

**Sport and Personal Use Shellfish Fisheries in the  
Lower Cook Inlet and North Gulf Coast Management  
Areas, 2022–2023**

by

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Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code		all standard mathematical signs, symbols and abbreviations	
deciliter	dL		AAC		
gram	g	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H <sub>A</sub>
hectare	ha			base of natural logarithm	<i>e</i>
kilogram	kg			catch per unit effort	CPUE
kilometer	km	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	coefficient of variation	CV
liter	L			common test statistics	(F, t, $\chi^2$ , etc.)
meter	m	at	@	confidence interval	CI
milliliter	mL	compass directions:		correlation coefficient (multiple)	R
millimeter	mm	east	E	correlation coefficient (simple)	r
<b>Weights and measures (English)</b>		north	N	covariance	cov
cubic feet per second	ft <sup>3</sup> /s	south	S	degree (angular)	°
foot	ft	west	W	degrees of freedom	df
gallon	gal	copyright	©	expected value	<i>E</i>
inch	in	corporate suffixes:		greater than	>
mile	mi	Company	Co.	greater than or equal to	≥
nautical mile	nmi	Corporation	Corp.	harvest per unit effort	HPUE
ounce	oz	Incorporated	Inc.	less than	<
pound	lb	Limited	Ltd.	less than or equal to	≤
quart	qt	District of Columbia	D.C.	logarithm (natural)	ln
yard	yd	et alii (and others)	et al.	logarithm (base 10)	log
<b>Time and temperature</b>		et cetera (and so forth)	etc.	logarithm (specify base)	log <sub>2</sub> , etc.
day	d	exempli gratia (for example)	e.g.	minute (angular)	'
degrees Celsius	°C	Federal Information Code	FIC	not significant	NS
degrees Fahrenheit	°F	id est (that is)	i.e.	null hypothesis	H <sub>0</sub>
degrees kelvin	K	latitude or longitude	lat or long	percent	%
hour	h	monetary symbols (U.S.)	\$, ¢	probability	P
minute	min	months (tables and figures): first three letters	Jan,...,Dec	probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
second	s	registered trademark	®	probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
<b>Physics and chemistry</b>		trademark	™	second (angular)	"
all atomic symbols		United States (adjective)	U.S.	standard deviation	SD
alternating current	AC	United States of America (noun)	USA	standard error	SE
ampere	A	U.S.C.	United States Code	variance	
calorie	cal			population sample	Var var
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. 25-06***

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COOK INLET AND NORTH GULF COAST MANAGEMENT AREAS,  
2022–2023**

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## ABSTRACT

This report provides a detailed summary of the sport and personal use shellfish fisheries in the Lower Cook Inlet (LCIMA) and North Gulf Coast (NGCMA) Management Areas specific to the proposals before the Alaska Board of Fisheries (BOF) at its March 2025 meeting. Estimates of sport fishing effort, harvest, and catch are summarized through 2023. All other information, including relevant stock assessments and management actions, are provided through 2024. Included for each fishery is information specific to the proposals that the BOF will address. An appendix guiding the reader to specific information relevant to each proposal is also included.

**Keywords:** Lower Cook Inlet Management Area, North Gulf Coast Management Area, East Cook Inlet, West Cook Inlet, Kachemak Bay, Kamishak Bay, Pacific razor clam, *Siliqua patula*, Pacific littleneck, *Leukoma staminea*, butter clam, *Saxidomus gigantea*, Tanner crab, *Chionoecetes bairdi*, Dungeness crab, *Metacarcinus magister*, fisheries management, sport fisheries, personal use fisheries

## INTRODUCTION

This fisheries management report provides information regarding sport and personal use shellfish fisheries in the Lower Cook Inlet (LCIMA) and North Gulf Coast (NGCMA) Management Areas. Management of most of these fisheries is the responsibility the Alaska Department of Fish and Game (ADF&G) Division of Sport Fish (SF). The Division of Commercial Fisheries (CF) manages the NGCMA personal use shrimp fishery out of the Homer office; other NGCMA fisheries are managed out of the Anchorage office. The LCIMA sport and personal use shellfish fisheries are managed out of the Homer area office. This report presents fisheries performance and management actions for sport and personal use shellfish fisheries in these areas in 2022 and 2023. In addition, this report includes a description of the primary shellfish fisheries' regulatory processes, and the geographic and regulatory boundaries.

The mission of SF is to protect and improve the state's sport fishery resources by managing for sustainable yield of wild stocks of sport fish, providing diverse sport fishing opportunities, and providing information to assist the BOF in optimizing social and economic benefits from sport fisheries. To implement these goals, SF has in place a fisheries management process that includes an annual regional review of fisheries status and research needs, development of fisheries stock assessments, a formal operational planning process, use of biological and fishing effort data, and input from user groups to assess the need for and to develop management plans and regulatory proposals.

For shellfish, SF management and research activities are funded by ADF&G general funds derived from the sale of state fishing licenses, other peripheral funding sources including State Wildlife Grant (SWG) funds, and contracts with various government agencies. Federal Aid in Sport Fish Restoration Act (also referred to as the Dingell–Johnson Act or D–J Act) funds are not available for shellfish.

This report is organized as follows: an overview of the management areas including a description of each management area and a summary of effort, harvest, and catch for each area; and following sections for each significant fishery including harvest and catch by species and geographical region.

# OVERVIEW OF MANAGEMENT AREAS

## LCIMA DESCRIPTION

The LCIMA includes the freshwater drainages on the west side of the Kenai Peninsula south of the Kasilof River drainage to Gore Point, the freshwater drainages on the west side of Cook Inlet from the south end of Chisik Island to Cape Douglas, and the beaches of Cook Inlet bounded by these landmarks but with the inclusion of beaches north of Tuxedni Bay to Point Harriet in West Cook Inlet (Figure 1). Because very little sport fishing effort occurs in Cook Inlet salt waters north of the Kasilof River, the LCIMA includes all the Cook Inlet and North Gulf Coast salt waters north of the latitude of Cape Douglas and west of Gore Point.

The LCIMA supports saltwater sport fisheries for salmon, groundfish, and shellfish; freshwater sport fisheries for salmon (*Oncorhynchus* spp.), steelhead and rainbow trout (*O. mykiss*), and Dolly Varden (*Salvelinus malma*); and several personal use and educational fisheries. Except for residency requirements, most shellfish personal use fisheries are indistinguishable from sport fisheries and essentially fall within SF jurisdiction as well.

A variety of shellfish stocks have supported sport and personal use fisheries in LCIMA, but most have declined over time. The state's largest sport and personal use Pacific razor clam (*Siliqua patula*) fishery historically occurred along a 50-mile area of beach between the Kasilof and Anchor Rivers on the east side of Cook Inlet but has been closed since 2015 because of low abundance of adult clams. The razor clam sport and personal use fishery along the west side of Cook Inlet is more robust and has remained opened. A Tanner crab (*Chionoecetes bairdi*) fishery periodically opens in Kachemak and Kamishak Bays. Hardshell clams (Pacific littleneck [*Leukoma staminea*] and butter clam [*Saxidomus gigantea*]), Red king crab (*Paralithodes camtschaticus*), Dungeness crab (*Metacarcinus magister*), and shrimp (*Pandalus* spp.) are all indigenous to the area, but sport fisheries for these species are all closed because of low stock abundance.

## NGCMA DESCRIPTION

The NGCMA consists of all salt and fresh waters between Gore Point (156°96'25"W longitude) and Cape Fairfield (148°50'25"W longitude; Figure 1). The eastern boundary of the NGCMA used to be located 15 miles farther east at Cape Puget. At the 2008 Alaska Board of Fisheries (BOF) meeting, the eastern boundary was moved to Cape Fairfield to align the commercial, subsistence, and sport fish regulatory boundaries. The City of Seward is the only community in the management area.

The NGCMA sport fisheries primarily occur in salt water and target the 5 species of Pacific salmon, a variety of groundfish, and there are some small shellfish opportunities. The NGCMA supports a large saltwater coho salmon sport fishery. Groundfish species targeted by sport anglers and include Pacific halibut (*Hippoglossus stenolepis*), rockfish (*Sebastes* spp.), and lingcod (*Ophiodon elongatus*). All freshwater drainages in Resurrection Bay, except the Resurrection River drainage downstream of the Seward Highway and Nash Road in Seward, are closed to salmon fishing but are open to Arctic char (*Salvelinus alpinus*), Dolly Varden, lake trout (*S. namaycush*), rainbow trout, and Arctic grayling (*Thymallus arcticus*) sport fishing. Similar to LCIMA, the NGCMA supports a variety of shellfish including Tanner crab and also provides a personal use fishery opportunity for shrimp that is managed by the Division of Commercial Fisheries.

## **ESTABLISHED MANAGEMENT PLANS AND POLICIES RELEVANT TO THE 2025 STATEWIDE MISCELLANEOUS SHELLFISH MEETING**

The regulations governing the shellfish sport and personal use fisheries of the LCIMA and NGCMA are found in Alaska statutes (AS) and administrative codes (AAC). Cook Inlet–Resurrection Bay Saltwater Area sport regulations are found in 5 AAC 58.000; statewide sport provisions and definitions are found in 5 AAC 75.000; statewide personal use provisions and definitions are found in 5 AAC 77.000; and the Cook Inlet Area personal use fishery regulations are found in 5 AAC 77.500.

Management plans that specifically affect sport and personal use shellfish fisheries are as follows: *Southern District Hardshell Clam and Mussel Fishery Management Plan* (5 AAC 38.318), *Registration Area H Tanner crab harvest strategy* (5 AAC 35.408), and *East Cook Inlet Razor Clam Sport Fishery Management Plan* (5 AAC 58.040).

## **SPORT FISHING EFFORT, HARVEST, AND CATCH**

### **Statewide Harvest Survey**

Since 1977, sport angler effort and harvest have been estimated using the ADF&G Alaska Sport Fishing Survey (commonly known as the Statewide Harvest Survey or SWHS; Mills 1979–1980, 1981a, 1981b, 1982–1991, 1992a, 1992b, 1993, 1994; Howe et al. 1995, 1996)<sup>1</sup>. The SWHS is a mail survey that is used to estimate annual sport fishing effort and harvest. Final estimates are available during the early fall of the following year. The survey is designed to estimate effort in angler-days and the number of fish caught and harvested by location. Although harvest and catch are estimated for individual species, the SWHS is not designed to estimate directed effort toward individual species.

The SWHS has been modified over time to add stratifications to the estimates and to incorporate changes to the regulatory structure. The effort and harvest of shellfish were not estimated by the SWHS until 1981. Angler residency data have been available since 1993.

The precision of the SWHS estimates is related to the number of household respondents who reported participating in each fishery. For any given fishery, estimates based on 12 or more but less than 30 household respondents can be useful for detecting relative trends. Estimates based on 30 or more respondents generally represent fishing effort, catch, and harvest levels. Estimates based on fewer than 12 household respondents are generally not used but are included in this report with appropriate caveats to interpretation (Mills and Howe 1992). Creel surveys or permits have been used periodically for specific fisheries when more detailed information is needed for inseason management and to validate the SWHS for a given fishery.

In this report, data from the SWHS are generally divided into 3 periods: (1) a historical period with just the average for 1981–1999 (annual data for LCIMA are published in Kerkvliet et al. [2016]), (2) a second historical period from 2000 through 2020 with annual data and averages, (3) and the most recent 3 years of data (2021–2023) with averages. These periods provide context for comparing the effort, catch, and harvest estimates and trends over time.

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<sup>1</sup> Hereafter, “SWHS” will refer to these references for 1977–1995 data and to the Alaska Sport Fishing Survey database [Internet] Anchorage, AK for data 1996–present: <http://www.adfg.alaska.gov/sf/sportfishingsurvey/>.

## **LCIMA Effort and Harvest**

Of all the ADF&G SF management areas, the LCIMA supports the second highest sport fishing effort after the Northern Kenai Peninsula Management Area. During the 2000–2020 period, the LCIMA accounted for an average of 11.0% of the total statewide sport fishing effort (Table 1). During 2019–2021, resident anglers represented approximately 48% of the total number of LCIMA anglers and 59% of the days fished in LCIMA, although effort for both residents and nonresidents has steadily declined over those years (Booz and Dickson 2023). Most of the sport fishing effort in LCIMA occurs in salt waters, but from 2000 to 2014, both freshwater finfish and shellfish fisheries contributed roughly equal portions to the total LCIMA effort each year (roughly 10–15%; Table 1). However, starting in 2015 and continuing to present, shellfish fisheries have contributed less than 5% of the total annual LCIMA effort.

The LCIMA historically supported a diversity of sport and personal use fishing opportunities for shellfish, but most stocks are in decline and many fisheries have been closed (Table 2). Within LCIMA, most of the shellfish effort and harvest historically occurred in East Cook Inlet for razor clams. Kachemak Bay historically had robust stocks of king crab, Tanner crab, Dungeness crab, shrimp, and hardshell clams that all supported commercial fisheries but are currently closed due to stock decline. In West Cook Inlet, razor clams were and still are the primary shellfish harvested, but the area also supports Tanner crab, Dungeness crab, and weathervane scallops; however, this area is difficult to access for sport fishing. A variety of other shellfish including giant Pacific octopus (*Enteroctopus dofleini*) and Pacific blue mussels (*Mytilus trossulus*) are still available throughout LCIMA.

## **NGCMA Effort and Harvest**

On average, NGCMA sport fishing effort is approximately 55% of LCIMA effort, about 5% of the total statewide sport fishing effort, and 7% of the total Southcentral Alaska effort (calculated from Booz et al. 2023 and Arthur et al. 2024). In the NGCMA, most sport fisheries occur in salt water and account for almost all angling effort (about 99%). Since 1990, anglers fishing from boats have composed the largest fraction of the total saltwater effort. However, average shore effort over the last 3 years (22,898 angler-days) was more than double the previous 10-year average (10,420 angler-days; Arthur et al. 2024). Effort towards shellfish was estimated by the SWHS from 1996 through 2000 and averaged 425 angler days per year, which was less than 1% of the total average sport fishing effort for NGCMA during that period. The number of respondents to the SWHS for these estimates ranged from 9 to 22 per year, which is too low for reliable estimates but does highlight the small overall magnitude of the shellfish sport fishery in NGCMA. Since 2001, NGCMA effort toward shellfish has been included with the saltwater effort and therefore cannot be estimated separately. The NGCMA supports the same shellfish stocks as the LCIMA but to a lesser extent for all species (Table 3). Except for a personal use shrimp fishery in NGCMA, most commercial and noncommercial shellfish fisheries were and continue to be much smaller in NGCMA than in LCIMA.

## **PACIFIC RAZOR CLAM FISHERIES**

Razor clams occur throughout the northern Gulf of Alaska from Cordova to Kodiak (Nickerson 1975). In LCIMA, they occur in both East and West Cook Inlet. In NGCMA, razor clams have been documented in the Nuka Bay area.

## **LCIMA RAZOR CLAMS**

### **East Cook Inlet Razor Clam Fisheries Description**

The East Cook Inlet Pacific razor clam sport and personal use fisheries occur almost exclusively on sandy intertidal beaches stretching approximately 76 km along the Kenai Peninsula between the Kasilof and Anchor Rivers (Figure 2). Historically, the East Cook Inlet sport fishery constituted the largest shellfish sport fishery in Alaska, due largely to accessibility, with effort concentrated in Clam Gulch and Ninilchik, which have public access from the Sterling Highway and the greatest clam densities. Both Clam Gulch and Ninilchik beaches have a developed access road and nearby camping facilities. Razor clams may be dug on any minus tide. Most of the effort occurs within a 5-month period from April through August when minus tides occur during daylight hours and warmer temperatures prevail. During the darker winter months from October through February, most clam digging is precluded when the low tides occur at night, temperatures are cold, and ice builds up on beaches. There are about 60 minus tides annually from April through August. Diggers locate razor clams by the presence of a “show” or dimple in the sand.

