

Current Efforts to Restore Kokanee Salmon in the Lake Sammamish Basin



Autumn 2009 Science Seminar

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King County

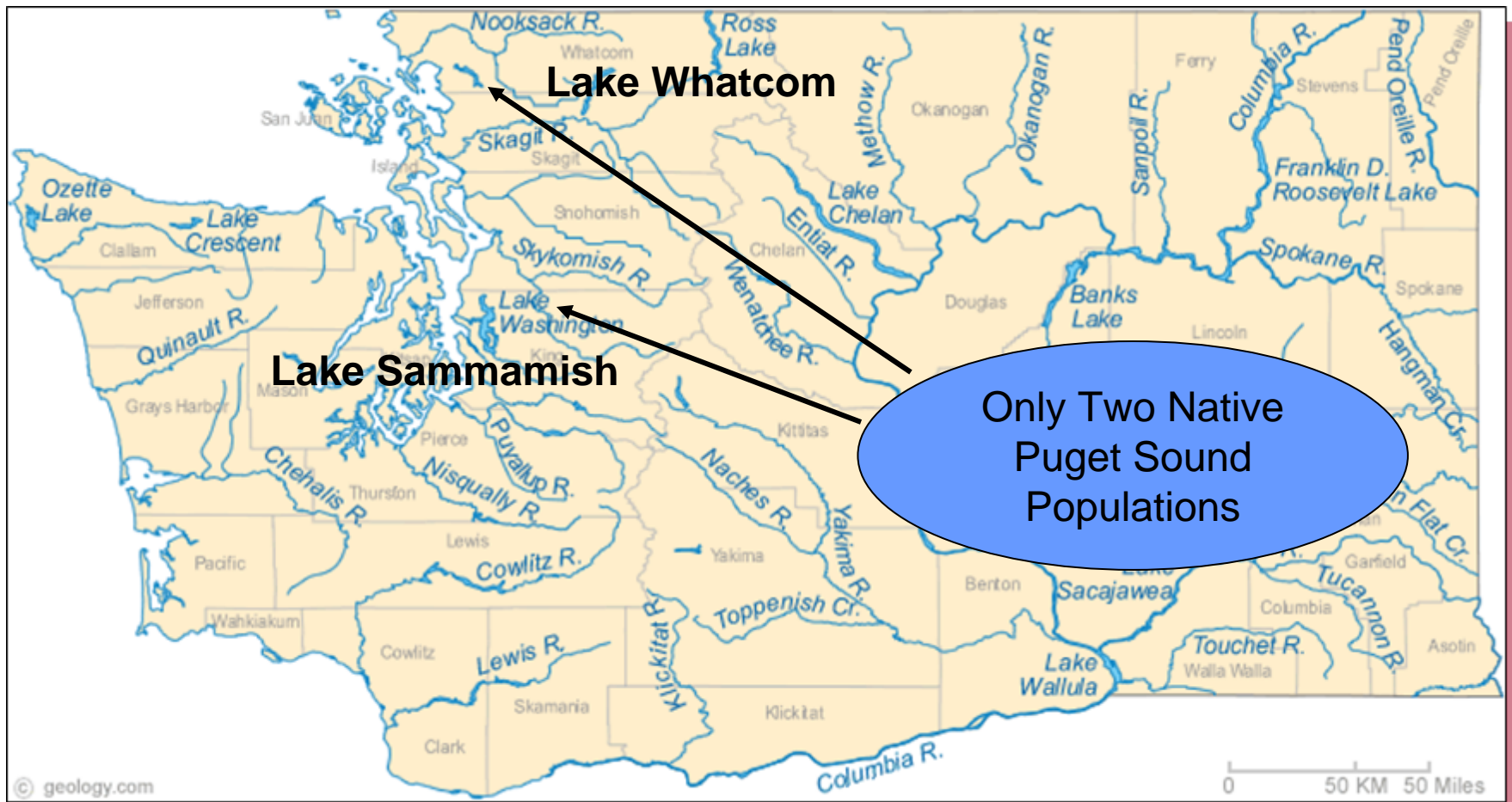


Lake Sammamish Kokanee

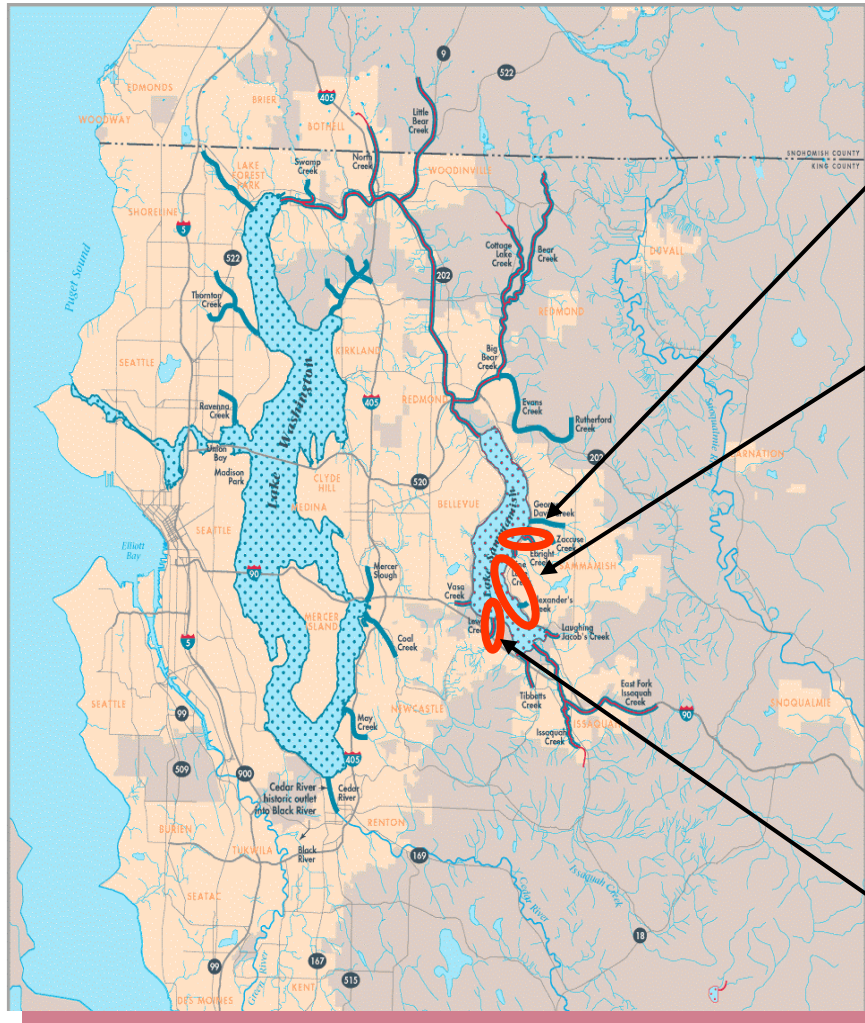
- *the landlocked, smaller form of sockeye salmon*
- *predominantly a four year life cycle*
- *lives in natal streams for days to weeks after hatching*
- *rears entirely within Lake Sammamish before spawning migration back to natal streams*



Current Regional Distribution



Historic and Current Local Distribution



Ebright Creek

Lake & shoreline

HISTORIC AND CURRENT KOKANEE DISTRIBUTION in the Lake Washington Basin

- Historic Kokanee Distribution in Stream or River
- Historic Kokanee Distribution in Lake
- Current Kokanee Distribution in Stream or River
- Current Kokanee Distribution in Lake

- Road
- River/Stream
- Lake
- Incorporated Area
- Unincorporated King County



Sources: King County WRA & Kokanee Distribution Map, May 2001; Historic and Current Status of Kokanee in the Lake Washington Basin, March 2000.

