

1976 adoption of the male-only restriction and minimum carapace size limit of 5.3 inches. The legal male portion of PWS Tanner crab may have been overharvested because early fisheries were limited by regulatory season length rather than an abundance based guideline harvest level (GHL). Handling mortality of undersized and female crab may have contributed to the decline, particularly during fishing seasons of seven months duration, which encompassed some of the molting and mating seasons. Changes in environmental conditions, documented on a Gulf of Alaska-wide basis, may have caused high mortality of Tanner crab larvae, impaired growth and reproduction, and coincided with increased production of crab predators such as gadoid fishes.

SUBSISTENCE FISHERY SUMMARY

Tanner crab noncommercial fisheries were closed by regulation in 1999 after years of declines in Tanner crab abundance documented by department surveys. In March 2008, the Alaska Board of Fisheries (board) made a positive customary and traditional use finding for Tanner crab in PWS and subsequently opened a subsistence fishery beginning in 2008. In addition, concurrent with the opening of the subsistence fishery, results from the PWS trawl survey indicated increasing estimates of legal male Tanner crab abundance (Table 2).

In the subsistence fishery, Tanner crab catch peaked during the 2012/13 season with 2,177 legal male crab harvested, 1,447 legal crab released, and 5,989 sublegal males released (Table 3). The lowest catch occurred during the first year of the subsistence fishery in the 2008/09 season, when 44 legal males were harvested, 5 legal males were released, and 130 sublegal males were released. During the most recent 2015/16 season, 842 legal male Tanner crab were harvested, 1,466 legal crab released, and 1,593 sublegal males released. These fluctuations in catch are corroborated by PWS trawl survey abundance estimates, in which estimates of total males was highest in the 2013 survey (Table 2).

The number of permits issued for the fishery has ranged from a low of 74 permits in the 2010/11 season to a high of 227 permits in the 2014/15 season (Table 3, Figure 2). However, actual participation was considerably lower, ranging from 25 permits fished during the 2010/11 season to 89 permits fished during the 2015/16 season. The amount of trips taken by permit holders ranged from a high of 368 trips taken during the 2012/13 season, which was the season with the highest harvest, down to a low of 58 trips in the 2010/11 season.

During the first four seasons permits were required, 2008/09 through 2011/12 seasons, the majority of legal male Tanner crab were harvested from statistical areas in the Northwest and Southwest sections of PWS (Table 4, Figure 3), with a high of 91% in the 2008/09 season (Table 5). Following the 2011/12 season, area of harvest and effort shifted over the next four seasons, with the majority of legal male Tanner crab harvest taken from the Orca Bay area; ranging from 89% in the 2012/13 season declining to 67% in the 2015/16 season. Harvest in the Northwest area increased the past three years to 20% during the 2015/16 season, while harvest from Southwest and Northern locations remained low.

The subsistence fishery is open to Alaska residents only and is monitored through a required permit (5 AAC 02.206). The season is open from October 1 through March 31 and only two pots may be fished per person and a maximum of two pots per vessel (5 AAC 02.206 (3)). Pots must

have two escape rings at least $4\frac{3}{8}$ inches inside diameter (5 AAC 02.207 (2)). Buoy and line requirements also exist. Only male Tanner crab may be harvested 5 $\frac{1}{2}$ inches or greater; females and sublegal males must be released. There is a daily bag and possession limit of 5 legal male Tanner crab per permit holder fishing and certain waters, including Port Valdez, Galena Bay, Port Fidalgo, and Port Gravina, remain closed to the harvest of Tanner crab (Figure 3). Information collected on permits includes date of harvest, statistical area of harvest, number of pots fished, number of legal male Tanner crab retained, number of legal male Tanner crab captured and released, number of sublegal male Tanner crab released, number of female Tanner crab released, and the number of Dungeness crab released. This harvest information must be recorded each time the crab pots are pulled. The permit must be returned by April 15 following each season.

Before permits were required, there was no mechanism to directly monitor effort or harvest of Tanner crab in historical noncommercial fisheries within PWS. Data from the Division of Sport Fish Statewide Harvest Survey (SWHS) indicated an annual harvest range of between 137 to 537 crab, with an average annual harvest of 300 Tanner crab from 1994 to 1998 (Table 6). Limited data developed through household interviews by ADF&G Subsistence Division staff suggested that subsistence harvests totaled less than 4,900 Tanner crab among all PWS communities in 1997. There was no reported harvest between 1999 and 2008, when the noncommercial fisheries were closed by regulation.

