some kelp and reef material onshore Concrete and	Both the experimental and mitigation reef will be monitored for movement of construction material during storm events The monitoring will be on a biweekly basis from November through March and monthly during the rest	Experimental Reef Ongoing for five years after construction of the experimental reef, on a biweekly basis from	Project proponent to implement/monitoring by City of San Clemente, CDPR, CSLC, and CCC	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Health Hazards (continued)				
quarry rocks are not natural components of the beach environment, and the presence of concrete pieces on the shoreline would potentially affect the safety of the beach environment. People walking on the beach could be injured by an unexpected block of concrete or rock People wading, swimming, or surfing could be injured and become incapacitated in the water, leading to drowning	of the year, consistent with the program outlined under the public services section Any recycled concrete or quarry rock from the reefs, which is found on the beaches or in the shallow surf will be removed by the project proponent	November through March and on a monthly basis during the other months <u>Mitigation Reef</u> Ongoing for five years or as long as needed after construction of the mitigation reef is completed, or until a conclusion can be reached regarding the impacts of kelp and other materials washing onto the beaches or shallow surf zone, on a biweekly basis from November through March and on a monthly basis during the other months		

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Section 9 Noise				
Construction Noise				
Truck Routes The use of project trucks within residential and commercial zones would conflict with the applicable noise control ordinances for these zones The conflict would be particularly substantial during the nighttime, when more restrictive thresholds apply The use of truck routes within residential and commercial zones would create noise levels in conflict with the County of Los Angeles, County of San Diego, and City of San Diego noise control ordinances This is considered a significant impact	Contractors will be directed to avoid the use of routes within areas zoned for residential and commercial uses In the event such routes cannot be avoided, the contractor will be directed to avoid use of these routes during the weekday hours of 7 p m to 7 a m , and all day Sunday	Ongoing during project construction activities	Project proponent and contractors to implement/monitoring by CSLC/CCC	
Section 10 Public Services and Utilities				
Offshore Emergency Response				
Reef Construction The need for offshore emergency response services could occur during the construction of the experimental reef and mitigation reef Available Orange County Harbor Patrol emergency response services would be adequate to handle any problems during the construction phase, and the construction would not create any problems for the Harbor Patrol in carrying out their duties In addition, it is expected that current Coast Guard emergency services would be adequate for any problems that might occur	The Harbor Patrol requested that they be notified when the construction plans and schedule for the experimental reef are finalized The Harbor Patrol will be given notification two weeks prior to when construction activities are beginning for both the experimental and mitigation reefs	Two weeks prior to initiation of experimental reef construction activities and two weeks prior to initiation of mitigation reef construction activities	Project proponent to implement/monitoring by CSLC/CCC	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Kelp and Beach Maintenance				
Experimental Reef The 22 4-acre experimental artificial reef could potentially add twice the current amount of persistent kelp bed to the project area. The additional kelp wrack washing on shore from the experimental reef represents a relatively small increase in kelp wrack and is not likely to increase the need for clean up services There is a very small chance some small rocks or pieces of concrete used to construct the experimental reef could wash onshore or into the shallow surf zone because of the added buoyancy from attached kelp plants	A monitoring program will be initiated upon the construction of the experimental reef and continued for the following five years to determine the amount of kelp wrack currently washing onto the beaches Because the City of San Clemente and CDPR do not collect data on the amount of kelp washing onto beaches currently, monitoring would establish a baseline The monitoring of the experimental reef should also observe whether concrete or quarry rock are moved toward the beach during strong wave events This monitoring would make it easier to compare changes due to the experimental reef or to the subsequent build out of the mitigation reef, as outlined below The beach monitoring would be done on a bi-weekly basis throughout the months of November through March and on a monthly basis during the other months The monitoring visits would be coordinated to occur immediately after any large storm events (by the next day) The beach monitoring would include 1) observations of the amount of kelp wrack on the beach (cubic yards and/or percentage coverage), 2) tracking beach clean up schedules and costs (including disposal), and 3) tracking the number of complaints from beach users or nearby residents and businesses due to kelp or rocks/concrete on the beaches The movement of the concrete and quarry rock would be monitored as a component of the larger performance monitoring effort	Ongoing for five years after construction of the experimental reef, on a biweekly basis from November through March and on a monthly basis during the other months	Project proponent, to implement/monitoring by City of San Clemente, CDPR, CSLC, and CCC	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Kelp and Beach Maintenance (continued)				
