Northwest **Power** and **Conservation** Council



July 3, 2017

**MEMORANDUM**

**TO:** **Council members**

**FROM:** **Kendall Farley**

**SUBJECT:** **Lake Roosevelt Northern Pike Research and Suppression**

## BACKGROUND:

Presenter: Chris Donley, Region 1 Fish Program Manager, WDFW
Holly McLellan, Principal Biologist, Colville Confederated Tribes
Elliott Kittel, Biologist II, Spokane Tribe of Indians

Summary: The non-native invasive Northern Pike *Esox luscious* arrived in the upper reaches of the Columbia River, in Lake Roosevelt, in 2011. Since that time, Northern Pike abundance has increased and their distribution is expanding downstream. The co-managers of Lake Roosevelt (Colville Confederated Tribes, Spokane Tribe of Indians, and the Washington Department of Fish and Wildlife) worked together to develop a Lake Roosevelt Northern Pike Research and Suppression Plan (hereafter Plan), which includes multiple tasks and is supported by multiple funding sources, that aims to meet the Council's Non-native and Invasive Species principles and stragegy. Limited aspects of the Plan were implemented in 2015 and 2016. The full plan is being implemented in 2017 as a result of additional funding acquired. The three co-managers of Lake Roosevelt will present the comprehensive Plan, as well as preliminary results, data gaps, and future needs.

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Relevance: Part Three, Section IV A (Strategies, Ecosystem Function) Non-native and Invasive Species section of the 2014 Fish and Wildlife Program (page 46) supports the development of the Lake Roosevelt Northern Pike Research and Suppression Plan. The outlined principles of this section support work to prevent the establishment, monitor and control introductions and dispersal, removal and eradication of non-native species. The co-managers of Lake Roosevelt have developed this plan which aims to meet the above principles and reduce competition from Northern Pike. The co-managers have coordinated this effort and integrated multiple funding sources to meet the objectives.

Additionally, the Program's Investment Strategy Emerging Priorities #3 (Page 116) Preserve program effectiveness by supporting: (3) aggressively addressing non-native and invasive species.

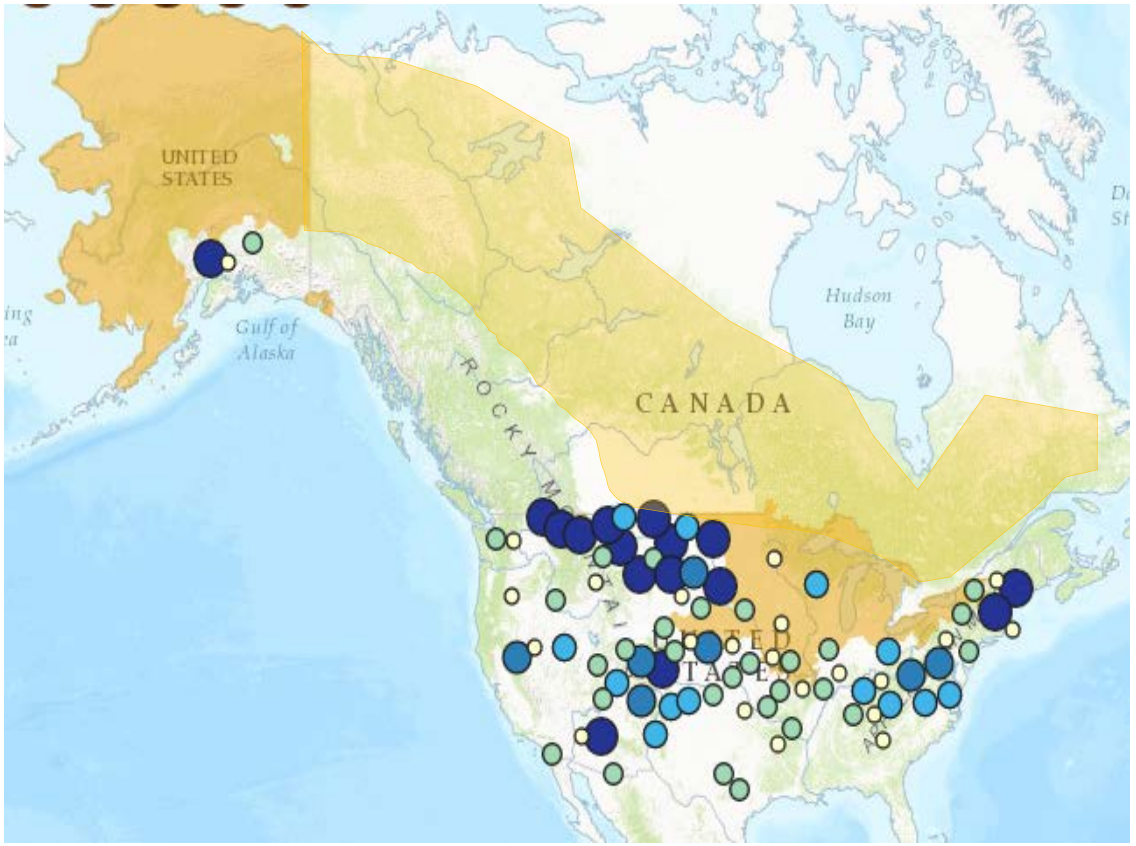
# Lake Roosevelt Northern Pike Research and Suppression

**Washington Department of Fish and Wildlife**: Chris Donley, Bill Baker and Charles Lee
**Confederated Tribes of the Colville Reservation**: Bret Nine and Holly McLellan
**Spokane Tribe of Indians**: Brent Nichols and Elliott Kittel

