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Hugh Smith Lake Sockeye Salmon Stock Status and Action Plan, 2025

by

Bo L. Meredith

Teresa M. Fish

Andrew W. Piston

and

Kelly S. Reppert

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Alaska Department of Fish and Game **Division of Commercial Fisheries**

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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

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by
Bo L. Meredith, Teresa M. Fish, Andrew W. Piston
Alaska Department of Fish and Game, Division of Commercial Fisheries, Ketchikan
and
Kelly S. Reppert
Alaska Department of Fish and Game, Division of Sport Fish, Ketchikan

Alaska Department of Fish and Game
Division of Commercial Fisheries
802 3rd, Douglas, Alaska, 99824-0020

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Bo L. Meredith, Teresa M. Fish, Andrew W. Piston,
Alaska Department of Fish and Game, Division of Commercial Fisheries,
2030 Sea Level Drive, Suite 205, Ketchikan, AK, 99901

and

Kelly S. Reppert
Alaska Department of Fish and Game, Division of Sport Fish,
2030 Sea Level Drive, Suite 205, USA

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ABSTRACT

In response to guidelines established in the *Policy for the Management of Sustainable Salmon Fisheries* (5 AAC 39.22), the Alaska Department of Fish and Game recommended that the Hugh Smith Lake sockeye salmon *Oncorhynchus nerka* run be designated as a *stock of management concern*. A *management concern* is defined in policy as "a concern arising from a chronic inability, despite use of specific management measures, to maintain escapements for a salmon stock within the bounds of the sustainable escapement goal, biological escapement goal, optimal escapement goal (OEG), or other specified management objectives for the fishery." Hugh Smith Lake sockeye salmon escapements were below the lower bound of the current OEG range of 8,000–18,000 fish for 6 consecutive years, 2018–2023. Hugh Smith Lake sockeye salmon are harvested primarily in commercial net fisheries, as identified by past stock assessment information and current genetic stock identification analyses. This action plan report provides stock assessment information and presents actions for reducing the harvest of Hugh Smith Lake sockeye salmon in commercial, personal use, and sport fisheries approved by the Alaska Board of Fisheries.

Keywords: sockeye salmon, *Oncorhynchus nerka*, Hugh Smith Lake, optimal escapement goal, Southeast Alaska, stock of concern, sustainable salmon fisheries policy, Alaska Board of Fisheries, action plan

INTRODUCTION

The *Policy for Management of Sustainable Salmon Fisheries* (5 AAC 39.222) directs the Alaska Department of Fish and Game (department) to provide the Alaska Board of Fisheries (board) with reports on the status of salmon stocks and identify any salmon stocks that present a concern related to yield, management, or conservation during regularly scheduled board meetings. At the October 2024 board work session, the department recommended, and the board adopted the Hugh Smith Lake sockeye salmon *Oncorhynchus nerka* run as a *stock of management concern*. This recommendation was based on guidelines established in the sustainable salmon fisheries policy, which describes a management concern as "a concern arising from a chronic inability, despite use of specific management measures, to maintain escapements for a salmon stock within the bounds" of the established escapement goal. This established escapement goal could refer to a sustainable escapement goal, biological escapement goal (BEG), optimal escapement goal (OEG), or other specified management objective. *Chronic inability* is further defined as the "continuing or anticipated inability to meet escapement thresholds over a 4 to 5-year period, which is approximately the generation time of most salmon species." Hugh Smith Lake sockeye salmon escapements were below the lower bound of the OEG of 8,000 to 18,000 fish for the past 6 consecutive years, 2018–2023.

This action plan provides the department's assessment of the Hugh Smith Lake sockeye salmon run as a stock of management concern, summarizes historical assessments of annual run sizes, and describes the existing regulations and emergency order (EO) authority that the department follows to manage the run. The plan outlines management actions for commercial, sport, and subsistence fisheries, as well as ongoing research projects for this stock. Criteria that must be met for future removal of the stock of concern designation are also outlined. The action plan was presented to the board and public as a draft for review at the 2025 Alaska board meeting on Southeast and Yakutat Finfish and Shellfish. Immediately following the meeting, the department updated this report with descriptions of management measures and other recommendations from the board related to the Hugh Smith Lake sockeye salmon stock of concern.

STOCK ASSESSMENT BACKGROUND

Hugh Smith Lake is located on mainland Southeast Alaska, 67 km southeast of Ketchikan, in Misty Fjords National Monument (Figure 1). The lake is organically stained and covers a surface area of 320 ha. It has a mean depth of 70 m, a maximum depth of 121 m, and a volume of 222.7×10^6 m^3

(Figure 2). Hugh Smith Lake is meromictic; an upper layer of freshwater sits on top and does not exchange with a layer of salt water located below a depth of 60 m. The lake empties into Boca de Quadra Inlet by way of Sockeye Creek (50 m long, ADF&G Anadromous Waters Catalog[1] number 101-30-10750). Sockeye salmon spawn in the 2 inlet streams: Buschmann Creek flows northwest 4 km to the head of the lake (ADF&G Anadromous Waters Catalog number 101-30-10750-2006, and Beaver Pond Channel 101-30-10750-2006-3003; Giefer and Blossom 2021); and Cobb Creek flows north 8 km to the southeast head of the lake (ADF&G Anadromous Waters Catalog number 101-30-10750-2004; Giefer and Blossom 2021; Figure 2). Accessible spawning habitat in Cobb Creek is limited by a barrier to anadromous migration approximately 0.8 km upstream from the lake. Beach spawning by sockeye salmon has not been documented in Hugh Smith Lake; the steep-sided rocky shore along the lake perimeter limits potential spawning areas primarily to the 2 inlet streams.

The Hugh Smith Lake sockeye salmon run has been an important contributor to commercial fisheries in southern Southeast Alaska for over a century. Terminal fisheries in Boca de Quadra Inlet supplied 2 canneries and a saltery (near the outlet of the lake) from the late 1800s to early 1900s (Rich and Ball 1933; Roppel 1982). A private hatchery was operated by various salmon packing companies at the head of Hugh Smith Lake from 1901 to 1903 and from 1908 to 1935. Numbers of adult salmon escaping into the lake were not recorded, but egg take records (Roppel 1982) indicated that 3,000–6,000 females were collected annually for broodstock. Moser (1898) concluded that despite overfishing, Hugh Smith Lake should produce annual runs of 50,000 sockeye salmon under average conditions.

The department counted adult salmon escapements through a weir at the outlet of Hugh Smith Lake from 1967 to 1971 and has continued to conduct stock assessment projects at the lake annually since 1980 (Figure 3). Beginning in the early 1980s, the lake was the subject of sockeye salmon enhancement and rehabilitation efforts that included nutrient enrichment from 1981 to 1984 (Peltz and Koenings 1989) and fry stocking from 1986 to 1997 (Geiger et al. 2003). Despite those enhancement efforts, sockeye salmon escapements steadily declined from an average 17,500 fish in the 1980s to 12,000 fish in the 1990s (Figure 3). Escapements averaged only 3,500 fish from 1998 to 2002, including the smallest escapement on record in 1998 (1,138 fish). Poor escapements were thought to be due primarily to high harvest rates in the commercial drift gillnet and purse seine fisheries (Burkett et al. 1989; Geiger et al. 2003). An informal escapement goal of 15,000–35,000 sockeye salmon was established for Hugh Smith Lake in the early 1990s (ADF&G 1993), but the goal was replaced with a BEG of 8,000–18,000 fish in 2003 (Geiger et al. 2003).

In 2003, the board designated the Hugh Smith Lake sockeye salmon run a stock of management concern because escapements had been below the new BEG for 5 consecutive years, 1998–2002 (Geiger et al. 2003). The board set an OEG of 8,000–18,000 sockeye salmon (5 AAC 33.390) that included spawning salmon of both wild and hatchery origin because, at that time, Southern Southeast Regional Aquaculture Association (SSRAA) was conducting a stocking program intended to increase sockeye salmon runs at the lake. The board adopted an action plan[2] that directed the department to review stock assessment and rehabilitation efforts and implemented conservation measures to reduce commercial harvests of Hugh Smith Lake sockeye salmon.

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[1] Alaska Department of Fish & Game. Anadromous Waters Catalog. Habitat Division, Conservation. https://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=main.home (accessed March 2023).

[2] Alaska Department of Fish & Game. 2003. Hugh Smith Lake sockeye salmon action plan, 2003. Final report to the Alaska Board of Fisheries RC-106. Alaska Department of Fish and Game, Division of Commercial Fisheries.

Fishery restrictions in the form of time and area closures (Figure 3) were implemented in the commercial drift gillnet and purse seine fisheries closest to the entrance of Boca de Quadra when escapements were projected to be below the lower bound of the escapement goal range.

From 2003 to 2007, the department estimated the contribution, distribution, and run timing of stocked Hugh Smith Lake sockeye salmon from recoveries of marked fish in the commercial net fisheries. Results from this project showed that fisheries management restrictions outlined in the action plan were appropriately timed to reduce harvests on this stock (Heinl et al. 2007). The department also conducted studies to identify factors in the freshwater environment that might limit juvenile sockeye salmon survival; however, none of the factors evaluated indicated increased mortality of juvenile sockeye salmon (Piston et al. 2006 and 2007; Piston 2008). Adult escapements (1998–2007) steadily improved from a low of 1,138 fish in 1998 to a high of 42,529 fish in 2006 (Piston et al. 2007); however, adults returning from the SSRAA stocking program made up a significant portion (58–65%) of escapements from 2003 to 2007 (Heinl et al. 2007; Piston 2008). The board removed the stock of concern designation in 2006 due to improved escapements (Geiger et al. 2005).

Sockeye salmon escapements surpassed the lower bound of the escapement goal in 13 of 15 years from 2003 through 2017 (Brunette and Piston 2019; Figure 3). This long series of escapements generally meeting or exceeding the escapement goal range came to an abrupt end in 2018. Juvenile sockeye salmon entering the marine environment from the 2013 and 2014 brood years that returned as adults in 2018 experienced the anomalously warm sea surface temperatures that persisted throughout the Gulf of Alaska from fall of 2013 through much of 2016 (Bond et al. 2015; Di Lorenzo and Mantua 2016; Walsh et al. 2018) and in 2018 and 2019. Survival of Hugh Smith Lake sockeye salmon was poor in subsequent years, and drought conditions in the fall of 2018 may have negatively impacted spawning success of the very small escapement in that year (Brunette and Piston 2019). Over the past decade, there was also a trend toward reduced size at age in multiple age classes of Hugh Smith Lake sockeye salmon, which was further indication of poor marine conditions (Fish and Piston 2022a; Brunette and Piston 2020; Figure 4). All recent escapements, from 2018 to 2024, have been below the OEG (Figure 3).

ESCAPEMENT

Sockeye salmon escapements at Hugh Smith Lake are counted through a weir located at the outlet of the lake, approximately 50 m upstream from salt water. Since 1982, the weir has been operated from at least mid-June to late October or early November to encompass the run timing of both the sockeye and coho salmon escapements. The current weir is an aluminum bipod, channel-and-picket design, approximately 27 m long, with an upstream trap operated in combination with a video camera to facilitate counting and sampling (Brunette and Piston 2020). In addition, mark–recapture studies have been conducted annually since 1992 to verify the weir count (Fish and Piston 2022b) and may be used instead of the weir count if substantial numbers of fish entered the lake before the weir was installed in mid-June or if fish passed the weir uncounted during extreme flood events. A subset of sockeye salmon are sampled at the weir to estimate the age, sex, and size composition of the escapement (Fish and Piston 2025; Figure 5).

Although Hugh Smith Lake escapements fell below the escapement goal range in nearly half (45%) the years on record (1980 to 2023), recent years have been persistently weak. The last 6 escapements (2018–2023) have been well below the escapement goal, averaging only 2,500 sockeye salmon (Figure 3, Appendix A1), and include all but 2 of the smallest escapements on

record (1990 and 1998). Over the last 5 years, the annual mean size at age for this stock has generally been less than the historical average for both sexes and all age classes (Figure 4). There has not been a shift in the age structure of the stock as the age at return remains within the historical bounds (Figure 5, Appendix A2).

SMOLT COUNTS

Hugh Smith Lake coho and sockeye salmon smolt have been counted and sampled annually from mid-April to early June at a smolt weir operated at the outlet of the lake, just upstream of the location of the adult weir. Smolt are captured in an incline plane trap incorporated with a smolt weir described in detail by Shaul et al. 2009. Smolt trap efficiencies are calculated using the coho salmon coded wire tag (CWT) mark fraction at the adult weir the following year, and smolt estimates are calculated by expanding the smolt count by the trap efficiency. Smolt are sampled to estimate the age and size composition of the population. In the 1980s and 1990s, CWT studies of Hugh Smith Lake sockeye salmon smolt provided information on commercial harvest of adult runs from 1989 to 1991 and 1994 to 1998 (Geiger et al. 2003).

Sockeye salmon smolt estimates averaged 196,000 fish since 1982 but have been below average since 2014. Only 23,000 fish were estimated in 2020, followed by new record lows of 19,000 in both 2021 and 2022 (Figure 6, Appendix A3). Smolt estimates were much higher in the last 2 years (121,000 and 103,000). Even with a return to a near average smolt population in 2023, however, the string of recent poor escapements and smolt production make it likely that Hugh Smith Lake sockeye salmon runs will continue to be poor through at least 2025—even if marine survival increases (Fish and Piston 2022b).

HARVEST

Commercial Fisheries

During their return migration, adult Hugh Smith Lake sockeye salmon move through offshore waters along the west coast of Prince of Wales Island and into inside waters primarily through Dixon Entrance, then through Clarence Strait and Revillagigedo Channel to Boca de Quadra and on to Hugh Smith Lake (Figure 1). A smaller portion of the run also migrates through Sumner Strait, then south through Clarence Strait. As a result, Hugh Smith Lake sockeye salmon contribute to most commercial net fisheries in southern Southeast Alaska (Districts 1–8). Historically, Hugh Smith Lake sockeye salmon also contributed to Canadian fisheries in adjacent British Columbia waters; however, Canadian fisheries have been greatly curtailed since 2017. Comprehensive information regarding harvest is limited because most of these fisheries are distant from Hugh Smith Lake and because they are conducted on mixed stocks that do not specifically target Hugh Smith Lake sockeye salmon. This disconnect is particularly true of purse seine fisheries, which are largely managed to harvest pink salmon (*O. gorbuscha*; Clark et al. 2006).

Information regarding the commercial harvest of Hugh Smith Lake sockeye salmon has been obtained from various projects conducted intermittently since the 1980s:

- 1980s–1990s: CWT studies of Hugh Smith Lake sockeye salmon provided information on harvest rate, distribution, and run timing that were used to guide the 2003 Hugh Smith Lake action plan (Geiger et al. 2003).
- 2004–2006: Otolith sampling studies of 100% otolith-marked hatchery-stocked Hugh Smith Lake sockeye salmon provided information on the distribution and run timing of

stocked Hugh Smith Lake sockeye salmon in the District 1 net fisheries. The study was conducted specifically to assess the effectiveness of the 2003 Hugh Smith Lake action plan (Heinl et al. 2007).

- 2014–present: U.S.–Canada genetic stock identification information has provided information on harvest rates and harvest distribution and timing in Districts 1–6 (Tables 1–3; Brunette and Piston 2016, 2017, 2019, Fish and Piston 2022a, and 2022b; and Fish and Piston 2025).

