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FINAL REPORT

PORT SUSAN 2021 DERELICT FISHING GEAR PROJECT

PREPARED FOR:

NORTHWEST STRAITS FOUNDATION

PREPARED BY:

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Introduction

Abandoned, lost and discarded crab pots can present economic and environmental impact issues in marine waters. Every year pot gear is lost due to entanglement with debris, vessel hits and vandalism. Identification, location and safe removal of derelict crab pots can reduce these destructive impacts of derelict fishing gear, as has been demonstrated in derelict gear removal projects previously conducted in Washington waters of the Salish Sea within the Northwest Straits Foundation (NWSF) operation area. The Puget Sound Derelict Fishing Gear Removal Program has been operational since 2002; managed by the NWSF in collaboration with several partnering stakeholders including Puget Sound treaty tribes, Washington Department of Fish and Wildlife (WDFW), Washington Department of Natural Resources, Natural Resources Consultants (NRC), and more.

The Stillaguamish River pours into Port Susan Bay which hosts an estuarine habitat that supports an array of natural resources including salmon, Dungeness crab, and more. Derelict fishing gear recovery in Port Susan began in 2002, as it was identified to host heavy fishing effort targeting these two species, and known to be a location where gear becomes lost for many reasons. Derelict gear, particularly Dungeness crab pots, accumulates in such areas, warranting surveys and recovery of derelict gear on a semi-annual basis. The last gear recovery project conducted in Port Susan was in 2013.

The Stillaguamish Tribe of Indians has a vested interest in the health of Port Susan, as the tribe has harvested salmon for subsistence from the Stillaguamish River since time immemorial. Salmon species which depend on the ecological health of Port Susan Bay. This project was proposed and funded by the Stillaguamish Tribe of Indians in the fall of 2021. The Tribe contracted with NRC to plan and manage the survey and recovery of derelict crab pots and other fishing gear in the northern portion of Port Susan, where gear loss is known to occur. The removal operations were coordinated with the Stillaguamish Tribe, WDFW, the Tulalip Tribes, NOAA, the U.S. Fish and Wildlife Service (USFWS) and the U.S. Coast Guard (USGC).

Scope of Work

The project plan consisted of 2.5 days of sidescan sonar survey for derelict crab pots, 0.5 days of post-survey data processing, and 4.0 days of dive removal operations. Operations were to focus on water depths within diver safety depths of 0 to 100 feet, with one pass through deeper waters to assess the extent of derelict pots that occur in waters beyond maximum diver depths (BMDD; >100 ft). Operations were conducted in the commonly fished areas of the north-northeastern portion of Port Susan Bay. This report presents the summary of findings from data collected during the survey and removal operations.

Methodology

Sidescan Sonar Survey

Fenn Enterprises performed the sidescan sonar surveys on September 14 and 20, 2021, in Port Susan followed by 0.5 days of post-survey processing. A Marine Sonic sidescan sonar system operating at 600 kHz with a differential global positioning system (DGPS) was used during the survey to locate derelict fishing gear. The sonar system employed a heavy towfish, towed off the bow of a 26-foot survey vessel. A hydraulic winch and cable controlled the depth of the towfish. The sidescan sonar image was projected on a monitor onboard the vessel and recorded onto a computer hard drive for later processing.

Generally, the sidescan sonar survey was conducted at 5.0 km/hr (2.7 knots) with a path width of 50 m on both sides of the boat for an approximate area swept of 90 to 100 m (295 to 328 ft). The survey path width was occasionally decreased to 30 m on either side of the boat in shallow water (less than 8 m deep), and increased to 75 m on either side in relatively featureless, flat areas when there were no objects or relief to block and/or distort the extended travel of the sonar signal. Survey depths in Port Susan generally ranged from about 3 m (10 ft) to 32 m (105 ft) in order to identify derelict fishing gear within the dive depth capabilities of the recovery team. The deep water pass covered water depths out to approximately 180 feet.

Counts and precise locations of derelict fishing gear were recorded during post-survey processing of the data. The products from the sidescan sonar survey included a trackline file of the area surveyed, calculation of the area covered and the positions (latitude and longitude) of likely derelict fishing gear targets found (Figure 1).

