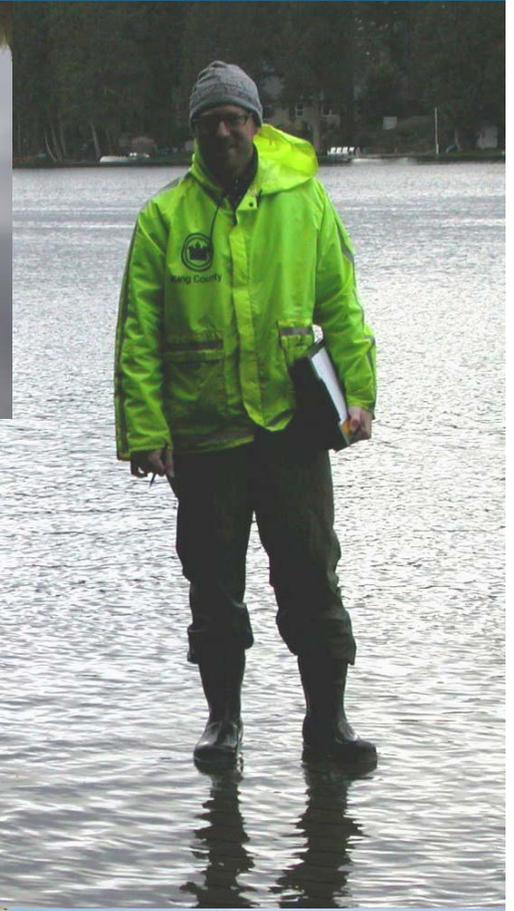
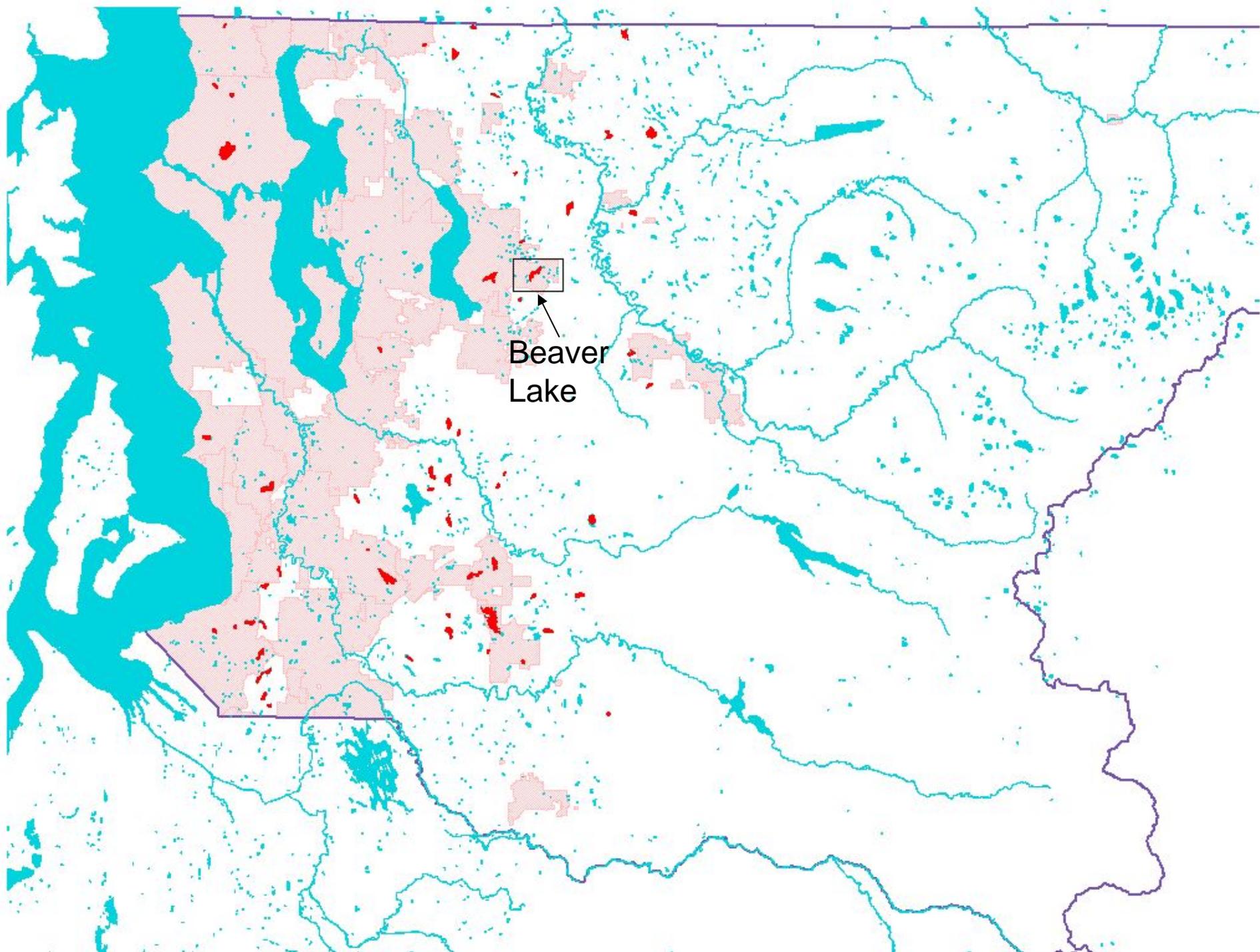


