Preliminary Design Study
for
Munition Response Underwater Test Site

MR-2735

Stan D. Tomich
Pacific Northwest National Laboratory
Marine Sciences Lab (MSL)

In-Progress Review Meeting
February 21, 2018

SERDP
DOD ▪ EPA ▪ DOE

Pacific Northwest
NATIONAL LABORATORY

MR-2735: Preliminary Design Study for Munition Response Underwater Test Site

Performers:

PNNL's MSL Staff & University of Washington

Technology Focus

- Does Sequim Bay represent bottom types at known UXO sites?
- Suitability of MSL and Sequim Bay for test site hosting PI's

Research Objectives

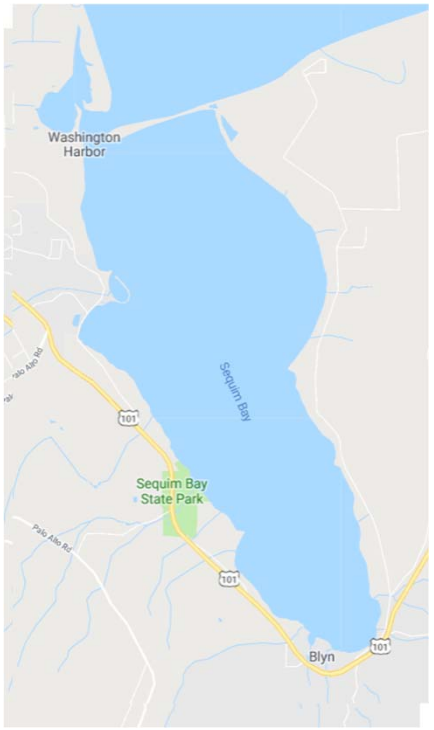
- Compile sediment types from known UXO sites
- Investigate Sequim Bay sediment types
- Propose candidate area(s) that are the best matches

Project Progress and Results

- Completed all project goals and proposed candidate area(s)

Technology Transition

- Transition to active test site
- Collaborate with SERDP for selecting test area
- Obtain necessary permits from concerned agencies
- Grid development and underwater locating techniques
- Placement and monitoring of munitions surrogates



Social Media Content

General process:

- **Contact PNNL communications POC**
- **Develop plan and content**
- **Meet requirements to post**
- **Submit for DOE approval (1 week)**
- **Release to media or customer**

Project Team

Stan Tomich (PI)
Sue Southard (co-PI)
Todd Hefner (co-PI)

Co-performers:

John Vavrinec –Dive Officer/Boat Ops
Sue Southard – Diver/Boat Ops
Kate Hall - Diver/Boat Ops
Shon Zimmerman – Boat Ops/GIS
Garrett Staines – Boat Ops/Acoustics
Rhonda Karls – Boat Ops
Nancy Kohn - Scientist
Adam Maxwell - Modeler
Dana Woodruff - Scientist

Problem Statement

Detection and classification of unexploded ordinance (UXO) requires standardized test sites where the performance of technologies and detection equipment can be evaluated under controlled conditions using inert munitions.

PNNL's MSL is a federal facility with the potential to host a year-round test site for visiting scientists to test munitions detection technologies and devices in an underwater environment.

Technical Objective

The objective was to perform a preliminary study of Sequim Bay in Washington State to determine its suitability for becoming an underwater test site for evaluating UXO detection technologies and equipment and to develop a preliminary test site design.

Technical Approach

The technical approach for the preliminary study consisted of three tasks:

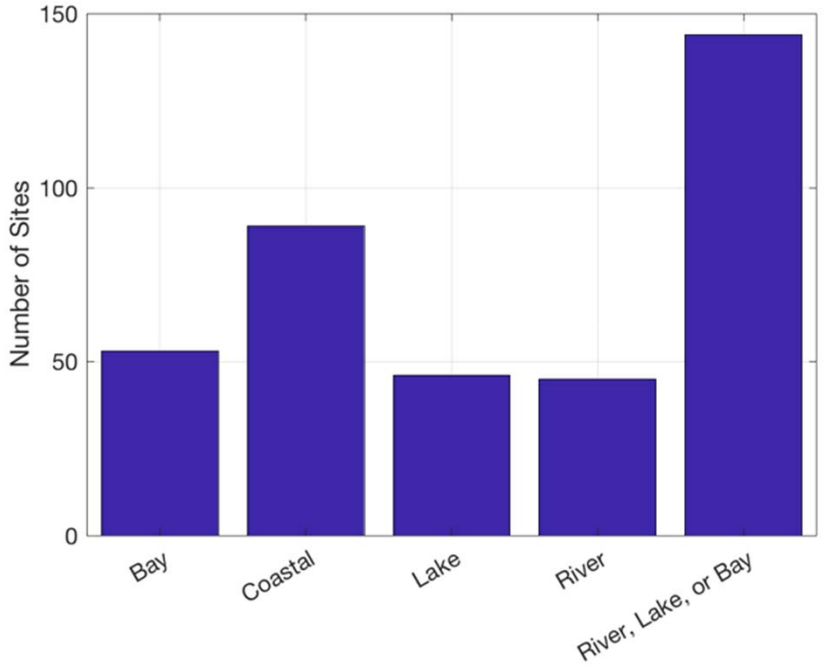
- Obtain knowledge about typical UXO sites and their substrates
- Characterize Sequim Bay and locate areas of substrates similar to those described at typical UXO sites.
- Propose test areas in Sequim Bay that could be used in a test site design.

Results Task 1

- Survey of Munitions Response Inventory Sites:
  - Due to limited information, only those sites with available maps included in survey.
  - 191 installations identified as having sites that are partially or fully underwater and are a priority or need further evaluation.
  - A majority of the sites (75.4%) are in rivers, lakes, or bays.
  - As a consequence a majority of the sediments with potential UXO will be a mixture of sand, silt, and/or mud.

