

IN WATER REMEDIATION OF SEAFOODWASTE ACCUMULATIONS BY REMOVAL AND CAPPING

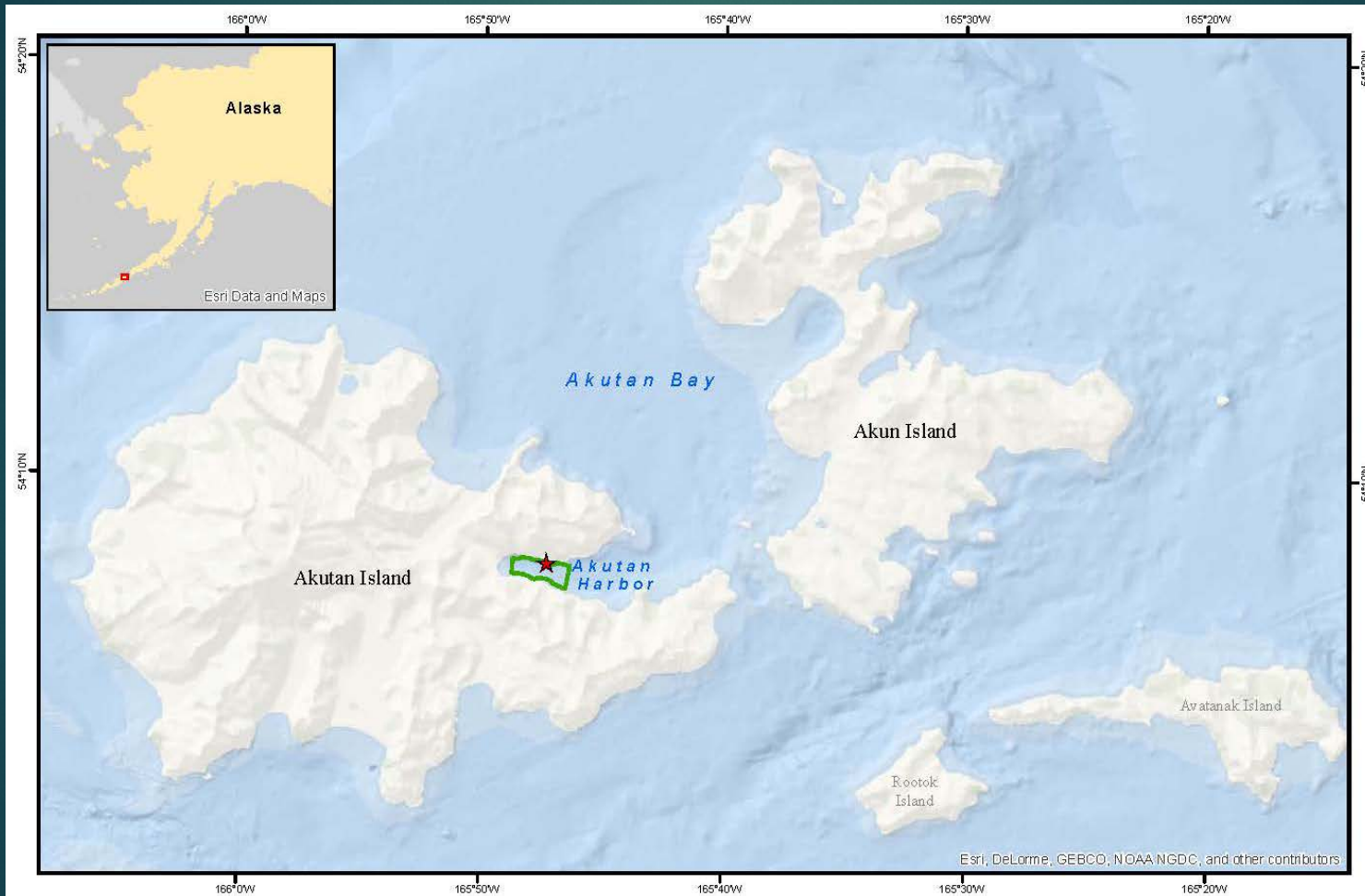
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Background