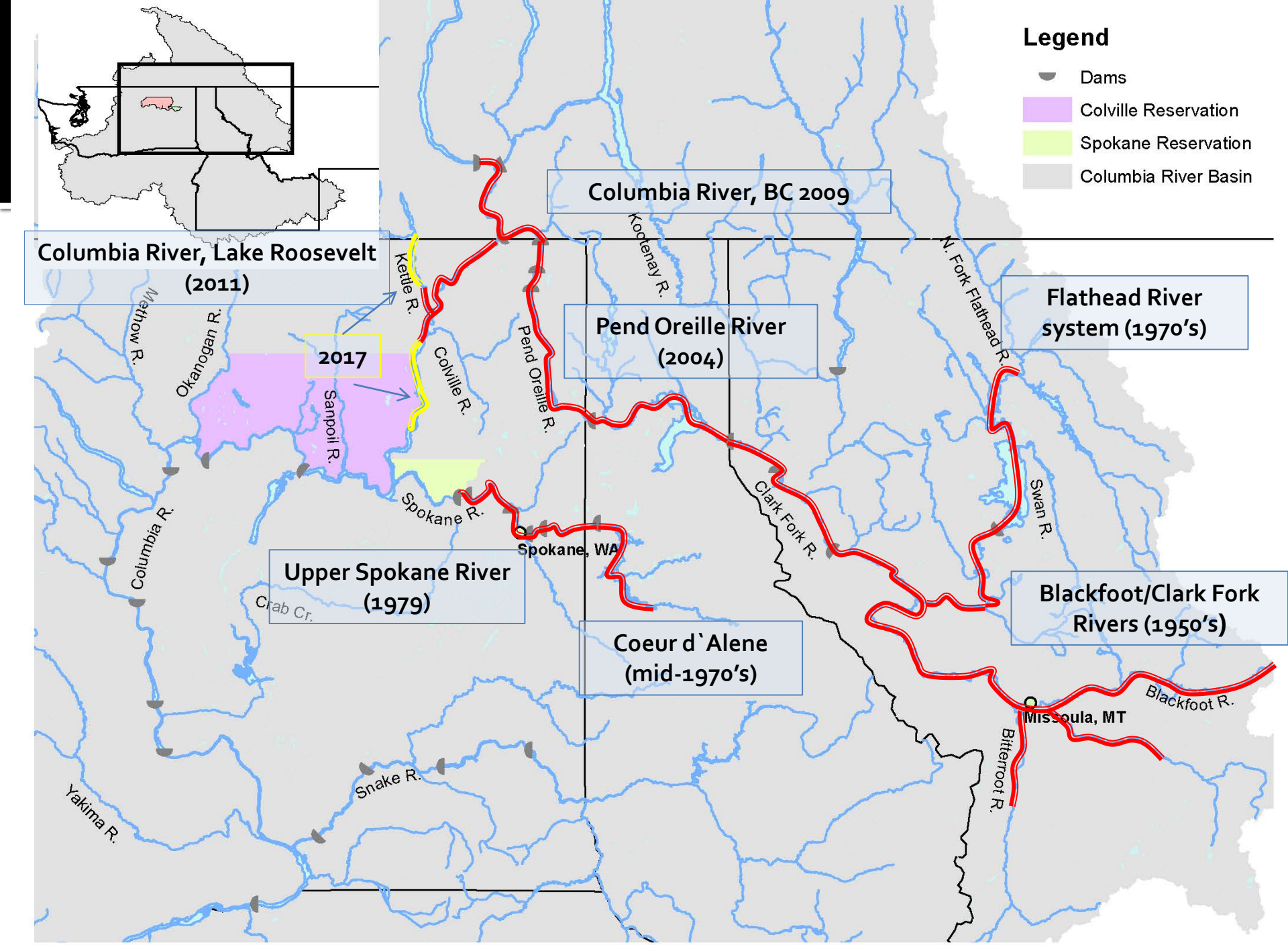
*Presented to* The Northwest Power Council on July 13th, 2017

# Northern Pike *Esox lucius*

- Within North America Northern Pike are native to the mid-west and large parts of Canada and Alaska
- Numerous introductions over the past 50 years increased distribution throughout the country




Map modified from USGS website


Legend
Dams
Colville Reservation
Spokane Reservation
Columbia River Basin
Columbia River, BC 2009
Columbia River, Lake Roosevelt (2011)
2017
Pend Oreille River (2004)
Flathead River system (1970's)
Upper Spokane River (1979)
Coeur d`Alene (mid-1970's)
Blackfoot/Clark Fork Rivers (1950's)
Kettle R.
Kootenay R.
N. Fork Flathead R.
Methow R.
Okanogan R.
Colville R.
Pend Oreille R.
Sanpoil R.
Spokane R.
Spokane, WA
Clark Fork R.
Swan R.
Columbia R.
Crab Cr.
Blackfoot R.
Missoula, MT
Bitterroot R.
Snake R.
Yakima R.

# Washington State Management

- Pike are a problem, not an opportunity
- In 2011 WDFW Fish Commission reclassified Pike to "Prohibited Species"
- Harvest: no minimum size, no daily limit, no possession limit
- Must be killed before transporting
- Releasing live Pike into other waters prohibited
- Other prohibited species: fathead minnow, bowfin, and snakeheads




# Why are Northern Pike so bad?

- Northern Pike have disrupted ecosystems in MT, AK, ID, WA, CO, UT, CA
- Caused the elimination of multiple native prairie minnow species in MT (Ostovar 2012).
- Prey heavily on WCT and Bull Trout in Upper Flathead, MT (Mulhlfeld and Bennett 2008)
- Caused the elimination of native salmonids in Sustina drainage, AK (Ruzt 1999)

26 pound female Pike from Roosevelt, 6/7/17

- **Prey on fish 75% body size**
  - NO FISH ARE SAFE, except adult *White Sturgeon*
  - Salmonids can grow big enough to escape Walleye and Smallmouth Bass

# Northern Pike in Lake Roosevelt

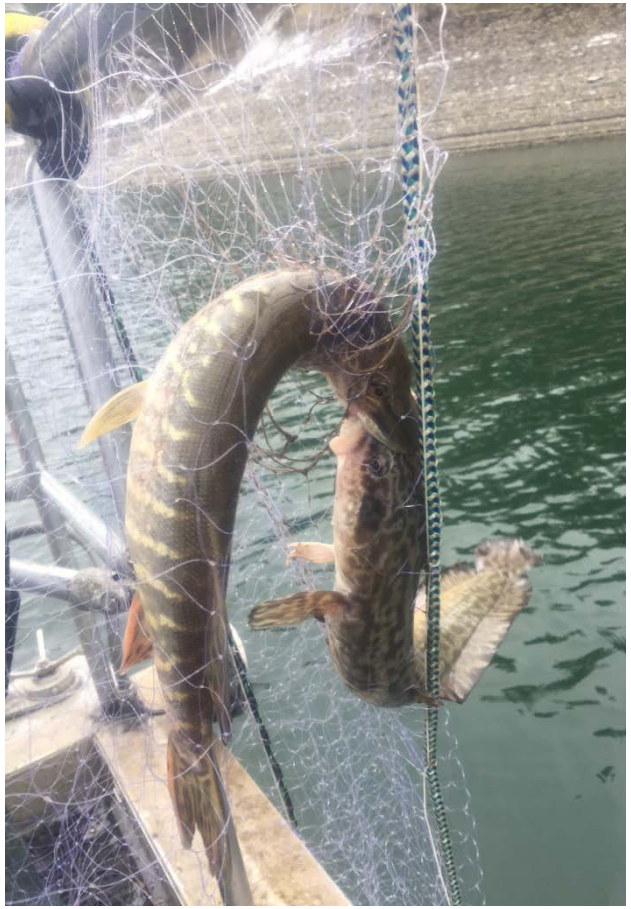
- Managers are concerned:
  - Redband Trout/ other native spp.
  - Expansion into Salmon ESA listed waters
  - Expansion into Banks Lake (Columbia Basin)
- Managers Goals:
  - Minimize impacts to native and important game fish species
  - Suppress Northern Pike and monitor the program
  - Prevent  the spread of Northern Pike to other waters

Multiple years classes

2016 Mature female

# Co-Managers Plan

- Established a Pike Technical Working Group
  - Lake Roosevelt partners
    - Collaborate on Northern Pike Research and Suppression Plan
  - Coordinates with regional partners: Kalispel Tribe/CDA Tribe/IDFG/USFS/NPS
  - Coordinates with Canadian partners: Ministry, BC Hydro, ONA Tribes, Watershed groups and consultants
- Tasks:
  - Seek and pool funding
  - Develop a Northern Pike Suppression and Monitoring Plan
  - Need to start suppression yesterday