TANNER CRAB ASSESSMENT

The department has conducted assessment programs for Tanner crab within PWS since 1977 (Berceli et al. 2002); with pot gear through 1991 and then switching to trawl gear (Donaldson 1991). Pot survey objectives were to provide indices of legal and sublegal male Tanner crab and to monitor reproductive success of female Tanner crab. This information was used to determine relative stock condition, as well as to set preseason harvest guidelines for the commercial fishery. Pot survey data indicated steady declines in the numbers of male and female Tanner crab (Table 7). During the prosecution of the pot survey, the average Tanner crab catch decreased 86%. Legal male Tanner crab catch per unit effort (CPUE) from the pot survey was at the lowest point in 1991, the final year the pot survey was conducted, at 3.7 crab per pot (Table 8). This CPUE was generated from pots that were in the traditional stations of the Northern and Hinchinbrook stations combined.

Recognizing the weaknesses of pot surveys, including the inability to expand catches to estimate population abundance, the department implemented trawl surveys in 1991 (Bechtol 1999; Kimker and Trowbridge 1992), which can generate population abundance estimates by using an area swept method. Trawl surveys to assess crab stocks are also used by the department in other management areas and by the National Marine Fisheries Service for the Bering Sea crab fisheries. The trawl survey is conducted in the Northern (except Valdez Arm) and Hinchinbrook districts of PWS.

Legal male Tanner crab estimates from the PWS trawl survey showed an increase in 2011 and were also the highest estimates in the history of the trawl survey (Table 2), while total male crab estimates were at their highest level in 2013. Legal and sublegal male crab subsequently declined

in 2014 and 2015 to similar levels as 1991; the first year of the trawl survey was conducted and at a time when the commercial fishery was closed. The PWS trawl survey was last conducted in 2015.

TANNER CRAB TEST FISHERY 2016

In response to the public's interest in a pot survey to survey untrawlable areas, and due to decreased budgets with no surplus funds for survey costs, a request for quotations (RFQ) for a PWS Tanner crab test fishery was offered in the winter and fall of 2016. The minimum bid was 10% of legal male Tanner crab harvested paid to the department for two lots of 300 pots each. In winter 2016, there were no bids submitted. However, in the following fall of 2016, five bids were submitted, and the F/V Miss Michelle was the highest bidder for the RFQ at 12.5% for both lots paid to the department.

The vessel departed Seward on November 11 with an ADF&G observer aboard and Tanner crab were landed in Kodiak on December 6, 2016. A total harvest of 3,946 lb was delivered to Alaska Pacific Seafoods with 506 lb of deadloss (13%). The total value of Tanner crab sold was \$9,006. Legal male crab harvested averaged approximately 2 lb per crab.

A total of 1,982 legal (5.3 inches or greater) male Tanner crab were harvested in the test fishery with a total of 5,961 Tanner crab (legal males, sublegal males, and females combined) caught (Table 9) during the fishery. The majority of Tanner crab caught during the fishery were in old shell condition; 69% of legal crab were old shell and 63% of sublegal male crab were old shell.

The CPUE of legal male Tanner crab was compared from the 2016 test fishery and the historical pot survey (data from 1977-1991); these were traditional stations in the Northern and Hinchinbrook districts combined. The CPUE in those stations in 2016 was 4.8 legal male Tanner crab per pot, only slightly higher than the CPUE of 3.7 legal male Tanner crab per pot in 1991, the final year the historical pot survey was conducted (Tables 8 and 10) and the third year the fishery was closed. For all ADF&G survey stations combined, including both traditional and auxiliary stations (Figure 1), the CPUE of legal male Tanner crab caught per pot was 3.6 crab and the highest catches were in the Northern District with an average of 7.2 legal crab per pot (Table 9). For the captain's choice pots (all in Northern District), the CPUE of legal male Tanner crab caught was 29.5 crab per pot, and the average total crab caught was 68 crab per pot.

The captain's choice pots were set in a small area, approximately eight square nautical miles, of the Northern District corresponding with the most productive ADF&G station (N03). In station N03, the four pots set had an average CPUE of 35 legal crab per pot. This area is in the mouth of Orca Bay approximately centered between Johnstone Point on Hinchinbrook Island and Red Head Point on the mainland on the north side of Port Gravina (Figure 4). This area is surveyed by our trawl survey.

