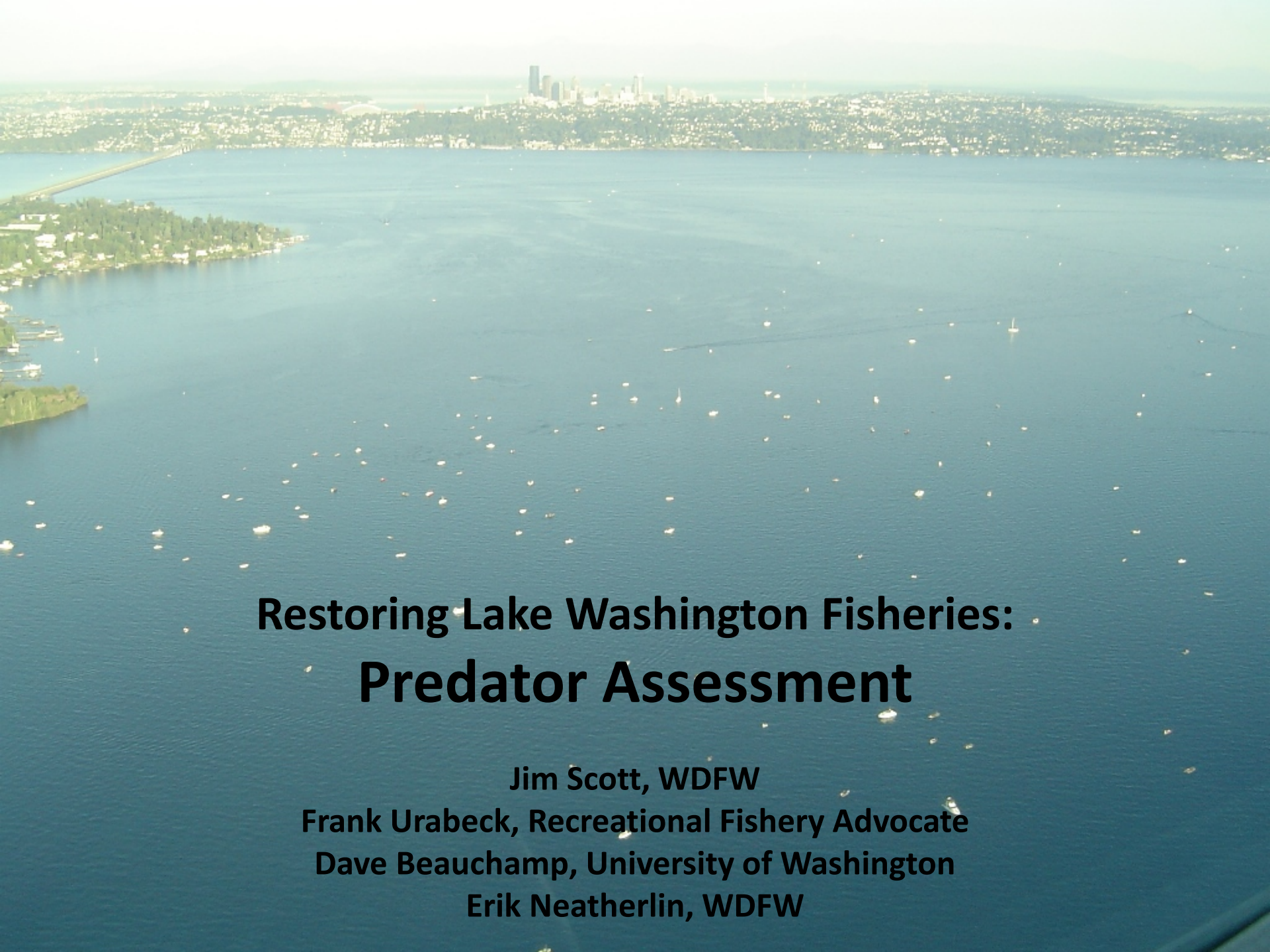


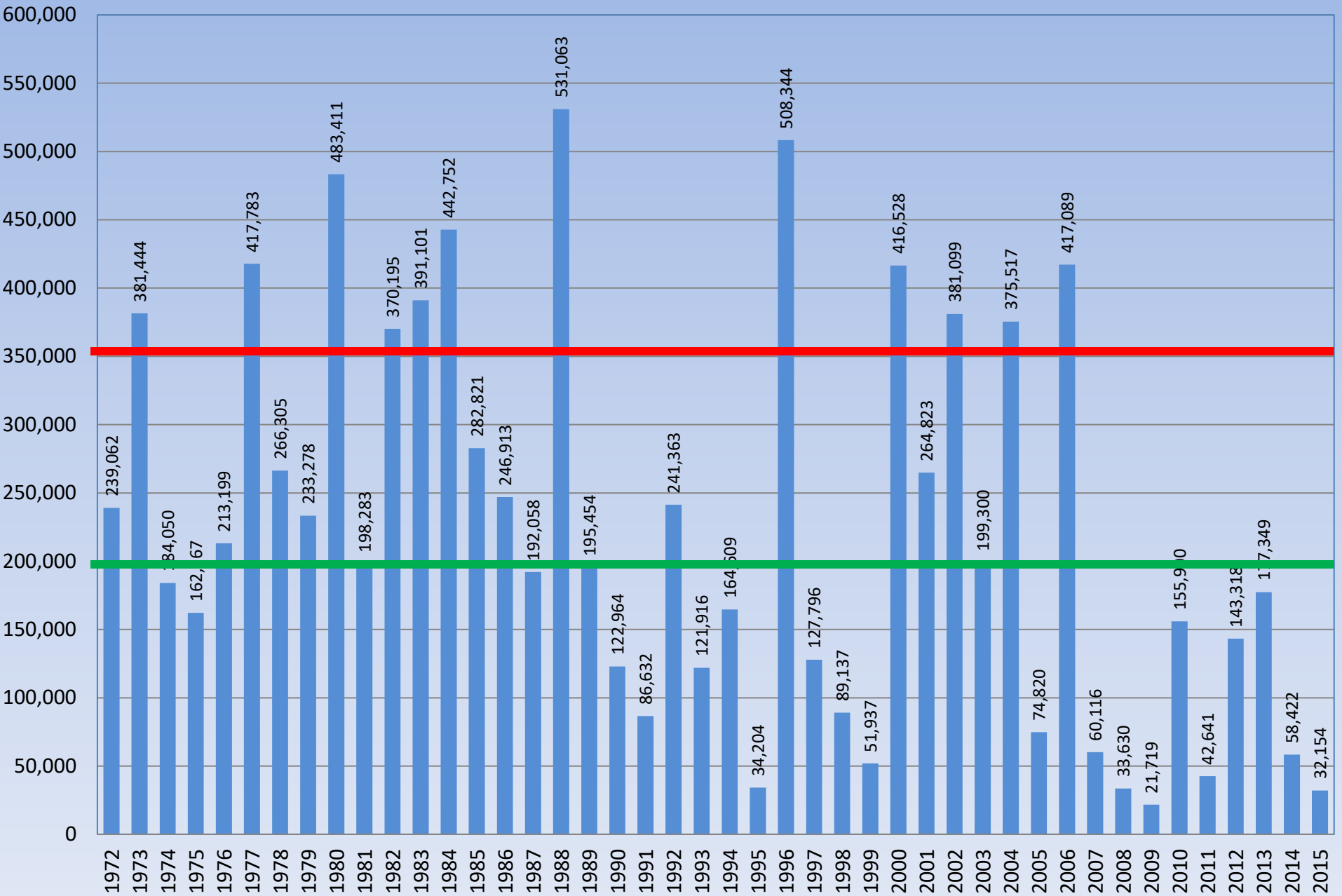
Restoring Lake Washington Fisheries:
Predator Assessment

Jim Scott, WDFW
Frank Urabeck, Recreational Fishery Advocate
Dave Beauchamp, University of Washington
Erik Neatherlin, WDFW

Lake Washington Salmon

- **Accessible:** Salmon in the city!
- **Fun:** Sockeye easy to catch
- **Valuable:** $9-$12M fishery
- **Threatened:**
  - Chinook ESA-Listed
  - Coho, Sockeye Declining

July 31st Sockeye Total "Cumulative" Counts at Locks



Why Declining?