Lewis Creek

Sammamish Watershed Local Jurisdictions

Jurisdiction	Acres	%age of watershed	Spawning Aggregations*
Bellevue (UGA)	4,550.37	7.87	2 (L, LS)
Issaquah (UGA)	7,268.32	12.57	2 (L, LS)
King County	36,278.68	62.75	1 (LS)
Redmond (UGA)	892.96	1.54	1 (LS)
Sammamish (UGA)	8,825.90	15.27	2 (E, LS)

* - E: Ebright Creek L: Lewis Creek LS: lakeshore

How Things Have Changed



Historic population:

- *numbered in the thousands*
- *supported Snoqualmie Tribe subsistence fishery*
- *supported very popular recreational fishery*

Current population:

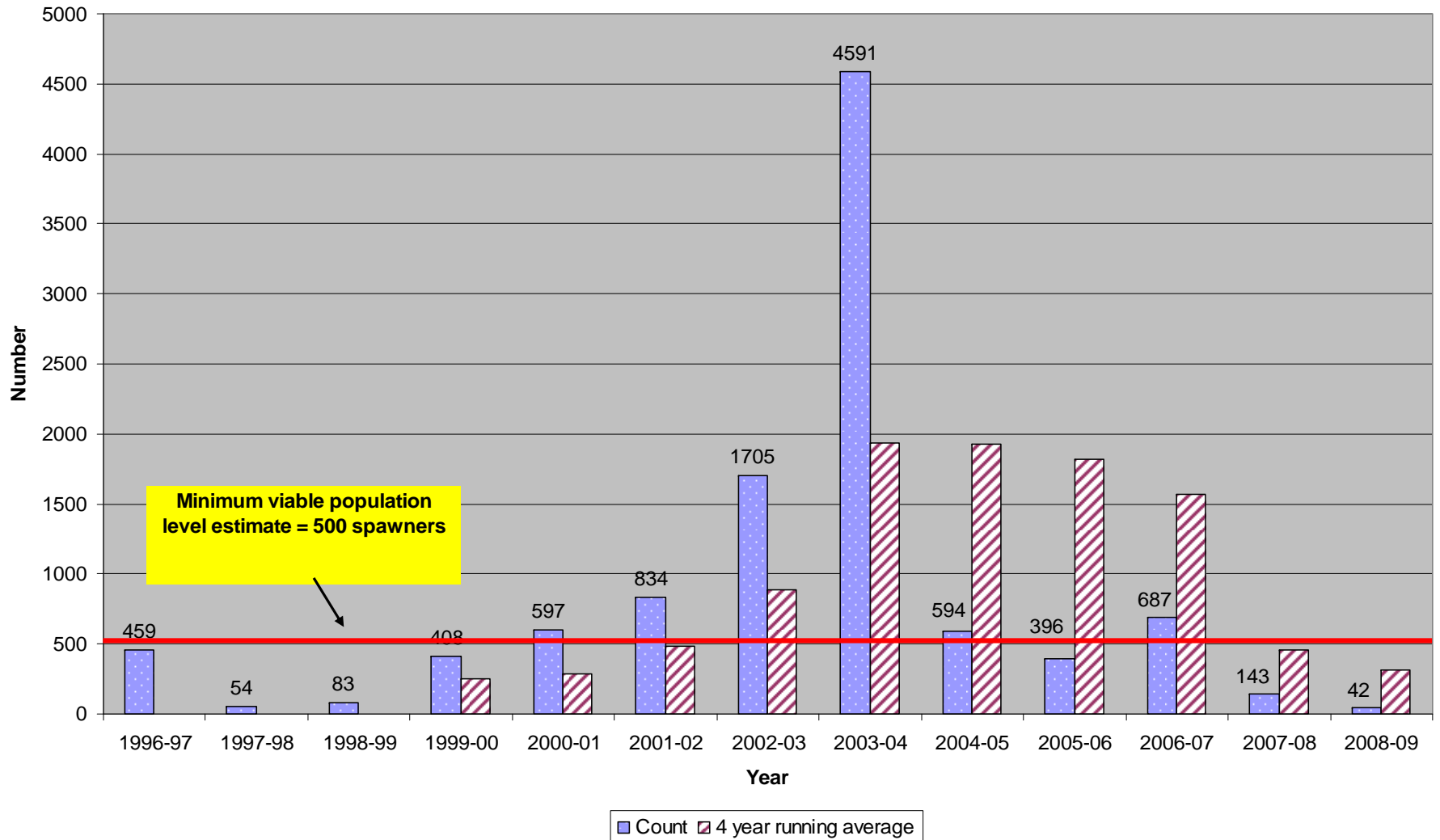
- *numbers fewer than one hundred*
- *keeping kokanee is prohibited*