Derelict Fishing Gear Removal

Fenn Enterprises was contracted to conduct the dive recovery operations of crab pots in the Port Susan area. Three divers equipped with SCUBA operated off a 40-foot dive support and gear recovery vessel, the R/V *Surveyor II*. A list of the precise locations of derelict crab pots detected during the sidescan sonar survey was used by the onboard biologist and dive team to locate derelict pots. This was done by plotting the pot targets as waypoints over navigational charts in an electronic navigation software package (Nobeltec®) connected to a wide area augmentation (WAAS) GPS.

Using the WAASGPS system, the dive support vessel was directed to the exact location of the potential derelict gear target identified by the sidescan sonar survey. When the vessel arrived at the target location, a clump weight with a line and float was deployed at the target location. The dive support vessel was then anchored in the vicinity of the clump weight or drifted nearby and a single diver was deployed (Exhibit 1). A second, safety backup diver stood by on deck. A 30 m (100 ft) length of rope was passed through a loop on the rope near the clump weight and the diver held the other end. Typically the clump

weight, and therefore, the diver, landed within two meters of the derelict gear target, however when poor water visibility conditions were encountered, which is common in Port Susan, 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.

Exhibit 1. Diver and tender on the R/V Surveyor II preparing for deployment of clump weight and diver descent in Port Susan.

A variety of information about the derelict crab pot was reported by the diver to the biologist or observed directly onboard the support vessel. Information collected included whether the derelict pot was from the commercial fishery or sport fishery, whether it was equipped with legal escape cord, whether the gear was actively fishing or not, the number of live and dead Dungeness crab, and 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. The derelict gear was freed by hand by the diver, a recovery

line from the vessel was attached and it was hauled aboard the recovery vessel with a hydraulic winch. The onboard biologist further inspected the gear at the surface and looked for owner identification information.

During removal operations at Port Susan, the derelict fishing gear was stored in a locked secure location on property at the Port of Everett. If the owner of the pot could be determined, the owner was contacted and allowed the opportunity to recover his/her fishing gear at no cost. All pots with Tulalip Tribal identification tags were stored separately, to be retrieved by the Tulalip Fisheries Enforcement officers and eventually returned to their owners.

Results

Sidescan Sonar Survey and Target Investigation

In the 2.5 days of sidescan sonar surveys conducted in Port Susan on September 14 and 20, 2021, 5.16 km^2 were covered and 113 potential derelict crab pot targets were detected or 21.90 targets/km^2. Based on survey locations overlain with water depth contours, in waters within diver depths, the density was 21.24 targets/km^2, and in waters beyond 100 feet deep the density was 22.0 targets/km^2. Nine (9) crab pot targets were investigated but nothing was found, 14 targets were not investigated as they were in water depths beyond maximum allowable diver safety depths (BMDD), and two (2) targets were found to be wood debris and left in place. A total of 88 of the 99 original targets within diver depths were found to be derelict fishing gear; including 65 crab pots removed, 21 crab pots that were found buried >75% in sediment and left in place after ensuring pots were disabled, one length of crab line removed, and one small piece of salmon gillnet removed (Exhibit 2). One additional crab pot was found within close proximity to sidescan targets and removed during dive operations for a total of 66 derelict crab pots, one (1) crab line, and one (gillnet) removed (Table 1)(Figure 2). Table 1 provides the characteristics of pots removed in Port Susan.

