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Marine Life Protection Act Initiative



SAT Evaluation of Water and Sediment Quality of North Coast External Proposed MPA Arrays

Presentation to the MLPA Regional Stakeholder Group
March 24, 2010 • Crescent City

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Water Quality Overview



Guidance Document and Maps

- Water quality opportunities
 - Areas of special biological significance
- Water quality concerns to avoid
 - Urban runoff and non-point source pollution
 - Point source waste water pollution
- Special considerations

Evaluation Methods

- ExA Mobile MPAs were treated as static

Areas of Special Biological Significance

- Areas of special biological significance (ASBS) can be considered water quality opportunities
- Four in MLPA North Coast Study Region
- All ASBSs are marine managed areas and a subset of state water quality protection areas (SWQPAs)
- Waste discharges are prohibited
- 2003 survey found storm water and other discharges, currently being regulated by water boards
- On-going monitoring effort

ASBS - Large Areas of North Coast

ASBS Site	Area (mi ²)	SWQPA ID Number
Jughandle Cove	0.32	1
Trinidad Head	0.46	6
King Range	39.15	7
Redwood National Park	97.88	8





Water Quality Concerns – Urban Runoff

- Urban Stormwater Runoff
 - Numerous pollutants, toxic to marine life
- Sources of Concern - Phase II Permitted Communities
 - McKinleyville
 - Arcata
 - Eureka
 - Fortuna
 - Fort Bragg

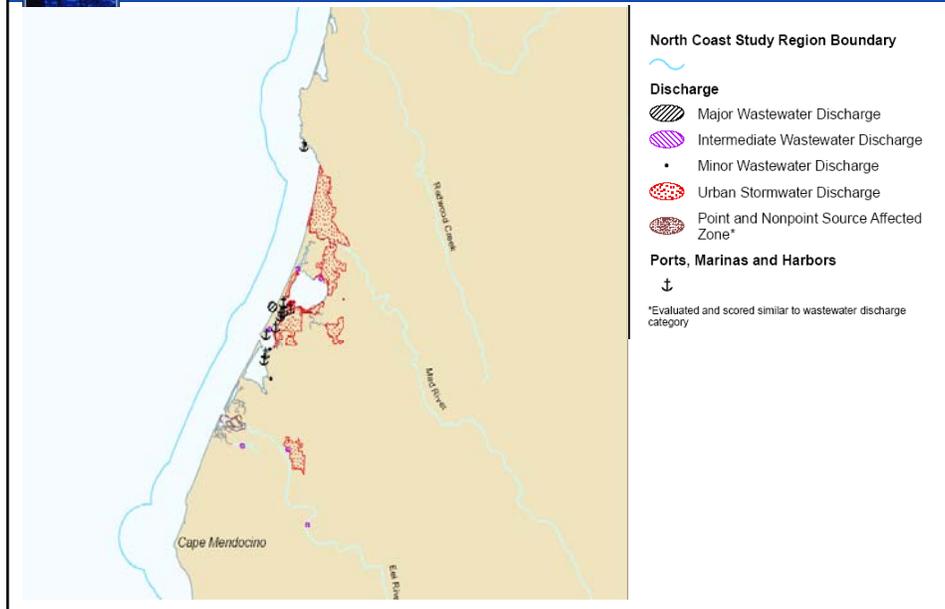


Water Quality Concerns – Nonpoint Sources

- Nonpoint sources
 - Urban runoff
 - Agricultural runoff
 - Timber harvest
 - Marinas/harbors



Water Quality Concerns



Water Quality Concerns – Major and Intermediate Wastewater Discharges

Major Discharges	Effluent
Samoa Island Pulp Mill/Fairhaven Power	Lumber (pulp) mill wastewater and cooling water
Intermediate Discharges	Effluent
Crescent City	Treated sanitary wastewater and seafood wastes
City of Arcata	Treated sanitary wastewater
Sierra Pacific Industries Arcata Division	Lumber (pulp) mill wastewater
City of Eureka	Treated sanitary wastewater
Fort Bragg, City of	Treated sanitary wastewater
Fortuna and other Eel River dischargers, collectively	Treated sanitary wastewater, cooling water and industrial wastewater



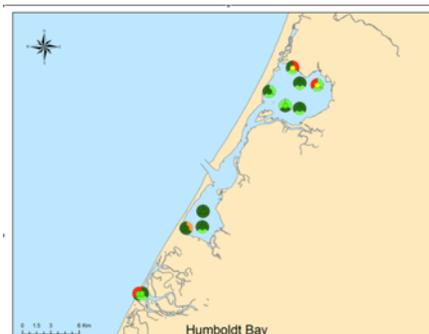
Water Quality Concerns – Minor Wastewater Discharges

