



Pacific International Terminals

A Carrix Enterprise



Gateway Pacific Terminal – Marine Environment

Presentation to Multi Agency Permitting Team

April 28, 2011



Presented by:

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Gateway Pacific Terminal: Presentation Content

- Summary of Existing Conditions
- Study Area Definition
- Baseline investigations
- Q&A



Summary of Existing Conditions - Project Vicinity



- ## 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

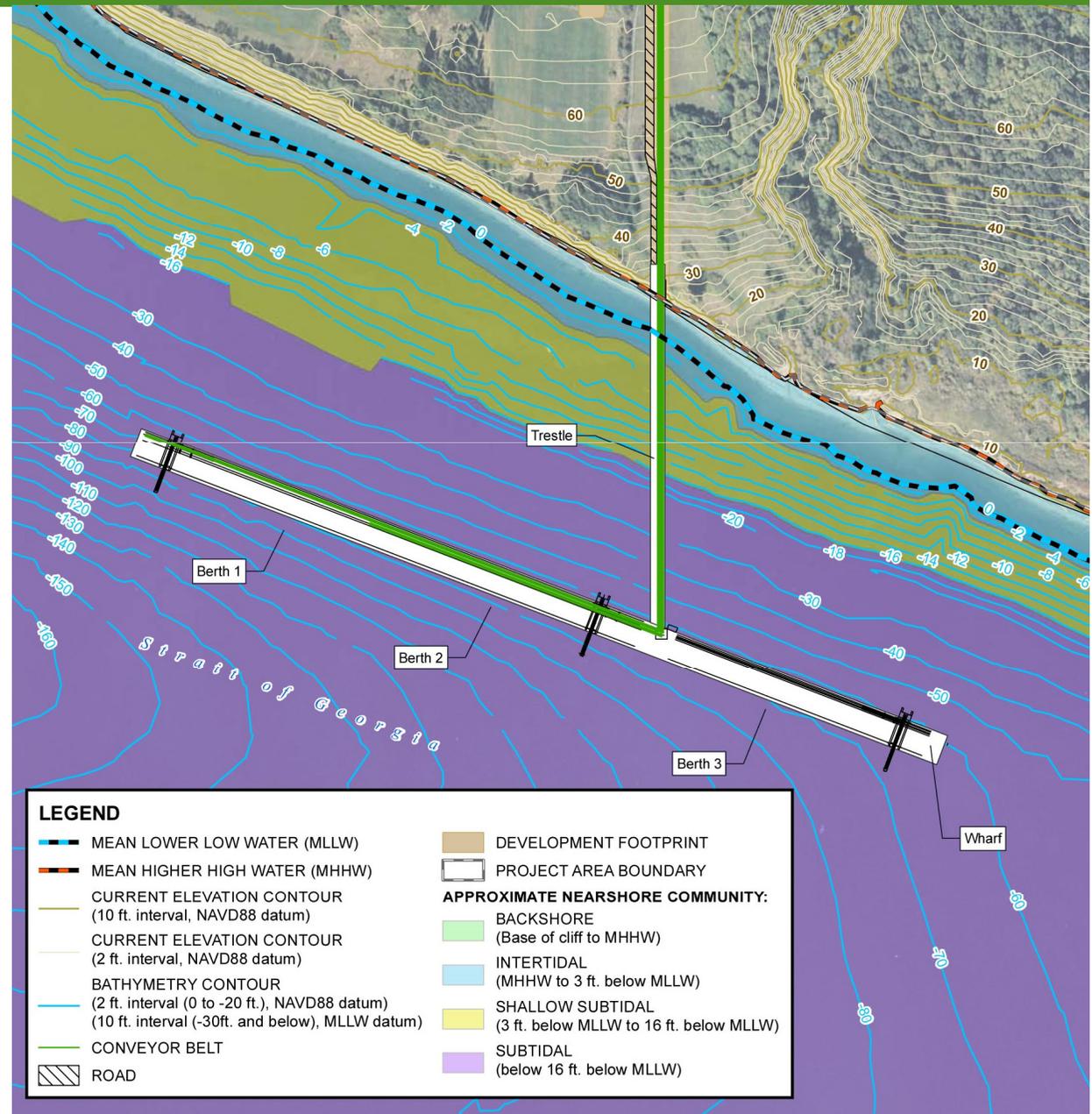
- Deep water at wharf

• 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)



