Marine Life Protection Act Initiative

Summary of MLPA Master Plan Science Advisory Team Evaluations of Round 2 MPA Proposals for the MLPA South Coast Study Region

Presentation to the MLPA South Coast Regional Stakeholder Group
August 3, 2009 • Carlsbad, CA

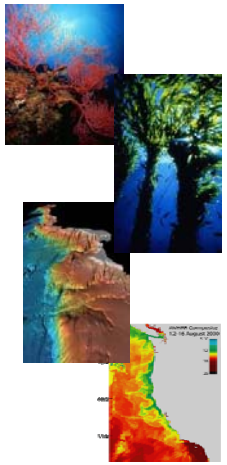
Marine Life Protection Act Initiative

Habitat Representation and Replication

Presented by Dr. Peter Raimondi
MLPA Master Plan Science Advisory Team

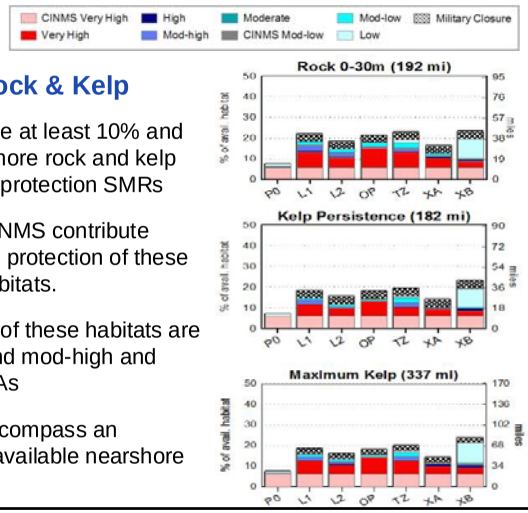
MLPA Goals*: Habitats

1. To protect the natural diversity and function of **marine ecosystems**.
2. To help sustain and restore **marine life populations**.
3. To improve **recreational, educational, and study opportunities** in areas with minimal human disturbance.
4. To protect representative and unique **marine life habitats**.
5. Clear objectives, effective management, adequate enforcement, sound science.
6. To ensure that MPAs are designed and managed as **a network**.



** Note that this language paraphrases the MLPA goals*

Results: Habitat Representation



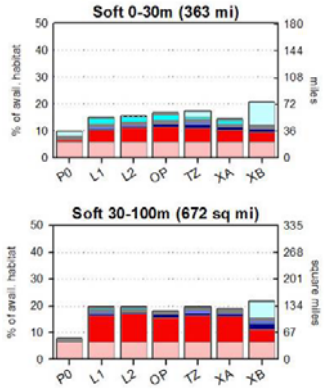
Nearshore Rock & Kelp

- Most proposals have at least 10% and up to 15% of nearshore rock and kelp habitat in very high protection SMRs
- SMRs within the CINMS contribute significantly (6%) to protection of these nearshore rocky habitats.
- An additional 1-3% of these habitats are protected in high and mod-high and high protection MPAs
- Military closures encompass an additional 3-4% of available nearshore rocky habitats.

Results: Habitat Representation

Shallow Soft-bottom Habitats

- Shallow soft-bottom habitats are very abundant across the study region – small percentages correspond to large areas
- All proposals have at least 10% and up to 17% of shallow soft bottom habitats in very high protection SMRs.
- SMRs within the CINMS contribute significantly (6-7%) to protection of these habitats.
- An additional 1-4% of these habitats are protected in high and mod-high and high protection MPAs



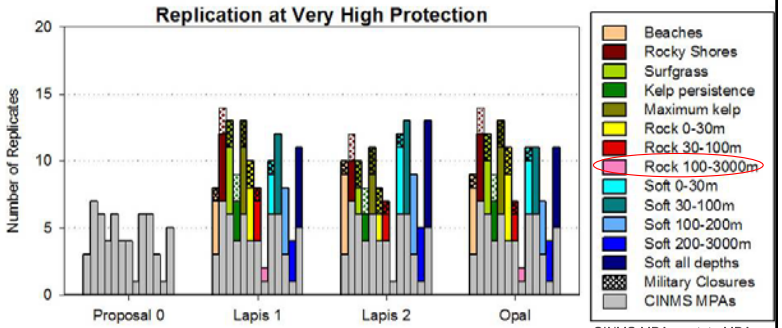
Results: Habitat Representation

Summary

- Some convergence of proposals in Round 2 – internal proposals perform similarly
- Ranking of proposals for protection across all habitats:
  Very High: OP > TZ > L1 & L2 > XA > XB
  Mod-high: TZ > L1 > L2 > OP > XA > XB
- All internal proposals include at least 10% of most habitats at very high protection. Exceptions include beaches, rock and soft bottom 200-3000 meters, and some estuarine habitats
- Most proposals successfully capture rare and unique habitats except for shallow hydrothermal vents