Minor Discharges	Effluent
CSU Humboldt	Marine lab waste seawater
Pacific Gas and Electric Humboldt Bay Power Plant	Industrial wastewater (reclassified from major due to re-powering)
Shelter Cove Waste Water Plant	Treated sanitary wastewater
Shelter Cove Fish Cleaning Station	Seafood wastes (currently un-permitted, may be controlled soon)
Mendocino City	Treated sanitary wastewater



Special Considerations

- Impaired water bodies (not meeting standards)
 - Several watersheds for stream quality (e.g., timber harvest effects, sediment, temperature, etc.)
 - Sediment pollution (Humboldt Bay for dioxins and polychlorinated biphenyls)



LOE Categories	MLOE Assessment	LOE Assessment			
B= Benthic Disturbance T= Toxicity C= Chemistry Exposure M=MLOE Assessment	● Unimpacted	Reference	Low	Moderate	High
	● Likely Unimpacted	Nontoxic Minimal	Low	Moderate	High
	● Possibly Impacted		Low	Moderate	High
	● Likely Impacted		Low	Moderate	High
	● Clearly Impacted				



Water Quality Guidance

SAT Recommendations

- Co-location, where possible, with SWQPAs
 - ASBSs are special subset of SWQPAs
- Avoiding, where possible, areas of water quality concern:
 - Urban stormwater and nonpoint sources of pollution (e.g. harbors)
 - Wastewater point sources
 1. Major sources – ½ mile radius buffer
 2. Intermediate sources – ¼ mile radius buffer
 3. Minor sources – avoid outfall point



Evaluation Methods

- Two categories of marine protected areas (MPAs):
 1. Bay and estuary MPAs
 - Bays and estuaries are more likely to be associated with storm-water runoff
 - No areas of special biological significance (ASBSs) currently designated in embayments
 2. Coastal MPAs
 - Coast and offshore rocks
 - Large ASBSs provide opportunities for co-location



Scoring of MPA Proposals

- Scores based on presence/absence of areas of water quality concern and opportunity
- Co-location with areas of water quality concern: Water quality scores deducted
 - Stormwater and nonpoint source discharges (-1)
 - Industrial/municipal wastewater discharges (-0.5)
- Co-location with areas of opportunity: Water quality scores improved (+0 to 1)
 - State water quality protection areas (SWQPAs) and ASBSs



SWQPA Scoring

North Coast Example - Crescent City Mobile MPA*



- MPA (in blue) does not completely coincide with ASBS (in black)
- ASBS shoreline covers 64% of MPA shoreline
- ASBS co-location score would be 0.64

* Static



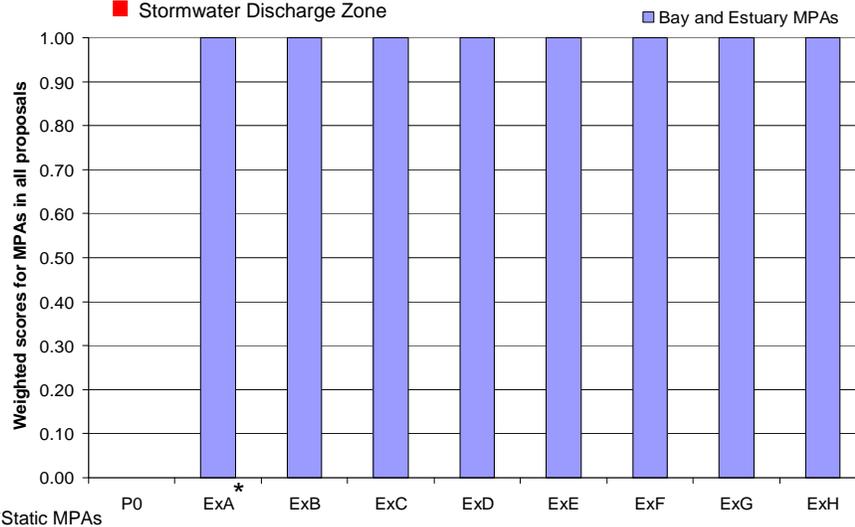
Evaluation Scoring Methods

- 0.0 is the least desirable and has serious water-quality concerns
- For embayment MPAs, 1.00 is considered the most desirable, with no water-quality concerns
- For coastal MPAs, 0.67 is desirable, indicating no water-quality concerns
- Coastal MPAs with scores over 0.67 indicate they are co-located with an area of special biological significance (ASBS) / state water quality protection area; a score of 1.0 is the most desirable



Proposal Comparison - Bay and Estuary MPAs (Weighted Scores)

