



NATURAL RESOURCES CONSULTANTS, INC.

4039 21ST AVENUE WEST, SUITE 404
SEATTLE, WASHINGTON 98199, U.S.A.
TELEPHONE: (206) 285-3480
TELEFAX: (206) 283-8263
E-Mail : jjune@nrccorp.com (corporate)

FINAL REPORT

KING COUNTY 2009 DERELICT FISHING GEAR MONITORING PROJECT

PREPARED FOR:

NORTHWEST STRAITS INITIATIVE
AND
KING COUNTY METRO

PREPARED BY:

NATURAL RESOURCES CONSULTANTS, INC.

December 11, 2009

INTRODUCTION

Purpose

The purpose of this project is to fulfill monitoring requirements contained in the United States Fish and Wildlife Service (USFWS) Biological Opinion (BO) dated December 19, 2004. The BO states that King County must monitor sites where derelict fishing gear was removed within eelgrass areas to determine if eelgrass and other habitat features have been restored. The King County Department of Natural Resources and Parks, Wastewater Treatment Division, initiated the Derelict Gear Removal Project to mitigate, in part, for permanent and temporal impacts to fish and shellfish habitats that would occur during installation of a new marine outfall in the vicinity of Point Wells for the Brightwater Treatment Plant.

Background

In March of 2008, King County provided a total of \$25,000 to the Northwest Straits Foundation (NWSF), a non-profit organization established to support the scientific, restoration, and education projects and programs in Puget Sound. The NWSF used the funding to contract with Natural Resources Consultants, Inc. (NRC), who used side-scan sonar to locate fishing gear and deployed divers for removal. NRC issued the final report on May 12th, 2008. Removal operations were coordinated with the WDFW, Snohomish County, King County, Tribal governments, NOAA, the U.S. Fish and Wildlife Service (USFWS) and the U.S. Coast Guard (USGC).

King County and NRC created a Work Plan for fishing gear removal based on the following criteria:

- 1) *Location* – preferably the site will be within close proximity to Point Wells where project impacts will occur.
- 2) *Water Depth* – water depths of – 30 MLLW and less will be the focus of the gear removal.
- 3) *Eelgrass Presence* – efforts will be focused on areas where eelgrass is suspected to grow (or is growing).
- 4) Preference will be given to removing fishing nets first and then geographically clustered crab pots.

The derelict fishing gear removal plan was prepared and submitted to WDFW on March 3, 2008 and approved on March 21, 2008.

The project focused on the removal of derelict gillnets located in central Puget Sound and the Duwamish Waterway and derelict crab pots in the vicinity of the Brightwater project construction activities near Point Wells. A total of 1.5 days on March 7 and April 12,

2008, were expended on sidescan sonar surveys of the King and Snohomish County shoreline from Meadow Point north to the Port of Everett at a depth of -30 ft. MLLW to shore. Approximately 6.24 km² (2.4 nm²) of area was surveyed and 122 potential derelict gear targets were identified. The observed derelict gear target density was 19.6 targets/ km². Eelgrass was found along 32.6 km of shore or 89% of the 36.76 km total distance covered during the sidescan sonar surveys. Gaps in eelgrass distribution detected during the survey were generally associated with manmade structures such as the docks at Point Wells, Edmonds and Mukilteo.

A total of 3.0 days of diving for derelict pot removal occurred on April 30, May 1 and May 2, 2008, in Port Gardner near Mukilteo and near Meadow Point. A total of 68 (56%) of the 122 derelict gear targets identified by the sidescan sonar survey were investigated by divers during the three days of removal activities. Fifty-four (46%) of the 122 derelict gear targets remain uninvestigated. A total of 77 derelict gear items were found during the three days of removal operations including 71 crab pots, one shrimp pot and five crab rings.

The final report was submitted to the USFWS on June 17, 2008.

Follow Up Monitoring

As mentioned above, the USFWS stipulated that King County must conduct follow up monitoring at sites where derelict fishing gear was removed in eelgrass areas to determine if eelgrass and other habitat features have been restored. The report must be submitted to the USFWS and the Corps of Engineers one year after the gear has been removed, or after one full growing season of eelgrass to determine how it has recovered.