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Background

- ▶ Seafood Processing in Akutan Harbor
- ▶ Floating Processors
- ▶ Land Facility



Seafood Waste Characterization:

- ▶ Sediment Profile Images
- ▶ Coring
 - Boxcores
 - Vibracores



Seafood Waste Characterization:

- ▶ Two Primary Types of Waste

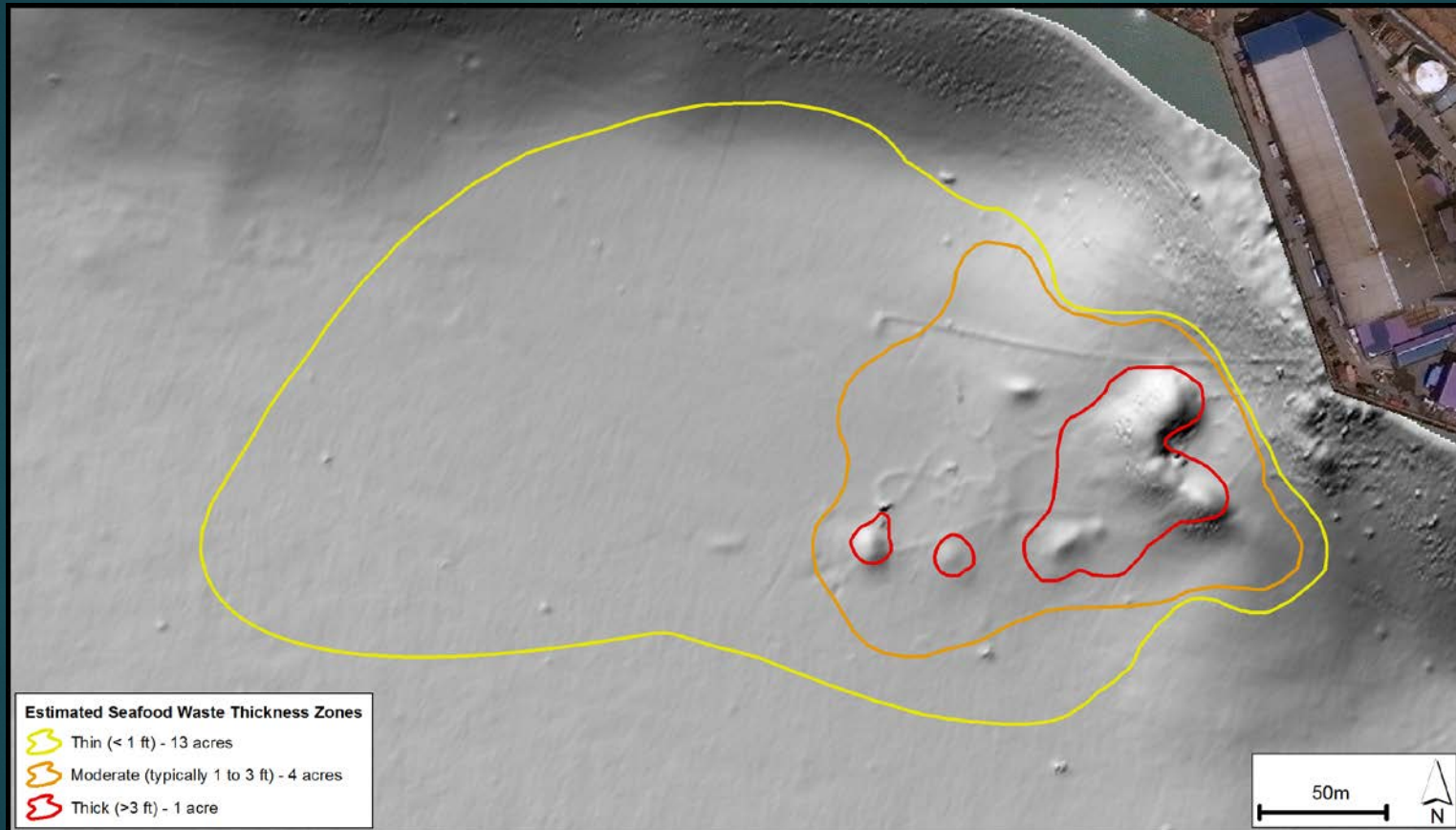
- ▶ Coarse Fish Bone