Mitigation Reef If a significant increase in the amount of kelp wrack reaching the beaches occurs, there could be a need for additional public services to clean up the kelp The full mitigation reef with 150 acres of medium-to-high density kelp bed could increase the amount of kelp washing onshore annually by up to 3,000 yd^3, primarily between the months of November through February There is a small chance some small rocks or pieces of concrete used to construct the experimental reef could wash onshore because of the added buoyancy from attached kelp plants	Due to uncertainty regarding the amount, frequency and location of increased kelp washing onshore, kelp on the beaches shall be monitored as part of the experimental reef (as discussed above) and the larger mitigation reef Although rocks and concrete used in constructing the reef are not likely to wash onshore or into the shallow surf, the monitoring program shall also observe this possibility Monitoring shall be conducted for five years or as long as needed after construction of the mitigation reef is completed, or until a conclusion can be reached regarding the impacts of kelp and other materials washing onto the beaches This would be done on a bi-weekly basis throughout the months of November through March and on a monthly basis during the other months The monitoring visits would be coordinated to occur immediately after any large storm events (by the next day) The monitoring would include 1) observations of the amount of kelp wrack on the beach (cubic yards and/or percentage coverage) and of potential rocks/concrete, 2) tracking beach clean up schedules and costs (including disposal), and 3) tracking the number of complaints from beach users or nearby residents and businesses due to kelp and rocks/concrete on the beaches	Ongoing for five years or as long as needed after construction of the mitigation reef is completed, or until a conclusion can be reached regarding the impacts of kelp and other materials washing onto the beaches, on a biweekly basis from November through March and on a monthly basis during the other months	Project proponent, with monitoring by City of San Clemente, CDPR, CSLC, and CCC	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Kelp and Beach Maintenance (continued)	Based on the results during the monitoring period, it would be determined if additional clean up services are needed as a result of the artificial reef This clean up would occur at any time it is determined it is necessary during monitoring Possible mitigation includes the project proponents establishing a trust fund to pay for 1) leasing or purchasing special equipment for clean up, or possibly to bury kelp in the sand, 2) additional personnel for beach clean up, and/or 3) landfill or other disposal costs for kelp and rocks/concrete removed Based on the results of the monitoring, it would be determined if additional clean up services are needed as a result of the artificial reef Mitigation would include the project proponents establishing a trust fund to pay for (1) leasing or purchasing special equipment for clean up, or possibly to bury kelp in the sand, (2) additional personnel for beach clean up, and/or (3) land fill or other disposal costs for kelp and rocks/concrete removed			
Section 11 Aesthetics				
Effects on Scenic Vistas or Scenic Highways				
Reef Construction The presence of several barges 0 6 mile and farther offshore at the project site would not substantially alter the area's visual integrity as seen from any designated scenic routes or view corridors	It is recommended that the project proponent conduct an educational outreach program to inform the public about the project and the construction activities This would include notifying the media and residents about the type and duration of construction activities a	One month prior to initiation of reef construction activities and continuing throughout the construction period	Project proponent, to implment/monitoring by City of San Clemente, CDPR, CSLC, and CCC	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Effects on Scenic Vistas or Scenic Highways (cont)	month prior to beginning construction Temporary notices would also be posted along the shore at the San Clemente Pier and near the mouth of San Mateo Creek			
Demonstrable Negative Aesthetic Effects				
Reef Construction The appearance of project-related barges operating approximately 0 6 mile offshore would resemble existing offshore vessel activities, which include commercial fishing and shipping, and U S military exercises Consequently, project construction activities are not expected to diminish the project area's visual quality	It is recommended that the project proponent conduct an educational outreach program to inform the public about the project and the construction activities This would include notifying the media and residents about the type and duration of construction activities a month prior to beginning construction Temporary notices would also be posted along the shore at the San Clemente Pier and near the mouth of San Mateo Creek	One month prior to initiation of reef construction activities and continuing throughout the construction period	Project proponent, to implement/monitoring by City of San Clemente, CDPR, CSLC, and CCC	
Section 13 Recreation				
Effects of a Kelp Forest				
Mitigation Reef The development of an additional 150 acres of medium-to-high density kelp forest within the lease area has the potential to substantially increase kelp wrack on the adjacent beaches by as much as 3,000 yd^3 per year The additional kelp wrack on area beaches would adversely affect recreation if it discouraged use by the public.	Due to uncertainty regarding the amount, frequency and location of increased kelp washing onshore, kelp on the beaches shall be monitored as part of the experimental reef (as discussed above) and the larger mitigation reef Although rocks and concrete used in constructing the reef are not likely to wash onshore or into the shallow surf, the monitoring program shall also observe this possibility Monitoring shall be conducted for at least five years after construction of the	Ongoing for five years or as long as needed after construction of the mitigation reef is completed, or until a conclusion can be reached regarding the impacts of kelp and other materials washing onto the beaches, on a	Project proponent, to implement/monitoring by City of San Clemente, CDPR, CSLC, and CCC	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Effects of a Kelp Forest (cont)	mitigation reef is completed or until a conclusion can be reached regarding the impacts of kelp and other materials washing onto the beaches This would be done on a bi-weekly basis throughout the months of November through March and on a monthly basis during the other months The monitoring visits would be coordinated to occur immediately after any large storm events (by the next day) The monitoring would include 1) observations of the amount of kelp wrack on the beach (cubic yards and/or percentage coverage) and of potential rocks/concrete, 2) tracking beach clean up schedules and costs (including disposal), and 3) tracking the number of complaints from beach users or nearby residents and businesses due to kelp and rocks/concrete on the beaches Based on observations during monitoring, it would be determined if additional clean up services are needed as a result of the artificial reef Clean up could begin at any time during this monitoring period as needed Possible mitigation includes the project proponents establishing a trust fund to pay for 1) leasing or purchasing special equipment for clean up, or possibly to bury kelp in the sand, 2) additional personnel for beach clean up, and/or 3) land-fill or other disposal costs for kelp and rocks/concrete removed	biweekly basis from November through March and on a monthly basis during the other months		