Replication: Very High Protection

First 3 of 6 proposals

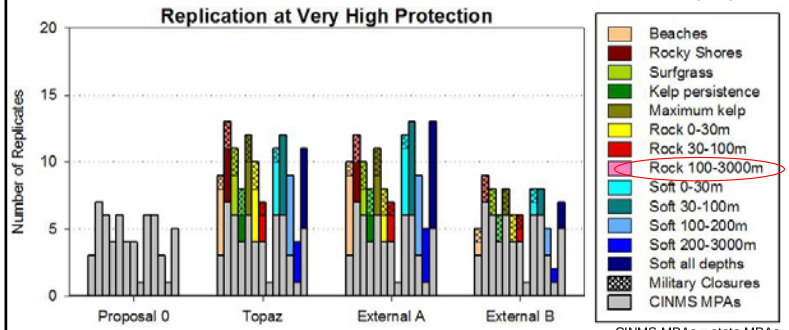


CINMS MPAs = state MPAs within CINMS; does NOT include federal MPAs

- Deep rock (100-3000 meters) is very sparse and hard to achieve minimum area
- Otherwise, most habitats meet replication guidelines
- Replication increases when high and mod-high protection areas are considered

Replication: Very High Protection

Next 3 of 6 proposals



CINMS MPAs = state MPAs within CINMS; does NOT include federal MPAs

- Deep rock (100-3000 meters) is very sparse and hard to achieve minimum area – none of these proposals achieve replicates of deep rock (100-3000m)
- External B does not replicate several habitats outside of the military closures
- Replication increases when high and mod-high protection areas are considered

Habitat Replication by Bioregion

Rocky Habitats

Number of bioregions with at least 1 habitat replicate

	Rocky Shores (5)			Surfgrass (5)			Kelp persist. (5)			Maximum kelp (5)			Rock 0-30m (5)			Rock 30-100m (5)			Rock 100-3000m (3)		
	VH	H	MH	VH	H	MH	VH	H	MH	VH	H	MH	VH	H	MH	VH	H	MH	VH	H	MH
Proposal 0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1
Lapis 1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	2	2
Lapis 2	5	5	5	4	5	5	4	4	4	5	5	5	4	5	5	4	4	4	1	2	2
Opal	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	2	3	3
Topaz	5	5	5	5	5	5	4	4	5	5	5	5	5	5	5	4	4	5	1	2	2
External A	5	5	5	4	5	5	4	4	5	5	5	5	4	5	5	4	4	5	1	2	2
External B	3	5	5	3	4	5	3	4	5	3	5	5	3	4	5	3	3	4	1	1	1

- Lapis 1 and Opal replicate nearshore rocky habitats across all bioregions
- Most proposals miss replicates of some habitats in at least one bioregion
- External B misses very high replicates in at least 1 bioregion for all habitats

Results: Habitat Replication

Summary

- All proposals meet replication guidelines for all but the sparse habitats (rock > 100 meters and eelgrass)
- Convergence on replication across proposals at very high protection with exception of External B
- Military closures at San Clemente contribute to replication of nearshore rocky habitats
- Persistent kelp, deeper rock, and deeper soft bottom are not replicated across all bioregions at very high by most proposals

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MPA Size and Spacing

Presented by Dr. Eric Bjorkstedt

MLPA Master Plan Science Advisory Team

MLPA Goals*: Populations

1. To protect the natural diversity and function of **marine ecosystems**.
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3. To improve **recreational, educational, and study opportunities** in areas with minimal human disturbance.
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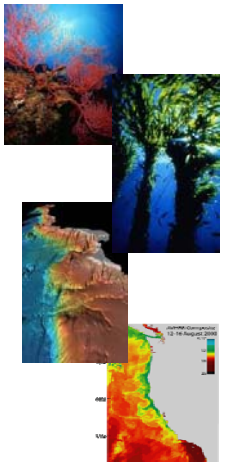