Long-term monitoring of Beaver Lake



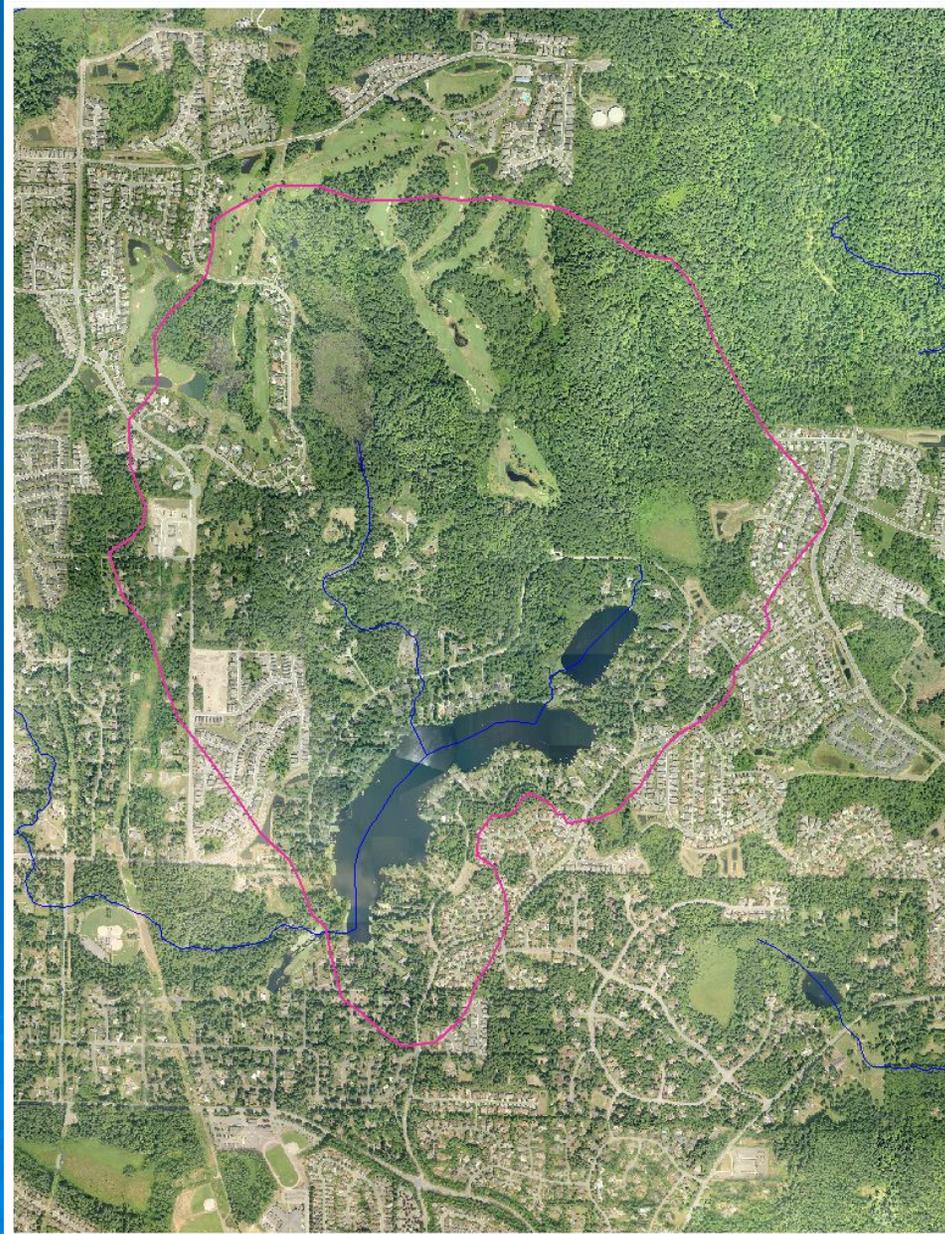
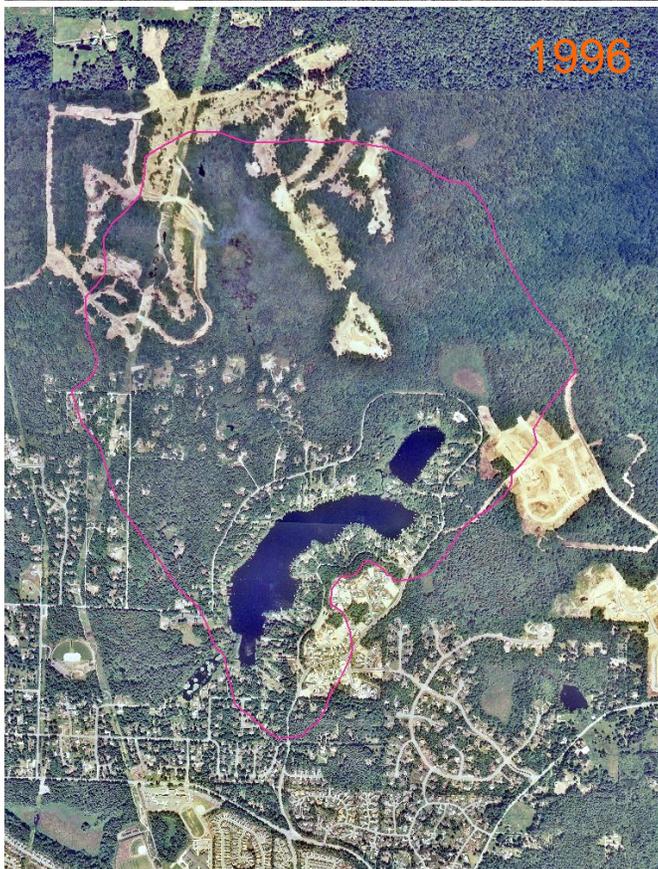
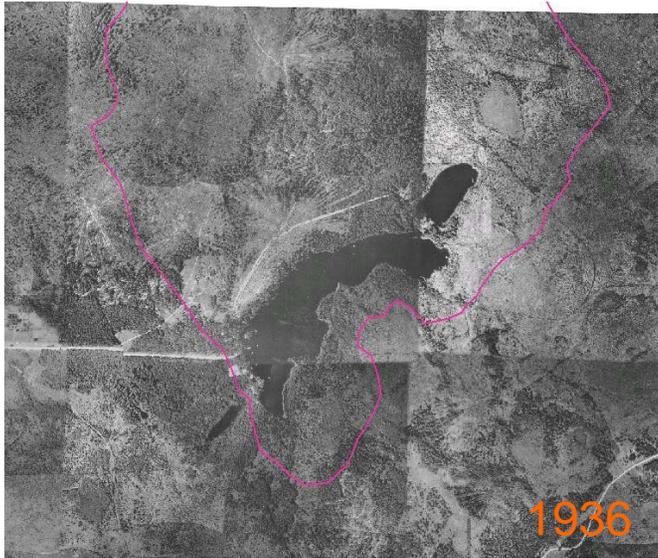
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5 May 2009