Provisions of the RFQ bid packet allowed for up to one-third of pots to be set in locations of the captain's choosing. A total of 206 pots were set, 23% (48 pots; Table 9) of those pots were set at "captain's choice" locations. Although less than one-quarter of pots set were captain's choice, 71% of legal male crab came from those captain's choice pots. The plan outlined by the test

PWS Tanner Crab Test Fishery Summary

fishery RFQ designated 600 total pot sites with 200 of those captain's choice sites. Pot sites corresponded to an ADF&G survey station and for the area fished there were four pot sites per station. Due to poor weather, time constraints, smaller vessel size (48 feet), and financial loss incurred by the skipper for participating, the test fishery was not completed in its entirety. There never was a weather window to attempt to set gear in the Gulf of Alaska (GOA) stations (Eastern and outside Western districts).

All Tanner crab pots used in the test fishery were the same configuration of 6 foot by 6 foot pyramid style pots tapering up to 4 foot by 4 foot with a top opening of 28 inches square with a plastic square insert around the perimeter of the opening to help prevent crab from escaping. Mesh openings were 3.5 inches stretched measure. All escape rings were closed using zip ties in order to catch sublegal and female Tanner crab. Herring was used for bait. The vessel also utilized three groundfish pots to harvest Pacific cod to use as hanging bait in the crab pots.

Other bycatch included 10 halibut discarded at sea, approximately 1,200 lb of Pacific cod retained for bait, 310 lb of octopus released alive, 40 lb of octopus retained for personal use, and approximately 80 lb of yelloweye and quillback rockfish retained for personal use (mandatory retention requirement for rockfish in PWS).

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PWS Tanner Crab Test Fishery Summary

Table 1.—Commercial Tanner crab harvests from the PWS Management Area, 1968–2016.

Season	Vessel	Landings	Harvest by Area (lb)				Total	Mean wt. (lb/crab)	Number of crab
			Inside	Outside					
1968/69									
1969/70						1,235,613			
1970/71						1,284,597			
1971/72						4,159			
1972/73						7,788,498			
1973/74			1,658,000	8,500,000		13,927,868			
1974/75			1,187,000	2,667,000		10,158,000			
1975/76			3,322,482	3,810,262		3,854,000			
			Northern	Hinchinbrook	Western	Eastern	Total		
1976/77 ^a	23	316	782,048	766,650	701,725	70,925	2,321,348		
1977/78	38	591	994,721	1,161,831	2,079,549	570,573	4,806,674	2.2	2,184,852
1978/79	51	783	649,977	708,562	2,248,545	3,443,471	7,050,555	2.1	3,357,408
1979/80	49	561	140,228	332,583	1,462,059	4,057,847	5,992,717	2.0	2,996,359
1980/81	30	304	152,196	812,352	1,561,207	250,076	2,775,831	2.1	1,321,824
1981/82	29	216	351,139	722,834	1,503,253	288,425	2,865,651	No Data	
1982/83	40	304	471,422	31,447	921,663	45,308	1,469,840	2.1	699,924
1984 ^b	0	0	Closed	Closed	Closed	No Effort	0		
1985	0	0	Closed	Closed	No Effort	No Effort	0		
1986	14	35	137,720	236,241	160,829	587	535,377	2.1	254,941
1987	23	65	152,834	222,052	196,246	0	571,132	2.1	271,968
1988	21	46	55,929	226,509	191,654	0	474,092	2.1	225,758
1989–2016	0	0	Closed	Closed	Closed	Closed	0		

^a New districts and minimum legal size established.

^b Calendar year season established.

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Table 2.—Male Tanner crab abundance estimates from bottom trawl surveys in PWS, 1991–2015.

Year	Tows	Pre-recruit <113 mm	Pre-recruit -1 (113-134 mm)	Legal	Legal CI ¹	Total Males	Total CI ^a
1991	29	1,856,802	275,497	134,820	106,043	2,267,119	1,420,647
1992	37	1,409,381	318,010	68,119	39,590	1,795,511	606,398
1993	38	816,548	266,073	121,184	39,588	1,203,805	433,640
1994	38	872,375	182,595	55,544	23,511	1,110,513	484,107
1995	32	407,159	100,786	24,820	15,535	532,765	171,825
1996	No Survey						
1997	39	316,785	34,283	11,336	11,048	362,403	158,018
1998	No Survey						
1999	40	152,217	16,792	3,677	3,574	172,686	64,516
2000	No Survey						
2001	40	1,994,339	59,143	6,626	6,655	2,060,109	784,610
2002	No Survey						
2003	40	804,693	94,758	15,882	17,969	915,333	360,036
2004	No Survey						
2005	40	502,834	117,450	28,940	25,743	649,224	291,641
2006	No Survey						
2007	32	1,168,957	225,888	17,749	14,290	1,412,595	423,048
2008	No Survey						
2009	43	1,775,164	337,161	43,836	30,505	2,156,161	883,720
2010	No Survey						
2011	43	1,926,016	574,852	186,422	87,727	2,687,291	1,732,997
2012	No Survey						
2013	43	7,440,730	322,264	184,993	74,780	7,947,986	2,332,125
2014	41	1,873,285	329,437	134,929	80,188	2,337,652	647,317
2015	43	1,686,919	302,250	102,789	46,797	2,091,958	882,128
2016	No Survey						

^a Confidence Interval.

