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FINAL REPORT

DERELICT FISHING GEAR REMOVAL PROJECT PORT GARDNER

PREPARED FOR:

NORTHWEST STRAITS FOUNDATION
AND
SNOHOMISH COUNTY MARINE RESOURCES COMMITTEE

PREPARED BY:

NATURAL RESOURCES CONSULTANTS, INC.

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Introduction

Abandoned, lost and discarded fishing gear can present safety, liability, nuisance and environmental impact issues in marine waters. Identification, location and safe removal of derelict fishing gear can reduce these impacts. The Northwest Straits Commission (NWSC) recently teamed with the National Oceanic and Atmospheric Administration (NOAA) to address the issue of derelict fishing gear in north Puget Sound and the Strait of Juan de Fuca. The result of this project is a comprehensive program to safely remove derelict fishing gear from the marine environment in an environmentally acceptable manner. The Washington Department of Fish and Wildlife (WDFW) has recently published guidelines for derelict fishing gear removal in Washington marine waters based on the NOAA/NWSC project.

The Northwest Straits Foundation and the Snohomish County Marine Resources Committee (MRC) sought to locate and remove derelict fishing gear in Port Gardner off of Everett, Washington. The NWSF contracted with Natural Resources Consultants, Inc., (NRC) to manage the derelict fishing gear project. NRC subcontracted with Doug Monk for diver gear recovery services. The derelict fishing gear removal project followed the guidelines established by the WDFW and the NWSC and was conducted in collaboration with the WDFW, the Snohomish County MRC and the Tulalip Tribe.

Scope of Work

This project focused on the identification and removal of derelict crab pots in Port Gardner from Mission Beach east of Tulalip Bay in the north, south along the east shoreline of Gedney Island and the mud flats west of Jetty Island and along the southern shoreline of Port Gardner from the Port of Everett to the Washington State ferry terminal in Mukilteo (Figure 1).

A sidescan sonar survey of the commercial and recreational (sport) crab pot fishing grounds had been conducted between 3 m (10 ft) and 36.5 m (120 ft) depth (the depth attainable by removal divers is limited to 100 ft) over five days in July and August 2004. Possible derelict fishing gear targets were identified and plotted on an electronic charting system.

A derelict fishing gear removal plan was prepared and submitted to the WDFW on September 2, 2005. WDFW approved the plan and provided an approval letter for the Port Gardner project dated September 7, 2005.

Divers using surface supplied air conducted derelict gear removal operations for four days from October 25-28, 2005. Gear retrieved during the course of this project was treated in line with the Washington State Abandoned Property Rights Law and other salvage laws when applicable. The owners of the derelict fishing gear recovered, if identified, were contacted and provided an opportunity to recover their property. Derelict fishing gear that could not be identified to an owner was disposed of in the Port Angeles City landfill.

This report summarizes the results and conclusions from the derelict fishing gear survey and removal project in Port Gardner and provides recommendations for future actions.

Methodology

Doug Monk diving conducted the diver recovery of the derelict crab pots encountered. Two divers equipped with surface supplied air and two-way communication systems operated off a 40-foot dive support and gear recovery vessel. An onboard scientist recorded gear and impact information. The list of the precise locations of derelict crab pots detected during the sonar survey was used by the scientist and dive team to locate the derelict pots using a Wide Area Augmented Geographic Positioning System (WASSGPS) and electronic chart software (Nobeltec®). Derelict gear target locations derived from the sidescan sonar survey were transferred into the Nobeltec charting software and plotted over a navigation chart of Port Gardner.

Highest priority was given to locations with multiple derelict gear targets to maximize the number of derelict gear units recovered during each dive operation. Using the WASSGPS system, the dive support vessel was directed to the exact location of the potential derelict gear target identified by the sidescan sonar survey. As the vessel arrived at the target location a clump weight with a line and float were deployed as near as possible to the derelict gear location. The dive support vessel was then anchored in the vicinity of the clump weight and a single diver deployed. The other diver stood by on deck as safety backup. A 30 m (100 ft) length of rope was passed through a loop on the rope near the clump weight and the other end was held by the diver. When poor water visibility conditions were encountered, the diver would drag the 30 m rope around the clump weight in a circle until it tangled with the derelict fishing gear and then the diver worked back along the rope to the gear.