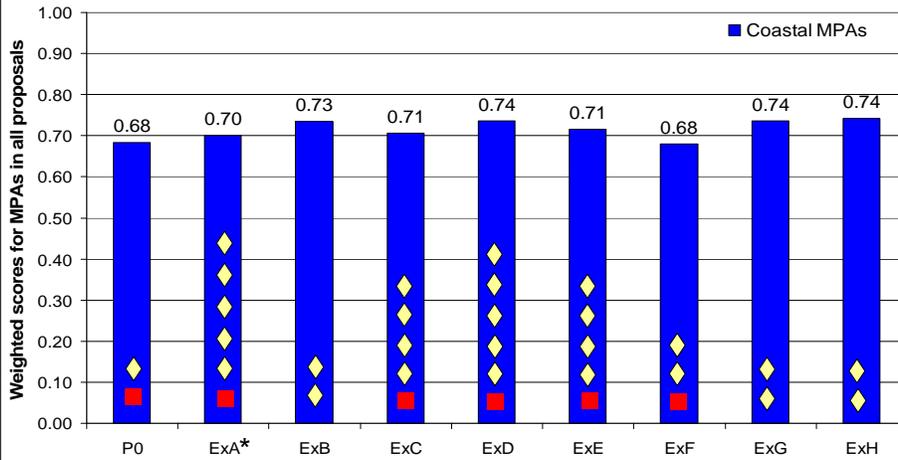
- ◆ Areas of Special Biological Significance
- ▲ Wastewater Discharge Zone
- Stormwater Discharge Zone





Proposal Comparison - Coastal MPAs (Weighted Scores)

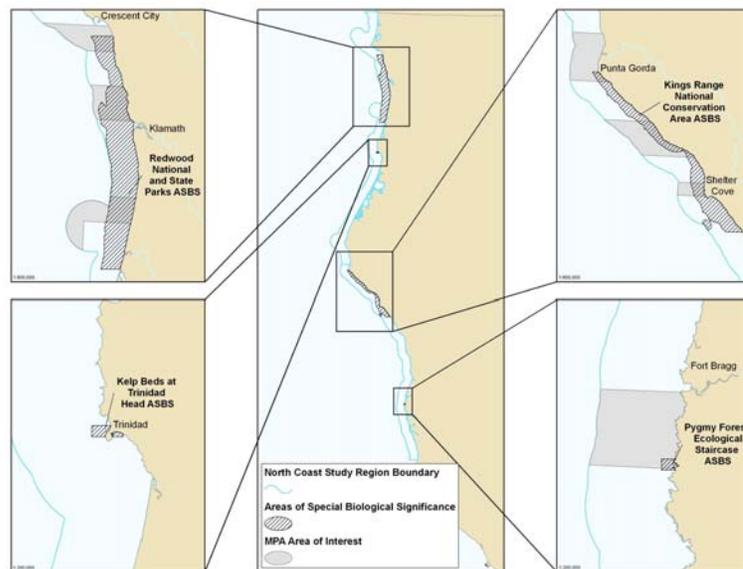
- ◆ Areas of Special Biological Significance
- ▲ Wastewater Discharge Zone
- Stormwater Discharge Zone



*Static MPAs (ExD, ExG & ExH > ExB > ExC & ExE > ExA > ExO & ExF)



ASBSs and Common Areas of MPA Placement





Areas of Water Quality Concern

- MacKerricher SMCA
 - Proposal 0 (existing MPAS)
 - ExC
 - ExD
 - ExE
 - ExF
- Southern boundary intersects MS4 drainage area
- Extends offshore to the 3-fathom depth contour



Areas of Water Quality Concern

- Trinidad Mobile SMCA
 - ExA*
- Intersects stormwater drainage area
- Misses Trinidad Head ASBS to north



*Static version

Scoring Table - Proposal 0 Example

MPA	Stormwater and Other Nonpoint Source Discharge	Wastewater Discharge	Co-Located with ASBS	Average Score	Weighted Score	Size Ratio	MPA Shoreline Length (miles)
<i>Coastal</i>							
Punta Gorda	1.00	1.00	0.38	0.79	0.10	0.13	1.36
Mackerricher	0.00	1.00	0.00	0.33	0.14	0.42	4.28
Point Cabrillo	1.00	1.00	0.00	0.67	0.16	0.24	2.43
Russian Gulch	1.00	1.00	0.00	0.67	0.12	0.18	1.87
Van Damme	1.00	1.00	0.00	0.67	0.02	0.03	0.35
Final Score	0.80	1.00	0.08	0.63	0.54		10.28326

* MPA Average Score = Average of all categories

* MPA Size Ratio = Shoreline length of MPA / Σ (all shoreline lengths in the proposal)

* MPA Weighted Score = MPA Average Score x MPA Size Ratio

* Final Proposal Score = Σ (all MPA Weighted scores in a proposal)

Round 1 Summary

- External arrays did well with only two MPAs (one repeated in five arrays) containing water quality concern area
- Half of external MPA arrays contained at least two ASBSs, and other half contained more than two
- All external MPA arrays contained MPAs within a bay or estuary free of SAT-defined water quality concerns



Round 1 Summary, conclusion

- *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.*