N. Pike trying to eat a equal size Burbot

# Paying for a Program

- Colville Tribe
  - BPA $225,000 (reallocated Accord funds; 2017 only)
  - Grant ($25,000 for 3 yrs) and Chelan PUD ($35,000 3 yrs)
  - CCT Internal Funds $35,000 (3 yrs)
- Spokane Tribe
  - Secured BPA BOG funding for 3 yrs ($71,000); New BOG $123,017 (one year)
  - AFS Grant: $6,000; UCUT $12,000.; STI $4,500; BIA $ $72,000
- WDFW
  - STI/BPA $50,000, Chelan PUD $15,000, WDFW Internal Funds $10,000

# Northern Pike Research and Suppression Work Plan

| Tasks | Year Began | Agency | Who's Paying |
|---|---|---|---|
| **Research** | | | |
| Relative Abundance Survey | 2015 | WDFW/STI/CCT | BPA |
| Microchemistry Study | 2015 | CCT | BPA |
| Radio Telemetry Study | 2017 | WDFW | WDFW |
| Otolith Aging Study | 2016 | WDFW | WDFW |
| eDNA Study | 2017 | CCT/WDFW | CCT/PUD's |
| Harvest Trends in Creel | 2011 | STI/WDFW/CCT | BPA |
| **Suppression** | | | |
| Adult Gillnetting | 2016/17 | CCT/STI/WDFW | BPA/CCT/PUD's/BIA |
| Juvenile Electrofishing | 2016 | CCT/STI | CCT/PUD's/STI/BIA |
| Reward Program | 2017 | CCT | CCT/PUD's |
| Pilot Angling/Seining | 2017 | CCT | CCT/PUD's |
| Pilot Fyke Nets/Snorkel | 2017 | CCT/STI | CCT/PUD's/STI |
| **Public Outreach** | 2016 | WDFW/CCT/STI/NPS | All |

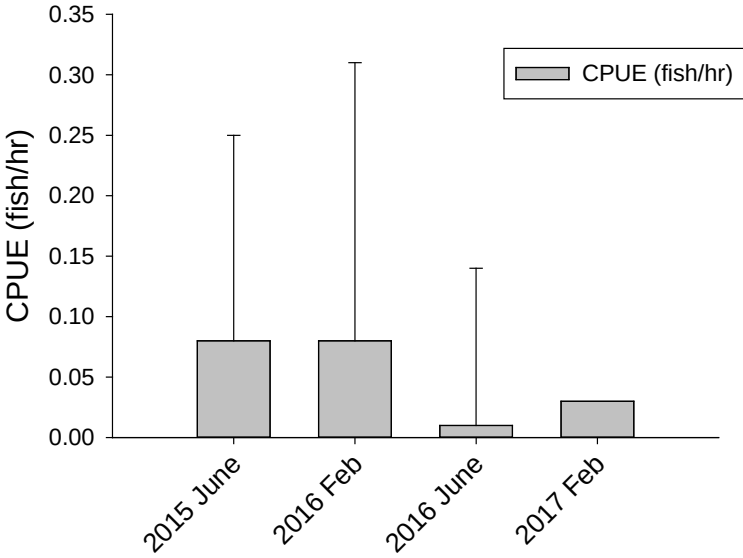
# Monthly Northern Pike Work Plan

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Research** | | | | | | | | | | | | |
| Relative Abundance Survey | | | | | | | | | | | FWIN | |
| Microchemistry Study | | | | | | | | | | | | |
| Radio Telemetry Study | | | | | | | | | | | | |
| Otolith Aging Study | | | | | | | | | | | | |
| eDNA Study | | | | | | | | | | | | |
| Harvest via Creel | | | | | | | | | | | | |
| **Suppression** | | | | | | | | | | | | |
| Adult Gillnetting | | | | | | | | | | | | |
| Juvenile Electrofishing | | | | | | | | | | | | |
| Reward Program | | | | | | | | | | | | |
| Pilot Adult Angling/Seining | | | | | | | | | | | | |
| Pilot Fyke/ Snorkel | | | | | | | | | | | | |
| **Public Outreach** | | | | | | | | | | | | |

# Relative Abundance Surveys

Goal: Monitor changes in abundance over time and to identify congregations to assist with suppression netting

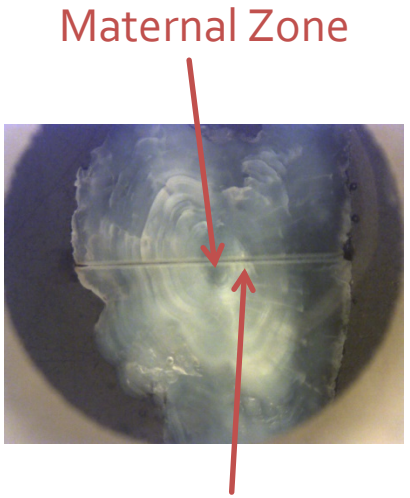
- Survey: February
  - GRTS sites; slope ≤ 45° ; ≤ 50 ft water
  - 1 week survey; 130 SPIN nets, 4 hr sets
  - Study area: Kettle Falls
- Challenges
  - Reservoir conditions different every year
  - Adjusting survey to occur when water temps reach 4 °C  instead of reservoir elevation