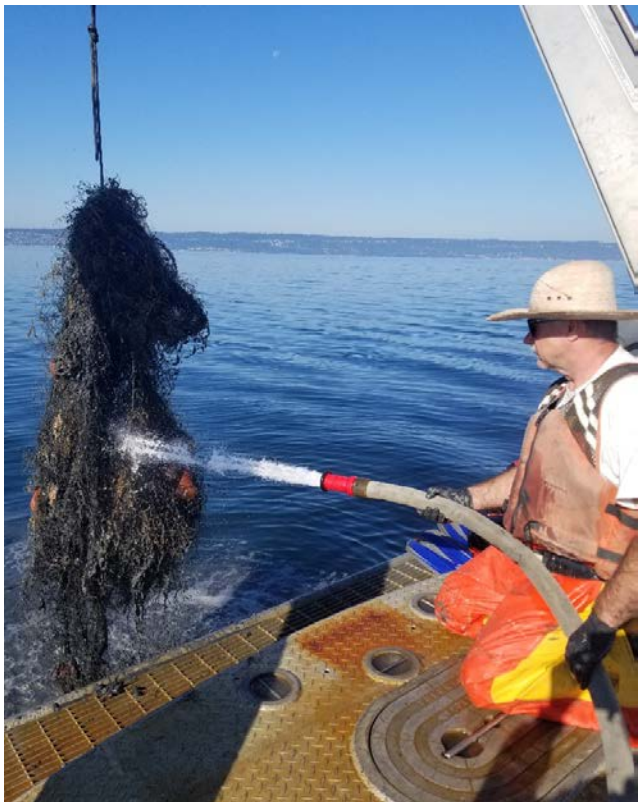

Exhibit 2. Derelict gillnet recovered during dive removal operations targeting crab pots in Port Susan.

Table 1. Number of pots and associated crab entrapped removed and disabled from Port Susan in 2021, by pot type (commercial, sport) and by rot cord compliance.

Fishable/Not Fishable		Fishable			Not Fishable				All Pots			
Rot Cord Use		Rot Cord	No Rot Cord	Total	Rot Cord	No Rot Cord	Unknown	Total	Rot Cord	No Rot Cord	Unknown	Total
Commercial	**# Pots Recovered**	**9**	**1**	**10**	**24**	**0**	**3**	**27**	**33**	**1**	**3**	**37**
	# D. Crab Dead	7	0	7	3	0	5	8	10	0	5	15
	# D. Crab Alive	33	0	33	21	0	1	22	54	0	1	55
	# RRC Dead	0	0	0	0	0	1	1	0	0	1	1
	# RRC Alive	4	1	5	2			2	6	1	0	7
Sport	**# Pots Recovered**	**12**	**3**	**15**	**34**	**0**	**1**	**35**	**46**	**3**	**1**	**50**
	# D. Crab Dead	1	2	3	3	0	0	3	4	2	0	6
	# D. Crab Alive	40	1	41	6	0	0	6	46	1	0	47
	# RRC Dead	0	0	0	0	0	0	0	0	0	0	0
	# RRC Alive	1	1	2	3	0	0	3	4	1	0	5
All Pots	**# Pots Recovered**	**21**	**4**	**25**	**58**	**0**	**4**	**62**	**79**	**4**	**4**	**87**
	# D. Crab Dead	8	2	10	6	0	5	11	14	2	5	21
	# D. Crab Alive	73	1	74	27	0	1	28	100	1	1	102
	# RRC Dead	0	0	0	0	0	1	1	0	0	1	1
	# RRC Alive	5	2	7	5	0	0	5	10	2	0	12
# Total Crab		86	5	91	38	0	7	45	124	5	7	136

Derelict Crab Pot Removal

Derelict fishing gear was removed from Port Susan on September 22 - 25, 2021. A total of 45 crab pots and one crab ring were removed. A total of 66 derelict crab pots were removed, and 21 were disabled. Additionally, one crab line, and one piece of salmon gillnet were removed. Eighty-six (86) of the derelict crab pots removed/disabled were identified in the sidescan sonar surveys, and one derelict pot not identified in the survey was found adjacent to surveyed pots and removed. Derelict crab pots were removed from water depths ranging from 6.1 m (20 ft) to 27.4 m (90 ft) from mud and mixed sand/mud substrate.

Of the 87 derelict pots removed/disabled, 37 (43%) were commercial pots and 50 (57%) were sport pots (Table 1). Twenty-five (29%) pots were determined to be still actively fishing and 62 (71%) were no longer fishing. Of the 87 pots removed, four (4.6%) were not equipped with legal escape cord, 79 (90.8%) had legal escape cord, and four (4; 4.6%). Of the 79 pots equipped with legal escape cord, the escape cord had disintegrated

Exhibit 3. Dungeness crab in recovered derelict commercial crab pot in Port Susan.

on 61 (77%) and was still intact on 18 (23%) pots.

