

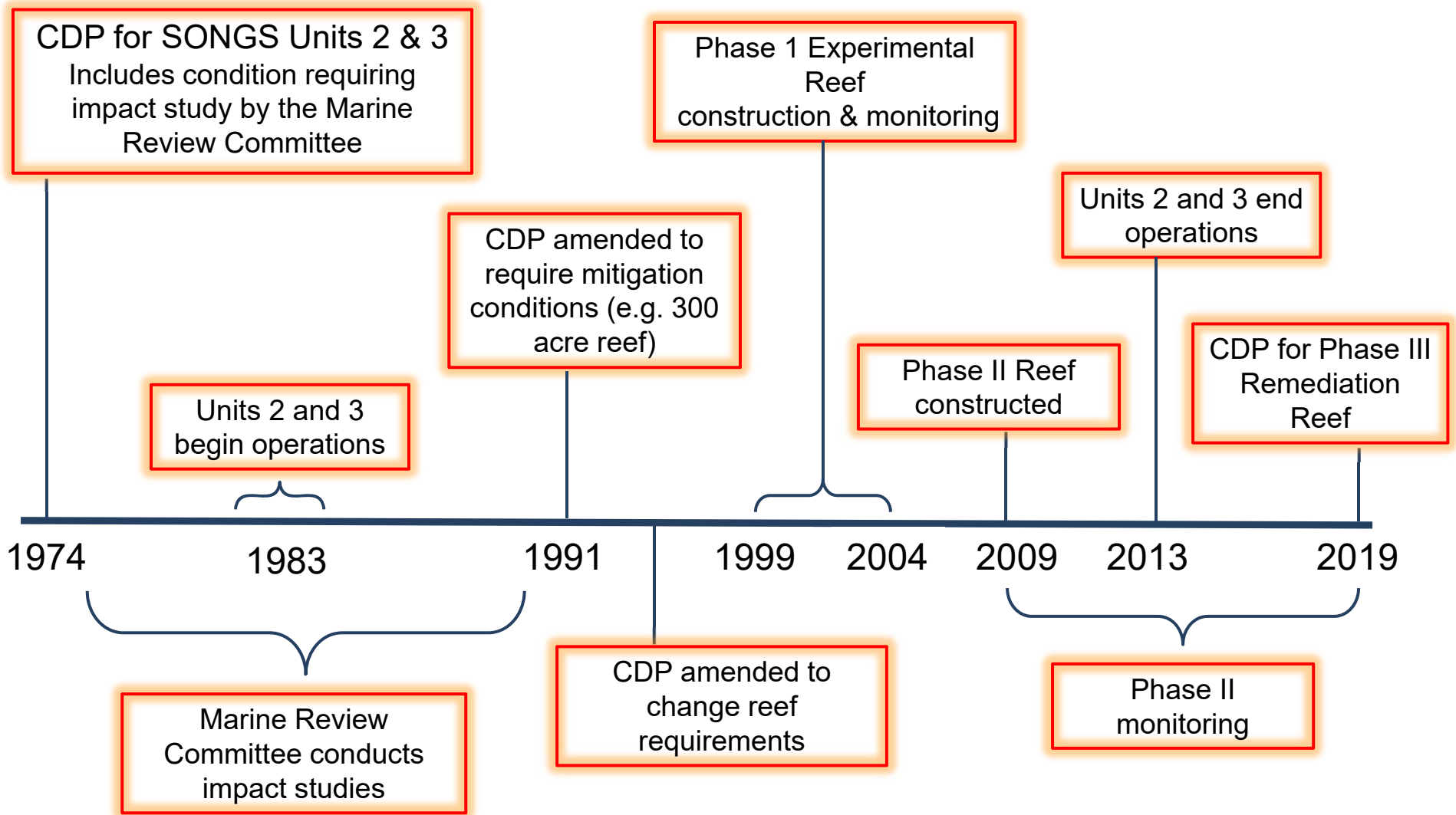
Expansion of Wheeler North Reef to increase fish stocks and giant kelp acreage