Prior to recovery of the derelict fishing gear a variety of information about the derelict gear was reported to the scientist on board the support vessel by

the diver. Information collected included whether the derelict gear was commercial or sport, whether it was fishing or disabled, whether it was equipped with rot cord (pots), whether the gear was actively fishing or not, the number of live and dead Dungeness crab, other crab and fish entrapped. Also reported was information about the overall condition of the gear and the depth and type of seabed where the gear was located. Gear to be recovered was freed by hand by the diver, a recovery line from the vessel was attached and it was hauled aboard the recovery vessel by the aid of a hydraulic winch. Pots buried more than 1/3 of their height in the seabed were disabled and left in place. The onboard scientist further inspected the gear at the surface and looked for owner identification information.

The derelict fishing gear was stored in the fish hold of the recovery vessel until offloaded at a secure location, returned or disposed of in a landfill.

Results

The July/August 2004 sidescan sonar survey located 842 possible derelict gear targets in the Port Gardner study area. A previous removal operation conducted in September 2004 investigated and eliminated 156 targets or 19% of the total number of targets identified. This removal operation conducted in October 2005, investigated an additional 172 derelict gear targets or 20% of the original 842 targets found and 25% of the 686 targets that remained uninvestigated after the 2004 removal operation. A total of 514 potential derelict gear targets remain uninvestigated in Port Gardner.

In addition to the 172 derelict gear targets investigated, divers encountered 21 derelict gear items that had not been surveyed and were presumably lost subsequent to the July/August 2004 side scan sonar survey. Of the 172 targets investigated and the 19 addition gear items encountered, 142 were crab pots, 16 were crab rings, 1 target was a shrimp pot, 2 targets were debris, 5 targets were duplicate sightings of other pots and for 27 targets nothing was found by the divers. Of the 142 crab pots found, 138 were removed and 4 were disabled and left in place. Of the 16 crab rings found, 15 were removed and one was lost during recovery and remains on the seabed. The one shrimp pot found was removed.

Of the 143 pots encountered (142 crab and 1 shrimp pot), 86 (60%) were sport pots and 57 (40%) were commercial pots. A total of 23 (16%) of the derelict pots were considered to be actively fishing and 120 pots (86%) were considered to be disabled and no longer actively fishing.

Of the 57 commercial crab pots recovered, 9 (16%) were still actively fishing and 48 (84%) were no longer fishing. Nine (16%) of the derelict commercial crab pots recovered were not equipped with rot cord or were equipped with rot cord made of a synthetic material (nylon), 26 (46%) commercial pots were equipped with rot cord and for 22 (39%) commercial pots it could not be determined if rot cord had been used or not. Of the 9 commercial crab pots still actively fishing, 7 (78%) did not have rot cord or had rot cord made of a synthetic material and 2 (22%) did have rot cord that had yet to disintegrate (Table 1). All of the nine commercial pots still actively fishing, including the 2 pots with intact legal rot cord, had been detected by sidescan sonar during the July/August 2004 survey and, therefore, had been fishing at least 448 days when recovered.

Of the 86 sport pots recovered (85 crab pots and 1 shrimp pot), 14 (16%) were still actively fishing and 72 (84%) were not actively fishing. Nine (10%) of the 86 sport pots did not have rot cord, 51 (59%) did have rot cord and for 26 (30%) pots it was impossible to determine if rot cord had or had not been used (Table 1). Of the 14 sport pots still actively fishing, seven (50%) had rot cord and seven (50%) did not have rot cord. Of the 7 sport pots with rot cord, the legal rot cord had yet to disintegrate on 6 of the pots and on 1 pot the rot cord had disintegrated but sea anemones were covering the escape ring. Ten (71%) of 14 actively fishing sport pots had been detected by sidescan sonar during the July/August 2004 survey and, therefore, had been fishing at least 446 days when recovered. Of the 7 sport pots with intact legal rot cord, 5 pots had been fishing at least 446 days.