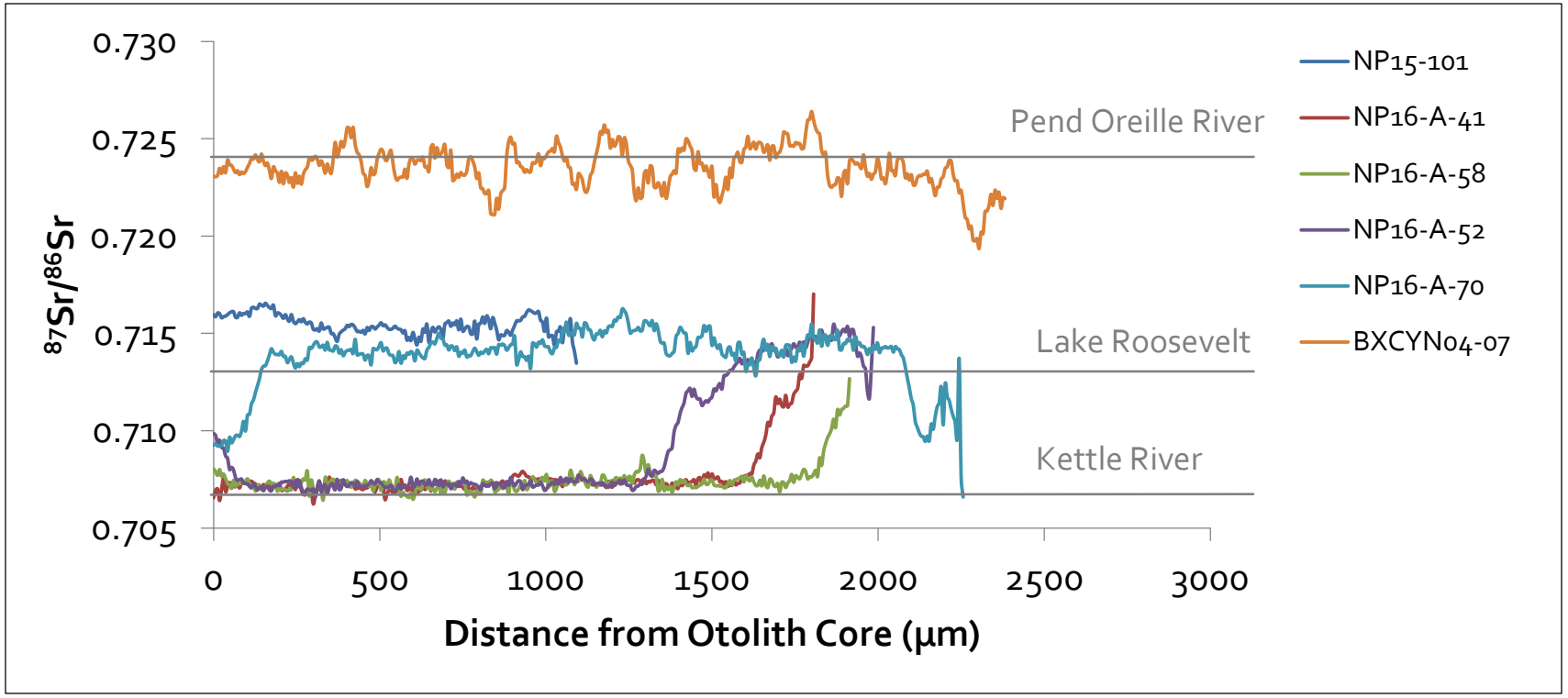

# Microchemistry Research

Goal: Determine general spawning locations, understand movement and spawning patterns. Data will be used to assist with suppression plans.

- Otoliths from Lake Roosevelt
  - Analyzed: 40 adults and 24 juveniles
  - Will analyze: Juveniles from above and below key spawning areas (n=16)
- Reference otoliths (to be analyzed)
  - Box Canyon (n=5), Boundary Reservoir (n=5), Long Lake (n=5), Coeur d' Alene (n=5), Clark Fork River (n=15)



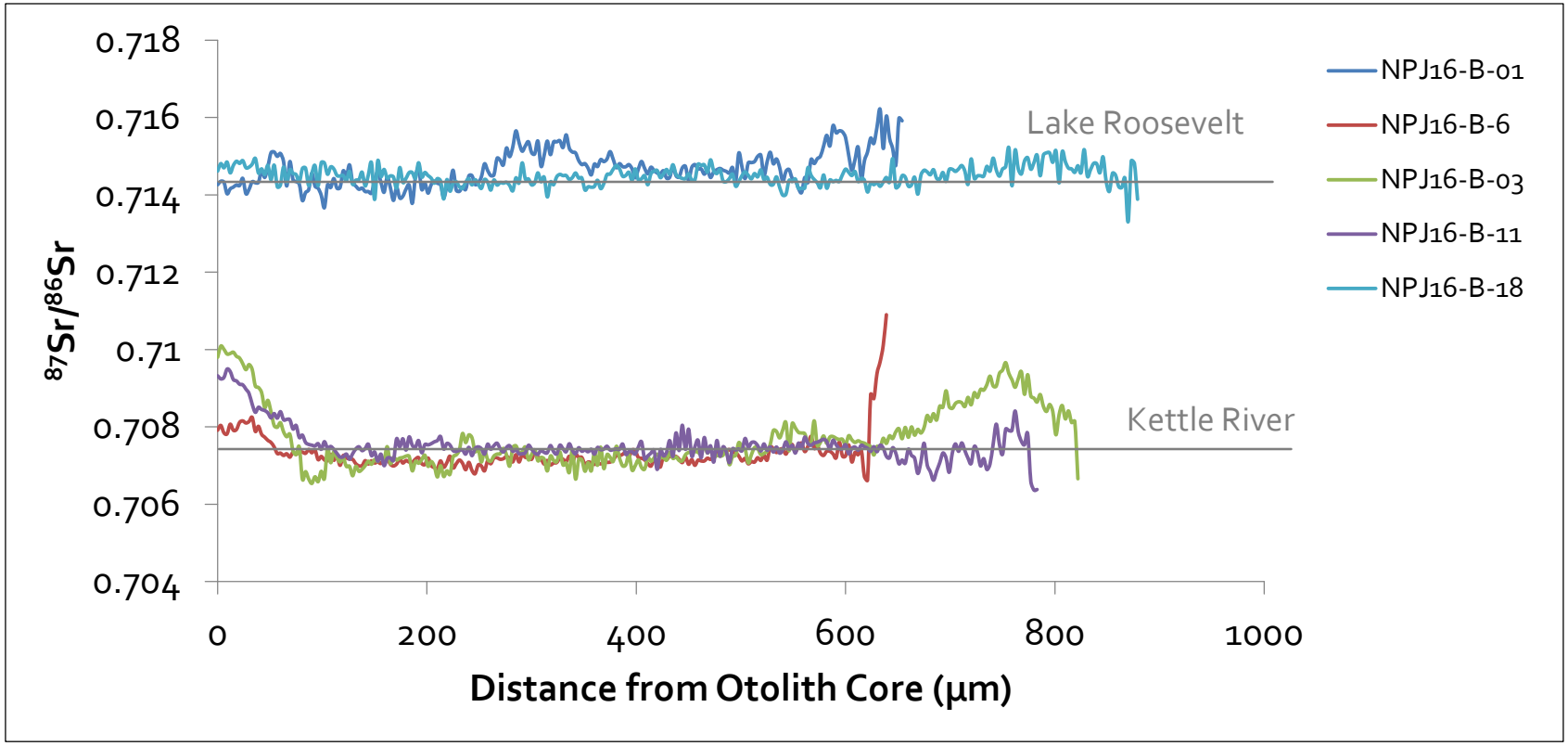
# Preliminary Results- Adults




- Pend Oreille River has a different $^{87}Sr/^{86}Sr$ signature
- Large portion of adults tested from multiple sites originated in the Kettle River (2016 cohort)
- Most appear to enter Lake Roosevelt after age 1 or 2
- 1 with maternal signature of Colville River

| Sample | TL (mm) | Capture Site |
|---|---|---|
| NP15-101 | 505 | LR- Colville River (mouth) |
| NP16-A-41 | 667 | LR- Evans |
| NP16-A-58 | 663 | Marcus/Kettle River |
| NP16-A-52 | 677 | Marcus/Kettle River |
| NP16-A-70 | 794 | LR- Singer Bay |
| BXCYN04-07 | - | PO- Box Canyon Reservoir |

# Preliminary Results- Juveniles




- Juveniles captured at Northport and Evans from mainstem Columbia River
- Juveniles captured in Kettle River were born there

| Sample | TL (mm) | Capture Site |
|---|---|---|
| NPJ16-B-01 | 120 | LR-Northport |
| NPJ16-B-6 | 114 | LR- Kettle River Bay |
| NPJ16-B-03 | 179 | LR- Kettle River Bay |
| NPJ16-B-11 | 168 | LR- Kettle River Bay |
| NPJ16-B-18 | 191 | LR-Evans |

# Radio Telemetry Research

Goal: Determine spawning locations and summer movement patterns to assist with suppression efforts

