Fishery Management Report No. 20-03

Area Management Report for the Sport Fisheries of Anchorage, 2016–2018

by

Jay Baumer

and

Brittany Blain-Roth

January 2020

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 MANAGEMENT REPORT NO. 20-03

AREA MANAGEMENT REPORT FOR THE SPORT FISHERIES OF ANCHORAGE, 2016–2018

by
Jay Baumer
Alaska Department of Fish and Game, Division of Sport Fish, Anchorage
and
Brittany J. Blain-Roth
Alaska Department of Fish and Game, Division of Sport Fish, Anchorage

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

January 2020

This investigation was partially financed by the Federal Aid in Sport Fish Restoration Act (16 U.S.C. 777-777K) under Project F-10-31 to 34; Job Nos. E-2-5, S-2-33.

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

Jay Baumer,
Alaska Department of Fish and Game, Division of Sport Fish,
333 Raspberry Road, Anchorage, AK 99518-1599, USA

and

Brittany J. Blain-Roth,
Alaska Department of Fish and Game, Division of Sport Fish,
333 Raspberry Road, Anchorage, AK 99518-1599, USA

This document should be cited as follows:
Baumer, J., and B. J. Blain-Roth. 2020. Area management report for the sport fisheries of Anchorage, 2016–2018. Alaska Department of Fish and Game, Fishery Management Report No. 20-03, Anchorage.

TABLE OF CONTENTS

Page

TABLE OF CONTENTS (Continued)

Page

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABSTRACT

This report provides a summary of sport fisheries in the Anchorage Management Area from 2016 through 2018. Included are a description and historical overview of each sport fishery, how each fishery is currently managed, and the performance and escapement for each fishery for 2016–2018.

Key words: Anchorage Management Area, Alaska Board of Fisheries, sport fisheries, stocked fish, Chinook salmon, *Oncorhynchus tshawytscha*, coho salmon, *Onchoryncus kisutch*, sockeye salmon, *Oncorhyncus nerka*, pink salmon, *Oncorhynchus gorbuscha*, chum salmon, *Oncorhynchus keta*, Dolly Varden, *Salvelinus malma*, groundfish, sharks

INTRODUCTION

The Anchorage Sport Fish Management Area (AMA) is part of the Southcentral Sport Fish Region and consists of all waters flowing into eastside Knik Arm and the north side of Turnagain Arm from the Eklutna River drainage in the north to Ingram Creek in the south (Figure 1). The AMA includes the brackish waters on the south side of Turnagain Arm and the northeast side of Knik Arm and includes part of the Chugach Mountain Range. Even though the AMA is coastal and includes Turnagain Arm, most fishing effort and opportunity is in fresh water. Turnagain Arm is muddy in nature and has extreme daily tidal fluctuations making it difficult for anglers to catch fish and difficult for boats to navigate. Most streams, except Ingram Creek, are fed from high mountain lakes, snowmelt, or glaciers in the Chugach Mountain Range. These streams have year-round resident sport fish species as well as anadromous salmon that return to them. Many of these streams are enhanced with hatchery fish to provide additional sport fishing opportunity. Most lakes, except those located in the Chugach Mountains (e.g., Symphony and Rabbit lakes), are relatively shallow in nature and are often man-made. Many AMA lakes are stocked with fish to provide sport fishing opportunity and if not stocked, would contain very few, if any, sport fish species.

Local communities within the area include Anchorage, Eagle River, Chugiak, Birchwood, Peters Creek, Eklutna, Indian, Bird, Girdwood, Portage, and the Joint Base Elmendorf-Richardson (JBER). Of Alaska's 737,438 residents (2018 U. S. Census Bureau Population Estimate data, https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml, accessed November 2019), 40% or 291,538 people reside in the AMA. Anchorage is commonly referred to as the hub for the rest of the state and has the Ted Stevens International Airport acting as the gateway to connect travelers to smaller in-state flights or quickly access Alaska's primary highways. Even though there are 3 lakes dedicated as float-plane lakes and numerous local small-plane runways, most anglers access the AMA sport fisheries by road.

AMA land managers include private individuals, Municipality of Anchorage (MOA), Alaska Railroad Corporation (ARRC), Alaska Department of Natural Resources (ADNR), U.S. Forest Service (USFS), U.S. Bureau of Land Management (BLM), U.S. Department of Defense (DOD), and Alaska Native organizations. Management and research functions for AMA sport fisheries are conducted by the Alaska Department of Fish and Game (ADF&G), Division of Sport Fish (SF) staff from the Anchorage regional office.

All 5 species of salmon are found in the AMA: Chinook (*Oncorhynchus tshawytscha*, called king salmon in regulatory language), chum (*O. keta*), coho (*O. kisutch*), pink (*O. gorbuscha*), and sockeye (*O. nerka*) salmon. In addition, resident and stocked species in the AMA include Arctic char (*Salvelinus alpinus*), grayling (*Thymallus arcticus*), Dolly Varden (*Salvelinus malma*), and rainbow trout (*Oncorhynchus mykiss*). There are also unconfirmed reports of steelhead

(anadromous *O. mykiss*) and confirmed reports of invasive species such as northern pike (*Esox lucius*), Alaska blackfish (*Dallia pectoralis*), and domestic goldfish (Family Cyprinidae). Data from the ADF&G Statewide Harvest Survey (SWHS) used in this report groups Dolly Varden and Arctic char as 1 fish although they are 2 separate species, and both are found in the AMA.

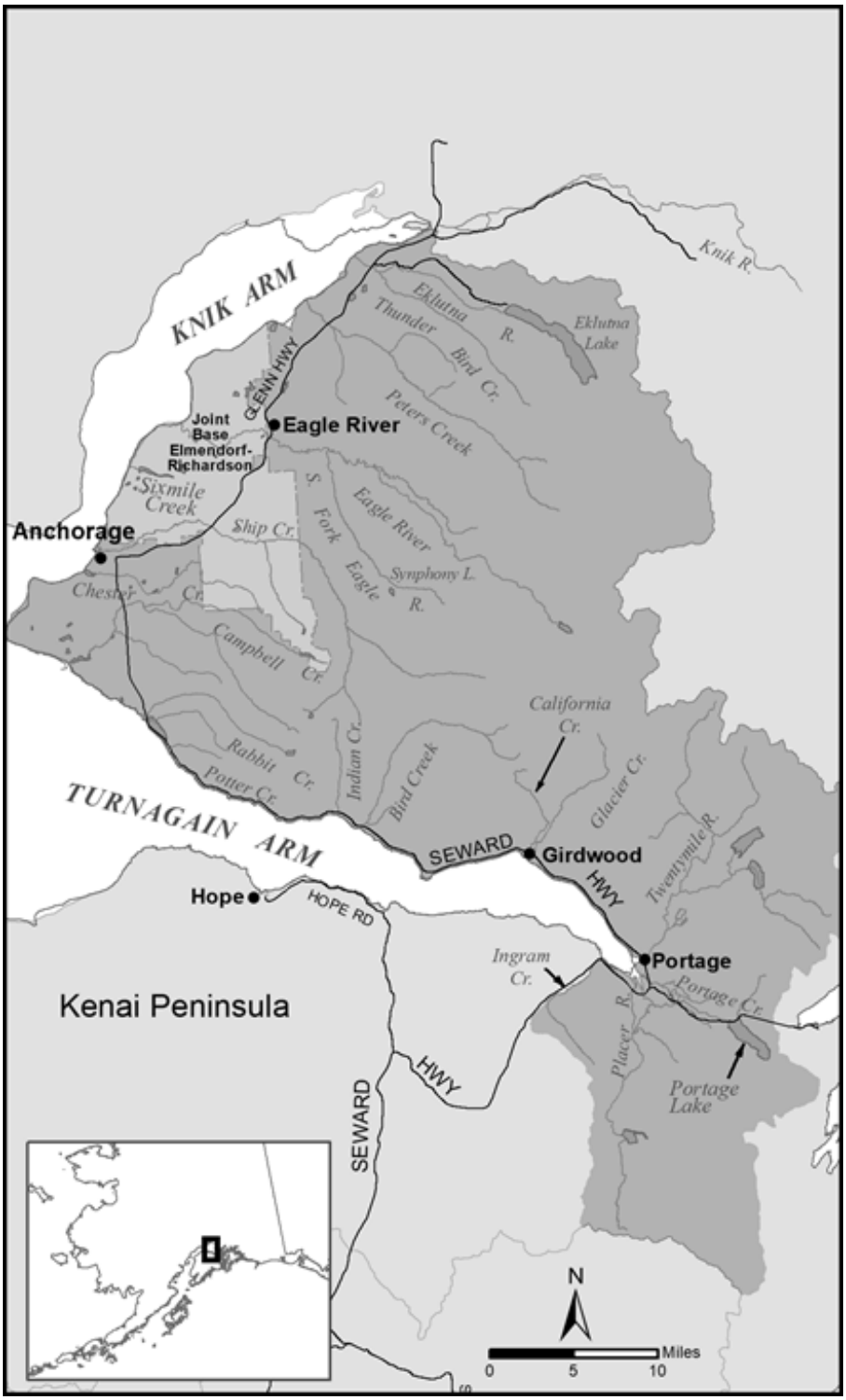

Figure 1.–Map of the Anchorage Management Area (AMA).

AREAWIDE OVERVIEW

The AMA has approximately 1,575 miles of flowing waters and 371 lakes (ADF&G GIS staff, calculated using ArcView). All of the watersheds eventually flow into 2 arms of Cook Inlet (Knik Arm and Turnagain Arm). A majority of creeks support anadromous fish and many support resident species as well. Four creeks and approximately 30 lakes are stocked with hatchery fish to improve and provide additional sport fishing opportunities in the AMA.

KNIK ARM STREAMS

Knik Arm streams are those that flow into Knik Arm from Fish Creek, near Point Woronzof located at the edge of the Ted Stevens International Airport north to the Eklutna River and include Chester Creek, Eagle River, Ship Creek, Sixmile Creek, and Peters Creek (Figure 2).

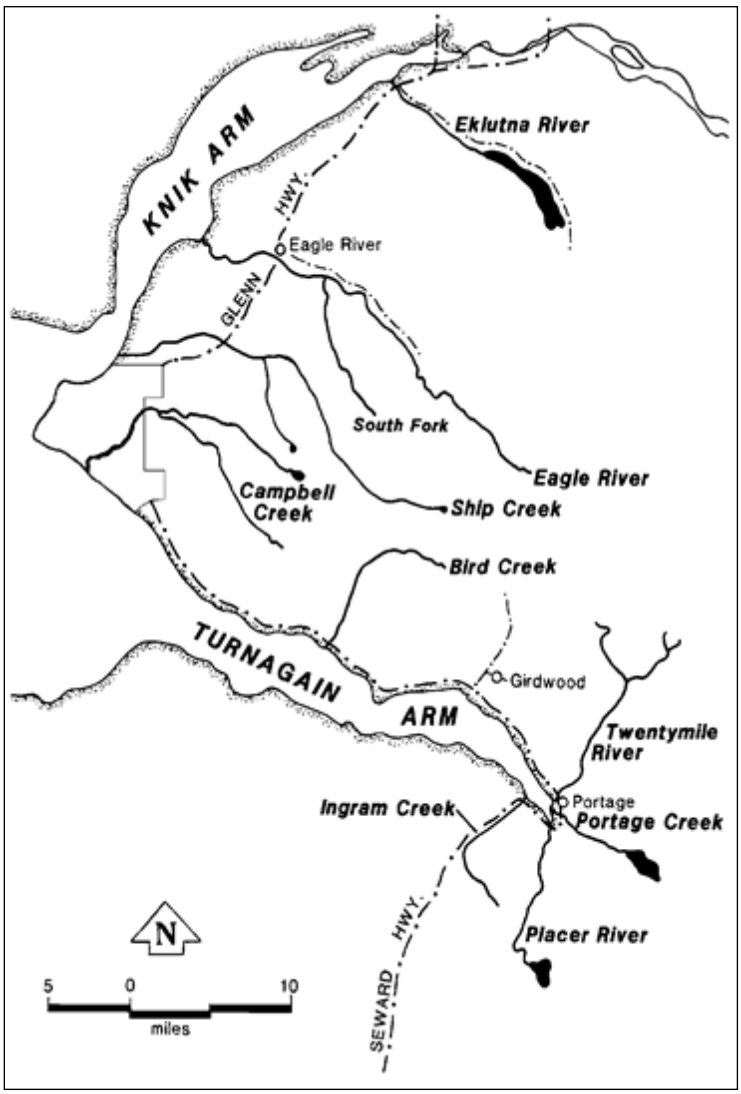

Figure 2.–Map of creeks in the Anchorage Management Area.

Chester Creek

Chester Creek, also known as *Chanshtnu*, or "Grass Creek" (Kari et. al. 2003), travels approximately 16 miles from the Chugach Mountains and flows into Knik Arm of Cook Inlet. Some of the headwaters of Chester Creek are on DOD property. The mainstem of Chester Creek is fed by a tributary from Reflection Lake as well as tributaries formed from rain and snowmelt from the mountains. After the waters of Reflection Lake and a mountain tributary combine near Lee Street, they then flow into University Lake, also known as "APU Lake" or Behm Lake near the Alaska Pacific University (APU) campus. After exiting University Lake, Chester Creek flows through or on the edge of many neighborhoods for approximately 5 miles until it enters Chester Lagoon. Chester Lagoon is a man-made lagoon separated into 2 sections (Westchester Lagoon and Chester Lagoon) by the Walter J. Hickel Parkway. The water flows out of Westchester Lagoon for approximately one-tenth of a mile to the mud flats of Knik Arm. Coho and sockeye salmon, rainbow trout, and Dolly Varden (ADF&G Anadromous Waters Catalog; https://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=main.home, accessed January 2017) are present at times in Chester Creek and its tributaries. It is also believed that Chinook salmon, chum salmon, and steelhead are also present in Chester Creek but in very low numbers and they are not well documented. Rainbow trout are also stocked into sections of Chester Creek. To protect wild rainbow trout and give them an opportunity to spawn, the entire Chester Creek drainage is closed to sport fishing April 15 through June 14. This drainage is closed to salmon fishing.

Eagle River

The Eagle River drainage originates in the Chugach Mountains with most of its flow contributed by Eagle Glacier and 2 lakes (Eagle Lake and Symphony Lake). The lower portion of the river flows through flats on Fort Richardson; these flats were historically used as a large-weapon test firing range and impact area. Access to Eagle River from the mouth upstream to Bravo Bridge, approximately 2 miles, is restricted by the military due to the presence of unexploded ordnance, and this reach of river is closed to all sport fishing year-round. The portion of Eagle River upstream from Bailey Bridge to the Glenn Highway Bridge is accessed through Fort Richardson. Upstream of the Glenn Highway, the river meanders through dedicated greenbelt as part of Chugach State Park. Developed public access points on Eagle River are limited. These access sites include 1) the Glenn Highway campground located immediately upstream of Glenn Highway, 2) a day use area upstream of Briggs Bridge, and 3) a parking area and unimproved small boat launch site located at Mile 7.4 of Eagle River Road. The Eagle River drainage is largely used for hiking, camping, and white-water float trips. According to the ADF&G Anadromous Waters Catalog, Eagle River contains all 5 species of Pacific salmon (Chinook, chum, coho, pink, and sockeye salmon). Dolly Varden are also present in Eagle River. Arctic grayling and rainbow trout have been reportedly seen and caught but these reports have not been confirmed yet. Mainstem Eagle River was stocked with Chinook salmon in the early 1990s and with 1,010 rainbow trout in 1990. Symphony Lake, one of the headwater lakes of the Southfork of Eagle River was stocked with Arctic grayling in 2001 and 2003.

Eklutna River

Eklutna River is located 17 miles northeast of Anchorage and is the northern boundary to the AMA. Eklutna River is approximately 22 miles long and has as its origin the Eklutna Glacier as well as rain runoff and snowmelt from the Chugach Mountains. The Eklutna River was first

dammed in the 1920s to provide power for the growing area. The dam was replaced after the 1964 earthquake. The dam on Eklutna Lake separates and limits flow into Eklutna River. According to the Anadromous Waters Catalog, the Eklutna River contains all 5 species of Pacific salmon (Chinook, chum, coho, pink, and sockeye salmon). Dolly Varden are also present in the Eklutna River (ADF&G Anadromous Waters Catalog). Eklutna Lake was stocked with rainbow trout in the early 1990s (ADF&G Alaska Lakes Database [ALDAT] http://www.adfg.alaska.gov/index.cfm?adfg=fishingsportstockinghatcheries.lakesdatabase, accessed January 2017).

Fish Creek

Fish Creek is a small creek located near Point Woronzof. Much of Fish Creek has been urbanized and runs sometimes underground through culverts in parts of Anchorage. No sport fishing takes place on Fish Creek although according to the Anadromous Waters Catalog, coho salmon can be present at times. Dolly Varden are also likely to be present in Fish Creek along with illegally introduced goldfish in Cuddy Pond, which is an artificial pond that was created by diverting Fish Creek water and opening it to make a daylight pond. Cuddy Pond eventually flows back into Fish Creek. The water flowing into Cuddy Pond can be shut off and flows through plumbing.

Ship Creek

Ship Creek is located north of downtown Anchorage at the Port of Anchorage. The source of this creek is Ship Lake as well as rain runoff and snowmelt from the Chugach Mountains. This drainage is approximately 27 miles long and flows into Kink Arm of Cook Inlet. The majority of Ship Creek flows through U.S. Department of Defense (DOD) property. Most fishing occurs in the lower three-quarter-mile section before entering Cook Inlet. Prior to the official designation of Anchorage in 1915, several indigenous names existed for the creek. Ship Creek was also called *Dgheyaytnu*, translated to "Stickleback Creek," and *Dgheyay Leht*, which is "Where Stickleback Run" (Kari et al. 2003).

Four dams were constructed in the lower 11 miles of the creek during the 1940s and 1950s for power generation and as a water source for both the Municipality of Anchorage (MOA) and the military bases (Elmendorf and Fort Richardson, currently combined). These dams reduced Ship Creek wild salmon runs (Bosch 2010). All 5 species of Pacific salmon (Chinook, chum, coho, pink, and sockeye salmon) as well as Dolly Varden and rainbow trout have been observed in Ship Creek (ADF&G Anadromous Waters Catalog). Hatcheries run by ADF&G SF have been stocking Chinook salmon, coho salmon, and rainbow trout (only in 1969) into Ship Creek since 1966. The hatchery facility currently used to stock fish into Ship Creek and currently located on Ship Creek is the William Jack Hernandez Sport Fish Hatchery (WJHSF Hatchery).

In the fall of 2005, ADF&G received funding from U.S. Fish and Wildlife Service (USFWS) for a study evaluating the feasibility of restoring fish passage to Ship Creek upstream of the Elmendorf and Ft. Richardson dams. The report was completed in February 2007 and lists alternative actions for each dam site ranging from "do nothing" to "total removal." Each alternative was described in terms of impacts and pros and cons for issues such as effectiveness of restoring fish passage, effects to water tables, sediment, creek shoreline stability, and costs. The report also identified issues outside the scope of this initial study (such as social issues) and issues that may require further study. This report was presented to the DOD as the landowner, and to stakeholder agencies, organizations, and the public in order to help choose a course of action that would achieve the goal of restoring fish passage on Ship Creek. DOD stated concerns about allowing fish passage

upstream of the WJHSF Hatchery citing BASH (bird air strike hazard), safety issues related to new housing built along the banks of Ship Creek, and potential groundwater issues.

Sixmile Creek

Sixmile Creek is located in Southcentral Alaska on JBER and flows approximately 1 mile into Cook Inlet. The Sixmile Creek drainage includes Sixmile Creek and Lower and Upper Sixmile lakes, and occupies a valley created by an old channel of the Eagle River. The source of the Sixmile drainage is primarily by springs entering the south side of Upper Sixmile Lake. The creek is now flooded for most of its length by the waters of Upper and Lower Sixmile lakes, which were created by damming Sixmile Creek in 1951. Improvements made in 1966 to Talley Avenue crossing the upper portion of the system included the addition of a fish ladder–culvert easing fish access into Upper Sixmile Lake. Much of the old creek channel is still visible in the lakes. All 5 species of Pacific salmon (Chinook, chum, coho, pink, and sockeye salmon) as well as Dolly Varden and rainbow trout are present in Sixmile Creek (ADF&G Anadromous Waters Catalog). The WJHSF Hatchery stocks rainbow trout into Upper Sixmile Lake; however, these fish can move freely into Lower Sixmile Lake. In 2017, the Alaska Board of Fisheries (BOF) aligned the Upper and Lower Sixmile lakes regulations so that they were both included as stocked lakes (Appendix A4). Prior to that meeting, Upper Sixmile Lake was treated as stocked lake and Lower Sixmile Lake was not.

Peters Creek

Peters Creek is located approximately 21 miles to the northeast of Anchorage. The source of Peters Creek is rain and snowmelt from the Chugach Mountains. Chinook, coho, and pink salmon are present at times in Peters Creek. Dolly Varden are also present in Peters Creek (ADF&G Anadromous Waters Catalog).

TURNAGAIN ARM STREAMS

Turnagain Arm streams are the streams that flow into Turnagain Arm from Campbell Creek, south of Point Woronzof located at the edge of the Ted Stevens International Airport, and south and east to Ingram Creek. They include Bird Creek, California Creek, Glacier Creek, Indian Creek, Rabbit Creek, Placer River, Portage River, and Twenty Mile River (Figure 2). These drainages are prone to flash floods due to the steep nature of the Chugach Mountain Range.

Bird Creek

Bird Creek is southeast of Anchorage approximately 25 miles from downtown Anchorage. This is a popular stream for coho salmon anglers. Bird Creek is fed by high, small, mountain lakes as well as rain and snowmelt. Salmon can only travel up Bird Creek approximately 1.5 miles before reaching an unpassable waterfall. Prior to the falls, there is 1 tributary, Penguin Creek, that is about 0.5 miles from the mouth of Bird Creek. Sections of Bird Creek are popular for salmon fishing. All 5 species of Pacific salmon (Chinook, chum, coho, pink, and sockeye salmon) as well as Dolly Varden are present in Bird Creek (ADF&G Anadromous Waters Catalog). The WJHSF Hatchery stocks coho salmon into Bird Creek. The entire Bird Creek drainage is closed to fishing January 1 through July 13.

California and Glacier Creeks

California and Glacier creeks are located in Girdwood, Alaska. The community of Girdwood is located approximately 41 miles southeast from downtown Anchorage and near the end of Turnagain Arm. California and Glacier creeks combine 0.36 miles from Turnagain Arm of Cook

Inlet. The lower sections of these streams are popular fisheries for locals in Girdwood. Both of the creeks are fed from rain, snowmelt, and small lakes in the Chugach Mountains. All 5 species of Pacific salmon (Chinook, chum, coho, pink, and sockeye salmon) as well as Dolly Varden are present in California and Glacier creeks (ADF&G Anadromous Waters Catalog).

Campbell Creek

Campbell Creek travels approximately 21 miles from the Chugach Mountains and flows into Turnagain Arm of Cook Inlet. Campbell Creek was named after Sir Joseph Campbell, who was an explorer in Alaska in the late 1700s (Anchorage Park Foundation, http://anchorageparkfoundation.org/directory/campbell/, accessed December 2016). Campbell Creek has also historically been known as *Qin Cheghi* (Kari et al. 2003). *Qin Cheghi*, or "Crying Ridge," refers to Tanaina Peak to the east in the Chugach Mountains and the ridge along the north side of upper Campbell Creek (Kari et al. 2003). North Fork Campbell Creek and South Fork Campbell Creek are both fed by small mountain lakes, rain, and snowmelt. The North Fork and South Fork Campbell Creek combine near Piper Street to form the mainstem Campbell Creek, which flows through many neighborhoods. From the junction near Piper Street, Campbell Creek flows approximately 7.5 miles into the artificial Campbell Lake. It exits Campbell Lake and flows about one-quarter mile to the mud flats of Turnagain Arm. Four species of Pacific salmon (Chinook, coho, pink, and sockeye salmon), as well as Dolly Varden and rainbow trout, are present in Campbell Creek at times (ADF&G Anadromous Waters Catalog). It is also believed that chum salmon and steelhead (anadromous rainbow trout) are present in Campbell Creek but in very low numbers, and they are not well documented. Steelhead were stocked in Campbell Creek (Bosch 2010), but stocking was discontinued due to poor returns. Rainbow trout and coho salmon are also stocked into sections of Campbell Creek. Campbell Creek, the largest free-flowing stream in the Anchorage metropolitan area, supports a small wild Chinook salmon run. To protect the wild spawning rainbow trout, the entire drainage is closed to fishing April 15 through June 14.

The upper reach of Campbell Creek is composed of 2 tributaries, the North and South Forks, which drain from the Chugach Mountains east of Anchorage. Both forks flow through canyons in their upper reaches that are impassable to upstream fish migration. Downstream of the canyons, these tributary streams flow approximately 10 miles through the largely undeveloped forests and wetlands of Chugach State Park and Far North Bicentennial Park before converging near Piper Street. Campbell Creek flows through MOA greenbelt and private property from the confluence of the forks downstream to Cook Inlet. The greatest effects from urbanization have occurred in this reach of Campbell Creek.

MOA has made an effort to obtain and preserve the riparian habitat of Campbell Creek from Lake Otis Parkway downstream to Campbell Lake and to improve water quality. In 1981, the Bureau of Land Management (BLM) transferred title to the 4,000-acre Campbell Tract (Bicentennial Park) to the MOA. This area makes up the primary spawning and rearing habitat for salmon. Campbell Creek is stocked annually with coho salmon and rainbow trout.

Indian Creek

Indian Creek is a small stream located approximately 24 miles southeast of Anchorage near the small community of Indian. Indian Creek is fed from rain and snowmelt from the steep but south facing slopes of the Chugach Mountain Range before flowing into Turnagain Arm of Cook Inlet. According to the ADF&G Anadromous Waters Catalog, Indian Creek has Chinook, coho, and pink salmon present at times of the year. Chum salmon and Dolly Varden may also be present.

Ingram Creek

Ingram Creek is the southernmost stream in the AMA. Its headwaters are in Turnagain Pass in the Kenai Peninsula Mountain Range. Its water source is rain and snowmelt. According to the ADF&G Anadromous Waters Catalog, chum, coho, and pink salmon are present. Dolly Varden are also present in Ingram Creek. Ingram Creek was stocked in the late 1980s with coho and pink salmon (ADF&G 2020).

Rabbit Creek

Rabbit Creek is located south of Anchorage and includes Little Rabbit Creek and Savage Creek. Water sources include Rabbit Lake as well as rain and snowmelt. It flows through many developed neighborhoods and eventually flows through Potter Marsh Wildlife Refuge before entering Turnagain Arm of Cook Inlet. Rabbit Creek has small runs of Chinook, chum, coho, and sockeye salmon as well as Dolly Varden (ADF&G Anadromous Waters Catalog). Rabbit Lake is stocked with rainbow trout. Rabbit Creek downstream of the Old Seward Highway is closed to all sport fishing.

Twentymile River

Twentymile River is located approximately 47 miles southeast of Anchorage at the head of Turnagain Arm. Twentymile River divides into South Fork, Twentymile, North Fork, and Glacier River. Glacier River is fed from Carmen Lake and Twentymile Glacier. The sources of water feeding the Twentymile drainage, including Glacier River and Carmen Creek, are rain, Carmen Lake, snowmelt, and Twentymile Glacier. The lower sections of the Twentymile River drainage are often traveled by jet boats, but airboats are often used to reach the upper section. According to the ADF&G Anadromous Waters Catalog, Chinook, coho, chum, and sockeye salmon are present. Dolly Varden and eulachon (*Thaleichthys pacificus*) have also been documented in Placer River. It is suspected that pink salmon and rainbow trout–steelhead may also be present, but these have not been documented.

Placer River

The Placer River is a glacial river located approximately 52 miles southeast of Anchorage at the head of Turnagain Arm of Cook Inlet. The sources of the water feeding the Placer River are rain, snowmelt, and glaciers (Bartlett, Skookum, and Spencer glaciers). The Placer River is constantly changing channels and it is difficult for jet boats to navigate because of the shallowness. According to the ADF&G Anadromous Waters Catalog, coho salmon are present. Dolly Varden and sockeye salmon have also been documented in Placer River. It is suspected that chum salmon may also be present, but these have not been documented.

Portage River

Portage River is approximately 45 miles southeast of Anchorage and is located at the head of Turnagain Arm. Portage River is fed primarily by Portage Lake and Placer Creek, which flows out of Bear Valley on the north side of Portage Lake, which is glacial. Chum, coho, pink, and sockeye salmon have been documented in the Portage drainage (ADF&G Anadromous Waters Catalog).

ANCHORAGE LAKES

Anchorage Management Area (AMA) lakes are currently stocked with catchable-sized fish. Before the 1960s and the initiation of stocking efforts, few AMA lakes supported resident fish populations of recreational interest. Most lakes are landlocked and threespine stickleback (*Gasterosteus aculeatus*) was the only fish species present. In the 1960s, ADF&G began a rainbow trout stocking program to increase sport fishing opportunities within the AMA. Alaska blackfish were illegally introduced into AMA lakes and can now be found in almost all area lakes.

In order to evaluate the stocking program, a creel survey was conducted during 1986 on 4 AMA lakes (Havens et al. 1987). Results of this survey indicated that youths and adult males were the primary recreational anglers. The main objective of the survey was to determine if a single annual spring release of a large number of rainbow trout was suitable for anglers using AMA lakes. Data indicated that catch rates remained high for 2 to 6 weeks after stocking and then dropped to below 1 fish per angler-hour. It was recommended, and adopted, that initial stocking would occur after ice-out and then a second stocking would be repeated after 4 to 6 weeks. Multiple stocking of high use lakes appears to increase fishing success throughout the open water season.

The AMA stocked lakes program has increased sport fishing opportunities for the general public, including the development of educational fishing classes for youths and adults, and an annual ice fishing jamboree for disabled and underprivileged anglers. Fish species stocked from 2016 to 2018 into AMA lakes included rainbow trout, Arctic char, and landlocked Chinook salmon. Locations of stocked AMA lakes can be found in Figure 3.

Beginning in 2018, SF staff began to assess a select number of lakes in the AMA to determine select water chemistry and quality variables and assess fish populations. The primary goal of this project is to document and monitor biotic and select abiotic factors that could impact sportfish species in AMA lakes (Baumer et al. 2019). Assessments will continue through 2021 and results will be published in future management reports or in a Fishery Data Series.