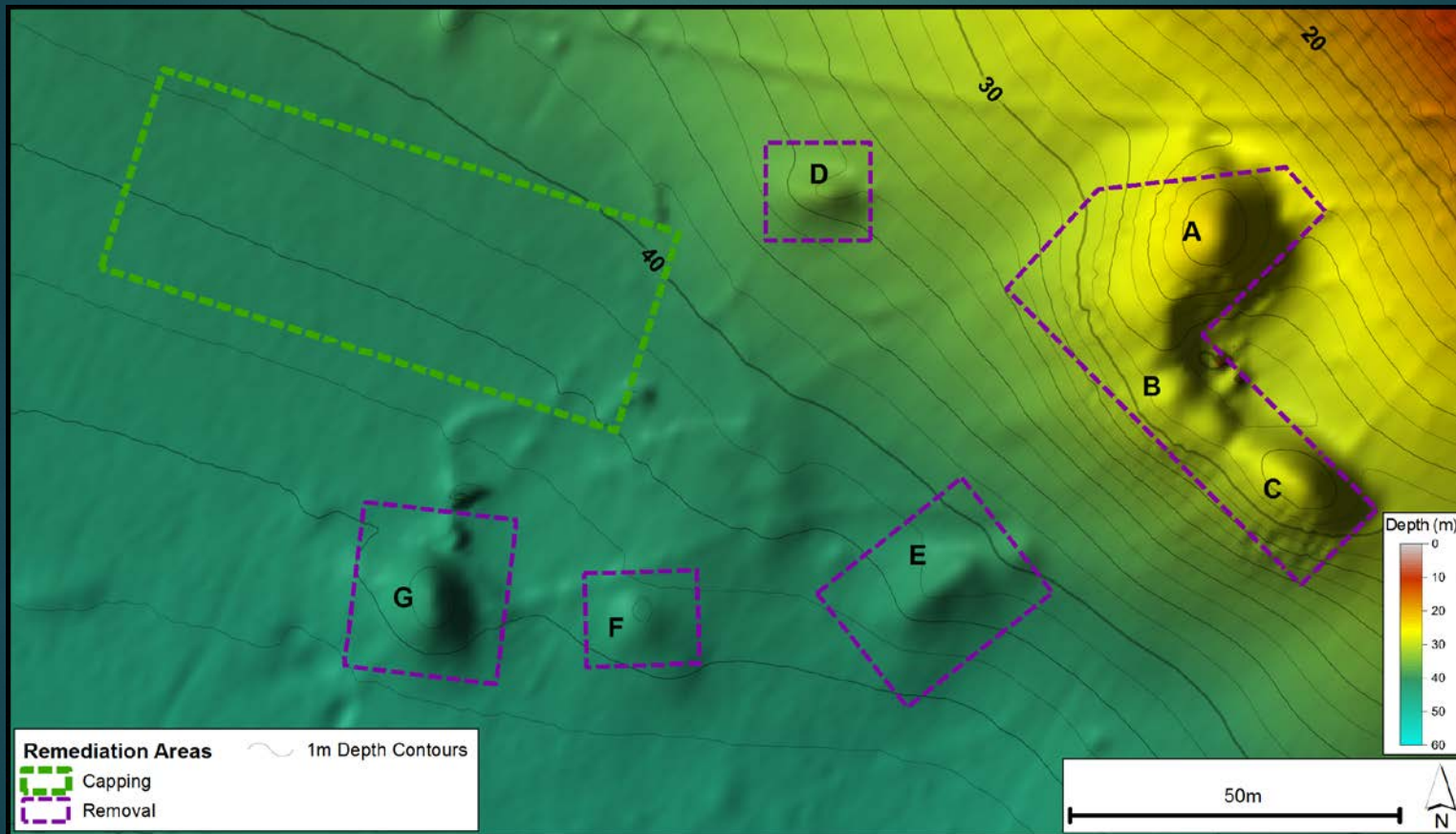
- ▶ Fine Decomposing Organics



Seafood Waste Piles



Remediation Work Area



Pile Remediation – Pilot Projects

▶ *Removal Pilot Objective*

- ▶ Remove a portion of the seafood waste pile from locations where there is thick waste and moderate waste, where waste thickness has the potential to preclude natural recovery.

