The use of heavy machinery to remove *Ammophila arenaria* from native sand dunes at Point Reyes National Seashore

Ben Peterson
Point Reyes National Seashore

Native dune plant community at Abbott's Lagoon
(in the foreground)

Listed species that depend on native coastal dune habitat:

Western snowy plover (threatened)

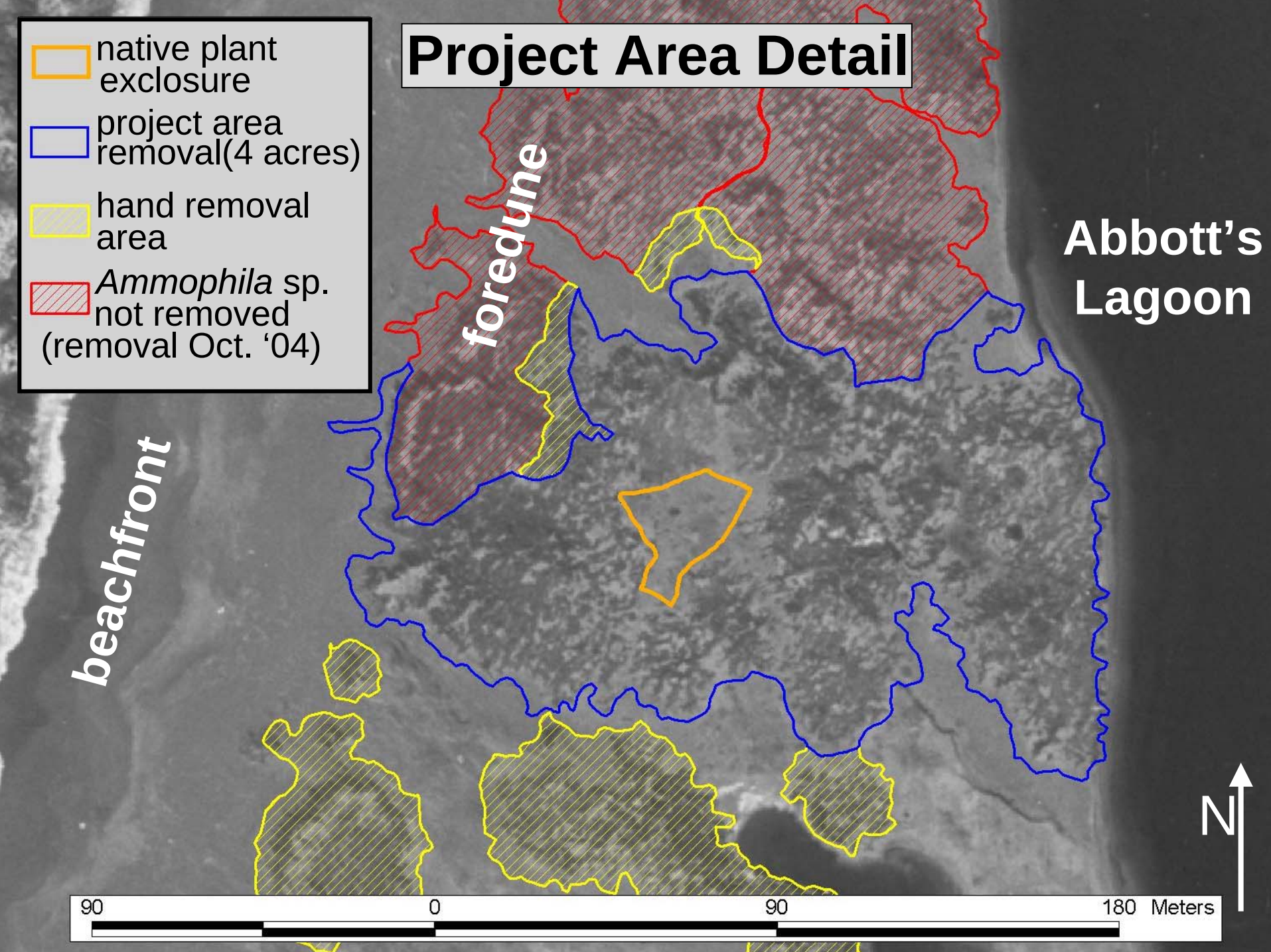
Myrtle's Silverspot butterfly (endangered)

Lupinus tidestromii (endangered)

Layia carnosa (endangered)

Dense stand of *Ammophila arenaria* at Abbott's Lagoon

Point Reyes National Seashore


native plant exclosure
project area removal(4 acres)
hand removal area
Ammophila sp. not removed (removal Oct. '04)
Project Area Detail
foredune
beachfront
Abbott's Lagoon
N
90
0
90
180 Meters