Figure 3.–Anchorage Management Area streams and stocked lakes.

GUIDE PROGRAM

Sport fishing guide registration and licensing has developed over the years in response to a lack of information regarding the industry and its impact on fishery resources. Sport fish guide registration has been required since 1995 throughout the state. In 1998, the Alaska Board of Fisheries (BOF) adopted statewide registration regulations and definitions. Licenses with associated fees were not part of the registration process at that time. The Division of Sport Fish (SF) has operated the Sport Fish Guide Licensing and Logbook program since 1998 to register sport fishing guides and sport fishing guide businesses. In 2004, the Alaska Legislature adopted House Bill 452 (HB 452). The Bill established licensing requirements for sport fishing guide business owners and sport fishing guides on a statewide basis. This bill was created to establish minimum professional standards that both freshwater and saltwater sport fish guides and business owners must follow before a license can be obtained. The standards were established to protect consumers and to promote the viability and legitimacy of a professional sport fish guide industry. Businesses providing sport fish guided services were now required to obtain a State of Alaska Occupational Business License and hold liability insurance with a minimum of $300,000 coverage for all incidents in a year (AS 16.40.260). Licensed sport fishing guides were required to 1) be citizens of the United States, Canada, or Mexico, 2) hold a current first aid card, 3) have a current-year Alaska sport fishing license, and 4) have a valid U.S. Coast Guard operator's license if they were to operate a motorized vessel in navigable waters. License application forms and the information collected in logbooks on fishing participation, effort, and harvest have remained consistent in design since 2006 (Sigurdsson and Powers 2009–2014). Logbook information is used to provide management biologists with comprehensive and credible data on guided sport fishing activities. The data can be used as an index to track effort and harvest trends, changes in effort across management areas, and to help inform the decisions of regulatory agencies such as the BOF. Guide logbook information with fewer than 4 businesses are not reported separately to protect confidentiality of respondents (R. Powers, Program Coordinator, ADF&G Guide Logbook Program, personal communication).

Guided Activity

In the Anchorage Management Area (AMA), there is no saltwater guiding that occurs and relatively little freshwater guided effort occurs. According to unpublished ADF&G Guide Logbook Program data, from 2006 through 2016, only 2 years (2013 and 2016) had more than 4 businesses operating in the AMA freshwaters. In 2013, there were 5 guide operations that fished in the AMA and 8 businesses in 2016. In 2013, the guided trips were in 4 flowing waters (Ship, Bird, and Campbell creeks and Twentymile River) and in 2016, guiding occured in 2 additonal flowing waters (Chester and Glacier creeks) and 2 AMA lakes (Jewel and Delong lakes). In both years, guides reported 63 trips in which the majority of the clients were nonresidents. In 2013, 208 individuals participated in an overall catch of 237 Dolly Varden (58 harvested), 197 coho salmon (130 harvested), 15 Chinook salmon (all released), 3 sockeye salmon (all harvested), and 2 rainbow trout (all released). In 2016, 201 individuals participated with an overall catch of 38 coho salmon (33 harvested), 33 sockeye salmon (12 harvested), 25 Dolly Varden (1 harvested), 21 Chinook salmon (all harvested), and 9 rainbow trout (all released). Freshwater guide logbook information regarding 2017 and 2018 activities have not been fully processed; however, anecdotal information indicates that guiding in the AMA is becoming more prevalent. The freshwater logbook requirement was discontinued after the 2018 season.

STOCKING PROGRAM

The Alaska Department of Fish and Game produces a Statewide Stocking Plan, which outlines plans for stocking sport fish throughout Alaska every 5 years with annual updates as needed. The Division of Sport Fish stocking program is primarily funded with Federal Aid in Sport Fish Restoration funds and license sales revenue. Fish stocking plans go through a formal process and sites are reviewed prior to initiating stocking. The stocking plan for future years can be found online at http://www.adfg.alaska.gov/index.cfm?adfg=fishingSportStockingHatcheries.stockingPlan. Historical sport fish stockings can be found in the stocked fish database: http://www.adfg.alaska.gov/index.cfm?adfg=SportStockingHatcheriesSearch.main.

Historically, stocking in the AMA has been done primarily by 2 fish hatcheries (Fort Richardson Hatchery and Elmendorf Hatchery), both located on Ship Creek since the late 1950s. The Fort Richardson hatchery was built in 1958 by the U.S. Army to provide fish for lakes on the DOD property. The Alaska Department of Fish and Game became involved in the early 1960s and assumed full operation of the Fort Richardson Hatchery facility by the late 1960s. The Fort Richardson Hatchery sits on the banks of Ship Creek, just downstream of the Glenn Highway (ADF&G website Fort Richardson State Fish Hatchery; http://www.adfg.alaska.gov/index.cfm?adfg=fishingSportStockingHatcheryInfo.ftrichardson, accessed January 2020) and approximately 5 miles upstream from the Elmendorf Hatchery. The Elmendorf State Hatchery started in 1965. Elmendorf State Hatchery was located in Anchorage on the north bank of Ship Creek near the intersection of Reeve Boulevard and Post Road (ADF&G website Elmendorf State Fish Hatchery; http://www.adfg.alaska.gov/index.cfm?adfg=fishingSportStockingHatcheries.elmendorf, accessed December 2016). The permanent loss of heated effluent from the Fort Richardson (2003) and Elmendorf (2005) power plants resulted in a reduction in fish size and number of catchable-sized fish released from 2005 to 2011. The catchable rainbow trout program shifted from producing 1-year-old catchable fish to producing 3-year-old catchable fish and 2-year-old undersized catchable or subcatchable-sized fish. The closure of Elmendorf Hatchery in 2010 resulted in the release of rainbow trout fingerling into local lakes. The catchable Chinook salmon program saw reductions in fish size, number of fish released, and number of lakes stocked starting in 2006 when an outbreak of bacterial kidney disease (BKD) in the Chinook salmon at Fort Richardson Hatchery resulted in the release of fingerling instead of catchable Chinook salmon that year. In addition, from 2007 to 2009, only category 1 (landlocked) lakes were permitted for releases of catchable-sized fish from Elmendorf Hatchery after an Oregon State University graduate student reported the presence of DNA from the parasite that causes whirling disease. Catchable-sized Chinook salmon were not released in 2010–2011. Due to disease concerns, catchable-sized Arctic grayling production ceased in 2002. Arctic grayling fingerling and subcatchable-sized fish were released from 2003 to 2012.

In June 2011, construction of the new William Jack Hernandez Sport Fish Hatchery (WJHSF Hatchery) was completed. With over 100 rearing tanks, there is the capacity to produce over 6 million sport fish each year to stock throughout permitted areas of Alaska. The rainbow trout and Chinook salmon catchable production programs returned to historical stocking levels when the first catchable-sized fish were released from the WJHSF Hatchery in 2012. In addition, the first release of catchable-sized Arctic grayling from WJHSF Hatchery occurred in 2013; however, due to budget restrictions, the Arctic grayling stocking program was suspended after stocking in 2015 to reduce operating expenses but will resume in 2019 (ADF&G Statewide Stocking Plan for Sport

Fish; https://www.adfg.alaska.gov/index.cfm?adfg=fishingSportStockingHatcheries.stockingPlan, accessed December 2016).

INVASIVE SPECIES

Northern Pike

Northern pike were illegally introduced and documented in 6 AMA lakes. The presence and spread of these invasive northern pike have been identified as top concerns by area mangers and regional staff. The northern pike management program began in 2003 with sampling of Lower Fire, Sand, and Cheney lakes using 30 ft and 48 ft variable mesh gillnets, baited hoop traps, fyke nets, and spears. The presence of ADF&G staff, targeting northern pike in area lakes, captured the attention of local anglers and media who reported the sampling trips and helped increase public awareness of the local northern pike problem. Educating the public and encouraging anglers to harvest northern pike is a crucial component in ADF&G's efforts to control northern pike in AMA lakes. ADF&G staff have continued to monitor and investigate northern pike reports from the general public.

To further eradicate northern pike in AMA lakes, Cheney Lake was treated with rotenone in October 2008, followed by continued monitoring by ADF&G throughout the winter. During May 2009, gillnet sampling failed to find northern pike in Cheney Lake, but many invertebrate species were collected and apparently continued to thrive. Cheney Lake was once again stocked with catchable-sized fish from the WJHSF Hatchery and in 2009 it was the second-most fished lake in the AMA. A grassroots effort by residents around Sand Lake helped ADF&G start northern pike removal from this lake as well. In October of 2009, Sand Lake was treated with rotenone and spring sampling in 2010 failed to find any northern pike. Sand Lake was stocked with catchable fish and residents around the lake reported good rainbow trout fishing once again. In 2015, Otter Lake on Joint Base Elmendorf–Richardson (JBER) was also treated with rotenone to eradicate northern pike. Posttreatment netting efforts failed to find any northern pike in the lake. As of 2015, Lower Fire Lake is the only AMA lake where northern pike may still be present in small numbers. Efforts to monitor this lake are ongoing and it will not be stocked again until northern pike are fully eradicated. AMA lakes will continue to be monitored for the presence of northern pike and removal methods will be determined on a case-by-case basis.

Goldfish

Goldfish have been reported by the public throughout the AMA lakes but very few of the reports have been confirmed. It is believed that goldfish have not been able to survive over the winter in most of the AMA lakes. Goldfish were reported and confirmed in Cuddy Pond in 2018.

In 2018, efforts were made to determine if goldfish could be removed using hand nets or electro-fishing. Due to the muddy bottom and characteristics of the goldfish taxon, electro-fishing was effective at stunning the goldfish but not an effective means of capturing or eradicating. Goldfish in Cuddy Pond will continue to be monitored and assessed. It is unknown if the goldfish survive over the winter in the artificial pond.

Bass

In August 2018, a largemouth bass (*Micropterus salmoides*) was caught by a local angler in Sand Lake and the specimen was turned into the ADF&G SF office. Following this report, efforts were made through angling and the use of gillnets and fyke nets to determine if this was a single event

or if more bass were present in the lake. So far, no bass have been captured. This lake will continue to be monitored with eDNA sampling to determine if there are any bass present in the lake. This was the first report of a bass in Alaska waters.

Elodea

Elodea (*Elodea* spp.) is not native to Alaska and is the first freshwater aquatic invasive plant known to have established here. Aquatic and terrestrial plants fall under the jurisdiction of the Alaska Department of Natural Resources (DNR), Division of Agriculture. Elodea is a common aquarium plant, but when released into Alaska's waters it has the potential to affect freshwater resources and degrade fish habitat (e.g., decrease flow, increase sedimentation), outcompete and displace native flora and fauna, impede boat and seaplane navigability, reduce recreational opportunities, and reduce property values. Elodea spreads vegetatively, meaning any plant fragment can form a new plant and thus a new infestation. It can float long distances in flowing waters and be transported from one lake to another by seaplane, boat, or gear. Elodea was first documented growing in Alaska in Eyak Lake in Cordova. Land managers did not take notice of this plant until 2010, when it was found growing aggressively in Chena Slough near Fairbanks (DNR website: http://dnr.alaska.gov/ag/ag_Elodea.htm). In other places where elodea has invaded, it has dramatically impeded navigation, impacted native ecosystems, and made fishing problematic or impossible. Once elodea is found and funding is secured, DNR is the leading authority on the use of the herbicides Diquat and Fluridone in projects aimed at reducing the risk of spread and eradicating elodea from infested waters (Dan Coleman, Invasive Weeds and Agricultural Pest Coordinator, personal communication). These treatments so far have not shown impacts on local fisheries.

In 2011, elodea was found in 3 AMA lakes (Sand, Delong, and Little Campbell). Since then, elodea has been found in Lake Hood, Jewel Lake, Little Survival Creek, and Potters Marsh, which is a tributary of Rabbit Creek. Sand, Delong, and Little Campbell lakes were treated with Fluridone in 2015. In 2015, treatment of Lake Hood was started, although it was done over the course of 2 years, and treatments continue under the Department of Transportation (DOT). In 2016, treatment began on a portion of Little Survival Creek. In November of 2018, elodea was found in Jewel Lake and will be treated with Fluridone in 2019. To date, the treatments appear to be successful at eradicating elodea. DNR continues to monitor for elodea in local bodies of water and monitor the treatment sites.

FISHERIES MANAGEMENT AND OBJECTIVES

ADF&G has a constitutional mandate to manage on the principle of sustained yield. Within the sustained yield principle, SF goals seek to optimize social and economic benefits, and where possible, expand opportunity to participate in diverse fisheries on these stocks. Fisheries management and objectives are implemented at the species level within a particular drainage although other species present in the drainage may be impacted by species-specific objectives. Drainages in the AMA are dynamic, and often more than 1 species is present at a time, which must be considered when management objectives and actions are being assessed.

Present regulations combined with emergency order authority have allowed ADF&G to achieve management objectives. In years where adequate numbers of fish are not returning, ADF&G will take action under Alaska Statute (16.05.060) to issue an emergency order allowing more fish to escape.

FISHERIES PERFORMANCE

Overall, there has been decrease in sport fishing effort in the AMA, although the area sport fishing efforts mirror the statewide trends in sport fishing effort. According to the ADF&G Statewide Harvest Survey (SWHS), average annual sport fishing effort in the AMA during 2009–2018 is 61,732 angler-days, which represents approximately 3% of the statewide effort and 4% of the effort for Southcentral Alaska (Table 1). In 2016, there was a drop in AMA sport fishing effort similar to what was observed in 2011; however, in 2017 and 2018, an increase in effort has been observed. Most (98% on average for 2009–2018) of the effort is in the freshwaters of the AMA (Table 2). Considering just freshwater effort in the AMA, 56% or 34,657 angler-days (2009–2018 average) are spent fishing on streams (as opposed to lakes), annually (Table 2).

In streams, anglers primarily focused on anadromous salmon versus trout (Dolly Varden or rainbow trout). The recent catch of anadromous salmon in streams has varied, including a record low catch in 2016 of 16,477 salmon, which was due to both a low pink and coho salmon catch. In addition, in 2018, there was a near record low catch of Chinook salmon (Table 3). Conversely, in 2017, the highest catch of salmon since 2009 was estimated in the AMA (46,418 salmon; Table 3). In AMA streams, the previous 10-year average (2006–2015) of 46,746 salmon were caught annually and 15,323 (33%) of those salmon were harvested on average. From 2016 to 2018, the salmon catch ranged from 16,477 (2016) to 46,418 (2017) salmon (average: 29,772; Table 3, Figure 4). The greatest effort in AMA streams is largely directed toward Ship Creek (2006–2015 average 22,719 angler-days) and the least toward Eagle River (2006–2015 average 652 angler-days; Table 4)

Many of the local streams are stocked with anadromous salmon to support the growing population of Anchorage. Overall quality of smolt released in stocked streams has improved since 2012 with the new WJHSF Hatchery, although catch of anadromous salmon has not reached pre-2010 levels on both wild and stocked streams, which could indicate poor marine survival (Table 3). However, a detailed investigation at a scale that includes more areas, commercial and subsistence harvest, and an age-class analysis of fish would be needed to further support this claim. Over the last 10 years (2009–2018), coho salmon were harvested more frequently than any other species of salmon in the AMA, followed by pink, Chinook, chum, and sockeye salmon, in that order (Table 3).

Table 1.–Sport fishing effort expended in the Anchorage Management Area (AMA) compared to Southcentral Alaska and statewide, 1999–2018.

			AMA		
Year	Statewide effort	Southcentral effort	Effort	Percent of statewide	Percent of Southcentral
1999	2,499,152	1,659,966	146,789	6	9
2000	2,627,805	1,844,824	167,499	6	9
2001	2,261,941	1,560,562	135,359	6	9
2002	2,259,091	1,569,513	111,694	5	7
2003	2,219,398	1,535,501	104,004	5	7
2004	2,473,961	1,709,671	101,943	4	6
2005	2,463,929	1,712,610	101,041	4	6
2006	2,297,961	1,605,852	103,800	5	6
2007	2,543,674	1,799,352	91,881	4	5
2008	2,315,601	1,622,920	111,121	5	7
2009	2,216,445	1,522,345	79,743	4	5
2010	2,000,167	1,371,470	61,704	3	4
2011	1,919,313	1,326,950	48,187	3	4
2012	1,885,692	1,252,263	45,407	2	4
2013	2,202,957	1,488,383	64,037	3	4
2014	2,309,853	1,571,650	79,306	3	5
2015	2,212,331	1,470,381	74,631	3	5
2016	1,982,300	1,314,668	51,927	3	4
2017	2,006,244	1,312,586	53,730	3	4
2018	1,878,009	1,245,253	58,644	3	5
Average					
2016–2018	1,955,518	1,290,836	54,767	3	4
2009–2018	2,061,331	1,387,595	61,732	3	4
2006–2015	2,190,399	1,503,157	75,982	3	5

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

Note: "Effort" means number of angler-days.

Table 2.–Saltwater, lake, and stream sport fishing effort (angler-days), Anchorage Management Area (AMA), 1999–2018.

			Freshwater						
	Saltwater		Lake		Stream		Total freshwater		AMA
Year	Effort	Percent	Effort	Percent	Effort	Percent	Effort	Percent	Total Effort
1996	870	1	54,699	43	70,756	56	125,455	99	126,325
1997	1,449	1	64,331	46	73,769	53	138,100	99	139,549
1998	2,921	2	43,905	35	78,687	63	122,592	98	125,513
1999	2,916	2	66,312	45	77,561	53	143,873	98	146,789
2000	2,197	1	69,607	42	95,695	57	165,302	99	167,499
2001	2,277	2	47,384	35	85,698	63	133,082	98	135,359
2002	3,493	3	40,201	36	68,000	61	108,201	97	111,694
2003	3,243	3	40,552	39	60,209	58	100,761	97	104,004
2004	1,251	1	47,539	47	53,153	52	100,692	99	101,943
2005	2,670	3	36,833	36	61,538	61	98,371	97	101,041
2006	1,540	1	35,741	34	66,519	64	102,260	99	103,800
2007	5,542	6	28,833	31	57,506	63	86,339	94	91,881
2008	2,977	3	35,984	32	72,160	65	108,144	97	111,121
2009	2,616	3	27,910	35	49,217	62	77,127	97	79,743
2010	1,675	3	24,152	39	35,877	58	60,029	97	61,704
2011	2,230	5	16,793	35	29,164	61	45,957	95	48,187
2012	702	2	22,265	49	22,440	49	44,705	98	45,407
2013	1,085	2	32,095	50	30,857	48	62,952	98	64,037
2014	2,123	3	39,333	50	37,850	48	77,183	97	79,306
2015	921	1	30,738	41	42,972	58	73,710	99	74,631
2016	1,670	3	18,121	35	32,136	62	50,257	97	51,927
2017	461	1	19,285	36	33,984	63	53,269	99	53,730
2018	854	1	25,714	44	32,076	55	57,790	99	58,644
Average									
2016–2018	995	2	21,040	38	32,732	60	53,772	98	54,767
2009–2018	1,434	2	25,641	41	34,657	56	60,298	98	61,732
2006–2015	2,141	3	29,384	40	44,456	57	73,841	97	75,982

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

Note: "Effort" means number of angler-days.

Table 3.–Sport fish catch and harvest of anadromous salmon, Anchorage Management Area, 1999–2018.

	Chinook salmon			Chum salmon			Coho salmon			Pink salmon			Sockeye salmon			Total	
Year	Catch	Harv	% Rls	Catch	Harv	% Rls	Catch	Harv	% Rls	Catch	Harv	% Rls	Catch	Harv	% Rls	Catch	Harv
1999	15,118	5,462	64	2,304	129	94	17,834	12,266	31	5,462	721	87	1,507	542	64	42,225	19,120
2000	11,848	4,752	60	3,936	340	91	46,888	28,191	40	38,236	3,123	92	1,182	537	55	102,090	36,943
2001	11,843	4,452	62	4,631	470	90	63,865	40,693	36	12,988	783	94	2,292	894	61	95,619	47,292
2002	7,070	2,421	66	6,540	472	93	41,219	26,260	36	11,651	1,168	90	694	330	52	67,174	30,651
2003	9,480	3,678	61	4,121	313	92	20,762	13,375	36	9,461	1,600	83	1,791	943	47	45,615	19,909
2004	7,713	3,160	59	2,185	306	86	25,474	13,447	47	7,897	1,272	84	1,012	286	72	44,281	18,471
2005	9,202	4,329	53	2,376	234	90	25,937	15,063	42	10,739	677	94	997	551	45	49,251	20,854
2006	6,857	3,165	54	4,427	242	95	35,854	19,863	45	23,926	2,345	90	341	91	73	71,405	25,706
2007	6,142	3,106	49	2,968	97	97	17,806	10,692	40	34,318	3,278	90	595	172	71	61,829	17,345
2008	5,464	2,647	52	6,033	283	95	26,124	17,996	31	30,004	2,032	93	1,719	223	87	69,344	23,181
2009	2,655	1,027	61	5,945	386	94	17,736	10,805	39	62,996	6,426	90	663	192	71	89,995	18,836
2010	2,141	1,130	47	3,852	335	91	5,983	4,466	25	14,625	2,578	82	618	193	69	27,219	8,702
2011	1,322	616	53	4,350	397	91	10,327	7,405	28	15,241	893	94	535	244	54	31,775	9,555
2012	334	113	66	1,749	137	92	6,535	4,187	36	8,587	1,488	83	220	64	71	17,425	5,989
2013	1,304	824	37	3,511	2,053	42	7,641	6,190	19	9,568	2,447	74	172	28	84	22,196	11,542
2014	1,382	882	36	3,737	541	86	13,939	9,430	32	12,941	1,473	89	656	288	56	32,655	12,614
2015	3,077	1,820	41	1,742	194	89	19,218	15,099	21	19,236	2,382	88	342	266	22	43,615	19,761
2016	2,826	1,999	29	1,759	226	87	6,198	5,069	18	5,271	631	88	423	16	96	16,477	7,941
2017	1,473	656	55	3,391	509	85	17,500	13,049	25	23,062	2,331	90	992	145	85	46,418	16,690
2018	567	470	17	1,747	157	91	14,887	12,058	19	8,769	1,055	88	451	193	57	26,421	13,933
Average																	
2016–2018	1,622	1,042	34	2,299	297	88	12,862	10,059	21	12,367	1,339	89	622	118	80	29,772	12,855
2009–2018	1,708	954	44	3,178	494	85	11,996	8,776	26	18,030	2,170	87	507	163	67	35,420	12,556
2006–2015	3,068	1,533	50	3,831	467	87	16,116	10,613	32	23,144	2,534	87	586	176	66	46,746	15,323

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 8, 2016). Available from Division of Sport Fish, Research and Technical Services.

Note: Column labels are "catch," "harvest," and "percent released."

Table 4.–Angler effort for streams in the Anchorage Management Area, 1999–2018.

	Bird Creek		Campbell Creek		Eagle River		Ship Creek		Twentymile R.		Other		Total
Year	Effort	Percent of total	Effort	Percent of total	Effort	Percent of total	Effort	Percent of total	Effort	Percent of total	Effort	Percent of total	stream effort
1999	13,033	17	4,446	6	2,096	3	52,294	67	3,370	4	2,322	3	77,561
2000	17,550	18	3,918	4	1,998	2	62,101	65	3,620	4	6,508	7	95,695
2001	13,662	16	6,222	7	1,214	1	56,402	66	4,161	5	4,037	5	85,698
2002	5,540	8	4,561	7	1,538	2	46,955	69	2,869	4	6,537	10	68,000
2003	3,691	6	4,937	8	1,382	2	40,380	67	3,418	6	6,401	11	60,209
2004	2,239	4	5,674	11	1,289	2	35,524	67	3,826	7	4,601	9	53,153
2005	8,365	14	6,933	11	1,130	2	39,610	64	2,554	4	2,946	5	61,538
2006	15,220	23	6,235	9	1,591	2	34,557	52	2,299	3	6,617	10	66,519
2007	13,247	23	5,779	10	955	2	30,676	53	2,749	5	4,100	7	57,506
2008	10,866	15	6,267	9	1,541	2	40,605	56	4,874	7	8,007	11	72,160
2009	13,605	28	2,774	6	108	0	23,663	48	1,729	4	7,338	15	49,217
2010	7,464	21	2,209	6	515	1	18,136	51	1,738	5	5,815	16	35,877
2011	5,027	17	2,897	10	474	2	12,473	43	1,843	6	6,450	22	29,164
2012	4,222	19	2,183	10	393	2	8,763	39	1,304	6	5,575	25	22,440
2013	4,142	13	4,271	14	463	2	17,287	56	1,323	4	3,371	11	30,857
2014	9,171	24	4,295	11	182	0	16,780	44	1,899	5	5,523	15	37,850
2015	8,953	21	4,760	11	300	1	24,253	56	989	2	3,717	9	42,972
2016	5,763	18	2,598	8	691	2	18,329	57	1,304	4	3,451	11	32,136
2017	5,694	17	3,844	11	295	1	16,186	48	2,137	6	5,828	17	33,984
2018	6,689	21	3,700	12	478	1	14,459	45	2,916	9	3,834	12	32,076
Average													
2016–2018	6,049	19	3,381	10	488	2	16,325	50	2,119	6	4,371	13	32,732
2009–2018	7,073	20	3,353	10	390	1	17,033	49	1,718	5	5,090	15	34,657
2006–2015	9,192	20	4,167	10	652	1	22,719	50	2,075	5	5,651	14	44,456

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

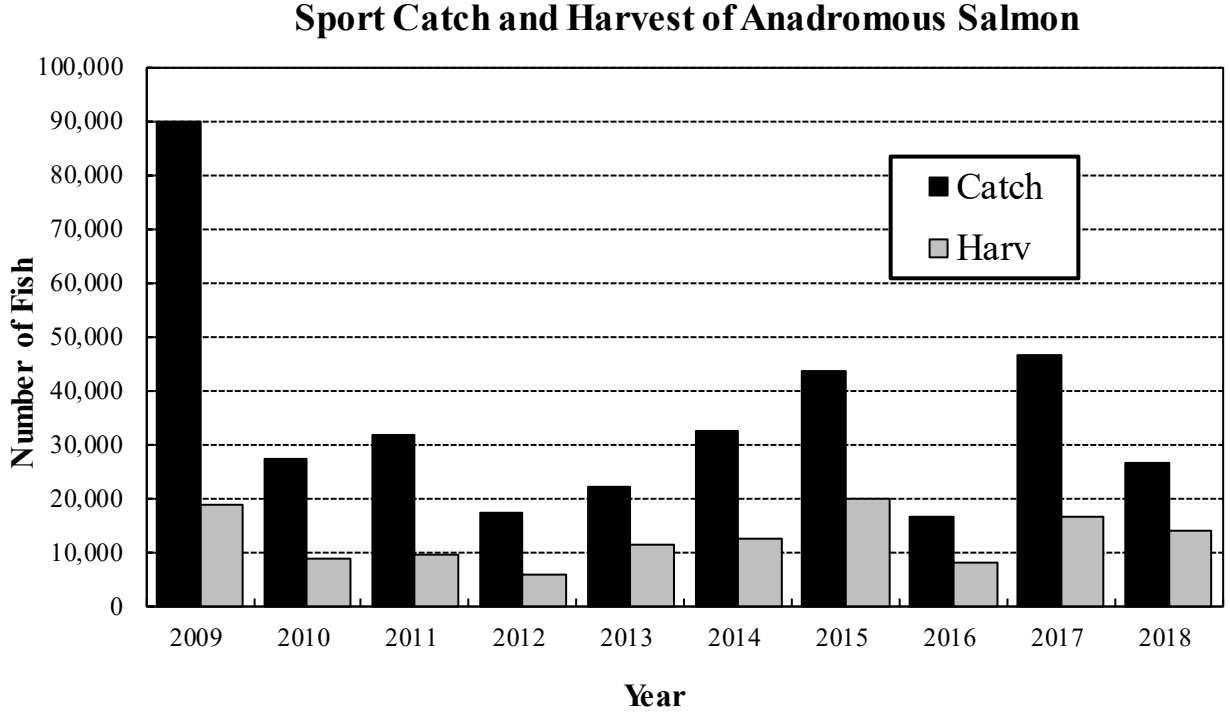

Figure 4.–Sport fish catch and harvest of anadromous salmon, Anchorage Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

CHINOOK SALMON FISHERIES

FISHERY DESCRIPTION

Chinook salmon return to AMA streams from May through early July. Chinook salmon typically spend 2 to 4 years feeding in the ocean before returning to their natal stream to spawn (Healey 1991) so in any given year, the run will be made up of multiple year classes. Wild Chinook salmon runs are found in creeks or rivers across the area including Bird, California (a tributary to Glacier Creek in Girdwood), Carmen (a tributary of Glacier River in Twentymile River drainage), Campbell, Eagle, Eklutna, Glacier, Indian, Peters, Placer, Portage, Rabbit, Ship, and Twentymile creeks. Most of these streams support annual Chinook salmon runs of less than 100 fish each (Bosch 2010). As a result, sport fishing for Chinook salmon in streams has been closed with few exceptions.

Chinook salmon fisheries in the AMA include Campbell Creek, Eagle River, and Ship Creek. The largest Chinook salmon sport fishery is hatchery produced and occurs on Ship Creek. The Ship Creek sport fishery is centrally located in the heart of downtown Anchorage, providing a unique opportunity for anglers in an urban setting. Wild Chinook salmon fisheries include Eagle River and a youth-only fishery on Campbell Creek. ADF&G performs survey counts of Chinook salmon returning to sections of Ship, Rabbit, Bird, and Penguin creeks, as well as the south fork of Eagle River and Meadow Creek (tributary of Eagle River; Appendices C1–C5). The 10-year average (2009–2018) catch was 1,708 Chinook salmon and 954 (56%) were harvested (Table 5; Figure 5).

Table 5.–Chinook salmon sport fish catch and harvest, Anchorage Management Area, 1999–2018.

