



Mechanical Suppression of Invasive Northern Pike, Pend Oreille River, WA

Nick Bean¹, Jason Connor¹, Shane Harvey¹, Marc Divens²

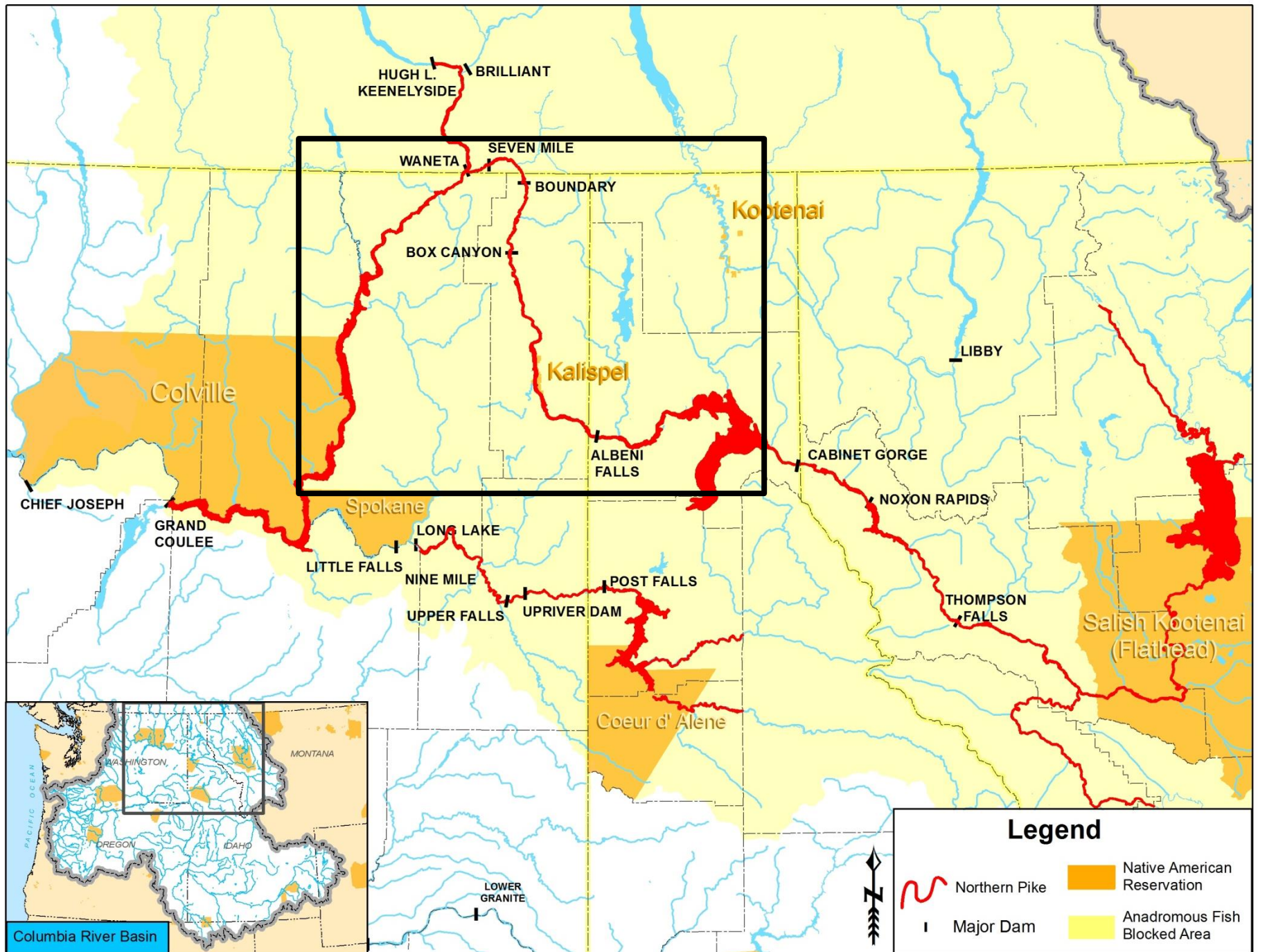
Kalispel Tribe Natural Resources Department¹
Washington Department of Fish and Wildlife²



