Fishery Data Series No. 26-06

Hatchery Contributions of Pink and Sockeye Salmon to Commercial Harvests in the Southern District, Lower Cook Inlet, 2018–2022

by

Edward O. Otis

Jonah A. Bacon

and

Timothy J. Blackmon

March 2026

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

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

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat or long
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	E
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

FISHERY DATA SERIES NO. 26-06

HATCHERY CONTRIBUTIONS OF PINK AND SOCKEYE SALMON TO COMMERCIAL HARVESTS IN THE SOUTHERN DISTRICT, LOWER COOK INLET, 2018–2022

by
Edward O. Otis, Jonah A. Bacon and Timothy J. Blackmon
Alaska Department of Fish and Game, Division of Commercial Fisheries, Homer

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

March 2026

This study was partially funded by a grant from the Pacific States Marine Fisheries Commission (PSMFC Grant No. 22-018G).

ADF&G Fishery Data Series was established in 1987 for the publication of Division of Sport Fish technically oriented results for a single project or group of closely related projects, and in 2004 became a joint divisional series with the Division of Commercial Fisheries. Fishery Data Series reports are intended for fishery and other technical professionals and are available through the Alaska State Library and on the Internet: http://www.adfg.alaska.gov/sf/publications/. This publication has undergone editorial and peer review.

Edward O. Otis, Jonah A. Bacon, and Timoth J. Blackmon
Alaska Department of Fish and Game, Division of Commercial Fisheries,
3298 Douglas Place, Homer, Alaska 99603 USA

This document should be cited as follows:
Otis, E. O., J. A. Bacon, and T. J. Blackmon. 2026. Hatchery contributions of pink and sockeye salmon to commercial harvests in the Southern District, Lower Cook Inlet, 2018–2022. Alaska Department of Fish and Game, Fishery Data Series No. 26-06, Anchorage.

TABLE OF CONTENTS

Page

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF FIGURES

LIST OF APPENDICES

LIST OF APPENDICES (Continued)

ABSTRACT

This project was initiated to collect baseline data associated with 3 salmon hatchery production programs in Lower Cook Inlet, including the contribution they made to commercial harvests in the Southern District. Otoliths from sockeye *Oncorhynchus nerka* and pink salmon *O. gorbuscha* were collected from set gillnet and purse seine commercial and cost recovery harvests and examined for hatchery otolith marks. From 2018 to 2022, otoliths were collected from 18,179 sockeye salmon (268 sample events) and 7,675 pink salmon (114 sample events) and used to estimate the hatchery–wild composition of the harvest. The hatchery contribution to the harvest varied considerably across species, gear type, harvest type, harvest location, and year (range: 0–100%). The estimated contribution of hatchery fish to the set gillnet harvest from 2018 to 2022 was 13,555 sockeye salmon (95% CI: 12,101–15,004) and was worth an estimated $164,000; 55,070 pink salmon (95% CI: 50,327–59,808) was worth an estimated $43,600. This was 14.0% (95% CI: +/-1.5%) and 49.8% (95% CI: +/-4.3%) of the total set gillnet harvest, respectively. The estimated contribution of hatchery fish to the purse seine harvest was 226,657 sockeye salmon (95% CI: 218,521–234,788) and was worth an estimated $1.99 million; 399,588 pink salmon (95% CI: 372,480–426,692) was worth an estimated $540,000. This was 67.5% (95% CI: +/-2.4%) and 59.8% (95% CI: +/-4.1%) of the total purse seine harvest, respectively. Hatchery cost-recovery harvests were composed of predominantly hatchery-origin fish (sockeye salmon = 98.3%, 95% CI: +/-0.3%; pink salmon = 90.5%, 95% CI: +/-5.3%). Most marked sockeye (99.4%) and pink salmon (99.0%) derived from Lower Cook Inlet hatcheries; however, harvests also included pink and sockeye salmon originating from hatcheries in Prince William Sound and Kodiak/Afognak Island. We recommend continuing monitoring of hatchery–wild contributions to commercial harvests in this mixed stock fishery.

Keywords: Lower Cook Inlet, Kachemak Bay, Prince William Sound, Afognak Island, Kodiak Island, sockeye salmon, *Oncorhynchus nerka*, pink salmon, *Oncorhynchus gorbuscha*, commercial harvest, hatchery cost recovery, otoliths, otolith marks, hatchery salmon

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) is charged with balancing the mission of managing, protecting, and improving the fish resources of the state in the best interest of the economy and the well-being of the people of the state, consistent with the sustained yield principle (https://www.adfg.alaska.gov/index.cfm?adfg=about.statutes). One way to improve fishery resources is through enhancement activities, including hatchery production. Salmon hatcheries have been part of the Alaska fisheries landscape for over a century, including significant production (e.g., hatcheries with capacities ~1 million eggs) for several years in the early 1900s (Roppel 1982). The number and scale of hatcheries producing sockeye *Oncorhynchus nerka*, pink *O. gorbuscha*, and chum *O. keta* salmon increased substantially in the mid-1970s (McGee 2004; Heard 2012). The Alaska salmon hatchery program was initiated in the 1970s to rehabilitate diminished salmon fisheries, with the stated goal of supplementing, but not supplanting, wild stock production (McGee 2004). During the development of Alaska's hatchery program, ADF&G and the Alaska Board of Fisheries (BOF) implemented several policies and regulations intended to guide salmon enhancement activity to avoid negative impacts on wild (naturally spawned) salmon stocks (McGee 2004). These included initiating policies addressing genetic (Davis et al. 1985; Davis and Burkett 1989) and pathology concerns (Meyers 2010).

Much has been learned in recent decades about hatchery–wild salmon interactions and an overview of contemporary research can be found in the 2012 issue of Environmental Biology of Fishes dedicated to the topic (Rand et al. 2012). Evenson et al. (2018) provides a more recent and Alaska-focused review of salmon hatcheries, including an evaluation of how well the program has adhered to the State of Alaska's policies and regulations. McGee (2004) summarized the various measures that the State of Alaska has implemented to protect wild stocks from adverse hatchery effects. These include legal mandates requiring that wild stock sustainability and escapements be given priority in fishery management; requirements for tagging and marking of hatchery fish; and as

necessary, requirements for special studies on hatchery–wild stock interactions. In accordance with these policies, this project was initiated to gain a better understanding of hatchery–wild salmon interactions in Lower Cook Inlet (LCI) fisheries.

Cook Inlet Aquaculture Association (CIAA) is the regional aquaculture association for Cook Inlet, where it operates 3 salmon hatcheries in the LCI management area (LCIMA; Figure 1). The Trail Lakes Hatchery (TLH) near Seward was constructed in 1982 by the State of Alaska, but CIAA has been contracted to operate the facility since 1988 (Stopha 2012a). The TLH is currently permitted to raise sockeye (30 million eggs), coho (6 million), and Chinook (4 million) salmon (Wilson 2020). Sockeye salmon fry from the TLH are remotely released at several locations in LCI, currently including 2 lakes (Leisure and Hazel Lakes) and 1 lagoon (Tutka Bay Lagoon) in the Southern District. From 1989 to 2011, TLH sockeye salmon annual releases across LCI ranged from 1.1 million in 2001 to 18.9 million in 2002 (Stopha 2012a). Annual fry and smolt releases over the past 10 years (2013–2022) ranged from 4.6 to 9.4 million (Appendix A1) and averaged 6.7 million, approximately 2.9 million (44%) of which were to sites in the Southern District (Appendix A2). The brood source for Southern District sockeye salmon releases has changed over the years (Tustumena Lake 1976–2004, Hidden Lake 2004–2011) but currently consists of a run of English Bay Lakes (EBL) stock imprinted to return to Tutka Bay Lagoon (Stopha 2012a; Hollowell et al. 2019).

The Tutka Bay Lagoon Hatchery (TBLH) is located on the south side of Kachemak Bay, about 15 miles southwest of Homer (Figures 1 and 2). The hatchery was constructed in 1976 and managed by the State of Alaska for many years before operations were fully turned over to CIAA in 1994 (Stopha and Musselwhite 2012). The hatchery is permitted to incubate up to 125 million salmon eggs; however, only 318,000 to 36.9 million (mean = 16.3 million) pink salmon fry were released annually by the state prior to CIAA taking over operations in 1991 (Appendix A3). From 1994 to 2004, releases averaged 77 million pink salmon, with a peak release of 105 million in 1996 (Stopha and Musselwhite 2012). Due to a decline in market conditions for pink salmon, CIAA suspended operation of the TBLH from 2005 to 2010 (Appendix A3). Prices soon recovered, however, and CIAA reopened this hatchery and began incubating pink salmon again in 2011, with fry releases occurring the following year (Stopha and Musselwhite 2012). The original and current brood source for TBLH pink salmon is Tutka Creek, which is adjacent to the hatchery and provides the hatchery water source (Stopha and Musselwhite 2012).

The Port Graham Hatchery (PGH) is located on the south side of Kachemak Bay, about 25 miles southwest of Homer (Figures 1 and 3). The facility was originally a salmon cannery but was converted into a hatchery, and permits for operation were secured by the Port Graham Hatchery Corporation in 1991 (Stopha 2012b). Both pink and sockeye salmon were incubated at this facility (Stopha 2012b). However, operations were suspended in 2008, and the facility remained dormant until CIAA acquired it, along with the permit, in 2014 (Regnart and Swanton *Unpublished*).[1] CIAA began raising pink salmon at PGH in 2014, with the first release of fry from the reopened PGH into Port Graham Bay occurring in 2015, and every year thereafter, through 2022 (Appendix A4). Pink salmon fry (Port Graham River stock) raised in the TBLH were remotely released into Port Graham Bay in 2013 and 2014 (Appendices A4 and A5). The PGH is permitted to incubate up to 125 million salmon eggs; however, water supply to the facility limits production to approximately

[1] Regnart, J., and C. Swanton. *Unpublished*. Basic management plan for Port Graham Hatchery operated by Cook Inlet Regional Aquaculture Association. Located at Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau.

84 million eggs (Day et al. *Unpublished*).[2] Since CIAA took over operations, the annual release of pink salmon fry from PGH has ranged from 188,000 in 2014 to 22.4 million in 2021 (Appendix A5), with an average annual release of 8.8 million.

Together, the TBLH and PGH are permitted to take 250 million green eggs, resulting in future anticipated releases of approximately 200 million pink salmon fry in LCI should they reach full production. The otoliths of 100% of the pink salmon raised at both facilities were thermal or dry marked (collectively termed "otolith marked") throughout the duration of this project. The process of thermal marking involves manipulating water temperature during embryonic development to create visible bands in the otolith structure (Volk et al. 1999). Dry marking otoliths involves temporarily removing water flow through incubators to expose eggs to moist conditions, which induces stress and creates visible bands. Both are forms of stress marking that enable creating unique banding patterns that allow biologists to determine the origin (hatchery and release site) of marked fish.

Otolith sampling of salmon harvest and escapement allows for assessment of hatchery and wild stock performance and helps ensure compliance with legal mandates prioritizing wild stock sustainability in Alaska. This project was initiated in 2013 to collect baseline data associated with salmon hatchery production programs in LCI, including evaluation of hatchery–wild salmon composition in mixed stock fisheries and wild stock escapements. Otis et al. (2018) summarized pink salmon hatchery proportions observed in escapement samples collected from selected LCI index streams for 2014–2017. Otis and Hollowell (2023) did the same for hatchery proportions identified in pink and sockeye salmon commercial harvests sampled from 2013 to 2017 using (1) commercial set gillnet (SGN) and purse seine (PS) fishery harvests, hereafter collectively referred to as commercial harvest (CH); and (2) hatchery cost-recovery (HCR) harvests in the Southern District; although, only sockeye salmon were sampled in 2013 and 2014. Results from these initial pilot studies (Otis et al. 2018; Otis and Hollowell 2023) were used to develop operational plans for a more intensive sampling program capable of robustly quantifying the hatchery contribution to commercial fisheries in LCI (Otis et al. 2020–2023). Prior to this project, estimates of hatchery contributions were based entirely on the location and timing of harvest. No hatchery contribution was recognized outside of hatchery special harvest areas (SHA). Based on these findings, ADF&G staff can now show that the harvest of hatchery-origin fish outside of SHAs can be substantial, and in some cases include nonlocal hatchery produced salmon.

This report follows up on Otis and Hollowell (2023) and summarizes 5 years (2018–2022) of sockeye and pink salmon hatchery contributions to SGN and PS commercial fisheries in the Southern District of LCI.

[2] Day, D., M. Miller, G. Hollowell, T. Vania, B. Lewis, E. Ford, L. Vercessi, T. Taube, and P. Bangs. *Unpublished*. 2020 Annual management plan for Port Graham Hatchery operated by Cook Inlet Regional Aquaculture Association. Located at Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau.

OBJECTIVES

1. Estimate the overall[3] hatchery–wild stock composition and the hatchery of origin and release site for commercial harvests of pink and sockeye salmon in the Southern District each statistical week by using otolith mark recoveries, such that the overall hatchery proportion estimate is within 10% of the true proportion 95% of the time.
2. Estimate the overall[3] hatchery–wild stock composition and the hatchery of origin and release site for selected HCR harvests of pink and sockeye salmon in the Southern District by using otolith mark recoveries, such that the overall hatchery proportion estimate is within 10% of the true proportion 95% of the time.

PURPOSE

Along with a paired study investigating hatchery–wild composition of selected LCI escapements (Otis et al. 2018; Otis and Bacon *In prep*), this project is part of a broad effort to assess wild and hatchery salmon stock performance (e.g., adult returns, productivity, marine survival) in the Southern and Outer districts of the LCIMA. In this study, ADF&G employees recovered otoliths from pink and sockeye salmon caught in commercial SGN, PS, and HCR fisheries in the Southern District. In the paired study, staff collected otoliths from spawned out pink salmon carcasses from 10 streams in the Southern and Outer districts. Otoliths are then examined for hatchery marks to estimate the hatchery–wild composition of LCI harvests and escapements. These contribution estimates are used by ADF&G fisheries managers to assist in managing mixed stock commercial harvests to be consistent with sustained yield of wild and hatchery stocks (AS 16.05.730 and 5 AAC 39.220), follow appropriate principles and criteria in the Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222), and achieve spawning escapement goals (5 AAC 39.223). In addition to fishery management uses, estimating the hatchery–wild composition of harvests and escapements is necessary to create preseason harvest and run projections and to evaluate wild stock escapement goals. Hatchery operators can also use contribution estimates to assess hatchery runs and evaluate total return, marine survival, and release strategies.

LONG-TERM GOALS

The primary goals associated with this project are described in the Purpose and Objectives sections of this report. However, a supplemental long-term goal is for the data collected to be of value to broader scale policy discussions that take place at upper management levels. ADF&G has a long history of conducting internal evaluations and collaborating on external research addressing hatchery–wild salmon interactions (e.g., ADF&G 2012; Brenner et al. 2012; Grant 2012; Habicht et al. 2013; Jasper et al. 2013; Gorman et al. 2017; Knudsen et al. 2021; Josephson et al. 2021; Shedd et al. 2022) to ensure adherence to applicable state policies and regulations (McGee 2004; Evenson et al. 2018).

This project monitors hatchery proportions in commercial harvests near (≤20 miles) 2 pink salmon hatcheries with a combined permitted capacity of 250 million eggs. By quantifying hatchery proportions in the catch and escapement over time, the results from this project may inform policy

[3] Our objectives focus on estimating the overall hatchery–wild composition within the specified precision for select harvests. Because unique thermal marks are applied to otoliths for each hatchery/release site, project results will also provide an estimate of the relative contribution each hatchery makes to the harvest sampled. This information will be reported and should be of interest to hatchery operators wishing to evaluate program performance. However, contribution estimates by individual hatchery/release site will likely not achieve the same level of precision as the overall hatchery contribution estimates.

for both aquaculture operations and harvest management. For instance, it may be informative to conduct spatial and temporal analyses of otolith mark recoveries from commercial harvests to identify the timing and location of nearshore migration corridors used by hatchery fish returning to imprinting sites. Such information may aid fishery managers seeking to manipulate time and area openings and closures to maximize harvest of hatchery-origin fish while minimizing impacts to adjacent wild stocks that may be vulnerable to overharvest.

STUDY SITES

Otoliths were collected to estimate hatchery–wild stock composition in HCR and CH samples in the Southern District, where currently 100% of the pink salmon and >40% of the sockeye salmon hatchery releases occur in the LCIMA (Appendices A4 and A5). Hatchery sockeye salmon are also released in the Eastern (Bear Lake, Resurrection Bay; Figure 1) and Kamishak (Kirschner Lake) Districts (Figure 1); however, current funding limitations preclude sampling harvests from those more distant districts consistently.

The Southern District includes the waters of eastern Cook Inlet south of Anchor Point and north of a line from Cape Elizabeth to Cape Douglas, excluding waters east of a line from Point Adam to the tip of Cape Elizabeth (Figure 1). Commercial fishing is restricted by regulation to waters along the south shore of Kachemak Bay from Chugachik Island near the terminus of Kachemak Bay to Point Bede approximately 6.4 km south of the village of Nanwalek (English Bay; Figures 2–4). Purse seine gear is permitted in all open waters during periods established by emergency order. Commercial SGN harvest is restricted to approximately 15 miles of shoreline in 5 subdistricts: the east shore of Ismailof Island near Halibut Cove; waters surrounding McDonald Spit extending to Jakolof Bay; waters east of Barabara Point extending approximately 1.4 miles; waters along the west shore of outer Seldovia Bay; and waters of a portion of the south shore of Port Graham and English Bay (Figure 5). The primary target species for both PS and SGN permit holders are sockeye and pink salmon, although modest numbers of chum and coho salmon are also harvested. The major natural producer of sockeye salmon is the English Bay Lakes system (Figure 3). Pink salmon historically have returned in high abundance to Humpy Creek and Seldovia River, as well as numerous smaller streams in the Southern District (Figures 2 and 4). Hatchery releases began contributing to commercial harvests in the Southern District in the mid-1970s and continue today (Appendix A). Currently, hatchery (TLH) sockeye salmon are released into Hazel and Leisure Lakes and Tutka Bay Lagoon (Figures 1, 2, and 4; Appendix A4). Hatchery pink salmon are released into Tutka Bay Lagoon and Port Graham Bay, adjacent to the TBLH and PGH hatcheries (Figures 1–3, Appendix A5). These hatchery releases have consistently provided additional salmon harvest opportunities within the district (Appendices A6–A8).

METHODS

OTOLITH MARK METHODOLOGY

This project quantified the proportion of marked hatchery-origin sockeye and pink salmon in commercial harvest samples in the Southern District of LCI by determining the marked to unmarked ratio of sampled otoliths. However, hatchery marking practices vary between programs and over time, and not all hatchery-origin salmon are marked. Large hatchery programs adjacent to our management area with different marking practices include the Kitoi Bay Hatchery, Pillar Creel Hatchery, and the Gulkana Hatchery. Kitoi Bay Hatchery (KBH) on Afognak Island released 173.6 and 117.7 million unmarked fry in 2018 and 2019, respectively (ADF&G Hatchery Release

Reports).[4] Since 2019, the otoliths of 100% of the pink salmon fry released from KBH have been saltwater marked (Fairbanks et al. *Unpublished*).[5] Saltwater marking is another method of stress-marking otoliths, whereby developing salmon embryos are exposed to salt water, which in turn causes stress and a change in the deposition of calcium carbonate in the developing otoliths. Saltwater marking results in visible bands on the otolith similar to thermal or dry marking. Hence, we can estimate the KBH contribution to the LCI harvest after 2019, the year 100% saltwater marking was implemented.[4] However, the Gulkana Hatchery in PWS marks their sockeye salmon releases using strontium chloride ($SrCl_2$; Stopha 2013), which requires a scanning electron microscope to detect (Morella and Ertz 2025), rather than the compound microscope this project used to identify visual otolith marks. Releases from Pillar Creek Hatchery operated by the Kodiak Regional Aquaculture Association (KRAA) included unmarked sockeye salmon during the period covered by this report (ADF&G G Hatchery Release Reports).[4] Thus, the hatchery proportions estimated by this project represent the proportion of stress-marked salmon, but not necessarily the proportion of all hatchery-origin salmon (unmarked or $SrCl_2$ marked) that could be present in our samples.

Marked otoliths collected during this project were classified by a uniform hatch code (Johnson et al. 2006) that is annually assigned by ADF&G's Mark, Tag and Age Laboratory (MTAL; Oxman 2019–2023). Relevant details associated with unique otolith marks assigned to each hatchery, brood year, and release location in Alaska, including images of voucher specimens, can be found in the MTAL's Voucher Summary Reports.[6] Marked sockeye and pink salmon otoliths collected during this study (2018–2022) derived from hatchery brood years 2012–2020 (Table 1).

Mark recovery results were stratified by year, species, gear type, statistical week, contributing hatchery, and whenever possible, individual hatchery release sites. The calendar dates associated with statistical weeks varied slightly from year to year (Table 2) based on which day of the week January 1 fell on (statistical weeks run Sunday through Saturday). However, all commercial harvest samples were collected between June 1 (statistical week 22 or 23) and the end of August (statistical week 35 or 36).

Recovering Marked Otoliths from the Harvest

There are 2 legal gear types for commercially harvesting salmon in the Southern District of LCI: PS and SGN. Both sockeye and pink salmon are harvested by PS and SGN gear; however, run timing and magnitude differs by species. Peak sockeye and pink salmon harvests occur in July and August, respectively. We collected weekly samples from each gear type and species whenever they were available in sufficient abundance to achieve sampling goals (96 otoliths per sampling event). From 2018 to 2022, we sampled mixed tender loads of SGN harvested sockeye and pink salmon that were delivered to a processing plant in Homer. Through informal cooperative agreements with seine permit holders, tender operators, and fish processors in Homer, we were able to collect more spatially explicit samples (by subdistrict) from the commercial PS fishery targeting both sockeye and pink salmon in the Southern District.

---

[4] ADF&G Mark, Tag and Age Laboratory Hatchery Release Reports. 1968–. Alaska Department of Fish and Game, Division of Commercial Fisheries, Headquarters, Juneau, AK. https://mtalab.adfg.alaska.gov/CWT/Reports/hatcheryrelease.aspx (Accessed April 15, 2025).

[5] Fairbanks, T., T. Polum, J. Jackson, T. Vania, N. Sagalkin, K. Schaberg, L. Vercessi, T. Taube, and P. Bangs. *Unpublished*. 2020 Annual management plan for Kitoi Bay Hatchery operated by Kodiak Regional Aquaculture Association. Located at Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau.

[6] ADF&G Mark, Tag and Age Laboratory Voucher Summary Reports. 1988–. Alaska Department of Fish and Game, Division of Commercial Fisheries, Headquarters, Juneau, AK. https://mtalab.adfg.alaska.gov/OTO/reports/VoucherSummary.aspx (Accessed April 15, 2025).

Set gillnet fishing is allowed in portions of the Halibut Cove, Tutka, Barabara, Seldovia, and Port Graham Subdistricts of the Southern District (Figure 5). A single fishing tender serviced most of the SGN sites throughout the Southern District, except those in the Halibut Cove and Port Graham Subdistricts. Homer staff coordinated with the tender operator and fish processors to sample mixed tender loads of sockeye and pink salmon weekly as they were being processed. In recent years, SGN operators in Halibut Cove have delivered their own fish to processors, so field crews coordinated with them and their processors to sample the harvest from that subdistrict. SGN harvest from the Port Graham Subdistrict did not occur during this reporting period. When the delivery being sampled was large (e.g., >200 fish), the field crew systematically sampled proportional to the harvest at a rate scaled to the total fish available to achieve the sampling objective of heads from >96 fish (e.g., every fifth fish passing through the header machine was sampled for harvests totaling ~500 fish). One of 2 SGN deliveries (Wednesday or Saturday) was sampled each statistical week in this manner to ensure our samples represented the total SGN harvest from the Southern District each week.

During this reporting period, over 20 permit holders participated in the LCI PS fishery, although not all fished every year. Fewer than 15 vessels regularly fished the Southern District and >90% of their effort occurred in the following subdistricts or sections: Tutka Bay, Tutka Hatchery SHA, Neptune Bay, China Poot Section, China Poot SHA, and Halibut Cove (Figures 2 and 4). The PS harvest landed in Homer usually came from multiple subdistricts and was typically transported immediately by truck to Seward for processing. Hence, systematic sampling at the processor was not feasible for this gear type. Consequently, otoliths were recovered by ADF&G crews sampling directly from purse seine vessels, tenders, or both that were actively fishing or tendering harvests in the Southern District. During commercial openings, a 2-person crew surveyed fishing effort in the Southern District from a skiff and targeted representative sample collections from each subdistrict contributing to that day's harvest. This ensured that location-specific sampling integrity was maintained, because individual seiners often moved between subdistricts and mixed the catch in their hold(s).

Pairs of otoliths collected from SGN and PS harvests were placed sequentially into plastic 96-well plate trays. Individual trays were labeled with tender vessel name, species, fishing subdistrict (or multiple subdistricts for SGN mixed-area harvest sampled at the fish processor) and period, date, and other descriptive information for data entry, cataloging, and storage purposes. All otolith trays and metadata from Homer samplers were delivered to the crew leader's office at the end of each shift, and sample events were logged into a computer.

Otolith Mark Processing

Otoliths collected during this project were processed and read by staff at otolith labs run by CIAA (sockeye salmon) and ADF&G (pink salmon). Readers in both labs were trained by personnel at the MTAL in Juneau. Otolith processing protocols followed by the CIAA and ADF&G labs are summarized by species in the following sections.

Sockeye Salmon

All sockeye salmon otoliths collected by this project were read by CIAA staff in their otolith lab under an informal cooperative agreement using protocols summarized here (C. Cline, Fishery Biologist, Cook Inlet Aquaculture Association, Kenai, personal communication). Otolith tray sample labels were verified against the sample inventory provided by ADF&G Division of Commercial Fisheries, Homer. Otoliths were mounted on a compound microscope slide, sulcus

side up, using thermoplastic cement or Cytoseal, and the slide was labeled with sample identification. Mounted otoliths were pre-aged under a dissecting scope, evenly ground at 200 revolutions per minute with 400–600 grit sandpaper and a constant water flow, and examined until the primordia was visible to determine the presence of marks. Otolith mark patterns were compared to all possible hatchery otolith mark patterns from the brood year range and geographic area, as reported in the MTAL's Voucher Summary Reports.[7] An unspecified subsample of sockeye salmon otoliths was read a second time by the original reader to corroborate initial results for marks that were considered challenging to identify (C. Cline, Fishery Biologist, Cook Inlet Aquaculture Association, Kenai, personal communication). Final reads were recorded using a preformatted spreadsheet compatible with the MTAL database.

Pink Salmon

All pink salmon otoliths collected by this project were read by staff in ADF&G otolith labs in either Cordova or Juneau following established protocols described by Agler et al. (2016) and summarized here. Extracted pink salmon otoliths (left otolith from each pair) selected for analysis were cleaned and rinsed using MTAL protocols prior to being mounted sulcus side up on a petrographic glass slide with a unique barcoded label attached that contains sample details. Otoliths were ground to the midsagittal plane manually using 1200-grit or 4000-grit silicon carbide paper and viewed under a compound microscope with transmitted light at 250x or 400x. Observed otolith mark patterns were compared to all possible hatchery otolith mark patterns from the brood year range and geographic area, as reported in MTAL's Voucher Summary Reports.[7] After determining the origin of an otolith, a barcode scanner recorded the slide identity to the MTAL otolith recovery database (Oracle) and a front-end application was used to enter additional relevant data about the otolith (e.g., otolith mark identification [ID], age, comments, etc.). Hatchery proportion estimates were determined after identifying all otoliths from a sample.

Second Reads of Mark Interpretations

For quality control, readers typically reexamine ≥30% of previously examined otolith samples from commercial SGN, PS, and HCR harvests (Haught et al. 2019). However, the ADG&G MTAL's standard quality assurance and control (QA/QC) procedures recommend reading 100% of the otoliths a second time, if possible, to assess reader accuracy and precision (Agler et al. 2017). With additional grant funding during this reporting period, we were able to adhere to that high standard for all the pink salmon otoliths processed in ADF&G labs.

DATA ANALYSIS

Estimating Hatchery Contributions to Commercial and Hatchery Cost-Recovery Harvests (Objectives 1–2)

Only readable otoliths were included in the analyses; otoliths that were lost, damaged, deformed, or destroyed during preparation were considered not readable and were excluded. The left otolith was read whenever possible. The right otolith was read whenever there was no left otolith present or the left otolith was unreadable.

[7] ADF&G Mark, Tag and Age Laboratory Voucher Summary Reports. 1988–. Alaska Department of Fish and Game, Division of Commercial Fisheries, Headquarters, Juneau, AK. https://mtalab.adfg.alaska.gov/OTO/reports/VoucherSummary.aspx (Accessed April 15, 2025).

The otolith-derived estimate of the contribution of hatchery h to district-period stratum i, C_{hi} was

$$\hat{C}_{hi} = \frac{o_{hi}}{n_i} N_i \quad (1)$$

where

o_{hi} = number of otoliths from hatchery h in sample n_i,

n_i = number of readable otoliths sampled from stratum i (usually 96), and

N_i = number of fish caught in stratum i.

The variance estimate of $\hat{C}_{hi}$ was computed as

$$var(\hat{C}_{hi}) = {N_i}^2 \frac{1}{n_i - 1} \frac{o_{hi}}{n_i} \left(1 - \frac{o_{hi}}{n_i}\right). \quad (2)$$

Otolith-derived estimates of the contribution of hatchery h, C_{Sh}, to all sampled CH (or other collections including HCR, special harvests, or broodstocks), were calculated as

$$\hat{C}_{Sh} = \sum_{i=1}^{Q} C_{h_i} \quad (3)$$

where

Q = number of recovery strata associated with CH or other collection in which otoliths from hatchery h are found.

The variance estimate of $\hat{C}_{Sh}$ was

$$var(\hat{C}_{Sh}) = \sum_{i=1}^{Q} var(C_{h_i}) \quad (4)$$

The contribution of hatchery h to unsampled strata, C_{Uh}, was estimated from contribution rates associated with strata sampled from the same district–period openings as the unsampled strata using methods similar to those used for coded wire tags (Riffe et al. 1996):

$$\hat{C}_{Uh} = \sum_{i=1}^{u} \left[N_i * \left(\frac{\sum_{j=1}^{S} \hat{C}_{hj}}{\sum_{j=1}^{S} N_j} \right) \right] \quad (5)$$

where

u = number of unsampled strata,

N_i = number of fish in ith unsampled stratum,

S = number of strata sampled in the period in which the unsampled stratum resides,

C_{hj} = contribution of otolith mark h to the sampled stratum j, and

N_j = number of fish in jth sampled stratum.

The variance estimate of $\hat{C}_{Uh}$ was calculated as

$$var(\hat{C}_{Uh}) = \sum_{i=1}^{u} \left[{N_i}^2 * \left(\frac{1}{\sum_{j=1}^{S} N_j - 1} \right) \left(\frac{\sum_{j=1}^{S} \hat{C}_{hj}}{\sum_{j=1}^{S} N_j} \right) \left(1 - \frac{\sum_{j=1}^{S} \hat{C}_{hj}}{\sum_{j=1}^{S} N_j} \right) \right] \quad (6)$$

If a statistical week was not sampled (an infrequent occurrence), the harvest from that week was treated as an unsampled harvest of the subsequent or previous week in the same district.

An estimate of the contribution by hatchery *h* to all strata, sampled and unsampled, was calculated by the following:

$$\hat{C}_h = \hat{C}_{Sh} + \hat{C}_{Uh}. \quad (7)$$

The variance estimate of $\hat{C}_h$ was

$$var(\hat{C}_h) = var(\hat{C}_{Sh}) + var(\hat{C}_{Uh}) \quad (8)$$

The overall hatchery contribution by all hatcheries, $\hat{C}_H$, was calculated by

$$\hat{C}_H = \sum_h^H \hat{C}_h \quad (9)$$

where

H = number of hatcheries.

The variance estimate of $\hat{C}_H$ was

$$var(\hat{C}_H) = \sum_h^H var(\hat{C}_h) \quad (10)$$

RESULTS

SAMPLING COVERAGE

Readable otoliths were collected from 25,854 commercially harvested sockeye and pink salmon during 382 individual sampling events from 2018 to 2022 (18,179 sockeye and 7,675 pink salmon; Table 3). This represented 99.3% of the 26,048 otoliths examined. The remaining otoliths were not readable due to being lost, broken, deformed, or destroyed during preparation and were not used in the analysis. The number of individual sampling events per year ranged from 52 in 2022 to 96 in 2019, with further variation within years by species, gear, and harvest type (Table 3).

Although efforts were made to collect samples every week from every statistical area in the Southern District with reported harvest, that was not always possible. The average proportion of harvest strata (i.e., gear, stat week, stat area) that was sampled varied by year, harvest type (CH, HCR), and gear type (SGN, PS). For sockeye salmon, the average portion of the HCR harvest strata sampled (31.7%) was lower than it was for the commercial harvest (86.2%), with the overall average proportion of the harvest strata sampled being 71.6% (Table 4). With pink salmon, the average portion of the harvest strata sampled was 12.5% for HCR, 62.4% for CH (75.7% for SGN, 60.2% for PS), and 25.0% overall (Table 5). A detailed summary of the various hatchery marks identified in LCI commercial sockeye and pink salmon harvests, including their estimated contribution to the harvest, can be found in Appendices B1 and C1, respectively.