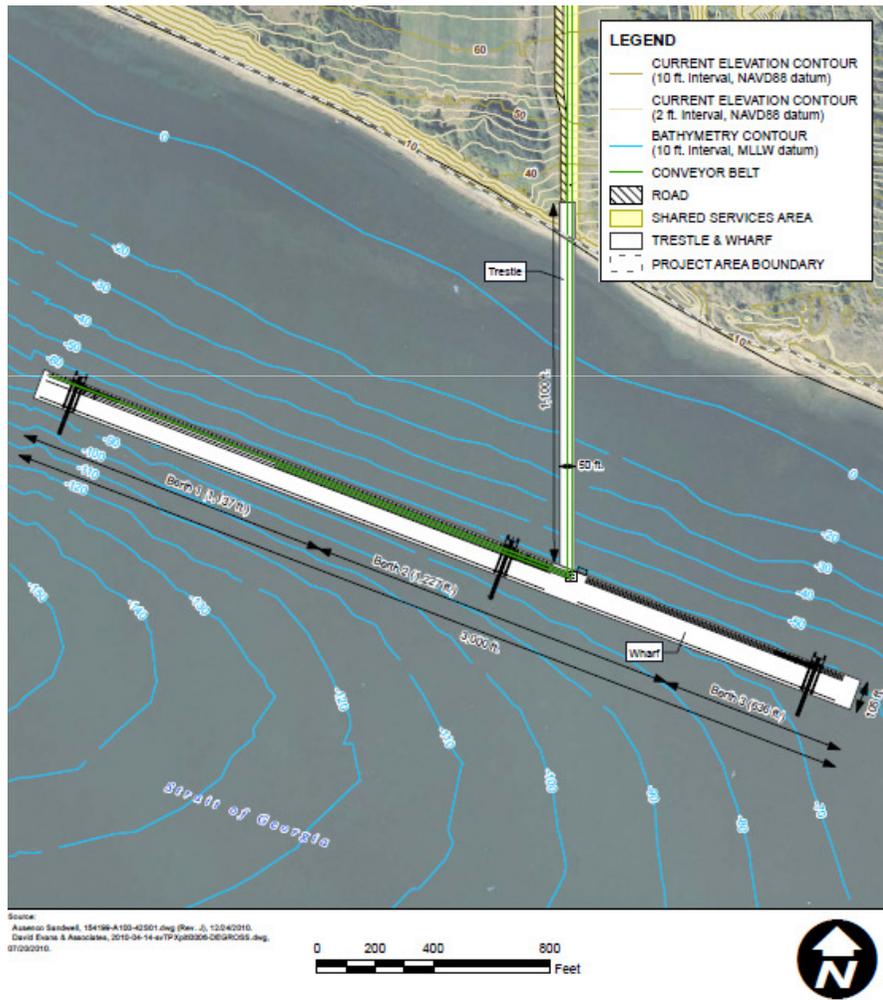


Baseline Investigation: Study Area

- 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





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)