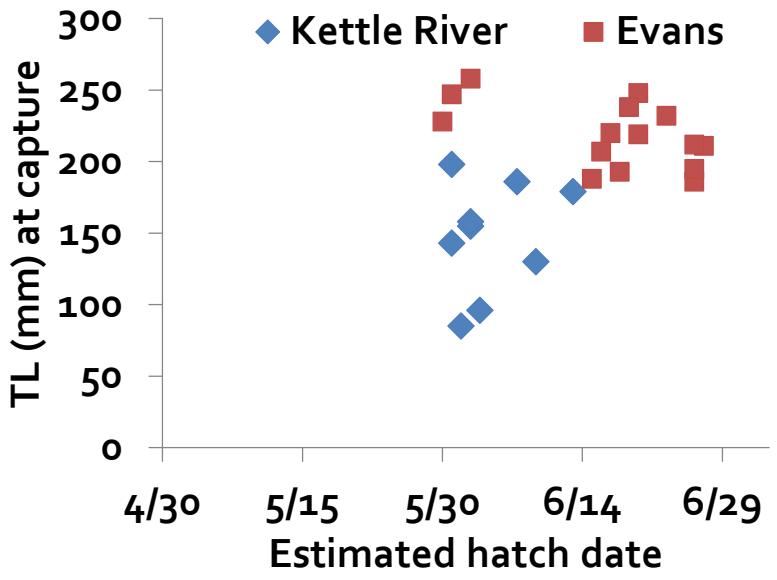
- 2017 marked 6 Pike in the spring
  - Lotek Model MCCFT2-3M (528 days)
- Tracking twice a week by boat and vehicle
- Future: Plan to deploy 5 additional tags this year and continue tracking in 2018

# Otolith Growth Study

Goal: Use otoliths daily growth rings to identify spawning time and correlate with reservoir elevation to assist with removal planning

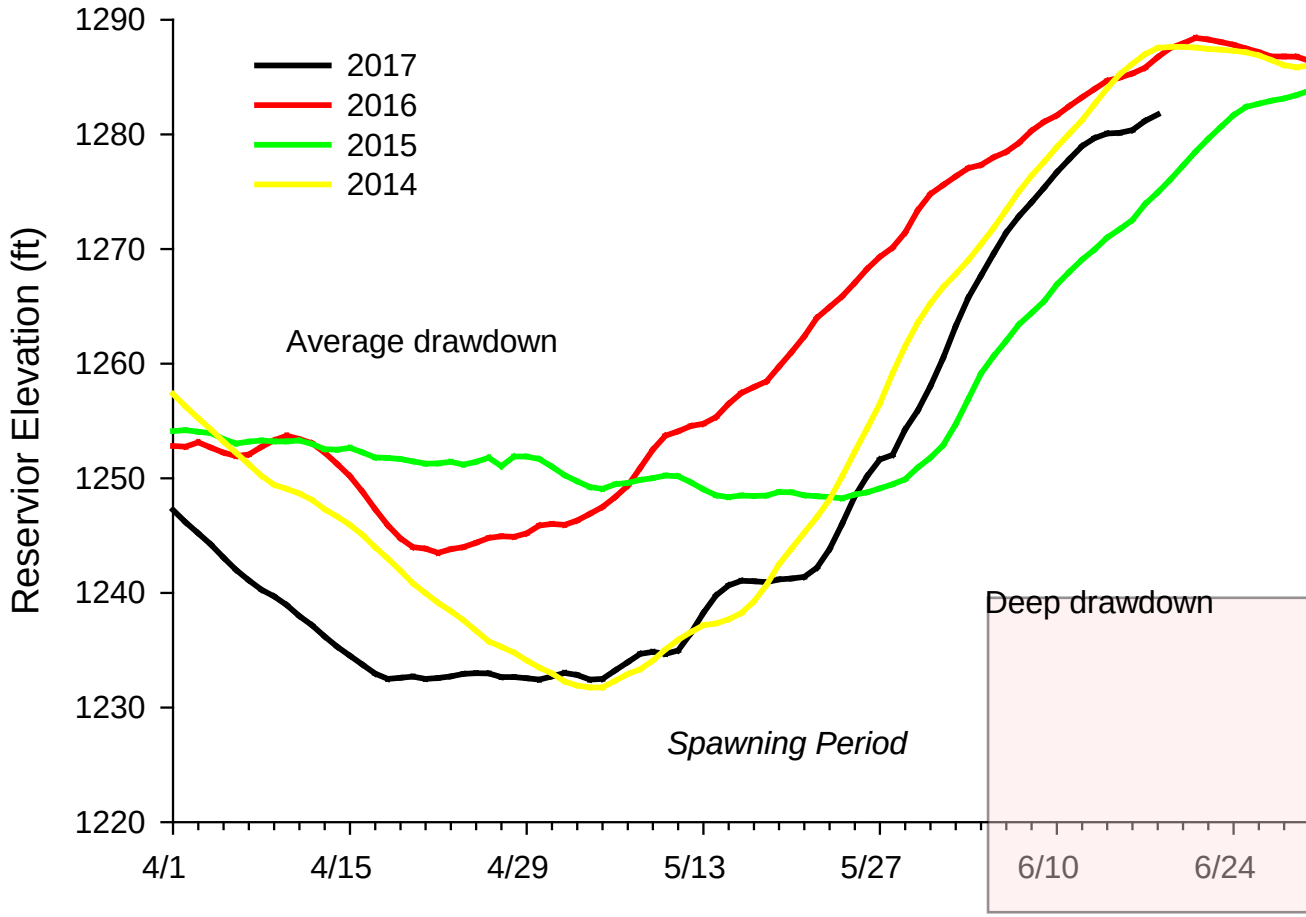
- Successful spawning appears to occur in mid May – mid June (2016 fish)
- Later than other regional waters