▶ *Capping Pilot Objective*

- ▶ Place clean sediment that is representative of the sediments in Akutan Harbor over a target capping area of 2,500 square meters.

Vessels and Equipment



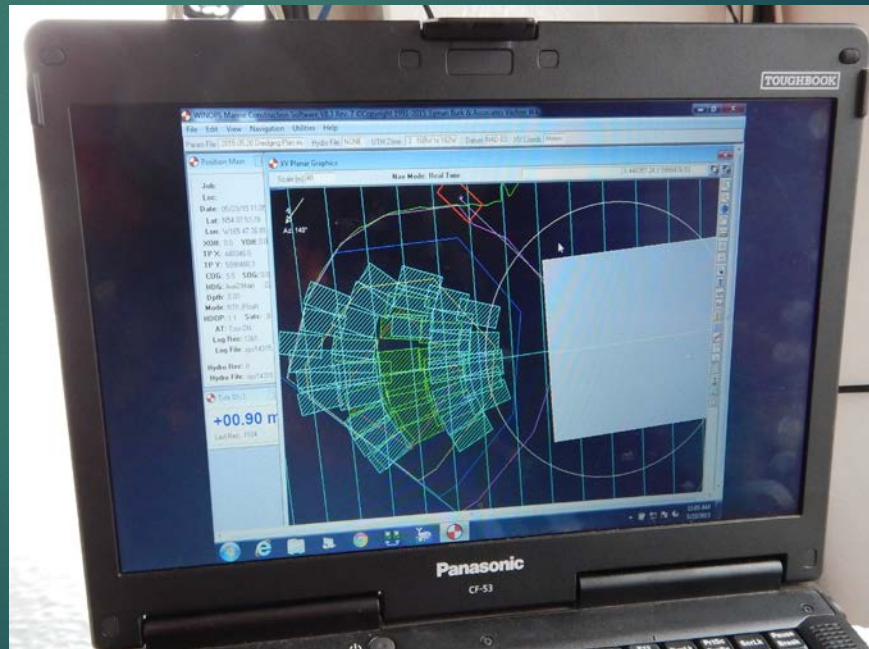
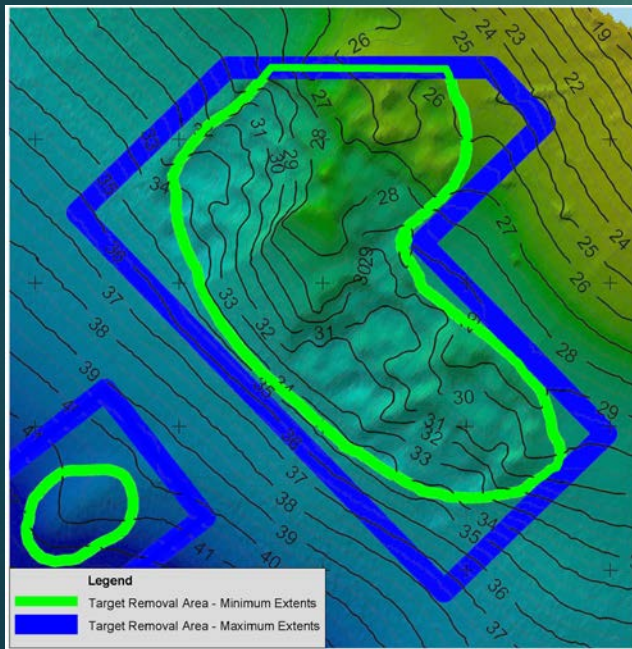
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Removal Pilot - Quantities

Area ID	Target Area (m ²)	Target Removal Volume (m ³)	Actual Area (m ²)	Actual Removal Volume (m ³)
A, B, & C	1930	4530	2350	6530
D	45	30	120	50
E	145	120	255	160
F	15	5	15	20
G	145	135	215	240
Total	2280	4820	2955	7000