Scope of Work

Natural Resource Consultants conducted follow up monitoring through funding from the NWSF using underwater video and photographs from dive surveys in areas where fishing gear was removed in eelgrass. Eleven of 71 derelict crabs removed in 2008 were located in or very near heavy eelgrass locations and had the potential to impede eelgrass growth. Four of the 11 derelict pots removed from eelgrass areas were located just north of Shilshole Bay and east of Meadow Point at approximately 47°42'N latitude and 122°22.5' W longitude in -6 ft to -13 ft MLLW and seven of the eleven derelict pots were located east of Elliott Point (Mukilteo Ferry Terminal) at approximately 47°57.5' N latitude and 122°17' W longitude in -8 to -28 ft MLLW. SCUBA divers returned to the exact geographic locations (recorded with WAAS and differential corrected GPS) of derelict crab pot removals. Still and video images of the derelict pot impacted areas and adjacent unaffected areas were recorded at each of the eleven pots removal locations.

METHODOLOGY

Still photographs and exact geographic locations were recorded (using WAAS and differential corrected GPS) for each of the derelict crab pots removed during the April 30 to May 2, 2008, derelict pot removal project. SCUBA divers returned to the exact geographic locations (+ or – 3 ft recorded with WAAS and differential corrected GPS) of the eleven derelict crab pots removed from eelgrass and recorded still and video images of the derelict pot impacted areas and adjacent unaffected (control) areas. The 1+ year post removal photos were compared with the control area photos and the photos recorded in 2008 at each pot location to assess relative eelgrass recovery. Divers reported whether the derelict pot affected locations were visually distinguished from the surrounding unaffected areas.

The report contains:

- A table outlining the number, location, and depth ranges where gear was removed in eelgrass areas and a description of eelgrass recovery in those locations.
- A map using color-coded symbols illustrating qualitative eelgrass recovery where gear was removed (e.g., high, medium, low).
- Side-by-side photographs of eelgrass areas before and after gear removal.
- General characterization of the habitat/substrate type in areas where gear was removed (e.g., rocky reef, sand/mud, gravel/cobble, etc.).
- Any problems encountered during monitoring (e.g., weather, currents, boat traffic, etc.).

RESULTS

One-year post monitoring operations were conducted over two days on October 3 and October 25, 2009. The eleven locations where crab pots were removed from eelgrass or from the immediate vicinity of eelgrass were monitored by divers. Diver reports and side-by-side pre- and post-pot removal photos are attached in Appendix 1.

Full recovery of eelgrass from derelict pot impacts occurred at three of the eleven (27%) pot removal locations, one location near Shilshole and two locations in Port Gardner (Table 1 and Figure 1). There was partial recovery of eelgrass at two of the eleven (18%) pot removal locations in Port Gardner. Six of the eleven (55%) of the pot removal locations, three near Shilshole and three in Port Gardner, showed no recovery of eelgrass one-year after pot removal (Table 1 and Figure 1). Divers reported derelict pot footprint marks were not evident at any of the eleven derelict pot removal locations.

Divers reported that eelgrass has receded from the derelict pot removal locations in three locations near Shilshole (pots 5000, 5001 and 5187) and two locations in Port Gardner (pots 5013 and 5016) (Table 1 and Appendix 1). The bottom substrate appeared to be generally disturbed throughout these areas and remaining eelgrass was broken, uncovered or generally in poor condition.

DISCUSSION

Post-gear removal at five of the eleven sites had low or no eelgrass recovery. Divers could not determine whether the eelgrass receded in these areas due to natural or human-caused events. However, on the October 25, 2009, monitoring trip, salmon gillnetters were active in the Shilshole area immediately outside the three pot removal locations (pots 5000, 5001, and 5187) where receding eelgrass was noted. In addition, eelgrass recovery may have been lower at some sites due to macroalgae displacement of eelgrass after disturbance or pot removal. For example, at Pot 5000, there appears to be a dense growth of macroalgae at the location where the pot was removed. Finally, eelgrass was sparse in the vicinity of some crab pots prior to gear removal (Pot 5001, 5013, 5015, 5016, 5026, 5187). Low light availability due to depth may be a factor in the slow recovery observed at these sites and may be a limiting factor for future growth.

