

Fishery Management Report No. 12-05

**Prince William Sound Area Management Report for
Dungeness Crab, Shrimp, and Miscellaneous Shellfish
Fisheries 2011**

by

Maria Wessel,

Charles E. Trowbridge,

and

Chris Russ

February 2012

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the *Système International d'Unités* (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H_A
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	e
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, χ^2 , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient	
milliliter	mL	west	W	(multiple)	R
millimeter	mm	copyright	©	correlation coefficient (simple)	r
		corporate suffixes:		covariance	cov
Weights and measures (English)		Company	Co.	degree (angular)	$^\circ$
cubic feet per second	ft ³ /s	Corporation	Corp.	degrees of freedom	df
foot	ft	Incorporated	Inc.	expected value	E
gallon	gal	Limited	Ltd.	greater than	>
inch	in	District of Columbia	D.C.	greater than or equal to	≥
mile	mi	et alii (and others)	et al.	harvest per unit effort	HPUE
nautical mile	nmi	et cetera (and so forth)	etc.	less than	<
ounce	oz	exempli gratia	e.g.	less than or equal to	≤
pound	lb	(for example)		logarithm (natural)	ln
quart	qt	Federal Information Code	FIC	logarithm (base 10)	log
yard	yd	id est (that is)	i.e.	logarithm (specify base)	log ₂ , etc.
		latitude or longitude	lat. or long.	minute (angular)	'
Time and temperature		monetary symbols (U.S.)	\$, ¢	not significant	NS
day	d	months (tables and figures): first three letters	Jan, ..., Dec	null hypothesis	H_0
degrees Celsius	°C	registered trademark	®	percent	%
degrees Fahrenheit	°F	trademark	™	probability	P
degrees kelvin	K	United States (adjective)	U.S.	probability of a type I error (rejection of the null hypothesis when true)	α
hour	h	United States of America (noun)	USA	probability of a type II error (acceptance of the null hypothesis when false)	β
minute	min	U.S.C.	United States Code	second (angular)	"
second	s	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard deviation	SD
Physics and chemistry				standard error	SE
all atomic symbols				variance	
alternating current	AC			population sample	Var
ampere	A			sample	var
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

FISHERY MANAGEMENT REPORT NO. 12-05

**PRINCE WILLIAM SOUND AREA MANAGEMENT REPORT
FOR DUNGENESS CRAB, SHRIMP, AND
MISCELLANEOUS SHELLFISH FISHERIES 2011**

by
Maria Wessel,
Division of Commercial Fisheries, Cordova

Charles E. Trowbridge,
and
Chris Russ
Division of Commercial Fisheries, Homer

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
333 Raspberry Road, Anchorage, Alaska, 99518-1565

February 2012

Portions of projects described in this manuscript were partially financed by a grant cooperative agreement from the National Oceanic and Atmospheric Association.

The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: <http://www.adfg.alaska.gov/sf/publications/>. This publication has undergone regional peer review.

Maria Wessel

*Alaska Department of Fish and Game, Division of Commercial Fisheries,
PO Box 669, Cordova, AK 99574, USA*

and

Charles E. Trowbridge, and Chris Russ

*Alaska Department of Fish and Game, Division of Commercial Fisheries,
3298 Douglas Place, Homer, AK 99603, USA*

This document should be cited as:

Wessel, M., C. E. Trowbridge, and C. Russ. 2012. Prince William Sound area management report for Dungeness crab, shrimp, and miscellaneous shellfish fisheries 2011. Alaska Department of Fish and Game, Fishery Management Report No. 12-05, Anchorage.

The Alaska Department of Fish and Game (ADF&G) administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act (ADA) of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

If you believe you have been discriminated against in any program, activity, or facility please write:

ADF&G ADA Coordinator, P.O. Box 115526, Juneau, AK 99811-5526

U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, MS 2042, Arlington, VA 22203

Office of Equal Opportunity, U.S. Department of the Interior, 1849 C Street NW MS 5230, Washington DC 20240

The department's ADA Coordinator can be reached via phone at the following numbers:

(VOICE) 907-465-6077, (Statewide Telecommunication Device for the Deaf) 1-800-478-3648,

(Juneau TDD) 907-465-3646, or (FAX) 907-465-6078

For information on alternative formats and questions on this publication, please contact:

ADF&G Division of Sport Fish, Research and Technical Services, 333 Raspberry Road, Anchorage AK 99518 (907) 267-2375

TABLE OF CONTENTS

	Page
LIST OF TABLES.....	ii
LIST OF FIGURES.....	ii
LIST OF APPENDICES.....	ii
ABSTRACT.....	1
INTRODUCTION.....	1
DUNGENESS CRAB.....	2
Background.....	2
2012 Management Outlook.....	3
POT SHRIMP.....	3
Background.....	3
2011 Season Summary.....	5
2012 Management Outlook.....	6
SHRIMP TRAWL.....	6
Background.....	6
2011 Season Summary.....	8
2012 Management Outlook.....	8
RAZOR CLAMS.....	9
Background.....	9
2011 Season Summary.....	10
2012 Management Outlook.....	10
WEATHERVANE SCALLOPS.....	10
Background.....	10
2011 Season Summary.....	13
2012 Management Outlook.....	14
MISCELLANEOUS SHELLFISH.....	14
Background.....	14
2011 Season Summary.....	14
2012 Management Outlook.....	14
ACKNOWLEDGEMENTS.....	15
REFERENCES CITED.....	16
TABLES AND FIGURES.....	17
APPENDIX A.....	31

LIST OF TABLES

Table	Page
1. Shellfish emergency orders issued for the Prince William Sound Management Area E, 2006–2011.....	18
2. Copper River Dungeness crab survey results, 1986–2011.....	20
3. Prince William Sound spot shrimp survey results, 1989–2011.....	21

LIST OF FIGURES

Figure	Page
1. Shellfish management districts and sections within Prince William Sound, Registration Area E.	22
2. Areas of note within the Prince William Sound Management Area.....	23
3. Traditional harvest locations for Dungeness crab and razor clams in the Prince William Sound Management Area.	24
4. Management areas and index survey sites for spot shrimp in Prince William Sound.	25
5. Prince William Sound spot shrimp survey mean (average) weight of all spot shrimp and commercially marketable spot shrimp per pot (those equal or greater than 32 mm in carapace length).....	26
6. Shrimp trawl fishing sections in Prince William Sound.....	27
7. Predominate carapace mode length of sidestripe shrimp sampled from commercial trawl harvests in Port Wells and Wells Passage, 1990–1996 and 1998–2011.....	28
8. Fishing areas for weathervane scallops in Prince William Sound.....	29

LIST OF APPENDICES

Appendix	Page
A1. Commercial Dungeness crab harvest and effort in Prince William Sound, 1960–2011.....	32
A2. Effort and harvest in the commercial shrimp pot fishery of Prince William Sound, 1960–2011.....	33
A3. Prince William Sound shrimp trawl effort and harvest, 1972–2011.	34
A4. Commercial razor clam harvest in Prince William Sound, 1980–2011.	35
A5. Commercial harvest of weathervane scallops from Prince William Sound, 1992–2011.....	36
A6. Reported landings and harvests of octopus and squid from Prince William Sound, 1989–2011.	37

ABSTRACT

This report includes summaries of reported harvest and effort information and management actions for Dungeness crab, shrimp, and miscellaneous shellfish fisheries managed by the Alaska Department of Fish and Game (ADF&G) in the Prince William Sound Management Area (Area E). Area E currently encompasses waters of Alaska from 144°00' W. longitude, near Cape Suckling, to the longitude of Cape Fairfield at 148°50.25' W. longitude. ADF&G is responsible for the management of commercial, subsistence, and personal use Dungeness crab *Cancer magister*, sidestripe shrimp *Pandalopsis dispar*, spot shrimp *Pandalus platyceros*, coonstripe shrimp *Pandalus hypsinotus*, weathervane scallops *Patinopecten caurinus*, razor clams *Siliqua patula*, and miscellaneous shellfish which includes squid, octopus *Octopus dofleini*, green urchin *Strongylocentrotus droebachiensis*, and sea cucumber *Parastichopus californicus* fisheries.

Key words: assessment, management, commercial, Dungeness crab, *Cancer magister*, spot shrimp, *Pandalus platyceros*, coonstriped shrimp, *Pandalus hypsinotus*, weathervane scallop, *Patinopecten caurinus*, razor clam, *Siliqua patula*, squid, octopus, *Octopus dofleini*, sea urchin, *Strongylocentrotus droebachiensis*, sea cucumber, *Parastichopus californicus*, Alaska Board of Fisheries, Prince William Sound, Area E.

INTRODUCTION

The boundaries of the Prince William Sound (PWS) Management Area (Registration Area E) historically included waters within PWS and territorial waters of Alaska outside of PWS between the longitudes of Cape Fairfield (148°50.25' W. long.) and Cape Suckling (143°53' W. long.). In 2001, the eastern boundary was moved to 144°00' W. longitude, making the regulatory boundaries consistent among all state shellfish and groundfish fisheries (Figure 1).

The PWS area is divided into the Inside and Outside Districts. The Inside District is defined as waters enclosed by lines from Point Whittshed to Point Bentinck, from Cape Hinchinbrook to Zaikof Point, and from Cape Cleare to Cape Puget. The Outside District, comprised of the Gulf of Alaska waters 0–3 miles from shore, is further divided into two sections, the Western and Eastern. The Western Section includes waters between Cape Fairfield and 147°00' W. longitude and the Eastern Section includes waters between 147°00' W. longitude and 144°00' W. longitude.

The Alaska Department of Fish and Game (ADF&G), Division of Commercial Fisheries manages all commercial shellfish fisheries within the PWS Management Area including federal waters of the exclusive economic zone (EEZ) located 3 to 200 nautical miles (nm) offshore. In the EEZ, ADF&G manages fishing for all species not covered under a federal fishery management plan (FMP). Weathervane scallops are managed by the department in EEZ waters under authority of a FMP developed by the North Pacific Fishery Management Council (NPFMC). The Alaska Board of Fisheries (Board) establishes management regulations and ADF&G uses its emergency order authority to make adjustments to fishing time and area. The Board schedules regular meetings for shellfish on a triennial basis.

This report updates information on several commercially important shellfish species in the Prince William Sound area through the 2011 calendar year (Berceli and Trowbridge 2006). Commercial fisheries include spot shrimp *Pandalus platyceros*, sidestripe shrimp *Pandalopsis dispar*, and weathervane scallops *Patinopecten caurinus*. Subsistence fisheries for razor clams *Siliqua patula* also occur. Commercial fisheries for Dungeness crab *Cancer magister* are closed at this time due to depressed stock conditions. However, the harvest history, management and research programs, and stock status of this species are reviewed. Directed fishing for most other marine invertebrates, including squid, octopus, sea cucumbers, and sea urchins, may occur only under the conditions of a permit issued by ADF&G. Although there are currently no directed

fisheries for these species in PWS, bycatch harvests for octopus and squid, as well as historical efforts to target sea urchins and sea cucumbers, are discussed. Lacking basic stock abundance and status information, any permits ADF&G issues for these species will include an approach for determining a harvestable surplus and obtaining funding for stock assessment. Harvest data for some species within some years and areas, are confidential due to having less than three participants. Table 1 lists emergency orders affecting area fisheries during 2006–2011.