Kate Huckelbridge
San Onofre Nuclear Generating Station (SONGS) Mitigation
Monitoring Program



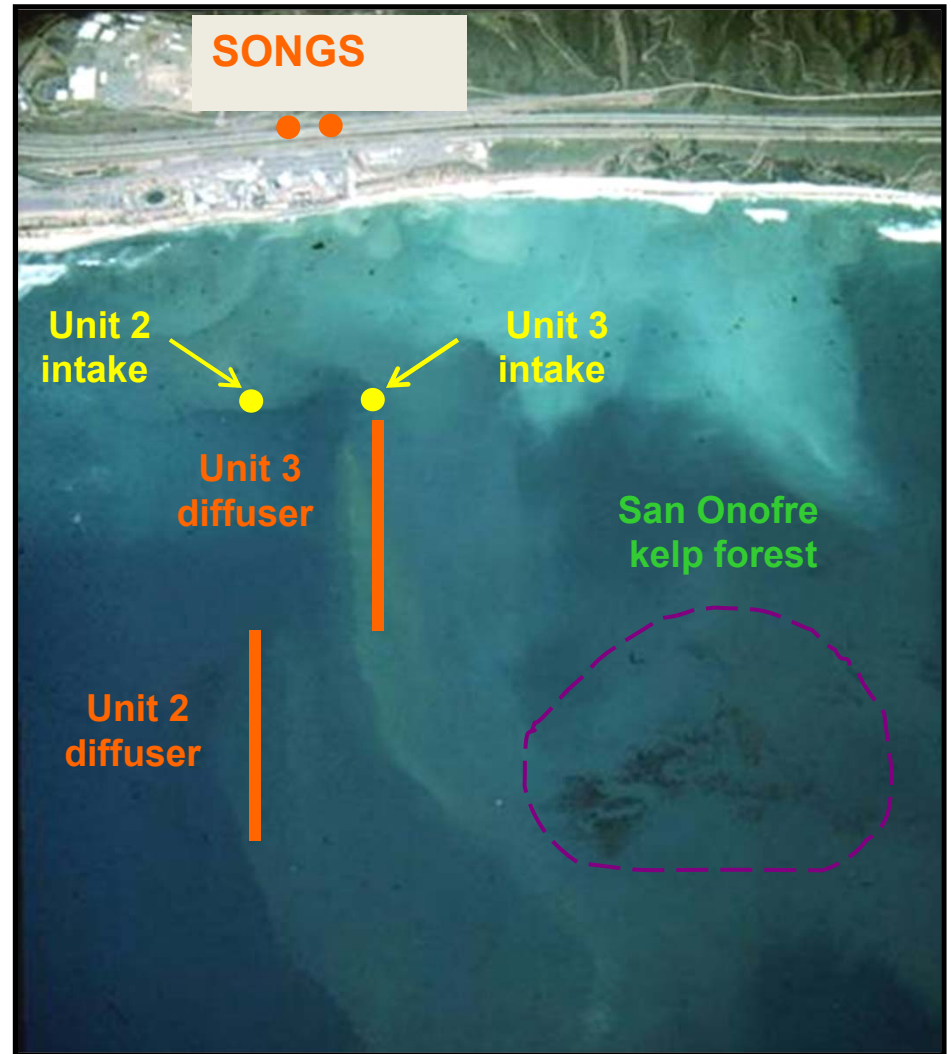
Project Timeline



Impacts and Required Mitigation

Impact: Discharge causes substantial reduction in the area of the San Onofre kelp forest and the standing stock of associated kelp bed fish

Mitigation: Creation of a New Kelp Reef - in-kind mitigation to compensate for losses of kelp and kelp bed fish invertebrates and algae associated with SONGS discharge.