SOCKEYE SALMON

Commercial Harvest

The hatchery–wild stock composition of sockeye salmon harvested in Southern District commercial fisheries varied by year, harvest type, and gear type. Overall, we estimated 380,565 hatchery sockeye salmon were harvested in the Southern District between 2018 and 2022 (95% CI = 370,510–390,608; Table 6), which corresponded to an exvessel value of $3.77 million (Appendix D1; Note: This hatchery-origin exvessel value does not include the 2020 HCR harvest because it was not sampled; value was derived from hatchery contribution estimates in this report

and annual price and average weight data reported in Hollowell et al. 2019, 2022a, 2022b, 2022c, and 2023). The vast majority of hatchery marked sockeye salmon estimated in the harvest was derived from LCI releases (378,246 fish, 99.4%); however, hatchery fish from Prince William Sound (PWS, 1,177 fish, 0.3%), Kodiak/Afognak Islands (KOD, 1,011 fish, 0.3%) and Upper Cook Inlet (UCI, 131 fish, <0.1%) were also present (Table 7). Hatcheries that contributed sockeye salmon to LCI harvests included: Trail Lakes Hatchery (TLH) operated by CIAA in LCI, Main Bay Hatchery (MBH) operated by the PWS Aquaculture Association (PWSAC) in PWS, and the Kitoi Bay (KBH) and Pillar Creek (PCH) hatcheries operated by the Kodiak Regional Aquaculture Association (KRAA) in the Kodiak/Afognak Islands area (Appendix B1). A small number of TLH sockeye salmon released at Hidden Lake in UCI were also identified in LCI harvests in 2022 (Appendix B1). A summary by gear and harvest type is presented in the following sections.

Set Gillnet Fishery

Because most SGN harvests were mixed in the hold of the tender vessel prior to delivery and prior to sampling at the Homer fish dock or processing facility, our SGN results pertain to the entire Southern District and cannot be stratified by subdistrict. Although Halibut Cove SGN harvests were sampled separately, those sample results were pooled with other subdistricts to avoid confidentiality issues. From 2018 to 2022, the total set gillnet commercial harvest was 97,125 sockeye salmon, of which 13,555 (14.0%, range: 8.2–18.4%; Table 8) were estimated to be hatchery origin, which translated to an exvessel value of $164,000 (Appendix D1; Note: This hatchery origin exvessel value was derived from hatchery contribution estimates in this report and annual price and average weight data reported in Hollowell et al. 2019, 2022a, 2022b, 2022c, and 2023). The 95% CI around this estimate (12,101–15,004, +/-1.5%) was well within the criteria established in Objective 1 (Table 6). Annual estimates of the number of hatchery sockeye salmon harvested in the Southern District SGN fishery ranged from 1,025 (95% CI = 868–1,181) in 2020 to 4,109 (95% CI = 3,646–4,571) in 2022 (Table 8). Within years, the abundance of hatchery and wild sockeye salmon in the SGN harvest varied by statistical week, generally peaking in weeks 26–30 (Figure 6). Like the overall harvest, the hatchery composition of the SGN harvest was composed primarily of fish from LCI hatcheries (11,885 of 13,555 marks, 87.7%), with lesser contributions from PWS (1,026 fish, 7.6%), KOD (617 fish, 4.6%), and UCI (27 fish, 0.2%; Table 7).

Purse Seine Fishery

Southern District

From 2018 to 2022, the total purse seine (PS) commercial harvest (excluding cost recovery) was 335,725 sockeye salmon, of which 226,657 (67.5%, range: 47.3–85.0%; Table 9) were estimated to be hatchery origin, corresponding to an exvessel value of $1.99 million (Appendix D1; Note: This hatchery origin exvessel value was derived from hatchery contribution estimates in this report and annual price and average weight data reported in Hollowell et al. 2019, 2022a, 2022b, 2022c, and 2023). The 95% CI around this estimate (218,521–234,788, +/-2.4%; Table 6) was well within the criteria established in Objective 1. Annual estimates of the number of hatchery sockeye salmon harvested in the Southern District PS fishery ranged from 23,959 (95% CI = 22,820–25,097) in 2019 to 69,816 (95% CI = 68,146–71,485) in 2022 (Table 9). Within years, the abundance of hatchery and wild sockeye salmon in the PS harvest varied by statistical week (peaking in weeks 27–29; Figure 7) and by statistical area (Appendix B6). Like the overall and SGN harvest, the hatchery composition of the PS harvest was composed primarily of fish from LCI hatcheries

(226,008 of 226,657 marks, 99.7%), with negligible contributions from PWS (151 fish, 0.1%), KOD (394 fish, 0.2%), and UCI (104 fish, <0.1%; Table 7). The following sections present hatchery contribution results to the purse seine commercial harvest by subdistrict.

Tutka Bay Subdistrict (241-06)

The hatchery contribution to the purse seine commercial harvest from the Tutka Bay Subdistrict (241-06) varied considerably among years (Appendix B3) and within years across statistical weeks (Appendix B6). From 2018 to 2022, hatchery sockeye salmon composed 55.8% of the PS harvest from this subdistrict (range: 7.4–71.6%; Appendix B3). Point estimates of the number of hatchery sockeye salmon harvested in the Tutka Bay PS fishery ranged from 66 in 2022 to 8,811 in 2021 (Appendix B3). Of the 18,149 hatchery fish harvested from 2018 to 2022, 17,900 (98.6%) derived from LCI hatchery releases, with minimal contributions also coming from Kodiak (202 fish, 1.1%) and PWS area hatchery releases (47 fish, 0.3%; Appendix B3).

Tutka Bay SHA (241-07)

There was only one year with commercial harvest of sockeye salmon reported from the Tutka Bay SHA, because this subdistrict is usually restricted to hatchery cost-recovery harvest. The harvest occurred in 2018 and consisted of 7,078 sockeye salmon, 6,809 of which (96.2%) were hatchery marked, all (100%) originating from LCI hatcheries (Appendix B3).

Halibut Cove Subdistrict (241-15)

The hatchery contribution to the purse seine commercial harvest from the Halibut Cove Subdistrict (241-15) varied considerably among years (Appendix B3) and within years across statistical weeks (Appendix B6). From 2018 to 2022, hatchery sockeye salmon composed 18.3% of the PS harvest from this subdistrict (range: 12.9–30.5%; Appendix B3). Point estimates of the number of hatchery sockeye salmon harvested in the Halibut Cove PS fishery ranged from 25 in 2021 to 683 in 2019 (Appendix B3). Of the 1,682 hatchery fish harvested, all of them (100.0%) derived from LCI area hatchery releases (Appendix B3).

China Poot Section (241-90)

During years with reported harvest (2018–2019, 2021–2022), the hatchery contribution to the purse seine commercial harvest from the China Poot Section (241-90) varied considerably among years (Appendix B3) and within years across statistical weeks (Appendix B6). Hatchery sockeye salmon composed 56.6% of the PS harvest from this subdistrict (range: 45.3–82.3%; Appendix B3). Point estimates of the number of hatchery sockeye salmon harvested in the China Poot Section PS fishery ranged from 5,620 in 2021 to 13,613 in 2018 (Appendix B3). Of the 38,251 hatchery fish harvested from 2018 to 2022, 38,207 (99.9%) derived from LCI hatchery releases, with a minimal contribution (44 fish in 2018) also coming from Kodiak area hatchery releases (Appendix B3).

Neptune Bay Section (241-91)

The hatchery contribution to the purse seine commercial harvest from the Neptune Bay Section (241-91) varied considerably among years (Appendix B3) and within years across statistical weeks (Appendix B6). From 2018 to 2022, hatchery sockeye salmon composed 55.2% of the PS harvest from this subdistrict (range: 37.4–71.3%; Appendix B3). Point estimates of the number of hatchery sockeye salmon harvested in the Neptune Bay Section PS fishery ranged from 3,585 in 2021 to 10,850 in 2018 (Appendix B3). Of the 29,903 hatchery fish harvested from 2018 to 2022, 29,885

(99.9%) derived from LCI hatchery releases, with a negligible contribution (18 fish in 2022) also coming from Kodiak area hatchery releases (Appendix B3).

China Poot SHA (241-92)

During years with reported harvest (2019–2022), the hatchery contribution to the purse seine commercial harvest from the China Poot SHA (241-92) varied moderately among years (Appendix B3) and within years across statistical weeks (Appendix B6). From 2018 to 2022, hatchery sockeye salmon composed 83.4% of the PS harvest from this subdistrict (range: 71.2–90.7%; Appendix B3). Point estimates of the number of hatchery sockeye salmon harvested in the China Poot SHA PS fishery ranged from 2,839 in 2018 to 47,110 in 2022 (Appendix B3). Of the 106,047 hatchery fish harvested from 2019 to 2022, 105,758 (99.7%) derived from LCI hatchery releases, with minimal contributions also coming from PWS (104 fish in 2022), Upper Cook Inlet (104 fish in 2022), and Kodiak (81 fish in 2020) area hatchery releases (Appendix B3).

Hazel Lake SHA (241-93)

During years with reported harvest (2019–2022), the hatchery contribution to the purse seine commercial harvest from the Hazel Lake SHA (241-93) varied considerably among years (Appendix B3) and within years across statistical weeks (Appendix B6). From 2019 to 2022, hatchery sockeye salmon composed 68.3% of the PS harvest from this subdistrict (range: 42.6–87.5%; Appendix B3). Point estimates of the number of hatchery sockeye salmon harvested in the Hazel Lake SHA PS fishery ranged from 23 in 2020 to 9,870 in 2022 (Appendix B3). Of the 24,576 hatchery fish harvested from 2019 to 2022, 24,529 (99.8%) were derived from LCI hatchery releases, with a minimal contribution also coming from Kodiak (47 fish in 2019) area hatchery releases (Appendix B3).

Hatchery Cost Recovery

Southern District

During 2018, 2019, 2021, and 2022, hatchery fish composed 98.3% of the sampled HCR harvest of sockeye salmon in the Southern District (range: 96.7–100.0%; Table 6), which translated to an exvessel value of $1.62 million (Appendix D1; Note: This hatchery origin exvessel value does not include the 2020 HCR harvest because it was not sampled; value was derived from hatchery contribution estimates in this report and annual price and average weight data reported in Hollowell et al. 2019, 2022a, 2022b, 2022c, and 2023). The 95% confidence intervals for hatchery contribution estimates each year (mean = +/-0.3%; range 0.0–0.6%) were well within the criteria established in Objective 2. The hatchery composition of the HCR harvest was composed entirely of fish from LCI hatcheries (100%), with no contributions from other area hatchery releases (Table 7). Point estimates of the number of wild sockeye salmon harvested in Southern District HCR events that were sampled ranged from 0 in 2021 and 2022 to 217 in 2018 (Appendix B4). HCR samples were not collected in 2020, so the hatchery–wild composition of the HCR harvest that year is not known (Table 6). Results by individual SHAs are presented in the following sections.

Tutka Bay SHA (241-07)

Three HCR samples were collected in this subdistrict, 1 in 2021 and 2 in 2022. Overall, hatchery sockeye salmon composed 100% of the HCR harvest from this subdistrict (Appendix B4). Of the

61,190 hatchery fish harvested in the Tutka Bay SHA in 2021 and 2022, all (100%) were derived from LCI hatchery releases (Appendix B4).

China Poot SHA (241-92)

Two HCR samples were collected in this subdistrict, one each in 2018 and 2019. Overall, hatchery sockeye salmon composed 97.2% of the HCR harvest from this subdistrict (Appendix B4). Point estimates of the number of wild sockeye salmon in China Poot SHA HCR harvest events that were sampled ranged from 20 in 2019 to 217 in 2018 (Appendix B4). Of the 8,343 hatchery fish harvested in the China Poot SHA in 2018 and 2019, all (100%) were derived from LCI hatchery releases (Appendix B4).

PINK SALMON

Commercial Harvest

The hatchery–wild stock composition of pink salmon harvested in Southern District commercial fisheries varied by year, harvest type, and gear type. Overall, we estimated 1,676,410 hatchery pink salmon were harvested in the Southern District from 2018 to 2022 (95% CI = 1,573,017–1,779,791; Table 10), which corresponded to an exvessel value of $2.48 million (Appendix D2; Note: This hatchery origin exvessel value does not include the 2019 and 2020 HCR harvest because they were not sampled; value was derived from hatchery contribution estimates in this report and annual price and average weight data reported in Hollowell et al. 2019, 2022a, 2022b, 2022c, and 2023). The vast majority of hatchery marked pink salmon estimated in the harvest were derived from LCI releases (1,659,658 fish, 99.0%); however, hatchery fish from Prince William Sound (PWS, 16,645 fish, 1.0%) and Kodiak/Afognak Islands (KOD, 107 fish, <0.1%) were also present (Table 11). Hatcheries that contributed pink salmon to LCI harvests included the Tutka Bay Lagoon (TBLH) and Port Graham (PGH) hatcheries operated by CIAA in LCI; the Armin F. Koernig (AFKH), Wally Noerenberg (WNH), and Cannery Creek (CCH) hatcheries operated by PWSAC in PWS; the Solomon Gulch Hatchery (SGH) operated by the Valdez Fisheries Development Association (VFDA) in PWS; and the Kitoi Bay Hatchery (KBH) operated by KRAA in the Kodiak/Afognak Islands area (Appendix C1). A summary by gear and harvest type is presented in the following sections.

Set Gillnet Fishery

Because most SGN harvests were mixed in the hold of the tender vessel prior to sampling at the Homer fish dock or the processing facility, our SGN results pertain to the entire Southern District and cannot be stratified by subdistrict. From 2018 to 2022, the total Southern District set gillnet commercial harvest was 110,573 pink salmon, of which 55,070 (49.8%, range: 38.3–58.3%; Table 12) were estimated to be hatchery origin, which resulted in an exvessel value of $43,600 (Appendix D2; Note: This hatchery origin exvessel value was derived from hatchery contribution estimates in this report and annual price and average weight data reported in Hollowell et al. 2019, 2022a, 2022b, 2022c, and 2023). The 95% confidence interval around this estimate (50,327–59,808, +/-4.3%; Table 10) was well within the criteria established in Objective 1. Annual estimates of the number of hatchery pink salmon harvested in the Southern District SGN fishery ranged from 1,378 (95% CI = 1,248–1,507) in 2021 to 27,221 (95% CI = 24,914–29,527) in 2018 (Table 12). Within years, the abundance of hatchery and wild pink salmon in the SGN harvest varied by statistical week, generally peaking in weeks 29–31 (Figure 8). Like the overall harvest, the hatchery composition of the SGN harvest was composed primarily of fish from LCI hatcheries

(46,264 of 55,070 marks; 84.0%), with lesser contributions from PWS (8,771 fish; 15.9%) and KOD (35 fish, 0.1%; Table 11).

Purse Seine Fishery

Southern District

From 2018 to 2022, the total purse seine commercial harvest (excluding cost recovery) was 667,843 pink salmon, of which 399,588 (59.8%, range: 22.2–92.1%; Table 13) were estimated to be hatchery origin, which translated to an exvessel value of $540,000 (Appendix D2; Note: This hatchery origin exvessel value was derived from hatchery contribution estimates in this report and annual price and average weight data reported in Hollowell et al. 2019, 2022a, 2022b, 2022c, and 2023). The 95% confidence interval around this estimate (372,480–426,692, +/-4.1%; Table 10) was well within the criteria established in Objective 1. Annual estimates of the number of hatchery pink salmon harvested in the Southern District PS fishery ranged from 3,597 (95% CI = 3,336–3,857) in 2022 to 247,960 (95% CI = 225,633–270,286) in 2018 (Table 13). Within years, the abundance of hatchery and wild pink salmon in the PS harvest varied by statistical week (usually peaking in weeks 30–32; Figure 9), and by statistical area (Appendix C6). Like the overall and SGN harvest, the hatchery composition of the PS harvest was composed primarily of fish from LCI hatcheries (393,158 of 399,588 marks; 98.4%), with minor contributions from PWS (6,358 fish; 1.6%) and KOD (72 fish, <0.1%; Table 11). Hatchery contribution results by subdistrict are reported in the following sections.

Tutka Bay Subdistrict (241-06)

Commercial purse seine harvest of pink salmon occurred in the Tutka Bay Subdistrict (241-06) every year from 2018 to 2022. The hatchery contribution to the commercial harvest in this subdistrict varied considerably among years (Appendix C3) and within years across statistical weeks (Appendix C6). From 2018 to 2022, hatchery pink salmon composed 87.0% of the PS harvest from this subdistrict (range: 58.2–95.7%; Appendix C3). Point estimates of the number of hatchery pink salmon harvested in the Tutka Bay PS fishery ranged from 1,951 in 2022 to 108,592 in 2018 (Appendix C3). Of the 208,482 hatchery fish harvested from 2018 to 2022, 206,630 (99.1%) were derived from LCI hatchery releases, with minimal contributions also coming from PWS (1,784 fish, 0.9%) and Kodiak (68 fish, <0.1%) hatchery releases (Appendix C3).

Tutka Bay SHA (241-07)

Commercial purse seine harvest of pink salmon occurred in the Tutka Bay SHA (241-07) in 2018 and 2020. The hatchery contribution to the commercial harvest in this subdistrict varied very little among years (Appendix C3) or within years across statistical weeks (Appendix C6). In 2018 and 2020, hatchery pink salmon composed 88.0% of the PS harvest from this subdistrict (range: 87.6–88.7%; Appendix C3). Point estimates of the number of hatchery pink salmon harvested in the Tutka Bay SHA PS fishery ranged from 26,934 in 2018 to 38,470 in 2020 (Appendix C3). Of the 65,404 hatchery fish harvested, 64,959 (99.3%) were derived from LCI hatchery releases, with minimal contributions also coming from PWS area hatcheries (445 fish, 0.7%; Appendix C3).

Humpy Creek Subdistrict (241-14)

There was only one year with a small commercial harvest of pink salmon reported from the Humpy Creek Subdistrict. The harvest occurred in 2018 and consisted of 49 pink salmon, all of which (100%) were unmarked fish (Appendix C3).

Halibut Cove Subdistrict (241-15)

Commercial purse seine harvest of pink salmon occurred in the Halibut Cove Subdistrict (241-15) in 2019 and 2021. The hatchery contribution to the commercial harvest in this subdistrict was minimal and varied somewhat among years (Appendix C3) and within years across statistical weeks (Appendix C6). In 2019 and 2021, hatchery pink salmon composed 2.7% of the PS harvest from this subdistrict (range: 2.1–23.8%; Appendix C3). Point estimates of the number of hatchery pink salmon harvested in the Halibut Cove PS fishery ranged from 10 in 2021 to 29 in 2019 (Appendix C3). Of the 39 hatchery fish harvested, 29 (74.4%) were derived from PWS hatchery releases and 10 (25.6%) from LCI area hatcheries (Appendix C3).

Port Graham Section (241-20)

Commercial purse seine harvest of pink salmon occurred in the Port Graham Section (241-20) in 2018 and 2020. The hatchery contribution to the commercial harvest in this subdistrict varied considerably among years (Appendix C3) but occurred in just one statistical week each year (Appendix C6). In 2018 and 2020, hatchery pink salmon composed 34.8% of the PS harvest from this subdistrict (range: 34.7–70.7%; Appendix C3). Point estimates of the number of hatchery pink salmon harvested in the Port Graham PS fishery ranged from 603 in 2020 to 106,180 in 2018 (Appendix C3). Of the 106,783 hatchery fish harvested, 103,111 (96.6%) were derived from LCI hatchery releases and 3,672 (3.4%) from PWS area hatcheries (Appendix C3).

China Poot Section (241-90)

Commercial purse seine harvest of pink salmon occurred in the China Poot Section (241-90) in 2018 and 2019. The hatchery contribution to the commercial harvest in this subdistrict was relatively minor and varied somewhat among years (Appendix C3) and within years across statistical weeks (Appendix C6). In 2018 and 2019, hatchery pink salmon composed 14.9% of the PS harvest from this subdistrict (range: 3.5–30.0%; Appendix C3). Point estimates of the number of hatchery pink salmon harvested in the Halibut Cove PS fishery ranged from 178 in 2019 to 1,158 in 2018 (Appendix C3). Of the 1,336 hatchery fish harvested, 1,143 (85.6%) were derived from LCI hatchery releases (primarily PGH) and 193 (14.4%) from PWS area hatcheries (Appendix C3).

Neptune Bay Section (241-91)

Commercial purse seine harvest of pink salmon occurred in the Neptune Bay Section (241-91) every year except 2018. The hatchery contribution to the commercial harvest in this subdistrict varied among years (Appendix C3) and within years across statistical weeks (Appendix C6). During 2019 to 2022, hatchery pink salmon composed 47.1% of the PS harvest from this subdistrict (range: 16.7–80.7%; Appendix C3). Point estimates of the number of hatchery pink salmon harvested in the Neptune Bay PS fishery ranged from 300 in 2022 to 3,234 in 2020 (Appendix C3). Of the 7,707 hatchery fish harvested from 2019 to 2022, 7,609 (98.7%) were derived from LCI hatchery releases, with minimal contributions also coming from PWS area hatchery releases (98 fish, 1.3%; Appendix C3).

Hazel Lake SHA (241-93)

There was only one year with a commercial harvest of pink salmon reported from the Hazel Lake SHA (241-93). The harvest occurred in 2019 and consisted of 4,942 pink salmon, 642 of which (13.0%) were hatchery fish, all of which (100%) were derived from LCI hatchery releases (Appendix C3).

Hatchery Cost Recovery

Southern District

During 2018, 2021, and 2022, hatchery fish composed 90.5% of the sampled HCR harvest of pink salmon in the Southern District (range: 84.7–92.7%; Table 10), which resulted in an exvessel value of $1.89 million (Appendix D2; Note: This hatchery origin exvessel value does not include the 2019 and 2020 HCR harvest because they were not sampled; value was derived from hatchery contribution estimates in this report and annual price and average weight data reported in Hollowell et al. 2019, 2022a, 2022b, 2022c, and 2023). The 95% confidence intervals for hatchery contribution estimates each year (+/-5.3%; range: 5.2–5.3%) were well within the criteria established in Objective 2. The hatchery composition of the HCR harvest was composed almost entirely of fish from LCI hatcheries (99.9%), with a minimal contribution coming from PWS area hatchery releases in 2021 (1,516 fish, 0.1%; Table 11). Point estimates of the number of wild pink salmon harvested in Southern District HCR events that were sampled ranged from 3,642 in 2022 to 74,257 in 2018 (Appendix C4). HCR samples were not collected in 2019 or 2020, so the hatchery–wild composition of the HCR harvest in those years is not known (Table 10). Results by individual SHAs are presented in the following sections.

Tutka Bay SHA (241-07)

Four HCR samples were collected in this subdistrict, 1 in 2018, 2 in 2021, and 1 in 2022. Overall, hatchery pink salmon composed 90.4% of the sampled HCR harvest from this subdistrict (Appendix C4). Point estimates of the number of hatchery pink salmon in the Tutka Bay SHA HCR harvest ranged from 46,254 in 2022 to 918,714 in 2018 (Table 10). Of the 1,221,752 hatchery fish harvested in 2018, 2021, and 2022, the overwhelming majority (1,220,236 fish, 99.9%) were derived from LCI hatchery releases, with a minimal contribution (1,516 fish in 2021, 0.1%) coming from PWS hatchery releases (Table 11).

ALL-YEARS SUMMARY

Appendix B1 (sockeye salmon) and Appendix C1 (pink salmon) provide lists of individual hatchery marks identified in our samples and their estimated total contribution to Southern District commercial harvests. Results in these appendices are stratified by hatchery area (LCI, PWS, KOD, UCI) and facility. Results also include brood year, release year, release site, and release number for each hatchery mark.

Sockeye Salmon

We identified 69 unique hatchery marks in our sockeye salmon samples (Appendix B1). Most of the hatchery sockeye salmon identified in LCI harvests were derived from TLH releases in the Southern District of LCI (Tutka Lagoon, and Leisure and Hazel Lakes). However, we also recovered hatchery marks denoting releases from other areas, including PWS, Kodiak, and Upper Cook Inlet. Of the 380,565 hatchery sockeye salmon estimated in all LCI commercial and HCR harvests from 2018 to 2022, 378,246 (99.4%) were derived from TLH releases in LCI, 1,177 (0.3%) from MBH releases in PWS, 1,011 (0.3%) from KBH and PCH releases in KOD, and 131 (<0.1%) from TLH releases to Hidden Lake in UCI (Table 7). Contributions from individual

hatchery releases by year and mark ID can be found in Appendix B1 and on the ADF&G MTAL Mark Summary Report Form website.[8]

Hatchery origin sockeye salmon composed a smaller percentage of the SGN harvest, and not all fish were derived from the TLH. Of the 13,555 (95% CI: 12,101–15,004; Table 6) hatchery sockeye salmon harvested in LCI SGN fisheries between 2018 and 2022, 11,885 (87.7%) were derived from the TLH in LCI, 1,026 (7.6%) from the MBH in PWS, 617 (4.6%) from the PCH and KBH in KOD, and 27 (0.2%) from TLH releases to Hidden Lake in UCI (Table 7).

Pink Salmon

We identified 40 unique hatchery marks in our pink salmon samples (Appendix C1). Most of the hatchery pink salmon identified in LCI harvests were derived from TBLH and PGH releases in the Southern District of LCI (Tutka Lagoon and Port Graham Bay). However, we also observed hatchery marks assigned to releases in other areas, including PWS and Kodiak. Of the 1,676,410 hatchery pink salmon estimated in all LCI commercial and HCR harvests from 2018 to 2022 (Table 11), 1,659,658 (99.0%) were derived from TBLH (92.2%) and PGH (6.8%) releases in LCI; 16,645 (1.0%) from CCH (0.1%), AFKH (0.2%), WNH (0.2%), and SGH (0.6%) releases in PWS; and 107 (<0.01%) from KBH releases in KOD (Table 11, Appendix C1). Contributions from individual hatchery releases by year and mark ID can be found in Appendix C1 and on the ADF&G MTAL Mark Summary Report Form website.[8]

Hatchery origin pink salmon composed a smaller percentage of the SGN harvest, and not all fish were derived from the Port Graham or Tutka Bay Lagoon hatcheries. Of the 55,070 hatchery pink salmon harvested in LCI SGN fisheries between 2018 and 2022, 46,264 (84.0%) were derived from TBLH and PGH in LCI; 8,771 (15.9%) from AFKH, CCH, SGH, and WNH in PWS; and 35 (0.1%) from the KBH in KOD (Table 11).

DISCUSSION

General Observations

The overall purpose of this project was to estimate the hatchery contribution to commercial and cost-recovery harvests as part of a broader effort to assess wild and hatchery salmon stock performance (e.g., adult returns, productivity, marine survival) in the Southern and Outer Districts of the LCIMA. This project focused on hatchery contribution to the harvest in the Southern District, whereas a related study focused on documenting hatchery-origin pink salmon in escapements to select LCI streams in the Southern and Outer Districts (Otis et al. 2018; Otis and Bacon *In prep*).

This project was initiated with a pilot study occurring from 2013 to 2017 (Otis and Hollowell 2023). However, funding constraints limited our spatial and temporal sampling coverage at that time, limiting our ability to estimate total hatchery contribution to the harvest. Additional support from the Pacific States Marine Fish Commission (PSMFC Grant No. 22-018G) enabled us to overcome those challenges and produce statistically robust estimates of the hatchery–wild composition of Southern District commercial and cost-recovery harvests. The additional funding also enabled us to implement robust quality control measures for otolith reads. Reevaluating at

[8] ADF&G Mark, Tag and Age Laboratory Mark Summary Report Forms. 1994–. Alaska Department of Fish and Game, Division of Commercial Fisheries, Headquarters, Juneau. https://mtalab.adfg.alaska.gov/OTO/reports/MarkSummary.aspx (Accessed April 15, 2025).

least a portion of the otoliths collected is generally considered standard operating procedure to assess within and across-reader agreement of otolith mark identification (Agler et al. 2017; Otis et al. 2023). For this study, 100% of the pink salmon otoliths were read twice, and a more experienced reader was used to adjudicate final reads whenever disagreements occurred. Sockeye salmon otoliths were read by a CIAA biologist as part of a cooperative agreement and second reads were implemented on a modest, but unknown percentage of otoliths to corroborate first read results.

It is possible that some otoliths read as unmarked did not represent naturally produced fish. Otis et al. (2018) reread 20% of the otoliths they collected from spawned out pink salmon carcasses in LCI streams and found that some LCI hatchery pink salmon had poorly executed marks. They found a higher reassignment rate (10.6%) for TBLH marks during their second read and attributed it to an otolith marking issue that TBLH staff was aware of and actively sought to resolve by transitioning to "dry" marking. Although TBLH pink salmon marks have improved since then, poor marks and variants of the intended mark still occurred some years during this reporting period, which made it difficult to reliably identify all TBLH marks (see Voucher Summary Reports for the following mark IDs: TUTKA16PINK, TUTKA16PINKA, TUTKA17PINK, TUTKA17PINKA, TUTKA18PINK, TUTKA18PINKA, TUTKA18PINKB, TUTKA18PINKC, TUTKA19PINKB, TUTKA20PINKB).[9] Additional sources for unmarked, nonlocal otoliths in samples may include naturally produced salmon from other areas that were migrating through LCI, over 290 million unmarked pink salmon released in 2018 and 2019 from the Kitoi Bay Hatchery (KBH) on Afognak Island (source: Hatchery Release Report),[10] or sockeye salmon produced at the Gulkana Hatchery in the Copper River Basin, which are marked using a procedure (strontium) that is not detectable with the methods used to assess visible otolith marks.

SOCKEYE SALMON

Hatchery-origin sockeye salmon composed a sizeable portion of the SGN and PS commercial harvests in the Southern District of LCI. From 2018 to 2022, we estimated 13,555 of the 97,125 (14.0%; Table 8) sockeye salmon harvested in Southern District SGN fisheries were of hatchery origin, as were 226,657 of 335,725 (67.5%; Table 9) sockeye salmon harvested from PS fisheries. Hatchery salmon composed a much higher portion of the HCR harvest (98.3%) than either the SGN or PS fishery harvests (Table 6).

The high percentage (67.5%; Table 9) of hatchery sockeye salmon identified in PS harvests (99.7% of which were from TLH in LCI; Table 7) was not surprising given that commercial fishers target hatchery runs relatively close to the locations where returning fish had been remotely released and imprinted as fry. Even higher hatchery proportions were identified in HCR harvests made in the immediate vicinity of the release and imprinting sites at Tutka Bay Lagoon and Leisure Lake in China Poot Bay (98.3%; Table 6). The occurrence of high hatchery proportions in HCR harvests is desirable given that state policies stipulate hatchery activities and mixed stock harvests must be conducted in a manner that does not negatively impact wild stocks (5 AAC 39.222 - Policy for the management of sustainable salmon fisheries, and 5 AAC 39.220 - Policy for the management of mixed stock salmon fisheries).

---

[9] ADF&G Mark, Tag and Age Laboratory Voucher Summary Reports. 1988–. Alaska Department of Fish and Game, Division of Commercial Fisheries, Headquarters, Juneau, AK. https://mtalab.adfg.alaska.gov/OTO/reports/VoucherSummary.aspx (Accessed April 15, 2025).

[10] ADF&G Mark, Tag and Age Laboratory Hatchery Release Reports. 1968–. Alaska Department of Fish and Game, Division of Commercial Fisheries, Headquarters, Juneau, AK. https://mtalab.adfg.alaska.gov/CWT/Reports/hatcheryrelease.aspx (Accessed April 15, 2025).

The observation that 1,670 of the 13,555 (12.3%) hatchery sockeye salmon harvested in SGN fisheries were derived from releases outside of the LCI management area (Table 7) was unexpected given that only 649 of the 226,657 (0.3%) hatchery sockeye salmon harvested in PS fisheries were derived from hatchery releases in PWS, KOD, and UCI (Table 7). This observation is probably due to differences in where these fisheries are conducted. Purse seine activities primarily occur inside Kachemak Bay, east of Tutka Bay, as close as possible to streams and hatchery remote release sites where large aggregations of fish are returning. Conversely, 3 of the 4 areas open to set gillnet fishing are in outer Kachemak Bay, closer to the Gulf of Alaska where transiting nonlocal fish are more likely to occur (Figure 5).

Harvest location and timing may also play a role in the harvest of nonlocal hatchery stocks in LCI. Thirty-seven of the 42 (88.1%) PCH/Kodiak fish identified in SGN samples collected from 2013 to 2017 (Otis and Hollowell 2023) were caught in the Seldovia Subdistrict (241-17), which was the westernmost area actively fished by SGN gear during that study. Furthermore, 28 of the 42 (66.7%) PCH/Kodiak marks identified in that study were collected just 7 days apart in statistical weeks 27 and 28, and all were from the Seldovia Subdistrict (Otis and Hollowell 2023). Because the SGN samples we collected during this reporting period were derived from a mix of fish harvested in different subdistricts, we cannot discern the location(s) where 1,670 nonlocal hatchery sockeye salmon were harvested in the SGN fishery from 2018 to 2022. However, it appears that timing once again may have played a role. Of the 617 PCH/Kodiak fish harvested in the SGN fishery from 2018 to 2022, most were harvested in 2–4 consecutive statistical weeks, although the timing varied by year. Harvest of Kodiak hatchery fish peaked in statistical weeks 26–27 in 2018, weeks 25–27 and 29–31 in 2019, weeks 25–27 in 2020, weeks 26–29 in 2021, and weeks 28–32 in 2022 (Figure 6, Appendix B5).

In addition to observing marked sockeye salmon derived from hatcheries outside the LCIMA, we also observed marked fish from other districts in LCI. Of the 377,928 TLH fish harvested in Southern District commercial harvest samples, 4,748 (1.3%) were from releases to Bear Lake or Resurrection Bay in the Eastern District near Seward (Appendix B1), over 150 ocean miles away from Kachemak Bay (Figure 1). Otis and Hollowell (2023) also observed Bear Lake or Resurrection Bay hatchery marks in Southern District SGN and PS commercial harvests sampled from 2013 to 2017.