Commercial Harvest Rate: Commercial harvest rate estimates for Hugh Smith Lake sockeye salmon have been produced for 18 years and show the potential for very high harvest rates—particularly because estimates represent minimum values as not all fisheries were sampled in all years (Brunette and Piston 2020).

- Harvest rates estimated from CWT studies in 8 years from 1989 to 1991 and 1994 to 1998 averaged 65% (range: 46–94%; Geiger et al. 2003).
- Harvest rates estimated from U.S.–Canada genetic stock identification information during 10 years from 2014 to 2023 averaged 67% (range: 38–88%; Tables 1–3; Brunette and Piston 2020; Fish and Piston 2025).

Commercial Harvest Distribution: Information regarding the distribution of Hugh Smith Lake sockeye salmon in commercial mixed stock fisheries is available for 1989–1991, 1994–1998, and 2014–present.

- From 1989 to 1991 and 1994 to 1998, the District 1 drift gillnet fishery accounted for an average 39% (range: 26–65%) of the estimated commercial harvest of Hugh Smith Lake sockeye salmon, followed by 29% (range: 2–44%) in District 1 purse seine fishery and 18% (range: 6–67%) in the District 4 purse seine fishery (Geiger et al. 2003).
- From 2014 to 2023, an average 45% of the Hugh Smith Lake sockeye salmon harvest occurred in the District 1 purse seine fishery, 32% in the District 4 purse seine fishery, 17% in the District 1 drift gillnet fishery, 3% in the District 2 purse seine fishery and 1% in the District 6 drift gillnet fishery (Table 2; Brunette and Piston 2016, 2017, 2019, and 2020; Fish and Piston 2022a, and 2022b; and Fish and Piston 2025).

Commercial Harvest Timing:

- In 1989 and 1990 and from 1994 to 1998, in the District 1 drift gillnet fishery the average midpoint of the harvest occurred on July 23, and most (80%) of the harvest of Hugh Smith Lake sockeye salmon occurred between late July and mid-August, around statistical weeks (SW) 31 to 34 (Geiger et al. 2003).
- In 1989 and 1990 and from 1994 to 1998, in the District 1 purse seine fishery, the average midpoint of the harvest and peak occurred on July 23 and ranged from July 9 to August 9. Most of the harvest (90%) of Hugh Smith Lake sockeye salmon occurred between late July and early August, around SWs 31 to 33 (Geiger et al. 2003).
- In 1990 and from 1994 to 1997, in the District 4 purse seine fishery, the average midpoint and the peak occurred on August 6 and ranged between July 16 and August 13. More than half (55%) of the Hugh Smith Lake sockeye salmon harvest occurs between SWs 32 and 34, and most (73%) occurs between SWs 31 and 35 (Geiger et al. 2003).
- In 2004 and 2005 in the District 1 purse seine fishery, most (90%) of the stocked Hugh Smith Lake sockeye salmon harvest took place between SWs 29 and 33. In 2004, the run

peaked in SW 32, and in 2005 there were 2 equal peaks in SWs 29 and 32 (Heinl et al. 2007).

- In 2006 in the District 1 purse seine fishery, most (75%) of the stocked Hugh Smith Lake sockeye salmon harvest took place between SWs 29 and 33 and peak harvest occurred in SW 29 (Heinl et al 2007).
- In 2004, the run timing of stocked Hugh Smith Lake fish in the escapement was later than the run timing of wild fish (Heinl et al. 2007).
- From 2014 to 2023, in the District 1 purse seine fishery, peak harvests of Hugh Smith Lake sockeye salmon occurred in SWs 31–33 (Table 3; Brunette and Piston 2016, 2017, 2019, Fish and Piston 2022a, and 2022b; Fish and Piston 2025).
- From 2014 to 2023, in the District 4 purse seine fishery, peak harvests of Hugh Smith Lake sockeye salmon occurred in SWs 30–31 (Table 3; Brunette and Piston 2016, 2017, 2019, Fish and Piston 2022a, and 2022b; Fish and Piston 2025).
- From 2014 to 2023, in the District 1 drift gillnet fishery, peak harvests of Hugh Smith Lake sockeye salmon occurred from SWs 27–32 and the peak harvest occurred in SW 30 in 4 of 10 years (Table 3; Brunette and Piston 2016, 2017, 2019, Fish and Piston 2022a, and 2022b; Fish and Piston 2025).

Subsistence Fishery

Hugh Smith Lake sockeye salmon are harvested in the Hugh Smith Lake/Sockeye Creek subsistence fishery. The subsistence fishery occurs "in Boca de Quadra, in the waters of Sockeye Creek, and within 500 yards of the terminus of Sockeye Creek, and in Hugh Smith Lake" (5 AAC 01.716[a][1][B][ii]). Since Sockeye Creek is only 50 m long and regulations prohibit fishing within 300 feet of the weir (5 AAC 01.010[e]), the fishery takes place primarily in salt water. The subsistence fishing season extends from June 22 to July 31, and the daily possession limit is 12 fish per person with no annual limit (5 AAC 01.745). Fishery participants are required to obtain an ADF&G Subsistence and Personal Use permit prior to fishing, and to return their permit with a detailed daily harvest record by November 15, even if they did not fish. Since 2000, participants have been required to report harvest from their prior year's fishing activity before they are issued a new permit. From 1985 to 2011, the annual number of permits fished at Hugh Smith Lake/Sockeye Creek averaged only 2 permits (range: 0–14 permits) and the reported subsistence harvest averaged only 88 fish (range: 0–269 fish) in years fishing occurred. Fishing effort increased from 2012 to 2019, to an average 21 permits fished (range: 10–28 permits) and an average reported harvest of 537 sockeye salmon (range: 54–892 fish). Fishing effort has decreased since 2020 to an average of 7 permits annually (range: 2–12 permits) and an average reported harvest of 64 sockeye salmon (range: 5–159 fish; Appendix A5). Reported subsistence harvest and effort has been based entirely on the cooperation of fishery participants; however, reported subsistence harvests here and elsewhere in Southeast Alaska likely underrepresent the true harvest because not all permits are returned, and those that are returned may underreport the actual number of fish harvested (Conitz and Cartwright 2005; Conitz 2008; Walker 2009; Fall et al. 2020).

Sport Fisheries

Sport fishing effort and harvest of Hugh Smith Lake sockeye salmon is presumed to be very low. The Alaska Statewide Sport Fish Harvest Survey is designed to estimate sport fishing effort and harvest by location (Smith et al. 2024). Estimates of the Hugh Smith Lake sockeye salmon sport harvest are not available due to the low number of respondents that report angling effort in the

Hugh Smith Lake and Boca de Quadra areas. In the greater Ketchikan area, the 10-year average (2014–2023) annual sport harvest of sockeye salmon is approximately 19 fish in fresh water and 1,204 fish in salt water.[3] There are no guided freshwater activities that target Hugh Smith Lake sockeye salmon. Saltwater charter logbook data for the Ketchikan area indicates the average annual sockeye salmon harvest is 144 fish, suggesting that the saltwater harvest of sockeye salmon in the Ketchikan area is predominately noncharter (resident or unguided nonresident). Little or no sockeye salmon sport fishing effort is observed by the weir crews at the lake from late April through early November. The sport harvest of Hugh Smith Lake sockeye salmon is unknown, but likely accounts for a miniscule fraction of the total Hugh Smith Lake run.

ENHANCEMENT

The department's *Fisheries Rehabilitation, Enhancement, and Development Division* (FRED) fertilized the lake from 1981 to 1984. The nutrient addition project was discontinued because the investigators concluded that age-1 smolt size was constrained by the temperature regimes in the lake, rather than by a limited food supply (Peltz and Koenings 1989). FRED Division began remote sockeye salmon egg incubation, with back-planting into Hugh Smith Lake in 1984 in an attempt to increase the lake rearing fry production. The eggs were incubated at the Beaver Falls Central Incubation Facility in Ketchikan. Unfed, emergent fry were returned to Hugh Smith Lake from 1986–1990. When FRED Division was constricted due to budget cuts, SSRAA took over the Hugh Smith sockeye salmon rehabilitation program in 1991 (Geiger et al. 2003). This unfed fry stocking program was modified after 1989 but continued off and on again until 1996 (Geiger et al. 2003). Available data indicates that post release mortality of stocked unfed fry was very high and that few of these fish survived to the smolt stage.

The program was modified into a pen-reared presmolt strategy starting in 1998. Eggs were collected from Buschmann Creek (1998–2002) and thermal marked at Burnett Inlet Hatchery. The fry were then reared in net pens at the outlet of Hugh Smith Lake and released at presmolt size in midsummer (1999–2003). Unlike previous efforts, the presmolt strategy resulted in large numbers of returning adult sockeye salmon (Piston 2008; Heinl et al. 2007). From 2003 to 2007, stocked fish accounted for the majority (58–65%) of the escapements (Heinl et al. 2007; Piston 2008), but likely contributed to juvenile production to a lesser extent than their wild counterparts. During these years (2003–2007), carcasses sampled at the outlet of Hugh Smith Lake had disproportionately high mark rates (average = 95%) when compared to carcasses sampled on the spawning grounds of Buschmann (22%) and Cobb Creeks (67%) suggesting stocked fish did not contribute to the spawning escapement equally (Piston 2008). In 2006, ADF&G decided to suspend lake stocking efforts for 1 life cycle to allow further study of the program (Clark et al. 2006). Estimated wild sockeye salmon escapements were near (2003 and 2004) or within goal range from 2003 to 2007 when adult fish from the presmolt stocking program were returning, and met the escapement goal consistently through 2017.

ESCAPEMENT GOAL EVALUATION

The *Policy for Statewide Salmon Escapement Goals* (5 AAC 39.223), adopted by the board in 2001, established the formal process for setting escapement goals. The department is required to report on salmon stock status and escapement goals to the board on a regular basis, document and

[3] Alaska Sport Fishing Survey. 1977– . Alaska Department of Fish and Game, Division of Sport Fish, Juneau AK. https://www.adfg.alaska.gov/sf/sportfishingsurvey/index.cfm?ADFG=area.home (accessed September, 2024).

review existing salmon escapement goals, establish goals for stocks for which escapement can be reliably measured, and prepare scientific analyses with supporting data when goals are created, modified, or recommended for elimination.

ESCAPEMENT GOAL HISTORY

Early Hugh Smith Lake sockeye salmon escapement goals included an escapement goal range of 15,000–35,000 sockeye salmon that was established in the early 1990s (ADF&G 1993). The goal was based largely on professional judgement due to the limited stock assessment information available at the time (Geiger et al. 2003). Zadina et al. (1995) estimated that escapements of at least 16,000 sockeye salmon would sustain maximum adult production, based on a euphotic volume model (Koenings and Burkett 1987) that related physical water features of the lake to carrying capacity in other sockeye salmon lakes throughout Alaska.

A BEG range of 8,000–18,000 sockeye salmon was recommended in 2003, based on a risk analysis and theoretical stock–recruit analyses outlined in Geiger et al. (2003). In 2003, the board adopted an OEG range of 8,000–18,000 sockeye salmon (5 AAC 33.390) that included spawning salmon of both wild and hatchery origin in recognition of enhancement and rehabilitation efforts that were ongoing at the time.

ESCAPEMENT GOAL FINDING

The department has reviewed salmon escapement goals every 3 years prior to the Southeast and Yakutat board meeting and has not recommended changes to the Hugh Smith Lake sockeye salmon escapement goal since 2003 (Geiger et al. 2003). Annual estimates of harvest have been available since 2014, and a brood table is being updated annually with a goal of updating the escapement goal when enough complete brood years are available.

STOCK OF CONCERN RECOMMENDATION

Hugh Smith Lake sockeye salmon have not met the OEG in the past 7 years (2018–2024) and the department judges this stock to be a candidate stock of management concern as defined in the Sustainable Salmon Fishery Policy.

OUTLOOK

No formal forecasts of Hugh Smith Lake sockeye are made; however, smolt populations mirrored the decline in adult population since 2014. Smolt estimates from 2021 to 2022 were the lowest in the history of the smolt project (1982–2024). Based on the dominate age at return for Hugh Smith Lake sockeye salmon (age-5), fish from these lowest smolt years will return through 2025. Smolt estimates in 2023 and 2024 have been closer to average (121,000 and 103,000 fish), indicating improved spawning success and freshwater survival in recent years. In addition, the count of 330 jack sockeye salmon in 2024 was the second highest number since 2007, which is a further indication of improved survival from recent brood years. The improved smolt counts and large number of jack sockeye salmon in 2024 indicate that there may be increased numbers of 2-ocean age adult sockeye salmon in 2025 if environmental conditions in marine waters are favorable.

HABITAT ASSESSMENT

Hugh Smith Lake is located in the Misty Fjords National Monument Wilderness. Aside from habitat alterations that took place at Buschmann Creek in association with operation of the

hatchery in the early 1900s (Roppel 1992), the habitat is considered pristine and there are no habitat related concerns identified for this stock.

FISHERY MANAGEMENT OVERVIEW AND BACKGROUND

COMMERCIAL FISHERIES

All commercial salmon net fisheries conducted in southern Southeast Alaska (Districts 101–108) harvest mixed stocks of salmon, except in terminal harvest locations. In addition, commercial purse seine fisheries are managed primarily to harvest pink salmon (Clark et al. 2006). Although there are exceptions—such as directed fisheries on fall-run chum salmon *O. keta* or on hatchery stocks—inseason management of the purse seine fishery is based on pink salmon abundance. Over the past 20 years (2004–2023), pink salmon accounted for an average 87% (19.2 million fish) of the annual salmon harvest in traditional commercial net fisheries in southern Southeast Alaska (Districts 101–108), followed by chum salmon at 8% (1.8 million fish), sockeye salmon at 3% (584,270 fish), and coho salmon *O. kisutch* at 2% (369,000 fish; Table 4). Unless otherwise noted, all harvest data presented in the sections below pertain to the 20-year period from 2004 to 2023.

Purse Seine Fisheries

Regulations allow purse seine fishing in southern Southeast Alaska in Districts 101 (Sections 1-C, 1-D, 1-E, and 1-F only), 102, 103, 104, 105, 106 (Sections 6-C and 6-D only), and 107. Purse seine fishing is also allowed in hatchery terminal harvest areas at Carroll Inlet, Neets Bay, Kendrick Bay, and Anita Bay. Although the areas specified above are designated purse seine fishing areas, specific open areas and fishing times are established in season by EO.

District 101 encompasses Revillagigedo Channel, portions of East and West Behm Canal, and the eastern portion of southern Clarence Strait (Figure 1). The southern section of District 101 opens the first week in July to target early-run pink salmon. After initial openings in lower District 1 to harvest pink salmon traveling through southern Clarence Strait and Revillagigedo Channel, the fishing area is expanded north to include the Gravina Island shoreline. The Gravina Island shore is managed conservatively to allow pink salmon to move into West Behm Canal. In most years, the entire shoreline of Gravina Island is open by the third week in August. Sockeye salmon account for an average of 2% (55,400 fish) of the total purse seine salmon harvest in District 1 (Table 5). An average of 39% (28,400 fish) of the sockeye salmon harvest in this district (not including terminal West Behm Canal fisheries) occurs on the Gravina Island shoreline (Subdistrict 101-29). The waters of Boca de Quadra are closed east of 130°50.00′ W long (5 AAC 33.350 (b)(2)).