Hand removal of *Ammophila arenaria*

Environmental Compliance

- California Coastal Commission
- U.S. Fish and Wildlife Service
- Internal park Project Review process including:
  - "Minimum Tool in Wilderness Area" document
  - Section 116 Archeological Clearance

Pre-removal monitoring

Equipment used: two excavators 21 and 13 metric tons each

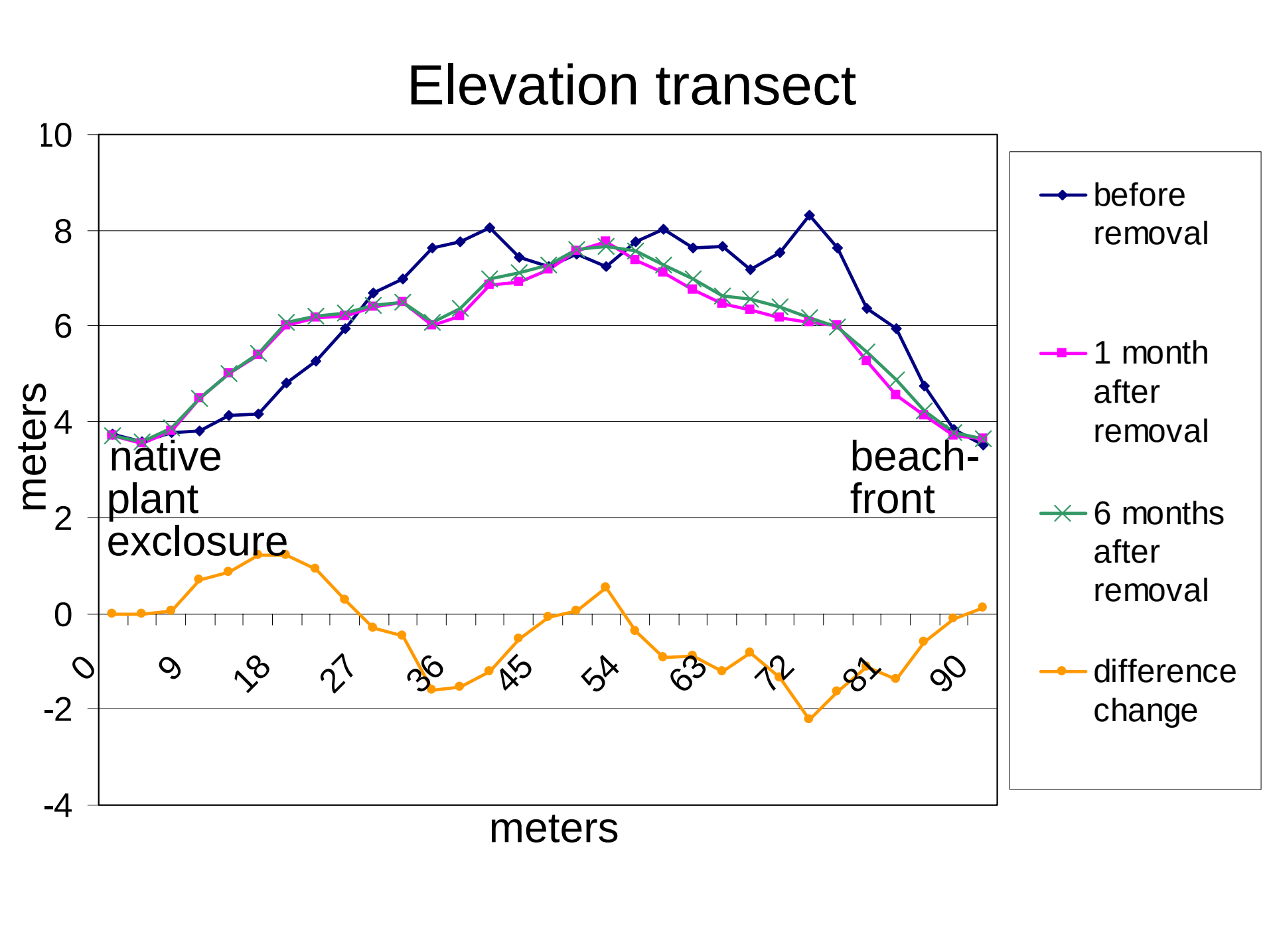
1. Removing *Ammophila* sp. and "dirty" sand, piling it to the left

