Lake Pend Oreille Predator Management Program

2021 Annual Project Update

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ABSTRACT

Beginning in 2006, predator suppression programs were implemented with the goal of reducing predatory fish abundance in Lake Pend Oreille (LPO). An angler incentive program (AIP) was introduced to incentivize sport harvest of Rainbow Trout *Oncorhynchus mykiss* (ended in 2013) and Lake Trout *Salvelinus namaycush* (ongoing). In addition, commercial trap net and gill net operations targeting Lake Trout were implemented to further reduce the predator population and subsequently increase kokanee *O. nerka* survival (ongoing). The success of these efforts was illustrated by increased kokanee abundance and the reopening of the kokanee harvest fishery in 2013. Much like Lake Trout in the early 2000s, an expanding Walleye *Sander vitreus* population has the potential to put several fish populations in LPO at risk through direct predation and competition, spurring the implementation of a Walleye suppression feasibility project and periodic monitoring. This report provides preliminary results of the 2021 predator suppression programs on LPO. In 2021, 6,221 Lake Trout were caught in the suppression netting program and removed from LPO. A total of 1,258 Bull Trout *S. confluentus* were also caught, with 289 being direct mortalities (23%). Anglers turned in 2,509 Lake Trout heads through the AIP, with only two incidental Bull Trout mortalities due to angler misidentification. In addition, 319 Walleye were removed through the Walleye netting project, with only four incidental Bull Trout mortalities. Walleye were also included in the AIP in 2021 and this resulted in 757 heads turned in during the year, with six reward tags ($1,000 each) being returned.

INTRODUCTION

Lake Pend Oreille (LPO) represents a stronghold for adfluvial Bull Trout *Salvelinus confluentus* within their native range. Rainbow Trout *Oncorhynchus mykiss* in LPO provide a popular world-class trophy fishery that largely depends on abundant kokanee *O. nerka* for forage. Kokanee also provide a popular yield fishery and are the main forage base for adfluvial Bull Trout. Westslope Cutthroat Trout *O. clarkii lewisi* are also native to LPO and historically provided an important sport fishery in the lake.

Kokanee have been the primary driver of the LPO salmonid fishery since becoming established in the 1930s. They serve a dual role by providing both a high-yield sport fishery and the primary prey source for pelagic predators that support trophy fisheries (i.e., Rainbow Trout, Bull Trout). From the 1950s through the mid-1970s, LPO anglers targeted mainly kokanee, with commensurately high kokanee harvests. The lake also supported an active commercial kokanee fishery. However, kokanee abundance began declining in the mid-1960s and reached a depressed state by the 1970s. The commercial fishery was closed in 1973. Lake Trout *S. namaycush* were introduced in the early part of the 20th century and became increasingly abundant by the early 2000s. Increased predation threatened to collapse the already diminished kokanee population (Hansen et al. 2010; Rust et al. 2020) which prompted the implementation of fishing regulation changes intended to balance high predator abundance, specifically Lake Trout and Rainbow Trout, with the declining kokanee prey base. In 2000, the kokanee fishery was closed, Rainbow Trout limits were liberalized, and the bag limit on Lake Trout was removed (Fredericks et al. 2003). Despite these efforts, the Lake Trout population continued to expand, and the kokanee fishery did not show signs of recovery. Restricted fish passage, zooplankton dynamics, and floods may have also contributed to the decline of kokanee (Corsi et al. 2019).

Research determined that reduced kokanee productivity in LPO, in concert with an over-abundance of upper trophic level predators, had created a predator pit that would have likely led to a complete collapse of kokanee in the system (Hansen et al. 2010). Beginning in 2006, with support from Avista and the Bonneville Power Administration, predator suppression programs were implemented with the goal of reducing predator abundance in LPO. An Angler Incentive Program (AIP) was introduced to incentivize sport harvest of Rainbow Trout and Lake Trout. In addition, commercial trap net and gill net operations targeting Lake Trout were implemented to further reduce the predator population and increase kokanee survival. The AIP was also intended to reduce Rainbow Trout abundance, but this component of the program was discontinued in 2013 because of limited success and increased resiliency of the kokanee population by that time. The predator suppression program has been a major success and the kokanee population has responded positively (Dux et al. 2019; Rust et al. 2020).

Walleye *Sander vitreus*, were illegally introduced into Noxon Reservoir in the early 1990s and have become well-established throughout Noxon and Cabinet Gorge reservoirs (Horn et al. 2009). These reservoirs provide suitable spawning and rearing habitat for Walleye and downstream drift was the likely source of subsequent invasions into the Idaho portion of the Clark Fork River, LPO, and the Pend Oreille River, where they now present a threat to these downstream fisheries. Walleye were originally documented in LPO in the early 2000s (Schoby et al. 2007), and the population remained stable at a low density until 2011. Since then, catch per

unit effort in index netting surveys has approximately doubled every three years from 2011 to 2017 (Ryan et al. 2020). Additionally, increasing numbers of Walleye were caught in Lake Trout netting efforts throughout the northern and southern basins of LPO during this period (Rust et al. 2020).

Much like with Lake Trout, an expanding Walleye population has the potential to put several fish populations in LPO at risk through direct predation and competition. Walleye are prolific piscivores and their establishment in other western lentic systems has led to significant fishery management challenges, particularly where they overlap with salmonid fisheries (McMahon and Bennett 1998; MFWP 2016). Lake Trout existed at low abundances in LPO for many years before they became a predation concern, and it is likely a similar situation exists with Walleye. Lake Trout suppression programs were instituted to reduce predation risk when we began to observe rapid population increases, as we recently observed with Walleye. These similar patterns led to the establishment of an experimental Walleye netting program in 2018 and a Walleye AIP in 2019. Unlike the incentivized angling system established for Lake Trout, the Walleye AIP instead focuses on a small number of tagged fish for a high reward ($1,000 per fish). Should Walleye abundance continue to increase and the scope of their niche expand to include ecologically significant predation on kokanee, Westslope Cutthroat Trout, and juvenile Bull Trout and Rainbow Trout, it would undermine the conservation successes and recreational fishery enhancements made through previous suppression programs.

This report provides a timely summary of preliminary results from the 2021 predator suppression programs on LPO.

METHODS

LAKE TROUT

Netting

Lake Trout netting methods closely followed those described in Rust et al. (2020). Hickey Brothers Research, LLC was contracted to remove Lake Trout from LPO using gill nets during 13 weeks in the winter/spring netting season (January 4–April 1) and 11 weeks in the fall netting season (September 9–October 29 and November 29–December 17).

Prior to 2018, trap net catch rates were utilized as an index of Lake Trout and Bull Trout abundance. Trap netting was discontinued in 2018 and replaced with a random assessment netting protocol based on analysis by Hansen et al. (2019). Data from this program are utilized to conduct a cohort analysis for Lake Trout, which provides an annual age-specific abundance estimate. This random assessment netting was conducted during the late fall 2018–2020, but was complicated with periodic catches of spawning and recently spawned kokanee that quickly fouled the nets. To avoid this, assessment netting was not conducted in December of 2021 but instead moved early January 2022 after most of the kokanee had spawned. Assessment netting will be conducted in January moving forward.

Bottom-set gill nets with stretch mesh sizes ranging from 3.8 to 14 cm were used. Each net was 91 m long. Three nets were connected to form a 274 m “box”. Several boxes were then tied together to form a “gang”. Gangs were generally set in serpentine patterns parallel to shore at various location around LPO (Figure 1). Suppression and spawner netting locations were chosen

based on past catch history and available telemetry information. Assessment netting locations were based on a stratified random design. Nets were set near dawn and retrieved in the late-morning (typically 4–6 hour sets). See Rust et al. (2020) for a more detailed explanation of netting methods and a summary of the 2017–2018 results.

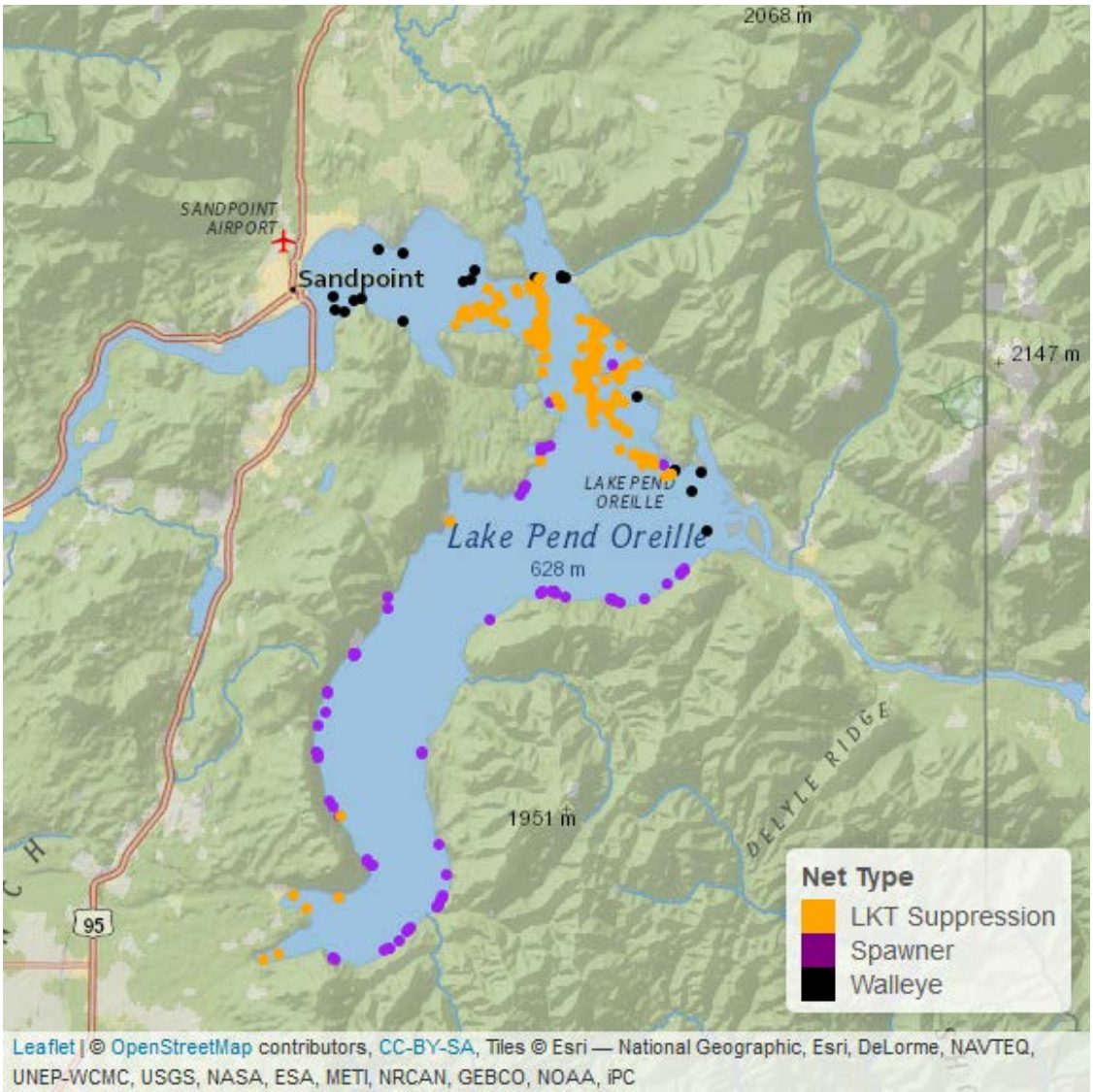

Figure 1. Netting locations in 2021 as part of the predator suppression program. Color denotes the target of the net set (orange = LKT suppression; purple = spawner; black = Walleye).

With the exception of spawning or recently spawned kokanee and Lake Whitefish *Coregonus clupeaformis*, all gamefish captured in gill nets were enumerated. Because of high catch rates, Lake Whitefish were enumerated from a stratified random subset of standardized assessment netting locations. Catch rates were calculated as the number of fish of a particular species captured per 274 m box.

All captured individuals of each target species (i.e., Lake Trout, Northern Pike *Esox lucius*, and Walleye) were measured for total length and, with few exceptions (i.e., those tagged for research purposes), removed from the population and donated to local food banks or raptor rehabilitation facilities. Sex and maturity were determined for most of the Lake Trout captured throughout the spawning period (September–November). In the past, otoliths were removed from a subset of Lake Trout during the standardized assessment netting for ageing purposes. However, due to moving the timing of assessment netting in 2021, these data will be collected in early 2022. All Bull Trout captured during Lake Trout netting were measured for total length and scanned for PIT tags. Previously unmarked Bull Trout were implanted with a 12-mm PIT tag, revived in an oxygenated tank if necessary, assigned a condition score, and released. In addition, when incidental mortalities occurred, total length, head length, and body depth were measured; sex and maturity level were determined; genetic samples, otoliths, scales, and fin rays were collected; pathogen samples were taken; fecundity was estimated from a subset of mature females; and stomach contents were described.

Lake Trout Angler Incentive Program

Anglers that caught Lake Trout from LPO had the option to turn the heads in to freezers placed around the lake at angler access points for a payment of $15 per head. Heads were collected from freezers weekly, identified to species, and measured from the tip of the snout to the posterior edge of the operculum. Previously developed head-length to total-length relationships for Lake Trout in LPO (Wahl et al. 2013) were used to extrapolate total length. In addition to the freezer collections, angler clubs had the ability to apply for AIP sponsorship at fishing derbies. Clark Fork Settlement Agreement funds were used to increase the total dollar amount of prize winnings for each derby, typically increasing the participation and resulting number of Lake Trout removed from the system.

WALLEYE

Telemetry

During 2021, Walleye greater than 495 mm (n = 24) in LPO were tagged using Vemco acoustic telemetry tags for tracking purposes. Tags were implanted into fish via a 4.5 cm incision in the anterior of the abdomen and closed with non-absorbable sutures. A total of 73 walleye have been implanted with acoustic tags since telemetry research began in 2018. Due to angler harvest and subsequent removal of tagged fish by both anglers and contracted netting, a total of 44 walleye with acoustic tags are currently present in LPO. An acoustic telemetry array was installed in 2019, and expanded in 2020 and 2021 to passively track fish movements within the system throughout the year. The array consists of 38 acoustic receivers positioned strategically throughout the LPO system at main lake points and islands, and throughout the adjoining Pend Oreille and Clark Fork Rivers to maximize observations and capture fish movement data. There are 24 receivers permanently deployed in the LPO system, and 14 receivers that are deployed seasonally in LPO when full summer water level is achieved and the littoral zone is navigable by boat. The main lake contains 24 receivers, the Pend Oreille River has eight receivers, and the Clark Fork River contains six receivers. To supplement this array, fish were also tracked using active methods from a research boat. Active tracking was conducted weekly throughout the entire system on a rotating basis in areas of seasonal interest to fish movement (i.e., spawning seasons).

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Netting

Hickey Brothers Research, LLC was contracted to operate gill nets during three weeks in the spring of 2021 (April 5–May 23) to target Walleye. This was done to evaluate their use as a tool to reduce Walleye abundance in LPO. Aided by telemetry data, gill net effort was primarily focused on the following areas: Pack River delta, Fisherman's Island area, Sheepherder Point, immediately north of the Burlington Northern train bridge in Sandpoint, Kootenai Point, and adjacent to the mouth of the Clark Fork River delta (Figure 1).

Bottom-set gill nets with stretch mesh sizes of 8.9, 10.2, and 11.4 cm were used. Each net was 91 m long. Three nets were connected to form a 274 m "box". Several boxes were then tied together to form a "gang". Gang-specific mesh size and set locations may have varied based upon recent catch data to maximize catch rates of target species while minimizing bycatch. Gill nets were set just before dawn and retrieved mid-morning, typically after 4–5 hours fishing time. With the exception of Lake Whitefish (because of high abundances in the catch), all gamefish captured in gill nets were enumerated. Catch rates were calculated as the number of Walleye captured per 274 m box.

All captured Walleye were weighed, measured for total length, and checked for existing tags or marks. Thirty-eight Walleye were implanted in the snout with coded wire tags during 2021 to maintain an adequate group of tagged fish for the angler incentive program. To date, 150 Walleye have been implanted with coded wire tags, although we estimate about 20–60 are still at large due to known or estimated natural mortality. Remaining Walleye captured during netting were taken to local food banks. All Bull Trout were measured for total length and scanned for PIT tags. Live Bull Trout were implanted with a 12-mm PIT tag if they were not already tagged, revived in an oxygenated tank if necessary, assigned a condition score, and released. From all Bull Trout mortalities head length and body depth were measured, sex and maturity level determined, genetic samples, otoliths, scales, and fin rays were collected, pathogen samples taken, and stomach contents were described.

Walleye Angler Incentive Program

Anglers that caught Walleye from LPO had the option to turn the heads in to freezers already in place for the Lake Trout AIP. Heads were collected from freezers weekly and measured from the tip of the snout to the posterior edge of the operculum. Previously developed head-length to total-length relationships for Walleye in Lake Pend Oreille were used to extrapolate total length (Idaho Department of Fish and Game unpublished data). Anglers received one entry for each head submitted in a monthly drawing for 10 rewards ($100 each). Walleye heads were also scanned for a coded wire tag and, when present, the angler received a $1,000 reward.

RESULTS AND DISCUSSION

LAKE TROUT

Netting

A total of 6,221 Lake Trout were captured during 2021, all of which were removed from the lake. A total of 1,258 Bull Trout were also caught, with 289 of them being mortalities (23%). The number of Lake Trout removed by the netting program annually since 2006 is shown in Figure 2.

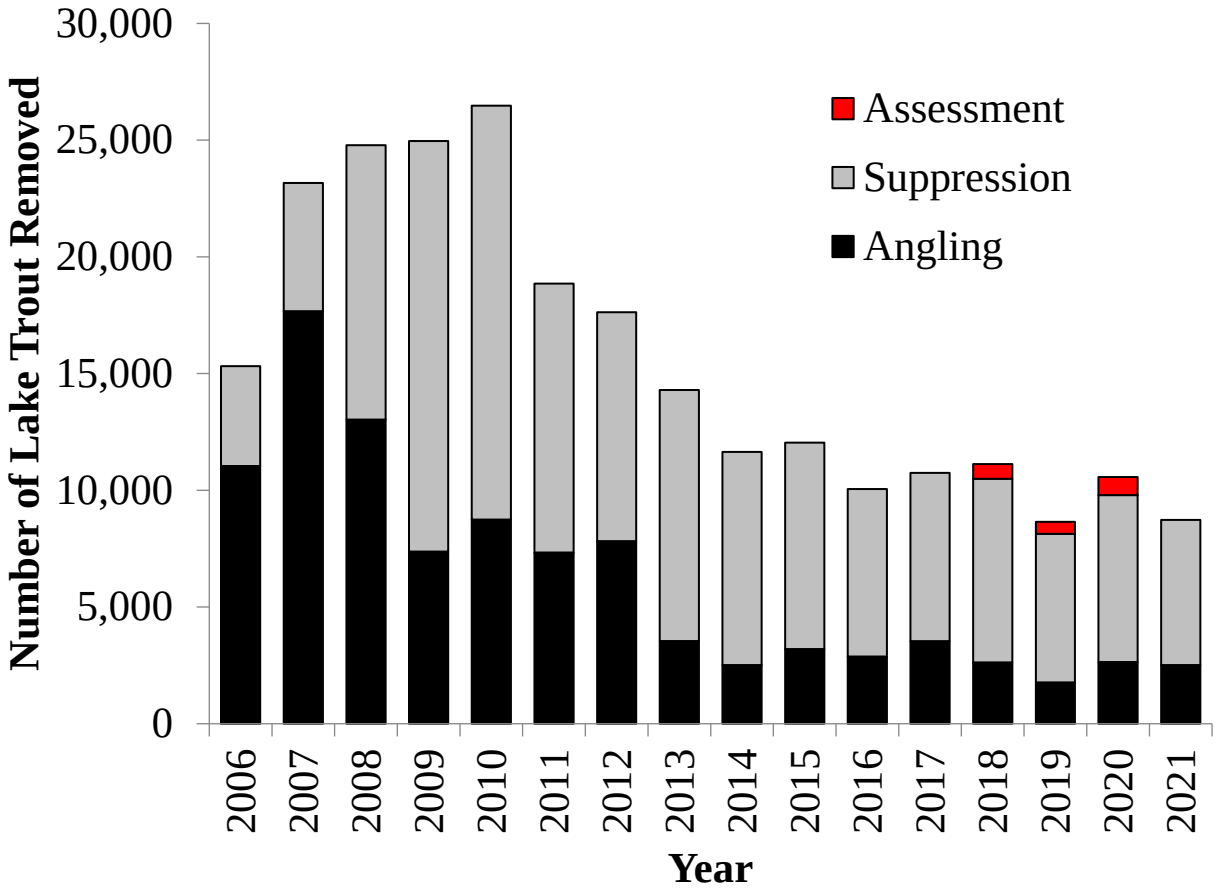

Figure 2. Number of Lake Trout removed during suppression netting, assessment netting, and by incentivized angling 2006–2021, Lake Pend Oreille, Idaho. Note: assessment netting for the 2021–2022 winter will occur in January 2022.

Data specific to the spring 2021 netting program are listed in Appendix A, fall 2021 netting program data are listed in Appendix B.

Angler Incentive Program

Anglers turned in a total of 2,509 Lake Trout heads in 2021 (Figure 2). This represented 29% of the total LKT removed from LPO in 2021. A total of 214 different anglers participated in the program in 2021. Seven LPO derbies were recipients of sponsorship funding. These were the Lake Pend Oreille Idaho Club Spring (April 23–May 2), Members Only (September 25–26), and Thanksgiving derbies (November 20–28); the Lake Pend Oreille Anglers Club Fall (November 3–7) derby; the Lake Pend Oreille Anglers Club Spring (May 21–23) derby; the Captn's Table Halloween (October 30–31) derby; and the Oktoberfish derby (October 2–3). The entire $2,000 for each derby was dedicated towards Lake Trout prizes. Data were collected from all submitted heads to describe the size structure of the fish harvested under this program.

In 2021, two Bull Trout were misidentified and submitted for payment as putative Lake Trout. Genetic samples were taken from both of these fish for species confirmation. The high

compliance (i.e., two misidentifications out of 2,509 heads turned in) by anglers participating in the AIP is indicative of the effectiveness of the ongoing species identification education efforts.

Data specific to the 2021 Lake Trout AIP are listed in Appendix C.

WALLEYE

Telemetry

From telemetry efforts, it was determined that Walleye were concentrated at two main areas during the spring: the Clark Fork River and delta, and from the Pack River mouth west to the eastern edge of Oden Bay. Walleye were more widely distributed during the summer period with loose concentrations of fish located in the Clark Fork River and delta, in shallow warmer bays including Denton Slough, Oden Bay and Kootenai Bay, and downstream to near the Sandpoint Bridges and into the Pend Oreille River. These data were regularly posted on the Idaho Department of Fish and Game (IDFG) website (https://idfg.idaho.gov/news/panhandle).

Netting

Gillnetting proved to be an effective method for capturing Walleye during the pre-spawn period. Walleye were concentrated in relatively shallow water and catch rates were relatively high while bycatch was reasonably low. A total of 319 Walleye was removed (Figure 3), with only four incidental Bull Trout mortalities.

Data specific to the 2021 Walleye Netting Program are listed in Appendix D.

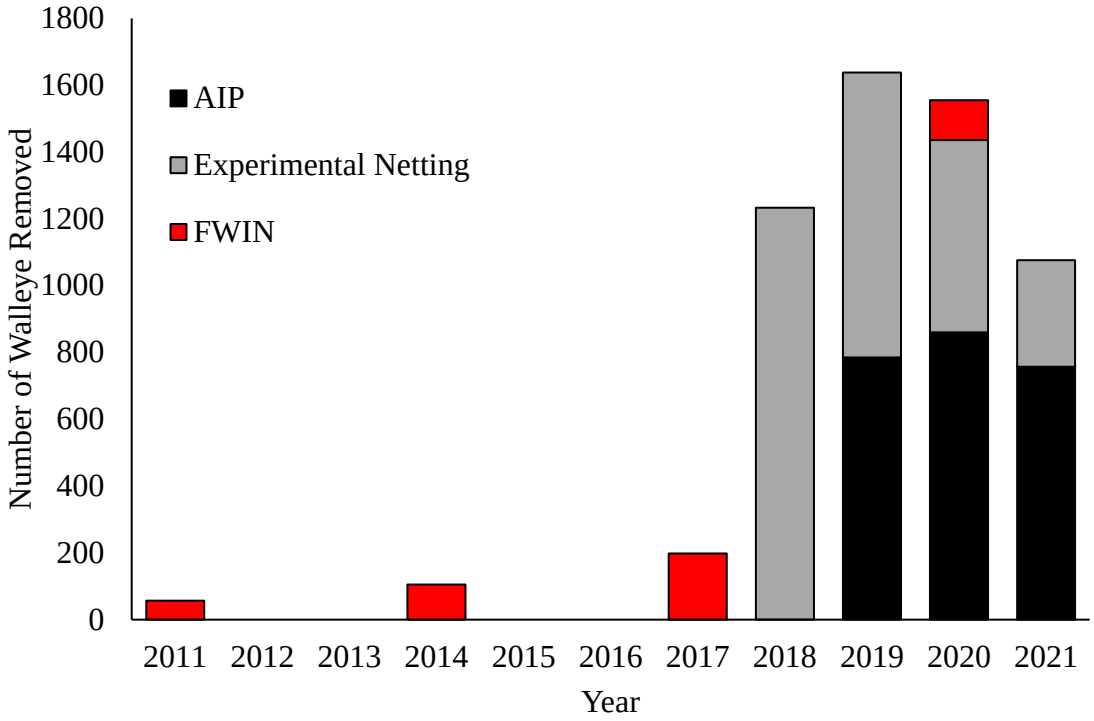

Figure 3. Number of Walleye removed during experimental suppression netting, FWIN surveys and by incentivized angling 2011–2021.