District 104 is located along the outer coast of southern Southeast Alaska (Figure 1). Up to 80% of the purse seine harvest of sockeye salmon in southern Southeast Alaska is taken in District 104. The majority of those sockeye salmon (70% to 80%) are made up of Canadian fish bound for the Skeena, Nass, and Fraser Rivers. Early season management in District 104 is greatly influenced by the Pacific Salmon Treaty (treaty). The treaty has placed severe restrictions on the first 3 to 4 weeks of the season in the district. Whereas the intent of the treaty is to pass Canadian sockeye salmon, it also has the effect of passing other early-run salmon through the district.

Drift Gillnet Fisheries

Traditional drift gillnet fishing areas in southern Southeast Alaska include Tree Point/Portland Canal (District 101), Prince of Wales (District 106), and Stikine (District 108). In addition, drift gillnet fisheries occur in several terminal harvest areas adjacent to hatchery facilities and at remote hatchery release sites throughout the region. Although the terminal hatchery areas are designated drift gillnet fishing areas, specific open areas and fishing times are established in regulation or in season by EO. Early season management in the District 101 drift gillnet fishery is largely driven by provisions of the treaty. The treaty allows for a controlled harvest on Nass River (located in northern British Columbia) sockeye salmon. The sockeye salmon harvest at Tree Point from mid-June through most of July is dominated by Nass River sockeye salmon. In some fishing periods, Nass River sockeye salmon contributed up to 95% of the sockeye salmon harvest at Tree Point.

District 101 Pink Salmon Management Plan

The pink salmon management plan establishes drift gillnet fishing time in Section 1-B in relation to the District 101 purse seine fishing time when both gear types are concurrently harvesting the same pink salmon stocks. By regulation, the plan starts on the third Sunday in July (July 20, 2025) with the following fishing time:

1. When the purse seine fishery is open for any portion of 1 day during a fishing week, the drift gillnet fishery must be open for 48 hours during the same fishing week.
2. When the purse seine fishery is open for any portion of 2 days during a fishing week, the drift gillnet fishery must be open for 96 hours during the same fishing week.
3. When the purse seine fishery is open for any portion of 3 or more days during a fishing week, the drift gillnet fishery must be open for 120 hours during the same week.

PAST COMMERCIAL FISHERY MANAGEMENT MEASURES

From 2003 to 2006, Hugh Smith Lake sockeye salmon were listed as a stock of management concern. The former action plan used EO authority to restrict area in the District 101 purse seine and drift gillnet fishery and was implemented during SWs 29–33 to reduce the commercial harvest of Hugh Smith Lake sockeye salmon when the inseason escapement is projected to be below the OEG.

- If projections of the cumulative Hugh Smith Lake sockeye salmon weir count in SWs 29 and 30 fall below the lower bound of the OEG, the department shall close a portion of the District 101 purse seine fishery east of a line from Quadra Point to Slate Island Light to Black Rock Light to a point on the mainland shore at 55°01.40′ N lat, 131°00.20′ W long (Figure 7).
- If projections of the cumulative Hugh Smith Lake sockeye salmon weir count in SWs 31, 32, and 33 fall below the lower bound of the OEG, the department shall:
    - close that portion of the District 101 purse seine fishery east of a line from Foggy Point Light to Black Rock Light to the southernmost tip of Black Island (Figure 8) and;
    - close the upper portion of the Section 1-B drift gill net fishery 1 nautical mile south of the latitude of Foggy Point Light (Figure 8).

Management actions taken to conserve Hugh Smith Lake sockeye since 2006:

- 2008 — Implemented area restrictions from the 2003 Hugh Smith action plan in SWs 29–33 in both the drift gillnet and purse seine fishery.
- 2019–2024 — Implemented area restrictions from 2003 Hugh Smith action plan in SWs 29–33 in both the drift gillnet and purse seine fishery.

PAST SPORT FISHERY MANAGEMENT MEASURES

No management actions have been taken to limit harvest of Hugh Smith Lake sockeye salmon in the sport fishery.

PAST SUBSISTENCE FISHERY MANAGEMENT MEASURES

No management actions have been taken to limit sockeye salmon harvest in the Hugh Smith/Sockeye Creek subsistence fishery.

MANAGEMENT ACTION PLAN OPTIONS FOR ADDRESSING STOCK OF CONCERN

ACTION PLAN GOAL

The action plan goal is to rebuild the Hugh Smith Lake sockeye salmon run to levels that consistently achieve the escapement goal range. The plan includes measures to reduce commercial harvests of Hugh Smith Lake sockeye salmon in the commercial drift gillnet and purse seine fisheries in closest proximity to Hugh Smith Lake and during the time Hugh Smith Lake fish are most prevalent in those fisheries. The plan provides flexibility with respect to information (e.g., harvest distribution and timing) used in managing fisheries to conserve Hugh Smith Lake sockeye salmon.

ACTION PLAN ACTIONS

A draft action plan was presented to the Alaska Board of Fisheries at the 2025 Southeast Alaska and Yakutat Finfish and Shellfish meeting in Ketchikan. The draft plan contained options for management actions in each fishery: commercial, sport, and subsistence. The following actions are the board adopted actions.

Action 1: Commercial Fisheries

Objective: reduce commercial harvest of Hugh Smith Lake sockeye salmon**.**

Specific action to implement the objective: Use EO authority to implement the 2025 Hugh Smith Lake action plan which uses the same measures adopted in 2003 to reduce fishing area in the District 101 purse seine and drift gillnet fisheries. These actions will be implemented annually during SWs 29–33 to reduce harvest of Hugh Smith Lake sockeye salmon.

1) If projections of the cumulative Hugh Smith Lake sockeye salmon weir count in SWs 29 and 30 fall below the lower bound of the escapement goal range, the department shall close a portion of the District 101 purse seine fishery east of a line from Quadra Point to Slate Island Light to Black Rock Light to a point on the mainland shore at 55°01.40′ N lat, 131°00.20′ W long (Figure 7).
2) If projections of the cumulative Hugh Smith Lake sockeye salmon weir count in SWs 31, 32, and 33 fall below the lower bound of the OEG, the department shall:

a. close that portion of the District 101 purse seine fishery east of a line from Foggy Point Light to Black Rock Light to the southernmost tip of Black Island (Figure 8) and;
b. close the upper portion of the Section 1-B drift gill net fishery 1 nautical mile south of the latitude of Foggy Point Light (Figure 8).

3) Projected escapements will be based annually on the most recent 10-year average cumulative weir counts. When projections of Hugh Smith Lake sockeye salmon escapement are above the cumulative number needed to meet the lower bound of the escapement goal range, the department shall manage the purse seine and drift gillnet fisheries based on the overall run strength of wild stock salmon to District 101.

Action 2: Subsistence Fishery

Objective: Maintain subsistence opportunity**.**

Specific action to implement the objective: No restrictions to the subsistence fishery were recommended.

Action 3: Sport Fishery

Objective: reduce sport harvest of Hugh Smith Lake sockeye salmon.

Specific action to implement the objective: Use EO authority to reduce sport harvest of Hugh Smith Lake sockeye salmon by implementing restrictions or closures in season as needed. No restrictions are being considered at this time because sport effort and harvest is very low.

CONDITIONS FOR REDUCING MANAGEMENT RESTRICTIONS OR DELISTING STOCK OF CONCERN

The department will emphasize meeting condition 1 below, before considering the other conditions.

1) If the lower bound of the OEG range is met or exceeded in 3 consecutive years or is met in 4 out of 6 consecutive years, the department may recommend removing the stock of concern designation for the Hugh Smith Lake sockeye salmon run at the first Southeast and Yakutat board meeting after this condition is met.
2) Management measures could be relaxed in specific areas or during specific time periods if updated stock composition and harvest data indicate areas and/or times where and/or when restrictions are no longer needed to ensure the OEG is met.
3) In the event the lower bound of the OEG range is met or exceeded in 2 consecutive years, management restrictions may be relaxed or set aside.

Stock status, action plan performance (including information on harvest rate, distribution, and timing in commercial fisheries), will be updated in a report to the board at the 2028 Southeast and Yakutat meeting.

RESEARCH PLAN

There has been a substantial amount of research directed at Hugh Smith Lake sockeye salmon. Studies have included lake productivity work, monitoring of juvenile populations through hydroacoustic analysis and tow netting, coded wire tagging of smolts, counting of smolts, monitoring of escapement through a counting weir, and mark–recapture studies to verify weir

counts. Studies have been modified through the years as research and monitoring objectives have changed.

PREVIOUS RESEARCH PROJECTS

- Lake fertilization — The department's FRED Division fertilized the lake from 1981 to 1984. The nutrient-addition project was discontinued because the investigators concluded that age-1 smolt size was constrained by the temperature regimes in the lake, rather than by a limited food supply.
- Hugh Smith Lake limnological sampling — Annual sampling of zooplankton from 1980 to 1987, and 1993 to 2002, as well as annual sampling of lake chemistry to monitor production characteristics of the system. Additional zooplankton sampling occurred from 2004 through 2007.
- Hugh Smith Lake juvenile sockeye monitoring — Monitoring of juvenile production of sockeye salmon was conducted by several methods. Hydroacoustic surveys were used to estimate fall and spring fry abundance in the lake, in conjunction with tow netting to provide species apportion of counts in 1998, and from 2004 to 2007.
- Hugh Smith Lake egg takes and fry plants — Fry or presmolt plants occurred annually from 1987 to 2004 with the exception of 1992, 1994, and 1999. Egg takes were conducted on the spawning grounds, eggs were incubated, and fry were returned to the lake. The program involved unfed fry releases, fed fry releases, and a pen-reared thermal-marked presmolt production program. Monitoring of the stocked and wild proportion of out-migrating smolt occurred from 1997 to 1999, and from 2001 to 2004.
- In-depth monitoring of juvenile salmon production in the lake, 2004 to 2007— This 4-year intensive research effort involved improving estimates of juvenile survival, abundance, and size and partitioning of abundance into wild and hatchery origin fish to better understand factors limiting production of this sockeye salmon stock. A predation study at the spring smolt weir was also conducted in 2007.

CURRENT RESEARCH PROJECTS

The following research programs are being conducted to gather detailed information about Hugh Smith Lake sockeye salmon:

- Hugh Smith Lake adult weir — An adult counting weir has been operated annually since 1982 to monitor escapements of sockeye and coho salmon into Hugh Smith Lake. Salmon are enumerated at the weir and are sampled for age, sex, and size composition. Since 1992, adults have been marked at the weir using a series of fin clip marks; fish are examined on the spawning grounds and marked: unmarked ratios are used to provide backup mark–recapture estimates of escapement. The total annual costs of this program for sockeye salmon are approximately $52,000.
- Hugh Smith Lake juvenile sockeye monitoring — Monitoring of juvenile production and age structure of sockeye salmon has been conducted annually since 1980. Numbers of out-migrating sockeye smolt are recorded during operation of a smolt weir operated to capture and CWT coho salmon from the system, smolt estimates are generated, and scales lengths and weights of sockeye salmon smolt are collected.

- Harvest estimates — Since 2014, the harvest of Hugh Smith Lake sockeye salmon in Southeast Alaska commercial net fisheries has been estimated using genetic stock identification methods. Samples collected to determine the harvest contribution by country of origin in the boundary area fisheries—specifically, the estimated contribution of Alaska sockeye salmon and British Columbia Nass and Skeena Rivers sockeye salmon—are used to provide estimates for Hugh Smith Lake sockeye salmon.

PROPOSED OR POTENTIAL RESEARCH PROJECTS

- Hugh Smith Lake egg take for supplemental fry planting — Egg takes and subsequent fry or presmolt releases occurred nearly annually at Hugh Smith Lake from 1987 to 2004. Although earlier stockings using unfed or fed fry were considered unsuccessful, the most recent method of short-term pen rearing fry to a larger *presmolt* size was highly successful at producing large numbers of returning adults, although many of these fish homed to the outlet of the lake where the net pens were located and did not contribute to natural production (Piston et al. 2006; Heinl et al. 2007). In 2023 and 2024, smolt counts increased significantly, as well as counts of jack sockeye salmon in 2024 (see Outlook section), indicating improved spawning success and freshwater survival in recent years. If the recent signs of increased survival fail to continue, the stock may benefit from an improved rehabilitation stocking program, with short-term rearing of fry in net pens located at the head of the lake near Buschmann Creek to increase the odds of proper homing by returning fish. SSRAA is equipped and willing to participate in this type of rehabilitation project. The project would involve collecting gametes from the spawning grounds in the fall, incubating and hatching at a SSRAA facility over the winter, and then transporting fry to the lake in early June for short-term rearing in net pens near the inlet streams of Hugh Smith Lake until mid-to-late July.

  Stock rehabilitation will only be considered for Hugh Smith Lake sockeye salmon if smolt counts do not stabilize at higher levels, or if adult escapements do not begin to increase over the next 2 seasons (as would be expected, with higher smolt numbers and jack counts in recent years). In addition, the department would like to wait until results are available from an ongoing study at Auke Creek, in northern Southeast Alaska, looking at the relative reproductive success of hatchery-born and wild sockeye salmon from a similarly designed stocking project to aid in the decision to proceed with potential rehabilitation efforts at Hugh Smith Lake.

REFERENCES CITED

ADF&G (Alaska Department of Fish and Game). 1993. Southeast Alaska purse seine fishery management plan, 1993. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 1J93-02, Juneau.

Bond, N. A., M. F. Cronin, H. Freeland, and N. Mantua (2015), Causes and impacts of the 2014 warm anomaly in the NE Pacific. *Geophysical Research Letters*, 42: 3414–3420.

Brunette, M. T, and A. W. Piston. 2016. Hugh Smith Lake sockeye salmon, 2015. Alaska Department of Fish and Game, Fishery Data Series No. 16-33, Anchorage.

Brunette, M. T, and A. W. Piston. 2017. Hugh Smith Lake sockeye salmon, 2016. Alaska Department of Fish and Game, Fishery Data Series No. 17-34, Anchorage.

Brunette, M. T., and A. W. Piston. 2019. Hugh Smith Lake sockeye salmon stock assessment, 2017–2018. Alaska Department of Fish and Game, Fishery Data Series No. 19-24, Anchorage.

Brunette, M. T., and A. W. Piston. 2020. Hugh Smith Lake sockeye salmon stock assessment, 2019. Alaska Department of Fish and Game, Fishery Data Series No. 20-28, Anchorage.

Burkett, R., J. Koenings, M. Haddix, and D. Barto. 1989. Cooperative ADF&G, FRED Division/U.S. Forest Service lake enrichment program for Southeast Alaska. Alaska Department of Fish and Game, Division of Fisheries Rehabilitation, Enhancement and Development Report No. 98, Juneau.

Clark, J. H., R. D. Mecum, A. McGregor, P. Krasnowski, and A. M. Carroll. 2006. The commercial salmon fishery in Alaska. Alaska Fisheries Research Bulletin 12(1):1-146.

Conitz, J. M. 2008. Klawock Lake subsistence sockeye salmon project 2006 annual report and 2004–2006 summary. Alaska Department of Fish and Game, Fishery Data Series No. 08-48, Anchorage.

Conitz, J. M., and M. A. Cartwright. 2005. Kanalku, Sitkoh, and Kook Lakes subsistence sockeye salmon project: 2003 annual report and 2001–2003 final report. Alaska Department of Fish and Game, Fishery Data Series No. 05-57, Anchorage.