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PWS Tanner Crab Test Fishery Summary

Table 3. –Subsistence Tanner crab harvest and effort in the PWS Management Area from the 2008/09 through the 2015/16 seasons.

Year	Permits Issued	Permits Fished	Permits Returned	Total Trips Made	Harvest (count)				
					Legal Males Harvested	Total Legal Males Released	Total Sublegal Crab Released	Total Female Crab Released	Avg Harvest per Permit Fished
2008/09	130	39	39	80	44	5	130	18	1
2009/10	95	28	29	71	85	16	265	55	3
2010/11	74	25	27	58	78	11	223	18	3
2011/12	82	34	34	88	268	41	468	77	8
2012/13	152	80	82	368	2,177	1,447	5,989	750	27
2013/14	173	67	71	176	638	274	1,641	185	10
2014/15	227	83	87	203	863	1,364	1,794	204	10
2015/16	214	89	92	219	842	1,466	1,593	219	9

PWS Tanner Crab Test Fishery Summary

Table 4.—Subsistence Tanner male legal crab harvest by location in PWS from the 2008/09 through 2015/16 seasons.

Location	Season							
	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Orca Bay ^a	0	0	5	32	1,935	520	713	566
Northwest ^b	27	45	26	42	87	74	89	165
Northern ^c	0	6	25	97	4	11	6	9
Southwest ^d	13	29	22	93	32	6	18	41
Hinchinbrook ^e	0	0	0	0	19	1	32	50
Other Stat Areas	0	0	0	0	0	4	5	3
No Reported Stat Area	4	5	0	4	100	22	0	8
Total	44	85	78	268	2,177	638	863	842

^a Statistical areas 456031, 456032, 466031, and 466032.

^b Statistical areas 476033, 486031, 486033, and 486034.

^c Statistical areas 466033, 476034, 476035, 476036, and 476101.

^d Statistical areas 476004, 476005, 476006, 476007, 486001, and 486005.

^e Statistical area 466003.

Table 5.—Subsistence Tanner male legal crab percentage of harvest by location in PWS from 2008/09 through 2015/16 seasons.

Location	Season							
	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Orca Bay ^a	0%	0%	6%	12%	89%	82%	83%	67%
Northwest ^b	61%	53%	33%	16%	4%	12%	10%	20%
Northern ^c	0%	7%	32%	36%	0%	2%	1%	1%
Southwest ^d	30%	34%	28%	35%	1%	1%	2%	5%
Hinchinbrook ^e	0%	0%	0%	0%	1%	0%	4%	6%
Other Stat Areas	0%	0%	0%	0%	0%	1%	1%	0%
No Reported Stat Area	9%	6%	0%	1%	5%	3%	0%	1%
Northwest and Southwest	91%	87%	62%	50%	5%	13%	12%	24%

^{a-c} See Table 3 for corresponding statistical areas.

Table 6.—Prince William Sound Management Area Tanner crab estimated sport and personal use harvest from the Alaska Statewide Harvest Survey, 1994–1998.

Year	Tanner Crab Harvested
1994	333
1995	304
1996	137
1997	537
1998	189

PWS Tanner Crab Test Fishery Summary

Table 7.—Number of pots fished, male Tanner crab catch (includes legal and sublegal male crab), female Tanner crab catch, total Tanner crab catch, and average Tanner crab catch per pot by year in historical pot survey traditional stations in the Northern and Hinchinbrook districts, PWS, 1977–1991.

Year	Number of Pots	Male	Female	Total (both sexes)	Avg Per Pot
1977	51	2,773	1,972	4,745	93.0
1978	146	6,376	1,099	7,475	51.2
1979	237	16,831	3,210	20,041	84.6
1980	240	11,012	2,092	13,104	54.6
1981	216	8,114	1,064	9,178	42.5
1982	224	4,734	849	5,583	24.9
1983	180	3,225	573	3,798	21.1
1984	178	3,440	610	4,050	22.8
1985	163	2,191	212	2,403	14.7
1986	168	2,473	570	3,043	18.1
1987	138	2,336	1,010	3,346	24.2
1988	119	1,195	750	1,945	16.3
1989 ^a	114	1,640	459	2,099	18.4
1990	109	1,336	255	1,591	14.6
1991	81	724	331	1,055	13.0

^a Fishery closed.