Beaver Lake watershed: land use over time

2007



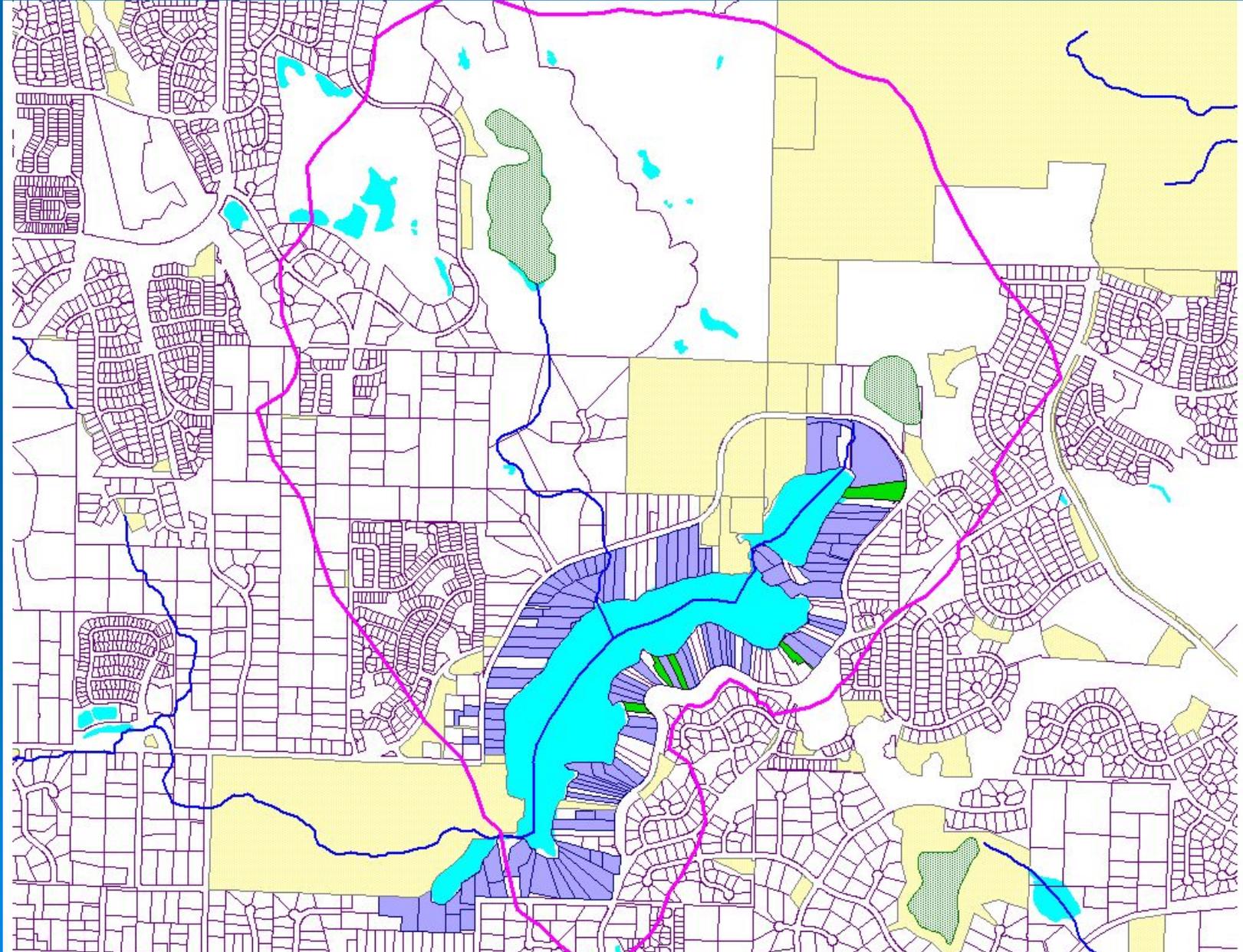
Lake protection and Study opportunity

- Rapidly developing area;
- Sensitive areas present (high quality wetlands, streams, lakes);
- Small watershed, mostly inside city limits;
- Two connected lake basins with differing water chemistry;
- Two easily sampled inlets, one per lake basin, both ephemeral (generally running November through June);
- Adoption of King County surface water design manual, sensitive areas ordinance, and shoreline master program: general continuity of regulations through incorporation;
- Continued monitoring can shed light on the long term success of regulatory framework protecting water quality.
- Support of the people living in the watershed critical to the ongoing effort.