Di Lorenzo, E., Mantua, N. 2016. Multi-year persistence of the 2014–2015 North Pacific marine heatwave. Nature: Climate Change 6:1042–1047.

Fall, J. A., A. Godduhn, G. Halas, L. Hutchinson-Scarbrough, B. Jones, B. McDavid, E. Mikow, L. A. Sill, and T. Lemons. 2020. Alaska subsistence and personal use salmon fisheries 2017 annual report. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 451, Anchorage.

Fish, T. M., and A. W. Piston. 2022a. Hugh Smith Lake sockeye salmon stock assessment, 2020. Alaska Department of Fish and Game, Fishery Data Series No. 22-10, Anchorage.

Fish, T. M., and A. W. Piston. 2022b. Hugh Smith Lake sockeye salmon stock assessment, 2021. Alaska Department of Fish and Game, Fishery Data Series No. 22-18, Anchorage.

Fish, T. M., and A. W. Piston. 2025. Hugh Smith Lake sockeye salmon stock assessment, 2022. Alaska Department of Fish and Game, Fishery Data Series No. 25-01, Anchorage.

Geiger, H. J., T. P. Zadina, and S. C. Heinl. 2003. Sockeye salmon stock status and escapement goal for Hugh Smith Lake in Southeast Alaska. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 1J03-05, Juneau.

Geiger, H. J., R. L. Bachman, S. C. Heinl, K. Jensen, T. A. Johnson, A. Piston, and R. Riffe. 2005. Sockeye salmon stock status and escapement goals in Southeast Alaska [in] Der Hovanisian, J. A. and H. J. Geiger, editors. Stock status and escapement goals for salmon stocks in Southeast Alaska 2005. Alaska Department of Fish and Game, Special Publication No. 05-22 Chapter 2, Anchorage.

Giefer, J., and B. Blossom. 2021. Catalog of waters important for spawning, rearing, or migration of anadromous fishes – Southeastern Region, effective June 1, 2021, Alaska Department of Fish and Game, Special Publication No. 21-04, Anchorage.

REFERENCES CITED (Continued)

Heinl, S. C., X. Zhang, and H. J. Geiger. 2007. Distribution and run timing of Hugh Smith Lake sockeye salmon in the District 101 commercial net fisheries of southern Southeast Alaska, 2004–2006. Alaska Department of Fish and Game, Fishery Manuscript No. 07-03, Anchorage.

Koenings, J. P., and R. D. Burkett. 1987. Population characteristics of sockeye salmon (*Oncorhynchus nerka*) smolts relative to temperature regimes, euphotic volume, fry density and forage base within Alaskan lakes. Pages 216–234 [*In*] H. D Smith, L. Margolis, and C. C. Wood, editors. Sockeye salmon (*Oncorhynchus nerka*) population biology and future management. Canadian Special Publications of Fisheries and Aquatic Science No. 96, Ottawa.

Moser, J. F. 1898. The salmon and salmon fisheries of Alaska. Report of the operations of the United States Fish Commission steamer *Albatross* for the year ending June 30, 1898. Bulletin of the U.S. Fish Commission, Washington D. C.

Peltz, L., and J. P. Koenings. 1989. Evidence for temperature limitation of juvenile sockeye salmon, *Oncorhynchus nerka*, growth in Hugh Smith Lake, Alaska. Alaska Department of Fish and Game, Division of Fisheries Rehabilitation, Enhancement and Development Report No. 90, Juneau.

Piston, A. W. 2008. Hugh Smith Lake sockeye salmon adult and juvenile studies, 2007. Alaska Department of Fish and Game, Fishery Data Series No. 08-43, Anchorage.

Piston, A. W., S. C. Heinl, H. J. Geiger, and T. A. Johnson. 2006. Hugh Smith Lake sockeye salmon adult and juvenile studies, 2003 to 2005. Alaska Department of Fish and Game, Fishery Data Series No. 06-51, Anchorage.

Piston, A. W., S. C. Heinl, and H. J. Geiger. 2007. Hugh Smith Lake sockeye salmon adult and juvenile studies, 2006. Alaska Department of Fish and Game, Fishery Data Series No. 07-58, Anchorage.

Rich, W. H., and E. M. Ball. 1933. Statistical review of the Alaska salmon fisheries. Part IV: Southeastern Alaska. U.S. Department of Commerce, Bulletin of the Bureau of Fisheries, Volume XLVII, Bulletin No. 13, Washington, D. C.

Roppel, P. 1982. Alaska's salmon hatcheries, 1891–1959. National Marine Fisheries Service, Alaska Historical Commission Studies in History, No. 20, Portland, OR.

Smith, N. J., S. Restrepo, I. Rafferty, and J. Bozzini. 2024. Alaska statewide sport fish harvest survey, 2024. Alaska Department of Fish and Game, Division of Sport Fish, Regional Operational Plan No. ROP.SF.4A.2024.02, Anchorage.

Walker, R. 2009. The validity and reliability of fisheries harvest monitoring methods, Southeast Alaska. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 286, Anchorage.

Walsh, J.E., R.L. Thoman, U.S. Bhatt, P.A. Bieniek, B. Brettschneider, M. Brubaker, S. Danielson, R. Lader, F. Fetterer, K. Holderied, and K. Iken. 2018. The high latitude marine heat wave of 2016 and its impacts on Alaska. Bulletin of the American Meteorological Society 99(1):S39-S43.

Zadina, T. P., M. H. Haddix, and M. A. Cartwright. 1995. Production potential of sockeye salmon nursery lakes in southern Southeast Alaska. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 5J95-03, Juneau.

TABLES

Table 1.–Reported genetic stock identification (GSI) based harvest estimates of Hugh Smith Lake sockeye salmon including upper and lower 90% confidence intervals (CI), weir counts, subsistence harvest, total run, and harvest rates, 2014–2023.

			GSI estimates using all proportions					GSI estimates using proportions >= 0.05				
				90% CI					90% CI			
Year	Escape-ment	Sub-sistence harvest	Traditional commercial net harvest	Lower	Upper	Total run	Traditional commercial net harvest rate	Traditional commercial net harvest	Lower	Upper	Total run	Traditional commercial net harvest rate
2014	10,378	457	15,030	10,507	19,553	25,865	58.1%	10,563	9,550	11,576	21,398	49.4%
2015	21,296	892	24,436	17,928	30,944	46,624	52.4%	15,590	14,370	16,810	37,778	41.3%
2016	12,865	488	36,198	31,931	40,465	49,551	73.1%	30,686	27,996	33,376	44,039	69.7%
2017	14,748	629	13,760	12,526	14,994	29,137	47.2%	11,152	10,394	11,910	26,529	42.0%
2018	2,039	54	4,031	3,163	4,899	6,124	65.8%	2,770	2,455	3,085	4,863	57.0%
2019	2,240	521	9,122	3,857	14,387	11,883	76.8%	4,790	4,040	5,540	7,551	63.4%
2020	3,860	70	2,386	1,339	3,433	6,316	37.8%	1,196	880	1,512	5,126	23.3%
2021	3,235	159	12,811	7,805	17,817	16,205	79.1%	3,854	1,586	6,122	7,248	53.2%
2022	1,657	22	12,015	7,344	16,686	13,694	87.7%	6,368	4,263	8,473	8,047	79.1%
2023	1,689	5	13,028	9,346	16,710	14,717	88.5%	6,790	4,318	9,262	8,479	80.1%
Average	7,401	366	14,282	10,575	17,989	22,012	66.7%	9,376	7,985	10,767	17,106	55.9%

Note: Estimates on the left include all weekly estimates, many of which are of low precision and below the department's guideline to only report estimates when the expected proportion of fish in a mixture is 5% or more. Estimates on the right only include weekly harvest estimates where Hugh Smith Lake sockeye salmon accounted for at least 5% of the stock mixture. This can be thought of as a minimum harvest because for all weeks where the proportion of Hugh Smith Lake sockeye salmon is less than 5% no harvest is estimated.

Table 2.–Proportion of Hugh Smith Lake sockeye salmon harvest by fishery and district, 2014–2023.

		Percentage		
Gear	District	Average	Maximum	Minimum
Drift gillnet	101-11	16.5%	40.8%	3.5%
	106-30	0.7%	2.2%	0.0%
	106-41	1.1%	6.0%	0.1%
	108	0.1%	0.4%	0.0%
Purse seine	101	44.7%	62.4%	9.4%
	102	3.1%	8.3%	0.2%
	103	2.1%	9.9%	0.0%
	104	31.5%	75.6%	13.7%
	106	0.3%	1.2%	0.0%

Table 3.–Harvest of Hugh Smith Lake sockeye salmon in 101 and 104 purse seine and 101-11 drift gillnet by statistical week, 2014–2023.

Gear	District	Year	Statistical week															
			25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Drift gillnet	101-11	2014	478	434	775	747	477	223	2	453	118	46	177	67	12	4	2	0
		2015	–	6	68	687	284	267	279	515	40	68	57	12	5	2	0	0
		2016	–	222	231	221	572	1,115	391	807	541	394	393	48	53	6	1	0
		2017	147	344	730	1,239	659	879	355	757	207	211	65	18	5	4	0	–
		2018	2	65	100	107	75	463	296	57	116	8	10	3	1	0	0	–
		2019	5	30	30	143	86	276	227	97	60	21	21	1	0	0	0	0
		2020	–	0	0	31	48	80	144	63	1	4	1	0	0	0	–	–
		2021	–	0	16	3	44	138	77	200	32	31	15	16	1	0	0	–
		2022	–	38	59	0	142	176	0	0	0	0	0	4	2	1	0	–
		2023	0	53	22	207	235	133	127	46	70	54	17	4	0	0	–	–
Purse seine	101	2014	478	434	775	747	477	223	2	453	118	46	177	67	12	4	2	0
		2015	–	–	–	1,526	944	2,352	2,348	3,610	2,654	–	–	–	–	–	–	–
		2016	–	–	–	1,692	2,771	3,757	6,825	4,250	2,072	1,013	–	–	–	–	–	–
		2017	–	–	378	335	714	560	673	408	860	726	114	–	–	–	–	–
		2018	–	–	59	89	152	468	880	276	87	–	–	–	–	–	–	–
		2019	–	–	–	54	399	775	999	1,012	738	2	0	–	–	–	–	–
		2020	–	–	–	26	201	339	375	493	0	56	–	–	–	–	–	–
		2021	–	–	–	67	61	202	855	0	0	0	13	11	–	–	–	–
		2022	–	–	–	62	230	319	210	516	1070	1028	121	–	–	–	–	–
		2023	–	–	70	293	315	882	3,074	2,256	307	49	5	–	–	–	–	–
	104	2014	–	–	–	188	236	1,546	331	187	1,160	18	67	–	–	–	–	–
		2015	–	–	–	32	150	810	1,425	174	2,192	146	69	–	–	–	–	–
		2016	–	–	–	2,038	1,577	236	2,118	531	206	334	–	–	–	–	–	–
		2017	–	–	–	–	376	159	677	552	170	645	77	6	–	–	–	–
		2018	–	–	–	–	50	442	15	16	10	69	–	–	–	–	–	–
		2019	–	–	–	16	10	0	3,281	48	20	692	8	–	–	–	–	–
		2020	–	–	–	–	–	149	103	15	4	57	–	–	–	–	–	–
		2021	–	–	–	–	119	291	4,010	0	434	1,116	3,654	54	–	–	–	–
		2022	–	–	–	51	89	575	3,099	886	241	645	1,390	6,976	–	–	–	–
		2023	–	–	2	13	20	1,856	208	204	63	759	16	–	–	–	–	–

Table 4.–Harvest in Districts 1–8 traditional net fisheries, 2004–2023.

Year	Chinook	Sockeye	Coho	Pink	Chum
2004	40,832	937,834	422,092	20,181,105	1,904,728
2005	42,607	1,024,668	409,231	28,216,641	1,338,188
2006	47,420	556,080	189,426	2,897,446	1,800,217
2007	36,193	1,199,400	316,384	30,828,111	2,235,885
2008	18,764	167,519	434,018	12,680,909	1,096,340
2009	18,111	458,558	488,265	24,643,504	1,703,152
2010	6,825	326,156	486,035	12,270,014	1,474,366
2011	15,941	570,200	273,627	10,320,621	1,770,880
2012	15,422	273,926	433,491	17,543,434	2,580,433
2013	19,372	291,863	635,667	50,580,919	1,573,142
2014	27,250	1,014,674	728,484	31,048,797	1,291,043
2015	28,152	895,489	347,802	11,591,653	2,439,549
2016	32,918	811,030	432,066	14,672,658	2,302,151
2017	8,295	236,418	175,497	8,498,120	1,607,275
2018	7,515	245,723	258,811	5,044,757	1,547,436
2019	15,817	430,189	289,366	16,719,974	1,511,714
2020	10,167	256,454	148,965	5,692,309	750,627
2021	9,802	813,799	390,095	35,340,598	1,447,746
2022	17,157	681,541	237,643	12,191,247	2,250,379
2023	10,600	493,883	284,597	33,668,589	4,174,912
2004–23 Average	21,458	584,270	369,078	19,231,570	1,840,008
2004–23 Average % of total harvest	0.10%	2.65%	1.67%	87.23%	8.35%

Table 5.–State managed harvest in District 101 purse seine fishery, 2004–2023.

