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

May 1, 2018

MEMORANDUM

TO: **Council Members**

FROM: **Jeff Allen**

SUBJECT: **Update on Lake Pend Oreille Lake Trout Suppression Efforts**

BACKGROUND:

Presenters: Dr. Dan Schill, Fishery Research Supervisor, Idaho Department of Fish and Game
Dr. Matt Corsi, Principal Fishery Research Biologist, Idaho Department of Fish and Game

Summary: The nonnative Lake Trout population in Lake Pend Oreille, Idaho increased exponentially from 1999-2006. This led to an unsustainable level of predation on kokanee, increased the conservation threat to native Bull Trout, and had undesirable effects on the popular recreational fishery. In response, an aggressive Lake Trout suppression program funded By Bonneville Power Administration and Avista was implemented in 2006 using both incentivized angling and contract netting (gill nets and deep water trap nets). Through 2017, 208,988 Lake Trout were removed (88,612 by anglers; 121,376 by netting). From 2006 to 2016, abundance of age-3 and older Lake Trout declined 58%. The Bull Trout population remained robust and stable during the period of Lake Trout suppression. To date, Lake Trout suppression has allowed the kokanee population to rebound to levels similar to those observed prior to Lake Trout population expansion. Additionally, conservation benefits for native Bull Trout have

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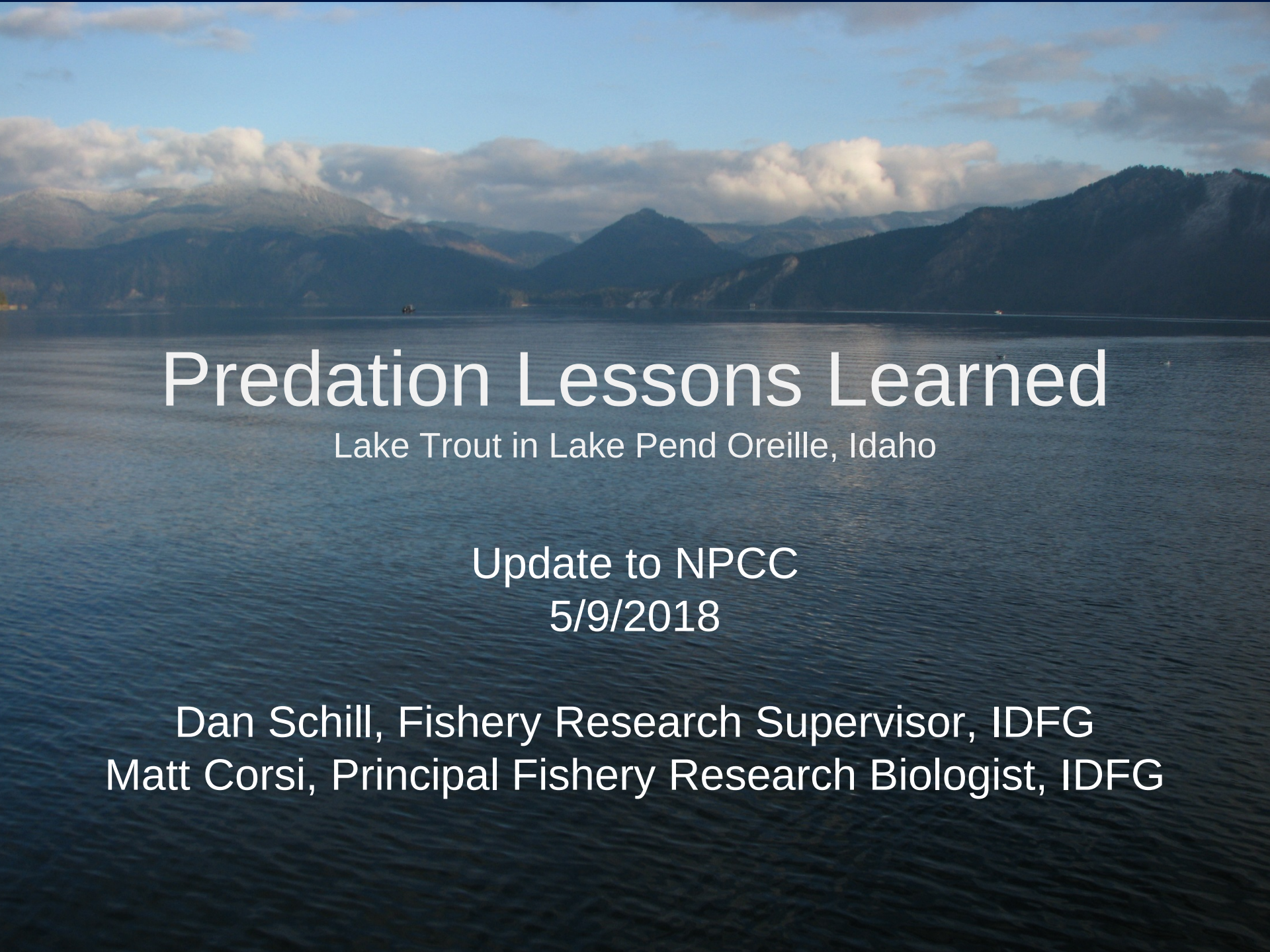
been realized, and we have observed desired improvements to the recreational fishery. New population modeling efforts using the data collected from the suppression program indicate we can achieve a 90% Lake Trout reduction in as few as 10 more years of suppression by optimizing the application of removal tools. After Lake Trout management targets are achieved, modeling suggests netting effort can be reduced dramatically (70%) to maintain target abundances at greatly reduced costs. Our results support the efficacy of suppression as a management strategy for nonnative Lake Trout in a large, deep lake.

The Lake Pend Oreille fishery is currently robust due to the predator suppression efforts, but a burgeoning Walleye population has emerged as a new threat to the long-term sustainability of the sport fishery and native fish conservation efforts. We are currently monitoring the exponentially growing walleye population and evaluating the efficacy of manual removal as management tool. We have documented high rates of kokanee predation in sampled Walleye, indicating this predator poses a similar threat to long term sustainability of the Lake Pend Oreille fish community as Lake Trout did a decade ago. By using the support of outside experts, and the best scientifically informed management practices, we are approaching the challenge presented by Walleye in much the same way as we did with Lake Trout.



Predation Lessons Learned

Lake Trout in Lake Pend Oreille, Idaho

Update to NPCC
5/9/2018

Dan Schill, Fishery Research Supervisor, IDFG
Matt Corsi, Principal Fishery Research Biologist, IDFG