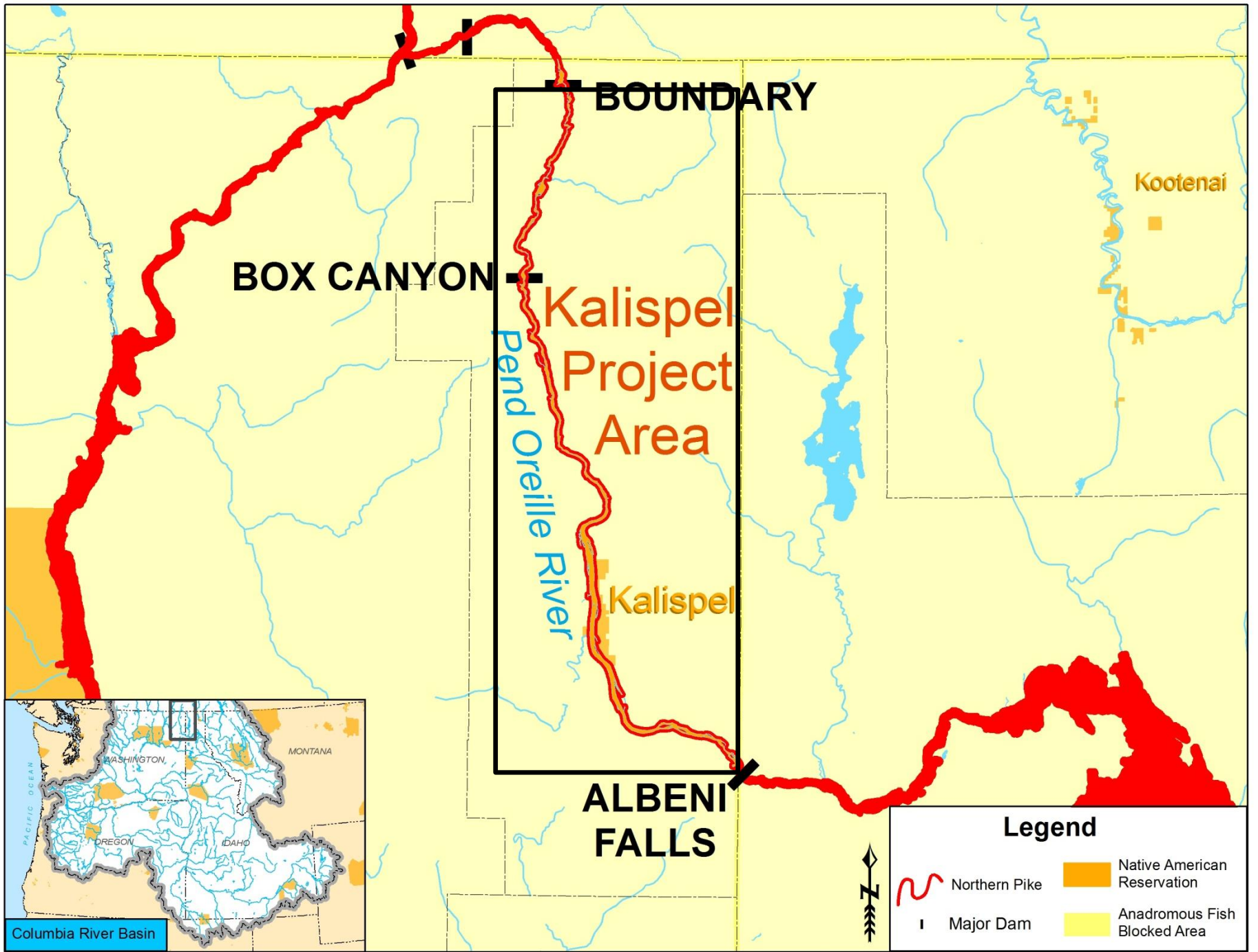
Northern Pike *Esox lucius*

- “Coolwater” species
 - Vegetation dependent life history
 - Mature as early as 2-3 years old
 - Spawn <2 m with water at 10-12 °C
 - Potential of >250,000 eggs/female
- Large size
 - > 18 kg (40 lbs) and 1,270 mm (50”)
 - Grow 100-250 mm (4-10”) annually
- Apex predator
 - Consume fish >50% body length
 - Restructures fish communities
- Highly invasive & popular (sport)