Razor clam life history influences productivity and ultimately the stock’s ability to support harvest. Razor clam growth rate varies inversely with latitude along the East Cook Inlet beaches and as a result, the average length-at-age increases from north to south (Szarzi and Hansen 2009). For example, clams of the same age class at Ninilchik reach adult size (80 mm) 1 to 2 years prior to those from Clam Gulch to the north, despite being separated by only 10 miles of beach (Szarzi and Hansen 2009). Razor clams live to a maximum age of approximately 19 years in Alaska (Weymouth et al. 1925). In East Cook Inlet, the oldest razor clam found in hand-dug surveys by ADF&G was 15 years old at Ninilchik in 2004 (Kerkvliet et al. 2021). By contrast, razor clam lifespan at the southern end of its range in California is generally 5 years (Weymouth and McMillan 1931). Relying on broadcast spawning, recruitment success is highly dependent on environmental conditions and is highly variable between beach and year. More consistent annual recruitment occurs on the Clam Gulch beaches, and less frequent, larger recruitments occur on Ninilchik beaches.

Based on creel monitoring and SWHS data, the 1969–1999 average annual effort was approximately 29,000 digger-days and annual harvest averaged roughly 0.87 million razor clams in the East Cook Inlet razor clam fishery (Table 4). Participation and harvest peaked in 1994 when about 48,500 digger-days were spent digging about 1.27 million razor clams (Kerkvliet et al. 2016). From 2000 to 2012, average harvest declined to about 0.50 million razor clams with largely the same average effort (28,000 digger-days) as the prior period (1969–1999). Resident harvest and effort composed the majority of the total harvest and effort during 2000–2012 (Table 4). These fisheries have been restricted or closed since 2013 due to low abundances of adult-sized clams (Booz et al. 2019: Appendix A1).

### **East Cook Inlet Razor Clam Fisheries Management Objectives**

The East Cook Inlet sport and personal use razor clam fisheries are concurrent and identical except that only Alaska residents can participate in the personal use fishery whereas the sport fishery is open to all with a sport fishing license. Because of this, both the sport and personal use razor clam fisheries have been managed exclusively by the Division of Sport Fish and are jointly considered the “SPU” razor clam fishery. In regulation, the East Cook Inlet SPU fishery area occurs from the mouth of the Kenai River south to the tip of the Homer spit. Until 2022, the razor clam sport

(5 AAC 58.022 [a][14][A]) and personal use (5 AAC 77.518) fisheries were only regulated by bag, possession, and statewide “method and means” clam gear restrictions (5 AAC 75.035[6] for the sport fishery and 5 AAC 77.010 [k] [3] for the personal use fishery). Clam diggers are also required to harvest all razor clams taken. Gear is limited to harvest by hand or with the use of a rake, shovel, or manually operated clam gun. The SPU fishery was first restricted by emergency order (EO) in 2013 due to low abundances of adult clams on Ninilchik area beaches (Kerkvliet et al. 2016).

ADF&G began monitoring East Cook Inlet razor clams in 1965. Since then, the following 5 data sets have been used to monitor the East Cook Inlet razor clam SPU fishery and stock: digger distribution, harvest and effort estimates, age and length compositions, growth rates, and abundance estimates (Booz et al. 2024). Consistent annual abundance surveys have occurred at Ninilchik and Clam Gulch since 2014 and are currently the primary data used to assess the stock for supporting harvest opportunities.

In March 2022 at the Statewide Miscellaneous Shellfish Meeting, the BOF adopted a management plan for the East Cook Inlet razor clam sport (5 AAC 58.040) and personal use (5 AAC 77.519) fisheries. The plan splits the East Cook Inlet beach into 2 management areas. Lemans Point, north of Ninilchik, serves as the division between the Clam Gulch area (Lemans Point to the Kenai River) and the Ninilchik area (Lemans Point to the tip of the Homer Spit). The management plans split the fishery into 2 levels: the standard (historical) fishery with a bag limit of 60 and possession limit of 120 clams with a year-round season, and a limited fishery with a bag and possession limit of 30 clams with a restricted season of 1 May through 30 September. The plan also identifies abundance thresholds of adult sized clams ( $\geq 80$  mm) that trigger the two fishery levels to open in either management area. For the standard fishery to open, the adult clam abundance must be equal to or greater than the historical (1989–2012) abundance, the adult razor clam recruitment must replace or exceed harvest and natural mortality, and the length and age composition of the harvest must be equivalent to the 1989–2012 averages. For the limited fishery to open, the adult razor clam abundance must be equal to or greater than 50% of the 1989–2012 adult clam abundance in that management area. The Ninilchik South beach and the Clam Gulch North beach abundances are used as abundance indexes for each respective management area. The plan also stipulates that the standard fishery won’t harvest more than 20% of the adult abundance, and the limited fishery won’t harvest more than 10%.

### **East Cook Inlet Razor Clam Fisheries 2022–2023 Performance**

In 2022, the East Cook Inlet SPU fishery remained closed in both the Clam Gulch and Ninilchik management areas because adult abundances did not meet the fishery thresholds. In 2023, the abundance at Clam Gulch did not meet the threshold, and the fishery remained closed in the Clam Gulch management area. However, the adult abundance estimate for the Ninilchik South beach (332,217 adult razor clams) in the Ninilchik management area exceeded the abundance threshold for the limited fishery by 35% (Table 5). Given the uncertainty in potential effort for this fishery opener, the season and bag limit were both reduced by a preseason EO to be more certain that the fishery harvest would not exceed 10% of the adult abundance estimate. The season was reduced to 4 days from July 1 through July 4, and the bag and possession limits were set at the first 15 razor clams dug. Prior to opening the razor clam fishery, clams from several East Cook Inlet beaches were collected and sent to the Department of Environmental Conservation’s Environmental Health Laboratory for toxin testing. Samples were all below the FDA regulatory limits of 80  $\mu$ g toxin/100 g shellfish tissue for paralytic shellfish toxins and 20 ppm for domoic acid (Table 6).

Creel surveys were conducted at all major beaches and access points during all 4 days of the fishery in 2023 to count the number of diggers and interview diggers to assess their success. Digger counts were assumed to be a census of the total number of diggers for each beach (Table 7), but not every counted digger was surveyed for success. ADF&G staff were able to contact diggers on all the beaches, but success at surveying every digger varied by beach depending on the ability to funnel traffic to the survey point as diggers were leaving and the availability of alternative access points by which diggers could leave. The creel survey of Ninilchik North successfully surveyed 70–90% of diggers each of the 4 days. Creel surveys for Ninilchik South, Ninilchik Bar, and Whiskey Gulch were also successful because the access was funneled to the road. One hundred percent of Ninilchik South diggers were surveyed on 3 out of the 4 days. The ability to stop diggers at Deep Creek improved over the 4 days of the fishery but wasn't as successful at surveying all the diggers due to the multiple access points diggers could drive off the beach near the Deep Creek tractor launch. The survey rate at Deep Creek varied from 35% on July 2 to 85% on July 3.

The razor clam harvest for each beach was estimated by applying the average number of clams per digger from the creel survey to the census of diggers (Table 7). The total diggers over the four days for all beaches in the management area was 5,420. The average number of clams harvested per digger was 4.44, but success varied by day and by beach. The preliminary harvest estimate for the Ninilchik management area was a summation of the harvest on all beaches and totaled 22,609 razor clams. The Ninilchik South beach harvest estimate was 7,763 adult razor clams, which resulted in a 2.3% adult clam harvest rate when compared to the adult abundance estimate (Table 5).

Weather was generally poor for spotting razor clam shows during the fishery, and standing water and aquatic plant vegetation on the Ninilchik South beach also inhibited diggers' ability to identify razor clam shows. The tides became larger over the duration of the fishery, beginning with a minus 1.4 ft low on July 1 and ending with a minus 4.9 ft low on July 4. The size of harvested razor clams was fairly uniform at the Ninilchik beaches, ranging from about 3 to 5 inches. The clams were slightly larger on average at Deep Creek and Whiskey Gulch beaches.

Overall, the digging conditions during the 4-day fishery were not ideal, with rain and overcast conditions making it difficult to find clam shows. The worst weather occurred on July 2 and 3 and these conditions influenced digger success during the fishery. Digging conditions were probably the poorest at the Ninilchik South beach, with standing water and beach wrack as well as concentrated foot and offroad vehicle traffic that made spotting shows very difficult. Digger success was greatest on the Ninilchik Bar beach, with each digger harvesting 7.3 clams on average (Table 7). Ninilchik North and Ninilchik South saw similar success with an average of 5.3 and 5.0 clams per digger, respectively. Deep Creek and Whiskey Gulch beaches saw poorer success with averages of 3.1 and 0.38 clams per digger, respectively. Digger success at Ninilchik South remained steady throughout the four days, and success at Ninilchik North declined after the first day but the remaining 3 days were similar to each other. The most successful diggers were at Ninilchik Bar on July 1 and 2, with 15 and 11.5 clams per digger, respectively. On July 1, diggers at Ninilchik North were also fairly successful on average, with 8.2 clams per digger. The digging at Deep Creek improved on the last day of the fishery to an average of 4.5 clams per digger (Holly Dickson, Fishery Biologist, ADF&G, Homer, unpublished data). Diggers at Whiskey Gulch were mostly unsuccessful throughout the fishery.

Over the 4 days of the fishery, 10% of diggers harvested the EO bag limit of 15 clams. The bag limit success varied by day, ranging from 22% of diggers harvesting the bag limit on July 1 to 5%

on July 3 (Danielle Siegert, Fishery Biologist, ADF&G, Homer, unpublished data). Bag limit success varied by beach as well, with 17% of Ninilchik Bar diggers harvesting the bag limit, and 14% at Ninilchik North, 10% at Ninilchik South, and 3% at Deep Creek (Table 7). At Whiskey Gulch, 1 out of 386 diggers harvested the bag limit.

In addition to the creel surveys, the SWHS also produced estimates of digger-days and harvest for East Cook Inlet SPU fishery in 2023 (Table 4). The number of responses to the SWHS indicating participation in the SPU fishery was well below the historical averages. This likely made the estimates less precise (see *Statewide Harvest Survey* under *Sport Fishing Effort, Harvest and Catch* section). The SWHS estimate of total harvest on East Cook Inlet beaches was 1,305 razor clams, with 1,996 days of effort for a success of 0.65 clams per digger. These estimates are well below the digger census and harvest estimate from creel surveys in 2023 (22,609 clams harvested, 5,420 days of effort, and 4.44 clams per digger). This discrepancy suggests limitations to producing reliable estimates with the SWHS for the limited razor clam fishery in East Cook Inlet. Effective management will require continued creel surveys or the use of permits with harvest records to assess the effort and harvest in future years when the fishery is open.

Abundance surveys at Ninilchik South and Clam Gulch North and hand-dug harvest monitoring at 9 East Cook Inlet beaches continued in 2022 and 2023. The juvenile abundance estimates at both beaches in 2022 and 2023 were below the historical and 2013–2020 period averages (Table 5). The 2023 Ninilchik South juvenile abundance estimate of 30,714 was the lowest annual estimate since 2015. The trend was similar at Clam Gulch North, with a 2023 juvenile abundance estimate of 893,062, which was a 61% decrease from the 2013–2020 average of 4.9 million juvenile clams. Adult abundance trends, on the other hand, were different between beaches in 2022 and 2023. At Ninilchik South, the 2022 adult abundance was below the historical and 2013–2020 period averages, but the 2023 adult abundance (332,217) was an improvement over the 2013–2020 period average. At Clam Gulch North, adult abundances in 2022 and 2023 were both higher than any other year in the 2013 to 2020 period but still well below the historical average. At Clam Gulch North, the adult abundance was 14% below the threshold to open the limited fishery in 2022 and 46% below the threshold in 2023.

The age compositions from hand-dug samples taken during 2022 and 2023 at both Ninilchik and Clam Gulch beaches remained truncated, with fewer age classes (1 year and 10+ age classes missing) than historically (Figures 3 and 4). In 2023, at all Ninilchik management area beaches, the dominant age class was 4-year-olds. A secondary cohort of age-7 clams was also still detected in 2023 on the Ninilchik beaches. On Clam Gulch beaches, the dominant age class in both years was the 7-year-olds.

Based on the trends in abundance and age compositions at both Ninilchik and Clam Gulch management areas, it does not seem likely that East Cook Inlet razor clams are capable of rebuilding to historical levels or supporting any consistent harvest opportunities. Particularity discouraging is the decline in juvenile abundances that will limit the recruitment to the adult size in the next 2 to 4 years.

## **West Cook Inlet Razor Clam Fisheries Description**

Razor clams are found in sandy intertidal beaches interspersed throughout West Cook Inlet. Unlike the East Cook Inlet beaches, the sandy intertidal areas are not contiguous and razor clam distribution throughout the West Cook Inlet is not well documented. The more well-known locations are from Polly Creek to the Crescent River bar, Chinitna Bay, Silver Salmon Creek, and



Oil Bay. Both commercial and SPU razor clam fisheries have occurred in West Cook Inlet, though commercial clamming has not taken place in recent years (2020–2021). When open and conducted, the commercial fishery only takes place in a 19-mile section from Harriet Point to Crescent River Bar. The sport and personal use fisheries are open throughout West Cook Inlet, but the most popular area overlaps with the commercial fishery area at Polly Creek and Crescent River bar. These razor clam fisheries are accessed by boat from the tractor launch facilities in Anchor Point and Deep Creek, the City of Kenai boat launch on the Kenai River, and by small fixed-wing aircraft from Cook Inlet communities. Boating to these fisheries requires crossing Cook Inlet for at least 30 miles in open seas, which usually requires a sufficiently large vessel. Access by fixed-wing aircraft requires landing on the intertidal beaches in locations of higher elevation with stable substrate. It is assumed most of the effort in the sport and personal use fisheries occurs from May through August and on days with larger minus tides. Some charter operators that operate out of the Deep Creek tractor launch offer boat transport to the fishery. Because clam diggers harvest clams unassisted, all harvest is considered nonguided and the charter operators are not required to complete a logbook for the trip.

The SWHS has produced shellfish effort and razor clam harvest estimates in numbers of clams in West Cook Inlet since 1986; commercial effort and harvest in pounds is available from Division of Commercial Fisheries fish ticket data. The West Cook Inlet sport and personal use harvest has been estimated for several locations, with harvest primarily occurring in the Polly Creek to Crescent River area. On average, West Cook Inlet has historically (1986–2012) accounted for about 5% of the total LCIMA sport and personal use razor clam harvest, but this proportion increased in 2013 when the East Cook Inlet razor clam fishery was restricted by EO (Booz and Dickson 2023). To facilitate comparisons between the sport and commercial harvest in the Polly Creek and Crescent River area, conversions from numbers to pounds were generated by razor clam length–weight relationship data collected by a graduate student in the late 2000s (McKellar 2014). On average from 1986 through 2018, the sport and personal use fisheries in West Cook Inlet harvested over 38,000 clams, and the commercial fishery harvested about 900,000 clams in this area, which resulted in approximately 97% of the total harvest coming from the commercial fishery (Booz and Dickson 2023).

### **West Cook Inlet Razor Clam Fisheries Management Objectives**

The West Cook Inlet razor clam sport (5 AAC 58.022 [a][14][B]) and personal use (5 AAC 77.518) fisheries are under the areawide regulations for the Cook Inlet–Resurrection Bay saltwater area. Statewide “method and means” regulations restrict clam gear in the sport fishery (5 AAC 75.035 [6]) and in the personal use fishery (5 AAC 77.010 [k][3]). Gear is limited to harvest by hand, or with the use of a rake, shovel, or manually operated clam gun. Clam diggers are also required to harvest all razor clams that they take. There are no management plans for the West Cook Inlet sport and personal use razor clam fisheries. The West Cook Inlet commercial razor clam fishery area is from Redoubt Creek south to Crescent River, with an annual harvest limit of 400,000 lb of whole weight razor clam (Lipka and Stumpf 2024). The commercial fishery is prosecuted under the guidelines of a commissioner’s permit where annual limit and individual size limits (clams must be 4.5 inches or larger) are established.