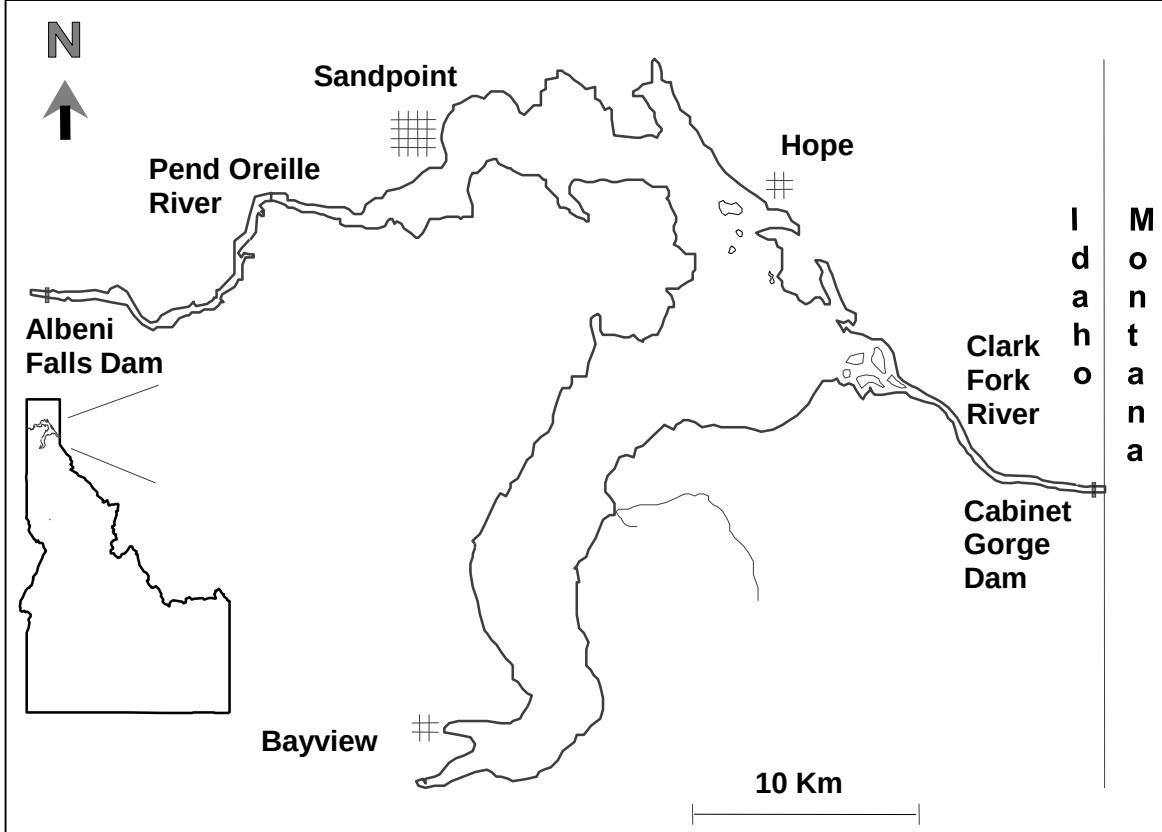
Acknowledgments

- Funding: Avista Corporation, Bonneville Power Administration (1994-047-00)
- Hickey Bros. Research, LLC
- Numerous agencies and cooperators
- Anglers and other public supporters

Lake Pend Oreille

Largest lake in Idaho
- 36,400 ha

5th deepest natural lake in U.S.
- Avg. depth 164 m
- Max. depth 351 m



Lake Pend Oreille Fishery

Background

- Diverse, multi-species fishery
  - 13 sport fish species caught (2014-15 survey)
    - 7 coldwater, 3 coolwater, 3 warmwater
- 200,000 hours of angler effort (2014)
- $13 million economic value (2011)
  - No kokanee fishery

Traditional LPO Fishery

- Bull Trout – native (ESA listed)
- Westslope Cutthroat Trout - native
- Kokanee – established in 1930s
  - Historically supported most popular fishery in Idaho
  - Primary prey source for predators
- Gerrard Rainbow Trout – introduced in 1941

1949 world-record bull trout, 32 lbs.

1947 world-record rainbow, 37 lbs.

2010 derby-winning rainbow, 25 lbs.

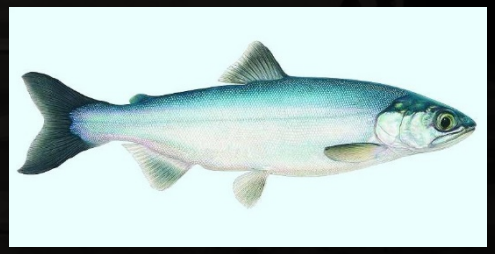
LPO Fishery Food Web

Trophy Fisheries in Late 1940s

1949 world-record bull trout, 32 lbs.

1947 world-record rainbow, 37 lbs.

Kokanee fishery established in 1930s

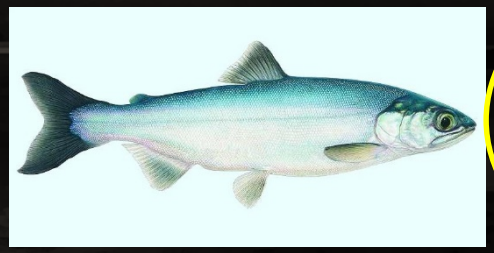


Kokanee Decline started in 1960s

LPO Fishery Food Web

1949 world-record bull trout, 32 lbs.

1947 world-record rainbow, 37 lbs.



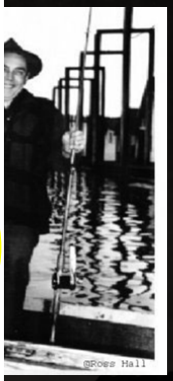
Mysis introduced 1960s, well established by 1975

Introduced as a food source, more likely a competitor

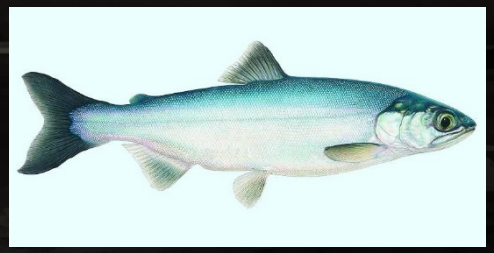
LPO Fishery Food Web

Lake Trout proliferation in late 1990's

1949 world-reco



rainbow, 37 lbs.

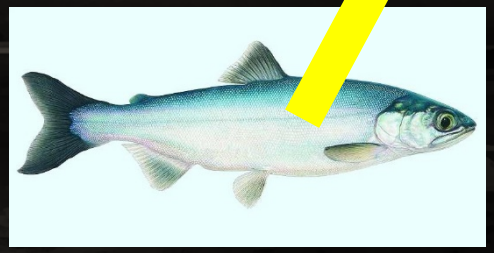


LPO Fishery Food Web

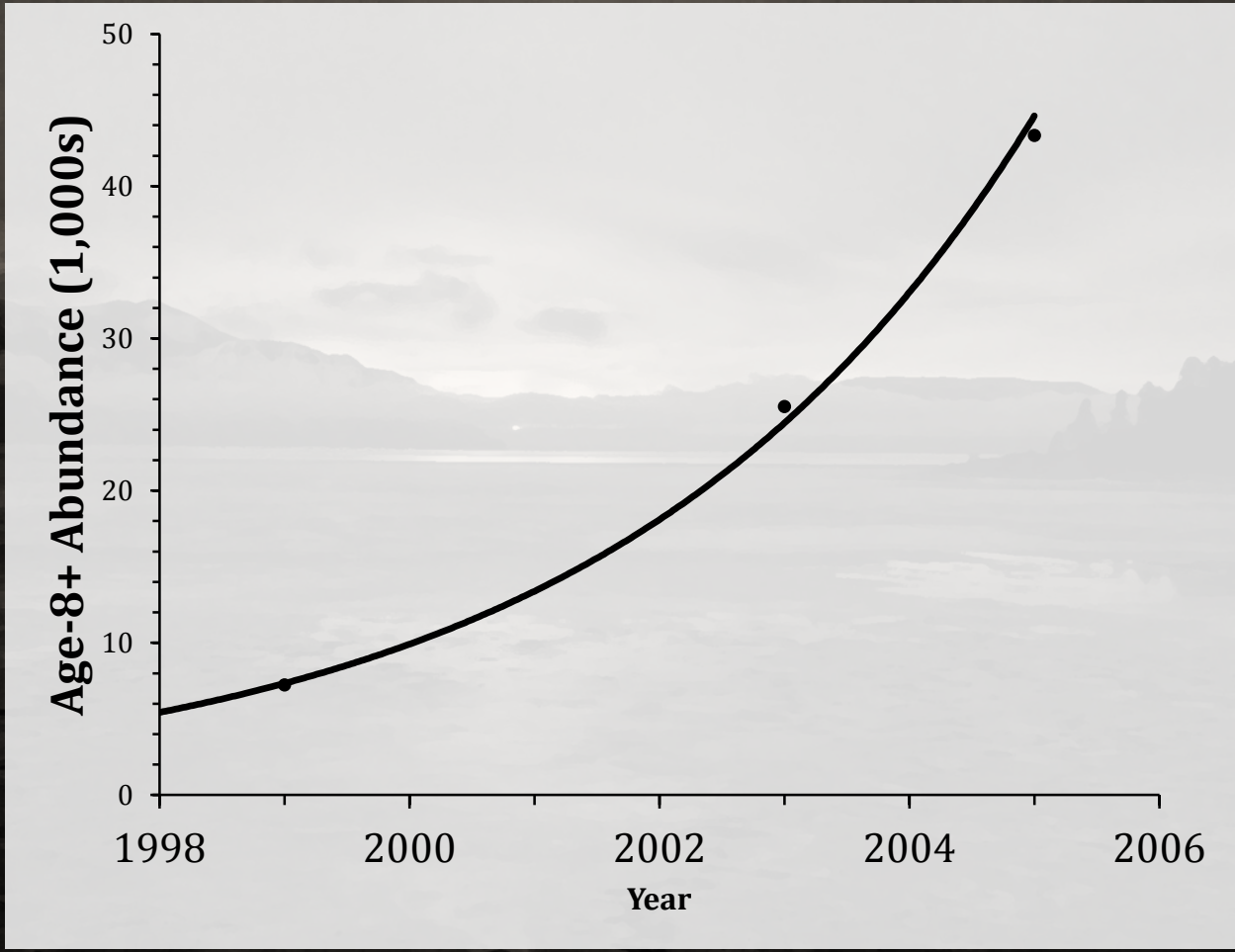
Increased predation + competition = predator pit