** Note that this language paraphrases the MLPA goals*

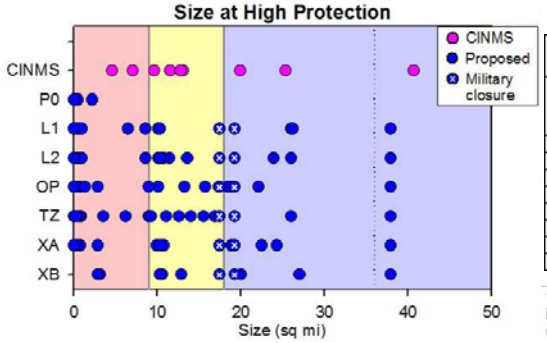
Protecting Populations (Goals 2 & 6)

Size and Spacing

- Marine protected areas (MPAs) should be large enough that adults don't move out too frequently and become vulnerable to fishing

- MPAs should be close enough together that sufficient larvae can move from one to the next

Cluster Sizes: High Protection*



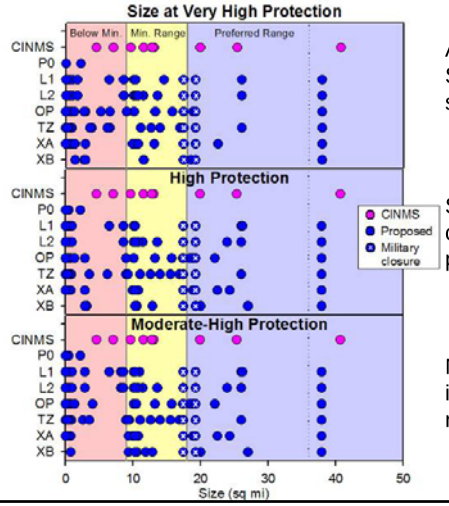
Number of MPA Clusters* at High Protection				
Proposal	Below Min. Size	Min. Size Range	Pref. Size Range	Total # Clusters
CINMS MPAs	3	5	3	11
Proposal 0	4	0	0	4
Lapis 1	6	4(1)	3(1)	13(2)
Lapis 2	5	6(1)	3(1)	14(2)
Opal	6	6(1)	4(1)	16(2)
Topaz	8	6(1)	2(1)	16(2)
External A	4	5(1)	4(1)	13(2)
External B	3	3(1)	3(1)	9(2)

* Clusters tabulated above do not include CINMS MPAs in proposals, () indicates military closures

- **At very high protection there are fewer clusters in the preferred range across all proposals**
- **At mod-high protection some of the smaller clusters move into the minimum size range but all proposals retain clusters below 9 square miles**

** Evaluated for all open coast MPAs at or above high protection*

Cluster Sizes



All proposals have 2 SMRs in the preferred size range

Some additional clusters move into the preferred size range

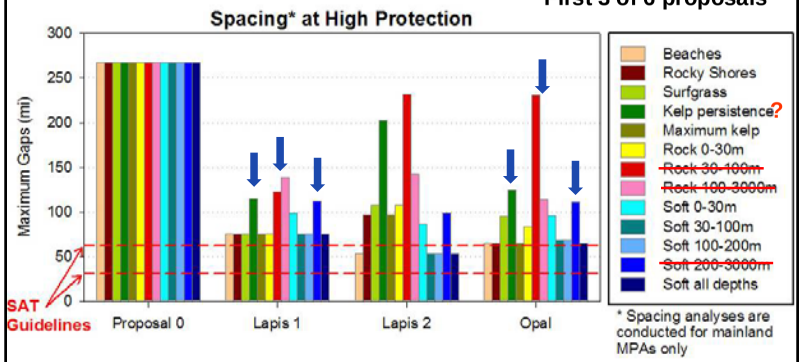
More clusters move into the minimum size range

Size: Conclusions

- Most proposals similar in the number and size range of MPAs (External B is the exception with fewer MPA clusters)
- All proposals have 2 SMRs within the preferred size range
- All proposals have MPAs that do not meet minimum size guidelines
- Trends in MPA size differ from previous study regions: on average moving toward clusters on the low end of the minimum size range