How Things Have Changed

- *Early Run – August timing; Issaquah Creek focused* **EXTIRPATED**
- *Middle Run – September to November run timing; Lake Washington and Sammamish River tribes* **REDUCED and LIKELY EXTIRPATED**
- *Late Run – November to January run timing; Lake Sammamish tribes except Issaquah (?)* **REDUCED TO <100 FISH**
- *Shoreline spawners* **UNKNOWN**

Current Kokanee Abundance Trend

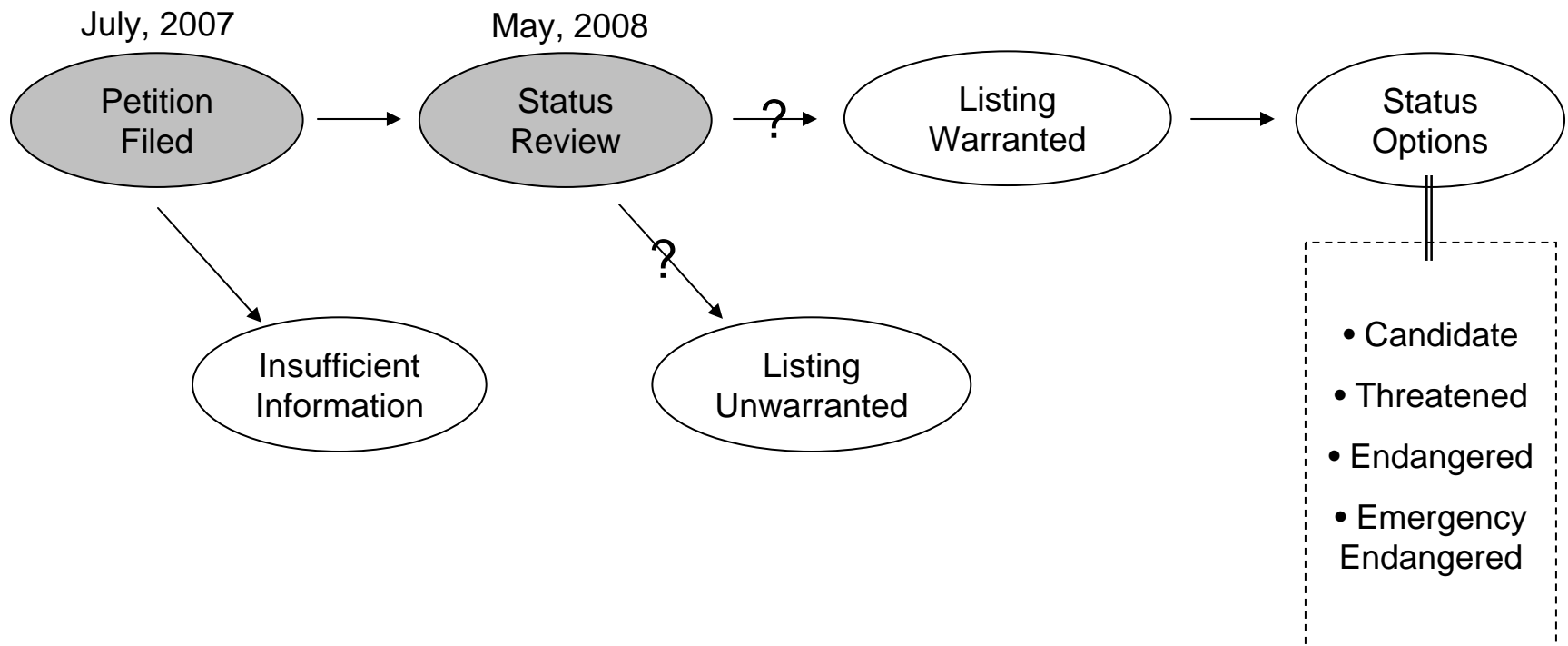
Kokanee Spanwer Counts



Kokanee and the Endangered Species Act

- *listing petition sent to US Fish and Wildlife in July, 2007*
- *submitted by Trout Unlimited, King County Executive Sims, City of Issaquah Mayor Frisinger, Snoqualmie Tribe, People for Puget Sound, Save Lake Sammamish, and Wild Fish Conservancy*
- *focused on all remaining native Lake Sammamish kokanee*
- *abundance, distribution, diversity and productivity reduced*
- *petition led to current formal status review*

Endangered Species Act Listing Process



Expect a decision sometime this fall

Lake Sammamish Kokanee Work Group

- *Local collaboration formed in 2007 to focus on kokanee conservation*
- *Includes each local government, state and federal agencies, non-governmental conservation groups, and citizens*
- *Activities very constrained by funding limitations*
- *Supported a limiting factors study completed in 2008*



2008 Kokanee Limiting Factors Study Findings

- *Supplementation is needed immediately*
- *Preliminary signals of hydrologic impacts*
- *Potential for problems from predation within Lake Sammamish*
- *Climate change could compound problems for stream spawning and Lake Sammamish rearing*
- *Must improve our data for effective management*



Kokanee Conservation Goal

“Prevent the extinction and improve the health of the native kokanee population such that it is viable and self-sustaining, and then supports fishery opportunities”



Photo by Tim Rains, US Forest Service