1949 world-reco

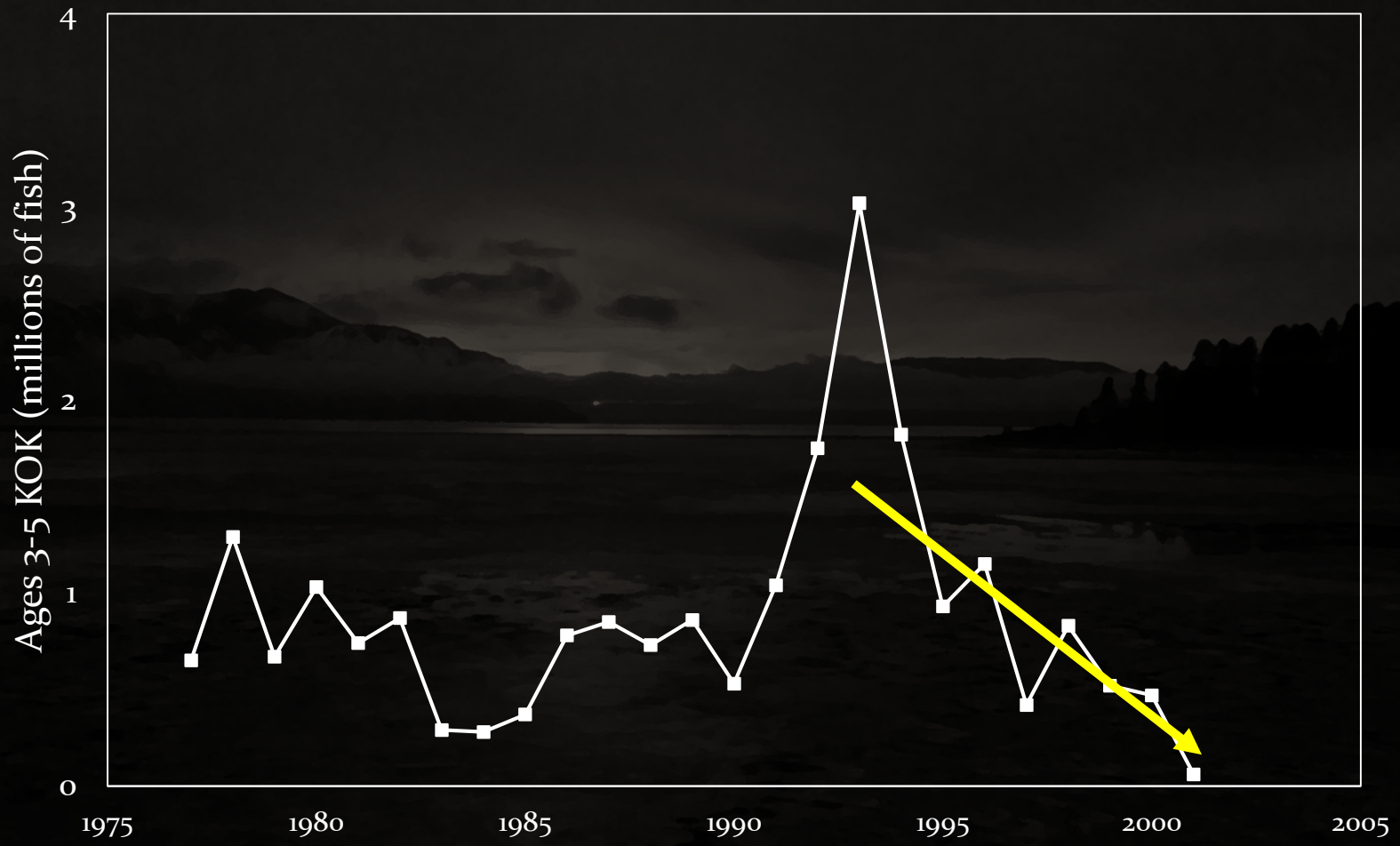
rainbow, 37 lbs.



Lake Trout Population Expansion



Kokanee Decline



Lake Trout Suppression

- Should it be done? – Set quantitative goals
- Evaluate Current/possible Exploitation rates
- Can it be done? – Convened expert panel
  - Michael Hansen - UWSP
  - Mark Ebener – Chippewa Ottawa RA
  - John Gunn – Laurentian University

→ Commonly overharvested in native range

- Populations collapsed in Great Lakes

- Can we afford it? – BPA/Avista cost share

Lake Trout Suppression

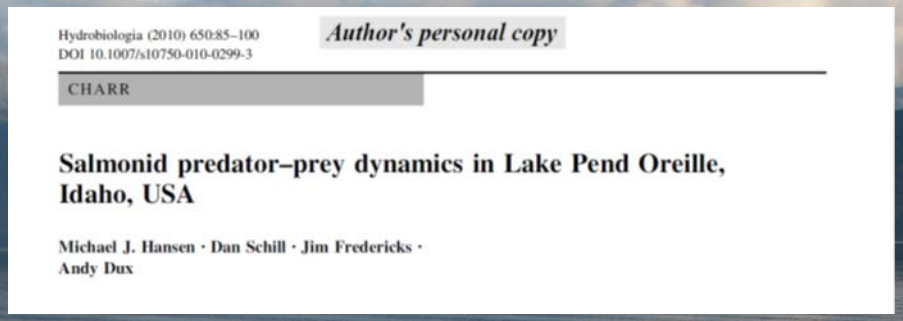
- How best to do it?
  - Mike Hansen – Sabbatical
    - "Squeeze" fish: target adults and juveniles; anglers and nets
    - Modeling:
      - how much effort?
      - which gears?
      - how long to suppression goals?

