Humboldt Bay Eelgrass Management Plan:

Project Partner Meeting #3

Humboldt Bay Harbor, Recreation and Conservation District
Outline

1) Plan Outline and Key Components

2) Up-front Project Checklist & Guidance: How to determine whether a project may impact eelgrass and what to do about it

3) Preliminary Inventory & Evaluation of Eelgrass Mitigation/Restoration Opportunities

4) Regulatory Tools & Programs: Capturing Value within Available Regulatory Frameworks & Desirable Management Planning Structure

Lunch Break

5) Boat Tour- Observe and Discuss Eelgrass Restoration/Mitigation Needs and Opportunities
Humboldt Bay EMP Plan Outline and Key Components

• Humboldt Bay Eelgrass Comprehensive Management Plan (Document)
• Humboldt Bay Eelgrass Management Webpage
• Additional Resources and Appendices
Humboldt Bay Eelgrass Comprehensive Management Plan (CMP) Draft Outline

1.0 Introduction

- Description of Humboldt Bay (Physical Geography, Natural Resources, Port/harbor facilities)
- Humboldt Bay’s eelgrass in context
  - California, Pacific Flyway and under SLR
- Need for Plan
  - CEMP, poor history of mitigation performance
    - high prescriptive planting ratios,
  - eelgrass believed near carrying capacity in Bay
  - Regional economy drives programmatic action
- Plan overview
  - Plan Purpose
  - Plan covers entire system
  - Core focus areas
2.0 Humboldt Bay Eelgrass-

- Eelgrass distribution, abundance, and wetland/ecological functions in Humboldt Bay
  - Baseline assessment-2009 Benthic Habitat plus supplemental ss survey fall 2016

- Threats to eelgrass
  - Watershed-related impacts
  - Fine sediment loading-light attenuation and sediment aggradation, eutrophication; dredging/fill placement
  - Boat wake; shading, circ patterns, storm water runoff
  - Mariculture activities
  - others?

- Sea level rise and ocean acidification
  - Only large system with substantial capacity for shoreward transgression with SLR
  - Potential buffering capacity for ocean acidification
  - Sediment trapping and mediated aggradation
3.0 Comprehensive Management Plan Framework-
• Eelgrass Mitigation Policy Standards (CEMP) and CMP Structure
• Plan Implementation
  – Harbor District Dissemination of Information EMP website
    – Pre-project Checklist and Guidance
    – KMLs depicting known benchmark eelgrass coverage
    – Depth range in the bay
  – Inventory, evaluation, and prioritization of mitigation/restoration opportunities
  – Consider approach for valuation of restoring former tidelands, increased tidal prism to enhance eelgrass and salt marsh, challenges in quantifying gains
  – Regulatory/permitting mechanism(s)
  – Promote/establish system-level long-term monitoring
    • Understand interannual variability in eelgrass abundance and distribution as an indicator of overall system health and the effects of climate change on the Humboldt Bay Ecosystem
    • Enhance understanding of eelgrass for management planning and implementation
How to Determine Whether a Project May Impact Eelgrass and What to Do About It

- **Local Resources**
  - (EMP, existing information, early contact with agencies and specialists)

- **EMP Implementation & Project Checklist**
  - Plan distribution and public/project applicant engagement (Harbor District)
  - Agency process support and dissemination
  - Project Checklist & guidance component to facilitate education and communication
Pre-project Eelgrass Checklist and Up Front Guidance for Project Applicants

- Pre-Project Guidance & Checklist as stand-alone Appendix and node within EMP webpage
- Provide kml/kmz overlays of baseline eelgrass distribution (2009 NOAA Benthic Habitat Data and supplemental 2016 hydroacoustic survey data-this program)
- Highlight benefits of preliminary survey
  - (improves procedural efficiency, informs project design, potential cost savings)
Checklist Elements

1. Project-Area of Potential Effect?
2. Checklist/ questionnaire
   – New Projects
   – Repair/Maintenance Projects
   – Construction Activities
   – Operational Activities
3. If ‘yes’, planning function eelgrass survey recommended
Checklist/Questionnaire

• Is the project located within 100 feet of previously mapped (known) eelgrass habitat?
• Will any construction or new operational traffic occur within the vicinity of existing eelgrass?
• Is any portion of the project located in an area with depths ranging from -10 to +4 feet MLLW?
• Does the project result in new cover, shading or other form of light reduction of open water areas?
• Is the project anticipated to affect wind or tidal circulation patterns within the bay?
• Could the project affect ambient water clarity or temperature?
• Does the project result in any placement of fill, including shoreline armor?
• Is the project anticipated to lead to boat traffic that could affect nearby eelgrass habitat through grounding, prop scarring, wake, or shading impacts?
• Is project construction likely to increase turbidity? To what extent and for what duration?
• Will construction require the use of a barge or other vessel that may temporarily impact the bay floor (e.g. spud poles, anchoring, prop scarring, etc) within known eelgrass habitat or within depths ranging from -10 to +4 feet?
• Will construction require the use of turbidity curtains in proximity to eelgrass habitat?
• Will project construction result in temporary shading from moored/anchored working vessel(s)?
Additional Resources

• Google Earth-Kml overlays of benchmark eelgrass distribution

• Provide project applicants with basic understanding of eelgrass habitat in relation to project area
Pre-project Guidance-Preliminary Surveys