DUNGENESS CRAB

BACKGROUND

Major Dungeness crab harvests historically occurred in Orca Inlet, the Copper River Delta, and Controller Bay areas (Kimker 1985; Figures 2 and 3). Relatively minor harvests of Dungeness crab also occurred from Orca Bay and from the western portion of the Inside District (Figures 1 and 2).

Orca Inlet, immediately adjacent to Cordova, once provided a Dungeness crab fishery for small vessels in an area protected from adverse sea conditions. Harvests ranged from approximately 35,000 lb in 1976 to over 1.5 million lb in 1960, but this area has been closed since 1980 due to low crab abundance (Appendix A1).

The Copper River Dungeness crab fishery occurred along the eastern portion of the Copper River Delta and in the Controller Bay area. Harvests ranged from approximately 70,000 lb in 1991 to 1.5 million lb in 1981, with an average harvest and effort of approximately 590,000 lb and 12 vessels annually during 1983–1992, the most recent fishing years (Appendix A1). A split regulatory open season with dates of March 20 through May 20 and July 25 through December 31 was implemented in 1987 for the Copper River fishery. The May 21 through July 24 closure was designed to reduce handling mortality during the soft shell period following the male molt. Additionally, the Controller Bay area closed by regulation October 15 to reduce gear loss and consequent mortality from storms in this area of shallow water. The Copper River fishery has been closed since 1992 due to low crab abundance.

Statewide Dungeness regulations provided for a male-only harvest with a minimum carapace width of 6½ inches. Gear requirements included a biodegradable escape mechanism and two 4¾ inch escape rings. Regulations specific to PWS included superexclusive area registration, and pot limits of 250 for the Outside District and 100 for the Inside District.

Past management strategies failed to provide for a sustainable fishery and Dungeness abundance remains low despite long-term fishery closures. In 2000, the board adopted a regulatory closure of all PWS Dungeness crab fisheries. Although all commercial and non-commercial fisheries targeting Dungeness crab are currently closed, anecdotal information indicates continued bycatch of Dungeness crab by the Copper River salmon gillnet fleet. The population impacts of this bycatch are difficult to quantify, but may be significant given the status of the stock.

ADF&G has used standardized pot surveys to collect data on size, sex, shell condition, and catch rates of Dungeness crab in the PWS management area. An annual survey in Orca Inlet from 1977 to 1994 was changed to a biennial survey in 1995 due to low crab abundance and budget constraints, and is now conducted opportunistically. The 2002 survey caught no Dungeness crab in 30 pot lifts. The survey was not conducted in 2004 but resumed in 2005 and produced 2 sublegal Dungeness crab in 25 pot lifts. The survey was last conducted in 2008 and produced no Dungeness crab in 15 pot lifts.

The scope of the survey in the Copper River Delta area has changed over time with respect to survey dates and locations fished. Beginning in the late 1970s, ADF&G initiated seasonal closures when soft-shell crab were landed. An annual Dungeness pot survey was begun in 1976 to assess the soft-shell percentage. After adoption of the split season dates in 1987, ADF&G conducted the survey prior to the July 25 opening date. If 10% or more of the crab were in a soft-shell condition, the fishery was delayed, and another survey conducted in August. The July survey was discontinued in 1998 due to the prevalence of soft-shell crab in most years and budget constraints; the August survey is now conducted triennially at standard index sites.

ADF&G surveys documented a precipitous decline and continued low abundance of legal males relative to historical population levels. In the Copper River Delta area, survey catches of legal male crab declined from 16.0 per pot in 1986 to a low of 0.1 per pot in 1997 (Table 2). From 1998 through 2003, survey catches averaged 0.9 legal male crab per pot. Yields increased in 2005 and 2006 with 2.3 and 2.2 legal male crab respectively per pot and then markedly declined in 2008 and 2010 to 0.2 and 0.1 legal male crab per pot respectively.

2012 MANAGEMENT OUTLOOK

The likelihood of a fishery in the near term is low. The decline of the Copper River Dungeness crab stock coincides with the collapse of other shellfish populations in the PWS area and northwest Gulf of Alaska waters (Bechtol 1997). Possible explanations for the stock decline and failure to recover include overfishing, sporadic recruitment, bycatch, predation, and environmental changes that affect disease, growth, and larval survival. Dungeness crab in PWS are at the northern extent of the species' geographic range, a factor that may have implications for recruitment, growth, and survival. Because of the need to maximize crab reproductive opportunity when ecological conditions have improved, continued fishery closures are justified because all crab are needed to sustain the limited existing productivity. The department plans to continue monitoring PWS Dungeness crab through pot surveys. When recovery is evident, a management plan will be developed for consideration by the board and user groups.

POT SHRIMP

BACKGROUND

The Prince William Sound shrimp pot fishery currently occurs within the Inside District in approximately the waters historically designated as the Traditional Harvest Area (THA). Within these waters, the harvest area rotates on an annual basis between three areas (Figure 4).

The shrimp pot fishery has targeted spot shrimp and, to a limited extent, coonstripe shrimp *Pandalus hypsinotus* (Appendix A2). Commercial shrimp landings were first documented in 1960 when approximately 5,000 lb were harvested. From 1960 through 1977, harvest ranged from zero in 1961 and 1966, to approximately 25,000 lb in 1974. The shrimp pot fishery expanded rapidly during 1978 to 1982 as local markets were established and the major harvest areas located. Although early seasons were open year-around, during 1982 to 1984 they were reduced to April 1 through November 30 and a guideline harvest range (GHR) of 75,000 to 145,000 lb was adopted. Despite the shortened season, catch increased to approximately 214,000 lb in 1982 and effort increased to 79 vessels in 1984. Beginning in 1985, the board established a split season of March 15 through June 30 and August 15 through December 5, with a GHR of 75,000 to 100,000 lb each season, and an experimental harvest area with no closed season. The split season was intended to reduce harvests during the egg bearing periods. Due to

incomplete and late catch reporting, coupled with harvest from the experimental fishing area, harvests substantially exceeded the GHR over the next few years. Harvest peaked at approximately 290,600 lb in 1986 and effort increased to 86 vessels in 1987. Harvest declines beginning in 1988 indicated stock conservation problems. The *Exxon Valdez* Oil Spill (EVOS) complicated prosecution of the 1989 fishery in which 33 vessels harvested 29,315 lb. In 1991, a limited commercial fishery with a conservative guideline harvest range of 10,000 to 40,000 lb was closed after 46 days of fishing had yielded only 17,580 lb taken by 15 vessels in 45 landings. Fishery performance data from the 1991 fishery indicated low shrimp abundance. In 1994 the board lowered the PWS pot shrimp GHR to 0–100,000 lb, and in 2000 closed the commercial fishery until the population rebuilt and a new management plan was adopted.

Although the commercial spot shrimp season was closed by emergency order beginning in 1992 and closed by regulation in 2000, noncommercial fisheries remained open. Prior to 2000, the noncommercial season was open year around. Gear for sport and personal use shrimp fishing was limited to 5 pots per person and 10 pots per vessel and for subsistence fishing was 10 pots per person and 20 pots per vessel. In 2000, the board made a customary and traditional use determination that 9,000–15,000 lb of useable shrimp are reasonably necessary for subsistence in the PWS area, and restructured the subsistence, personal use, and sport fisheries. The new regulations established open fishing season dates of April 15 through September 15, gear limits of 5 pots per person and 5 pots per vessel, and a harvest permit requirement. The closed season protected egg-bearing females and the permit provided the department with participation and harvest data.

In 1989, as part of the EVOS damage assessment process, ADF&G initiated an annual survey using pot gear to assess spot shrimp in the THA (Trowbridge 1992; 1994). Six stations in the northern, western, and southwestern portions of PWS have been surveyed since 1989, with two additional stations added in southwestern PWS in 1991, and one additional station added in 2009. (Figure 4). Data from the survey, specifically catch per unit of effort (CPUE) and sex ratios, were used to make management decisions regarding the 1991 fishery and in subsequent years when the fishery was closed by emergency order. Sex ratios are particularly important because spot shrimp are protandric hermaphrodites that first recruit to the fishery as males and as they grow, later transition to females. Fishing pressure therefore typically has the greatest impact on the larger, female, segment of the population.

Catches in the department's standardized index survey for spot shrimp declined 55% from 1.29 lb per pot in 1989 to 0.29 lb per pot in 1998 (Table 3). After 1998, survey catches demonstrated a slow, but steady increase in abundance and biomass from 0.29 lb/pot to 2.58 lb/pot for all shrimp in 2008. Similarly, survey results for commercially marketable shrimp with a carapace length of 32 mm or greater also increased from 0.14 lb/pot to 1.08 lb/pot in 2008 (Figure 5). In March of 2009 the Board adopted regulations for a commercial shrimp pot fishery in PWS with two stipulations; first that a harvestable surplus of 110,000 lb exists before a commercial harvest may occur and second that 60% of the harvestable surplus would be allocated to the non-commercial fishery. Additionally, several conservative management elements were built into the management approach including:

- 1.) Commercial fishing activities are rotated on an annual basis between the waters described in 5 AAC 31.210(a) (1), (2), and (3) (Figure 4).

- 2.) The department determines on an annual basis the number of shrimp pots that may be operated from a vessel based on the total number of registered vessels, the estimated catch per unit effort, and the magnitude of the guideline harvest level.
- 3.) Shrimp pot gear may only be deployed and retrieved between the hours of 8:00 a.m. and 4:00 p.m., unless modified by emergency order.
- 4.) Each week and before each landing, shrimp fishermen must contact the department and provide all required harvest information.

Statewide commercial shrimp regulations describe buoy marking, maximum tunnel size, and a biodegradable escape mechanism. Area shrimp pot regulations specify that a pot may not have more than one bottom, a vertical height of more than 24 inches, more than 4 tunnel eye openings, or a bottom perimeter exceeding 124 inches. Additionally, a shrimp pot must be entirely covered with net webbing or rigid mesh and at least 2 adjacent sides or 50% of the vertical or near vertical sides must be covered with net webbing or rigid mesh that allows the unaided passage of a 7/8-in dowel. The PWS Area is a superexclusive registration area for vessels fishing for shrimp with pot gear and a commissioner's permit is required to fish in the eastern area to allow monitoring of effort and catch via mandatory logbooks and ADF&G contact.

The PWS commercial pot shrimp fishery opened April 15, 2010 after an 18 year closure with a guideline harvest level (GHL) of 55,000 pounds and gear limits of 20 pots per vessel. A total of 155 vessels registered for the fishery and 73 participated in the fishery with only 12 making more than two trips. The first 3 fishing periods were short, 4, 6, and 7 days respectively. The third fishing period was extended several times by emergency order and finally extended indefinitely. Hours of gear operation were extended to 8:00 a.m. to 8:00 p.m. during the second fishing period in order to increase gear efficiency by increasing soak time and allow fisherman more time to relocate gear (Table 1). These hours remained in effect for the duration of the season. Effort was highest during the first period and declined steadily throughout the fishery with an average of 5 vessels participating during the months of May through September 15. Average fishery catch per unit effort was 2.5 lb per pot. The season closed by regulation on September 15 with a total harvest of 45,349 pounds, from 232 landings by 73 vessels. (Appendix A2).