Lake Trout Suppression

- The socio-political element
  - LPO Task Force (2006)
    - Politicians recommend participants
    - Not “if”, but “How”
  - Develops angler incentive program
  - IDFG and Task Force engage media

→ Scientific foundation for management and external experts are key

Lake Trout Suppression



Hydrobiologia (2010) 650:85–100
DOI 10.1007/s10750-010-0299-3

CHARR

Salmonid predator–prey dynamics in Lake Pend Oreille, Idaho, USA

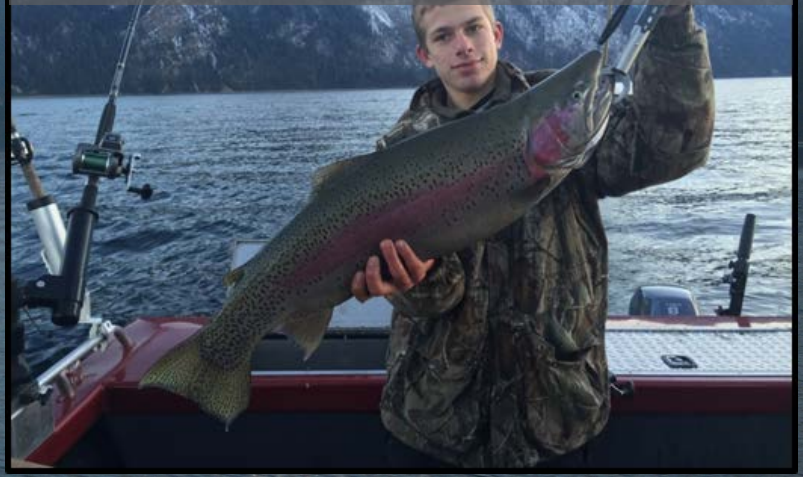
Michael J. Hansen · Dan Schill · Jim Fredericks · Andy Dux

- Key Program Goals:
  - Reduce Lake Trout abundance
    - 90% decrease from 2006 abundance
  - Sustain native Bull Trout population
  - Recover kokanee population
  - Improve Rainbow Trout growth
  - Allow recovery of traditional sport fishery

Fishery Recovery Goals

Restore kokanee population that supports consistent harvest fishery and trophy Rainbow Trout fishery

Restore consistent trophy Rainbow Trout fishery



Maintain/enhance Bull Trout population and restore harvest opportunity

Maintain/enhance Westslope Cutthroat Trout population

Lake Trout Suppression

- Key Questions to Answer
  - Where are do Lake Trout spawn?
    - Acoustic telemetry
  - Can we minimize Bull Trout bycatch?
    - Net configuration evaluations
    - PIT tag evaluations
    - Active/ongoing collaboration with USFWS

Lake Trout Suppression

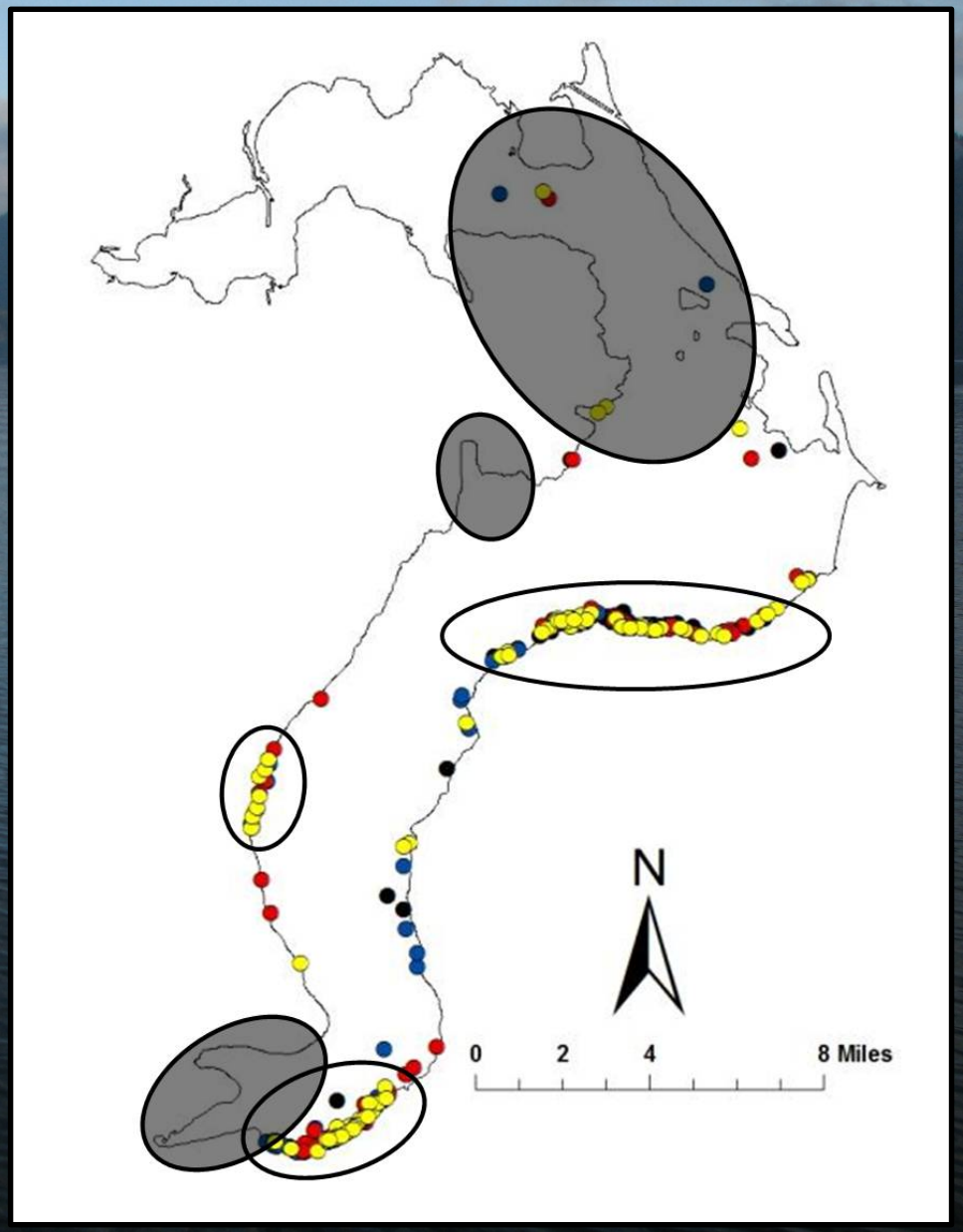
- Contracted commercial fishing company
  - Hickey Bros. Research, LLC
  - ~30 weeks/year
- Angler incentive ($15/fish)
- Began in 2006
- Targeted all segments of population

Cost share: BPA - $278,000

Avista - ~$700,000

Netting Strategies

- Adult gillnetting
  - Target spawning areas
  - Sept. – Oct.
- Adult trap-netting
  - Sept. – Nov.
- Juvenile gillnetting
  - Target “nursery” areas
  - Oct. - April