• High accuracy surveying/mapping critical to assessing and communicating eelgrass-project interactions
• For a preliminary survey- mapping is the focus
• Is Eelgrass likely to be affected by my project? How much? (reference site, turion density data not required)
• Survey Methodology – driven by project scale, depth distribution, eelgrass abundance
# Recommended Eelgrass Surveying Methods

Driven by Project scale, depth range, eelgrass abundance

<table>
<thead>
<tr>
<th>Depth Range</th>
<th>Project Scale</th>
<th>Recommended Survey Method</th>
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<tbody>
<tr>
<td>Intertidal (-1 to +4 ft):</td>
<td>0-1,000 m²</td>
<td>Total station/sub-meter GPS</td>
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<tr>
<td></td>
<td>0-3,000 m²</td>
<td>Total station/sub-meter GPS/low-altitude UAV</td>
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<td>3,000 m² -100 ha</td>
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<td>50 ha+</td>
<td>Manned aircraft</td>
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<td>Subtidal (-10 to -1 ft):</td>
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<td>Total station/sub-meter GPS w/ diver transects/single-beam or SS sonar</td>
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<tr>
<td></td>
<td>1,000-2,000 m²</td>
<td>Sub-meter GPS/single-beam or SS sonar</td>
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</tbody>
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Early Off-Ramp for ‘No Eelgrass’ Finding in Planning Survey and Clear Path Forward for Presence?

• Analysis/Findings from Planning Survey - key
  – Eelgrass present and needs to be addressed
  – Eelgrass absent but site is suitable, needs pre-con survey
  – Eelgrass not present and not likely, no further work required

• Inform need for further eelgrass mitigation/monitoring program development

• Criteria for consensus
Potential Mitigation/ Restoration Opportunities

- Spatial and temporal factors of mitigation and conservation
- Historic changes in Humboldt Bay and effects on eelgrass
- Eelgrass habitat/use differences within Humboldt Bay
- Mitigation/restoration site prioritization, opportunities, scale
Potential Mitigation/ Restoration Opportunities

• Removal of derelict infrastructure
• Substrate remediation
• Mitigation transplanting and site development
• Synergistic restoration of former tidelands
• Experimental transplanting
Spatial and Temporal Factors

• Area of eelgrass impact relative to site’s capacity to develop additional habitat

• Ownership/development/redevelopment considerations

• Understanding near-term needs (e.g. mitigation for project-related impacts) vs long-term trends (e.g. legacy effects and sea level rise)
Historic Changes in Humboldt Bay
and Effects on Eelgrass

- Eelgrass habitat presumed to be largely stable through time
- Early surveys: Salt marsh habitat well-represented (e.g. 1870), eelgrass not depicted but described in survey records

Historic imagery credit: Humboldt Bay Historical Atlas and County of Humboldt
A Historic Look at Humboldt Bay
Preliminary Inventory of Eelgrass Mitigation and Restoration Opportunities

• Inventory limited to current bay footprint

• Opportunities include: Debris removal, substrate remediation, site modification for bare-root transplanting (e.g. sand shoal), and experimental (unmanipulated site) transplanting

• Additional small-scale opportunities at project site level
North Bay-Eelgrass Mitigation and Restoration Opportunities

- Substrate remediation—spatially most extensive eelgrass restoration opportunity in North Bay
- Somewhat complicated by ownership and active mariculture lease areas
- High likelihood of success, but uncertain costs
- Challenges include unknown volume of material requiring removal, access and temporary impacts
- Warrants further investigation through a pilot study or demonstration project
Working Waterfront-Eelgrass Mitigation and Restoration Opportunities

• Debris removal-Principal opportunity within developed working waterfront

• Piling fields, wharves, derelict floats, other legacy shoreline infrastructure

• High likelihood of success

• Good strategy for mitigating smaller impacts at the site level

• Credit for ‘footprint’ effect and relatively high cost of removal limits scale of opportunity
South Bay-Eelgrass Mitigation and Restoration Opportunities

• Debris removal and sand shoal sites - Primary opportunities in South Bay

• Experimental transplant potential at King Salmon Cove - wave energy likely affects seed retention, transplants more likely to persist

• Sand Shoal sites - Reflect a legacy of shoreline modification, armoring, and dredging-related changes in Bay morphology
Taking a closer look...
South Bay Opportunities with a Historic Perspective
Characterizing Substrate Conditions

- Understanding differences between sand flats or shoals and mudflats
- Distribution related to location and energy gradients in wind/wave exposure
- Both capable of supporting eelgrass given suitable energy conditions
- Differences in benthic species richness/abundance and wildlife use
Substrate Remediation to Restore Historic Eelgrass Habitat

North Bay- Legacy bottom hardening site

• Outside current mariculture operations

• Approximately 1/3 - 1/2 acre of eelgrass restoration capacity-patchy eelgrass surrounds site

• Landowner receptive to conservation easement

• Excavation vs dredging
Travel Lift
Mitigation Strategy and Considerations cont.

Reclaiming former tidelands increases tidal prism and promotes eelgrass expansion, often beyond the project area...
EMP Project Tracking and Mitigation Credit/Capture

- Project Tracking
- Humboldt Bay EMP (CMP) as a mechanism for capture
- Ledger mechanism to standardize accounting
Mitigation Credit/Capture

• Potential incentive for maintaining the tracking system: HD retains the surplus that may result from successful project-level mitigation, shared value, recuperated costs?

• In lieu of a mitigation bank, CMP and database could provide an initial ‘market’ function.

• Capturing value within the regulatory frameworks available and desirable management planning structure.
  
  – In lieu fee program
  – Mitigation Bank
  – RGPs
  – Other
Questions?