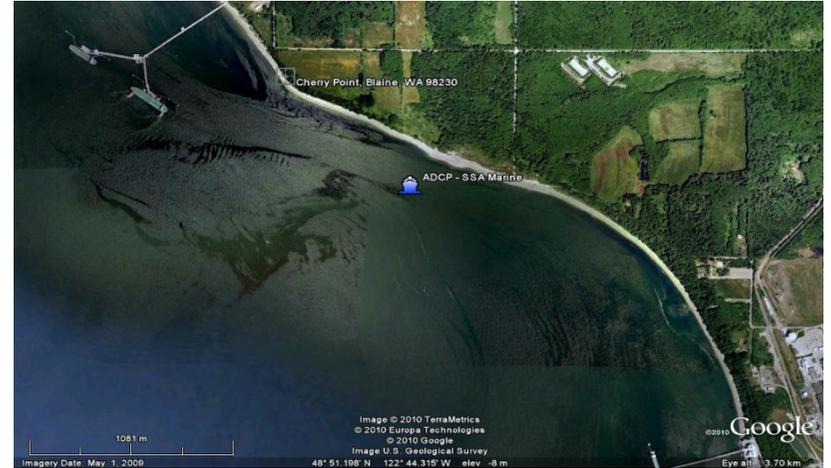
Baseline Studies

Engineering and Design	Marine Biota	Marine Water Quality
Marine waves and currents	Marine vegetation	Marine sediment investigation
Marine geotechnical	Marine benthic and epibenthic invertebrates	
Vessel traffic risk assessment	Geoduck and horse clams	
	Video mapping benthic habitats	

Engineering and Design Studies

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.



Engineering and Design Studies

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.



Engineering and Design Studies

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:**

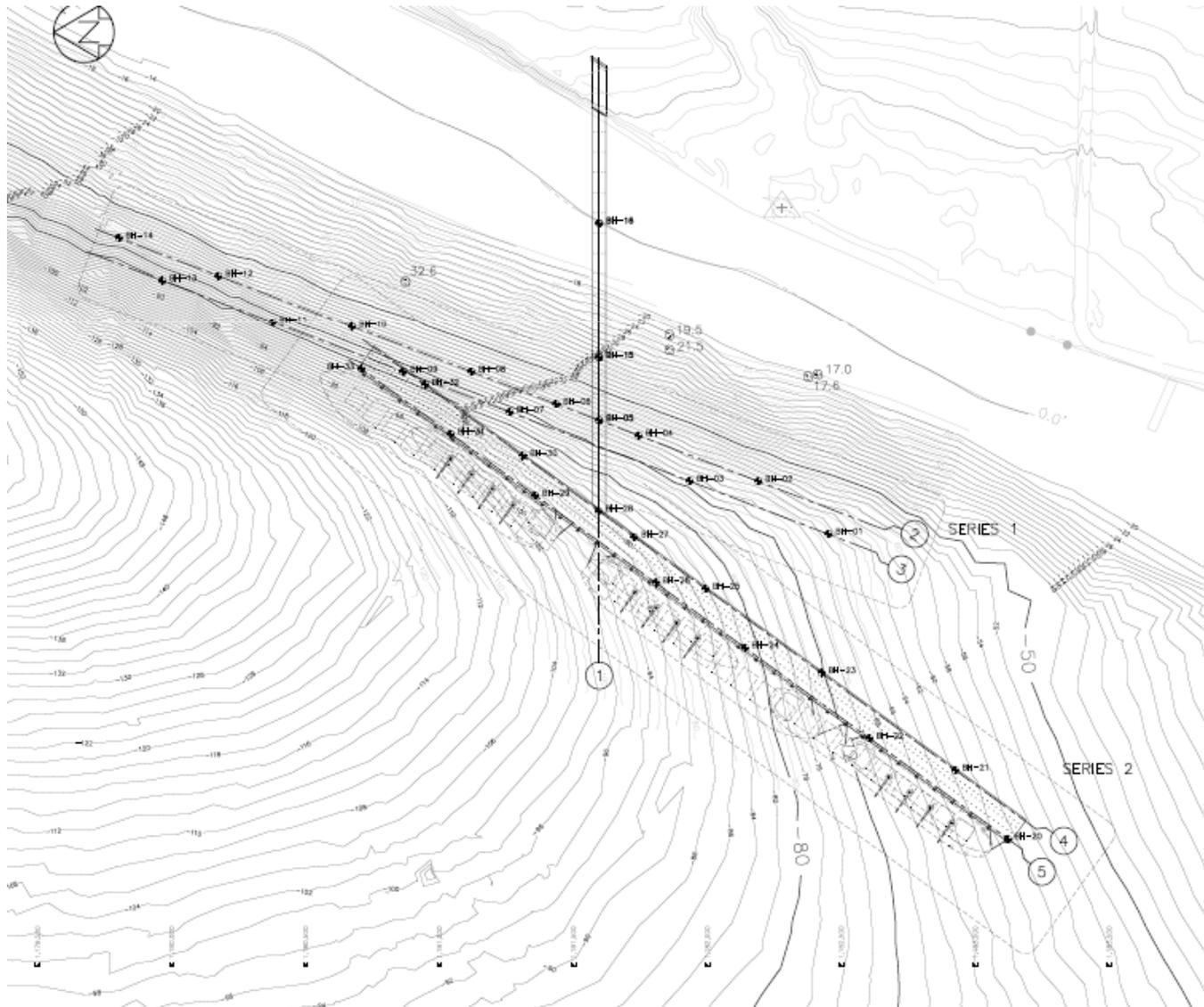
- Explorations from a barge-mounted drill rig
- Samples will be taken to evaluate moisture content, grain size, unit weight, and direct shear strength.
- Approximately 28-30 borings within the project footprint
- Locations will extend from approximately 8 to 80 feet water depth.
- The borings will be 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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The background of the slide is a green-tinted photograph of an offshore oil or gas rig structure in the ocean. The rig is silhouetted against a lighter sky, and its reflection is visible in the calm water below. The overall color scheme is a gradient of green, from a darker shade at the top to a lighter shade at the bottom.