	Eagle River		Ship Creek		Saltwater		Other freshwater		Area total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1999	48	22	14,275	5,204	201	167	594	69	15,118	5,462
2000	132	109	11,090	4,593	60	20	566	30	11,848	4,752
2001	132	58	10,656	4,286	262	108	793	0	11,843	4,452
2002	162	34	5,967	2,287	164	94	777	6	7,070	2,421
2003	76	25	8,667	3,588	78	52	659	13	9,480	3,678
2004	51	24	6,840	2,790	104	58	718	288	7,713	3,160
2005	25	25	7,578	4,081	183	108	1,416	115	9,202	4,329
2006	251	60	5,464	3,060	32	32	1,057	13	6,804	3,165
2007	125	47	4,888	2,615	695	366	434	78	6,142	3,106
2008	46	0	4,279	2,540	92	92	1,047	15	5,464	2,647
2009	0	0	1,869	884	209	143	577	0	2,655	1,027
2010	0	0	1,918	1,095	0	0	223	35	2,141	1,130
2011	17	0	1,171	600	16	16	118	0	1,322	616
2012	0	0	154	113	0	0	180	0	334	113
2013	0	0	1,265	824	0	0	39	0	1,304	824
2014	0	0	1,245	882	0	0	137	0	1,382	882
2015	0	0	3,002	1,761	16	16	59	43	3,077	1,820
2016	17	17	2,540	1,922	96	20	173	40	2,826	1,999
2017	0	0	910	635	0	0	563	21	1,473	656
2018	20	20	451	411	0	0	96	39	567	470
Average										
2016–2018	12	12	1,300	989	32	7	277	33	1,622	1,042
2009–2018	5	4	1,453	913	34	20	217	18	1,708	954
2006–2015	44	11	2,526	1,437	106	67	387	18	3,063	1,533

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

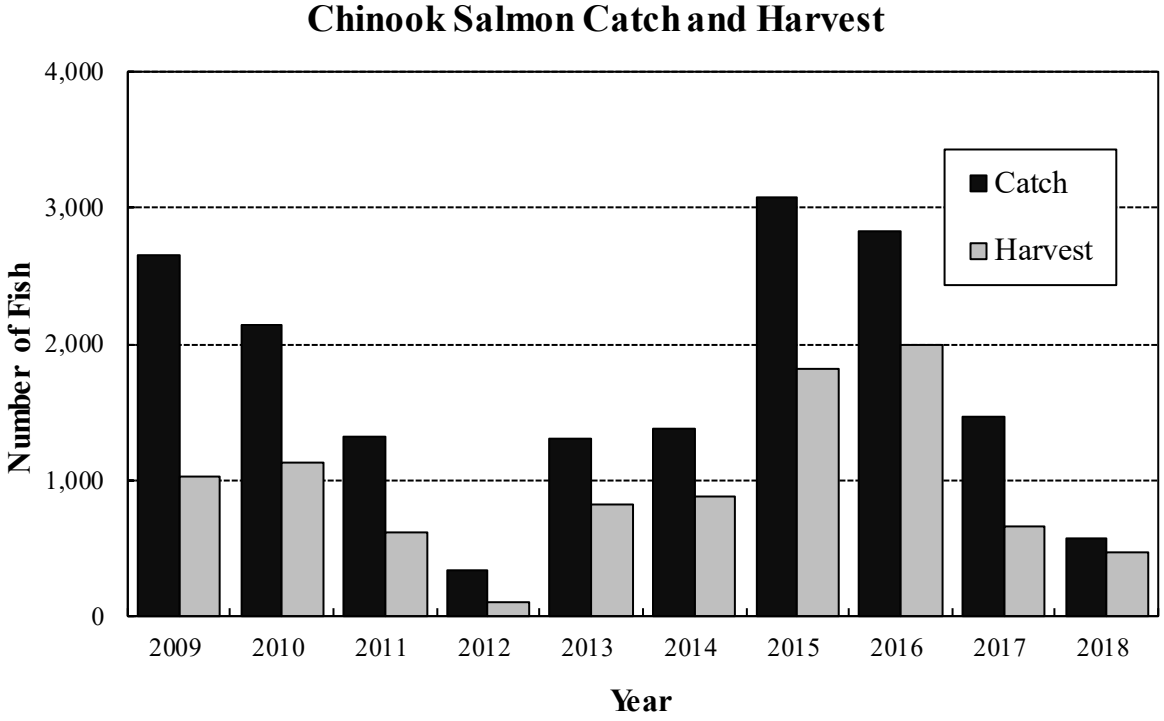

Figure 5.–Chinook salmon sport fish catch and harvest, Anchorage Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

Campbell Creek

Prior to 2005, Chinook salmon sport fishing had not been permitted in Campbell Creek since statehood in 1959. However, in 2005, the Alaska State Legislature gave the Alaska Board of Fisheries (BOF) the authority to create youth-only fisheries (Alaska resident youth under age 18 are not required to obtain a sport fishing license). The BOF created the Campbell Creek Youth-only Fishery to give area kids, 15 or younger, access to a Chinook salmon fishery where they would not have to compete with adult anglers. Kids (youth) under the age of 16 may fish for Chinook salmon on Campbell Creek between Dimond Boulevard and the Old Seward Highway between 6:00 AM and 10:00 PM daily on the last Saturday and Sunday in June of each year. Campbell Creek is closed to fishing for Chinook salmon the rest of the year. After the youth-only fishery, a combination of foot and float escapement surveys are performed to count spawning Chinook salmon in Campbell Creek. The current bag and possession limits for Chinook salmon during the Campbell Creek Youth Fishery are 1 per day, 1 in possession for Chinook salmon 20 inches or longer; and 10 per day, 10 in possession for Chinook salmon less than 20 inches long. After taking a Chinook salmon 20 inches or longer, a person may not fish for any species that same day in waters open to Chinook salmon sport fishing. Chinook salmon 20 inches or longer harvested in Campbell Creek must be immediately recorded on the back of the youth's harvest record card and count towards the annual limit of 5 Chinook salmon harvested from the fresh waters of Cook Inlet. Chinook salmon less than 20 inches in length do not need to be recorded on the back of the sport fishing license or harvest record card, and do not count toward the Cook Inlet seasonal limit. The small wild run of Chinook salmon has not been stocked with hatchery releases and cannot provide a sustainable harvest in such a heavily urbanized location.

In 2006, the Campbell Lake Homeowners Association and MOA were permitted to lower Campbell Lake levels for 3 months in order to winterkill invasive aquatic vegetation species in the lake that were interfering with float plane travel. ADF&G staff expressed concern that Campbell Lake, as the only significant deep water body in the Campbell Creek drainage, probably provides significant habitat for stocks of wild Chinook and sockeye salmon, hatchery-enhanced runs of coho salmon, and resident species in the watershed. Permit requests to extend the refill date of May 15, 2007, by a week were filed but denied. In 2010, the Campbell Lake Homeowners Association and MOA were permitted to draw down Campbell Lake in order to finish the dredging project started in 2006.

Eagle River

Before the Chinook salmon fishery opening in 1992 in Eagle River, angler effort targeting other salmon and resident species averaged about 2,300 angler-days from 1982 through 1991 (Stratton and Cyr 1997). In 1992, the first year of the Chinook salmon fishery, estimated effort was 4,908 angler-days for all species (Mills 1993). The estimated Chinook salmon catch was 109 fish and harvest was 48 fish (Mills 1993). Approximately 300 wild Chinook salmon and 1,000 hatchery Chinook salmon were projected to be available to sport anglers. Estimated effort for Eagle River was 3,396 angler-days in 1993; estimated catch and harvest were 88 and 47 Chinook salmon, respectively (Mills 1994). The low harvest in 1993 was surprising because over 2,300 hatchery Chinook salmon were expected to be available. Because the hatchery run failed to materialize and because the estimated angler-days of effort were at prestocking levels, the stocking program was eliminated in 1995. The fishery was reconfigured by the BOF in spring 1996, and the area open to Chinook salmon fishing was restricted to the portion of the Eagle River near the Glenn Highway campground. This small area was only open for four 3-day weekends (Saturday, Sunday, Monday) beginning Memorial Day weekend. Annual effort was estimated at an average of 390 angler-days from 2009 through 2018 and an average catch of only 5 Chinook salmon. (Tables 4 and 5). It is thought that this limited fishery does not impact natural Chinook salmon runs.

From 2016 to 2018, Eagle River was only open to fishing for Chinook salmon from the Bailey Bridge on Fort Richardson upstream to ADF&G markers in the Chugach State Park Eagle River Campground on Saturdays, Sundays, and Mondays for the 4 consecutive weeks beginning on the Saturday before Memorial Day. The current bag and possession limits for Chinook salmon in those waters of Eagle River open to salmon fishing are 1 per day, 1 in possession for Chinook salmon 20 inches or longer; and 10 per day, 10 in possession for Chinook salmon less than 20 inches in length. After taking a Chinook salmon 20 inches or longer, a person may not fish for any species that same day in waters open to Chinook salmon sport fishing. Chinook salmon 20 inches or longer harvested in Eagle River must be immediately recorded on the back of the angler's sport fishing license or harvest record card and count towards the annual limit of 5 Chinook salmon from the fresh waters of Cook Inlet. Chinook salmon less than 20 inches in length do not need to be recorded on the back of the sport fishing license or harvest record card, and do not count towards the Cook Inlet seasonal limit.

Ship Creek

Ship Creek was open to Chinook salmon sport fishing from 1957 through 1959 but was closed from 1960 through 1969. Chinook salmon fishing was allowed during selected periods in Ship Creek downstream of the Chugach Power Plant Dam from 1970 through 1972. From 1973 through 1986, the creek was closed to Chinook salmon sport fishing due in part to low Chinook salmon

abundance throughout northern Cook Inlet. Beginning in 1987, as returns increased from annual stocking efforts, the lower portion of Ship Creek downstream of the Chugach Power Plant Dam was reopened to Chinook salmon sport fishing 2 days per week for 5 consecutive weeks in June and July. The season was expanded to 7 days per week, January 1 through July 13, in 1990. Nighttime closures from 11:00 PM to 6:00 AM were issued by emergency order to help address enforcement issues and passed into regulation in 2001. The fishery now occurs during late May through early July in the lower 1 mile of Ship Creek, downstream of the Chugach Power Plant Dam (Figure 6). Fishing is also closed within 100 ft of the Chugach Power Plant Dam. The shoreline of the area open to Chinook salmon fishing is owned and managed by Alaska Railroad Corporation (ARRC) and the MOA. The Ship Creek Chinook Salmon Derby, which was first held in 1993, has become an annual event currently sponsored to benefit their Downtown Soup Kitchen.

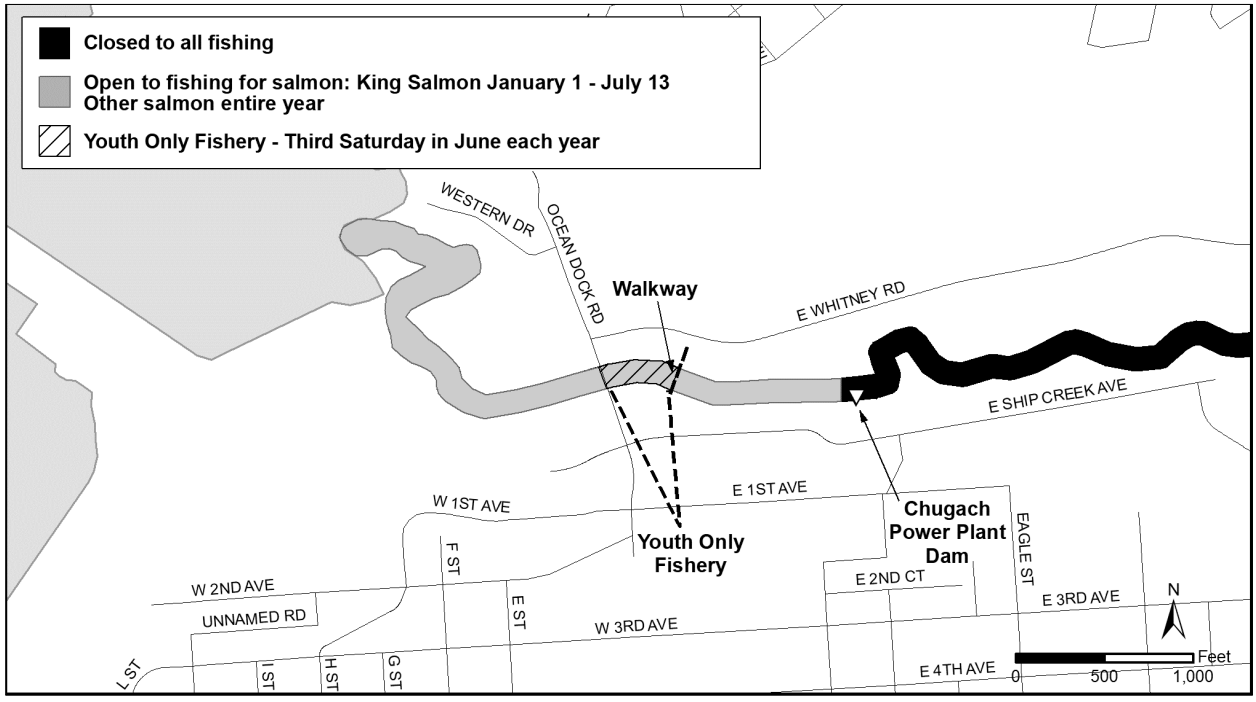

Figure 6.–Map of lower section of Ship Creek.

The current sport fishing bag and possession limits for Chinook salmon in those waters of Ship Creek open to salmon fishing are 1 per day, 1 in possession for Chinook salmon 20 inches or greater; and 10 per day, 10 in possession for Chinook salmon less than 20 inches. After taking a Chinook salmon 20 inches or longer, a person may not fish for any species that same day in waters open to Chinook salmon sport fishing. Chinook salmon 20 inches or longer harvested in Ship Creek must be immediately recorded on the back of the angler's sport fishing license or harvest record card and counted towards the annual limit of 5 Chinook salmon from the salt or fresh waters of Cook Inlet north of Bluff Point. The 10-year average (2009–2018) catch was 1,453 Chinook salmon, and 913(63%) were harvested in Ship Creek (Table 5).

A signed Chinook salmon stamp or a Permanent Identification Card is required to fish for Chinook salmon. Harvest must be immediately recorded in ink on the back of the angler's sport fishing license or harvest record card and counts toward the Cook Inlet seasonal limit of 5 Chinook salmon. Chinook salmon less than 20 inches in length do not need to be recorded on the back of the sport fishing license and do not count toward the Cook Inlet seasonal limit.

FISHERY MANAGEMENT AND OBJECTIVES

In the majority of streams in the AMA, Chinook salmon runs are too small to allow a harvestable surplus. The management goal and objectives are to maintain historical Chinook salmon escapement levels, continue natural production, and provide viewing opportunities. Campbell Creek is the only creek that has a sustainable escapement goal (SEG) threshold in the AMA.

Campbell Creek

The management objectives for Campbell Creek Chinook salmon are to manage and protect the wild Chinook salmon run and to achieve an SEG threshold of 380 Chinook salmon. The SEG threshold for Campbell Creek Chinook salmon was developed in 2010 and includes the 2010 data in the analysis to develop this goal. Campbell Creek was previously managed for an SEG with a range of 50 to 700 fish (Munro and Volk 2010). In 2016, the SEG threshold of 380 Chinook salmon counted through ground surveys was reevaluated as part of the annual escapement review process and determined to still be a suitable goal with the data available.

Eagle River

Eagle River is managed to allow small levels of opportunity for Chinook salmon fishing while ensuring wild populations are not impacted. In addition, the fishery is managed to maintain historical Chinook salmon escapement levels, continue natural production, and provide viewing opportunities.

Ship Creek

This fishery began to develop in 1987, with fishing open for 2 days each week (Appendix A1) to allow stocked Chinook salmon returns to build to harvestable levels. The fishery was expanded to 7 days per week in 1991, resulting in a catch of over 1,600 Chinook salmon and a harvest of over 1,100 Chinook salmon during that year (Bosch 2010). Small saltwater Chinook salmon fisheries occur near the mouths of Ship and Bird creeks.

The 3 management objectives for the Ship Creek Chinook salmon fishery are as follows: 1) to maintain or increase current angler effort through smolt stocking, 2) to generate at least 50,000 angler-days of annual sport fishing opportunity directed at stocked Chinook and coho salmon in Ship Creek, and 3) to produce a return to Ship Creek of 6,000 to 9,000 adult Chinook salmon to assure 750 adult salmon are available (having passed above the Chugach Power Plant Dam) for natural spawning, fish viewing, and meeting hatchery egg-take needs.

STOCKING PROGRAM

Ship Creek

Currently, the only anadromous Chinook salmon stocking in the AMA occurs in Ship Creek. Attempts to enhance Ship Creek salmon runs occurred from 1966 through 1980 when Chinook salmon of Alaska and Oregon origin were stocked (Miller 1990; Stratton and Cyr 1995). During this period, eggs obtained from these stocks were incubated at Fire Lake Hatchery. The fry were reared to smolt in the Fort Richardson Hatchery before release. These releases were generally unsuccessful because consistent numbers of returning adults could not be established. A more successful hatchery enhancement program was established in 1987 using smolt releases from the Elmendorf Hatchery and Ship Creek Chinook salmon broodstock.

The Chinook salmon run is the result of an annual release of smolt raised at the WJHSF Hatchery. From 2016 through 2018, an average of 364,760 Chinook salmon smolt were released into Ship Creek annually (Appendix B1).

Eagle River

In 1990, an annual stocking program was initiated in Eagle River with approximately 105,000 Chinook salmon smolt of Ship Creek origin (Stratton and Cyr 1995). Due to poor returns and difficult fishing conditions, the stocking program was discontinued in 1995.

FISHERY PERFORMANCE

The AMA Chinook salmon fisheries are largely driven by the Ship Creek fishery. On average (2009–2018), the Ship Creek Chinook salmon fishery accounts for almost 50% of the total angler effort in Anchorage streams each year (Table 4). Chinook salmon catches in the AMA have averaged 1,300 from 2016 through 2018 and the average harvest for this period is 989 Chinook salmon, or about 76% of the estimated catch (Table 5).

Campbell Creek

The Youth-only Fishery began in 2005; however, because it is only open to youths 15 years old and younger (who do not require Alaska sport fishing licenses), participants are not eligible to receive a Statewide Harvest Survey, from which catch and harvest are estimated. Furthermore, even if other members of the household received a survey, it is likely the Youth-only Fishery effort was underreported. In 2005, the first year of the fishery, an estimated 750–1,000 youth anglers and adult chaperons participated in the fishery and harvested 150–200 Chinook salmon (Bosch 2010). No annual estimates of participation have been made for this Youth-only Fishery. Participation, effort, and success may reflect run strength and weather conditions during the fishery. Anecdotal information indicates that illegal harvest is probably greater than the legal harvest.

Escapement of Chinook salmon in Campbell Creek is assessed using a combination of foot and float surveys. The accuracy of these surveys varies greatly depending on timing, water levels, and water clarity. Chinook salmon survey escapements have ranged from 1,119 fish (1997) to 260 fish (2011) (Baumer and Blain 2017; Appendix C3). These estimates are based on foot surveys conducted along the length of the creek after the Youth-only fishery occurred. No surveys were conducted in 2012–2013 due to reductions in staff. The average observed escapement using data from surveys conducted in the last 10 years (2009–2018) has been 417 Chinook salmon, which is 20% lower than the previous 10-year average (2006–2015) of 514.

Eagle River

In Eagle River, the average effort from 2016 to 2018 was 488 angler-days or approximately 2% of angling effort for AMA streams (Table 4); much of the Eagle River effort is probably targeting Dolly Varden (Bosch 2010). From 2016 to 2018, an average of 12 Chinook salmon were caught and harvested and no Chinook salmon were reported caught or harvested in Eagle River from 2012 through 2015 (Table 5).

Foot surveys are performed on portions of 2 clear tributaries of Eagle River: South Fork Eagle River and Meadow Creek. Chinook salmon surveys conducted from 2016 to 2018 counted an average of 57 Chinook salmon (Appendix C2). The failure to enhance the fishery with hatchery releases, and typically poor fishing conditions with high, fast water during the season open to Chinook salmon fishing, all probably contributed to low angler effort and success. Anecdotal

information and observations of fishery performance inseason suggest that the catch and harvest estimates will continue to remain low.

Ship Creek

By far the largest Chinook salmon fishery in the AMA is the stocked Ship Creek fishery (Appendix B1). Angling effort targeting all species in Ship Creek peaked at 62,101 angler-days in 2000 and has been on a declining trend ever since then with the second-lowest year of effort in 2018 (14,459 angler days; Table 4). From 2006 to 2015, the Ship Creek sport fishery produced an annual average catch and harvest of 2,526 and 1,437 Chinook salmon, respectively (Table 5). However, from 2016 to 2018, catch and harvest was only 1,300 and 989 fish, respectively. Runs to Ship Creek are predicted to average about 5,000 Chinook salmon annually (Bosch 2010). Since 2000, a broodstock of 750 fish have been collected in most years to meet egg-take goals and to produce not only the 315,000 smolt released specifically for Ship Creek, but to also provide for other Southcentral Chinook salmon smolt releases. Between 2016 and 2018, the number of stocked Chinook salmon smolt was increased to an average of 364,760 smolt. Present regulations combined with emergency order authority have allowed ADF&G to achieve these management objectives. In years when adequate hatchery fish are not returning, ADF&G will take action under Alaska Statute (16.05.060) to issue an emergency order allowing more fish to escape through the Ship Creek fishery to the WJHSF Hatchery for egg takes.

Broodstock needs were very minimal for 2010 because the new WJHSF Hatchery was not due to come online until 2011. The new hatchery can produce 0-check smolt so that rearing smolt for 2 years before release was not necessary. The salmon not used for broodstock spawn naturally near the hatchery and provide an opportunity for the public to view spawning Chinook salmon. The WJHSF Hatchery (formerly the Elmendorf hatchery) attracts over 35,000 visitors each year who are interested in learning about Alaska's stocking programs and state-of the art hatchery, and viewing thousands of salmon that return to Ship Creek adjacent to the hatchery (Molly McCarthy-Cunfer, Ship Creek Fisheries Center Supervisor, personal communication).

An emergency order (EO 2-KS-2-26-17, Table 6) was issued July 11, 2017, increasing the bag and possession limit for Chinook salmon to 2 fish and extending the Chinook salmon sport fishing season on Ship Creek through July 31, 2017. The 2017 estimated final escapement in Ship Creek was 1,852 Chinook salmon (Appendix C1). In 2018, an emergency order (EO 2-KS-2-26-18, Table 6) was issued on June 29 closing sport fishing for all species, on all of Ship Creek, for the remainder of the Chinook salmon season. In 2018, the escapement of Chinook salmon was estimated at 351 fish (Appendix C1) and was the lowest observed since the 1990s. Conversely, no emergency orders were issued in 2016 and the escapement of Chinook salmon in Ship Creek was 3,294 fish. This was the highest escapement that has ever been observed on Ship Creek. Average escapement over the previous 10 years (2006–2015) was 1,379 Chinook salmon (Appendix C1) and harvest was 1,437 (Table 5; total run = 2,816 fish). Adding the average escapement (including broodstock; Appendix C1) and the estimated harvest (Table 5) for 2016–2018, gives a conservative estimated annual run of about 2,821 (989 harvest + 1,832 escapement) adult Chinook salmon returning to Ship Creek. Even with the extremely high and low years of escapement estimated, average run to Ship Creek was very similar between these 10-year and recent 3-year periods.

Table 6.–Emergency orders (EO) issued in the AMA between 2016 and 2018.

Year	Effective dates	Emergency order number	Regulatory change
2016	None		
2017	July11–July 31	2-KS-2-26-17	Increased the bag and possession limit from 1 to 2 for Chinook salmon in Ship Creek and extended the sportfishing season for Chinook salmon on Ship Creek through July 31, 2017.
2017	August 25–December 31	2-SS-2-40-17	Increased the bag and possession limit for salmon, other than Chinook salmon, 16 inches or greater in length, from 3 to 6 for coho salmon in the sections of Ship Creek open to salmon fishing.
2018	June 29–July 13	2-KS-2-26-18	Closed sport fishing for all species on all of Ship Creek for the remainder of the Chinook salmon season to protect Chinook salmon.
2018	August 15–December 31	2-SS-2-56-18	Increased the bag and possession limit for salmon, other than Chinook salmon, 16 inches or greater in length, from 3 to 6 for coho salmon in the sections of Ship Creek open to salmon fishing.

CHUM SALMON FISHERIES

FISHERY DESCRIPTION

Chum salmon do not return in significant numbers to AMA streams. Anglers targeting pink and coho salmon harvest most of the chum salmon. The majority of the catch and harvest were from Bird Creek. Chum salmon are also harvested in California, Fish, Glacier, Indian, Peters, and Ship creeks, and Eagle, Eklutna, Placer, and Twentymile rivers. Although chum salmon harvests have remained relatively low, catches hit a peak of 6,540 in 2002, followed by 6,033 caught in 2008, which was significantly higher than the most recent 10-year average (2009–2018) of 3,178 fish (Table 7, Figure 7). Chum salmon are counted during Chinook salmon escapement surveys although no directed chum salmon counts are conducted by ADF&G staff (Appendices C1–C5). ADF&G does not currently monitor chum salmon escapements.

In those freshwaters of the AMA open to fishing for salmon, the bag and possession limits for salmon (other than Chinook salmon) 16 inches or longer is 3 per day and 3 in possession, only 2 of which may be coho salmon (see regulations for exceptions). The limits for salmon (other than Chinook salmon) under 16 inches are 10 per day, 10 in possession. In saltwater, the limits for salmon, (other than Chinook salmon) are 6 per day, 6 in possession. Only 3 per day, 3 in possession may be coho salmon. Annually between 2009 and 2018 the SWHS estimated that an average of 3,178 chum salmon were caught and 494 (16%) were harvested (Table 7) in the AMA.

Table 7.–Chum salmon sport fish catch and harvest, Anchorage Management Area, 1999–2018.

	Bird Creek		Ship Creek		Twentymile R.		Other streams		Saltwater		Area total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1999	1,156	99	354	16	81	14	244	0	469	0	2,304	129
2000	2,549	158	853	73	48	0	389	73	97	36	3,936	340
2001	1,489	87	1,347	218	357	35	1,270	130	168	0	4,631	470
2002	3,056	406	807	66	1,400	0	1,238	0	39	0	6,540	472
2003	1,857	155	1,014	67	357	25	349	66	544	0	4,121	313
2004	1,233	117	516	44	103	70	305	75	28	0	2,185	306
2005	1,548	116	338	100	0	0	420	18	70	0	2,376	234
2006	2,952	203	677	26	253	0	545	13	0	0	4,427	242
2007	2,027	61	425	22	102	0	295	0	119	14	2,968	97
2008	2,505	239	351	0	926	0	2,236	29	15	15	6,033	283
2009	4,205	316	517	40	69	11	1,154	19	0	0	5,945	386
2010	1,345	148	288	57	903	32	1,316	98	0	0	3,852	335
2011	1,006	111	827	0	22	0	2,265	286	230	0	4,350	397
2012	894	98	140	0	342	0	373	39	0	0	1,749	137
2013	1,366	449	1,885	1,512	58	0	202	92	0	0	3,511	2,053
2014	2,166	309	491	199	0	0	1,067	20	13	13	3,737	541
2015	925	97	331	97	19	0	467	0	0	0	1,742	194
2016	567	168	364	29	45	0	768	29	15	0	1,759	226
2017	1,414	189	493	59	123	18	1,361	243	0	0	3,391	509
2018	1,364	84	197	58	59	0	127	15	0	0	1,747	157
Average												
2016–2018	1,115	147	351	49	76	6	752	96	5	0	2,299	297
2009–2018	1,525	197	553	205	164	6	910	84	26	1	3,178	494
2006–2015	1,939	203	593	195	269	4	992	60	38	4	3,831	467

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

FISHERY MANAGEMENT AND OBJECTIVES

There are no formal management objectives for chum salmon in the AMA. ADF&G has a constitutional mandate to manage on the principle of sustained yield. Within the sustained yield principle, SF goals seek to optimize social and economic benefits, and where possible, expand opportunity to participate in diverse fisheries on these stocks.

STOCKING PROGRAM

There is currently no chum salmon stocking program in the AMA.

FISHERY PERFORMANCE

Chum salmon catch and harvest has varied year to year. Specifically, sport caught chum salmon numbers have been on the decline since 2008 with 2012, 2015, and 2016 seeing nearly identical low catches of chum salmon (Figure 7). Chum salmon harvest has been steady over the last 10 years; however, a significant harvest of chum salmon was observed in 2013, specifically in Ship Creek. From 2016 to 2018, the AMA estimated chum salmon sport catch was 2,299 fish of which 297 (13%) were harvested (Table 6). From 2016 to 2018, average catch and harvest was below the previous 10-year averages (2006–2015) of 3,831 and 467. On average (2009–2018), 13% of chum salmon caught in AMA streams are harvested; however, in 2013, chum salmon harvest was 58% in AMA streams (Table 7).