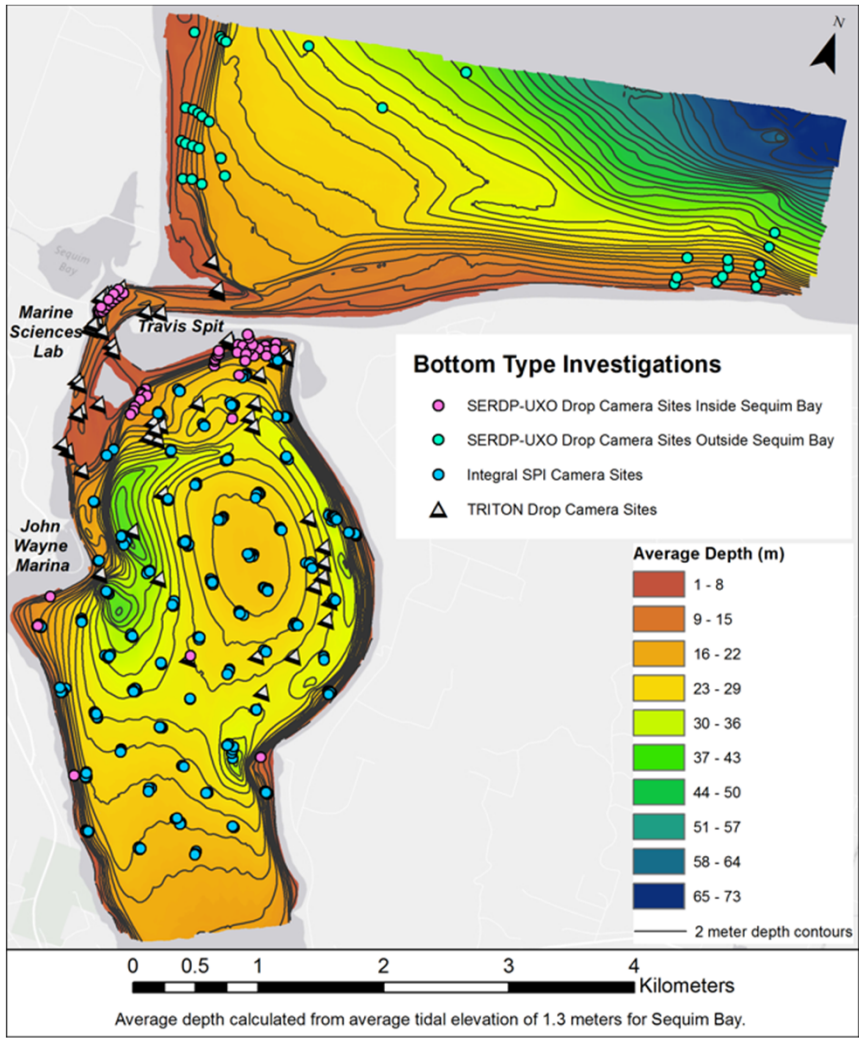
Task 1 Cont'd

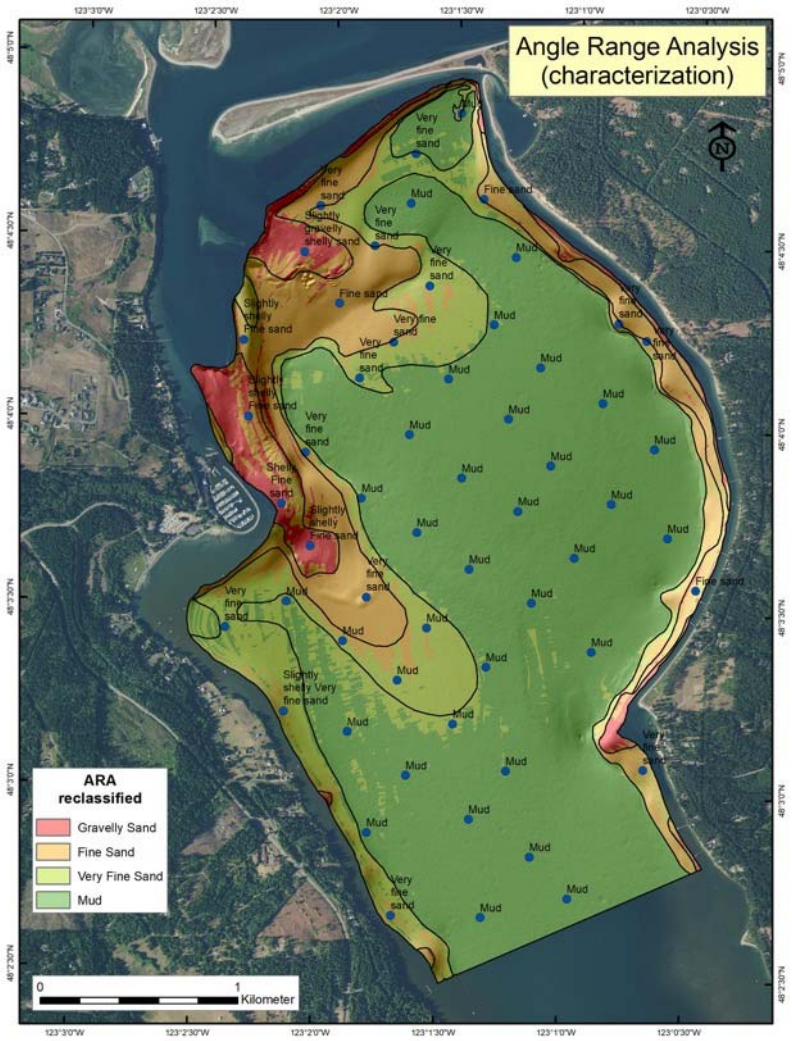
Distribution of Environments for Active Underwater Sites in the Munitions Response Inventory



