Regional Operational Plan No. ROP.SF.2A.2022.21

Operational Plan: Alexander Creek Northern Pike Suppression, 2022–2024

by

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and

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March 2022

Alaska Department of Fish and Game **Division of Sport Fish**

Symbols and Abbreviations

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Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

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OPERATIONAL PLAN: ALEXANDER CREEK NORTHERN PIKE SUPPRESSION, 2022-2024

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SIGNATURE PAGE

Project Title:	Alexander Creek Northern Pike Suppression, 2022-2024
Project leader(s):	Parker Bradley and Cody Jacobson
Division, Region and Area	Division of Sport Fish, Region II, Palmer Office
Project Nomenclature:	State Wildlife Grant T-10-13 P-28: Northern Cook Inlet Invasive Northern Pike Suppression and Monitoring
Period Covered	April 2022–June 2024
Field Dates:	Approximately May 2022–June 2024
Plan Type:	Category II

Approval

Title	Name	Signature	Date
Project co-leader	Parker Bradley		2/4/22
Project co-leader	Cody Jacobson		2/4/22
Regional Invasive Species Coordinator	Kristine Dunker		2/2/22
Biometrician	Mike Martz		2/18/22
Research Coordinator	Tim McKinley		3/27/2022

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ABSTRACT

This project will continue toward the goal of increasing salmon abundance and restoring fisheries in the Alexander Creek drainage by suppressing the invasive northern pike (*Esox lucius*) population from 2022 to 2024. Netting will be conducted in up to 71 side channel sloughs of Alexander Creek to catch northern pike.

Keywords: invasive species, northern pike, *Esox lucius*, Alexander Creek

INTRODUCTION

PURPOSE

The mission of the Alaska Department of Fish and Game (ADF&G) Division of Sport Fish (SF) is "to protect and improve the state's recreational fisheries resources," and an objective of the SF strategic plan is to "minimize impacts of invasive species on fish stocks, recreational fisheries, and fish habitat." Removing northern pike from vital salmon rearing habitat directly relates to this objective. ADF&G has an aquatic nuisance species management plan (Fay 2002) and an invasive northern pike management plan (ADF&G 2007; AKISP *In prep*). Goals and objectives in these plans address the need to remove invasive northern pike where possible and improve salmon populations that have been impacted by northern pike. Alexander Creek is recognized as SF's highest invasive northern pike control priority (ADF&G 2010; unpublished memorandum, *Region II Invasive Northern Pike Priorities*). The activities proposed in this project are aligned with several plans and initiatives, and ADF&G believes this project will result in the eventual re-establishment of salmon and trout fisheries in Alexander Creek.

BACKGROUND

Invasive northern pike (*Esox lucius*) pose a significant threat to salmon habitats in Southcentral Alaska (Dunker et al. 2020). Northern pike are native throughout much of the state but do not naturally occur south and east of the Alaska Range (Figure 1). They were introduced by anglers to the Yentna River drainage in the late 1950s and subsequently spread throughout the Susitna River basin through flood events and further illegal stockings (Mills 1986). It is believed that northern pike were introduced to Alexander Lake in the late 1960s, although there was no harvest record of them prior to 1985 (Mills 1986). Anecdotal accounts from Alexander Creek area residents suggest that dispersal of northern pike from the lake to the lower river occurred slowly over 10–20 years. Anglers first caught them in the lower river in the mid-1990s. Today, northern pike are widespread throughout the system. A large portion of the drainage is shallow and densely vegetated, making it ideal northern pike habitat (Morrow 1980).

Sport fisheries of Alexander Creek historically generated an average of 13,700 angler-days of effort annually for the 20-year period from 1980 to 1999 (Oslund et al. 2017: Table 4, page 70). During that same period, on average 2,880 Chinook salmon (*Oncorhynchus tshawytscha*) were harvested annually from the Alexander Creek fishery, which historically supported one of the largest Chinook salmon fisheries in the Westside Susitna Management Unit (Oslund et al. 2017: Table 26, page 112). Between 1977 and 2008 (when harvests dropped to zero) the peak of the sport fishery occurred in 1991, with a reported 26,235 days of effort and 6,548 Chinook salmon harvested (Oslund et al. 2017); a more recent average (2001–2008) for sport fishing effort on Alexander Creek was about 6,112 angler-days (Oslund et al. 2017). Approximately 8 lodges operated during this period in which Chinook salmon were primarily targeted. From 2008 to 2014, when Chinook salmon were no longer harvested, average annual effort for Alexander Creek dropped to about 1,300 angler-days (Oslund et al. 2017).