A total of 124 live and dead crabs of all species were recovered from the 143 derelict pots recovered. A total of 106 Dungeness crab (*Cancer magister*) were recorded from 27 (19%) of the 143 sport and commercial crab pots recovered including 72 (68%) live and 34 (32%) dead Dungeness crab (Table 1). The overall catch rate of Dungeness crab was about 0.74 crab per pot all pots encountered. The 57 commercial pots recovered contained 83 (53%) Dungeness crab for a catch rate of about 1.46 crab per pot. The 86 sport crab pots recovered contained 23 Dungeness crab for a catch rate of about 0.27 crab per pot. The 23 actively fishing sport and commercial pots contained 74 (70%) of the 106 Dungeness crab recovered and inactive pots contained 32 (30%) of the total Dungeness crab recovered including 18 dead Dungeness crab. The 9 actively fishing commercial pots recovered had the highest catch of Dungeness crab at 60 crab or 6.67 crab per pot (13 dead and 47 live Dungeness crab). The 14 actively fishing sport crab pots recovered contained 14 Dungeness crab or 1.0 crab per pot (3 dead and 11 live Dungeness crab).

Of the total of 106 Dungeness crab recovered, 82 were male (77%), 1 was a female (<1%) and for 23 (22%) dead crab the sex could not be determined.

A total of 16 red rock crab (*Cancer productus*) were found in the 143 derelict sport and commercial crab pots recovered including 9 dead and 7 live crab. Commercial pots contained 4 live and 6 dead red rock crab and the sport pots contained 3 live and 3 dead red rock crab. The overall catch rate for red rock crab was 0.11 crab per sport and commercial pot recovered, 0.07 crab per sport pot and 0.18 per commercial pot. Actively fishing sport and commercial pots contained 8 (50%) red rock crab and inactive pots contained 8 (50%) red rock crab. Two live graceful crab (*Cancer gracilis*) were recovered from one sport pot.

Of the 159 derelict gear items found during the project, 5 were disabled and left in place on the seabed, 1 was lost during recovery and 153 derelict gear items were removed. Ten of the commercial crab pots were identified as Tulalip Tribal pots and returned to Tulalip Tribal fisheries enforcement officers. The owners of five non-tribal commercial pots were identified, three were able to be contacted and were provided an opportunity to recover their gear but only one recovered one crab pot. The others declined the opportunity to recover their pots and released the gear to the custody of the project personnel for disposal.

Conclusions

The 159 derelict gear items disabled or removed represent 18% of the 842 derelict crab pots found during the previous sidescan sonar surveys in the area. To date the two derelict gear removal operations (2004 and 2005) have investigated a total of 328 derelict gear targets or 39 percent of the 842 targets originally surveyed in 2004. There are 514 (61%) potential derelict gear targets remaining to be investigated in the study area. Over the course of both the 2004 and 2005 removal projects, of the 328 potential derelict gear targets investigated, 40 (12%) have not been found, 15 (5%) were debris, 5 (2%) targets were discovered to be duplicate targets of the same gear item encountered when survey transects overlapped and 268 (82%) were found to be actual derelict fishing gear. These results would suggest that of the 514 derelict gear targets remaining to be investigated that possibly 420 are likely to be actual derelict fishing gear. Derelict gear items not identified during the 2004 sidescan sonar surveys were encountered during both removal operations, 38 items in 2004 and 21 items in 2005. These derelict gear items were probably lost subsequent to the sidescan sonar survey or could have been missed in the survey transects.