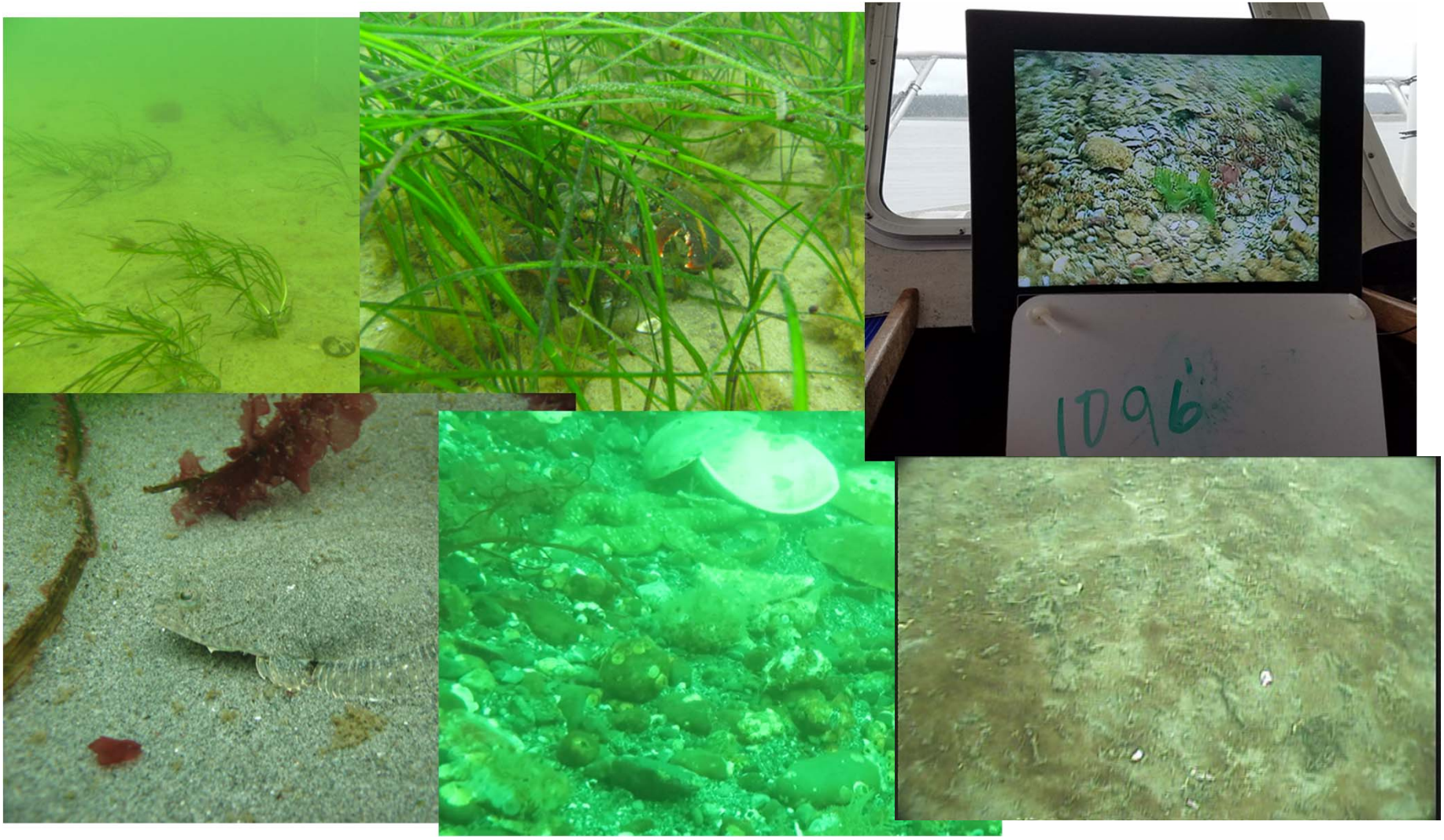
Note: Any one site may have more than one bottom type