Year	Chinook	Sockeye	Coho	Pink	Chum
2004	2,097	124,936	45,971	7,542,299	571,607
2005	1,428	81,020	38,344	5,555,967	197,707
2006	1,534	42,416	8,732	585,019	199,969
2007	1,073	29,215	15,205	2,559,461	173,884
2008	30	6,962	40,368	3,046,975	72,221
2009	1,055	45,902	53,293	7,787,995	176,760
2010	148	54,106	56,619	6,327,548	404,647
2011	424	20,582	6,375	535,079	102,710
2012	132	18,393	27,772	3,379,287	188,388
2013	38	27,380	68,733	13,164,878	184,356
2014	1,549	75,378	52,762	7,292,343	151,505
2015	129	78,414	18,170	1,485,776	578,489
2016	1,950	95,134	29,083	4,750,752	309,695
2017	67	15,370	11,379	1,067,716	61,028
2018	–	22,993	8,513	630,185	120,995
2019	725	38,093	24,809	3,507,893	224,564
2020	234	40,955	10,764	1,275,244	72,408
2021	9	94,541	56,634	9,856,957	200,938
2022	105	49,943	25,890	5,782,832	203,626
2023	448	147,355	45,377	10,531,342	1,144,913
2004–23 Average	693	55,454	32,240	4,833,277	267,021
2004–23 Average % of total harvest	0%	2%	1%	90%	8%

FIGURES

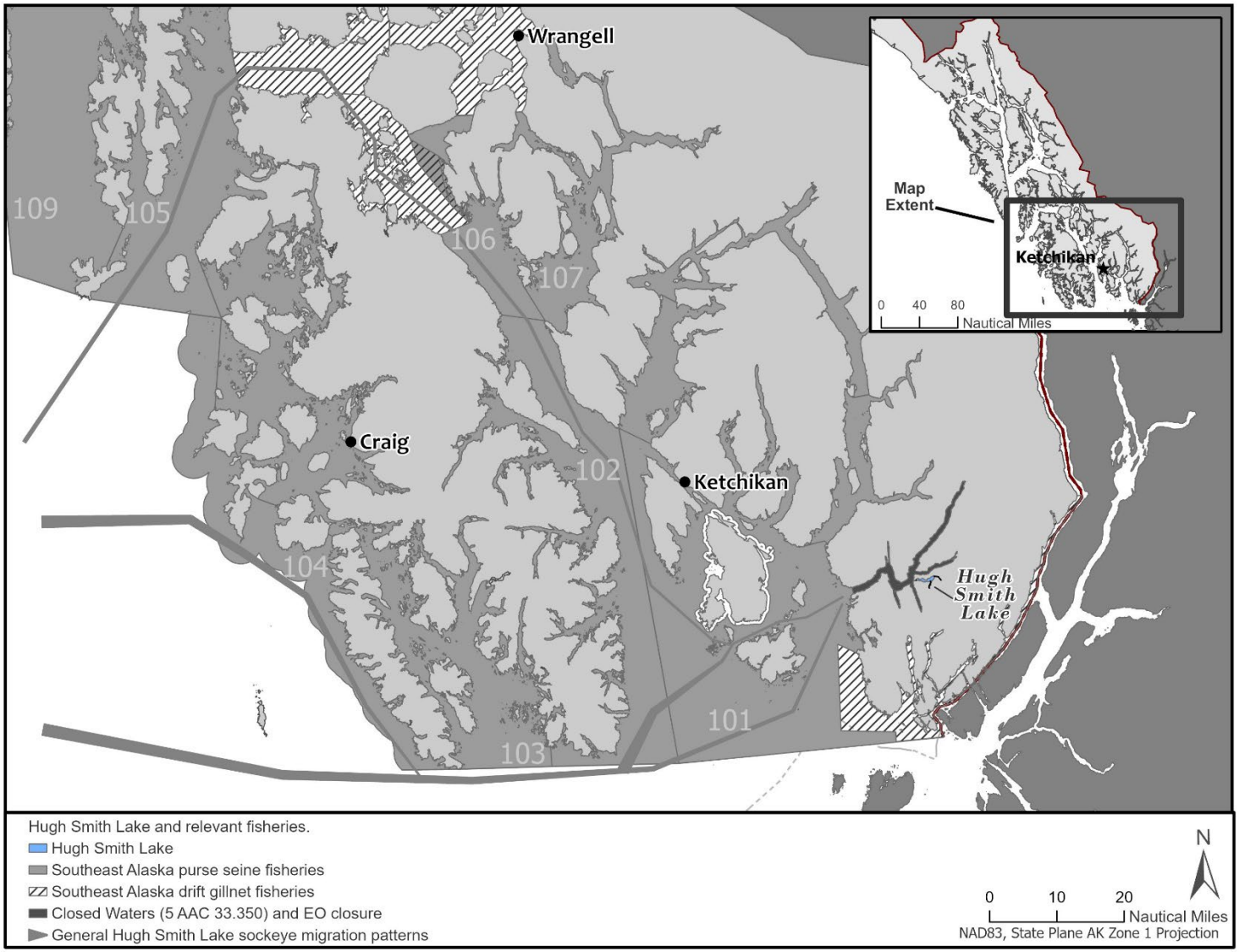

Figure 1.–Location of Hugh Smith Lake in Southeast Alaska showing fishing districts (labeled in light gray) and general Hugh Smith Lake sockeye salmon migration patterns (dark gray arrows). .

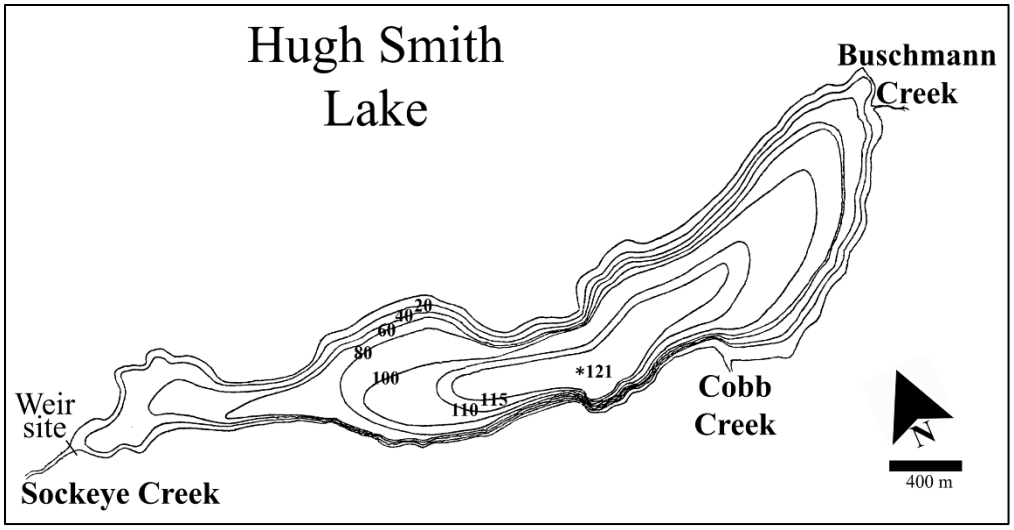

Figure 2.–Bathymetric map of Hugh Smith Lake (depths in meters) showing the weir location above the outlet stream Sockeye Creek, and the 2 primary inlet streams.

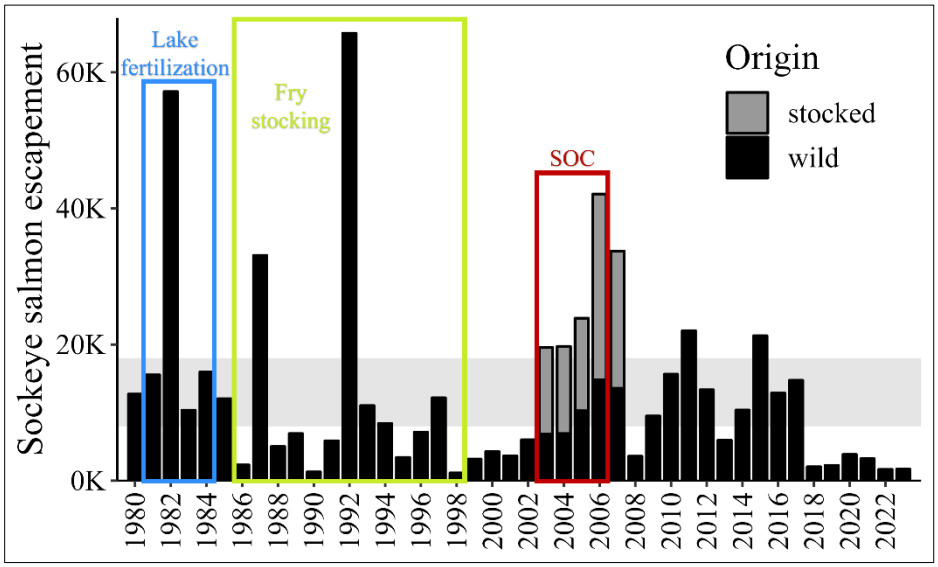

Figure 3.–Annual sockeye salmon escapement at Hugh Smith Lake, 1980–2023.

Note: From 2003 to 2007, the bars are divided to show our estimate of wild (black) and stocked fish (gray) in the escapement. Fry stocked from 1986 to 1997 were thought to have experienced very low survival rates with few surviving to emigrate from the lake (Geiger et al. 2003). Contribution estimates of wild and stocked fish are not available for years prior to 2003. Gray shaded area indicates the current optimal escapement goal range of 8,000–18,000 sockeye salmon, which includes both wild and hatchery-stocked fish, boxes denote years of lake fertilization (blue), fry stocking (yellow), and stock of concern (SOC; red) periods.

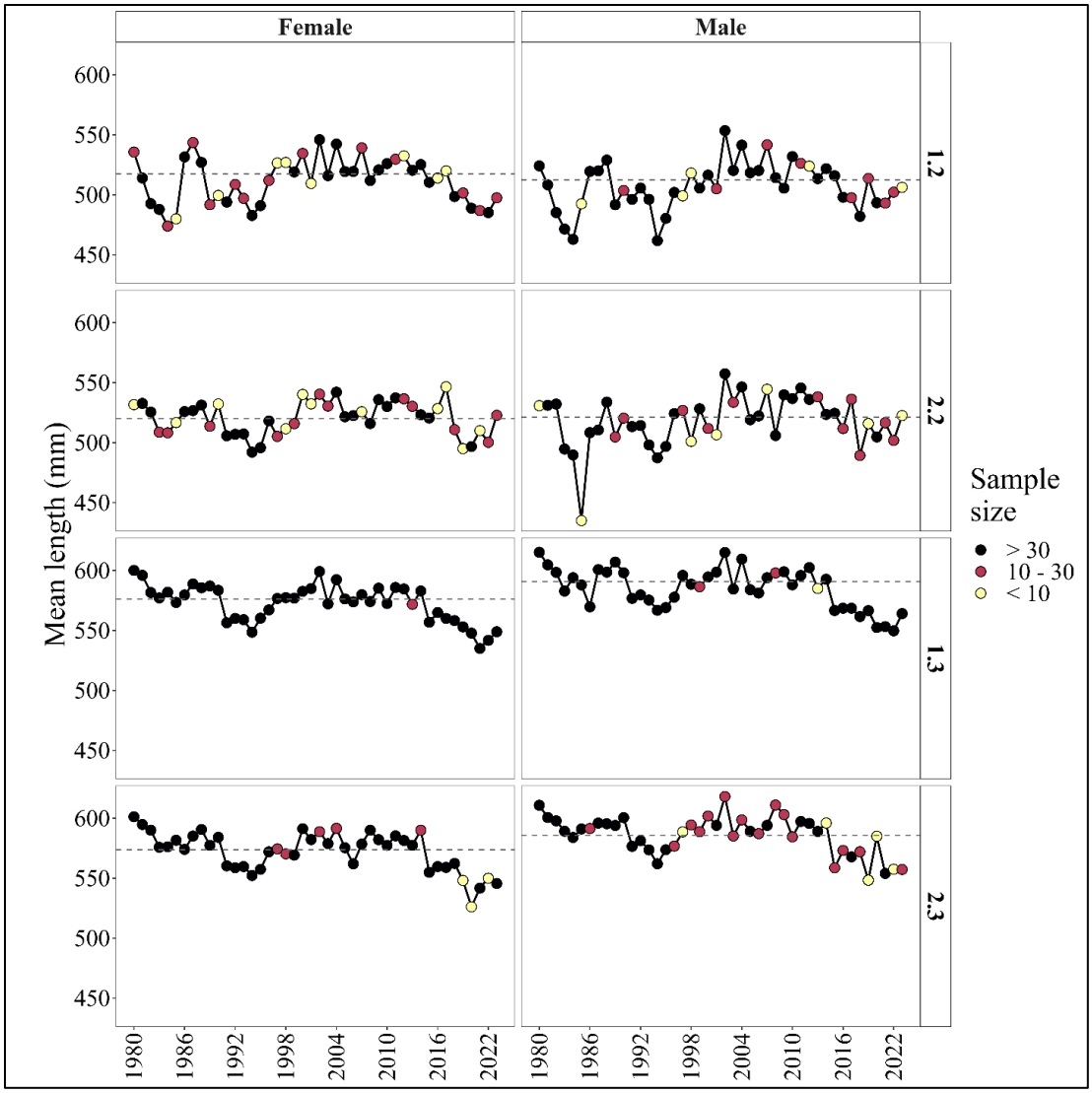

Figure 4.–Mean lengths of age-1.2, age-2.2, age-1.3, and age-2.3 female and male sockeye salmon by year, 1980–2023 and the mean length of all observed fish by sex and age class (gray dashed line).

Note: Mean lengths calculated from more than 30 fish are displayed in black, 10 to 30 fish in red, and less than 10 fish in yellow.

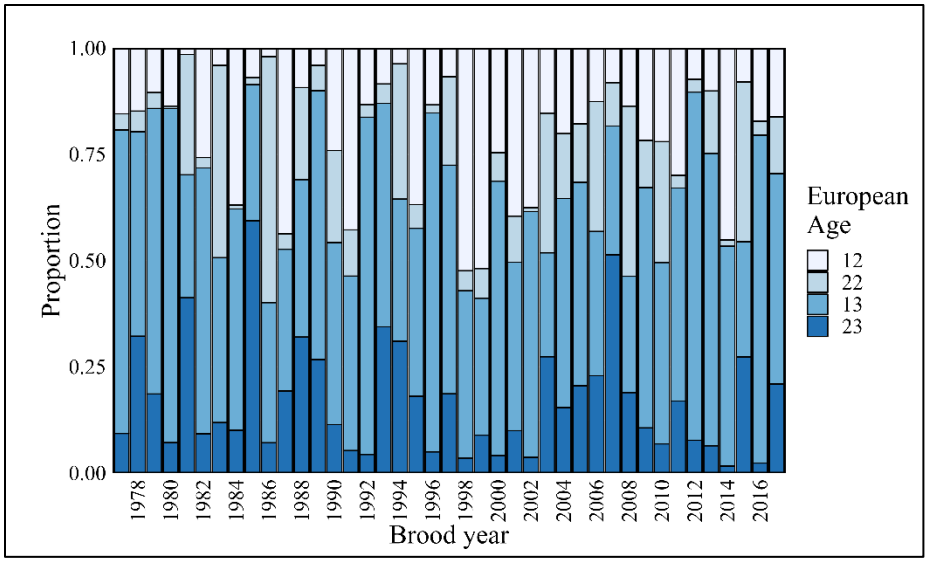

Figure 5.–Proportions of sockeye salmon age class from brood year at Hugh Smith Lake, 1977–2017.

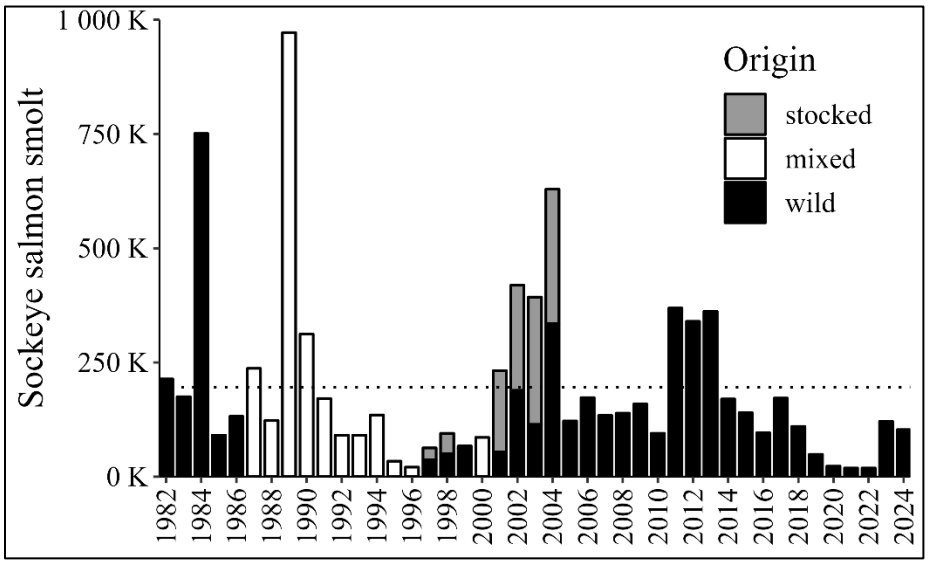

Figure 6.–Annual sockeye salmon smolt estimates at Hugh Smith Lake and mean (dotted line), 1982–2024.