Mouth of Colville River during draw down



# Recruitment Questions

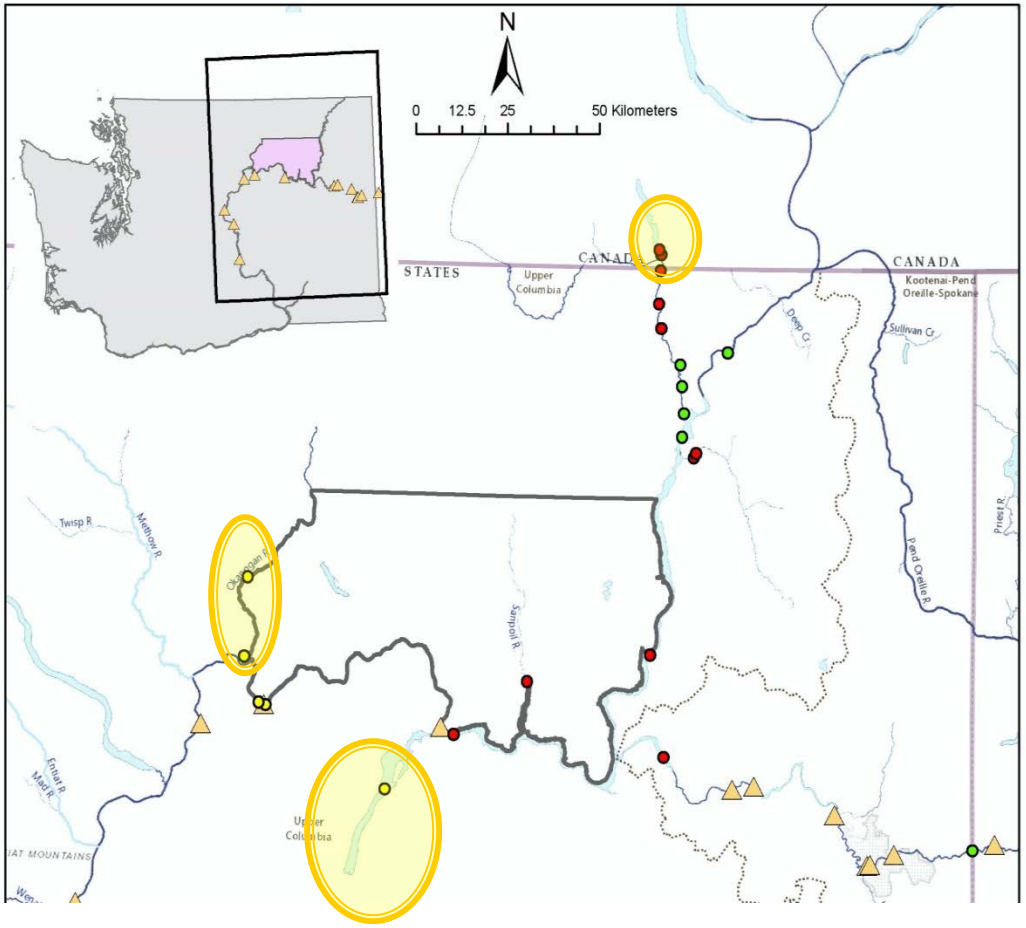
- Does reservoir elevation or refill timing affect year class strength?
- Continued research needed



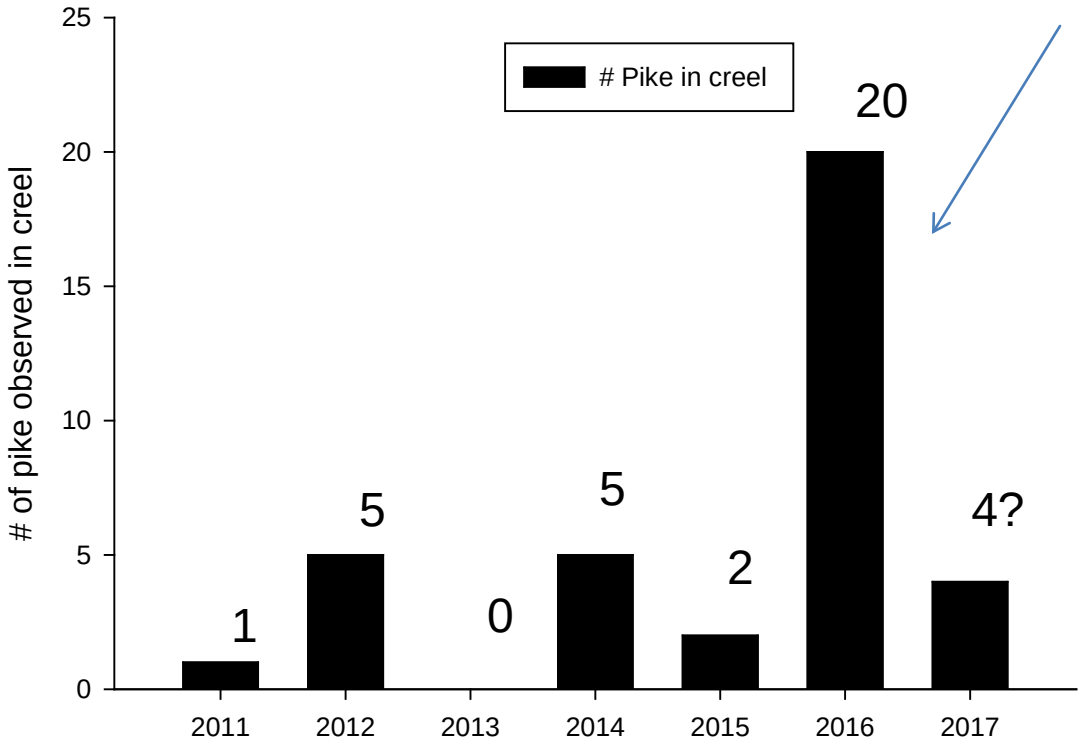
# eDNA Study

Goal: Detect the early presence of Northern Pike in areas of concern which will enable relevant agencies to respond rapidly

- Monitor eDNA in the water during low flows, September
- Provide information to regional managers
- Information will assist with quick response plans
- Areas of concern: Christina Lake, Okanogan River, Banks Lake
- Sub-contract with Rocky Mountain Research Station



# Harvest Trends in the Creel




- 2016 expanded catch estimate 297 Pike Captured (SE 49.79)
- Only observed in Upper Reservoir creel

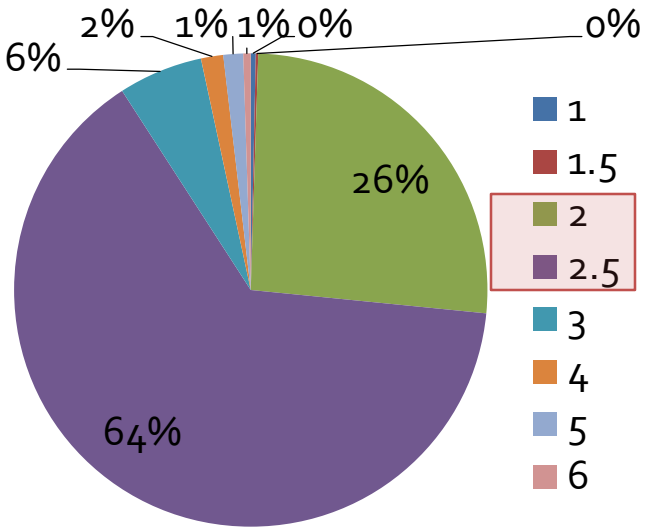
# Suppression: Adult Netting

- Began Feb.2017
  - Overnight sets during cool months (40 nets/wk/Agency)
  - Shallow <30 ft; release all live bycatch
  - If bycatch limits met, move out of area for week (or use short sets)
  - Keeping track of catch in mesh size to develop Roosevelt specific Pike nets
  - Field crews coordinate every evening to discuss catch and bycatch