Results Task 2





Task 2 Cont'd



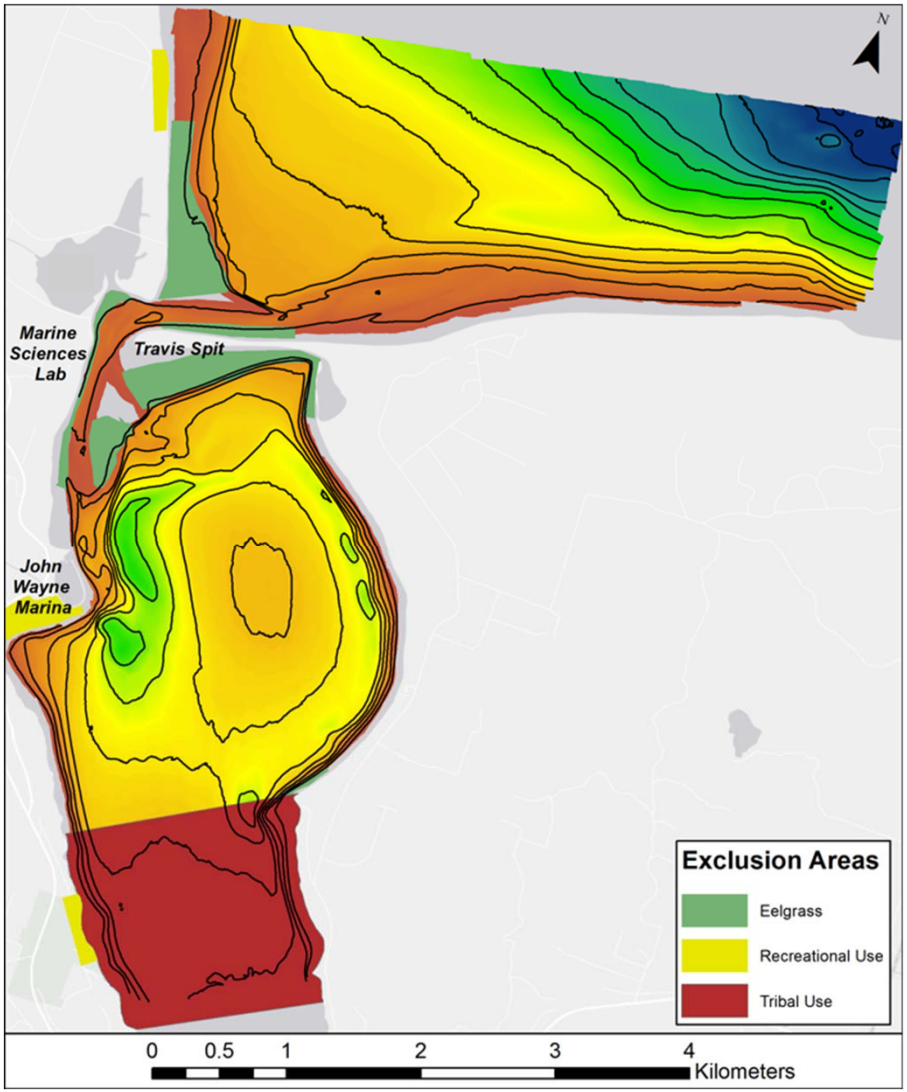
Task 2 Cont'd

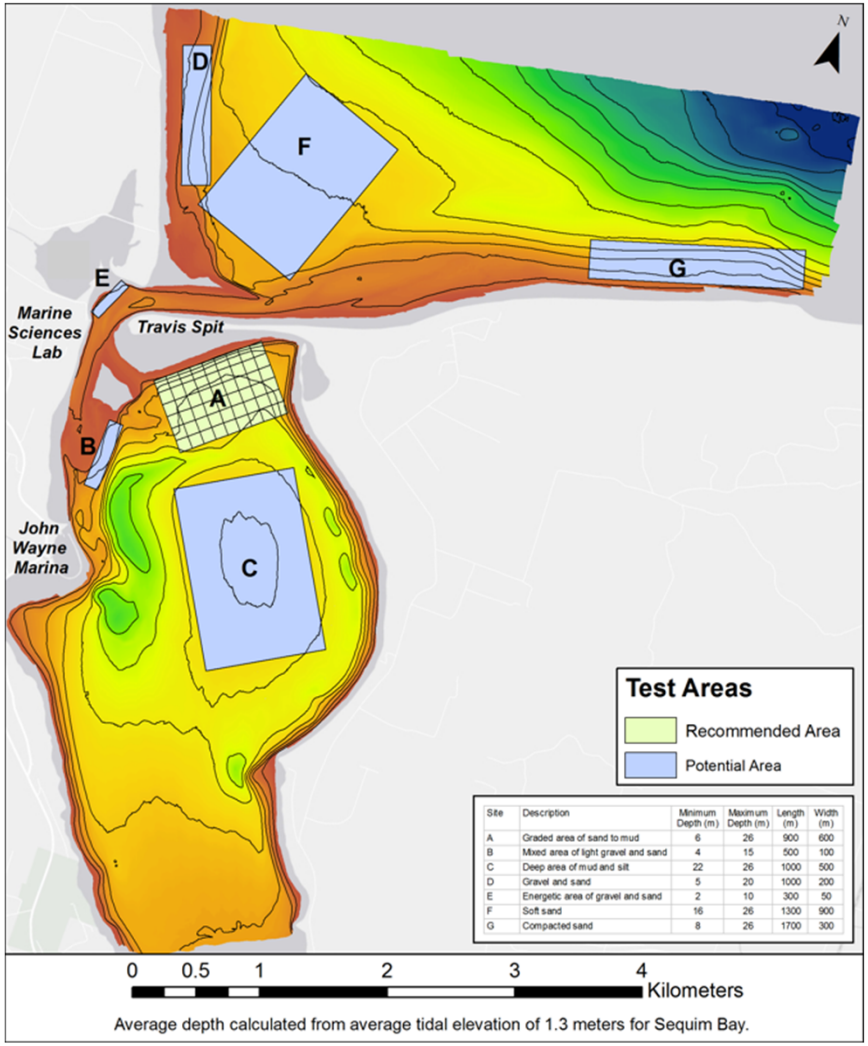

8/29/17 075 WPT
Near MSL
Aug 27, 2017 076 WPT
Near MSL
Aug 29, 2017 074 WPT
Middle Ground