Of the total of 301 derelict pots removed or disabled during the two removal operations, 158 pots in 2004 and 143 pots in 2005, a total of 79 pots or 26% were still actively fishing. The percentage of actively fishing pots was higher in 2004, 35% (56 actively fishing pots out of 158 pots found), than in 2005, 16% (23 actively fishing pots out of 143 pots found) suggesting fishing activity diminishes over time with rot cord disintegration and pot corrosion. The overall catch rate of Dungeness crab in all pots recovered in the 2004 project, conducted approximately one and one-half months after the sidescan sonar survey, was 1.5 crab per pot, twice the overall catch rate of 0.74 crab per pot found in the 2005 removal operation conducted nearly 15 months after the pots were detected with sidescan sonar.

A critical factor affecting the impact of derelict crab pots on the crab resource is the length of time the derelict pots remain actively fishing. WDFW regulations require that crab and shrimp pots be constructed such that when equipped with 200 thread count (1/8 inch diameter) cotton rot cord, the pot will become disabled in a reasonable period of time after being lost. The results of this study indicate that adherence to this regulation is not universal. Of the total of 143 crab pots recovered in the 2005 removal operation, 16 (11%) pots were not equipped with any type of rot cord and 2 additional pots were equipped with synthetic (nylon) rot cord. Six of the 16 pots recovered without rot cord were of a construction type that doesn't allow the use of rot cord without modification of the sport pot, which had not been done.

Twelve crab pots recovered during the 2005 removal operation were equipped with legal rot cord that had yet to disintegrate. Ten of these twelve pots had been detected during the July/August 2004 sidescan sonar survey conducted nearly 15 months prior to the removal operations. Seven of the ten pots with intact legal rot cord known to have been derelict for nearly 15 months were still actively fishing and contained 37 Dungeness crab or 35% of the total number of Dungeness crab recovered in all pots found during the 2005 removal operation.

Eighteen dead Dungeness crab were found in 48 crab pots considered to be no longer fishing. It appears these crabs were unable to find the escape panel in the top of the sport crab pots or were unable to open the lid on the commercial crab pots.

It is difficult to make projections about the total annual mortality resulting from either the recovered and/or projected remaining derelict fishing gear

encountered during the survey. Assumptions about entrapped animal survival time, pot deterioration, pot self-baiting rates and seasonal animal densities in the area would be necessary to estimate the total annual impact of the derelict fishing gear on the mortality of the species they entrap. Developing estimates for each of these assumptions is beyond the scope of this study but should be addressed in future research. However, the results of the project indicate that some level of continuous mortality is occurring for Dungeness and other crab due to derelict crab pots in Port Gardner.

It is clear that the impacts of derelict pots could be reduced by fishers complying with the regulations for the use of rot cord in all pots.

Recommendations

Based on the observations and the results of the Port Gardner derelict fishing gear project, the following are recommendations to further reduce the impact of derelict fishing gear on the marine environment.

- **The derelict crab pots located during the 2004 sidescan sonar survey remaining on the fishing grounds should be removed.**

The concentration of derelict pots encountered and the number of crab and other organisms found in the gear is sufficiently high to warrant removal of the remaining derelict crab pots. Although comparison of the crab catch rates between the 2004 and 2005 removal operations showed a decrease of about half in the average number of Dungeness crab caught per pot, the 0.74 crab per pot rate measured in 2005 is sufficiently high to warrant further removal of all crab pots detected during the 2004 sidescan sonar survey. Additionally, removal or investigation of all known derelict gear targets would allow for subsequent surveys and calculation of pot loss rates in the study area.

- **Further sidescan sonar surveys should be conducted in areas not covered during the project.**

Sidescan sonar effort was concentrated within areas and at depths that the salvage divers were capable of working (<105 ft). There was insufficient time and budget for the project to survey deeper water areas where commercial crab and shrimp pot fishing occurs. It would be useful to survey these deeper areas and determine the density of derelict fishing gear. There may be other means available to recover deepwater derelict pots and traps such as by a remote operated vehicle. The area from the Washington State ferry terminal

at Mukilteo 1 km east to the dilapidated pier should be re-surveyed for derelict gear. Both the deeper water and Mukilteo survey operations are scheduled for after the close of the 2005 commercial crab season.