Removal Pilot - CQA

- ▶ Bathymetric Surveys
- ▶ WINOPS



Removal Pilot – Material Identification

- ▶ Decayed Seafood Waste
- ▶ Bone Waste
- ▶ Crab Waste
- ▶ Native Sediment



Removal Pilot – Environment Monitoring

- ▶ Wildlife Observer Program
- ▶ Water Quality Monitoring Program

	Average Turbidity (NTU)
Baseline	0.9
Pre-Removal	0.5
Removal	0.7
Post-Removal	0.7

Removal Pilot – Lessons Learned

- ▶ *Cycle Times: Water depth between 25 and 45 meters*

Date	Daily Cycle Time Average (mm:ss)	Daily Bucket Count
5/23/2015	01:40	114
5/26/2015	01:44	212
5/27/2015	01:53	214
5/28/2015	01:34	103
5/29/2015	01:54	238
5/30/2015	01:49	238
5/31/2015	02:01	243

- ▶ *Seafood Waste Characteristics:*

- *Minor Sulfur Oder*

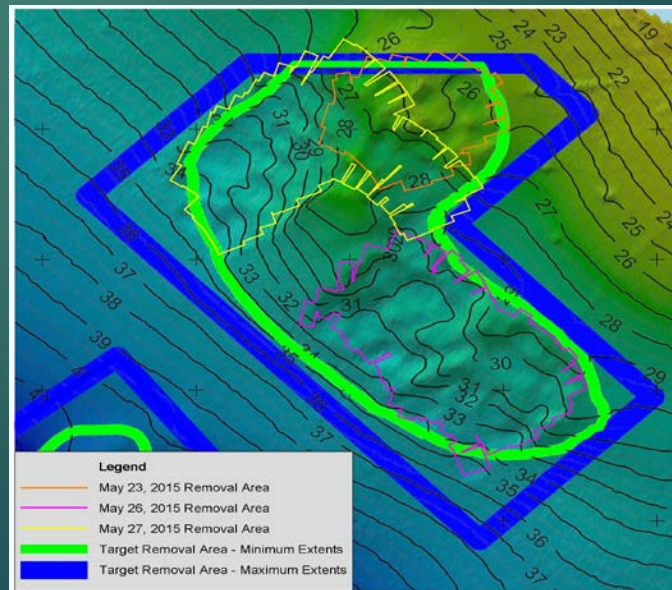
- *Fishbone Material:*

- Stackable*

- Disassociates Freely Releasing Entrained Water*

Removal Pilot – Lessons Learned

- ▶ *Clamshell Bucket:*
 - ▶ Lighter Smooth Cutting Bucket
 - ▶ Limited Removal of Native Sediment
 - ▶ Closed Environmental Bucket Recommended
- ▶ Horizontal Accuracy



Capping Pilot



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Capping Pilot

- ▶ Capping Material



Capping Pilot

- ▶ Capping Area
 - 2,500 square meters
- ▶ Capping Rate
 - Target Thickness of 15 cm (6 in)
 - Placed Volume Equivalent of 30 cm (12 in)
- ▶ Placement Method