An ADF&G study following the EVOS concluded that PWS spot shrimp likely declined as a result of overfishing (Trowbridge 1992). Successive depletion and insufficient resolution of harvest location masked localized CPUE declines until decreased stock abundance was widespread. An ADF&G tagging study during 1983–1986 indicated that spot shrimp lifespan exceeds 7 years (Kimker et al. 1996). Spot shrimp are also remarkably sedentary, making them particularly susceptible to serial depletion. The fishery is also size and female selective because spot shrimp are hermaphroditic, beginning life as males and becoming females as they attain a larger size. However, similar to other shellfish populations throughout the Gulf of Alaska, environmental conditions were likely instrumental in the decline and slow recovery of spot shrimp in PWS (Bechtol 1997).

2011 SEASON SUMMARY

The 2011 pot shrimp season in PWS opened on April 15 with a GHL of 52,760 pounds and closed by emergency order on July 29 with a harvest total of 52,694 pounds, 99.9% of the GHL. The department issued 92 vessel registrations and 44 of those vessels participated with only 16 making more than two landings in the fishery. Spot shrimp comprised 98% (51,446 lb) of the total catch while coonstripe shrimp comprised 2% (1,204 lb) and other species totaled less than

1% (44 lb). Vessels were limited to 40 pots and gear deployment hours were relaxed to 8:00 a.m. to 8:00 p.m. daily. The first fishing period was established for 5 days in order to accurately gauge effort and catch. The second and third fishing periods were 7 and 15 days respectively. A fourth and final fishing period opened for 29 days and was extended indefinitely. The season closed July 29 upon attainment of the GHL. During the fourth fishing period the hours for gear deployment were also extended to 6:00 a.m. to 10:00 p.m. daily on July 2 (Table 1). Effort was highest during the first fishing period and declined steadily over the entire season. Catch per unit effort in pounds of whole shrimp per pot varied by fishing period from 1.52 lb in the first period, 1.61 lb in the second period, 2.20 lb in the third period, 2.25 lb in the fourth period, and 1.80 lb in the fourth period extension. Average catch per unit effort was 1.78 lb whole weight. The reporting requirements as well as the ability to control the pace of the fishery with fishing periods and hours of gear deployment contributed to successful management of the fishery.

2012 MANAGEMENT OUTLOOK

Department survey results for 2011 suggest that spot shrimp abundance remains high relative to recent years and a commercial fishery is likely. Mean weight per pot of commercially marketable shrimp (≥ 32 mm carapace length) was 1.7 lb, the highest in the history of the survey (Figure 5). The southwestern portion of PWS, “Pot Fishery Area 3”, is scheduled to open for 2012 and fishery management will be similar to the recent two seasons (Figure 4). Effort is expected to be lower than the recent 2 years due to the distance from port of the open fishing area.

SHRIMP TRAWL

BACKGROUND

Historical PWS shrimp trawl landings date to the early 1970’s but the fishery didn’t develop until the late 1970s when several vessels harvested northern (pink) shrimp *Pandalus borealis* from Icy Bay and adjacent waters of southwest PWS. Harvest and effort in the fishery peaked in 1984 with approximately 1.3 million lb and 14 vessels before declining to 245,870 lb and 3 vessels in 1986 (Appendix A3). As the fishery for northern shrimp declined due to low abundance, reduced exvessel value, and limited processing capabilities, a fishery targeting sidestripe shrimp began to develop.

Commercial harvests of sidestripe shrimp were first documented in 1983 from Icy Bay and southwest PWS waters, but subsequent effort focused on Port Wells and Wells Passage in northwest PWS (Figure 2). Sidestripe shrimp harvests increased in 1985 as markets developed for a fleet of small vessels targeting previously unfished stocks. The fishery operated chiefly from the port of Whittier. Shrimp tails were sold fresh in PWS communities and Anchorage while markets for whole, fresh, and frozen sidestripe shrimp existed in both Anchorage and Japan (Trowbridge 1995). ADF&G has used logbooks, fish tickets, and catch reporting requirements to manage the fishery.

During the period 1987 to 1993, sidestripe shrimp fishery harvest and effort increased from less than 100,000 lb landed by 2 vessels to 246,000 lb landed by 7 vessels. As the fishery continued to develop, uncertainty increased about sidestripe shrimp stock status in the Wells Section. In 1990 the department began placing an observer aboard vessels and using catch data to calculate an area-swept estimate of shrimp abundance in the Port Wells and Wells Passage area. The GHL was determined inseason by applying a 20% harvest rate to the estimated shrimp biomass.

Although this management strategy initially seemed conservative, GHL declined from 80,000 lb in 1991 to 19,000 lb in 1999. From 1999 the Wells Section GHL gradually increased to 34,400 lb in 2001, but declined to 23,500 lb in 2002 before again increasing to 36,700 lb in 2004. Since 1999 the GHL has gradually increased to a high of 104,700 lb in 2010.

The GHL for the Perry Passage area of the Northwest Section was established at 16,000 lb in 1995 based on an area-swept biomass estimate and a 20% harvest rate. Effort has historically been low in this area of strong current. The GHL was increased to 18,500 lb in 1996 based on increased fishery CPUE. Although the GHL remained at 18,500 into the 1998 season, the fishery was closed before the GHL was attained, due to declines in CPUE. Based on the 1998 fishery performance the 1999 GHL was reduced to 14,000 lb and has remained at that level. From 1999 to 2006 the GHL was attained by late May to late June. Although some effort has occurred, the GHL has not been attained since 2006.

The trawl fishery in the Central and Southwest Sections of PWS has been managed using historical catches and CPUE (Figure 6). During 1992 and 1993, effort in these areas increased sharply and included two larger catcher-processors. Catch and CPUE declined in these areas resulting in reduced harvest levels. Since 1995, the GHL for the central and southwest areas has been 33,000 lb based on the 1994 harvest from these areas. The GHL was attained in 1997, but not in 1998 or 1999 due primarily to low effort. Although the GHL was attained by mid July or early August during 2000 to 2006, and some effort has occurred in recent years, the GHL has not been attained since 2006.

Regulations for shrimp trawling in northwestern PWS adopted in 1986 included seasons, a commissioner's permit requirement, cod end specifications including 1 $\frac{5}{8}$ inch mesh hung square to the mouth of the net, and a 10% limit on retention of northern shrimp. In 1990, the cod end mesh size was increased to 1 $\frac{7}{8}$ inches to facilitate release of small sidestripe and pink shrimp. Shrimp trawling regulations were largely restructured in 1994 when the board adopted open season dates of April 15 through August 15 and October 1 through December 31, amended the cod end requirement and created the Northwest Shrimp Trawl Fishing District (NSTFD). The NSTFD was defined as waters north of 60°27.00' N. lat. and west of 147°20.00' W. long. and integrated important harvest areas as Port Wells, Wells Passage, and Perry Passage. The new season dates were based on biological data indicating that egg release was not complete until April 15 and industry reports that soft-shell shrimp were present until October 1.

In 2000, the Board adopted a regulation requiring that shrimp trawls be equipped with a finfish excluder device and in 2003 the Board adopted regulations restructuring shrimp trawl management areas. The NSTFD was repealed and the new sections created by this action were the Northwest, Wells, Southwest, and Central Sections (Figure 6).

The PWS Area is a nonexclusive registration area for vessels fishing for shrimp with trawl gear and current regulations restrict the retention of northern shrimp or other pandalid species to no more than 20% by weight of the shrimp in possession. They also require catch reporting within 24 hours of landing and that completed logbook sheets are returned with fish tickets within 7 days of landing.

Other regulatory measures for the shrimp trawl fishery include:

1. Open season dates of April 15 through August 15 and October 1 through December 31.
2. Cod end mesh composed entirely of 1 $\frac{7}{8}$ inch stretched mesh hung horizontal and

perpendicular to the mouth of the trawl.

3. A year around closure in eastern Prince William Sound to minimize indirect fishing mortality on depressed stocks of king and Tanner crabs in these key production areas (Figure 6).
4. A shrimp trawl must be equipped with a finfish excluder device consisting of a rigid grate with parallel bars spaced not more than 2½-inch apart, except they may be spaced 4 inches apart if the operator of the shrimp trawl also holds a PWS limited entry sablefish permit and is registered for the current year's fishery. Regulations specify how the excluder must be secured within the trawl and define an escapement outlet.

The regulatory spacing of 2½ inches for excluder bars was adopted as a compromise between ADF&G and industry in an effort to reduce discard mortalities of finfish and shrimp. With the exception of the PWS sablefish fishery, nonpelagic or "bottom" trawls are not legal gear for targeting groundfish in PWS.

In addition to fishery performance data collected by ADF&G observers in the Port Wells and Wells Passage area, the sidestripe shrimp harvest is sampled for sex and size composition as indicators of change in stock status (Charnov 1981). Sex composition is important because sidestripe shrimp are protandric hermaphrodites that first recruit to the fishery as males and later transition to females. More intensive fishing pressure typically has the greatest impact on the larger, female, segment of the population. Female proportions in sidestripe shrimp samples from the PWS fishery have varied greatly over the last 2 decades, from a high of 44% in 2003 to a low of 5% in 2008. The extent of gear selectivity with respect to cod end mesh size and excluder requirements remains unknown. However, the predominant carapace length mode of male, transitional, and female sidestripe shrimp has remained fairly consistent and has only varied by a few millimeters between years (Figure 7).

2011 SEASON SUMMARY

The PWS sidestripe shrimp fishery opened by regulation April 15, 2011. The preliminary GHL for the Wells Section was 104,700 lb based on the results of the 2010 assessment. Preliminary GHLs for the Northwest Section and the combined Central and Southwest Sections were 14,000 lb and 33,000 lb, respectively. The GHL in the Port Wells and Perry Passage area was subsequently adjusted in season to 98,745 lb based on the inseason area-swept biomass estimates and a 20% harvest rate methodology.

The 2011 PWS sidestripe shrimp fishery closed December 31 by regulation. Total harvest remains confidential due to participation of a single vessel.

2012 MANAGEMENT OUTLOOK

ADF&G will continue to manage the sidestripe trawl fishery in the Wells Section using an area-swept population estimate generated from commercial trawl vessel data. The preliminary 2012 GHLs will be 98,000 lb for the Wells Section, 33,000 lb for the combined Central and Southwest Sections and 14,000 lb for the Northwest Section. Effort in the fishery is expected to remain stable due to the relatively low GHL. ADF&G will continue to monitor logbook and observer data for significant changes in CPUE.

RAZOR CLAMS

BACKGROUND

The community of Cordova once regarded itself as the “razor clam capital of the world.” Annual harvests from the early-1900s through the mid-1950s achieved a maximum of 3.6 million lb in 1917 and frequently exceeded 1.0 million lb. Most of the harvest was canned for human consumption. Although historical fishery data are imprecise, it appears the majority of razor clam harvests occurred in Orca Inlet and the western Copper River Delta (Figure 3). The eastern Copper River Delta, which includes Kanak Island, was not a substantial contributor to early harvests.