- **Fishing gear regulations should be enforced in commercial and recreational crab fisheries.**

A total of 18 or 13% of the 143 derelict crab pots recovered were not equipped with legal rot cord. The use of rot cord is essential to minimize the impact of derelict crab and shrimp pots. Six sport pots recovered were constructed of black plastic coated wire material with sides that snapped into wire tabs on the base and lid. These six pots had the proper sized escape rings but no accommodation for disabling the pots by the disintegration of rot cord. Other similar sports pots were recovered that had been modified by cutting the wire around one of the escape rings and tying the ring back in with rot cord. The manufactures and sellers of these pots may not be adequately informing purchasers of these type of pots of this required modification to comply with regulations. The one derelict shrimp pot recovered was not equipped with rot cord and contained a red rock crab.

- **Conduct a study to determine catch rates and survival time for entrapped crabs in derelict pots as well as time for rot cord disintegration and pot disabling.**

There are a number of factors that determine the impact of derelict crab pots on crab populations. Very little research has been conducted to quantify these factors. A study should be conducted to provide information that can be used to estimate overall mortality from derelict crab pots.

Table 1. Number of derelict pots recovered, type of pot (commercial or sport), fishing status (actively fishing or not), rot cord use and numbers of live and dead organisms observed during the Port Gardner Derelict Fishing Gear Project, 2005. Source: NRC.

Fishing/Not Fishing	Actively Fishing			Not Fishing				All Pots*			
	Rot Cord	No Rot Cord	Total	Rot Cord	No Rot Cord	Unknown	Total	Rot Cord	No Rot Cord	Unknown	Total
Commercial											
# Pots Recovered	2	7	9	24	2	22	48	26	9	22	57
# Dungeness Crab Dead	4	9	13	10	0	1	11	14	9	1	24
# Dungeness Crab Alive	28	19	47	12	0	0	12	40	19	0	59
# Red Rock Crab Dead	0	5	5	0	0	1	1	0	5	1	6
# Red Rock Crab Alive	0	1	1	2	0	1	3	2	1	1	4
# Total Crab Dead	4	14	18	10	0	2	12	14	14	2	30
# Total Crab Alive	28	20	48	14	0	1	15	42	20	1	63
Sport											
# Pots Recovered	7	7	14	44	2	26	72	51	9	26	86
# Dungeness Crab Dead	2	1	3	5	0	2	7	7	1	2	10
# Dungeness Crab Alive	10	1	11	2	0	0	2	12	1	0	13
# Red Rock Crab Dead	0	1	1	2	0	0	2	2	1	0	3
# Red Rock Crab Alive	0	1	1	2	0	0	2	2	1	0	3
# Graceful Crab Dead	0	0	0	0	0	0	0	0	0	0	0
# Graceful Crab Alive	0	0	0	2	0	0	2	2	0	0	2
# Total Crab Dead	2	2	4	7	0	2	9	9	2	2	13
# Total Crab Alive	10	2	12	6	0	0	6	16	2	0	18
All Pots											
# Pots Recovered	9	14	23	68	4	48	120	77	18	48	143
# Dungeness Crab Dead	6	10	16	15	0	3	18	21	10	3	34
# Dungeness Crab Alive	38	20	58	14	0	0	14	52	20	0	72
# Red Rock Crab Dead	0	6	6	2	0	1	3	2	6	1	9
# Red Rock Crab Alive	0	2	2	4	0	1	5	4	2	1	7
# Graceful Crab Dead	0	0	0	0	0	0	0	0	0	0	0
# Graceful Crab Alive	0	0	0	2	0	0	2	2	0	0	2
# Total Crab Dead	6	16	22	17	0	4	21	23	16	4	43
# Total Crab Alive	38	22	60	20	0	1	21	58	22	1	81
# Total Crab	44	38	82	37	0	5	42	81	38	5	124

* The status of rot cord on 22 commercial and 26 sport pots recovered could not be determined.