Max Gaps: High Protection

First 3 of 6 proposals

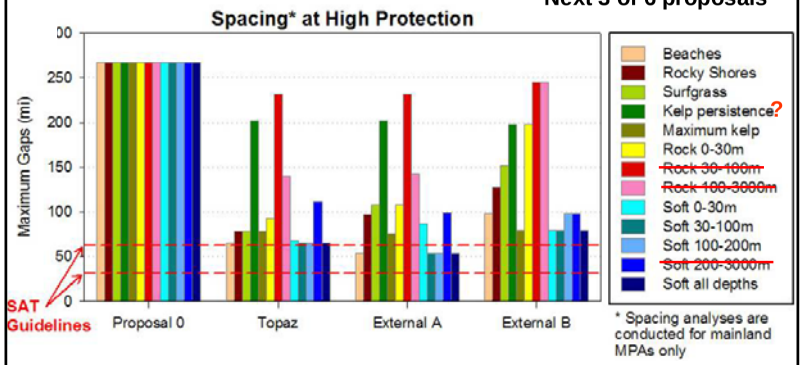


Not possible to meet spacing guidelines for >30 meter rock or >200 meter soft

Best possible spacing for persistent kelp (at least 3 of 7 years) is ~ 75 miles due to gap between Palos Verdes and San Elijo area

Max Gaps: High Protection

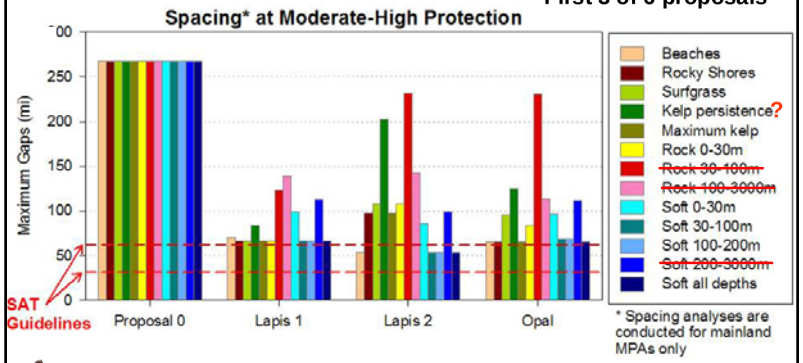
Next 3 of 6 proposals



- All proposals have larger gaps when only very high protection areas are considered
- Many proposals have smaller gaps when mod-high protection areas are considered

Max Gaps: Mod-high Protection

First 3 of 6 proposals



- At mod-high protection Lapis 1 comes close to meeting spacing guidelines for most possible habitats and minimizes gaps between rare habitats
- Other proposals meet spacing guidelines for some habitats but have large gaps for others.

Spacing: Conclusions

- Spacing guidelines are impossible to meet for some habitats
- No proposals meet spacing guidelines for all possible habitats
- Lapis 1 comes closest to meeting spacing guidelines for all possible habitats, followed by Topaz/Opal

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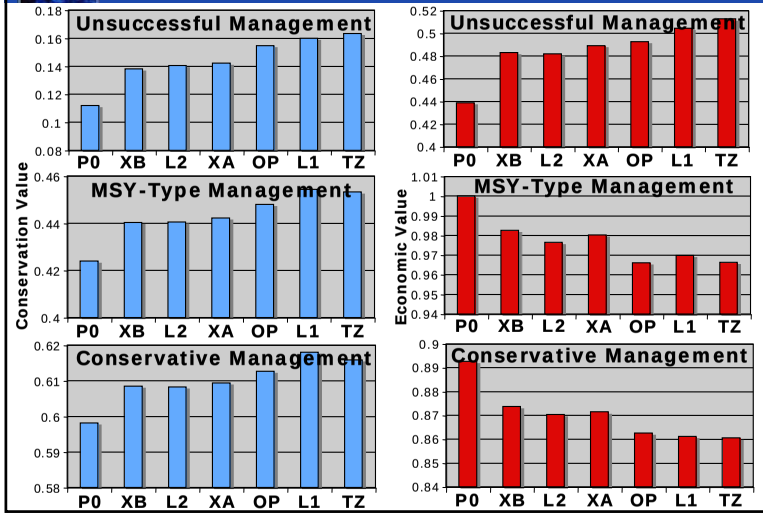
Spatial Bioeconomic Models

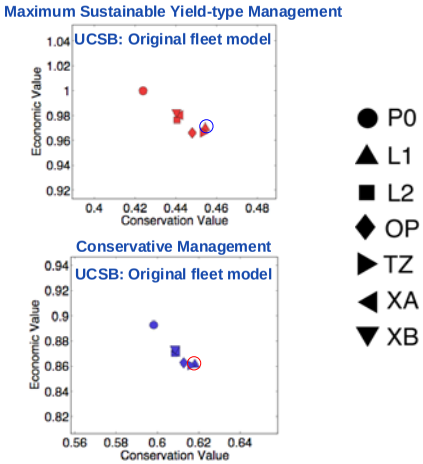
Presented by Dr. Will White
University of California, Davis