Angler Incentive Program
Anglers submitted 757 Walleye heads in 2021 (Figure 3). Six of the heads contained a coded wire tag. A total of 113 unique anglers participated in this program in 2021.

Data specific to the 2021 Walleye AIP are listed in Appendix E.

RECOMMENDATIONS

1. Continue Lake Trout suppression netting at the existing effort level
2. Continue to implement the Lake Trout random assessment netting program, but conduct it in early January instead of in December to avoid kokanee bycatch
3. Continue the Lake Trout AIP, including angler payouts and derby sponsorships
4. Continue investigating the use of netting to suppress the Walleye population
5. Continue investigating the Walleye AIP as a tool to suppress the Walleye population

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LITERATURE CITED

Corsi, M. P., M. J. Hansen, M. C. Quist, D. J. Schill, and A.M. Dux. 2019. Influences of Lake Trout (*Salvelinus namaycush*) and *Mysis diluviana* on kokanee (*Oncorhynchus nerka*) in Lake Pend Oreille, Idaho. Hydrobiologia 840:351–362.

Dux, A. M., M. J. Hansen, M. P. Corsi, N. C. Wahl, J. P. Fredericks, C.E. Corsi, D. J. Schill, and N. J. Horner. 2019. Effectiveness of Lake Trout (*Salvelinus namaycush*) suppression in Lake Pend Oreille, Idaho: 2006–2016. Hydrobiologia 840:319–333.

Fredericks, J., J. Davis, and N. Horner. 2003. Regional fisheries management investigations, Panhandle Region. Job Completion Report 02-53. Idaho Department of Fish and Game, Boise ID.

Hansen, M. J., D. Schill, J. Fredericks, and A. Dux. 2010. Salmonid predator-prey dynamics in Lake Pend Oreille, Idaho, USA. Hydrobiologia 650:85–100.

Hansen, M. J., M. P. Corsi, and A. M. Dux. 2019. Long-term suppression of the Lake Trout (*Salvelinus namaycush*) population in Lake Pend Oreille, Idaho. Hydrobiologia 840:335–349.

Horn, C., J. Hanson, T. Tholl, and K. Duffy. 2009. Noxon Reservoir Walleye Life History. Prepared for: Avista Corporation, Noxon MT.

McMahon, T. E., and D. H. Bennett. 1996. Walleye and northern pike: boost or bane to northwest fisheries?. Fisheries 21:6–13.

Morgan, G.E. 2002. Manual of Instructions – Fall Walleye Index Netting (FWIN). Laurentian University. Sudbury, Ontario Canada.

MFWP (Montana Fish, Wildlife and Parks). 2016. Ecology and Management of Montana Walleye Fisheries. Avista document identification number 2016-0449. Montana Cooperative Fishery Research Unit, Montana State University, Bozeman, Montana, and Montana Fish, Wildlife and Parks, Helena, Montana.

Rust, P., N. Mucciarone, S. M. Wilson, M. P. Corsi, and W. H. Harryman. 2020. Lake Pend Oreille Research, 2017 and 2018. Lake Pend Oreille Fishery Recovery Project Annual Progress Report, January 1, 2017–December 31, 2018. IDFG Report Number 20-01. Boise, ID.

Ryan, R., C. Watkins, A. Dux, T. J. Ross, J. Fennell, and R. Gary. 2020. Fishery Management Annual Report, Panhandle Region 2017. IDFG Report Number 20-107, Boise, ID.

Schoby, G. P., T. Bassista, and M. Maioline. 2007. Effects of Higher Winter Water Levels on the Pend Oreille River Fish Community. Lake Pend Oreille Recovery Project 2005 Annual Progress Report, Part 2. IDFG Report 07-15.

Wahl, N. C, A. M. Dux, W. J. Ament, and W. Harryman. 2013. Lake Pend Oreille Research, 2011. Annual Report to Bonneville Power Administration, Contract Number 52380. Report number 13-22, Portland, OR.

APPENDIX A. SPRING 2021 LPO LAKE TROUT NETTING SUMMARY

Spring 2021 LPO Lake Trout Netting Summary
1/04/2021–4/02/2021
Jeff Strait
05/28/2021
Overview

During spring 2021, gill netting effort was divided into two categories based on the primary target and the mesh sizes fished. We fished a combination of 1.5, 2.0, 2.5 and 3.0 inch (38.1, 50.8, 63.5, and 76.2 mm) mesh gill nets to target juvenile Lake Trout (*Salvelinus namaycush*, hereafter, Small Mesh) and 5.0 and 5.5 inch (127 and 139.7 mm) mesh gill nets to target adult Lake Trout (hereafter, Large Mesh). In the Small Mesh sets, a total of 2,705 Lake Trout were removed ranging from 116 mm to 902 mm total length using an effort of 576,000 ft (175,564.8 m) of net. In the Large Mesh sets, a total of 579 Lake Trout were removed ranging from 383 mm to 985 mm total length using an effort of 561,300 ft (171,084.2 m) of net. A grand total of 3,284 Lake Trout were removed during the spring 2021 netting season.

As part of the bycatch during these efforts, fifteen different species were captured including Endangered Species Act Threatened Bull Trout (*Salvelinus confluentus*). A total of 230 Bull Trout were captured during the Lake Trout suppression efforts with an average direct mortality rate of 16.5%. We PIT tagged 123 and recaptured 79 previously tagged Bull Trout. Bull Trout condition was broken down as following:

- Good = 149
- Fair = 21
- Poor = 11
- Not Reported = 11
- Mortalities = 38 (mort recaps = 10)

In addition to the mark-recapture data collection for Bull Trout, we also collected 230 genetic samples from tagged and released Bull Trout and 15 samples from Pygmy Whitefish (*Prosopium coulterii*).

The following tables and figures provide summary information on catch and bycatch from gill net efforts during the complete spring 2021 netting season.

Tables

Table 1: Summary of the spring 2021 gillnetting from Large Mesh and Small Mesh sets. For each species, statistics include the number captured (Captured), released alive (Released), tagged with PIT tags (Tagged), recaptured PIT-tagged (Recaptured), and removed from LPO (Removed). For species other than Lake Trout, Walleye, or Northern Pike, the number of individuals removed represents fish that were "dead on capture".

Set Type	Species	Captured	Released	Tagged	Recaptured	Removed
Large Mesh	Lake Trout	579	0	0	2	579
Large Mesh	Bull Trout	102	92	62	40	10
Large Mesh	Brown Trout	18	16	0	0	2
Large Mesh	Kokanee	4	1	0	0	3
Large Mesh	Walleye	4	0	0	0	4
Large Mesh	Rainbow Trout	2	1	0	0	1
Large Mesh	Channel Catfish	1	1	0	0	0
Large Mesh	Northern Pike	1	0	0	0	1
Large Mesh	Smallmouth Bass	1	1	0	0	0
Small Mesh	Lake Trout	2,705	0	0	0	2,705
Small Mesh	Bull Trout	128	100	89	39	28
Small Mesh	kokanee	19	17	0	0	2
Small Mesh	Pygmy Whitefish	15	3	0	0	12
Small Mesh	Westslope Cutthroat Trout	10	7	0	0	3
Small Mesh	Yellow Perch	5	5	0	0	0
Small Mesh	Rainbow Trout	4	3	0	0	1
Small Mesh	Brown Trout	2	1	0	0	1
Small Mesh	Northern Pike	2	1	0	0	1
Small Mesh	Brook Trout X Bull Trout	1	1	0	0	0
Small Mesh	Rainbow X Cutthroat Trout	1	0	0	0	1

Table -2: Totals of the spring 2021 gillnetting statistics for both Large Mesh and Small Mesh netting. For each species, statistics include the number captured (Captured), released alive (Released), tagged with PIT tags (Tagged), recaptured PIT-tagged (Recaptured), and removed from LPO (Removed). For species other than Lake Trout, Walleye, or Northern Pike, the number of individuals removed represents fish that were "dead on capture".

Species	Captured	Released	Tagged	Recaptured	Removed
Lake Trout	3,284	0	0	2	3,284
Bull Trout	230	192	151	79	38
kokanee	23	18	0	0	5
Brown Trout	20	17	0	0	3
Pygmy Whitefish	15	3	0	0	12
Westslope Cutthroat Trout	10	7	0	0	3
Rainbow Trout	6	4	0	0	2
Yellow Perch	5	5	0	0	0
Walleye	4	0	0	0	4
Northern Pike	3	1	0	0	2
Brook Trout X Bull Trout	1	1	0	0	0
Channel Catfish	1	1	0	0	0
Rainbow X Cutthroat Trout	1	0	0	0	1
Smallmouth Bass	1	1	0	0	0

Table 3: Summary of length data for Lake Trout (LKT), Bull Trout (BLT), and Bull Trout mortalities (BLT Mortalities) captured in gillnets during the spring 2021.

Set Type	Species	Mean TL	SE	Max TL	Min TL
Large Mesh	BLT	604.7	8.4	860	410
Large Mesh	BLT Mortalities	592.4	18.7	669	516
Large Mesh	LKT	623.6	3.6	985	383
Small Mesh	BLT	466.9	12.9	855	173
Small Mesh	BLT Mortalities	427.0	18.6	641	265
Small Mesh	LKT	330.5	1.4	902	116

Table 4: Catch data for Lake Trout, Bull Trout, and Bull Trout mortalities from Large Mesh, Small Mesh, and all gillnets combined (S21 All Nets) during the spring 2021. These statistics include the total number of Lake Trout (LKT), live Bull Trout (BLT), Bull Trout mortalities (BLT Morts), the mean catch ratios of Lake Trout to live Bull Trout (LKT:BLT), Lake Trout to Bull Trout mortalities (LKT:BLT Morts), and the mean proportion of Bull Trout captures that resulted in direct mortality (Prop Morts).

	LKT	BLT	BLT Morts	LKT:BLT	LKT:BLT Morts	Prop Morts
Large Mesh	579	92	10	6.29	57.90	0.11
Small Mesh	2,705	100	28	27.05	96.61	0.28
S21 All Nets	3,284	192	38	17.10	86.42	0.20

Table 5: Catch per unit effort statistics for Lake Trout, Bull Trout, and Bull Trout mortalities from Large Mesh, Small Mesh, and all gillnets combined (S21 All Nets) during the spring 2021. These statistics include the total number of 274m gillnet panels fished (Effort), and the Mean and SE of daily catch per unit effort (# fish / 274 m of net) for Lake Trout (LKT CPUE, LKT SE), Bull Trout (BLT CPUE, BLT SE), and Bull Trout mortalities (BLT Mort CPUE, BLT Mort SE).

	Effort	LKT CPUE	LKT SE	BLT CPUE	BLT SE	BLT Mort CPUE	BLT Mort SE
Large Mesh	623.67	0.97	0.11	0.16	0.03	0.02	0.01
Small Mesh	640.00	3.77	0.26	0.14	0.02	0.04	0.01
S21 All Nets	1,263.67	2.64	0.18	0.15	0.02	0.03	0.01

Table 6: Catch data for Lake Trout, Bull Trout, and Bull Trout mortalities for each gillnet mesh size (inches) fished during the spring 2021. These statistics include the total number of Lake Trout (LKT), live Bull Trout (BLT), Bull Trout mortalities (BLT Morts), the mean catch ratios of Lake Trout to live Bull Trout (LKT:BLT), Lake Trout to Bull Trout mortalities (LKT:BLT Morts), and the mean proportion of Bull Trout captures that resulted in direct mortality (Prop Morts).

Mesh Size (in)	LKT	BLT	BLT Morts	LKT:BLT	LKT:BLT Morts	Prop Morts
5.5	309	57	4	5.42	77.25	0.07
5	270	35	6	7.71	45.00	0.17
3	85	10	1	8.50	85.00	0.10
2.5	1,371	50	15	27.42	91.40	0.30
2	1,177	40	12	29.43	98.08	0.30
1.5	72	0	0	NA	NA	NA

Table 7: Catch per unit effort statistics for Lake Trout, Bull Trout, and Bull Trout mortalities for each gillnet mesh size (inches) fished during the spring 2021. These statistics include the total number of 274m gillnet panels fished (Effort), and the Mean and SE of daily catch per unit effort (# fish / 274 m of net) for Lake Trout (LKT CPUE, LKT SE), Bull Trout (BLT CPUE, BLT SE), and Bull Trout mortalities (BLT Mort CPUE, BLT Mort SE).

Mesh Size (in)	Effort	LKT CPUE	LKT SE	BLT CPUE	BLT SE	BLT Mort CPUE	BLT Mort SE
5.5	389.33	0.81	0.12	0.15	0.02	0.01	0.01
5	234.33	1.13	0.18	0.17	0.05	0.03	0.01
3	50.00	1.63	0.34	0.21	0.07	0.04	0.04
2.5	314.00	4.37	0.36	0.16	0.03	0.05	0.01
2	244.00	4.92	0.55	0.16	0.03	0.05	0.01
1.5	32.00	2.25	0.55	0.00	0.00	0.00	0.00

Figures

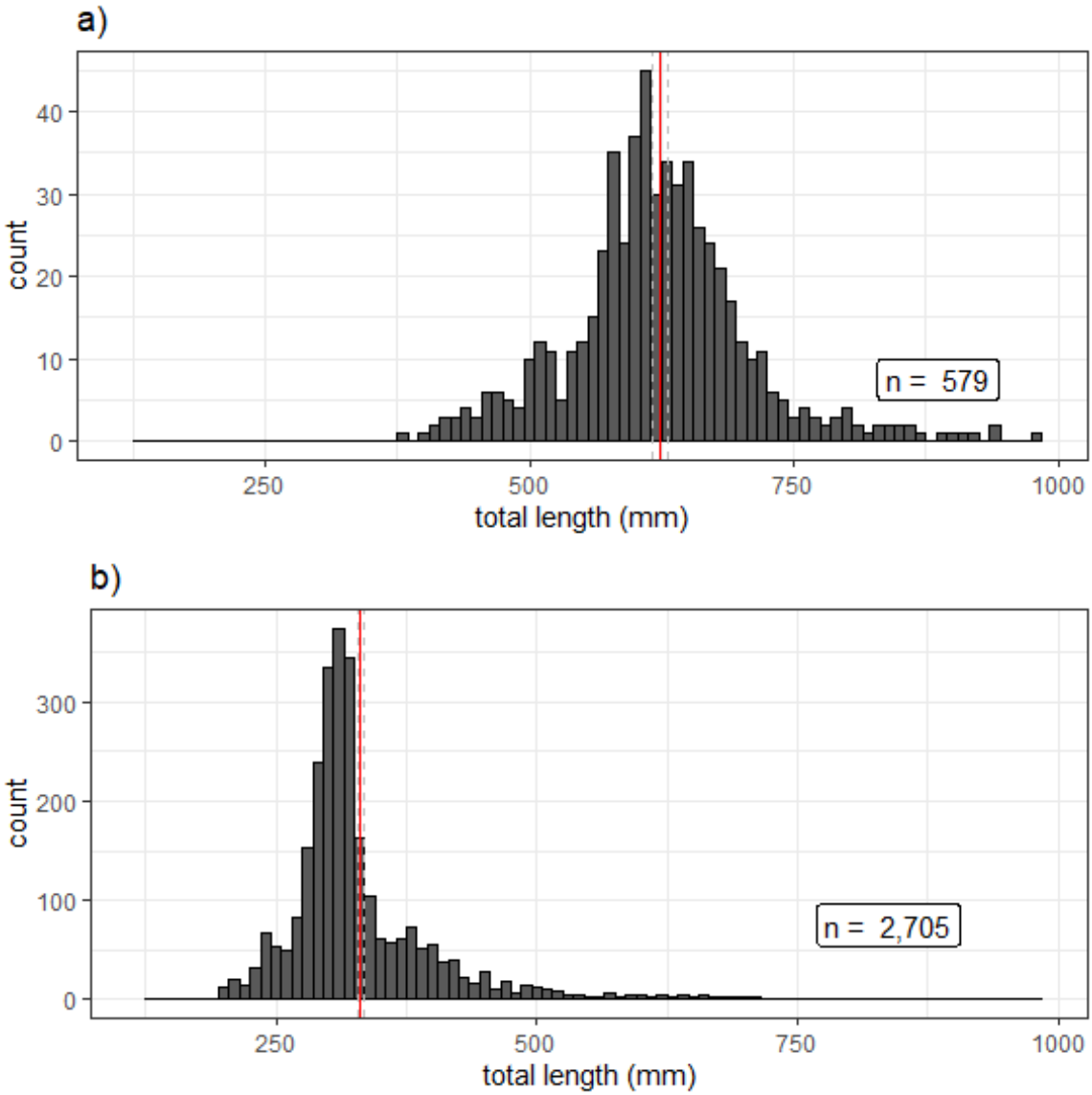

Figure 1: Length frequencies of Lake Trout captured in gillnets during Spring 2021 Large Mesh (a) and Small Mesh (b) netting efforts. Vertical red lines represent the sample mean length for each group and the dashed grey lines represent two standard errors above and below the sample mean.

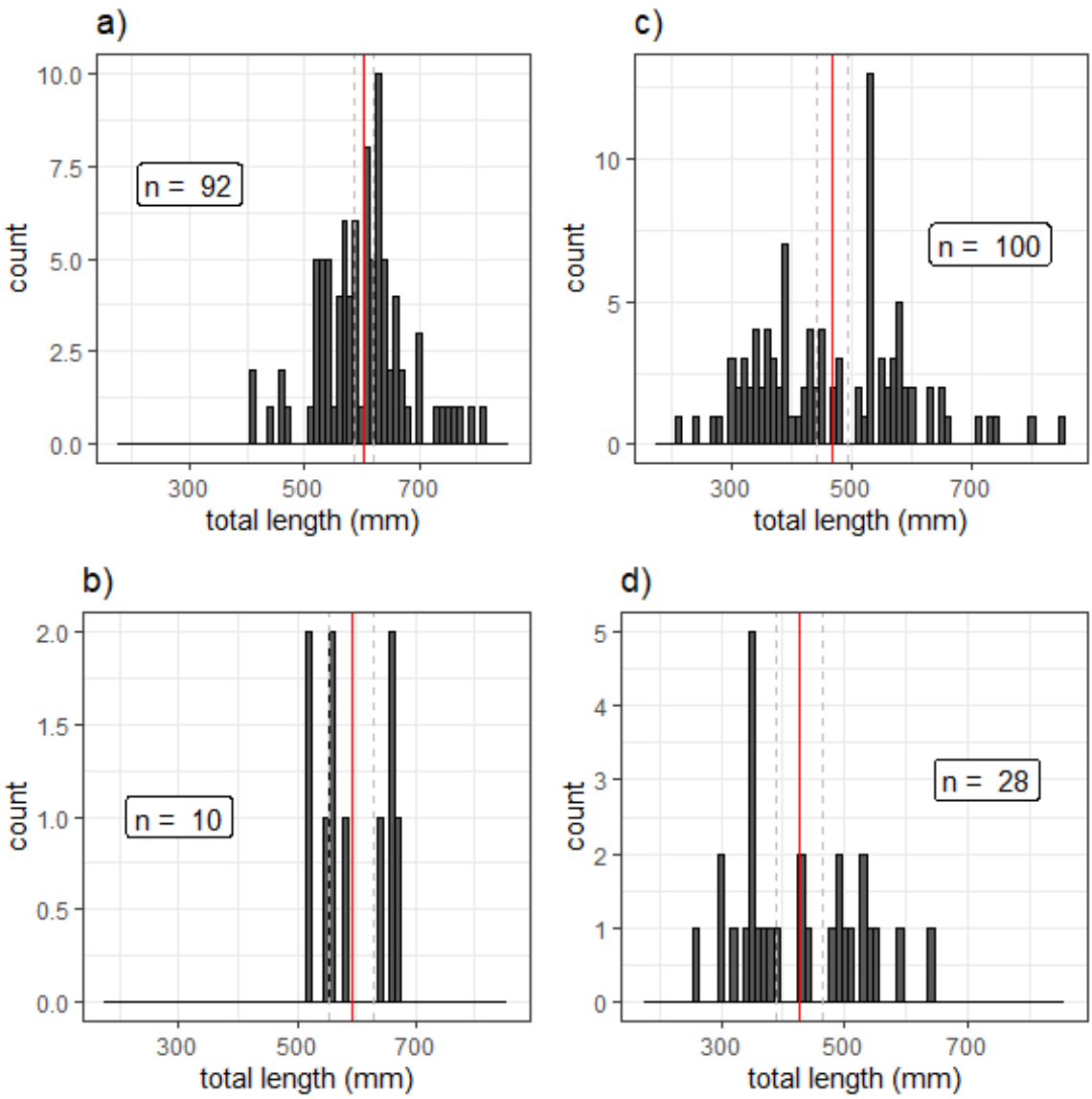

Figure 2: Length frequencies of Bull Trout captured in gillnets during Spring 2021 netting efforts. Panels a) and b) are the length frequencies of Bull Trout released alive in the Large Mesh and Small Mesh netting efforts, respectively. Panels c) and d) are the length frequencies of Bull Trout mortalities in the Large Mesh and Small Mesh netting efforts, respectively. Vertical red lines represent the sample mean length for each group and the dashed grey lines represent two standard errors above and below the sample mean.

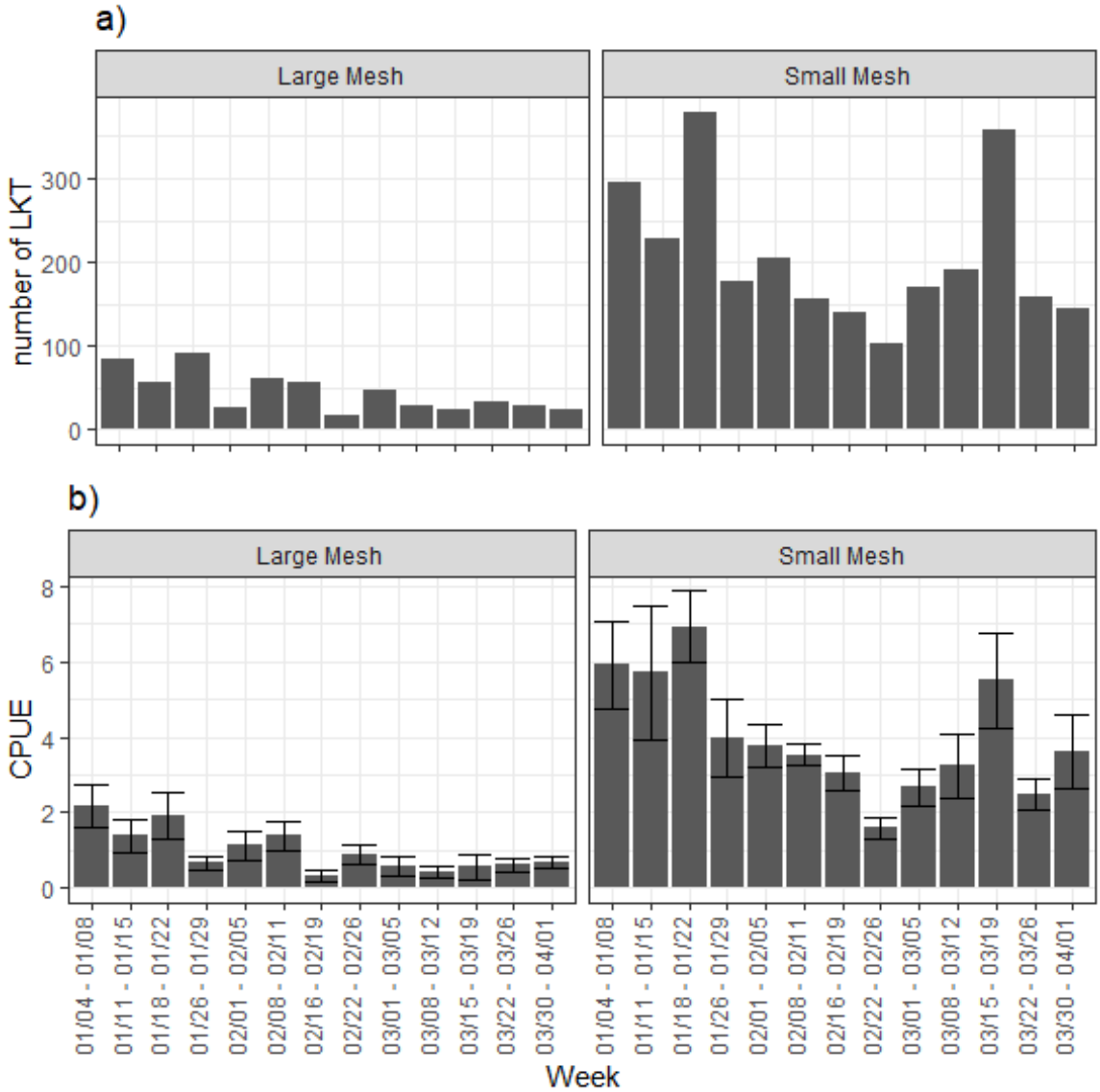

Figure 3: Weekly catch (a) and mean weekly CPUE (b, with SE bars) of Lake Trout captured during the Spring 2021 gillnetting efforts.