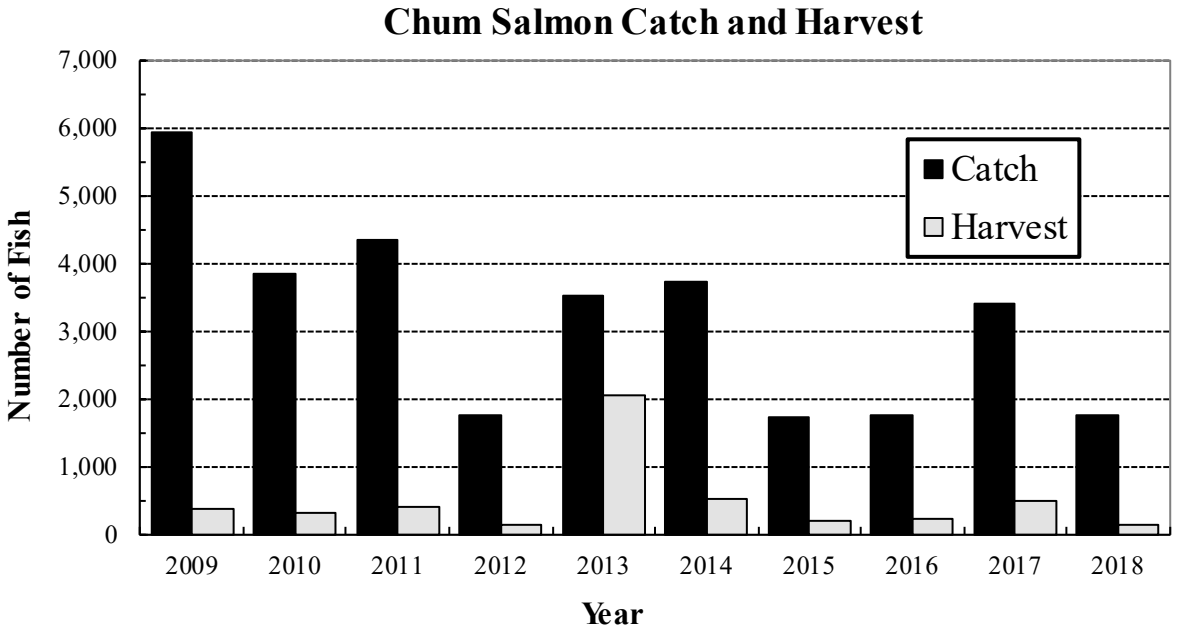

Figure 7.–Chum salmon sport fish catch and harvest, Anchorage Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

COHO SALMON FISHERIES

FISHERY DESCRIPTION

Coho salmon fisheries in the AMA range from centrally located urban opportunities for anglers at Ship and Campbell creeks to remote, boat-accessible angling opportunities at Twentymile and Placer rivers in Turnagain Arm. The largest coho salmon sport fisheries in the AMA include the 3 hatchery enhanced streams (Bird, Campbell, and Ship creeks) and the wild run returning to Twentymile River. Other drainages support smaller runs of wild coho salmon including the Placer River. Ship and Bird creeks contribute significantly to the overall AMA average catch and harvest of coho salmon (Table 3). The 10-year average (2009–2018) catch in the AMA was 11,996 coho salmon and 8,776 (74%) were harvested (Table 3). Once coho salmon leave the freshwater as smolt, they spend 1 winter out in the ocean prior to returning to their natal streams (Sandercock 1991). Coho salmon return to AMA streams from mid-July through mid-October. Hatchery-stocked stream runs peak in mid-August, whereas wild Turnagain Arm runs peak in mid-September.

In the fresh waters open to fishing for coho salmon, bag and possession limits for salmon other than Chinook salmon 16 inches or greater in length are 3 per day and 3 in possession, only 2 of which may be coho salmon except in stocked streams. In stocked streams like Bird, Campbell, and Ship creeks, the bag and possession limits for salmon other than Chinook salmon are 3 per day and 3 in possession of which all 3 can be coho salmon. Beginning in 2011, a coho salmon 16 inches or longer that is removed from fresh water must be retained and becomes part of the bag limit of the person who originally hooked the fish.

Bird Creek

Little historical information is available regarding Bird Creek coho salmon. The first foot surveys were conducted in 1986 and 3 coho salmon were observed. Foot surveys from 1990 through 1992 indicated escapements ranging from 10 to 100 coho salmon (Stratton and Cyr 1995). The well-developed access, proximity to Anchorage, and lack of natural coho salmon production makes Bird Creek an ideal candidate for coho salmon enhancement. Bird Creek is open to sport fishing from the ADF&G markers approximately 500 yards upstream of the Seward Highway Bridge downstream to the mouth of the creek. A marker approximately 400 yards upstream of the Seward Highway Bridge marks the public–private property boundary. The open area was expanded in 1993 by approximately 100 yards as a result of a pending land exchange between the Alaska Department of Natural Resources (DNR), Municipality of Anchorage (MOA), and private landowners. To date, this land exchange has not occurred. Once the land swap is completed, the marker will be moved upstream. Bird Creek upstream of this reach is closed to all salmon fishing. The area open to salmon sport fishing in Bird Creek is within the intertidal reach, and coho salmon are harvested from late July through mid-September. The remainder of the drainage is closed year-round to salmon fishing.

In 2005, construction of the new parking and access project was completed. The enhanced coho salmon fishery had grown in popularity since the initial return in 1993 and quickly outgrew existing facilities for anglers. This project provided off-road parking for over 125 vehicles and developed camping, safe access for anglers and spectators, and sanitation facilities. In Bird Creek, the 10-year average (2009–2018) catch was 2,822 coho salmon and 2,009 (70%) were harvested (Table 8; Figure 8).

Table 8.–Coho salmon sport fish catch and harvest, Anchorage Management Area, 1999–2018.

	Bird Creek		Campbell Creek		Ship Creek		Twentymile River		Saltwater		Other freshwater		Area total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1999	6,284	4,611	1,880	1,341	7,064	4,649	1,457	1,051	170	158	979	456	17,834	12,266
2000	15,799	10,741	1,873	555	20,890	11,858	5,025	3,094	591	288	2,710	1,655	46,888	28,191
2001	11,563	8,449	2,748	813	39,615	26,419	5,724	2,742	732	463	3,483	1,807	63,865	40,693
2002	1,504	1,053	2,998	1,144	24,699	16,751	4,101	2,672	1,012	587	6,905	4,053	41,219	26,260
2003	1,117	776	2,873	1,457	8,831	6,094	3,039	2,116	867	441	4,035	2,491	20,762	13,375
2004	1,064	611	3,468	1,056	10,543	6,110	5,048	3,012	336	143	5,015	2,515	25,474	13,447
2005	5,331	3,281	4,552	1,989	10,922	6,830	1,632	1,334	473	473	3,027	1,156	25,937	15,063
2006	9,530	5,889	3,622	1,767	14,881	8,079	2,299	1,739	316	220	5,172	2,169	35,820	19,863
2007	7,461	3,287	1,051	758	5,845	3,934	998	719	993	915	1,458	1,079	17,806	10,692
2008	3,817	3,030	2,164	1,155	8,755	6,735	7,336	4,116	0	0	4,052	2,960	26,124	17,996
2009	6,020	3,296	577	364	4,014	2,974	2,052	1,329	284	207	4,789	2,635	17,736	10,805
2010	1,381	974	392	249	1,038	743	1,358	1,214	44	15	1,770	1,271	5,983	4,466
2011	2,024	1,324	784	502	3,748	2,443	1,281	1,087	55	55	2,435	1,994	10,327	7,405
2012	1,120	722	425	306	2,289	1,312	939	639	305	46	1,457	1,162	6,535	4,187
2013	1,251	980	168	136	3,733	3,264	1,304	895	0	0	1,185	915	7,641	6,190
2014	3,936	2,751	2,409	1,303	4,235	2,949	1,116	784	198	198	2,045	1,445	13,939	9,430
2015	4,712	4,097	2,993	1,908	9,309	7,232	685	503	125	104	1,394	1,255	19,218	15,099
2016	1,511	1,210	150	2,598	1,878	1,601	1,260	1,181	258	193	1,141	734	6,198	5,069
2017	2,764	1,836	1,521	1,312	6,897	6,011	2,349	1,249	0	0	3,969	2,641	17,500	13,049
2018	3,502	2,904	1,650	1,051	4,494	3,856	2,805	2,474	0	0	2,436	1,773	14,887	12,058
Average														
2016–2018	2,592	1,983	1,107	838	4,423	3,823	2,138	1,635	86	64	2,515	1,716	12,862	10,059
2009–2018	2,822	2,009	1,107	728	4,164	3,239	1,515	1,136	127	82	2,262	1,583	11,996	8,776
2006–2015	4,125	2,635	1,459	845	5,785	3,967	1,937	1,303	232	176	2,576	1,689	16,113	10,613

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

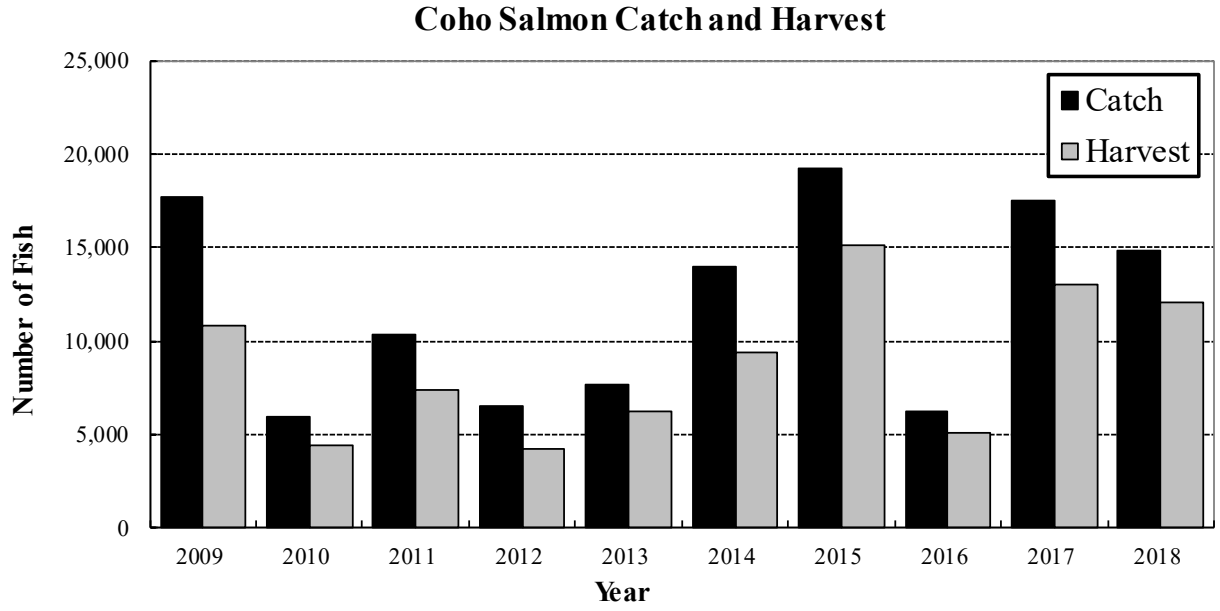

Figure 8.–Coho salmon sport fish catch and harvest, Anchorage Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

Campbell Creek

Although wild coho salmon historically returned to Campbell Creek in August and September, the number of returning adults was insufficient to support a viable sport fishery. Currently, coho salmon start to enter Campbell Creek in mid-July and are observed during annual ADF&G Chinook salmon surveys. Coho salmon do not stay long in the area of Campbell Creek below Piper Street (the only area open to salmon fishing). Coho salmon that return in August tend to hold in Campbell Lake, which is closed to all fishing, before moving into the creek. A majority of fish migrate upstream of Lake Otis Parkway and spawn in the forks of Campbell Creek; however, some fish spawn in the mainstem of Campbell Creek as well. From 1986 to 1992, before the returns of hatchery fish commenced, Campbell Creek coho salmon escapement surveys averaged 159 fish annually (Stratton and Cyr 1995). The reduction of Campbell Creek coho salmon runs was probably a result of urbanization and development along the creek that reduced the number and size of wetlands and associated rearing habitat, an influx of pollutants and silt from storm drain runoffs, and poaching. A combination of foot and float escapement surveys are performed to count spawning coho salmon in Campbell Creek.

Campbell Creek was opened to coho salmon fishing in 1993 for the first time since 1971 (Appendix A3). A map of lower Campbell Creek showing areas open to coho salmon sport fishing can be found in Figure 9. Campbell Creek, from Dimond Boulevard to Shelikof Street, and Lake Otis to the Forks located near Piper Street, is open to coho salmon fishing from July 14 through September 30 each year. The bag and possession limits on Campbell Creek for salmon (other than Chinook salmon) 16 inches or greater in length are 3 per day, 3 in possession, of which all 3 may be coho salmon. In Campbell Creek, the 10-year average (2009–2018) catch was 1,107 coho salmon and 728 (66%) were harvested (Table 8).

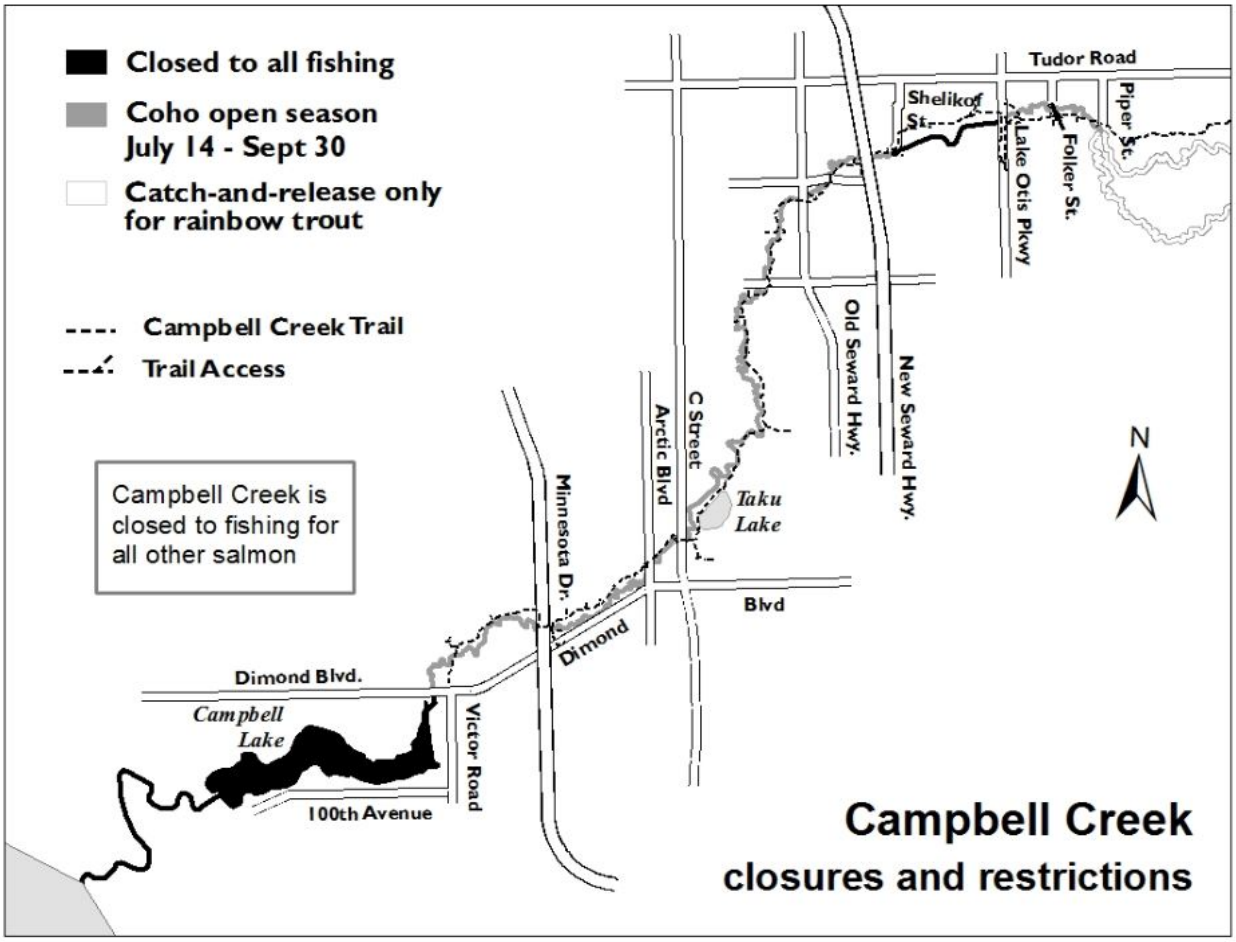

Figure 9.–A map of lower section of Campbell Creek showing areas open to coho salmon sport fishing and season dates.

Ship Creek

Prior to the start of World War II in 1939, Ship Creek had a wild run of coho salmon that supported sport, personal use, and subsistence fisheries (Bosch 2010). The dams constructed in the lower 11 miles of the creek were built for power generation and as a water source for the Municipality of Anchorage (MOA). The construction of these dams as well as the development of military installments during the 1940s and 1950s coincided with reduced Ship Creek salmon runs. To rebuild the coho salmon runs, smolt were stocked annually into Ship Creek (ADF&G SF hatchery records).

Ship Creek was open to coho salmon sport fishing from 1957 through 1959, and again from 1964 to present (Appendix A1). Currently, only the reach downstream of the Chugach Power Plant Dam is open to fishing (Figure 6). Fishing is also closed within 100 ft of the Chugach Power Plant Dam. The bag and possession limits on Ship Creek for salmon (other than Chinook salmon) 16 inches or greater in length are 3 per day, 3 in possession of which all 3 may be coho salmon. In Ship Creek, the 10-year average (2009–2018) catch was 4,164 coho salmon and 3,239 (78%) were harvested (Table 8).

Turnagain Arm Streams

Turnagain Arm streams produce the largest wild stock coho salmon runs in the AMA; coho salmon return to several streams from late July through mid-September. In some systems, fresh fish are available into October.

The Twentymile River drainage supports the largest and most popular recreational coho salmon fishery in Turnagain Arm. Only about the first 10 miles of the Twentymile River are open to fishing after July 13. The Glacier River is only open to its confluence with Carmen River. The upper reaches of Twentymile River, Glacier River, and Carmen River are closed by regulation to sport fishing after July 14 and are always closed to salmon fishing. These rivers are heavily influenced by the summertime glacial runoff and fishing typically takes place in or near freshwater sloughs that feed these streams. The 10-year average (2009–2018) catch was 1,515 coho salmon and 1,136 (75%) were harvested in the Twentymile River drainage (Table 8).

In the Placer River drainage, and Skookum and Lower Explorer creeks, sport fishing effort is minimal. Spawning areas in Lower Explorer and Skookum creeks are closed to sport fishing by regulation after July 14. Coho salmon are also harvested in California, Glacier, Ingram, Peterson, and Placer creeks and several Portage Valley streams.

In waters of Turnagain Arm open for fishing for coho salmon, the bag and possession limits for salmon (other than Chinook salmon), 16 inches or greater in length are 3 per day, 3 in possession. Only 2 may be coho salmon.

Fishery Management and Objectives

The Alaska Board of Fisheries has no established management plans or objectives for AMA coho salmon. The management objective and goal for wild stocks of coho salmon in systems considered too small to support a harvestable surplus is to maintain historical escapement levels, continue natural production, and provide viewing opportunities. Angler opportunity should be provided in those streams only when there is a harvestable surplus. Escapement goals have not been set for these streams. Angler participation and harvest of wild stocks have increased in many systems in recent years and should be monitored to ensure sustainability.

Campbell Creek

Campbell Creek was closed to all salmon fishing prior to 1993 when it was opened to fishing for coho salmon. A biological escapement goal of 200 fish was set for Campbell Creek coho salmon (it was changed to a sustainable escapement goal (SEG) of 100 to 500 wild coho salmon in 2001), and a weir was operated on Campbell Creek from 1993 to 1994 to count returning adult salmon. There is currently no escapement goal for coho salmon on Campbell Creek.

The Campbell Creek coho salmon fishery was established to provide additional angler opportunities in Anchorage by attempting to produce a run of 3,500 adult coho salmon to Campbell Creek while maintaining historical levels of natural coho spawning. In addition, coho salmon enhancement was established to provide 5,000 angler-days of annual sport fishing opportunity directed at stocked coho salmon in Campbell Creek. The fishery will continue to be managed to maintain historical escapement levels and to provide continued natural production and viewing opportunities (ADF&G Statewide Stocking Plan; http://www.adfg.alaska.gov/index.cfm?adfg=fishingSportStockingHatcheries.stockingPlan, accessed November 2019).

Ship Creek

The Ship Creek coho salmon fishery management objectives are to produce a return of 12,000 adult coho salmon to Ship Creek while assuring approximately 1,000 coho salmon are available at Ship Creek for natural spawning, fish viewing, and egg-take needs and to generate at least 35,000 angler-days of annual sport fishing opportunity directed at stocked Chinook and coho salmon in Ship Creek. (ADF&G Statewide Stocking Plan). Present regulations provide for the harvest of coho salmon in excess of spawning and viewing requirements and allow optimum utilization of Ship Creek coho salmon.

Turnagain Arm Streams

The management objective for the Turnagain Arm coho salmon fisheries is to provide angler opportunities while ensuring adequate spawning escapement. No escapement goals have been set for these systems. Large areas of streams at the head of Turnagain Arm are closed to all sport fishing after July 13 to protect spawning salmon.

STOCKING PROGRAM

Stocking of coho salmon into anadromous streams in the Anchorage Management Area is referred to as the *Urban Coho Salmon Stocking Program*. The primary purpose of the *Urban Coho Salmon Stocking Program* is to maintain or increase coho salmon sport fishing opportunities in Anchorage on a sustainable basis by supplementing natural runs with hatchery fish. Approximately 440,000 smolt are stocked in Bird, Campbell, and Ship creeks annually. Coho salmon returning to Ship Creek are used for the broodstock, although their origin is most likely from Little Susitna River coho salmon (ADF&G 2020). In 2018, due to a lack of coho salmon returning to Resurrection Bay there was additional room at the hatchery and extra fish were raised for Ship Creek and Homer Spit (D. Loopstra, William Jack Hernandez Sport Fish Hatchery, personal communication). As a result, Ship Creek received more smolt than was historically stocked.

Bird Creek

Bird Creek historically produced few coho salmon, leaving no genetic concerns with stocking, and no attempts were made to collect wild Bird Creek coho salmon for broodstock. Thus, Little Susitna River coho salmon broodstock (now collected at WJHSF Hatchery site) have been and are currently used for Bird Creek stocking. Stocking of coho salmon smolt was initiated at Bird Creek in 1992 to increase the number of coho salmon for sport anglers because natural production is very low. The annual stocking of about 120,000 coho salmon smolt of Little Susitna River origin was initiated to increase the number of coho salmon for sport anglers. Smolt released in 1992 returned as adults to the Bird Creek fishery in 1993. Due to hatchery surplus, nearly 300,000 coho salmon smolt were released in 1997. Coho salmon smolt releases were suspended from 2001 through 2003 while the Bird Creek parking area was under construction. From 2016 to 2018 the average number of stocked coho salmon smolt was 130,136 (calculated from Appendix B2). This stocking is part of the *Urban Coho Salmon Stocking Program* aimed at increasing coho salmon angling opportunities in the AMA.

Campbell Creek

Hatchery-produced coho salmon runs in Campbell Creek provide a unique opportunity for sport anglers to participate in quality fisheries in an urban setting. The annual stocking of coho salmon smolt of Little Susitna River origin was initiated in 1992 to increase coho salmon runs to Campbell

Creek (ADF&G 2020). This stocking is part of the *Urban Coho Salmon Stocking Program* aimed at increasing coho salmon angling opportunities in the AMA. The number of coho salmon smolt stocked annually has ranged from 42,046 in 1999 to 157,241 in 1995 but typically it averaged 71,457 smolt (Baumer and Blain 2017). The current stocking goal is 50,000 smolt annually. From 2016 to 2018, the average number of stocked coho salmon smolt was 52,740.

Ship Creek

Hatchery-produced coho salmon runs in Ship Creek also provide a unique opportunity for sport anglers to participate in quality fisheries in an urban setting. The primary purpose of the stocking program is to maintain or increase coho salmon sport fishing opportunities in Anchorage on a sustainable basis by supplementing Ship Creek's natural run with hatchery fish.

The construction of dams in the 1940s and 1950s on Ship Creek made it difficult for wild coho salmon runs. To enhance and reestablish the coho salmon runs after the construction of the dams, the creek was stocked annually with coho salmon smolt from 1968 through 1977 (ADF&G SF hatchery records). These efforts proved unsuccessful in providing consistent numbers of returning adults. Nine different broodstocks from Ship Creek, Bear Lake (near Seward), Kodiak, Washington, and Oregon were used (Miller 1990). Eggs obtained from these stocks were incubated at Fire Lake Hatchery (located on Upper Fire Lake in Eagle River) and the resultant fry were reared to smolt at Fort Richardson Hatchery. No coho salmon smolt were released in Ship Creek from 1978 through 1986. From 1987 through 1994, ADF&G stocked coho salmon smolt in Ship Creek using fish of Ship Creek origin reared at Elmendorf Hatchery. Although these efforts have provided consistent coho salmon runs, these runs tend to enter the system slowly throughout the fall. Ideally, coho salmon runs that appeal to sport anglers exhibit a compressed run timing with large numbers of fish available in a relatively short time period. The decision was made to change broodstock for Ship Creek to Little Susitna River origin fish, which exhibit the preferred condensed run timing. The first release of Little Susitna River origin coho salmon smolt occurred in 1995. The number of coho salmon smolt stocked annually has ranged from 30,400 in 1971 to 400,784 in 2018 but typically it averaged 158,965 smolt. This high number of smolt released in 2018 was due to excess coho salmon collected for the possibility of stocking into Resurrection Bay but it was determined that Ship Creek was not a suitable coho salmon stock for Resurrection Bay waters. This allowed for a one time increase in coho salmon stocking in Ship Creek above the stocking goal. The current stocking goal is 240,000 smolt annually (ADF&G 2020). From 2016 to 2018, the average number of stocked coho salmon smolt was 311,077.

Turnagain Arm Streams

With the exception of the Bird Creek coho salmon enhancement program described above, there are currently no coho salmon stocking programs in Turnagain Arm.

FISHERY PERFORMANCE

Prior to the *Urban Coho Salmon Stocking Program*, which was initiated in 1991, the greatest total coho salmon harvest (6,730 fish) occurred in 1988 (Mills 1989). Poor runs of coho salmon in many systems in Upper Cook Inlet from 1997 until 2000 resulted in closures of the Upper Cook Inlet commercial fisheries, reductions to bag and possession limits, bait restrictions to the sport fisheries, and a conservative approach to coho salmon management regionwide. These years of weak runs were followed by record runs from 2000 through 2002. The 2000 through 2002 estimated catches of coho salmon in the AMA are 3 of the 4 highest years ever recorded. The 2003

through 2009 estimated catches remained relatively good, averaging a catch and harvest of 24,237 and 14,463, respectively (calculated from Table 8); however, the areawide catch of 5,983 coho salmon in 2010 was the lowest on record since the early 1990s (Baumer and Blain 2017). From 2011 to 2013, the coho salmon runs continued to be weak, although from 2013 to 2015, the coho salmon runs increased to nearly double what was observed in 2012 and 2013 (Table 8).

In 2016, there was a steep drop in the AMA catch to 6,198 fish (Figure 8). In addition, in 2016 the third lowest harvest (5,069 fish) since the early 1990s was observed. Catch and harvest in 2016 was low at all locations although there was no observable change in effort. From 2016 to 2018, total stream effort was on average 32,732 angler-days which was lower than the previous 10-year average (2006–2015) of 44,456 angler-days (Table 4).

In 2017 and 2018, catches of coho salmon returned to larger numbers and in 2017, a high of 17,500 fish were caught in the AMA, which exceeded the 2006–2015 10-year average of 16,113 fish (Table 8). In 2018, a slight decrease in catch was observed down to 14,887 fish, which was also below the 2006–2015 10-year average. The 2017 catch was the 3rd highest in the last 10 years and harvest that year was the 2nd highest. On average (2009–2018), an estimated 11,996 coho salmon were caught annually in AMA sport fisheries and 8,776 of those fish were harvested (Table 8, Figure 8). The peak catch between 2009 and 2018 was 19,218 coho salmon caught in 2015 (Table 8, Figure 8).

Bird Creek

The angler effort in Bird Creek in from 2016to 2018 has averaged 6,049 angler-days (Table 4), which is 3,143 angler-days lower than previous 10-year (2006–2015) average of 9,192 angler-days. Average catch and harvest of coho salmon from Bird Creek for 2016–2018 of 2,592 and 1,983 fish, respectively, were lower than the 2006–2015 averages of 4,125 and 2,635, respectively, reflecting the decreased angling effort (Table 8).

The first returns from hatchery stockings in 1993 resulted in a catch and harvest of 7,799 and 6,195 coho salmon, respectively (Bosch 2010). In 1998, the fishery peaked with a catch and harvest of 33,546 and 22,406 fish, respectively (Baumer and Blain 2017). Fishery performance is linked closely to the number of properly sized hatchery-reared smolt that are released. Nearly 300,000 coho salmon smolt were released in 1997 (Baumer and Blain 2017; Appendix B2) resulting in high catch rates the following year. The fishery continued to do well until 2002, when the catch dropped to 1,504 coho salmon of which 1,053 fish were harvested. This decline in fishery performance was due to Bird Creek not being stocked in 2001. Construction of the new parking area north of Bird Creek was scheduled to begin in 2002, and in order to conduct a safe and orderly fishery, Bird Creek was not stocked from 2001 through 2003. The loss of the stocking program for those 3 years corresponded to poor fishery performance from 2002 through 2004 (Table 8).

From 2016 to 2018, the number of stocked coho salmon smolt averaged 130,136. However, the sport catch and harvest did not materialize as expected during these years. The stocking levels during these 3 years was approximately 30,000 fish less than the amount stocked in 1998 (Appendix B2). Catch and harvest the year following the 1998 stocking (1999), was 6,284 and 4,611 fish, respectively, and effort was 13,033 angler days (Tables 4 and 8). The coho salmon smolt from the new WJHSF Hatchery ranged from 18 g to 23 g at release (ADF&G 2020) and were in good health.

The release location on Penguin Creek, a tributary of Bird Creek, was considered a possible cause for increased mortality. Prior to the new hatchery, fish were stocked approximately 0.5 miles up Penguin Creek on a small access road. A new stocking release site was utilized for fish from the new hatchery, about another river mile upstream on Penguin Creek. This new location was selected to provide smolt more time to imprint in the fast-flowing freshwater of Penguin Creek. In 2014, a foot survey was conducted immediately after the coho salmon smolt were released, and it was determined that this additional upper section of Penguin Creek was very steep and may have contributed to increase mortality; however, no actual mortalities were observed on the foot survey. In 2015, stocked fish were divided into 3 different release locations and observed closely to try to determine the best release location for the future. One group of coho salmon smolt was released at the highest location, which was approximately 1.39 miles up Penguin Creek from the confluence with Bird Creek. The second group of coho salmon smolt was released at more traditional (2009 and earlier) site, which is about 0.5 miles up Penguin Creek, and the final release location and the smallest group of smolt was released at a bridge about 0.25 miles above the fishery on the mainstem of Bird Creek but just below the confluence of Bird and Penguin creeks. These 3 locations are the only locations where the stocking truck can realistically intersect with Penguin or Bird creeks. The lowest stocking location on Bird Creek was determined to be too close to the tidally influenced saltwater and the fish were swept out by the tide within an hour. It appears that the middle stocking location, which is approximately 0.5 miles up Penguin Creek, is the most suitable stocking location and was continued as the traditional stocking location from 2016 to 2018 until further assessments can be made. This section has less of a gradient than the upper stocking location and released smolt were seen holding in this section by observers.