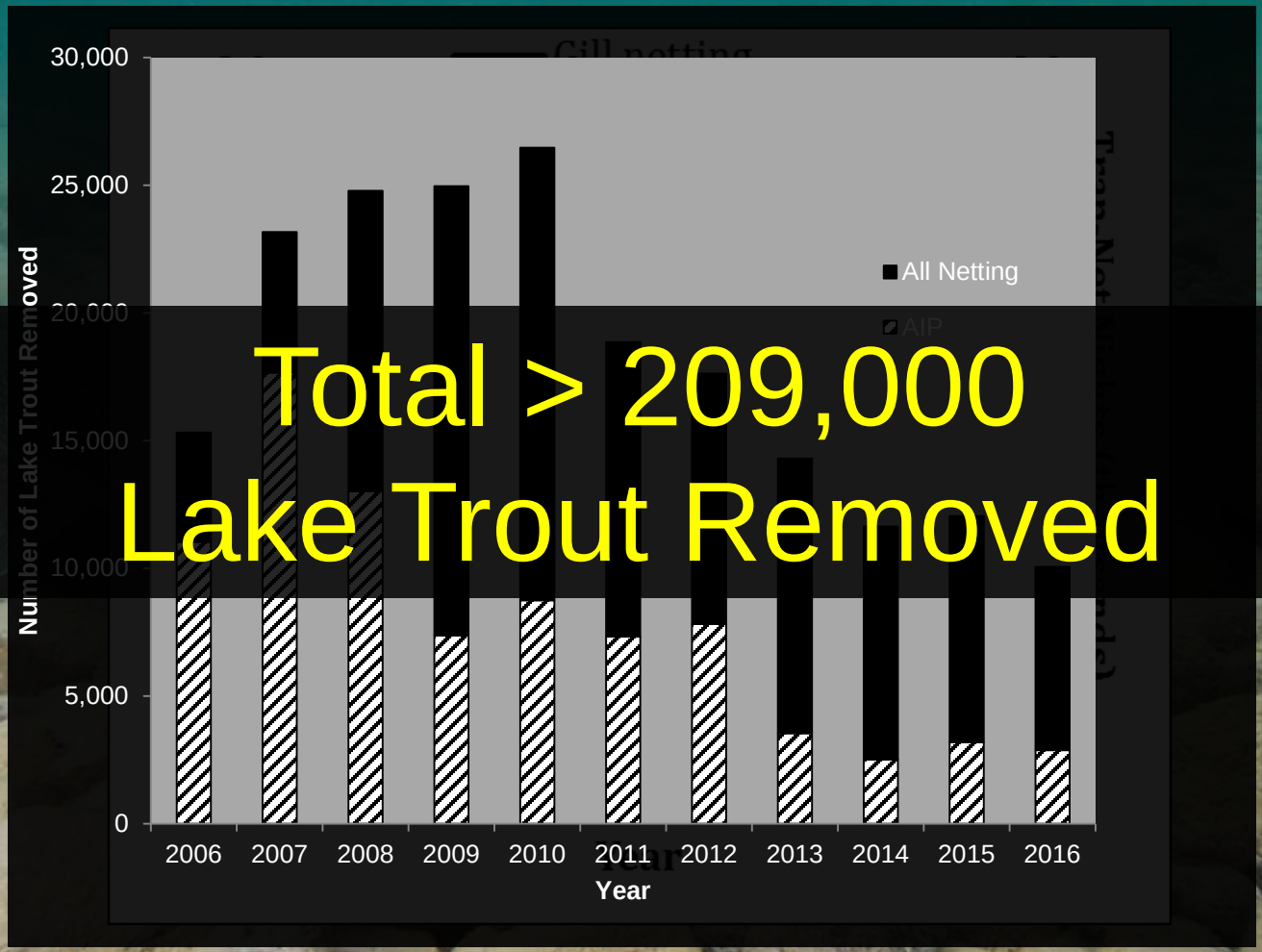
Monitoring Strategy

- Continued use of Judas fish – optimize netting
- Length, sex/maturity for all fish
- Regular age-growth, fecundity work
- Standardized netting – annual abundance trends

→ Is it working? How can we do better?

"In theory there is no difference between theory and practice. In practice, there is"

Results – Fishing Effort and Harvest



Total > 209,000 Lake Trout Removed

Photo courtesy of Dr. Mike Hansen

Results – Abundance

Prediction: Declines by 67% from 2006-2015 (Hansen et al. 2010)

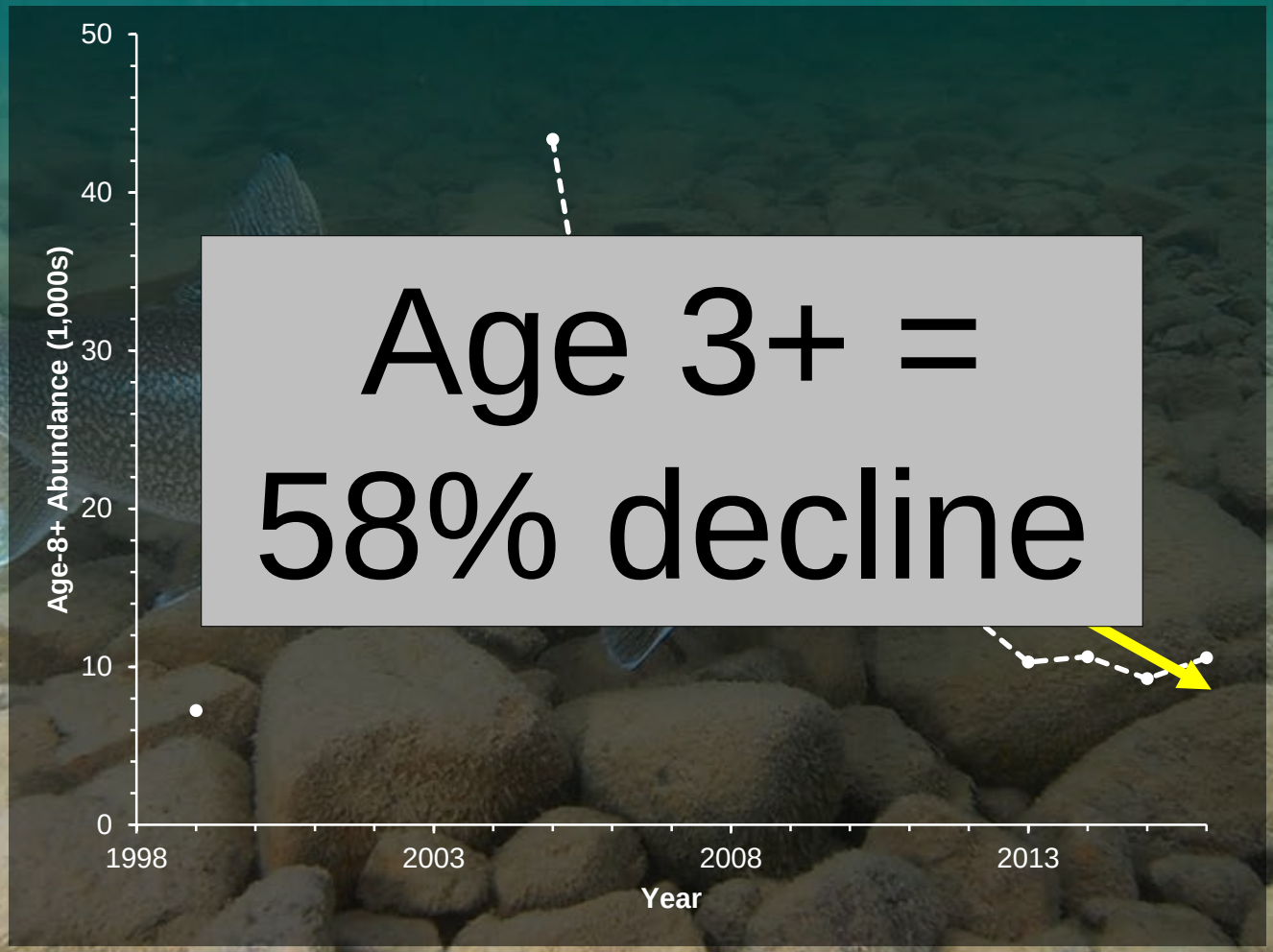


Photo courtesy of Dr. Mike Hansen

Results – Kokanee

Prediction: 65% chance of collapse by 2015 (Hansen et al. 2010)