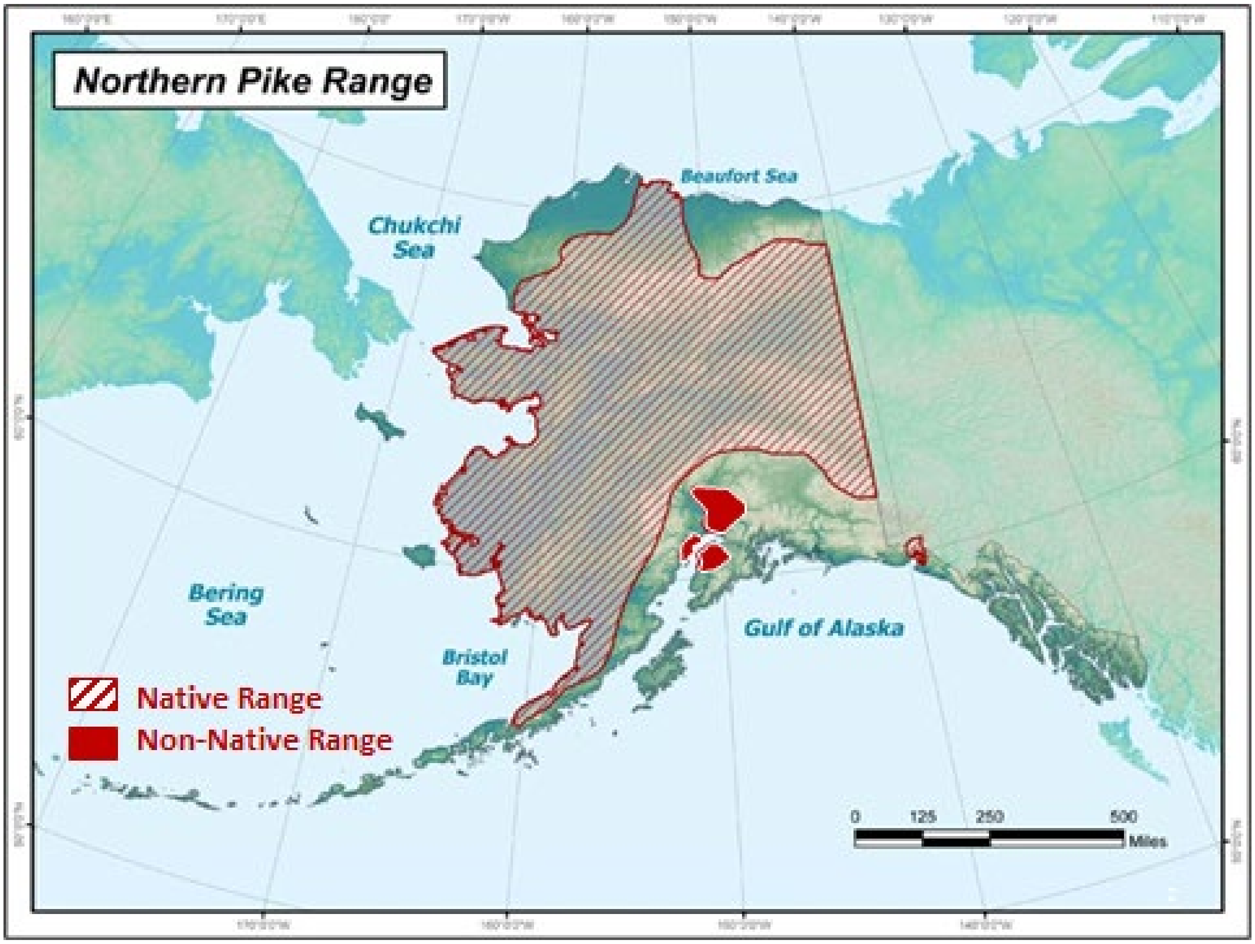

Figure 1.–Northern pike range in Alaska.

Since the late 1990s, northern pike may have been the biggest factor in the reduced populations of multiple fish species in the Alexander Creek drainage. Aerial indices of escapement have shown a downward trend in Chinook salmon spawners over the past 2 decades culminating in the Alaska Board of Fisheries (BOF) designating Alexander Creek Chinook salmon as a "stock of concern" (SOC) in 2011. The sustainable escapement goal (SEG) for Chinook salmon is now 1,900–3,700 fish, but escapement counts dropped to less than 200 fish by 2008 (Oslund et al. 2017). The Chinook salmon sport fishery has been closed since 2008. Aerial surveys have also shown a change in the distribution of Chinook salmon spawners. Since 1992, Chinook salmon spawners have disappeared from the tributaries upstream of Alexander Lake and by 1998 they had stopped spawning in the upper mainstem of Alexander Creek between Sucker Creek and Alexander Lake. Harvest of coho salmon (*O. kisutch*) has been below the 1980–1999 historical average of 1,531 since 2005, ranging from 757 fish in 2005 to only 10 fish in 2008 (Oslund et al. 2017: Table 45, page 127). The once popular and abundant rainbow trout (*O. mykiss*) and Arctic grayling (*Thymallus arcticus*) fisheries were also closed to harvest in 1997 (Oslund et al. 2017). Despite these fisheries becoming catch-and-release, catch rates of rainbow trout have declined in Alexander Creek since 1990 (Oslund et al. 2017: Table 60, page 154).