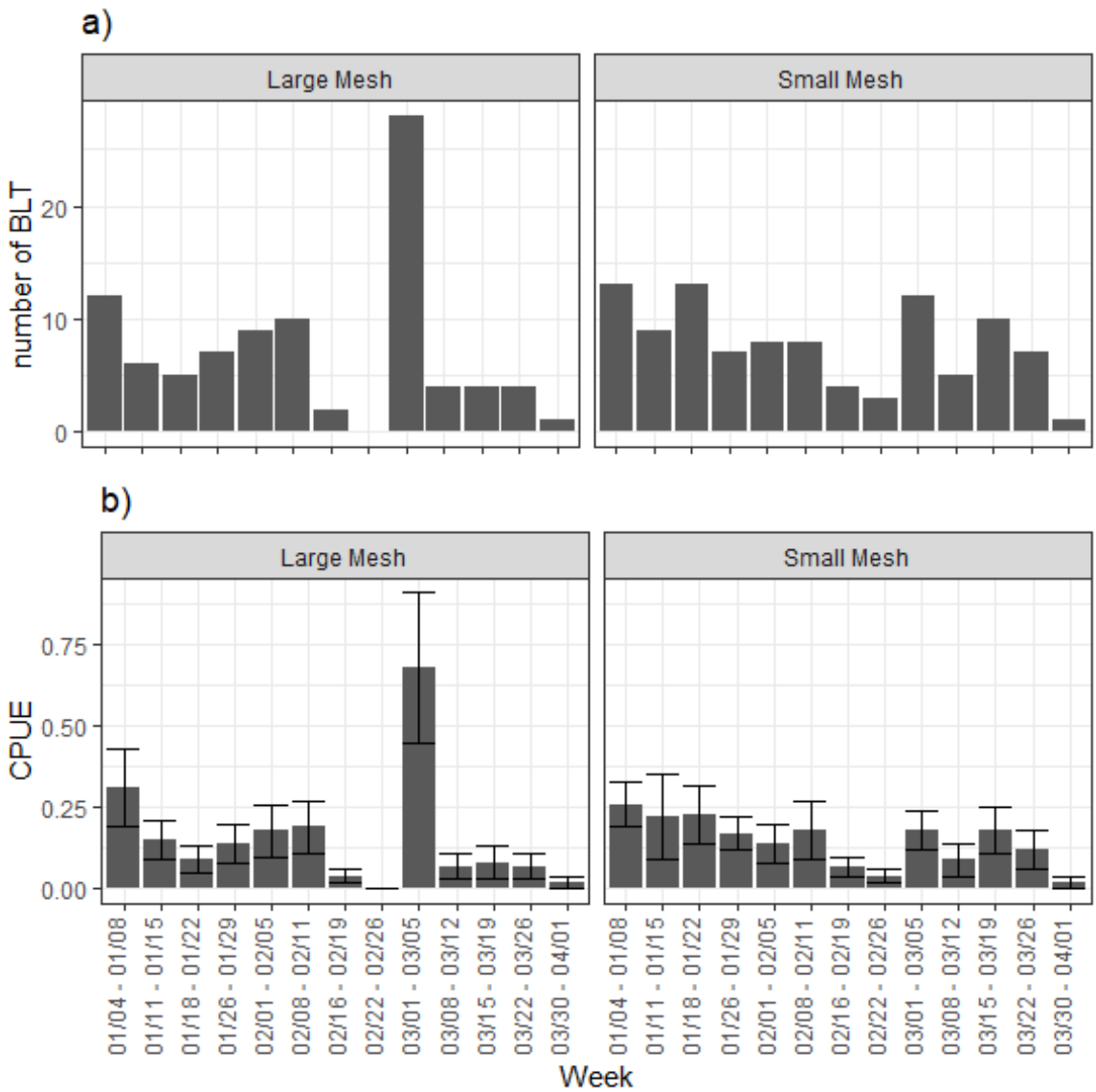

Figure 4: Weekly catch (a) and mean weekly CPUE (b, with SE bars) of Bull Trout captured and released alive during the spring 2021 gillnetting efforts.

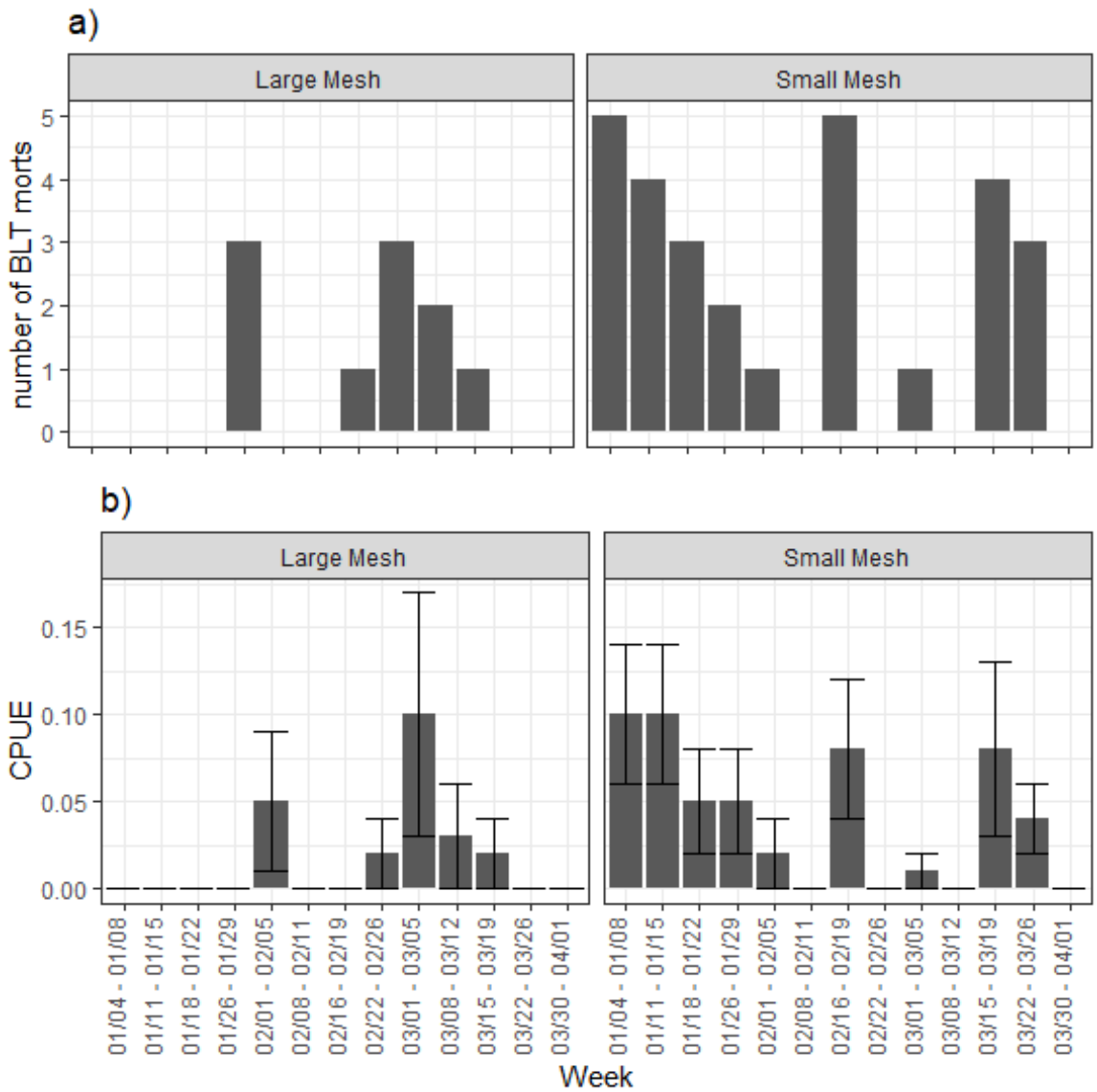

Figure 5: Weekly catch (a) and mean weekly CPUE (b, with SE bars) of direct Bull Trout mortalities during the spring 2021 gillnetting efforts.

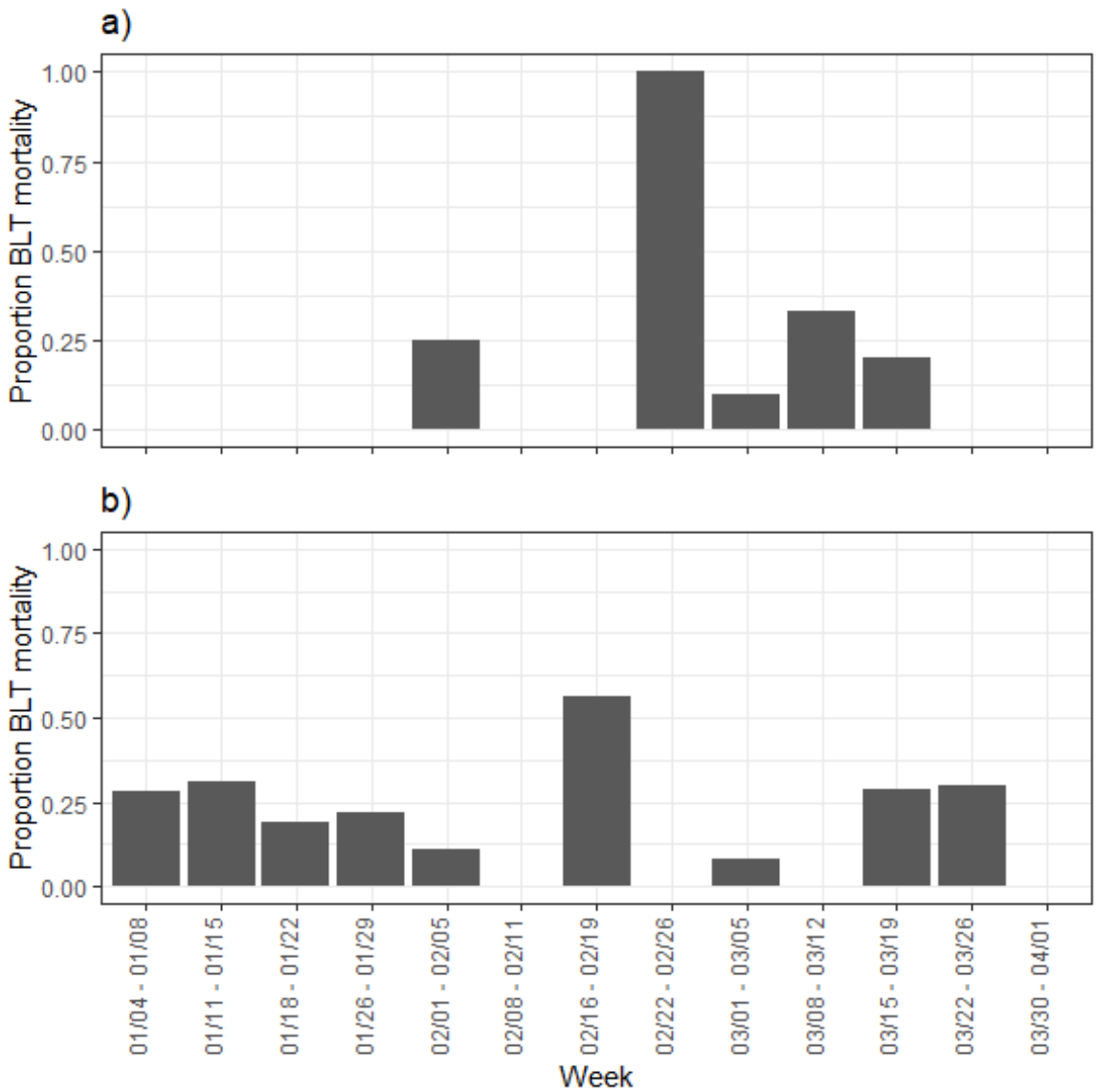

Figure 6: Proportion bycatch resulting in direct mortalities for Bull Trout captured in Large Mesh (a) and Small Mesh (b) netting during the spring 2021 gillnetting efforts.

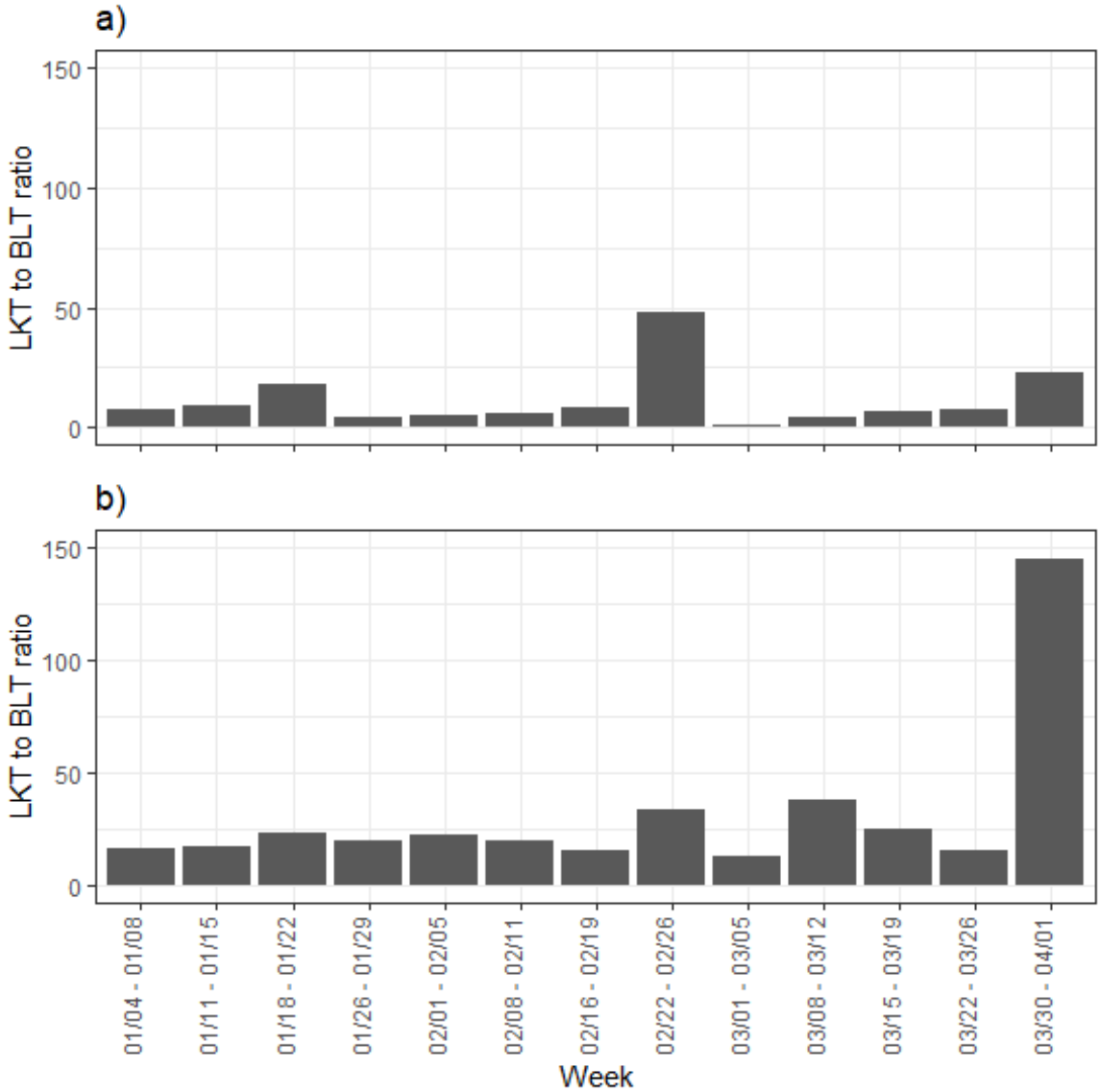

Figure 7: Lake Trout to Bull Trout catch ratios in Large Mesh (a) and Small Mesh (b) netting during the spring 2021 gillnetting efforts.

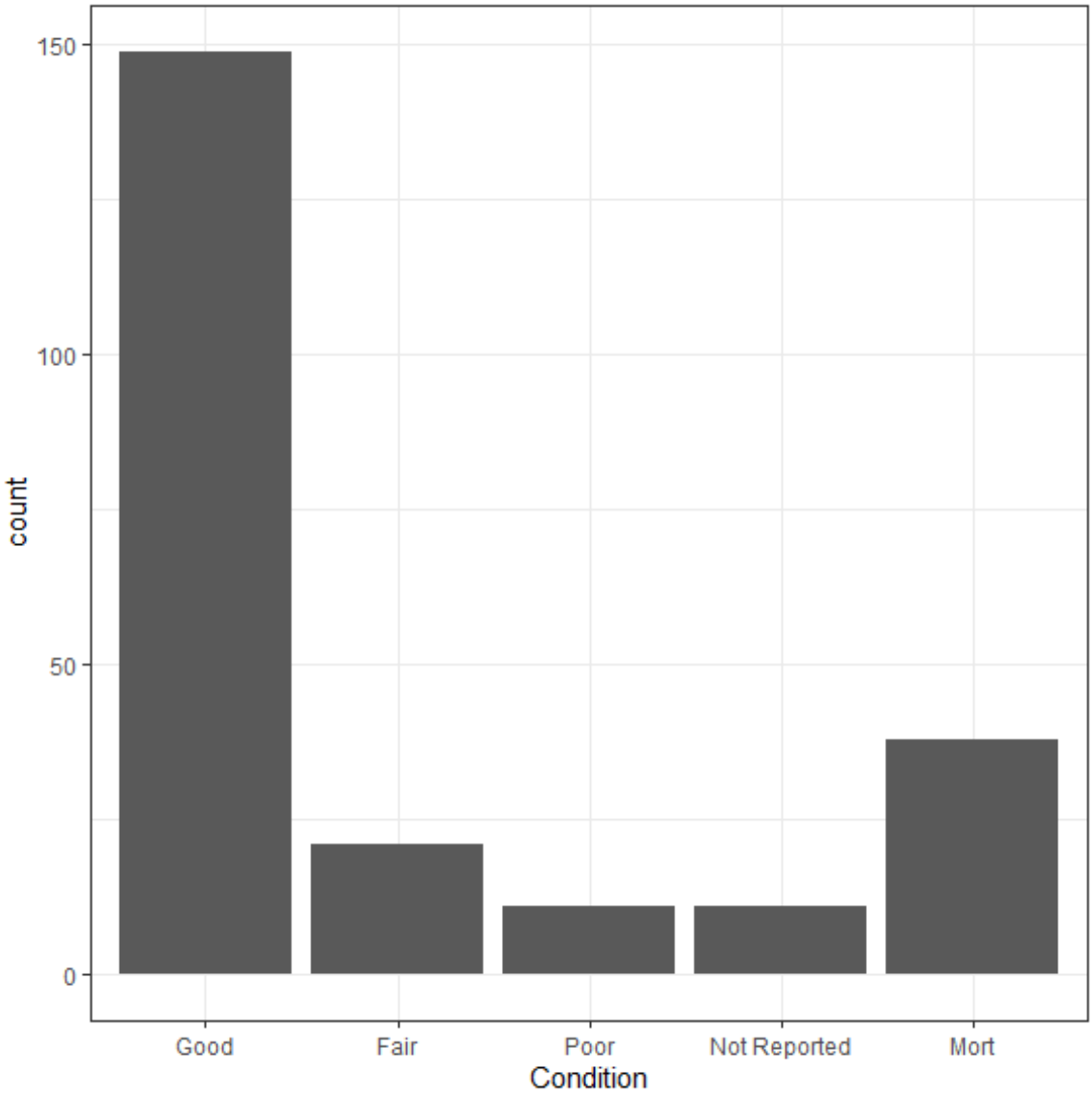

Figure 8: Condition index of Bull Trout captured during Spring 2021 netting efforts.

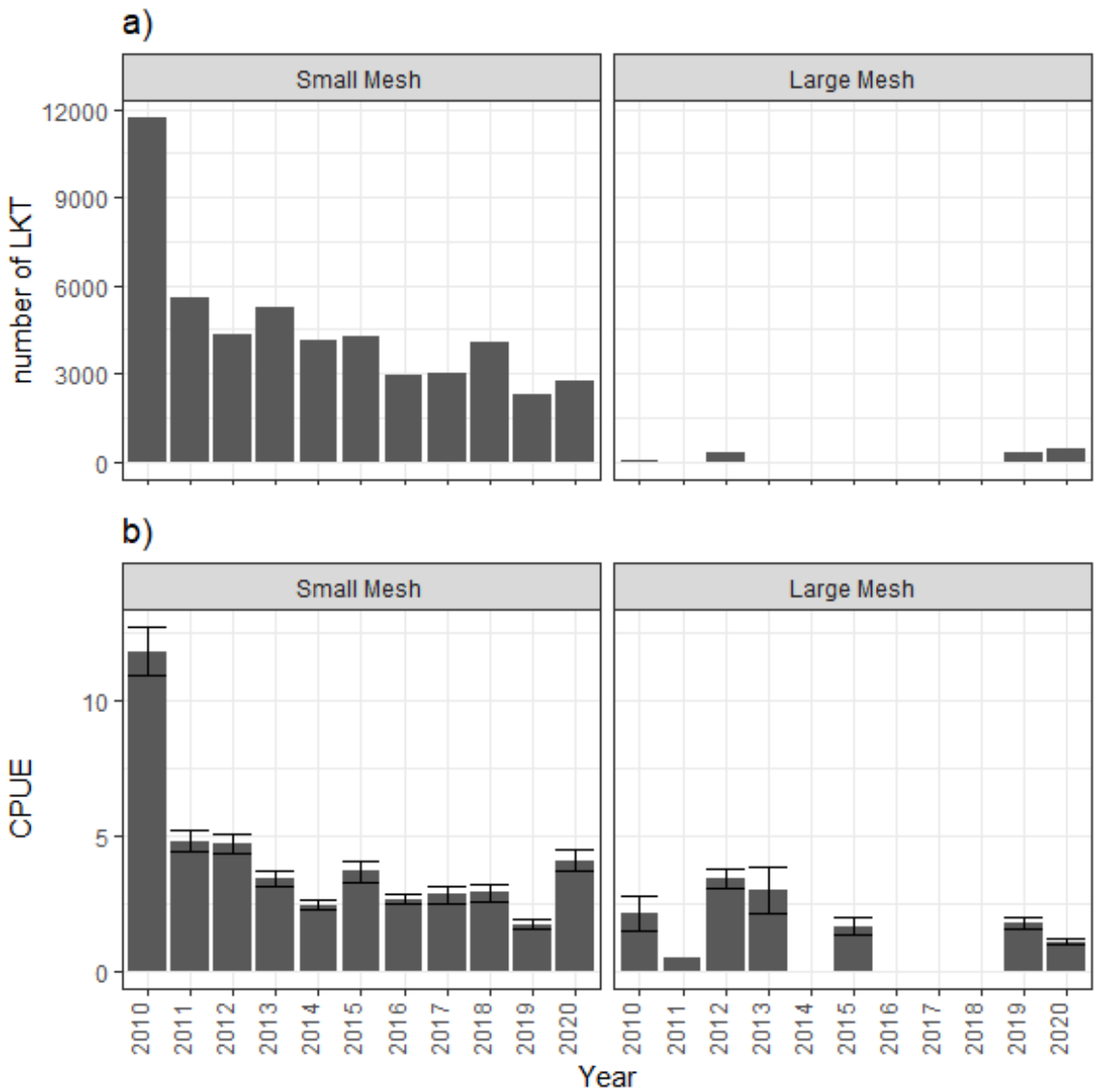

Figure 9: Annual catch (a) and mean CPUE (b) of Lake Trout in large and small mesh gillnetting efforts during the designated spring netting season from 2010-present.

APPENDIX B. FALL 2021 LPO LAKE TROUT NETTING SUMMARY

Fall 2021 LPO Lake Trout Netting Summary
9/7/2021–12/17/2021
Jeff Strait
12/22/2021
Overview

During the fall 2021, gillnet effort was divided into two categories based on the primary target and the mesh sizes fished. From 09/07 to 10/26 we targeted spawning Lake Trout (*Salvelinus namaycush*) using 5.5 and 5.0 inch (139.7 mm and 127 mm) mesh gillnets (hereafter, Spawner). In the Spawner gillnetting sets, a total of 1,264 Lake Trout were removed ranging from 211mm to 1005mm total length using an effort of 690,800 ft (210555.84m) of net.