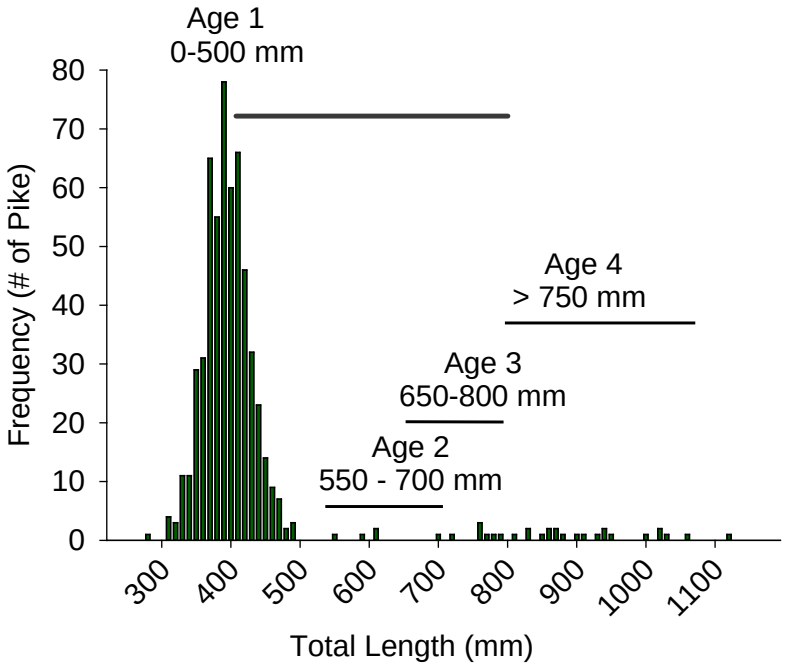
Sculpin and Hatchery RBT in stomach

# 2017 Suppression Summary

- 2017: **525** overnight net (5,399 hrs) sets have removed **1,083 Pike**
  - 90% Pike captured in 2.0 and 2.5 stretch mesh
  - Majority of the fish are age 1 ; largest fish 44 in. and 26 pounds