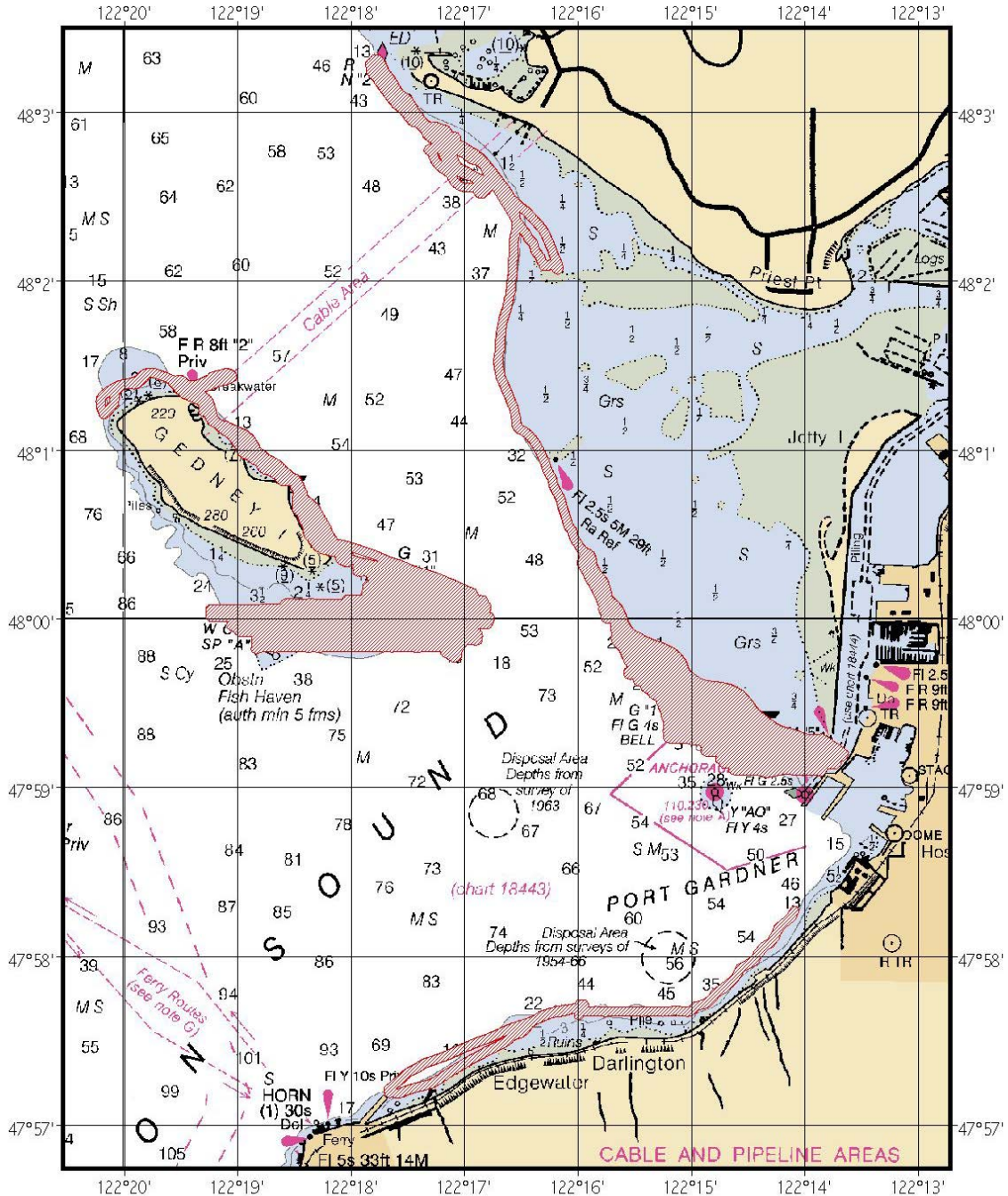


Figure 1. Location of the study area and sidescan sonar survey transects conducted for the Port Gardner derelict gear removal project. Source: NRC.