From 10/27 to 12/17 we fished 2.5 and 2.0 inch (63.5 mm and 50.8 mm) mesh gillnets to target juvenile Lake Trout in the nurseries. For the remainder of the fall 2021 from 11/29 to 12/17, we fished a combination of large (5.0 and 5.5 inch) and small (2.0 and 2.5 inch) mesh gillnets targeting juvenile and adult Lake Trout in the nurseries (hereafter, LKT Suppression - Large Mesh or Small Mesh). In the LKT suppression gillnetting sets a total of 2,369 Lake Trout were removed ranging from 210 mm to 835 mm total length using an effort of 566,100 ft (172,547.28 m) of net. A grand total of 2,937 Lake Trout were removed during the fall 2021 netting season. We also recaptured 5 previously sonic-tagged Lake Trout at spawning locations.

As part of the bycatch during these efforts, twelve different species were captured including Endangered Species Act Threatened Bull Trout (*Salvelinus confluentus*). A total of 1,028 Bull Trout were captured during the Lake Trout suppression efforts with an average direct mortality rate of 24.42%. We PIT tagged 573 and recaptured 234 previously tagged Bull Trout. Bull Trout condition was broken down as following:

- Good = 687
- Fair = 71
- Poor = 18
- Not Reported = 1
- Mortalities = 251 (mort recaps = 41)

In addition to tagging Bull Trout, we collected tissue samples for genetic analysis from 586 of the released Bull Trout.

We used the high instances of bycatch to tag Smallmouth Bass (*Micropterus dolomeiu*) and Gerrard-strain Rainbow Trout (*Oncorhynchus mykiss*) with non-reward and reward Floy T-bar tags. We tagged a total of 45 Smallmouth Bass, including 38 with reward tags. We recaptured 1 Smallmouth Bass. We tagged a total of 38 Rainbow Trout, including 34 with reward tags. We recaptured 0 Rainbow Trout.

- SMB tagged = 45
- SMB reward tags = 38
- SMB recaps = 1
- RBT tagged = 38
- RBT reward tags = 34
- RBT recaps = 0

The following tables and figures provide summary information on catch and bycatch from gill net efforts during the complete fall 2021 netting season.

Tables

Table 1: Summary of the fall 2021 Spawner and general LKT Suppression gillnetting sets. For each species, statistics include the number captured (Captured), released alive (Released), tagged with PIT or T-Bar tags (Tagged), recaptured previously tagged fish (Recaptured), and removed from LPO (Removed). For species other than Lake Trout, Walleye, and Northern Pike, the number of individuals removed represents fish that were "dead on capture".

Project	Species	Captured	Released	Tagged	Recaptured	Removed
Spawner	Lake Trout	1,264	0	0	5	1,264
	Bull Trout	454	356	218	159	98
	Smallmouth Bass	81	81	44	1	0
	Rainbow Trout	69	36	36	0	33
	Walleye	22	0	0	0	22
	Brown Trout	15	11	0	0	4
	kokanee	9*	2	0	0	7*
	Westslope Cutthroat Trout	7	3	0	0	4
	Rainbow X Cutthroat Trout	1	0	0	0	1
	Yellow Perch	1	1	0	0	0
Small Mesh	Lake Trout	1,372	0	0	0	1,372
	Bull Trout	533	385	338	56	148
	Kokanee	82	54	0	0	28
	Northern Pike	3	0	0	0	3
	Walleye	3	0	0	0	3
	Rainbow Trout	2	0	0	0	2
	Westslope Cutthroat Trout	1	1	0	0	0
	Yellow Perch	1	1	0	0	0
Large Mesh	Lake Trout	301	0	0	0	301
	Bull Trout	41	35	17	19	6
	kokanee	18	12	0	0	6
	Brown Trout	3	2	0	0	1
	Rainbow Trout	2	2	2	0	0
	Smallmouth Bass	1	1	1	0	0
	Walleye	1	0	0	0	1

*Plus roughly 3,000 kokanee that were caught and released (mostly dead) back into the lake on 10/19/2021 near Bernard Beach

Table 2: Combined totals of the fall 2021 Spawner and general LKT Suppression gillnetting sets. For each species, statistics include the number captured (Captured), released alive (Released), tagged with PIT tags (Tagged), recaptured PIT-tagged (Recaptured), and removed from LPO (Removed). For species other than Lake Trout, Walleye, and Northern Pike, the number of individuals removed represents fish that were "dead on capture".

Species	Captured	Released	Tagged	Recaptured	Removed
Lake Trout	2,937	0	0	5	2,937
Bull Trout	1,028	776	573	234	252
kokanee	109*	68	0	0	41*
Smallmouth Bass	82	82	45	1	0
Rainbow Trout	73	38	38	0	35
Walleye	26	0	0	0	26
Brown Trout	18	13	0	0	5
Westslope Cutthroat Trout	8	4	0	0	4
Northern Pike	3	0	0	0	3
Yellow Perch	2	2	0	0	0
Rainbow X Cutthroat Trout	1	0	0	0	1

*Plus roughly 3,000 kokanee that were caught and released (mostly dead) back into the lake on 10/19/2021 near Bernard Beach

Table 3: Summary of length (mm) data for Lake Trout, Bull Trout, and Bull Trout mortalities captured during the fall 2021 designated Spawner, 2.0 and 2.5 inch mesh LKT Suppression ("Small Mesh"), and 5.0 and 5.5 inch mesh LKT Suppression ("Large Mesh") gillnetting efforts.

Project	Species	Mean TL	SE	Max TL	Min TL
Spawner	BLT	558.1	6.1	871	235
	BLT Mortalities	538.1	12.0	960	296
	LKT	645.8	3.0	1005	211
Small Mesh	BLT	358.8	5.0	699	191
	BLT Mortalities	348.3	4.8	566	240
	LKT	308.6	1.5	728	210
Large Mesh	BLT	573.8	12.6	714	325
	BLT Mortalities	641.4	42.9	749	527
	LKT	590.1	5.0	835	255

Table 4: Catch data for Lake Trout, Bull Trout, and Bull Trout mortalities from Spawner, 2.0 and 2.5 inch mesh LKT Suppression ("Small Mesh"), 5.0 and 5.5 inch mesh LKT Suppression ("Large Mesh"), and all gillnets combined (All Nets) during the fall 2021. These statistics include the total number of Lake Trout (LKT), live Bull Trout (BLT), direct Bull Trout mortalities (BLT Morts), the mean catch ratios of Lake Trout to live Bull Trout (LKT:BLT), Lake Trout to Bull Trout mortalities (LKT:BLT Morts), and the mean proportion of Bull Trout captures that resulted in direct mortality (Prop Morts).

	LKT	BLT	BLT Morts	LKT:BLT	LKT:BLT Morts	Prop Morts
Spawner	1264	356	98	3.55	12.90	0.22
Small Mesh	1372	385	148	3.56	9.27	0.28
Large Mesh	301	35	5	8.60	60.20	0.12
All Nets	2937	776	251	3.78	11.70	0.24

Table 5: Catch Per Unit Effort statistics for Lake Trout, Bull Trout, and Bull Trout mortalities from Spawner, 2.0 and 2.5 inch mesh LKT Suppression ("Small Mesh"), 5.0 and 5.5 inch mesh LKT Suppression ("Large Mesh"), and all gillnets combined (All Nets) during the fall 2021. These statistics include the total number of 274m gillnet panels fished (Effort), and the Mean and SE of daily catch per unit effort (# fish / 274m of net) for Lake Trout (LKT CPUE, LKT SE), Bull Trout (BLT CPUE, BLT SE), and direct Bull Trout mortalities (BLT Mort CPUE, BLT Mort SE).

	Effort	LKT CPUE	LKT SE	BLT CPUE	BLT SE	BLT Mort CPUE	BLT Mort SE
Spawner	767.56	1.69	0.17	0.50	0.04	0.13	0.02
Small Mesh	480.00	2.89	0.34	0.76	0.06	0.29	0.02
Large Mesh	149.00	2.11	0.24	0.24	0.05	0.04	0.02
All Nets	1396.56	2.04	0.14	0.53	0.03	0.16	0.01

Table 6: Catch data for Lake Trout, Bull Trout, and Bull Trout mortalities for each gillnet mesh size (inches) fished during the fall 2021. These statistics include the total number of Lake Trout (LKT), live Bull Trout (BLT), Bull Trout mortalities (BLT Morts), the mean catch ratios of Lake Trout to live Bull Trout (LKT:BLT), Lake Trout to Bull Trout mortalities (LKT:BLT Morts), and the mean proportion of Bull Trout captures that resulted in direct mortality (Prop Morts).

Mesh Size (in)	LKT	BLT	BLT Morts	LKT:BLT	LKT:BLT Morts	Prop Morts
5.5	727	175	40	4.15	18.18	0.19
5.0	838	216	63	3.88	13.30	0.23
2.5	670	222	74	3.02	9.05	0.25
2.0	702	163	74	4.31	9.49	0.31

Table 7: Catch Per Unit Effort statistics for Lake Trout, Bull Trout, and Bull Trout mortalities for each gillnet mesh size (inches) fished during the fall 2021. These statistics include the total number of 274 m gillnet panels fished (Effort), and the Mean and SE of daily catch per unit effort (# fish / 274 m of net) for Lake Trout (LKT CPUE, LKT SE), Bull Trout (BLT CPUE, BLT SE), and Bull Trout mortalities (BLT Mort CPUE, BLT Mort SE).

Mesh Size (in)	Effort	LKT CPUE	LKT SE	BLT CPUE	BLT SE	BLT MORT CPUE	BLT MORT SE
5.5	473.00	1.57	0.18	0.39	0.05	0.09	0.01
5.0	443.56	1.94	0.23	0.52	0.06	0.14	0.03
2.5	240.00	2.75	0.38	0.88	0.10	0.29	0.04
2.0	240.00	3.03	0.57	0.64	0.07	0.29	0.03

Figures

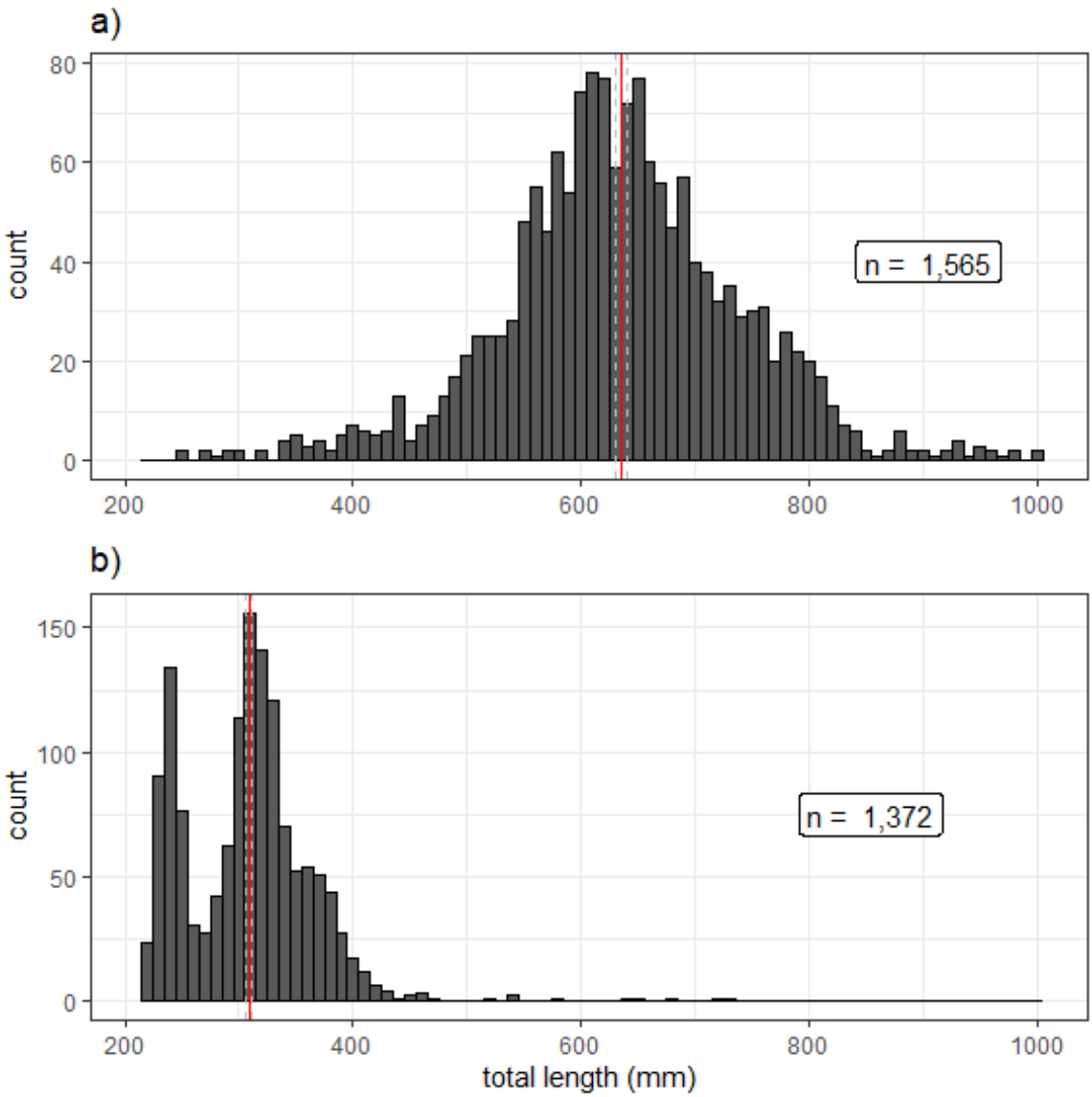

Figure 1: Length frequency distributions of Lake Trout captured in large (5.0 and 5.5 inch) (a) and small mesh gillnets (2.0 and 2.5 inch) (b) during fall 2021 Spawner and LKT Suppression netting efforts. The vertical red lines represent the mean total length (mm) for each group and the dashed grey lines represent two standard errors above and below the sample mean. Note: Panel a) represents the length frequency for LKT captured during the designated Spawner and those captured with large mesh (5.0 and 5.5 inch) during the LKT Suppression periods.

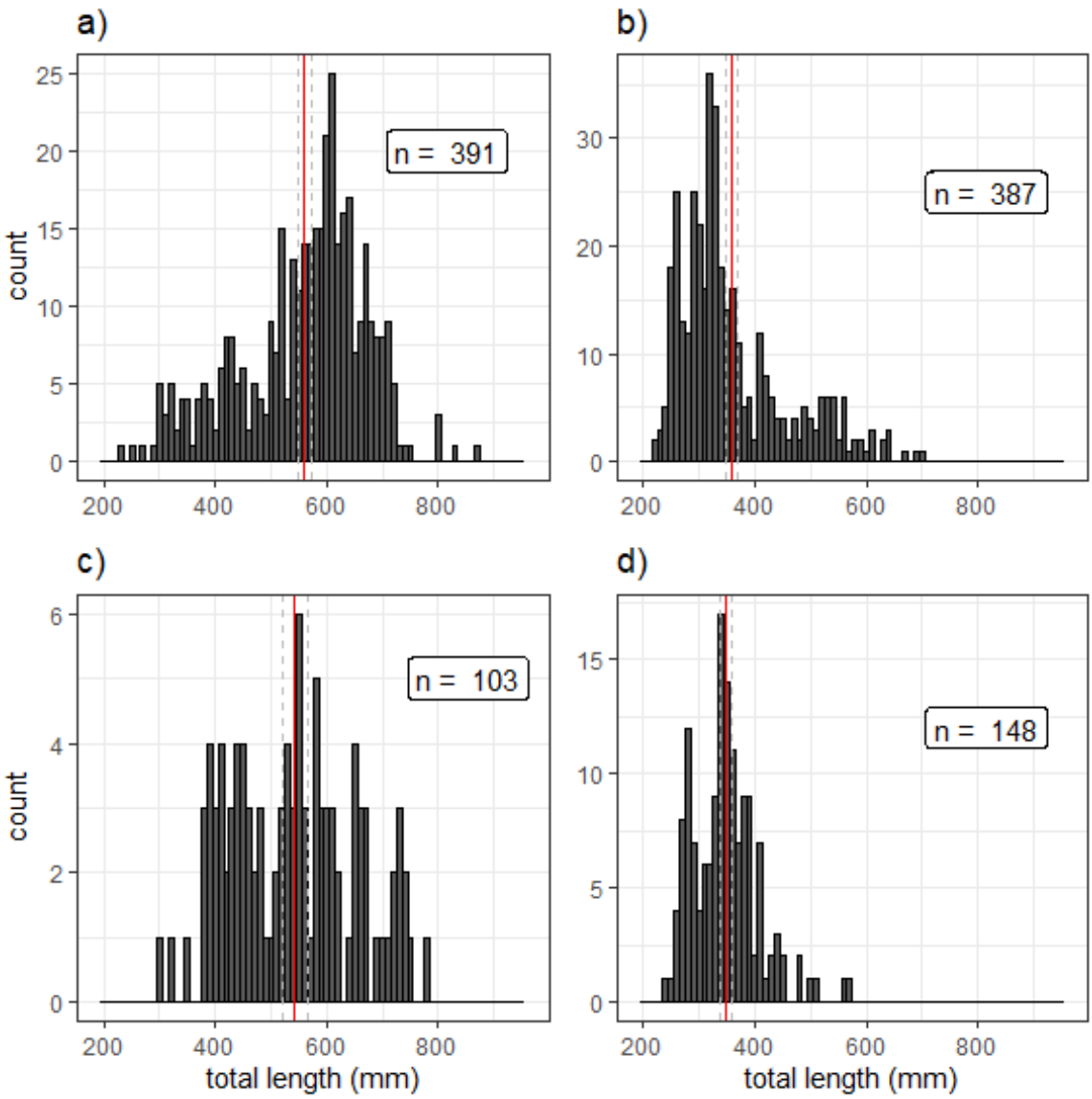

Figure 2: Length frequency distributions of Bull Trout captured in gillnets during fall 2021 netting efforts. Panels a) and c) are the length frequencies of Bull Trout **released alive** in large mesh (5.0 and 5.5 inch) during the Spawner and general LKT Suppression netting efforts, respectively. Panels b) and d) are the length frequencies of Bull Trout **direct mortalities** in the small mesh (2.0 and 2.5 inch) LKT Suppression netting efforts, respectively. The vertical red lines represent the mean total length (mm) for each group and the dashed grey lines represent two standard errors above and below the sample mean.

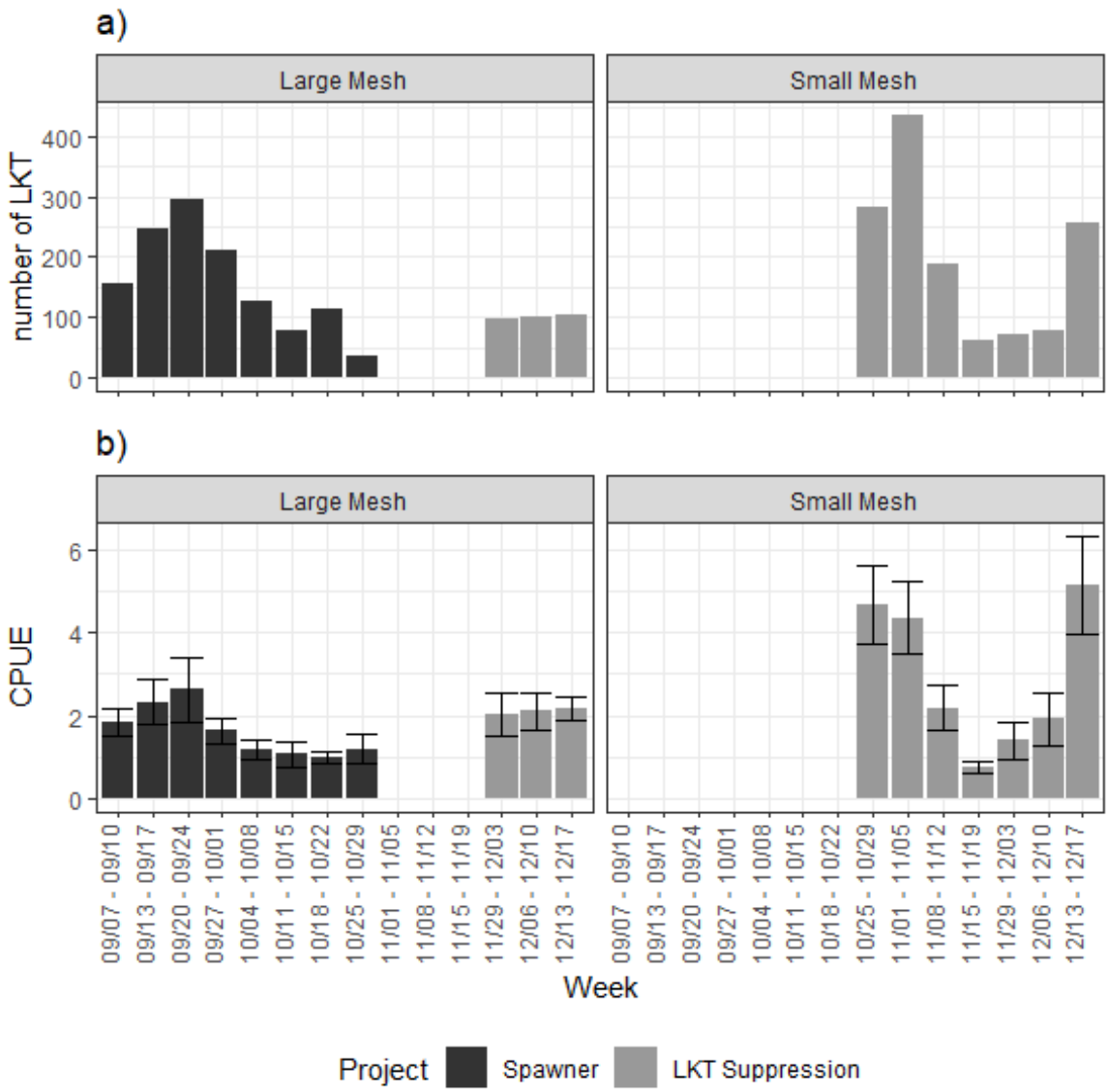

Figure 3: Total weekly catch (a) and mean weekly catch per unit effort with standard error bars (b, number of LKT per 274 m of gillnet) of Lake Trout captured during the fall 2021 gillnetting efforts.

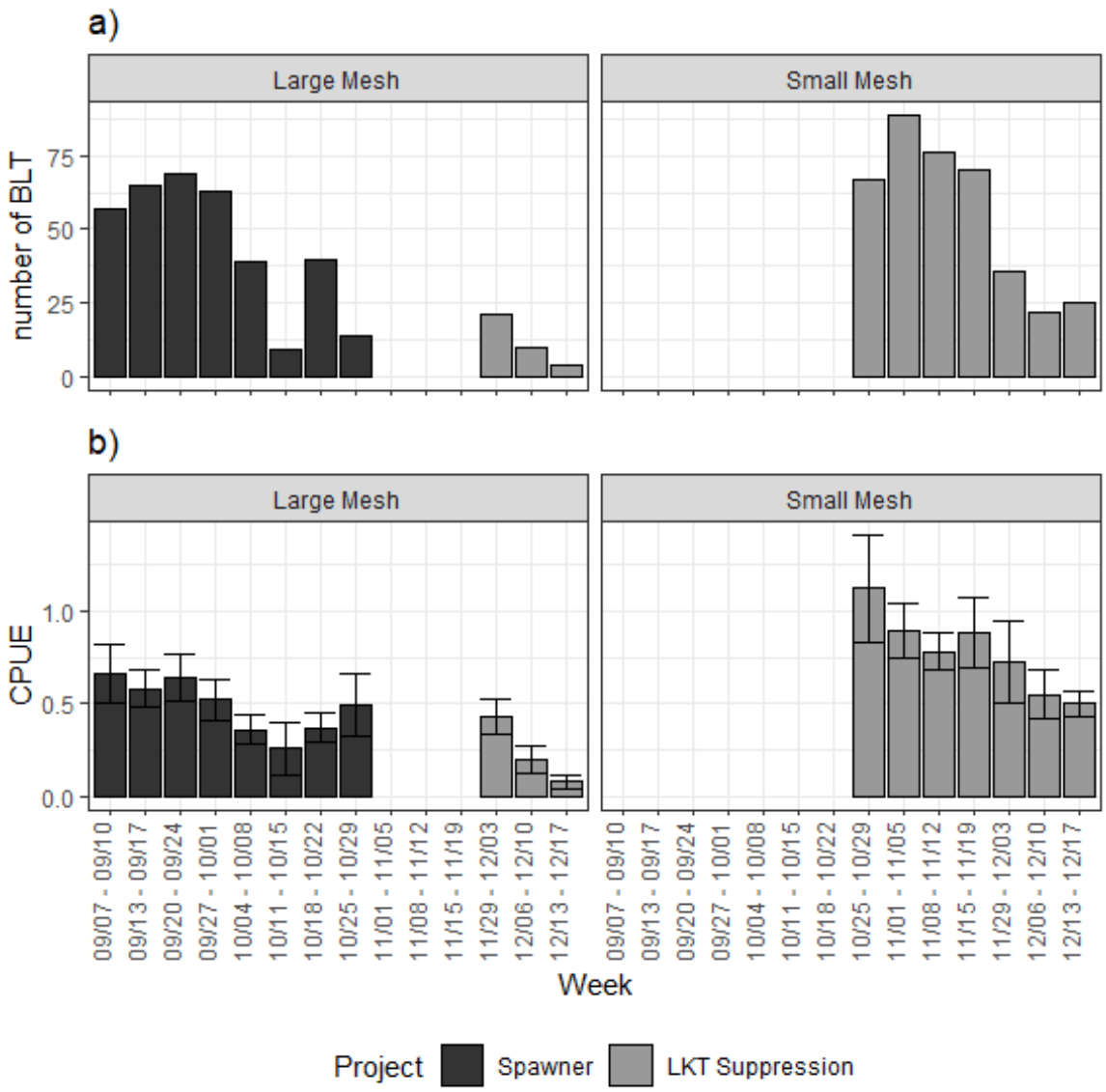

Figure 4: Total weekly catch (a) and mean weekly catch per unit effort with standard error bars (b, number of BLT per 274 m of gillnet) of Bull Trout captured and released alive during the fall 2021 gillnetting efforts.