Since 2011, ADF&G has been implementing a long-term northern pike suppression program to reduce northern pike abundance and increase salmonid productivity within Alexander Creek. The planned efforts for 2022 through 2024 are described in detail in this operational plan. Past northern pike suppression efforts have been accomplished by intensively gillnetting the side-channel sloughs (depicted in Appendix A1) of Alexander Creek each year until seasonal catch rates of northern pike decrease by 85%. Northern pike gillnetting has been conducted during the peak spawning period (approximately the month of May) when northern pike are most mobile and concentrated in the Alexander Creek sloughs. Recently, spring gillnetting and reports from anglers have shown that native species such as rainbow trout, Arctic grayling, burbot (*Lota lota*), and even sockeye salmon (*O. nerka*) are becoming more numerous and occupying habitat in Alexander Lake and the upper stretches of Alexander Creek, whereas they had been in very low abundance since northern pike arrived.

The Alaska State Legislature provided funding for a portion of this work. In the fall of 2010, this funding was used as non-Federal match to acquire $635K from the Alaska Sustainable Salmon Fund (AKSSF) to support the associated project activities between 2011 and 2013. In the winter of 2013, ADF&G was again awarded AKSSF funding ($563K) to continue this work between 2014 and 2016. In 2016, ADF&G was awarded a $223.6K grant from the Matanuska–Susitna Borough to continue a slightly scaled down version of this program in 2017 and 2018. For the 2019–2021 season, the program was funded by the State Wildlife Grant program through the U. S. Fish and Wildlife Service. This source will also fund the current planning period of 2022–2024.

OBJECTIVES

This project will continue to advance ADF&G's long-term goal of increasing salmon abundance and restoring fisheries in the Alexander Creek drainage by suppressing the invasive northern pike population. Specific objectives of this project for 2022–2024 are as follows:

PRIMARY OBJECTIVES

1) Annually set gillnets in up to 71 side sloughs for 3 days in each between May 1 and June 15 to target northern pike.

SECONDARY OBJECTIVES

1) Calculate the mean and range of fork lengths measured for northern pike caught in gillnets.
2) Document stomach contents, sex, spawning condition, and maturity information from northern pike caught in gillnets.
3) Monitor gillnet catches for northern pike tagged with a passive integrative transponder (PIT tag) originating in Alexander Lake.
4) Document and compare catches between the multi and single mesh gillnets.

METHODS

STUDY AREA

Alexander Creek is a tributary to the Susitna River (Figure 2). The creek is approximately 68 km (42 miles) long from its mouth at the Susitna River to Alexander Lake and can be characterized as low-gradient and tannin-stained. Aside from Alexander Lake, several clearwater tributaries draining Mount Susitna contribute to the mainstem flow. Sucker Creek enters the mainstem at 32 RKM (20 RM) and currently provides the majority of spawning and rearing habitat for Chinook and coho salmon. The mainstem of Alexander Creek is convoluted with numerous side channel sloughs, most of which were once part of the mainstem channel. Side channels are typically shallow, stagnant waters with low flows that can contain dense aquatic vegetation. Northern pike are well suited to these side-channel habitats (Morrow 1980; Inskip 1982) and are currently widespread throughout the system.