The Bird Creek coho salmon fishery relies largely on hatchery enhancement and attempts to estimate escapement from 2016 to 2018 were successful. Average escapement was 305 fish (range: 154–463). This is higher than the previous 10-year average (2006–2015) of 255 fish (Appendix C4). In Bird Creek, the average catch and harvest of coho salmon for the last 3 years (2016–2018) was 2,592 and 1,983 fish, respectively, both of which were lower than the previous 10-year average (4,125 and 2,635 fish, respectively) (Table 8).

Combining the average estimated harvest (2009–2018) of 2,009 fish (Table 8) and average stream survey estimates (2009–2018) of 269 fish (excluding 2012, 2013 and 2015, when no surveys were performed; Appendix C3), the annual total run size of adult coho salmon for Campbell Creek would be estimated at 2,278 fish (2,009 harvest + 269 escapement).

Campbell Creek

The proximity of Campbell Creek within Anchorage makes it easy to access and fish. Even when hatchery runs are anticipated to be low, fishing effort remains fairly steady. The effort on Campbell Creek from 2016 to 2018 averaged 3,381 angler-days (Table 4) and is 786 angler-days lower than the average effort from the previous 10-year average. Effort decreased in 2016, dropping to a low of 2,598 angler-days; however, a decrease in effort was common in other AMA streams that year.

In Campbell Creek, the average catch and harvest of coho salmon for the last 3 years (2016–2018) was 1,107 and 838 fish, respectively, both of which were less than the previous 10-year average (1,459 and 845 fish, respectively) (Table 8). Stocking in Campbell Creek was on average 52,000 coho salmon smolt from 2016 to 2018 (Appendix B2). Coho salmon released as smolt will spend 1 winter in the ocean prior to returning to spawn as adults.

In 2016, angler effort on Campbell Creek decreased by over 2,000 angler-days from the previous 3 years and then increased in 2017 (Table 4). The decrease in effort in 2016 was reflected in the extremely poor catch and harvest of coho salmon (150 and 150 fish, respectively) which was the lowest observed since the 1990s (Baumer and Blain 2017; Table 8). Poor coho salmon returns were also observed throughout the entire AMA and other areas of the state. However, in 2017 and 2018, catch and harvest were above the previous 10-year average (Table 8).

Successful stream surveys were performed from 2016 to 2018. In 2016, only 565 fish were counted on the annual survey, which was well below the 2006–2015 average (Appendix C3). In 2017 and 2018, 1,983 and 1,986 adult coho salmon were counted, respectively, which was above average (Appendix C3). Estimates from these surveys are consistent with angler reports of coho salmon abundance during that time and probably reflect the escapement of coho salmon in Campbell Creek and the poor run observed in 2016 and the better runs in 2017 and 2018.

Combining the average estimated harvest (2009–2018) of 728 fish (Table 8) and average stream surveys estimates (2009–2018) of 1,262 fish (excluding 2011 and 2012, when no surveys were performed; Appendix C3), the annual total run size of adult coho salmon for Campbell Creek would be estimated at 1,990 fish (728 harvest + 1,262 escapement).

Ship Creek

Effort, catch, and harvest of coho salmon in Ship Creek remain the highest out of any stream in the AMA even though overall effort has decreased since the late 2000s and early 1990s (Tables 4 and 8). On average during the previous 10 years (2006–2015), anglers have spent 22,719 angler-days of effort in Ship Creek (Table 4). This is higher than the recent 3-year average (2016–2018) of 16,325 angler-days.

The average catch and harvest of coho salmon in Ship Creek from 2016 to 2018 was 4,423 fish and 3,823 fish, respectively (Table 8). This was 1,362 and 144 fish, respectively, lower than the previous 10-year average (2006–2015). The catch and harvest of coho salmon in 2016 were some of the lowest on record (1,878 and 1,601 fish, respectively). In 2017 and 2018, emergency orders (EO 2-SS-2-40-17 and EO 2 SS-2-56-18) were issued to allow for additional harvest (Table 6). The bag and possession limit was increased to 6 salmon, of which all 6 could be coho salmon in the sections open to salmon fishing during both years. The 2017 estimated final escapement in Ship Creek was 2,155 coho salmon. In 2018 estimated final escapement was 2,206 coho salmon (Appendix C1). No emergency orders were issued to liberalize or restrict the coho salmon fishery in 2016.

The 10-year (2006–2015) average annual number of coho salmon smolt stocked in Ship Creek (254,116) has been fairly constant and has ranged from a low of 243,499 (2012) to high of 287,825 fish (2009; Appendix B2). In 2016 there was an increase to 275,402 smolt and in 2018 a large increase to over 400,000 smolt. Stocking levels in 2017 were similar to historical at 257,047 smolt (Appendix B2). Even with consistent and higher stocking numbers back to 1996 (Appendix B2), the average catch and harvest of coho salmon in the past 5 years are much less than most years in the late 1900s and early 2000s (Baumer and Blain 2017; Table 8). Catch and harvest from the 2018 stocking will be reported in the next AMA report.

It is difficult to estimate the entire coho salmon run size for Ship Creek. Stream surveys and hatchery counts do not always coincide. The stream survey counts need good visibility and suitable water conditions. Some fish counted in stream surveys may be counted again at the hatchery. If

the hatchery needs additional fish to meet broodstock goals, they may catch fish near the hatchery, or if the hatchery has too many fish, they may return fish to the creek. These are all potential issues with stream foot survey data on Ship Creek. In recent years, SF biologists for the AMA have been working more closely with the WJHSF hatchery staff to try to get a better end-of-season escapement estimate by combining both hatchery-counted fish and fish observed on the foot survey. Rain is common in the fall, causing increased water levels and turbidity that make accurate stream surveys difficult. The 10-year (2009–2018) average annual estimated escapement for Ship Creek is 2,238 adult coho salmon (Appendix C1). If the 10-year average annual harvest of 3,239 coho salmon (Table 8) is added to the estimated 10-year average annual escapement, the conservatively estimated annual drainage escapement is 5,477 coho salmon (3,239 harvest + 2,238 escapement = 5,477 run).

Turnagain Arm Streams

Besides Bird Creek (see Bird Creek coho salmon section) and the Twentymile River drainage, the sportfishing effort for coho salmon on Turnagain Arm streams is small and not reported in the annual Statewide Harvest Survey (SWHS). Twentymile River and other Turnagain Arm streams are wild coho salmon runs. The only river that does show up consistently in the SWHS results is Twentymile River. Twentymile River is open to coho salmon fishing in the lower reach (see Turnagain Arm Streams fishery description for more detail). The average annual effort in Twentymile River makes up 5% of the overall effort in the AMA (Table 4). It is difficult to participate in this coho salmon fishery without a boat. The average annual effort for the previous 10 years (2006–2015) was 2,075 angler-days. This is 44 angler-days less than the 3-year average (2016–2018) of 2,119 angler-days. In 2017 and 2018, the increase in effort was the highest observed since the drop off in 2009. Catch and harvest in 2017 and 2018 also increased during these years. Following the historically low catch and harvest in 2015, catch and harvest increased annually from 2016 to 2018 on Twentymile River (Table 8). The 10-year (2009–2018) average annual catch and harvest of coho salmon, in Twentymile River was 1,515 and 1,136 fish, respectively.

Currently no escapement surveys are performed on the Twentymile River drainage. Historical aerial streams survey numbers and reasons for discontinuing the surveys are detailed in the 2010 Anchorage Management Report (Bosch 2010).

PINK SALMON FISHERIES

FISHERY DESCRIPTION

Pink salmon return annually to AMA streams in July and August, although the largest runs tend to occur in even-numbered years. However, since 2004, every odd-numbered year has observed a higher catch than the previous even-numbered year. In some cases, the differences were very significant. For example, in 2008, 30,004 pink salmon were caught followed by a catch of 62,996 in 2009 (Table 9). The 10-year average (2009–2018) catch was 18,030 pink salmon and 2,170 were harvested (Table 9). Historically, pink salmon fisheries had the second highest annual salmon catch in the AMA after coho salmon; however, a shift began in 2007, and annual catch of pink salmon has been greater than coho salmon in almost every year since then (Table 3). In 2015, the catch was nearly the same for both pink and coho salmon (19,236 and 19,218 fish, respectively) but in 2016 and 2018, pink salmon catch was lower than coho salmon with 2018 coho salmon catch nearly double pink salmon catch (Table 3).

The majority of pink salmon caught in AMA streams are released (about 88% since 1999) and Bird Creek supports the largest pink salmon sport fishery in the AMA with an average (2009–2018) catch and harvest of 9,854 and 1,110 pink salmon, respectively (Table 9). Bird Creek flows into Turnagain Arm approximately 25 miles south of Anchorage and supports the primary AMA pink salmon sport fishery. Improvements in parking areas and access trails have increased Bird Creek's popularity as a fishing destination for both local and nonresident anglers. Pink salmon return to Bird Creek from mid-July to mid-August each year. Although the pink salmon stocks in Bird Creek are wild, beginning in 1992, ADF&G began releasing hatchery-reared coho salmon smolt, making Bird Creek even more popular with most anglers. Bird Creek is open to sport fishing from ADF&G markers located approximately 500 yards upstream of the Seward Highway Bridge and downstream to the mouth of the creek. The open area was expanded in 1993 by approximately 100 yards as a result of a pending land exchange between the Alaska Department of Natural Resources (DNR), the Municipality of Anchorage (MOA), and private landowners. To date, this land exchange has not occurred. Bird Creek upstream of this reach is closed to all salmon fishing.

Most AMA streams support annual pink salmon runs, but run size is often small and doesn't support a recreational harvest. Other area streams with significant pink salmon catch and some harvest include Ship Creek and Twentymile River. Reported harvests from California, Fish, Glacier, Indian, Ingram, and Peters creeks, and Eagle, Eklutna, and Placer rivers are included in "other freshwater" on Table 9.

In those waters of the AMA open to fishing for salmon, the bag and possession limits for salmon (other than Chinook salmon) 16 inches or longer is 3 per day, 3 in possession, only 2 of which may be coho salmon (see regulations for exceptions). The limits for salmon (other than Chinook salmon) under 16 inches are 10 per day, 10 in possession. Rabbit and Sixmile creeks are closed to all salmon fishing and Campbell Creek is closed to pink salmon fishing.

FISHERY MANAGEMENT AND OBJECTIVES

There are no formal management objectives for pink salmon in the AMA. ADF&G has a constitutional mandate to manage on the principle of sustained yield. Within the sustained yield principle, SF goals seek to optimize social and economic benefits and, where possible, expand opportunity to participate in diverse fisheries on these stocks.

Table 9.–Pink salmon sport fish catch and harvest, Anchorage Management Area, 1999–2018.

	Bird Creek		Ship Creek		Twentymile R.		Saltwater		Other freshwater		Area total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1999	3,913	507	789	80	80	0	185	40	495	94	5,462	721
2000	20,055	1,335	6,841	853	297	10	963	348	10,080	577	38,236	3,123
2001	7,662	333	2,815	190	234	23	321	64	1,956	173	12,988	783
2002	5,931	758	2,724	155	709	29	53	7	2,234	219	11,651	1,168
2003	6,152	1,033	1,055	291	109	0	997	150	1,148	126	9,461	1,600
2004	2,677	751	1,668	61	163	16	884	81	2,505	363	7,897	1,272
2005	8,624	433	839	108	93	46	85	24	1,098	66	10,739	677
2006	16,182	1,574	1,755	288	384	0	108	0	5,482	483	23,911	2,345
2007	25,861	1,717	3,559	405	299	88	1,287	743	3,312	325	34,318	3,278
2008	16,205	1,088	1,492	191	2,043	63	140	140	10,124	550	30,004	2,032
2009	37,299	3,812	7,620	785	185	0	159	74	17,733	1,755	62,996	6,426
2010	6,956	1,433	914	377	450	27	80	14	6,225	727	14,625	2,578
2011	5,366	339	5,268	21	292	56	85	85	4,230	392	15,241	893
2012	2,834	508	1,387	92	432	134	0	0	3,934	754	8,587	1,488
2013	3,657	672	4,085	1,734	60	0	0	0	1,766	41	9,568	2,447
2014	9,314	944	1,532	99	287	0	73	73	1,735	357	12,941	1,473
2015	14,047	1,435	1,932	378	58	0	0	0	3,199	569	19,236	2,382
2016	2,693	375	1,577	116	36	0	21	21	944	119	5,271	631
2017	10,840	955	4,325	358	2,190	19	73	0	5,634	999	23,062	2,331
2018	5,529	631	1,228	182	567	31	16	16	1,429	195	8,769	1,055
Average												
2016–2018	6,354	654	2,377	219	931	17	37	12	2,669	438	12,367	1,339
2009–2018	9,854	1,110	2,987	414	456	27	51	28	4,683	591	18,030	2,170
2006–2015	13,772	1,352	2,954	437	449	37	193	113	5,774	595	23,143	2,534

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

STOCKING PROGRAM

There is currently no pink salmon stocking program in the AMA.

FISHERY PERFORMANCE

Bird Creek, Ship Creek, and Twentymile River provide the only pink salmon fisheries of any significance in the AMA. All other pink salmon fisheries are included in "other freshwater" in Table 9. Fishery performance for all AMA pink salmon fisheries has improved since a significant drop in 2012; however, in 2016 a larger decrease was observed. In addition, the catch in 2018 was low, similar to catches observed in 2012. The majority of the pink salmon catch continues to be released (Table 9, Figure 10).

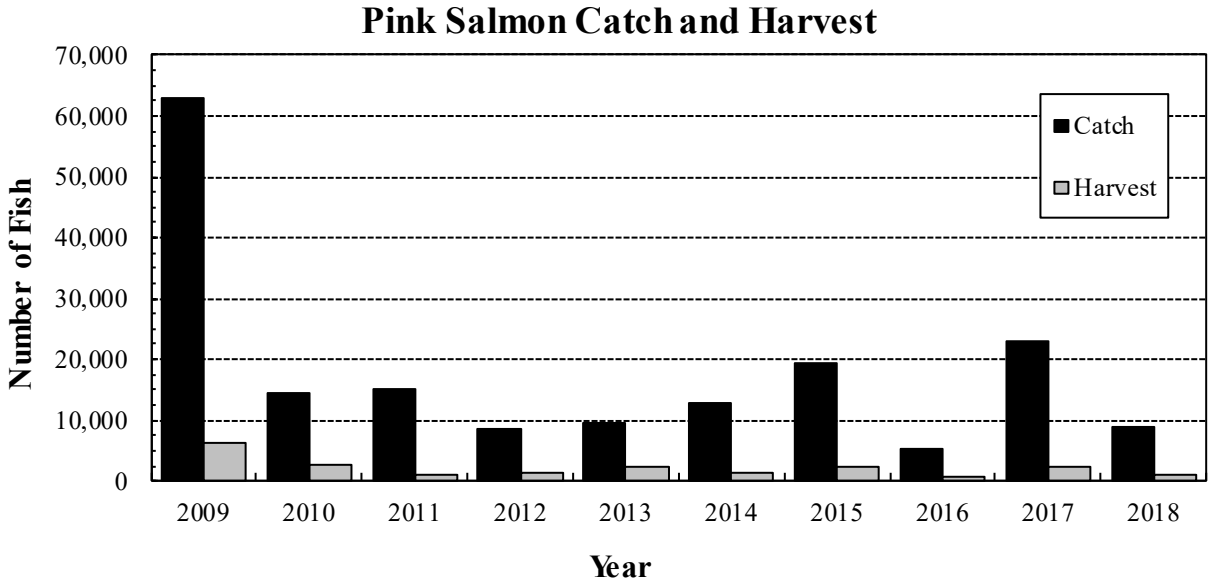

Figure 10.–Pink salmon sport fish catch and harvest, Anchorage Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

The 3-year (2016–2018) average catch and harvest of pink salmon in the AMA was 12,367 and 1,339, respectively (Table 9). This is a significant drop from the previous 10-year catch and harvest (2006–2015) averages of 23,143 and 2,534, respectively. Except Twentymile River, catch and harvest of pink salmon at all locations showed a decline when looking at the 3-year (2016–2018) versus previous 10-year averages (2006–2015). Twentymile River had the highest ever reported catch of pink salmon in 2017 which was similar to other systems such as Ship and Bird creeks that also reported high catches (Table 9).

The average annual pink salmon catch and harvest at Bird Creek from 2016 to 2018 (6,354 and 654, respectively) were below the previous 10-year average catch (13,772) and harvest (1,352; Table 9). The 3-year (2016–2018) average catch and harvest of pink salmon on Bird Creek accounts for about 50% of the pink salmon catch and harvest in the AMA on average (calculated from Table 9). In 2017, pink salmon catch was highest in Bird Creek followed by "other freshwater" streams.

The average sport catch and harvest of pink salmon in "other freshwater" AMA creeks from 2016 to 2018 was 2,669 and 438, respectively (Table 9). This is a decline from the previous 10-year average (2006–2015) sport catch and harvest that was 5,774 and 595, respectively. In 2016, "other freshwater" catch and harvest was the lowest observed since 1999. This trend of low numbers in 2016 carried throughout many of the AMA systems (Table 9). Saltwater catch and harvest of pink salmon is less than 1% of the total freshwater numbers of pink salmon caught and harvested in the AMA.

Stream surveys are not conducted specifically for pink salmon in any AMA drainage; however, in 2009, there was one conducted on Bird Creek and it noted an unusually high number of pink salmon (32,100) for an odd year. No pink salmon catch or escapement of this magnitude has been observed in Bird Creek since 2009, and no additional pink salmon–specific streams surveys of escapement have since been conducted.

SOCKEYE SALMON FISHERY

FISHERY DESCRIPTION

The primary Anchorage Management Area (AMA) streams that support sockeye salmon runs are Sixmile Creek and Twentymile River. Carmen Lake and its inlet tributaries are the primary sockeye salmon spawning areas in the Twentymile River drainage, and mainstem spawning has been documented (Stratton et al. 1994). Unlike Twentymile River, Sixmile Creek is presently closed to sport fishing, but fishing is allowed in the intertidal area below the high-tide mark near the creek mouth and in Lower and Upper Sixmile lakes. The intertidal site, marked with a steel cable across the stream and ADF&G markers, is growing in popularity and contributes to most of the AMA saltwater harvest. This cable is left in at the request of JBER. This fishery is probably even larger because some of the sockeye salmon reported in "saltwater fisheries" are probably harvested at the mouth of Sixmile Creek. Elmendorf Air Force Base (now called Joint Base Elmendorf-Richardson or JBER) personnel have operated a weir in Sixmile Creek since 1988. In 1998, this weir was moved upstream near the lake outlet. The ADF&G operated this weir in 2009 and 2010 under contract with the Joint Base. Currently the weir is operated annually by JBER staff.

The most significant sockeye salmon fisheries are reported in "other freshwater" streams (probably Portage Valley streams) and from salt water. Sockeye salmon returning to Placer River spawn in Luebner Lake. Sockeye salmon returning to Portage Creek primarily spawn in the artificially created channel in Williwaw Creek where a viewing platform and information kiosk were installed and are maintained by U.S. Forest Service (USFS). Other AMA streams that support small sockeye salmon runs include Ship and Campbell creeks, and Portage Valley streams. In Campbell Creek, most sockeye salmon spawn in North Fork and are thought to utilize beaver ponds for rearing. Campbell Creek has no natural lake system accessible to salmon, only the man-made lake near the creek mouth (Campbell Lake). An annual Chinook and coho salmon assessment via a combination of foot and float escapement surveys are performed and sockeye salmon are also enumerated in Campbell Creek. In the winter of 2006–2007 and again in 2010, the lake was drained to complete a dredging project to winterkill aquatic vegetation along the shoreline. It is unknown to what degree sockeye salmon utilize the lake for overwinter rearing, and escapements to this lake should be closely monitored. Sockeye salmon in Campbell Creek have similar run timing as Chinook salmon, so a combination of foot and float survey counts is used to estimate escapement.

In those freshwaters of the AMA open to fishing for salmon, the bag and possession limits for salmon (other than Chinook salmon) 16 inches or longer are 3 per day, 3 in possession, only 2 of which may be coho salmon (see ADF&G sport fishing regulations for exceptions; http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.sc_sportfish, accessed January 2017). In saltwater, the limits for salmon (other than Chinook salmon) are 6 per day, 6 in possession. Only 3 per day and 3 in possession may be coho salmon. Campbell Creek is closed to sockeye salmon sport fishing, and remains closed to all fishing downstream of Dimond Blvd.

The sockeye salmon 10-year average (2009–2018) catch was 507 fish and 163 (32%) were harvested (Table 10).

Table 10.–Sockeye salmon sport catch and harvest, Anchorage Management Area, 1999–2018.

	Bird Creek		Twentymile R.		Saltwater		Other freshwater		Area total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1999	78	56	42	10	782	248	605	228	1,507	542
2000	678	446	42	0	59	38	403	53	1,182	537
2001	316	263	176	97	830	271	970	263	2,292	894
2002	0	0	288	95	91	77	315	158	694	330
2003	0	0	84	36	346	299	1,361	608	1,791	943
2004	0	0	291	88	328	110	393	88	1,012	286
2005	0	0	139	106	445	445	413	0	997	551
2006	0	0	22	11	11	11	297	58	330	80
2007	0	0	172	81	60	60	363	31	595	172
2008	0	0	275	0	150	136	1,294	87	1,719	223
2009	0	0	156	48	48	0	459	144	663	192
2010	0	0	180	32	209	110	229	51	618	193
2011	0	0	0	0	215	215	320	29	535	244
2012	0	0	66	33	0	0	154	31	220	64
2013	0	0	0	0	0	0	172	28	172	28
2014	0	0	155	0	20	20	481	268	656	288
2015	0	0	83	83	0	0	259	183	342	266
2016	0	0	35	0	17	0	371	16	423	16
2017	0	0	676	0	0	0	316	145	992	145
2018	0	0	20	20	0	0	431	173	451	193
Average										
2016–2018	0	0	244	7	6	0	373	111	622	118
2009–2018	0	0	137	22	51	35	319	107	507	163
2006–2015	0	0	111	29	71	55	403	91	585	175

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

FISHERY MANAGEMENT AND OBJECTIVES

There are no formal management objectives for sockeye salmon in the AMA.

STOCKING PROGRAM

ADF&G does not have a sockeye salmon stocking program in AMA waters.

FISHERY PERFORMANCE

The 3-year average (2016–2018) catch and harvest of sockeye salmon in the AMA was 622 and 118 sockeye salmon, respectively (Table 10) and catch was as high as 992 fish in 2017 and harvest was as high as 193 fish in 2018 (Figure 11). "Other freshwater" streams made up approximately 60% of the average catch and just over 90% of the average harvest of sockeye salmon in the AMA from 2016 to 2018, whereas during the previous 10 years the average was 69% of the catch and just over 50% for the harvest. However, in 2017, 68% of the catch of sockeye salmon came from Twentymile River.

Sockeye salmon escapement into Campbell Creek since 1999 has been 587 fish on average (calculated from Appendix C3). Survey data showed below-average escapement in 2018 (102 fish) and the lowest observed since 2009 but above-average escapement in 2016 and 2017 (770 and 1,685 fish) (Appendix C3). Successful surveys were conducted in 2016–2018 on Campbell Creek (Appendix C3). No other formal sockeye salmon surveys are conducted on AMA streams.

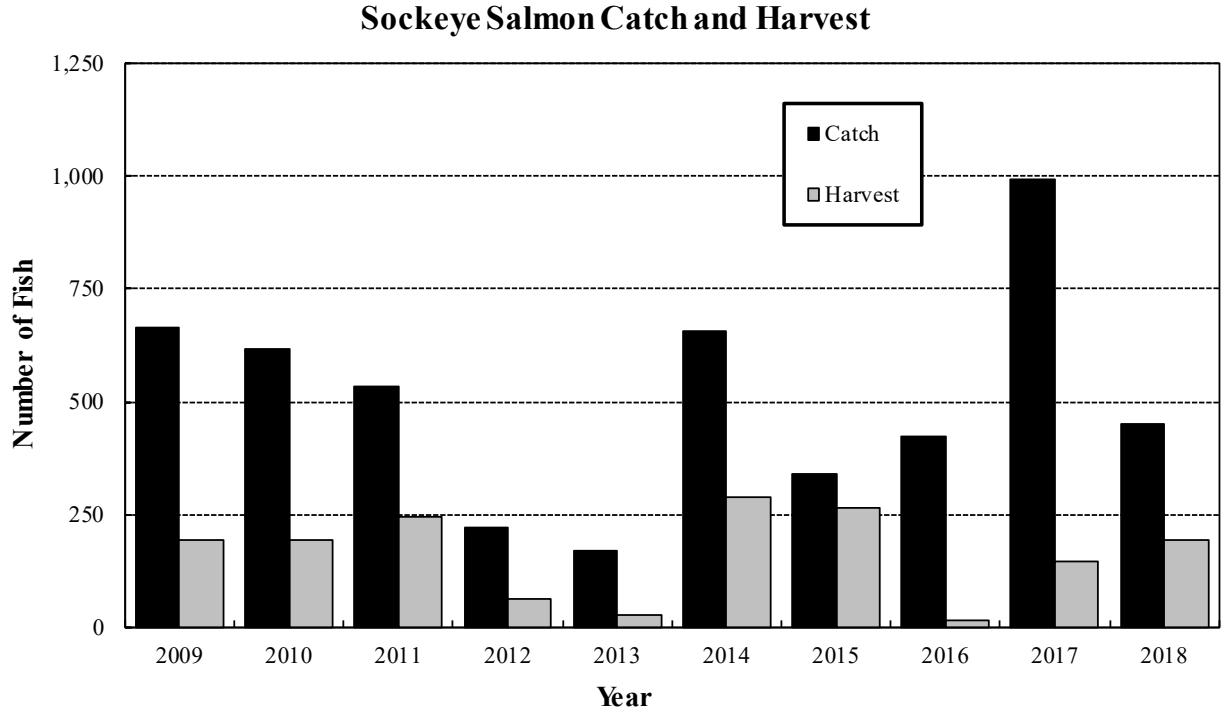

Figure 11.–Sockeye salmon sport fish catch and harvest, Anchorage Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

DOLLY VARDEN–ARCTIC CHAR FISHERIES

FISHERY DESCRIPTION

Dolly Varden and Arctic char are 2 distinct fish species; however, anglers often have difficulties distinguishing between the 2 fish species. These fish are not stocked in AMA streams, but Arctic char are raised at the WJHSF Hatchery and stocked in AMA lakes annually. For this section, the term "Dolly Varden" will be used but should be recognized that some of these fish called Dolly Varden could in fact be Arctic char.

Several area streams and lakes support small populations of resident Dolly Varden. Dolly Varden have been reported in Bird, Campbell, Chester, Ingram, and Ship creeks, and Placer and Twentymile rivers. In the early 2000s, Campbell Creek supported the largest catch estimates of Dolly Varden (Table 11), but in the last 10 years, this has shifted and the "other streams" category has observed an average catch estimate (959 fish) above the Campbell Creek estimate (just under 550 Dolly Varden), and an average harvest estimate of 120 versus the Campbell Creek average harvest estimate of 16 (Table 11, Figure 12).

FISHERY MANAGEMENT AND OBJECTIVES

There are no formal management objectives for Dolly Varden in the AMA. No stream surveys are conducted to specifically count Dolly Varden.

STOCKING PROGRAM

There is currently no Dolly Varden–Arctic char stocking program for streams in the AMA. There are some lakes in the AMA stocked with Arctic char.

FISHERY PERFORMANCE

Annual Dolly Varden catch has been demonstrated a slight decline since 2009; however, on average, only around 14% of the estimated Dolly Varden catch is actually harvested in AMA streams (calculated from Table 11). Prior to 2006, Campbell Creek typically had the largest catches of Dolly Varden in the AMA streams. Since then, Campbell Creek has only had 1 year with catch exceeding 1,000 fish (2013). The largest catch of Dolly Varden ever recorded (12,760) was in Campbell Creek in 2001 (Table 11, Figure 9). "Other streams" and lakes make up the majority of the catch; however, in 2018, Twentymile River had the highest catch (1,125 fish) estimated since 2009.

Table 11.–Dolly Varden sport fish catch and harvest, Anchorage Management Area, 1999–2018.

	Bird Creek		Campbell Creek		Eagle River		Ship Creek		Twentymile R.		Other streams		Lake total		Area total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1999	90	0	1,693	626	814	97	44	22	190	99	331	89	1,362	1,092	4,524	2,025
2000	137	0	5,161	83	1,275	409	184	0	935	154	1,536	118	4,949	604	14,177	1,368
2001	22	0	12,760	238	87	0	648	33	2,027	189	767	151	947	290	17,258	901
2002	17	0	2,339	369	507	190	589	0	482	0	1,116	424	2,135	355	7,185	1,338
2003	70	50	2,568	228	820	0	536	10	702	153	3,257	439	2,851	1,205	10,804	2,085
2004	27	13	3,386	200	777	281	912	13	271	27	754	175	5,391	3,476	11,518	4,185
2005	39	13	4,116	35	953	0	584	0	260	81	391	142	3,634	1,087	9,977	1,358
2006	177	14	701	0	476	127	127	0	514	119	944	822	1,868	679	4,807	1,761
2007	59	0	710	15	225	115	599	0	1,177	218	970	252	2,849	667	6,589	1,267
2008	92	0	379	76	396	15	246	0	878	31	1,259	153	2,201	425	5,451	700
2009	79	33	198	0	0	0	28	0	1,174	57	1,272	384	1,797	653	4,548	1,127
2010	118	29	969	51	29	0	220	15	428	148	655	110	721	78	3,140	431
2011	19	0	504	0	376	9	1,203	16	491	198	804	139	1,882	410	5,279	772
2012	11	11	211	0	111	32	13	13	589	263	827	452	677	285	2,439	1,056
2013	13	0	1,542	35	54	19	662	35	331	35	397	0	1,772	318	4,771	442
2014	140	0	718	0	0	0	95	0	91	91	1,918	0	4,069	723	7,031	814
2015	39	0	385	41	39	0	103	0	236	0	870	19	2,112	189	3,784	249
2016	0	0	418	0	798	23	181	0	737	226	2,613	80	1,502	387	6,249	716
2017	0	0	85	17	0	18	38	0	29	0	139	0	1,195	51	1,486	68
2018	0	0	438	13	0	0	0	0	1,125	0	91	20	1,325	227	2,979	260
Average																
2016–2018	0	0	314	10	266	14	73	0	630	75	948	33	1,341	222	3,571	348
2009–2018	42	7	547	16	141	10	254	8	523	102	959	120	1,705	332	4,171	594
2006–2015	75	9	632	22	171	32	330	8	591	116	992	233	1,995	443	4,784	862

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

Note: Arctic char may be included in these estimates due to angler difficulty in distinguishing the two species.