The West Cook Inlet razor clam stocks and fisheries are not as closely monitored as the East Cook Inlet beaches. Sport and personal use fisheries assessment has primarily been through SWHS effort and harvest estimates (Table 8). Starting in 2013, age and length compositions of West Cook Inlet clam stocks (Figures 5 and 6) have been assessed through hand-dug samples collected by SF staff

with sampling methods similar to those used on the East Cook Inlet beaches. The Division of Commercial Fisheries fish ticket data have provided some stock assessment information through annual and monthly catch per unit effort (CPUE; Booz et al. 2019). From 2002 through 2016, the annual CPUE was above the 1984–2018 average but it trended downward in 2017 through 2019. The commercial fishery was not prosecuted in 2020 and 2021 due to no participants registering for the fishery (Rumble et al. 2023).

Abundance surveys were conducted by Lake Clark National Park staff at Clam Cove in Chinitna Bay in 2021. The surveys were designed and conducted as outlined in the operational plan for East Cook Inlet razor clams (Booz et al. 2024). The intention of these surveys was to contribute to a broad-scale study assessing the effects of sea otter range expansion in West Cook Inlet. Overall, the results of these surveys found a robust population of razor clams at Clam Cove capable of supporting harvest opportunities (Booz and Dickson 2023).

### **West Cook Inlet Razor Clam Fisheries 2022–2023 Performance**

At the statewide miscellaneous shellfish meeting, the BOF adopted a department proposal to implement a bag limit of 10 gallons for razor clams for all areas of Cook Inlet and the North Gulf Coast, excluding East Cook Inlet starting in 2022. For locations in West Cook Inlet such as Polly Creek and Crescent River Bar, 10 gallons is approximately 200–300 clams depending on the size of clams (Michael Booz, Fishery Biologist, ADF&G, Homer, unpublished data). Using a bag limit of 10 gallons (usually harvested in two 5-gallon buckets) was suggested by ADF&G as a means to reduce the burden on the user (to keep track of the number of clams) and to make it easier for enforcement.

The total West Cook Inlet razor clam harvest in 2022 was the lowest estimate since the mid-1990s and the total effort in 2022 was the lowest since 2003. Only the Polly Creek–Crescent River area reported effort and harvest in 2022. However, interpretation of these 2022 results should be very cautious because the response rate for West Cook Inlet was very low, with only 9 survey respondents. The 2023 total harvest was comparable to harvest from 2017–2021, and there were responses for all harvest reporting locations (Table 8). Low numbers of responses for the SWHS result in less precise estimates, which makes it difficult to discern trends in effort and harvest for the West Cook Inlet razor clam fisheries and prevents any meaningful assessment of the 2022 bag limit regulation change on total harvest.

In 2022, razor clam abundance was assessed at Silver Salmon Creek by Lake Clark National Park staff. The beach in the study area was south of Silver Salmon Creek and was similar in size and amount of razor clam habitat to Clam Gulch North beach in East Cook Inlet (Table 9). Overall, both adult and juvenile density and abundance were much higher than those observed in East Cook Inlet. In particular, juvenile density appears sufficient to support recruitment to the adult size class over the next few years. These estimates suggest a robust stock for this portion of West Cook Inlet. It is unknown how representative this study area is for other beaches in West Cook Inlet. Lake Clark National Park staff also surveyed razor clam abundance at Clam Cove in Chinitna Bay in 2023, but the sampling was incomplete (Dan Young, Fisheries Biologist, Lake Clark National Park, personal communication).

Hand-dug collection of razor clams to assess age and length compositions continued at Crescent River Bar and Polly Creek in 2022 and 2023. In addition to sampling at these beaches, clams were dug by Lake Clark National Park staff at Silver Salmon Creek in both years. Digging was reported

as good by staff at all three locations. Generally, clams were abundant and widespread in both years.

At Crescent River Bar, the 2022 and 2023 age compositions made up a full complement of ages and showed continued improvement toward relative abundance of older clams (Figure 5). The 2017 cohort was the primary age class for both years. Additionally, almost all samples (>88%) were 5 years and older in both years (Table 10). Maximum age in 2022 and 2023 (15 and 14, respectively) was older than it has been since 2016. Overall, these compositions suggest that razor clams in Crescent River Bar are continuing to survive to the maximum age documented for Cook Inlet razor clams, and the consistent annual recruitment suggests a productive, robust stock.

At Polly Creek, age compositions did not indicate as much population robustness as Crescent River Bar, but age compositions still included 8- or 9-year age classes in both years (Figure 6). The 2017 cohort was the primary age class for both years. Most of the samples were 5 years and older and the percentage of juvenile clams (<80 mm) was less than 2% in both years (Table 11). Maximum age has not substantially changed since 2018. Overall, the age composition suggests that razor clams in Polly Creek are continuing to survive to an age older than clams in East Cook Inlet and that there is consistent annual recruitment, suggesting a productive, robust stock.

Age compositions of razor clams at Silver Salmon Creek during 2022 and 2023 were more similar to Crescent River Bar than Polly Creek and were composed of a full complement of ages in both years (Table 12). Maximum age was 15 years old in both years, which suggests survival is high at this location. The length compositions at Silver Salmon Creek show that clams are smaller than those sampled at Crescent River Bar and Polly Creek.

## **NGCMA RAZOR CLAMS**

### **North Gulf Coast Razor Clam Fisheries Description**

There is very little background information available on North Gulf Coast razor clam fisheries. A small population of razor clams was found on a sandy beach at the southwest end of Nuka Island (Nickerson 1975). East of Nuka Island, from Gore Point to Tonsina Bay, there are scattered sandy beaches and razor clam shells have been found on the beach; razor clam abundance in this area is unknown. Sport and personal use harvest in this area is thought to be very small, and there is no commercial harvest in the area. In most years, no razor clam harvest is reported for the NGCMA and when there are harvest estimates, the number of clams is less than 600 (Table 3).

### **North Gulf Coast Razor Clam Fisheries Management Objectives**

The North Gulf Coast razor clam sport (5 AAC 58.022 [a][14][B]) and personal use (5 AAC 77.518) fisheries are under the areawide regulations for the Cook Inlet–Resurrection Bay Saltwater area. Statewide “method and means” regulations restrict clam gear in the sport fishery (5 AAC 75.035 [6]) and in the personal use fishery (5 AAC 77.010 [k][3]). Gear is limited to harvest by hand or with the use of a rake, shovel, or manually operated clam gun. Clam diggers are also required to harvest all razor clams they take. There are no management plans for the North Gulf Coast sport and personal use razor clam fisheries. There is no active or historical assessment of North Gulf Coast razor clam populations.

### **North Gulf Coast Razor Clam Fisheries 2022–2023 Performance**

At the statewide miscellaneous shellfish meeting in 2022, the BOF adopted an ADF&G proposal to implement a bag limit of 10 gallons for razor clams for all areas of Cook Inlet and the North

Gulf Coast excluding East Cook Inlet. No razor clam harvest was reported in the NGCMA in 2022 or 2023 (Table 3).

## **HARDSHELL CLAM FISHERIES**

Hardshell clams are found in rocky intertidal areas throughout the LCIMA and NGCMA but their distribution is not well known. The generic term, hardshell clam, refers to Pacific littleneck (*Leukoma staminea*) and butter clam (*Saxidomus gigantea*). Pacific littleneck and butter clam are found in the intertidal areas (from +5 ft to -5 ft tides) of bays, estuaries, and open coastlines. They are encountered in a variety of beach habitats and gravel sizes, with Pacific littleneck preferring gravel beaches with more mud content. Pacific littleneck clams typically inhabit the upper 4–6 inches of the substrate and occasionally to depths of 8 inches, whereas butter clams are encountered to depths of 1 ft. Kachemak Bay in LCIMA historically supported the largest concentration of hardshell clams in LCIMA and likely NGCMA.

### **Hardshell Clam Fisheries Description**

Kachemak Bay has historically supported hardshell clam sport, personal use, subsistence, and commercial fisheries. Noncommercial harvest is largely unknown for other areas of LCIMA and NGCMA but assumed to be low in comparison to Kachemak Bay. Historically, Jakolof Bay, China Poot Bay, and Bear Cove were the primary harvest areas for Pacific littleneck clams. Butter clams have been primarily harvested on the islands in China Poot Bay. Like razor clams, most of the SPU effort occurs within a 5-month period from April through August when minus tides occur during daylight hours and warmer temperatures prevail. During the darker winter months from October through February, most clam digging is precluded when the low tides occur at night, temperatures are cold, and ice builds up on beaches. There are about 60 minus tides annually from April through August.

Harvest in the sport fishery has been assessed by the SWHS and was reported in gallons through 2010 and in numbers of hardshell clams since then. The SWHS estimates are not apportioned by species so conversion between gallons and numbers is difficult without species apportionment, especially considering the large size difference between the species. Average annual harvest of hardshell clams from 1981 to 2010 was approximately 12,000 gallons and from 2011 through 2015 averaged about 43,000 clams (Kerkvliet et al. 2016).

### **Hardshell Clam Fisheries Management Objectives**

Since 1997, hardshell clam fisheries in Kachemak Bay have been managed by the *Southern District Hardshell Clam and Mussel Fishery Management Plan* (5 AAC 38.318). The plan limits the annual noncommercial (sport and personal use) and commercial harvests to 160,000 pounds and 40,000 pounds, respectively. The harvest level for the noncommercial fishery was based on the average harvest in the fishery from 1981 to 1995. In 2007, the Alaska Board of Fisheries (BOF) made a positive customary and traditional use finding for shellfish in the portion of Cook Inlet outside the Anchorage, Matanuska–Susitna, and Kenai Peninsula nonsubsistence area (NSA). The BOF also determined the amount reasonably necessary for subsistence uses (ANS) of hardshell clams was 6,800–10,200 pounds in a portion of Cook Inlet outside of the NSA (5 AAC 02.311[b][1]) and 2,800–4,200 pounds in another portion of Cook Inlet outside of the NSA (5 AAC 02.311[b][2]). For all areas of the LCIMA and NGCMA, the sport fishery regulations are outlined in 5 AAC 58.022(a)(12) and additional personal use regulations are outlined in 5 AAC 77.518(2)(B).

Annual hardshell clam abundance surveys were conducted in Kachemak Bay from the mid-1990s through 2010, and in 2018–2019. The surveyed beach sections included Jakolof Bay, China Poot Bay, and Chugachik Island. Results in 2018 and 2019 indicated dramatic declines in hardshell clam abundance (Booz and Dickson 2023).

### **Hardshell Clam Fisheries 2022–2023 Performance**

Hardshell clam sport and personal use fisheries were closed in all waters of LCIMA and the NGCMA following the March 2022 Board of Fish meeting. Some subsistence harvest of hardshell clams still occurs outside of the nonsubsistence area (Figure 7). Subsistence harvest of hardshell clams in these years is unknown but expected to be low.

## **TANNER CRAB FISHERIES**

Tanner crab are found throughout LCIMA and NGCMA, with the largest concentrations occurring in Kachemak and Kamishak Bays. Generally, legal male Tanner crab are found in proximity to the deepest waters of Kachemak Bay whereas juvenile and female crab are more distributed throughout (Rhea-Fournier et al. 2022). Additionally, within Cook Inlet, juvenile male Tanner crab have been observed in the intertidal as far north as Clam Gulch in East Cook Inlet (Michael Booz, Fisheries Biologist, ADF&G, Homer, unpublished data). Tanner crab distribution in NGCMA is not well documented but concentrations may occur, particularly in the eastern portion of the area. Tanner crab have been observed in National Oceanic and Atmospheric Association (NOAA) trawl surveys in both state and federal waters throughout the North Gulf Coast (DisMap NOAA mapper tool, <https://apps-st.fisheries.noaa.gov/dismap/DisMAP.html>, accessed January 15, 2025).

### **Tanner Crab Fisheries Description**

Historically, Tanner crab in LCIMA and NGCMA supported both commercial and noncommercial (sport, personal use, and subsistence) fisheries. Tanner crab were primarily harvested in Kachemak Bay, but Kamishak Bay also supported a commercial fishery. The NGCMA has more limited commercial and noncommercial opportunities. Due to the depth where Tanner crab are found (greater than 300 feet) and size of these crabs, large heavy pots are required to harvest them, along with mechanical pullers or boats with sufficient horsepower to raise the pots. Tanner crab abundance in Kachemak and Kamishak Bays has been periodically assessed with a large-mesh bottom trawl survey since 1990 (Rhea-Fournier et al. 2022). Due to low stock abundance, the commercial fisheries have been closed since 1995.

The noncommercial fisheries in LCIMA and NGCMA have been managed together and have had periodic closures since 1989 (Table 2; Kerkvliet et al. 2016). Overall, a very small proportion of the annual total harvests have occurred in the NGCMA. Noncommercial harvest data are available from the Statewide Harvest Survey (SWHS) from 1981 through present and from shellfish permits starting in 1996 (Kerkvliet et al. 2016: Table 3). The permit data available from 1996 to 2011 provides trip-level data by household for all noncommercial Tanner crab fisheries combined by area. Since 2017, permits have been issued online to individuals, with separate permits for the sport and subsistence Tanner crab fisheries, providing angler-level harvest reports by area and fishery type. SWHS estimates of noncommercial Tanner crab harvest in most years are much lower and more variable than estimates obtained from shellfish permits and are not considered reflective of the actual harvest. Tanner crab harvests reported on permits are considered more accurate than SWHS estimates because permit compliance is high whereas SWHS response rate is low for shellfish fisheries.

From 1996 to 2000, the average annual noncommercial harvest estimated for all areas from permits was approximately 15,400 under a bag and possession limit of 20 crab (Kerkvliet et al. 2016). A bag limit reduction to 5 Tanner crab resulted in an estimated harvest in 2001 of 6,499 crab. The fishery closed early in the 2002 season following low trawl survey abundance estimates of legal male Tanner crab. The fishery re-opened from 2008 to 2011, and the Tanner crab harvest for all areas averaged roughly 16,000 crab in those seasons. The fishery closed by emergency order during the 2011–2012 season following trawl survey results that fell below the abundance threshold for the noncommercial fishery (see *Tanner Crab Fisheries Management Objectives* below). The trawl survey did not occur from 2014 to 2016 and the fishery remained closed with no abundance estimates to trigger an opening. The noncommercial fisheries re-opened in 2017 following the BOF decision to provide a smaller more limited harvest opportunity in the absence of trawl survey results. Harvest averaged 8,500 Tanner crab in the 2017–2018 and 2018–2019 limited seasons. The 2019–2020 season opened under the standard fishery structure, following trawl survey results that triggered the larger fishery. In 2020, ADF&G lost funding for the trawl survey and the BOF adopted a department proposal to implement an annual limit of 20 for the limited fishery and 40 for the standard fishery. This resulted in reduced total harvests of approximately 6,500 in the following 2 limited seasons.

### **Tanner Crab Fisheries Management Objectives**

In March 2002, the BOF adopted the *Registration Area H Tanner Crab Harvest Strategy* (5 AAC 35.408), which includes Cook Inlet Area waters within the Southern, Kamishak, and Barren Island commercial districts but does not include the Outer and Eastern districts. The strategy established abundance thresholds for the commercial and noncommercial (including NGCMA) Tanner crab fisheries by district. When the estimated abundance of legal male Tanner crab is below the minimum threshold for a commercial fishery, the harvest strategy specifies that the noncommercial Tanner crab fisheries guideline harvest level (GHL) may not exceed 10 percent of the recent 3-year average of legal male Tanner crab. This is referred to as the standard noncommercial fishery. Furthermore, the harvest strategy outlines a limited noncommercial fishery that occurs when the legal male abundance is below the threshold for the standard noncommercial fishery or in the absence of any trawl survey (see below). Starting in 2020, the Kamishak Bay trawl survey was no longer used for management of the noncommercial fisheries because no surveys have been conducted since 2012.