Marine Biota

Qualitative and Quantitative Surveys

Qualitative Surveys:

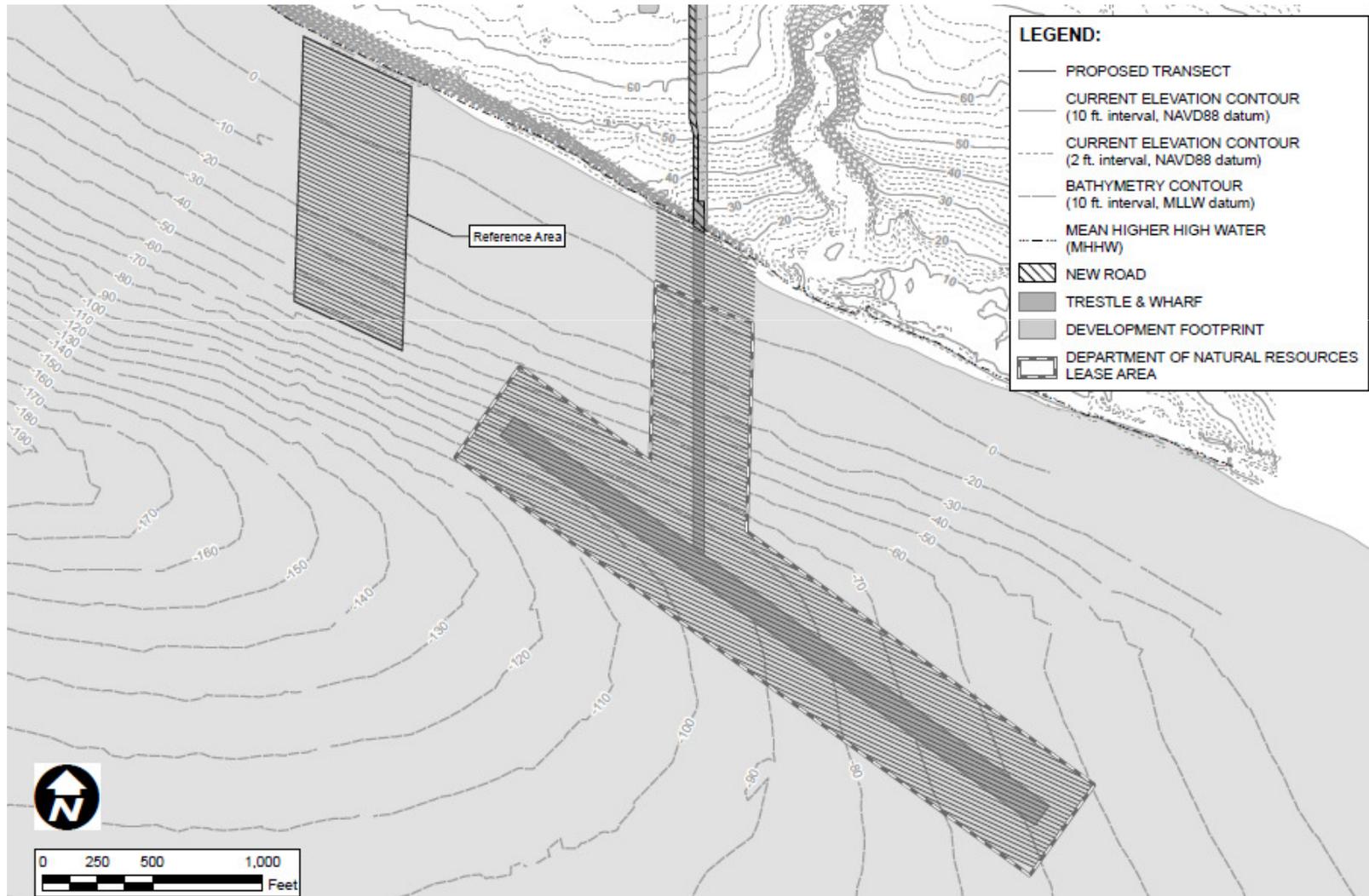
- Underwater towed video
- Characterize habitat for more intensive quantitative surveys
- Macroalgae, eelgrass, epifauna (crabs, sea urchins, etc.), rockfish and essential fish habitat

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



Marine Biota

Marine Vegetation Survey

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



Marine Biota

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



Photo credit: Cody Logan



Photo credit: WDFW



Photo credit: racerocks.com

Marine Biota

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.



Marine Biota

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 Penttala 2001)



Schooling Sand Lance

Photo: Randy Schuman, King County DNRP

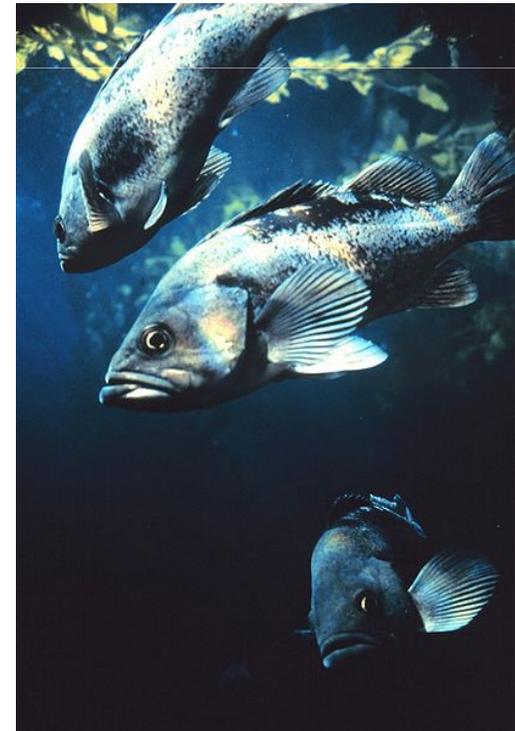
Marine Biota

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.