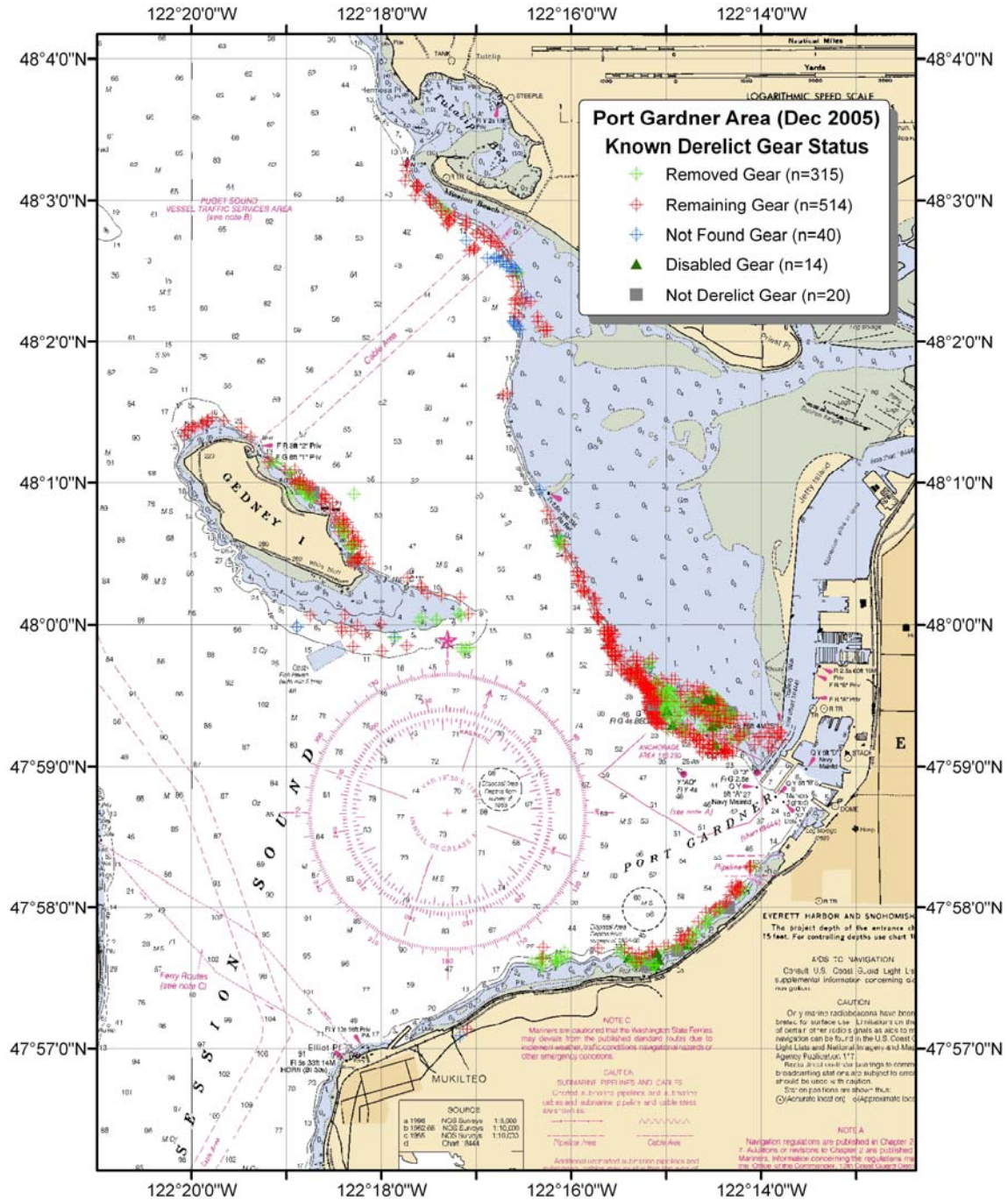


Figure 2. The location of removed or disabled derelict gear and remaining potential derelict gear targets in Port Gardner after the 2004 and 2005 derelict gear removal projects. Source: NRC and the Innerspace Exportation Team.