Other regulations for the sport, personal use, and subsistence noncommercial Tanner crab fisheries have been modified over time (Booz et al. 2019). Sport regulations are generally listed in Chapter 58 of Alaska Administrative Code 5, but the statewide permit regulations in 5 AAC 75.016 apply to this Tanner crab fishery. Season and limits are listed for the entire Cook Inlet–Resurrection Bay area in 5 AAC 58.022 (a)(11). Cook Inlet area sport fish permit regulations are in 5 AAC 58.026, and Cook Inlet area methods and means are listed in 5 AAC 58.035. In the LCIMA, gear regulations allow up to 2 pots or ring nets during the standard Tanner crab fishery, whereas in the NGCMA, up to 6 pots or ring nets are allowed. The personal use fisheries were repealed in 2016 with the Administrative Procedures Act (AS 44.62) because it was viewed as a redundant fishery to the sport fishery. Subsistence regulations established in 2007 are listed in Chapter 2 of Alaska Administrative Code 5 and the Cook Inlet Tanner Crab regulations are in 5 AAC 02.325. This includes an ANS of 275–1,400 Tanner crab outlined in 5 AAC 02.311(b)(4).

At the March 2017 meeting, the BOF adopted several substantial regulation changes to the noncommercial fishery. The legal size of males was reduced from 5.5 inches (carapace width) to 4.5 inches (114 mm). The “limited” smaller noncommercial fishery was given a season of

October 1 through the last day of February and a bag and possession limit of 3 legal males, and gear was restricted to 1 pot per person and per vessel. The standard fishery has a season of September 1 through March 15 and a bag and possession limit of 5 legal males, and each person or vessel is allowed to operate 2 pots. The smaller fishery allowed ADF&G to implement a mandatory online reporting requirement tied to permits obtained only through the ADF&G online store<sup>2</sup>. This requirement allowed ADF&G to enforce the authority under 5 AAC 58.026(a) and 5 AAC 01.015(c) to deny a permit to those who failed to return a harvest report for the previous year. By issuing permits online, ADF&G was able to separate the sport and subsistence fisheries with a permit for each fishery.

At the March 2020 meeting, the BOF adopted an annual limit for both the limited and standard fisheries, clarified gear and season regulations, established an appeals process for permit holders placed on the failure to report (FTR) list, and updated the legal male abundance thresholds based on the 4.5-inch legal size. An annual limit of 20 was established for the smaller limited fishery and an annual limit of 40 was established for the standard fishery. The standard fishery season dates were updated to September 1 through March 15, eliminating the 2-week closure in January. Gear regulations were updated to include ring nets as legal gear in the limited fishery and to standardize the use of no more than 1 pot or ring net per vessel for the limited fishery and no more than 2 per vessel in the standard fishery. The gear regulations are consistent between the LCIMA and NGCMA for the limited fishery, but in NGCMA waters, crabbers are allowed up to 6 pots or ring nets during the standard fishery. An appeals process was established for permit holders who failed to report by the deadline. The legal male abundance threshold for the standard noncommercial fishery was updated to require a 3-year average of at least 200,000 and the most recent year to be at least 100,000 legal males.

## **Tanner Crab Fisheries 2022–2023 Performance**

In 2022, there were no proposals for LCIMA and NGCMA Tanner crab sport fisheries to the BOF at the Statewide Miscellaneous Shellfish meeting. No trawl surveys were conducted in 2022 through 2023 due to loss of funding, so the limited fishery was opened by regulatory default in those years. Online reporting was required in all years by regulation, and an FTR list of permit holders who did not report on time or submit an approved written appeal within the appeals deadline was maintained to prohibit noncompliant permit holders from obtaining a permit the following year.

In the 2022–2023 and 2023–2024 seasons respectively, a total of 2,477 and 2,233 individual permits for the sport and subsistence Tanner crab fisheries were issued. Approximately 97% were sport permits each season (Table 13). This was an increase in the number of issued permits compared to other limited fishery seasons since 2017–2018 (all seasons except 2019–2020 were limited fishery). Additionally, a larger percentage of the permits were fished in 2022–2023 and 2023–2024, which resulted in just under 1,700 individuals participating in the sport fishery each season (calculated from Table 13). During those seasons, sport permit reporting was 89% and 94%, respectively, with 332 and 133 individuals on the FTR list, respectively. Subsistence reporting was 84% and 94%, respectively, with 15 and 5 people on the FTR list, respectively (Table 13).

Reporting behavior varied by residency category (Homer area, other Alaska, and nonresident). During the last two seasons, nonresidents made up 11–14% of permit holders (calculated from

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<sup>2</sup> ADF&G online store available at <https://www.adfg.alaska.gov/Store/>.

Table 14) and 25–27% of the FTR list (ADF&G unpublished data). Homer area residents (including communities from Anchor Point to the south side of Kachemak Bay) were more likely to report, making up 38% and 39% of permit holders the last two seasons (Table 14), respectively, and 24–27% of the FTR list. Reporting compliance was the highest in 2023 after the transition to online reporting in 2017. Although the number of permits fished increased in the sport fishery in the 2022–2023 and 2023–2024 seasons (Table 13), the total harvests were similar to those since 2019 (Table 15). In the NGCMA (Area C), effort in both 2022–2023 and 2023–2024 was below the average for seasons starting in 2017–2020. Reduced effort in all areas may have been related to icy conditions in the Homer harbor, limiting access during portions of both seasons. The vast majority (94–95%) of the harvest occurred in Kachemak Bay in both seasons. NGCMA accounted for 1–2% of the season harvest.

In the 2022–2023 and 2023–2024 seasons, the SWHS estimates of Tanner crab harvests in the LCIMA were approximately 5,000 and 2,500, respectively, which was less than the harvest estimates derived from permit data. The SWHS also underestimated harvest in the NGCMA during these seasons, with estimates of zero harvest in both seasons compared to the harvests of 82 and 80 reported on permits during 2022–2023 and 2023–2024, respectively.

## **DUNGENESS CRAB FISHERIES**

Dungeness crab are found throughout LCIMA and NGCMA in sandy and muddy habitats. Historically, noncommercial crabbers harvest Dungeness crab in shallow waters (<45 ft), and commercial harvests target Dungeness crab in deeper waters (90–240 feet) near the mouth of Kachemak Bay and near Bluff Point (Merritt 1984). Trawl surveys throughout Cook Inlet found most Dungeness crab in Kachemak Bay east of Homer Spit and attributed this distribution to the double-gyre oceanographic pattern that results in a high residence time for Dungeness crab planktonic larvae within the bay (Paul 1984). Dungeness crab are found in Cook Inlet as far north as Kalgin Island (Kimker and Hammarstrom 1990).

### **Dungeness Crab Fisheries Description**

Historically, Dungeness crab in Cook Inlet supported both commercial and noncommercial fisheries. Almost all of the commercial Dungeness crab harvest occurred in the Southern District, which includes Kachemak Bay. Although much of the commercial harvest occurred near Bluff Point, Dungeness were also commercially harvested east of Homer Spit. The Southern District closed to commercial harvest in 1991, and the remaining districts closed in 1997. The noncommercial fishery, which primarily occurred within Kachemak Bay east of Homer Spit, closed following the 1998 season. Dungeness crab were taken in the noncommercial fishery with lightweight pots that could be deployed and retrieved by hand. Harvest data from the commercial fishery indicate a majority (92%) of the commercial harvest occurred from June through October (Kimker and Hammarstrom 1990).

Prior to its closure, the commercial fishery was the primary harvester of Dungeness crab in the Cook Inlet area (Table 16). Commercial harvest data are available from 1961 through the commercial closure in 1997 (Kimker and Hammarstrom 1990). The commercial fishery peaked in the late 1970s and early 1980s, with annual harvests of up to 1 million crab and then declined through the 1980s. Commercial harvest from 1981 to 1989 averaged 422,091 crab (calculated from Table 16). Noncommercial harvest data were first regularly available in 1981 through the SWHS; permit harvest data are also available from 1996 and 1997 (Szarzi et al. 2010). Noncommercial



harvest from 1981 to 1989 averaged 24,470 crab. Harvest dropped dramatically in the noncommercial fishery in 1995 and remained low, averaging around 7,000 crab until the noncommercial closure in 1998 (Szarzi et al. 2010).

When the noncommercial fishery was open, the season was open in Kachemak Bay from July 15 through December 31 and from January 15 or the beginning of the commercial Tanner crab season, whichever was later, through March 15. Prior to 1990, the bag limit was 20 legal male Dungeness crab (carapace width 6.5 inches or greater), whereas after 1990 it was reduced to 5 legal male crab. Pots were restricted to 5 per person and 10 per vessel through 1995, and 4 per person and vessel after that. Beginning in 1996, harvest was reported by trips on permits for both Tanner and Dungeness crab. Currently throughout Alaska, commercial and noncommercial Dungeness crab fisheries are only open to harvest of male crab 6.5 inches or greater carapace width. In areas that are open to noncommercial harvest of Dungeness crab, harvest is generally allowed year-round with bag limits ranging from 3 to 20 Dungeness crab and no annual limit.

### **Dungeness Crab Fisheries Management Objectives**

Concern over declining commercial harvest rates through the 1980s led ADF&G to initiate a 90-pot survey in 1990. Pots were set east of Homer Spit to index abundance and assess molt timing; the survey was conducted in 1990–1998, 2000, and 2009. The CPUE of legal male Dungeness crab in the pot survey declined dramatically from 1995 to 1998, leading ADF&G to close the noncommercial fisheries by emergency order in 1998 and 1999.

The commercial fishery was closed annually by ADF&G beginning in 1991, and by BOF action in 1997. The BOF was concerned that the stock abundance of Dungeness crab was insufficient to ensure sustainable fisheries, and stipulated in the Cook Inlet Area Dungeness crab fisheries management plan (5 AAC 32.390) that the commercial fishery would remain closed until ADF&G drafted a new management plan that considered 14 factors: a minimum acceptable biomass level; maximum allowable exploitation rates; minimum thresholds for implementation of commercial and noncommercial fisheries; age and sex composition information; fishing seasons that avoid biologically sensitive periods and areas; a regular schedule and mechanism for the stock assessment; area-specific limits on the incidental catch of nontarget fish, including any considerations for the sex and size of target species, if appropriate; operating requirements, including gear, vessel, and time restrictions; reporting requirements, including logbooks; full accountability of fishing mortality, including deadloss and discards; potential user group conflicts; the ecosystem function of both target and nontarget species; maintenance of Dungeness crab geographic distribution; and an analysis of the customary and traditional subsistence use patterns. In 2000, the BOF closed the noncommercial fisheries and added the stipulation to the management plan that the noncommercial fisheries would also not re-open unless ADF&G developed a management plan addressing the factors listed above.

ADF&G was not prepared to present a new management plan that met the criteria outlined by the board for the 2000, 2003, or 2006 board meetings. The Cook Inlet Area Dungeness crab fisheries management plan, implemented by the BOF in 1997, included a sunset clause for 2006; because no management plan was adopted, the regulation requiring a detailed management plan to re-open the fisheries has been repealed since July 31, 2006. In 2007, there was a positive customary and traditional use finding for shellfish in the Cook Inlet Area outside the Anchorage–Matanuska–Susitna–Kenai Nonsubsistence Use Area (5 AAC 02.311; nonsubsistence use area is defined in 5 AAC 99.015), but no amount reasonably necessary for subsistence (ANS) finding occurred for

Dungeness crab because the fishery was closed. There is limited information on the historical subsistence harvest of Dungeness crab. Primary data are from household surveys (Jones and Kostick 2016). Cook Inlet personal use crab fisheries were repealed through the Administrative Procedures Act in 2016 to eliminate redundancies in existing regulations.

Since the BOF imposed closures of the commercial and noncommercial fisheries, there has been limited assessment of the Dungeness crab stock in Cook Inlet. In the 2009 pot survey, no legal male crab were caught. Additionally in 2009, ADF&G explored an area outside the historical 90-pot survey. Fifteen pots were fished in Mud Bay near the harbor mouth and the catch was composed of 10 legal and 23 sublegal males, and 1 female. The 15 pots fished in the deep trench west of Homer Spit caught 7 females and 1 sublegal male (Szarzi et al. 2010). Dungeness crab have been incidentally captured in the ADF&G Kachemak Bay Tanner crab trawl survey, but the catch may not reflect changes in abundances because the trawl survey isn't representative of all Dungeness crab habitat. Similar to the historical harvests, the index of Dungeness crab from the trawl survey had large fluctuations from year to year, with densities of legal males per nautical mile towed fluctuating from 0 following the closure of the noncommercial fishery to 2.45 in the 2018 survey (Table 16). Dungeness crab are also caught incidentally in the Cook Inlet Tanner crab noncommercial fishery with recent reports of legal male crabs being captured. Overall, the current status of Dungeness crab in Cook Inlet is unknown, but they have persisted and are still observed throughout Kachemak Bay.

### **Dungeness Crab Fisheries 2022–2023 Performance**

The Dungeness crab sport fishery remained closed in Cook Inlet for 2022 and 2023 (Table 2). There were no pot or trawl surveys. Noncommercial crabber reports of legal male Dungeness crab captured in the Tanner crab fishery continued in both 2022 and 2023.

## **SHRIMP FISHERIES**

Shrimp are found throughout LCIMA and NGCMA, although most species are not found north of Anchor Point. There are 5 species of pandalid shrimp that have been targeted by fisheries in these areas: northern shrimp (*Pandalus borealis*), sidestripe shrimp (*P. dispar*), humpy shrimp (*P. goniurus*), coonstripe shrimp (*P. hypsinotus*), and spot shrimp (*P. platyceros*). Shrimp generally prefer muddy habitat, although spot shrimp are often associated with rocky substrates, and older shrimp tend to migrate to deeper, offshore waters.

### **Shrimp Fisheries Description**

Historically, shrimp in LCIMA and NGCMA areas supported commercial trawl fisheries, and commercial and noncommercial pot fisheries (Kimker and Hammarstrom 1990). Species caught in trawl fisheries were primarily northern shrimp, followed by sidestripe shrimp, humpy shrimp, and coonstripe shrimp. Commercial pot fisheries targeted coonstripe shrimp but occasionally caught other species, including spot shrimp. Most commercial shrimp harvest occurred in Kachemak Bay, and the trawl fishery was the primary harvester in this area. Noncommercial harvesters generally set lightweight pots from boats.

Trawl fisheries developed in this area around statehood, when mechanical shell peelers made commercial shrimp fisheries feasible. In the early 1970s, ADF&G began conducting small-mesh trawl abundance surveys in Kachemak Bay, which indicated a decline in all pandalid shrimp stocks in Kachemak Bay after the late 1970s. During the decline, there were intermittent closures and

guideline harvest levels were reduced until the commercial fishery in Cook Inlet was closed in fall 1986 (Kimker and Hammarstrom 1990). The North Gulf Coast area trawl fishery and noncommercial fisheries remained open until they were closed by BOF action in 1997 (Trowbridge and Goldman 2006). The BOF, citing concerns for the lack of information, adopted a regulatory closure in 1997 (5 AAC 31.390) that also stipulated 14 criteria that must be considered in any subsequent management plan adopted by the BOF (see *Dungeness Crab* section above for these criteria). Environmental factors and large populations of predatory groundfish species are thought to have hindered shrimp stock recovery because shrimp populations remain low whereas groundfish abundance is relatively high (Rumble et al. 2023).

## **Shrimp Fisheries Management Objectives**

In March 2006, the BOF adopted a proposal allowing personal use fishing for shrimp in the commercial Cook Inlet Area, east of Gore Point to Aialik Cape, excluding the waters of Resurrection Bay (5 AAC 77.511). The fishery is informally referred to as the North Gulf Coast personal use shrimp fishery; it takes place in the Outer and Eastern Districts of the Cook Inlet Area. Regulations for the fishery include a season from April 15 to September 15, a permit requirement as outlined in 5 AAC 77.015, pot limits of 5 per person and 5 per vessel, and pot requirements as outlined in 5 AAC 77.511(4). In March 2012, the BOF included the waters of Resurrection Bay in the personal use shrimp fishery.

Participants in the shrimp fishery are required to obtain a permit through the ADF&G online store. The failure to report (FTR) policy does not allow a person to obtain a permit if they failed to comply with reporting requirements the previous year. The permit has undergone changes through the years to better define fishing locations and allow flexibility when recording shrimp amounts. Daily reporting is required on the permit and includes the number of pots pulled, soak time, and number or gallons of shrimp harvested. Reporting shrimp by species is not required, although the targeted and primary species harvested is spot shrimp.