PWS Tanner Crab Test Fishery Summary

Table 8.–Legal male Tanner crab catch per unit effort (CPUE) in historical pot survey traditional stations by district and for Northern and Hinchinbrook districts combined, PWS, 1977–1991 (fishery closed in 1989) and PWS Tanner crab test fishery, 2016..

Year	Legal Male CPUE by District				
	Eastern	Western	Northern	Hinchinbrook	Northern and Hinchinbrook combined
1977	NA	NA	40.1	34.8	37.5
1978	29.8	28.7	29.5	21.3	25.4
1979	36.4	49.5	12.0	16.4	14.2
1980	5.9	18.5	26.1	34.9	30.5
1981	3.2	12.5	25.7	34.2	30.0
1982	2.6	6.0	15.6	8.1	11.9
1983	0.5	3.1	15.5	12.2	14.1
1984	0.1	5.6	14.5	16.6	15.4
1985	0.1	5.1	12.8	8.2	10.8
1986	0.0	3.4	13.1	8.3	11.1
1987	0.0	2.1	9.6	13.2	11.1
1988	0.0	2.5	4.4	3.6	4.1
1989	NA	0.3	5.6	10.2	7.6
1990	NA	0.1	6.3	9.4	7.7
1991	NA	NA	3.1	4.4	3.7
2016	NA	<1	7.2	<1	4.8

PWS Tanner Crab Test Fishery Summary

Table 9.–Tanner crab catch (legal male, sublegal male, and female crab) by district from all ADF&G survey stations combined (both traditional and auxiliary) and captain’s choice pots (Northern District only), PWS Tanner crab test fishery, 2016.

District	Pots	Legal Male crab	Average Legal Male crab per pot	Sublegal Male crab	Female Crab	Total Crab	Average Total crab per pot
ADF&G Survey Stations							
Hinchinbrook	49	44	<1	229	6	279	6
Northern	67	485	7.2	1,010	12	1,507	22
Western	42	37	<1	837	22	896	21
ADF&G Totals	158	566	3.6	2,076	40	2,682	17
Captain’s Choice Sites							
Northern	48	1,416	29.5	1,781	82	3,279	68
Test Fishery Totals							
All Pots	206	1,982	9.6	3,857	122	5,961	29

Table 10.–Tanner crab catch per unit effort (CPUE), number of legal crab, and number of pots for the traditional survey stations in the Hinchinbrook and Northern districts, PWS Tanner crab test fishery, 2016.

District	Pots	Legal crab	CPUE
Hinchinbrook	36	27	0.8
Northern	48	380	7.9
Combined	84	407	4.8