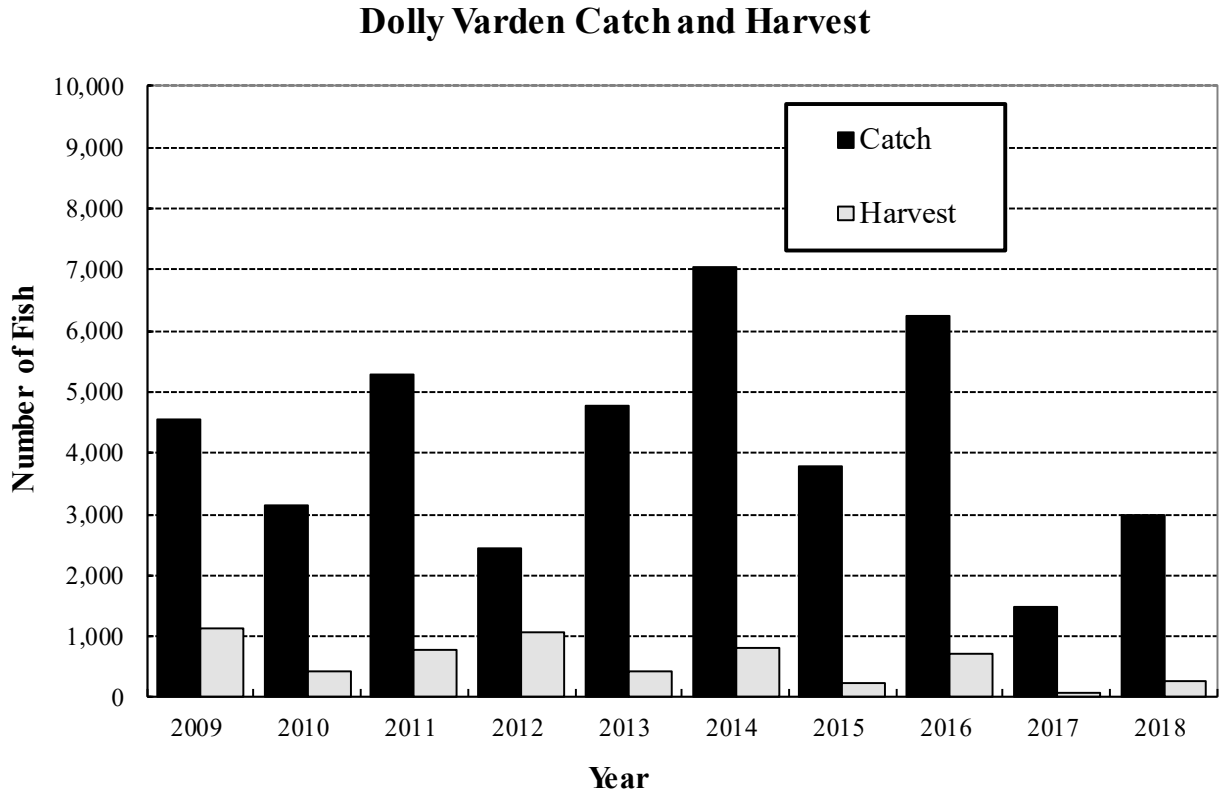

Figure 12.–Dolly Varden sport catch and harvest, Anchorage Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 8, 2016). Available from Division of Sport Fish, Research and Technical Services.

Note: Arctic char may be included in these estimates due to angler difficulty in distinguishing the two species.

STEELHEAD–RAINBOW TROUT FISHERIES

FISHERY DESCRIPTION

Several AMA streams support populations of resident rainbow trout. Rainbow trout have been reported in Bird, Campbell, Chester, Ingram, and Ship creeks, and Placer and Twentymile rivers. Although steelhead are not indigenous to the AMA, there has been angling interest from the public and unsuccessful stocking attempts were done to establish an anadromous rainbow trout population (Bosch 2010). On average, Campbell Creek has supported the largest catch estimates for over the last 20 years (1999–2018) with over 2,000 rainbow trout caught annually and less than 1% of those harvested (Table 12, Figure 13). Few steelhead have been caught in the AMA, although stocking of these fish was historically attempted in Campbell Creek.

Since 1999, only triploid rainbow trout, which do not spawn, have been stocked into Chester and Campbell creeks. Both of these streams have populations of wild rainbow trout. However, stocking of steelhead from Kodiak and Anchor River origin into Campbell Creek was attempted in the 1950s and reattempted in the 1980s until it was discontinued in 1987 due to poor returns (Bosch 2010). Both creeks are urban with paved trail access along good portions of their reaches, making them popular spring and summer fisheries.

Table 12.–Rainbow trout sport fish catch and harvest, Anchorage Management Area, 1999–2018.

	Streams								Lakes		Area total	
	Campbell Creek		Ship Creek		Other creeks		Stream Total					
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Total catch	Total harvest	Catch	Harvest
1999	2,874	711	94	47	1,362	144	4,330	902	158,680	27,874	163,010	28,776
2000	4,766	216	1,106	85	1,891	61	8,380	384	153,431	35,203	161,811	35,587
2001	14,952	369	1,094	0	2,053	332	18,099	701	91,521	20,610	109,620	21,311
2002	2,950	418	1,245	0	807	61	5,002	479	86,742	21,999	91,744	22,478
2003	3,177	257	2,359	0	3,480	483	9,016	740	53,203	17,782	62,219	18,522
2004	2,032	117	937	0	673	161	3,642	278	77,479	22,998	81,121	23,276
2005	1,455	99	1,312	0	1,034	463	3,801	562	52,067	13,314	55,868	13,876
2006	720	24	334	0	713	500	1,767	524	35,417	7,321	37,184	7,845
2007	888	11	231	0	2,325	82	3,444	93	26,167	5,212	29,611	5,305
2008	740	0	215	0	1,455	142	2,410	142	41,236	8,295	43,646	8,437
2009	310	0	105	0	314	10	729	10	31,391	5,706	32,120	5,716
2010	495	0	73	0	461	57	1,029	57	25,155	3,320	26,184	3,377
2011	920	0	239	0	2,035	40	3,194	40	12,767	2,071	15,961	2,111
2012	318	0	58	17	254	103	630	120	27,719	5,705	28,349	5,825
2013	646	140	691	82	1,034	17	2,371	239	45,864	9,008	48,235	9,247
2014	559	0	112	28	1,213	304	1,884	332	36,063	5,981	37,947	6,313
2015	1,636	82	466	156	78	17	2,180	255	63,772	15,554	65,952	15,809
2016	300	12	48	48	1,185	32	1,533	92	34,701	6,009	36,234	6,101
2017	770	257	82	18	129	110	981	385	23,729	6,566	24,710	6,951
2018	409	14	67	0	186	0	662	14	43,059	5,541	43,721	5,555
Average												
2016–2018	493	94	66	22	500	47	1,059	164	33,830	6,039	34,888	6,202
2009–2018	636	51	194	35	689	69	1,519	154	34,422	6,546	35,941	6,701
2006–2015	723	26	252	28	988	127	1,964	181	34,555	6,817	36,519	6,999

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

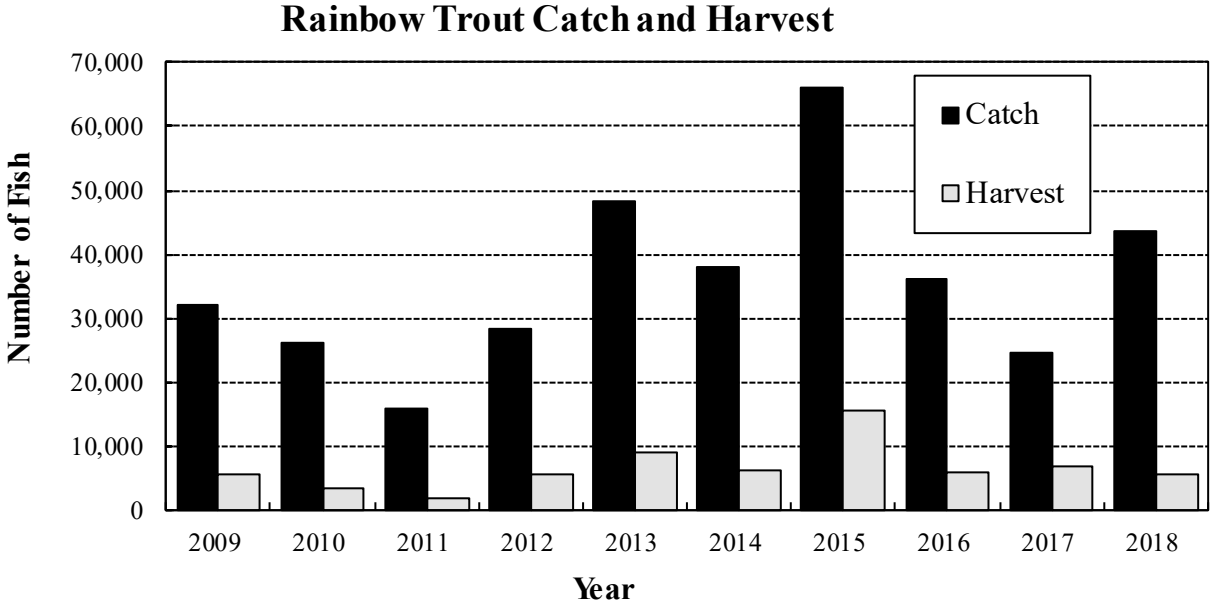

Figure 13.–Rainbow trout sport fish catch and harvest, Anchorage Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

FISHERY MANAGEMENT AND OBJECTIVES

There are no formal management objectives for steelhead–rainbow trout in the AMA. ADF&G has a constitutional mandate to manage on the principle of sustained yield. Within the sustained yield principle, SF goals seek to optimize social and economic benefits and, where possible, expand opportunity to participate in diverse fisheries on these stocks. No stream surveys are conducted to specifically count rainbow trout.

FISHERY PERFORMANCE

For 2016–2018, less than 3% of the total catch of rainbow trout in the AMA came from streams (Table 12). This percentage is similar to historical catches going back to 1996 (Baumer and Blain 2017; Table 12). On average, nearly half of the rainbow trout caught in AMA streams come from Campbell Creek. In 2011, an emergency order (EO 2-RT-2-10-11) was issued to prohibit the retention of rainbow trout–steelhead in the Chester and Campbell creek drainages, including University Lake, and prohibited the use of bait in the Chester Creek drainage (Baumer and Blain 2017). This EO was issued to conserve the catchable-sized fish and help ensure angler opportunity throughout the fishing season until the new hatchery came online in 2012. Stockings were back to near historical levels in 2012 and continue to be at these levels (Appendices B3–B4).

The average catch and harvest of rainbow trout in AMA streams for the last 3 years (2016–2018) was 1,059 and 164 fish, respectively. Average catch was significantly less than the previous 10-year average (1,964 fish) but harvest was nearly the same (181 fish; Table 12). Stocking of rainbow trout in AMA streams from 2016 to 2018, specifically on Chester and Campbell creeks was on average about 4,000 catchable-sized fish (Appendix B3 and B4).

STOCKED LAKE FISHERIES

FISHERY DESCRIPTION

In the 1960s, ADF&G began a rainbow trout stocking program to increase sport fishing opportunities within AMA lakes; this program continues today (Appendices B3 and B4). Stocking of coho salmon into AMA lakes began in 1966 in small numbers but was discontinued by 1993 in all but Clunie Lake where 1 additional stocking took place in 2002. Chinook salmon have been stocked in AMA lakes since 1981 and in 1990, stocking of Arctic char and Arctic grayling began in select AMA lakes (Appendices B1, B5, and B6). Arctic grayling stocking was discontinued after the 2015 stocking but will resume in 2019. For all species, actual stocking numbers have varied by location and number annually (Appendices B1–B6). Recent stocked fish locations can be found in Figure 3.

The AMA stocked lakes program has increased sport fishing opportunities dramatically in the AMA. Without the current stocking program in place, harvest on wild stocks in the AMA would have to be managed with tighter restrictions due to the increasing Anchorage population, resulting in an increasing number of anglers. Stocked lakes in the AMA have provided Alaska residents and nonresidents with additional sport fish opportunities, and effort on these lakes has continued to increase annually since the new WJHSF Hatchery started stocking at historical levels in 2012. An economic study prepared by Northern Economics (Northern Economics Inc. 2004) estimated the AMA stocked lakes fishery provided the Anchorage area with an annual benefit of more than $3,000,000.

Arctic Char–Dolly Varden

Since 1990, 3 lakes in the AMA were designated as the primary stocking locations for Arctic char: Campbell Point, Clunie, and Mirror lakes. In 2002 and 2003, ADF&G increased stocking of Arctic char to include Delong, Jewell, Sand, and Tangle lakes. In total, 7 AMA lakes were stocked in 2002 and 2003 (Appendix B5). Although these stocked Arctic char were active in cold water temperatures and added to the stocked lakes program, they did not do well in warmer waters, and high mortalities were reported in shallow area lakes in the summer of 2003. In response, ADF&G evaluated the stocking program and reduced stocking of Arctic char to just Campbell Point and Sand lakes in most of the following years. In addition to Campbell Point and Sand lakes, since 2003, 2 stockings have occurred in Jewel Lake and since 2011, Clunie Lake has been stocked annually with Arctic char. In 2016, Arctic char were stocked in Fish, Green, and Thompson lakes annually. In 2017, Cheney Lake was stocked with a small number of Arctic char for the first time.

ADF&G daily bag and possession limits for Arctic char–Dolly Varden in stocked waters are 5 per day, 5 in possession with no size limit. In all other waters, the limits are 5 per day, 5 in possession, and only 1 may be 12 inches or longer.

Arctic Grayling

Arctic grayling have been stocked in 8 AMA lakes since 1990, but only Beach Lake was stocked almost annually from 1990 to 2015 (Appendix B6 and ADF&G hatchery records). In addition, from 2010 to 2015, Sand Lake was stocked annually with Arctic grayling. A healthy population of Arctic grayling is found in Symphony Lake, but it has not been stocked since 2003. Natural reproduction from diploid grayling stocked in 2001 and 2003 is maintaining the angling opportunities in this lake. In 2010, a mark–recapture study examined the stock structure of the

Symphony Lake Arctic grayling population (D. Bosch, Fishery Biologist, ADF&G, personal communication). This project found that the abundance was higher than expected, nearing the limits of lake capacity, with a small proportion of the population greater than 12 inches in length.

Due to disease concerns, catchable Arctic grayling production ceased in 2002. Arctic grayling fingerling and subcatchable fish were released from 2003 to 2012. The first release of catchable Arctic grayling from WJHSF Hatchery occurred in 2013. The Arctic grayling stocking program was discontinued after 2015 in order to reduce operating expenses (ADF&G WJHSF Hatchery staff, personal communication); however, it was brought back online in 2018 and stocking will resume in 2019.

ADF&G daily bag and possession limits for Arctic grayling in stocked lakes are 5 per day, 5 in possession. Symphony Lake has the same bag limit, but only 1 fish may be greater than 12 inches in length and sport fishing is closed in this lake from May 1 to June 30. In all other waters the bag and possession limits are 2 per day, 2 in possession.

Chinook Salmon

Chinook salmon have been stocked in 19 AMA lakes since 1990 (Appendix B1; ADF&G hatchery records). From 2016 to 2018, only 11 AMA area lakes were stocked annually with Chinook salmon. Between 1990 and 2005, 54,000 Chinook salmon were stocked on average between AMA lakes. From 2007 to 2015, this average was lower (37,000 fish). When stocking occurred, as few as 4 lakes were stocked. In 2010 and 2011, no Chinook salmon were stocked in AMA lakes due to the hot water reduction at the hatcheries and awaiting the new hatchery to come online. The Chinook salmon catchable production program has returned to near historical stocking levels when the first catchable fish were released from the WJHSF Hatchery in 2012 and from 2016 to 2018, on average, over 51,000 Chinook salmon were stocked (Appendix B1).

ADF&G daily bag and possession limits for landlocked salmon were 10 per day, 10 in possession with no size restrictions through 2013. In 2014, the limit was reduced to 5 per day, 5 in possession to align with the rainbow trout bag and possession limits.

Rainbow Trout

Rainbow trout have been stocked in 35 AMA lakes since stocking began in the 1960s (ADF&G hatchery records). In 1966, six AMA lakes were stocked for the first time with rainbow trout. From 2016 to 2018, between 24 and 26 AMA lakes were stocked annually (Appendix B4). On average, 88,154 catchable rainbow trout were stocked in AMA lakes from 2016 to 2018 (calculated from Appendix B4). A total of 34,371 catchable rainbow trout were stocked between 2010 and 2011, when the hatcheries lost use of hot water and the new hatchery had yet to come online. The rainbow trout catchable production program returned to historical stocking levels when the first catchable fish were released from the WJHSF Hatchery in 2012.

ADF&G daily bag and possession limits for rainbow trout are 5 per day, 5 in possession, of which only 1 can be 20 inches or more in length. Anglers must immediately record rainbow trout 20 inches or more in length on the back of their sport fishing license, and for all Cook Inlet waters combined, there is a seasonal limit of 2 rainbow trout, 20 inches or more in length.

Fishery Management and Objectives

The management objective for AMA lakes is to maintain 67,500 angler-days of effort annually. Stocking goals, public information programs, news releases, and community school classes are

used to increase angler activity towards attaining the management objective. News releases and weekly fishing reports outlining lake stocking efforts have helped to keep anglers up to date on the status of AMA lakes. Stocked AMA lakes have provided significant urban angling opportunities throughout the year and have supported on average (2016–2018) 38% of the annual AMA sport fishing effort (Table 2). Since the new hatchery came online and stocking has increased, effort in AMA lakes also increased; however, from 2016 to 2018, effort decreased slightly compared to the previous 10 years when effort was estimated at 40% of the annual AMA effort. The most popular AMA lakes include Jewel, Campbell Point, and Cheney lakes in the Anchorage Bowl; Otter, Clunie, and Sixmile lakes on Joint Base Elmendorf Richardson (JBER); and Mirror Lake in Peters Creek (Tables 13 and 14).

FISHERY PERFORMANCE

Peak catch and harvest in AMA lakes occurred in 2000 (198,200 and 44,241, respectively) followed by a decline through 2011 (Table 15). Reductions in the number and size of fish available for release in local stocked lakes had negative effects on the popularity and productivity of local stocked lakes fisheries. For the years 2010 and 2011, all fish destined for AMA lakes had to be stocked at once, during the spring and early summer of 2010, due to the closure of Elmendorf State Fish Hatchery (Bosch 2010). In 2011, while waiting for the new hatchery to come online, the total numbers of sport fish caught and harvested in AMA lakes reached an all-time low. Total catch and harvest was 17,497 and 3,323 fish, respectively (Table 15). In addition, in 2011, the lowest number of angler-days of effort was observed in AMA lakes (16,793; Tables 13 and 14, Figure 14). This drop in catch, harvest, and effort can probably be attributed to the reduction of stocked fish in AMA lakes with the hatchery changeover (Appendices B1–B6). Total catch and harvest in AMA lakes rebounded and in 2015, total catch and harvest had increased to 70,481 and 17,721, respectively, which is much closer to what was observed historically (Table 15; Figure 15). From 2006 to 2015, angler effort in AMA lakes was on average nearly 30,000 angler-days followed by a decrease to 21,000 angler-days from 2016 to 2018 (Table 2). From 2010 to 2012, the number of angler-days of effort in area lakes hit a low point, then began to increase followed by a drop in 2016 and, again, an increasing trend. The reduction in 2011 was also probably due to an emergency order (EO 2-R-2-01-11) that was issued in 2011 to reduce the bag and possession limit for steelhead–rainbow trout, Arctic char–Dolly Varden, and Arctic grayling.

Fish used for stocking in AMA lakes have been raised in the William Jack Hernandez Sport Fish Hatchery (WJHSF) since 2012. In 2010, the Fort Richardson and Elmendorf hatcheries that raised sport fish for stocking were closed and replaced by the new WJHSF Hatchery at the old Elmendorf hatchery location. Since 2005, effort, catch, and harvest in AMA stocked lakes dropped considerably when both state hatcheries lost hot water, and thus the ability to rear fish to catchable size (Baumer and Blain 2017). The new WJHSF Hatchery facility has heated water and the ability to rear catchable-sized fish in 1 year. Catchable-sized fish were released into AMA lakes again in 2012. The current Statewide Stocking Plan, including specifics for AMA lakes, can be found here: https://www.adfg.alaska.gov/index.cfm?adfg=fishingSportStockingHatcheries.stockingPlan.

Table 13.–Angler lake sport fishing effort (lakes with names starting A–G), Anchorage Management Area, 1999–2018.

	Beach		Taku		Campbell Point		Cheney		Clunie		Delong		Fire (lower)		Fish		Green		Gwenn	
Year	Effort	%	Effort	%	Effort	%	Effort	%	Effort	%	Effort	%	Effort	%	Effort	%	Effort	%	Effort	%
1999	4,088	6	3,290	5	1,572	2	3,933	6	4,843	7	3,620	5	2,091	3	2,356	4	3,781	6	3,456	5
2000	3,468	5	5,494	8	1,982	3	3,935	6	5,850	8	4,649	7	2,288	3	1,974	3	4,204	6	2,756	4
2001	3,939	8	1,410	3	1,336	3	1,630	3	4,550	10	3,100	7	1,446	3	740	2	1,824	4	1,778	4
2002	5,148	13	1,399	3	1,469	4	1,616	4	1,130	3	2,215	6	2,352	6	933	2	919	2	1,046	3
2003	4,530	11	1,050	3	991	2	1,104	3	2,268	6	3,302	8	3,117	8	[a]		2,199	5	1,070	3
2004	2,313	5	2,540	5	1,680	4	[a]		6,289	13	4,499	9	1,471	3	[a]		2,192	5	1,420	3
2005	3,564	10	985	3	1,423	4	915	2	2,037	6	4,296	12	1,546	4	[a]		[a]		[a]	
2006	2,892	8	1,697	5	2,266	6	838	2	1,115	3	3,266	9	1,992	6	[a]		[a]		[a]	
2007	2,291	8	1,075	4	2,134	7	604	2	1,266	4	2,272	8	1,700	6	[a]		745	3	[a]	
2008	1,109	3	[a]		2,551	7	1,044	3	3,513	10	1,966	5	824	2	[a]		1,557	4	612	2
2009	2,455	9	[a]		2,645	9	2,307	8	1,390	5	2,375	9	629	2	[a]		883	3	[a]	
2010	784	3	728	3	2,287	9	3,485	14	1,286	5	2,353	10	1,860	8	[a]		[a]		[a]	
2011	[a]		[a]		1,109	7	1,145	7	2,265	13	1,587	9	[a]		[a]		[a]		[a]	
2012	751	3	[a]		[a]		1,771	8	[a]		2,102	9	[a]		[a]		[a]		[a]	
2013	[a]		[a]		4,320	13	5,642	18	[a]		4,130	13	[a]		[a]		[a]		[a]	
2014	1,346	3	1,854	5	2,127	5	1,330	3	2,440	6	6,228	16	[a]		[a]		[a]		[a]	
2015	1,982	6	[a]		4,043	13	1,284	4	2,350	8	3,315	11	[a]		[a]		[a]		[a]	
2016	1,773	10	[a]		2,459	14	1,463	8	[a]		[a]		[a]		[a]		[a]		[a]	
2017	1,720	9	[a]		2,155	11	521	3	[a]		1,189	6	[a]		[a]		[a]		[a]	
2018	1,935	8	[a]		1,839	7	1,803	7	[a]		[a]		[a]		[a]		[a]		[a]	
Average																				
2016–2018	1,809	9			2,151	10	1,262	6												
2009–2018	1,593	6	1,291	5	2,554	10	2,075	8	1,946	8	2,910	11	1,245	5			883	3		
2006–2015	1,701	6	1,339	5	2,609	9	1,945	7	1,953	7	2,959	10	1,401	5			1,062	4	612	2

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

[a] Less than 12 responses provided to the SWHS.

Table 14.–Angler lake sport fishing effort (lakes with names starting H–Z and total AMA effort), Anchorage Management Area, 1999–2018.

	Hillberg		Jewel		Mirror		Otter		Sand		Sixmile		Symphony		Triangle		Other lakes		Total effort
Year	Effort	%	Effort	%	Effort	%	Effort	%	Effort	%	Effort	%	Effort	%	Effort	%	Effort	%	for all lakes
1999	3,651	6	7,814	12	3,843	6	4,090	6	3,492	5	5,928	9	[a]		1,096	2	35,861	54	66,312
2000	3,546	5	6,173	9	4,052	6	5,048	7	4,692	7	5,101	7	[a]		1,086	2	39,448	57	69,607
2001	1,882	4	5,755	12	6,989	15	3,293	7	2,337	5	3,248	7	[a]		[a]		21,919	46	47,384
2002	898	2	6,632	16	5,384	13	2,577	6	1,715	4	1,072	3	[a]		[a]		21,790	54	40,201
2003	878	2	5,531	14	2,987	7	3,670	9	1,877	5	1,683	4	[a]		[a]		23,309	57	40,552
2004	1,185	2	7,956	17	4,103	9	2,983	6	2,768	6	1,323	3	[a]		[a]		24,568	52	47,539
2005	1,895	5	6,321	17	3,927	11	1,510	4	2,838	8	1,979	5	[a]		[a]		20,144	55	36,833
2006	761	2	4,774	13	3,965	11	1,318	4	3,451	10	1,562	4	[a]		[a]		22,169	62	35,741
2007	[a]		4,925	17	2,751	10	1,273	4	1,722	6	1,620	6	[a]		[a]		16,394	57	28,883
2008	2,901	8	3,477	10	3,071	9	2,515	7	1,628	5	1,184	3	572	2	[a]		21,180	59	35,984
2009	1,536	6	3,551	13	2,060	7	[a]		1,470	5	1,076	4	533	2	[a]		16,151	58	27,910
2010	1,431	6	2,624	11	1,017	4	[a]		764	3	[a]		[a]		[a]		14,199	59	24,152
2011	[a]		1,677	10	[a]		635	4	1,834	11	[a]		[a]		[a]		9,955	59	16,793
2012	[a]		2,042	9	976	4	[a]		5,354	24	[a]		[a]		[a]		14,419	65	22,265
2013	[a]		3,119	10	4,304	13	[a]		3,090	10	[a]		[a]		[a]		17,586	55	32,095
2014	[a]		12,624	32	3,879	10	[a]		2,587	7	[a]		[a]		[a]		18,091	46	39,333
2015	[a]		5,013	16	2,756	9	[a]		1,641	5	[a]		[a]		[a]		17,425	57	30,738
2016	[a]		1,746	10	2,761	15	[a]		[a]		[a]		[a]		[a]		6,427	35	18,121
2017	[a]		1,787	9	3,483	18	[a]		3,298	17	1,156		[a]		[a]		5,132	27	19,285
2018	[a]		3,263	13	2,719	11	[a]		2,221	9	[a]		[a]		[a]		8,469	33	25,714
Average																			
2016–2018			2,265	11	2,988	14											6,676	32	21,040
2009–2018			3,745	15	2,662	10	635	2	2,473	10	1,116	4	533	2			12,785	50	25,641
2006–2015			4,383	15	2,753	9	1,435	5	2,354	8	1,361	5	553	2			16,757	57	29,389

Source: Alaska Sport Fishing Survey database [Intranet]. 1996–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 8, 2016). Available from Division of Sport Fish, Research and Technical Services.

[a] Less than 12 responses provided to the SWHS.

Table 15.–Lake sport fish catch (C), harvest (H), and percent released (%), Anchorage Management Area, 1999–2018.