From the late 1950s through the early 1980s, Alaska clam markets had declined due to market concerns for paralytic shellfish poisoning (PSP) and the inability to certify product as being free of PSP (Nickerson 1975). During this period, markets changed to the use of razor clams as Dungeness crab bait. The decline in razor clam harvest in Orca Bay and the western Copper River Delta was also attributed to a variety of factors including a market shift from the U.S. West coast to the East coast clam fishery, substrate change due to a siltation event from the Copper River in 1958, and habitat loss as result of the 1964 Good Friday Earthquake (Nickerson 1975). The 1958 siltation event is thought to have severely affected juvenile survival, while the 1964 earthquake caused significant uplift in prime razor clam habitat in Orca Inlet. These events contributed to the low harvests in the 1970s and early 1980s and were followed by a shift in clam digging effort to the east side of the Copper River Delta and Controller Bay area.

Demand for PWS razor clams increased again in 1983 when clam harvests for human consumption declined in Washington State. The majority of the PWS clam harvest subsequently occurred at Kanak Island with lesser harvests coming from Softuk and Katalla beaches (Figure 3). Annual harvests during the 1980s attained a maximum of approximately 168,000 lb in 1984 before declining to less than 7,000 lb in 1988, with an average harvest and effort of 48,000 lb by 16 diggers during 1979–1988 (Appendix A4). No commercial harvests have occurred since 1988, except in 1993; 1993 data remain confidential because only 2 diggers participated.

There is no closed season for razor clams and a guideline harvest range of 100,000 to 150,000 lb is in effect for the combined commercial and sport/subsistence harvests from Kanak Island. By regulation, clams harvested from Kanak Island must be used for human consumption as food. There is a 4½ inch (114 mm) minimum legal size for all commercially harvested razor clams in the Copper River Delta. Commercial harvest beaches need annual certification by the Alaska Department of Environmental Conservation (ADEC) before bivalves can be sold for human consumption. Currently there are no areas within PWS that are certified for commercial clam harvest by ADEC. No harvest of the razor clam resource will be permitted until regulatory requirements of both ADEC and ADF&G are met. ADF&G historically monitored commercial razor clam harvests via fish ticket information.

A harvest permit must be obtained from ADF&G prior to the noncommercial harvesting (subsistence, sport, and personal use) of razor clams from the Copper River Delta. Regulations further specify a minimum legal size of 4½ inch (114 mm) for retained razor clams from areas east of 146° W. long. and south of a line from Point Bentinck to the southernmost tip of Point

Whitshed. Reported noncommercial harvests ranged from 2 lb by 2 diggers in 2009 to 6,225 lb in 1987 (Appendix A4).

2011 SEASON SUMMARY

ADF&G staff in Cordova issued 11 noncommercial razor clam harvest permits. One successful digger harvested 2.5 lb of razor clams. Nine individuals receiving a permit did not dig, and one individual was unsuccessful. Harvests occurred on Hinchinbrook beaches.

2012 MANAGEMENT OUTLOOK

Although ADF&G does not directly assess abundance of razor clams, reports from noncommercial diggers indicate that razor clam abundance in the eastern Copper River delta, Katalla, and Controller Bay areas remains at a very low level. This information is supported by the low number of subsistence permits issued in recent years and the complete lack of interest from commercial diggers.

WEATHERVANE SCALLOPS

BACKGROUND

The commercial fishery for weathervane scallops in the PWS registration area began in 1992 near Kayak Island, and its history reflects a continuous progression of regulatory changes, management measures and fishing practices (Figure 8; Appendix A5). The fishery developed during a phase of industry expansion and transition from short trips with iced product to extended trips with product frozen onboard (Barnhart 2000; Shirley and Kruse 1995). Harvests occur in a small portion of the management area and typically more than 3 miles from shore, placing most fishing effort in waters of federal jurisdiction. The department manages this fishery in both federal and state waters via authority deferred to the state through a federal FMP and the Alaska Scallop Fisheries Management Plan (Kruse 1994; NPFMC 1997).

Although vessels were initially given substantial liberty to explore potential fishing areas, waters inside of PWS and adjacent waters of the Gulf of Alaska were closed to scallop dredging due to concerns for the bycatch of depressed Tanner and Dungeness crabs (Figure 8).

In 1992, fishing began in late February and the GHL of 64,000 lb of scallop meats was calculated inseason using area-swept methods and a 10% harvest rate for the area east of 147°00' W long. (Figure 8). The fishery closed in April with a harvest total of approximately 209,000 lb of meats by 4 vessels (Appendix A5). The discrepancy between the 1992 GHL and actual harvest was attributed to a lack of timely and accurate catch reporting, and insufficient data about the scallop biomass.

ADF&G management measures for the PWS fishery evolved significantly in 1993 when an interim fisheries management plan was implemented under regulation 5 AAC 39.210. Management Plan for High Impact and Emerging Fisheries. This interim plan was then finalized into regulation in 1994 and included the following components:

1. Area registration.
2. Gear restrictions, including 4-inch ring size and a maximum of two 15-foot dredges.
3. Guideline harvest level of 50,000 lb of shucked meat for the eastern area.
4. Bycatch caps of 500 and 130 Tanner crabs east and west of 147°00' W. long.
5. Season dates set by emergency order.

6. Industry funded observer program.
7. Crew size limit of 12.
8. Department specified catch reporting

In addition to the eastern area GHL, the area west of 147°00' W. longitude was given an initial GHL of 5,000 lb to provide opportunity for exploratory fishing. The 500 Tanner crab bycatch cap was established as 0.5% of the Kayak Island Tanner crab harvest during the 1980–1983 crab seasons. The 1993 fishery opened July 15 with a 50,000 lb GHL and closed July 18 with 7 vessels landing 63,068 lb of meats.

In 1994 the season opening date changed from July 1 to January 10 with closure by emergency order; because of this change the fishery did not open in 1994 as it would have resulted in doubling the harvest within a single cycle. Additionally, closure areas, intended to protect depressed Tanner crab and Dungeness crab stocks, were established in eastern PWS and along the Copper River Delta (Figure 8).

The 1995 weathervane scallop seasons opened January 10 and closed by emergency order January 26 when the 50,000 lb GHL was attained. Subsequent to the 1995 closure, an unlicensed vessel fished the Kayak scallop bed but remained outside territorial waters. This action identified a loophole in the Magnuson Fishery Conservation and Management Act (MFCMA) in which a vessel not licensed or registered by the State of Alaska could not be restricted from fishing scallops managed by the state in federal waters. Federal fisheries managers subsequently closed all scallop fisheries in federal waters off Alaska, but not before an estimated additional 60,000 lb of meats had been harvested near Kayak Island. Commercial scallop fishing remained closed in federal waters through the 1996 PWS season while federal fisheries regulations were restructured.

Also in August of 1995, the department initiated a fishery-independent scallop survey in waters east of Kayak Island to assess stock condition and effects of the postseason harvest. ADF&G returned in 1996 to conduct a systematic area-swept assessment using an 8-ft New Bedford style dredge initially contributed by the industry. The dredge is equipped with a liner to maximize retention of scallop samples that are sampled for age and size composition, and sexual maturity. Survey results indicated recruitment to the Kayak Island bed was very low with only 11% of sampled scallops younger than age 7 and therefore a conservative GHL of 17,200 lb of scallop meats was warranted for the 1997 season (Bechtol and Bue 1998). The 1997 fishery opened on January 10 and closed on January 19, with a harvest total of 18,000 lb. In March of 1997 a regulatory change moved the opening date of the scallop season from January 10 back to July 1.

In 1998 ADF&G's scallop survey was expanded to include waters located east and west of Kayak Island. Scallops beds were determined to occupy fairly discrete and limited areas with the highest concentrations occurring in federal waters. Results of the assessment survey indicated age-9 and age-10 year classes primarily composed the population. Variable recruitment was one determinant in applying the conservative exploitation rates of 4% and 8% to biomass estimates for areas east and west of the longitude of Cape Saint Elias. Using this approach, the calculated GHLs for 1998–1999 and 1999–2000 for these two areas were 6,000 and 14,000 lb of scallop meats. This survey established the precedent of conducting a biennial survey to establish separate GHLs for waters east and west of Cape Saint Elias for two consecutive fishing seasons (Appendix A5; Figure 8). The 1998–1999 season opened July 1 and waters east of the longitude

of Cape Saint Elias closed on July 2 while waters west of the longitude of Cape Saint Elias closed on July 4, with a harvest total of 19,650 lb.

The 1999–2000 weathervane scallop fishery opened on July 1. The eastern area closed July 3 and the western area closed July 4, with a harvest total of 20,275 lb. This season and the previous one are notable for being two of the shortest on record.

A federal license limitation program (LLP) for scallop fishing in federal waters was implemented in 2000 resulting in a total of 9 vessels being eligible to fish scallops in Alaskan waters. In 2002, the Alaska State Legislature passed a vessel permit system bill which resulted in significant changes to the state's limited entry statutes. Subsequently, in 2004 the Commercial Fisheries Entry Commission (CFEC) adopted regulations establishing the Vessel Limited Entry Program (LEP) for vessels participating in the scallop fishery in state waters; two vessel length categories of greater than 80 feet and 80 feet and less resulted in the 9 vessels licensed under the federal LLP being eligible for a state LEP (Free-Sloan 2007).

Also in 2000, the BOF adopted a regulation restricting the scallop fishery to the Eastern Section of the Outside District (Figure 1). This measure provided the opportunity for some exploration while protecting unassessed areas.

Based on improved results of the 2000 assessment survey, 2000–2001 and 2001–2002 GHGs were increased to 9,000 and 21,000 lb of scallop meats for areas east and west of Cape Saint Elias. The 2000–2001 season opened July 1 and closed July 31 in the eastern harvest area with a harvest of 8,998 lb and August 2 in the western area with a harvest of 21,268 lb. Tanner crab bycatch was estimated to be 365 crab from the eastern area and 182 crab from the western area, or 547 total crab. Approximately half of the estimated Tanner crab bycatch in the eastern area occurred in a single tow where sample data expanded to 48% of total fishery bycatch. Tanner crab samples were juveniles, ranging from 13 mm to 29 mm carapace width.

Prior to the 2001 regulatory season, a vessel cooperative formed among some, but not all Alaska weathervane scallop fishery permit holders. The effect in the Kayak fishery has been to considerably reduce the race for fish. Additionally, vessel owners and operators within the cooperative have taken an active role in developing measures aimed at reducing crab bycatch by sharing in-season information with each other.

Beginning in 2001, Tanner crab bycatch caps were set at 0.5% of the Tanner crab population estimate from the 2000 scallop assessment survey. This resulted in bycatch limits of 2,700 and 8,700 for the east and west harvest areas. The 2001–2002 season opened July 1 and closed February 8 in the eastern area and February 11 in the western area; harvest data are confidential. Estimated fishery bycatch was 43 Tanner crab.

The 2002 assessment survey yielded poor results. Available age composition data indicated poor recruitment for this population. A decline in stock biomass would be expected given the relatively poor recruitment observed in recent years. However, it is likely that population biomass estimates were artificially low due to survey gear difficulties. As a precaution, ADF&G applied the GHGs from the 1998 assessment of 6,000 and 14,000 lb for the eastern and western areas respectively for the 2002–2003 and 2003/04 scallop seasons. The 2002–2003 season opened July 1 and closed February 14 in the eastern area and by regulation on February 15 in the western area with a total harvest of 15,641 lb from 2 vessels.

The 2003 season opened July 1 and closed January 23 in the western section and January 24 in the eastern section with a total harvest of 19,980 lb from a single vessel.