Kokanee Conservation Priorities

Tier 1:

- *Implement aggressive artificial propagation program*
- *Correct habitat conditions causing mortality or limiting habitat access*
- *Protect existing intact habitat areas at near term risk of damage or conversion*

Tier 2:

- *Do the science to improve certainty of actions*
- *Protect, improve or restore habitat*
- *Build and maintain public awareness and support*

Immediate Conservation Focus

- *WDFW developing 2009 supplementation program*
- *KWG submitting project application to KCD for habitat project feasibility analysis*
- *KWG providing input to Shoreline Master Program updates*
- *Volunteer development of educational brochure*
- *Tagging study on Lake Sammamish*
- *Complete long term conservation strategy*
- *Increase access to funding*

Immediate Conservation Actions - Supplementation



Funding Kokanee Conservation

- *No dedicated source of project funding*
- *WDFW is partially funding supplementation while taking agency-level cuts*
- *KWG time is in-kind from staff and volunteer*
- *\$50K from USFWS for tagging study and \$45K for supplementation in 2009*
- **2010 King Conservation District Grant funding for project feasibility and scoping**
- *ESA listing could change the availability of federal and state funding*

King County's Current Conservation Actions

- *Chairing and supporting the Kokanee Work Group*
- *Stewardship – future habitat improvements as part of the East Lake Sammamish Trail Master Plan*
- *Stewardship - land use and stormwater management in unincorporated areas of the watershed*
- *Implementing current kokanee tagging study*
- *Spawner surveys*



Kokanee Science

To Date:

- Spawning ground surveys (annually since 1996)
- Food web research within the lake (2002-2005)
- Fry trapping on Lewis Creek (annually since 2007)

Current:

- Supplementation (Fall 2009)
- Tagging study (2009-2010)

Future:

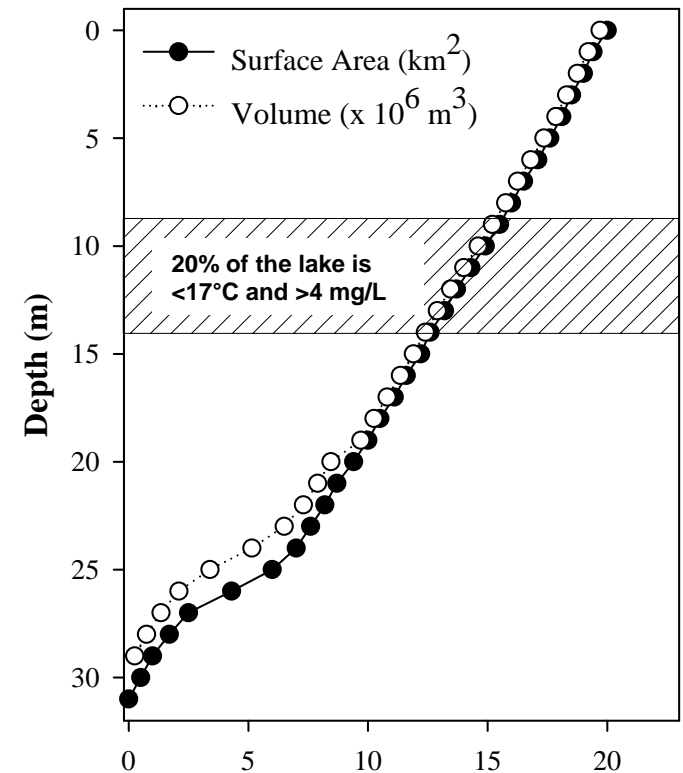
- Stream habitat assessment
- Project prioritization
- Release strategies
- Colonization in other spawning streams
- Effects of hatchery releases from Issaquah Creek



Kokanee growth is reduced in the summer...

- Relative weight (Wr) used to measure condition
- Species specific values for cutthroat and kokanee (Hyatt and Hubert 2000)
- Cutthroat trout Wr was greater during stratification (t-test, $p < 0.002$)
- Kokanee Wr was lower during stratification and the DO squeeze (t-test, $p < 0.001$)