Similar to PCH/Kodiak hatchery sockeye salmon, LCI harvest of MBH/PWS origin fish generally peaked in 2–3 adjacent statistical weeks that also varied somewhat by year. Harvest of MBH/PWS fish peaked in statistical weeks 26–29 in 2018, weeks 30–31 in 2019, weeks 27–29 in 2020, weeks 25–29 in 2021, and weeks 26–28 in 2022 (Appendix B5). Because our SGN samples derived from a mix of fish harvested in different subdistricts, we could not look for spatial trends in the harvest. However, Otis and Hollowell (2023) observed both spatial and temporal trends associated with MBH/PWS fish in the SGN harvest from 2013 to 2017. In that study, over 75% of the MBH/PWS fish identified in their samples were caught in the westernmost (Seldovia) subdistrict and less than 1% was found in samples from the Halibut Cove Subdistrict (241-15), which is the easternmost SGN area in Kachemak Bay (Figure 5). The majority (76.2%) of MBH/PWS fish appearing in their SGN samples occurred in one year (2016), suggesting perhaps that an anomalous event (e.g., weather/oceanographic event, ineffective hatchery imprinting, mismatched cohort survivorship between hatchery and wild LCI sockeye salmon) may have triggered a higher MBH/PWS interception rate in SGN harvests from that year (Otis and Hollowell 2023). However, during this study, we documented MBH/PWS fish in the SGN harvest every year from 2018 to 2022 (range:

100–430; Tables 7 and 8). Of the 1,177 MBH/PWS fish observed in our study (Table 7), most were caught during statistical weeks 26–31 (late June to late July; Table 2, Appendix B5). This was surprising given that the MBH is nearly 250 ocean miles from Kachemak Bay (Figure 10), and the historical peak of the Coghill Lake/MBH run occurs around 2 July and 90% of the run is over by mid-July (Clark et al. *Unpublished*).[11]

Although the scale of the harvest differed considerably between areas, hatcheries contributed similar proportions to the commercial harvest in PWS and the Southern District of LCI between 2018 and 2022. Over that time frame, 55.5% of the LCI commercial harvest (SGN and PS combined) were derived from hatcheries (range: 47.3–85.0%; Table 6), whereas in PWS, hatcheries contributed approximately 49.2% of the sockeye salmon harvested in commercial fisheries (range: 34.6–79.3%; ADF&G unpublished data provided by R. Ertz and J. Morella, PWS Fishery Biologists, 22 April 2025). Hatchery proportions observed in HCR harvests were also similar between LCI (98.3%, range: 96.7–100.0%; Table 6) and PWS (99.7%, range: 98.8–100.0%). These very high hatchery proportions demonstrate that HCR harvest efforts successfully minimized the harvest of wild fish.

PINK SALMON

Like sockeye salmon, hatchery-origin pink salmon composed a sizeable portion of the SGN and PS commercial harvests in the Southern District of LCI. Between 2018 and 2022, we estimated 55,070 of the 110,573 (49.8%; Table 12) pink salmon harvested in Southern District SGN fisheries were of hatchery origin, as were 399,588 of 667,843 (59.8%; Table 13) pink salmon harvested from PS fisheries. Hatchery pink salmon composed a much higher portion of the HCR harvest inside hatchery SHAs (90.5%; Table 10).

Like sockeye salmon, the high percentage (59.8%; Table 13) of hatchery pink salmon identified in PS harvests (98.4% of which were LCI hatchery origin; Table 11) was not surprising given that fishers were targeting hatchery runs relatively close to the locations where returning fish had been remotely released and imprinted as fry. Even higher hatchery proportions were identified in HCR harvests made in the immediate vicinity of the release and imprinting sites at Tutka Bay Lagoon (90.5%; Figure 2, Table 10). Our results demonstrate that HCR harvests are primarily targeting hatchery-origin salmon and minimally harvesting wild-origin salmon, which aligns with state policies which stipulate that hatchery activities and mixed stock harvests must be conducted in a manner that does not negatively impact wild stocks (5 AAC 39.222 - Policy for the management of sustainable salmon fisheries, and 5 AAC 39.220 - Policy for the management of mixed stock salmon fisheries).

Similar to sockeye salmon, and probably for the same reasons, we identified higher proportions and abundances of nonlocal origin hatchery pink salmon in SGN harvests (8,806 of 55,070 fish, 16.0%) than in PS harvests (6,430 of 399,588 fish, 1.6%; Table 11). Otis and Hollowell (2023) observed similar trends for both species from 2013 to 2017. Because our SGN samples were derived from a mix of fish harvested in different subdistricts, we could not discern the location(s) where 8,806 nonlocal hatchery pink salmon were harvested in the SGN fishery from 2018 to 2022 (Table 11). Unlike nonlocal hatchery sockeye salmon, PWS hatchery pink salmon showed up in

[11] Clark, G., B. Blain-Roth, J. Botz, J. Dye, B. Lewis, E. Ford, L. Wilson, and F. Bowers. *Unpublished*. 2025 Annual management plan for Main Bay Hatchery operated by Prince William Sound Regional Aquaculture Association. Located at Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau.

SGN harvests consistently across statistical weeks, with slightly higher abundances occurring in weeks 29–31 in most years (Figure 8, Appendix C5).

The composition of PWS hatchery pink salmon identified in Southern District commercial harvests was not even across hatchery facilities. Of the 16,608 PWS hatchery fish estimated in the overall harvest, 9,402 (56.6%) came from SGH, 3,611 (21.7%) from AFKH, 2,585 (15.6%) from WNH, and 1,010 (6.1%) from CCH (Appendix C1). Otis et al. (2023) also found SGH pink salmon to be the most prevalent nonlocal hatchery stock identified in Southern District CH samples. This was somewhat unexpected given that SGH is in a remote location at the eastern terminus of Valdez Arm, farther from LCI than the other 3 PWS pink salmon hatcheries (Figure 10). It is also more spatially and temporally (i.e., run timing) isolated from other hatcheries and major wild stocks in PWS, 2 factors that Brenner et al. (2012) suggested may have contributed to it being the hatchery stock least likely to be identified straying into wild stock streams in PWS. Although SGH has the highest permitted egg capacity (270 million) among PWS hatcheries, 80 million more than AFKH and 120 million more than WNH (Wilson 2020), the total release from this facility from 2018 to 2022 (406.5 million) was considerably less than AFKH (630.4 million), CCH (638.6 million), or WNH (551.8 million; Appendix C1). It is uncertain why the PWS hatchery stock that has the lowest release numbers and is the farthest from LCI was the nonlocal hatchery stock most often identified in LCI harvests. However, it could be that SGH experienced better ocean survival than other PWS hatcheries, as evidenced by SGH pink salmon also making up the largest proportion of hatchery fish in PWS commercial harvests during 2018–2022 (annual mean = 57.6%, range 35.0–95.0%; ADF&G unpublished data provided by R. Ertz and J. Morella, PWS Fishery Biologists, 22 April 2025)

As evidenced by proposals and public testimony at the 2019 and 2023 LCI Alaska Board of Fisheries (BOF) meetings, there has been some debate regarding the contribution LCI hatcheries make to PS and SGN commercial harvests. This study found that hatchery-origin pink salmon made up over half (58.4%, range: 22.2–92.1%; Table 10) of all pink salmon commercial harvests in the Southern District between 2018 and 2022. This hatchery proportion is comparable to PWS, a neighboring management area with similar but larger scale mixed-stock hatchery–wild pink salmon fisheries. From 2018 to 2022, hatcheries contributed 67.0% (range: 61.4%–77.9%) to the combined drift gillnet and PS commercial harvest in PWS area commercial fisheries, which include Prince William Sound and Bering and Copper Rivers (ADF&G unpublished data provided by R. Ertz and J. Morella, PWS Fishery Biologists, 22 April 2025). Although the overall proportion of hatchery pink salmon observed in Southern District commercial harvests was slightly less than the overall hatchery proportion observed in PWS commercial fisheries, LCI hatcheries clearly contributed substantially to the Southern District pink salmon harvest during this study.

Nearly 50% of the pink salmon harvested in SGN fisheries between 2018 and 2022 were of hatchery origin (Table 12) and all were harvested outside of hatchery SHAs (Figure 5). Nearly 60% of the pink salmon harvested in PS fisheries from 2018 to 2022 were marked (Table 13), and most (>83%) of these fish were also harvested outside of SHAs (Appendix C3). Like sockeye salmon, not all hatchery pink salmon harvested in commercial (PS and SGN) and HCR fisheries derived from a LCI hatchery. Among the 1.68 million hatchery pink salmon that were harvested in the Southern District of LCI between 2018 and 2022, 92.2% were derived from TBLH, 6.8% from PGH, 0.6% from SGH in PWS, 0.2% from AFKH in PWS, 0.2% from WNH in PWS, 0.1% from CCH in PWS, and less than 0.1% from KBH in Kodiak (Appendix C1)

We observed the highest hatchery contribution (90.4%; Appendix C4) in pink salmon harvested during HCR operations conducted in the Tutka Bay SHA (241-07), in the immediate vicinity of hatchery release and imprinting sites near Tutka Bay Lagoon (Figure 2). However, this proportion is lower than we observed for sockeye salmon HCR harvests (98.3%, range: 96.7–100.0%; Table 6) and it is lower than the mean pink salmon hatchery proportion observed in PWS HCR harvests from 2018 to 2022 (98.3%, range: 97.0–99.0%; ADF&G unpublished data provided by R. Ertz and J. Morella, PWS Fishery Biologists, 22 April 2025). Unlike sockeye salmon, not all marked pink salmon in the HCR harvest originated from the hatchery they were caught next to, but most were. Among the 1.17 million hatchery pink salmon estimated to have been harvested for cost recovery near Tutka Bay Lagoon between 2018 and 2022, only 1,516 (0.1%) were derived from PWS (Appendix C4).

The LCI HCR harvests in 2018 (brood year [BY] 2016) and 2021 (BY2019) contained relatively high estimated abundances (74,257 and 46,385 respectively; Appendix C4) of unmarked pink salmon. The larger 2018 harvest of >74 thousand unmarked fish during HCR operations did not appear to affect local stock performance, because 5 of 6 Southern District pink salmon stocks with sustainable escapement goals (SEGs) exceeded the upper end of their respective SEG ranges that year. In 2021, 2 of 6 Southern District pink salmon stocks (Humpy and China Poot Creeks) fell a combined 16.8 thousand fish short of their respective SEG ranges, so it is possible the HCR harvest of 46 thousand unmarked pink salmon that year may have contributed to a wild stock shortfall. However, without genetic data to estimate the wild stock composition of the HCR harvest, drawing conclusions is tenuous, especially considering that escapement to 3 other Southern District stocks closer to the TBLH (Barabara, Seldovia, Port Graham) fell within their respective SEG ranges in 2021. Another factor contributing to uncertainty regarding possible interception of wild pink salmon during HCR operations, and indeed the contribution TBLH hatchery pink salmon made to commercial PS and SGN harvests in general, was poor mark quality. As documented in MTAL voucher reports, the TBLH had some difficulty achieving clear, identifiable marks that matched the prescribed mark for several releases from 2016 to 2020 (the brood years corresponding to harvests from 2018 to 2022; Appendix C1). For selected releases during this study period, voucher specimens revealed that some TBLH otoliths were marked incorrectly, had several mark variants, or no recognizable mark (i.e., appeared unmarked), which could lead to mistakenly identifying them as wild- rather than hatchery-origin (see especially BY2016 TBLH marks and the BY2019 TUTKA19PINKB mark). Therefore, TBLH pink salmon contribution estimates reported herein should be considered conservative.

CONCLUSIONS

Three hatcheries operated by CIAA contributed substantially to commercial harvests of sockeye and pink salmon in the Southern District of LCI from 2018 to 2022. Unlike earlier pilot studies (Otis et al. 2023), our spatial and temporal sampling coverage was intensive enough to produce robust estimates of the hatchery contribution to Southern District commercial fisheries. During this reporting period, we estimated 240,212 (Table 6) hatchery sockeye salmon and 454,658 (Table 10) hatchery pink salmon were harvested in commercial fisheries (SGN and PS combined, HCR excluded), which represents 55.5% (+/-2.2%) and 58.4% (+/-4.1%) of their respective harvests. This demonstrates that the exvessel value of these fisheries was significantly enhanced by hatchery contributions from 2018 to 2022.

Currently, LCI sockeye and pink salmon otoliths are processed postseason at nonlocal labs (Cordova or Juneau). Recently, funding support for otolith processing has become tenuous because previous grants have run out and CIAA, who previously read all sockeye otoliths under an informal in-kind agreement, has been cutting projects. If adequate funding and capacity can be developed to process otoliths quickly in Homer, results could be used to inform inseason management decisions to provide harvest opportunity on hatchery-origin salmon while facilitating run entry for local wild pink and sockeye salmon stocks, as is currently done in PWS (Botz et al. 2024; Morella and Ertz 2025). Such a strategy would help ensure that management of this mixed stock hatchery–wild salmon fishery is consistent with state policies and regulations designed to protect wild stocks (McGee 2004; Evenson et al. 2018). For example, LCI managers could choose to reduce fishing time and area in Tutka Bay Subdistrict (241-06; see Figure 2) if sampling results indicate that unmarked (i.e., wild) fish make up a high proportion of the harvest, and nearby wild stocks (e.g., Humpy Creek) are not tracking to meet their respective management objectives (Otis et al. 2023). The timeliness and precision of such management actions could be substantially improved by inseason processing of otolith samples in Homer.

ACKNOWLEDGEMENTS

This project would not have been possible without strong cooperation from many individuals and organizations. In particular, the authors would like to thank ADF&G Fish and Wildlife Technicians Joe Loboy, Tim Blackmon, Tom Sigurdsson, Patrick Houlihan, Brent Fagen, Tom Griffin, and Ali McCarron for tirelessly chasing down samples; Cathy Cline from CIAA for reading all sockeye salmon otoliths; staff at ADF&G's Cordova and Juneau otolith labs for reading all pink salmon otoliths; tender operators, owners, managers, and staff at the Fish Factory, Coal Point Seafoods, OBI, and Pac Star for allowing ADF&G staff access to their buying stations and processing facilities to sample fish; and all the LCI seine permit holders, captains, and crew who provided samples for this project. The authors would also like to thank our ADF&G colleagues Jack Erickson, Glenn Hollowell, Ethan Ford, Jennifer Morella, Rachel Ertz, and Andrew Munro for their insightful reviews of this report. Base funding for this project derived from ADF&G general funds, but during much of this reporting period, additional funding was provided by the Pacific States Marine Fisheries Commission (PSMFC, Grant No. 22-018G). Their funding facilitated greater spatial and temporal sampling coverage and implementation of 100% second reads on pink salmon otoliths for QA/QC purposes, which enabled us to produce the robust hatchery–wild composition estimates presented in this report.

REFERENCES CITED

ADF&G (Alaska Department of Fish and Game). 2012. Interactions of wild and hatchery pink and chum salmon in Prince William Sound and Southeast Alaska. Request for proposals (RFP 2013-1100-1020). Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau, AK. https://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/research/rfp_hatchery_fish_interaction.pdf.

Agler, B., L. Wilson, and M. Lovejoy. 2016. Thermal mark recovery procedures of the ADF&G Mark, Tag and Age Laboratory. Alaska Hatchery Research Group, Technical Document 7, Juneau. https://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/research/mta_procedures.pdf.

Agler, B., L. Wilson, and M. Lovejoy. 2017. Thermal mark recovery data quality assurance and quality control procedures by the ADF&G Mark, Tag and Age Laboratory. Alaska Hatchery Research Group, Technical Document 8, Version 1.0., Juneau. https://mtalab.adfg.alaska.gov/OTO/Files/TechDoc8_MTAQAQC.pdf.

REFERENCES CITED (Continued)

Botz, J., H. Scannell, M. Olson, J. Morella, and R. Ertz. 2024. 2023 Prince William Sound area finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 24-15, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FMR24-15.pdf

Brenner, R. E., S. D. Moffitt, and W. S. Grant. 2012. Straying of hatchery salmon in Prince William Sound, Alaska. Environmental Biology of Fishes 94:179–195.

Davis, B., B. Allee, D. Amend, B. Bachen, B. Davidson, T. Gharrett, S. Marshall, and A. Wertheimer. 1985. Alaska Department of fish and Game genetic policy. Alaska Department of fish and Game, Division of Fisheries Rehabilitation, Enhancement and Development, Special report, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/FRED.GeneticsPolicy.1985.pdf

Davis, B., and B. Burkett. 1989. Background of the genetic policy of the Alaska Department of fish and Game. Alaska Department of fish and Game. Division of Fisheries Rehabilitation. Enhancement and Development, FRED Report No. 95, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/fred.095.pdf

Evenson, D. F., C. Habicht, M. Stopha, A. R. Munro, T. R. Meyers, and W. D. Templin. 2018. Salmon hatcheries in Alaska – A review of the implementation of plans, permits, and policies designed to provide protection for wild stocks. Alaska Department of Fish and Game, Special Publication No. 18-12, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/SP18-12.pdf

Gorman, K., J. McMahon, P. Rand, E. Knudsen, and D. R. Bernard. 2017. Interactions of wild and hatchery pink salmon in Prince William Sound. Prince William Sound Science Center Progress Report for 2016 https://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/research/2016_pwssc_annual_report.pdf.

Grant, W. S. 2012. Understanding the adaptive consequences of ecological interactions between hatchery and wild salmon in Alaska. Environmental Biology of Fishes 94:325–342.

Habicht, C., T. M. Tobias, G. Fandrei, N. Webber, B. Lewis, and W.S. Grant. 2013. Homing of sockeye salmon within Hidden Lake, Alaska, can be used to achieve hatchery management goals. North American Journal of Fisheries Management 33(4):777–782. https://doi.org/10.1080/02755947.2013.808290.

Haught, S., J. Morella, and S. Vega. 2019. Estimating wild and hatchery contributions of Pacific salmon stocks in Prince William Sound Management Area fisheries. Alaska Department of Fish and Game, Regional Operational Plan No. ROP.CF.2A.2019.03, Cordova. https://www.adfg.alaska.gov/FedAidPDFs/ROP.CF.2A.2019.03.pdf.

Heard, W. R. 2012. Overview of salmon stock enhancement in southeast Alaska and compatibility with maintenance of hatchery and wild stocks. Environmental Biology of Fishes 94:273–283.

Hollowell, G., E. O. Otis, and E. Ford. 2019. 2018 Lower Cook Inlet area finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 19-23, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FMR19-23.pdf.

Hollowell, G., E. O. Otis, and E. Ford. 2022a. 2019 Lower Cook Inlet area finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 22-11, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FMR22-11.pdf.

Hollowell, G., E. O. Otis, and E. Ford. 2022b. 2020 Lower Cook Inlet area finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 22-20, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FMR22-20.pdf.

Hollowell, G., E. O. Otis, and E. Ford. 2022c. 2021 Lower Cook Inlet area salmon management report. Alaska Department of Fish and Game, Fishery Management Report No. 22-17, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FMR22-17.pdf.

Hollowell, G., E. O. Otis, and E. Ford. 2023. 2022 Lower Cook Inlet area salmon annual management report. Alaska Department of Fish and Game, Fishery Management Report No. 23-04, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FMR23-04.pdf.

REFERENCES CITED (Continued)

Jasper, J. R., C. Habicht, S. Moffit, R. Brenner, J. Marsh, B. Lewis, E. C. Fox, Z. Grauvogel, S. D. Rogers Olive, and W. S. Grant. 2013. Source-sink estimates of genetic introgression show influence of hatchery strays on wild chum salmon populations in Prince William Sound, Alaska. PLoS One 8(12):e81916. doi:10.1371/journal.pone.0081916

Johnson, W. F., R. P. Josephson, T. R. Frawley, and D. S. Oxman. 2006. Revised web-based North Pacific salmon otolith mark directory. North Pacific Anadromous Fish Commission, Document 971. Alaska Department of Fish and Game, Juneau, Alaska.

Josephson, R., Wertheimer, A., Gaudet, D., Knudsen, E. E., Adams, B., Bernard, D. R., Heinl, S. C., Piston, A. W., and W. D. Templin. 2021. Proportions of hatchery fish in escapements of summer-run chum salmon in Southeast Alaska, 2013–2015. North American Journal of Fisheries Management 41(3):724–728.

Knudsen, E. E., P. S. Rand, K. B. Gorman, D. R. Bernard, and W. D. Templin. 2021. Hatchery-origin stray rates and total run characteristics for pink salmon and chum salmon returning to Prince William Sound, Alaska, in 2013–2015. Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science 13(1):41–68.

McGee, S. G. 2004. Salmon hatcheries in Alaska - plans, permits, and policies designed to provide protection for wild stocks. Pages 317–331 [*In*] Proceedings of propagated fish in resource management. American Fisheries Society Symposium 44.

Meyers, T. 2010. Regulation changes, policies and guidelines for Alaska fish and shellfish health and disease control. Alaska Department of Fish and Game, Regional Report Series No. 5J10-01, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2010.01.pdf.

Morella, J. R., and R. Ertz. 2025. Estimating wild and hatchery contributions of Pacific salmon stocks in Prince William Sound Management Area fisheries, 2025–2027. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Operational Plan No. ROP.CF.2A.2025.04, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/ROP.CF.2A.2025.04.pdf.

Otis, E. O. and J. A. Bacon. *In prep*. Hatchery–wild composition of escapements to 10 Lower Cook Inlet streams, 2018–2022. Alaska Department of Fish and Game, Fishery Data Series, Anchorage.

Otis, E. O., G. J. Hollowell, and E. G. Ford. 2018. Observations of pink salmon hatchery proportions in selected Lower Cook Inlet escapements, 2014–2017. Alaska Department of Fish and Game, Special Publication No. SP18-11, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/SP18-11.pdf.

Otis, E. O., and G. J. Hollowell. 2023. Observations of pink and sockeye salmon hatchery proportions in Southern District commercial harvests, Lower Cook Inlet, 2013–2017. Alaska Department of Fish and Game, Fishery Data Series No. 23-07, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FDS23-07.pdf.

Otis, E. O., G. J. Hollowell, A. W. Barclay, and X. Zhang. 2020. Recovery and analysis of thermal mark hatchery salmon otoliths in Lower Cook Inlet, 2020. Alaska Department of Fish and Game, Regional OperationalPlan No. ROP.CF.2A.2020.03, Homer. https://www.adfg.alaska.gov/FedAidPDFs/ROP.CF.2A.2020.03.pdf.

Otis, E. O., G. J. Hollowell, A. W. Barclay, and X. Zhang. 2021. Recovery and analysis of thermal mark hatchery salmon otoliths in Lower Cook Inlet, 2021. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Operational Plan No. ROP.CF.2A.2021.02, Homer. https://www.adfg.alaska.gov/FedAidPDFs/ROP.CF.2A.2021.02.pdf.

Otis, E. O., G. J. Hollowell, A. W. Barclay, and X. Zhang. 2022. Recovery and analysis of thermal mark hatchery salmon otoliths in Lower Cook Inlet, 2022. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Operational Plan No. ROP.CF.2A.2022.06, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/ROP.CF.2A.2022.06.pdf.

Otis, E. O., G. J. Hollowell, and X. Zhang. 2023. Recovery and analysis of thermal mark hatchery salmon otoliths in Lower Cook Inlet, 2023–2024. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Operational Plan No. ROP.CF.2A.2023.02, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/ROP.CF.2A.2023.02.pdf.

REFERENCES CITED (Continued)

Oxman, D. S. 2019. Releases of otolith marked salmon from Alaska in 2018. North Pacific Anadromous Fish Commission, Document 1818. Alaska Department of Fish and Game, Juneau. Available at https://npafc.org/published-documents-2018/.

Oxman, D. S. 2020. Releases of otolith marked salmon from Alaska in 2019. North Pacific Anadromous Fish Commission, Document 1879. Alaska Department of Fish and Game, Juneau. Available at https://npafc.org/published-documents-2020/.

Oxman, D. S. 2021. Releases of otolith marked salmon from Alaska in 2020. North Pacific Anadromous Fish Commission, Document 1937. Alaska Department of Fish and Game, Juneau. Available at https://npafc.org/published-documents-2021/.

Oxman, D. S. 2022. Releases of otolith marked salmon from Alaska in 2021. North Pacific Anadromous Fish Commission, Document 2012. Alaska Department of Fish and Game, Juneau. Available at https://npafc.org/published-documents-2022/.

Oxman, D. S. 2023. Releases of otolith marked salmon from Alaska in 2022. North Pacific Anadromous Fish Commission, Document 2081. Alaska Department of Fish and Game, Juneau. Available at https://npafc.org/published-documents-2023/.

Rand, P. S., B. A. Berejikian, T. N. Pearsons, and D. L. G. Noakes. 2012. Ecological interactions between wild and hatchery salmonids: an introduction to the special issue. Environmental Biology of Fishes 94:1–6.

Roppel, P. 1982. Alaska salmon hatcheries, 1891–1959. Alaska Department of Fish and Game, Fisheries Rehabilitation, Enhancement, and Development Division, Juneau.

Shedd, K. R., E. A. Lescak, C. Habicht, E. E. Knudsen, T. H. Dann, H. A. Hoyt, D. J. Prince, and W. D. Templin. 2022. Reduced relative fitness in hatchery-origin pink salmon in two streams in Prince William Sound, Alaska. Evolutionary Applications 15(3):429–446.

Stopha, M. 2012a. An evaluation of the Trail Lakes salmon hatchery for consistency with statewide policies and prescribed management practice. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 5J12-21, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2012.21.pdf.

Stopha, M. 2012b. An evaluation of the Port Graham salmon hatchery for consistency with statewide policies and prescribed management practice. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 5J12-28, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2012.28.pdf.

Stopha, M., and J. Musslewhite. 2012. An evaluation of the Tutka Bay Lagoon Hatchery for consistency with statewide policies and prescribed management practices. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 5J12-05, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2012.05.pdf.

Stopha, M. 2013. An evaluation of the Gulkana salmon hatchery for consistency with statewide policies and prescribed management practices. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 5J13-05, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2013.05.pdf.

Volk, E. C., S. L. Schroder, and J. J. Grimm. 1999. Otolith thermal marking. Fisheries Research 43:205–219.

Wilson, L. 2020. Alaska salmon fisheries enhancement annual report 2019. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 5J-04, Juneau. https://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2020.04.pdf.

TABLES AND FIGURES

Table 1.–Hatchery brood years that contributed to the sockeye (A) and pink (B) salmon commercial harvests sampled between 2018 and 2022.

(A) Sockeye salmon brood and return years.

	Age and return year										
Brood year	0.2	1.1	0.3	1.2	2.1	1.3	2.2	3.1	1.4	2.3	3.2
2012	–	–	–	–	–	–	–	–	2018	2018	2018
2013	–	–	–	–	–	2018	2018	2018	2019	2019	2019
2014	–	–	2018	2018	2018	2019	2019	2019	2020	2020	2020
2015	2018	2018	2019	2019	2019	2020	2020	2020	2021	2021	2021
2016	2019	2019	2020	2020	2020	2021	2021	2021	2022	2022	2022
2017	2020	2020	2021	2021	2021	2022	2022	2022	–	–	–
2018	2021	2021	2022	2022	2022	–	–	–	–	–	–
2019	2022	2022	–	–	–	–	–	–	–	–	–

(B) Pink salmon brood and return years.

Brood year	Release year	Return year
2016	2017	2018
2017	2018	2019
2018	2019	2020
2019	2020	2021
2020	2021	2022

Note: En dash (–) = no data

Table 2.–Calendar dates (2018–2022) associated with statistical weeks 22 through 38, the period during which commercial fisheries may occur in the Southern District of Lower Cook Inlet.

	2018		2019		2020		2021		2022	
Statistical week[a]	Begin	End	Begin	End	Begin	End	Begin	End	Begin	End
22	5/27	6/2	5/26	6/1	5/24	5/30	5/23	5/29	5/22	5/28
23	6/3	6/9	6/2	6/8	5/31	6/6	5/30	6/5	5/29	6/4
24	6/10	6/16	6/9	6/15	6/7	6/13	6/6	6/12	6/5	6/11
25	6/17	6/23	6/16	6/22	6/14	6/20	6/13	6/19	6/12	6/18
26	6/24	6/30	6/23	6/29	6/21	6/27	6/20	6/26	6/19	6/25
27	7/1	7/7	6/30	7/6	6/28	7/4	6/27	7/3	6/26	7/2
28	7/8	7/14	7/7	7/13	7/5	7/11	7/4	7/10	7/3	7/9
29	7/15	7/21	7/14	7/20	7/12	7/18	7/11	7/17	7/10	7/16
30	7/22	7/28	7/21	7/27	7/19	7/25	7/18	7/24	7/17	7/23
31	7/29	8/4	7/28	8/3	7/26	8/1	7/25	7/31	7/24	7/30
32	8/5	8/11	8/4	8/10	8/2	8/8	8/1	8/7	7/31	8/6
33	8/12	8/18	8/11	8/17	8/9	8/15	8/8	8/14	8/7	8/13
34	8/19	8/25	8/18	8/24	8/16	8/22	8/15	8/21	8/14	8/20
35	8/26	9/1	8/25	8/31	8/23	8/29	8/22	8/28	8/21	8/27
36	9/2	9/8	9/1	9/7	8/30	9/5	8/29	9/4	8/28	9/3
37	9/9	9/15	9/8	9/14	9/6	9/12	9/5	9/11	9/4	9/10
38	9/16	9/22	9/15	9/21	9/13	9/19	9/12	9/18	9/11	9/17

[a] Statistical weeks run Sunday through Saturday, except for the first and last weeks of the year; week 1 begins on January 1 and ends on Saturday; week 53 begins on Sunday and ends on December 31.

Table 3.–Summary of readable otoliths collected from commercial (purse seine and set gillnet) and cost-recovery harvests sampled in the Southern District, 2018–2022.

Year	Species	Gear type[a]	Commercial harvest		Cost recovery		Total	
			# Events	# Samples	# Events	# Samples	# Events	# Samples
2018	Sockeye	SGN	27	2,079	0	0	27	2,079
		PS	20	1,119	1	60	21	1,179
	Pink	SGN	7	665	0	0	7	665
		PS	22	1,709	1	89	23	1,798
	Total		75	5,478	2	149	78	5,721
2019	Sockeye	SGN	31	2,545	0	0	31	2,545
		PS	41	1,976	1	96	42	2,072
	Pink	SGN	3	285	0	0	3	285
		PS	20	615	0	0	20	615
	Total		95	5,421	1	96	96	5,517
2020	Sockeye	SGN	26	1,862	0	0	26	1,862
		PS	22	1,314	0	0	22	1,314
	Pink	SGN	9	766	0	0	9	766
		PS	17	1,028	0	0	17	1,028
	Total		74	4,970	0	0	74	4,970
2021	Sockeye	SGN	26	2,243	0	0	26	2,243
		PS	30	1,440	1	96	31	1,536
	Pink	SGN	10	762	0	0	10	762
		PS	13	816	2	190	15	1,006
	Total		79	5,261	3	286	82	5,547
2022	Sockeye	SGN	20	1,769	0	0	20	1,769
		PS	20	1,389	2	191	22	1,580
	Pink	SGN	6	448	0	0	6	448
		PS	3	206	1	96	4	302
	Total		49	3,812	3	287	52	4,099
All years	Sockeye	SGN	130	10,498	0	0	130	10,498
		PS	133	7,238	5	443	138	7,681
	Pink	SGN	35	2,926	0	0	35	2,926
		PS	75	4,374	4	375	79	4,749
Total read:			373	25,306	9	818	382	25,854
Total collected:								26,048
Percent read:								99.3%

[a] Gear type: SGN = Set gillnet, PS = Purse seine.

Table 4.–Summary of sampled and unsampled sockeye salmon commercial harvest strata (stratified by year, harvest type and gear) in the Southern District of Lower Cook Inlet, 2018–2022.

			Sampled		Unsampled			
Year	Harvest type[a]	Gear type[b]	n[c]	Estimated harvest	n[c]	Estimated harvest	Total harvest	Percent sampled
2018	CH	SGN	9	14,738	4	521	15,259	96.6%
2018	CH	PS	15	46,773	17	12,356	59,129	79.1%
2018	HCR	PS	1	3,157	10	65,822	68,979	4.6%
2019	CH	SGN	11	29,362	1	19	29,381	99.9%
2019	CH	PS	26	42,874	15	7,778	50,652	84.6%
2019	HCR	PS	1	1,220	6	11,366	12,586	9.7%
2020	CH	SGN	8	11,532	3	975	12,507	92.2%
2020	CH	PS	14	58,073	17	10,778	68,851	84.3%
2020	HCR	PS	0	0	8	15,892	15,892	0.0%
2021	CH	SGN	9	12,822	1	301	13,123	97.7%
2021	CH	PS	17	59,022	13	15,947	74,969	78.7%
2021	HCR	PS	1	21,596	4	13,473	35,069	61.6%
2022	CH	SGN	10	26,853	1	2	26,855	100.0%
2022	CH	PS	15	71,240	7	10,884	82,124	86.7%
2022	HCR	PS	2	24,394	1	1,727	26,121	93.4%
Total sum:				423,656		167,841	591,497	71.6%
Comm. harvest (CH; excludes HCR) sum:				373,289		59,561	432,850	86.2%
Cost-recovery (HCR) sum:				50,367		108,280	158,647	31.7%
Set gillnet (SGN) harvest sum:				95,307		1,818	97,125	98.1%
Purse seine (PS) harvest sum:				277,982		57,743	335,725	82.8%

[a] Harvest type: CH = Commercial harvest (excluding hatchery cost recovery), HCR = Hatchery cost recovery.

[b] Gear type: SGN = Set gillnet, PS = Purse seine.

[c] n: number of sampled or unsampled events by strata (i.e., harvest by species, harvest type, and gear type).

Table 5.–Summary of sampled and unsampled pink salmon commercial harvest strata (stratified by year, harvest type and gear) in the Southern District of Lower Cook Inlet, 2018–2022.