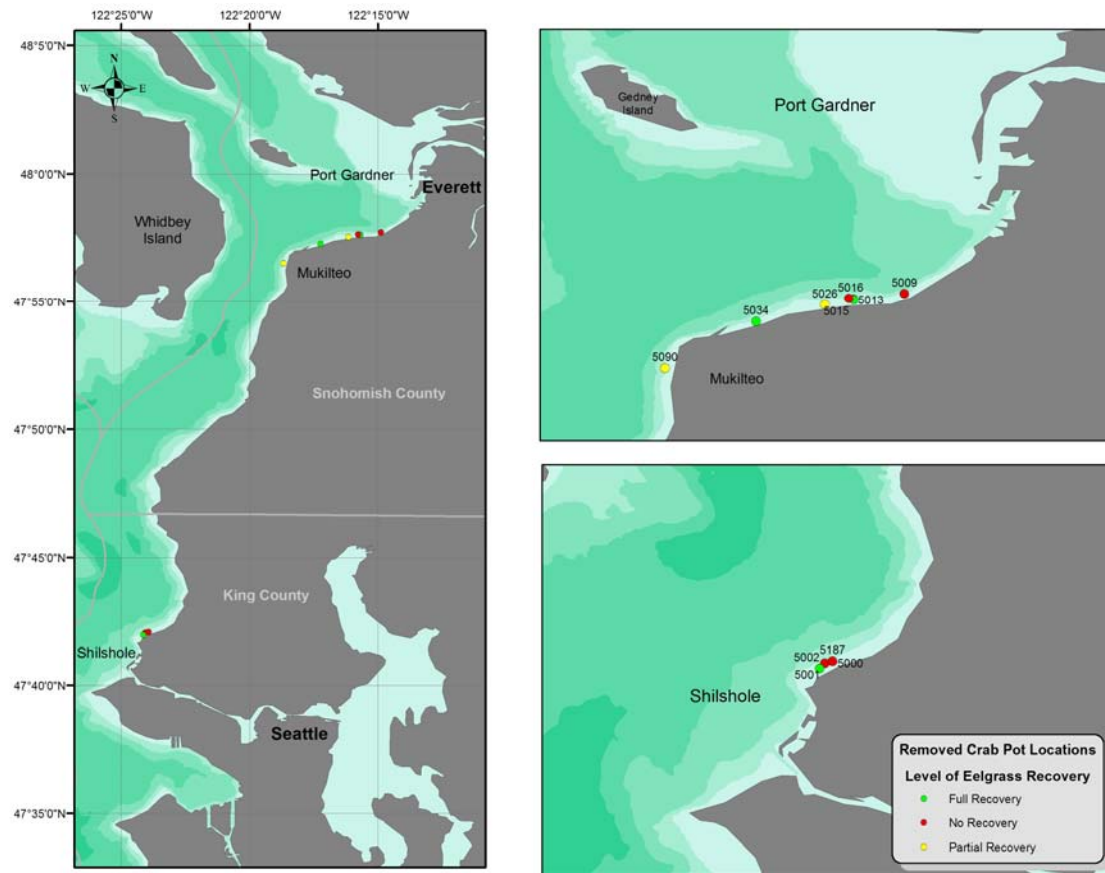
In February of 2009, the Northwest Straits Initiative sponsored a study of eelgrass recovery six months and approximately one year after derelict crab pot removal. Results showed 30% recovery of eelgrass in the derelict pot footprint after six months but no further recovery after one year.

(http://derelictgear.org/uploads/Images/Derelict_Gear/DG%20Reports/MarineHabitatRecoveryMonitoring021109.pdf)

Table 1. Pot identification, general location, latitude, longitude, mean low low water depth, habitat type, pre- and one –year post-removal eelgrass condition and relative eelgrass recovery for eleven derelict crab pots removed in Puget Sound.