Note: Divided bars show estimates of wild and stocked origin smolt for years when proportions of hatchery-stocked smolt were estimated from otolith samples collected at the weir (1997–1999 and 2001–2004) and mixed for years where smolt origin is unknown. Stocked fish released prior to 1996 (smolt year 1997) were unmarked.

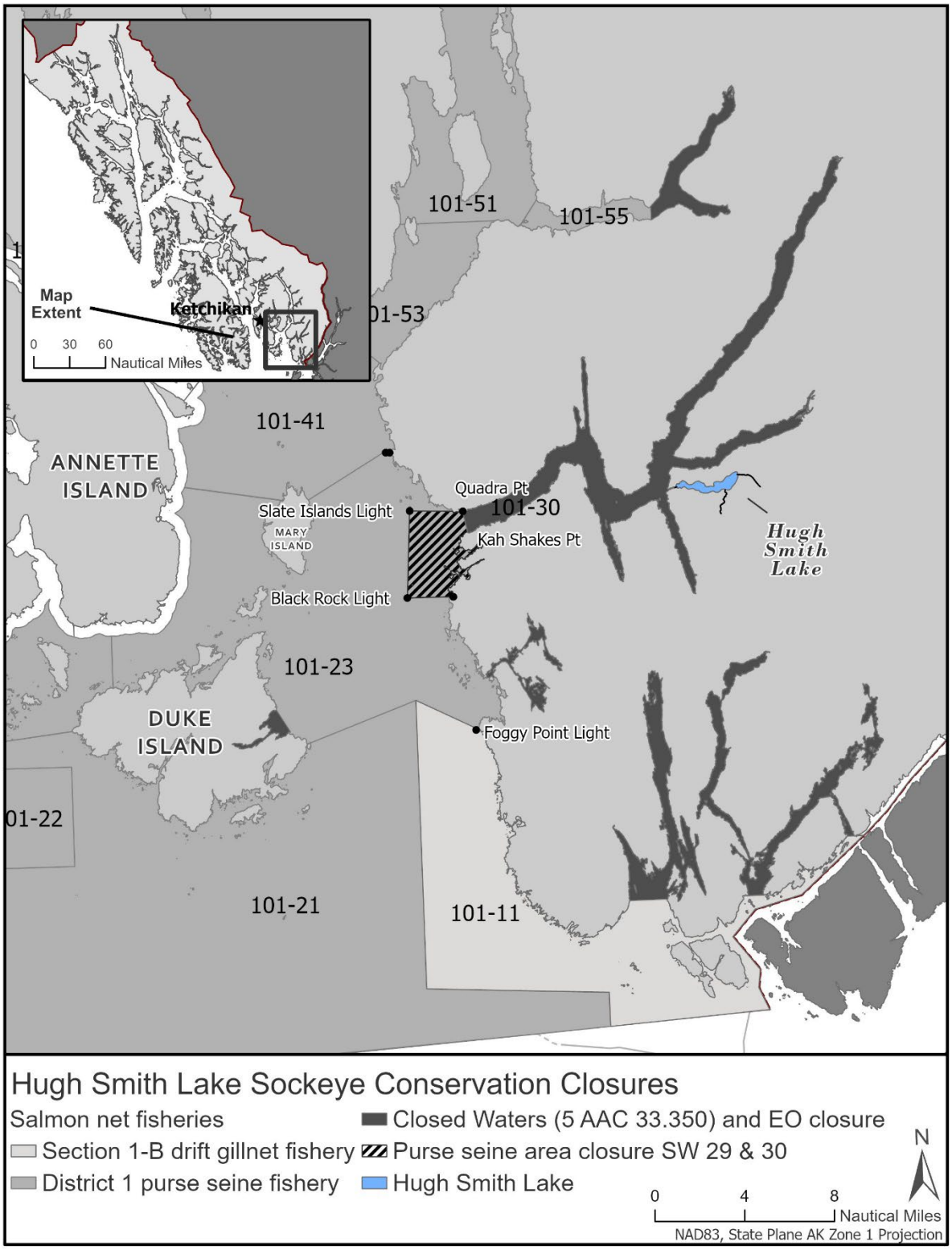

Figure 7.–District 101 purse seine closure per the 2003 Hugh Smith action plan, statistical weeks 29 and 30.

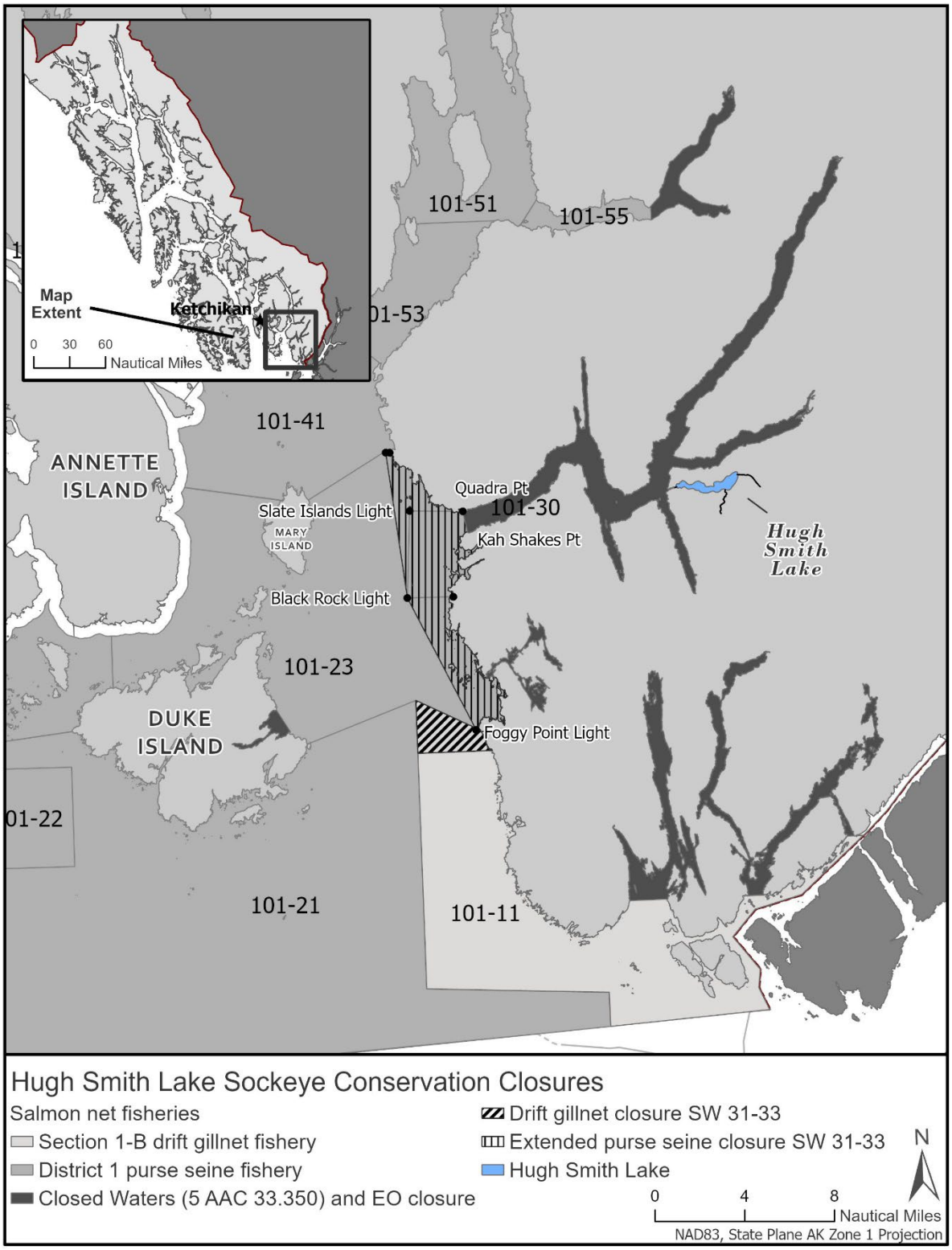

Figure 8.–District 101 purse seine and drift gillnet closure per the 2003 Hugh Smith action plan, statistical weeks 31, 32, and 33.

APPENDIX A: HUGH SMITH LAKE STOCK ASSESSMENT

Appendix A1.–Sockeye salmon spawning escapement at Hugh Smith Lake, 1982–2023.

Year	Escapement
1982	57,138
1983	10,384
1984	15,533
1985	11,246
1986	6,337
1987	31,195
1988	4,604
1989	4,934
1990	1,257
1991	5,495
1992	65,408
1993	11,794
1994	8,187
1995	3,129
1996	6,553
1997	12,154
1998	897
1999	2,878
2000	3,989
2001	3,551
2002	5,880
2003	19,568
2004	19,734
2005	23,872
2006	42,112
2007	33,743
2008	3,588
2009	9,483
2010	15,646
2011	22,029
2012	13,353
2013	5,946
2014	10,397
2015	21,296
2016	12,865
2017	14,748
2018	2,039
2019	2,240
2020	3,860
2021	3,235
2022	1,657
2023	1,689

Appendix A2.–Age distribution estimates of the Hugh Smith Lake sockeye salmon escapement, weighted by statistical week, 1980–2023.

		Age class															
Year		0.1	1.1	2.1	3.1	0.2	1.2	2.2	3.2	0.3	1.3	2.3	3.3	1.4	2.4	1.5	2.5	Total
1980	Number by age class	–	37	–	–	–	1,055	113	–	–	9,380	2,129	–	–	–	–	–	12,714
	SE of number	–	21	–	–	–	139	33	–	–	200	156	–	–	–	–	–	–
	Proportion by age class	–	0.3%	–	–	–	8.3%	0.9%	–	–	73.8%	16.7%	–	–	–	–	–	–
	SE of proportion	–	0.2%	–	–	–	1.1%	0.3%	–	–	1.6%	1.2%	–	–	–	–	–	–
	Sample size	–	3	–	–	–	72	12	–	–	719	175	–	–	–	–	–	981
1981	Number by age class	–	250	–	–	–	7,216	1,826	–	–	4,598	1,655	–	–	–	–	–	15,545
	SE of number	–	55	–	–	–	208	126	–	–	204	119	–	–	–	–	–	–
	Proportion by age class	–	1.6%	–	–	–	46.4%	11.7%	–	–	29.6%	10.6%	–	–	–	–	–	–
	SE of proportion	–	0.4%	–	–	–	1.3%	0.8%	–	–	1.3%	0.8%	–	–	–	–	–	–
	Sample size	–	19	–	–	–	502	149	–	–	338	137	–	–	–	–	–	1,145
1982	Number by age class	–	–	–	–	–	1,613	805	–	12	52,124	2,665	–	–	–	–	–	57,219
	SE of number	–	–	–	–	–	155	115	–	11	205	118	–	–	–	–	–	–
	Proportion by age class	–	–	–	–	–	2.8%	1.4%	–	0.0%	91.1%	4.7%	–	–	–	–	–	–
	SE of proportion	–	–	–	–	–	0.3%	0.2%	–	0.0%	0.4%	0.2%	–	–	–	–	–	–
	Sample size	–	–	–	–	–	174	122	–	1	2,305	407	–	–	–	–	–	3,009
1983	Number by age class	–	14	8	–	–	1,375	495	–	12	5,501	2,843	–	182	–	–	–	10,429
	SE of number	–	14	7	–	–	98	62	–	8	169	157	–	38	–	–	–	–
	Proportion by age class	–	0.1%	0.1%	–	–	13.2%	4.7%	–	0.1%	52.7%	27.3%	–	1.7%	–	–	–	–
	SE of proportion	–	0.1%	0.1%	–	–	0.9%	0.6%	–	0.1%	1.6%	1.5%	–	0.4%	–	–	–	–
	Sample size	–	1	1	–	–	157	57	–	2	565	301	–	23	–	–	–	1,107
1984	Number by age class	–	9	–	–	–	966	551	–	–	10,436	4,144	–	–	–	–	–	16,106
	SE of number	–	9	–	–	–	77	70	–	–	153	137	–	–	–	–	–	–
	Proportion by age class	–	0.1%	–	–	–	6.0%	3.4%	–	–	64.8%	25.7%	–	–	–	–	–	–
	SE of proportion	–	0.1%	–	–	–	0.5%	0.4%	–	–	0.9%	0.9%	–	–	–	–	–	–
	Sample size	–	1	–	–	–	149	56	–	–	1,007	378	–	–	–	–	–	1,591
1985	Number by age class	–	–	15	–	–	76	43	–	–	8,935	2,997	13	74	70	–	23	12,245
	SE of number	–	–	14	–	–	23	17	–	–	151	147	9	31	28	–	13	–
	Proportion by age class	–	–	0.1%	–	–	0.6%	0.3%	–	–	73.0%	24.5%	0.1%	0.6%	0.6%	–	0.2%	–
	SE of proportion	–	–	0.1%	–	–	0.2%	0.1%	–	–	1.2%	1.2%	0.1%	0.3%	0.2%	–	0.1%	–
	Sample size	–	–	1	–	–	10	6	–	–	856	279	2	6	7	–	3	1,170
1986	Number by age class	–	5	–	–	4	5,076	780	–	–	745	305	–	49	–	5	–	6,968
	SE of number	–	3	–	–	1	28	25	–	–	25	18	–	6	–	3	–	–
	Proportion by age class	–	0.1%	–	–	0.1%	72.8%	11.2%	–	–	10.7%	4.4%	–	0.7%	–	0.1%	–	–
	SE of proportion	–	0.0%	–	–	0.0%	0.4%	0.4%	–	–	0.4%	0.3%	–	0.1%	–	0.0%	–	–
	Sample size	–	1	–	–	1	1,389	191	–	–	195	77	–	13	–	1	–	1,868