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Effects of a Kelp Forest (continued)				
	Based on the results of the monitoring, it would be determined whether additional clean up services are needed as a result of the experimental reef and mitigation reef Mitigation would include the project proponents establishing a trust fund to pay for (1) leasing or purchasing special equipment for clean up, or possibly to bury kelp in the sand, (2) additional personnel for beach clean up, and/or (3) land fill or other disposal costs for kelp removed			
Effects of Reef Materials on the Beach				
The experimental reef and mitigation reef have the potential to introduce quarry rock and concrete onto the beaches or into the shallow surf zone nearest the lease site, which could present a hazard to beach users	A monitoring program would be initiated upon the construction of the experimental reef and continued for the following five years to determine the amount of kelp wrack currently washing onto the beaches Because the City of San Clemente and CDPR do not collect data on the amount of kelp on beaches, this monitoring would establish a baseline data base The monitoring of the experimental reef would also observe whether concrete or quarry rock are moved toward the beach during strong wave events This monitoring would make it easier to compare changes due to the experimental reef or to the subsequent build out of the mitigation reef, as outlined below The beach	Experimental Reef Ongoing for five years after construction of the experimental reef, on a biweekly basis from November through March and on a monthly basis during the other months	Project proponent, to implement/monitoring by City of San Clemente, CDPR, CSLC, and CCC	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Potential for Concrete and Quarry Rock to Wash Ashore (continued)	monitoring would be done on a bi-weekly basis throughout the months of November through March and on a monthly basis during the other months The monitoring visits would be coordinated to occur immediately after any large storm events (by the next day) The beach monitoring would include 1) observations of the amount of kelp wrack on the beach (cubic yards and/or percentage coverage), 2) tracking beach clean up schedules and costs (including disposal), and 3) tracking the number of complaints from beach users or nearby residents and businesses due to kelp or rocks/concrete on the beaches The movement of the concrete and quarry rock from the artificial reef would be monitored as a component of the larger performance monitoring effort	Mitigation Reef Ongoing for five years or as long as needed after construction of the mitigation reef is completed, or until a conclusion can be reached regarding the impacts of kelp and other materials washing onto the beaches, on a biweekly basis from November through March and on a monthly basis during the other months		
Conflicts with Plans and Policies				
The creation of kelp wrack and the potential for concrete and quarry rock to be washed up on shore are two project effects that could conflict with the general goals and objectives of applicable plans and policies Both excessive kelp wrack and the presence of concrete and rock could discourage the use of the local beaches for recreation	The mitigation measures described above for kelp wrack and concrete and quarry rock washing ashore are also required to assure consistency with the existing applicable plans and policies	Experimental Reef Ongoing for five years after construction of the experimental reef, on a biweekly basis from November through March and on a monthly basis during the other months	Project proponent, to implement/monitoring by City of San Clemente, CDPR, CSLC, and CCC	