Crab Pot ID	General Location	Latitude	Longitude	MLLW Depth (ft)	Habitat Type	Pre-Removal Eelgrass Condition	Post-Removal Eelgrass Condition	Eelgrass Recovery Index
5000	Shilshole	47°42.07' N	122°23.94'W	26 ft	Sand	Sparse Eelgrass	Sparse eelgrass within 12 ft shoreward, bottom covered with macroalgae at pot location	No Recovery
5001	Shilshole	47°42.04' N	122°24.06'W	30 ft	Sand	Sparse Eelgrass	Sparse eelgrass within 20 ft shoreward	No Recovery
5002	Shilshole	47°41.96' N	122°24.14'W	19 ft	Sand	Medium to High Density Eelgrass	Medium to High Density Eelgrass	Full Recovery
5009	Port Gardner	47°57.70' N	122°14.88'W	42 ft	Sand	High Density Eelgrass 8 -10 ft Shoreward	High Density Eelgrass 8 -10 ft Shoreward	No Recovery
5013	Port Gardner	47°57.61' N	122°15.69'W	28 ft	Mud/Sand	Sparse Eelgrass	Sparse eelgrass within 12 ft shoreward	No Recovery
5015	Port Gardner	47°57.61' N	122°15.69'W	21 ft	Mud/Sand	Sparse Eelgrass	Sparse Eelgrass	Full Recovery
5016	Port Gardner	47°57.62' N	122°15.76'W	26 ft	Mud/Sand	Sparse Eelgrass	Sparse eelgrass edge 6 ft shoreward	No Recovery
5026	Port Gardner	47°57.52' N	122°16.14'W	13 ft	Mud/Sand	Sparse Eelgrass	Sparse eelgrass, thick eelgrass 6 ft shoreward	Partial Recovery
5034	Port Gardner	47°57.25' N	122°17.23'W	20 ft	Mud/Sand	Sparse Eelgrass	Medium density eelgrass	Full Recovery
5090	Port Gardner	47°56.52' N	122°18.67'W	18 ft	Mud/Sand	Sparse Eelgrass	Medium density eelgrass in area, no eelgrass at pot location but bottom with parital macroalgae	Partial Recovery
5187	Shilshole	47°42.07' N	122°23.94'W	26 ft	Sand	Sparse Eelgrass	No eelgrass at pot location but some macroalgae, sparse eelgrass 20 ft shoreward	No Recovery

Figure 1. The location and relative recovery of eelgrass of eleven derelict crab pots removed from Puget Sound.



APPENDIX 1

Diver Reports and Pre-Removal and One-Year Post-Removal Photos

Pot 5000

Surveyed 4/12/2008, Removed 5/2/2008, Monitored October 3, 2009

Shilshole Bay

47 42.07 N
122 23.94 W

MLLW Depth: -26 ft of water

Habitat Type: Sand

Commercial pot:

Pot was still fishing, no rot cord was used.

Contained 4 Dungeness Crab (4 live 1 dead all male) and 2 dead red rock crab sex unknown.

Eelgrass Condition:

Pre-Removal

Sparse eelgrass in the area within 3 ft of pot location.

One Year Post-Removal

Eelgrass edge was 12 ft inshore of pot location. Pot location covered with macroalgae on sand. Eelgrass edge has apparently receded toward shore 9 ft from pot location.

Pot 5000
Pre-Removal



One Year Post-Removal



Pot 5001

Surveyed 4/12/2008, Removed 5/2/2008, Monitored 10/25/2009

Shilshole Bay

47 42.04 N
122 24.06 W

MLLW Depth: -30 ft of water

Habitat Type: Sand

Sport pot

Pot was still actively fishing, rot cord had been used and was degraded but pot lid was jammed shut. Pot contained no crabs.

Eelgrass Condition:

Pre-Removal

Sparse eelgrass near crab pot location.

One Year Post-Removal

No eelgrass with 20 ft of pot location. Sparse eelgrass apparently receded from pot location.

Pot 5001
Pre-Removal



One Year Post-Removal



Pot 5002

Surveyed 4/12/2008, Removed 5/2/2008, Monitored 10/25/2009

Shilshole Bay

47 41.96 N
122 24.14 W

MLLW Depth: -19 ft of water

Habitat Type: Sand

Commercial pot

Pot was not actively fishing, rot cord had been used and was degraded.
Pot contained one northern kelp crab.