2. Removing “clean” sand, piling it to the right

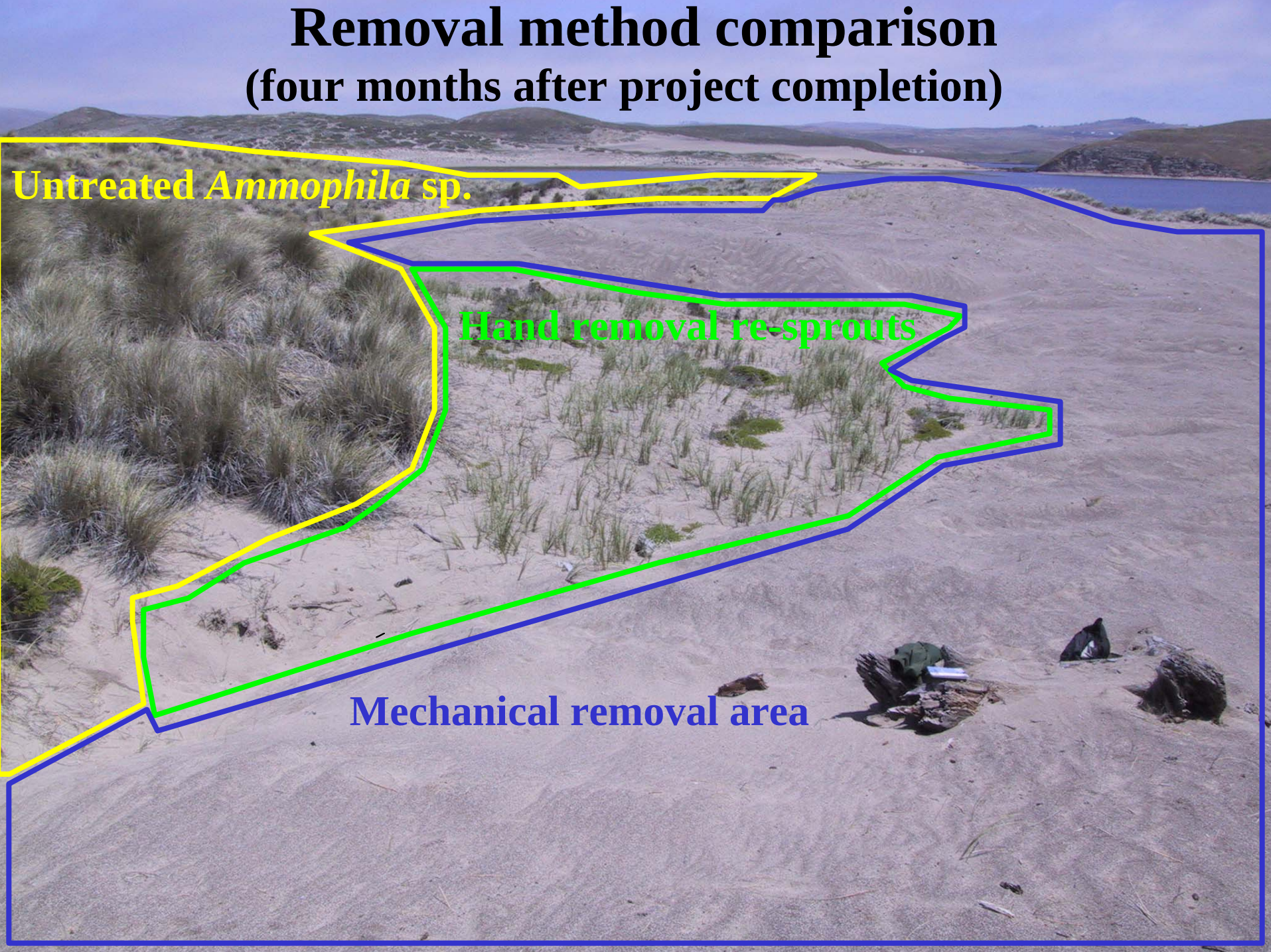
3. Filling the pit with the *Ammophila* sp. and “dirty” sand