			Sampled		Unsampled			
Year	Harvest type[a]	Gear type[b]	n[c]	Estimated harvest	n[c]	Estimated harvest	Total harvest	Percent sampled
2018	CH	SGN	3	41,479	7	15,230	56,709	73.1%
2018	CH	PS	11	271,269	19	204,156	475,425	57.1%
2018	HCR	PS	1	117,377	10	880,141	997,518	11.8%
2019	CH	SGN	3	2,347	7	4,076	6,423	36.5%
2019	CH	PS	13	14,444	28	8,561	23,005	62.8%
2019	HCR	PS	0	0	6	179,659	179,659	0.0%
2020	CH	SGN	4	28,141	4	7,019	35,160	80.0%
2020	CH	PS	9	78,539	19	43,200	121,739	64.5%
2020	HCR	PS	0	0	9	795,068	795,068	0.0%
2021	CH	SGN	5	3,495	3	5	3,500	99.9%
2021	CH	PS	8	34,161	20	7,746	41,907	81.5%
2021	HCR	PS	2	160,655	3	142,514	303,169	53.0%
2022	CH	SGN	4	8,302	6	491	8,793	94.4%
2022	CH	PS	3	3,565	13	2,205	5,770	61.8%
2022	HCR	PS	1	13,341	1	36,555	49,896	26.7%
Total sum:				777,115		2,326,626	3,103,741	25.0%
Comm. harvest (CH; excludes HCR) sum:				485,742		292,689	778,431	62.4%
Cost recovery (HCR) sum:				291,373		2,033,937	2,325,310	12.5%
Set gillnet (SGN) harvest sum:				83,761		26,821	110,585	75.7%
Purse seine (PS) harvest sum:				401,978		265,868	667,846	60.2%

[a] Harvest type: CH = Commercial harvest (excluding hatchery cost recovery), HCR = Hatchery cost recovery.

[b] Gear type: SGN = Set gillnet, PS = Purse seine.

[c] n: number of sampled or unsampled events by strata (i.e., harvest by species, harvest type, and gear type).

Table 6.–Estimated hatchery contribution and 95% confidence intervals by strata to all sampled and unsampled sockeye salmon commercial harvest in the Southern District of Lower Cook Inlet, 2018–2022.

			Estimated total hatchery contribution (C_H)						
Year	Harvest type[a]	Gear type[b]	C_H (#)	C_H (%)	95% CI (+/- %)	Estimated SE	Estimated lower 95% CI	Estimated upper 95% CI	Total harvest
2018	CH	SGN	2,686	17.6	1.7	130	2,431	2,940	15,259
2018	CH	PS	40,111	67.8	2.7	818	38,507	41,714	59,129
2018	HCR	PS	66,703	96.7	0.6	206	66,299	67,106	68,979
2019	CH	SGN	3,321	11.3	1.2	186	2,956	3,685	29,381
2019	CH	PS	23,959	47.3	2.2	581	22,820	25,097	50,652
2019	HCR	PS	12,460	99.0	0.5	31	12,399	12,520	12,586
2020	CH	SGN	1,025	8.2	1.3	80	868	1,181	12,507[c]
2020	CH	PS	40,721	59.1	2.9	1,021	38,719	42,722	68,851
2020	HCR	NS	NS	NS	NS	NS	NS	NS	15,892
2021	CH	SGN	2,414	18.4	1.6	109	2,200	2,627	13,123
2021	CH	PS	52,050	69.4	2.3	878	50,329	53,770	74,969
2021	HCR	PS	35,069	100.0	0.0	0	35,069	35,069	35,069
2022	CH	SGN	4,109	15.3	1.7	236	3,646	4,571	26,855
2022	CH	PS	69,816	85.0	2.0	852	68,146	71,485	82,124
2022	HCR	PS	26,121	100.0	0.0	0	26,121	26,121	26,121
Total sum (all types):			380,565	66.1	1.7	5,128	370,510	390,608	575,605[c]
CH (excluding HCR) sum:			240,212	55.5	2.2	4,891	230,622	249,792	432,850
HCR sum:			140,353	98.3	0.3	237	139,888	140,816	142,755[c]
SGN sum:			13,555	14.0	1.5	741	12,101	15,004	97,125
PS sum:			226,657	67.5	2.4	4,150	218,521	234,788	335,725

Note: NS = not sampled.

[a] Harvest type: CH = Commercial harvest (excluding cost recovery), HCR = Hatchery cost recovery.

[b] Gear type: SGN = Set gillnet, PS = Purse seine.

[c] The total and hatchery cost-recovery harvest (HCR) sums do not include the HCR harvest in 2020 (15,892) because hatchery contribution estimates were not made.

Table 7.–Estimated hatchery contribution by strata and hatchery area to all sampled and unsampled sockeye salmon commercial harvest in the Southern District of Lower Cook Inlet, 2018–2022.

			Est. hatchery area contribution (C_h) to all harvest										
	Harvest	Gear	C_h-LCI[c]		C_h-PWS[c]		C_h-KOD[c]		C_h-UCI[c]		C_H-All marks		Total
Year	type[a]	type[b]	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. %	harvest
2018	CH	SGN	2,411	122	168	35	107	28	0	0	2,686	17.6	15,259
2018	CH	PS	40,066	817	0	0	45	46	0	0	40,111	67.8	59,129
2018	HCR	PS	66,703	206	0	0	0	0	0	0	66,703	96.7	68,979
2019	CH	SGN	2,997	176	118	34	206	48	0	0	3,321	11.3	29,381
2019	CH	PS	23,912	580	0	0	47	31	0	0	23,959	47.3	50,652
2019	HCR	PS	12,460	31	0	0	0	0	0	0	12,460	99.0	12,586
2020	CH	SGN	875	74	100	25	50	18	0	0	1,025	8.2	12,507
2020	CH	PS	40,639	1,019	0	0	82	63	0	0	40,721	59.1	68,851
2020	HCR	PS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	15,892[d]
2021	CH	SGN	2,165	102	210	34	39	14	0	0	2,414	18.4	13,123
2021	CH	PS	51,801	870	47	50	202	100	0	0	52,050	69.4	74,969
2021	HCR	PS	35,069	0	0	0	0	0	0	0	35,069	100.0	35,069
2022	CH	SGN	3,437	213	430	81	215	58	27	21	4,109	15.3	26,855
2022	CH	PS	69,590	841	104	93	18	19	104	93	69,816	85.0	82,124
2022	HCR	PS	26,121	0	0	0	0	0	0	0	26,121	100.0	26,121
			Est. #	Est. %[e]	Est. #	Est. %[e]	Est. #	Est. %[e]	Est. #	Est. %[e]	Est. #	Est. %	Total harvest
Total sum (all types):			378,246	**99.4**	1,177	**0.3**	1,011	**0.3**	131	**0.0**	380,565	66.1%	575,605[d]
CH (excluding HCR) sum:			237,893	**99.0**	1,177	**0.5**	1,011	**0.4**	131	**0.1**	240,212	55.5%	432,850
HCR sum:			140,353	**100.0**	0	**0.0**	0	**0.0**	0	**0.0**	140,353	88.5%	158,647[d]
SGN sum:			11,885	**87.7**	1,026	**7.6**	617	**4.6**	27	**0.2**	13,555	14.0%	97,125
PS sum:			226,008	**99.7**	151	**0.1**	394	**0.2**	104	**0.0**	226,657	67.5%	335,725

Note: NS = not sampled; # = number; Est. = estimated.

[a] Harvest type: CH = Commercial harvest (excluding cost recovery), HCR = Hatchery cost recovery.

[b] Gear type: SGN = Set gillnet, PS = Purse seine.

[c] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, UCI = Upper Cook Inlet hatchery mark.

[d] The total and hatchery cost-recovery harvest (HCR) sums do not include HCR harvest in 2020 (15,892) because hatchery contribution estimates were not made.

[e] Hatchery area proportions (**in bold**) associated with total and harvest or gear type sums are relative to the total number of marked fish, not total harvest. Total marked proportions are relative to the total harvest.

Table 8.–Annual hatchery contribution estimates and 95% confidence intervals for sockeye salmon harvested in the commercial set gillnet (SGN) fishery in the Southern District of Lower Cook Inlet, 2018–2022.

						Hatchery		Wild	
Year	n[a]	Total harvest	Hatchery area[b]	Est. # (95% CI)	Est. %	Est. total # (95% CI)	Est. total %	Est. total # (95% CI)	Est. total %
2018	2,079	15,259	LCI	2,411 (2,171–2,650)	15.8	2,686 (2,431–2,940)	17.6	12,573 (12,319–12,828)	82.4
			PWS	168 (99–236)	1.1				
			KOD	107 (52–161)	0.7				
			UCI	0 (0–0)	0.0				
2019	2,545	29,381	LCI	2,997 (2,652–3,341)	10.2	3,321 (2,956–3,685)	11.3	26,060 (25,696–26,425)	88.7
			PWS	118 (51–184)	0.4				
			KOD	206 (111–300)	0.7				
			UCI	0 (0–0)	0.0				
2020	1,862	12,507	LCI	875 (729–1,020)	7.0	1,025 (868–1,181)	8.2	11,482 (11,326–11,639)	91.8
			PWS	100 (51–149)	0.8				
			KOD	50 (14–85)	0.4				
			UCI	0 (0–0)	0.0				
2021	2,243	13,123	LCI	2,165 (1,965–2,364)	16.5	2,414 (2,200–2,627)	18.4	10,709 (10,496–10,923)	81.6
			PWS	210 (143–276)	1.6				
			KOD	39 (11–66)	0.3				
			UCI	0 (0–0.0)	0.0				
2022	1,769	26,855	LCI	3,437 (3,019–3,854)	12.8	4,109 (3,646–4,571)	15.3	22,746 (22,284–23,209)	84.7
			PWS	430 (271–588)	1.6				
			KOD	215 (101–328)	0.8				
			UCI	27 (0–68)	0.1				
Total:		97,125				13,555	14.0	83,570	86.0

Note: # = number of fish; Est. = estimated.

[a] n: number of sampled otoliths by strata (i.e., species, harvest type, gear type, and year).

[b] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, UCI = Upper Cook Inlet hatchery mark.

Table 9.–Annual hatchery contribution estimates and 95% confidence intervals for sockeye salmon harvested in the commercial purse seine (PS) fishery in the Southern District of Lower Cook Inlet, 2018–2022.

						Hatchery		Wild	
Year	n[a]	Total harvest	Hatchery area[b]	Est. # (95% CI)	Est. %	Est. total # (95% CI)	Est. total %	Est. total # (95% CI)	Est. total %
2018	1,119	59,129	LCI	40,066 (38,464–41,667)	67.8	40,111 (38,507–41,714)	67.8	19,018 (17,415–20,622)	32.2
			PWS	0 (0–0)	0.0				
			KOD	45 (0–135)	0.1				
			UCI	0 (0–0)	0.0				
2019	1,976	50,652	LCI	23,912 (22,775–25,048)	47.2	23,959 (22,820–25,097)	47.3	26,693 (25,555–27,832)	52.7
			PWS	0 (0–0)	0.0				
			KOD	47 (0–107)	0.1				
			UCI	0 (0–0)	0.0				
2020	1,314	68,851	LCI	40,639 (38,641–42,636)	59.0	40,721 (38,719–42,722)	59.1	28,130 (26,129–30,132)	40.9
			PWS	0 (0–0)	0.0				
			KOD	82 (0–205)	0.1				
			UCI	0 (0–0)	0.0				
2021	1,440	74,969	LCI	51,801 (50,095–53,506)	69.1	52,050 (50,329–53,770)	69.4	22,919 (21,199–24,640)	30.6
			PWS	47 (0–145)	0.1				
			KOD	202 (6–398)	0.3				
			UCI	0 (0.0–0)	0.0				
2022	1,389	82,124	LCI	69,590 (67,941–71,238)	84.7	69,816 (68,146–71,485)	85.0	12,308 (10,639–13,978)	15.0
			PWS	104 (0–286)	0.1				
			KOD	18 (0–55)	0.0				
			UCI	104 (0–286)	0.1				
Total:		335,725				226,657	67.5	109,068	32.5

Note: # = number of fish; Est. = estimated.

[a] n: number of sampled otoliths by strata (i.e., species, harvest type, gear type, and year).

[b] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, UCI = Upper Cook Inlet hatchery mark.

Table 10.–Estimated hatchery contribution by strata to all sampled and unsampled pink salmon commercial harvest in the Southern District of Lower Cook Inlet, 2018–2022.

Year	Harvest type[a]	Gear type[b]	Est. total hatchery contribution (C_H) C_H (#)	C_H (%)	95% CI (+/- %)	Est. SE	Est. lower 95% CI	Est. upper 95% CI	Total harvest
2018	CH	SGN	27,221	48.0	4.1	1,177	24,914	29,527	56,709
2018	CH	PS	247,960	52.2	4.7	11,391	225,633	270,286	475,425
2018	HCR	PS	918,714	92.1	5.3	26,973	865,846	971,581	997,518
2019	CH	SGN	2,460	38.3	6.3	205	2,058	2,861	6,423
2019	CH	PS	5,117	22.2	3.4	400	4,333	5,901	23,005
2019	HCR	PS	NS	NS	NS	NS	NS	NS	179,659[c]
2020	CH	SGN	20,498	58.3	4.1	741	19,045	21,950	35,160
2020	CH	PS	112,081	92.1	2.0	1,226	109,678	114,483	121,739
2020	HCR	PS	NS	NS	NS	NS	NS	NS	795,068[c]
2021	CH	SGN	1,378	39.4	3.7	66	1,248	1,507	3,499
2021	CH	PS	30,833	73.6	3.2	680	29,500	32,165	41,907
2021	HCR	PS	256,784	84.7	5.3	8,197	240,717	272,850	303,169
2022	CH	SGN	3,513	40.0	5.1	230	3,062	3,963	8,782
2022	CH	PS	3,597	62.4	4.5	133	3,336	3,857	5,767
2022	HCR	PS	46,254	92.7	5.2	1,330	43,647	48,860	49,896
Total sum (all types):			1,676,410	78.7	4.9	52,749	1,573,017	1,779,791	2,128,999[c]
CH (excluding HCR) sum:			454,658	58.4	4.1	16,249	422,807	486,500	778,416
HCR sum:			1,221,752	90.5	5.3	36,500	1,150,210	1,293,291	1,350,583[c]
SGN sum:			55,070	49.8	4.3	2,419	50,327	59,808	110,573
PS sum:			399,588	59.8	4.1	13,830	372,480	426,692	667,843

Note: NS = not sampled; Est. = estimated.

[a] Harvest type: CH = Commercial harvest (excluding cost recovery), HCR = Hatchery cost recovery.

[b] Gear type: SGN = Set gillnet, PS = Purse seine.

[c] The total and hatchery cost recovery harvest (HCR) sums do not include the HCR harvest in 2019 (179,659) or 2020 (795,068) because hatchery contribution estimates were not made.

Table 11.–Estimated hatchery contribution by strata and hatchery area to all sampled and unsampled pink salmon commercial harvest in the Southern District of Lower Cook Inlet, 2018–2022.

			Est. hatchery area contribution (C_H) to all harvest										
	Harvest	Gear	C_H-LCI[c]		C_H-PWS[c]		C_H-KOD[c]		C_H-Other[c]		C_H-All marks		
Year	type[a]	type[b]	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. %	Total harvest
2018	CH	SGN	24,839	1,091	2,382	441	0	0	0	0	27,221	48.0	56,709
2018	CH	PS	243,313	11,110	4,647	2,514	0	0	0	0	247,960	52.2	475,425
2018	HCR	PS	918,714	26,973	0	0	0	0	0	0	918,714	92.1	997,518
2019	CH	SGN	1,850	172	610	111	0	0	0	0	2,460	38.3	6,423
2019	CH	PS	5,003	397	114	50	0	0	0	0	5,117	22.2	23,005
2019	HCR	PS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	179,659[d]
2020	CH	SGN	16,982	635	3,481	380	35	45	0	0	20,498	58.3	35,160
2020	CH	PS	110,946	1,137	1,135	458	0	0	0	0	112,081	92.1	121,739
2020	HCR	PS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	795,068[d]
2021	CH	SGN	178	27	1,200	60	0	0	0	0	1,378	39.4	3,500
2021	CH	PS	30,310	659	451	151	72	65	0	0	30,833	73.6	41,907
2021	HCR	PS	255,268	8,041	1,516	1,595	0	0	0	0	256,784	84.7	303,169
2022	CH	SGN	2,415	185	1,098	137	0	0	0	0	3,513	40.0	8,793
2022	CH	PS	3,586	133	11	6	0	0	0	0	3,597	62.3	5,770
2022	HCR	PS	46,254	1,330	0	0	0	0	0	0	46,254	92.7	49,896

	Est. #	Est. %[e]	Est. #	Est. %[e]	Est. #	Est. %[e]	Est. #	Est. %[e]	Est. #	Est.	Total harvest
Total sum (all types):	1,659,658	**99.0**	16,645	**1.0**	107	**0.0**	0	**0.0**	1,676,410	78.7	2,129,014[d]
CH (excl. HCR) sum:	439,422	**96.6**	15,129	**3.3**	107	**0.0**	0	**0.0**	454,658	58.4	778,431
HCR sum:	1,220,236	**99.9**	1,516	**0.1**	0	**0.0**	0	**0.0**	1,221,752	90.5	1,350,583[d]
SGN sum:	46,264	**84.0**	8,771	**15.9**	35	**0.1**	0	**0.0**	55,070	49.8	110,585
PS sum:	393,158	**98.4**	6,358	**1.6**	72	**0.0**	0	**0.0**	399,588	59.8	667,846

Note: NS = not sampled; # = number; Est. = estimated.

[a] Harvest type: CH = Commercial harvest (excluding cost recovery), HCR = Hatchery cost recovery.

[b] Gear type: SGN = Set gillnet, PS = Purse seine.

[c] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, Other = all other management area hatchery marks.

[d] The total and hatchery cost recovery harvest (HCR) sums do not include HCR harvest in 2019 (179,659) or 2020 (795,068) because hatchery contribution estimates were not made.

[e] Hatchery area proportions associated with total and harvest or gear type sums (**in bold**) are relative to the total number of marked fish, not total harvest. Total marked proportions are relative to the total harvest

Table 12.–Annual hatchery contribution estimates and 95% confidence intervals for pink salmon harvested in the commercial set gillnet (SGN) fishery in the Southern District of Lower Cook Inlet, 2018–2022.

						Hatchery		Wild	
Year	n[a]	Total harvest	Hatchery area[b]	Est. # (95% CI)	Est. %	Est. total # (95% CI)	Est. total %	Est. total # (95% CI)	Est. total %
2018	665	56,709	LCI	24,839 (22,700–26,977)	43.8	27,221 (24,914–29,527)	48.0	29,488 (27,199–31,813)	52.0
			PWS	2,382 (1,517–3,246)	4.2				
			KOD	0 (0–0)	0.0				
			Other	0 (0–0)	0.0				
2019	285	6,423	LCI	1,850 (1,512–2,187)	28.8	2,460 (2,058–2,861)	38.3	3,963 (3,562–4,365)	61.7
			PWS	610 (392–827)	9.5				
			KOD	0 (0–0)	0.0				
			Other	0 (0–0)	0.0				
2020	766	35,160	LCI	16,982 (15,737–18,226)	48.3	20,498 (19,045–21,950)	58.3	14,662 (13,210–16,115)	41.7
			PWS	3,481 (2,736–4,225)	9.9				
			KOD	35 (0–123)	0.1				
			Other	0 (0–0)	0.0				
2021	762	3,499	LCI	178 (125–230)	5.1	1,378 (1,248–1,507)	39.4	2,121 (1,992–2,251)	60.6
			PWS	1,200 (1,082–1,317)	34.3				
			KOD	0 (0–0)	0.0				
			Other	0 (0–0)	0.0				
2022	448	8,782	LCI	2,415 (2,0529–2,777)	27.5	3,513 (3,062–3,963)	40.0	5,269 (4,819–5,720)	60.0
			PWS	1,098 (829–1,366)	12.5				
			KOD	0 (0–0)	0.0				
			Other	0 (0–0)	0.0				
Total:		110,573				55,070	49.8		

Note: # = number of fish; Est. = estimated.

[a] n: number of sampled otoliths by strata (i.e., species, harvest type, gear type, and year).

[b] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, Other = all other management area hatchery marks.

Table 13.–Annual hatchery contribution estimates and 95% confidence intervals for pink salmon harvested in the commercial purse seine (PS) fishery in the Southern District of Lower Cook Inlet, 2018–2022.

						Hatchery		Wild	
Year	n[a]	Total harvest	Hatchery area[b]	Est. # (95% CI)	Est. %	Est. total # (95% CI)	Est. total %	Est. total # (95% CI)	Est. total %
2018	1,709	475,425	LCI	243,313 (221,537–265,088)	51.2	247,960 (225,633–270,286)	52.2	227,465 (205,139–249,792)	47.8
			PWS	4,647 (0–9,574)	1.0				
			KOD	0 (0–0)	0.0				
			Other	0 (0–0)	0.0				
2019	615	23,005	LCI	5,003 (4,224–5,781)	21.7	5,117 (4,333–5,901)	22.2	17,888 (17,104–18,672)	77.8
			PWS	114 (16–212)	0.5				
			KOD	0 (0–0)	0.0				
			Other	0 (0–0)	0.0				
2020	1,028	121,739	LCI	110,946 (108,717–113,174)	91.1	112,081 (109,678–114,483)	92.1	9,658 (7,256–12,061)	7.9
			PWS	1,135 (237–2,032)	0.9				
			KOD	0 (0–0)	0.0				
			Other	0 (0–0)	0.0				
2021	816	41,907	LCI	30,310 (29,018–31,601)	72.3	30,833 (29,500–32,165)	73.6	11,074 (9,742–12,407)	26.4
			PWS	451 (155–746)	1.0				
			KOD	72 (0–199)	0.2				
			Other	0 (0–0)	0.0				
2022	206	5,767	LCI	3,586 (3,325–3,846)	62.2	3,597 (3,336–3,857)	62.4	2,170 (1,910–2,431)	37.6
			PWS	11 (0–22)	0.2				
			KOD	0 (0–0)	0.0				
			Other	0 (0–0)	0.0				
Total:		667,843				399,588	59.8		

Note: # = number of fish; Est. = estimated.

[a] n: number of sampled otoliths by strata (i.e., species, harvest type, gear type, and year).

[b] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, Other = all other management area hatchery marks.

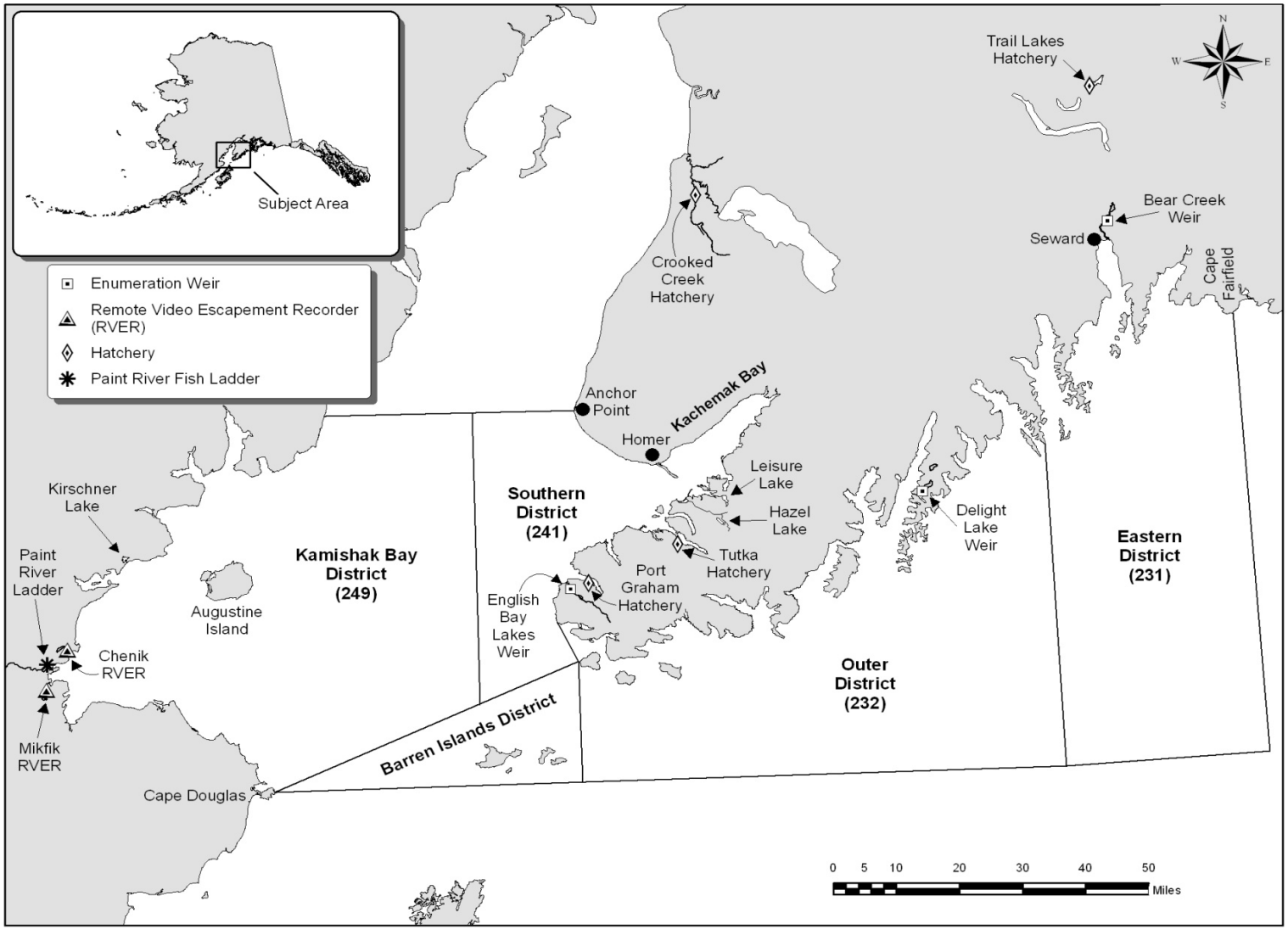

Figure 1.–Lower Cook Inlet management area showing commercial fishing districts, salmon hatcheries, weir and fish ladder locations, and remote video salmon monitoring sites.

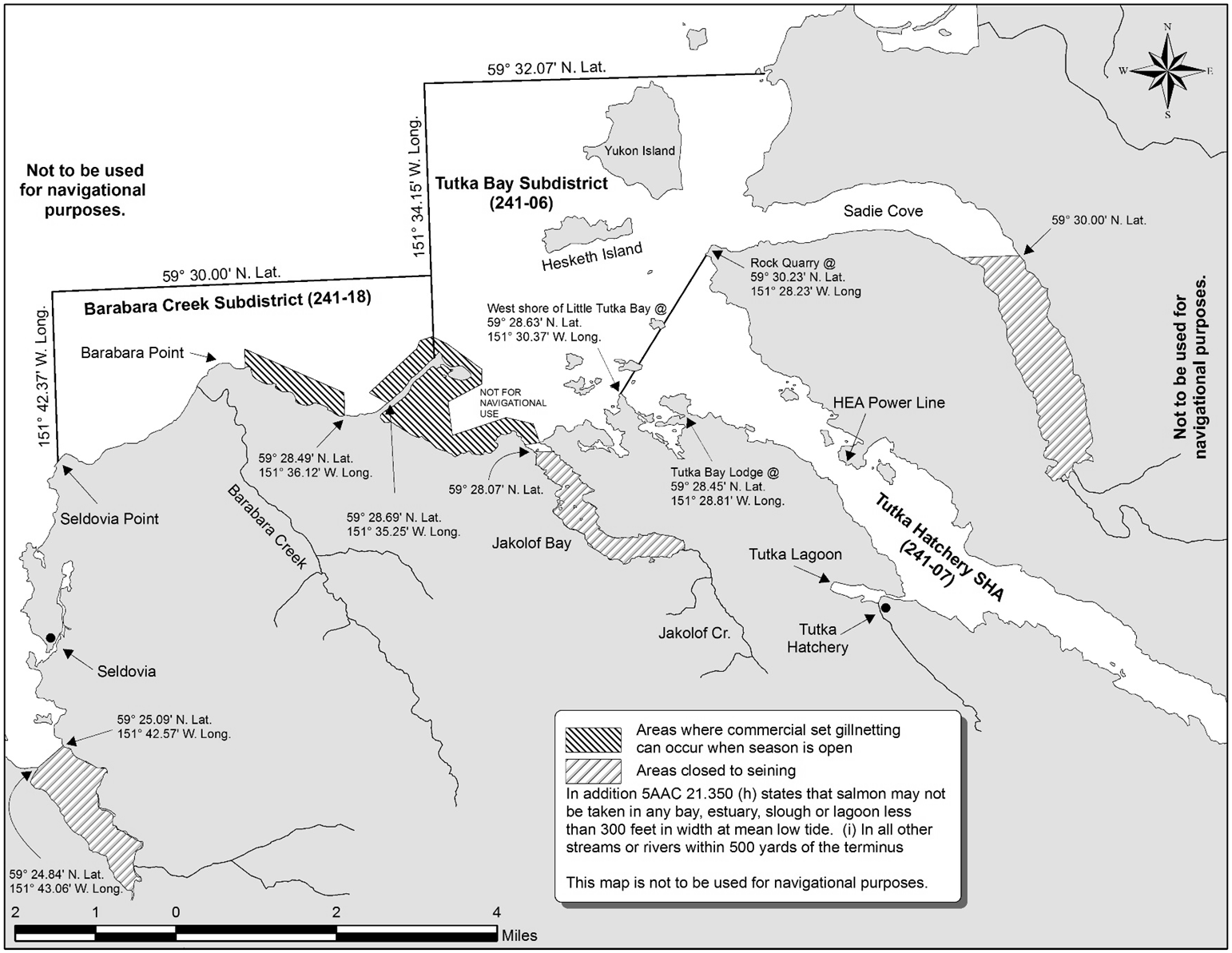

Figure 2.–Lower Cook Inlet management area, Southern District, Tutka Bay Lagoon Hatchery, and special harvest area (SHA).

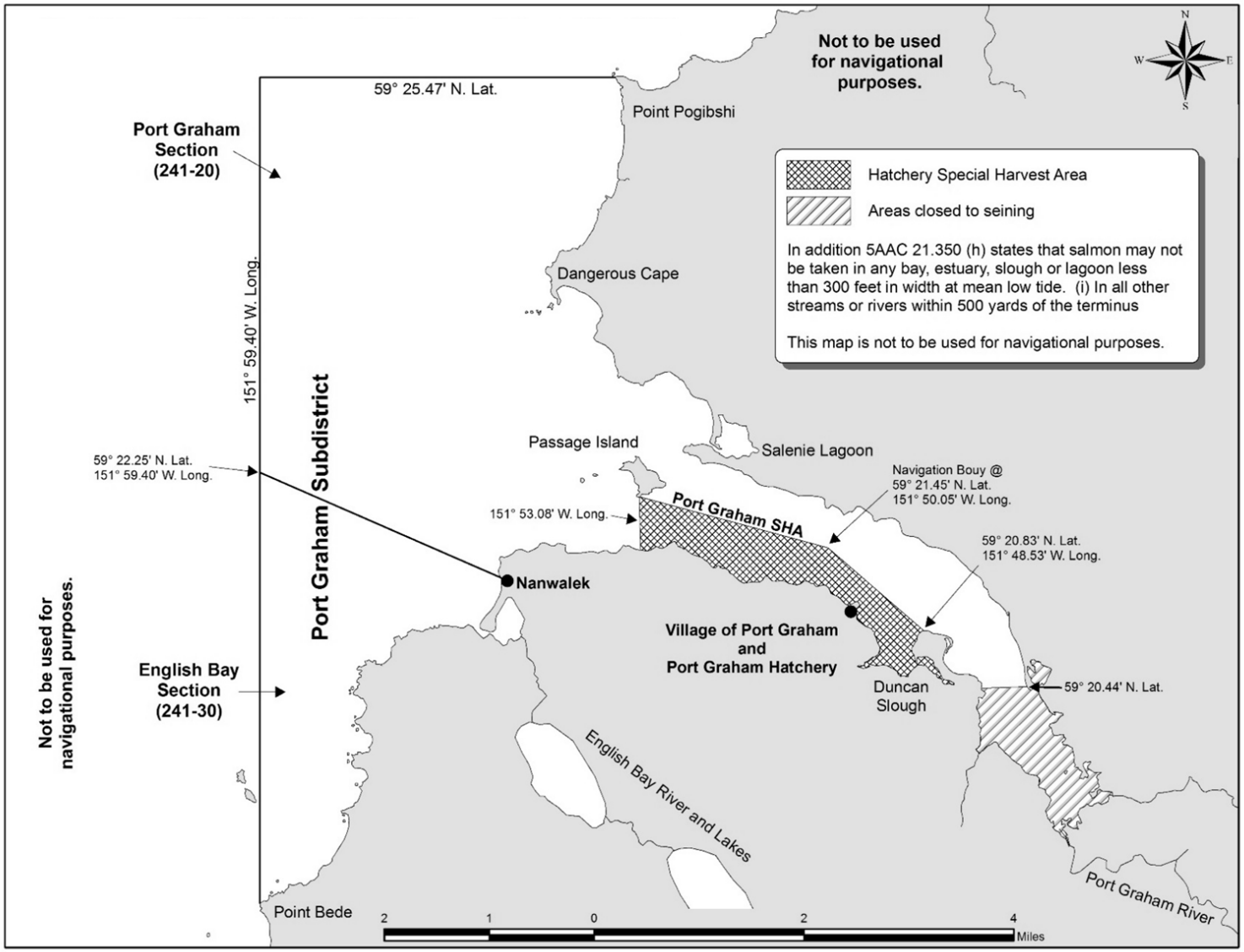

Figure 3.–Lower Cook Inlet management area, Southern District, Port Graham Hatchery, and special harvest area (SHA).