Mitigation Monitoring Plan (continued)

Environmental Impacts	Mitigation Measures	Timing	Implementation and Monitoring/ Enforcement Responsibility	Verification (Initial/Date)
Conflicts with Plans and Policies (continued)				
		Mitigation Reef Ongoing for five years or as long as needed after construction of the mitigation reef is completed, or until a conclusion can be reached regarding the impacts of kelp and other materials washing onto the beaches, on a biweekly basis from November through March and on a monthly basis during the other months		

Appendix I

Letter from Dennis Bedford, Marine Biologist, CDFG Artificial Reef Program

STATE OF CALIFORNIA-THE RESOURCES AGENCY Gray Davis, *Governor*
DEPARTMENT OF FISH AND GAME

Marine Region
Southern Operations
330 Golden Shore, Suite 50
Long Beach, California 90802
(310) 590-5171

March 18, 1999

Ms. Elaine Russell
California State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, CA 95825-8202

Dear Ms. Russell·

During the public response period to the Draft PEIR it was suggested that Mission Beach, San Diego County, should be considered as an alternate site for the experimental and/or build out phases for the Southern California Edison Company kelp reef mitigation project

The Department of Fish and Game, Artificial Reef Program has considered this alternative and has found it to be unacceptable for the following reasons

- Mission Beach is too far away from the impact site A long standing policy within the Department is that, whenever possible mitigation should be "in kind" and "as close as practical to the impact site " Other sites, much closer to San Onofre have been identified during the SCE siting studies If an alternative site to San Clemente is deemed desirable, one of these would be far more appropriate than Mission Beach

- The existing CDFG Mission Beach Artificial Reef site is sandwiched between the two largest and most persistent kelp beds along the southern California coast It has already been demonstrated that kelp will grow on an artificial reef there This fact has been cited by proponents of "concrete only as reef material" and of "utilizing Mission Beach for some or all of the mitigation reef " These proponents are attempting to answer the wrong question. The appropriate question is not, "how can we grow the maximum amount of kelp on an artificial reef?" If that was the appropriate question, any of the Channel Islands, or perhaps the Big Sur coastline might be an even better choice The appropriate question is, <u>can SCE replace the kelp, fish and invertebrates lost through the operation of SONGS through the construction of an artificial reef?</u> The area in the immediate vicinity of SONGS has less of these natural resources than prior to power plant start up <u>Can these resources be replaced?</u>

We find no merit in the suggestion to utilize Mission Beach as an alternative site to San Clemente We would urge the State Lands Commission staff to give no further consideration to this proposal.

Respectfully,

Dennis Bedford
Marine Biologist, Coordinator
CDFG Artificial Reef Program

cc: John Dixon, California Coastal Commission
Russ Kaiser, U S Army Corps of Engineers