From 2008 through 2019, the number of personal use shrimp permits issued annually ranged from 109 to 195, averaging 140 permits per year (calculated from Table 17). In 2020, the number of issued permits increased to 422, most likely due to increased effort by Alaska residents during the beginning of the COVID-19 pandemic, although effort has remained high since then, averaging 291 permits annually from 2021 through 2023. Between 2008 and 2016, the reporting rate for permits was high, averaging 94% (calculated from Table 17), but beginning in 2017, reporting rates decreased, reaching a low of 51% in 2020. The proportion of permits fished steadily decreased from a high of 72% in 2010 to a low of 17% in 2020, when the greatest number of permits was issued.

Harvest and effort in the NGC personal use shrimp fishery is low compared to other personal use and sport shellfish fisheries in Southcentral Alaska. The most effective metric for assessing effort in the fishery is the number of pots fished annually for all permit holders combined. Effort has varied since the permit requirement was implemented in 2008. During the first 3 years, effort increased from 212 pots fished in 2008 to 556 pots fished in 2010 (Table 18). Effort then stabilized to an average of 526 pots fished annually from 2011 to 2016. After 2016, effort increased to 1,141 pots fished annually by 2020. Harvest in the fishery has been variable as well, ranging from 56 pounds in 2017 to 621 pounds in 2019, without respect to number of pots fished. This has resulted in variable catch per unit effort (CPUE) in pounds harvested per pot ranging from 0.29 pounds per pot in 2017 to 1.05 pounds per pot in 2015.

## Shrimp Fisheries 2022–2023 Performance

During this reporting period, the number of issued permits remained higher than the historical average, with between 244 and 342 permits issued annually (Table 17). Reporting rates were also high, averaging 82%, most likely due to the consequences of the FTR system, which began in 2021. The proportion of issued permits that were fished remained low, averaging 26% annually.

The highest effort since the fishery opened occurred in 2021, when 1,441 pots were fished (Table 18). In the following years, effort decreased to 940 pots fished in 2022 and 421 pots fished in 2023. Harvest during these years also decreased from 589 pounds in 2021, the second highest annual harvest in the fishery, to 472 pounds in 2022 and 133 pounds in 2023. CPUE ranged from 0.50 pounds per pot in 2022 to 0.32 pounds per pot in 2023.

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## **TABLES**

Table 1.–SWHS estimates of angler days of effort by fishery type in Lower Cook Inlet Management Area (LCIMA) waters, 2000–2023.

Year	Lower Cook Inlet Management Area				LCIMA % of state	Alaska total
	Saltwater fish	Saltwater shellfish	Freshwater finfish	Total		
2000	210,559	50,187	51,406	312,152	11.9	2,627,805
2001	184,278	41,341	40,896	266,515	11.8	2,261,906
2002	188,216	42,366	40,750	271,332	12.0	2,259,091
2003	190,775	31,583	40,313	262,671	11.8	2,219,398
2004	206,182	37,460	44,942	288,584	11.7	2,473,961
2005	224,606	41,250	43,454	309,310	12.6	2,463,929
2006	200,572	34,149	37,465	272,186	11.8	2,297,961
2007	212,187	30,781	57,625	300,593	11.8	2,543,648
2008	174,963	36,663	47,088	258,714	11.2	2,315,592
2009	166,275	35,148	40,302	241,725	10.9	2,216,436
2010	167,797	25,786	31,402	224,985	11.2	2,000,152
2011	168,214	29,836	17,307	215,357	11.2	1,919,312
2012	168,040	25,344	19,040	212,424	11.3	1,885,692
2013	192,745	30,155	17,535	240,435	10.9	2,202,957
2014	196,037	12,813	22,497	231,347	10.0	2,309,851
2015	185,388	5,280	22,311	212,979	9.6	2,212,331
2016	181,843	2,789	22,131	206,763	10.4	1,982,300
2017	185,501	2,721	20,404	208,626	10.4	2,006,244
2018	180,905	3,037	12,209	196,151	10.4	1,878,009
2019	166,664	4,903	15,072	186,639	9.0	2,075,431
2020	126,887	2,942	17,353	147,182	9.4	1,566,516
2021	165,847	3,554	11,666	181,067	9.2	1,978,655
2022	155,405	3,442	12,297	171,144	9.4	1,827,809
2023	154,452	5,979	9,192	169,623	9.6	1,775,094
Averages						
1977–1999	211,709	46,309	56,037	314,056	13.1	2,383,929
2000–2020	184,697	25,073	31,500	241,270	11.0	2,177,072
2021–2023	158,568	4,325	11,052	173,945	9.4	1,860,519

Source: Mills (1991, 1992, 1993, 1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 2024). Available from: <http://www.adfg.alaska.gov/sf/sportfishingsurvey/>. 1977–1999 data published in Kerkvliet et al. (2016).



Table 2.—SWHS estimates of effort and harvest of shellfish in sport fisheries by species in Lower Cook Inlet Management Area, 2000–2023.

Year	Responses <sup>a</sup>	Lower Cook Inlet Management Area							
		Effort		Shellfish					
		Anglers	Angler-days	Razor clam	Hardshell clam <sup>b</sup>	King crab	Tanner crab	Dungeness crab	Other shellfish
2000	1,356	31,721	50,187	870,545	20,747	–	16,141	–	2,596
2001	1,096	27,239	41,341	656,087	19,982	–	3,052	–	10,170
2002	936	26,953	42,366	781,895	25,454	–	1,124	–	11,576
2003	851	25,167	31,583	586,229	17,257	–	–	–	2,214
2004	863	26,275	37,460	543,268	16,748	–	–	–	4,952
2005	765	25,107	41,250	448,164	36,091	–	–	–	3,854
2006	628	19,100	34,149	478,515	7,503	–	–	–	1,819
2007	559	18,421	30,781	386,636	12,731	–	–	–	2,157
2008	598	19,087	36,663	580,897	6,898	–	5,694	–	4,773
2009	619	19,242	35,148	553,490	9,782	–	22,889	–	3,275
2010	506	16,834	25,786	355,314	5,039	–	5,898	–	2,268
2011	493	18,398	29,836	435,203	34,222	–	2,534	–	6,036
2012	451	13,234	25,344	316,029	44,974	–	–	–	3,994
2013	445	15,857	30,155	290,470	59,179	–	–	–	2,925
2014	208	8,854	12,813	88,458	33,474	–	–	–	3,680
2015	62	2,825	5,280	38,307	41,746	–	–	–	1,093
2016	61	2,326	2,789	76,207	7,532	–	–	–	4,421
2017	50	2,055	2,721	14,863	3,918	–	–	–	1,001
2018	57	2,213	3,037	21,872	5,357	–	1,300	–	455
2019	41	1,873	4,903	11,825	3,033	–	2,101	–	–
2020	55	2,396	2,942	18,792	2,889	–	580	–	683
2021	23	2,205	3,554	11,345	3,423	–	2,478	–	491
2022	36	2,126	3,403	7,651	closed	–	2,170	–	–
2023	76	4,678	5,979	18,947	closed	–	4,034	–	–
Averages									
1981–1999	1,267	33,757	48,200	999,158	20,212	2,168	5,288	16,461	6,956
2000–2020	510	15,485	25,073	359,670	19,741	–	6,131	–	3,697
2021–2023	45	3,003	4,312	12,648	3,423	–	2,894	–	491

Source: Mills (1991, 1992, 1993, 1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 2024). Available from: <http://www.adfg.alaska.gov/sf/sportfishingsurvey/>. 1981–1999 data published in Kerkvliet et al. (2016)..

Note: An en dash represents no estimates from the SWHS due to a lack of responses for the fishery.

<sup>a</sup> Responses to the SWHS indicating harvest of shellfish.

<sup>b</sup> Hardshell clam harvest was reported in gallons through 2010 and in numbers of clams since 2011.

Table 3.—SWHS estimates of the number of shellfish harvested in the sport fisheries by species in North Gulf Coast Management Area, 2000–2023.

Year	Responses <sup>a</sup>	North Gulf Coast Management Area						Other shellfish
		Razor clam	Hardshell clam <sup>b</sup>	King crab	Tanner crab	Dungeness crab	Shrimp	
2000	5	542	98	–	–	–	–	7
2001	0	–	–	–	–	–	–	–
2002	0	–	–	–	–	–	–	–
2003	0	–	–	–	–	–	–	–
2004	4	–	506	–	–	–	16	663
2005	3	–	–	–	–	–	48	–
2006	4	–	–	–	–	–	48	–
2007	7	–	–	–	–	–	252	30
2008	1	–	–	–	–	–	–	16
2009	6	–	–	–	–	–	68	10
2010	5	–	–	–	–	–	406	–
2011	5	337	–	–	–	–	103	708
2012	4	–	2,508	–	–	–	97	–
2013	2	172	–	–	–	–	47	–
2014	3	–	–	–	–	–	83	–
2015	5	–	–	–	–	–	340	–
2016	1	–	–	–	–	–	–	246
2017	3	–	–	–	–	–	364	–
2018	6	–	–	–	–	–	204	–
2019	5	–	–	–	–	–	1,571	–
2020	9	–	–	–	–	–	548	3
2021	5	–	–	–	–	–	718	–
2022	5	–	–	–	–	–	366	–
2023	3	–	104	–	–	–	47	–
Averages								
1981–1999	17	287	312	39	416	112	3,279	6,250
2000–2020	4	350	1,037	–	–	0	280	210
2021–2023	4	–	104	–	–	0	377	–

Source: Mills (1991, 1992, 1993, 1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 2024). Available from: <http://www.adfg.alaska.gov/sf/sportfishingsurvey/>. 1981–1999 data published in Kerkvliet et al. (2016).

Note: An en dash represents no estimates from the SWHS due to a lack of responses for the fishery. Average estimated number of anglers and angler-days for 1981–1999 were 608 and 793, respectively.

<sup>a</sup> Responses to the SWHS indicating harvest of shellfish.

<sup>b</sup> Hardshell clam harvest was reported in gallons through 2010 and in numbers of clams since 2011.

Table 4.—SWHS estimates of total razor clam harvest and effort in the sport and personal use fisheries from East Cook Inlet beaches, 2000–2023.

Year	Responses <sup>a</sup>	Residents		Nonresidents		Total razor clam harvest	Total digger-days	Total clams per digger-day
		Razor clam harvest	Digger-days	Razor clam harvest	Digger-days			
2000	1,027	ND	ND	ND	ND	842,270	37,755	22
2001	872	379,166	21,066	264,645	11,723	643,811	32,789	20
2002	749	602,435	24,634	165,345	9,772	767,780	34,406	22
2003	679	405,253	19,008	163,409	6,353	568,662	25,361	22
2004	690	354,952	22,250	164,265	7,961	519,217	30,211	17
2005	613	292,361	22,255	134,655	10,580	427,016	32,835	13
2006	503	301,273	18,712	146,690	6,770	447,963	25,482	18
2007	433	223,695	17,685	126,529	7,485	350,224	25,170	14
2008	474	389,667	20,250	146,870	8,556	536,537	28,806	19
2009	473	386,638	20,591	106,538	6,391	493,176	26,982	18
2010	399	212,620	11,803	114,530	7,609	327,150	19,412	17
2011	408	225,220	16,640	181,210	6,381	406,430	23,021	18
2012	384	169,662	15,658	91,195	6,214	260,857	21,872	12
2013 <sup>b</sup>	332	126,125	18,457	48,180	5,418	174,305	23,875	7
2014 <sup>c</sup>	136	22,580	6,263	9,616	1,581	32,196	7,844	4
2015 <sup>d</sup>	0	0	0	0	0	0	0	NA
2016 <sup>d</sup>	0	0	0	0	0	0	0	NA
2017 <sup>d</sup>	0	0	0	0	0	0	0	NA
2018 <sup>d</sup>	0	0	0	0	0	0	0	NA
2019 <sup>d</sup>	0	0	0	0	0	0	0	NA
2020 <sup>d</sup>	0	0	0	0	0	0	0	NA
2021 <sup>d</sup>	0	0	0	0	0	0	0	NA
2022 <sup>d</sup>	0	0	0	0	0	0	0	NA
2023 <sup>e</sup>	28	194	1,751	1,111	245	1,305	1,996	0.65
Averages								
1969–1999	922	ND	ND	ND	ND	867,573	28,897	30
2000–2012	593	328,579	19,213	150,490	7,983	507,007	28,008	18
2013–2014	234	74,353	12,360	28,898	3,500	103,251	15,860	6

Source: Mills (1991, 1992, 1993, 1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 2024). Available from: <http://www.adfg.alaska.gov/sf/sportfishingsurvey/>. 1969–1999 data published in Kerkvliet et al. (2016).

<sup>a</sup> Responses to the SWHS indicating harvest of shellfish.

<sup>b</sup> Bag and possession reduced to 25 by emergency order.

<sup>c</sup> Ninilchik south and north subareas closed and bag and possession reduced to 25 razor clams for remaining subareas by emergency order.

<sup>d</sup> Entire beach closed by emergency order.

<sup>e</sup> Ninilchik Management Area opened for a 4-day fishery with bag and possession reduced to 15 by emergency order.

Table 5.—Abundance estimates of juvenile and adult razor clams on Ninilchik South, Ninilchik North, and Clam Gulch North beaches, 2013–2023.

Year	Ninilchik South		Clam Gulch North	
	Juvenile	Adult	Juvenile	Adult
2013	5,016	71,629	ND	ND
2014	153,644	95,629	237,032	380,338
2015	33,463	95,391	322,170	208,116
2016	415,284	59,363	1,418,404	220,686
2017	880,273	121,769	4,102,878	200,145
2018	2,600,302	280,410	6,593,878	129,042
2019	1,314,700	259,702	12,498,835	147,012
2020	172,787	345,997	9,120,008	813,212
2021	1,951,402	233,465	3,688,693	1,027,241
2022	781,181	104,610	1,115,645	834,835
2023	30,714	332,217	893,062	527,088
Averages				
1989–2012	247,273	474,525	1,293,126	1,940,964
2013–2020	696,934	166,236	4,899,029	299,793
2021–2023	921,099	223,431	1,899,133	796,388

Source: Data collection methods available in Booz and Dickson 2021.

Note: ND means “no data” and indicates no abundance survey was conducted that year.

Table 6.—Razor clam toxin testing results, 2023.

Site	Collection date	Toxin concentration	
		Domoic acid (ppm) <sup>a</sup>	Paralytic shellfish toxin (µg/100 g) <sup>b</sup>
Ninilchik South	4/9/2023	—	<34
Clam Gulch North	5/8/2023	—	<34
Ninilchik South	6/5/2023	<1.2	<34
Ninilchik North	6/21/2023	<1.2	<34
Deep Creek	7/6/2023	<1.2	<34

Source: Personal communication, Danielle Siegert, Fishery Biologist, ADF&G, Homer.

<sup>a</sup> The FDA regulatory limits is 20 ppm for domoic acid.

<sup>b</sup> The FDA limit is 80 µg toxin/100 g shellfish tissue for paralytic shellfish toxins.

Table 7.—Razor clam harvest estimates in the sport and personal use fisheries from East Cook Inlet beaches, 2023.

Beach	Digger count	Diggers surveyed	Clams per digger	Harvest estimate	Bag limit (%)
Ninilchik North	1,621	1,327	5.31	8,607	13.9
Ninilchik South	1,543	1,516	5.03	7,763	10.4
Ninilchik Bar	248	227	7.32	1,815	17.2
Deep Creek	1,368	795	3.06	4,181	3.3
Whiskey Gulch <sup>a</sup>	640	400	0.38	243	0.3
	Sum	Sum	Average	Sum	Average <sup>b</sup>
Overall	5,420	4,265	4.17	22,609	9.6

*Source:* Data collection methods available in Booz and Dickson 2022.

<sup>a</sup> Survey data from Whiskey Gulch includes the Happy Creek beach.

Table 8.—SWHS estimates of razor clam sport and personal use harvest and effort in West Cook Inlet, 2000–2023.