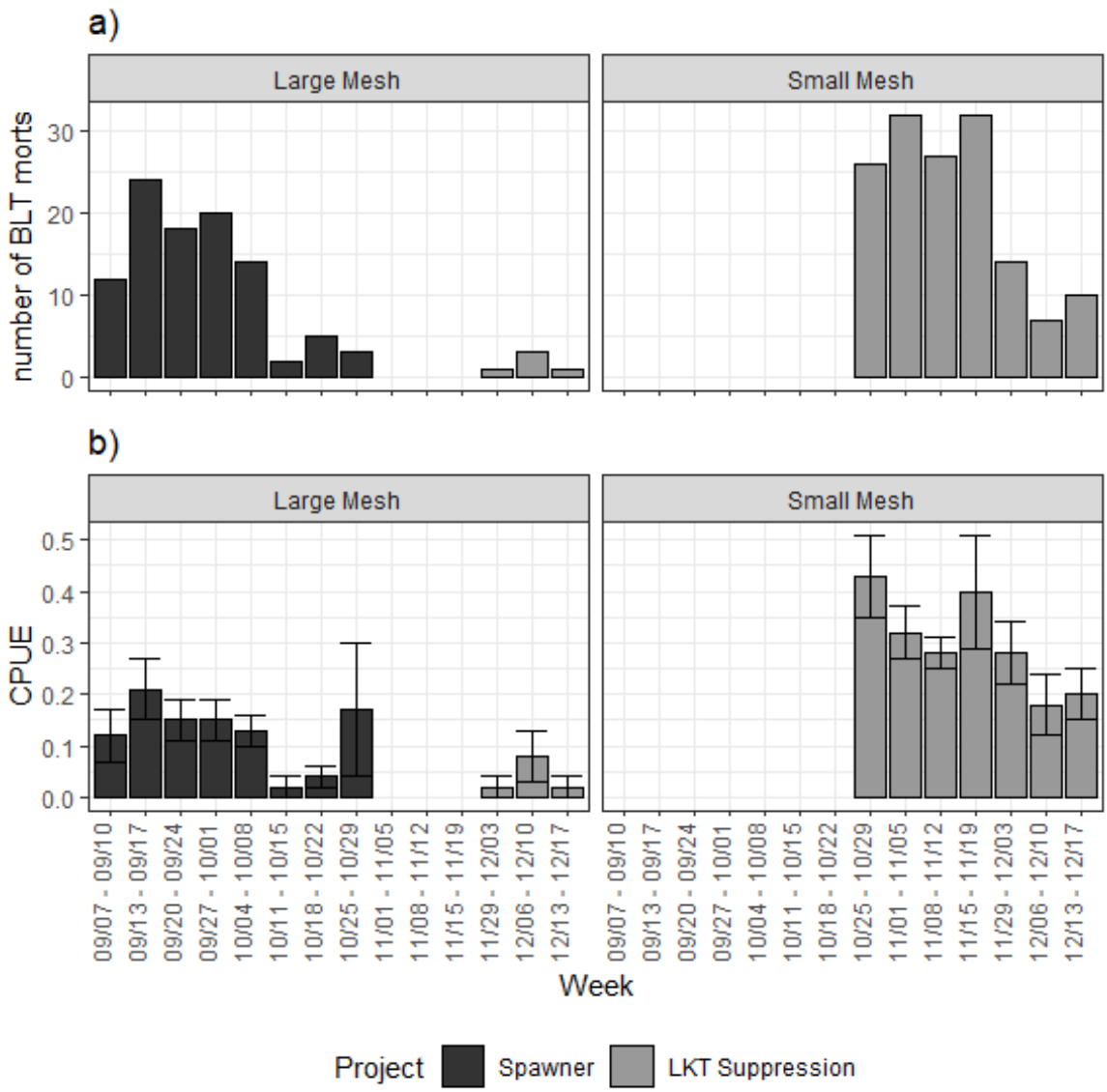

Figure 5: Total weekly catch (a) and mean weekly catch per unit effort with standard error bars (b, number of BLT per 274 m of gillnet) of Bull Trout mortalities during the fall 2021 gillnetting efforts.

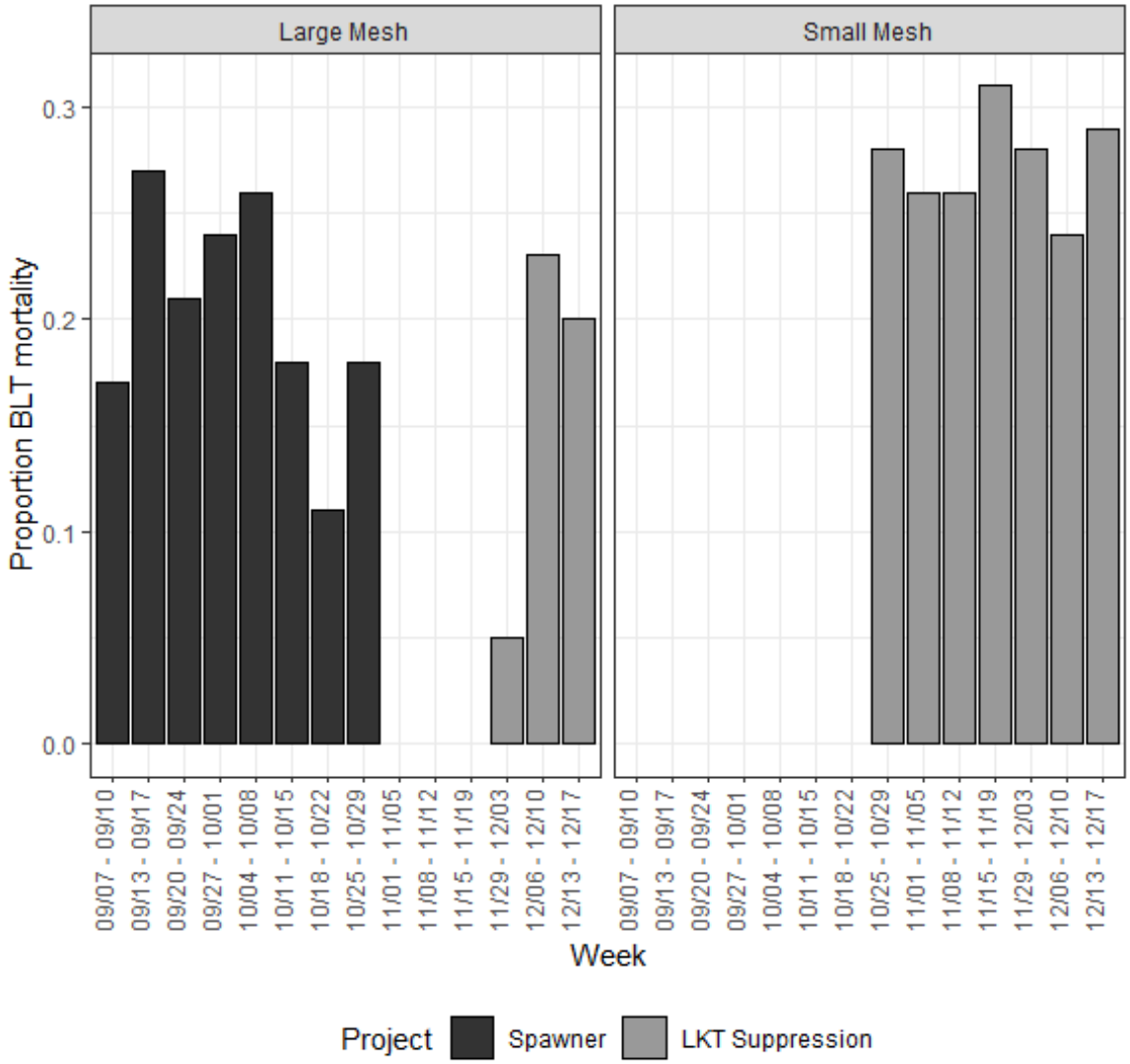

Figure 6: The weekly mean proportion of Bull Trout bycatch resulting in mortality from large (5.0 and 5.5 inch) and small mesh (2.0 and 2.4 inch) during the Spawner and general LKT Suppression gillnetting efforts in the fall 2021.

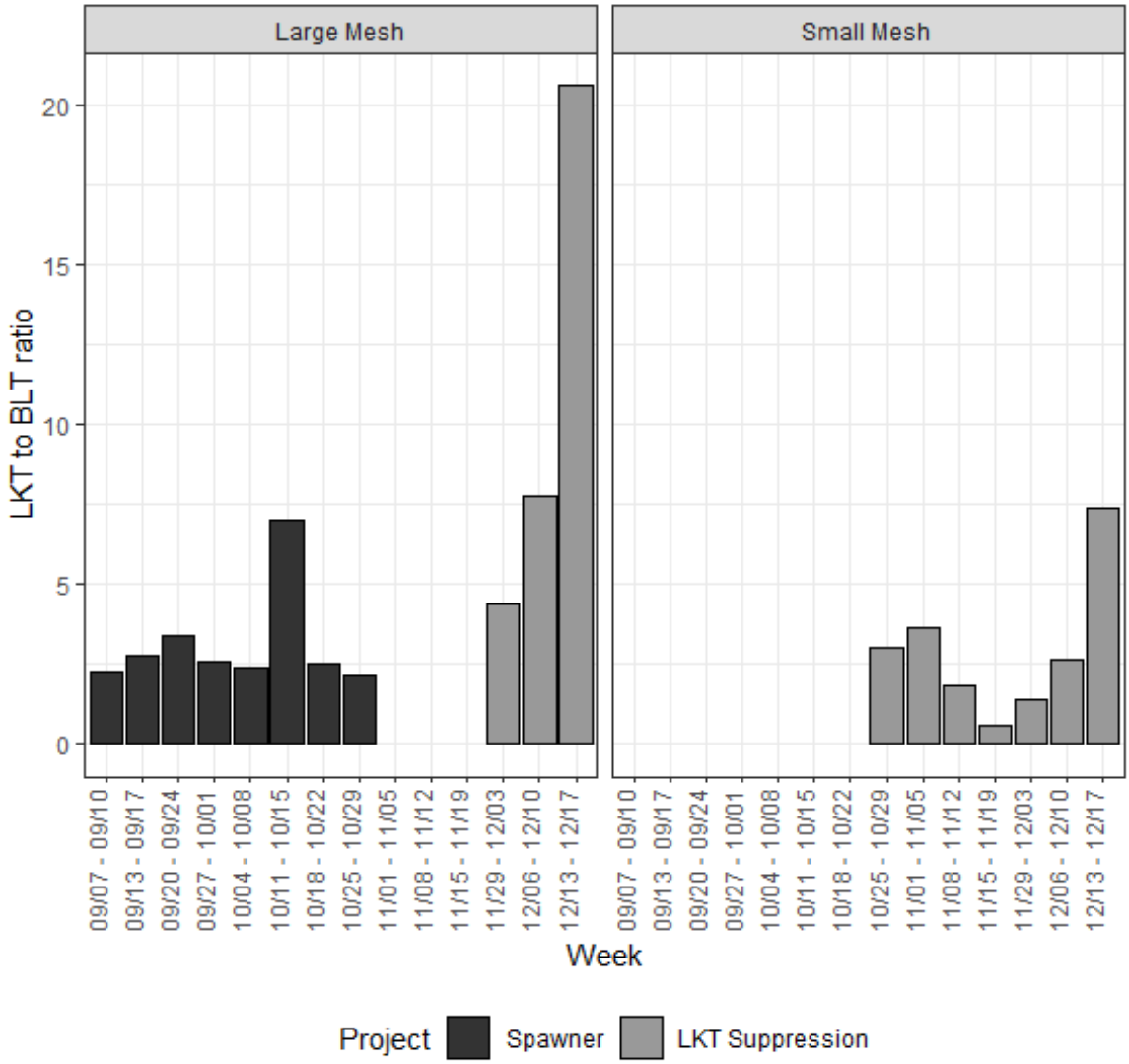

Figure 7: The weekly mean Lake Trout to Bull Trout catch ratios from large (5.0 and 5.5 inch) and small mesh (2.0 and 2.4 inch) during the Spawner and general LKT Suppression gillnetting efforts in the fall 2021.

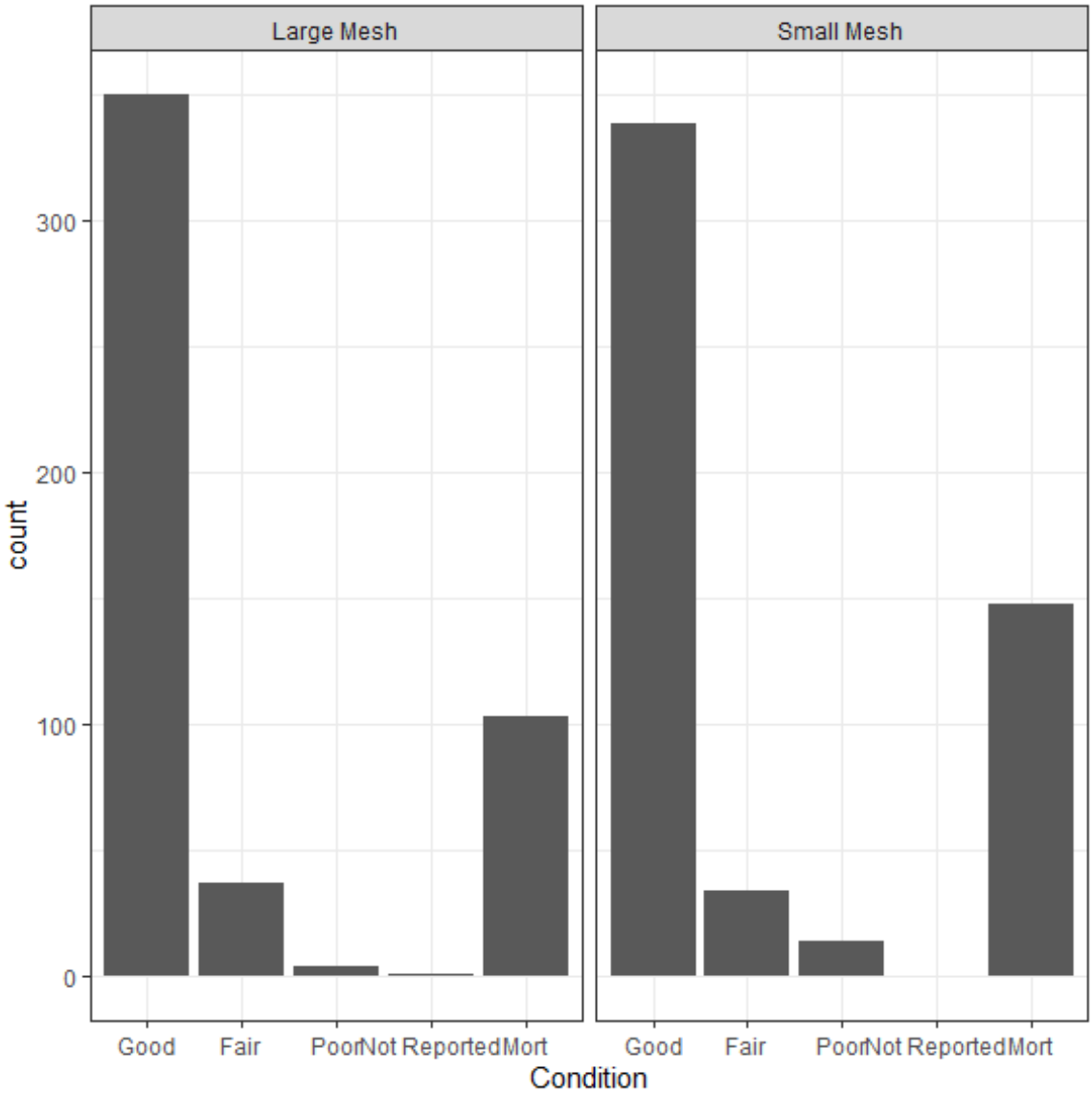

Figure 8: Condition index of Bull Trout captured in large (5.0 and 5.5 inch) and small mesh (2.0 and 2.4 inch) during the Spawner and general LKT Suppression gillnetting efforts in the fall 2021.

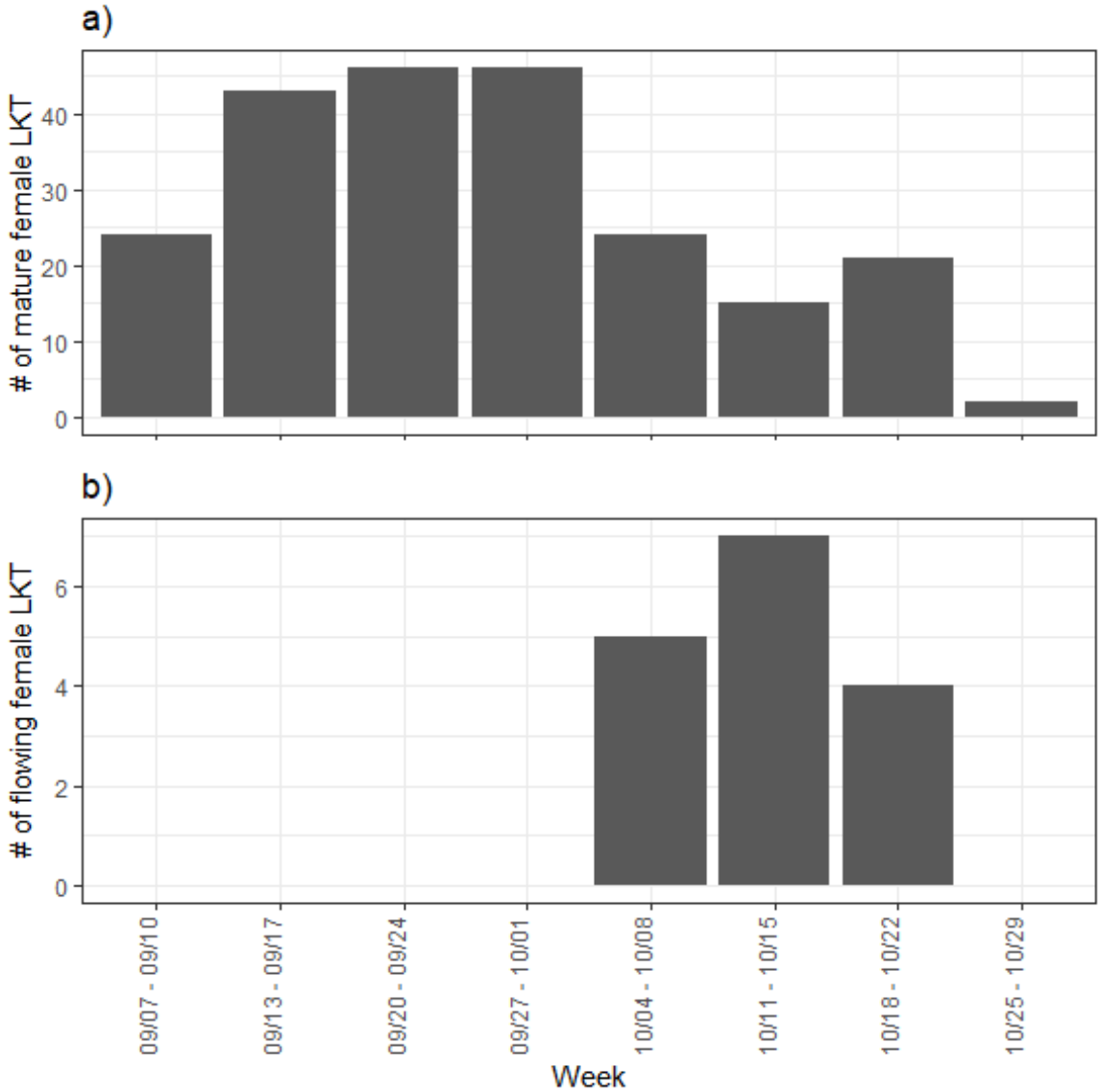

Figure 9: The weekly catch of mature female Lake Trout (a) and mature female Lake Trout that were flowing at time of capture (b) during the fall 2021 Spawner gillnetting efforts.

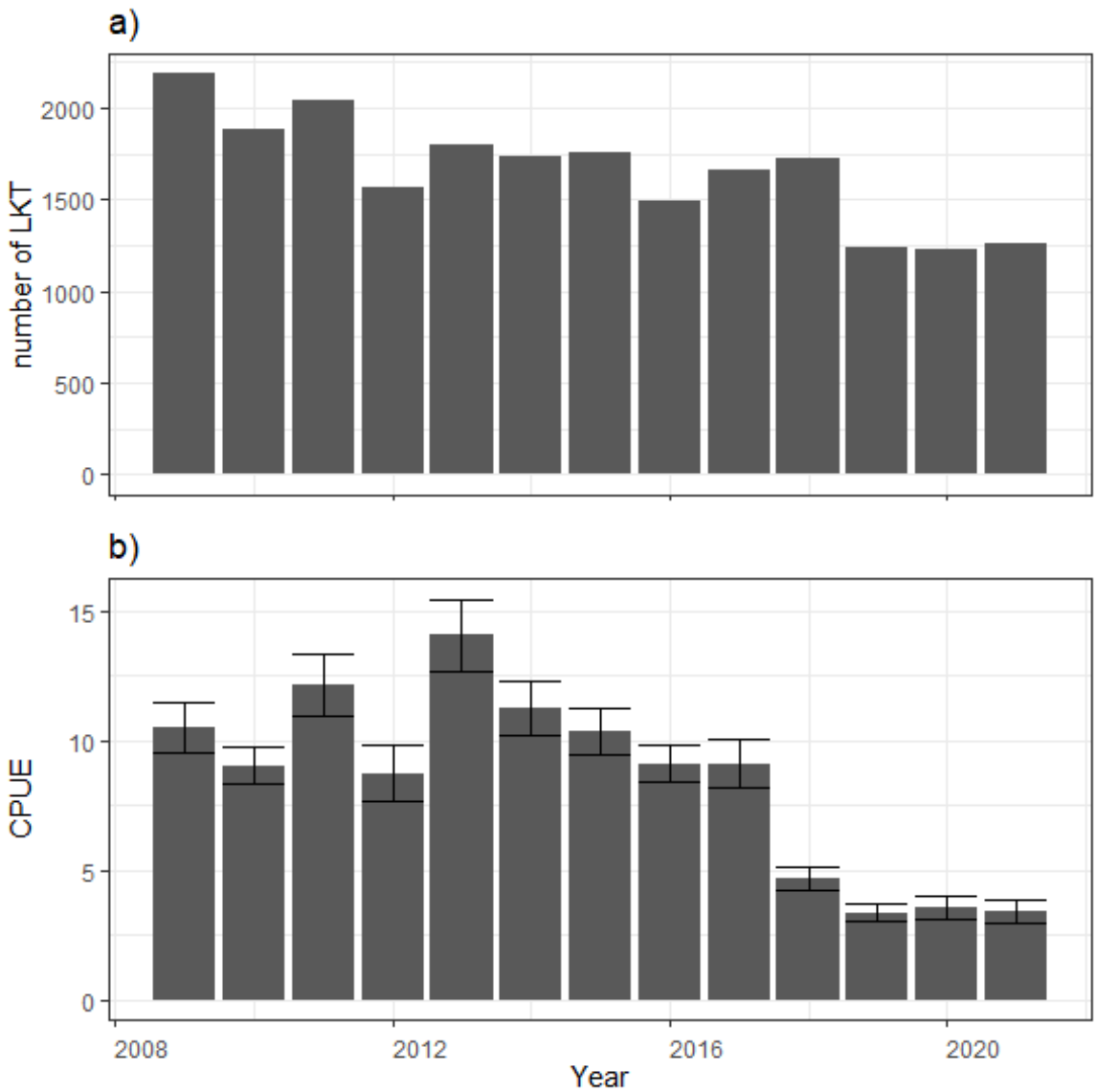

Figure 10: Annual catch (a) and mean catch per unit effort with standard error bars (b, number of LKT per 274 m of gillnet) of Lake Trout during the designated fall Spawner gillnetting efforts from 2009–2021.