Of the 37 commercial pots, 33 (89%) were equipped with proper escape cord, one (1; 2.7%) was not equipped with legally compliant escape cord, and three (3; 8.1%) were too dilapidated to discern whether escape cord was used or not. Three (3; 6%) of the 50 derelict sport pots were not equipped with legal escape cord, 46 (92%) did have legal escape cord, and one (1; 2%) could not be discerned due to dilapidation. Of the 25 crab pots found to still be fishing, 4 (16%) were not equipped with proper escape cord (Exhibit 3) and 21 (84%) had legal escape cord that had either yet to deteriorate (Exhibit 4), or were still fishing even after the escape cord had disintegrated due to the pot lid being stuck closed.

Of the 87 derelict pots removed/disabled, 28 (32%) pots contained a total of 123 Dungeness crab and 13 red rock crab (Table 1). Of the 123 Dungeness crab recovered, 102 (83%) were live and 21 (17%) were dead. Seventeen (14%) of the Dungeness crab recovered were females (15 live and 2 dead) and 83 (67%) were males (81 live and 2 dead). Sex could not be discerned on 23 (19%) of the Dungeness crab found in recovered pots. Of the 13 red rock crab found, 12 (92%) were live, and one (1; 8%) was dead. Derelict pots determined to be still actively fishing contained 84 Dungeness crab (74 live and 10 dead), and seven live red rock crab. Pots determined to be no longer actively fishing contained 39 Dungeness crab (28 live and 11 dead), and six red rock crab (5 live and 1 dead). Crab pots without legal escape cord contained three (3) Dungeness crab (1 live and 2 dead), and two (2) live red rock crab. Crab pots with legal escape cord contained 114 (93%) Dungeness crab (100 live and 14 dead), and 10 live red rock crab. Figure 3 shows the locations of removed crab pots and the associated magnitude of Dungeness crab per removed pot encountered.

Seven crab pots recovered with Tulalip Tribal identification are being securely stored as transfer to Tulalip Fisheries enforcement officers is scheduled for late November 2021, as is the transfer to owners of three non-tribal owned pots that are also in secure storage. Degraded pots and other gear not returned to owners are being held in a storage location

until transfer to a metal recycling center scheduled for late November 2021. Salvageable derelict gear items without identification were stored in by project personnel for future use in either research projects or potential fund raising opportunities. The estimated total weight of all gear recovered was approximately 2,165 lbs.

Discussion and Conclusions

The amount of derelict pots identified in surveys within the northern Port Susan area were within the range of what was expected, based on estimated deposition rates from work conducted in previous years. It should be noted, however, that significantly less pots were found at and near the Kayak Point pier and boat launch. During an unrelated research excursion, project partners witnessed two recreational divers recovering derelict crab pots around the Kayak Point pier, and they explained that they do this annually (F. Perez, pers. comm.). Until now, this was unknown to NRC or anyone involved in the Puget Sound Derelict Fishing Gear Program, yet explains the paucity of lost pots found near Kayak Point, which is a location commonly listed in lost gear reports.

Exhibit 4. Dungeness crab in recovered derelict sport pot in Port Susan.

During this project, 66 derelict crab pots were successfully removed, and 21 were left in place after ensuring they were disabled and no longer fishing. One piece of gillnet, and one length of crab line was also removed. Of the pots in which escape cord compliance could be discerned (83 of 87), escape cord was used in 79 pots, for a rate of 95%. This is slightly higher than the 91% rate of legal escape cord use on pots removed from Port Susan during the last project in 2013, and is higher than the average (85%) escape cord compliance seen in derelict pots found throughout Puget Sound in other related projects.

The pot density in waters beyond diver depths of 100 feet was very similar to the density of gear within 100 feet water depths, suggesting that derelict gear survey and recovery in deeper waters could be warranted in the future. Such removals would include the use of remote operated vehicles (ROV) to avoid the high risk (and cost) associated with dive operations at such depths. In 2008, an ROV-based deepwater pot removal project was successfully completed in Port Susan, and more recently similar methods were employed to recover derelict shrimp pots in the nearby waters off Mukilteo.

Acknowledgements

Thanks to Francesca Perez at the Stillaguamish Tribe of Indians for interest in derelict gear recovery in Port Susan, and for acquiring funds to pay for the project. The Port of Everett kindly provided a secure location for staging recovered gear during the project. Their assistance is greatly appreciated. Cathy Stanley from Tulalip Tribes provided valuable insight regarding commercial tribal fishing seasons to assist in the planning of the surveys and removals.