Artificial Reef constructed in two phases:

- Phase 1: 22 acres (completed October 1999)
- Phase 2: 152 acres (completed September 2008)
- Phase 1 + Phase 2 = 174 acre Wheeler North Reef

**Artificial Reef
(mitigation site)**

**San
Clemente**

**San Mateo
(reference site)**

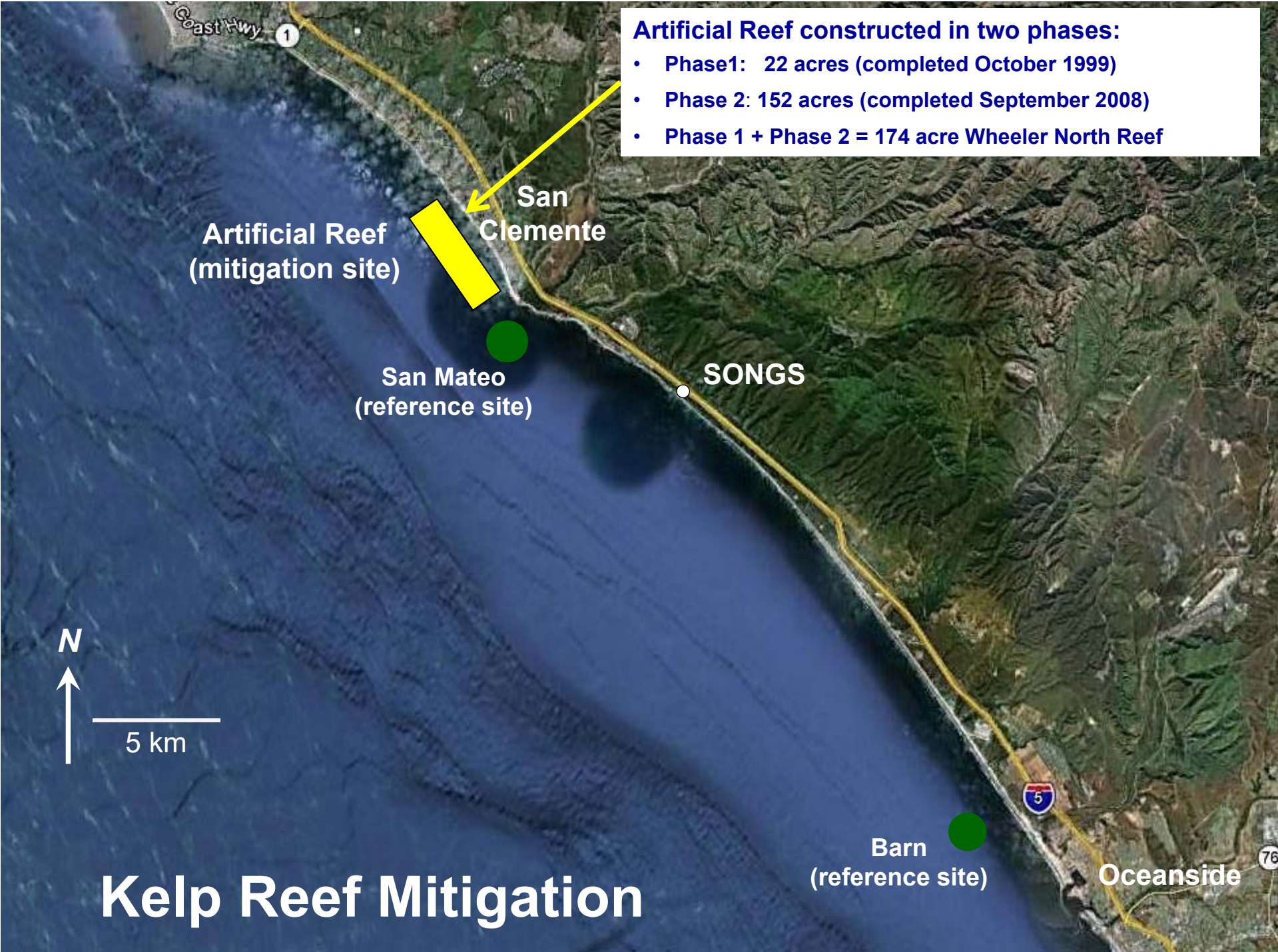
SONGS

**Barn
(reference site)**

Oceanside



Kelp Reef Mitigation



Performance Standards for Wheeler North Reef

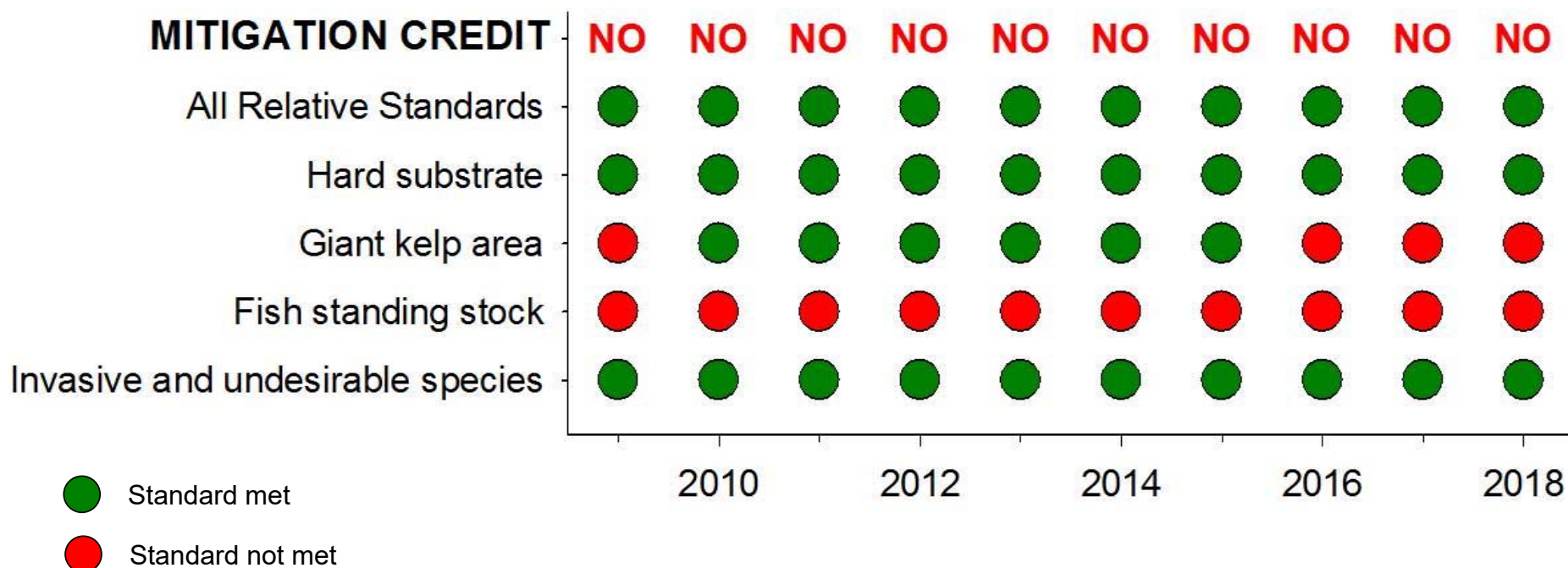
1. Hard Substrate
2. Giant Kelp
3. Fish Standing Stock
4. Invasive and Undesirable Species
5. Algal percent cover
6. Algal species richness
7. Sessile invertebrate percent cover
8. Mobile invertebrate density
9. Invertebrate species richness
10. Resident fish density
11. Young-of-Year fish density
12. Fish species richness
13. Fish reproductive rates
14. Fish production
15. Food chain support

Absolute Standards:
Measured against a fixed
value at WNR only

Relative Standards:
Must be similar to natural
reefs



Summary of SONGS Reef Mitigation Compliance



Conclusions:

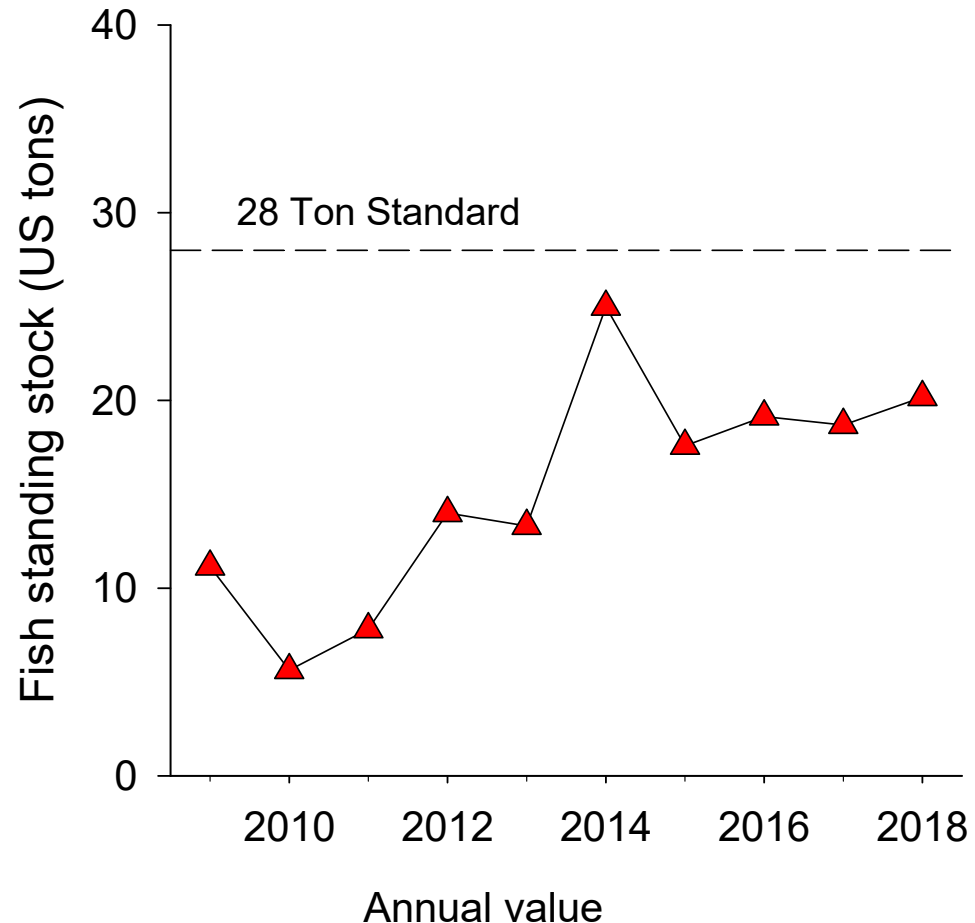
- **WNR is behaving like a natural reef (i.e., it meets relative standards)**
- **WNR has consistently failed to meet the absolute standards for fish standing stock in all years and the giant kelp area in 4 of 10 years**
- **SCE has received 0 years of mitigation credit**

Remediation of Wheeler North Reef

Issue: Why is Wheeler North Reef not meeting the fish standing stock requirement of 28 tons?

Conclusion: Analysis of reef data shows that the present area of the reef is insufficient to sustain 28 tons of fish and 150 acres of kelp

➔ **The reef is too small**



Result: the Executive Director required SCE to **remediate** Wheeler North Reef by building new reef acreage.