Multiple factors are causing the decline of Lake Washington salmon, including:

- **Lock passage**
- **Water temperature**
- **Flooding**
- **Predation**

Legislative Funding

- Stakeholders, Coastal Conservation Association, Puget Sound Anglers, and others identified critical need
- 2014 legislature provided $150,000 to assess predation on juvenile salmon

Leading Suspects

Cutthroat Trout

Northern Pikeminnow

Smallmouth Bass

Walleye

Responsible for mortality of millions of ESA-listed Chinook and Sockeye salmon each year

2005 Study – Every 1,000 cutthroat and pikeminnow can have 2% impact on survival

Prey species	Predation per 1,000 Cutthroat Trout	Predation per 1,000 N. Pikeminnow	Total
Sockeye	0.6%	1.4%	2.0%
Chinook	1.1%	0.1%	1.2%
Smelt	0.6%	0.9%	1.5%
Stickleback	1.6%	0.4%	2.0%

% of Presmolt abundance

2005 Study – Every 1,000 cutthroat and pikeminnow can have 2% impact on survival

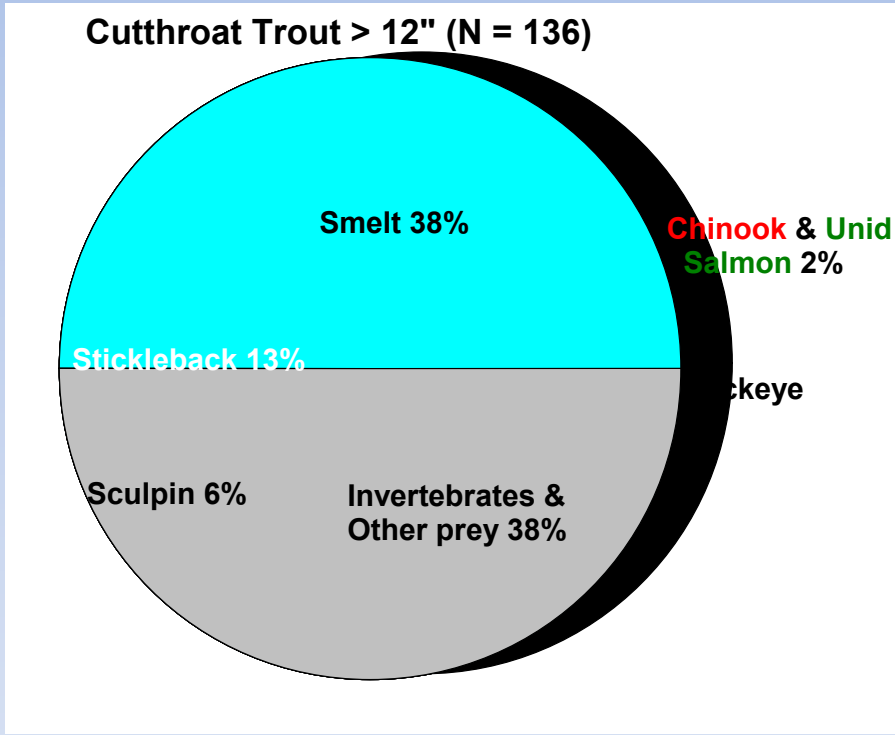
Hmmmm…

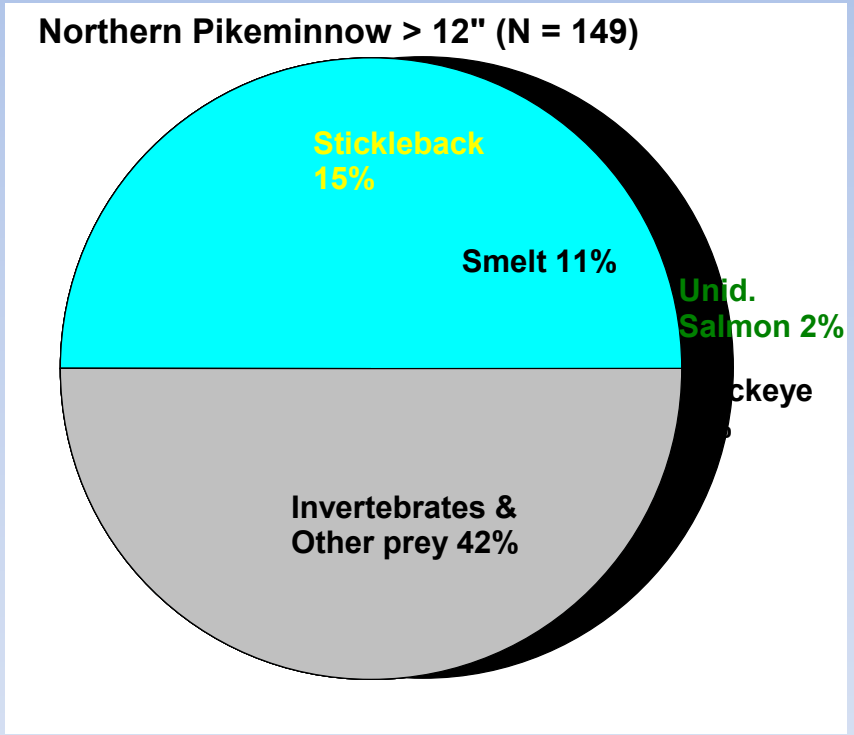
- **97%** average lake mortality of juvenile sockeye
- With 10000s of predators, they are a significant factor limiting salmon recovery and restoration of fisheries!

Our 2015 Study Objectives

- Confirm predation by Cutthroat & Pikeminow
  - Timing & magnitude of predation
  - Importance of alternative prey (smelt cycles & sticklebacks)
  - Environmental factors that affect predation
- Estimate abundance of Cutthroat Trout & Pikeminnow