The 2004 assessment survey yielded substantially improved results. Guideline harvest levels for 2004–2005 and 2005–2006 of 26,000 lb and 24,000 lb for waters east and west of Cape Saint Elias were established by applying harvest rates of 5.2% and 5.3% to the respective population estimates. Justification for the increased GHGs was the evidence of recruitment, relatively low harvest rates and comparison of dredge and video data (B. Bechtol, Commercial Fisheries Biologist, ADF&G, Homer; personal communication). The 2004 season opened on July 1 and the eastern section closed October 22 while the western section closed by regulation February 15. Total harvest was 49,320 lb from 2 vessels.

The 2005–2006 Kayak Island scallop fishery opened July 1. The western section closed on August 13 with a harvest total of 23,875 lb, and the eastern section closed on August 22 with a harvest total of 25,458 lb. Tanner crab bycatch estimates were 173 and 234 for the east and west areas.

The 2006 assessment survey indicated a decline in biomass in both the eastern and western areas, resulting in GHG's of 20,000 lb and 17,000 lb respectively for 2006–2007 and 2007–2008.

The 2006–2007 season opened July 1 and the eastern and western sections closed on July 7 and July 11 with harvests of 20,010 and 17,005 lb. The 2007–2008 season opened July 1 and the eastern and western sections closed on August 8 and August 11 with harvests of 20,015 and 17,090 lb.

The 2008 assessment survey again demonstrated a decline in biomass and GHG's were further reduced to 15,000 lb and 5,000 lb for the eastern and western areas for the 2008–2009 and 2009–2010 seasons. The 2008–2009 season opened on July 1 and the eastern and western sections closed on July 15 and July 8 with harvests of 15,030 and 5,010 lb.

The 2009–2010 season opened July 1 and the eastern and western sections closed on October 6 and September 26 with harvests of 14,859 and 4,491 lb.

The 2010 survey of the eastern area was incomplete due to weather and equipment failure, and the western area yielded poor results. The biomass estimate of 738,945 lb whole weight was only 46% of the 2008 estimate, and the western area was closed to commercial scallop fishing for the 2010–2011 and 2011–2012 seasons. The GHG for the east side was determined by reducing the previous year's GHG of 15,000 lb by the 44% decline observed in fishery CPUE, resulting in a GHG of 8,400 lb for the 2010–2011 and 2011–2012 seasons. The 2010–2011 season opening for the eastern section was delayed in an attempt to complete the 2010 survey, and opened by emergency order August 16. The season closed August 23 with a harvest total of 8,445 lb.

2011 SEASON SUMMARY

The 2011–2012 Kayak Island scallop fishery opened at 12:00 noon July 1, 2011 for the harvest area east of the longitude of the Cape St. Elias Lighthouse, and south of Kayak Island with a GHG of 8,400 lb of scallop meats. Waters west of Cape Saint Elias were closed to commercial scallop fishing by emergency order. Waters east of Cape Saint Elias closed to commercial scallop fishing on August 5 with a total harvest of 8,460 lb. No Tanner crab bycatch was observed during the fishery. As area scallop beds managed for separate GHGs are in close

proximity and have produced some of the highest catch rates observed in Alaska, mandatory observer coverage in this fishery is necessary to verify CPUE, bycatch, and scallop harvest by area.

2012 MANAGEMENT OUTLOOK

The department plans to conduct an assessment survey in May 2012. Survey results will be used to make a determination regarding a fishery. Effort in the PWS fishery is expected to remain low due to the relatively small GHL and the cooperative harvest approach currently in place among most eligible permit holders.

MISCELLANEOUS SHELLFISH

BACKGROUND

There are no directed fisheries for miscellaneous shellfish in PWS, however squid and octopus are taken as bycatch in other directed fisheries. Squid are encountered in ADF&G bottom trawl surveys (Bechtol 1999) and taken as bycatch during the commercial pollock trawl fishery and to some extent in the shrimp trawl fishery (Berceli et al. 2008). Since 1989 the harvest of squid has ranged from 0 lb in some years to 180,250 lb by 3 vessels over 22 landings in 2002 (Appendix A6). All harvest in 2002 occurred as bycatch in the pelagic trawl fishery for pollock that primarily occurs in Port Bainbridge and waters north of Hinchinbrook Entrance. (Figure 2). While the 2002 squid bycatch level was a dramatic increase over previous years, it was unclear whether the increase resulted from fishing practices or changes in the relative abundance of squid and pollock (Berceli et al. 2008). Subsequently, bycatch in the pollock fishery was set at 5% to encourage more efficient fishing practices.

Octopus is primarily harvested incidentally to the Pacific cod pot fishery. Octopus harvests first exceeded 1,000 lb in 1992, and attained the high harvest of 5,798 lb by 7 vessels in 1994 (Appendix A6). Octopus harvests from 1992 to 1998 averaged 3,400 lb, with no reported harvests from 1999–2001 and 2006–2009, and 939 lb harvested in 2010.

ADF&G has received several inquiries regarding the abundance of sea cucumbers and urchins. There are no reported landings of sea cucumbers or urchins from PWS, nor does ADF&G assess these species. The most recent commercial effort for sea cucumbers occurred in 1992 when 5 permits were issued but no catch reported. This is consistent with anecdotal reports on abundance from both ADF&G and sport divers. No permits have been issued for sea urchin harvest and anecdotal information indicates few urchins of a marketable size occur in PWS.

2011 SEASON SUMMARY

The incidental harvest of squid in the pollock trawl fishery totaled 16,841 lb. There was no harvest of octopus reported in 2011.

2012 MANAGEMENT OUTLOOK

ADF&G will continue to monitor squid bycatch in the pollock fishery to see that the harvest cap is not exceeded. Squid bycatch has not been utilized for commercial purposes but has become very popular with cannery workers for personal consumption.

ACKNOWLEDGEMENTS

The authors would like to thank staff of the Homer and Cordova offices of the Alaska Department of Fish and Game for their contributions to this report. Much of the historical information in this report was developed by Al Kimker and Wayne Donaldson. In particular, many of the data were collected by John Buchanan, Jane Browning, Karen Swartzbart, James Vansant, David Branshaw, and David Anderson. Portions of the data collection or analysis in the report were partially funded by a grant-cooperative agreement from the National Oceanic and Atmospheric Association. The views expressed herein are those of the authors and do not necessarily reflect the views of NOAA or any of its subagencies.

REFERENCES CITED

- Barnhart, J. P. 2000. Annual management report for the shellfish fisheries of the Westward Region, 1999. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 4K00-55, Kodiak.
- Bechtol, W. R. 1997. Changes in forage fish populations in Kachemak Bay, Alaska, 1976-1995. pp: 441-455, [in]: Forage Fishes in Marine Ecosystems. Alaska Sea Grant College Program Report 97-01. University of Alaska, Fairbanks.
- Bechtol, W. R. 1999. A bottom trawl survey for crabs and groundfish in the Prince William Sound Management Area, 16-26 August 1997. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 2A99-24, Anchorage.
- Bechtol, W. R., and B. G. Bue. 1998. Assessment of weathervane scallops *Patinopecten caurinus* near Kayak Island, Alaska, 1996. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 2A98-20, Anchorage.
- Berceli, R., C. E. Trowbridge, K. J. Goldman, and C. Russ. 2008. Review of Prince William Sound management area groundfish fisheries; a report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Division of Commercial Fisheries, Special Publication No. 08-12, Anchorage.
- Berceli, R., and C. E. Trowbridge. 2006. Review of Prince William Sound Area Dungeness crab, shrimp, and miscellaneous shellfish fisheries, a report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Division of Commercial Fisheries, Special Publication No. 06-10, Anchorage.
- Charnov, E. L. 1981. Sex reversal in *Pandalus borealis*: effect of a shrimp fishery? *Marine Biology* 2:53-57.
- Free-Sloan, N. 2007. A Brief Overview of the Alaska Weathervane Scallop Fishery and the Vessel Permit Limited Entry Program. Commercial Fisheries Entry Commission Report 07-2N, Juneau, AK 99801. www.cfec.state.ak.us/research/07-2n/rpt07-2n.pdf
- Kimker, A. 1985. Overview of the Prince William Sound Management Area Dungeness crab fishery. pp: 77-84 [in]: Melteff, B.R. (editor). Proceedings of the symposium on Dungeness crab biology and management. Alaska Sea Grant, Report No. AK-SG-85-3, University of Alaska, Fairbanks.
- Kimker, A., W. Donaldson, and W. R. Bechtol. 1996. Spot shrimp growth in Unakwik Inlet, Prince William Sound, Alaska. *Alaska Fishery Research Bulletin* 3(1):1-8.
- Kruse, G. H. 1994. Draft fishery management plan for commercial scallop fisheries in Alaska. Alaska Department of Fish and Game, Division of Commercial Fisheries, Special Publication No. 5, Juneau.
- Nickerson, R. B. 1975. A critical analysis of some razor clam (*Siliqua patula*) populations in Alaska. Alaska Department of Fish and Game, Division of Fisheries Rehabilitation, Enhancement, and Development, Juneau.
- NPFMC (North Pacific Fishery Management Council). 1997. Stock assessment and fishery evaluation report for the scallop fisheries off Alaska. North Pacific Fishery Management Council, Anchorage.
- Shirley, S. M., and G. H. Kruse. 1995. Development of the fishery for weathervane scallops, *Patinopecten caurinus* (Gould 1850), in Alaska. *Journal of Shellfish Research* 14:71-78.
- Trowbridge, C. 1992. Injury to Prince William Sound spot shrimp. Final report for *Exxon Valdez* Oil Spill State/Federal NRDA Subtidal Study No. 5.
- Trowbridge, C. 1994. Spot shrimp, *Pandalus platyceros*, surveys in the Prince William Sound Management Area, 1989-1993. Alaska Department of Fish and Game, Division of Commercial Fisheries Management and Development, Regional Information Report No. 2A94-31, Anchorage.
- Trowbridge, C. 1995. Prince William Sound Management Area, 1995 shellfish area management report. Alaska Department of Fish and Game, Division of Commercial Fisheries Management and Development, Regional Information Report No. 2A9-29, Anchorage.

TABLES AND FIGURES

Table 1.–Shellfish emergency orders issued for the Prince William Sound Management Area E, 2006–2011.