	Arctic char–Dolly Varden			Arctic grayling			Northern pike			Rainbow trout			Landlocked salmon			Other (trout, landlocked salmon)			Lake total	
Year	C	H	%	C	H	%	C	H	%	C	H	%	C	H	%	C	H	%	C	Ht
1999	1,362	1,092	20	1,351	158	88	726	243	67	158,680	27,874	82	17,372	7,854	55	5,226	921	82	184,717	38,142
2000	4,949	604	88	122	10	92	1,685	1,274	24	153,431	35,203	77	36,723	6,952	81	1,290	198	85	198,200	44,241
2001	947	290	69	412	43	90	4,822	1,140	76	91,521	20,610	77	25,157	9,638	62	650	173	73	123,509	31,894
2002	2,135	355	83	4,463	747	83	2,151	1,190	45	86,742	21,999	75	18,352	6,093	67	199	199	0	114,042	30,583
2003	2,851	1,205	58	2,192	221	90	2,351	1,066	55	53,203	17,782	67	9,614	3,206	67	1,797	779	57	72,008	24,259
2004	5,391	3,476	36	363	90	75	1,473	663	55	77,479	22,998	70	16,790	8,468	50	593	0	100	102,089	35,695
2005	9,977	1,358	86	630	166	74	1,413	611	57	55,868	13,876	75	16,900	4,850	71	688	64	91	85,476	20,925
2006	1,817	641	65	152	55	64	1,053	364	65	35,417	7,321	79	4,295	1,595	63	253	39	85	42,987	10,015
2007	2,849	667	77	1,340	386	71	1,975	1,285	35	26,167	5,212	80	7,689	1,463	81	0	0		40,020	9,013
2008	2,201	425	81	3,409	444	87	1,267	205	84	41,236	8,295	80	5,721	1,479	74	307	246	20	54,141	11,094
2009	1,797	653	64	1,124	194	83	2,560	2,040	20	31,391	5,706	82	4,972	1,948	61	323	36	89	42,167	10,577
2010	721	78	89	599	123	79	594	507	15	25,155	3,320	87	1,864	341	82	1008	364	64	29,941	4,733
2011	1,882	410	78	367	0	100	645	616	4	12,767	2,071	84	1,782	209	88	54	17	69	17,497	3,323
2012	677	285	58	2,105	120	94	469	312	33	27,719	5,705	79	381	216	43	990	133	87	32,341	6,771
2013	1,772	318	82	2,796	124	96	2,473	2,323	6	45,864	9,008	80	3,282	897	73	1543	48	97	57,730	12,718
2014	4,069	723	82	1,982	60	97	129	100	22	36,063	5,981	83	8,339	2,903	65	246	62	75	50,828	9,829
2015	2,112	189	91	1,453	205	86	198	136	31	63,772	15,554	76	2,807	1,617	42	139	20	86	70,481	17,721
2016	1,502	387	74	592	83	86	144	144	0	34,701	6,009	83	1,653	709	57	21	21	0	38,613	7,353
2017	1,195	51	96	2,227	136	94	355	355	0	23,729	6,566	72	10,538	2,188	79	43	43	0	38,087	9,339
2018	1,325	227	83	701	0	100	110	110	0	43,059	5,541	87	4,492	2,221	51	0	0		49,687	8,099
Average																				
2016–2018	1,341	222	83	1,173	73	94	203	203	0	33,830	6,039	82	5,561	1,706	69	21	21	0	42,129	8,264
2009–2018	1,705	332	81	1,395	105	93	768	664	13	34,422	6,546	81	4,011	1,325	67	437	74	83	42,737	9,046
2006–2015	1,990	439	78	1,533	171	89	1,136	789	31	34,555	6,817	80	4,113	1,267	69	486	97	80	43,813	9,579

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

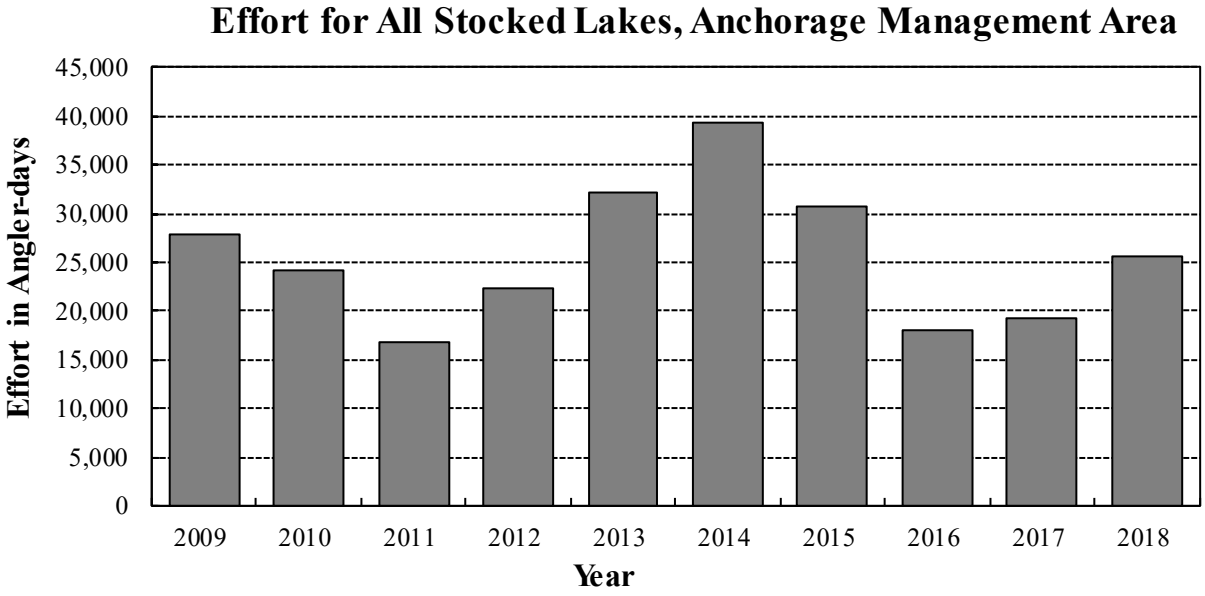

Figure 14.–Angler fishing effort for lakes in the Anchorage Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

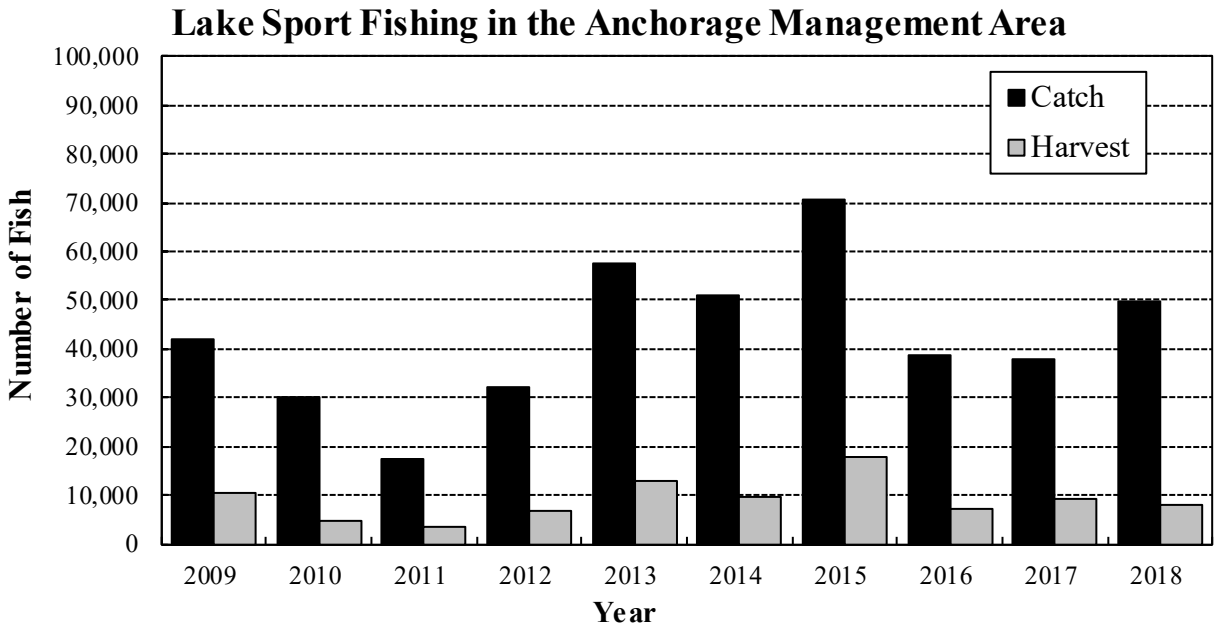

Figure 15.–Lake sport fish catch and harvest, Anchorage Management Area, 2009–2018.

Source: Alaska Sport Fishing Survey database [Intranet]. 1999–present. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 16, 2019). Available from Division of Sport Fish, Research and Technical Services.

Arctic Char–Dolly Varden

The average estimated annual catch and harvest of Arctic char in AMA lakes from 2016 to 2018 was 1,341 and 222 fish, respectively (Table 15). Harvest of Arctic char was lowest in 2017 (51 fish), whereas total catch was lowest in 2012 (677 fish). On average (2016–2018), approximately 83% of the Arctic char caught in the AMA lakes sport fishery are released. This was a slight increase from the previous 10-year average release of 78% of Arctic char caught in AMA lakes that were released (Table 15). Many of the Arctic char are probably misidentified as Dolly Varden. Only Arctic char are stocked in AMA lakes.

Arctic Grayling

The average estimated annual catch and harvest of Arctic grayling in AMA lakes from 2016 to 2018 was 1,173 and 73 fish, respectively (Table 15). On average 94% of Arctic grayling were released from 2016–2018. From 2016 to 2018, no fish were stocked (Appendix B6). Due to budget cuts, the last year of stocking Arctic grayling was 2015, but stocking will resume in 2019.

Landlocked Chinook Salmon

The average estimated annual catch and harvest of Chinook salmon in AMA lakes from 2016 to 2018 was 5,561 and 1,706 fish, respectively (Table 15). No lakes were stocked with Chinook salmon in 2010 or 2011 due to the hatchery change-over (Appendix B1). This was reflected in the catch and harvest numbers from 2010 to 2012 (Table 15). In 2012, after 2 years of reduced harvest, the first stocking of Chinook salmon did not occur until June and in some lakes, not until October. Catch in 2017 was the largest reported since 2005 (10,538 fish) followed by a decrease but overall, catch in 2018 was higher than the previous 10-year average. Harvest in 2018 was the second highest observed since 2005.

Rainbow Trout

The average estimated annual catch and harvest of rainbow trout in AMA lakes from 2016 to 2018 was 33,830 and 6,039 fish, respectively (Table 15). Reductions in stocking during 2010 and 2011 probably contributed to the low catch and harvest in 2011 (12,767 and 2,071 fish, respectively). From 1996 to 2005, average annual catch and harvest of rainbow trout was 106,425 and 25,093 fish, respectively (calculated from Table 15). In 2015, catch and harvest of rainbow trout was the largest observed since 2005 (63,772 and 15,554 fish, respectively; Table 15). In 2012, an emergency order (EO 2-R-01-12) was issued increasing the bag limit for rainbow trout in Otter Lake. A rotenone treatment to eradicate northern pike was anticipated to occur in fall of 2012 but did not. In 2015, a similar emergency order (EO 2-RR-2-16-15) was issued increasing the bag limit for rainbow trout in Otter Lake again, until its actual scheduled rotenone treatment to eradicate northern pike in fall of 2015 occurred. Catch and harvest of rainbow trout from 2016 to 2018 was 33,830 and 6,039 fish, respectively, which was similar to the previous 10-year average (34,555 and 6,817 fish, respectively).

EDUCATIONAL FISHERIES

FISHERY DESCRIPTION

The first educational fishery, the 1989 Kenaitze Tribal fishery (on the Kenai Peninsula), originated as a Federal Court-ordered subsistence fishery resulting from extensive legislation and litigation related to both state and federal interpretation of subsistence. Prior to the 1993 fishing season, the

Alaska Superior Court, in negotiations with ADF&G and the Kenaitze Tribe, ordered ADF&G to issue educational fishing permits. The Native Village of Eklutna was one of the first issued educational fishing permits for the 1994 season. These educational fisheries, originally ordered as interim fisheries until the court cases were decided, have been applied for and renewed by ADF&G annually. Permits are issued on an annual basis and must be renewed each year. After application or request for renewal ADF&G issues an educational permit which outlines the general conditions, exceptions, and restrictions which includes harvest limits by area and species. Standards, general conditions, and requirements of an educational fishery program were established by the BOF and are administered under Chapter 93 of the Alaska Administrative Code (5 AAC 93.200–235). Permit holders must submit a postseason summary to ADF&G as indicated in the specifications. A failure to meet specifications will result in nonrenewal of a permit.

The Native Village of Eklutna has the only educational fishery in the AMA, and the permit allows for fishing to occur in in 3 locations: 1) the waters of Knik Arm adjacent to the village and within the slough located approximately 1 mile northeast of the village; 2) Eklutna River, downstream of the Glenn Highway; and 3) the waters along the western shore of Knik Arm between the regulatory marker on the north shore of Goose Bay and Fish Creek, extending no more than 1 mile offshore from mean high water. However, the educational fishery shall not take place in the tidal channel of Fish Creek at any stage of the tide or in Fish Creek. The first 2 locations, near the Village of Eklutna, are within the AMA, and the third location is within the North Cook Inlet Management Area.

Fishery Management and Objectives

The objective of this fishery is to provide an opportunity for the Village of Eklutna to perform a systematic program for educating people concerning historical, contemporary, or experimental methods for locating, harvesting, handling, or processing fishery resources.

Fishery Performance

The Eklutna Native Village educational fishery harvested an average of 359 salmon annually from 2006 to 2015 (Table 16) and majority of the harvest was sockeye and coho salmon. Prior to 2009 retention of Chinook salmon was allowed. In most years, with the exception of 2008 and 2016, more of the harvest occurred at the site near the Village of Eklutna, within the AMA. In recent years (2016–2018) an average of 178 fish were harvested in the AMA. A majority (56%) of the harvest from 2016 through 2018 was sockeye salmon (100 fish), although coho salmon (53 fish) made up 30% of the harvest. Harvest has not occurred in Eklutna River although in recent years there has been discussion about attempting to fish in the Eklutna River site.

Table 16.–Native Village of Eklutna Educational Fishery harvest by site for 1999–2018.

	Eklutna Village (AMA) - Knik River							Fish Creek Site (NCIMA) - Knik River							Eklutna Tribal harvest						
	Salmon harvested (number)							Salmon harvested (number)							Salmon harvested (number)						Total fish
Year	Chk	Co	So	Pk	Chm	O	Total	Chk	Co	So	Pk	Chm	O	Total	Ch	Co	So	Pink	Chm	O	harvest
1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	11	25	80	3	20	ND	139
2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	17	85	76	21	51	ND	250
2001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	58	95	52	56	34	ND	295
2002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	58	156	220	40	76	ND	550
2003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	69	49	160	14	21	ND	313
2004	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	50	297	311	4	71	ND	733
2005	11	210	128	2	25	ND	376	61	32	38	6	4		141	72	242	166	8	29	ND	517
2006	2	148	41	6	4	ND	201	41	51	18	5	3		118	43	199	59	11	7	ND	319
2007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND
2008	16	177	19	3	0	9	215	8	200	23	0	17		248	24	377	42	3	17	9	463
2009	0	196	124	18	18	ND	356	0	25	11	2	5		43	0	221	135	20	23	ND	399
2010	0	75	144	5	0	ND	224	0	30	25	0	3		58	0	105	169	5	3	ND	282
2011	0	51	44	1	12	ND	108	0	184	271	31	35		521	0	235	315	32	47	ND	629
2012	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	0	242	218	10	63	ND	533
2013	0	40	109	0	10	ND	159	0	12	15	2	8		37	0	52	124	2	18	ND	196
2014	0	41	193	11	18	ND	263	0	7	55	2	6		70	0	48	248	13	24	ND	333
2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	0	15	43	1	21	ND	80
2016	0	48	26	6	12	ND	92	0	38	68	4	4		114	0	86	94	10	16	ND	206
2017	0	9	84	9	11	ND	113	0	15	44	0	20		79	0	24	128	9	31	ND	192
2018	0	48	77	0	11	6	136	0	0	0	0	0		0	0	48	77	0	11	6	136
Average 2016–2018[a]	0	35	62	5	11		114	0	18	37	1	8		64	0	53	100	6	19		178
2009–2018[a]	0	64	100	6	12		181	0	39	61	5	10		115	0	108	155	10	26		299
2006–2015[a]	3	104	96	6	9		218	7	73	60	6	11		156	7	166	150	11	25		359

Note: Chk is Chinook, Co is coho, So is sockeye, Pk is pink, and Chm is chum salmon. O is other fish (hooligan or unknown). ND indicates no data.

[a] Average calculated with years available.

REFERENCES CITED

ADF&G (Alaska Department of Fish and Game). 2020. Coded wire tag lab: hatchery release report. Mark, Tag and Age Lab. https://mtalab.adfg.alaska.gov/CWT/reports/hatcheryrelease.aspx (Accessed November 2019; requires free account to view data).

Baumer, J., and B. Blain. 2017. Area management report for the sport fisheries of Anchorage, 2011–2015. Alaska Department of Fish and Game, Fishery Management Report No. 17-04, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMR17-04.pdf

Baumer, J. A., B. Blain, D. E. Arthur, and B. Buzzee. 2019. Operational Plan: Monitoring and assessment of Anchorage Management Area lakes, 2018–2021. Alaska Department of Fish and Game, Regional Operational Plan ROP.SF.2A.2019.01, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/ROP.SF.2A.2019.01.pdf

Bosch, D. 2010. Area management report for the recreational fisheries of Anchorage, 2009 and 2010. Alaska Department of Fish and Game, Fishery Management Report No. 10-53, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/Fmr10-53.pdf

Havens, A. C., J. B. Murray, K. J. Delaney, and K. J. Roth. 1987. Evaluation of enhancement efforts for rainbow trout, coho salmon, and Chinook salmon in southcentral Alaska, 1986. Alaska Department of Fish and Game, Fishery Data Series No. 33, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/fds-033.pdf

Healey, M. C. 1991. Life history of Chinook salmon (*Oncorhynchus tshawytscha*). Pages 311-393 [*In*] Pacific salmon life histories. Edited by C. Groot and L. Margolis. University of British Columbia Press, Vancouver, BC.

Miller, J. 1990. Stocking records, 1990. Alaska Department of Fish and Game, Division of Fisheries Rehabilitation, Enhancement, and Development (FRED), Anchorage.

Mills, M. J. 1989. Alaska statewide sport fisheries harvest report, 1988. Alaska Department of Fish and Game, Fishery Data Series No. 122, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/fds-122.pdf

Mills, M. J. 1993. Harvest, catch, and participation in Alaska sport fisheries during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-42, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds93-42.pdf

Mills, M. J. 1994. Harvest, catch, and participation in Alaska sport fisheries during 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-28, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds94-28.pdf

Munro, A. R., and E. C. Volk. 2010. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2001 to 2009. Alaska Department of Fish and Game, Special Publication No. 10-12, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/SP10-12.pdf

Northern Economics Inc. 2004. Economic effect of ADF&G's Region II and III recreational stocking programs; Hatchery valuation analysis. Prepared for Alaska Department of Fish and Game, Northern Economics Inc, Anchorage.

Sandercock, F. K. 1991. Life history of coho salmon (*Oncorhynchus kisutch*). Pages 397-445 [*In*] Groot, C. and L. Margolis, editors. Pacific salmon life histories. University of British Columbia Press, Vancouver, Canada.

Sigurdsson, D., and B. Powers. 2009. Participation, effort, and harvest in the sport fish business/guide licensing and logbook reporting programs, 2006-2008. Alaska Department of Fish and Game, Special Publication No. 09-11, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/SP09-11.pdf

Sigurdsson, D., and B. Powers. 2010. Participation, effort, and harvest in the sport fish business/guide licensing and logbook programs, 2009. Alaska Department of Fish and Game, Fishery Data Series No. 10-65, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/Fds10-65.pdf

Sigurdsson, D., and B. Powers. 2011. Participation, effort, and harvest in the sport fish business/guide licensing and logbook programs, 2010. Alaska Department of Fish and Game, Fishery Data Series No. 11-31, Anchorage. http://www.sf.adfg.alaska.gov/FedAidpdfs/FDS11-31.pdf

Sigurdsson, D., and B. Powers. 2012. Participation, effort, and harvest in the sport fish business/guide licensing and logbook programs, 2011. Alaska Department of Fish and Game, Fishery Data Series No. 12-27, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS12-27

REFERENCES CITED (Continued)

Sigurdsson, D., and B. Powers. 2013. Participation, effort, and harvest in the sport fish business/guide licensing and logbook programs, 2012. Alaska Department of Fish and Game, Fishery Data Series No. 13-37, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS13-37.pdf

Sigurdsson, D., and B. Powers. 2014. Participation, effort, and harvest in the sport fish business/guide licensing and logbook programs, 2013. Alaska Department of Fish and Game, Fishery Data Series No. 14-23, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS14-23

Stratton, B., and P. Cyr. 1995. Annual management report for the recreational fisheries in the Anchorage area, 1994. Alaska Department of Fish and Game, Fishery Management Report No. 95-05, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fmr95-05.pdf

Stratton, B., and P. Cyr. 1997. Area management report for the Anchorage area, 1995. Alaska Department of Fish and Game, Fishery Management Report No. 97-1, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fmr97-01.pdf

Stratton, B., A. Hoffmann, and P. Cyr. 1994. Annual management report for the Anchorage area 1993. Alaska Department of Fish and Game, Fishery Management Report No. 94-08, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fmr94-08.pdf

APPENDIX A: SPORT FISHING REGULATIONS

Appendix A1.–Sport fishing regulations for Ship Creek, 1957–2018.

Year	Sport fishing regulations for Ship Creek
1957–1959	Closed to sport fishing from April 1 through May 27. Bag limit was 10 trout daily or in possession, only two 20 inches or more in length. No salmon fishing regulations.
1960	Closed to all sport fishing.
1961–1962	Closed to salmon fishing. Closed to sport fishing from April 1 through May 27. Bag limit was 10 trout daily or in possession, only two 20 inches or more in length. Anglers were allowed up to 20 resident fish if excess were Dolly Varden.
1963	Closed to sport fishing from April 1 through May 25.
1964–1965	Closed to sport fishing from April 1 through the third Friday in May. The fishery was open to salmon fishing (except Chinook salmon) downstream of a marker 300 feet below the Chugach Power Plant Dam. Bag limit was 3 chum, sockeye, or pink salmon with an additional 3 coho salmon allowed.
1966–1967	Legal gear was defined as a single-hook-only with gap between point and shank of one-half inch or less.
1968	Closed to all fishing from January 1 through August 31. Anglers were allowed 3 salmon. Closed to Chinook salmon fishing.
1969	From September 1 through December 31anglers were allowed 3 salmon but excess Dolly Varden was removed from the resident fish bag limit.
1970	Closed to all fishing from January 1 through August 31 except for a Chinook salmon opening from July 4 through July 19. Bag limit was 1 Chinook salmon per day and 2 per season. From September 1 through December 31, anglers were allowed 3 salmon.
1971–1972	Closed to all fishing from January 1 through August 31 except for Chinook salmon openings on June 10 through June 11 and June 17 through June 18. A Chinook salmon punch card was required and the bag limit was 1 Chinook salmon per day and 2 per season. From September 1 through December 31, anglers were allowed 3 salmon.
1973–1981	Closed to all fishing from January 1 through August 17. Closed to Chinook salmon fishing. From August 18 through December 31, anglers were allowed 3 salmon. Legal gear was single-hook-only with a gap between point and shank of one-half inch or less.
1982–1984	Same regulations as 1973–1981. In addition, rainbow trout daily bag limit was reduced to 5 fish, only one 20 inches or more in length.
1985–1986	Closed to all fishing from January 1 through July 31. Single-hook-only restriction was lifted. Anglers were allowed 3 salmon other than Chinook salmon from August 1 to December 31.
1987–1990	The area opened to salmon fishing was downstream of a marker located 100 feet below the Chugach Power Plant Dam. In addition, the creek was open to all fishing (including Chinook salmon) on Tuesdays and Wednesdays for 5 consecutive weeks commencing the second Tuesday in June. Chinook salmon bag and possession limits were 1 and 2, respectively with no seasonal limit.

-continued-

Year	Sport fishing regulations for Ship Creek
1991–1992	Chinook salmon fishing was allowed from January 1 through July 13. Daily bag and possession limits were 1 and 2, respectively with no seasonal limit. Fishing for other salmon was allowed year-round with bag and possession limits of 3 and 3, respectively. In addition, fishing for Dolly Varden, rainbow trout, and other species was allowed year-round.
1993	A seasonal limit of 5 Chinook salmon in Cook Inlet waters was added.
1997	The possession limit for Chinook salmon was reduced to 1 and a regulation went into effect that prohibited anglers from continuing to sport fish in waters open to Chinook salmon fishing after harvesting a Chinook salmon.
1999	Chinook salmon bag and possession limits were 1 per day and 1 in possession, and anglers were not allowed to fish in Ship Creek for the remainder of the day after harvesting a Chinook salmon 20 inches or longer. For salmon other than Chinook salmon, 16 inches or longer in length, the bag and possession limits were 3 fish, and all three could be coho salmon. Reeve Boulevard upstream to 300 ft upstream of Elmendorf Dam was closed to all fishing.
2001	The bag and possession limits for Chinook salmon less than 20 inches in length, and other salmon less than 16 inches in length was 10 fish. The fishery was open all year for these small salmon. In waters open to fishing for Chinook salmon 20 inches or more in length, fishing was not allowed between 11:00 PM and 6:00 AM from May 15 through July 13. Statewide regulation defined the bag and possession limits for Chinook salmon less than 20 inches in length (jack salmon), in fresh waters open to Chinook salmon fishing, as 10 per day and 10 in possession.
2005	In waters closed to fishing for salmon 20 inches or more, fishing was closed for salmon less than 20 inches in length. A coho salmon 16 inches or longer that is removed from fresh water must be retained and becomes part of the bag limit of the person who originally hooked the fish. A person may not remove a coho salmon 16 inches or longer from the water before releasing it.
2012	Sport fishing is closed from April 15 to June 14 from 100 feet upstream of the Chugach Power Plant Dam upstream to Reeves Boulevard. Footgear with absorbent felt or other fibrous material on the soles are prohibited while sport fishing in the fresh waters of Alaska. The regulation was adopted by the Alaska Board of Fisheries in 2010 to reduce the potential for introduction and spread of invasive organisms, including plants, into Alaska waters. Invasive organisms spread by contaminated waders and other gear can threaten resident fish stocks and important fish habitat.
2017	A youth-only fishery will occur on Ship Creek between the C Street Bridge and the Bridge Restaurant, on the third Saturday in June from 6am to 6pm. Extend the area closed to sport fishing on Ship Creek to all waters upstream of the Chugach Power Plant Dam to 300 feet above the Elmendorf Power Plant Dam.

Appendix A2.–Sport fishing regulations for Eagle River, 1957–2018.

Year	Sport fishing regulations for Eagle River
1957–1959	Closed to sport fishing from April 1 through May 27. Bag limit was 10 trout daily or in possession, only two 20 inches or more in length. No salmon fishing regulations.
1960	Closed to salmon fishing upstream of one-quarter mile above Glenn Highway Bridge. Bag limits were 10 salmon or trout daily, 3 could be salmon greater than 16 inches in length, and 2 could be Chinook salmon.
1961–1962	Anglers were allowed up to 20 resident fish if the excess were Dolly Varden.
1963	Closed to sport fishing from April 1 through May 25. Closed to salmon fishing upstream of one-quarter mile above Glenn Highway Bridge. Bag limit was 6 coho salmon; 3 pink, chum, or sockeye salmon; and 1 Chinook salmon. Resident fish bag limits were 10 trout daily, only 2 over 20 inches. Anglers were allowed up to 20 resident fish if the excess were Dolly Varden.
1964–1967	Closed season was from April 1 through the third Friday in May.
1968	No closed season. Bag limit was 3 salmon, 16 inches or greater in length. Closed to Chinook salmon fishing.
1969–1981	Excess Dolly Varden removed from bag limit in 1969.
1982–1986	Rainbow trout bag limit was reduced to 5 per day, only one 20 inches or greater in length in 1982. Bag limits were 10 for other resident fish.
1987–1991	South Fork Eagle River below the falls was closed to all fishing from June 1 through August 14.
1993–1996	Regulations restricted Chinook salmon fishing to a 30-day period commencing the Saturday before Memorial Day. Fishing was restricted to that portion of Eagle River upstream of Bailey Bridge on Fort Richardson to an ADF&G marker located approximately adjacent to Mile 7.4 of Eagle River Road. The area located approximately 100 yards on either side of the confluence of South Fork Eagle River was closed to fishing from June 1 through August 14. North Fork Eagle River upstream from an ADF&G marker located near its confluence with Eagle River was closed to all fishing during the Chinook salmon season. Passes were required to fish on Fort Richardson.
1999–2001	In areas open for fishing Chinook salmon less than 20 inches in length and other salmon 16 inches in length or less, the fishery was open all year. Bag and possession limits for these small salmon was 10 fish. Statewide regulation defined the bag and possession limits as 10 per day and 10 in possession for Chinook salmon less than 20 inches in length (jack salmon) in fresh waters open to Chinook salmon fishing.
2005	In waters closed to fishing for salmon 20 inches or more, waters were closed to fishing for salmon less than 20 inches in length.
2011	A coho salmon 16 inches or longer that is removed from fresh water must be retained and becomes part of the bag limit of the person who originally hooked the fish. A person may not remove a coho salmon 16 inches or longer from the water before releasing it.
2012	Footgear with absorbent felt or other fibrous material on the soles are prohibited while sport fishing in the fresh waters of Alaska. The regulation was adopted by the Alaska Board of Fisheries in 2010 to reduce the potential for introduction and spread of invasive organisms, including plants, into Alaska waters. Invasive organisms spread by contaminated waders and other gear can threaten resident fish stocks and important fish habitat.

Appendix A3.–Sport fishing regulations for Campbell Creek, 1957–2018.

Year	Sport fishing regulations for Campbell Creek
1957–1959	Closed to sport fishing from April 1 through May 27. Bag limit was 10 trout daily or in possession, only two 20 inches or more in length. No salmon fishing regulations.
1960	Campbell Creek was open to salmon fishing, except Chinook salmon, from August 22 through September 23. Bag limits were 10 salmon or trout daily, only 3 could be salmon greater than 16 inches in length and only 2 could be trout over 20 inches in length.
1961–1962	Anglers were allowed up to 20 resident fish if excess were Dolly Varden.
1963	Closed to sport fishing April 1 through May 25. Bag limit was 6 coho salmon; 3 pink, chum, or sockeye salmon. Resident fish bag limits were 10, only 2 over 20 inches.
1964–1967	Closed to sport fishing from April 1 through the third Friday in May. Open to salmon fishing (except Chinook salmon) from August 1 through September 30. Closed to salmon fishing above the Seward Highway. Bag limit was 6 coho, and 3 chum, sockeye, or pink salmon.
1968	Open to salmon fishing (except Chinook salmon) from August 1 through September 30. Closed to salmon fishing above the Seward Highway. Bag limit was 3 salmon 16 inches or greater in length. No closed season for resident fish.
1969–1970	Excess Dolly Varden removed from bag limit in 1969.
1971–1981	Closed to fishing above the Seward Highway and closed to salmon fishing throughout the drainage.
1982–1984	Rainbow trout bag limit was reduced to 5 per day, only one 20 inches or greater in length in 1982.
1985	Closed to all fishing above the Forks, and closed to salmon fishing below the Forks.
1986	Entire drainage was open to fishing but closed to salmon fishing.
1987–1992	Only unbaited, artificial lures could be used upstream of Forks, and rainbow trout could not be kept.
1993–1994	Open to coho salmon fishing from July 25 through October 15, with fishing limited to that portion of Campbell Creek upstream from Dimond Boulevard to an ADF&G marker located in the vicinity of Folker Street. Bag and possession limits for coho salmon were 3 and 3, respectively. Fishing for all other salmon was closed. Campbell Lake was closed to all fishing in 1993.
1996–1998	The portion of Campbell Creek that flows through Wickersham subdivision between Lake Otis Parkway and Shelikof Street was closed to all sport fishing year-round. Coho salmon fishing was allowed from July 25 through October 1 from Dimond Boulevard upstream to C Street. Coho salmon fishing was allowed from August 5 through October 1 upstream of C Street to markers near Piper Street except for the Wickersham closed area.
1999–2001	Regulations were the same as those established by the BOF during 1996–1998.
2005	In waters closed to fishing for salmon 20 inches or more in length, waters were closed to fishing for salmon less than 20 inches in length. ADF&G created a youth-only fishery on Campbell Creek for Chinook salmon.
2011	A coho salmon 16 inches or longer that is removed from fresh water must be retained and becomes part of the bag limit of the person who originally hooked the fish. A person may not remove a coho salmon 16 inches or longer from the water before releasing it.
2012	Footgear with absorbent felt or other fibrous material on the soles are prohibited while sport fishing in the fresh waters of Alaska. The regulation was adopted by the Alaska Board of Fisheries in 2010 to reduce the potential for introduction and spread of invasive organisms, including plants, into Alaska waters. Invasive organisms spread by contaminated waders and other gear can threaten resident fish stocks and important fish habitat.
2017	Close all fishing on a portion of Campbell Creek (from Lake Otis Blvd upstream to the forks near Piper Street) when that portion is not open to coho salmon fishing (October 2–July 13).