APPENDIX C. 2021 LPO LAKE TROUT ANGLER INCENTIVE PROGRAM SUMMARY

2021 LPO Lake Trout ANGLER INCENTIVE PROGRAM SUMMARY

January 1–December 31, 2021

Total Lake Trout heads submitted = 2,509

Total Bull Trout heads submitted = 2

Total unique anglers participating = 214

Tables

Table 1. Number of Lake Trout removed through the Lake Pend Oreille, Idaho, Angler Incentive Program (AIP).

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2006	--	--	--	--	1,317	2,136	1,033	2,200	1,755	1,689	661	250	11,041
2007	415	789	895	1,261	2,445	3,107	2,809	1,949	1,864	1,046	831	254	17,665
2008	216	241	363	544	771	2,117	2,612	1,878	2,178	862	940	298	13,020
2009	144	156	179	263	1,033	1,321	1,178	1,051	969	409	483	180	7,366
2010	330	351	380	343	873	1,558	1,354	988	1,261	766	330	206	8,740
2011	146	78	105	256	347	2,049	1,115	718	940	930	348	292	7,324
2012	140	103	96	233	928	1,552	1,534	977	1,119	419	388	324	7,813
2013	121	115	95	163	359	468	677	396	454	315	232	158	3,553
2014	85	47	40	90	300	480	361	354	297	130	191	135	2,510
2015	19	47	45	74	257	326	526	660	477	438	217	108	3,194
2016	36	84	63	97	313	491	417	525	322	213	248	62	2,871
2017	42	79	25	186	386	574	775	697	387	193	140	47	3,531
2018	106	21	48	140	135	315	530	391	424	272	156	80	2,618
2019	51	46	27	27	143	286	287	183	246	221	109	134	1,760
2020	107	71	72	37	158	367	470	501	271	319	155	113	2,641
2021	31	21	21	54	109	415	422	433	360	310	282	51	2,509
Total													98,156

Figures

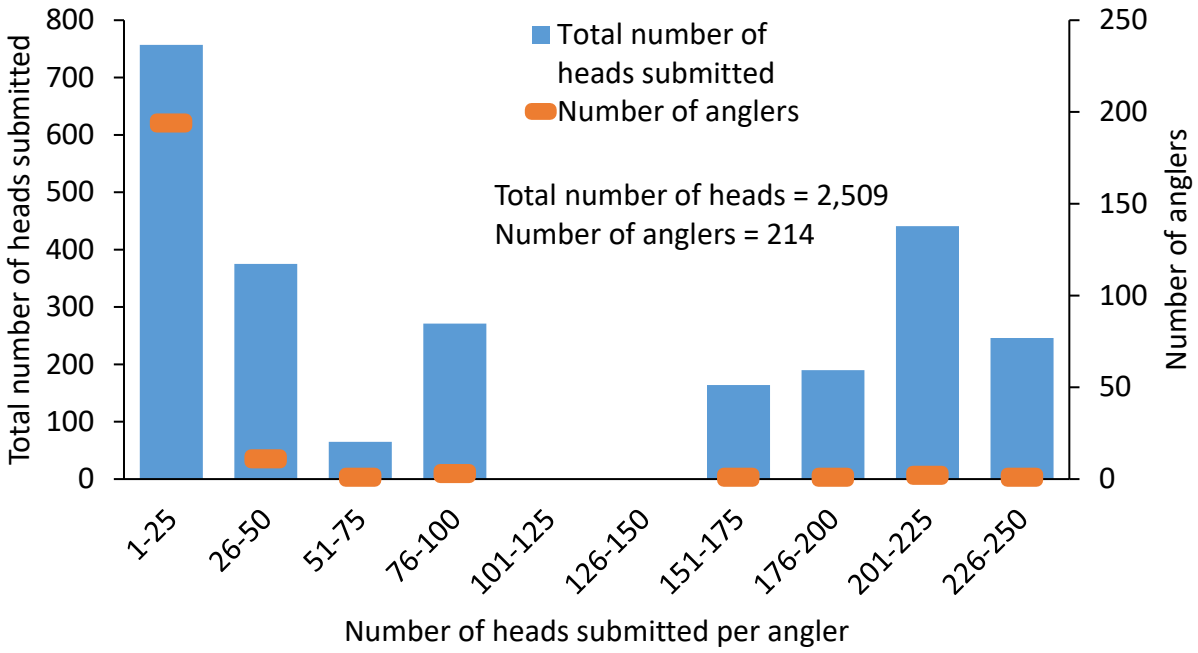

Figure 1. Total number of Lake Trout heads submitted and number of anglers submitting those heads, grouped by number of heads submitted per angler, through the Lake Pend Oreille AIP during 2021.

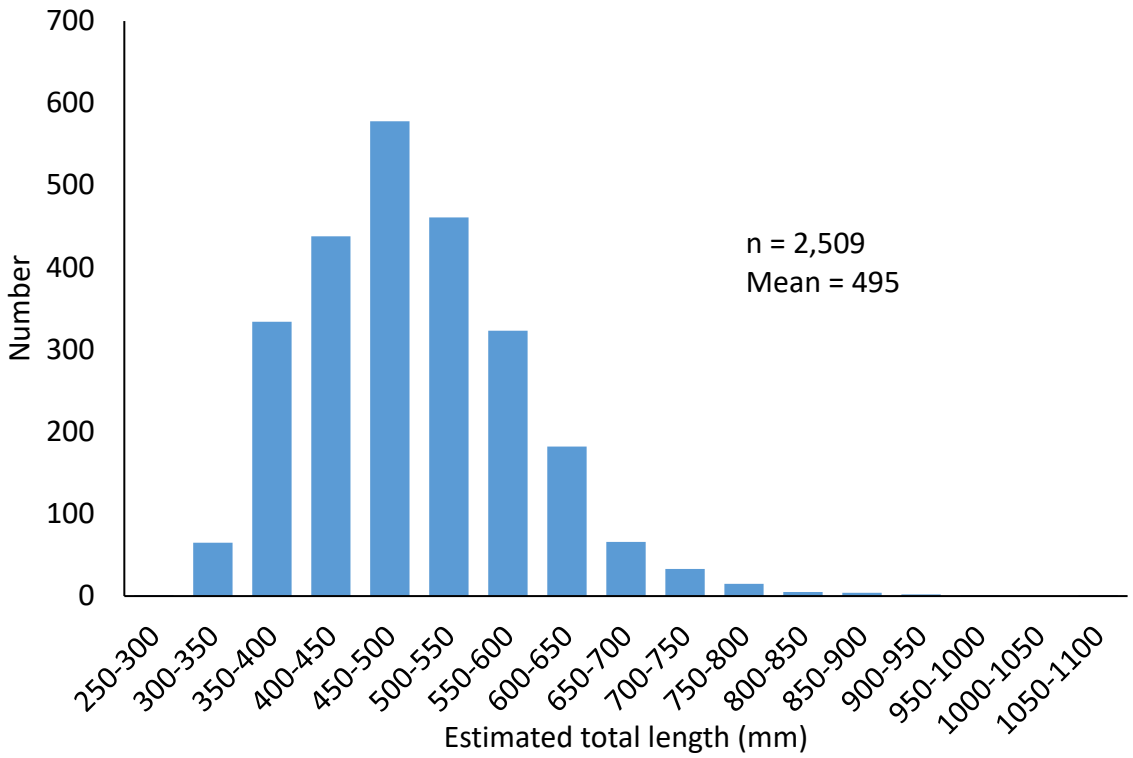

Figure 2. Length-frequency plot of Lake Trout captured by anglers participating in the AIP during 2021 by estimated total length bins. Lengths were derived using a head length to total length regression formula, developed from Lake Trout captured by the LPO Predator Suppression Program on Lake Pend Oreille.

APPENDIX D. SPRING 2021 WALLEYE NETTING SUMMARY

Spring 2021 Walleye Netting Summary
4/05/2021–4/23/2021
Jeff Strait
05/07/2021
Overview

During spring 2021 Walleye suppression gill netting, we fished a combination of 3.5, 4.0, and 4.5 inch (88.9, 101.6, and 114.3 mm) mesh gill nets to target Walleye (*Sander vitreus*) in Lake Pend Oreille, Idaho. A total of 362 Walleye were captured and 319 removed ranging from 333 mm to 811 mm total length using an effort of 153,000 ft (46,634.4 m) of net. We also tagged 19 Walleye with Vemco acoustic telemetry tags and 22 with coded-wire tags. We recaptured 2 Walleye previously implanted with an acoustic telemetry tag, and 2 Walleye previously implanted with a coded-wire tag. Additionally, we contributed 136 Walleye to a University of Idaho graduate research project.

As part of the bycatch during these efforts, sixteen different species were captured including Endangered Species Act Threatened Bull Trout (*Salvelinus confluentus*). A total of 15 Bull Trout were captured during the Walleye suppression efforts with an average direct mortality rate of 26.67%. We PIT tagged 6 and recaptured 7 previously tagged Bull Trout. Bull Trout condition was broken down as following:

- Good = 8
- Fair = 3
- Poor = 0
- Not Reported = 0
- Mortalities = 4 (2 were previously tagged)

In addition to the mark-recapture data collection for Bull Trout, we also collected 10 genetic samples from tagged and released Bull Trout and 50 samples from Lake Whitefish (*Coregonus clupeaformis*).

We use the high instances of bycatch to tag Smallmouth Bass (*Micropterus dolomeiu*) and Gerrard-strain Rainbow Trout (*Oncorhynchus mykiss*) with non-reward and $50-reward Floy T-bar tags. We tagged a total of 279 Smallmouth Bass, including 72 with reward tags. We recaptured 15 Smallmouth Bass during the three week netting period. We tagged a total of 34 Rainbow Trout, including 19 with reward tags. We recaptured 0 Rainbow Trout during the three week netting period.

- SMB tagged = 279
- SMB reward tags = 72
- SMB recaps = 15
- RBT tagged = 34
- RBT reward tags = 19
- RBT recaps = 0

The following tables and figures provide summary information on catch and bycatch from gill net efforts during the complete spring 2021 netting season.

Tables

Table 1: Summary of the Walleye suppression gillnetting during the spring 2021. For each species, statistics include the number captured (Captured), released alive (Released), tagged with one of several tags types (Tagged), previously released tags that were recaptured (Recaptured), and removed from LPO (Removed). We tagged Bull Trout with PIT tags, Rainbow Trout and Smallmouth Bass with T-bar tags, Northern Pike received a combination of T-bar and acoustic telemetry tags, and Smallmouth Bass received either a combination of T-bar and acoustic telemetry tags or coded-wire tags. For species other than Lake Trout, Walleye, or Northern Pike, the number of individuals removed represents fish that were "dead on capture".

Species	Captured	Released	Tagged	Recaptured	Removed
Smallmouth Bass	618	618	278	16	0
Walleye	362	43	42	6	319
Yellow Perch	145	145	0	0	0
Northern Pike	118	10	10	1	108
Rainbow Trout	57	47	34	0	10
Lake Whitefish	51	51	0	0	0
Westslope Cutthroat Trout	48	40	0	0	8
Lake Trout	46	0	0	0	46
Brown Trout	36	23	0	0	13
Black Crappie	21	21	0	0	0
Bull Trout	15	11	6	7	4
Rainbow X Cutthroat Trout	5	4	0	0	1
Largemouth Bass	4	4	0	0	0
Mountain Whitefish	3	3	0	0	0
Brook Trout X Bull Trout	1	1	1	0	0

Table 2: Total catch of each species by location during the spring 2021 Walleye suppression gillnetting. Species captured include: Black Crappie (BCR), Brook Trout X Bull Trout hybrids (BKT X BLT), Brown Trout (BRT), Bull Trout (BLT), Lake Trout (LKT, Lake Whitefish (LWF), Largemouth Bass (LMB), Mountain Whitefish (MWF), Northern Pike (NPK), Rainbow Trout (RBT), Rainbow Trout X Westslope Cutthroat Trout hybrids (RBT X WCT), Smallmouth Bass (SMB), Walleye (WAE), Westslope Cutthroat Trout (WCT), and Yellow Perch (YEP).

	BCR	BKT X BLT	BRT	BLT	LKT	LWF	LMB	MWF	NPK	RBT	RBT X WCT	SMB	WAE	WCT	YEP
Clark Fork Delta	0	0	2	1	6	0	0	0	4	7	0	60	14	1	0
Contest Point	0	0	2	0	5	47	0	0	2	0	0	37	94	0	4
Fisherman's Island to Sunnyside	0	0	3	1	6	0	0	0	2	0	0	9	11	2	3
Fisherman's Island	3	0	2	4	7	0	0	0	6	2	1	37	30	2	12
Kootenai Point	9	0	3	1	2	0	1	0	32	0	0	18	18	1	113
North Fork of the Clark Fork	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
Owens Bay	1	0	1	5	4	0	0	0	1	0	0	1	0	0	0
Railroad Channel	0	0	0	1	2	0	0	0	0	0	0	4	24	2	1
Sheepherder Point	1	0	6	0	2	0	1	0	17	12	0	24	14	2	1
Sourdough Point	0	0	0	0	3	0	0	0	0	0	0	11	1	1	2
Sunnyside	4	0	0	0	0	0	0	0	9	0	0	56	5	3	2
Train Bridge - North	0	0	0	1	1	0	0	0	1	0	0	9	43	3	1
Train Bridge - South	0	0	0	1	3	0	0	1	0	0	0	5	3	0	1
Trestle Creek to Pack Delta	3	1	17	0	4	4	2	2	44	35	4	347	105	31	5

Table 3: Summary of length data for Walleye, Bull Trout, and Bull Trout mortalities captured in gillnets during the spring 2021 Walleye suppression netting.

Species	Mean TL	SE	Max TL	Min TL
BLT	570.5	19.3	650	430
BLT Mortalities	590.2	15.9	619	550
WAE	541.4	4.8	811	333

Table 4: Catch data for Walleye, Bull Trout, and Bull Trout mortalities during the spring 2021 Walleye suppression netting. These statistics include the total number of Walleye (WAE), live Bull Trout (BLT), Bull Trout mortalities (BLT Morts), the mean catch ratios of Walleye to live Bull Trout (WAE:BLT), Walleye to Bull Trout mortalities (WAE:BLT Morts), and the mean proportion of Bull Trout captures that resulted in direct mortality (Prop Morts).

Mesh Size (in)	WAE	BLT	BLT Morts	WAE:BLT	WAE:BLT Morts	Prop Morts
4.5	95	2	1	47.50	95.0	0.33
4.0	111	2	2	55.50	55.5	0.50
3.5	156	7	1	22.29	156.0	0.12

Table 5: Catch per unit effort statistics for Walleye, Bull Trout, and Bull Trout mortalities during the spring 2021 Walleye suppression netting. These statistics include the total number of 274m gillnet panels fished (Effort), and the Mean and SE of daily catch per unit effort (# fish / 274 m of net) for Walleye (WAE CPUE, WAE SE), Bull Trout (BLT CPUE, BLT SE), and Bull Trout mortalities (BLT Mort CPUE, BLT Mort SE).

Mesh Size (in)	Effort	WAE CPUE	WAE SE	BLT CPUE	BLT SE	BLT Mort CPUE	BLT Mort SE
4.5	56	1.56	0.30	0.02	0.02	0.02	0.02
4.0	57	1.76	0.56	0.03	0.02	0.03	0.02
3.5	57	2.91	0.95	0.19	0.08	0.02	0.02

Figures

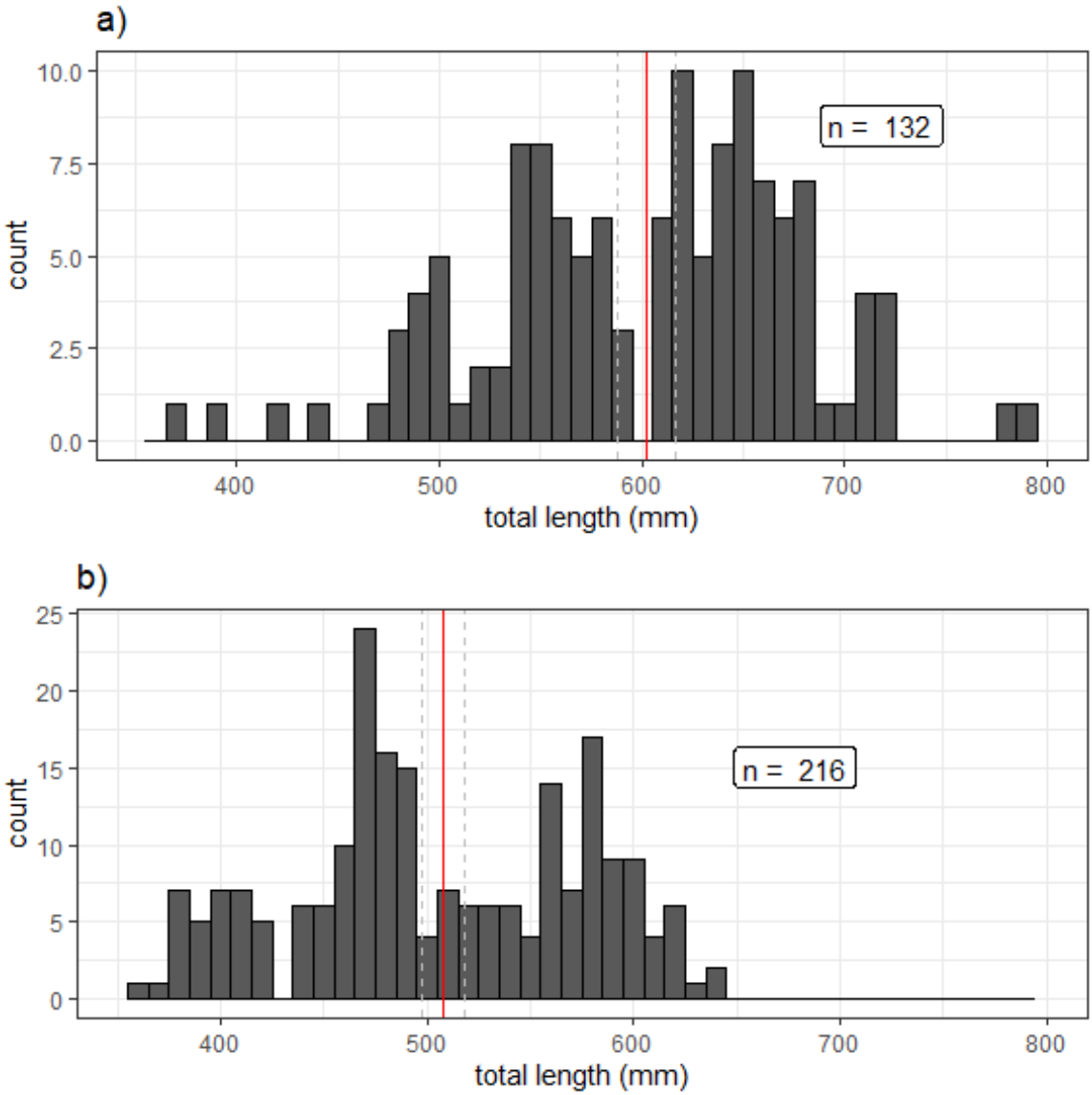

Figure 1: Length frequencies of female (a) and male (b) Walleye captured in gillnets during Spring 2021 Walleye suppression netting. Vertical red lines represent the sample mean length for each group and the dashed grey lines represent two standard errors above and below the sample mean.

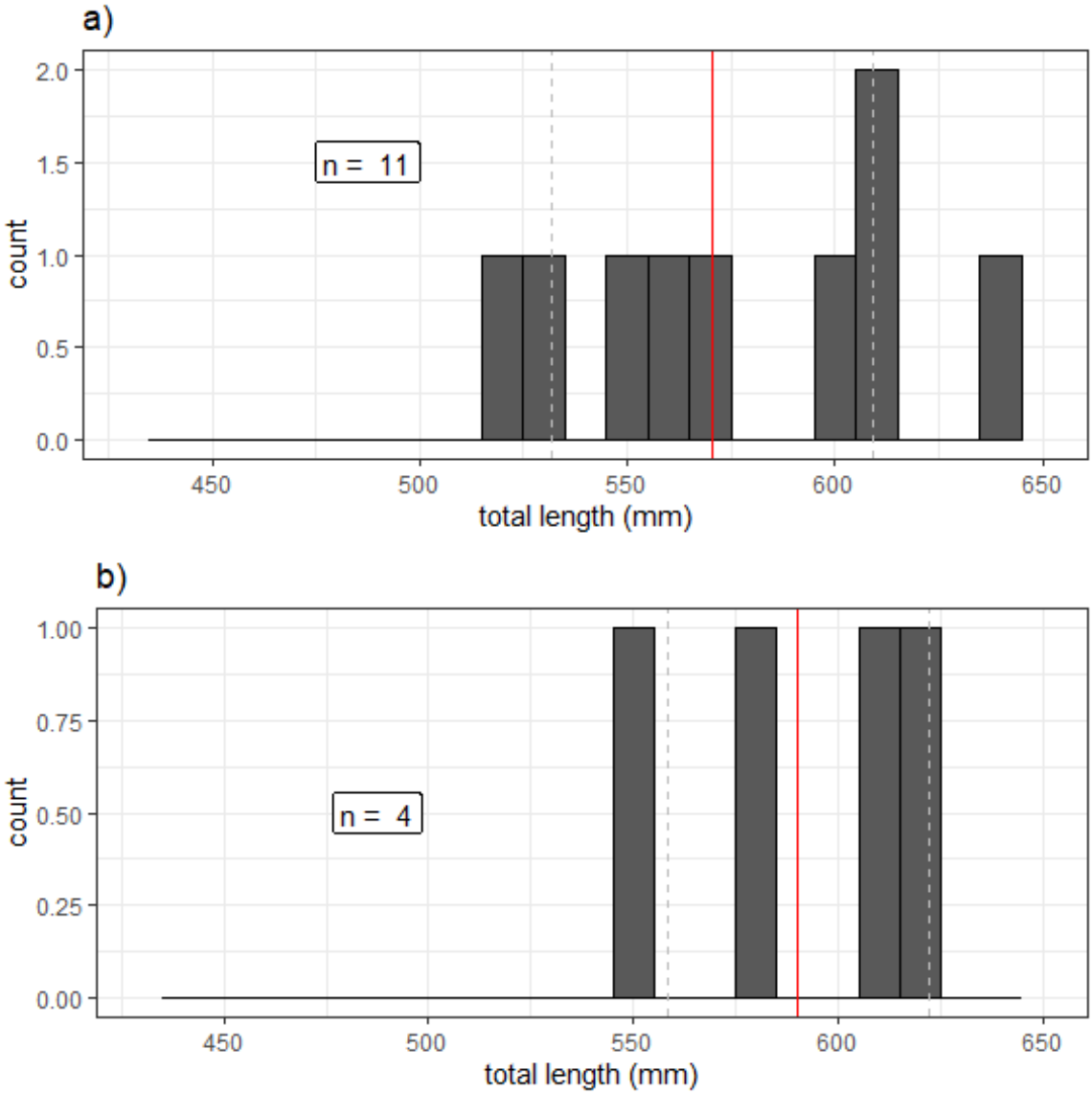

Figure 2: Length frequencies of Bull Trout captured in gillnets during Spring 2021 Walleye suppression netting. Panels a) is the length frequency of Bull Trout released alive and panel b) that of Bull Trout captures that resulted in direct mortalities. Vertical red lines represent the sample mean length for each group and the dashed grey lines represent two standard errors above and below the sample mean.