4. Capping the pit with the “clean” sand and smoothing over

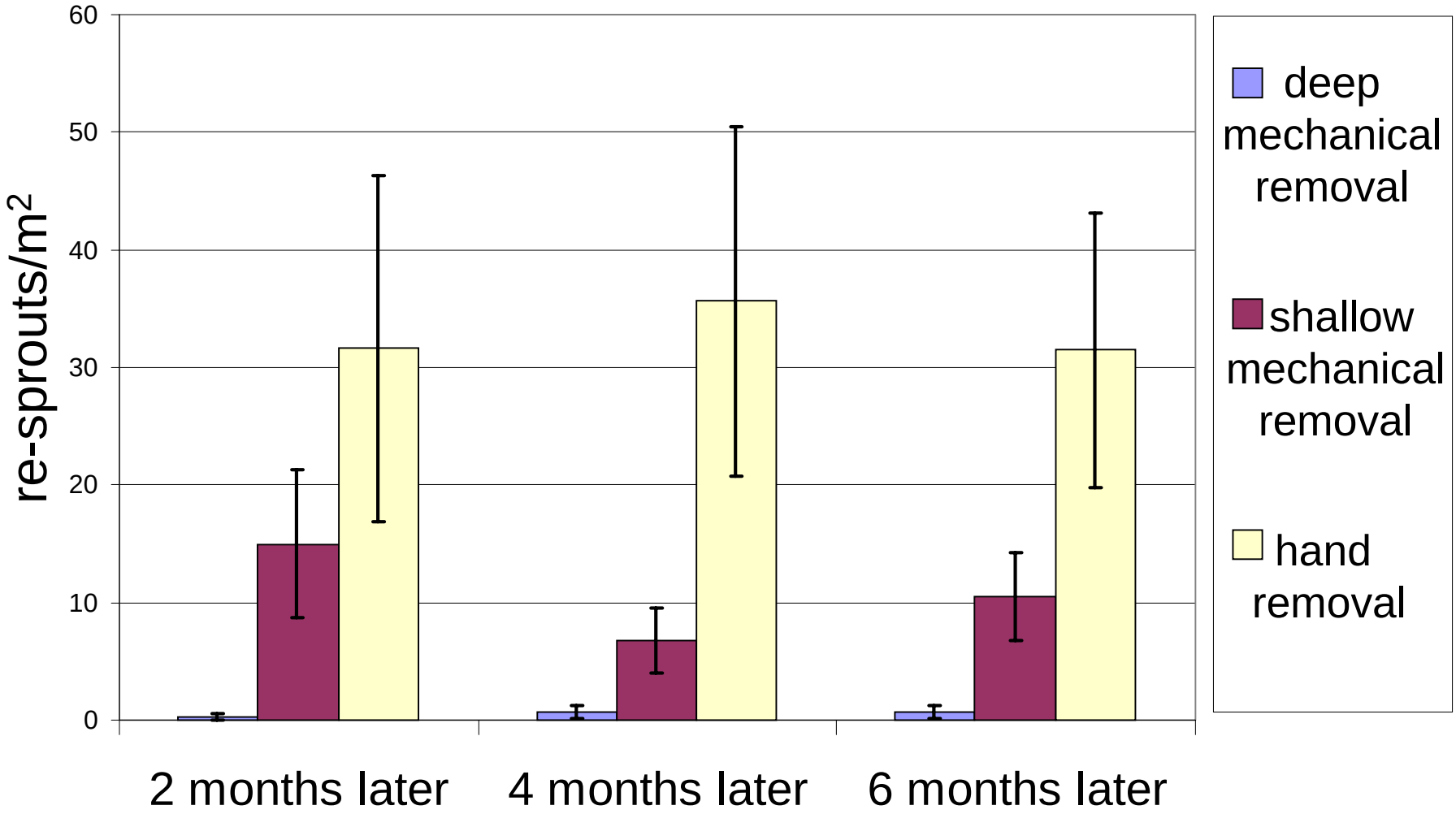

600 m2 native plant exclosure


Elevation transect
10
8
6
4
2
0
-2
-4
meters
native plant exclosure
beach-front
0
9
18
27
36
45
54
63
72
81
90
meters
before removal
1 month after removal
6 months after removal
difference change

Removal method comparison
(four months after project completion)



Mean *Ammophila* sp. re-sprouts/m^2



Western snowy plover

Two plants have grown insitu from the native seed bank within the mechanical removal area

Lupinus tidestromsii **(Tidestrom's lupine)**

Native plants found growing within the removal area

Abronia latifolia
Ambrosia chamissonis
Baccharis pilularis
Camissonia cheiranthifolia ssp. cheiranthifolia
Distichlis spicata
Lathyrus littoralis
Lupinus tidestromii
Plagiobothrys sp.
Rumex salicifolius

Cost comparison chart

Removal Method	Cost per acre
0.5m deep hand removal	$14,181
1.0m deep hand removal	$27,936
3m+ deep mechanical removal	$5,363

Lessons learned

- **Bury *Ammophila* sp. deeper on windward slopes**
- **Bury *Ammophila* sp. as deep as you can (at least 1.5m deep)**
- **Clear communication with the equipment operator**
- **Pre-check mechanical condition of equipment**
- **Remove re-sprouts as soon as possible**

Encouraging Results:

- Fewer re-sprouts
- Removal of steep foredune
- The ability to preserve native plant areas
- The ability for the snowy plover to quickly utilize the area
- The ability of rare and native plants to quickly re-colonize the area
- Lower cost (compared to hand removal)

Thank You To:

Jim Bromberg
Kim Cooper
Jimmy Hall
Jay Goldsmith
Levi McIsaac
Barbara Moritsch
Don Neubacher
Kate Peterlein
Andrea Pickart
Jane Rodgers

SS Cape Mohican Oil Spill Mitigation Fund