UCSB Model Results: Original Fleet Model



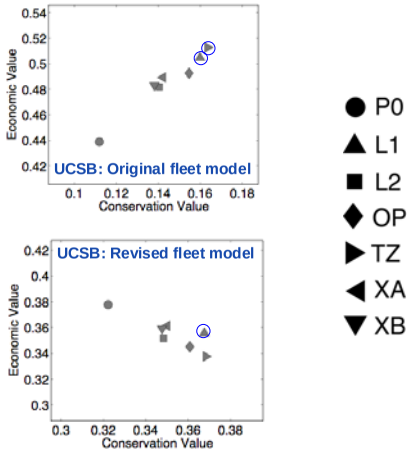
Model Results: MSY and Conservative Management

- **Trade-off** between biomass and yield in all cases.
- **L1** produces higher **biomass** and slightly higher **yield** than similar proposals.
- **Similar results** for **both** UCSB and UCD models and original and revised fleet models.



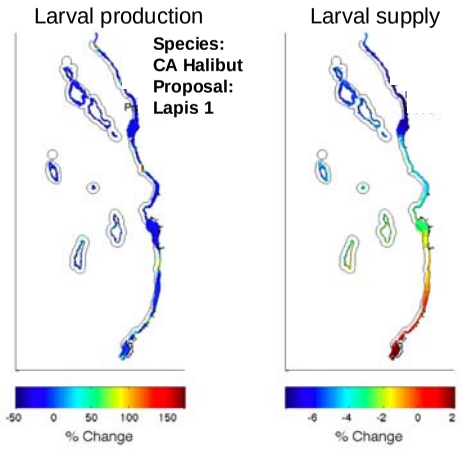
Model Results: Unsuccessful Management

- **UCD and original UCSB fleet model:** No trade-off, L1 and TZ perform best
- **Revised UCSB fleet model:** Trade-off, L1 produces relatively high biomass and higher yield than similar proposals.



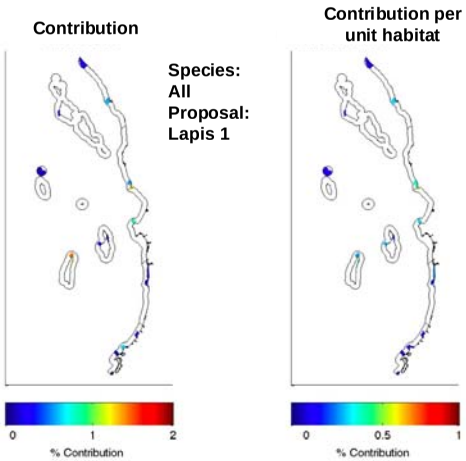
Results: Changes in Settlement

- Maps show percent **increases in larval production** and **larval supply**, relative to Proposal 0.
- Production increases in MPAs, supply increases over broader areas
- Lower supply values could be improved by adding MPAs to source locations.



Results: MPA Contribution

- Maps show percent **contribution** to total biomass of each MPA.
- Calculated using one-by-one "knockout" analysis
- Higher values indicate key MPA locations
- Smaller MPAs may have high value per unit habitat area



Conclusions

- Conservation ranking is relatively insensitive to (1) model, (2) assumption about fishery management and (3) choice of fleet model
- **Lapis 1** or **Topaz** had the highest predicted conservation value under all scenarios for both models
- Economic ranking depend on (1) management scenario (reversed for unsuccessful management) and (2) fleet model
- **External A** and **Lapis 2** had the highest predicted economic value for "MSY-type management" and "conservative management"

Conclusions, continued

- Under "unsuccessful management," **Lapis 1** and **Topaz** had high predicted economic values, except in UCSB's revised fleet model, where economic values were similar, with **Lapis 1**, **External A**, and **External B** performing best.
- **Lapis 1** usually had better than average values for both conservation and economic value.

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Marine Birds and Marine Mammals

Presented by Dr. Susan Chivers and Dan Robinette

MLPA Master Plan Science Advisory Team

Summary of Round 2 Analyses

Seabird Breeding Colonies

- All proposals identical for Mid and West Channel Islands.
- No breeding colonies protected in East Channel Islands by any proposal.
- Proposal 0 and External B provide no protection in North and South Mainland.
- All other proposals similar for North and South Mainland with small percentage of Least Tern colonies protected.