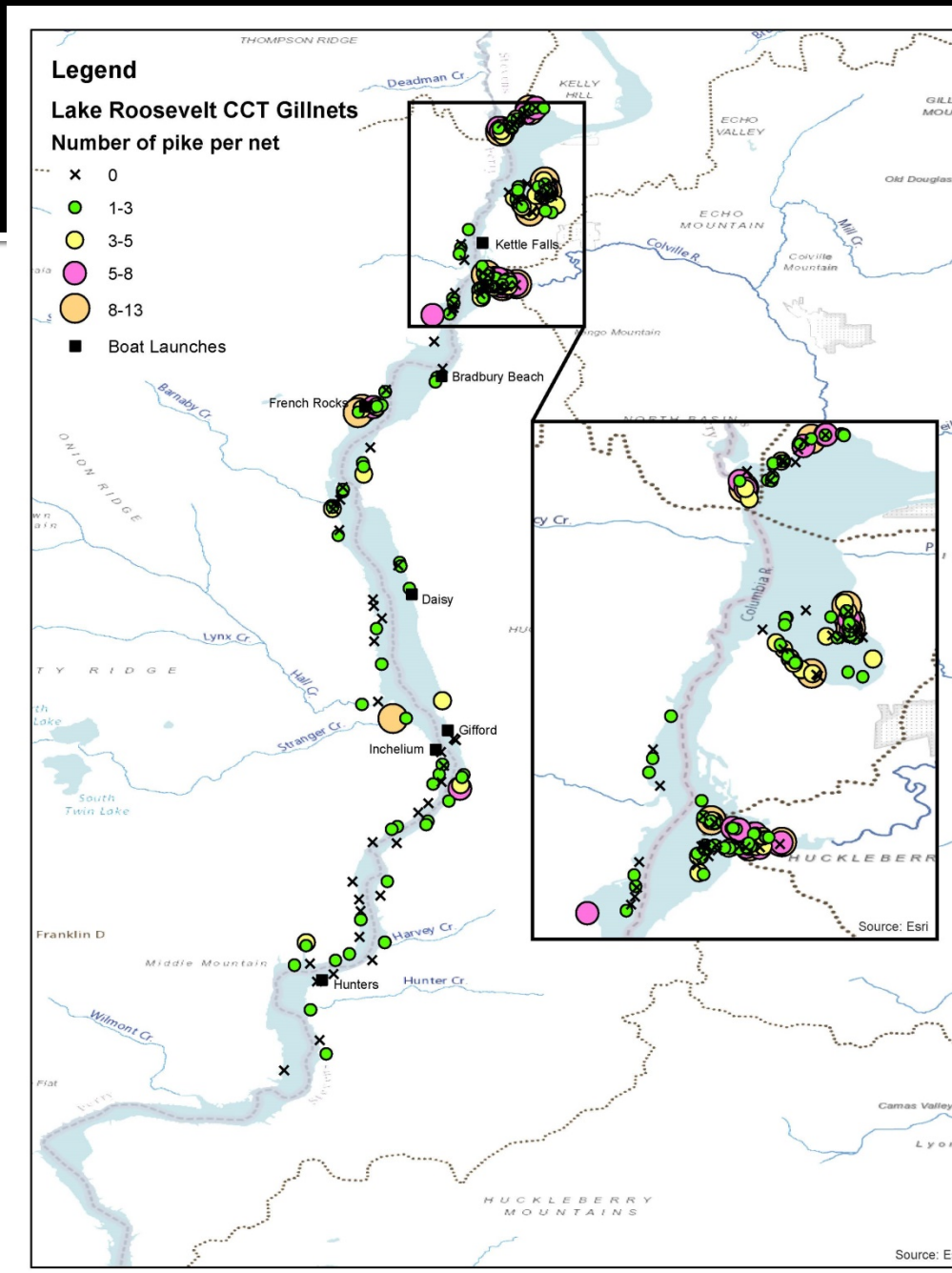



Percent of Pike captured per mesh size



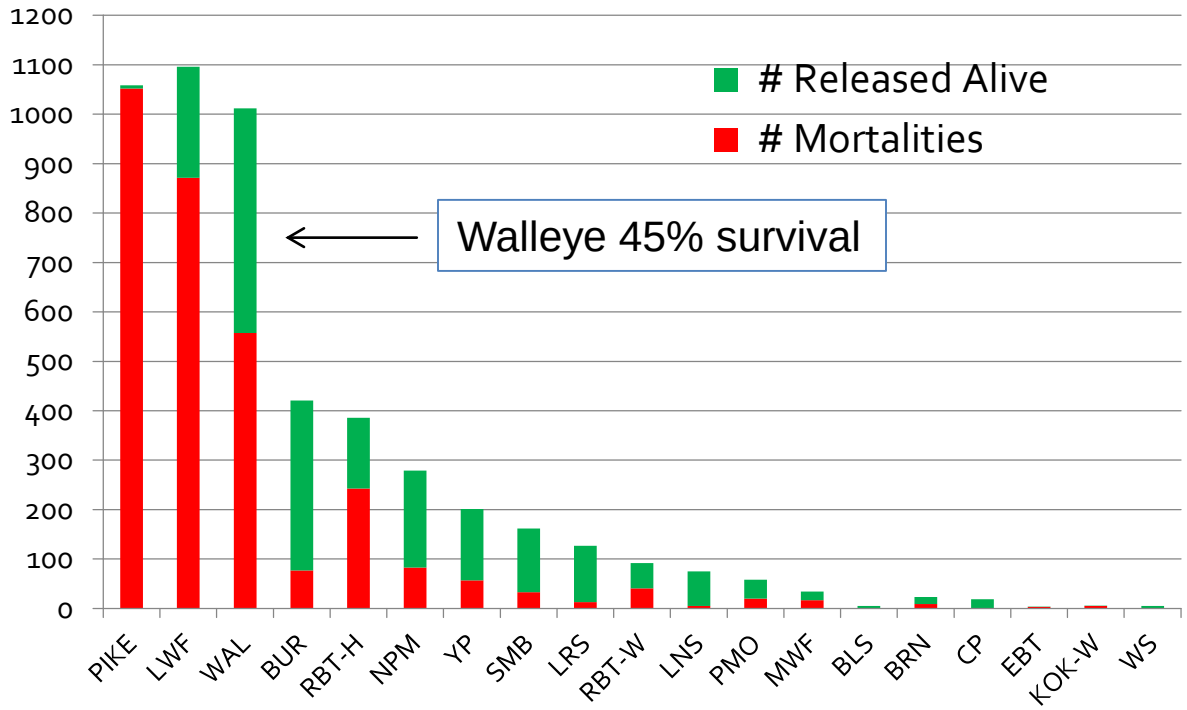
# 2017 Suppression

- The majority of Pike have been captured near the Kettle River mouth, Singers Bay, and the Colville River.
- Mean CPUE: 2.4 Pike/net
- This is the first year we have captured Pike near Hunters
- Plan to continue netting downstream
- Concurrent netting occurring in the Sanpoil River and Spokane Rivers, no Pike yet



# Suppression Total Catch for 2017

- Captured 5,447 fish and 1,083 Pike (as of June 29, 2017)
- Acceptable bycatch mortalities
  - Kill Lake Whitefish on purpose; Walleye had 45% survival; Hatchery Rainbow 37% survival; all other fish > 50% survival



# Fall Juvenile Electrofishing

Goal: Use non-lethal boat electrofishing to capture juvenile N. Pike in the fall

- In 2016, boat electrofishing in very shallow water (< 12 in) was successful at capturing juveniles
- Tend to congregate
- Removed **905 juveniles in 17 days** of effort (STI and CCT crews)

- 2017 Plan
  - Conduct 30 days of electrofishing (no BPA funds allowed)

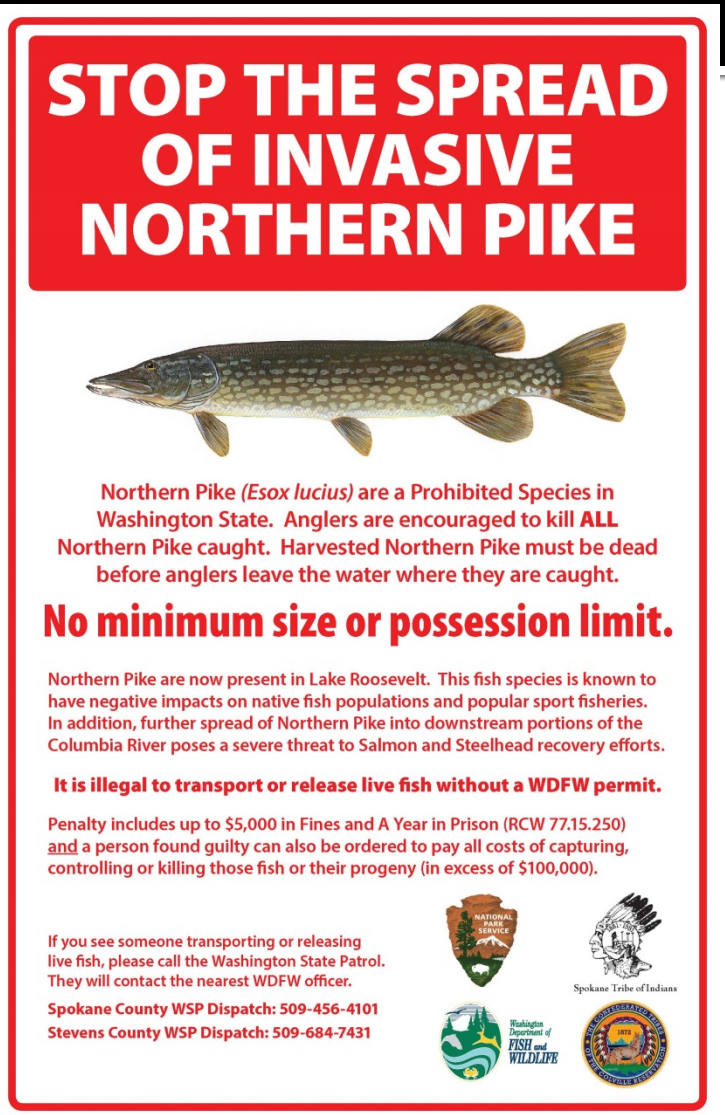
# Pilot Work

Goal: Test other live collection techniques to determine if one is effective at removing Northern Pike with minimal bycatch

- Seining: Plan to test suspected juvenile rearing habitat
- Angling: Plan to test commercial style trolling (10 rods)
- Fyke Netting: Plan to test in juvenile areas
- Snorkel Surveys: Kettle River difficult to sample, no boat access. Need to identify Pike areas then implement suppression plans.

# Public Outreach

- Posted Northern Pike Signs at all Lake Roosevelt boat launches
- Presented Pike Plans to two Walleye Clubs
- Provided information to local newspapers, radio talk shows
- Social Media Outreach
  - Facebook, Instagram



# Northern Pike Reward Program


**WANTED**

Northern Pike Heads

**$10 Reward**

Goal: Incentive for anglers to be a part of the solution

- Began May 1, 2017
- Pike drop off freezers/$10 per Pike
- 216 heads turned in ($2,106 payout)
- Continue program through 2018

**Attention Anglers: Help protect Lake Roosevelt from Invasive Northern Pike!**

# Future plans and needs

- Implement similar program in 2018
- Secure Funding for 2018 and beyond
- Co-managers (STI, CCT, WDFW) will work together on a Northern Pike Research and Suppression Project proposal for the NPCC and BPA
- Technical Group/Managers
  - Clarify RA and suppression targets
  - Need to review the data
  - Continue to refine research questions
  - Implement successful techniques

# Questions and Comments

Many thanks to our funding agencies and dedicated staff:

- Colville Tribe staff: Shay Wolvert, Bryan Jones, Charles Joseph, William Laramie, Robert Thomas, Jeffrey Joseph, Daniel Monaghan, Branditt West, Jeffrey Condon, Michael Peoples
- Spokane Tribe staff: Alix Blake, Chas Lawson, Donny Carter, Wyatt Thurman, Vaughan Lodge
- WDFW: Leslie King, Mitch Combs, Tyler Parsons, Marc Divens
- National Park Service: Meghan Lyons

Bonneville POWER ADMINISTRATION

THE CONFEDERATED TRIBES OF THE COLVILLE RESERVATION 1872

Grant PUD

P.U.D. CHELAN COUNTY

NATIONAL PARK SERVICE

# Bycatch limits

Agreed to stop netting in one general area for the rest of the sampling week if these mortality thresholds were met in one day

- Wild Rainbow Trout – 10
- Wild Kokanee – 10
- Walleye – 100
- Burbot – 50
- Hatchery Rainbow Trout – 50
- Lake Whitefish – n/a
- Mountain Whitefish – 15
- Smallmouth Bass – 100
- Sucker spp. - 50
- White Sturgeon (wild) 1
- White Sturgeon (hatchery; direct gamete take 2001-2009) – n/a
- White Sturgeon (hatchery; wild larvae origin 2010-2016) – 10