Capping Pilot – Confirmatory Monitoring

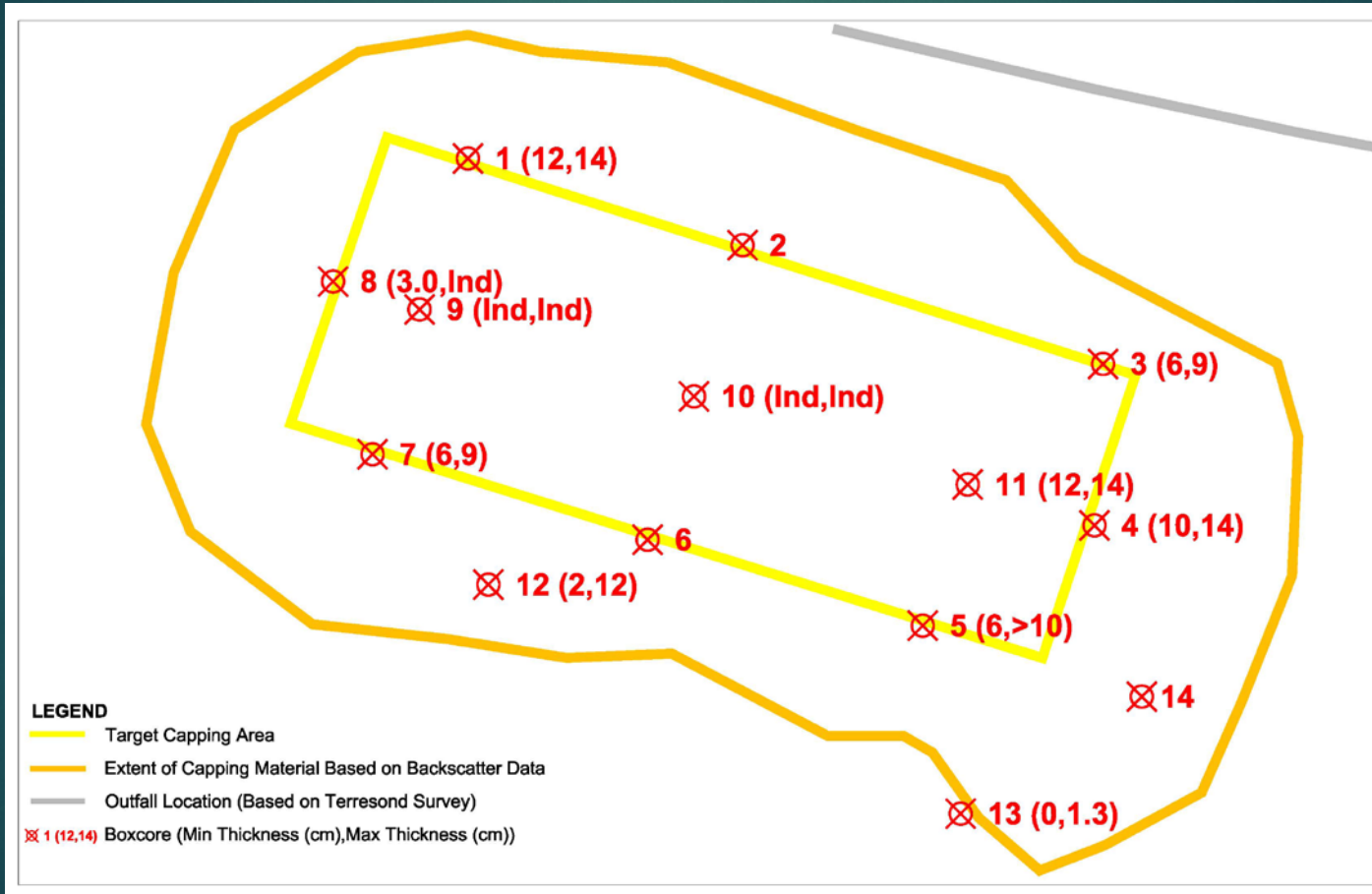
Boxcore Station	Minimum Cap Thickness (cm)	Maximum Cap Thickness (cm)	Continuous Surface	Native Sediment Encountered
1	12	14	Yes	Yes
3	6	9	Yes	Yes
4	10	14	Yes	Yes
5	6	>10	Yes	Yes
7	6	9	Yes	Yes
8*	3.0	Ind	Yes	No
9**	Ind	Ind	Ind	No
10**	Ind	Ind	Ind	No
11	12	14	Yes	Yes
12	2	12	Yes	Yes
13	0	1.3	No	Yes

“Ind” indicates indeterminate thickness

* Partial recovery due to cobbles in jaws of box core.