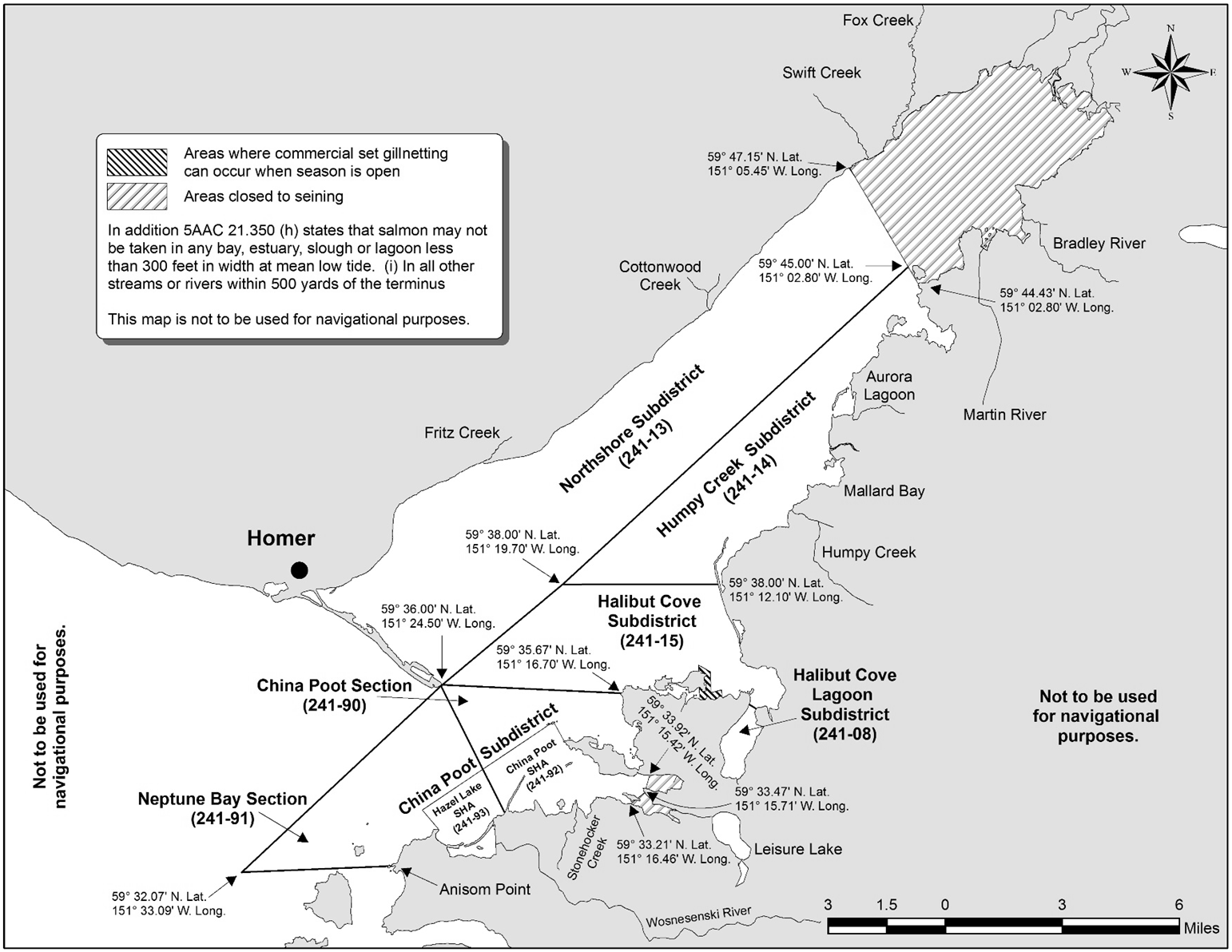

Figure 4.–Lower Cook Inlet management area, Southern District, Anisom Point east to Humpy Creek.

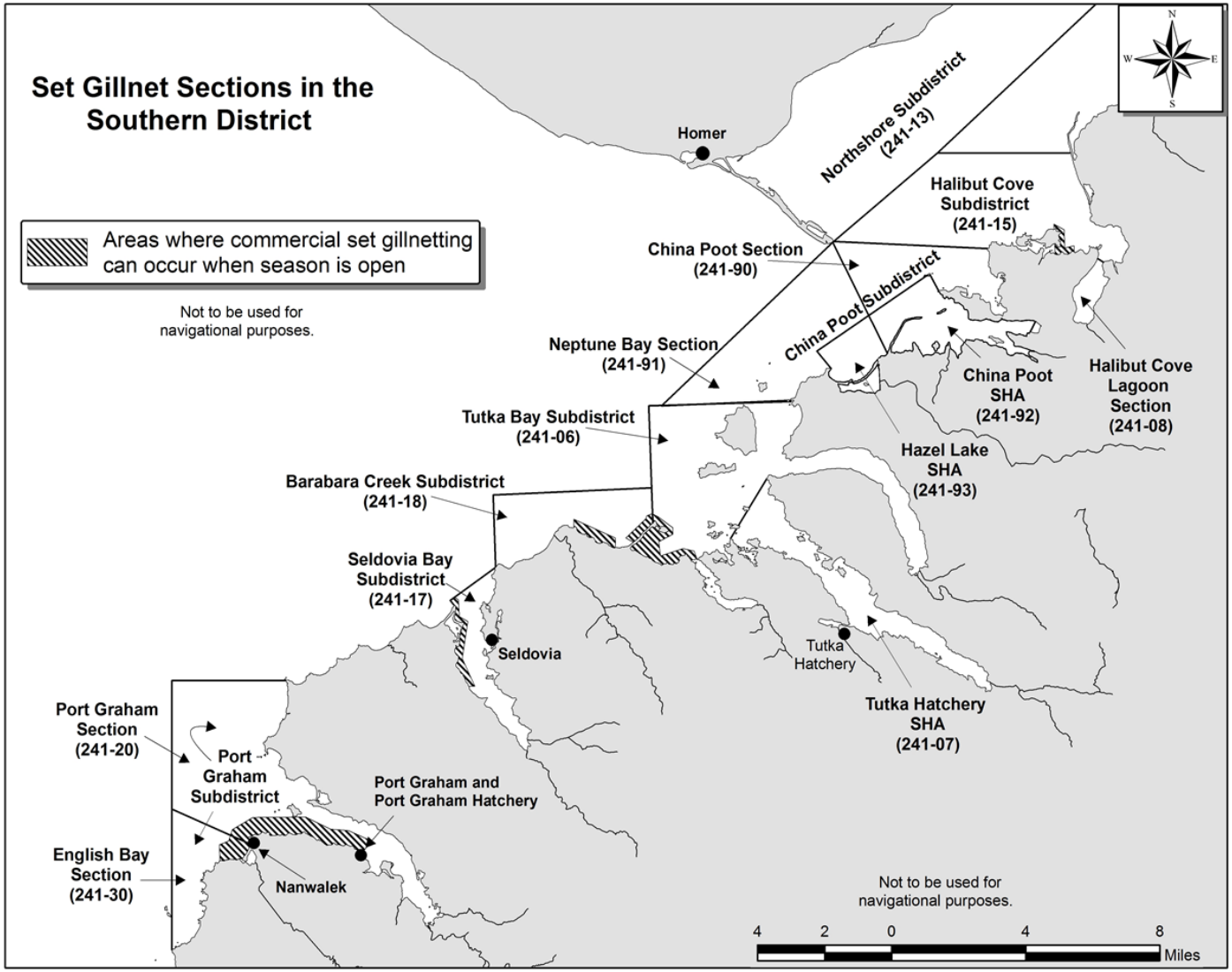

Figure 5.–Areas where commercial set gillnet fishing is allowed in the Southern District of the Lower Cook Inlet Management Area.

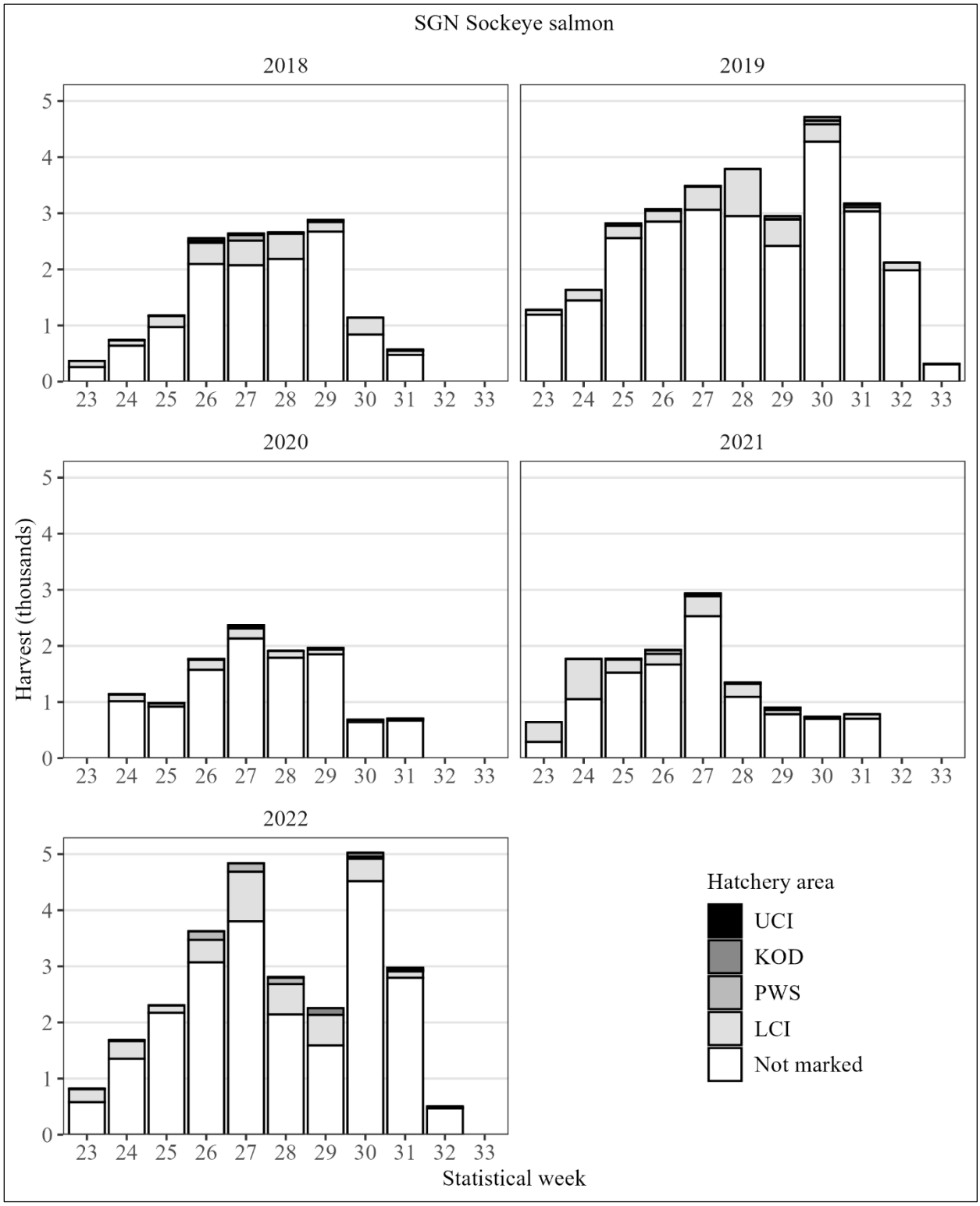

Figure 6.–Sockeye salmon wild (not marked) and hatchery (all others) stock contributions to the Southern District set gillnet (SGN) commercial harvest by statistical week, 2018–2022.

Note: Not marked = Wild stock, LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, UCI = Upper Cook Inlet hatchery mark.

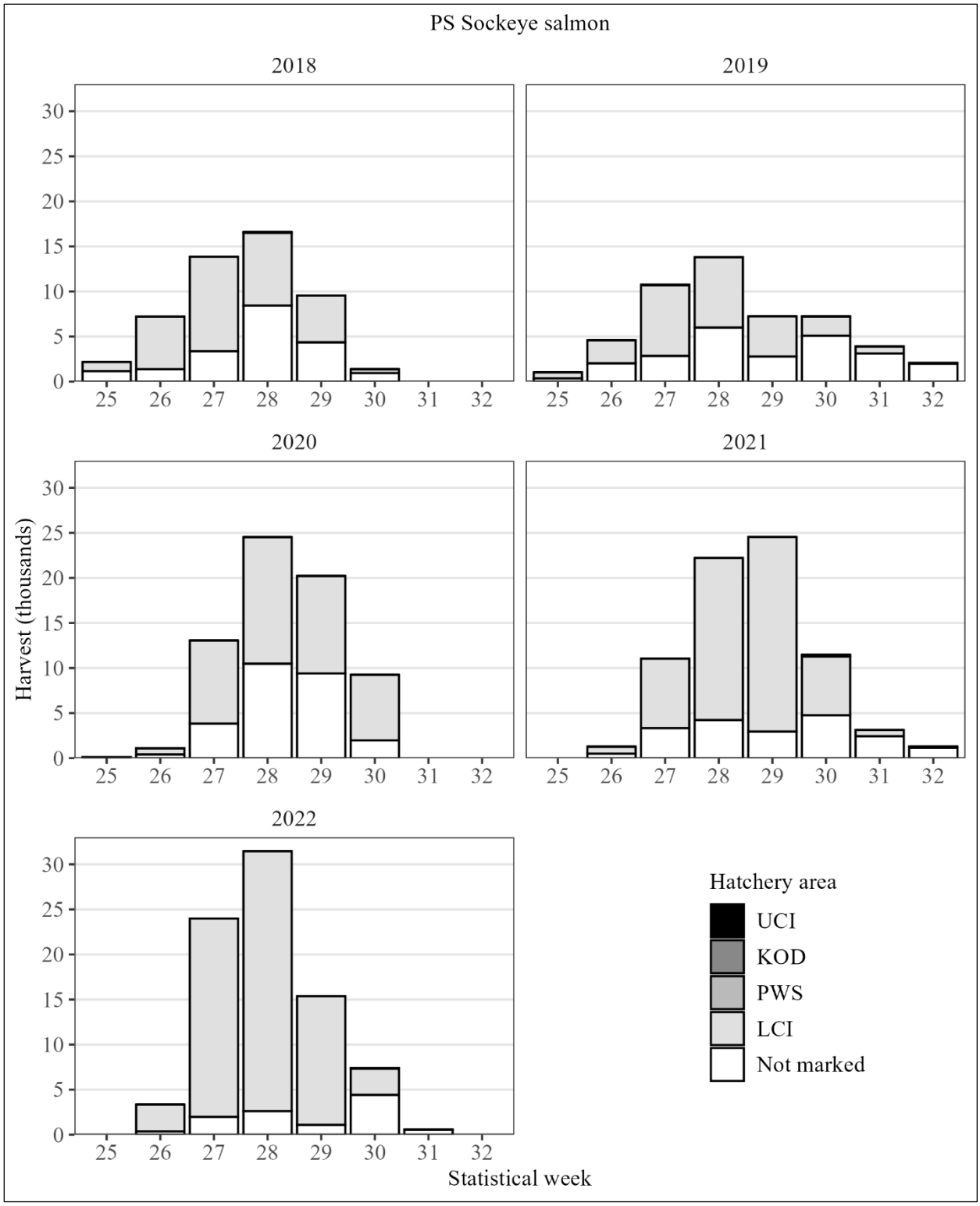

Figure 7.–Sockeye salmon wild (not marked) and hatchery (all others) stock contributions to the Southern District purse seine (PS) commercial harvest by statistical week, 2018–2022.

Note: Not marked = Wild stock, LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, UCI = Upper Cook Inlet hatchery mark.

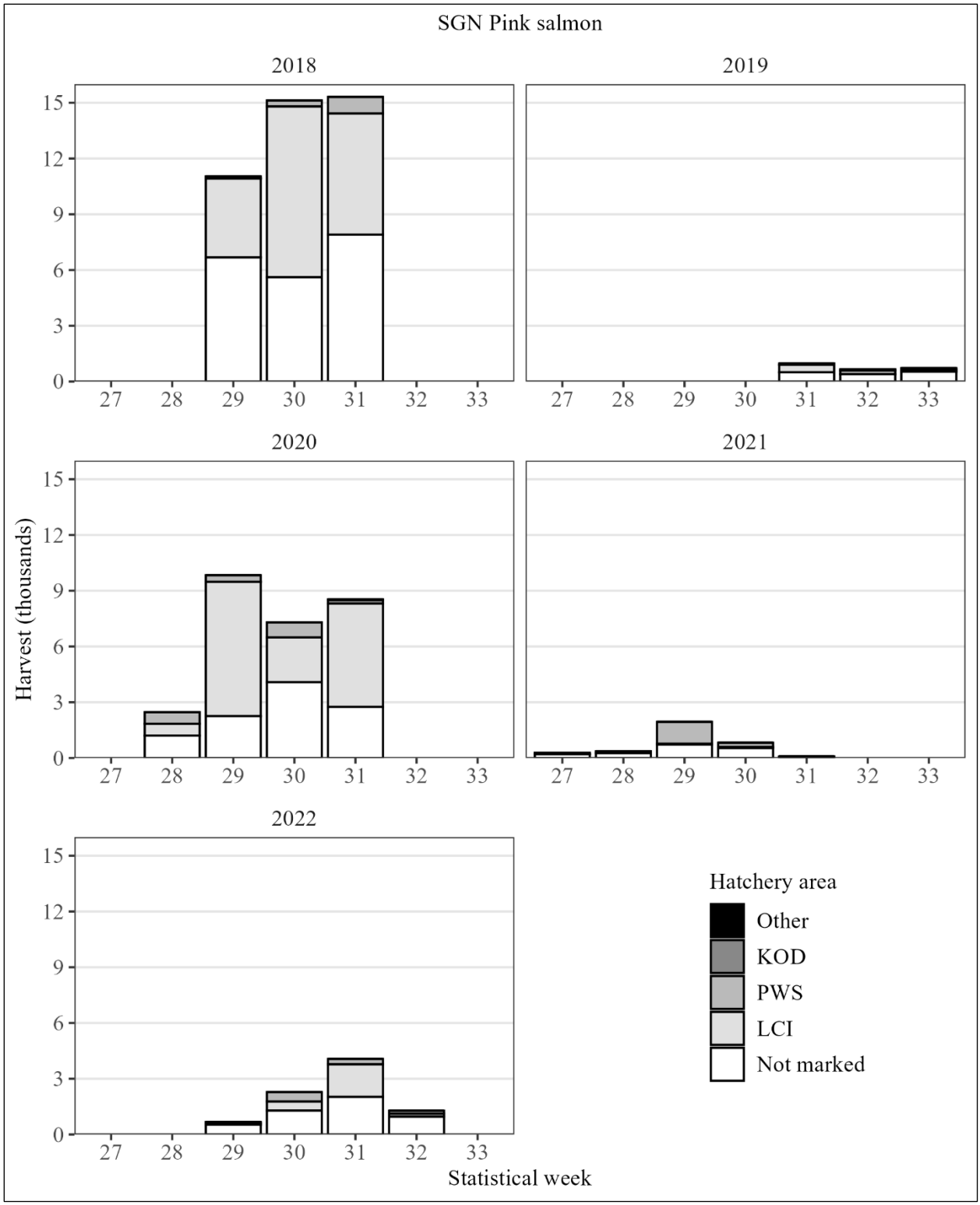

Figure 8.–Pink salmon wild (not marked) and hatchery (all others) stock contributions to the Southern District set gillnet (SGN) commercial harvest by statistical week, 2018–2022.

Note: Not Marked = Wild stock, LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, Other = all other management area hatchery marks.

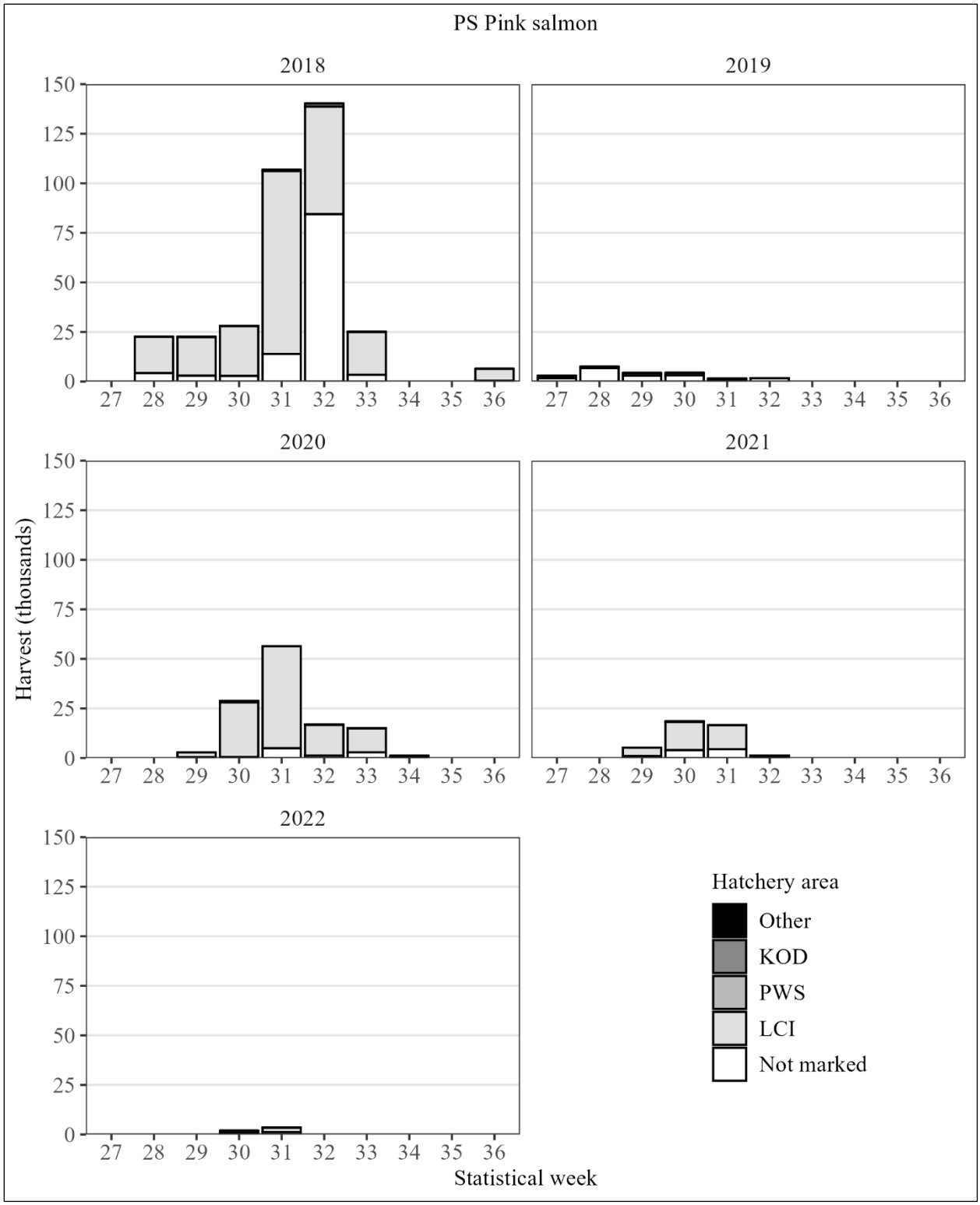

Figure 9.–Pink salmon wild (not marked) and hatchery (all others) stock contributions to the Southern District set purse seine (PS) commercial harvest by statistical week, 2018–2022.

Note: Not Marked = Wild stock, LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, Other = all other management area hatchery marks.

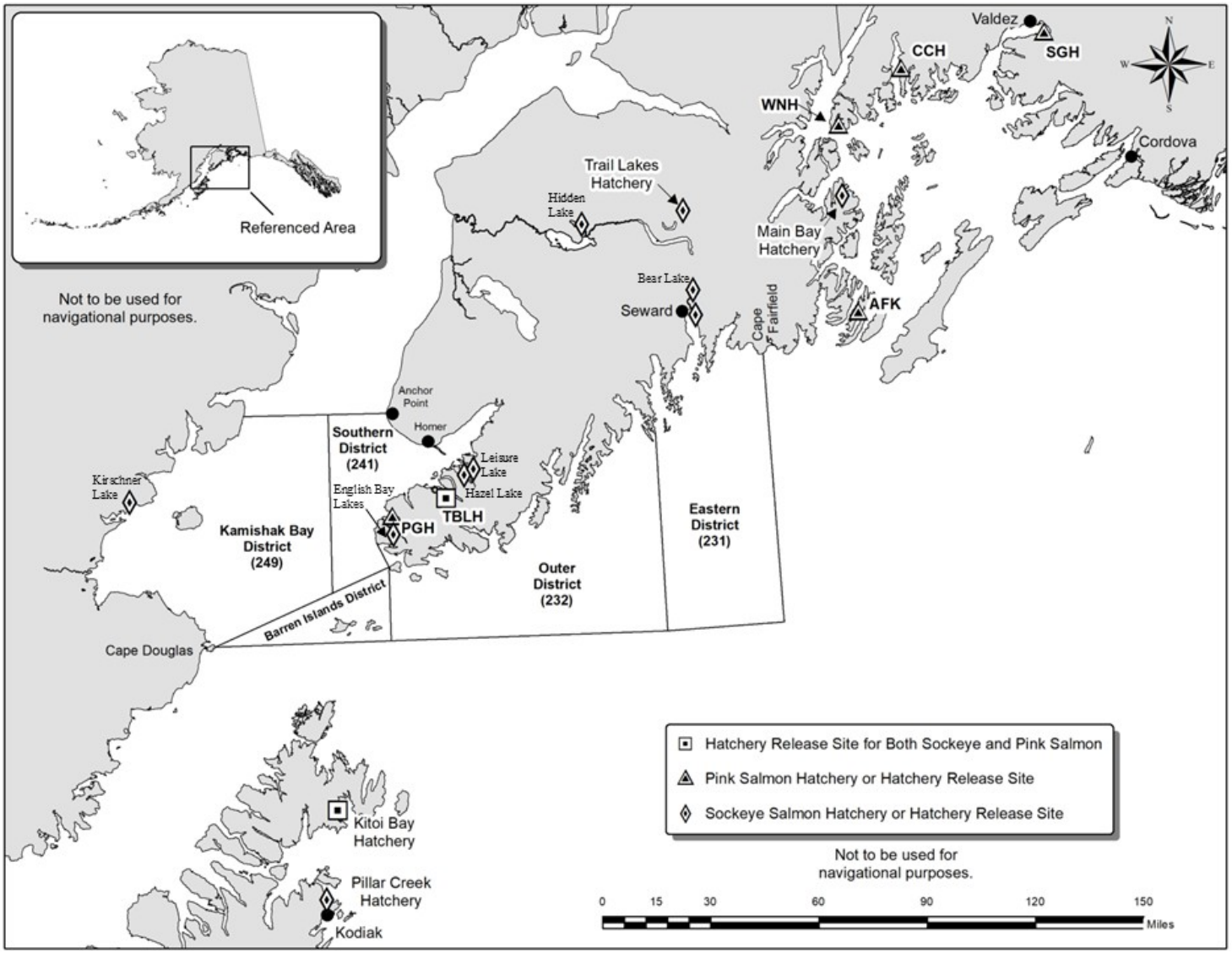

Figure 10.–Map of the North Gulf of Alaska illustrating relative distances between fisheries sampled in the Southern District of Lower Cook Inlet (LCI) and hatcheries located in LCI, Prince William Sound (PWS), and Kodiak/Afognak Islands where hatchery fish originated.

APPENDIX A: LOWER COOK INLET HATCHERY PRODUCTION AND RETURNS

Appendix A1.–Trail Lakes Hatchery salmon releases, 1983–2022.

Year released	Chinook	Sockeye	Coho	Chum
1983	–	2,310,751	1,039,673	–
1984	406,755	1,236,864	1,283,815	–
1985	398,586	1,805,792	1,538,361	455,809
1986	217,648	516,000	1,530,116	–
1987	268,399	3,718,311	1,702,446	–
1988	98,429	9,074,486	945,999	–
1989	–	5,690,000	1,337,340	–
1990	–	7,679,698	840,585	–
1991	–	6,345,252[a]	390,841	–
1992	–	7,575,637[a]	255,533	–
1993	–	7,979,820[a]	620,588	–
1994	–	6,640,000[a]	320,000	–
1995	–	6,339,485[a]	516,400	–
1996	–	4,110,638[a]	75,000	–
1997	–	10,857,470[a]	601,700	–
1998	–	7,653,000[a]	409,000	–
1999	–	9,923,500[a]	357,000	–
2000	–	12,521,000[a]	418,000[a]	–
2001	–	1,140,000[a]	432,000[a]	–
2002	–	18,907,200[a]	528,500[a]	–
2003	–	16,128,000[a]	761,000[a]	–
2004	–	17,272,000[a]	996,000[a]	–
2005	–	9,959,000[a]	988,000[a]	–
2006	–	5,785,000[a]	1,146,000[a]	–
2007	–	12,668,800[a]	956,000[a]	–
2008	–	13,203,000[a]	685,000[a]	–
2009	–	7,953,000[a]	382,000[a]	–
2010	–	8,616,000[a]	435,000[a]	–
2011	–	9,324,200[a]	437,000[a]	–
2012	–	7,636,300[a]	315,000[a]	–
2013	–	7,482,000[a]	405,000[a]	–
2014	–	9,368,500[a]	523,000[a]	–
2015	–	8,302,700[a]	546,000[a]	–
2016	–	6,001,790[a]	546,600[a]	–
2017	–	7,207,000[a]	180,000[a]	–
2018	–	8,883,000[a]	536,000[a]	–
2019	–	8,562,230[a]	514,000[a]	–
2020	–	4,642,556[a]	497,699[a]	–
2021	–	6,626,215[a]	503,283[a]	–
2022	–	8,055,281[a]	480,180[a]	–

Source: Unpublished historical hatchery annual management plans.

Note: En dash (–) indicates no release that year.

[a] Thermal marked otoliths.

Appendix A2.–Historical releases of sockeye salmon from hatcheries to Lower Cook Inlet, 1925–2022.

	Southern District (241)						Outer (232)	Kamishak District (249)					Eastern District (231)		
Year	Leisure Lake	Hazel Lake	Halibut Cove Lagoon	Tutka Bay Lagoon	English Bay Lakes	Pt Graham Subdist.	Port Dick Lake	Chenik Lake	Paint River Lakes	Kirschner Lake	Bruin Lake	Ursus Lake	Bear Lake	Resurrection Bay	Grouse Lake
1925	–	–	–	–	–	–	–	–	–	–	–	–	–	–	846,360
1926[a]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4,085,727
1976	1,085	–	7,777	–	–	–	–	–	–	–	–	–	–	–	–
1977	91,347	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1978	83,422	–	–	–	–	–	–	98,082	–	–	–	–	–	–	–
1979	–	–	–	–	–	–	–	256,525	–	–	–	–	–	–	–
1980	532,650	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1981	1,094,713	–	–	–	–	–	–	1,096,718	–	–	–	–	–	–	–
1982	1,527,876	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1983	2,113,239	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1984	2,110,000	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1985	2,018,000	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1986	2,250,303	–	–	–	–	–	–	839,000	820,026	–	–	–	–	–	–
1987	2,022,000	–	–	–	–	–	–	1,005,000	–	866,700	–	–	–	–	–
1988	2,100,000	783,000	–	–	–	–	221,700	2,601,000	2,207,300	521,000	–	–	–	–	–
1989	2,000,000	1,000,000	–	–	–	–	430,000	3,500,000	2,000,000	250,000	–	–	–	–	–
1990	2,000,000	1,500,000	–	–	855,347		–	3,250,000	2,000,000	250,000	–	–	2,577,962	–	–
1991	2,000,000	1,300,000	–	–	255,071	84,757	–	2,100,000	750,000	250,000	250,000		1,604,922	–	–
1992	2,000,000	1,000,000	–	–	290,298	144,982	–	2,750,000	750,000	250,000	250,000	250,000	1,482,489	–	–
1993	2,000,000	1,000,000	–	–	755,692	–	–	1,400,000	750,000	250,000	250,000	250,000	1,810,261	–	–
1994	–	–	–	–	820,174	9,985	–	–	–	208,000	–	–	170,000	–	570,000
1995	1,632,000	1,061,000	–	–	–	–	–	1,129,000	588,000	251,000	251,000	252,000	330,000	–	993,000
1996	1,490,000	1,030,000	–	75,000	292,134	–	–	951,000	500,000	250,000	250,000	250,000	780,638	–	217,605
1997	2,000,000	1,000,000	–	245,000	199,000	–	–	–	–	250,000	–	–	788,000	–	2,428,000

-continued-

Appendix A2.–Page 2 of 2.

	Southern District (241)						Outer (232)	Kamishak District (249)					Eastern District (231)		
Year	Leisure Lake	Hazel Lake	Halibut Cove Lagoon	Tutka Bay Lagoon	English Bay Lakes	Pt Graham Subdist.	Port Dick Lake	Chenik Lake	Paint River Lakes	Kirschner Lake	Bruin Lake	Ursus Lake	Bear Lake	Resurrection Bay	Grouse Lake
1998	1,877,000	1,218,000	–	–	–	–	–	–	–	234,000	–	–	772,000	–	1,514,000
1999	265,400	453,100	–	100,000	918,348	–	–	–	–	172,700	–	–	1,380,000	–	–
2000	1,708,000	1,248,000	–	–	906,057	–	–	–	–	249,000	–	–	1,796,000	–	–
2001	89,000	–	–	–	–	–	–	–	–	–	–	–	145,000	–	–
2002	2,246,200	1,280,100	–						507,700	301,500			3,210,300		
2003	2,240,000	1,547,000			694,647					298,000			1,801,000		
2004	2,002,000	351,000	–	–	50,096	109,520	–	–	–	251,000	–	–	3,012,000	–	–
2005	2,252,000	1,558,000	–	96,000	203,000	–	–	–	–	316,000	–	–	3,422,000	–	–
2006	680,000	–	–	260,000	–	422,060	–	–	–	–	–	–	3,393,000	–	–
2007	2,315,000	1,411,000	–	143,800	–	–	–	–	–	254,000	–	–	3,056,000	–	–
2008	2,053,000	1,161,000	–	483,000	246,000	–	–	–	–	300,000	–	–	2,400,000	1,600,000	–
2009	1,225,000	1,186,000	–	301,000	–	112,000	–	–	–	–	–	–	2,543,000	1,675,000	–
2010	1,933,000	1,218,000	–	278,000	202,000	–	–	–	–	255,000	–	–	2,200,000	1,650,000	–
2011	1,415,000	1,244,000	–	281,900	203,300	–	–	–	–	160,000	–	–	2,488,000	–	–
2012	2,074,000	1,240,000	–	371,300	213,000	–	–	–	–	300,000	–	–	2,490,000	1,305,000	–
2013	1,800,000	1,450,000	–	511,000	211,000	102,000	–	–	–	–	–	–	2,548,000	2,090,000	–
2014	1,353,000	1,223,000	–	599,500	209,000	–	–	–	–	217,000	–	–	2,405,000	1,742,000	–
2015	1,051,000	621,000	–	523,500	200,200	–	–	–	–	237,000	–	–	2,415,000	1,758,000	–
2016	–	–	–	531,625	–	–	–	–	–	185,000	–	–	2,374,000	1,680,165	–
2017	1,387,000	834,000	–	356,000	–	86,000	–	–	–	260,000	–	–	2,468,000	1,816,000	–
2018	1,948,000	813,000	–	518,000	–	–	–	–	–	244,000	–	–	2,555,000	1,488,000	–
2019	1,085,000	1,293,000	–	427,000	–	–	–	–	–	258,000	–	–	2,427,000	1,510,000	–
2020	274,443	266,448	–	363,072	–	–	–	–	–	271,858	–	–	2,446,353	–	–
2021	1,070,851	240,960	–	375,626	–	–	–	–	–	239,742	–	–	2,543,927	1,466,109	–
2022	1,735,350	1,073,596	–	452,172	–	–	–	–	–	250,000	–	–	2,115,385	1,393,778	–

Source: Unpublished historical hatchery annual management plans.