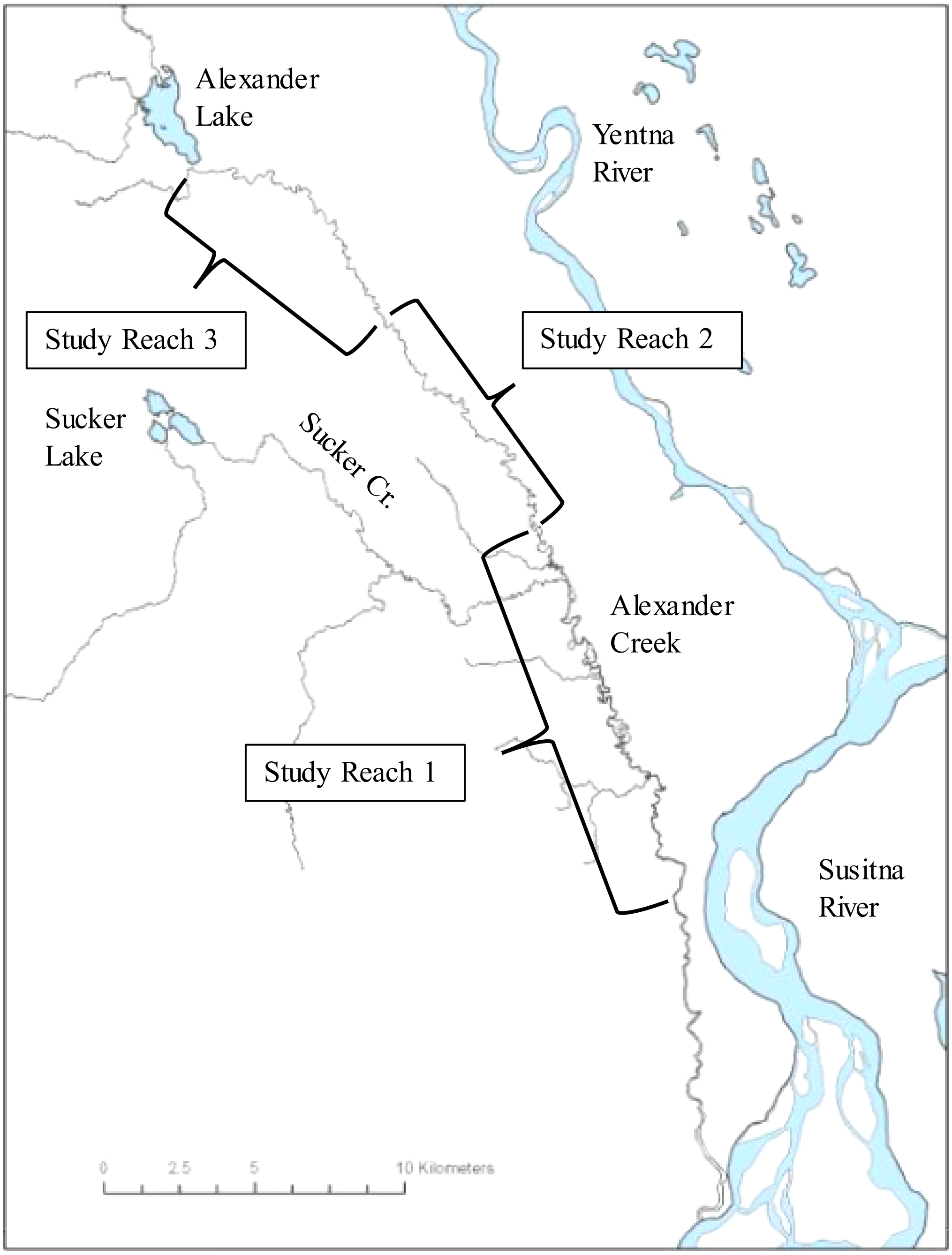

Figure 2.–Map of Alexander Creek and study reaches 1–3.

STUDY DESIGN

Background

The primary goals of this project are to reduce the impact of invasive northern pike on rearing salmonids by removing northern pike from Alexander Creek. Complete eradication of northern pike in this drainage would most likely be costly and logistically prohibitive. However, relieving some of the predation pressure on salmon fry and smolt should increase their abundance by contributing to greater survival (Muhlfeld et al. 2008). Over time, greater survival of juvenile salmon may result in larger annual returns of adult Chinook and coho salmon. In other parts of Alaska where northern pike are native, and even in other drainages in Southcentral Alaska where they are not (e.g., the Deshka River), northern pike and salmonids are capable of coexisting; however, habitat complexity that allows salmonids opportunities for predator avoidance is hypothesized to be a strong factor in mediating predator-prey interactions within these fish communities (Sepulveda et al. 2013). In Alexander Creek, where the entire system is composed of homogenous habitat providing ideal conditions for northern pike, salmonids may be unable to avoid predation and therefore their populations drastically declined (Oslund et al. 2017). Through annual suppression of northern pike, ADF&G hopes to eventually restore salmonid production to levels that will allow salmon fisheries to reopen in Alexander Creek.

To accomplish this, a long-term northern pike gillnetting program was established in 2011 and will continue annually. As in past years, all gillnetting will take place in the side-channel sloughs of Alexander Creek. Netting will take place in the spring during and immediately following the northern pike spawning period. Stomach contents will be identified from gillnetted northern pike to look for shifts in diet over time as the suppression continues from year to year.