**Cobbles in jaws. Small amount of material retained was cap material.

Capping Pilot – Confirmatory Monitoring

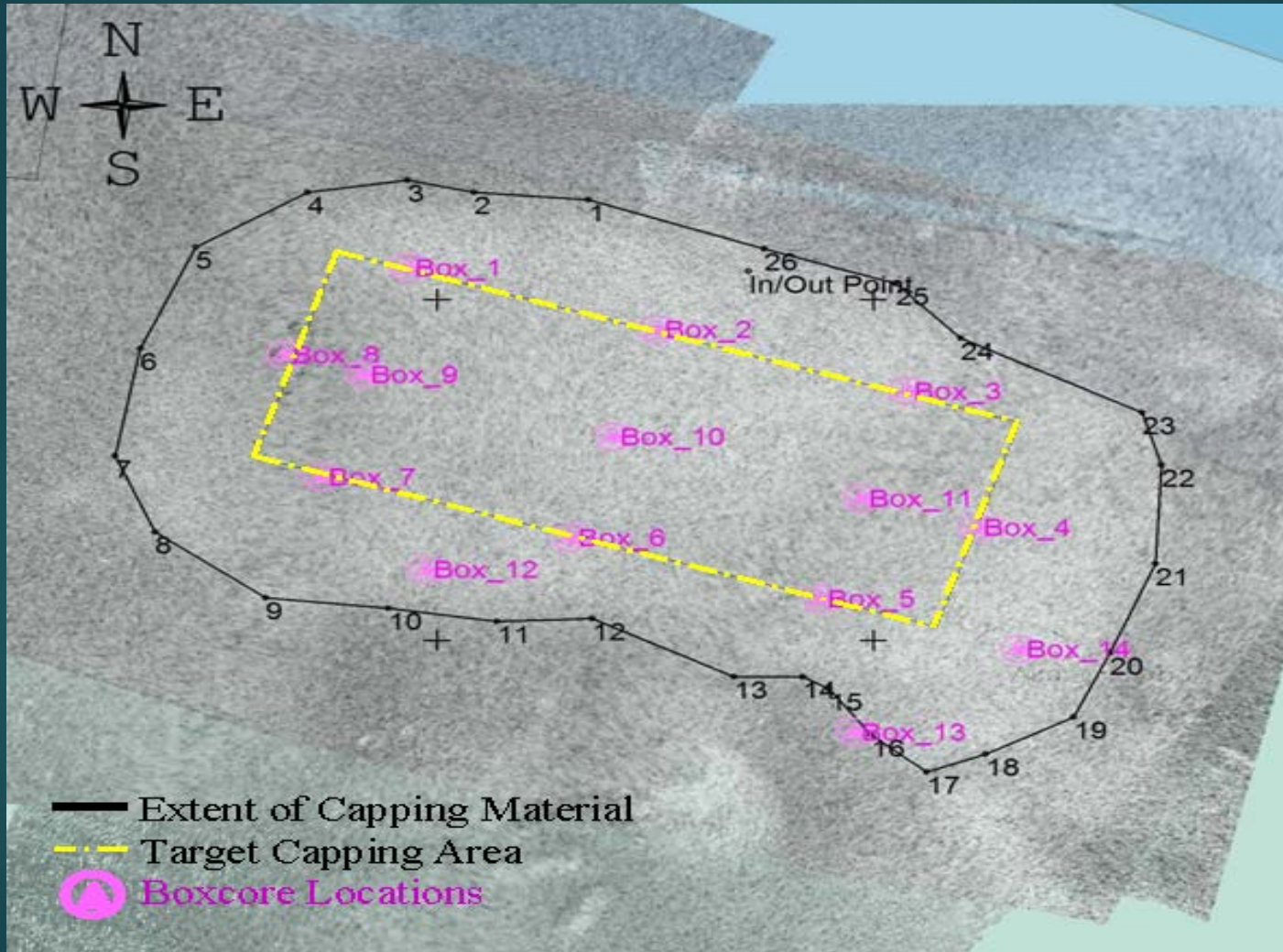


Capping Pilot – Lessons Learned

Capping through 40 meters (130 feet) of water.

- ▶ Release Area: 2,500 square meters
 - Actual Cap Area: 2.5 to 3 times the Release Area
- ▶ Volume of Cap Material: 30 cm x 2,500 sq. m
 - Actual Cap Thickness: Average of 10 cm
 - Cap thickness was 1/3 of the thickness of material deposited in the Release Area.

Capping Pilot – Lessons Learned



Questions



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