Source: Washington State Department of Fish and Wildlife



Source: Washington State Department of Fish and Wildlife

Project Background

- Northern Pike first documented in the Box Canyon in 2004
- Population monitored/studied from 2005-2011
- Exponential increase from ~400 in 2006 to >10,000 in 2011
- Majority of other fish species declined between 2004-2009
- Range expanded downstream into Boundary Reservoir and more recently into the Columbia River
 - Spokane River (CDA Basin) also a potential source to Columbia



Threats of Continued Expansion & Lack of Control

- Local Waters
 - Native species conservation/recovery in lower Pend Oreille
 - Box Canyon, Boundary dams FERC license implementation
 - Further illegal introductions into neighboring waters
 - Continued emigration to the Columbia
- Columbia River
 - ESA recovery (US); SARA species (Canada)
 - Tribal, recreational/sport, commercial salmon and steelhead fisheries
 - Lake Roosevelt resident fish mitigation and substitution

Management Perspective

Washington State:

Northern Pike are a problem, not an opportunity.

- Management Goals:
 - Minimize impacts to native species (locally & downstream)
 - Reduce spread to other waters (lakes and connected rivers)
 - Reduce number of Northern Pike in Box Canyon Reservoir (BCR)



Management Objectives

By 2014, **REDUCE ABUNDANCE** (CPUE) of Northern Pike (NP) in BCR from 2011's 13.2 NP/net night to:

- <1.73 NP/net night in core area (southern ½ of reservoir and sloughs) and
- <0.5 NP/net night in northern ½ in SPIN survey by 2014



Equates to an 87% reduction in relative abundance

Three-Pronged Approach

1. Increase angler exploitation
 - Education and outreach
 - Reclassify to “Prohibited Species”
2. Promote fishing contests that provide incentive for harvest
 - PikePalooza Fishing Derby
 - 2012 & 2013
3. Mechanical Suppression
 - Intensive gillnetting
 - Target pre-spawn NP
 - 2012-2014 minimum



Transporting and Unlawful Release of Live Fish in Washington is Illegal

Introducing predators such as northern pike can cause severe ecological damage and destroy trout and other popular fisheries.

A person found guilty of unlawfully releasing fish within the state is liable for a fine up to \$5,000 and a year in jail (RCW 77.15.250.250).

That person can also be ordered to pay all cost of capturing, controlling or killing those fish or their progeny (in excess of \$100,000).



Northern pike (*Esox lucius*)

If you see someone transporting or releasing live fish, please call the Washington State Patrol. They will contact the nearest WDFW officer. Pend Oreille County WSP Dispatch = 509-227-6560 Spokane County WSP Dispatch = 509-456-4101



Mechanical Suppression: Location-BCR

- 89 km (55 mile) long reservoir
- 3,556 surface ha (8,788 ac)
- Extensive off-channel and shallow habitat
 - >40 sloughs, bays, backwater areas

Mechanical Suppression: Methods

- Narrow window for effective (pre-spawn) netting
- Gillnet specifications and strategy:
 - 150' x 6' mono experimental gillnets (1", 1.25", 1.5", 1.75", 2")
 - 2 crews/boats up to 32 nets/day for 4-7 days/week
 - Net ice edge early then expand with pike (target <2 m water depth)
 - Collect data: biological, mesh, bycatch, location