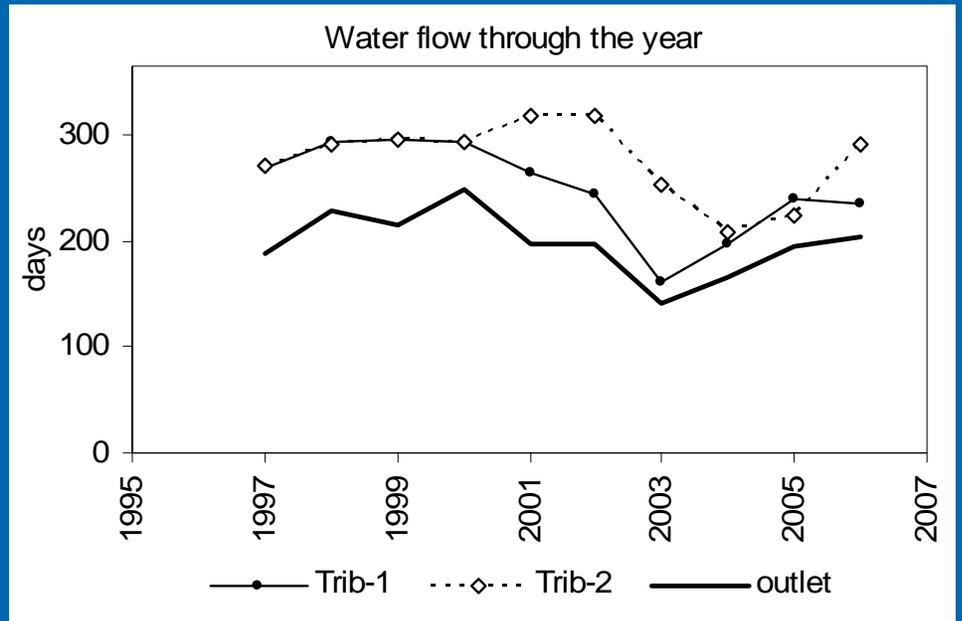
Beaver Lake monitoring timeline

- **1993:** Centennial Clean Water Fund grant to study lake ecosystem and produce lake management plan.
- **1995:** King County Lake Management District (LMD) formation for 5-year implementation of approved lake management plan.
- **2000:** First update of the lake management plan and sunset of first LMD.
- **2001:** Sammamish establishment of 2nd LMD for 5 more years (2002-2006).
- **2007:** Second update of lake management plan completed.
- **2007:** Sammamish establishment of 3rd LMD for 10 more years (2007 – 2016).

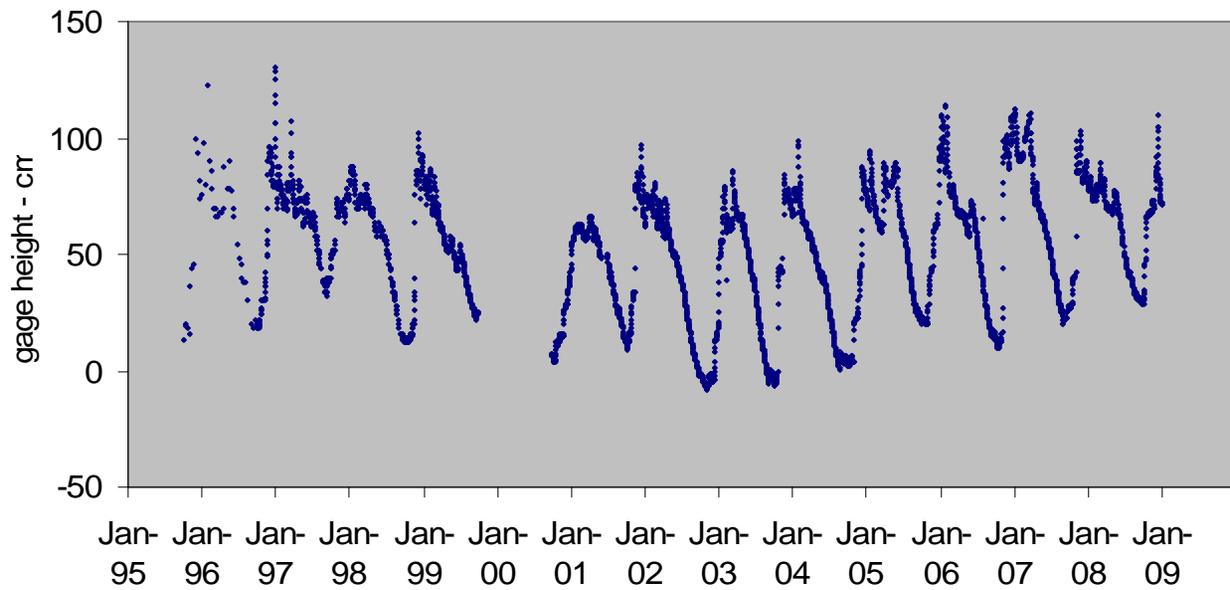
More than you ever wanted to know about the Beaver Lake watershed