From 2011 through 2013, ADF&G conducted radiotelemetry studies of adult northern pike to investigate movement patterns between Alexander Lake and Alexander Creek. Northern pike movement data from radiotelemetry demonstrated that few (~6%) radiotagged adult northern pike left the lake and moved downstream into the creek, and those that did were all captured in gillnets in the sloughs (Rutz et al. 2020b). This result supported the idea that working solely within Alexander Creek sloughs and not focusing on far costlier suppression efforts in Alexander Lake would be sufficient to meet our goal of increasing salmon production in the creek.

Another factor likely contributing to northern pike population fluctuations is the presence and treatment of an invasive plant elodea (*Elodea canadensis*) in Sucker and Alexander Lakes. This plant was first discovered in 2014 in Alexander Lake and by 2016, about 70% of the lake was infested with dense mats of the plant. Initial treatments in 2016 were not successful in eradicating the plant and by 2018, both lakes were completely infested. This likely provided not only plenty of spawning habitat for northern pike, but plenty of rearing habitat for juvenile northern pike. In the summer of 2019, initial treatments for elodea began and were successful in significantly reducing the biomass by the fall. Full scale treatments began the following year. However, it is unclear what impact the presence of elodea had on the northern pike population and whether the elodea treatments caused northern pike to leave the lake and move downstream where they were then captured in high numbers in the spring of 2020 and 2021 (Figure 3). This may also offer some explanation for why 2020 and 2021 had the highest catch per unit efforts (CPUEs) since the beginning of the suppression program in 2011 (Figure 4).

All northern pike collected in gillnets will be dissected for stomach content analyses, which will provide insight into the productivity of the prey base. ADF&G will continue indexing adult Chinook salmon runs to Alexander Creek via aerial surveys in July.

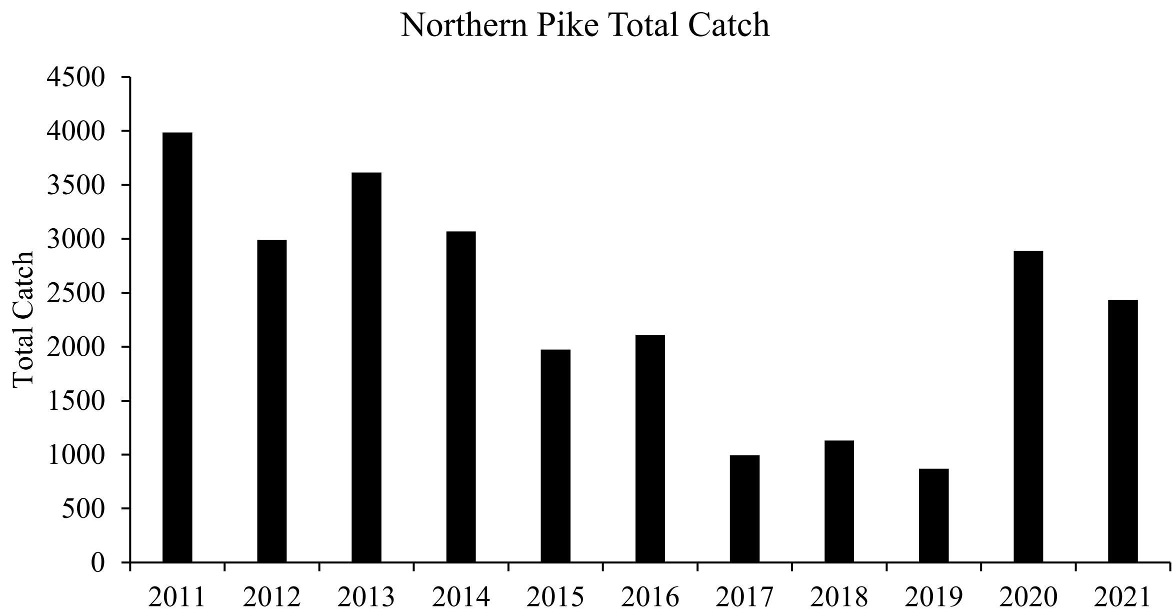

Figure 3.–Number of northern pike captured in Alexander Creek, 2011–2021.

