Remediating Wheeler North Reef

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SONGS Mitigation Monitoring Project
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Shown here is a summary of project compliance for the SONGS reef mitigation project. As described in the previous slide, project compliance requires that the Wheeler North Reef meet all 4 absolute standards and the collective group of relative standards in a given year for that year to count towards mitigation credit. Although it has met the relative standards in all years, the Wheeler North Reef has failed to meet the performance standard for fish standing stock in every year and thus has not accrued any mitigation credit to date.
• The performance standard for fish standing stock requires the Wheeler North Reef to sustain 28 tons of reef fish
• This value is based on the estimated reduction in the standing stock of fish in the San Onofre kelp forest that was attributed to SONGS’ operations in the impact assessment studies overseen by the Marine Review Committee
• The Wheeler North Reef has never met this performance standard during the eight years of its existence
In addition to requiring independent studies to determine why the performance standards are not being met, the SONGS coastal development permit also requires independent studies be done to develop recommendations for appropriate remedial measures.
As per the SONGS coastal development permit we used monitoring data to:

1. Investigate the reason(s) why the Wheeler North Reef’s failure to meet the performance standard for fish standing stock
2. Develop potential solutions for ensuring that this standard is met in the future
• Plotted here are annual values of fish standing stock for the natural reefs at San Mateo and Barn since 2009
• Both reefs are generally low relief (< 1 m tall) and their rock coverages of 52% and 47% are very similar to that of Wheeler North Reef (48% rock cover)
• In the graph on the left standing stock is scaled to 174 acres, which is the area of the Wheeler North Reef while standing stock in the right graph is scaled to the actual area of Barn and San Mateo which is 328 acres and 282 acres, respectively
• Not surprisingly, a larger area of reef supports a greater fish standing stock
Conclusions from Independent Studies

The present configuration of Wheeler North Reef (174 acres of low relief reef with 40% rock coverage) is not sufficient to consistently meet the performance standard for fish standing stock.

How much additional acreage is needed?
To estimate the area of additional reef needed for Wheeler North Reef to sustain a fish standing stock of 28 tons we:

1. Combined the expected future fish standing stock of the existing 174 acre Wheeler North Reef with the expected future standing stock of fish supported by new acreage of various reef designs
2. We did this for different reef designs for the additional new acreage

Data from the rock modules of the Phase 1 Reef collected from 2000 – 2015 is the longest time series available and it covers a relatively wide range in environmental conditions

1. We first used these data to predict the number of tons of fish that will be supported by the existing 174 acre Wheeler North Reef in the future with a 95% probability. This turned out to be 13.5 US tons
2. We then used these data to predict the number of additional acres needed to sustain a fish standing stock of 28 tons in the future

We chose a 95% as the level of confidence in our predictions because we wanted a high assurance in our estimates of the amount of new additional acres needed.

Increasing the confidence above 95% would result in more additional acres needed to sustain 28 tons of fish while decreasing the confidence below 95% would result in fewer additional acres needed.
*Number of additional acres needed for Wheeler North Reef to sustain a fish standing stock of at least 28 tons with 95% confidence*

<table>
<thead>
<tr>
<th>Reef Design</th>
<th>Additional acres needed*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low relief (&lt; 1 m), low rock cover (41%)</td>
<td>200</td>
</tr>
<tr>
<td>Low relief (&lt; 1 m), medium rock cover (63%)</td>
<td>125</td>
</tr>
<tr>
<td>Low relief (&lt; 1 m), high rock cover (81%)</td>
<td>105</td>
</tr>
<tr>
<td>High relief (2.5 m, 100% rock cover)</td>
<td>30</td>
</tr>
</tbody>
</table>

- Shown here is a summary table with estimates of the number of additional acres of various reef designs that are needed for Wheeler North Reef to sustain a fish standing stock of at least 28 tons.
- As you can see, the amount of additional acreage varies greatly depending on its rock coverage and vertical relief.
- If new additional acres were designed like the existing Wheeler North Reef (i.e., low relief with low rock coverage), then 200 additional acres would be needed, which would more than double its current size.
- It would take approximately half of this area (i.e., 105 acres) if the additional acres were low relief with high rock coverage.
- By contrast, if the additional acreage consisted of reef that averaged 2.5 m tall and was 100% rock, then only 30 additional acres would be needed.
This plot shows the tonnage of rock needed to construct 4 different reef designs, which when added to the existing Wheeler North Reef are expected to support a fish standing stock of 28 tons with 95% level of confidence.

- The numbers above each bar are the number of acres of additional reef needed for each reef design.
- A remediation reef designed with low relief and 41% cover rock requires the least amount of rock that is ~80% of that of a low relief 63% cover rock and ~63% of that of a low relief 81% cover rock.
- By contrast, a high relief reef with 100% cover of rock requires nearly 6 times more rock to support the same fish standing stock than a low relief 41% cover reef, even though it encompasses <1/6 the area (i.e., 30 acres for high relief 100% cover vs. 200 acres of low relief 41% cover).
Requirement to Remediate

Based on the results of independent studies, the CCC Executive Director required SCE to remediate WNR (5/24/2016)

- July 2016 – SCE submits Draft Remediation Plan of Action
- Sept – Dec 2016 – Discussions between CCC and SCE re: remediation design and site constraints
**Tentative Remediation Timeline**

- March 2017 – SCE submitted lease amendment application to SLC, begins underwater habitat surveys
- August 2017 (est.) - RFP for reef construction
- December 2017 (est.) - SLC reviews and acts on lease amendment application and appropriate CEQA action
- Spring 2018 (est.) - CCC, ESACE, RWQCB and other permits
- Summer 2018 (est.) - Begin reef construction
Questions?

For more information go to: http://marinemitigation.msi.ucsb.edu/