Mechanical Suppression: Implementation Strategy

- Phase I (March-April/Early May)
 - Start at ice-out
 - Gillnet spawning locations
- SPIN (Late April/Early May)
 - See if targets reductions are met
 - Either cease or begin Phase II
- Phase II (Post SPIN-Mid June)
 - Gillnet until 87% site reduction
 - Target higher concentrations (SPIN)
 - Implemented 2012-2013



BCR Suppression Results: 2012 - 2017



BCR Suppression Results: 2012 - 2017

Gillnets Set/Pulled				Northern Pike Removed			
Year	Phase I	Phase II	Total	Phase I	Phase II	Total	CPUE
2012	524	507	1,031	4,552	1,256	5,808	5.6
2013	1,026	190	1,216	5,953	499	6,452	5.3
2014	861	0	861	3,967	0	3,967	4.6
2015	854	0	854	751	0	751	0.88
2016	419	0	419	181	0	182	0.43
2017	220	0	220	34	0	33	0.15
Total	3,904	697	4,601	15,438	1,755	17,193	--

- 130.7 miles (210.3 km) of gillnet set
- 18.6 metric tons (41,000 pounds) of NP removed from BCR

Project Observations/Trends

- Majority of catch in <2 m of water
- Sex ratio consistent throughout project
 - Approximately 50:50 with females typically slightly less
- Nearly all female NP in BCR are spawned out by May 1st
- Size (age) distribution fluctuated
 - Periods of large year classes showing up in early years
 - Able to eliminate large (5+year old) cohorts early and maintain a generally younger population
 - Now seeing virtually no recruitment of young year classes
- 4 locations produced 56% of total NP removed
- Bycatch survival was >90% for project