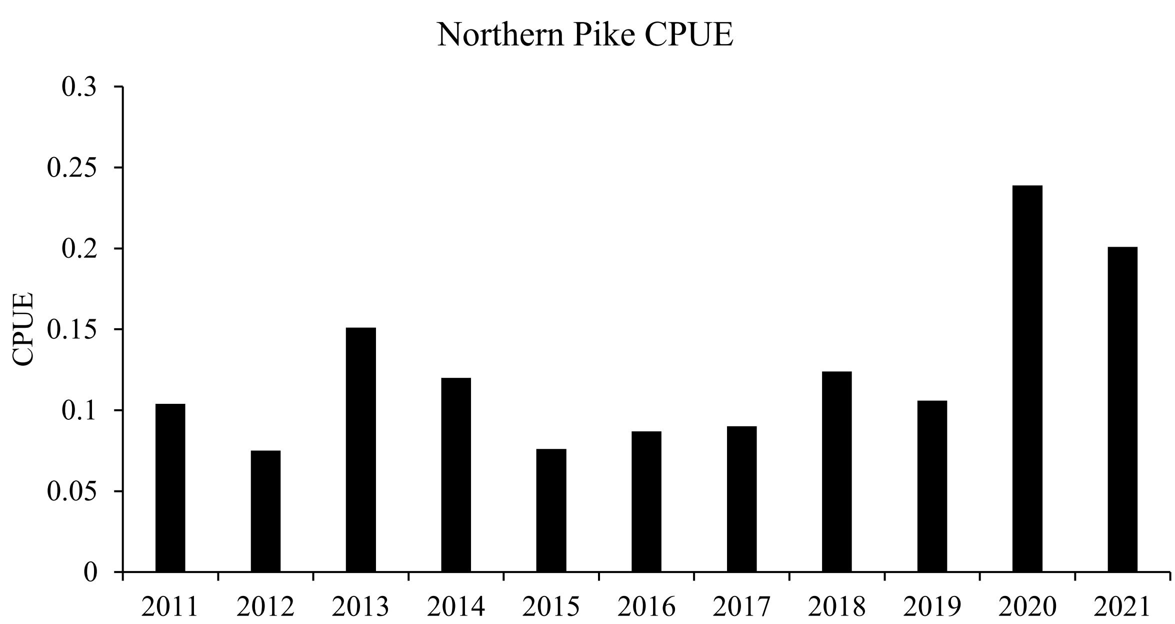

Figure 4.–Number of northern pike captured per net hour (CPUE) in Alexander Creek, 2011–2021.

Northern Pike Suppression

In May though early June each year, a large-scale gillnetting operation will continue in the side-channel sloughs of Alexander Creek. Northern pike will be targeted with up to 75 gillnets while they congregate for spawning in side-channel sloughs for approximately 2 weeks following ice out. Two main field camps will be operated along the mainstem of Alexander Creek, one located in the lower river between the mouth of Alexander Creek and Sucker Creek (Figure 2: Study reach 1) and the other located at the Alexander Lake outlet (Figure 2: Study reach 3). A third mobile field camp will be operated in the middle section of the mainstem of Alexander Creek located above the confluence of Sucker Creek (Figure 2: Study reach 2). This camp will be operated opportunistically for approximately 7 days by the two project biologists. Two technicians will be assigned to each main field camp and will be responsible for gillnetting the sloughs assigned to them within their study reach. Each crew will target between 13 and 31 side-channel sloughs for a total of 71 sloughs in all. The actual number of sloughs that are netted will be based on water levels because at low water, some sloughs cannot be accessed. Earlier years of this project demonstrated that catch of northern pike in many of the side-channel sloughs can be reduced by 85% within about 1 week of continuous gillnetting (Rutz et al. 2020a). Recently however, that target has been met within 3-4 days (Bradley et al. *In prep*). In study reach 1, sloughs furthest downstream will be netted first. Gillnet suppression efforts will continue in an upstream progression throughout the field season until all sloughs are eventually netted. In study reach 3, sloughs furthest upstream are netted first with progression moving downstream throughout the field season. In study reach 2, all the sloughs will be netted at the same time for approximately 3 to 4 days based on catches. Each slough has documented GPS coordinates and has been assigned a unique number beginning with the slough furthest downstream. For annual consistency, slough numbers will not be changed.

Two types of gillnets will be used: variable mesh and single mesh gillnets. Variable mesh gillnet dimensions are 37 m in length by 2 m in depth and composed of 6 panels of differing mesh sizes ordered in size along the length: 19 mm (0.75 in), 25 mm (1.0 in), 31 mm (1.25 in), 38 mm (1.5 in), 44 mm (1.75 in), and 51 mm (2 in). Single panel nets will be composed of 31 mm (1.25 in.) mesh and have the same overall dimensions. All nets will be made of monofilament with 13 mm (one-half inch) foam top cork line and a 22.7 kg (50 lb) lead line. The number of gillnets fished per slough will depend on the surface area and length of each slough. Historically, the number of gillnets used in a slough varied between 1 and 7, so this amount of netting is anticipated. The variable mesh nets will be used first, but when a slough is large enough to take more than 1 gillnet, at least 1 single mesh net will be incorporated. Gillnets will be fished overnight and checked once every 24 hours. The first gillnet set will be the first checked and others will follow in order of setting. If necessary, nets may be moved or more nets set to optimize catches. If this happens, it will be documented in field notebooks.