2015 Study Confirmed Cutthroat Trout & Pikeminnow Major Predators

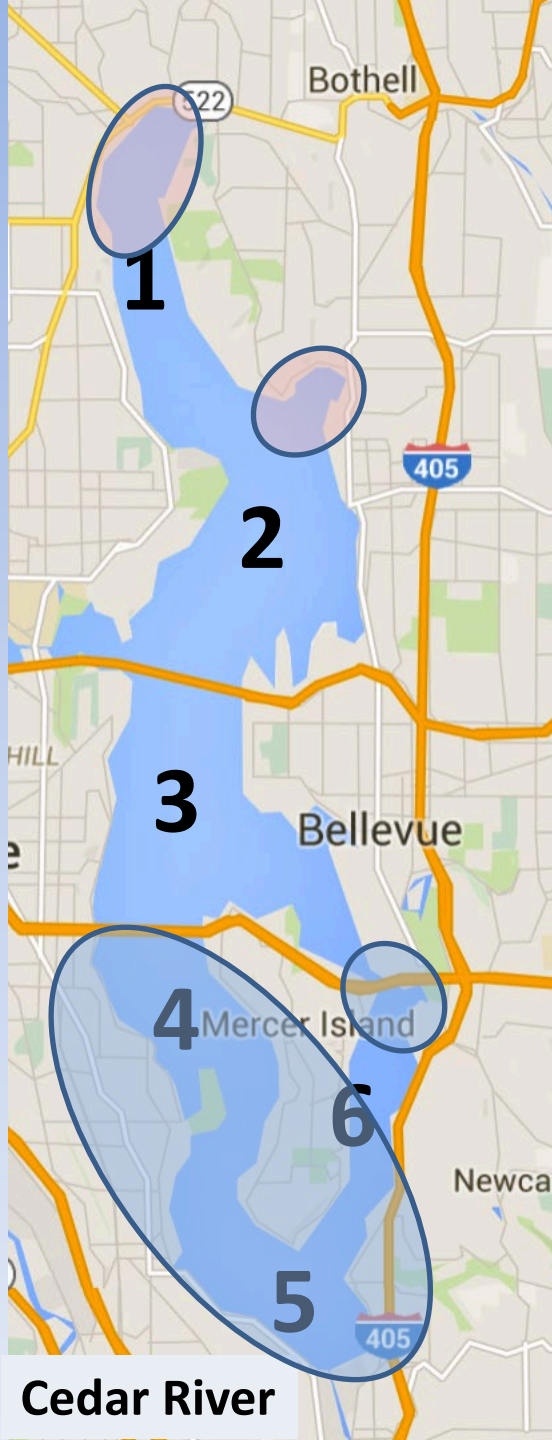




Pikeminnow Distribution

Highest Concentrations:

- **March & April in areas 4 and 5**
- **Associated with spawning smelt and entry of juvenile salmonids from Cedar River?**
- **Summer-North end & shallow bays**



Cedar River

Predator Abundance-Preliminary Results

as of October 10, 2015

Predator Species:	Marks	Captures (post marking period)	Recaptures	Abundance Chapman estimator
Cutthroat trout	350	712	4	50,053
Northern Pikeminnow	250	1007	1	x
Smallmouth Bass	x	653	x	x
Data from Casey Clark				

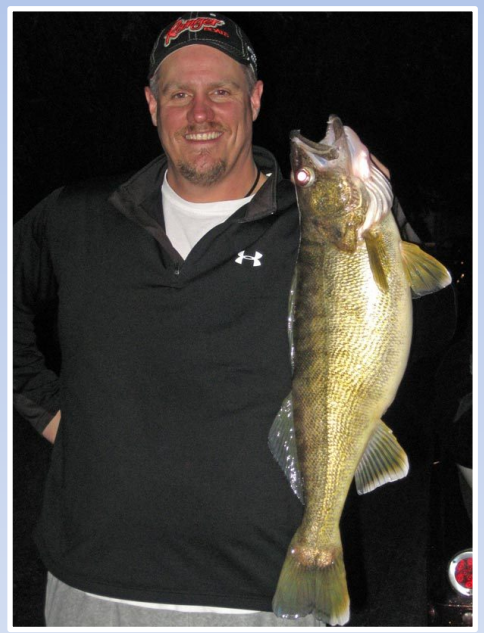
2015 Preliminary Results

Diet analysis and abundance estimates confirm significant predation morality

New Threats

Non-native Walleye

2005



2010

2015

New Threats

Non-native Smallmouth Bass

Preliminary Conclusions:

- **Rapidly expanding population**
- **May be significant source of mortality as juvenile salmon migrate out Ship Canal**

Why a second year of funding?

Critical to ensure effective use of limited resources!

- **When, where, and who are eating juvenile salmon**
- **When and where predator densities are greatest**
- **When and where juvenile salmon are eaten**

Leading to management actions…

Our study will lead to informed, cost-effective management actions, potentially including:

- **Removal programs to reduce predator abundance**
- **Transport smolts to avoid "hot-spots"**
- **Rear smolts to larger size to avoid predation**
- **Modify recreational fishery rules to reduce key predators**

Coordinated Effort to Secure Necessary Resources for Additional Year of Study

- **WDFW**
  - Contributing $33,000 and in-kind staffing and equipment
- **King County**
  - Letter of support for $33,000
- **Requesting legislative approval of $33,000**