Pinniped Breeding Sites

- All proposals except External B include 1 Northern Elephant Seal and 2 Harbor Seal rookeries in the North Mainland.
- Only Lapis 1 includes a Pacific Harbor Seal rookery in the South Mainland.

Seabird Roost and Pinniped Haul-out Sites

- Topaz provides most protection to Brown Pelican roosts in both the North Mainland and South Mainland.
- Lapis 1 protected highest % of pinniped population overall, External B and Proposal 0 the lowest %

Summary of Round 2 Analyses

Sea Otter Benefits

- 8.5-23.4% of kelp habitat is within proposed SMRs north of Rincon Point; area currently used by sea otters (Highest % kelp: Opal; lowest: External B)
- 6.1-21.4% of available kelp habitat is within proposed SMRs in whole north mainland bioregion; area of potential expansion (Highest % kelp: Opal; lowest: External B)

Nearshore Foraging

- All proposals are similar for Mid and West Channel Islands.
- External B provides most overall protection and most protection in the North Mainland for Least Terns. Opal provides most protection in South mainland.
- All proposals but Proposal 0 and External B provide protection to Pigeon Guillemots and Pelagic cormorants in North Mainland (Highest: Lapis 1 & 2, Topaz, External A).
- All proposals but Proposal 0 and External B provide protection to Brandt's Cormorants (Highest: Lapis 1).
- Topaz provides most protection for Bald Eagles.
- Lapis 1 provides the highest protection for Pacific Harbor Seals; lowest: External B

Summary of Round 2 Analyses

Neritic Foraging

- ~20-70 square miles of potential foraging areas are within proposed SMRs (Highest: Topaz; Lowest: External B)

Estuarine and Coastal Habitats

- Low percentage of all habitats protected to the level beneficial to birds
- Topaz provides most protection in all habitats
- Opal is similar to Topaz for beach habitat

Summary of Round 2 Analyses

Analysis	Lap1	Lap2	Opal	Topz	ExtA	ExtB
Seabird Breeding Colonies	=	=	=	=	=	=
Pinniped Breeding Rookeries	+					
Seabird Roost Sites				+		
Pinniped Haul-out Sites	+					
Sea Otter Habitat Protection			+			
Least Tern Foraging North Mainland						+
Least Tern Foraging South Mainland			+			
Bald Eagle Foraging				+		
Harbor Seal Foraging	+					
Neritic 'Hot Spot' Foraging				+		
Estuary/Coastal Marsh/Tidal Flats				+		
Beach Habitat			+			

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Potential Impacts on Commercial and Recreational Fisheries

Presented by Dr. Sarah Kruse, Ecotrust

Overview

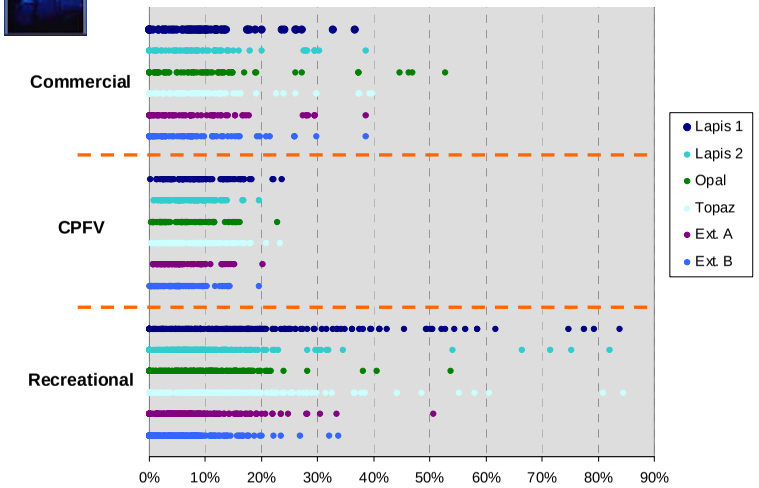
Data and Analysis

	Commercial	Commercial Passenger Fishing Vehicle (CPFV)	Recreational
# of fisheries	15 species	10 species	17 species
Level of analysis	65 port-fishery combinations	80 port-fishery combinations	Results reported by user group (private boat, kayak, dive/spear) and by county