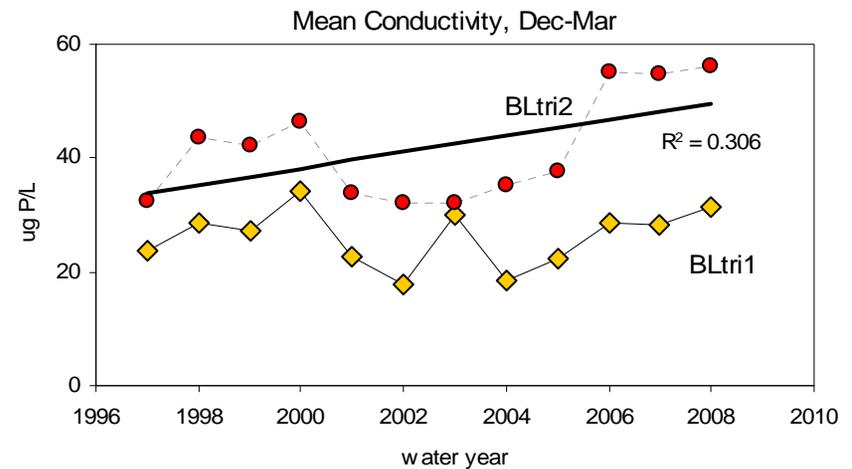
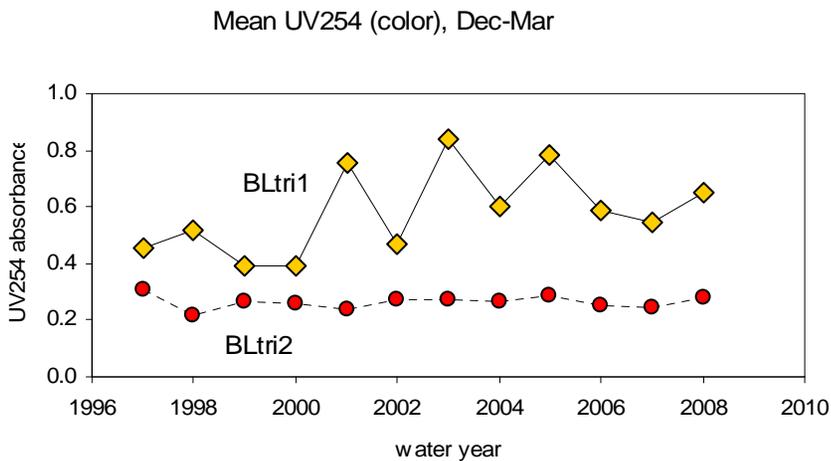
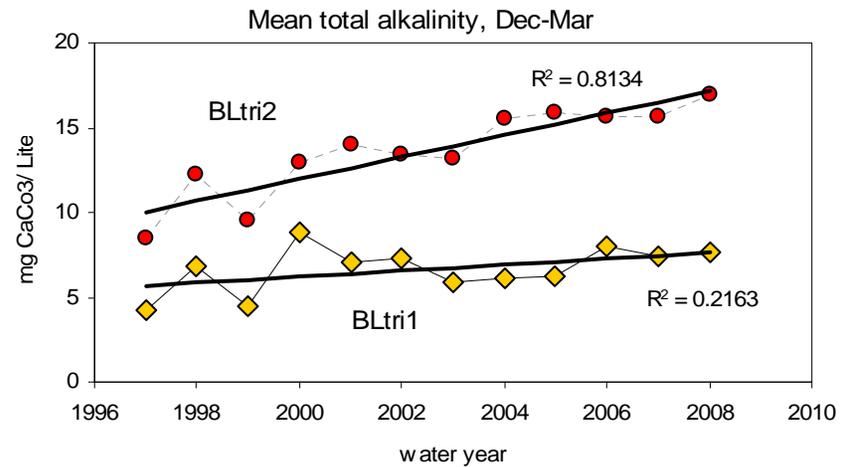
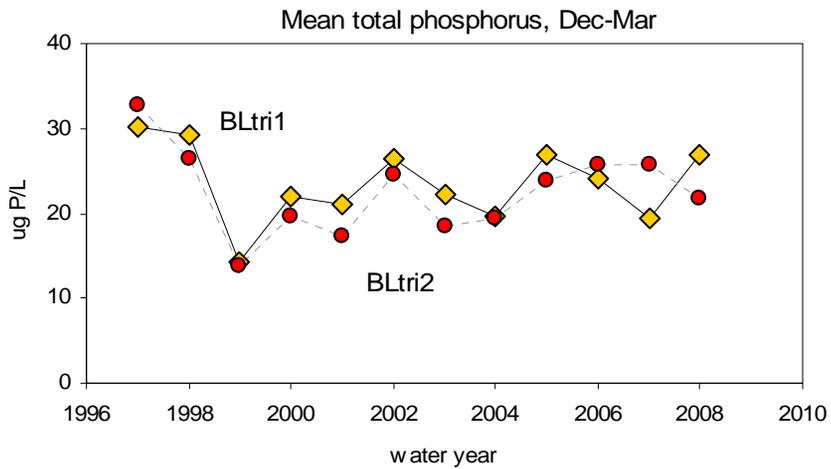
Inflows and Lake level



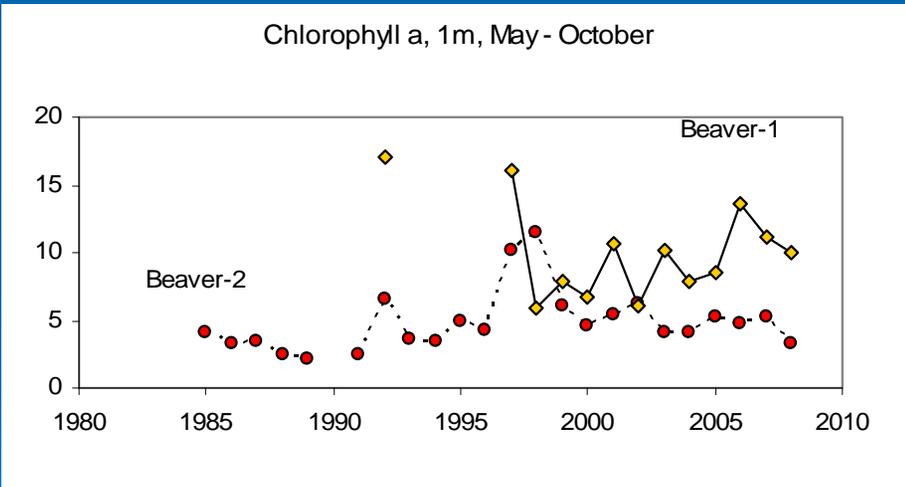
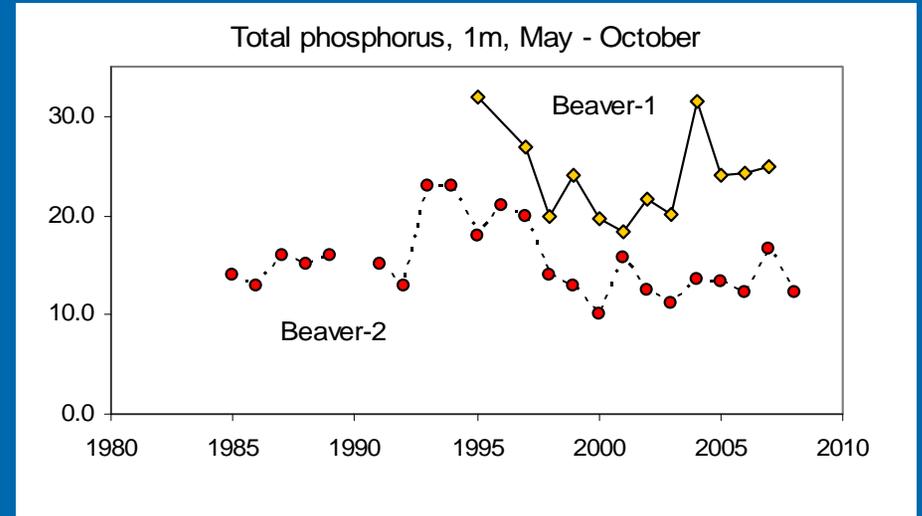
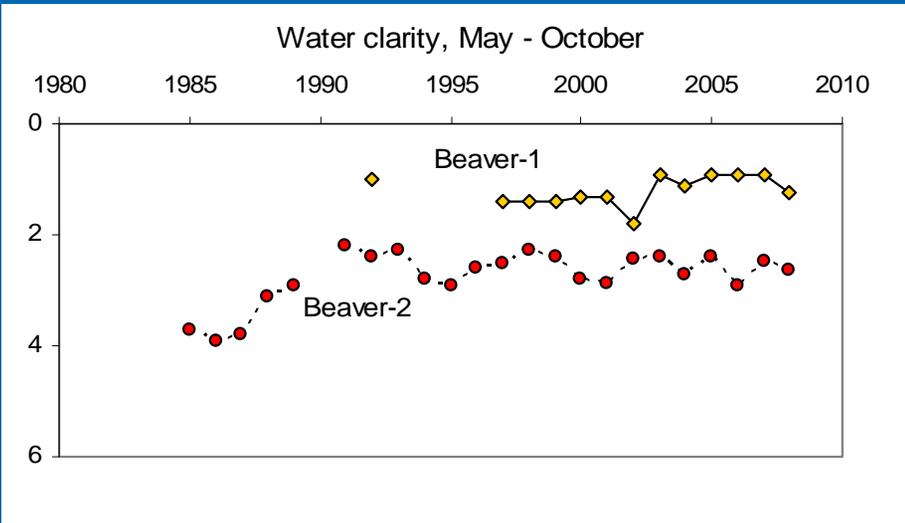
Beaver Lake - relative water level