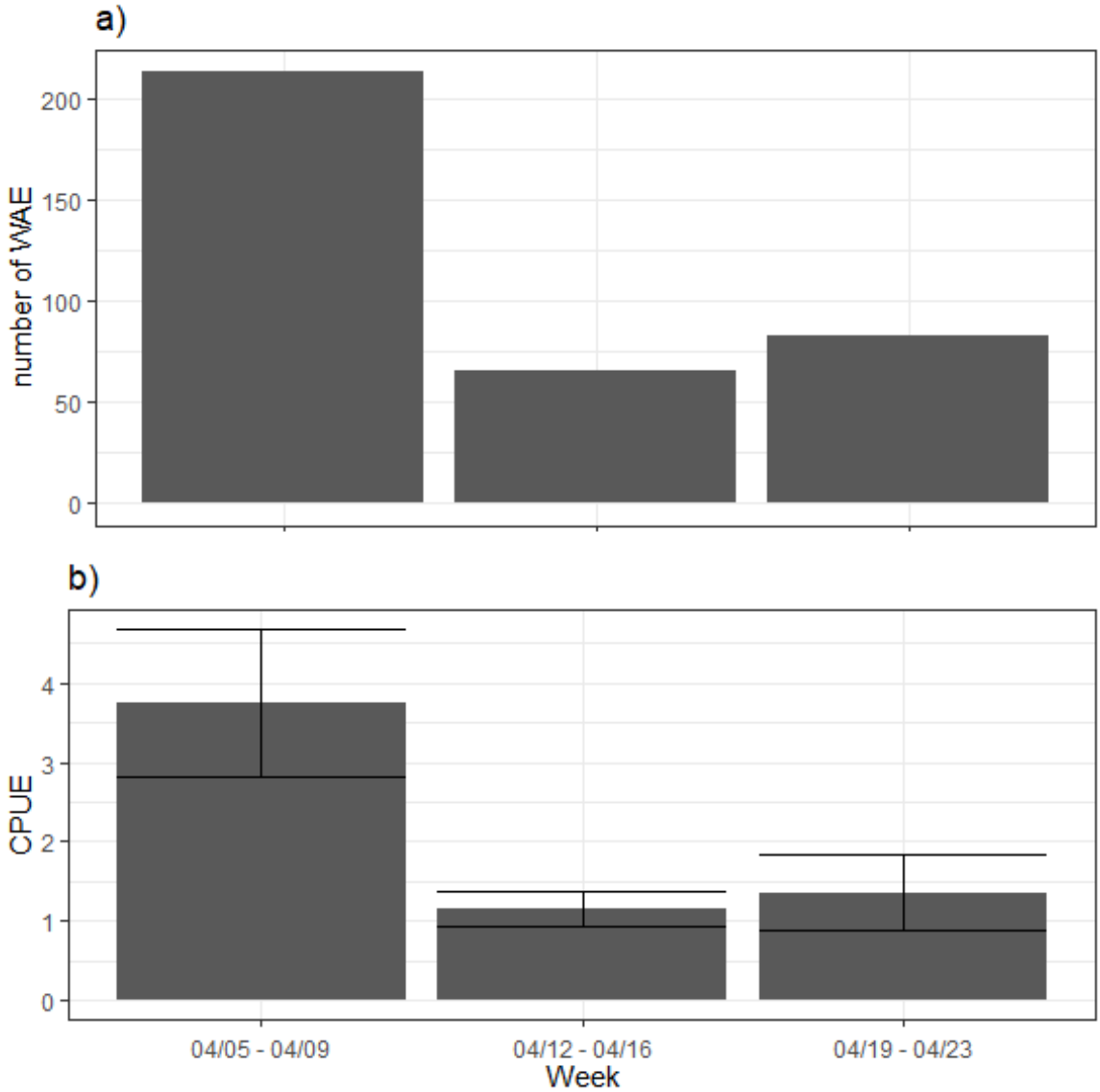

Figure 3: Weekly catch (a) and mean weekly CPUE (b, with SE bars) of Walleye captured during the Spring 2021 Walleye suppression netting.

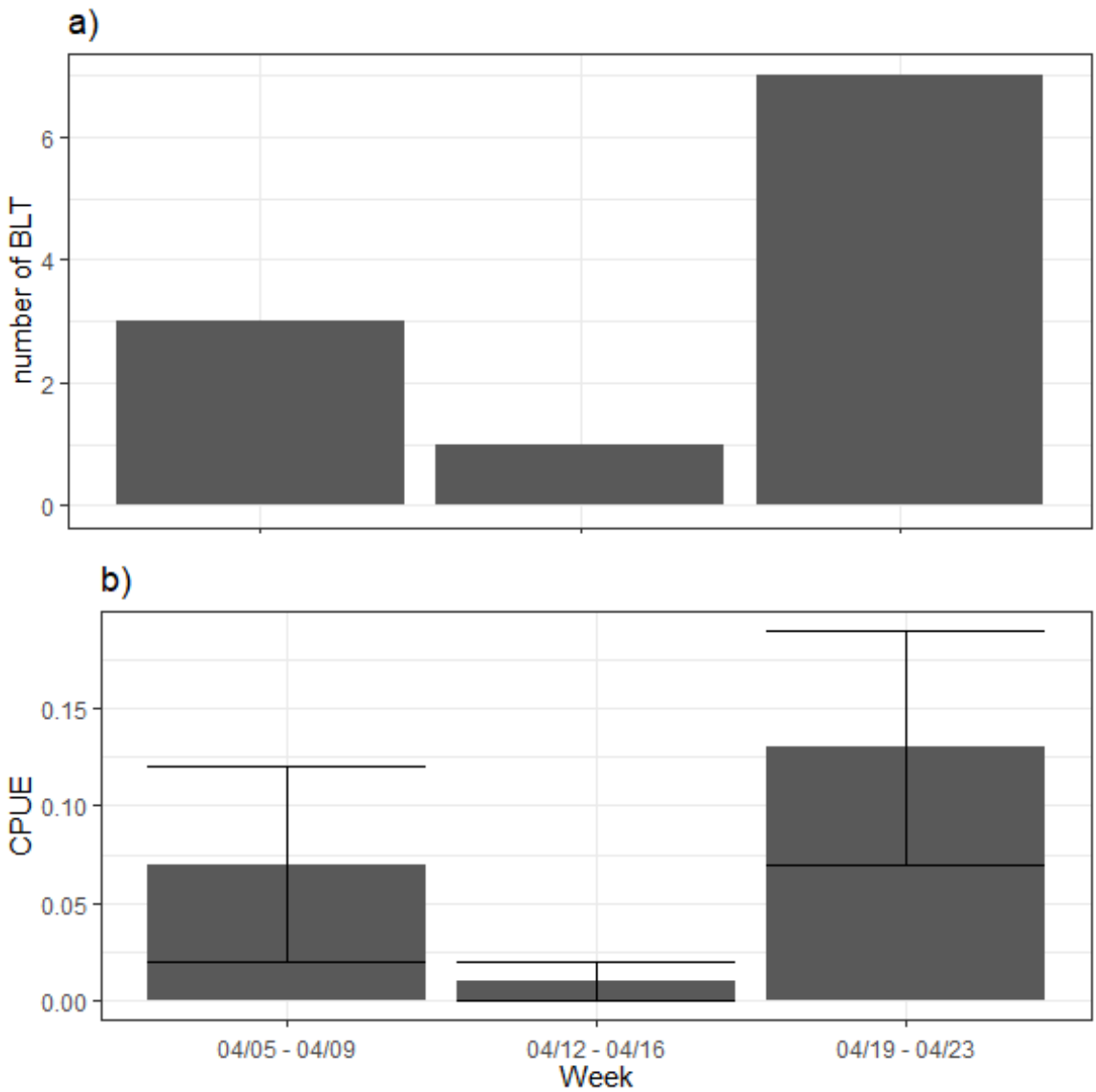

Figure 4: Weekly catch (a) and mean weekly CPUE (b, with SE bars) of Bull Trout captured and released alive during the spring 2021 Walleye suppression netting.

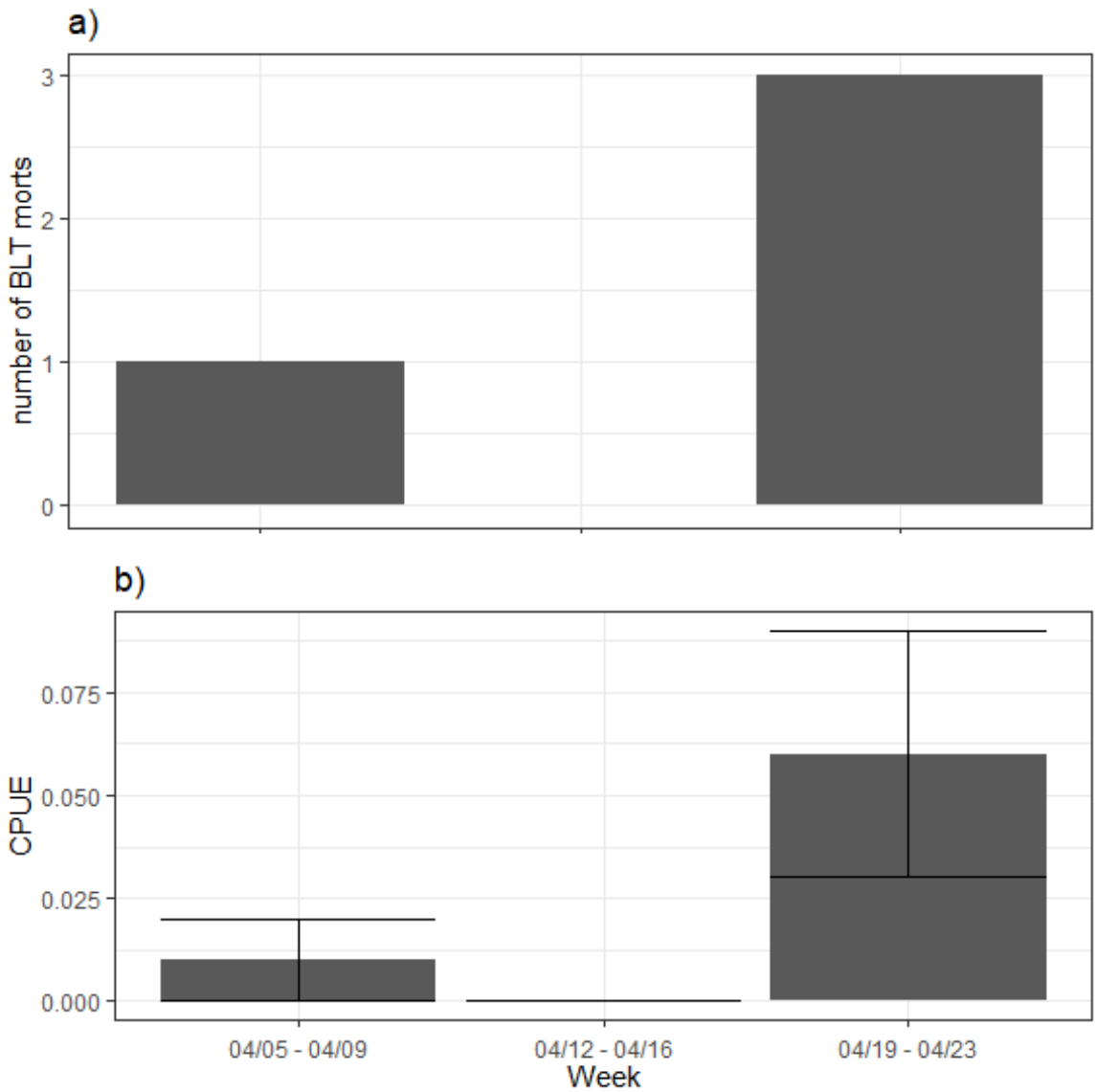

Figure 5: Weekly catch (a) and mean weekly CPUE (b, with SE bars) of direct Bull Trout mortalities during the spring 2021 Walleye suppression netting.

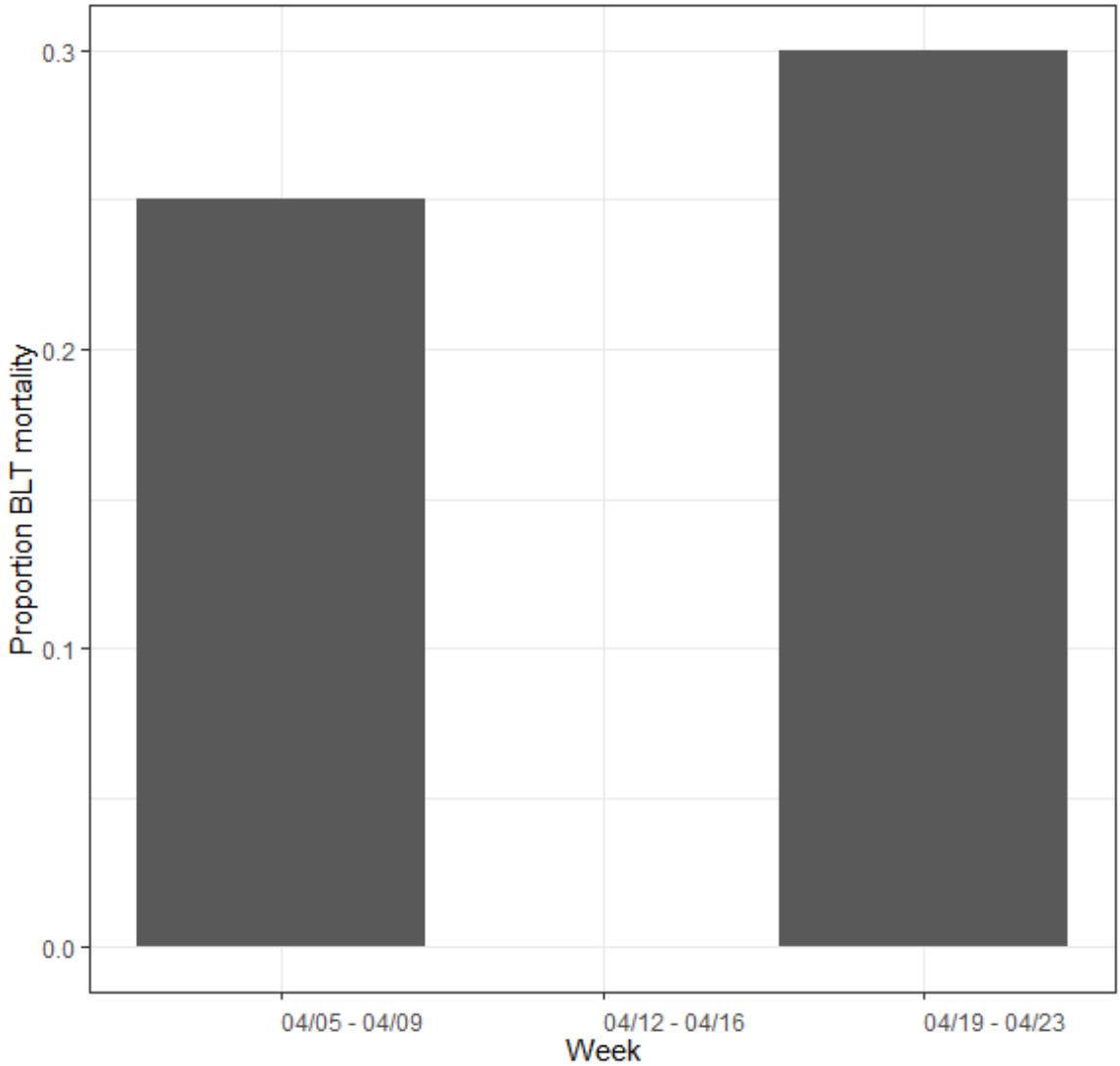

Figure 6: Proportion bycatch resulting in direct mortalities for Bull Trout captured during the spring 2021 Walleye suppression netting.

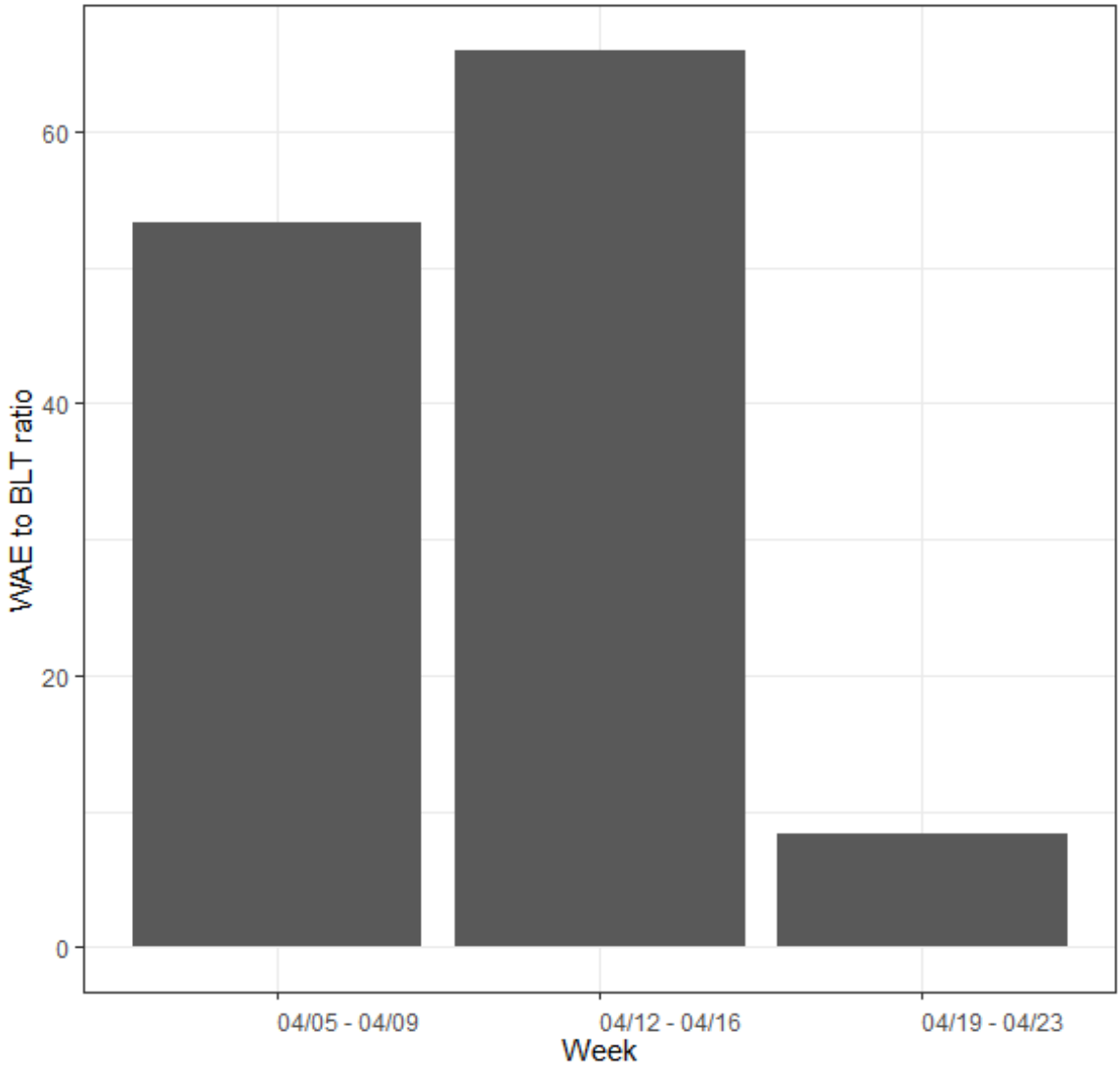

Figure 7: Walleye to Bull Trout catch ratios during the spring 2021 Walleye Suppression netting.

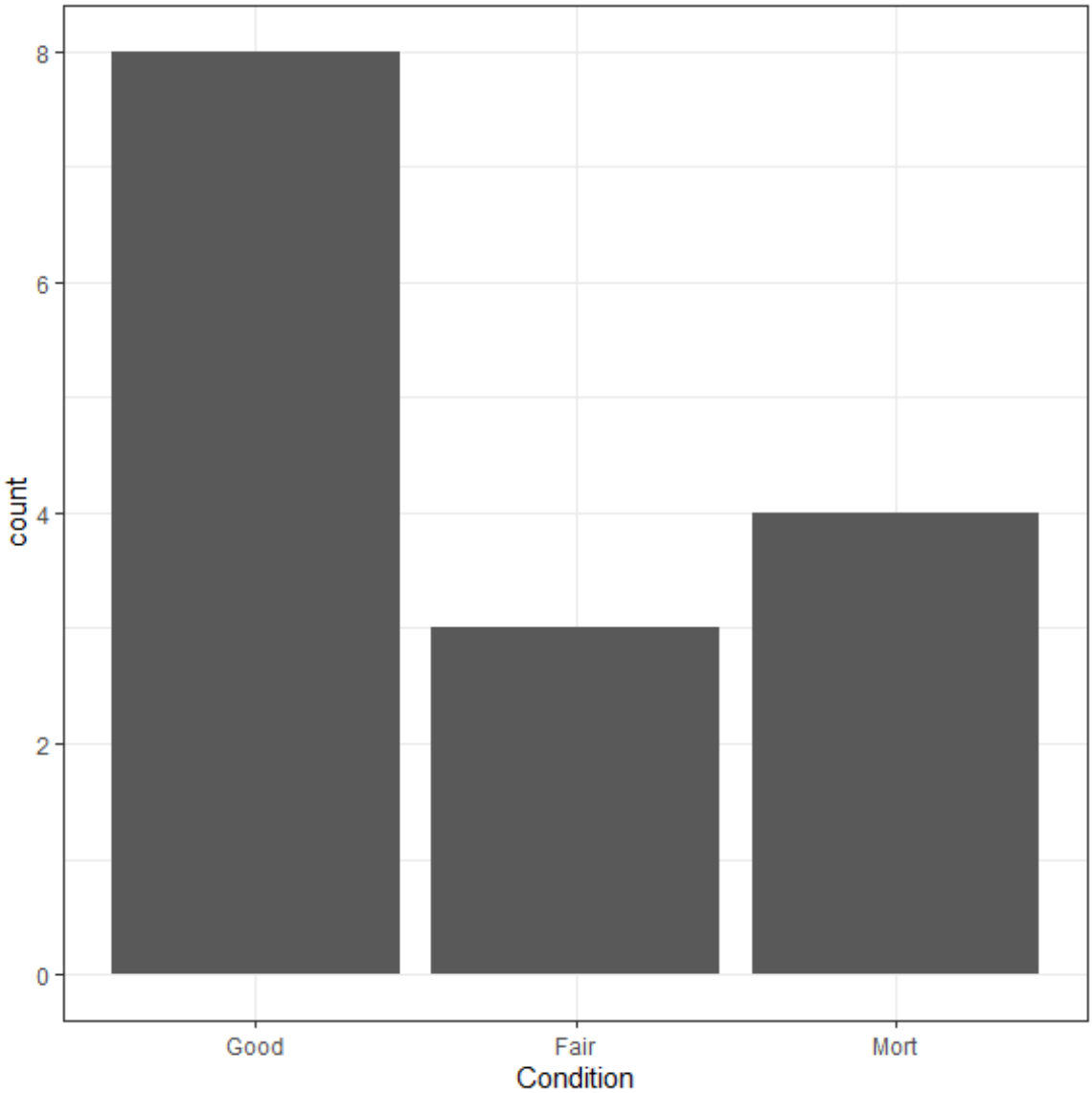

Figure 8: Condition index of Bull Trout captured during Spring 2021 Walleye suppression netting.

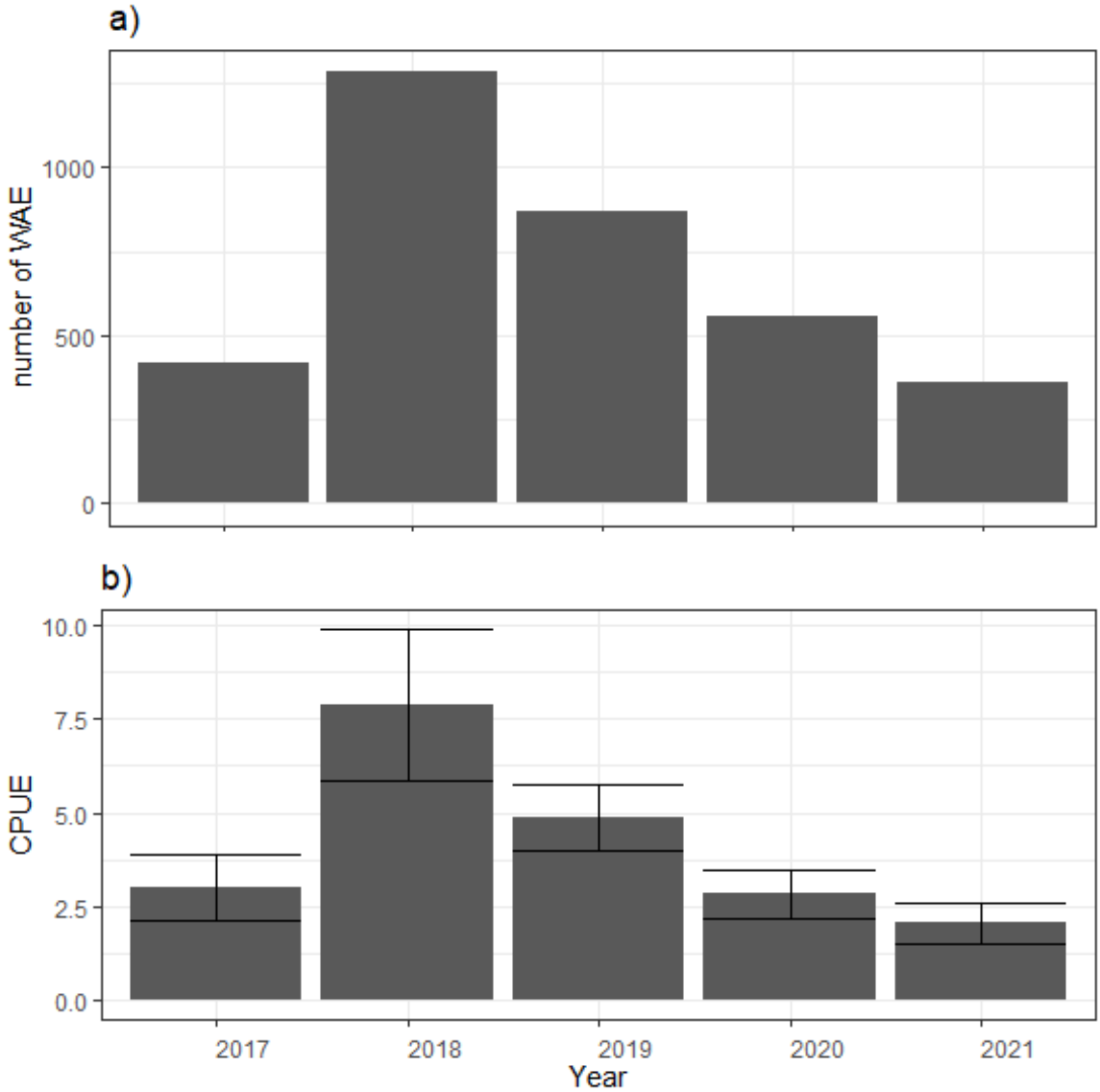

Figure 9: Annual catch and mean CPUE of Walleye during the designated spring gillnetting efforts from 2017–Present.