Optimal habitat reduced by Temp-DO Squeeze

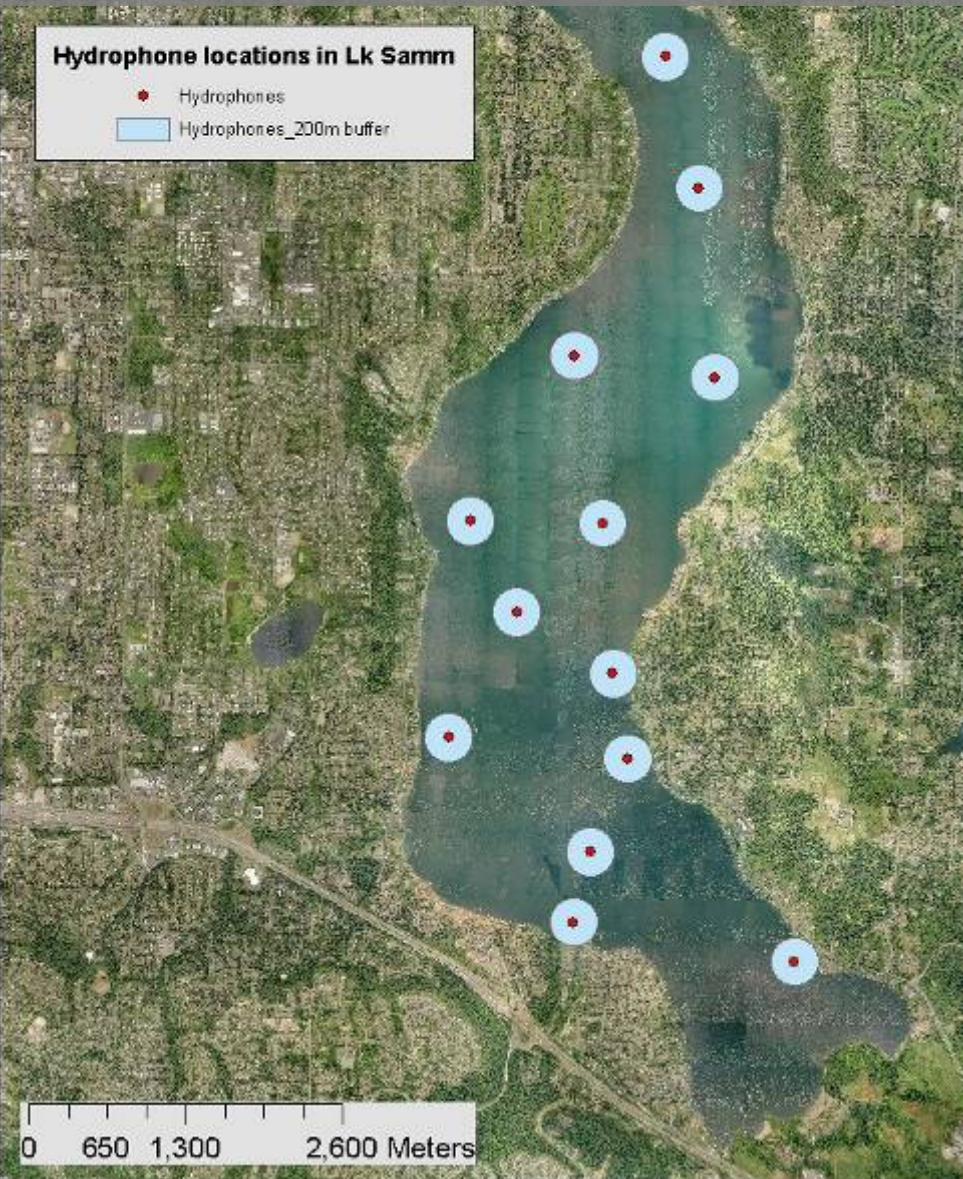


Acoustic Telemetry Project

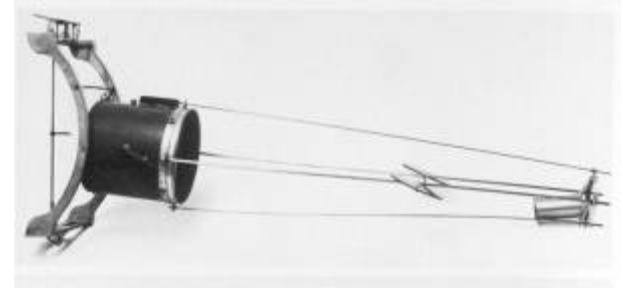
Project Goals:

- Understand seasonal movement of kokanee in Lake Sammamish
- Monitor spatial and temporal overlap of limnetic predators and prey
- Investigate the effects of thermal stratification, zooplankton density, and diel period on movement of kokanee

Hydrophone Deployment



Limnology



Clarke-Bumpus zooplankton sampler

- Limnological Measurements
 - Temperature, DO
 - Light and turbidity
 - Secchi Depth
 - Monthly zooplankton



SCAMP (Temp and Light)



Secchi (transparency))



Monitoring Buoys (Temp, DO)

Fish Collection



TU Anglers used to catch fish ↓



Transferred to livewell



Careful handling

Acoustic Tagging



Boat



Processing Table



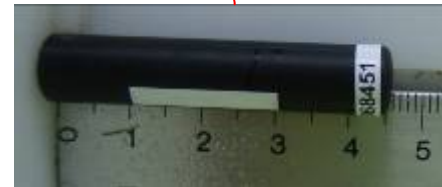
Anesthetic



Length and Weight



Sutures to close incision



Tag inserted



Recovery in insulated tank and released

Results to Date

- Analysis in progress...
- 35 tagged fish
- Downloaded data every other month beginning in August
- Have heard from 33 of them
- Detections at each hydrophone station, except Marymoor Park

Presentation Summary

- *Lake Sammamish Kokanee are in trouble*
- *Local collaboration for conservation is happening*
- *Need to advance immediate actions*
- *Need a long term strategy and funding for recovery based in sound scientific principles*
- *Need public support to be effective*