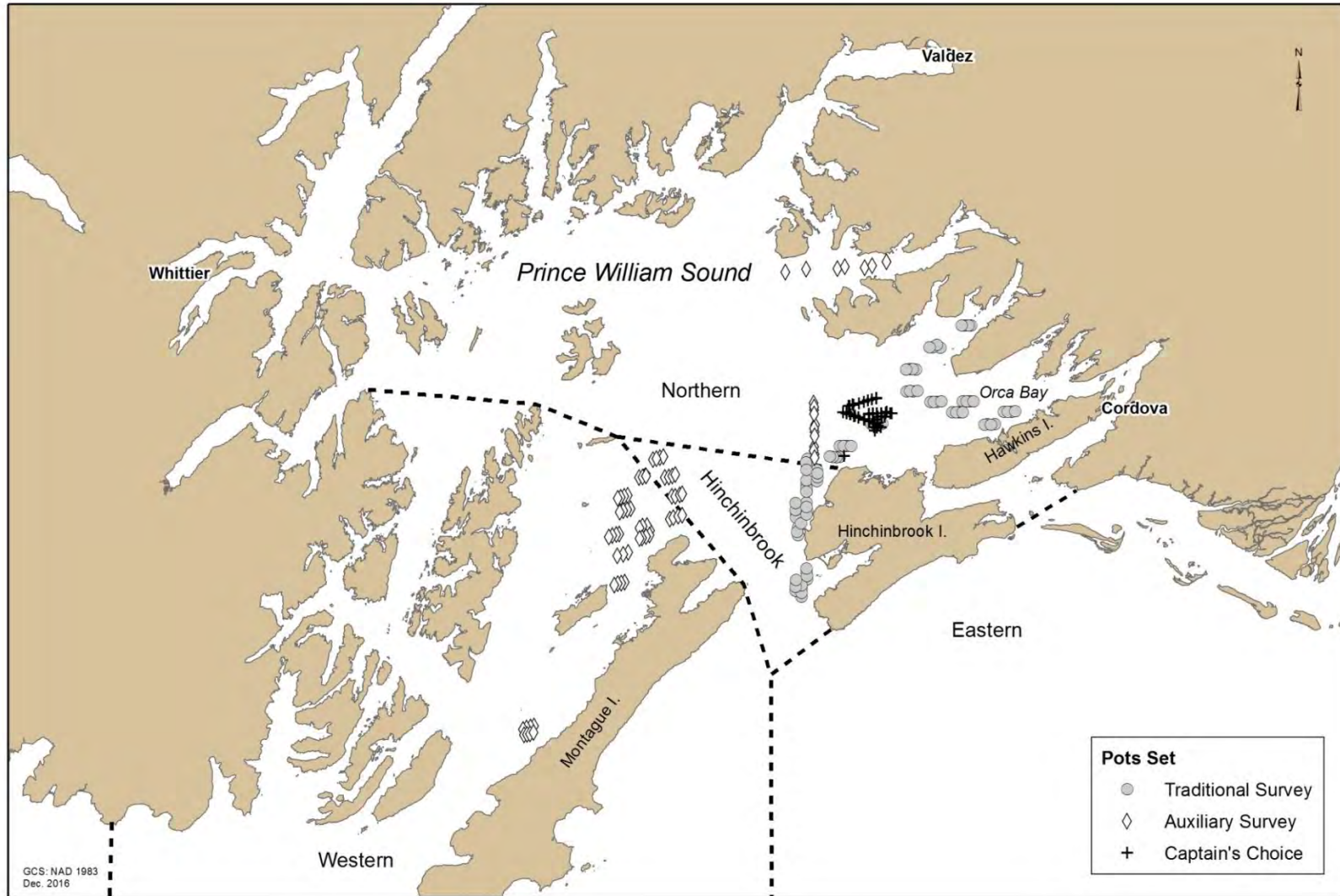


Figure 1.—Prince William Sound Tanner crab districts and test fishery pot locations during the Tanner crab test fishery; traditional survey, auxiliary survey, and captain’s choice pot locations, 2016.