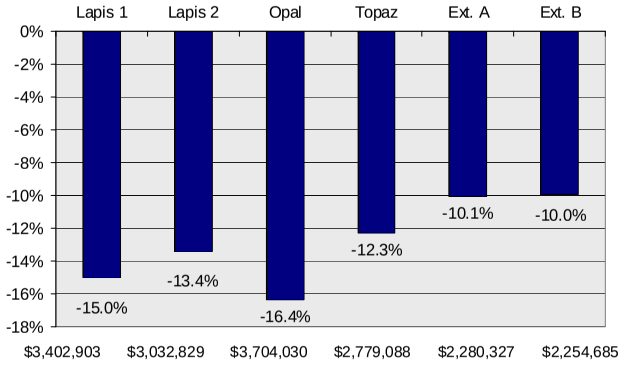
Reported Results

	Commercial	CPFV	Recreational
Potential impacts on fishing grounds (area and value)	X	X	X
Potential net economic impacts	X	X	
Potential gross economic impacts	X		

Impact on Fishing Grounds (Value)



Net Economic Impacts (Commercial)

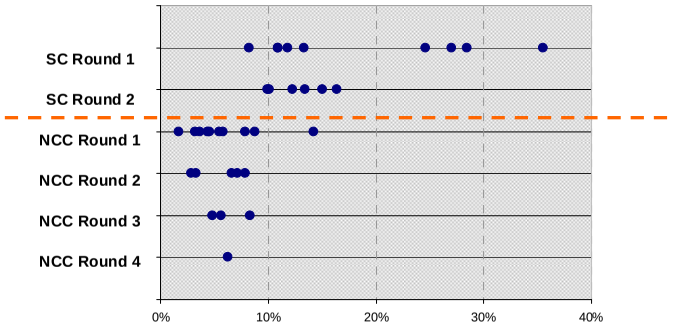


Maximum Potential Net Economic Impact (Reduction in Profit)

- Note: For potential gross economic impacts (commercial) and potential net economic impacts (CPFV), please see the summary evaluation report

Convergence – South Coast and NCC

- For commercial fisheries, the average % net economic impact (NEI) of the alternative MPA proposals decreased from 19.0% in round 1 to 12.8% in round 2



- For CPFV fisheries, the average % NEI of the alternative MPA proposals decreased from 19.9% in round 1 to 15.0% in round 2

Additional Analyses and Next Steps

- All results for the Round 2 are finalized and available
  - Summary report (including comments and suggestions provided by regional stakeholder group members)
  - Results summarized per MPA (Excel spreadsheet)
  - The above to be used in combination with the maps, data collection methods, and evaluation methods already provided
- Analyses for subsequent iterations
  - Consideration of existing fishing closures
- Next steps
  - 3rd round of analysis for MLPA South Coast Study Region

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Water and Sediment Quality

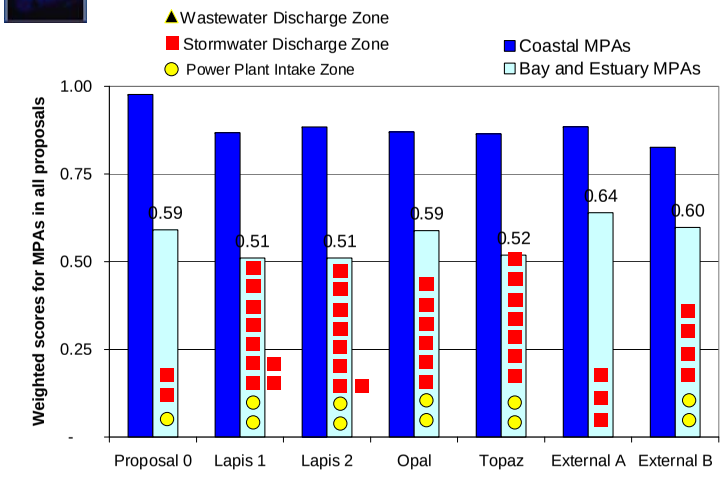
Presented by Dominic Gregorio, State Water Resources Control Board and MLPA Master Plan Science Advisory Team

Evaluation Scoring Methods

Description of Scores

- 0.0 is the least desirable and has serious water quality concerns
- 0.75 to 1.0 considered the most desirable, with no water quality concerns
- MPAs can be free of water quality concerns and still be scored 0.75 due to not being co-locating with an ASBS
- MPAs with scores over 0.75 indicate they are co-located with an ASBS