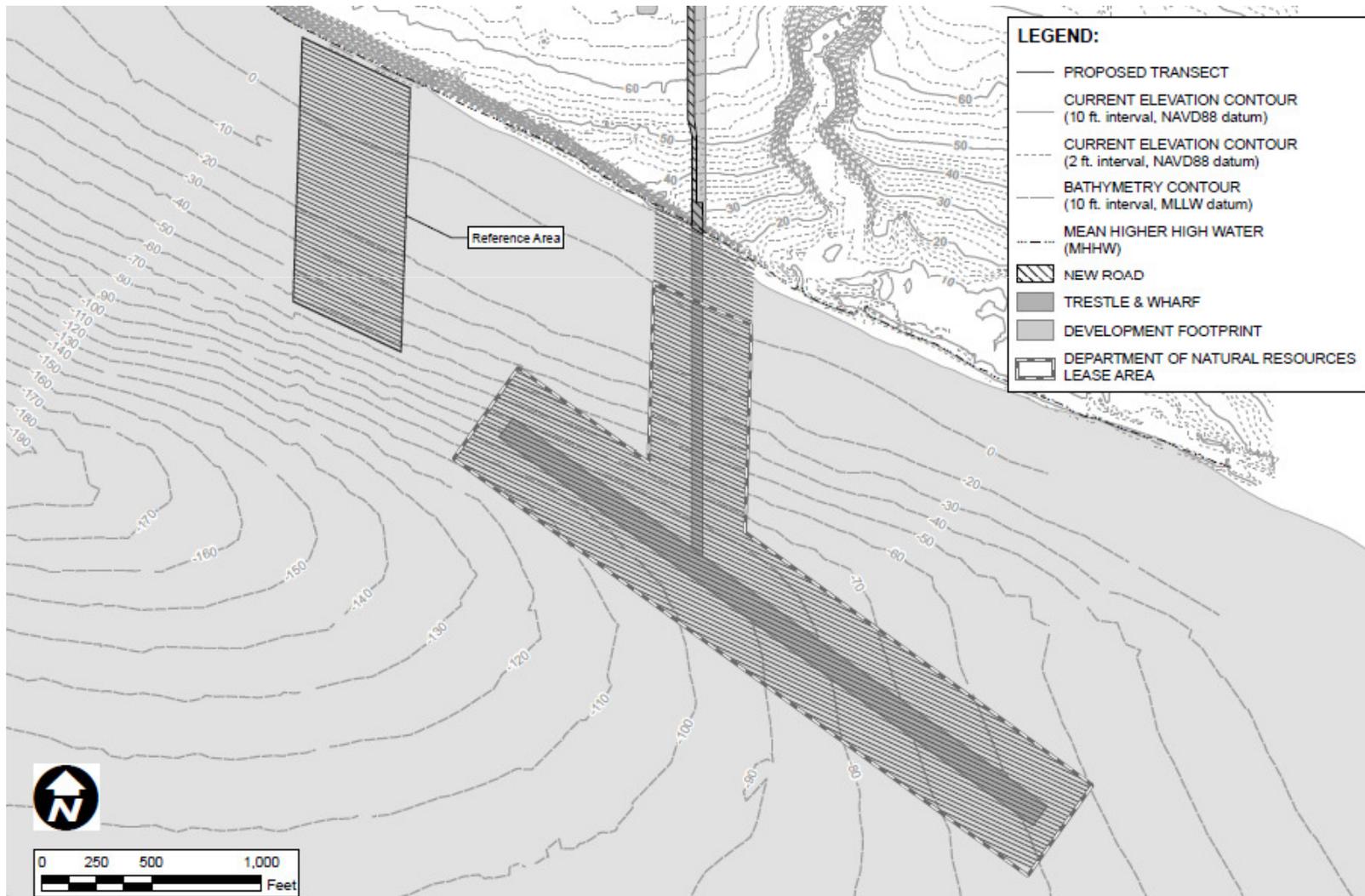
Approach: Use towed video to map habitat