Appendix A4.–Sport fishing regulations for all other locations in the AMA, 2005–2018.

Year	Sport fishing regulations for other locations
2005	Create a Kids Only Fishing Day on Campbell Creek for salmon.
2011	Removed Symphony Lake from list of stocked lakes. Set bag limit to 5 per day with only one 12 inches or greater in length.
	Established a seasonal spawning closure for rainbow trout in Campbell and Chester creeks.
	Established a seasonal spawning closure for rainbow trout in Ship Creek.
	Close Bird Creek to all sport fishing between January 1 and July 14.
2014	Reduce the bag limit for landlocked Chinook and other salmon in Anchorage stocked lakes.
2017	Amend the regulations for the Anchorage Bowl drainages to allow harvest of salmon, other than Chinook salmon, that are less than 16 inches in length in waters open to salmon fishing.
	Lower Sixmile Lake was added to the list of stocked lakes.

APPENDIX B: STOCKING IN THE ANCHORAGE MANAGEMENT AREA

Appendix B1.–Chinook salmon stocking in Anchorage Management Area by year (1996–2018) and site.

	Catchable[a] lake stocking															Smolt
Year	Beach	Campbell Pt	Cheney	Clunie	Delong	Green	Hillberg	Jewel	Mirror	Otter	Sand	Spring	Taku Campbell	Tangle Pond	Total	Ship Creek
1999	2,744	643	6,228	4,045	5,644	2,006	1,932	9,628	7,749	0	5,867	500	3,052	0	50,038	197,168
2000	10,709	0	[b]	8,819	5,348	2,149	2,058	9,741	15,399	0	5,119	1,031	0	0	60,373	265,582
2001	4,139	3,807	[b]	8,360[c]	5,966	998	3,308	21,792	10,272	0	4,945	0	0	0	55,227	254,924
2002	3,838	2,000	[b]	8,004	6,207	1,086	981	12,538	9,683	0	4,930	0	0	0	49,267	290,501
2003	4,040	1,975	[b]	3,822	6,055	1,190	1,144	24,243	7,142	0	5,133	0	5,811	0	60,555	329,416
2004	4,078	2,302	[b]	2,981	5,931	1,261	1,261	21,978	7,396	0	4,650	0	2,910	0	54,748	320,226
2005	3,925	3,158	[b]	2,981	5,982	1,100	1,100	15,828	6,958	0	6,122	0	3,058	0	50,212	358,029
2006	0	25,723[d]	[b]	0	26,277[d]	0	0	60,497[d]	29,043[d]	0	0	0	0	0	0	176,055
2007	0	6,500	[b]	3,118	10,530	1,070	1,117	15,795	11,565	0	0	0	0	0	49,695	333,940
2008	0	3,375	[b]	2,950	8,031	1,100	1,050	26,622	10,700	0	0	0	0	0	53,828	341,495
2009	0	10,190	[b]	3,060	14,838	921	987	27,850	0	0	0	0	0	0	57,846	282,735
2010	0	0	[b]	0	0	0	0	0	0	0	0	0	0	0	0	332,597
2011	0	0	[b]	0	0	0	0	0	0	0	0	0	0	0	0	314,194
2012	1,763	3,830	1,599	13,889	8,675	2,841	2,866	9,705	710	0	1,652	0	0	0	47,530	329,082
2013	3,055	1,493	1,400	1,736	7,235	849	926	11,860	5,980	0	1,800	0	1,521	0	37,855	324,145
2014	4,220	1,933	2,889	1,846	5,139	946	900	10,575	8,510	0	2,667	0	1,978	0	41,603	358,517
2015	4,123	1,980	4,676	1,944	6,992	1,109	978	11,285	9,718	0	2,442	0	2,009	0	47,256	365,246
2016	3,872	2,200	5,479	2,258	6,592	1,196	1,264	13,096	10,526	0	3,009	0	1,947	0	51,439	363,545
2017	2,972	3,940	7,417	2,014	6,905	957	908	12,033	10,829	0	1,770	0	1,986	0	51,731	340,937
2018	4,067	4,111	7,377	2,000	6,022	902	850	12,679	9,933	0	1,851	0	2,036	0	51,828	389,797

Source: All stocking information is from ADF&G Division of Sport Fish hatchery records.

[a] "Catchable" size is about 8 inches.

[b] Discontinued stocking beginning in 2000 due to presence of northern pike.

[c] An additional 24,498 Chinook salmon were stocked in Clunie Lake in 2001 but were undersized and considered "subcatchables".

[d] In 2006, the Fort Richardson Hatchery had an outbreak of bacterial kidney disease and Chinook salmon could not be transported to the Elmendorf Hatchery. Instead, they were stocked early into 4 local lakes. They were considered "fingerling-sized" at the time of release.

Appendix B2.–Coho salmon stocking in Anchorage Management Area by year (1999–2018) and site.

	Smolt releases			
	Site			
Site	Bird Creek [a]	Campbell Creek	Ship Creek	Total
1999	111,430	42,046	165,388	318,864
2000	97,409	63,730	260,070	421,209
2001	0	69,836	233,563	303,399
2002	0	69,836	212,639	282,475
2003	0	78,576	234,716	313,292
2004	109,949	85,790	241,006	436,745
2005	100,605	60,387	251,446	412,438
2006	104,974	78,805	252,775	436,554
2007	104,979	82,138	255,380	442,497
2008	113,035	83,421	245,490	441,946
2009	113,300	15,400	287,825	416,525
2010	157,534	50,214	252,319	460,067
2011	136,047	71,960	254,718	462,725
2012	70,004	0 [b]	243,499	313,503
2013	110,297	83,088	273,173	466,558
2014	91,443	29,028	226,576	347,047
2015	132,870	52,110	249,401	434,381
2016	131,981	52,807	275,402	460,190
2017	131,547	53,449	257,047	442,043
2018	126,879	51,966	400,784	579,629

Source: All stocking information is from ADF&G Division of Sport Fish hatchery records.

Note: Stocking of "catchable" size fish (about 8 inches in length) was discontinued in 2003.

[a] Bird Creek was not stocked from 2001 to 2003 due to construction of the parking area just north of the creek.

[b] Excessive mortality occurred during early rearing in 2012. No fish were stocked in Campbell Creek to ensure adequate fish were available for Ship Creek and future broodstock needs. Excess fish beyond Ship Creek needs were stocked in Bird Creek.

Appendix B3.–Rainbow trout stocking in the Anchorage Management Area by year (1999–2008) and site.

		Year									
Release type	Site	1999	2000	2001	2002	2003	2004	2005 [a]	2006 [a]	2007	2008
Catchable [b]											
	Airstrip/Willow Pond	1,018	1,497	1,938	2,200	1,866	1,671	1,281	616	500	313
	Alder Pond	2,608	2,072	1,906	2,019	2,455	2,185	1,098	507	0	0
	Beach Lake	10,312	10,487	8,087	10,095	9,614	11,920	7,527	2,802	0	0
	Campbell Creek	3,030	4,563	3,909	2,291	4,264	1,560	1,697	1,522	0	0
	Campbell Pt Lake	3,027	5,652	5,533	2,561	2,456	5,829	1,442	837	4,050	6,200
	Cheney Lake [c]	10,963	14,473	0	0	0	0	0	0	0	0
	Chester Creek [d]	1,000	852	2,335	2,036	1,779	976	613	326	0	0
	Clunie Lake	9,346	4,669	7,804	3,932	4,613	6,027	4,895	2,060	14,857	9,136
	Delong Lake	9,904	16,589	13,190	1,231	10,182	17,205	11,363	4,319	15,483	11,596
	Dishno Lake	483	0	0	0	0	0	0	0	0	0
	Eagle River	0	0	0	0	0	0	0	0	0	0
	Edmonds Lake	1,009	500	1,000	1,723	1,967	1,474	943	395	0	2,256
	Fire Island L	0	0	0	0	0	0	0	0	0	0
	Fish Lake	2,473	1,135	300	250	532	309	370	100	842	1,004
	Goose L	0	0	0	0	0	0	0	0	0	0
	Green Lake	2,870	3,151	2,546	1,500	1,359	1,005	889	408	900	1,188
	Gwen Lake	3,969	4,807	5,153	2,073	4,994	5,001	3,002	1,364	6,526	4,644
	Hillberg Lake	4,014	4,802	1,645	1,532	1,889	1,840	1,744	676	2,588	3,116
	Jewel Lake	16,794	15,946	24,622	14,057	17,344	20,060	12,656	4,999	20,397	13,089
	Lake Otis	1,000	500	500	500	250	554	458	275	1,856	2,648
	Lower Explorer Lake	0	0	0	0	0	0	0	0	0	0
	Lower Fire Lake	2,956	3,000	3,018	2,976	2,713	2,109	1,663	846	0	0
	Mirror Lake	11,299	12,469	20,195	9,299	7,402	10,812	9,855	4,424	19,131	7,880
	Otter Lake	10,886	10,941	10,159	5,418	7,342	3,738	3,618	1,827	0	0
	Rabbit Lake	1,994	0	0	920	0	0	400	0	0	0
	Sand Lake	3,022	4,096	6,201	3,074	2,105	4,983	2,680	2,098	5,400	572
	Spring Lake	500	500	0	500	500	505	370	180	687	621
	Taku Campbell Lake [c]	3,948	7,942	0	2,869	1,804	3,490	2,225	2,674	0	0

-continued-

Appendix B3.–Page 2 of 3.

Release type	Site	Year									
		1999	2000	2001	2002	2003	2004	2005 [a]	2006 [a]	2007	2008
Catchable [b] (continued)	Tangle Pond	1,733	1,000	1,713	1,031	1,021	1,607	1,075	510	0	0
	Thompson Lake	939	0	977	0	0	0	0	0	0	0
	Triangle Lake	1,007	707	0	500	500	505	218	180	687	527
	University/APU Lake	0	0	0	0	0	0	0	0	0	0
	Upper Six Mile Lake	4,103	5,066	2,256	2,001	2,241	1,898	1,210	480	0	0
	Waldon Lake	1,275	1,000	4,615	3,208	1,149	0	864	375	2,250	2,150
	Total	129,481	140,416	131,603	81,798	94,344	109,267	74,156	34,800	98,161	68,948
Subcatchable [e]											
	Beach Lake	29,844	0	0	0	0	0	0	0	0	0
	Campbell Pt Lake	0	0	0	0	0	0	0	0	0	0
	Cheney Lake [c]	0	0	0	0	0	0	0	0	0	0
	Chester Creek [d]	0	0	0	0	0	0	0	0	0	0
	Clunie Lake	46,138	0	0	0	0	0	0	0	0	0
	Delong Lake	2,769	0	0	0	0	0	0	0	0	0
	Dishno Lake	0	0	0	0	0	0	0	0	0	0
	Eagle River	0	0	0	0	0	0	0	0	0	0
	Edmonds Lake	0	0	0	0	0	0	0	0	0	0
	Eklutna Lake	0	0	0	0	0	0	0	0	0	0
	Fish Lake	0	0	0	0	0	0	0	0	0	0
	Green Lake	0	0	0	0	0	0	0	0	0	0
	Gwen Lake	0	0	0	0	0	0	0	0	0	0
	Hillberg Lake	0	0	0	0	0	0	0	0	0	0
	Jewel Lake	6,772	0	0	0	0	0	0	0	0	0
	Lake Otis	0	0	0	0	0	0	0	0	0	0
	Lower Fire Lake	0	0	0	0	0	0	0	0	0	0
	Mirror Lake	38,254	0	0	0	0	0	0	0	0	0
	Otter Lake	49,936	0	0	0	0	0	0	0	0	0
	Sand Lake	0	0	0	0	0	0	0	0	0	0
	Spring Lake	0	0	0	0	0	0	0	0	0	0

-continued-

Release type	Site	Year									
		1999	2000	2001	2002	2003	2004	2005 [a]	2006 [a]	2007	2008
Subcatchable [e] (continued)	Taku Campbell Lake [c]	0	0	0	0	0	0	0	0	0	0
	Tangle Pond	0	0	0	0	0	0	0	0	0	0
	Thompson Lake	0	0	0	0	0	0	0	0	0	0
	Triangle Lake	0	0	0	0	0	0	0	0	0	0
	Upper Six Mile Lake	0	0	0	0	0	0	0	0	0	0
	University/APU Lake	0	0	0	0	0	0	0	0	0	0
	Waldon Lake	0	0	0	0	0	0	0	0	0	0
	Total	173,713	0	0	0	0	0	0	0	0	0

Source: All stocking information is from ADF&G Division of Sport Fish hatchery records.

[a] Hatchery switched to cold water rearing, so it takes 2 years to rear a catchable-sized rainbow trout.

[b] Catchable releases includes catchable-sized and broodstock rainbow trout. “Catchable size” is about 8 inches in length.

[c] Cheney and Taku Campbell Lakes were not stocked starting in 2001 due to illegal introduction of northern pike.

[d] Includes fish stocked in University (Alaska Pacific University) Lake.

[e] Subcatchable releases includes fry, smolt, subcatchable-sized fish, and eyed eggs.

Appendix B4.–Rainbow trout stocking in the Anchorage Management Area by year (2009–2018) and site.

Release type	Site	Year									
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Catchable [b]											
	Airstrip/Willow Pond	200	0	0	2,017	1,534	1,640	2,308	1,969	1,259	1,265
	Alder Pond	0	0	0	1,889	1,444	1,493	1,766	1,405	1,841	1,822
	Beach Lake	0	0	0	18,125	14,479	10,747	12,075	8,566	9,754	9,550
	Campbell Creek	0	0	0	3,139	2,354	4,465	3,559	3,415	3,293	2,968
	Campbell Pt Lake	25,271	3,675	919	12,175	8,223	8,880	7,056	3,812	5,535	5,116
	Cheney Lake [c]	9,942	497	124	5,933	10,162	7,100	5,895	6,069	6,604	6,263
	Chester Creek [d]	0	0	0	935	1,000	1,000	902	1,073	1,011	1,029
	Clunie Lake	12,259	0	0	10,135	4,273	10,569	3,617	5,268	5,102	5,209
	Delong Lake	30,883	3,323	962	9,088	8,828	6,489	4,856	2,487	5,396	6,028
	Dishno Lake	0	0	0	0	0	0	0	0	0	0
	Eagle River	0	0	0	0	0	0	0	0	0	0
	Edmonds Lake	0	0	0	990	1,500	999	902	1,013	1,016	1,014
	Fire Island L	0	0	0	0	0	0	0	0	0	0
	Fish Lake	806	0	0	1,423	1,000	1,748	2,067	2,000	985	945
	Goose L	0	0	0	0	0	0	0	0	0	0
	Green Lake	1,990	100	100	3,765	2,094	2,735	2,330	2,029	2,483	2,292
	Gwen Lake	5,973	0	0	6,551	2,880	4,301	2,948	2,500	2,445	2,474
	Hillberg Lake	4,843	0	0	4,797	2,000	2,701	1,774	1,587	1,994	1,989
	Jewel Lake	36,946	5,970	973	25,886	13,120	15,461	10,254	10,046	11,061	11,235
	Lake Otis	771	0	0	1,789	1,500	1,627	1,635	1,678	1,663	1,778
	Lower Explorer Lake	0	0	0	0	0	0	0	0	0	0
	Lower Fire Lake	0	0	0	3,854	997	1,017	0	0	0	0
	Mirror Lake	0	0	0	15,332	16,058	13,758	12,907	10,238	10,120	11,155
	Otter Lake	0	0	0	0	0	0	0	1,782	1,475	0
	Rabbit Lake	0	0	0	0	0	997	0	541	270	0
	Sand Lake	0	12,791	916	5,999	11,681	6,039	5,871	6,105	8,055	6,130
	Spring Lake	741	0	0	500	500	500	482	500	454	493
	Taku Campbell Lake [c]	0	0	0	5,415	5,000	4,625	4,440	3,639	4,414	3,526

-continued-

Appendix B4.–Page 2 of 3.

Release type	Site	Year									
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Catchable [b] (continued)	Tangle Pond	0	0	0	1,023	1,054	1,195	1,255	1,054	967	1,020
	Thompson Lake	0	0	0	0	0	0	0	0	0	0
	Triangle Lake	741	0	0	1,304	1,150	1,737	1,007	1,000	957	0
	University/APU Lake	0	0	0	0	0	0	0	0	0	0
	Upper Six Mile Lake	0	0	0	2,079	2,000	2,262	1,780	1,000	1,016	999
	Waldon Lake	0	0	0	5,788	2,083	2,206	1,969	1,113	1,409	1,642
	Total	133,375	28,366	6,005	151,943	118,927	118,305	95,670	83,905	92,596	87,960
Subcatchable [e]											
	Beach Lake	0	0	0	0	0	0	0	0	0	0
	Campbell Pt Lake	0	10,462	0	0	0	0	0	0	0	0
	Cheney Lake c	0	28,421	0	0	0	0	0	0	0	0
	Chester Creek d	0	0	0	0	0	0	0	0	0	0
	Clunie Lake	0	21,125	0	0	0	0	0	0	0	0
	Delong Lake	0	25,293	0	0	0	0	0	0	0	0
	Dishno Lake	0	0	0	0	0	0	0	0	0	0
	Eagle River	0	0	0	0	0	0	0	0	0	0
	Edmonds Lake	0	0	0	0	0	0	0	0	0	0
	Eklutna Lake	0	0	0	0	0	0	0	0	0	0
	Fish Lake	0	2,025	0	0	0	0	0	0	0	0
	Green Lake	0	16,755	0	0	0	0	0	0	0	0
	Gwen Lake	0	7,375	0	0	0	0	0	0	0	0
	Hillberg Lake	0	19,455	0	0	0	0	0	0	0	0
	Jewel Lake	0	24,956	0	0	0	0	0	0	0	0
	Lake Otis	0	2,970	0	0	0	0	0	0	0	0
	Lower Fire Lake	0	0	0	0	0	0	0	0	0	0
	Mirror Lake	0	0	0	0	0	0	0	0	0	0
	Otter Lake	0	0	0	0	0	0	0	0	0	0
	Sand Lake	0	36150	180	0	0	0	0	0	0	0
	Spring Lake	0	1,015	0	0	0	0	0	0	0	0

-continued-

Release type	Site	Year									
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Subcatchable [e]											
	Taku Campbell Lake [c]	0	0	0	0	0	0	0	0	0	0
	Tangle Pond	0	0	0	0	0	0	0	0	0	0
	Thompson Lake	0	0	0	0	0	0	0	0	0	0
	Triangle Lake	0	2,025	0	0	0	0	0	0	0	0
	Upper Six Mile Lake	0	0	0	0	0	0	0	0	0	0
	University/APU Lake	0	0	0	0	0	0	0	0	0	0
	Waldon Lake	0	2,375	0	0	0	0	0	0	0	0
	Total	0	200,402	180	0	0	0	0	0	0	0

Source: All stocking information is from ADF&G Division of Sport Fish hatchery records.

[a] Hatchery switched to cold water rearing, so it takes 2 years to rear a catchable-sized rainbow trout.

[b] Catchable releases includes catchable-sized and broodstock rainbow trout. "Catchable size"is about 8 inches in length.

[c] Cheney and Taku Campbell Lakes were not stocked starting in 2001 due to illegal introduction of northern pike.

[d] Includes fish stocked in University (Alaska Pacific University) Lake.

[e] Subcatchable releases includes fry, smolt, subcatchable-sized fish, and eyed eggs.

Appendix B5.–Arctic char stocking in Anchorage Management Area by year (1999–2018) and lake.

Year	Lake												
	Campbell Point	Cheney	Clunie	Delong	Fish	Green	Jewel	Mirror	Sand	Tangle Pond	Thompson	Airstrip pond	Total
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	1,027	0	0	0	0	0	0	2,012	0	0	0	0	3,039
2001	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	2,094	0	4,387	14,820	0	0	4,000	4,845	2,522	503	0	0	33,171
2003	1,796	0	4,496	4,400	0	0	4,035	6,117	4,522	503	0	0	25,869
2004	2,096	0	0	0	0	0	0	0	2,603	0	0	0	4,699
2005	1,928	0	0	0	0	0	0	0	2,194	0	0	0	4,122
2006	2,904	0	0	0	0	0	1	0	4,332	0	0	0	7,237
2007	1,142	0	0	0	0	0	258	0	6,121	0	0	0	7,521
2008	2,102	0	0	0	0	0	0	0	3188	0	0	0	5,290
2009	2,017	0	0	0	0	0	0	0	0	0	0	0	2,017
2010	1,533	0	0	0	0	0	0	0	7,434	0	0	0	8,967
2011	1,301	0	769	0	0	0	0	0	2,481	0	0	150	4,701
2012	1,372	0	1,011	0	0	0	2,814	0	1,606	0	0	0	6,803
2013	2,133	0	1,100	0	0	0	0	0	2,665	0	0	0	5,898
2014	1,796	0	988	0	0	0	0	0	2,233	0	0	0	5,017
2015	1,940	0	999	0	0	0	0	0	2,170	0	0	0	5,109
2016	122	0	1,353	0	275	275	0	0	2,518	0	241	0	4,784
2017	76	80	1,253	0	275	306	0	0	2,415	0	199	0	4,604
2018	168	0	1,524	0	267	230	0	0	2,781	0	211	0	5,181

Source: All stocking information is from ADF&G Division of Sport Fish hatchery records.

Note: Unless otherwise noted, releases are of catchable-sized Arctic char.

Appendix B6.–Arctic grayling stocking in Anchorage Area by year (1999–2018) and site.

Year	Site								
	APU[a] Lake	Beach Lake	Lower Fire Lake	Tangle Pond	Sand Lake	Walden Lake	Airport/Willow Pond	Symphony Lake	Total
1999		1,048			0			0	1,048
2000	discontinued in 1991	0	discontinued in 1997	discontinued in 1995	0	discontinued in 1995	discontinued in 1993	0	0
2001[c]		4,749			0			2,936	7,685
2002[c]		4,199			0			0	4,199
2003		7,081	[d]		0			4,239	11,320
2004		4,489			0			0	4,489
2005		279			0			0	279
2006		4,080			0			0	4,080
2007		5,668			0			0	5,668
2008		0			0			0	0
2009		3,192			0			0	3,192
2010		3,034			7,885			0	10,919
2011		215			6,753			0	6,968
2012		4,694			1,218			0	5,912
2013		1,000			1,477			0	2,477
2014		1,559			1,385			0	2,944
2015		1,402			1,591			0	2,993
2016		0			0			0	0
2017		0			0			0	0
2018		0			0			0	0

Source: All stocking information is from ADF&G SF hatchery records.

Note: Unless otherwise noted, all releases are fingerlings. The first year of releases that came from the WJHSF Hatchery was 2013.

[a] "APU" is Alaska Pacific University. Stocking was discontinued in this Lake in 1991.

[b] Stocking was discontinued in 1997.

[c] Stocking was discontinued in 1995.

[d] Stocking was discontinued in 1993.

APPENDIX C: ESCAPEMENT ESTIMATES

Appendix C1.–Ship Creek salmon escapement estimates, Anchorage Management Area, 1999–2018.

	Chinook salmon				Coho salmon			
Year	Adults collected at hatchery	Used for egg take	Survey	Estimated escapement [a]	Adults collected at hatchery	Used for egg take	Survey	Estimated escapement [a]
1999	328	[b]	516	844		434	585	1,019
2000	341	[b]	323	664	348	305	815	1,163
2001	258	[b]	541	799	619	514	968	1,587
2002	467	336	1,492	1,959	727	378	4,225	4,952
2003	535	232	2,198	2,733	323	295	1,143	1,466
2004	468	352	1,606	2,074	953	514	1,262	2,215
2005	343	215	1,485	1,828	575	533	466	1,041
2006	458	294	1,431	1,889	757	583	1,431	2,188
2007	371	256	1,475	1,846	459	432	254	713
2008	468	252	833	1,301	820	508	891	1,711
2009	379	366	916	1,295	777	648	1,066	1,843
2010	30	30	368	398	562	446	189	751
2011	408	290	896	1,304	1,201	828	1,186	2,387
2012	569	321	227	796	1,208	534	836	2,044
2013	571	342	468	1,039	954	665	691	1,645
2014	1,048	447	423	1,471	2,239	782	2,203	4,442
2015	1,286	492	1,161	2,447	2,220	754	811	3,031
2016	2,188	536	1,106	3,294	1,442	651	432	1,874
2017	1,256	423	596	1,852	1,319	708	836	2,155
2018	273	167	78	351	1,311	750	895	2,206
Average								
2016–2018	1,239	375	593	1,832	1,357	703	721	2,078
2009–2018	801	341	624	1,425	1,323	677	915	2,238
2006–2015	559	309	820	1,379	1,120	618	956	2,076

Note: These surveys are a combination of trap collection counts and foot surveys. Trap collection was designed to capture broodstock and not to enumerate fish. Foot surveys were designed to manage the fishery and ensure that the hatchery collected the required broodstock. After 2001, all surveys were foot only.

Note: From 1996 to 1999, the number of Chinook salmon collected and used for egg takes are unknown. The number listed was documented only as "brood."

[a] Estimated escapement is the survey counts plus the number of adults collected at the hatchery. Survey dates vary by year and final escapement of salmon into the stream could be higher or lower but can't be verified due to varying survey conditions from year to year.

[b] Total number used for egg takes is unknown.

[c] Estimated escapement number would be survey number only. Accurate records for adults that made it to the hatchery are unknown.

[d] Total number of adults collected is unknown. The egg take number was used. The actual escapement is probably larger than reported.

[e] Survey was incomplete. Only surveyed to Reeves Blvd. Actual escapement is probably higher.

Appendix C2.–Eagle River salmon escapement estimates, Anchorage Management Area, 1999–2018.

Year	Chinook	Pink
1999	224	–
2000	[c]	[b] –
2001	77 [b]	19
2002	27 [b]	–
2003	167 [b]	–
2004	157 [d]	–
2005	122 [d]	–
2006	101 [d]	–
2007	117 [d]	–
2008	156 [d]	–
2009	152 [d]	–
2010	10 [d]	–
2011	7 [d]	–
2012	[c]	–
2013	[c]	–
2014	[c]	–
2015	[c]	–
2016	34	–
2017	75	–
2018	61	–
Average		
2016–2018	57	–
2009–2018	57	–
2006–2015	91	–

Note: Estimates are from foot surveys designed for Chinook salmon only; pink salmon catches were incidental. En dashes indicate no data.

[a] Survey conducted after spawning occurred.

[b] High water and poor visibility.

[c] No survey conducted.

[d] Surveys include Meadow Creek.

Appendix C3.–Campbell Creek salmon escapement estimates, Anchorage Management Area, 1999–2018.

Year	Chinook	Coho	Sockeye	Pink	Chum
1999	1,035	537	435	–	–
2000	591	3,196	109	–	–
2001	717	2,377 [a]	163	–	–
2002	744	7,574	1,473	–	–
2003	745	1,799	1,857	–	–
2004	964	713	776	–	–
2005	1,097	1,130	654	–	–
2006	1,052	542	589	3	1
2007	588	[b]	203	–	–
2008	439	403 [c]	42	–	–
2009	554	766	69	–	–
2010	290	157	249	–	–
2011	260	[c]	434	–	–
2012	[b]	[c]	[b]	–	–
2013	[b]	146	[b]	–	–
2014	274	3,316	368	–	–
2015	654	1,178	585	–	–
2016	544	565	770	–	–
2017	475	1,983	1,685	–	–
2018	287	1,986	102	–	–
Average					
2016–2018	435	1,511	852	–	–
2009–2018	417	1,262	533	–	–
2006–2015	514	930	317	–	–

Note: Estimates are from foot surveys designed for Chinook, sockeye, and coho salmon; pink and chum salmon catches were incidental. En dashes indicate no data.

[a] Only South Fork and mainstem from Forks to Folker Street were counted.

[b] No survey conducted.

[c] Only North Fork, South Fork, and mainstem from Forks to Folker Street were counted.

Appendix C4.–Bird Creek salmon escapement estimates, Anchorage Management Area, 1999–2018.

Year	Chinook	Coho
1999	497	279
2000	117	703
2001	88	1,554
2002	48	66
2003	140	4
2004	307	376
2005	29	619
2006	[a]	442
2007	173	[a]
2008	106	115
2009	148	278
2010	12	19
2011	112	45
2012	[a]	[a]
2013	[a]	[a]
2014	[b]	629
2015	87	[a]
2016	76	463
2017	48	154
2018	25	297
Average	136	435
2016–2018	50	305
2009–2018	73	269
2006–2015	106	255

Note: Estimates are from foot surveys designed for Chinook and coho salmon.

[a] No survey conducted.

[b] Incomplete survey.

Appendix C5.–Rabbit Creek salmon escapement estimates, Anchorage Management Area, 1999–2018.

Year	Chinook	Coho	Sockeye	Pink	Chum
1999-2000 [a]					
2001	64	697	300 [b]	7	–
2002	9	1,243	0	1,004	–
2003	7	348	0	33	–
2004	55	1,448	0	234	–
2005	73	7	71	257	–
2006	39	24	275	118	–
2007[a]					–
2008	15	109	4	1,562	1
2009	36	1,725	1	524	0
2010	16	7	15	0	0
2011	68	–	39	1	0
2012[a]					–
2013[a]					–
2014	35	–	14	18	–
2015	–	–	–	–	–
2016	54	71	–	120	–
2017	57	248	–	–	–
2018	11	161	–	–	–
Average					
2016–2018	41	160		120	–
2009–2018	40	442	17	133	–
2006–2015	35	466	58	371	–

Note: Estimates are from foot surveys designed for Chinook and coho salmon. En dashes indicate no data.

[a] No survey conducted.

[b] Estimated from boardwalk at Potter Marsh.