BCR NP Catch by Location

Everett Island

94.6 Hectares

2,866 Total NP
Removed

30.3 NP/Hectare
Removed

4.4 NP/Net

Tacoma/Trimble Slough

22.1 Hectares

2,577 Total NP
Removed

116.6 NP/Hectare
Removed

5.8 NP/Net

Cusick/ Gardiner Slough

26.1 Hectares

2,254 Total NP
Removed

86.4 NP/Hectare
Removed

4.7 NP/Net

Campbell Slough

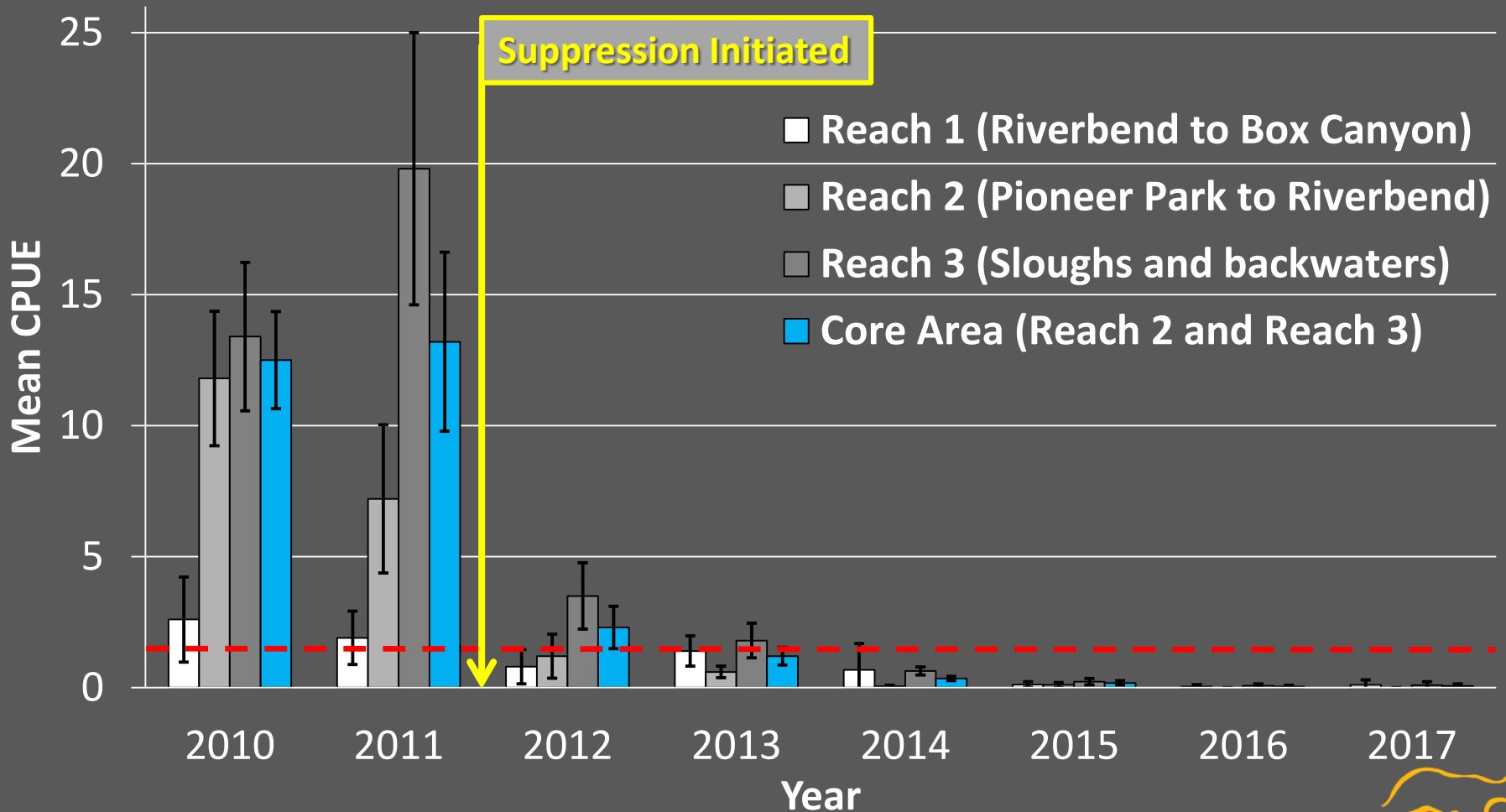
5.6 Hectares

1,854 Total NP
Removed

331.1 NP/Hectare
Removed

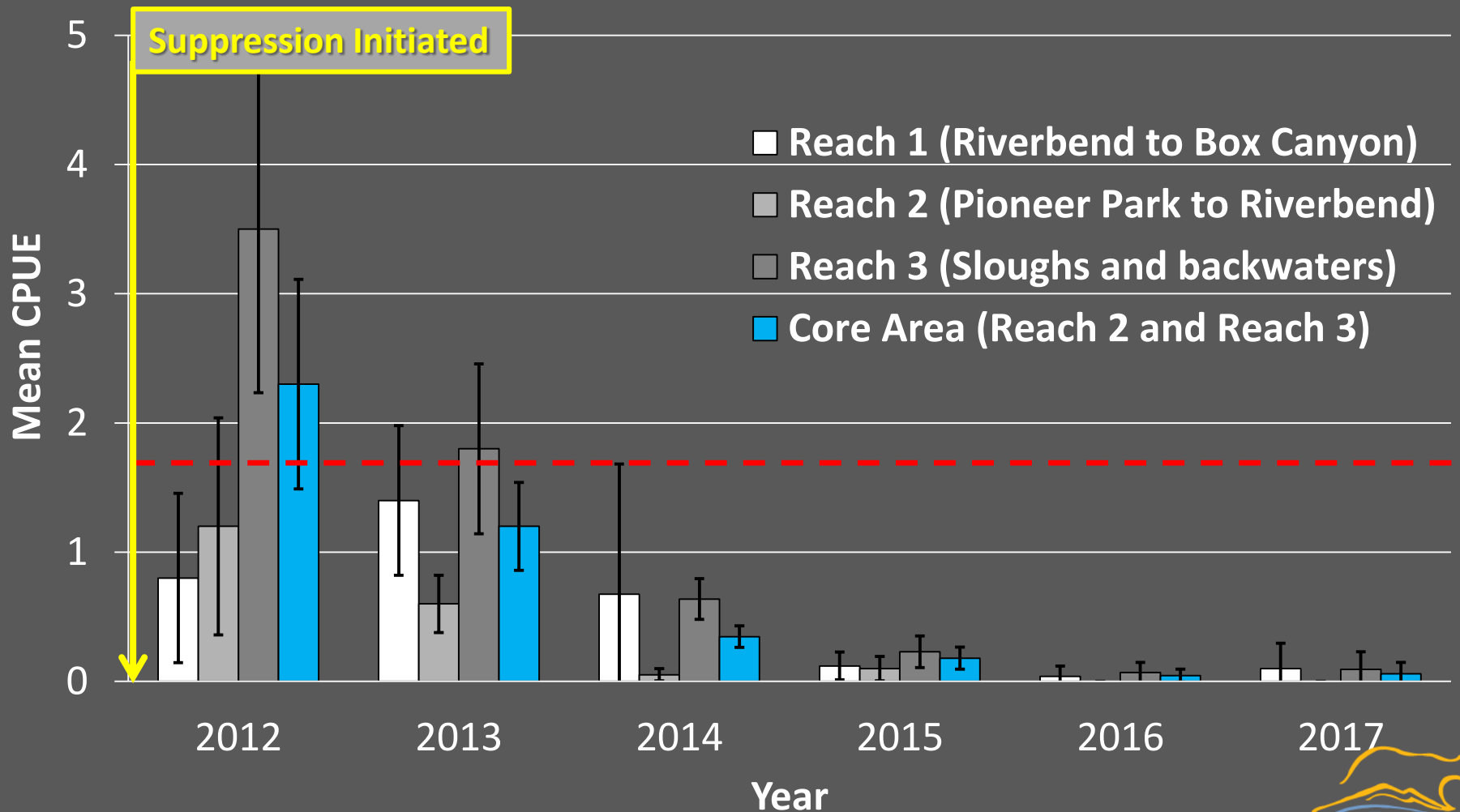
5.6 NP/net

BCR SPIN Survey: 2010-2017



“Core Area” (blue) is benchmark for monitoring

BCR SPIN Survey: 2012-2017



“Core Area” (blue) is benchmark for monitoring

Boundary Reservoir

- 2016 SPIN survey indicated NP were relatively abundant
 - 30 nets; 117 NP; 5.4 (sloughs) & 1.6 (river sets) NP/net
- Evaluated effectiveness through a depletion “pilot” project
 - 35 nets; 111 NP; 3.96 NP/net; location depletion occurred
- Initiated mechanical suppression in 2017
 - Focused on upper ½ of reservoir (core habitat)
 - 146 nets; 308 NP; 2.09 NP/net
 - Captured all (7) tagged NP released in 2016-17
- Conducted SPIN Survey in 2017
 - 40 nets; 28 NP; 0.93 (sloughs) & 0.0 (river) NP/net
 - Approximately 83% reduction in one year

Northern Pike Suppression Program Successes



- Mechanically removed 17,501 NP in 6 years
- Reduced NP relative abundance in a 89 km long reservoir by >98%
- In one year decreased relative abundance in Boundary reservoir by >80%
- Demonstrated the feasibility and effectiveness of this technique

What's Next?

- Conduct annual SPIN surveys in BCR and Boundary
- Reservoir-wide warmwater survey
- Mechanical suppression
 - Investigate suppression measures beyond 2017
 - Continue to scale back BCR effort & continue in Boundary
- Publish program results & assist other entities as possible



Acknowledgements

- Bonneville Power Administration
- US Bureau of Indian Affairs
- Avista Corporation
- Seattle City Light
- Eastern Washington University
- Washington Department of Fish and Wildlife
- Kalispel Tribe of Indians
- Hardworking KNRD Field Crew



Thank You! Questions?



More Information:

Email: nbean@knrd.org

Websites: http://wdfw.wa.gov/ais/esox_lucius/

and <http://kalispeltribe.com/kalispel-natural-resources-department/>