Eelgrass Condition:

Pre-Removal

Medium-high density eelgrass at crab pot location.

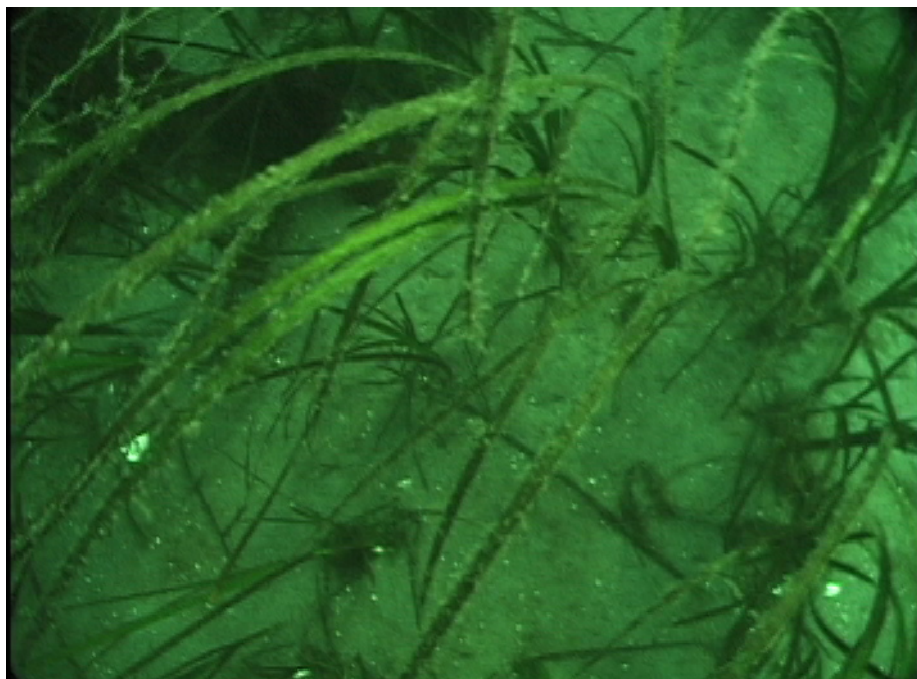
One Year Post-Removal

Medium-high density eelgrass at crab pot location, full recovery.

Pot 5002
Pre-Removal



One Year Post-Removal



Pot 5009

Surveyed 4/12/2008, Removed 5/1/2008, Monitored 10/3/2009

Port Gardner Near Mukilteo

47 57.70 N
122 14.88 W

MLLW Depth: -42 ft of water

Habitat Type: Sand

Commercial pot

Pot was still fishing, rot cord was used and had degraded by pot lid was jammed shut.
Contained 1 live female red rock crab.

Eelgrass Condition:

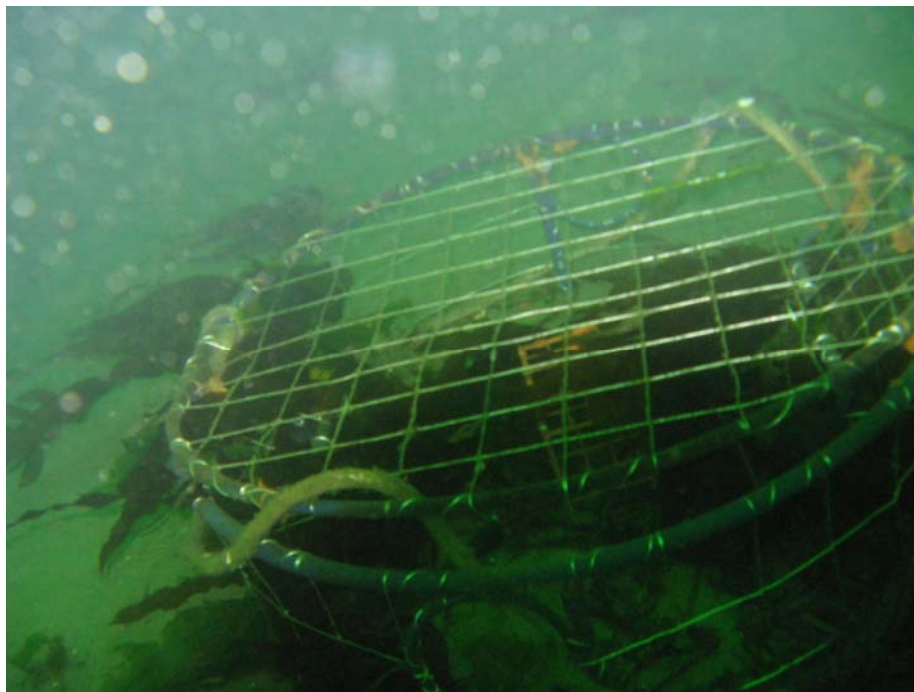
Pre-Removal

Thick eelgrass in the area within 8 ft of pot location on top of slope edge in 31 ft of water.

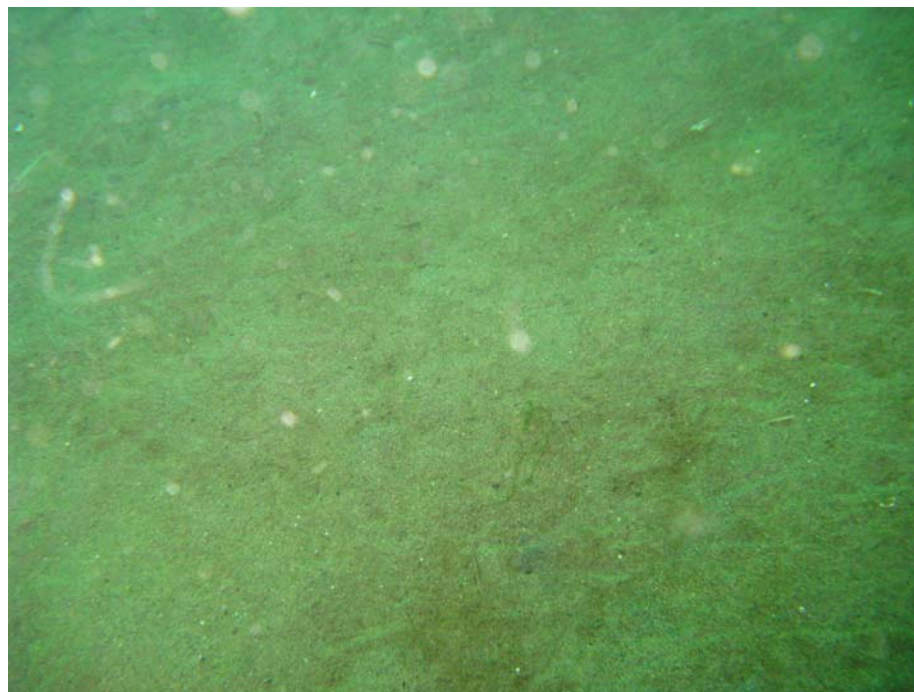
One Year Post-Removal

No eelgrass growth observed at former pot location; eelgrass edge in same location and density.

Pot 5009
Pre-Removal



One Year Post-Removal



Pot 5013

Surveyed 4/12/2008, Removed 4/30/2008, Monitored 10/3/2009

Port Gardner Near Mukilteo

47 57.61 N
122 15.69 W

MLLW Depth: -28 ft of water

Habitat Type: Mud, sand

Sport pot

Pot was still fishing, rot cord was used and had degraded by pot lid was jammed shut. Contained three Dungeness crab 2 dead and one live all males.

Eelgrass Condition:

Pre-Removal

Sparse eelgrass in the area

One Year Post-Removal

Very little eelgrass in the vicinity of the pot location, sparse eelgrass edge within 12 ft at -22 ft MLLW of water depth along entire area. Remnant eelgrass plants in area. Eelgrass apparently receded about 12 ft from pot location.

Pot 5013
Pre-Removal



One Year Post-Removal



Pot 5015

Surveyed 4/12/2008, Removed 4/30/2008, Monitored 10/3/2009

Port Gardner Near Mukilteo

47 57.60 N
122 15.68 W

MLLW Depth: -21 ft of water

Habitat Type: Mud, sand

Sport pot

Pot was not actively fishing, rot cord had been used and was degraded, although pot contained crab that could have escaped. Contained three Dungeness crab 2 dead and one live all males and a Sunflower star that was eating one of the dead Dungeness crabs

Eelgrass Condition:

Pre-Removal

Sparse eelgrass in the area

One Year Post-Removal

Sparse eelgrass remained in the area, pot location was not obvious, probably 100% eelgrass recovery.