- 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

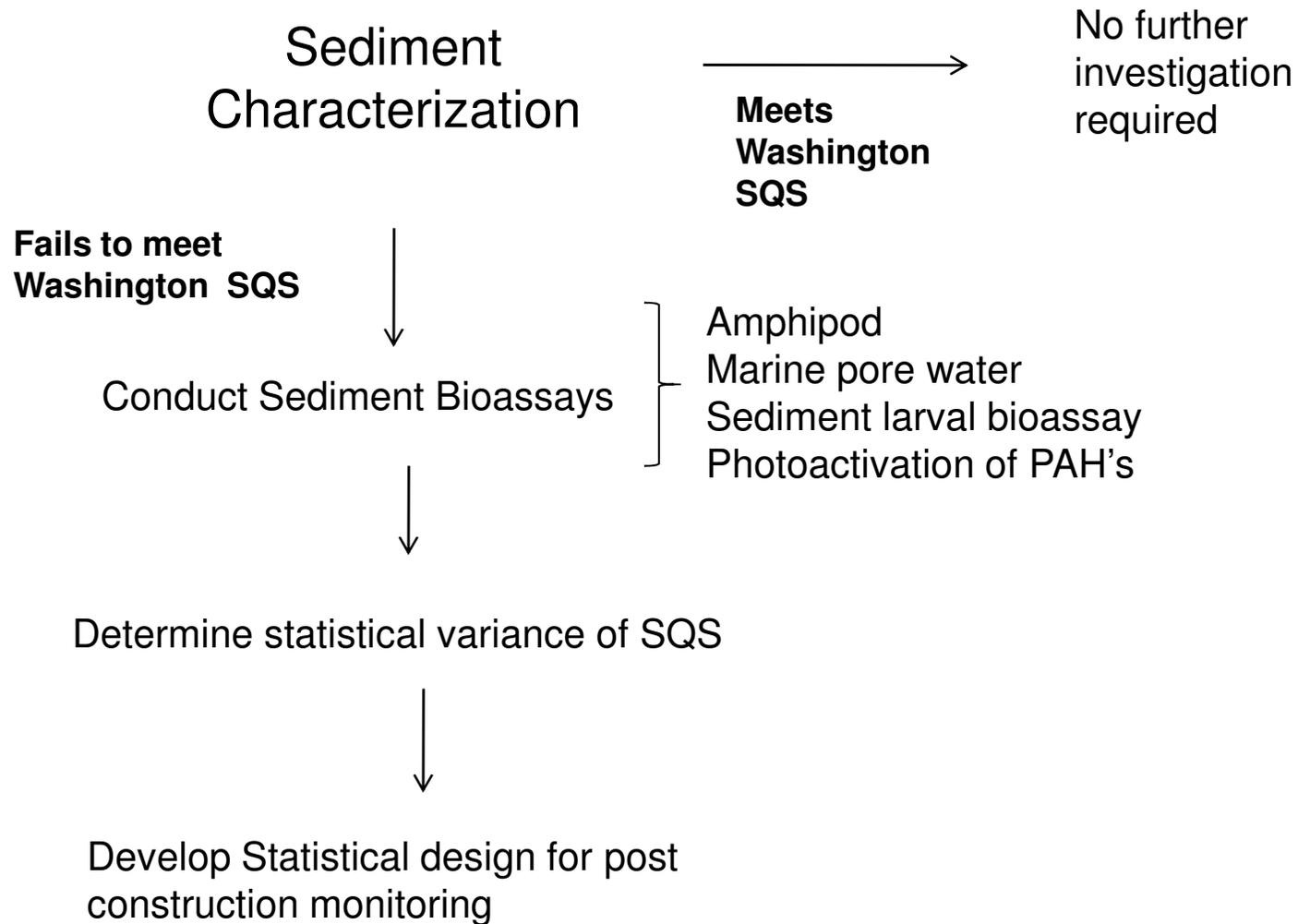
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Marine Water Quality



Marine Water Quality

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.

Slide 26

- 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





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