August 25, 2017 066 WPT
August 25, 2017
067 WPT

Task 2 Cont'd

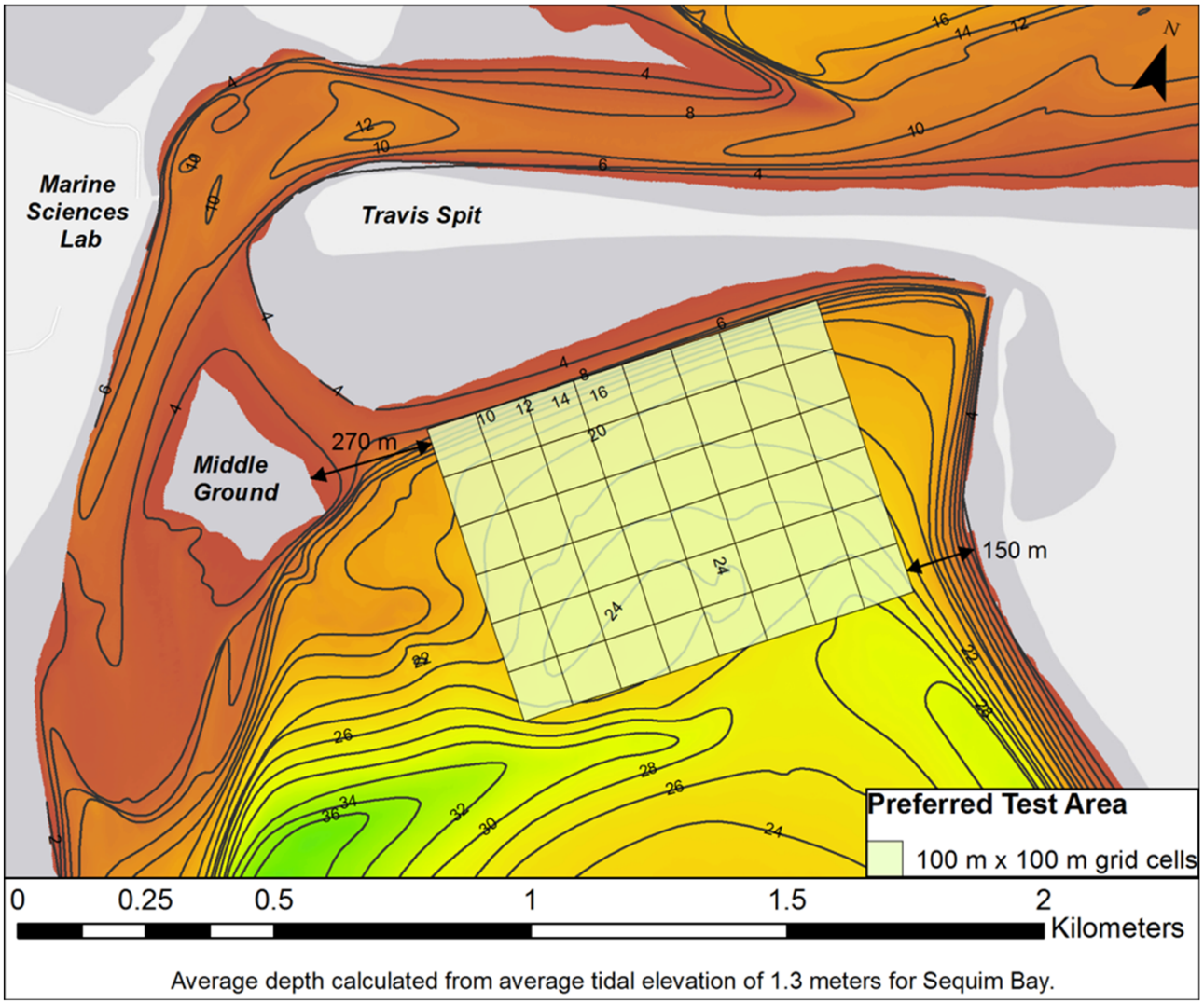
Results Task 3



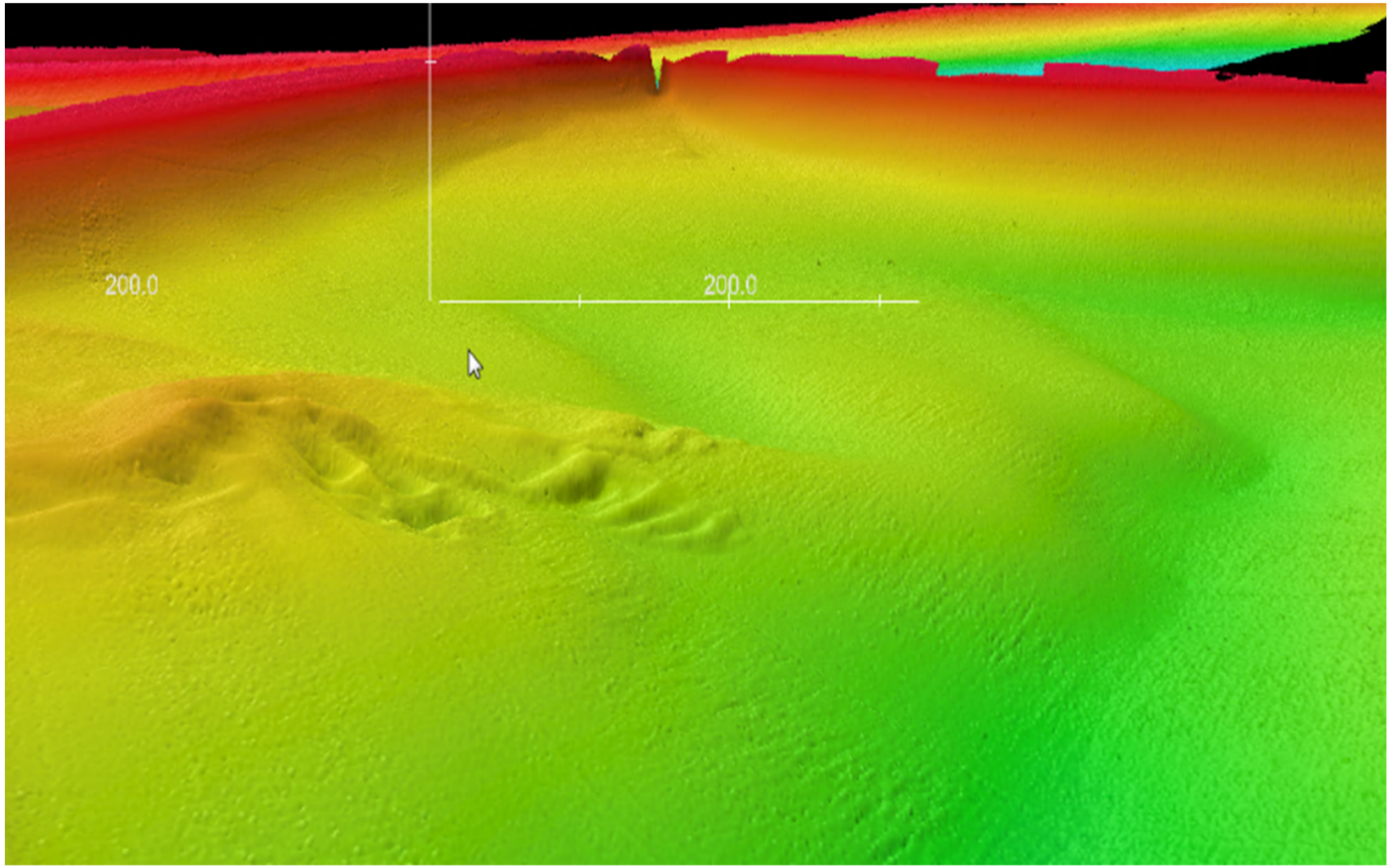


Site	Description	Minimum Depth (m)	Maximum Depth (m)	Length (m)	Width (m)
A	Graded area of sand to mud	6	26	900	600
B	Mixed area of light gravel and sand	4	15	500	100
C	Deep area of mud and silt	22	26	1000	500
D	Gravel and sand	5	20	1000	200
E	Energetic area of gravel and sand	2	10	300	50
F	Soft sand	16	26	1300	900
G	Compacted sand	8	26	1700	300

Task 3 Cont'd


Marine Sciences Lab
Travis Spit
Middle Ground
270 m
150 m
N
Preferred Test Area
100 m x 100 m grid cells
0
0.25
0.5
1
1.5
2
Kilometers
Average depth calculated from average tidal elevation of 1.3 meters for Sequim Bay.