Fishery	Emergency Order	Effective Date	Explanation
2006 Calendar Year			
Scallops	2-S-E-03-06	7/7/06	Commercial – Closed the season east of the longitude of the Cape St. Elias Lighthouse to 144°00'W.
	2-S-E-04-06	7/11/06	Commercial – Closed the season east of 147°00'W. long. to the longitude of the Cape St. Elias lighthouse and north of Kayak Island.
Shrimp Trawl	2-S-E-01-06	6/1/06	Commercial – Closed the season within the Wells Section
	2-S-E-02-06	6/22/06	Commercial – Closed the season within the Northwest Section
	2-S-E-05-06	8/3/06	Commercial – Closed the season in the Central and Southwest sections.
2007 Calendar Year			
Scallops	2-S-E-01-007	8/8/07	Commercial – Closed the season east of the longitude of the Cape St. Elias Lighthouse, and south of Kayak Island, to 144°00'W.
	2-S-E-02-07	8/11/07	Commercial – Closed the season east of 147°00'W. long. to the longitude of the Cape St. Elias lighthouse and north of Kayak Island.
2008 Calendar Year			
Scallops	2-S-E-01-08	7/8/08	Commercial – Closed the season east of 147°00'W. long. to the longitude of the Cape St. Elias lighthouse and north of Kayak Island.
	2-S-E-02-08	7/15/08	Commercial – Closed the season east of the longitude of the Cape St. Elias Lighthouse, and south of Kayak Island, to 144°00'W.
2009 Calendar Year			
Scallops	2-S-E-01-09	9/26/09	Commercial – Closed the season east of 147°00'W. long. to the longitude of the Cape St. Elias lighthouse and north of Kayak Island.
	2-S-E-02-09	10/6/09	Commercial – Closed the season east of the longitude of the Cape St. Elias Lighthouse, and south of Kayak Island, to 144°00'W.
2010 Calendar Year			
Shrimp Pot	2-SF-E-01-10	4/15/10	Subsistence – Increased pot limit to eight per person with a maximum of eight per vessel.
	2-SF-E-02-10	4/15/10	Personal Use – Increased pot limit to eight per person with a maximum of eight per vessel.
	2-SF-E-03-10	4/15/10	Commercial – Establishes commercial fishing period 8:00 a.m. April 15 – 4:00 p.m. April 18.
	2-SF-E-04-10	4/24/10	Commercial – Opens commercial fishing period and extends hours of gear operation from 8:00 a.m. April 24 – 8:00 p.m. April 29.
	2-SF-E-05-10	5/1/10	Commercial – Establishes commercial fishing period 8:00 a.m. May 1– 8:00 p.m. May 7.
	2-SF-E-06-10	5/7/10	Commercial – Extends commercial fishing period 8:00 p.m. May 7 – 8:00 p.m. May 14.

-continued-

Table 1.–Page 2 of 2.

Fishery	Emergency Order	Effective Date	Explanation
2010 Calendar Year			
Shrimp Pot	2-SF-E-07-10	5/14/10	Commercial – Extends commercial fishing period 8:00 p.m. May 14 – 8:00 p.m. May 21.
	2-SF-E-08-10	5/21/10	Commercial – Extends commercial fishing period 8:00 p.m. May 21 – 8:00 p.m. June 4.
	2-SF-E-10-10	6/4/10	Commercial – Extends commercial fishing period 8:00 p.m. June 4 – until further notice.
Scallops	2-S-E-09-10	7/1/10	Commercial – Closed the season.
	2-S-E-11-10	8/16/10	Commercial- Opened the season east of the longitude of the Cape St. Elias Lighthouse, and south of Kayak Island, to 144°00'W.
	2-S-E-12-10	8/23/10	Commercial – Closed the season east of the longitude of the Cape St. Elias Lighthouse, and south of Kayak Island, to 144°00'W
2011 Calendar Year			
Shrimp Pot	2-SF-E-01-11	4/15/11	Commercial – Established gear limit of 40 pots per vessel, hours for gear deployment at 8:00 a.m. to 8:00 p.m. daily and opens first fishing period at 8:00 a.m. April 15 until 8:00 p.m. April 19.
	2-SF-E-02-11	4/23/11	Commercial – Established second commercial fishing period for 8:00 am April 23 until 8:00 p.m. April 29.
	2-SF-E-03-11	5/4/11	Commercial – Established third commercial fishing period for 8:00 a.m. May 4 until 8:00 p.m. May 18.
	2-SF-E-04-11	5/22/11	Commercial – Established fourth commercial fishing period for 8:00 a.m. May 22 until 8:00 p.m. June 19.
	2-SF-E-05-11	6/19/11	Commercial– Extended fourth commercial fishing period indefinitely.
	2-SF-E-07-11	7/2/11	Commercial – Extended hours of gear deployment from 6:00 a.m. to 10:00 p.m. daily.
	2-SF-E-08-11	7/29/11	Commercial – Closed Prince William Sound commercial shrimp pot fishery for the 2011 season.
	Scallops	2-SF-E-06-11	7/1/11
2-SF-E-09-11		8/5/11	Commercial – Closed the season east of the longitude of the Cape St. Elias Lighthouse, and south of Kayak Island, to 144°00'W

Table 2.–Copper River Dungeness crab survey results, 1986–2011.

Year	Number of Pots	Male Crab Per Pot						Female Crab Per Pot
		Legal Crab	New shell Recruits	% New shell Recruits	Sublegal Crab	New shell Sublegal	% New shell Sublegal	
1986	65	16.0	12.1	76	10.8	3.8	35	3.1
1987	80	9.9	4.3	43	13.1	5.9	45	10.5
1988	80	8.0	4.8	60	11.8	4.1	35	9.2
1989					No Survey			
1990	80	8.3	3.0	36	8.6	1.9	22	8.0
1991	80	3.5	2.2	63	12.6	3.2	25	6.8
1992	80	1.1	0.3	27	10.0	3.4	34	2.0
1993	37	3.5	1.6	46	15.8	4.5	28	3.7
1994	78	1.4	0.3	21	9.2	3.1	34	1.4
1995	80	1.5	0.3	20	9.9	3.0	20	0.7
1996	80	1.1	0.3	24	3.5	1.3	37	0.1
1997	45	0.1	0	0	3.3	1.0	29	0.4
1998	65	0.3	0.1	31	7.4	3.8	52	0.3
1999	80	0.7	0.5	64	9.7	2.9	30	0.6
2000	80	0.7	0.5	34	5.6	3.2	46	0.4
2001	80	0.7	0.2	40	3.9	1.8	70	0.2
2002	80	1.7	0.6	34	10.8	5.0	47	0.6
2003	80	1.5	0.2	14	9.3	3.5	33	0.2
2004					No Survey			
2005	80	2.3	0.3	14	7.5	2.8	29	0.8
2006	79	2.2	.51	23	3.5	1.8	51	.25
2007					No Survey			
2008	65	0.2	0	0	0.5	0.2	39	0.02
2009					No Survey			
2010	70	0.1	0.03	25	0.8	0.6	75	0.01
2011					No Survey			

Table 3.–Prince William Sound spot shrimp survey results, 1989–2011.

Year	Number of Pots	Catch Weight (lb)	Average lb/Pot	Number of Shrimp	Percent		
					Male	Female	Egg Bearing
1989	132	170	1.29	5,192	96.0	4.0	4.1
1990	132	177	1.34	4,283	91.0	9.0	8.0
1991	205	261	1.27	5,989	92.8	7.2	5.4
1992	371	273	0.73	5,195	87.9	12.1	11.7
1993	336	124	0.37	2,507	80.8	19.2	18.8
1994	351	133	0.38	3,815	95.7	4.3	4.2
1995	350	206	0.59	5,053	95.7	4.3	3.9
1996	351	182	0.52	4,617	NA	5.1	NA
1997	350	142	0.41	3,828	94.1	5.9	5.6
1998	264	77	0.29	2,252	94.6	5.4	5.4
1999 ^a	349	165	0.47	4,391	94.4	5.6	NA
2000	351	246	0.70	6,545	95.1	4.8	4.7
2001	351	332	0.95	7,034	92.7	7.3	7.3
2002 ^b	306	377	1.23	8,798	90.9	9.1	NA
2003	352	399	1.13	9,341	91.9	8.1	8.1
2004	352	516	1.46	12,595	91.5	8.5	8.3
2005	349	486	1.39	14,453	94.9	5.1	4.8
2006	347	552	1.59	14,205	90.1	9.1	7.7
2007	349	841	2.41	24,156	94.2	5.8	4.8
2008	349	901	2.58	23,004	93.4	6.6	5.3
2009	351	829	2.36	17,622	86.2	13.8	12.1
2010	350	482	1.38	8,585	81.8	18.2	17.0
2011	352	698	1.98	11,760	74.8	25.2	24.9

Note: NA = Data not available.

^a Sex data interpolated for 452 lost data points.

^b Sex data interpolated for 192 lost data points.



Figure 1.—Shellfish management districts and sections within Prince William Sound, Registration Area E.



Figure 2.—Areas of note within the Prince William Sound Management Area.

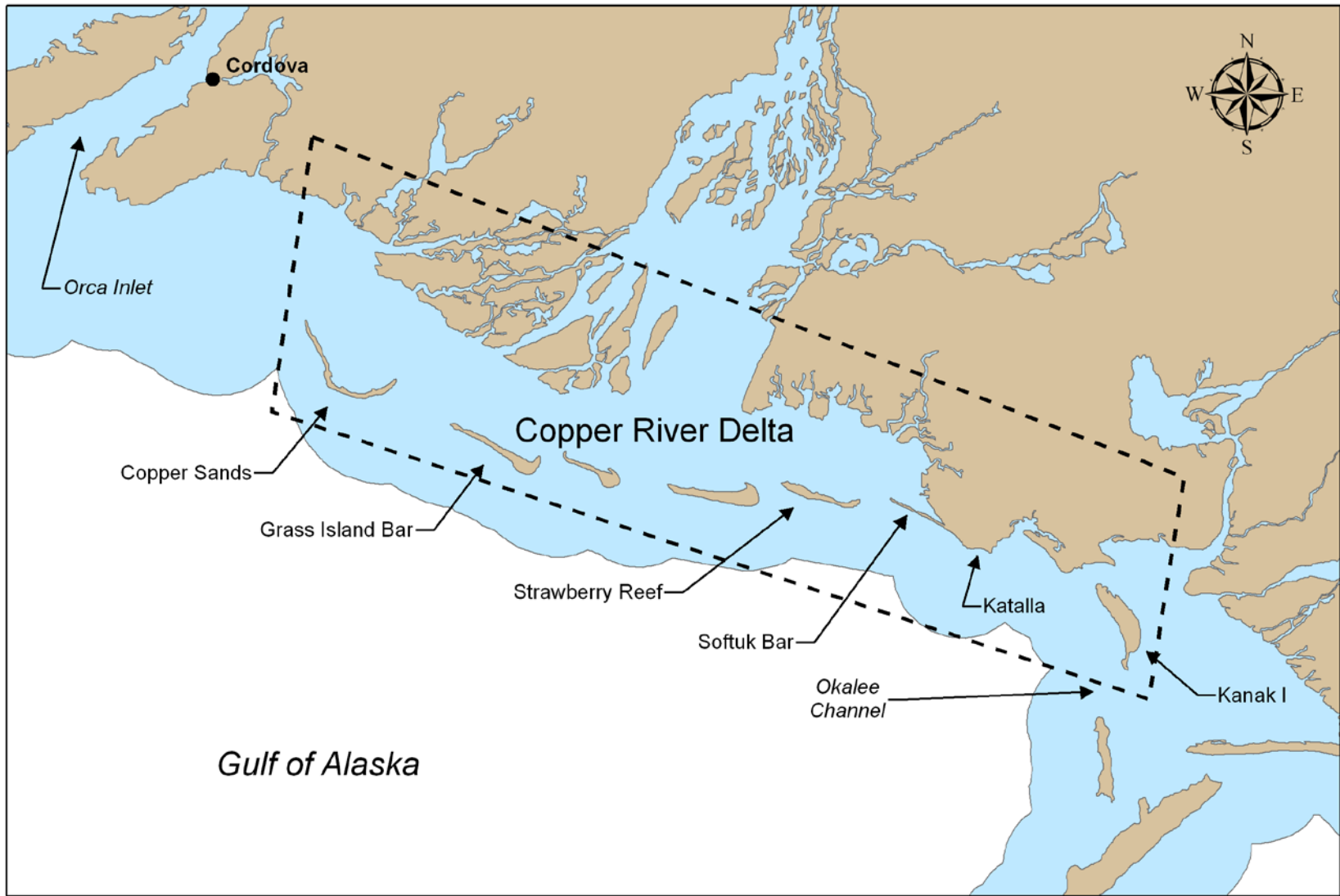


Figure 3.—Traditional harvest locations for Dungeness crab and razor clams in the Prince William Sound Management Area.