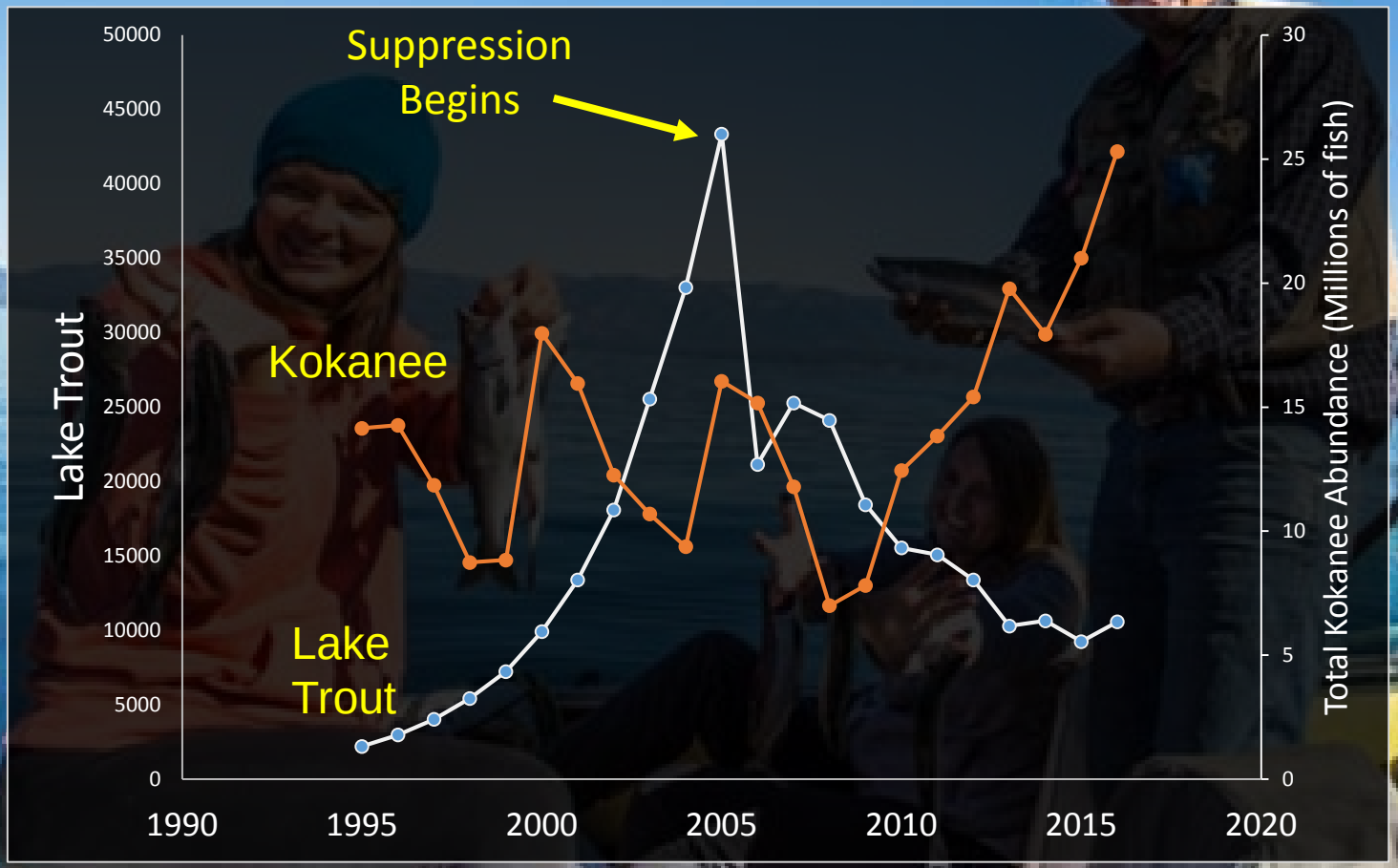


Photo courtesy of Dr. Mike Hansen

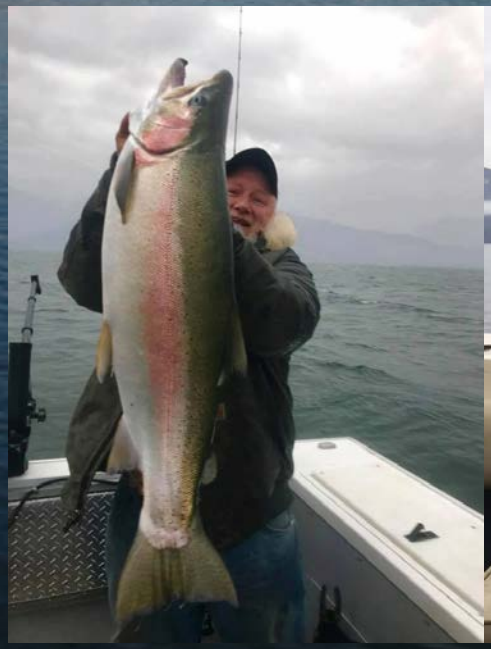
Results - Bull Trout Abundance

Prediction: Did not decline relative to pre-2006 trend (Hansen et al. 2010)

- Bull Trout have not declined – LPO remains Bull Trout stronghold
- Evidence from other systems suggest they may have been extirpated, if Lake Trout allowed to go unchecked

Results – Rainbow Trout Growth

- Rainbow Trout age at 25 inches
  - 2011 → Age 6
  - 2016 → Age 5 (Average 5 year old in 2011 only 15 inches)



2006 – 2017 Suppression Summary

- Lake Trout abundance declined 58% (age-3+)
  - Close to predicted decline; below 90% target
- Overfishing is possible – suppression working
- Kokanee fishery is restored
  - Increased to early-1990s abundance
- LPO remains Bull Trout stronghold
- Trophy Rainbow Trout fishery is restored

“It Ain’t Over til it’s Over”

- Hansen model Version 2.0
  - Made more potent by our 11 year dataset
  - Information to evaluate the efficiency of suppression
- How long until goal is reached (90% red. from 2006)?
- Once goal is reached – how much can we reduce effort?

How Long to Achieve Target?

Goal: 90% reduction from 2006 Lake Trout abundance

- Continue high level of effort for ~10 yrs*

- *Need to shift more effort to large mesh

Effort in the Long-Term

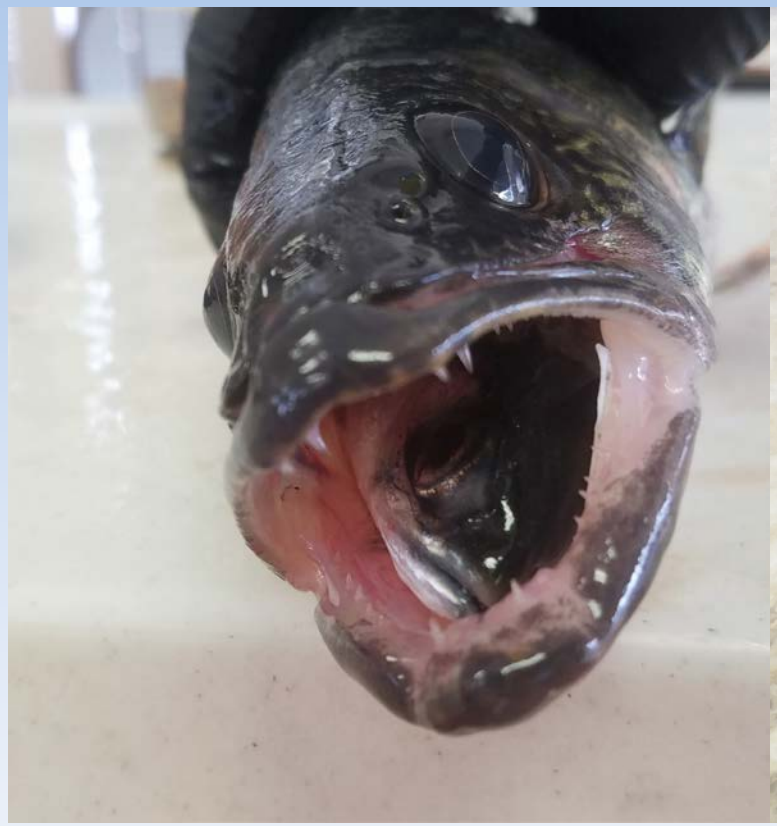
How much fishing effort is needed to sustain the target level of abundance over the long-term?

