Gateway Pacific Terminal – Marine Environment

Presentation to Multi Agency Permitting Team
April 28, 2011

Presented by:
Kristie Dunkin, Melinda Gray, Steve Ellis
• Summary of Existing Conditions
• Study Area Definition
• Baseline investigations
• Q&A
Cherry Point Shoreline
- Valuable economic and ecological function
- Existing industrial facilities
- DNR Cherry Point Aquatic Reserve
  - Management Plan
Summary of Existing Conditions – Nearshore Characteristics

• Substrate
  – Intertidal -- Large cobbles
  – Below -40 feet MLLW-- Sand and fines

• Bathymetry
  – Deep water at wharf

• Marine Vegetation
  – Intertidal -- non-native algae (*Sargassum*) and a variety of native Puget Sound algal species (e.g., *Ulva* and *Fucus*)
  – Subtidal -- bull kelp overstory with *laminariales* understory

• Marine Fauna
  – Sensitive Species (ESA and State Priority Species, forage fish)
Baseline Investigation: Study Area

- Permitted project footprint and associated DNR lease area
- Alternative Alignment and presumed DNR lease area
- Reference Area (for some studies)
Baseline Investigation: Study Area

Permitted Wharf Alignment

Alternative Wharf Alignment
Baseline Investigation: Study Area

Consolidated Study Area
Purpose of Baseline Studies

Planning, Monitoring, Evaluating

- To provide an inventory of existing conditions
- To better understand the current environment
- To inform and guide the project planning process
- To provide a frame of reference for subsequent evaluations (long term monitoring)
## Baseline Studies

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<tr>
<th>Engineering and Design</th>
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Marine Waves and Currents

- **Purpose:** Collect data to finalize design and understand existing conditions.

- **Approach:** Employ an Acoustic Doppler Current Profiler (ADCP) to measure
  - Directional wave parameters
  - current profiles, water level, instrument tilt, compass heading and temperature.
Vessel Traffic Risk Assessment

• **Purpose:** To investigate safety impacts of increased vessel traffic.

• **Approach:**
  - Determine routing and moorages
  - Analyze traffic volumes
  - Determine where accidents are most likely to occur
  - Identify traffic management, anchoring, spill containment and cleanup, etc.
Marine Geotechnical Investigation

**Purpose:** To collect subsurface stratigraphic data necessary to finalize the design of the marine wharf and trestle and better understand existing conditions.

**Approach:**
- Explorations from a barge-mounted drill rig
- Samples will be taken to evaluate moisture content, grain size, unit weight, and direct shear strength.
- Approximately 28-30 borings within the project footprint
- Locations will extend from approximately 8 to 80 feet water depth.
- The borings will be advanced to depths of 75 to 150 feet below the sediment-water interface.

Photo Credit: Huss Drilling
Engineering and Design Studies

Marine Geotechnical Investigation
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Qualitative Surveys:
- Underwater towed video
- Characterize habitat for more intensive quantitative surveys
- Macroalgae, eelgrass, epifauna (crabs, sea urchins, etc.), rockfish and essential fish habitat

Quantitative Surveys:
- Quantify species in a statistical manner that can be used to compare and evaluate data
- Sampling methods established and approved by State agencies
- Macroalgae, eelgrass, geoduck, forage fish, marine infauna (clams, marine worms, etc.)
Marine Biota

Qualitative Surveys
Purpose: To describe macroalgae and eelgrass communities.

Approach: Video and quantitative surveys will be conducted according to WDFW protocols (2008)

• Video Survey (Qualitative, Phase 1)
  – Underwater video transects will run parallel to the shoreline

• Quantitative survey
  – Eelgrass: shoot counts in delineated bed
  – Macroalgae: 5 transects perpendicular to shore in study area and reference area
Benthic and Epibenthic Invertebrates

Purpose: To describe benthic and epibenthic communities to evaluate post-construction impacts.

Approach:

- Video and quantitative surveys of epibenthic communities will be conducted along eelgrass and macroalgae transects.
- Benthic invertebrate samples will be conducted marine sediment sample locations following PSAMP Protocols (Ecology, 1998)
  - Samples will be sieved in the field.
Geoduck and Horse Clams

**Purpose:** To determine the presence/absence, density, and distribution of geoducks and horse clams.

**Approach:** Geoduck surveys following WDFW protocol (2000)
- Transects: 1,000 feet apart, perpendicular to shore (-18 to -70 MLLW)
- Establish a show plot to provide a correction factor for geoduck counts within the test transects.
Forage Fish

**Purpose:** While it is understood that Pacific herring spawn at the project site, the presence of other forage fish is not well documented. This study will evaluate the use of the site by Pacific sand lance and surf smelt.

**Approach:** Investigations will follow protocols defined by WDFW (Moulton and Penttila 2001)
Marine Biota

Habitat Mapping (Essential Fish Habitat)

**Purpose:** To map the subsurface habitat within the project footprint and assess the quality of the habitat for rockfish (and other species) by quantifying bottom topography and substrate characteristics.

**Approach:** Use towed video to map habitat
- Areas mapped as high quality rockfish habitat and moderate habitat quality will be verified by diver surveys to obtain an accurate estimate of the area of these features.
Marine Biota

Habitat Mapping (Essential Fish Habitat)
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Marine Water Quality

Sediment Characterization

Fails to meet Washington SQS

- Conduct Sediment Bioassays
  - Amphipod
  - Marine pore water
  - Sediment larval bioassay
  - Photoactivation of PAH’s

- Determine statistical variance of SQS

- Develop Statistical design for post construction monitoring

Meets Washington SQS

No further investigation required
Marine Sediment Investigation

**Purpose:** Establishing existing pollutant conditions and related biological conditions in the proposed WDNR lease area.

**Approach:**
- Characterize concentrations of metals and organics in sediments;
- Determine if sediments meet the Washington Marine Sediment Quality Standards (SQS);
- Where SQS are exceeded, conduct sediment bioassays;
- Use data collected to determine the statistical variance of SQS chemicals within the lease area;
- Use results to develop a statistical design for post construction monitoring.
m9  Add photo of sediment sampling fieldwork  
    melinda.gray, 4/26/2011  

m10  From SAP dated 11/11/2008  
    melinda.gray, 4/26/2011
Question and Answer
Pacific International Terminals
A Carrix Enterprise