Netting will continue for 3 days in each slough. Exceptions to this protocol will be made as follows:

1) If zero northern pike are captured in a slough in a day's check, the nets will be pulled and moved to another slough.
2) If significant bycatch occurs, nets will be pulled and moved to another slough.
3) If catches of northern pike remain at or above 5 fish in a slough, nets will remain in the slough until catches fall below 5 fish.

If any of the 3 criteria are not met, nets in a slough will be moved after the third day. Significant bycatch is defined as catching more Arctic grayling and rainbow trout combined than northern pike in a given slough. Depending on conditions, individual nets with the highest bycatch can be pulled or moved to other areas of the slough, or all nets in the slough can be pulled. All northern pike removed from gillnets will be dispatched, measured for fork length to the nearest millimeter, identified to sex, assessed for spawning condition (green, ripe, or spent), assessed for maturity (mature or immature), and have stomach contents identified. Only mature fish will have a spawning condition assigned because immature fish are too young to spawn. Maturity can be assessed by visual inspection of the gonads.

It is anticipated that catch rates of northern pike would rebound between years of netting, which is why annual netting is necessary (Glick and Willette 2016). However, a study on the effectiveness of gillnetting to remove invasive northern pike from lakes on the Kenai Peninsula demonstrated that catch rates of northern pike could be substantially reduced within 2 years of continuous northern pike suppression (Massengill 2010). Northern pike populations in larger systems with more northern pike habitat are more difficult to suppress. For example, in the Yampa River, Colorado, suppression efforts initially reduced the population of northern pike, but eventually the population stopped decreasing (Zelasko et al. 2016). However, northern pike suppression efforts in Box Canyon Reservoir in Washington have resulted in a 98% decrease in relative abundance from 2012 to 2017 (Joe Maroney, Director of Fishery and Water Resources, Kalispel Natural Resource Department, personal communication). Bioenergetics modeling of other large-scale invasive fish control programs, such as the systematic removal of lake trout (*Salvelinus namaycush*) to conserve cutthroat trout (*O. clarki*) stocks in Yellowstone Lake, demonstrate that these suppression projects can dramatically reduce the predation pressure on native fishes and bolster their recovery (Ruzycki et al. 2003; Syslo et al. 2011). However, bioenergetics modeling conducted by the U. S. Geological Survey, suggests the near elimination of northern pike from Alexander Creek will be necessary for recovery of salmon productivity in the drainage (Sepulveda et al. 2015). Results of this study highlight the need to remain vigilant in Alexander Creek northern pike suppression.

Shifts in northern pike diet over time will be investigated as the suppression efforts continue. All of the northern pike that are removed in gillnets during the suppression project (except those lost to animal predation) will be dissected to enumerate prey species in their stomach contents (e.g., Appendix A2). Stomach contents will be recorded in the field to taxonomic order for undigested invertebrates and the lowest taxonomic level possible for undigested fish. Shifts in northern pike diet will be evaluated by observing changes in the species composition of prey over time.

DATA COLLECTION

Gillnet set and check times will be recorded for each slough, along with the slough reference number on a catch form (Appendix B1). All fish captured in the northern pike suppression gillnets will be counted, identified to species, and recorded on the catch form (Appendix B1). Total number of gillnets set per slough will be recorded on this form, along with how many of those nets are single mesh nets. Any catches for single mesh nets will be recorded in the comment section. All northern pike will be measured to the nearest millimeter for fork length and recorded, and other biological information such as sex, maturity, spawning condition, and stomach contents will also be recorded for each northern pike on a sampling form (Appendix B2).

DATA REDUCTION

The data will be entered into Microsoft excel and stored on the state network. Hard copies of the data sheets will be kept in the Palmer ADF&G office.