Year	Responses	Harvest				Effort (Digger-days)				Totals	
		Polly Cr./ Crescent R.	North of Chinitna	South of Chinitna	Other	Polly Cr./ Crescent R.	North of Chinitna	South of Chinitna	Other	Harvest	Digger-days
1986	5	–	876	5,256	–	–	58	398	–	6,132	456
1987	–	–	–	–	–	–	–	–	–	–	–
1988	3	–	–	8,684	–	–	–	267	–	8,684	267
1989	4	–	3,140	5,181	–	–	276	86	–	8,321	362
1990	1	–	–	421	–	–	–	17	–	421	17
1991	1	–	–	1,070	–	–	–	33	–	1,070	33
1992	5	–	–	4,327	–	–	–	135	–	4,327	135
1993	14	–	201	6,112	–	–	30	176	–	6,313	206
1994	9	–	–	5,232	–	–	–	146	–	5,232	146
1995	3	–	–	2,052	–	–	–	188	–	2,052	188
1996	28	13,815	–	4,052	–	541	–	107	–	17,867	648
1997	27	13,490	1,202	701	–	572	15	75	–	15,393	662
1998	18	5,951	–	2,611	–	329	–	93	–	8,562	422
1999	30	13,814	–	2,179	–	677	–	363	–	15,993	1,040
2000	56	21,000	–	7,276	–	987	68	849	–	28,276	1,904
2001	34	7,621	2,411	4,868	–	398	471	349	–	14,900	1,218
2002	18	6,228	–	2,900	–	499	51	–	–	9,128	550
2003	22	10,326	–	2,887	–	386	–	180	–	13,213	566
2004	24	17,639	–	2,544	4,093	608	50	50	165	24,276	873
2005	23	17,471	–	2,280	–	2,000	35	283	–	19,751	2,318
2006	32	15,696	8,098	229	–	431	1,362	170	–	24,023	1,963
2007	36	26,617	6,114	548	–	630	431	74	–	33,279	1,135
2008	36	25,948	14,755	444	906	1,024	510	15	68	42,053	1,617
2009	45	19,541	20,632	4,113	3,749	616	889	167	31	48,035	1,703
2010	34	9,390	6,838	4,944	455	458	748	242	40	21,627	1,488
2011	27	18,390	7,680	864	620	2,696	257	92	50	27,554	3,095
2012	33	42,559	9,816	–	–	720	558	–	–	52,375	1,278
2013	70	87,910	17,189	156	3,210	2,781	527	64	151	108,465	3,523
2014	46	52,894	2,437	–	–	1,733	243	132	–	55,331	2,108
2015	33	34,863	2,274	1,170	–	1,211	186	26	–	38,307	1,423

-continued-

Table 8.–Page 2 of 2.

Year	Responses	Harvest				Effort (Digger-days)				Totals	
		Polly Cr./ Crescent R.	North of Chinitna	South of Chinitna	Other	Polly Cr./ Crescent R.	North of Chinitna	South of Chinitna	Other	Harvest	Digger-days
2016	41	61,936	13,123	–	–	1,040	377	–	63	75,059	1,480
2017	25	6,132	8,428	168	135	452	577	92	21	14,863	1,142
2018	30	19,289	590	–	1,729	1,130	77	–	131	21,608	1,338
2019	22	9,629	1,127	1,069	–	689	577	112	–	11,825	1,378
2020	30	17,116	703	234	739	1,165	206	62	166	18,792	1,599
2021	17	9,192	1,900	–	253	527	336	–	85	11,345	948
2022	9	7,651	–	–	–	542	–	201	–	7,651	743
2023	15	12,180	1,291	258	3,483	665	51	108	137	17,212	961
Averages											
1986–1999	11	11,768	1,355	3,683	–	530	95	160	–	7,721	352
2000–2020	34	25,152	7,638	2,158	1,737	1,031	410	174	89	33,464	1,605
2021–2023	14	9,674	1,596	258	1,868	578	194	155	111	12,069	884

Source: Mills (1991, 1992, 1993, 1994); Howe et al. (1995, 1996); Alaska Sport Fishing Survey database [Internet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 2024). Available from: <http://www.adfg.alaska.gov/sf/sportfishingsurvey/>. 1986–1999 data published in Kerkvliet et al. (2016).

<sup>a</sup> 1986–2012: Used constant weight of 0.249 lb/clam (McKellar 2014). 2013–2022: Estimated from mean annual length data from Polly Creek and Crescent River Bar beaches using  $\text{Weight (g)} = \text{Total Length (mm)} \times 3.381$  (McKellar 2014).

Table 9.–Razor clam beach survey area and abundance, 2022.

Metrics	West Cook Inlet	East Cook Inlet	
	Silver Salmon Creek	Ninilchik South	Clam Gulch North
Habitat			
Length (km)	2.4	1.57	2.38
Maximum strata <sup>a</sup>	31	29	25
Total area (m <sup>2</sup> )	897,294	565,224	890,082
Adults			
Density	2.51	0.19	0.94
Abundance	2,257,096	104,610	834,835
Avg length (mm)	106	95	84
Juveniles			
Density	4.02	1.38	1.25
Abundance	3,604,345	781,181	1,115,645
Avg length (mm)	48	42	69

Source: Preliminary estimates from M. Booz, Fishery Biologist, ADF&G, Homer.

<sup>a</sup> Strata are 15.24 m wide “strips” running parallel to the water line; maximum strata is the number of strata that cover the width of the exposed area during a minus tide.



Table 10.—Razor clam age and length compositions for Crescent River Bar, 2013–2023.

Year	Crescent River Bar													Number of samples <sup>a</sup>
	Age						Length							
	Min	Max	Mean	Mode	Number of cohorts	Percent ≥5 yr	Min	Max	Mean	Percentage by size class				
										<80 mm	80 mm ≥ size <129 mm	≥130 mm		
2013	5	17	10.3	7	13	100.0	101	174	142	0.0	19.5	80.4	133	
2014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0	
2015	2	16	7.3	8	15	79.7	39	165	117	6.5	63.0	30.4	138	
2016	1	18	6.8	5	17	80.0	41	172	119	8.0	54.7	37.3	150	
2017	2	12	5.4	5	11	71.3	61	159	109	3.3	90.0	6.7	150	
2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0	
2019	1	13	4.4	4	13	69.4	35	159	99	21.2	70.6	8.2	170	
2020	1	10	6.5	9	10	73.3	59	158	118	4.7	67.3	28.0	150	
2021	3	12	6.4	6	10	85.9	97	153	128	0.0	55.9	44.1	170	
2022	3	15	6.9	5	12	89.7	90	148	125	0.0	63.4	36.6	145	
2023	4	14	7.2	6	11	99.4	75	155	130	0.6	48.2	51.2	166	
Averages														
2013–2020	2.0	14	6.8	6	13	79.0	56	164	117	7.3	60.9	31.8	111	
2021–2023	3.3	14	6.8	6	11	91.7	87	152	128	0.2	55.8	44.0	160	

Source: Data collection methods available in Booz and Dickson 2022.

<sup>a</sup> The number of razor clams sampled for age and length is the total number of clams with ages and includes some samples without total length.

Table 11.—Razor clam age and length compositions for Polly Creek, 2013–2023.

Year	Polly Creek												
	Age						Length						
	Min	Max	Mean	Mode	Number of cohorts	Percent $\geq 5$ yr	Min	Max	Mean	Percentage by size class			Number of samples <sup>a</sup>
										<80 mm	80 mm $\geq$ size <129 mm	$\geq 130$ mm	
2013	4	11	6.7	7	8	91.0	105	162	135	0.0	33.0	67.0	100
2014	3	13	7.6	7	11	98.1	112	163	139	0.0	20.0	80.0	160
2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0
2016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0
2017	1	13	6.3	4	12	73.3	66	120	120	2.0	67.3	30.7	150
2018	3	10	5.4	5	8	78.7	13	145	109	2.0	87.3	10.7	150
2019	2	9	5.6	6	8	76.7	59	138	105	5.3	90.7	4.0	150
2020	1	9	4.3	3	9	45.3	38	129	107	2.0	98.0	0.0	150
2021	2	10	5.1	4	9	49.3	72	142	116	1.3	94.0	4.7	150
2022	2	10	5.6	5	9	88.0	67	138	120	1.3	86.7	12.0	150
2023	3	10	6.0	6	8	76.4	72	150	119	1.7	75.9	22.4	174
Averages													
2013–2020	2	11	6.0	5	9	77.2	65	143	119	1.9	66.1	32.1	108
2021–2023	2	10	5.6	5	9	71.2	70	143	118	1.4	85.5	13.0	158

Source: Data collection methods available in Booz and Dickson 2022.

<sup>a</sup> The number of razor clams sampled for age and length is the total number of clams with ages and includes some samples without total length.

Table 12.—Razor clam age and length compositions for Silver Salmon Creek, 2022–2023.

Year	Silver Salmon Creek												
	Age						Length						
	Min	Max	Mean	Mode	Number of cohorts	Percent $\geq 5$ yr	Min	Max	Mean	Percentage by size class			Number of samples <sup>a</sup>
										<80 mm	80 mm $\geq$ size <129 mm	$\geq 130$ mm	
2022	4	15	9.5	9	12	99.3	78	136	112	1.3	95.3	3.4	150
2023	5	15	10.4	11	11	100.0	91	133	119	0.0	88.8	11.2	125
Average													
2022–2023	5	15	10.0	10	12	99.7	84	135	116	0.7	92.1	7.3	138

Source: Data collection methods available in Booz and Dickson 2022.

<sup>a</sup> The number of razor clams sampled for age and length is the total number of clams with ages and includes some samples without total length.

Table 13.—Tanner crab sport and subsistence permits issued and reporting status in the Cook Inlet and North Gulf Coast Management Areas, 2017–2023.

Season <sup>a</sup>	Sport						Subsistence					
	Permits issued <sup>b</sup>	Percent fished	Reporting percentage			Permittees on FTR <sup>c</sup>	Permits issued <sup>a</sup>	Percent fished	Reporting percentage			Permittees on FTR <sup>c</sup>
			On time	Late	Total				On time	Late	Total	
2017–2018	1,782	55	62	35	97	NA	148	33	38	59	97	NA
2018–2019	1,587	62	81	12	93	255	184	53	58	9	67	26
2019–2020	1,327	55	85	8	93	119	80	43	79	11	90	9
2020–2021	1,889	69	91	3	94	149	96	41	91	2	93	7
2021–2022	1,712	72	90	4	94	131	58	40	83	14	97	3
2022–2023	2,396	70	84	5	89	332	81	49	80	4	84	15
2023–2024	2,162	78	91	3	94	133	71	47	86	8	94	5
Average (season start year)												
2017–2020	1,646	60	80	15	94	174	127	43	67	20	87	14
2021–2023	2,090	73	88	4	92	199	70	45	83	9	92	8

Source: Data collection methods available in Dickson and Booz 2020.

<sup>a</sup> All seasons except 2019–2020 were prosecuted under limited fishery regulations. The 2019–2020 season was prosecuted under standard fishery regulations..

<sup>b</sup> The number of permits is the number issued to individuals and does not include duplicated or voided permits.

<sup>c</sup> FTR means failure to report list.

Table 14.—Tanner crab sport and subsistence permits issued and reporting habits by residency type, 2019–2023.

Season <sup>a</sup>	Homer area residents				Other Alaska residents				Nonresident			
	Permits issued	Reporting percentage			Permits issued	Reporting percentage			Permits issued	Reporting percentage		
		On time	Late	No report		On time	Late	No report		On time	Late	No report
2017–2018	1,003	ND	ND	4	848	ND	ND	2	79	ND	ND	11
2018–2019	873	79	13	9	720	83	9	8	98	64	7	29
2019–2020	637	87	8	4	664	85	9	6	106	72	5	24
2020–2021	712	92	4	3	1,090	92	2	6	183	78	2	21
2021–2022	667	91	4	4	869	93	4	3	234	78	3	19
2022–2023	941	89	5	6	1,276	84	6	11	260	63	8	29
2023–2024	838	93	3	4	1,033	91	3	5	294	85	4	11
Average (season start year)												
2017–2020	806	86	8	5	831	87	7	5	117	71	4	21
2021–2023	815	91	4	5	1,059	89	5	7	263	75	5	20

*Source:* Data collection methods available in Dickson and Booz 2020.

*Note:* Homer Area residents were defined by the mailing address used to obtain a permit and included communities south of Anchor Point and communities on the south side of Kachemak Bay: Anchor Point, Nikolaevsk, Homer, Fritz Creek, Halibut Cove, Seldovia, and Port Graham. The Other Alaska category includes residents from all other Alaska communities that fall outside that boundary. Nonresidents are not residents of Alaska.

<sup>a</sup> All seasons except 2019–2020 were prosecuted under limited fishery regulations. The 2019–2020 season was prosecuted under standard fishery regulations..

Table 15.—Tanner crab sport, personal use, and subsistence effort (E) and harvest (H) from ADF&G permits in the Lower Cook Inlet and North Gulf Coast Management Areas, 2008–2012 and 2017–2023.

		Area													
Year	Fishery	Cook Inlet North (A)		Lower Cook Inlet (B)		North Gulf Coast (C)		Kachemak Bay East (D)		Kachemak Bay West (E)		Kachemak Bay Southwest (F)		Total	
		E	H	E	H	E	H	E	H	E	H	E	H	E	H
2008–2009	Historical <sup>a</sup>	3	0	249	823	19	9	1,203	3,443	3,580	12,742	ND	ND	5,108	17,173
2009–2010	Historical <sup>a</sup>	5	20	357	1,320	128	241	1,149	3,358	3,625	13,783	ND	ND	5,287	18,827
2010–2011	Historical <sup>a</sup>	14	34	197	610	31	41	759	1,708	3,537	10,968	ND	ND	4,723	13,745
2011–2012	Historical <sup>a</sup>	9	21	104	372	19	48	518	1,509	2,145	6,762	ND	ND	2,863	8,979
2017–2018	Limited	3	7	7	15	49	63	161	335	3,030	8,010	ND	ND	3,304	8,545
2018–2019	Limited	15	29	26	46	124	313	137	242	2,986	8,139	ND	ND	3,288	8,769
2019–2020	Standard	6	25	8	80	38	95	59	209	1,537	7,106	ND	ND	1,648	7,515
2020–2021	Limited	51	146	84	237	69	177	102	293	1,840	5,260	74	198	2,220	6,311
2021–2022	Limited	21	59	68	197	77	213	89	248	2,022	5,831	57	160	2,334	6,708
2022–2023	Limited	34	82	71	212	31	80	121	322	2,360	6,802	89	241	2,706	7,739
2023–2024	Limited	35	80	64	177	42	103	87	256	2,009	5,684	53	137	2,290	6,437
Average															
(season start year)															
2008–2011		8	19	227	781	49	85	907	2,505	3,222	11,064	ND	ND	4,495	14,681
2017–2020		19	52	31	95	70	162	115	270	2,348	7,129	74	198	2,615	7,785
2021–2023		30	74	68	195	50	132	99	275	2,130	6,106	66	179	2,443	6,961

Source: Data collection methods available in Dickson and Booz 2020.

Note: Effort from 2008 through 2012 is not comparable to 2018 to present effort. Effort prior to 2017 is crabber-days; effort beginning in 2017 is defined as crabber-days when at least 1 crab was harvested by the permit holder.

<sup>a</sup> Historical fishery was sport, personal use, and subsistence combined.

Table 16.—Dungeness crab harvest data from commercial and noncommercial fisheries in Cook Inlet, and catch per unit effort data from ADF&G crab pot and trawl surveys, 1961–2023.