Pot 5015
Pre-Removal



One Year Post-Removal



Pot 5016

Surveyed 4/12/2008, Removed 4/30/2008, Monitored 10/3/2009

Port Gardner Near Mukilteo

47 57.62 N
122 15.76 W

MLLW Depth: -26 ft of water

Habitat Type: Mud, sand

Sport pot

Pot was not actively fishing, rot cord had been used and was degraded. Pot contained one live male Dungeness crab that could escape through open panel.

Eelgrass Condition:

Pre-Removal

Sparse eelgrass in the general area around the pot, eelgrass edge within 6 ft inshore.

One Year Post-Post Removal

No eelgrass in the vicinity of the pot location, sparse eelgrass edge within 6 ft at -26 ft MLLW depth along entire area.

Pot 5016
Pre-Removal



One Year Post-Removal



Pot 5026

Surveyed 4/12/2008, Removed 4/30/2008, Monitored 10/3/2009

Port Gardner Near Mukilteo

47 57.52 N
122 16.14 W

MLLW Depth: -13 ft of water

Habitat Type: Mud, sand

Sport pot

Pot was not actively fishing, rot cord had been used and was degraded.
Pot contained no crabs

Eelgrass Condition:

Pre-Removal

Sparse eelgrass in the general area around the pot, eelgrass edge within 6 ft inshore.

One Year Post-Removal

Some eelgrass in the vicinity of the pot location, thicker eelgrass edge within 6 ft of pot location at -11 ft MLLW depth along entire area. Eelgrass edge appears to have extended out 3 ft further from shore than when pot was removed. Some signs of eelgrass recovery at pot location.

Pot 5026
Pre-Removal



One Year Post-Removal



Pot 5034

Surveyed 4/12/2008, Removed 4/30/2008, Monitored 10/3/2009

Port Gardner Near Mukilteo

47 57.25 N
122 17.23 W

MLLW Depth: -20 ft of water

Habitat Type: Mud, sand

Sport pot

Pot was still actively fishing, rot cord had been used and was degraded but lid was held shut by metridium anemone. Pot contained one dead male Dungeness crab.

Eelgrass Condition:

Pre-Removal

Medium density eelgrass throughout the area.

One Year Post-Removal

Medium density eelgrass throughout the area, crab pot footprint fully recovered.

Pot 5034
Pre-Removal



One Year Post-Removal



Pot 5090

Surveyed 4/12/2008, Removed 5/1/2008, Monitored 10/3/2009

Port Gardner Near Mukilteo

47 56.52 N
122 18.67 W

MLLW Depth: -18 ft of water

Habitat Type: Mud, sand

Sport pot

Pot was not actively fishing, rot cord had been used and was degraded. Pot contained no crabs.

Eelgrass Condition:

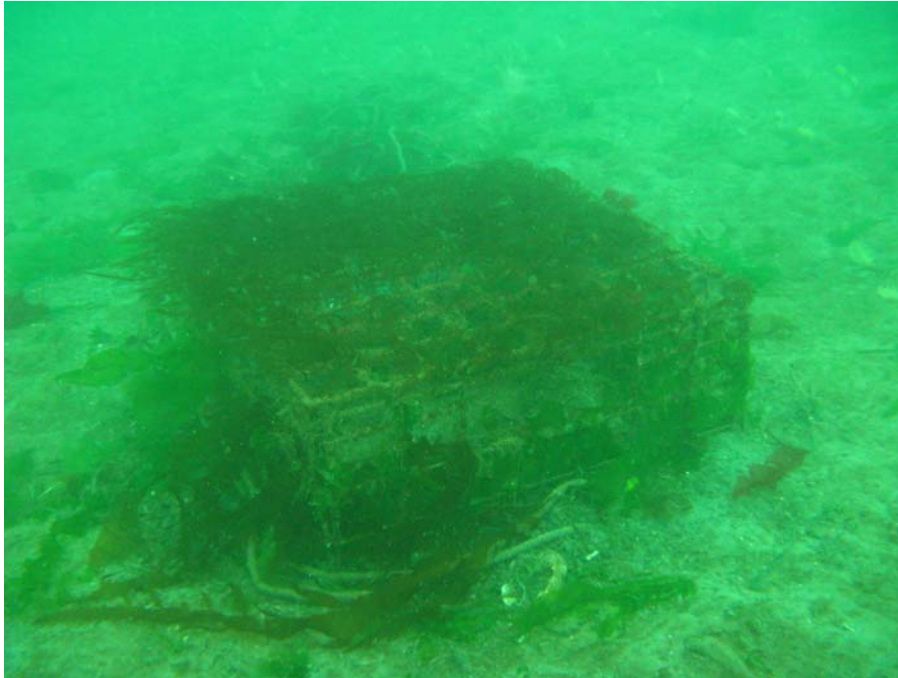
Pre-Removal

Medium density eelgrass within 20 ft of crab pot location.

One Year Post-Removal

Medium density eelgrass within 10 ft of crab pot location. No eelgrass at pot location. Eelgrass edge appears to have extended out 10 ft further from shore than when pot was removed. Some macroalgae at pot location.

Pot 5090
Pre-Removal



One Year Post-Removal



Pot 5187

Surveyed 5/2/2008, Removed 5/2/2008, Monitored 10/3/2009

Shilshole Bay

47 42.07 N
122 23.94 W

MLLW Depth: -26 ft of water

Habitat Type: Sand

Sport pot

Pot was not actively fishing, rot cord had been used and was degraded. Pot contained no crabs.

Eelgrass Condition:

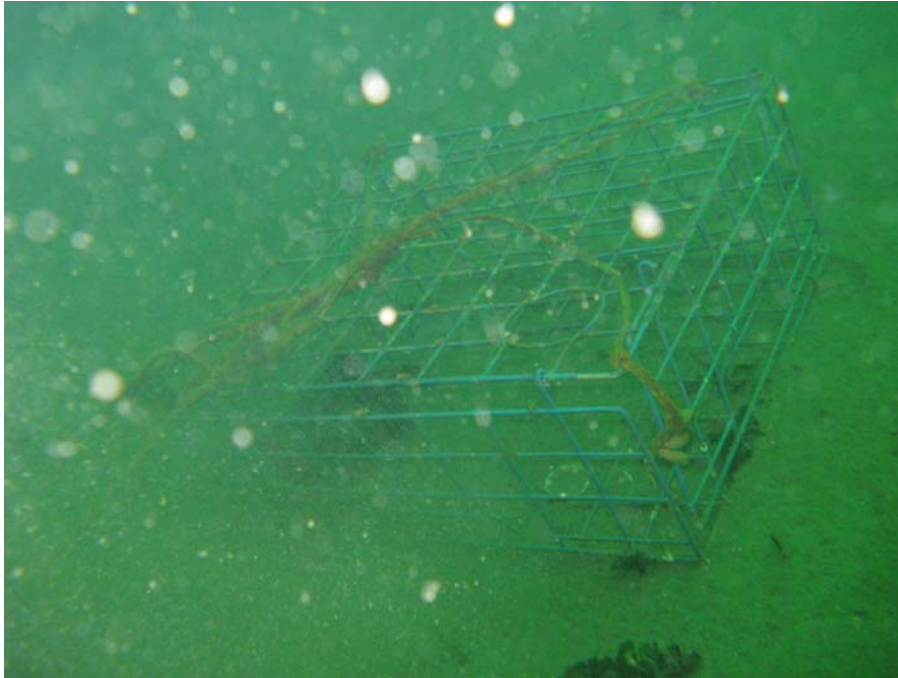
Pre-Removal

Sparse eelgrass at crab pot location.

One Year Post-Removal

No eelgrass with 20 ft of pot location. Sparse eelgrass apparently receded 20 ft toward shore from pot location. Some macroalgae at pot location.

Pot 5187
Pre-Removal



One Year Post Removal