DATA ANALYSIS

Northern pike CPUE *r* can be calculated for each mesh *m,* location *l*, and day *j* using Equation 1.

$$\hat{r}_{mlj} = \frac{c_{mlj}}{e_{mlj}} \tag{1}$$

where c_{mlj} is catch of northern pike in mesh *m* at location *l* on day *j*, and e_{mlj} is the total net hours for each mesh *m,* location *l*, and day *j*, calculated as the duration of nets (in hours) times the number of net sets at location *l*. Shifts in northern pike diet will be analyzed by comparing mean number of salmon prey species per pike stomach between locations within year and by locations among years using Tukey's Honestly Significant Difference test. The mean consumption rate $\bar{s}$ for location *l* will be calculated using Equation 2.

$$\bar{s}_l = \frac{1}{n_l}\sum_{i=1}^{n_l} s_i \tag{2}$$

where s_i are the number of salmon prey in the stomach of pike *i* at location *l.* For the purposes of this project, a salmon species is defined as any one of the five Pacific salmon species.

SCHEDULE AND DELIVERABLES

Dates	Activity
April 2022	Purchase equipment and field camp gear. Hire field crews.
May 2022	Establish field camps. Conduct gillnet suppression.
October 2022	Analyze data and write FDS report.
April 2023	Purchase equipment and field camp gear. Hire field crews.
May 2023	Establish field camps. Conduct gillnet suppression.
October 2023	Analyze data and write FDS report.
April 2024	Purchase equipment and field camp gear. Hire field crews.
May 2024	Establish field camps. Conduct gillnet suppression.
October 2024	Analyze data and write FDS report.

RESPONSIBILITIES

Parker Bradley, Fishery Biologist II

Duties: Serve as the primary project biologist, plan and coordinate field logistics, and author project report and presentations to the public.

Cody Jacobson, Fishery Biologist I

Duties: Assist with planning and coordinating field logistics, train field crews, and assist with project reporting and presentations to the public.

Kristine Dunker, Fishery Biologist III

Duties: Provide oversight and make recommendations on study designs and project plans, assist with data analysis and project reporting, and coordinate and assist with the completion of project deliverables.

Mike Martz, Biometrician I

Duties: Provide guidance on study design, assist with postseason data analysis, and review project operational plans and reports.

4 Fish and Wildlife Technicians

Duties: Assist with field activities.

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APPENDIX A: HABITAT AND PREDATION PHOTOS

Appendix A1.–Photographs of a section of Alexander Creek from the air (top and middle) and an example of a side channel slough along the mainstem of Alexander Creek from creek level (bottom).

Appendix A2.–Photograph showing juvenile salmonids in the stomach of a northern pike caught in an Alexander Creek gillnet.

APPENDIX B: DATA FORMS

Appendix B1.–Catch form.

2022 Alexander Ck. Catch Form Date Checked _______ _________ Samplers___________________ Camp#

SAMPLE ID #	Slough #	TIME SET	TIME CHECKED	# of Nets	# Northern Pike	Arctic Grayling	L. Nose Sucker	Rainbow Trout	Burbot	Round Whitefish	Humpback whitefish	Bering Cisco	Muskrat	Bird Bycatch	# single mesh nets	Comments (single mesh net catches, nets added/pulled, pictures)

Note: Sample ID # format is as follows: slough #-Date, e.g., 12-51722 (slough 12-May 27, 2022).

Appendix B2.–Northern pike sampling form.

Alexander Creek Northern Pike Stomach Sampling Form

Date: **Slough # :** **Samplers:** **Page:**

Fish #	Sample ID #	Fork Length (mm)	Sex (M, F, U)	Maturity (M or I)	Cond. (R or S)	Stomach content (Y or N)	Stomach Content	Comments about fish or stomach content; I.E. : Tag #, deformatie

Fish #: Fish numbered consecutively

Sample ID#: Slough#-Date, i.e. **12-51722** (slough 12 , May 17 2022)

Sex: Mark only if absolutely known after dissection of fish. M = male F = female U = unknown

Maturity: Dissect fish. M = mature (Gonads enlarged) I = immature (Gonads not developed)

Condition of spawn: Before dissection, squeeze to observe release of sex product R= ripe (spawing), S= spent (post spawn) *This column does not apply to immature fish*

Stomach Contents: N = None Y = yes, stomach has contents

Stomach Contents list: common abbreviations for species. KS=king salmon; SS=silver salmon; RS=red salmon; CS=chum salmon; PS=pink salmon; US=Unknown salmon, WF=whitefish; LNS=longnose sucker; SB=stickleback; RT=rainbow; GR=grayling; NP=northern pike; BB=burbot; DV=dolly varden; UF=unknown fish SC=sculpin;AL=Arctic Lamprey; PL=pacific lamprey, JL=juvenile lamprey, UL=Unknown Lamprey, DFL=Dragonfly Larvae . Other catch could be: macro invertebrates, rodents, other mammals, birds, leeches, and frogs