- Once goal is reached, only 30% of current effort will be required to keep it there

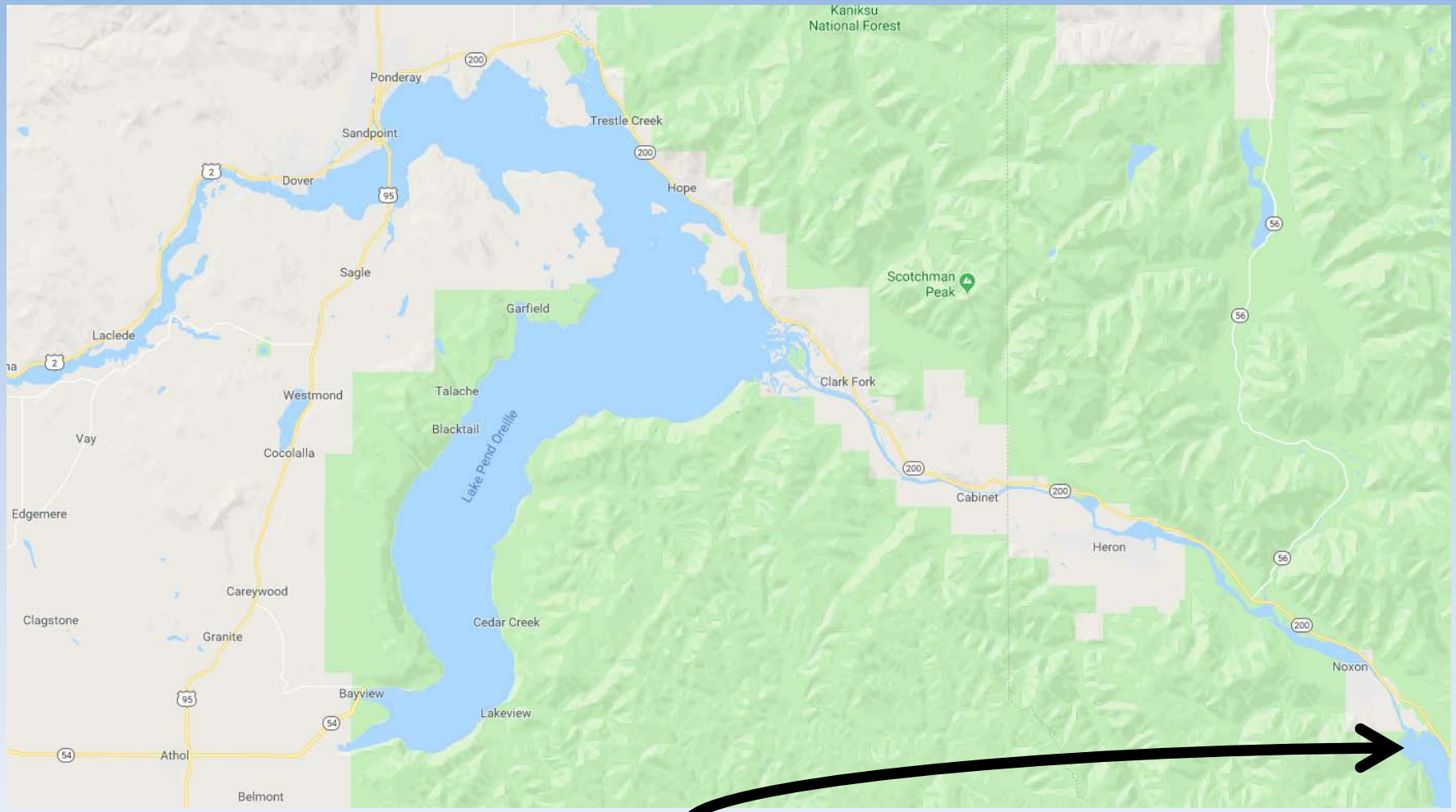
Upshot: High fishing effort for 10 years followed by drastic reduction:

→ Save $2 Million over 20 year period

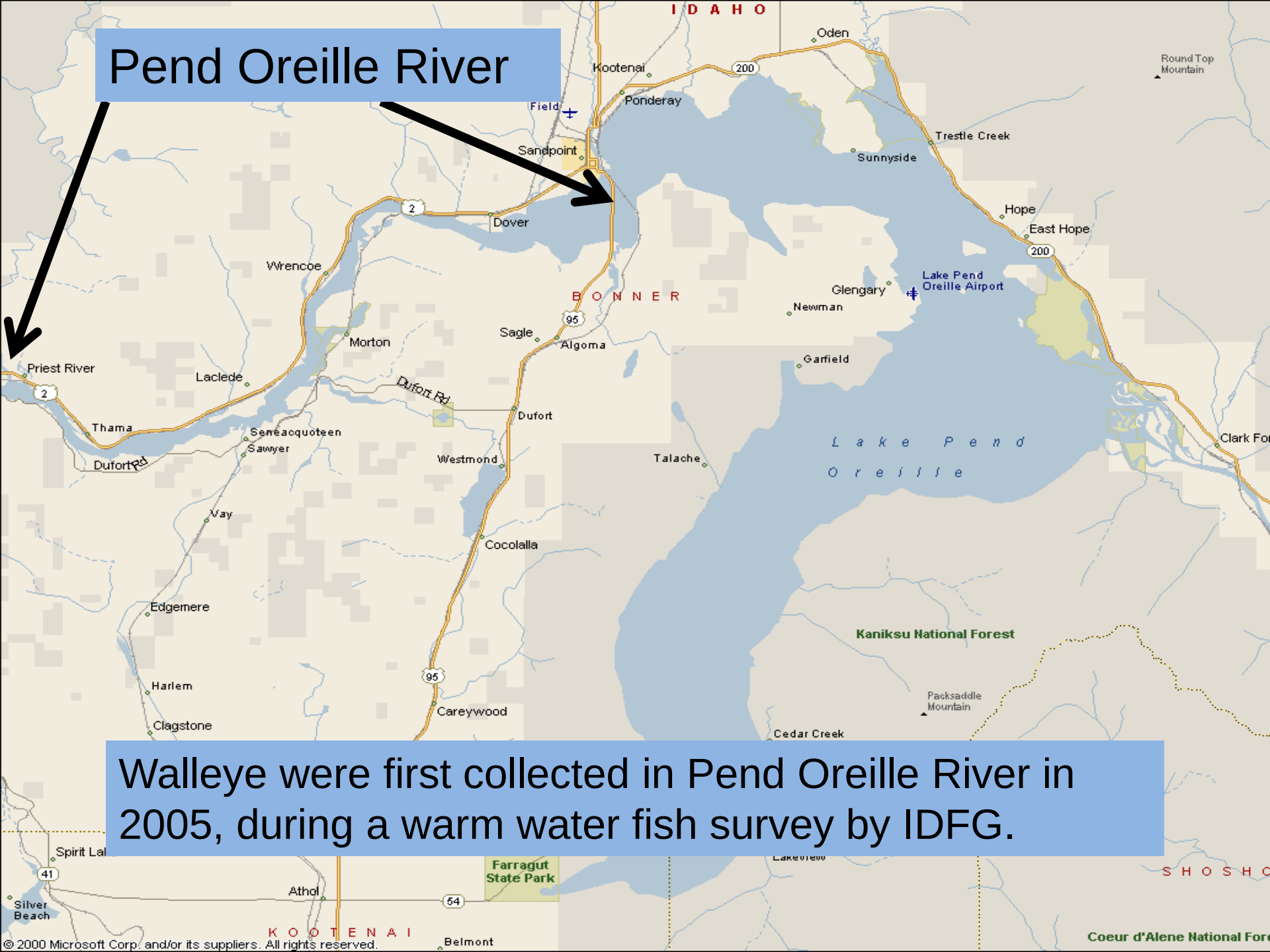
Out of the Frying Pan…



Walleye: The new predation threat



Walleye were illegally introduced into Noxon Reservoir, Montana, in 1991.