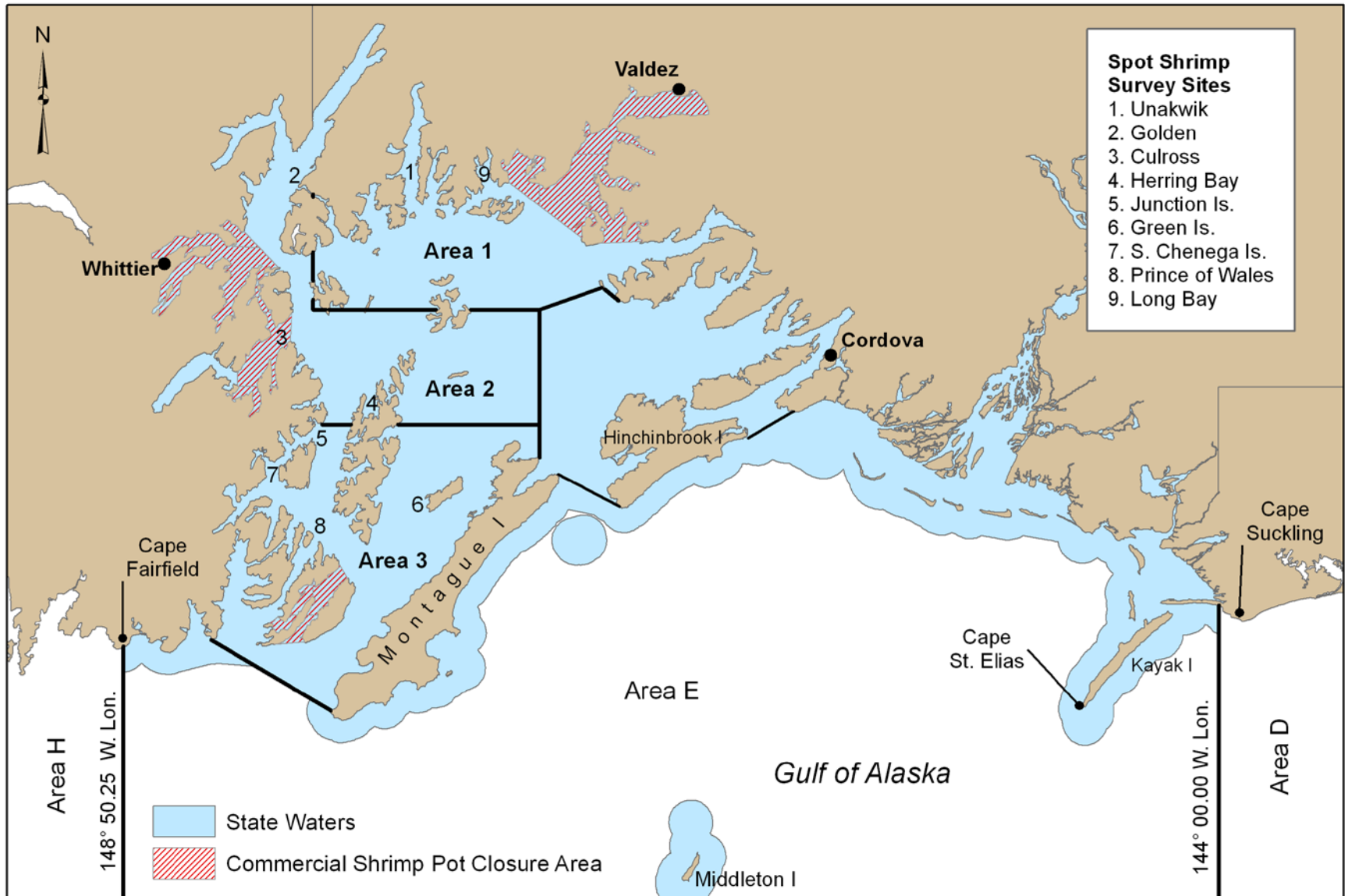
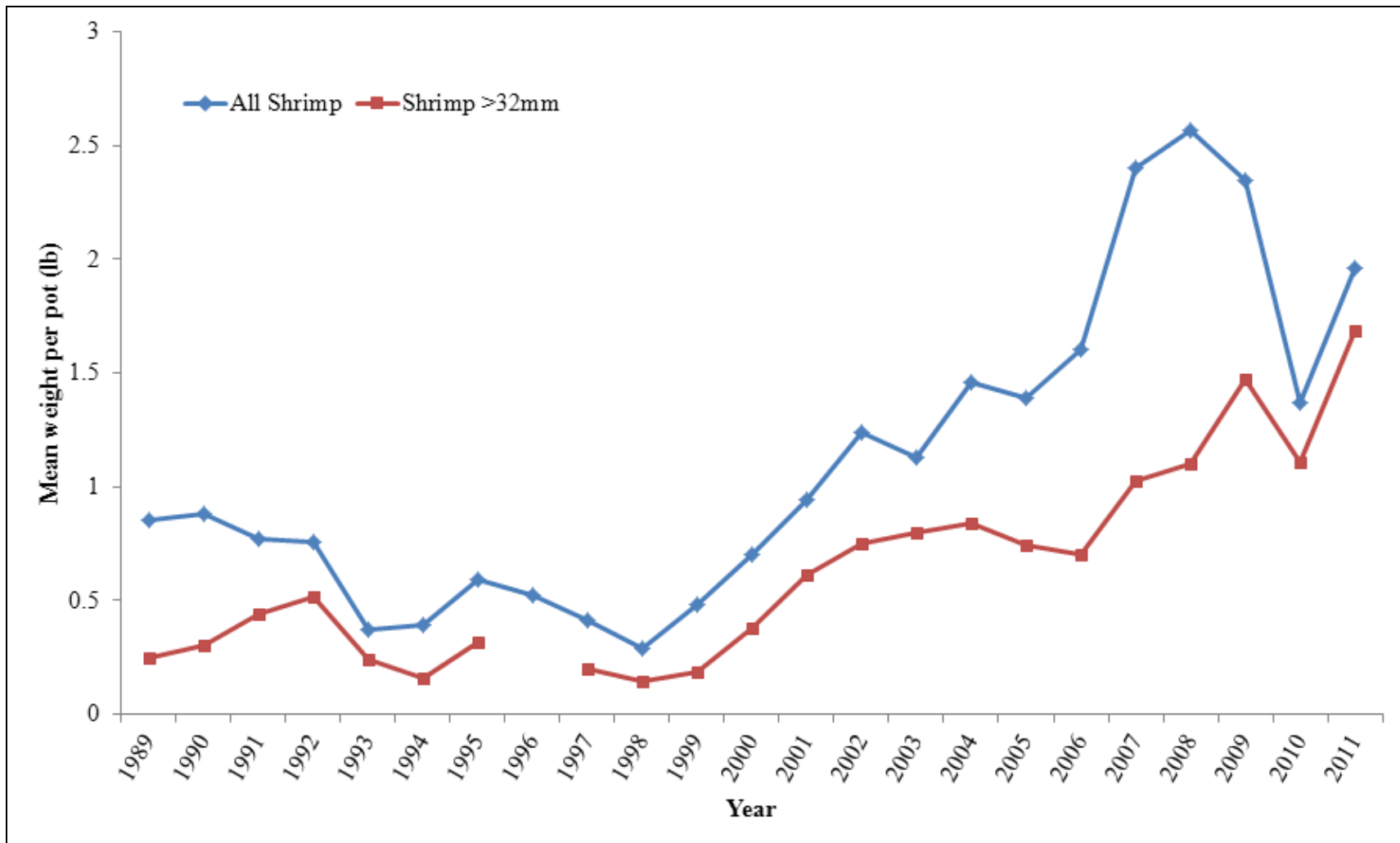


Figure 4.—Management areas and index survey sites for spot shrimp in Prince William Sound.



Note: Data for spot shrimp 32mm and greater not available for 1996.

Figure 5.—Prince William Sound spot shrimp survey mean (average) weight of all spot shrimp and commercially marketable spot shrimp per pot (those equal or greater than 32 mm in carapace length).



Figure 6.—Shrimp trawl fishing sections in Prince William Sound.

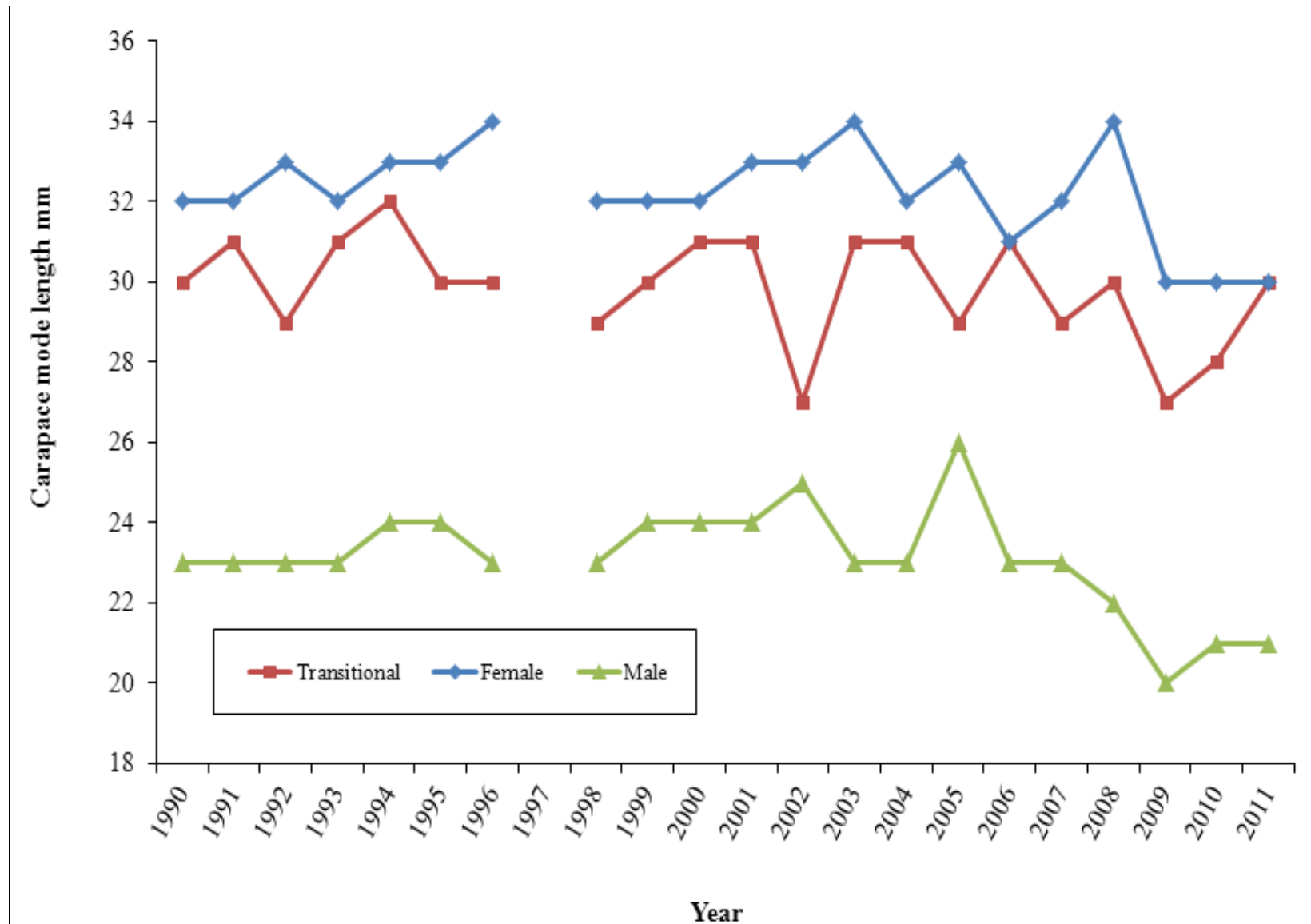


Figure 7.—Predominate carapace mode length of sidestripe shrimp sampled from commercial trawl harvests in Port Wells and Wells Passage, 1990–1996 and 1998–2011.