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Year		Age class																
		0.1	1.1	2.1	3.1	0.2	1.2	2.2	3.2	0.3	1.3	2.3	3.3	1.4	2.4	1.5	2.5	Total
1987	Number by age class	–	147	130	–	–	626	1,030	24	–	29,329	1,733	61	17	–	–	–	33,097
	SE of number	–	68	49	–	–	112	133	11	–	257	187	45	17	–	–	–	–
	Proportion by age class	–	0.4%	0.4%	–	–	1.9%	3.1%	0.1%	–	88.6%	5.2%	0.2%	0.1%	–	–	–	–
	SE of proportion	–	0.2%	0.1%	–	–	0.3%	0.4%	0.0%	–	0.8%	0.6%	0.1%	0.1%	–	–	–	–
	Sample size	–	9	18	–	–	66	132	4	–	3,374	278	6	1	–	–	–	3,888
1988	Number by age class	–	5	3	–	–	1,907	1,237	–	–	1,054	782	2	67	–	–	–	5,056
	SE of number	–	2	1	–	–	31	27	–	–	26	21	2	6	–	–	–	–
	Proportion by age class	–	0.1%	0.1%	–	–	37.7%	24.5%	–	–	20.8%	15.5%	0.0%	1.3%	–	–	–	–
	SE of proportion	–	0.0%	0.0%	–	–	0.6%	0.5%	–	–	0.5%	0.4%	0.0%	0.1%	–	–	–	–
	Sample size	–	3	2	–	–	1,076	727	–	–	624	499	1	46	–	–	–	2,978
1989	Number by age class	–	–	–	–	–	163	52	1	–	5,808	486	1	–	2	–	–	6,513
	SE of number	–	–	–	–	–	11	11	0	–	37	35	0	–	2	–	–	–
	Proportion by age class	–	–	–	–	–	2.5%	0.8%	0.0%	–	89.2%	7.5%	0.0%	–	0.0%	–	–	–
	SE of proportion	–	–	–	–	–	0.2%	0.2%	0.0%	–	0.6%	0.5%	0.0%	–	0.0%	–	–	–
	Sample size	–	–	–	–	–	116	24	1	–	1,489	184	1	–	1	–	–	1,816
1990	Number by age class	–	12	1	–	–	52	38	–	–	658	495	1	27	–	–	–	1,285
	SE of number	–	3	1	–	–	6	4	–	–	14	14	0	2	–	–	–	–
	Proportion by age class	–	0.9%	0.1%	–	–	4.1%	3.0%	–	–	51.2%	38.5%	0.1%	2.1%	–	–	–	–
	SE of proportion	–	0.2%	0.0%	–	–	0.4%	0.3%	–	–	1.1%	1.1%	0.0%	0.1%	–	–	–	–
	Sample size	–	8	1	–	–	39	29	–	–	537	294	1	24	–	–	–	933
1991	Number by age class	–	2	26	4	–	1,588	2,028	2	–	781	1,442	–	–	13	–	–	5,885
	SE of number	–	0	8	3	–	16	31	1	–	15	30	–	–	4	–	–	–
	Proportion by age class	–	0.0%	0.4%	0.1%	–	27.0%	34.5%	0.0%	–	13.3%	24.5%	–	–	0.2%	–	–	–
	SE of proportion	–	0.0%	0.1%	0.1%	–	0.3%	0.5%	0.0%	–	0.3%	0.5%	–	–	0.1%	–	–	–
	Sample size	–	2	11	1	–	1,274	1,103	1	–	629	998	–	–	8	–	–	4,027
1992	Number by age class	–	3	3	–	–	1,587	1,262	15	–	60,690	1,824	–	336	15	–	–	65,737
	SE of number	–	3	3	–	–	436	156	15	–	628	360	–	286	13	–	–	–
	Proportion by age class	–	0.0%	0.0%	–	–	2.4%	1.9%	0.0%	–	92.3%	2.8%	–	0.5%	0.0%	–	–	–
	SE of proportion	–	0.0%	0.0%	–	–	0.7%	0.2%	0.0%	–	1.0%	0.5%	–	0.4%	0.0%	–	–	–
	Sample size	–	1	1	–	–	63	105	1	–	914	135	–	2	2	–	–	1,224
1993	Number by age class	–	–	13	–	–	1,137	1,916	10	–	3,055	7,038	66	285	13	–	–	13,532
	SE of number	–	–	7	–	–	142	159	8	–	167	215	44	48	10	–	–	–
	Proportion by age class	–	–	0.1%	–	–	8.4%	14.2%	0.1%	–	22.6%	52.0%	0.5%	2.1%	0.1%	–	–	–
	SE of proportion	–	–	0.1%	–	–	1.3%	1.4%	0.1%	–	1.5%	1.9%	0.4%	0.4%	0.1%	–	–	–
	Sample size	–	–	2	–	–	62	163	1	–	279	564	2	31	1	–	–	1,105

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Year		Age class 0.1	1.1	2.1	3.1	0.2	1.2	2.2	3.2	0.3	1.3	2.3	3.3	1.4	2.4	1.5	2.5	Total
1994	Number by age class	–	51	41	–	–	572	625	6	–	6,546	1,079	–	66	5	2	–	8,992
	SE of number	–	23	14	–	–	73	88	4	–	139	95	–	18	3	1	–	–
	Proportion by age class	–	0.6%	0.5%	–	–	6.4%	7.0%	0.1%	–	72.8%	12.0%	–	0.7%	0.1%	0.0%	–	–
	SE of proportion	–	0.3%	0.2%	–	–	0.8%	1.0%	0.0%	–	1.5%	1.1%	–	0.2%	0.0%	0.0%	–	–
	Sample size	–	12	13	–	–	148	91	2	–	966	243	–	18	2	1	–	1,496
1995	Number by age class	–	–	25	–	–	902	451	–	–	802	1,226	–	44	1	–	–	3,452
	SE of number	–	–	6	–	–	47	38	–	–	44	49	–	14	0	–	–	–
	Proportion by age class	–	–	0.7%	–	–	26.1%	13.1%	–	–	23.2%	35.5%	–	1.3%	0.0%	–	–	–
	SE of proportion	–	–	0.2%	–	–	1.4%	1.1%	–	–	1.3%	1.4%	–	0.4%	0.0%	–	–	–
	Sample size	–	–	16	–	–	299	133	–	–	263	408	–	13	1	–	–	1,133
1996	Number by age class	–	12	–	–	–	1,012	1,654	6	–	3,519	904	–	–	16	–	–	7,123
	SE of number	–	8	–	–	–	125	176	5	–	175	139	–	–	16	–	–	–
	Proportion by age class	–	0.2%	–	–	–	14.2%	23.2%	0.1%	–	49.4%	12.7%	–	–	0.2%	–	–	–
	SE of proportion	–	0.1%	–	–	–	1.8%	2.5%	0.1%	–	2.5%	1.9%	–	–	0.2%	–	–	–
	Sample size	–	2	–	–	–	97	76	1	–	287	70	–	–	1	–	–	534
1997	Number by age class	–	18	–	–	–	249	404	–	–	10,793	664	20	35	–	–	–	12,182
	SE of number	–	18	–	–	–	68	83	–	–	144	101	19	24	–	–	–	–
	Proportion by age class	–	0.1%	–	–	–	2.0%	3.3%	–	–	88.6%	5.5%	0.2%	0.3%	–	–	–	–
	SE of proportion	–	0.1%	–	–	–	0.6%	0.7%	–	–	1.2%	0.8%	0.2%	0.2%	–	–	–	–
	Sample size	–	1	–	–	–	13	22	–	–	580	37	1	2	–	–	–	656
1998	Number by age class	–	27	9	–	3	75	49	–	–	576	332	–	66	–	–	–	1,138
	SE of number	–	18	3	–	2	26	19	–	–	54	50	–	30	–	–	–	–
	Proportion by age class	–	2.4%	0.8%	–	0.3%	6.6%	4.3%	–	–	50.6%	29.2%	–	5.8%	–	–	–	–
	SE of proportion	–	1.5%	0.3%	–	0.2%	2.3%	1.6%	–	–	4.7%	4.4%	–	2.7%	–	–	–	–
	Sample size	–	2	3	–	1	9	7	–	–	81	32	–	5	–	–	–	140
1999	Number by age class	–	–	29	–	–	1,658	538	–	–	573	363	–	6	7	–	–	3,174
	SE of number	–	–	14	–	–	67	52	–	–	53	43	–	5	6	–	–	–
	Proportion by age class	–	–	0.9%	–	–	52.2%	17.0%	–	–	18.1%	11.4%	–	0.2%	0.2%	–	–	–
	SE of proportion	–	–	0.4%	–	–	2.1%	1.6%	–	–	1.7%	1.4%	–	0.2%	0.2%	–	–	–
	Sample size	–	–	4	–	–	245	77	–	–	81	53	–	1	1	–	–	462
2000	Number by age class	–	14	–	13	–	918	302	–	–	2,251	769	14	–	–	–	–	4,281
	SE of number	–	13	–	12	–	86	52	–	–	103	82	13	–	–	–	–	–
	Proportion by age class	–	0.3%	–	0.3%	–	21.4%	7.1%	–	–	52.6%	18.0%	0.3%	–	–	–	–	–
	SE of proportion	–	0.3%	–	0.3%	–	2.0%	1.2%	–	–	2.4%	1.9%	0.3%	–	–	–	–	–
	Sample size	–	1	–	1	–	94	33	–	–	257	70	1	–	–	–	–	457

-continued-

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Year		Age class 0.1	1.1	2.1	3.1	0.2	1.2	2.2	3.2	0.3	1.3	2.3	3.3	1.4	2.4	1.5	2.5	Total
2001	Number by age class	7	60	–	–	6	162	71	–	–	2,908	598	–	7	6	–	–	3,825
	SE of number	6	18	–	–	6	34	18	–	–	60	49	–	6	6	–	–	–
	Proportion by age class	0.2%	1.6%	–	–	0.2%	4.2%	1.9%	–	–	76.0%	15.6%	–	0.2%	0.2%	–	–	–
	SE of proportion	0.2%	0.5%	–	–	0.1%	0.9%	0.5%	–	–	1.6%	1.3%	–	0.2%	0.1%	–	–	–
	Sample size	1	9	–	–	1	25	14	–	–	591	120	–	1	1	–	–	763
2002	Number by age class	–	6	21	–	–	3,981	564	–	–	1,318	263	–	13	–	–	–	6,166
	SE of number	–	6	11	–	–	89	58	–	–	76	41	–	9	–	–	–	–
	Proportion by age class	–	0.1%	0.3%	–	–	64.6%	9.2%	–	–	21.4%	4.3%	–	0.2%	–	–	–	–
	SE of proportion	–	0.1%	0.2%	–	–	1.4%	0.9%	–	–	1.2%	0.7%	–	0.1%	–	–	–	–
	Sample size	–	1	3	–	–	582	77	–	–	197	36	–	2	–	–	–	898
2003	Number by age class	–	42	67	–	14	10,028	840	18	136	7,385	1,059	–	–	–	–	–	19,588
	SE of number	–	23	28	–	13	287	121	17	44	276	129	–	–	–	–	–	–
	Proportion by age class	–	0.2%	0.3%	–	0.1%	51.2%	4.3%	0.1%	0.7%	37.7%	5.4%	–	–	–	–	–	–
	SE of proportion	–	0.1%	0.1%	–	0.1%	1.5%	0.6%	0.1%	0.2%	1.4%	0.7%	–	–	–	–	–	–
	Sample size	–	3	5	–	1	622	50	1	9	437	65	–	–	–	–	–	1,193
2004	Number by age class	–	523	36	–	–	8,623	1,695	–	–	8,362	690	–	–	–	–	–	19,930
	SE of number	–	102	25	–	–	339	196	–	–	341	113	–	–	–	–	–	–
	Proportion by age class	–	2.6%	0.2%	–	–	43.3%	8.5%	–	–	42.0%	3.5%	–	–	–	–	–	–
	SE of proportion	–	0.5%	0.1%	–	–	1.7%	1.0%	–	–	1.7%	0.6%	–	–	–	–	–	–
	Sample size	–	25	2	–	–	385	84	–	–	387	39	–	–	–	–	–	922
2005	Number by age class	–	–	26	–	–	6,696	1,566	–	18	14,264	1,537	–	–	–	–	–	24,108
	SE of number	–	–	18	–	–	267	152	–	18	296	150	–	–	–	–	–	–
	Proportion by age class	–	–	0.1%	–	–	27.8%	6.5%	–	0.1%	59.2%	6.4%	–	–	–	–	–	–
	SE of proportion	–	–	0.1%	–	–	1.1%	0.6%	–	0.1%	1.2%	0.6%	–	–	–	–	–	–
	Sample size	–	–	2	–	–	440	98	–	1	900	97	–	–	–	–	–	1,538
2006	Number by age class	–	–	–	–	–	20,815	3,467	–	–	16,642	1,604	–	–	–	–	–	42,529
	SE of number	–	–	–	–	–	1,029	488	–	–	1,000	303	–	–	–	–	–	–
	Proportion by age class	–	–	–	–	–	48.9%	8.2%	–	–	39.1%	3.8%	–	–	–	–	–	–
	SE of proportion	–	–	–	–	–	2.4%	1.1%	–	–	2.4%	0.7%	–	–	–	–	–	–
	Sample size	–	–	–	–	–	314	102	–	–	357	46	–	–	–	–	–	819
2007	Number by age class	–	–	–	–	–	2,266	592	–	–	25,915	5,304	–	–	–	–	–	34,077
	SE of number	–	–	–	–	–	383	188	–	–	655	555	–	–	–	–	–	–
	Proportion by age class	–	–	–	–	–	6.6%	1.7%	–	–	76.0%	15.6%	–	–	–	–	–	–
	SE of proportion	–	–	–	–	–	1.1%	0.6%	–	–	1.9%	1.6%	–	–	–	–	–	–
	Sample size	–	–	–	–	–	34	11	–	–	494	96	–	–	–	–	–	635

-continued-

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Year		Age class																
		0.1	1.1	2.1	3.1	0.2	1.2	2.2	3.2	0.3	1.3	2.3	3.3	1.4	2.4	1.5	2.5	Total
2008	Number by age class	–	–	–	–	–	1,437	855	–	–	708	445	–	129	16	–	–	3,590
	SE of number	–	–	–	–	–	90	77	–	–	77	60	–	35	16	–	–	–
	Proportion by age class	–	–	–	–	–	40.0%	23.8%	–	–	19.7%	12.4%	–	3.6%	0.4%	–	–	–
	SE of proportion	–	–	–	–	–	2.5%	2.1%	–	–	2.1%	1.7%	–	1.0%	0.4%	–	–	–
	Sample size	–	–	–	–	–	140	90	–	–	67	44	–	13	1	–	–	355
2009	Number by age class	–	–	–	–	–	2,407	1,588	–	–	4,397	1,091	–	–	–	–	–	9,483
	SE of number	–	–	–	–	–	151	135	–	–	174	118	–	–	–	–	–	–
	Proportion by age class	–	–	–	–	–	25.4%	16.7%	–	–	46.4%	11.5%	–	–	–	–	–	–
	SE of proportion	–	–	–	–	–	1.6%	1.4%	–	–	1.8%	1.2%	–	–	–	–	–	–
	Sample size	–	–	–	–	–	186	106	–	–	342	75	–	–	–	–	–	709
2010	Number by age class	–	–	–	–	–	3,020	2,762	17	–	7,987	1,728	120	12	–	–	–	15,646
	SE of number	–	–	–	–	–	199	188	17	–	247	158	48	11	–	–	–	–
	Proportion by age class	–	–	–	–	–	19.3%	17.7%	0.1%	–	51.0%	11.0%	0.8%	0.1%	–	–	–	–
	SE of proportion	–	–	–	–	–	1.3%	1.2%	0.1%	–	1.6%	1.0%	0.3%	0.1%	–	–	–	–
	Sample size	–	–	–	–	–	184	144	1	–	499	107	6	1	–	–	–	942
2011	Number by age class	–	–	–	–	–	796	9,019	11	–	7,898	4,261	–	43	–	–	–	22,029
	SE of number	–	–	–	–	–	118	313	11	–	285	261	–	26	–	–	–	–
	Proportion by age class	–	–	–	–	–	3.6%	40.9%	0.1%	–	35.9%	19.3%	–	0.2%	–	–	–	–
	SE of proportion	–	–	–	–	–	0.5%	1.4%	0.0%	–	1.3%	1.2%	–	0.1%	–	–	–	–
	Sample size	–	–	–	–	–	47	447	1	–	496	215	–	3	–	–	–	1,209
2012	Number by age class	–	–	–	–	–	313	1,370	43	–	3,927	7,629	–	50	22	–	–	13,353
	SE of number	–	–	–	–	–	84	163	30	–	241	266	–	34	0	–	–	–
	Proportion by age class	–	–	–	–	–	2.3%	10.3%	0.3%	–	29.4%	57.1%	–	0.4%	0.2%	–	–	–
	SE of proportion	–	–	–	–	–	0.6%	1.2%	0.2%	–	1.8%	2.0%	–	0.3%	–	–	–	–
	Sample size	–	–	–	–	–	13	59	2	–	175	335	–	2	1	–	–	587
2013	Number by age class	–	–	–	–	–	1,689	406	14	–	300	3,485	33	21	–	–	–	5,946
	SE of number	–	–	–	–	–	119	63	14	–	56	130	18	14	–	–	–	–
	Proportion by age class	–	–	–	–	–	28.4%	6.8%	0.2%	–	5.0%	58.6%	0.6%	0.3%	–	–	–	–
	SE of proportion	–	–	–	–	–	2.0%	1.1%	0.2%	–	0.9%	2.2%	0.3%	0.2%	–	–	–	–
	Sample size	–	–	–	–	–	135	38	1	–	26	297	3	2	–	–	–	502
2014	Number by age class	–	20	71	–	–	3,319	1,333	–	–	5,376	278	–	–	–	–	–	10,397
	SE of number	–	19	41	–	–	195	143	–	–	202	65	–	–	–	–	–	–
	Proportion by age class	–	0.2%	0.7%	–	–	31.9%	12.8%	–	–	51.7%	2.7%	–	–	–	–	–	–
	SE of proportion	–	0.2%	0.4%	–	–	1.9%	1.4%	–	–	1.9%	0.6%	–	–	–	–	–	–
	Sample size	–	1	3	–	–	196	69	–	–	351	18	–	–	–	–	–	638