Pend Oreille River
IDAHO
Oden
Kootenai
200
Round Top Mountain
Field
Ponderay
Sandpoint
Trestle Creek
Sunnyside
Hope
East Hope
200
2
Dover
Wrencoe
BONNER
Lake Pend Oreille Airport
Glengary
Newman
95
Sagle
Algoma
Morton
Garfield
Priest River
Laclede
2
Dufort Rd
Dufort
Thama
Seneacquoteen
Sawyer
Dufort Rd
Westmond
Talache
Lake Pend Oreille
Clark Fo
Vay
Cocolalla
Edgemere
Kaniksu National Forest
Harlem
95
Careywood
Packsaddle Mountain
Clagstone
Cedar Creek
Walleye were first collected in Pend Oreille River in 2005, during a warm water fish survey by IDFG.
Spirit Lal
41
Farragut State Park
Athol
54
Silver Beach
KOOTENAI
SHOSHO
Belmont
Coeur d'Alene National Fore
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Pend Oreille River and Lake

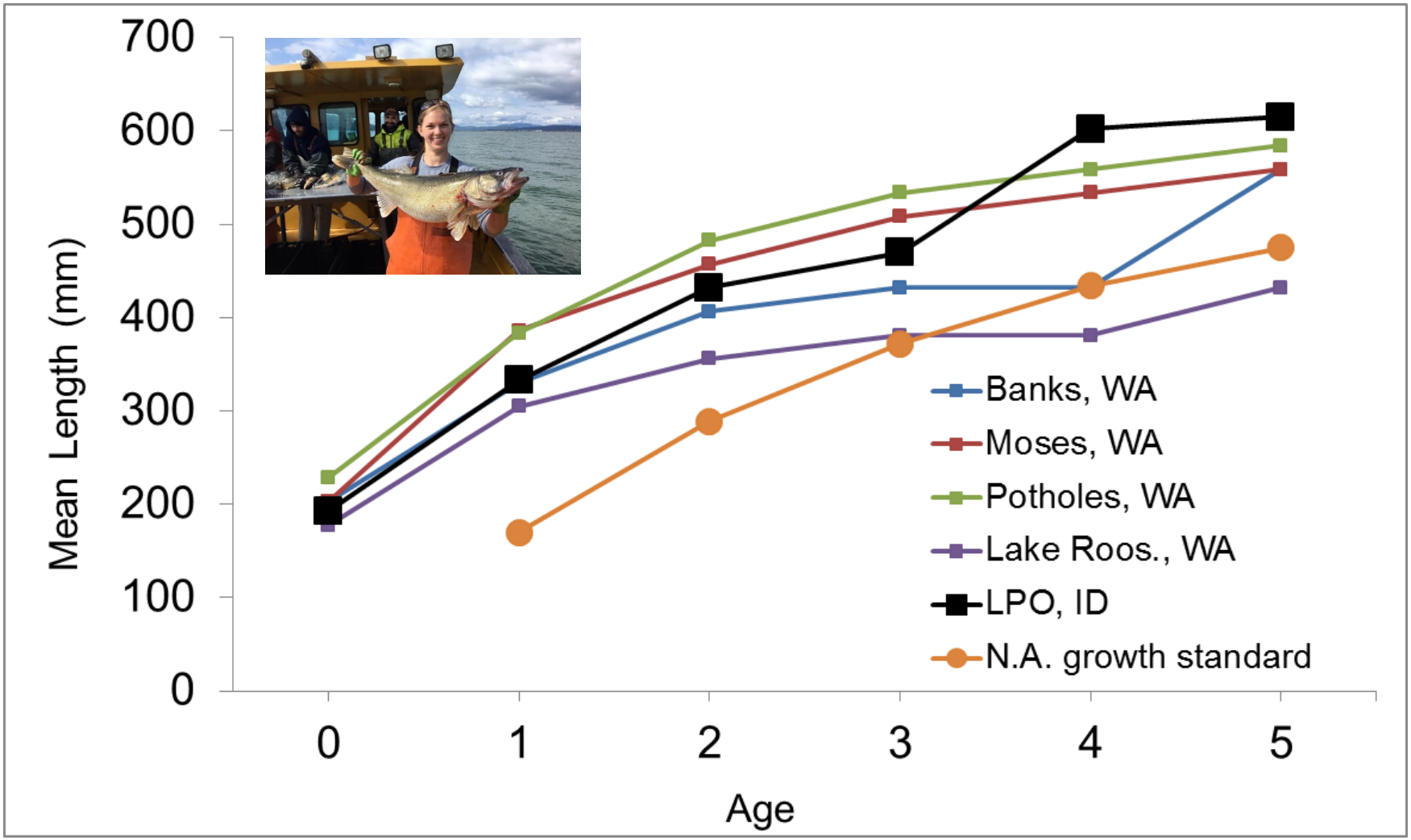
Walleye were first collected in Lake Pend Oreille in 2006, the first year of the LKT suppression program.

Submitted proposal to evaluate threat
(2007-060-00 – Lake Pend Oreille Invasive Fish) – Not funded

Walleye Expansion

Walleye Catch from LKT Suppression Netting

LPO Walleye: Eating, Growing Machines



Walleye Stomach Contents Shallow Water

- High prey diversity
- Perch and warmwater fish group most frequent
- Kokanee common (margins of kokanee habitat)

Walleye Stomach Contents Open Water

- Kokanee is the only identifiable fish in diet studies

The Idaho Walleye Summit

- Invited panel of Walleye experts to Idaho
  - Dr. Nigel Lester
  - Dr. Mike Hansen
  - Dr. Mike Quist
  - Dr. Eli Felts
  - Dave Lucchesi

- Reviewed Pend Oreille situation and provided feedback

The Idaho Walleye Summit

You are in big trouble, unless you get started now

- Turn and face this new enemy now
- Understand distribution
- What are trends in diet? – Walleye <u>will</u> be a problem

Walleye Summit: The Key Questions

The Test Fishery

- Avista funded targeted gill netting 4/16 – 5/4
- 1290 Walleye removed
- As with Lake Trout – collecting data from every fish we kill
  - Length structure
  - Age and growth
  - Sex and fecundity

“It’s déjà vu all over again”

- We know where to go from here

→Start, continue, and finish with the science

  - Just as we did with Lake Trout
  - 2006 Proposal (2007-060-00 – Lake Pend Oreille Invasive Fish)
    - ISRP “do not fund” → start immediate suppression

→Balancing act: How much can we take our foot off the pedal on Lake Trout to deal with Walleye?

Predation Lessons Learned

- Successful suppression requires:
  - Population effect of removals
    - Abundance
    - Exploitation (% of population removed)

Pop Dynamics → Model → Goals → Suppress

→ Evaluate → Optimize