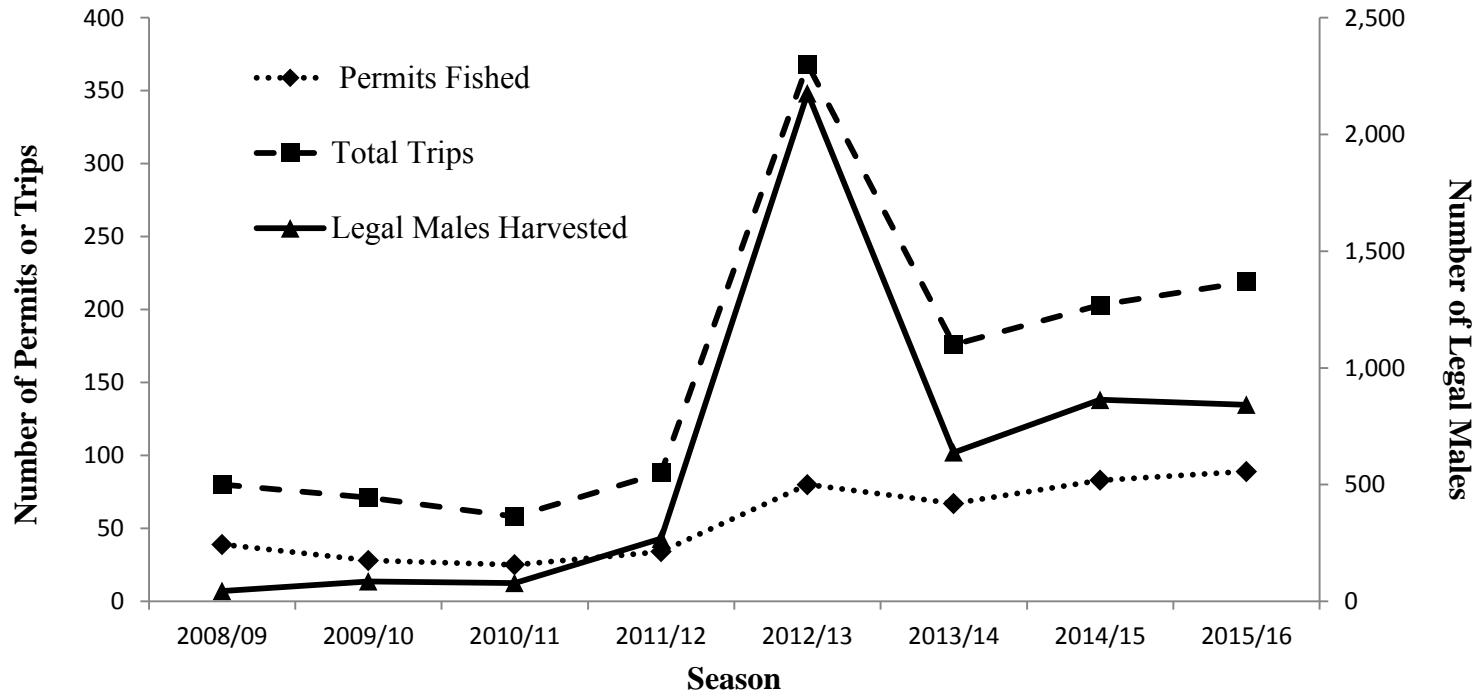


Figure 2.—Prince William Sound Area Tanner crab subsistence fishery statistics: permits fished, total trips, and legal males harvested from 2008/09 through 2015/16 seasons.

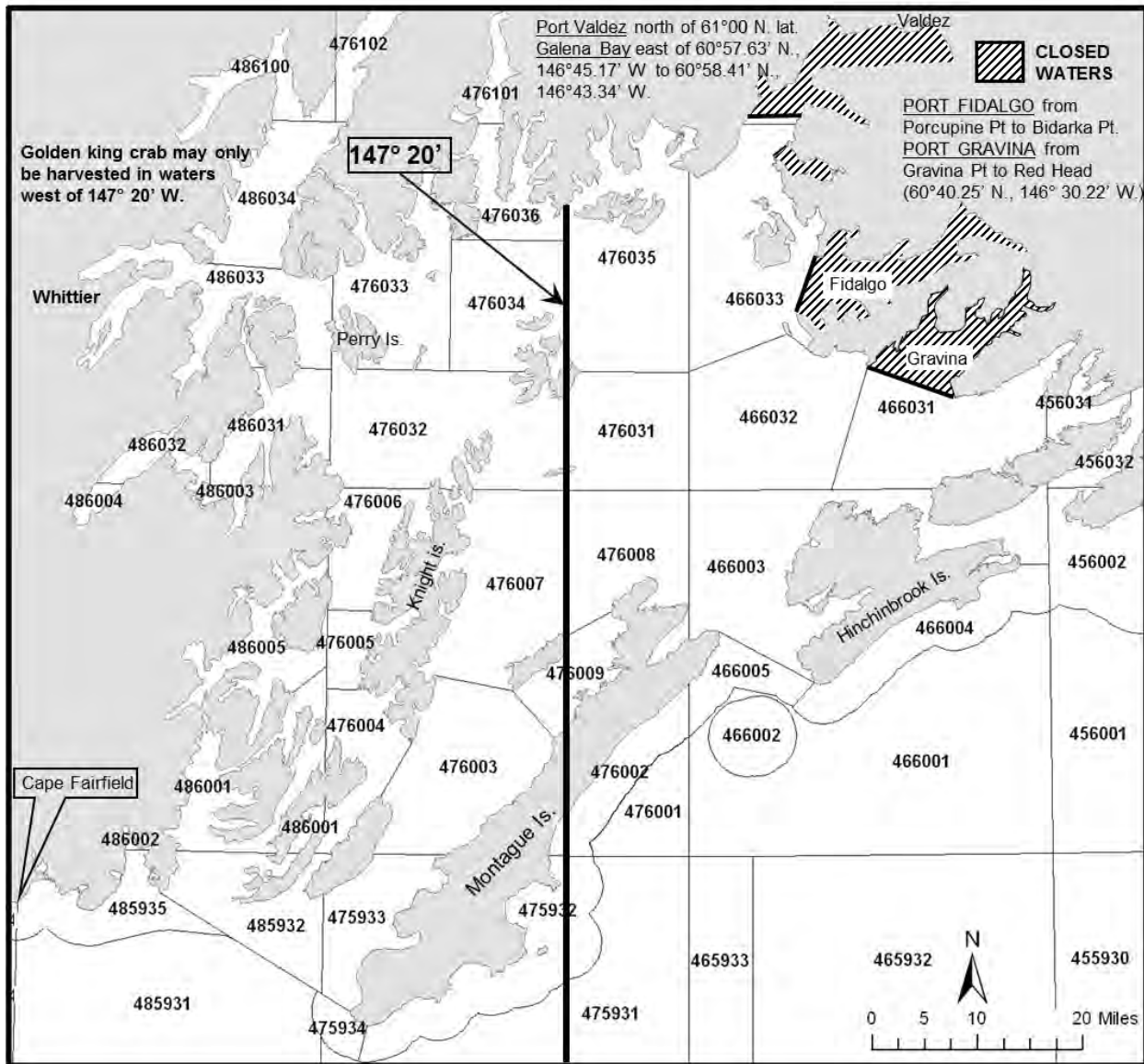


Figure 3.-Prince William Sound Area Tanner crab subsistence fishery permit map with statistical areas and closed waters.