Note: En dash (–) indicates no release that year.

[a] Grouse Lake Hatchery burned March 9, 1927.

Appendix A3.–Tutka Bay Lagoon Hatchery salmon releases, 1977–2022.

Year released	Sockeye	Pink	Chum
1977	91,347	318,280	–
1978	400,000	4,820,937	–
1979	–	9,243,717	732,000
1980	–	6,795,244	5,872
1981	–	10,268,753	7,992
1982	–	15,475,435	15,440
1983	–	15,232,750	1,117,745
1984	–	18,142,463	140,500
1985	–	23,537,000	9,777
1986	–	26,234,600	18,000
1987	–	8,240,700	445,700
1988	–	15,589,360	3,211,200
1989	–	36,977,190	2,164,393
1990	355,347	36,684,662	1,508,557
1991	–	30,000,000	–
1992	–	31,950,000	–
1993	–	48,700,000	–
1994	–	61,100,000	–
1995	–	63,000,000	–
1996	75,000	105,000,000	–
1997	245,000	89,000,000	–
1998	–	90,000,000	–
1999	100,000	60,132,000	–
2000	–	65,120,870	–
2001	–	99,336,410	–
2002	–	99,371,000	–
2003	–	67,967,000	–
2004	–	47,964,360	–
2005	–[a]	–	–
2006	–[a]	–	–
2007	–[a]	–	–
2008	–[a]	–	–
2009	–[a]	–	–
2010	–[a]	–	–
2011	–[a]	–	–
2012	–[a]	11,246,399	–
2013	–	18,603,000[b]	–
2014	–	51,298,000[b]	–
2015	–	12,274,240[b]	–
2016	–	11,433,515[b]	–
2017	–	54,245,411[b]	–
2018	–	50,040,000[b]	–
2019	–	85,580,538[b]	–
2020	–	27,684,949[c]	–
2021	–	71,907,183[c]	–
2022	–	55,092,122[c]	–

Source: Unpublished historical hatchery annual management plans.

Note: En dash (–) indicates no release that year.

[a] Sockeye salmon fry reared and thermally marked at Trail Lakes Hatchery (TLH), remote released as smolt at Tutka Bay Lagoon. These TLH releases are included in Appendix A1.

[b] Thermal marked otoliths.

[c] Thermal and/or dry marked otoliths.

Appendix A4.–Port Graham Hatchery salmon releases, 1991–2022.

Year released	Sockeye	Coho	Pink
1991	84,757	–	255,000
1992	144,982	–	1,810,487
1993	194,700	–	
1994	830,159	–	1,295,000
1995	–	–	358,000
1996	292,134	–	6,469,975
1997	199,000	29,963	918,000
1998	–	–	–
1999	918,348	–	4,617,362
2000	906,057	–	1,142,726
2001	–	–	27,298,797
2002	–	–	6,600,985
2003	694,647	–	57,200,000
2004	159,616	–	36,282,671
2005	203,000	–	26,567,983
2006	422,060	–	13,883,682
2007	–	–	13,282,049
2008	–	–	–
2009	–[a]	–	–
2010	–	–	–
2011	–	–	–
2012	–	–	–
2013	–[a]	–	–[b,c]
2014	–	–	–[b,c]
2015	–	–	2,200,060[b]
2016	–	–	1,310,762[b]
2017	–[a]	–	6,059,800[b]
2018	–	–	21,155,000[b]
2019	–	–	10,144,850[b]
2020	–	–	5,948,143[b]
2021	–	–	22,382,661[b]
2022	–	–	1,973,319[b]

Source: Unpublished historical hatchery annual management plans.

Note: En dash (–) indicates no release that year.

[a] Remote releases from Trail Lakes Hatchery; see Appendix A1.

[b] Thermal marked otoliths.

[c] Remote releases from Tutka Bay Lagoon Hatchery; see Appendix A3.

Appendix A5.–Historical releases of pink salmon from hatcheries to Cook Inlet, 1975–2022.

	Southern District (241)					Eastern District (231)	Kamishak Bay District (249)	Upper Cook Inlet (247-50, 247-60)		Total pink salmon released
Year	Tutka Bay	Halibut Cove Lagoon	Halibut Cove bight	Homer Spit	Port Graham Subdistrict	Resurrection Bay	Paint River	Eklutna River	Ingram Creek	
1975	–	50,916	–	–	–	–	–	–	–	50,916
1976	–	–	–	–	–	–	–	–	–	–
1977	–	318,280	–	–	–	–	–	–	–	318,280
1978	4,820,937	–	–	–	–	–	–	–	–	4,820,937
1979	9,243,717	–	–	–	–	–	–	–	–	9,243,717
1980	6,245,103	–	–	–	–	–	550,141	–	–	6,795,244
1981	9,759,144	–	–	–	–	–	509,609	–	–	10,268,753
1982	15,070,927	–	–	–	–	–	404,508	–	–	15,475,435
1983	14,730,794	–	–	–	–	–	501,956	–	–	15,232,750
1984	18,142,463	–	–	–	–	–	–	–	–	18,142,463
1985	23,537,000	–	–	–	–	–	–	281,500	–	23,818,500
1986	22,228,600	4,006,000	–	–	–	–	–	30,576	–	26,265,176
1987	4,385,600	3,001,400	–	594,500	–	–	–	38,267	259,200	8,278,967
1988	12,003,878	3,022,491	–	310,016	–	–	–	–	252,975	15,589,360
1989	30,091,053	6,229,062	–	331,695	–	–	–	–	325,380	36,977,190
1990	23,689,702	6,000,000	–	603,845	–	–	–	–	311,101	36,974,370
1991	23,657,112	6,039,062	–	303,826	255,000	–	–	–	–	30,602,576
1992	25,700,000	5,950,000	–	300,000	1,810,487	–	–	–	–	33,760,487
1993	48,700,000	–	–	–	–	–	–	–	–	48,700,000
1994	61,100,000	–	–	–	1,295,000	–	–	–	–	62,395,000
1995	63,000,000	–	–	–	358,000	–	–	–	–	63,358,000
1996	105,000,000	–	–	–	6,469,975	–	–	–	–	111,469,975

-continued-

Appendix A5.–Page 2 of 2.

Year	Southern District (241)					Eastern District (231)	Kamishak Bay District (249)	Upper Cook Inlet (247-50, 247-60)		Total pink salmon released
	Tutka Bay	Halibut Cove Lagoon	Halibut Cove bight	Homer Spit	Port Graham Subdistrict	Resurrection Bay	Paint River	Eklutna River	Ingram Creek	
1997	89,000,000	–	–	–	918,000	–	–	–	–	89,918,000
1998	90,000,000	–	–	–	–	–	–	–	–	90,000,000
1999	60,132,000	–	–	–	4,617,362	48,329	–	–	–	64,797,691
2000	65,120,870	–	–	–	1,142,726	24,216	–	–	–	66,287,812
2001	99,336,410	–	–	–	27,298,797	–	–	–	–	126,635,207
2002	99,371,000	–	–	–	6,600,985	–	–	–	–	105,971,985
2003	67,967,000	–	–	–	57,200,000	–	–	–	–	125,167,000
2004	47,964,360	–	–	–	36,282,671	–	–	–	–	84,247,031
2005	–	–	–	–	26,567,983	–	–	–	–	26,567,983
2006	–	–	–	–	13,883,682	–	–	–	–	13,883,682
2007	–	–	–	–	13,282,049	–	–	–	–	13,282,049
2008	–	–	–	–	–	–	–	–	–	–
2009	–	–	–	–	–	–	–	–	–	–
2010	–	–	–	–	–	–	–	–	–	–
2011	–	–	–	–	–	–	–	–	–	–
2012	8,100,399	–	3,146,000	–	–	–	–	–	–	11,246,399
2013	4,353,000	–	–	–	14,250,000	–	–	–	–	18,603,000
2014	51,110,000	–	–	–	188,000	–	–	–	–	51,298,000
2015	11,249,240	–	–	–	2,200,060	–	1,025,000	–	–	14,474,300
2016	11,433,515	–	–	–	1,310,762	–	–	–	–	12,744,277
2017	54,245,411	–	–	–	6,059,800	–	–	–	–	60,305,211
2018	50,040,000	–	–	–	20,850,000	–	305,000	–	–	71,195,000
2019	85,580,538	–	–	–	10,144,850	–	–	–	–	95,725,388
2020	27,684,949	–	–	–	5,948,143	–	–	–	–	33,633,092
2021	71,907,183	–	–	–	22,382,661	–	–	–	–	94,289,844
2022	55,092,122	–	–	–	1,973,319	–	–	–	–	57,065,441

Source: Unpublished historical hatchery annual management plans.

Note: En dash (–) indicates no release that year.

APPENDIX B: OTOLITH MARK RECOVERY RESULTS-SOCKEYE SALMON

Appendix B1.–Sockeye salmon hatchery marks identified in LCI commercial harvests, their estimated total contribution to the harvest (2018–2022), and hatchery release details pertaining to each Mark ID.

Area[a]	Facility[b]	Mark	Mark ID	Brood stock	Est. total harvest[c]	Year		Total release	Release site(s)
						Brood	Release		
LCI	TLH	2,4H	BRADLEYPONDS15	TUTKA LAGOON	174	2015	2017	86,000	PORT GRAHAM 241-20
LCI	TLH	2,3,2H	ENGLISHBAY12SMOLT	ENGLISH BAY LK	0	2012	2014	359,000	TUTKA BAY 241-16
LCI	TLH	5H	ENGLISHBAY13	ENGLISH BAY LK	39	2013	2014	209,000	ENGLISH BAY L 241-30
LCI	TLH	4H	ENGLISHBAY14	ENGLISH BAY LK	513	2014	2015	200,200	ENGLISH BAY L 241-30
LCI	TLH	4,1,3H	HAZEL13	TUTKA LAGOON CR	22,467	2013	2014	1,223,000	HAZEL LK 241-15 (B)
LCI	TLH	3,3H3	HAZEL14	TUTKA LAGOON CR	18,617	2014	2015	621,000	HAZEL LK 241-15 (B)
LCI	TLH	4,1,3H	HAZEL16	TUTKA LAGOON	22,825	2016	2017	834,000	HAZEL LK 241-15 (B)
LCI	TLH	3,3H3	HAZEL17	TUTKA BAY H	16,255	2017	2018	813,000	HAZEL LK 241-15 (B)
LCI	TLH	H2,2,2	HAZEL18	TUTKA BAY H	136	2018	2019	1,293,000	HAZEL LK 241-15 (B)
LCI	TLH	4,4H	HAZEL19	TUTKA BAY H	0	2019	2020	266,448	HAZEL LK 241-15 (B)
LCI	TLH	4H2,2	KIRSCHNER18	TUTKA BAY H	0	2018	2019	258,000	KIRSCHNER LK 249-75 (B)
LCI	TLH	H2,2	LEISURE18	TUTKA BAY H	8,909	2018	2019	1,085,000	LEISURE LK 241-15
LCI	TLH	3n,2H	LEISURE19	TUTKA BAY H	0	2019	2020	274,443	LEISURE LK 241-15
LCI	TLH	2,2H	PENINSULA11SOCKEYE	TUTKA LAGOON	42	2011	2012	2,374,000	KIRSCHNER LK 249-75 (B), LEISURE LK 241-15
LCI	TLH	H2,2	PENINSULA12SOCKEYE	HIDDEN LK 244-30	12	2012	2013	1,800,000	LEISURE LK 241-15
LCI	TLH	1,3H	PENINSULA13SOCKEYE	ENGLISH BAY LK	45,125	2013	2014	217,000	KIRSCHNER LK 249-75 (B)
LCI	TLH	2,2H	PENINSULA14SOCKEYE	TUTKA LAGOON CR	51,603	2014	2015	237,000	KIRSCHNER LK 249-75 (B)
LCI	TLH	1,3H	PENINSULA16SOCKEYE	TUTKA LAGOON	46,514	2016	2017	260,000	KIRSCHNER LK 249-75 (B)
LCI	TLH	2,2H	PENINSULA17SOCKEYE	TUTKA BAY H	41,904	2017	2018	244,000	KIRSCHNER LK 249-75 (B)
LCI	TLH	4H	TRAILLAKES13A	BEAR LK	10	2013	2014	2,405,000	BEAR LK 231-30
LCI	TLH	3,2H	TRAILLAKES14A	BEAR LK	424	2014	2015	2,415,000	BEAR LK 231-30
LCI	TLH	1,3H	TRAILLAKES14B	BEAR LK	568	2014	2016	1,680,165	RESURRECTION BAY 231-30
LCI	TLH	1,3H	TRAILLAKES14B	BEAR LK	568	2014	2016	1,680,165	RESURRECTION BAY 231-30
LCI	TLH	4,2H	TRAILLAKES15A	BEAR LK	200	2015	2016	2,374,000	BEAR LK 231-30
LCI	TLH	3,3,2H	TRAILLAKES15B	BEAR LK	59	2015	2017	288,000	BEAR CR 231-30
LCI	TLH	4H	TRAILLAKES16A	BEAR LK	540	2016	2017	2,468,000	BEAR LK 231-30
LCI	TLH	2,4H	TRAILLAKES16B	BEAR LK	604	2016	2018	1,488,000	RESURRECTION BAY 231-30
LCI	TLH	3,3H	TRAILLAKES17A	BEAR LK	1,011	2017	2018	2,555,000	BEAR LK 231-30
LCI	TLH	1,3H	TRAILLAKES17B	BEAR LK	184	2017	2019	1,510,000	RESURRECTION BAY 231-30
LCI	TLH	4,2H	TRAILLAKES18A	BEAR LK	580	2018	2019	2,427,000	BEAR LK 231-30
LCI	TLH	2,4H	TRAILLAKES19B	BEAR LK	0	2019	2021	1,466,109	RESURRECTION BAY 231-30
LCI	TLH	3,4nH	TUTKA19	TUTKA BAY H	0	2019	2021	375,626	TUTKA BAY 241-16
LCI	TLH	1,5H	TUTKA13	TUTKA LAGOON CR	4,013	2013	2015	523,500	TUTKA BAY 241-16

-continued-

Appendix B1.–Page 2 of 3.

Area[a]	Facility[b]	Mark	Mark ID	Brood stock	Est. total harvest[c]	Year		Total release	Release site(s)
						Brood	Release		
LCI	TLH	4,2H	TUTKA14	ENGLISH BAY LK	15,063	2014	2016	531,625	TUTKA BAY 241-16
LCI	TLH	3,5H	TUTKA15	TUTKA LAGOON	3,488	2015	2017	356,000	TUTKA BAY 241-16
LCI	TLH	2,5H	TUTKA16	ENGLISH BAY LK	6,693	2016	2018	518,000	TUTKA BAY 241-16
LCI	TLH	4,2H	TUTKA17	TUTKA BAY H	50,111	2017	2019	427,000	TUTKA BAY 241-16
LCI	TLH	3,5H	TUTKA18	TUTKA BAY H	18,677	2018	2020	363,072	TUTKA BAY 241-16
PWS	MBH	3H3	MBH13A	MAIN BAY H	26	2013	2015	2,340,000	MAIN BAY 225-20
PWS	MBH	3H2,2	MBH13B	MAIN BAY H	0	2013	2015	2,250,000	MAIN BAY 225-20
PWS	MBH	3H5	MBH13C	MAIN BAY H	10	2013	2015	2,260,000	MAIN BAY 225-20
PWS	MBH	3H3,3	MBH13D	MAIN BAY H	26	2013	2015	2,240,000	MAIN BAY 225-20
PWS	MBH	3H	MBH13E	MAIN BAY H	10	2013	2015	1,640,000	MAIN BAY 225-20
PWS	MBH	5H3	MBH14A	MAIN BAY H	63	2014	2016	1,780,000	MAIN BAY 225-20
PWS	MBH	5H2,2	MBH14B	MAIN BAY H	0	2014	2016	1,920,000	MAIN BAY 225-20
PWS	MBH	5H5	MBH14C	MAIN BAY H	10	2014	2016	2,070,000	MAIN BAY 225-20
PWS	MBH	5H3,3	MBH14D	MAIN BAY H	0	2014	2016	2,040,000	MAIN BAY 225-20
PWS	MBH	5H	MBH14E	MAIN BAY H	0	2014	2016	2,230,000	MAIN BAY 225-20
PWS	MBH	2,2H3	MBH15A	MAIN BAY H	6	2015	2017	1,956,000	MAIN BAY 225-20
PWS	MBH	2,2H5	MBH15C	MAIN BAY H	6	2015	2017	1,938,000	MAIN BAY 225-20
PWS	MBH	2,2H3,3	MBH15D	MAIN BAY H	6	2015	2017	2,170,000	MAIN BAY 225-20
PWS	MBH	2,2H4	MBH15E	MAIN BAY H	6	2015	2017	2,270,000	MAIN BAY 225-20
PWS	MBH	3H3	MBH16A	MAIN BAY H	39	2016	2018	2,058,000	MAIN BAY 225-20
PWS	MBH	3H2,2	MBH16B	MAIN BAY H	6	2016	2018	2,040,000	MAIN BAY 225-20
PWS	MBH	3H5	MBH16C	MAIN BAY H	6	2016	2018	2,110,000	MAIN BAY 225-20
PWS	MBH	3H3,3	MBH16D	MAIN BAY H	6	2016	2018	2,030,000	MAIN BAY 225-20
PWS	MBH	3H	MBH16E	MAIN BAY H	25	2016	2018	2,002,000	MAIN BAY 225-20
PWS	MBH	5H3	MBH17A	MAIN BAY H	97	2017	2019	2,210,000	MAIN BAY 225-20
PWS	MBH	5H2,2	MBH17B	MAIN BAY H	83	2017	2019	2,180,000	MAIN BAY 225-20
PWS	MBH	5H5	MBH17C	MAIN BAY H	81	2017	2019	2,132,000	MAIN BAY 225-20
PWS	MBH	5H3,3	MBH17D	MAIN BAY H	75	2017	2019	2,162,000	MAIN BAY 225-20
PWS	MBH	5H	MBH17E	MAIN BAY H	71	2017	2019	2,210,000	MAIN BAY 225-20
PWS	MBH	2,2H3	MBH18A	MAIN BAY H	21	2018	2020	1,857,324	MAIN BAY 225-20
PWS	MBH	2,2H2,2	MBH18B	MAIN BAY H	21	2018	2020	1,874,154	MAIN BAY 225-20
PWS	MBH	2,2H5	MBH18C	MAIN BAY H	49	2018	2020	2,035,411	MAIN BAY 225-20
PWS	MBH	2,2H	MBH18E	MAIN BAY H	122	2018	2020	2,016,833	MAIN BAY 225-20
PWS	MBH	3H3	MBH19A	MAIN BAY H	0	2019	2021	2,170,649	MAIN BAY 225-20
PWS	MBH	3H5	MBH19C	MAIN BAY H	0	2019	2021	2,144,698	MAIN BAY 225-20

continued-

Appendix B1.–Page 3 of 3.

Area[a]	Facility[b]	Mark	Mark ID	Brood stock	Est. total harvest[c]	Year Brood	Year Release	Total release	Release Site(s)
PWS	MBH	3H	MBH19E	MAIN BAY H	0	2019	2021	2,204,357	MAIN BAY 225-20
KOD	KBH	5,4H	KITOI14	L KITOI LK 252-31	0	2014	2016	577,086	LITTLE KITOI BAY 252-31
KOD	KBH	6,3H	KITOI15	L KITOI LK 252-31	48	2015	2017	585,810	LITTLE KITOI BAY 252-31
KOD	KBH	3H	KITOI16	SALTERY LK 259-41	0	2016	2018	399,668	LITTLE KITOI LK 252-31
KOD	PCH	3,4H	KODIAK13	SALTERY LK 259-41	10	2013	2014	1,850,000	SPIRIDON LK 254-40
KOD	PCH	4,3,2H	KODIAK13A	SALTERY LK 259-41	10	2013	2015	218,811	ANTON LARSON BAY 259-32
KOD	PCH	3,3,3H	KODIAK14	SALTERY LK 259-41	128	2014	2015	45,000	JENNIFER LK 252-31 (B)
KOD	PCH	4,4H	KODIAK14A	SALTERY LK 259-41	39	2014	2016	628,898	TELROD COVE 254-40
KOD	PCH	6H	KODIAK15	SALTERY LK 259-41	72	2015	2016	53,000	JENNIFER LK 252-31 (B)
KOD	PCH	5,2H	KODIAK15A	SALTERY LK 259-41	135	2015	2017	355,569	TELROD COVE 254-40
KOD	PCH	3,3,3H	KODIAK17	SALTERY LK 259-41	329	2017	2018	102,152	JENNIFER LK 252-31 (B)
KOD	PCH	4,4H	KODIAK17A	SALTERY LK 259-41	21	2017	2019	546,032	TELROD COVE 254-40
KOD	PCH	6H	KODIAK18	SALTERY LK 259-41	75	2018	2019	80,795	JENNIFER LK 252-31 (B)
KOD	PCH	5H	KODIAK18B	SALTERY LK 259-41	37	2018	2019	345,629	SPIRIDON LK 254-40
KOD	PCH	2,4,2H	KODIAK19	SALTERY LK 259-41	0	2019	2020	1,215,061	JENNIFER LK 252-31 (B),
KOD	PCH	4,3,2H	KODIAK19A	SALTERY LK 259-41	0	2019	2021	440,521	TELROD COVE 254-40
UCI	TLH	2,1,2H	HIDDENLAKE17	HIDDEN LK 244-30	21	2017	2018	1,271,000	HIDDEN LK 244-30
UCI	TLH	3,2,1H	HIDDENLAKE18	HIDDEN LK 244-30	101	2018	2019	1,094,000	HIDDEN LK 244-30

Facility–release area	Est. total harvest[c]	Percent (%) of harvest	Total release
TLH–Homer and Seward:	377,928	99.5	38,505,353
TLH–Homer:	373,180	98.3	15,748,914
TLH–Seward:	4,748	1.3	21,290,330
MBH–PWS:	871	0.2	64,541,426
KBH–KOD:	48	0.0	1,562,564
PCH–KOD:	856	0.2	5,881,468
TLH–UCI:	122	0.0	2,365,000
Sum total–all facilities:	379,825	100.0	112,855,811

Note: Est. = estimated.

[a] Area: LCI = Lower Cook Inlet, PWS = Prince William Sound, KOD = Kodiak, UCI = Upper Cook Inlet.

[b] Facility: TLH = Trail Lakes Hatchery, CIAA; MBH = Main Bay Hatchery, PWSAC; PCH = Pillar Bay Hatchery, KRAA.

[c] Harvest total includes all commercial (set gillnet and purse seine) and hatchery cost recovery (HCR) harvests from 2018 to 2022. Estimated total harvest of hatchery fish by Mark ID may differ slightly from the estimated total hatchery harvest by area in report tables due to rounding errors across groups.

Appendix B2.–Estimate of hatchery-area proportion and contribution for sockeye salmon harvested in the commercial set gillnet (SGN) fishery in the Southern District of Lower Cook Inlet, 2018–2022.

				Hatchery area[c]											
				LCI		PWS		KOD		UCI		All marks		Unmarked	
Year	Statistical area[a]	Total harvest	n[b]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2018	24100	15,259	2,079	15.8	2,411	1.1	168	0.7	107	0.0	0	17.6	2,686	82.4%	12,573
2019	24100	29,381	2,545	10.2	2,997	0.4	118	0.7	206	0.0	0	11.3	3,321	88.7%	26,060
2020	24100	12,507	1,862	7.0	875	0.8	100	0.4	50	0.0	0	8.2	1,025	91.8%	11,482
2021	24100	13,123	2,243	16.5	2,165	1.6	210	0.3	39	0.0	0	18.4	2,414	81.6%	10,709
2022	24100	26,855	1,769	12.8	3,437	1.6	430	0.8	215	0.1	27	15.3	4,109	84.7%	22,746
Total sum[d]:		97,125	10,498	**87.7**	11,885	**7.6**	1,026	**4.6**	617	**0.2**	27	14.0	13,555	86.0	83,570
Min:		12,507	1,769	7.0%	875	0.4	100	0.3	39	0.0	0	8.2	1,025	81.6	10,709
Max:		29,381	2,545	16.5%	3,437	1.6	430	0.8	215	0.1	27	18.4	4,109	91.8	26,060
Mean:		19,425	2,100	12.5%	2,377	1.1	205	0.6	123	0.0	5	14.2	2,711	85.8	16,714

Note: # = number of fish; Est. = estimated.

[a] Because all SGN samples were mixed prior to sampling, statistical area 24100 represents all stat areas in the Southern District with SGN harvest.

[b] n: number of otoliths sampled by strata.

[c] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, UCI = Upper Cook Inlet hatchery mark, Unmarked = wild fish.

[d] Hatchery area proportions associated with total sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

Appendix B3.–Estimate of hatchery-area proportion and contribution for sockeye salmon harvested in the commercial purse seine (PS) fishery by stat area in the Southern District of Lower Cook Inlet, 2018–2022.

				Hatchery area[b]											
				LCI		PWS		KOD		UCI		All marks		Unmarked	
Year	Statistical area	Total harvest	n[a]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2018	24106	10,469	134	71.6	7,496	0.0	0	0.0	0	0.0	0	71.6	7,496	28.4	2,973
2018	24107	7,078	26	96.2	6,809	0.0	0	0.0	0	0.0	0	96.2	6,809	3.8	269
2018	24115	2,077	141	30.5	633	0.0	0	0.0	0	0.0	0	30.5	633	69.5	1,444
2018	24190	21,921	472	61.9	13,569	0.0	0	0.2	44	0.0	0	62.1	13,613	37.9	8,308
2018	24191	16,539	346	65.6	10,850	0.0	0	0.0	0	0.0	0	65.6	10,850	34.4	5,689
2019	24106	2,712	117	23.9	648	0.0	0	0.0	0	0.0	0	23.9	648	76.1	2,064
2019	24115	5,298	317	12.9	683	0.0	0	0.0	0	0.0	0	12.9	683	87.1	4,615
2019	24190	15,223	584	46.1	7,018	0.0	0	0.0	0	0.0	0	46.1	7,018	53.9	8,205
2019	24191	8,293	148	57.4	4,760	0.0	0	0.0	0	0.0	0	57.4	4,760	42.6	3,533
2019	24193	15,802	714	50.4	7,964	0.0	0	0.3	47	0.0	0	50.7	8,011	49.3	7,791
2019	24192	3,324	96	85.4	2,839	0.0	0	0.0	0	0.0	0	85.4	2,839	14.6	485
2020	24106	2,885	23	39.1	1,128	0.0	0	0.0	0	0.0	0	39.1	1,128	60.9	1,757
2020	24190	13,551	128	45.3	6,139	0.0	0	0.0	0	0.0	0	45.3	6,139	54.7	7,412
2020	24191	11,070	479	37.4	4,140	0.0	0	0.0	0	0.0	0	37.4	4,140	62.6	6,930
2020	24193	54	52	42.3	23	0.0	0	0.0	0	0.0	0	42.6	23	57.7	31
2020	24192	40,395	632	71.0	28,680	0.0	0	0.2	81	0.0	0	71.2	28,761	28.8	11,634
2021	24106	15,568	307	55.0	8,562	0.3	47	1.3	202	0.0	0	56.6	8,811	43.4	6,757
2021	24115	142	84	17.9	25	0.0	0	0.0	0	0.0	0	17.6	25	82.1	117
2021	24190	9,791	155	57.4	5,620	0.0	0	0.0	0	0.0	0	57.4	5,620	42.6	4,171
2021	24191	9,029	247	39.7	3,585	0.0	0	0.0	0	0.0	0	39.7	3,585	60.3	5,444
2021	24193	8,872	153	75.2	6,672	0.0	0	0.0	0	0.0	0	75.2	6,672	24.8	2,200
2021	24192	31,567	494	86.6	27,337	0.0	0	0.0	0	0.0	0	86.6	27,337	13.4	4,230
2022	24106	897	94	7.4	66	0.0	0	0.0	0	0.0	0	7.4	66	92.6	831
2022	24115	1,673	93	20.4	341	0.0	0	0.0	0	0.0	0	20.4	341	79.6	1,332

-continued-

Appendix B3.–Page 2 of 2.

Year	Statistical area	Total harvest	n[a]	Hatchery area[b] LCI Est. %	LCI Est. #	PWS Est. %	PWS Est. #	KOD Est. %	KOD Est. #	UCI Est. %	UCI Est. #	All marks Est. %	All marks Est. #	Unmarked Est. %	Unmarked Est. #
2022	24190	7,122	79	82.3	5,861	0.0	0	0.0	0	0.0	0	82.3	5,861	17.7%	1,261
2022	24191	9,212	470	71.1	6,550	0.0	0	0.2	18	0.0	0	71.3	6,568	28.7%	2,644
2022	24193	11,280	96	87.5	9,870	0.0	0	0.0	0	0.0	0	87.5	9,870	12.5%	1,410
2022	24192	51,940	557	90.3	46,902	0.2	104	0.0	0	0.2	104	90.7	47,110	9.3%	4,830
Total sum[c]:		333,784	7,238	**99.7**	224,770	**0.1**	151	**0.2**	392	**0.0**	104	67.5	225,417	32.5	108,367
24106		32,531	675	**98.6**	17,900	**0.3**	47	**1.1**	202	**0.0**	0	55.8	18,149	44.2	14,382
24107		7,078	26	**100.0**	6,809	**0.0**	0	**0.0**	0	**0.0**	0	96.2	6,809	3.8	269
24115		9,190	635	**100.0**	1,682	**0.0**	0	**0.0**	0	**0.0**	0	18.3	1,682	81.7	7,508
24190		67,608	1,418	**99.9**	38,207	**0.0**	0	**0.1**	44	**0.0**	0	56.6	38,251	43.4	29,357
24191		54,143	1,690	**99.9**	29,885	**0.0**	0	**0.1**	18	**0.0**	0	55.2	29,903	44.8	24,240
24192		127,226	1,779	**99.7**	105,758	**0.1**	104	**0.1**	81	**0.1**	104	83.4	106,047	16.6	21,179
24193		36,008	1,015	**99.8**	24,529	**0.0**	0	**0.2**	47	**0.0**	0	68.3	24,576	31.7	11,432

Note: # = number of fish; Est. = estimated.

[a] n: number of otoliths sampled by strata.

[b] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, UCI = Upper Cook Inlet hatchery mark, Unmarked = wild fish.

[c] Hatchery area proportions associated with total and subdistrict sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

Appendix B4.–Estimate of hatchery-area proportion and contribution for sockeye salmon harvested in the hatchery cost recovery (HCR) fishery by statistical area in the Southern District of Lower Cook Inlet, 2018–2022.

				Hatchery area[c]											
				LCI		PWS		KOD		Other		All marks		Unmarked	
Year	Statistical area	Total harvest[a]	n[b]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2018	24192	6,590	60	96.7	6,373	0.0	0	0.0	0	0.0	0	96.7	6,373	3.3%	217
2019	24192	1,990	96	99.0	1,970	0.0	0	0.0	0	0.0	0	99.0	1,970	1.0%	20
2020	NS	[a]	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2021	24107	35,069	96	100.0	35,069	0.0	0	0.0	0	0.0	0	100.0	35,069	0.0%	0
2022	24107	26,121	191	100.0	26,121	0.0	0	0.0	0	0.0	0	100.0	26,121	0.0%	0
Total sum:		69,770	443	**100.0**[d]	69,533	**0.0**[d]	0	**0.0**[d]	0	**0.0**[d]	0	99.7	69,533	0.3	237
24107		61,190	287	**100.0**[d]	61,190	**0.0**[d]	0	**0.0**[d]	0	**0.0**[d]	0	100.0	61,190	0.0	0
24192		8,580	156	**100.0**[d]	8,343	**0.0**[d]	0	**0.0**[d]	0	**0.0**[d]	0	97.2	8,343	2.8	237

Note: NS = no samples collected; # = number of fish; Est. = estimated.

[a] The total hatchery cost recovery harvest for 2020 (15,892 sockeye salmon) is not included because contribution estimates could not be made that year due to no samples being collected.

[b] n: number of otoliths sampled by strata.

[c] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, UCI = Upper Cook Inlet hatchery mark, Unmarked = wild fish.

[d] Hatchery area proportions associated with total and subdistrict sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

Appendix B5.–Estimate of hatchery-area proportion and contribution for sockeye salmon harvested in the commercial set gillnet (SGN) fishery (sampled strata only) by statistical week in the Southern District of Lower Cook Inlet, 2018–2022.