Tributaries: water quality



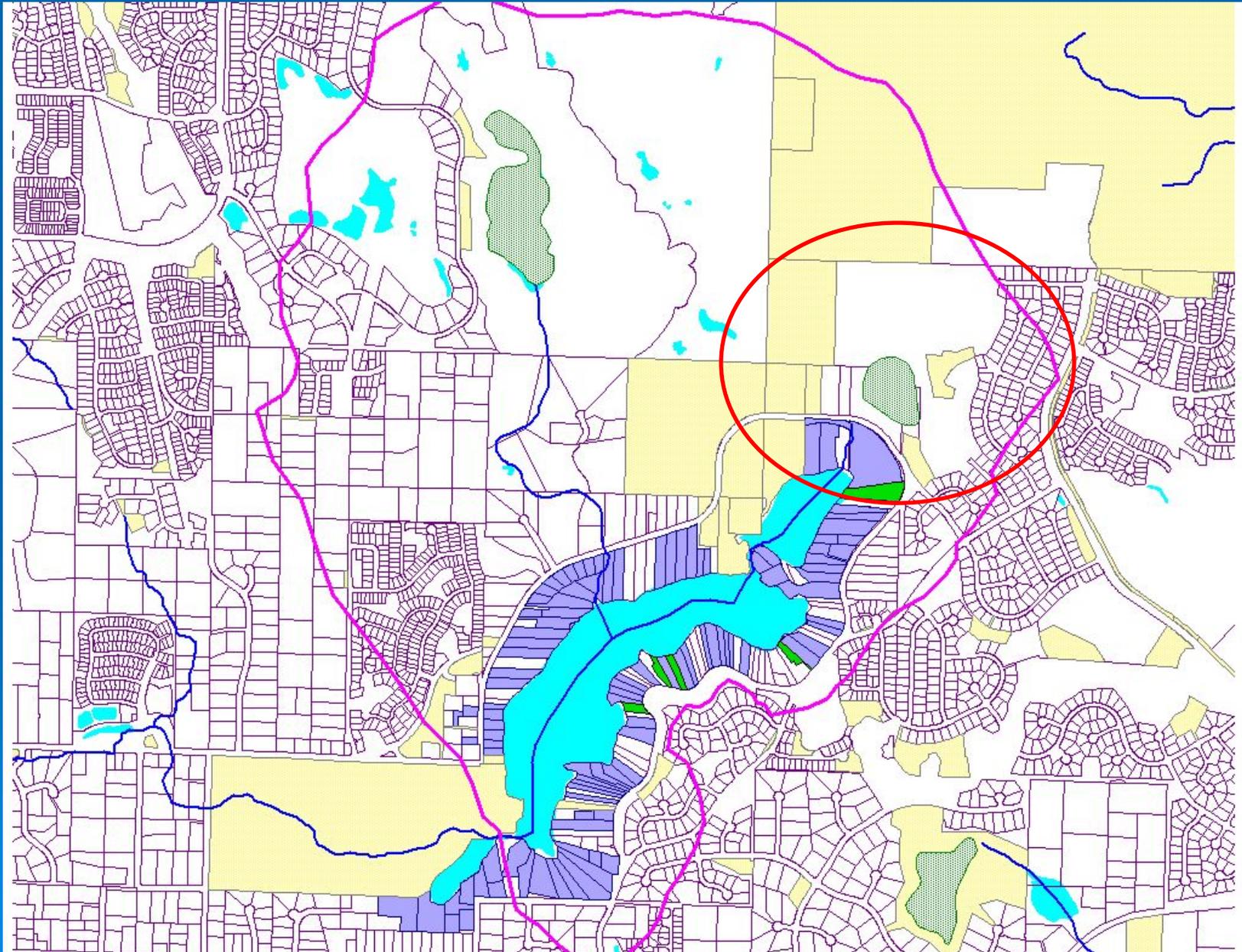
Lake water quality over time



Hydrological and nutrient models

- Included in lake management plan and updates.
- Original 1997 model updated for 2000. Unknowns: measured surface flow between lake basins, aerial estimates of land use (zoning maps)
- New data in 2006: GIS aerial photos for land use estimates.
- New hydrological model instead of recalibration better than previous models, but some difference in relative importance of several sources for water inputs.
- Resulting phosphorus model did not calibrate accurately for either lake basin. New measurements are being made to answer questions about unknowns before the next update in 2011.
- New data include information on water movement between lake basins and collecting composite storm samples from automated samplers instead of taking grab samples.