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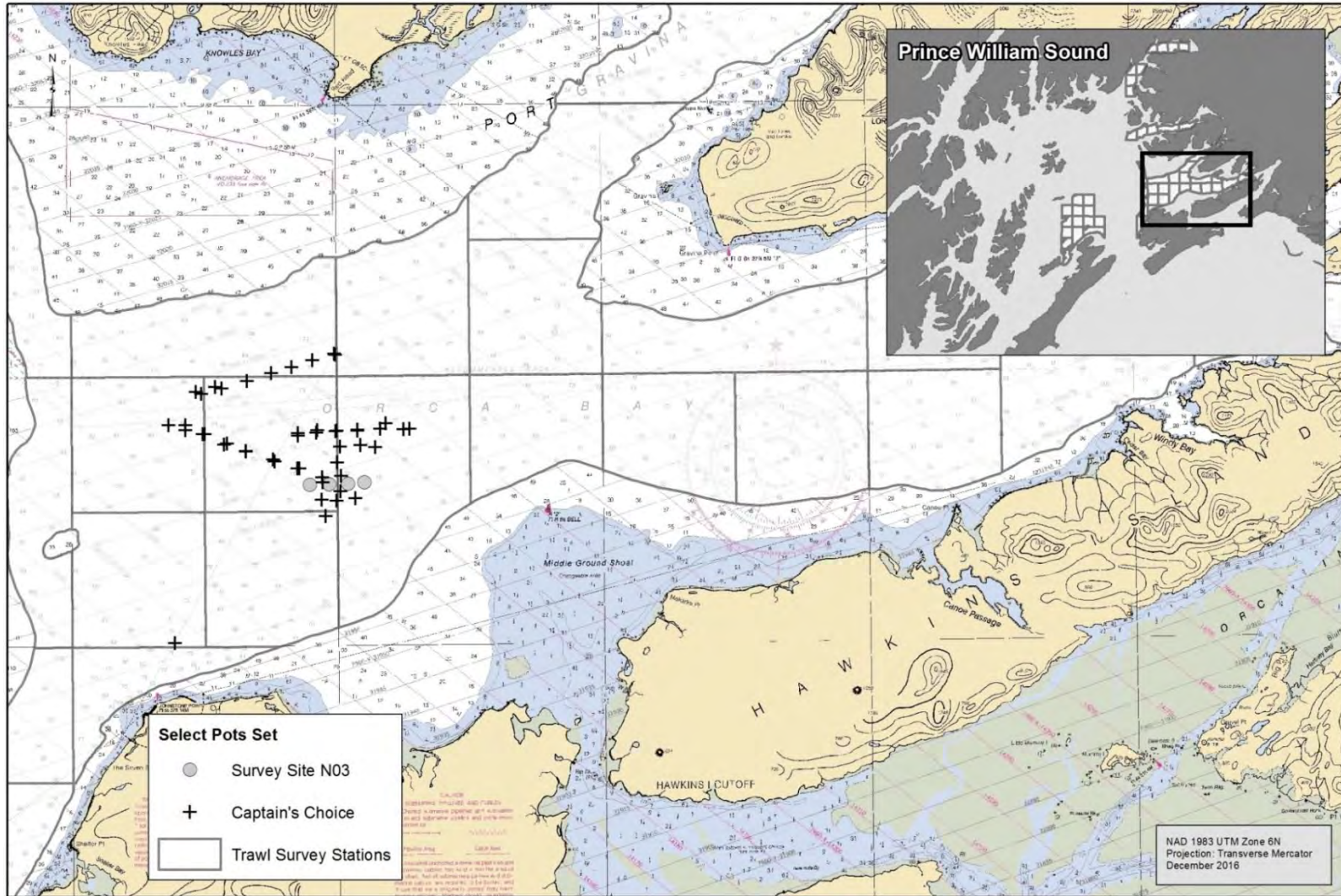


Figure 4.—Prince William Sound area of detail with pot locations of ADF&G survey station N03 and captain's choice sets during the Tanner crab test fishery in 2016 and ADF&G trawl survey locations.