Figure 8.—Fishing areas for weathervane scallops in Prince William Sound.

APPENDIX A

Appendix A1.–Commercial Dungeness crab harvest and effort in Prince William Sound, 1960–2011.

Year	Outside District		Inside District				Total Harvest (lb)
	Vessels	Harvest (lb)	Orca Inlet		Other Areas		
			Vessels	Harvest (lb)	Vessels	Harvest (lb)	
1960				1,524,326			1,524,326
1961				990,242			990,242
1962				1,353,190			1,353,190
1963				1,216,846			1,216,846
1964				1,290,929			1,290,929
1965				1,240,372			1,240,372
1966				999,341			999,341
1967				N/A			N/A
1968				579,279			579,279
1969		336,696		541,822			878,518
1970		78,223		660,411			738,634
1971		78,848		430,976			509,824
1972		437,865		286,808			724,673
1973		458,613		347,764			806,377
1974		290,149		269,015			559,164
1975		654,410		163,631			818,041
1976	4	254,933	3	35,399			290,332
1977	4	506,751	23	228,858			735,609
1978	12	1,319,451	34	648,439	17	49,571	2,053,461
1979	19	504,770	32	123,245	16	20,924	652,924
1980	10	659,667		CLOSED	5	31,152	690,819
1981	18	1,503,574		“ “	5	5,683	1,509,257
1982	16	757,911		“ “	2	4,221	762,182
1983	9	379,094		“ “	2	511	379,605
1984	10	826,778		“ “	2	150	826,938
1985	17	1,006,196		“ “	1	^a	1,007,429
1986	16	1,090,477		“ “		0	1,090,477
1987	13	887,713		“ “	2	^a	893,174
1988	8	602,969		“ “		0	602,969
1989	9	635,976		“ “		0	635,976
1990	17	397,913		“ “		0	397,913
1991	14	70,259		“ “		0	70,259
1992	2	^a		“ “		0	^a
1993-Present				FISHERY CLOSED			

Appendix A2.—Effort and harvest in the commercial shrimp pot fishery of Prince William Sound, 1960–2011.

Year	Vessels	Landings	Weight (lb) ^a			Total
			Spot	Coonstripe	Other	
1960						4,988
1961						-
1962						3,576
1963						1,101
1964						4,248
1965						4,356
1966						-
1967						749
1968						6,866
1969						5,146
1970						19,776
1971						13,073
1972						6,949
1973						6,370
1974						24,978
1975						4,150
1976						2,410
1977						7,516
1978	9	17	No Data	No Data	No Data	15,466
1979	17	98	No Data	No Data	No Data	52,208
1980	23	155	84,787	5,174	67	90,028
1981	51	509	153,017	20,055	465	173,537
1982	57	397	205,746	7,250	784	213,781
1983	71	646	198,719	14,119	583	213,420
1984	79	513	198,729	7,911	640	207,280
1985	78	528	271,928	3,919	860	276,707
1986	80	540	286,105	3,715	812	290,632
1987	86	498	265,707	3,795	151	269,653
1988	76	433	191,630	764	48	192,442
1989	33	69	28,884	431	0	29,315
1990	23	59	36,378	358	0	36,737
1991	15	45	17,302	278	0	17,580
1992-2009			Fishery Closed			
2010	75	232	45,076	263	10	45,349
2011	44	183	51,146	1,204	44	52,694

^a Catches converted from tail weight to whole weight using a conversion factor of 2.0.

Appendix A3.–Prince William Sound shrimp trawl effort and harvest, 1972–2011.

Year	Vessels	Landings	Whole Weight (lb) ^a				Total
			Northern	Sidestripe	Other	Deadloss	
1972	N/A	N/A	N/A	N/A	N/A	N/A	5,153
1973	"	"	"	"	"	"	4,243
1974	"	"	"	"	"	"	1,345
1975	"	"	"	"	"	"	26,961
1976	"	"	"	"	"	"	134,115
1977	"	"	"	"	"	"	170,757
1978	8	"	"	"	"	"	440,684
1979	4	"	"	"	"	"	634,518
1980	6	"	"	"	"	"	557,328
1981	4	"	"	"	"	"	70,560
1982	9	"	"	"	"	"	346,517
1983	13	46	420,275	1,058	2,345	"	423,678
1984	14	55	1,292,643	8,842	1,155	"	1,302,640
1985	6	44	432,514	15,696	440	"	448,650
1986	3	44	218,156	27,701	13	"	245,870
1987	2	109	^b	^b	^b	"	^b
1988	4	99	497	111,898	52	"	112,447
1989	1		^b	^b	^b	^b	^b
1990	4	89	3,348	105,795	15	18,303	127,461
1991	5	67	3,453	84,483	193	51,429	139,558
1992	5	70	651	196,467	28	49,097	246,243
1993	7	72	23	190,976	51	55,140	246,190
1994	6	47	749	85,980	0	24,134	110,863
1995	4	39	0	73,706	0	24,189	97,895
1996	3	42	0	89,551	0	21,704	111,255
1997	3	63	0	70,026	0	22,060	92,086
1998	2	39	^b	^b	^b	^b	^b
1999	3	47	0	56,386	0	7,754	64,140
2000	3	46	0	61,566	0	12,377	73,943
2001	3	45	0	59,736	0	21,765	81,501
2002	3	43	0	54,736	0	14,532	69,268
2003	3	46	612	61,269	106	18,236	80,223
2004	3	44	1,371	54,437	423	29,002	85,238
2005	3	41	0	61,130	413	23,028	84,571
2006	3	40	0	66,552	0	32,485	99,037
2007	2	24	^b	^b	^b	^b	^b
2008	1		^b	^b	^b	^b	^b
2009	1		^b	^b	^b	^b	^b
2010	1		^b	^b	^b	^b	^b
2011	1		^b	^b	^b	^b	^b

^a Catches converted from tail weight to whole weight using a conversion factor of 1.67.

^b Confidential data due to the small number of participants.

Appendix A4.–Commercial razor clam harvest in Prince William Sound, 1980–2011.

Year	Commercial		Non Commercial	
	Diggers	Pounds	Diggers	Pounds
1980	21	5,881		
1981	7	28,970		
1982	12	15,275		
1983	41	124,835		
1984	41	168,426		
1985	25	60,274	37	4,930
1986	17	13,122	38	4,831
1987	12	40,954	83	6,225
1988	4	6,766	52	2,768
1989	No Effort	0	50	2,903
1990	“	0	50	2,641
1991	“	0	77	1,484
1992	“	0	92	2,403
1993	^a	^a	37	1,131
1994	No Effort	0	28	459
1995	“	0	14	92
1996	“	0	19	381
1997	“	0	10	145
1998	“	0	4	32
1999	“	0	5	29
2000	“	0	4	27
2001	“	0	9	86
2002	“	0	7	71
2003	“	0	6	69
2004	“	0	11	74
2005	“	0	17	130
2006	“	0	11	11
2007	“	0	3	3
2008	“	0	1	1
2009	“	0	2	2
2010	“	0	3	3
2011	“	0	2	2

^a Confidential data due to the small number of participants.

Appendix A5.—Commercial harvest of weathervane scallops from Prince William Sound, 1992–2011.

Year ^c	Fishery Area	GHL ^a (lb meat)	Number of Vessels	Harvest (lb meat)	Dredge Hours	CPUE
1992		64,000	4	208,836	NA	NA
1993		50,000	7	63,068	638	99
1994/95		Closed				
1995/96		50,000	3	108,000	NA	NA
1996/97		Closed				
1997/98		17,200	1 ^b	18,000	171	105
1998/99	East	6,000	2 ^b	19,650	179	110
	West	14,000				
1999/00	East	6,000	2 ^b	20,410	149	137
	West	14,000				
2000/01	East	9,000	3	8,998	221	137
	West	21,000		21,268		
2001/02	East	9,000	1 ^b	9,060	263	114
	West	21,000		21,030		
2002/03	East	6,000	2 ^b	1,680	122	128
	West	14,000		13,961		
2003/04	East	6,000	1 ^b	5,910	216	93
	West	14,000		14,070		
2004/05	East	26,000	2 ^b	25,350	614	80
	West	24,000		23,970		
2005/06	East	26,000	3	24,435	491	100
	West	24,000		24,781		
2006/07	East	20,000	2 ^b	20,010	334	111
	West	17,000		17,005		
2007/08	East	20,000	2 ^b	20,015	428	87
	West	17,000		17,090		
2008/09	East	15,000	1 ^b	15,030	331	64
	West	5,000		5,010		
2009/10	East	15,000	2 ^b	15,035	419	46
	West	5,000		4,980		
2010/11	East	8,400	1 ^b	8,445	161	52
	West	Closed		Closed		
2011/12	East	8,400	1 ^b	8,460	160	53
	West	Closed		Closed		

^a Separate GHLs were established for areas east and west of Kayak Island beginning in 1998.

^b Confidential data voluntarily released by vessel operators.

Appendix A6.—Reported landings and harvests of octopus and squid from Prince William Sound, 1989–2011.

Year	Octopus		Squid	
	Landings	Weight (lb)	Landings	Weight (lb)
1989	0	0	3	1,467
1990	0	0	9	2,166
1991	0	0	0	0
1992	10	1,230	7	399
1993	45	5,625	3	317
1994	34	5,798	0	0
1995	22	3,779	4	289
1996	4	994	10	168
1997	11	3,547	32	18,316
1998	5	2,928	27	21,461
1999	0	0	35	6,104
2000	0	0	17	5,951
2001	0	0	17	31,101
2002	^a	^a	22	180,250
2003	^a	^a	16	20,547
2004	^a	^a	9	11,175
2005	^a	^a	4	6,155
2006	0	0	31	32,758
2007	0	0	17	11,437
2008	0	0	20	31,359
2009	0	0	13	15,622
2010	24	939	11	17,210
2011	0	0	13	16,841
Average	19	3,105	15	20,528

^a Confidential data.