Year	Harvest		Survey CPUE <sup>a</sup>		Year	Harvest		Survey CPUE <sup>a</sup>	
	Comm.	Noncomm.	Pots	Trawl		Comm.	Noncomm.	Pots	Trawl
1961	92,230	ND	—	—	2001	closed	closed	—	0.31
1962	252,748	ND	—	—	2002	closed	closed	—	0.91
1963	798,669	ND	—	—	2003	closed	closed	—	0.56
1964	201,448	ND	—	—	2004	closed	closed	—	0.88
1965	35,339	ND	—	—	2005	closed	closed	—	0.86
1966	61,695	ND	—	—	2006	closed	closed	—	3.08
1967	3,413	ND	—	—	2007	closed	closed	—	1.07
1968	232,314	ND	—	—	2008	closed	closed	—	0.89
1969	23,759	ND	—	—	2009	closed	closed	0.00	0.00
1970	99,914	ND	—	—	2010	closed	closed	—	—
1971	46,267	ND	—	—	2011	closed	closed	—	0.04
1972	18,538	ND	—	—	2012	closed	closed	—	0.00
1973	147,642	ND	—	—	2013	closed	closed	—	0.00
1974	343,449	ND	—	—	2014	closed	closed	—	—
1975	172,769	ND	—	—	2015	closed	closed	—	—
1976	56,809	ND	—	—	2016	closed	closed	—	—
1977	35,574	ND	—	—	2017	closed	closed	—	0.21
1978	578,942	3,570	—	—	2018	closed	closed	—	2.45
1979	1,014,744	ND	—	—	2019	closed	closed	—	0.21
1980	892,991	ND	—	—	2020	closed	closed	—	—
1981	881,418	22,928	—	—	2021	closed	closed	—	—
1982	389,945	9,956	—	—	2022	closed	closed	—	—
1983	355,914	15,083	—	—	2023	closed	closed	—	—
1984	381,051	15,113	—	—					
1985	702,938	29,530	—	—					
1986	255,321	34,217	—	—					
1987	399,893	51,279	—	—					
1988	348,715	32,053	—	—					
1989	83,621	10,075	—	—					
1990	14,282	7,034	0.22	0.35					
1991	0	closed	3.73	2.83					
1992	4,083	10,050	6.27	4.35					
1993	5,861	15,198	3.60	4.85					
1994	7,219	19,155	0.75	1.51					
1995	3,408	8,957	0.09	0.54					
1996	123	6,428	0.17	3.48					
1997	closed	5,905	0.08	0.55					
1998	closed	closed	0.03	0.19					
1999	closed	closed	—	0.62					
2000	closed	closed	0.01	0.12					

-continued-

Table 16.—Page 2 of 2.

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*Source:* Commercial data are primarily from Kimker (1996), but later years are a personal communication (Joseph Loboy, Research Analyst 2, ADF&G, Homer). Noncommercial data are from the 1981–1995 SWHS, and from permit data in other years (Szarzi and Begich 2004). Pot survey data from 1990–2000 are from Szarzi et al. (2007). Pot survey data for 2009 is published in Szarzi et al. (2010: pages 133-134). Trawl survey data are from Rhea-Fournier et al. (2022).

*Note:* ND means no data were collected. An en dash means no trawl survey was conducted.

<sup>a</sup> Catch per unit effort in numbers of legal male crab per pot (Pots) and numbers of legal male crab per nautical mile towed (Trawl).

Table 17.—Shrimp personal use permits issued, returned, and fished, in the North Gulf Coast Management Area, 2008–2023.

Year	Personal use shrimp permits				
	Issued	Returned	Percent returned	Fished	Percent fished
2008	123	123	100	79	64
2009	163	158	97	115	71
2010	162	151	93	116	72
2011	121	110	91	78	64
2012	195	181	93	121	62
2013	138	125	91	79	57
2014	150	139	93	102	68
2015	150	139	93	91	61
2016	112	107	96	66	59
2017	109	77	71	54	50
2018	119	104	87	29	24
2019	144	75	52	40	28
2020	422	215	51	72	17
2021	342	299	87	93	27
2022	286	219	77	78	27
2023	244	203	83	55	23
Averages					
2008–2020	162	131	85	80	54
2021–2023	291	240	82	75	26

Source: Division of Commercial Fisheries OceanAK database.



Table 18.—Shrimp personal use effort and harvest from ADF&G permits in the North Gulf Coast Management Area, 2008–2023.

Year	Soak time (hours)	Pots fished	Harvest (lb)	Avg CPUE (lb/pot)
2008	4,585	212	103	0.49
2009	4,175	283	130	0.46
2010	16,922	556	483	0.87
2011	13,871	516	366	0.71
2012	11,118	566	143	0.25
2013	14,539	602	417	0.69
2014	9,169	453	210	0.46
2015	11,443	506	530	1.05
2016	18,132	513	193	0.38
2017	4,245	190	56	0.29
2018	5,584	278	120	0.43
2019	27,224	802	621	0.77
2020	49,601	1,141	465	0.41
2021	82,058	1,441	589	0.41
2022	77,408	940	472	0.50
2023	21,380	421	133	0.32
Averages				
2008–2020	14,662	509	295	0.56
2021–2023	60,282	934	398	0.41

Source: Division of Commercial Fisheries OceanAK database.



## **FIGURES**

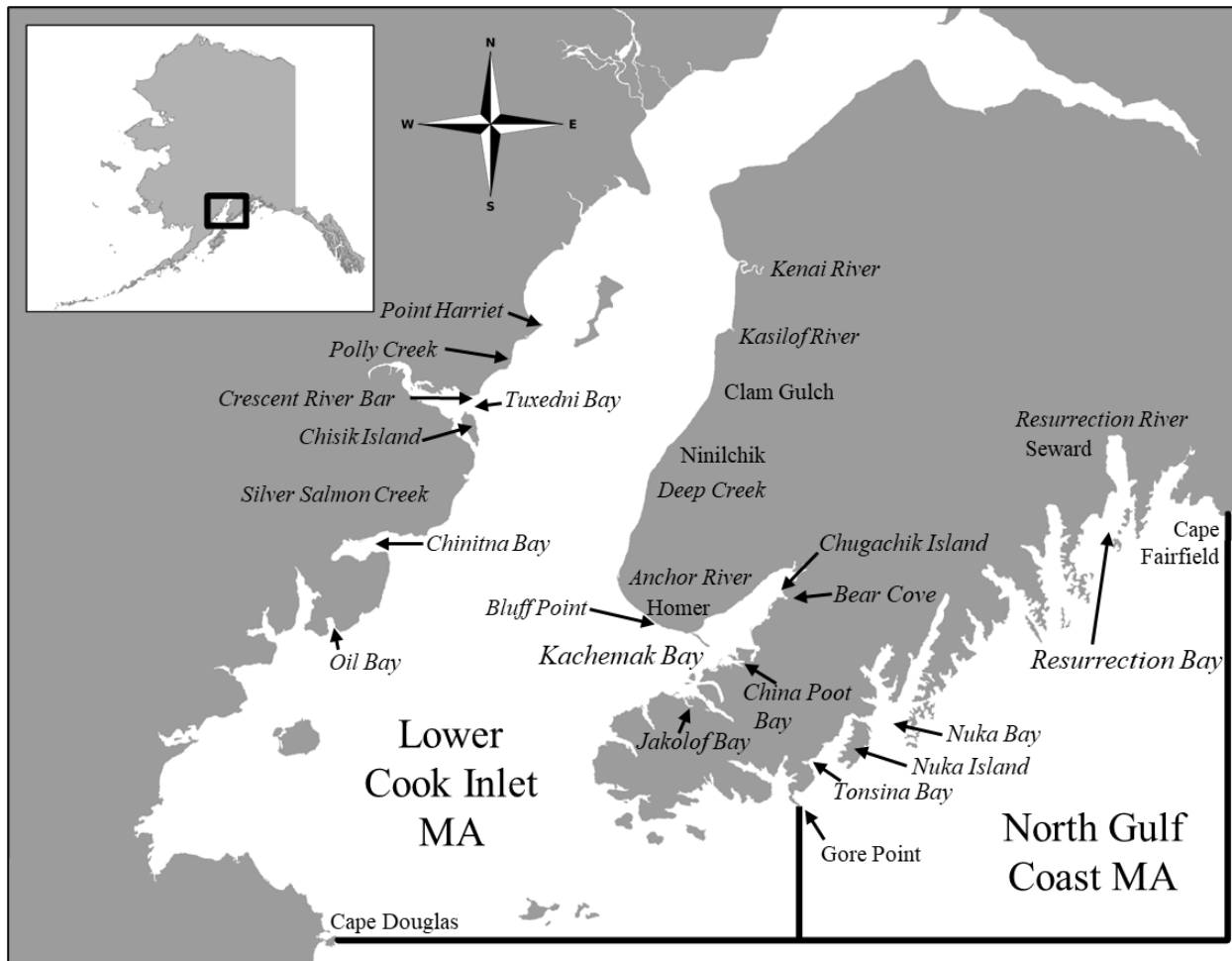


Figure 1.—Alaska Department of Fish and Game, Division of Sport Fish, Lower Cook Inlet and North Gulf Coast Management Areas.

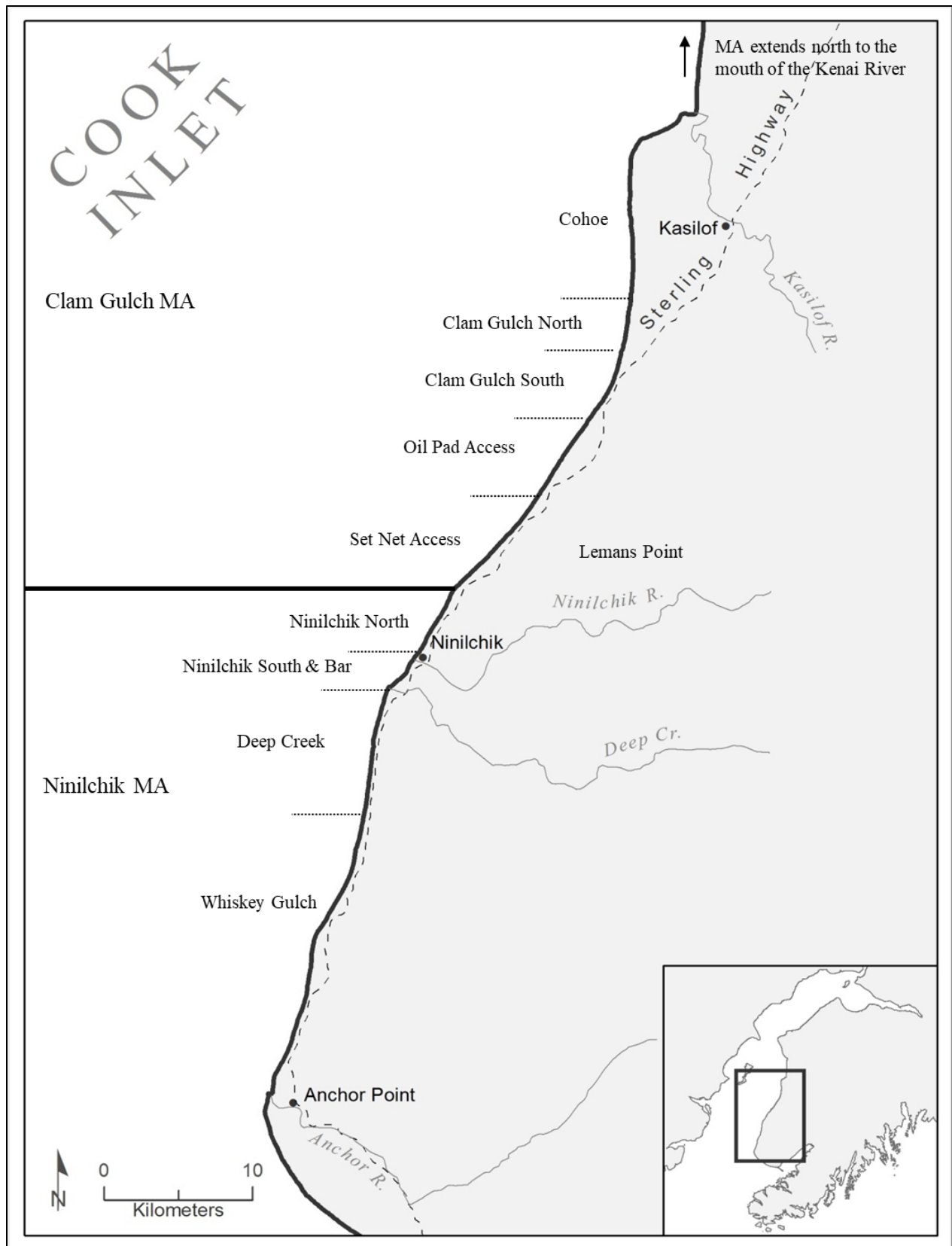


Figure 2.—Razor clam management areas in East Cook Inlet.

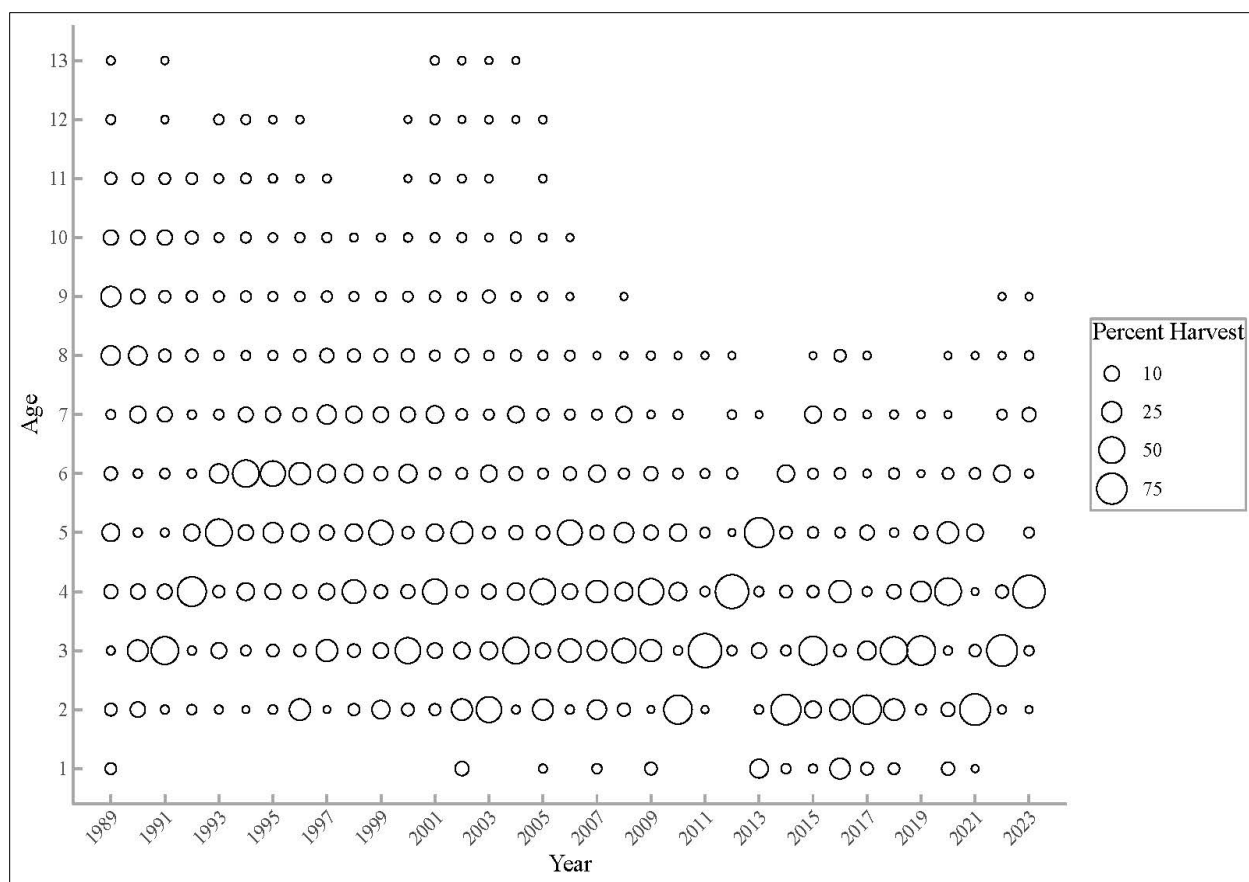


Figure 3.—Razor clam age composition for beaches in the Ninilchik Management Area, 1989–2023.

Source: Data collection methods available in Booz and Dickson 2021.