Proposed development in upper watershed

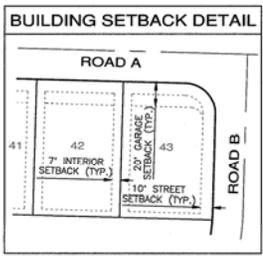
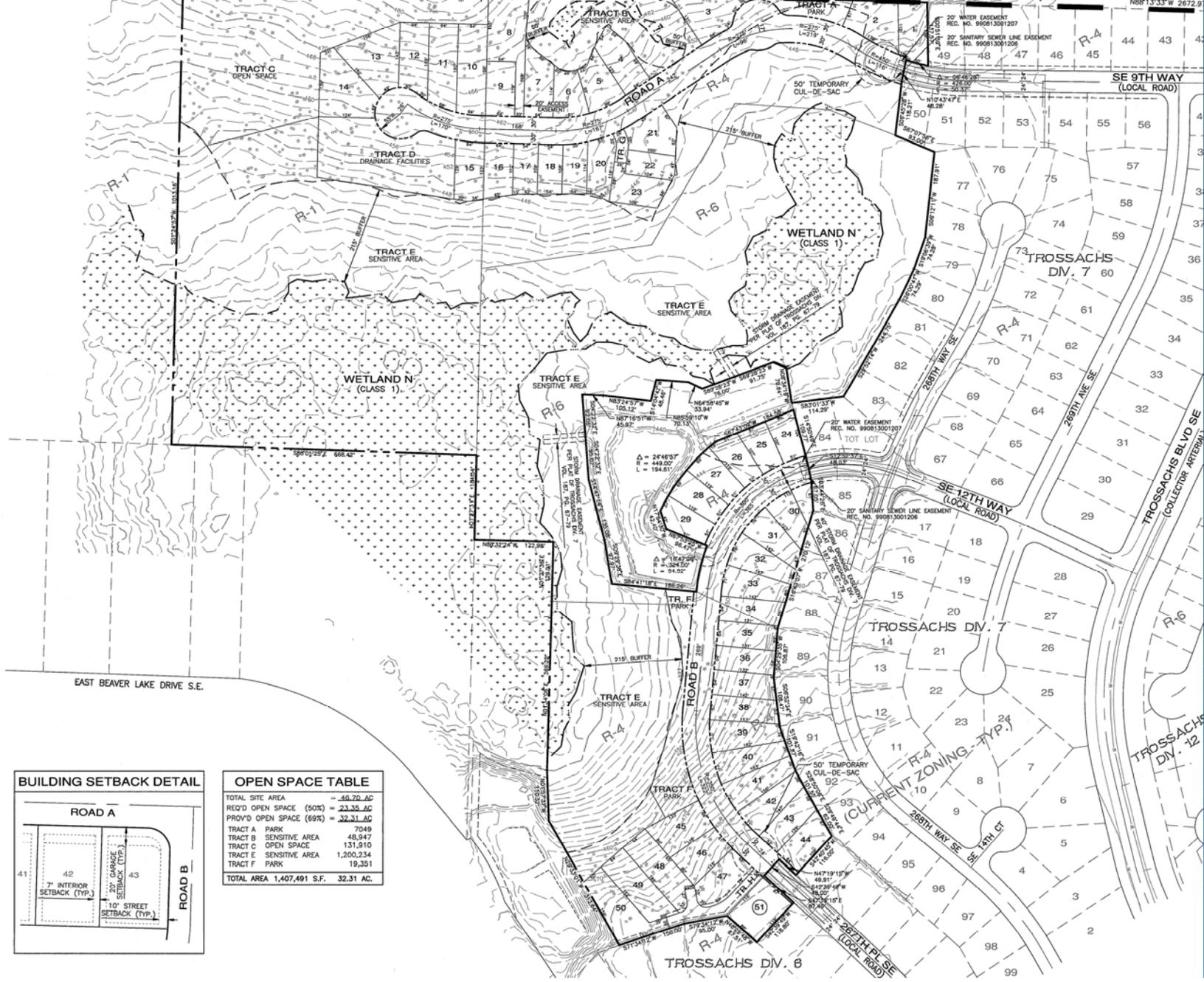


Wetland ELS 21



KING COUNTY
CITY OF SAMMAMISH

RA-5-SO A PORTION OF THE EAST HALF OF THE N.W. 1/4 OF THE N.W. 1/4 OF SECTION 1, TOWNSHIP 24 NORTH, RANGE 6 EAST, W.M.