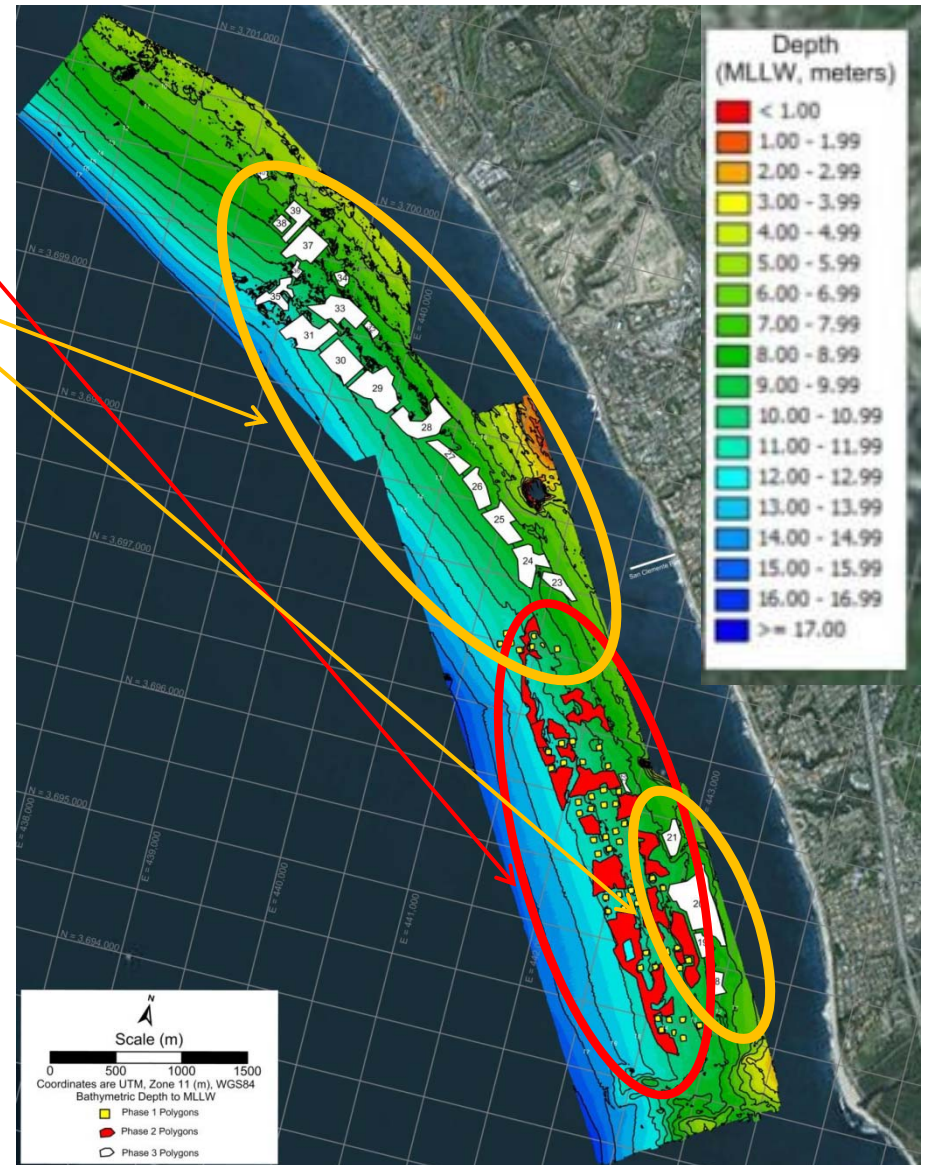
Expansion of the Wheeler North Reef

Existing Reef: **174 acres**

New Reef: **210 acres**

TOTAL: 384 acres

- Low-relief, low cover design (similar to the San Onofre Kelp Bed)
- EIR certified and lease approved on 2/4/19
- CDP approved on 3/7/19



Post-Remediation Compliance

An New Approach

- Decoupling of compliance determination for fish standing stock and kelp area from relative standards
 - Cumulative Approach for fish standing stock and kelp area
 - Maintain current approach for relative standards
- Mitigation credit applied moving forward (not retroactively)
- Approach is consistent with the letter and the intent of the SONGS CDP

Post-Remediation Compliance & Monitoring

Relative Standards

- Applies to Phases I & II
- Maintain current approach
- Begin accumulating years of credit in 2019
- Total years of credit needed = 32 years
- After standards are met for 3 years following Phase III construction – change to annual site inspections

Absolute Standards

- Applies to Phases I, II & III
- Cumulative requirement:
 - Giant Kelp: 4800 acre-yr
 - Fish Biomass: 896 ton-yr(based on 32 year operating life)
- Begin accumulating credit:
 - Phase I & II: 2019
 - Phase III: after construction is complete
- Hard Substrate –
 - % cover on Phase I & II (annual) and Phase III (every 5 years)
 - Footprint area – Phase I, II & III (every 5 years)

WNR Phase III Construction Schedule

Projected Start:	July 1, 2019
End of 2019 Season:	September 29, 2019
Resume Start:	June 1, 2020
Projected End of Construction	July 31, 2020