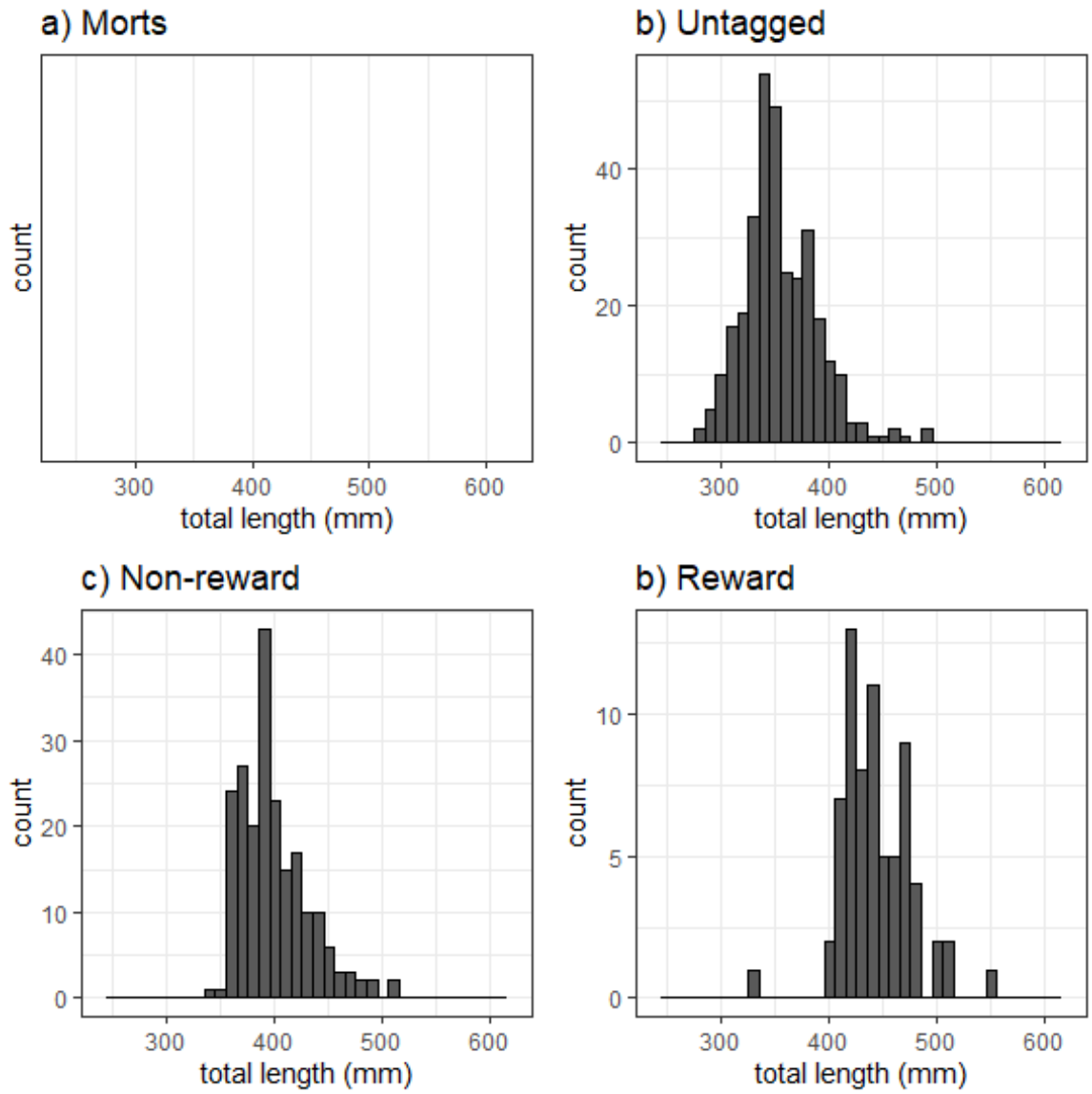

Figure A1: Length frequency of Smallmouth Bass a) mortalities, b) released untagged, c) tagged with a non-reward T-bar tag, and d) double-tagged with a $50-reward and non-reward T-bar tags during Spring 2021 Walleye suppression netting.

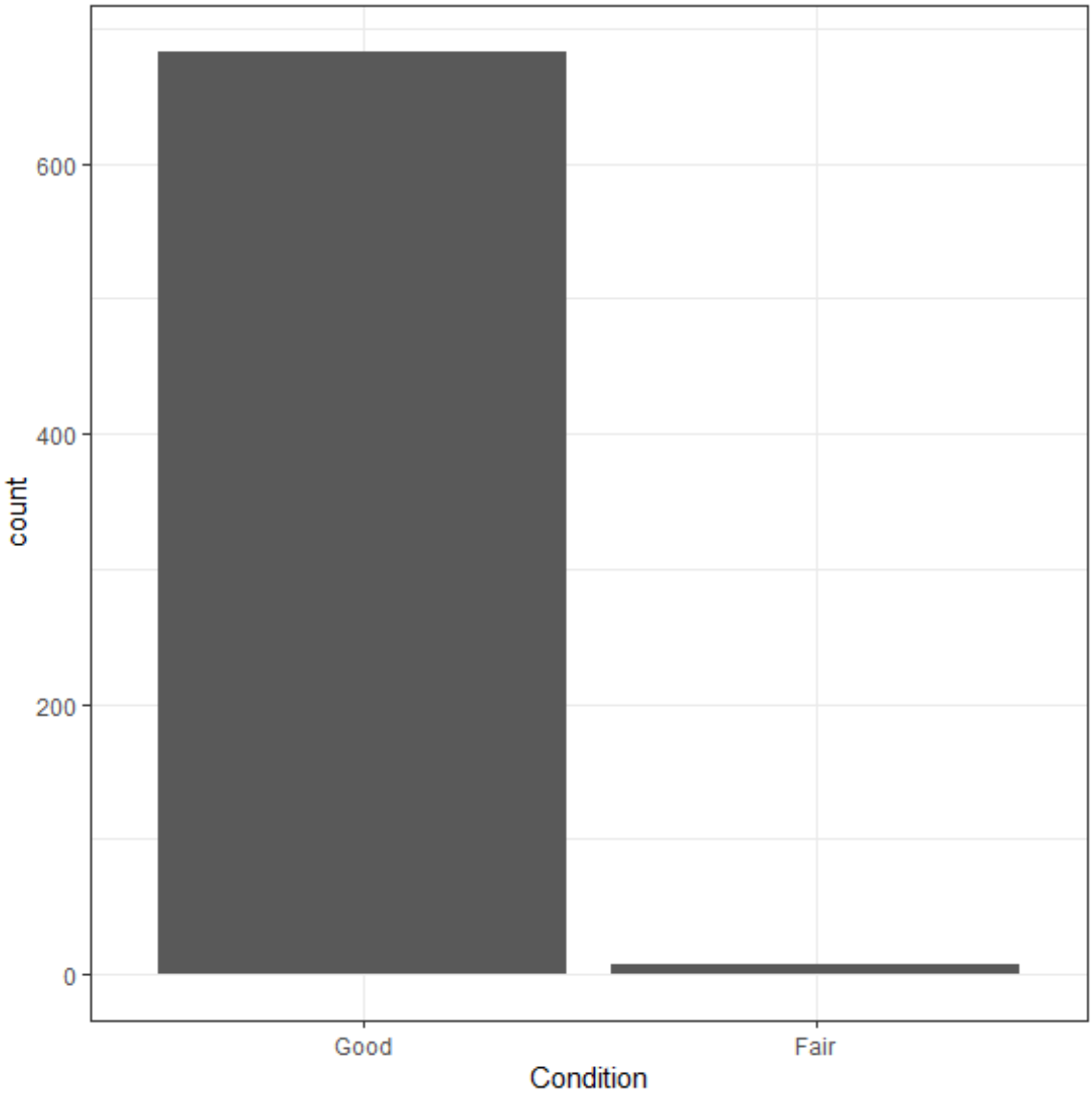

Figure A2: Condition index of Smallmouth Bass captured during Spring 2021 Walleye suppression netting.

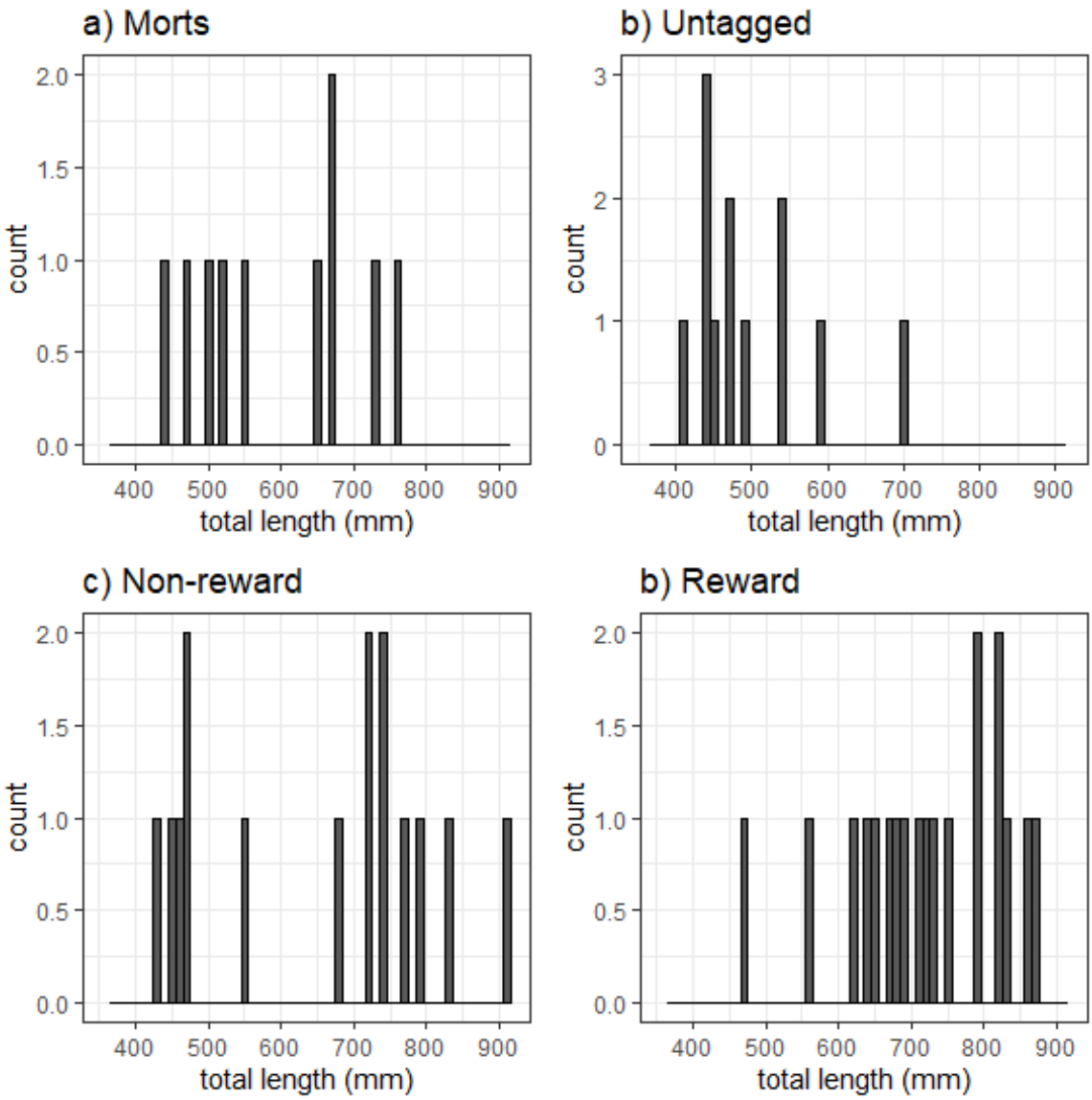

Figure B1: Length frequency of Rainbow Trout a) mortalities, b) released untagged, c) tagged with a non-reward T-bar tag, and d) double-tagged with a $50-reward and non-reward T-bar tags during Spring 2021 Walleye suppression netting.

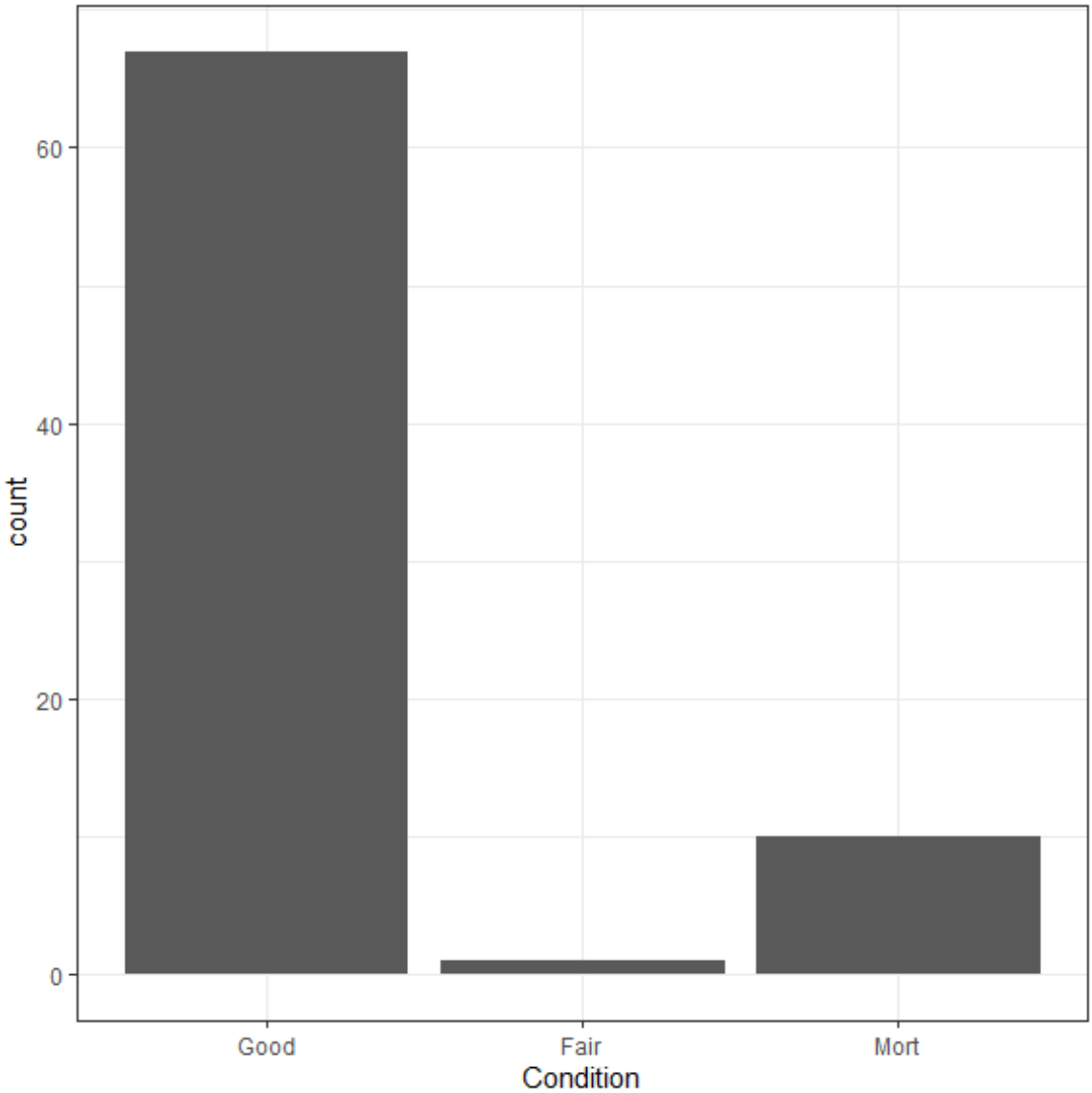

Figure B2: Condition index of Rainbow Trout captured during Spring 2021 Walleye suppression netting.

APPENDIX E. 2021 LPO WALLEYE ANGLER INCENTIVE PROGRAM SUMMARY

2021 LPO Walleye Angler Incentive Program Summary

Total Walleye heads submitted = 757

Total unique anglers participating = 113

Table 1. Number of Walleye removed through the Lake Pend Oreille Idaho, Angler Incentive Program (AIP), by month 2019–2021.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
2019			26	89	79	154	156	171	76	18	9	7	785
2020	12	17	60	53	71	121	137	206	130	25	14	14	860
2021	10	1	85	9	54	86	215	184	76	14	13	10	757

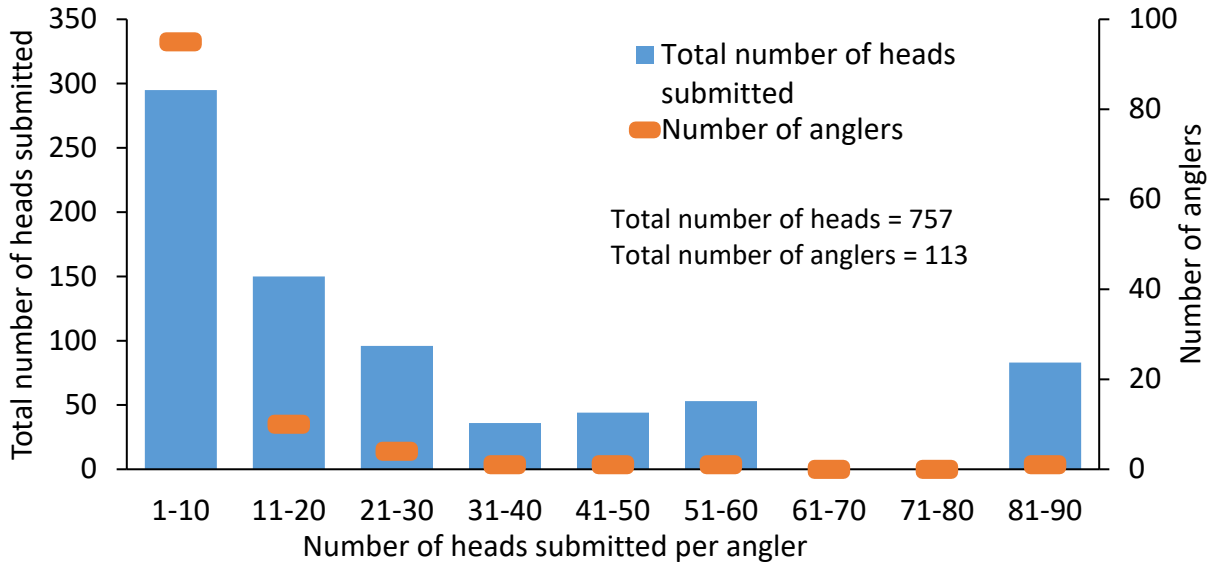

Figure 1. Total number of Walleye heads submitted and number of anglers submitting those heads, grouped by number of heads submitted per angler, through the Lake Pend Oreille AIP during 2021.

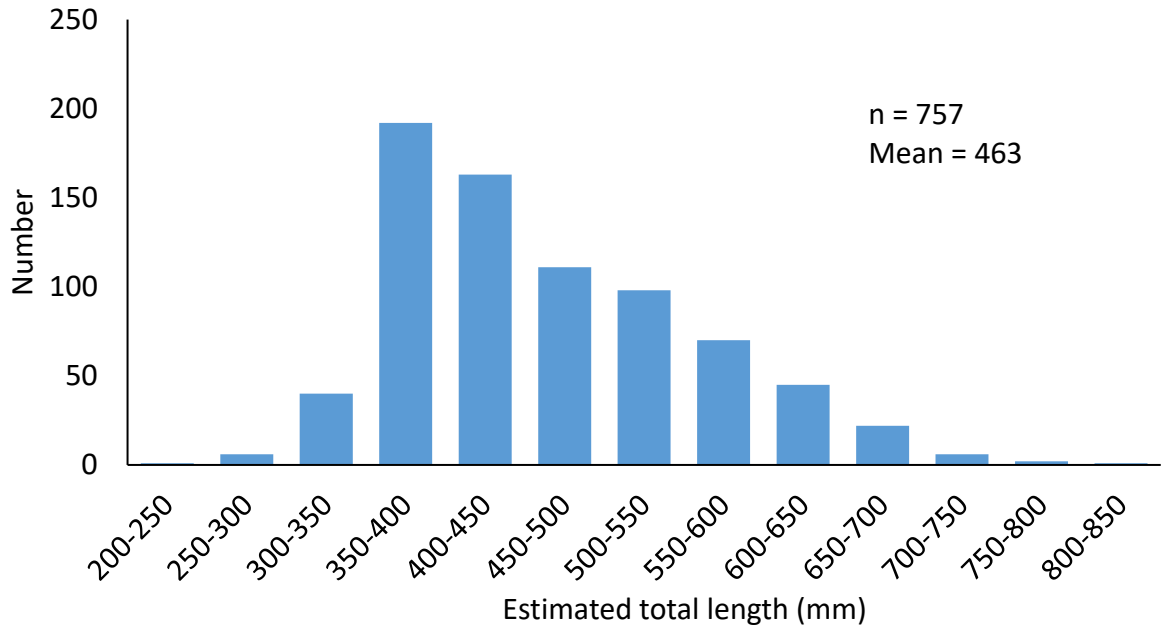

Figure 2. Length-frequency plot of Walleye captured by anglers participating in the AIP during 2021 by estimated total length bins. Lengths were derived using a head length to total length regression formula, developed from Walleye captured by the LPO Predator Suppression Program on Lake Pend Oreille.

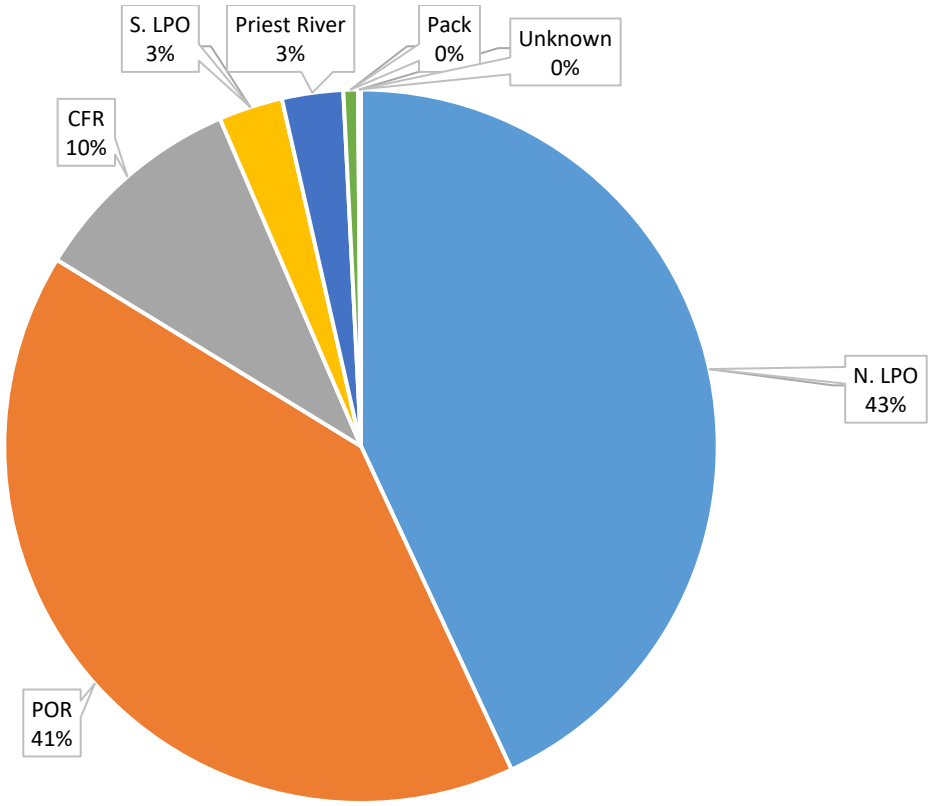

Figure 3. Locations (CFR: Clark Fork River, S. LPO: areas of LPO south of Windy Point, Priest River; Pack: Pack River) where Walleye were reported to have been caught, as a percentage of the total, by anglers participating in the Walleye AIP, 2021.