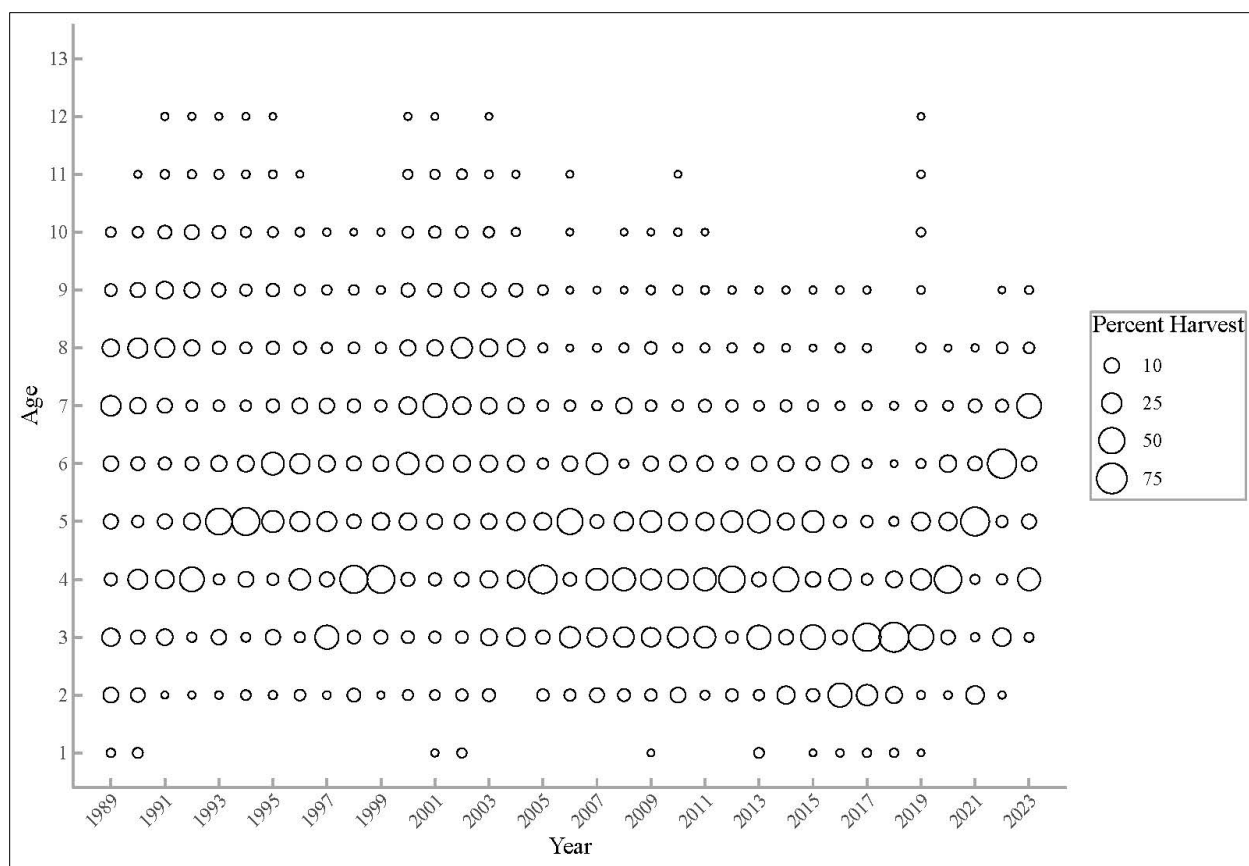


Figure 4.—Razor clam age composition for beaches in the Clam Gulch Management Area, 1989–2023.

Source: Data collection methods available in Booz and Dickson 2021.

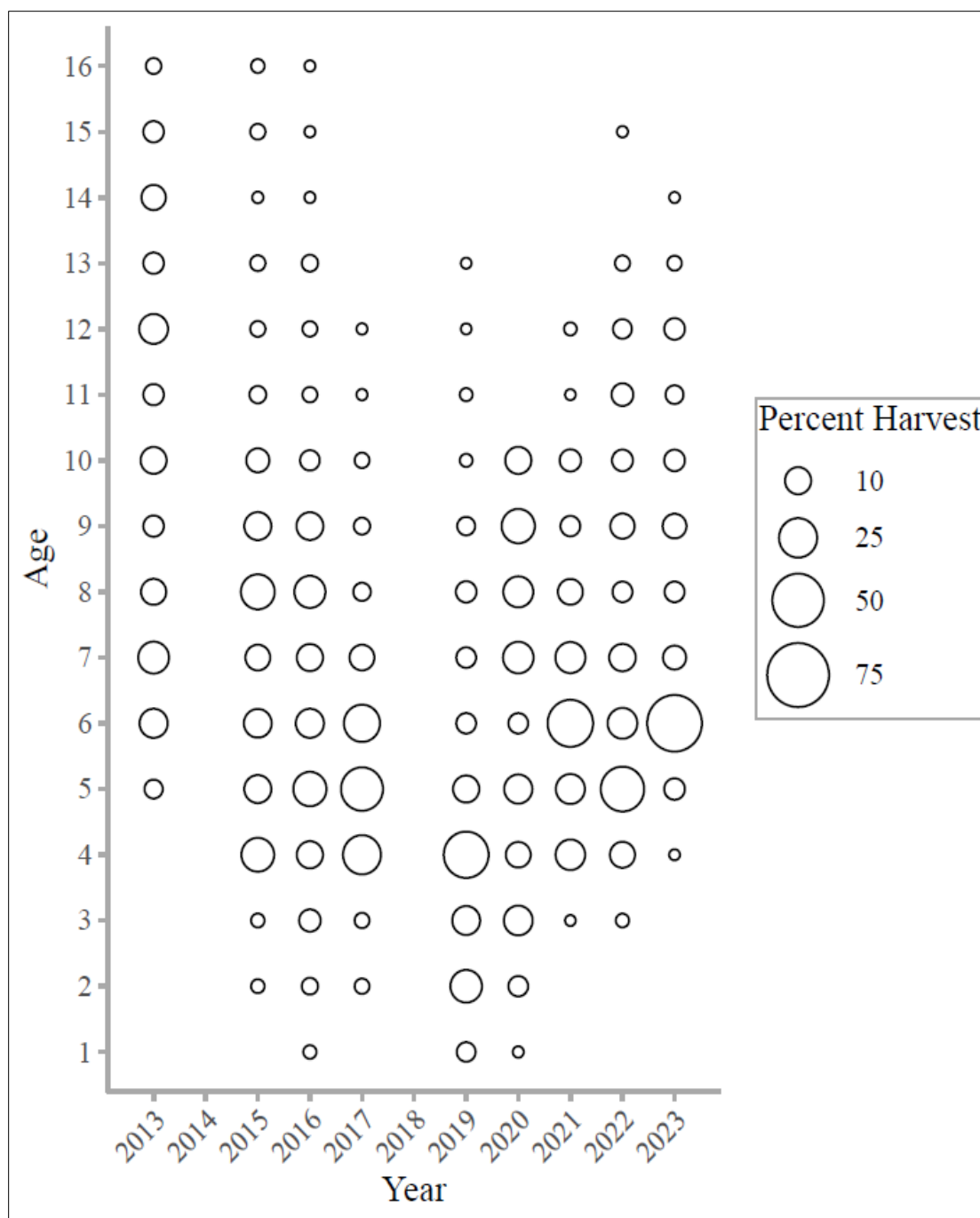


Figure 5.—Razor clam age composition for Crescent River Bar, 2013–2023.

Source: Data collection methods available in Booz and Dickson 2021.



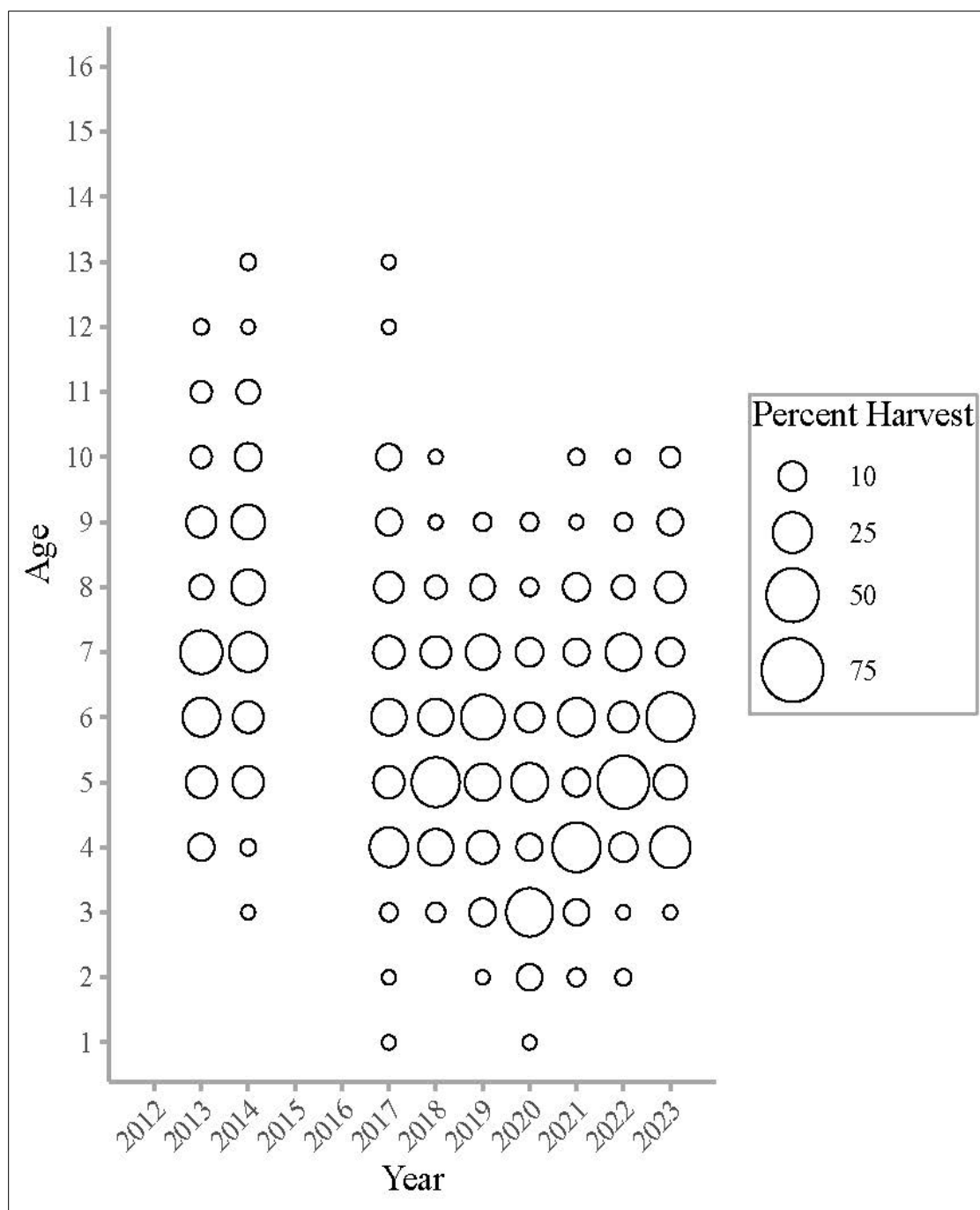


Figure 6.—Razor clam age composition for Polly Creek beach, 2013–2023.

Source: Data collection methods available in Booz and Dickson 2021.

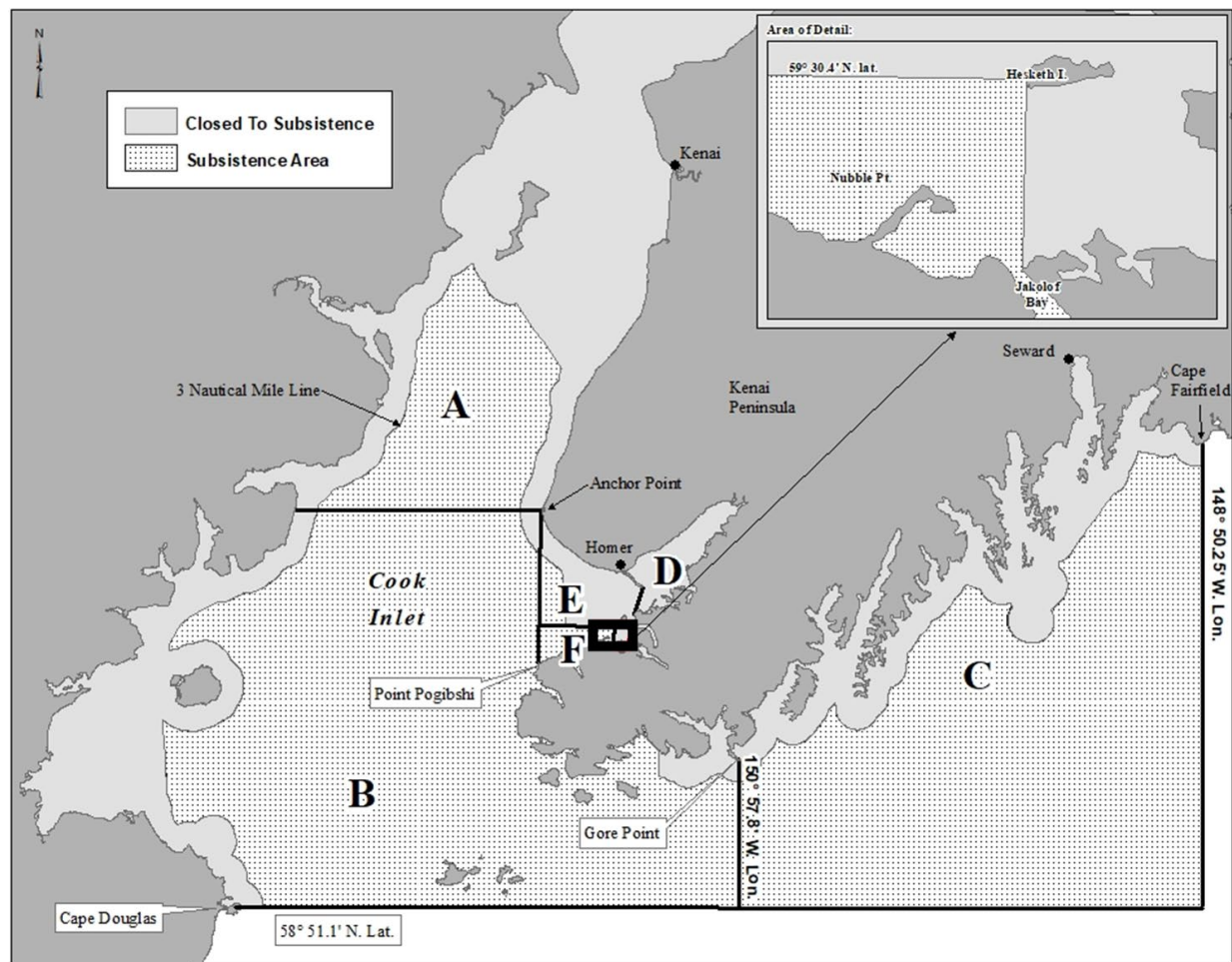


Figure 7.—Areas open and closed to shellfish subsistence harvest and Tanner crab sport and subsistence harvest area codes in the Lower Cook Inlet and North Gulf Coast Management Areas.

## **APPENDIX A: CROSS REFERENCED BOARD OF FISHERIES INFORMATION**

Appendix A1.–Reference information specific to March 2025 Alaska Board of Fisheries proposals.

Proposal	Proposal subject	Table(s)	Figure(s)
263	Dungeness crab – subsistence Cook Inlet	16	7
264	Dungeness Crab sport fishery Cook Inlet – Resurrection Bay	2, 3, 16	7
265	Dungeness Crab sport fishery Cook Inlet – Resurrection Bay	2, 3, 16	7
267	Tanner Crab (noncommercial) abundance thresholds	2, 3, 13, 14, 15	7
268	Tanner Crab – prohibit guiding	2, 3, 13, 14, 15	7
269	Razor Clam – harvest recording form Cook Inlet–Resurrection Bay	4,5,7,8	2, 3, 4, 5, 6
270	East Cook Inlet Razor Clam - season	4,5,7	2, 3, 4
271	East Cook Inlet Razor Clam – bag limit	4,5,7	2, 3, 4