Figure 1. Port Susan 2021 sidescan sonar survey tracklines, area swept and crab pot targets. Source: Fenn Enterprises and NRC, Inc.

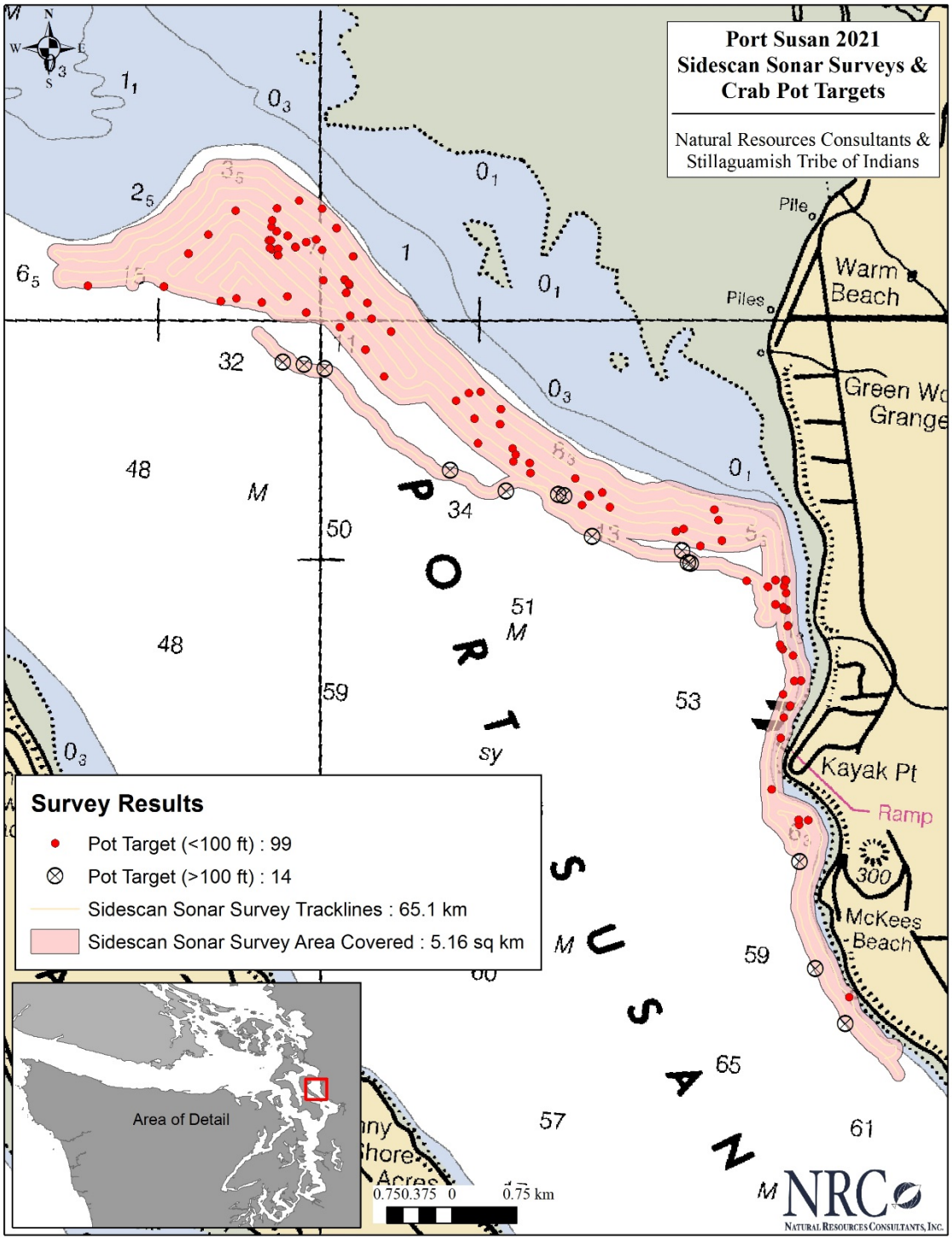

Figure 2. Derelict crab pot targets disposition in Port Susan following removal operations during the Port Susan 2021 derelict fishing gear project. Source: NRC, Inc.