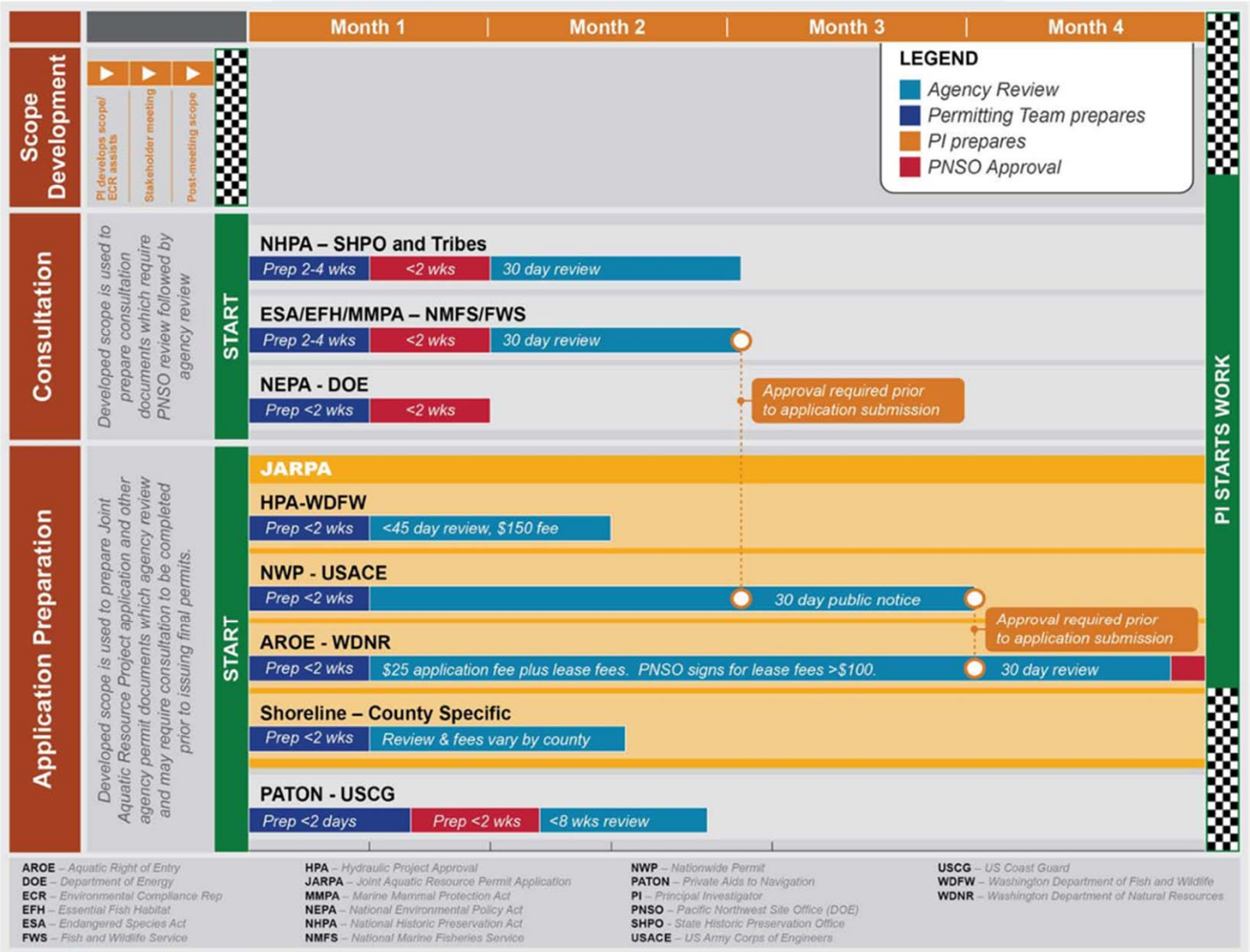
Task 3 Cont'd



Transition Plan

- Receive a Go decision from SERDP on Sequim Bay
- Conference with SERDP on proposed area and content
- Determine test grid content and locations for surrogates
- Engage permitting activity, prepare agency documentation, and apply for permits (5 year - renewable)
- Develop insertion and locating methods, test in existing permit area
- Explore use of custom local coordinate system – mask real locations for visiting PI's
- Sweep test area for existing targets with appropriate technologies
- Populate test grid with surrogates and verify navigation
- Maintain test site with periodic surveys
- Host P.I.'s technology - interfacing with permitting agencies

Issues – Permitting timeline



Issues – Time to permits

- Design test grid details
- Engage permitting agencies
- Prepare for site build out
- Develop site and manage