-continued-

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Year		Age class 0.1	1.1	2.1	3.1	0.2	1.2	2.2	3.2	0.3	1.3	2.3	3.3	1.4	2.4	1.5	2.5	Total
2015	Number by age class	–	–	12	–	–	6,010	4,815	24	–	8,835	1,559	–	41	–	–	–	21,298
	SE of number	–	–	12	–	–	323	291	16	–	369	201	–	41	–	–	–	–
	Proportion by age class	–	–	0.1%	–	–	28.2%	22.6%	0.1%	–	41.5%	7.3%	–	0.2%	–	–	–	–
	SE of proportion	–	–	0.1%	–	–	1.5%	1.4%	0.1%	–	1.7%	0.9%	–	0.2%	–	–	–	–
	Sample size	–	–	1	–	–	261	253	2	–	380	66	–	1	–	–	–	964
2016	Number by age class	–	–	–	–	–	1,645	1,029	–	–	8,577	1,603	–	15	–	–	–	12,868
	SE of number	–	–	–	–	–	193	189	–	–	261	218	–	15	–	–	–	–
	Proportion by age class	–	–	–	–	–	12.8%	8.0%	–	–	66.7%	12.5%	–	0.1%	–	–	–	–
	SE of proportion	–	–	–	–	–	1.5%	1.5%	–	–	2.0%	1.7%	–	0.1%	–	–	–	–
	Sample size	–	–	–	–	–	75	27	–	–	455	61	–	1	–	–	–	619
2017	Number by age class	–	–	–	–	–	274	425	24	–	11,432	2,401	–	157	–	–	–	14,753
	SE of number	–	–	–	–	–	56	76	16	–	195	176	–	45	–	–	–	–
	Proportion by age class	–	–	–	–	–	1.9%	2.9%	0.2%	–	77.5%	16.3%	–	1.1%	–	–	–	–
	SE of proportion	–	–	–	–	–	0.4%	0.5%	0.1%	–	1.3%	1.2%	–	0.3%	–	–	–	–
	Sample size	–	–	–	–	–	21	30	2	–	827	154	–	12	–	–	–	1,049
2018	Number by age class	–	–	–	–	11	976	97	–	–	578	323	–	53	–	–	–	2,039
	SE of number	–	–	–	–	10	52	14	–	–	46	38	–	14	–	–	–	–
	Proportion by age class	–	–	–	–	0.5%	47.9%	4.8%	–	–	28.4%	15.9%	–	2.6%	–	–	–	–
	SE of proportion	–	–	–	–	0.5%	2.6%	0.7%	–	–	2.2%	1.9%	–	0.7%	–	–	–	–
	Sample size	–	–	–	–	1	215	32	–	–	150	79	–	15	–	–	–	492
2019	Number by age class	–	25	10	–	–	215	43	–	–	1,829	115	–	3	–	–	–	2,241
	SE of number	–	17	9	–	–	44	18	–	–	55	32	–	3	–	–	–	–
	Proportion by age class	–	1.1%	0.4%	–	–	9.6%	1.9%	–	–	81.6%	5.2%	–	0.2%	–	–	–	–
	SE of proportion	–	0.8%	0.4%	–	–	2.0%	0.8%	–	–	2.5%	1.4%	–	0.1%	–	–	–	–
	Sample size	–	2	1	–	–	28	7	–	–	246	14	–	1	–	–	–	299
2020	Number by age class	–	–	–	–	–	1,110	1,544	–	–	1,103	91	–	12	–	–	–	3,860
	SE of number	–	–	–	–	–	146	147	–	–	87	30	–	11	–	–	–	–
	Proportion by age class	–	–	–	–	–	28.8%	40.0%	–	–	28.6%	2.4%	–	0.3%	–	–	–	–
	SE of proportion	–	–	–	–	–	27.8%	27.9%	–	–	26.3%	9.1%	–	3.4%	–	–	–	–
	Sample size	–	–	–	–	–	95	132	–	–	95	8	–	1	–	–	–	331
2021	Number by age class	–	–	–	–	–	324	78	–	–	2,388	440	–	–	5	–	–	3,235
	SE of number	–	–	–	–	–	36	18	–	–	53	41	–	–	5	–	–	–
	Proportion by age class	–	–	–	–	–	10.0%	2.4%	–	–	73.8%	13.6%	–	–	0.2%	–	–	–
	SE of proportion	–	–	–	–	–	5.8%	2.8%	–	–	8.5%	6.7%	–	–	0.8%	–	–	–
	Sample size	–	–	–	–	–	58	15	–	–	441	80	–	–	1	–	–	595

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Year		Age class																Totals
		0.1	1.1	2.1	3.1	0.2	1.2	2.2	3.2	0.3	1.3	2.3	3.3	1.4	2.4	1.5	2.5	
2022	Number by age class	–	–	63	–	–	345	251	–	–	909	76	–	13	–	–	–	1,657
	SE of number	–	–	17	–	–	36	32	–	–	45	18	–	8	–	–	–	–
	Proportion by age class	–	–	3.8%	–	–	20.8%	15.1%	–	–	54.9%	4.6%	–	0.8%	–	–	–	–
	SE of proportion	–	–	6.0%	–	–	12.8%	11.3%	–	–	15.8%	6.4%	–	2.9%	–	–	–	–
	Sample size	–	–	11	–	–	59	42	–	–	156	13	–	2	–	–	–	283
2023	Number by age class	–	–	–	–	–	169	261	–	–	766	462	–	32	–	–	–	1,689
	SE of number	–	–	–	–	–	30	38	–	–	52	46	–	13	–	–	–	–
	Proportion by age class	–	–	–	–	–	10.0%	15.4%	–	–	45.3%	27.4%	–	1.9%	–	–	–	–
	SE of proportion	–	–	–	–	–	12.9%	16.1%	–	–	22.3%	19.5%	–	5.6%	–	–	–	–
	Sample size	–	–	–	–	–	24	33	–	–	106	67	–	5	–	–	–	235

Note: Due to rounding, the sum of percentages may not equal 100.0.

Appendix A3.–Sockeye salmon smolt counts, weir efficiencies, smolt estimates, and freshwater age composition at Hugh Smith Lake, 1981–2024.

Smolt year	Smolt counted	Weir efficiency	Smolt estimate	Freshwater age percent of total[a]		
				Age 1	Age 2	Age 3
1982	94,000	43.9%	214,000	82.5%	17.5%	0.0%
1983	77,000	43.9%	175,000	60.1%	39.8%	0.1%
1984	330,000	43.9%	751,000	91.7%	8.3%	0.0%
1985	40,000	43.9%	91,000	51.3%	48.2%	0.5%
1986[b]	58,000	43.9%	132,000	72.8%	24.4%	2.8%
1987[b]	104,000	43.9%	237,000	42.3%	57.3%	0.5%
1988[b]	54,000	43.9%	123,000	65.1%	34.9%	0.0%
1989[b]	427,000	43.9%	972,000	83.2%	16.8%	0.0%
1990[b]	137,000	43.9%	312,000	30.9%	67.6%	1.5%
1991[b]	75,000	43.9%	171,000	63.6%	36.2%	0.2%
1992[b]	15,000	16.5%	91,000	41.8%	57.2%	1.0%
1993[b]	36,000	39.6%	91,000	62.8%	35.7%	1.5%
1994[b]	43,000	31.9%	135,000	74.9%	21.1%	4.0%
1995[b]	19,000	56.3%	34,000	37.6%	62.4%	0.0%
1996[b]	16,000	75.4%	21,000	43.9%	40.1%	16.0%
1997[b]	44,000	69.9%	63,000	52.1%	39.5%	8.3%
1998[b]	64,000	67.3%	95,000	80.6%	18.3%	1.1%
1999[b]	40,000	59.8%	67,000	68.4%	31.6%	0.0%
2000[b]	72,000	83.9%	86,000	77.4%	22.0%	0.5%
2001[b]	189,000	81.6%	232,000	91.1%	8.3%	0.6%
2002[b]	297,000	70.9%	419,000	88.1%	11.9%	0.1%
2003[b]	261,000	66.4%	393,000	85.9%	13.9%	0.2%
2004	364,000	57.9%	629,000	88.0%	12.0%	0.0%
2005	77,000	63.2%	122,000	54.3%	45.6%	0.0%
2006	119,000	68.8%	173,000	63.1%	36.0%	0.9%
2007	89,000	66.5%	134,000	71.2%	27.2%	1.7%
2008	58,000	41.8%	139,000	62.4%	36.9%	0.7%
2009	116,000	73.1%	159,000	40.1%	59.2%	0.7%
2010	64,000	67.7%	95,000	18.7%	79.3%	2.0%
2011	244,000	66.1%	369,000	88.7%	10.1%	1.2%
2012	179,000	52.6%	340,000	72.4%	27.6%	0.0%
2013	186,000	51.3%	362,000	73.7%	25.8%	0.5%
2014	95,000	55.9%	170,000	71.1%	28.9%	0.0%
2015	36,000	25.7%	140,000	53.0%	46.6%	0.4%
2016	31,000	32.3%	96,000	85.2%	13.8%	1.0%
2017	80,000	46.6%	172,000	88.3%	11.7%	0.0%
2018	63,000	57.0%	110,000	57.4%	42.2%	0.5%
2019	25,000	51.1%	49,000	55.5%	43.3%	1.2%
2020	16,000	69.5%	23,000	47.7%	52.3%	0.0%
2021	9,000	47.0%	19,000	75.7%	24.3%	0.0%
2022	8,000	42.9%	19,000	35.8%	63.9%	0.3%
2023	80,000	66.0%	121,000	68.3%	28.2%	3.5%
2024	57,000	55.3%	103,000	50.5%	48.5%	0.9%

Note: The mean weir efficiency from 1992 to 1996 is used for years before 1991 as the efficiency is unknown, and a mean weir efficiency from 2019 to 2023 is used for 2024.

[a] Due to rounding, the sum of percentages may not equal 100.0; Freshwater age proportions for 2024 were not available at the time of publication.

[b] Stocking activities occurred between 1986 and 2003.

Appendix A4. –Sockeye salmon hatchery releases, release type, smolt year and proportions of stocked smolt emigrating from the lake, 1986–2004.

Release year	Hatchery release numbers	Release type	Smolt year	Percent of total smolt weir estimate stocked
1986	273,000	Unfed fry	1987	ND
1987	250,000	Unfed fry	1988	ND
1988	1,206,000	Unfed fry	1989	ND
1989	532,800	Unfed fry	1990	ND
1990	1,480,800	Unfed fry	1991	ND
1991	–	–	1992	ND
1992	477,500	Fed fry	1993	ND
1993	–	–	1994	ND
1994	645,000	Unfed fry	1995	ND
1995	418,000	Unfed fry	1996	ND
1996[a]	358,000	Unfed fry/ Presmolt[b]	1997	40%
1997	573,000	Unfed fry[b]	1998	47%
1998	–	–	1999	4%
1999[b]	202,000	Presmolt[c]	2000	ND
2000[b]	380,000	Presmolt[c]	2001	77%
2001[b]	445,000	Presmolt[c]	2002	55%
2002[b]	465,000	Presmolt[c]	2003	71%
2003[b]	420,000	Presmolt[c]	2004	47%

Note: En dashes indicate that no hatchery fish were stocked in the lake or available to sample from the smolt population; ND indicates no data. Stocked proportions were determined from otolith samples collected at the weir.

Appendix A5.–Reported subsistence harvest, permits, permit days, subsistence harvest rate of the terminal run of Hugh Smith Lake sockeye salmon, and CPUE, 1985–2023.

Year	Permits	Permit days	Sockeye salmon harvested	CPUE	Escapement	Subsistence harvest and escapement	Subsistence harvest rate
1985	10	10	190	19.0	11,246	11,436	1.7%
1986	5	5	92	18.4	6,337	6,429	1.4%
1987	14	14	233	16.6	31,195	31,428	0.7%
1988	3	4	22	5.5	4,604	4,626	0.5%
1989	–	–	–	–	4,934	4,934	–
1990	2	2	20	10.0	1,257	1,277	1.6%
1991	–	–	–	–	5,495	5,495	–
1992	–	–	–	–	65,408	65,408	–
1993	–	–	–	–	11,794	11,794	–
1994	–	–	–	–	8,187	8,187	–
1995	–	–	–	–	3,129	3,129	–
1996	–	–	–	–	6,553	6,553	–
1997	3	4	38	9.5	12,154	12,192	0.3%
1998	–	–	–	–	897	897	–
1999	–	–	–	–	2,878	2,878	–
2000	–	–	–	–	3,989	3,989	–
2001	–	–	–	–	3,551	3,551	–
2002	–	–	–	–	5,880	5,880	–
2003	–	–	–	–	19,568	19,568	–
2004	–	–	–	–	19,734	19,734	–
2005	1	1	12	12.0	23,872	23,884	0.1%
2006	4	5	84	16.8	42,112	42,196	0.2%
2007	14	22	269	12.2	33,743	34,012	0.8%
2008	–	–	–	–	3,588	3,588	–
2009	5	8	85	10.6	9,483	9,568	0.9%
2010	1	1	14	14.0	15,646	15,660	0.1%
2011	1	1	0	0.0	22,029	22,029	0.0%
2012	19	38	499	13.1	13,353	13,852	3.6%
2013	25	63	756	12.0	5,946	6,702	11.3%
2014	24	39	457	11.7	10,397	10,854	4.2%
2015	28	76	892	11.7	21,298	22,190	4.0%
2016	22	45	488	10.8	12,868	13,356	3.7%
2017	20	54	629	11.6	14,748	15,377	4.1%
2018	10	14	54	3.9	2,039	2,093	2.6%
2019	23	37	521	14.1	2,241	2,762	18.9%
2020	12	21	70	3.3	3,860	3,930	1.8%
2021	10	16	159	9.9	3,235	3,394	4.8%
2022	4	4	22	5.5	1,657	1,679	1.3%
2023	2	2	5	2.5	1,698	1,703	0.3%