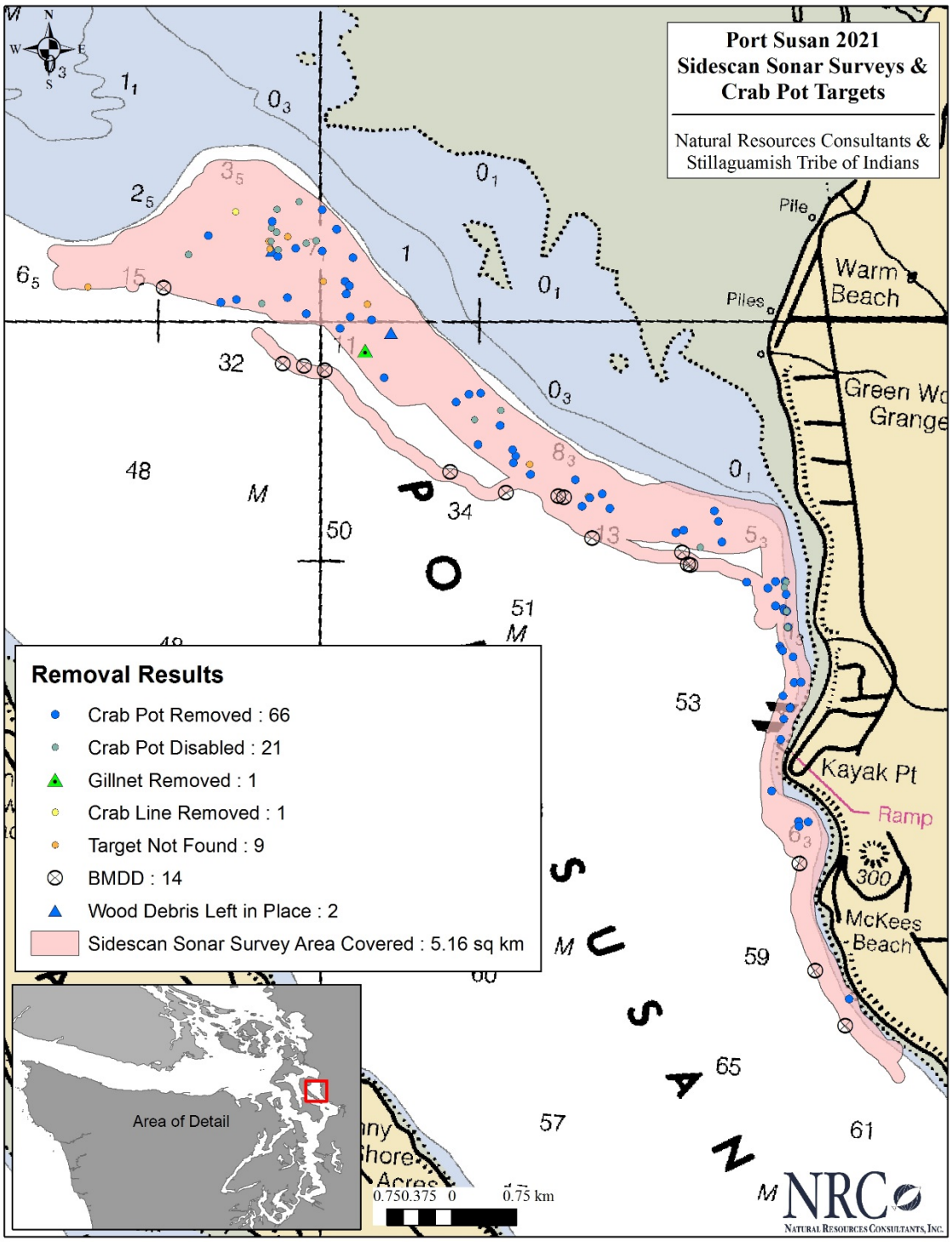

Figure 3. Location of removed derelict crab pots with graduated symbols depicting number of Dungeness crab encountered per pot during the Port Susan 2021 derelict fishing gear project. Source: NRC, Inc.