					Hatchery area[c]											
					LCI		PWS		KOD		UCI		All marks		Unmarked	
Year	Stat area[a]	Stat week	Total harvest	n[b]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2018	24100	23	367	122	29.5	108	0.0	0	0.0	0	0.0	0	29.4	108	70.5	259
2018	24100	24	744	262	12.6	94	1.5	11	0.0	0	0.0	0	14.1	105	85.9	639
2018	24100	25	1,178	273	16.5	194	0.4	5	0.7	8	0.0	0	17.6	207	82.4	971
2018	24100	26	2,555	289	14.9	381	1.4	36	1.7	43	0.0	0	18.0	460	82.0	2,095
2018	24100	27	2,639	209	16.7	441	3.8	100	1.0	26	0.0	0	21.5	567	78.5	2,072
2018	24100	28	2,658	355	16.9	449	0.6	16	0.3	8	0.0	0	17.8	473	82.3	2,188
2018	24100	29	2,886	281	6.0	173	0.7	20	0.7	20	0.0	0	7.4	213	92.5	2,670
2018	24100	30	1,140	162	26.5	302	0.0	0	0.0	0	0.0	0	26.5	302	73.5	838
2018	24100	31	571	126	12.7	73	1.6	9	2.4	14	0.0	0	16.8	96	83.3	476
2019	24100	23	1,278	192	6.8	87	0.0	0	0.0	0	0.0	0	6.8	87	93.2	1,191
2019	24100	24	1,633	192	11.5	188	0.0	0	0.0	0	0.0	0	11.5	188	88.5	1,445
2019	24100	25	2,819	206	7.8	220	0.0	0	1.5	42	0.0	0	9.3	262	90.8	2,560
2019	24100	26	3,076	206	6.3	194	0.0	0	1.0	31	0.0	0	7.3	225	92.7	2,851
2019	24100	27	3,486	237	11.8	411	0.0	0	0.4	14	0.0	0	12.2	425	87.8	3,061
2019	24100	28	3,789	338	22.2	841	0.0	0	0.0	0	0.0	0	22.2	841	77.8	2,948
2019	24100	29	2,948	328	15.9	469	0.3	9	1.8	53	0.0	0	18.0	531	82.0	2,417
2019	24100	30	4,719	288	6.6	311	1.4	66	1.4	66	0.0	0	9.4	443	90.6	4,275
2019	24100	31	3,175	286	2.4	76	1.4	44	0.7	22	0.0	0	4.5	142	95.5	3,032
2019	24100	32	2,121	184	6.5	138	0.0	0	0.0	0	0.0	0	6.5	138	93.5	1,983
2019	24100	33	318	88	3.4	11	0.0	0	0.0	0	0.0	0	3.5	11	96.6	307
2020	24100	24	1,143	192	10.4	119	0.5	6	0.5	6	0.0	0	11.5	131	88.5	1,012
2020	24100	25	984	192	5.7	56	0.0	0	1.0	10	0.0	0	6.7	66	93.2	917
2020	24100	26	1,769	313	10.2	180	0.6	11	0.3	5	0.0	0	11.1	196	88.8	1,571
2020	24100	27	2,368	288	7.6	180	1.7	40	0.7	17	0.0	0	10.0	237	89.9	2,129
2020	24100	28	1,912	288	6.2	119	0.3	6	0.0	0	0.0	0	6.5	125	93.4	1,786
2020	24100	29	1,965	254	4.3	84	1.2	24	0.4	8	0.0	0	5.9	116	94.1	1,849
2020	24100	30	686	164	6.1	42	0.6	4	0.0	0	0.0	0	6.7	46	93.3	640
2020	24100	31	705	171	4.1	29	0.6	4	0.6	4	0.0	0	5.2	37	94.7	668

-continued-

Appendix B5.–Page 2 of 2.

Year	Stat area[a]	Stat week	Total harvest	n[b]	Hatchery area[c] LCI Est. %	LCI Est. #	PWS Est. %	PWS Est. #	KOD Est. %	KOD Est. #	UCI Est. %	UCI Est. #	All marks Est. %	All marks Est. #	Unmarked Est. %	Unmarked Est. #
2021	24100	23	642	96	55.2	354	0.0	0	0.0	0	0.0	0	55.1	354	44.8	288
2021	24100	24	1,770	261	40.6	719	0.0	0	0.0	0	0.0	0	40.6	719	59.4	1,051
2021	24100	25	1,776	265	13.2	234	1.1	20	0.0	0	0.0	0	14.3	254	85.7	1,522
2021	24100	26	1,928	378	9.8	189	3.4	66	0.3	6	0.0	0	13.5	261	86.5	1,668
2021	24100	27	2,937	362	12.2	358	1.1	32	0.6	18	0.0	0	13.9	408	86.2	2,532
2021	24100	28	1,348	267	17.2	232	1.5	20	0.4	5	0.0	0	19.1	257	80.9	1,091
2021	24100	29	902	231	8.7	78	3.9	35	0.9	8	0.0	0	13.4	121	86.6	781
2021	24100	30	737	191	4.2	31	1.0	7	0.0	0	0.0	0	5.2	38	94.8	699
2021	24100	31	782	192	10.4	81	0.0	0	0.0	0	0.0	0	10.4	81	89.6	701
2022	24100	23	821	95	28.4	233	1.1	9	0.0	0	0.0	0	29.5	242	70.5	579
2022	24100	24	1,687	192	18.8	317	1.0	17	0.0	0	0.0	0	19.8	334	80.2	1,353
2022	24100	25	2,306	190	5.8	134	0.0	0	0.0	0	0.0	0	5.8	134	94.2	2,172
2022	24100	26	3,626	190	11.1	402	4.2	152	0.0	0	0.0	0	15.3	554	84.7	3,071
2022	24100	27	4,837	191	18.3	885	3.1	150	0.0	0	0.0	0	21.4	1,035	78.5	3,797
2022	24100	28	2,812	202	19.3	543	4.0	112	0.5	14	0.0	0	23.8	669	76.2	2,143
2022	24100	29	2,256	95	24.2	546	0.0	0	5.3	120	0.0	0	29.5	666	70.5	1,590
2022	24100	30	5,025	287	8.0	402	0.7	35	1.4	70	0.0	0	10.1	507	89.9	4,517
2022	24100	31	2,978	285	3.9	116	0.4	12	1.1	33	0.7	21	6.1	182	94.0	2,799
2022	24100	32	505	42	0.0	0	2.4	12	4.8	24	0.0	0	7.1	36	92.9	469
Total sum[d]:			95,307	10,498	**86.7**	11,824	**8.0**	1,090	**5.1**	695	**0.2**	21	14.3	13,630	85.7	81,673
2018			14,738	2,079	**87.5**	2,215	**7.8**	197	**4.7**	119	**0.0**	0	17.2	2,531	82.8	12,208
2019			29,362	2,545	**89.5**	2,946	**3.6**	119	**6.9**	228	**0.0**	0	11.2	3,293	88.8	26,070
2020			11,532	1,862	**84.8**	809	**10.0**	95	**5.2**	50	**0.0**	0	8.3	954	91.7	10,572
2021			12,822	2,243	**91.3**	2,276	**7.2**	180	**1.5**	37	**0.0**	0	19.4	2,493	80.6	10,333
2022			26,853	1,769	**82.1**	3,578	**11.4**	499	**6.0**	261	**0.5**	21	16.2	4,359	83.8	22,490

Note: # = number of fish; Est. = estimated.

[a] Because all SGN samples were mixed prior to sampling, statistical area 24100 represents all stat areas in the Southern District with SGN harvest.

[b] n: number of otoliths sampled by strata.

[c] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, UCI = Upper Cook Inlet hatchery mark, Unmarked = wild fish.

[d] Hatchery area proportions associated with total and annual sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

Appendix B6.–Estimate of hatchery-area proportion and contribution for sockeye salmon harvested in the commercial purse seine (PS) fishery (sampled strata only) by statistical area and statistical week in the Southern District of Lower Cook Inlet, 2018–2022.

					Hatchery area[b]											
					LCI		PWS		KOD		UCI		All marks		Unmarked	
Year	Stat area	Stat week	Total harvest	n[a]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2018	24106	28	4,841	53	77.4	3,747	0.0	0	0.0	0	0.0	0	77.4	3,747	22.6	1,094
2018	24106	29	2,232	81	67.9	1,516	0.0	0	0.0	0	0.0	0	67.9	1,516	32.1	716
2019	24106	29	561	23	60.9	342	0.0	0	0.0	0	0.0	0	61.0	342	39.1	219
2019	24106	30	1,249	29	31.0	387	0.0	0	0.0	0	0.0	0	31.0	387	69.0	862
2019	24106	31	65	65	7.7	5	0.0	0	0.0	0	0.0	0	7.7	5	92.3	60
2020	24106	29	668	23	39.1	261	0.0	0	0.0	0	0.0	0	39.1	261	60.9	407
2021	24106	27	1,380	96	88.5	1,221	0.0	0	1.0	14	0.0	0	89.5	1,235	10.4	144
2021	24106	29	5,258	49	79.6	4,185	0.0	0	0.0	0	0.0	0	79.6	4,185	20.4	1,073
2021	24106	30	4,052	140	28.6	1,159	0.7	28	2.1	85	0.0	0	31.4	1,272	68.6	2,780
2021	24106	31	2,804	22	22.7	637	0.0	0	0.0	0	0.0	0	22.7	637	77.3	2,167
2022	24106	30	94	94	7.4	7	0.0	0	0.0	0	0.0	0	7.4	7	92.6	87
2018	24107	25	38	26	96.2	37	0.0	0	0.0	0	0.0	0	97.4	37	3.8	1
2018	24115	25	1,157	45	44.4	514	0.0	0	0.0	0	0.0	0	44.4	514	55.6	643
2018	24115	28	96	96	24.0	23	0.0	0	0.0	0	0.0	0	24.0	23	76.0	73
2019	24115	27	203	8	50.0	102	0.0	0	0.0	0	0.0	0	50.2	102	50.0	102
2019	24115	28	263	24	29.2	77	0.0	0	0.0	0	0.0	0	29.3	77	70.8	186
2019	24115	30	1,712	89	14.6	250	0.0	0	0.0	0	0.0	0	14.6	250	85.4	1,462
2019	24115	31	1,284	89	13.5	173	0.0	0	0.0	0	0.0	0	13.5	173	86.5	1,111
2019	24115	32	1,398	107	4.7	66	0.0	0	0.0	0	0.0	0	4.7	66	95.3	1,332
2021	24115	31	27	27	22.2	6	0.0	0	0.0	0	0.0	0	22.2	6	77.8	21
2021	24115	32	40	57	15.8	6	0.0	0	0.0	0	0.0	0	15.0	6	84.2	34
2022	24115	30	1,673	93	20.4	341	0.0	0	0.0	0	0.0	0	20.4	341	79.6	1,332
2018	24190	25	928	46	47.8	444	0.0	0	0.0	0	0.0	0	47.8	444	52.2	484

-continued-

Appendix B6.–Page 2 of 4.

					Hatchery area[b]											
					LCI		PWS		KOD		UCI		All marks		Unmarked	
Year	Stat area	Stat week	Total harvest	n[a]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2018	24190	26	5,160	93	80.6	4,159	0.0	0	0.0	0	0.0	0	80.6	4,159	19.4	1,001
2018	24190	27	2,666	146	80.8	2,154	0.0	0	0.0	0	0.0	0	80.8	2,154	19.2	512
2018	24190	28	9,242	96	25.0	2,310	0.0	0	1.0	92	0.0	0	26.0	2,402	74.0	6,839
2018	24190	29	3,903	72	65.3	2,549	0.0	0	0.0	0	0.0	0	65.3	2,549	34.7	1,354
2018	24190	30	19	19	31.6	6	0.0	0	0.0	0	0.0	0	31.6	6	68.4	13
2019	24190	25	192	18	16.7	32	0.0	0	0.0	0	0.0	0	16.7	32	83.3	160
2019	24190	26	2,972	22	63.6	1,890	0.0	0	0.0	0	0.0	0	63.6	1,890	36.4	1,082
2019	24190	27	2,906	44	75.0	2,180	0.0	0	0.0	0	0.0	0	75.0	2,180	25.0	726
2019	24190	28	2,533	85	41.2	1,044	0.0	0	0.0	0	0.0	0	41.2	1,044	58.8	1,489
2019	24190	29	3,887	151	64.2	2,495	0.0	0	0.0	0	0.0	0	64.2	2,495	35.8	1,392
2019	24190	30	1,246	152	38.8	483	0.0	0	0.0	0	0.0	0	38.8	483	61.2	763
2019	24190	31	1,286	112	25.0	322	0.0	0	0.0	0	0.0	0	25.0	322	75.0	964
2020	24190	25	109	40	17.5	19	0.0	0	0.0	0	0.0	0	17.4	19	82.5	90
2020	24190	26	353	60	58.3	206	0.0	0	0.0	0	0.0	0	58.4	206	41.7	147
2020	24190	28	5,452	28	57.1	3,113	0.0	0	0.0	0	0.0	0	57.1	3,113	42.9	2,339
2021	24190	26	884	99	61.6	545	0.0	0	0.0	0	0.0	0	61.7	545	38.4	339
2021	24190	27	2,904	56	50.0	1,452	0.0	0	0.0	0	0.0	0	50.0	1,452	50.0	1,452
2022	24190	26	47	47	89.4	42	0.0	0	0.0	0	0.0	0	89.4	42	10.6	5
2022	24190	27	3,270	32	71.9	2,351	0.0	0	0.0	0	0.0	0	71.9	2,351	28.1	919
2018	24191	26	1,004	60	83.3	836	0.0	0	0.0	0	0.0	0	83.3	836	16.7	168
2018	24191	27	9,654	140	74.3	7,173	0.0	0	0.0	0	0.0	0	74.3	7,173	25.7	2,481
2018	24191	28	2,416	50	82.0	1,981	0.0	0	0.0	0	0.0	0	82.0	1,981	18.0	435
2018	24191	29	3,417	96	33.3	1,138	0.0	0	0.0	0	0.0	0	33.3	1,138	66.7	2,279
2019	24191	25	67	12	50.0	34	0.0	0	0.0	0	0.0	0	50.7	34	50.0	34

-continued-

Appendix B6.–Page 3 of 4.

					Hatchery area[b]											
					LCI		PWS		KOD		UCI		All marks		Unmarked	
Year	Stat area	Stat week	Total harvest	n[a]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2019	24191	26	741	12	41.7	309	0.0	0	0.0	0	0.0	0	41.7	309	58.3	432
2019	24191	27	981	51	68.6	673	0.0	0	0.0	0	0.0	0	68.6	673	31.4	308
2019	24191	28	2,952	73	53.4	1,576	0.0	0	0.0	0	0.0	0	53.4	1,576	46.6	1,376
2020	24191	27	1,148	243	44.4	510	0.0	0	0.0	0	0.0	0	44.4	510	55.6	638
2020	24191	28	4,429	89	36.0	1,594	0.0	0	0.0	0	0.0	0	36.0	1,594	64.0	2,835
2020	24191	29	3,693	80	26.2	968	0.0	0	0.0	0	0.0	0	26.2	968	73.8	2,725
2020	24191	30	1,774	67	26.9	477	0.0	0	0.0	0	0.0	0	26.9	477	73.1	1,297
2021	24191	29	2,317	91	78.0	1,807	0.0	0	0.0	0	0.0	0	78.0	1,807	22.0	510
2021	24191	31	68	94	21.3	14	0.0	0	0.0	0	0.0	0	20.6	14	78.7	54
2021	24191	32	179	62	11.3	20	0.0	0	0.0	0	0.0	0	11.2	20	88.7	159
2022	24191	26	448	84	48.8	219	0.0	0	0.0	0	0.0	0	48.9	219	51.2	229
2022	24191	27	1,760	62	77.4	1,362	0.0	0	0.0	0	0.0	0	77.4	1,362	22.6	398
2022	24191	28	6,001	96	95.8	5,749	0.0	0	0.0	0	0.0	0	95.8	5,749	4.2	252
2022	24191	29	835	168	88.1	736	0.0	0	0.6	5	0.0	0	88.7	741	11.3	94
2022	24191	31	168	60	8.3	14	0.0	0	0.0	0	0.0	0	8.3	14	91.7	154
2019	24193	26	673	46	39.1	263	0.0	0	0.0	0	0.0	0	39.1	263	60.9	410
2019	24193	27	6,316	125	73.6	4,649	0.0	0	0.8	51	0.0	0	74.4	4,700	25.6	1,617
2019	24193	28	5,211	104	67.3	3,507	0.0	0	0.0	0	0.0	0	67.3	3,507	32.7	1,704
2019	24193	29	862	192	51.0	440	0.0	0	0.0	0	0.0	0	51.0	440	49.0	422
2019	24193	30	1,607	169	37.9	609	0.0	0	0.6	10	0.0	0	38.5	619	61.5	988
2019	24193	31	1,133	78	23.1	262	0.0	0	0.0	0	0.0	0	23.1	262	76.9	871
2020	24193	26	52	52	42.3	22	0.0	0	0.0	0	0.0	0	42.3	22	57.7	30
2021	24193	28	4,281	93	74.2	3,177	0.0	0	0.0	0	0.0	0	74.2	3,177	25.8	1,104
2021	24193	29	3,655	60	76.7	2,803	0.0	0	0.0	0	0.0	0	76.7	2,803	23.3	852

-continued-

Appendix B6.–Page 4 of 4.

					Hatchery area[b]											
					LCI		PWS		KOD		UCI		All marks		Unmarked	
Year	Stat area	Stat week	Total harvest	n[a]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2022	24193	29	5,004	96	87.5	4,378	0.0	0	0.0	0	0.0	0	87.5	4,378	12.5	626
2019	24192	25	574	96	85.4	490	0.0	0	0.0	0	0.0	0	85.4	490	14.6	84
2020	24192	26	670	96	66.7	447	0.0	0	1.0	7	0.0	0	67.8	454	32.3	216
2020	24192	27	8,999	96	74.0	6,659	0.0	0	0.0	0	0.0	0	74.0	6,659	26.0	2,340
2020	24192	28	14,035	192	64.1	8,996	0.0	0	0.0	0	0.0	0	64.1	8,996	35.9	5,039
2020	24192	29	12,341	152	62.5	7,713	0.0	0	0.0	0	0.0	0	62.5	7,713	37.5	4,628
2020	24192	30	4,350	96	100.0	4,350	0.0	0	0.0	0	0.0	0	100.0	4,350	0.0	0
2021	24192	27	5,234	99	75.8	3,967	0.0	0	0.0	0	0.0	0	75.8	3,967	24.2	1,267
2021	24192	28	10,640	203	83.7	8,906	0.0	0	0.0	0	0.0	0	83.7	8,906	16.3	1,734
2021	24192	29	12,182	96	96.9	11,804	0.0	0	0.0	0	0.0	0	96.9	11,804	3.1	378
2021	24192	30	3,117	96	93.8	2,924	0.0	0	0.0	0	0.0	0	93.8	2,924	6.2	193
2022	24192	26	2,856	96	95.8	2,736	0.0	0	0.0	0	0.0	0	95.8	2,736	4.2	120
2022	24192	27	18,959	176	96.6	18,314	0.0	0	0.0	0	0.0	0	96.6	18,314	3.4	645
2022	24192	28	20,615	95	90.5	18,657	0.0	0	0.0	0	0.0	0	90.5	18,657	9.5	1,958
2022	24192	29	8,231	95	96.8	7,968	0.0	0	0.0	0	0.0	0	96.8	7,968	3.2	263
2022	24192	30	1,279	95	66.3	848	1.1	14	0.0	0	1.1	14	68.5	876	31.6	404
Total sum[c]:			277,982	7,238	**99.8**	194,93	**0.0**	42	**0.1**	264	**0.0**	14	70.2	195,25	29.8	82,727
24106			23,204	675	**99.1**	13,467	**0.2**	28	**0.7**	99	**0.0**	0	58.6	13,594	41.4	9,609
24107			38	26	**100.0**	37	**0.0**	0	**0.0**	0	**0.0**	0	97.4	37	2.6	1
24115			7,853	635	**100.0**	1,558	**0.0**	0	**0.0**	0	**0.0**	0	19.8	1,558	80.2	6,296
24190			49,959	1,418	**99.7**	27,796	**0.0**	0	**0.3**	92	**0.0**	0	55.8	27,888	44.2	22,070
24191			44,052	1,690	**100.0**	27,190	**0.0**	0	**0.0**	5	**0.0**	0	61.7	27,195	38.3	16,858
24192			124,082	1,779	**100.0**	104,77	**0.0**	14	**0.0**	7	**0.0**	14	84.5	104,81	15.5	19,269
24193			28,794	1,015	**99.7**	20,110	**0.0**	0	**0.3**	61	**0.0**	0	70.1	20,171	30.0	8,624

Note: # = number of fish; Est. = estimated.

[a] n: number of otoliths sampled by strata.

[b] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, UCI = Upper Cook Inlet hatchery mark, Unmarked = wild fish.

[c] Hatchery area proportions associated with total and subdistrict sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

Appendix B7.–Estimate of hatchery-area proportion and contribution for sockeye salmon harvested in the hatchery cost recovery (HCR) fishery (sampled strata only) by statistical area and statistical week in the Southern District of Lower Cook Inlet, 2018–2022.

					Hatchery area[b]											
					LCI		PWS		KOD		UCI		All marks		Unmarked	
Year	Stat area	Stat week	Total harvest	n[a]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2021	24107	30	21,596	96	100.0	21,596	0.0	0	0.0	0	0.0	0	100.0	21,596	0.0%	0
2022	24107	27	3,807	96	100.0	3,807	0.0	0	0.0	0	0.0	0	100.0	3,807	0.0%	0
2022	24107	30	20,587	95	100.0	20,587	0.0	0	0.0	0	0.0	0	100.0	20,587	0.0%	0
2018	24192	28	3,157	60	96.7	3,053	0.0	0	0.0	0	0.0	0	96.7	3,053	3.3%	104
2019	24192	28	1,220	96	99.0	1,208	0.0	0	0.0	0	0.0	0	99.0	1,208	1.0%	12
Total sum[c]:			50,367	443	**100.0**	50,251	**0.0**	0	**0.0**	0	**0.0**	0	99.8	50,251	0.2	116
24107			45,990	287	**100.0**	45,990	**0.0**	0	**0.0**	0	**0.0**	0	100.0	45,990	0.0	0
24192			4,377	156	**100.0**	4,261	**0.0**	0	**0.0**	0	**0.0**	0	97.3	4,261	2.7	116

Note: # = number of fish; Est. = estimated.

[a] n: number of otoliths sampled by strata.

[b] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, UCI = Upper Cook Inlet hatchery mark, Unmarked = wild fish.

[c] Hatchery area proportions associated with total and subdistrict sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

Appendix B8.–Estimated hatchery contribution by strata and hatchery area to sampled sockeye salmon commercial harvest in the Southern District of Lower Cook Inlet, 2018–2022.

			Est. hatchery area contribution to sampled harvest (C_{Sh})										
			LCI[c]		PWS[c]		KOD[c]		UCI[c]		All marks		Total
Year	Harvest type[a]	Gear type[b]	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. %	harvest
2018	CH	SGN	2,411	122	168	35	107	28	0	0	2,686	17.6	15,259
2018	CH	PS	39,357	817	0	0	44	46	0	0	39,401	66.6	59,129
2018	HCR	PS	6,373	154	0	0	0	0	0	0	6,373	9.2	68,979
2019	CH	SGN	2,997	176	118	35	206	49	0	0	3,321	11.3	29,381
2019	CH	PS	23,912	580	0	0	47	31	0	0	23,959	47.3	50,652
2019	HCR	PS	1,970	21	0	0	0	0	0	0	1,970	15.7	12,586
2020	CH	SGN	875	74	100	25	50	19	0	0	1,025	8.2	12,507
2020	CH	PS	40,110	1,020	0	0	81	64	0	0	40,191	58.4	68,851
2020	HCR	PS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	15,892
2021	CH	SGN	2,165	103	210	34	39	14	0	0	2,414	18.4	13,123
2021	CH	PS	51,801	871	47	51	202	101	0	0	52,050	69.4	74,969
2021	HCR	PS	35,069	0	0	0	0	0	0	0	35,069	100.0	35,069
2022	CH	SGN	3,437	213	430	81	215	59	27	21	4,109	15.3	26,855
2022	CH	PS	69,590	842	104	93	18	20	104	93	69,816	85.0	82,124
2022	HCR	PS	26,121	0	0	0	0	0	0	0	26,121	100.0	26,121

	Est. #	Est. %[d]	Est. #	Est. %[d]	Est. #	Est. %[d]	Est. #	Est. %[d]	Est. #	Total harvest
Total sum (all types):	306,188	**99.2**	1,177	**0.4**	1,009	**0.3**	131	**0.0**	308,505	591,497
CH (excl. HCR) sum:	236,655	**99.0**	1,177	**0.5**	1,009	**0.4**	131	**0.1**	238,972	432,850
HCR sum:	69,533	**100.0**	0	**0.0**	0	**0.0**	0	**0.0**	69,533	158,647
SGN sum:	11,885	**87.7**	1,026	**7.6**	617	**4.6**	27	**0.2**	13,555	97,125
PS sum:	224,770	**99.7**	151	**0.1**	392	**0.2**	104	**0.0**	225,417	335,725

Note: NS = not sampled; # = number of fish; Est. = estimated.

[a] Harvest type: CH = Commercial harvest (excluding cost recovery), HCR = Hatchery cost recovery.

[b] Gear type: SGN = Set gillnet, PS = Purse seine.

[c] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, UCI = Upper Cook Inlet hatchery mark, Unmarked = wild fish.

[d] Hatchery area proportions associated with total and harvest type sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

Appendix B9.–Estimated hatchery contribution by strata and hatchery area to unsampled sockeye salmon commercial harvest in the Southern District of Lower Cook Inlet, 2018–2022.

			Est. hatchery area contribution to unsampled harvest (C_{Uh})										
			LCI[c]		PWS[c]		KOD[c]		UCI[c]		All marks		Total
Year	Harvest type[a]	Gear type[b]	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. %	harvest
2018	CH	PS	709	0	0	0	1	0	0	0	710	1.2%	59,129
2018	HCR	PS	60,330	137	0	0	0	0	0	0	60,330	87.5%	68,979
2019	HCR	PS	10,490	24	0	0	0	0	0	0	10,490	83.3%	12,586
2020	CH	PS	529	0	0	0	1	0	0	0	530	0.8%	68,851
			Est. #	Est. %[d]	Est. #	Est. %[d]	Est. #	Est. %[d]	Est. #	Est. %[d]	Est. #	Est. %	Total
Total sum:			72,058	**100.0**	0	**0.0**	2	**0.0**	0	**0.0**	72,060		209,545
Min:			529		0		0		0		530		12,586
Max:			60,330		0		1		0		60,330		68,979
Mean:			18,015		0		1		0		18,015		52,386

Note: # = number of fish; Est. = estimated.

[a] Harvest type: CH = Commercial harvest (excluding cost recovery), HCR = Hatchery cost recovery.

[b] Gear type: SGN = Set gillnet, PS = Purse seine.

[c] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, UCI = Upper Cook Inlet hatchery mark, Unmarked = wild fish.

[d] Hatchery area proportions associated with total sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

APPENDIX C: OTOLITH MARK RECOVERY RESULTS- PINK SALMON

Appendix C1.–Pink salmon hatchery marks identified in Lower Cook Inlet (LCI) commercial harvests, their estimated total contribution to the harvest (2018–2022), and hatchery release details pertaining to each Mark ID.

Area[a]	Facility[b]	Mark	Mark ID	Brood stock	Est. total harvest[c]	Year		Total release	Release Site(s)
						Brood	Release		
LCI	TBLH	5,3H	TUTKA16PINK[d]	TUTKA LAGOON	786,654	2016	2017	3,421,276	TUTKA BAY 241-16
LCI	TBLH	4,4H	TUTKA16PINKA[d]	TUTKA LAGOON	291,071	2016	2017	32,869,608	TUTKA BAY 241-16
LCI	TBLH	5,3H	TUTKA17PINK[d]	TUTKA BAY H	5,753	2017	2018	21,881,986	TUTKA BAY 241-16
LCI	TBLH	4,4H	TUTKA17PINKA[d]	TUTKA BAY H	776	2017	2018	28,158,014	TUTKA BAY 241-16
LCI	TBLH	5,3H3	TUTKA18PINK[d]	TUTKA BAY H	62,148	2018	2019	22,321,189	TUTKA BAY 241-16
LCI	TBLH	4,4H3	TUTKA18PINKA[d]	TUTKA BAY H	20,100	2018	2019	10,881,924	TUTKA BAY 241-16
LCI	TBLH	4,3H	TUTKA18PINKB[d]	TUTKA BAY H	29,797	2018	2019	11,138,922	TUTKA BAY 241-16
LCI	TBLH	2,3H	TUTKA18PINKC[d]	TUTKA BAY H	12,607	2018	2019	9,890,249	TUTKA BAY 241-16
LCI	TBLH	6,3H	TUTKA19PINK	TUTKA BAY H	149,120	2019	2020	11,157,973	TUTKA BAY 241-16
LCI	TBLH	3,6H	TUTKA19PINKA	TUTKA BAY H	76,097	2019	2020	6,044,518	TUTKA BAY 241-16
LCI	TBLH	4,3,1H	TUTKA19PINKB[d, e]	TUTKA BAY H	60,455	2019	2020	10,482,458	TUTKA BAY 241-16
LCI	TBLH	4,3H	TUTKA20PINKB[d, e]	TUTKA BAY H	50,692	2020	2021	71,907,183	TUTKA BAY 241-16
LCI	PGH	5H3	PORTGRAHAM16	PORT GRAHAM H	109,343	2016	2017	6,059,757	PORT GRAHAM 241-20
LCI	PGH	5H3	PORTGRAHAM17	PORT GRAHAM H	284	2017	2018	20,850,000	PORT GRAHAM 241-20
LCI	PGH	4H5	PORTGRAHAM17A	BRUIN BAY CR 243-50	0	2017	2018	30,500	PAINT RIVER 243-20
LCI	PGH	5H3	PORTGRAHAM18	PORT GRAHAM H	3,256	2018	2019	10,144,850	PORT GRAHAM 241-20
LCI	PGH	5H3	PORTGRAHAM19	PORT GRAHAM H	15	2019	2020	4,349,945	PORT GRAHAM 241-20
LCI	PGH	5H3	PORTGRAHAM20	PORT GRAHAM H	1,540	2020	2021	7,522,113	PORT GRAHAM 241-20
PWS	AFKH	4H	AFK16B	A F KOERNIG H	596	2016	2017	45,700,000	SAWMILL BAY 226-40
PWS	AFKH	4H	AFK17B	A F KOERNIG H	155	2017	2018	173,000,000	SAWMILL BAY 226-40
PWS	AFKH	4H	AFK18B	A F KOERNIG H	1,054	2018	2019	157,000,000	SAWMILL BAY 226-40
PWS	AFKH	4H	AFK19B	A F KOERNIG H	1,715	2019	2020	123,600,000	SAWMILL BAY 226-40
PWS	AFKH	4H3	AFK20A	A F KOERNIG H	15	2020	2021	65,400,000	SAWMILL BAY 226-40
PWS	AFKH	4H	AFK20B	A F KOERNIG H	76	2020	2021	65,700,000	SAWMILL BAY 226-40
PWS	CCH	3,3H	CCH16	CANNERY CR	539	2016	2017	149,000,000	UNAKWIK 222-22
PWS	CCH	3,3H	CCH17	CANNERY CREEK H	111	2017	2018	163,000,000	UNAKWIK 222-22
PWS	CCH	3,3H	CCH18	CANNERY CREEK H	225	2018	2019	102,900,000	UNAKWIK 222-22
PWS	CCH	3,3H	CCH19	CANNERY CREEK H	78	2019	2020	109,100,000	UNAKWIK 222-22

-continued-

Appendix C1.–Page 2 of 2.

Area[a]	Facility[b]	Mark	Mark ID	Brood stock	Est. total harvest[c]	Year Brood	Year Release	Total release	Release Site(s)
PWS	CCH	3,3H	CCH20	CANNERY CREEK H	57	2020	2021	85,235,000	UNAKWIK INLET 222-22
PWS	CCH	2,3H3	CCH20A	CANNERY CREEK H	0	2020	2021	29,365,000	UNAKWIK INLET 222-22
PWS	SGH	6H	SGH16	SOLOMON GULCH H	3,673	2016	2017	36,804,772	PORT VALDEZ 221-60
PWS	SGH	6H	SGH17	SOLOMON GULCH H	354	2017	2018	69,653,303	PORT VALDEZ 221-60
PWS	SGH	6H	SGH18	SOLOMON GULCH H	3,161	2018	2019	50,006,602	PORT VALDEZ 221-60
PWS	SGH	6H	SGH19	SOLOMON GULCH H	1,301	2019	2020	91,834,809	PORT VALDEZ 221-60
PWS	SGH	6H	SGH20	SOLOMON GULCH H	913	2020	2021	158,177,313	PORT VALDEZ 221-60
PWS	WNH	8H	WNH16PINKB	WALLY NOERENBERG H	2,231	2016	2017	65,300,000	LAKE BAY 223-40
PWS	WNH	8H	WNH17PINKB	WALLY NOERENBERG H	86	2017	2018	130,100,000	LAKE BAY 223-40
PWS	WNH	8H	WNH18PINKB	WALLY NOERENBERG H	188	2018	2019	135,600,000	LAKE BAY 223-40
PWS	WNH	8H	WNH19PINKB	WALLY NOERENBERG H	47	2019	2020	132,500,000	LAKE BAY 223-40
PWS	WNH	8H	WNH20PINKB	WALLY NOERENBERG H	33	2020	2021	88,343,000	LAKE BAY 223-40
KOD	KBH	3,2H	KITOI17PINK	KITOI BAY H	0	2017	2018	18,364,905	KITOI BAY 252-31
KOD	KBH	7H	KITOI18PINK	KITOI BAY H	32	2018	2019	29,049,062	KITOI BAY 252-31
KOD	KBH	7H	KITOI19PINK	KITOI BAY H	70	2019	2020	175,359,011	KITOI BAY 252-31

Facility–release area	Est. total harvest[c]	Percent (%) of harvest	Total release	Percent (%) of PWS marks by facility[f]
TBLH–LCI:	1,545,270	92.2	240,155,300	
PGH–LCI:	114,438	6.8	48,957,165	
AFKH–PWS:	3,611	0.2	630,400,000	**21.7**
CCH–PWS:	1,010	0.1	638,600,000	**6.1**
SGH–PWS:	9,402	0.6	406,476,799	**56.6**
WNH–PWS:	2,585	0.2	551,843,000	**15.6**
KBH–KOD:	102	0.0	222,772,978	
Sum total–all facilities:	1,676,418	100.0	2,739,205,242	

[a] Area: LCI = Lower Cook Inlet, PWS = Prince William Sound, KOD = Kodiak.