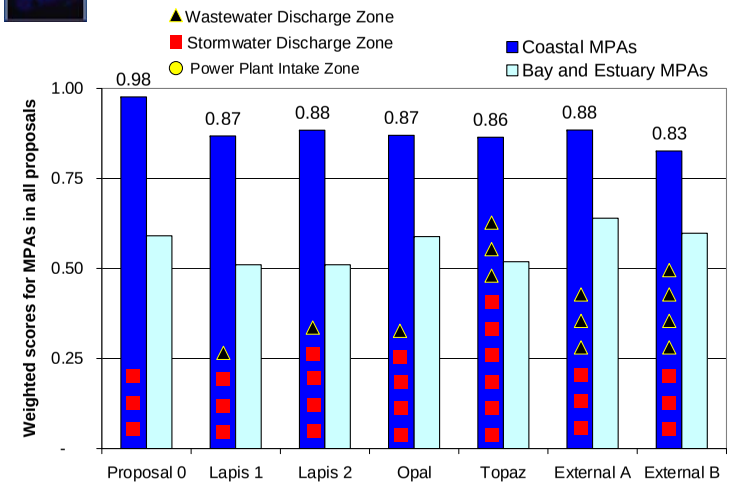
Proposal Comparison - Bay and Estuary MPAs (Weighted Scores)



Summary of Scores for Embayments

- All proposals scored less than 0.75
  - Most included MPAs within power plant intake zones
  - All included MPAs with major stormwater impact zones
  - All proposals did have some MPAs with scores greater than 0.75
- External A had the highest score (0.64) and the fewest water quality concerns
  - External A included no power plant intakes

Proposal Comparison - Coastal MPAs (Weighted Scores)



Summary for Coastal MPAs

- Coastal MPAs are any MPAs not in embayments
  - Include island MPAs not within embayments
- Northern Channel Islands equally represented in all proposals and therefore eliminated from further evaluation of coastal MPAs
- Highest score received was for existing MPAs - Proposal 0
- All submitted proposals scored at or above 0.83 for coastal MPAs
  - External A and Lapis 2 scored the highest (0.88)
  - There were no proposals with coastal MPAs in power plant intake zones

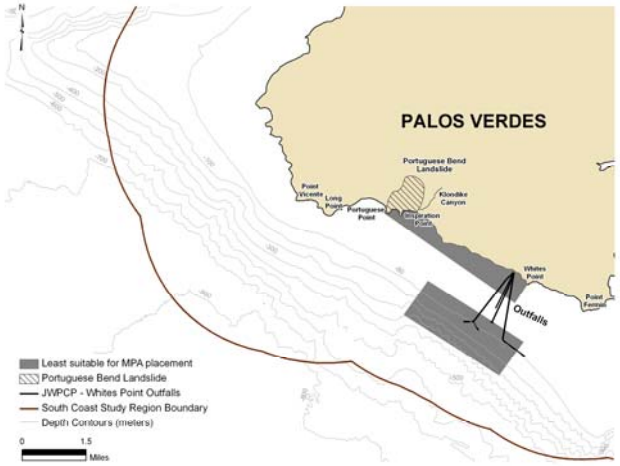
Round 2 Summary

- Overall coastal MPAs scored higher than bays and estuary MPAs
- All proposals avoided Los Angeles Harbor and the SONGS power plant intake zone
- Where possible, the SCRSG and external proposals could improve their scores by reducing the number of coastal MPAs that are placed in stormwater or wastewater discharge zones
- *Water quality evaluations are not mandated by the MLPA, and should therefore be considered secondary to other MPA design guidelines. Water quality considerations should be incorporated if other guidelines and criteria have been met.*

Palos Verdes Shelf Guidance

The SAT has identified two additional areas that are undesirable for MPA placement due to degraded water quality:

- Area near the White Point outfall as described in the Palos Verdes shelf supplemental guidance document[1] (legacy contaminants and ongoing and planned EPA fieldwork and mitigation activities)
- Area from Portuguese Bend Cove to White Point as described in the Palos Verdes shelf supplemental guidance document (turbidity and sedimentation)

[1]See *Draft Recommendations for Evaluating Water and Sediment Quality Along the Palos Verdes Shelf – Supplemental Guidance to the Draft Recommendations for Considering Water Quality and Marine Protected Areas in the MLPA South Coast Study Region*. Draft revised June 16, 2009

Palos Verdes Shelf Guidance