[b] Facility: TBLH = Tutka Bay Lagoon Hatchery, CIAA; PGH = Port Graham Hatchery, CIAA; AFKH = Armin F. Koernig Hatchery, PWSAC; CCH = Cannery Creek Hatchery, PWSAC; SGH = Solomon Gulch Hatchery, VFDA; WNH = Wally Noerenberg Hatchery, PWSAC; KBH = Kitoi Bay Hatchery, KRAA.

[c] Harvest total includes all commercial (set gillnet and purse seine) and hatchery cost recovery (HCR) harvests from 2018 to 2022. Estimated total harvest of hatchery fish by Mark ID may differ slightly from the estimated total hatchery harvest by area in report tables due to rounding errors across groups.

[d] Poorly executed otolith marks which resulted in variants or no discernable mark.

[e] Mark ID included dry-marked otoliths.

[f] PWS hatchery facility proportions (in **bold**) are relative to the total number of marked PWS fish, not total harvest.

Appendix C2.–Estimate of hatchery-area proportion and contribution for pink salmon harvested in the commercial set gillnet (SGN) fishery in the Southern District of Lower Cook Inlet, 2018–2022.

				Hatchery area[c]											
				LCI		PWS		KOD		Other		All marks		Unmarked	
Year	Statistical area[a]	Total harvest	n[b]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2018	24100	56,709	665	43.8	24,839	4.2	2,382	0.0	0	0.0	0	48.0	27,221	52.0	29,488
2019	24100	6,423	285	28.8	1,850	9.5	610	0.0	0	0.0	0	38.3	2,460	61.7	3,963
2020	24100	35,160	766	48.3	16,982	9.9	3,481	0.1	35	0.0	0	58.3	20,498	41.7	14,662
2021	24100	3,499	762	5.1	178	34.3	1,200	0.0	0	0.0	0	39.4	1,378	60.6	2,121
2022	24100	8,782	448	27.5	2,415	12.5	1,098	0.0	0	0.0	0	40.0	3,513	60.0	5,269
Total sum[d]:		110,573	2,926	**84.0**	46,264	**15.9**	8,771	**0.1**	35	**0.0**	0	49.8	55,070	50.2	55,503
Min:		3,499	285	5.1	178	4.2	610	0.0	0	0.0	0	38.3	1,378	41.7	2,121
Max:		56,709	766	48.3	24,839	34.3	3,481	0.1	35	0.0	0	58.3	27,221	61.7	29,488
Mean:		22,115	585	30.7	9,253	14.1	1,754	0.0	7	0.0	0	44.8	11,014	55.2	11,101

Note: # = number of fish; Est. = estimated.

[a] Because all SGN samples were mixed prior to sampling, statistical area 24100 represents all stat areas in the Southern District with SGN harvest.

[b] n: number of sampled otoliths by strata.

[c] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, Other = all other management area hatchery marks, Unmarked = wild fish.

[d] Hatchery area proportions associated with total sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

Appendix C3.–Estimate of hatchery-area proportion and contribution for pink salmon harvested in the commercial purse seine (PS) fishery by statistical area in the Southern District of Lower Cook Inlet, 2018–2022.

				Hatchery area[b]											
				LCI		PWS		KOD		Other		All marks		Unmarked	
Year	Statistical area	Total harvest	n[a]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2018	24106	125,394	1,105	86.2	108,090	0.4	502	0.0	0	0.0	0	86.6	108,592	13.4	16,802
2018	24107	30,365	362	88.1	26,752	0.6	182	0.0	0	0.0	0	88.7	26,934	11.3	3,431
2018	24114	49	49	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	100.0	49
2018	24120	305,995	173	33.5	102,508	1.2	3,672	0.0	0	0.0	0	34.7	106,180	65.3	199,815
2018	24190	3,861	20	25.0	965	5.0	193	0.0	0	0.0	0	30.0	1,158	70.0	2,703
2019	24106	5,602	268	56.7	3,176	1.5	84	0.0	0	0.0	0	58.2	3,260	41.8	2,342
2019	24115	1,387	48	0.0	0	2.1	29	0.0	0	0.0	0	2.1	29	97.9	1,358
2019	24190	5,083	113	3.5	178	0.0	0	0.0	0	0.0	0	3.5	178	96.5	4,905
2019	24191	5,847	48	16.7	976	0.0	0	0.0	0	0.0	0	16.7	976	83.3	4,871
2019	24193	4,942	138	13.0	642	0.0	0	0.0	0	0.0	0	13.0	642	87.0	4,300
2020	24106	71,552	330	94.5	67,617	1.2	859	0.0	0	0.0	0	95.7	68,476	4.3	3,076
2020	24107	43,916	491	87.0	38,207	0.6	263	0.0	0	0.0	0	87.6	38,470	12.4	5,446
2020	24120	853	150	70.7	603	0.0	0	0.0	0	0.0	0	70.7	603	29.3	250
2020	24191	4,007	57	80.7	3,234	0.0	0	0.0	0	0.0	0	80.7	3,234	19.3	773
2021	24106	33,853	520	76.2	25,796	1.0	339	0.2	68	0.0	0	77.4	26,203	22.6	7,650
2021	24115	42	26	23.1	10	0.0	0	0.0	0	0.0	0	23.8	10	76.9	32
2021	24191	6,078	270	51.1	3,106	1.5	91	0.0	0	0.0	0	52.6	3,197	47.4	2,881
2022	24106	3,183	142	61.3	1,951	0.0	0	0.0	0	0.0	0	61.3	1,951	38.7	1,232
2022	24191	426	64	68.8	293	1.6	7	0.0	0	0.0	0	70.4	300	29.6	126
Total sum[c]:		652,435	4,374	**98.4**	384,104	**1.6**	6,221	**0.0**	68	**0.0**	0	59.8	390,393	40.2	262,042
24106		239,584	2,365	**99.1**	206,630	**0.9**	1,784	**0.0**	68	**0.0**	0	87.0	208,482	13.0	31,102
24107[c]		74,281	853	**99.3**	64,959	**0.7**	445	**0.0**	0	**0.0**	0	88.0	65,404	12.0	8,877
24114		49	49	**0.0**	0	**0.0**	0	**0.0**	0	**0.0**	0	0.0	0	100.0	49
24115		1,429	74	**25.6**	10	**74.4**	29	**0.0**	0	**0.0**	0	2.7	39	97.3	1,390
24120		306,848	323	**96.6**	103,111	**3.4**	3,672	**0.0**	0	**0.0**	0	34.8	106,783	65.2	200,065
24190		8,944	133	**85.6**	1,143	**14.4**	193	**0.0**	0	**0.0**	0	14.9	1,336	85.1	7,608
24191		16,358	439	**98.7**	7,609	**1.3**	98	**0.0**	0	**0.0**	0	47.1	7,707	52.9	8,651
24193		4,942	138	**100.0**	642	**0.0**	0	**0.0**	0	**0.0**	0	13.0	642	87.0	4,300

Note: # = number of fish; Est. = estimated.

[a] n: number of sampled otoliths by strata.

[b] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, Other = all other management area hatchery marks, Unmarked = wild fish.

[c] Hatchery area proportions associated with total and subdistrict sums (in **bold**) are relative to the total number of marked fish, not total harvest. The Tutka Bay Lagoon Hatchery SHA is statistical area 24107. Total marked to unmarked proportions are relative to the total harvest.

Appendix C4.–Estimate of hatchery-area proportion and contribution for pink salmon harvested in the hatchery cost-recovery (HCR) fishery by statistical area in the Southern District of Lower Cook Inlet, 2018–2022.

				Hatchery area[c]									
				LCI		PWS		KOD		Other		All marks		Unmarked	
Year	Statistical area	Total harvest[a]	n[b]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2018	24107	939,967	89	92.1	865,710	0.0	0	0.0	0	0.0	0	92.1	865,710	7.9	74,257
2019	NS	[a]	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2020	NS	[a]	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2021	24107	303,169	190	84.2	255,268	0.5	1,516	0.0	0	0.0	0	84.7	256,784	15.3	46,385
2022	24107	49,896	96	92.7	46,254	0.0	0	0.0	0	0.0	0	92.7	46,254	7.3	3,642
Total sum[d]:		1,293,032	375	**99.9**	1,167,232	**0.1**	1,516	**0.0**	0	**0.0**	0	90.4	1,168,748	9.6	124,284
Min:		49,896	89	84.2	46,254	0.0	0	0	0	0.0	0	84.7	46,254	7.3	3,642
Max:		939,967	190	92.7	865,710	0.5	1,516	0	0	0.0	0	92.7	865,710	15.3	74,257
Mean:		431,011	125	89.7	389,077	0.2	505	0.0	0	0.0	0	89.8	389,583	10.2	41,428

Note: NS = no samples collected; # = number of fish; Est. = estimated.

[a] The total hatchery cost recovery harvest of pink salmon for 2019 (179,659) and 2020 (795,068) is not included because contribution estimates could not be made that year.

[b] n: number of sampled otoliths by strata.

[c] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, Other = all other management area hatchery marks, Unmarked = wild fish.

[d] Hatchery area proportions associated with total sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

Appendix C5.–Estimate of hatchery-area proportion and contribution for pink salmon harvested in the commercial set gillnet (SGN) fishery (sampled strata only) by statistical week in the Southern District of Lower Cook Inlet, 2018–2022.

					Hatchery area[c]											
					LCI		PWS		KOD		Other		All marks		Unmarked	
Year	Stat area[a]	Stat week	Total harvest	n[b]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2018	24100	25	28	94	22.3	6	11.7	3	0.0	0	0.0	0	32.1	9	66.0	18
2018	24100	29	11,038	192	38.5	4,250	1.0	110	0.0	0	0.0	0	39.5	4,360	60.4	6,667
2018	24100	30	15,123	189	60.8	9,195	2.1	318	0.0	0	0.0	0	62.9	9,513	37.0	5,596
2018	24100	31	15,318	190	42.6	6,525	5.8	888	0.0	0	0.0	0	48.4	7,413	51.6	7,904
2019	24100	31	970	96	41.7	404	7.3	71	0.0	0	0.0	0	49.0	475	51.0	495
2019	24100	32	659	94	28.7	189	10.6	70	0.0	0	0.0	0	39.3	259	60.6	399
2019	24100	33	718	95	15.8	113	10.5	75	0.0	0	0.0	0	26.2	188	73.7	529
2020	24100	28	2,465	143	25.9	638	25.2	621	0.0	0	0.0	0	51.1	1,259	49.0	1,208
2020	24100	29	9,836	166	73.5	7,229	3.6	354	0.0	0	0.0	0	77.1	7,583	22.9	2,252
2020	24100	30	7,300	270	33.0	2,409	11.1	810	0.0	0	0.0	0	44.1	3,219	55.9	4,081
2020	24100	31	8,540	187	65.2	5,568	2.1	179	0.5	43	0.0	0	67.8	5,790	32.1	2,741
2021	24100	27	280	95	2.1	6	24.2	68	0.0	0	0.0	0	26.4	74	73.7	206
2021	24100	28	359	205	6.8	24	20.5	74	0.0	0	0.0	0	27.3	98	72.7	261
2021	24100	29	1,947	208	2.4	47	60.6	1,180	0.0	0	0.0	0	63.0	1,227	37.0	720
2021	24100	30	821	191	7.3	60	27.7	227	0.0	0	0.0	0	35.0	287	64.9	533
2021	24100	31	88	63	6.3	6	27.0	24	0.0	0	0.0	0	34.1	30	66.7	59
2022	24100	29	673	95	14.7	99	7.4	50	0.0	0	0.0	0	22.1	149	77.9	524
2022	24100	30	2,284	144	21.5	491	22.2	507	0.0	0	0.0	0	43.7	998	56.2	1,284
2022	24100	31	4,068	169	43.2	1,757	7.1	289	0.0	0	0.0	0	50.3	2,046	49.7	2,022
2022	24100	32	1,277	40	12.5	160	12.5	160	0.0	0	0.0	0	25.1	320	75.0	958
Total sum[d]:			83,792	2,926	**86.5**	39,176	**13.4**	6,078	**0.1**	43	**0.0**	0	54.1	45,297	45.9	38,457
2018			41,507	665	**93.8**	19,976	**6.2**	1,319	**0.0**	0	**0.0**	0	51.3	21,295	48.6	20,185
2019			2,347	285	**76.6**	706	**23.4**	216	**0.0**	0	**0.0**	0	39.3	922	60.6	1,423
2020			28,141	766	**88.8**	15,844	**11.0**	1,964	**0.2**	43	**0.0**	0	63.4	17,851	36.5	10,282
2021			3,495	762	**8.3**	143	**91.7**	1,573	**0.0**	0	**0.0**	0	49.1	1,716	50.9	1,779
2022			8,302	448	**71.4**	2,507	**28.6**	1,006	**0.0**	0	**0.0**	0	42.3	3,513	57.7	4,788

Note: # = number of fish; Est. = estimated.

[a] Because all SGN samples were mixed prior to sampling, statistical area 24100 represents all stat areas in the Southern District with SGN harvest.

[b] n: number of sampled otoliths by strata.

[c] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, Other = all other management area hatchery marks, Unmarked = wild fish.

[d] Hatchery area proportions associated with total and annual sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

Appendix C6.–Estimate of hatchery-area proportion and contribution for pink salmon harvested in the commercial purse seine (PS) fishery (sampled strata only) by statistical area and statistical week in the Southern District of Lower Cook Inlet, 2018–2022.

					Hatchery area[b]											
					LCI		PWS		KOD		Other		All marks		Unmarked	
Year	Stat area	Stat week	Total harvest	n[a]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2018	24106	28	20,135	32	81.2	16,350	0.0	0	0.0	0	0.0	0	81.2	16,350	18.8	3,785
2018	24106	29	13,863	261	86.6	12,005	0.4	55	0.0	0	0.0	0	87.0	12,060	13.0	1,802
2018	24106	30	28,074	279	89.6	25,154	0.4	112	0.0	0	0.0	0	90.0	25,266	10.0	2,807
2018	24106	31	45,858	360	86.4	39,621	0.6	275	0.0	0	0.0	0	87.0	39,896	13.1	6,007
2018	24106	32	15,210	173	80.3	12,214	0.0	0	0.0	0	0.0	0	80.3	12,214	19.7	2,996
2019	24106	29	1,651	104	62.5	1,032	0.0	0	0.0	0	0.0	0	62.5	1,032	37.5	619
2019	24106	30	1,561	76	52.6	821	0.0	0	0.0	0	0.0	0	52.6	821	47.4	740
2019	24106	31	88	88	53.4	47	4.5	4	0.0	0	0.0	0	58.0	51	42.0	37
2020	24106	29	940	45	93.3	877	0.0	0	0.0	0	0.0	0	93.3	877	6.7	63
2020	24106	30	25,859	108	97.2	25,135	2.8	724	0.0	0	0.0	0	100.0	25,859	0.0	0
2020	24106	32	3,231	177	93.2	3,011	0.6	19	0.0	0	0.0	0	93.8	3,030	6.2	200
2021	24106	29	3,633	94	80.9	2,939	1.1	40	0.0	0	0.0	0	82.0	2,979	18.1	658
2021	24106	30	13,386	207	76.8	10,280	1.9	254	0.0	0	0.0	0	78.7	10,534	21.3	2,851
2021	24106	31	16,066	182	73.6	11,825	0.0	0	0.0	0	0.0	0	73.6	11,825	26.4	4,241
2021	24106	32	559	37	73.0	408	0.0	0	2.7	15	0.0	0	75.7	423	24.3	136
2022	24106	30	95	95	60.0	57	0.0	0	0.0	0	0.0	0	60.0	57	40.0	38
2022	24106	31	3,078	47	63.8	1,964	0.0	0	0.0	0	0.0	0	63.8	1,964	36.2	1,114
2018	24107	33	20,502	269	85.9	17,611	0.7	144	0.0	0	0.0	0	86.6	17,755	13.4	2,747
2018	24107	36	6,440	93	94.6	6,092	0.0	0	0.0	0	0.0	0	94.6	6,092	5.4	348
2020	24107	31	22,441	207	91.3	20,489	0.0	0	0.0	0	0.0	0	91.3	20,489	8.7	1,952
2020	24107	32	13,623	95	91.6	12,479	1.1	150	0.0	0	0.0	0	92.7	12,629	7.4	1,008
2020	24107	33	7,852	189	79.9	6,274	1.1	86	0.0	0	0.0	0	81.0	6,360	19.0	1,492
2018	24114	32	49	49	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	100.0	49
2019	24115	28	215	19	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	100.0	215
2019	24115	32	318	29	0.0	0	3.4	11	0.0	0	0.0	0	3.5	11	96.6	307
2021	24115	31	20	20	20.0	4	0.0	0	0.0	0	0.0	0	20.0	4	80.0	16
2021	24115	32	22	6	33.3	7	0.0	0	0.0	0	0.0	0	31.8	7	66.7	15
2018	24120	32	121,118	173	33.5	40,575	1.2	1,453	0.0	0	0.0	0	34.7	42,028	65.3	79,090

-continued-

Appendix C6.–Page 2 of 2.

					Hatchery area[b]											
					LCI		PWS		KOD		Other		All marks		Unmarked	
Year	Stat area	Stat week	Total harvest	n[a]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2020	24120	34	853	150	70.7	603	0.0	0	0.0	0	0.0	0	70.7	603	29.3	250
2018	24190	30	11	11	27.3	3	9.1	1	0.0	0	0.0	0	36.4	4	63.6	7
2018	24190	33	9	9	22.2	2	0.0	0	0.0	0	0.0	0	22.2	2	77.8	7
2019	24190	28	1,494	65	6.2	93	0.0	0	0.0	0	0.0	0	6.2	93	93.8	1,401
2019	24190	29	1,500	39	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	100.0	1,500
2019	24190	30	559	9	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	100.0	559
2019	24191	27	663	7	42.9	284	0.0	0	0.0	0	0.0	0	42.8	284	57.1	379
2019	24191	28	3,200	41	12.2	390	0.0	0	0.0	0	0.0	0	12.2	390	87.8	2,810
2020	24191	29	1,398	6	83.3	1,165	0.0	0	0.0	0	0.0	0	83.3	1,165	16.7	233
2020	24191	30	2,342	51	80.4	1,883	0.0	0	0.0	0	0.0	0	80.4	1,883	19.6	459
2021	24191	31	131	128	54.7	72	2.3	3	0.0	0	0.0	0	57.3	75	43.0	56
2021	24191	32	344	142	47.9	165	0.7	2	0.0	0	0.0	0	48.5	167	51.4	177
2022	24191	31	392	64	68.8	270	1.6	6	0.0	0	0.0	0	70.4	276	29.7	116
2019	24193	28	1,494	25	8.0	120	0.0	0	0.0	0	0.0	0	8.0	120	92.0	1,374
2019	24193	29	375	53	15.1	57	0.0	0	0.0	0	0.0	0	15.2	57	84.9	318
2019	24193	30	1,326	60	13.3	176	0.0	0	0.0	0	0.0	0	13.3	176	86.7	1,150
Total sum[c]:			401,978		**98.8**	272,554	**1.2**	3,339	**0.0**	15	**0.0**	0	68.6	275,908	31.4	126,129
24106			193,287	2,365	**99.1**	163,740	**0.9**	1,483	**0.0**	15	**0.0**	0	85.5	165,238	14.5	28,094
24107			70,858	853	**99.4**	62,945	**0.6**	380	**0.0**	0	**0.0**	0	89.4	63,325	10.7	7,547
24114			49	49	**0.0**	0	**0.0**	0	**0.0**	0	**0.0**	0	0.0	0	100.0	49
24115			575	74	**50.0**	11	**50.0**	11	**0.0**	0	**0.0**	0	3.8	22	96.2	553
24120			121,971	323	**96.6**	41,178	**3.4**	1,453	**0.0**	0	**0.0**	0	35.0	42,631	65.0	79,340
24190			3,573	133	**99.0**	98	**1.0**	1	**0.0**	0	**0.0**	0	2.8	99	97.2	3,474
24191			8,470	439	**99.7**	4,229	**0.3**	11	**0.0**	0	**0.0**	0	50.1	4,240	49.9	4,230
24193			3,195	138	**100.0**	353	**0.0**	0	**0.0**	0	**0.0**	0	11.0	353	89.0	2,842

Note: # = number of fish; Est. = estimated.

[a] n: number of sampled otoliths by strata.

[b] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, Other = all other management area hatchery marks, Unmarked = wild fish.

[c] Hatchery area proportions associated with total and subdistrict sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

Appendix C7.–Estimate of hatchery-area proportion and contribution for pink salmon harvested in the hatchery cost-recovery (HCR) fishery (sampled strata only) by statistical area and statistical week in the Southern District of Lower Cook Inlet, 2018–2022.

					Hatchery area[b]											
					LCI		PWS		KOD		Other		All marks		Unmarked	
Year	Stat area	Stat week	Total harvest	n[a]	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #	Est. %	Est. #
2018	24107	30	117,377	89	92.1	108,104	0.0	0	0.0	0	0.0	0	92.1	108,104	7.9%	9,273
2021	24107	30	77,149	95	93.7	72,289	0.0	0	0.0	0	0.0	0	93.7	72289	6.3%	4,860
2021	24107	33	83,506	95	74.7	62,379	1.1	919	0.0	0	0.0	0	75.8	63298	24.2%	20,208
2022	24107	30	13,341	96	92.7	12,367	0.0	0	0.0	0	0.0	0	92.7	12367	7.3%	974
Total sum[c]:			291,373	375	**99.6**	255,139	**0.4**	919	**0.0**	0	**0.0**	0	87.9	256,058	12.1	35,315

Note: # = number of fish; Est. = estimated.

[a] n: number of sampled otoliths by strata.

[b] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, Other = all other management area hatchery marks, Unmarked = wild fish.

[c] Hatchery area proportions associated with total sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

Appendix C8.–Estimated hatchery contribution by strata and hatchery area to sampled pink salmon commercial harvest in the Southern District of Lower Cook Inlet, 2018–2022.

			Est. hatchery area contribution to sampled harvest (C_{Sh})										
			LCI[c]		PWS[c]		KOD[c]		Other[c]		All marks		Total
Year	Harvest type[a]	Gear type[b]	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. %	harvest
2018	CH	SGN	24,839	1,092	2,382	442	0	0	0	0	27,221	48.0	56,709
2018	CH	PS	238,315	11,110	4,549	2,515	0	0	0	0	242,864	51.1	475,425
2018	HCR	PS	865,710	26,973	0	0	0	0	0	0	865,710	86.8	997,518
2019	CH	SGN	1,850	173	610	112	0	0	0	0	2,460	38.3	6,423
2019	CH	PS	4,972	397	113	51	0	0	0	0	5,085	22.1	23,005
2019	HCR	PS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	179,659
2020	CH	SGN	16,982	635	3,481	380	35	46	0	0	20,498	58.3	35,160
2020	CH	PS	109,661	1,138	1,122	459	0	0	0	0	110,783	91.0	121,739
2020	HCR	PS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	795,068
2021	CH	SGN	178	28	1,200	60	0	0	0	0	1,378	39.4	3,500
2021	CH	PS	28,912	660	430	152	68	65	0	0	29,410	70.2	41,907
2021	HCR	PS	255,268	8,041	1,516	1,596	0	0	0	0	256,784	84.7	303,169
2022	CH	SGN	2,415	185	1,098	137	0	0	0	0	3,513	40.0	8,793
2022	CH	PS	2,244	133	7	7	0	0	0	0	2,251	39.0	5,770
2022	HCR	PS	46,254	1,331	0	0	0	0	0	0	46,254	92.7	49,896

	Est. #	Est. %[d]	Est. #	Est. %[d]	Est. #	Est. %[d]	Est. #	Est. %[d]	Est. #	Total harvest
Total sum (all types):	1,597,600	**99.0**	16,508	**1.0**	103	**0.0**	0	**0.0**	1,614,211	3,103,741
CH (excl. HCR) sum:	430,368	**96.6**	14,992	**3.4**	103	**0.0**	0	**0.0**	445,463	778,431
HCR sum:	1,167,232	**99.9**	1,516	**0.1**	0	**0.0**	0	**0.0**	1,168,748	2,325,310
SGN sum:	46,264	**84.0**	8,771	**15.9**	35	**0.1**	0	**0.0**	55,070	110,585
PS sum:	384,104	**98.4**	6,221	**1.6**	68	**0.0**	0	**0.0**	390,393	667,846

Note: NS = not sampled; # = number of fish; Est. = estimated.

[a] Harvest type: CH = Commercial harvest (excluding cost recovery), HCR = Hatchery cost recovery.

[b] Gear type: SGN = Set gillnet, PS = Purse seine.

[c] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, Other = all other management area hatchery marks, Unmarked = wild fish.

[d] Hatchery area proportions associated with total and harvest type sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

Appendix C9.–Estimated hatchery contribution by strata and hatchery area to unsampled pink salmon commercial harvest in the Southern District of Lower Cook Inlet, 2018–2022.

			Est. hatchery area contribution to unsampled harvest (C_{Uh})										
			LCI[c]		PWS[c]		KOD[c]		Other[c]		All marks		Total
Year	Harvest type[a]	Gear type[b]	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. SE	Est. #	Est. %	harvest
2018	CH	PS	4,998	5	98	0	0	0	0	0	5,096	1.1	475,425
2018	HCR	PS	53,004	11	0	0	0	0	0	0	53,004	5.3	997,518
2019	CH	PS	31	0	1	0	0	0	0	0	32	0.1	23,005
2020	CH	PS	1,285	0	13	0	0	0	0	0	1,298	1.1	121,739
2021	CH	PS	1,398	1	21	0	4	0	0	0	1,423	3.4	41,907
2022	CH	PS	1,342	9	4	0	0	0	0	0	1,346	23.3	5,770
			Est. #	Est. %[d]	Est. #	Est. %[d]	Est. #	Est. %[d]	Est. #	Est. %[d]	Est. #		Total harvest
Total sum:			62,058	**99.8**	137	**0.2**	4	**0.0**	0	**0.0**	62,199		1,665,364
Min:			31		0		0		0		32		5,770
Max:			53,004		98		4		0		53,004		997,518
Mean:			10,343		23		1		0		10,367		277,561

Note: # = number of fish; Est. = estimated.

[a] Harvest type: CH = Commercial harvest (excluding cost recovery), HCR = Hatchery cost recovery.

[b] Gear type: SGN = Set gillnet, PS = Purse seine.

[c] Hatchery area: LCI = Lower Cook Inlet hatchery mark, PWS = Prince William Sound hatchery mark, KOD = Kodiak hatchery mark, Other = all other management area hatchery marks, Unmarked = wild fish.

[d] Hatchery area proportions associated with total sums (in **bold**) are relative to the total number of marked fish, not total harvest. Total marked to unmarked proportions are relative to the total harvest.

APPENDIX D: EXVESSEL VALUE AND HATCHERY CONTRIBUTION

Appendix D1.–Magnitude and value (total and hatchery contribution) of the sockeye salmon commercial harvest in the Southern District of Lower Cook Inlet, stratified by year, harvest type, and gear type, 2018–2022.

Year	Harvest type[a]	Gear type[b]	Total harvest (n fish)	Hatchery harvest (n fish)	Total harvest value ($)	Hatchery harvest value ($)	Hatchery harvest value (%)	Avg. weight (lb)/fish	$/lb	Source for average weight and $/lb
2018	CH	SGN	15,259	2,686	203,518	35,825	17.6	5.21	$2.56	Hollowell et al. 2019, Table 3
2018	CH	PS	59,129	40,111	556,759	377,685	67.8	4.40	$2.14	Hollowell et al. 2019, Table 3
2018	HCR	PS	68,979	66,703	876,896	847,962	96.7	3.75	$3.39	Hollowell et al. 2019, Table 3
2019	CH	SGN	29,381	3,321	357,755	40,438	11.3	5.56	$2.19	Hollowell et al. 2022a, Table 3
2019	CH	PS	50,652	23,959	494,728	234,012	47.3	4.21	$2.32	Hollowell et al. 2022a, Table 3
2019	HCR	PS	12,586	12,460	118,973	117,782	99.0	4.48	$2.11	Hollowell et al. 2022a, Table 3
2020	CH	SGN	12,507	1,025	131,778	10,800	8.2	5.09	$2.07	Hollowell et al. 2022b, Table 2
2020	CH	PS	68,851	40,721	474,487	280,629	59.1	3.85	$1.79	Hollowell et al. 2022b, Table 2
2020	HCR	PS	15,892	NA	184,449	NA	NA	4.03	$2.88	Hollowell et al. 2022b, Table 2
2021	CH	SGN	13,123	2,414	165,678	30,477	18.4	5.05	$2.50	Hollowell et al. 2022c, Table 2
2021	CH	PS	74,969	52,050	641,735	445,548	69.4	4.00	$2.14	Hollowell et al. 2022c, Table 2
2021	HCR	PS	35,069	35,069	408,456	408,456	100.0	4.22	$2.76	Hollowell et al. 2022c, Table 2
2022	CH	SGN	26,855	4,109	301,402	46,117	15.3	5.37	$2.09	Hollowell et al. 2023, Table 2
2022	CH	PS	82,124	69,816	766,972	652,026	85.0	4.49	$2.08	Hollowell et al. 2023, Table 2
2022	HCR	PS	26,121	26,121	241,201	241,201	100.0	4.05	$2.28	Hollowell et al. 2023, Table 2
Total sum (all types):			575,605	380,565	5,740,336	3,768,956	65.7	[c]		
CH (excl. HCR) sum:			432,850	240,212	4,094,811	2,153,555	52.6			
SGN sum:			97,125	13,555	1,160,130	163,656	14.1			
PS sum:			335,725	226,657	2,934,681	1,989,900	67.8			
HCR sum:			142,755	140,353	1,645,525	1,615,401	98.2	[c]		

Note: n = number of fish; NA = not available.

[a] Harvest type: CH = commercial harvest (excluding cost recovery), HCR = hatchery cost recovery.

[b] Gear type: SGN = set gillnet, PS = purse seine.

[c] The total and hatchery cost recovery harvest (HCR) sums do not include the HCR harvest in 2020 (15,892) because hatchery contributions could not be estimated due to lack of samples that year.

Appendix D2.–Magnitude and value (total and hatchery contribution) of the pink salmon commercial harvest in the Southern District of Lower Cook Inlet, stratified by year, harvest type, and gear type, 2018–2022.

Year	Harvest type	Gear type	Total harvest (n fish)	Hatchery harvest (n fish)	Total harvest value ($)	Hatchery harvest value ($)	Hatchery harvest value (%)	Avg. weight (lb)/fish	$/lb	Source for average weight and $/lb
2018	CH	SGN	56,709	27,221	40,621	19,498	48.0	3.77	0.19	Hollowell et al. 2019, Table 3
2018	CH	PS	475,425	247,960	723,121	377,147	52.2	3.90	0.39	Hollowell et al. 2019, Table 3
2018	HCR	PS	997,518	918,714	1,566,901	1,443,116	92.1	3.57	0.44	Hollowell et al. 2019, Table 3
2019	CH	SGN	6,423	2,460	5,700	2,183	38.3	3.55	0.25	Hollowell et al. 2022a, Table 3
2019	CH	PS	23,005	5,117	21,602	4,805	22.2	3.13	0.30	Hollowell et al. 2022a, Table 3
2019	HCR	PS	179,659	NA	223,352	NA	NA	2.96	0.42	Hollowell et al. 2022a, Table 3
2020	CH	SGN	35,160	20,498	30,347	17,692	58.3	4.11	0.21	Hollowell et al. 2022b, Table 2
2020	CH	PS	121,739	112,081	130,979	120,588	92.1	3.71	0.29	Hollowell et al. 2022b, Table 2
2020	HCR	PS	795,068	NA	1,242,214	NA	NA	3.72	0.42	Hollowell et al. 2022b, Table 2
2021	CH	SGN	3,499	1,378	3,429	1,350	39.4	3.92	0.25	Hollowell et al. 2022c, Table 2
2021	CH	PS	41,907	30,833	44,656	32,856	73.6	3.33	0.32	Hollowell et al. 2022c, Table 2
2021	HCR	PS	303,169	256,784	411,825	348,815	84.7	2.83	0.48	Hollowell et al. 2022c, Table 2
2022	CH	SGN	8,782	3,513	7,264	2,906	40.0	3.76	0.22	Hollowell et al. 2023, Table 2
2022	CH	PS	5,767	3,597	8,097	5,050	62.4	3.60	0.39	Hollowell et al. 2023, Table 2
2022	HCR	PS	49,896	46,254	108,544	100,621	92.7	2.98	0.73	Hollowell et al. 2023, Table 2
Total sum (all types):			2,128,999	1,676,410	3,103,086	2,476,628	79.8	[c]		
CH (excl. HCR) sum:			778,416	454,658	1,015,816	584,076	57.5			
SGN sum:			110,573	55,070	87,361	43,630	49.9			
PS sum:			667,843	399,588	928,455	540,446	58.2			
HCR sum:			1,350,583	1,221,752	2,087,270	1,892,552	90.7	[c]		

Note: n = number of fish; NA = not available.

[a] Harvest type: CH = commercial harvest (excluding cost recovery), HCR = hatchery cost recovery.

[b] Gear type: SGN = set gillnet, PS = purse seine.

[c] The total and hatchery cost recovery harvest (HCR) sums do not include the HCR harvest in 2019 (179,659) or 2020 (795,068) because hatchery contributions could not be estimated due to lack of samples those years.