OPEN SPACE TABLE

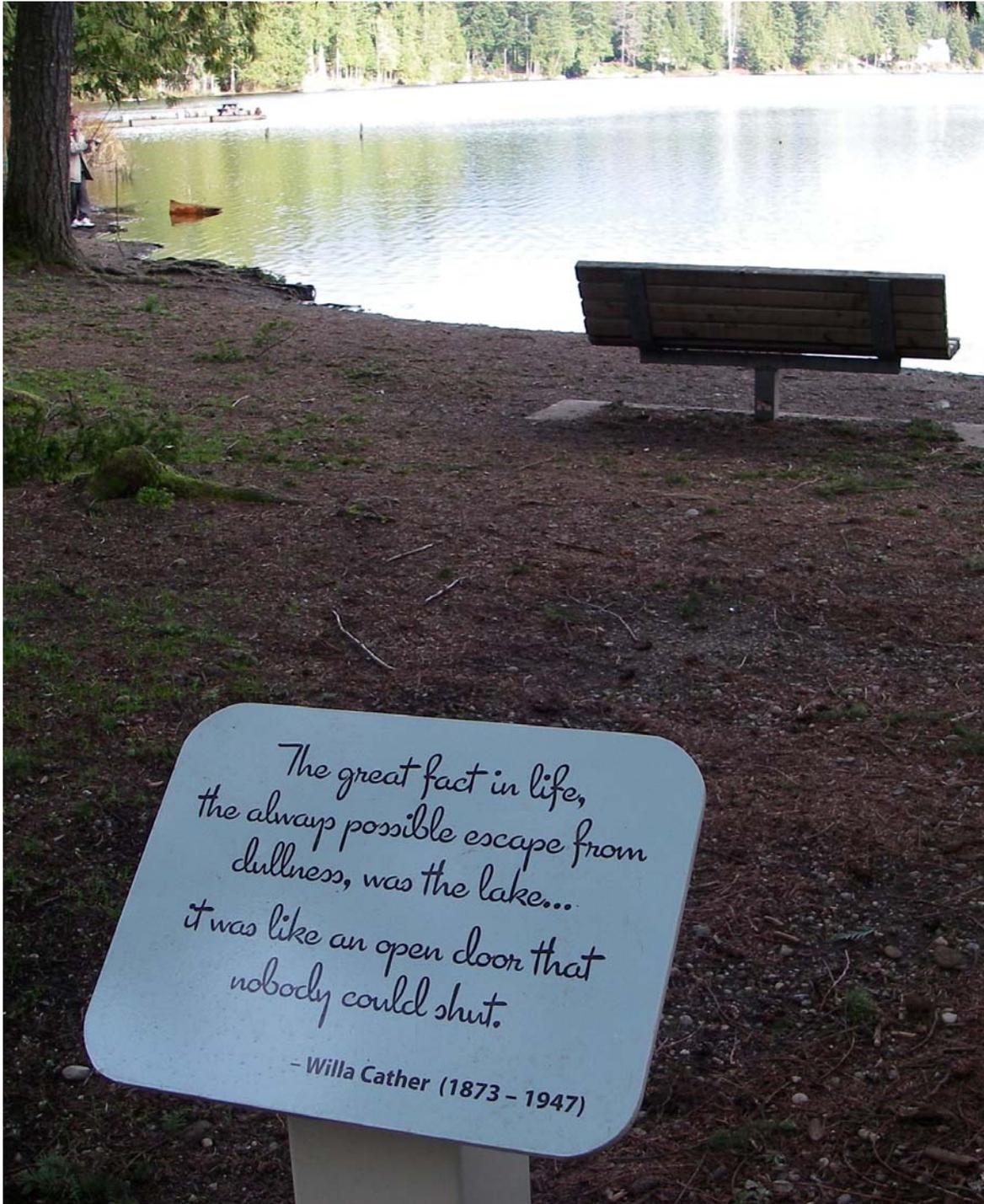
| | |
|------------------------|---------------------------------|
| TOTAL SITE AREA | = 40.70 AC |
| REQ'D OPEN SPACE (50%) | = 23.35 AC |
| PROVD OPEN SPACE (69%) | = 32.31 AC |
| TRACT A PARK | 7049 |
| TRACT B SENSITIVE AREA | 48,947 |
| TRACT C OPEN SPACE | 131,910 |
| TRACT E SENSITIVE AREA | 1,200,234 |
| TRACT F PARK | 19,351 |
| TOTAL AREA | 1,407,491 S.F. 32.31 AC. |



Trossachs 14 development:

- This will be a major change to surface water movement in the restricted Beaver-1 catchment basin.
- Continued monitoring of the water quality of the outflow from ELS21 will be critical to evaluating the success of the drainage plan in protecting the wetland and Beaver Lake

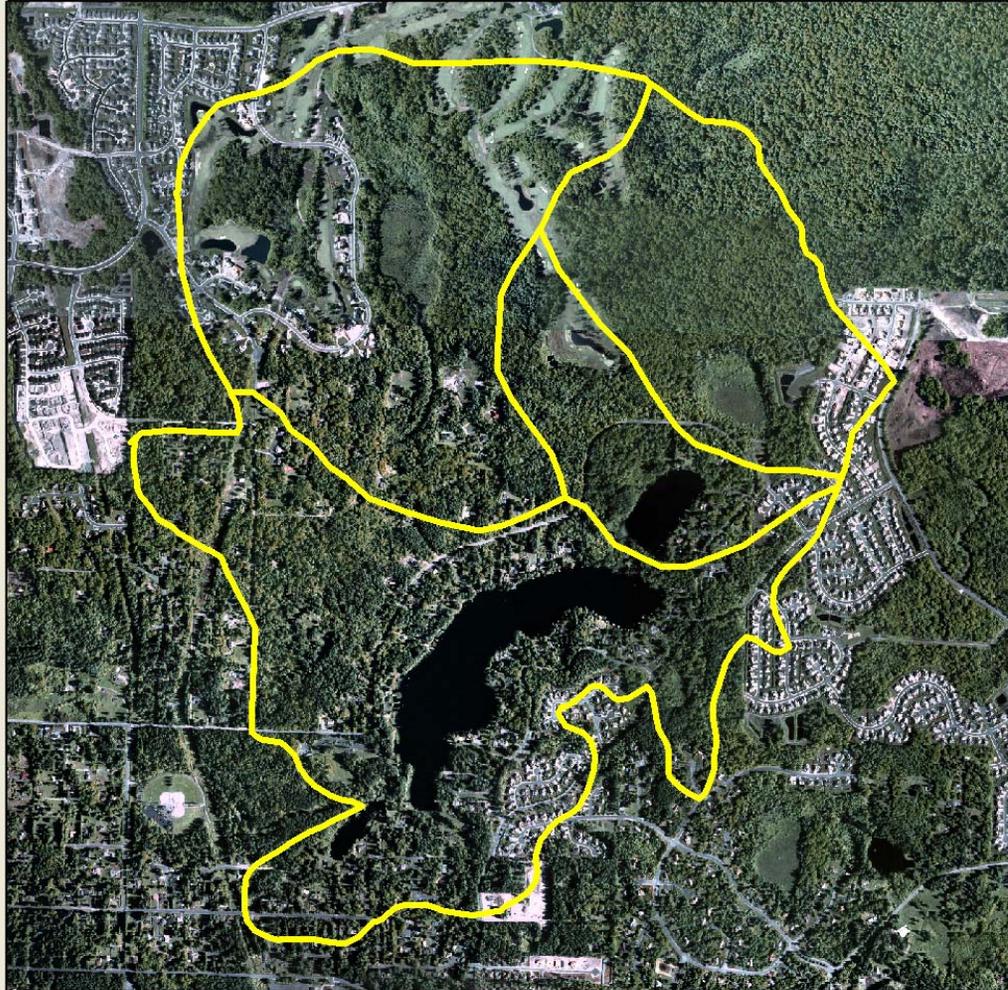




Thank you!

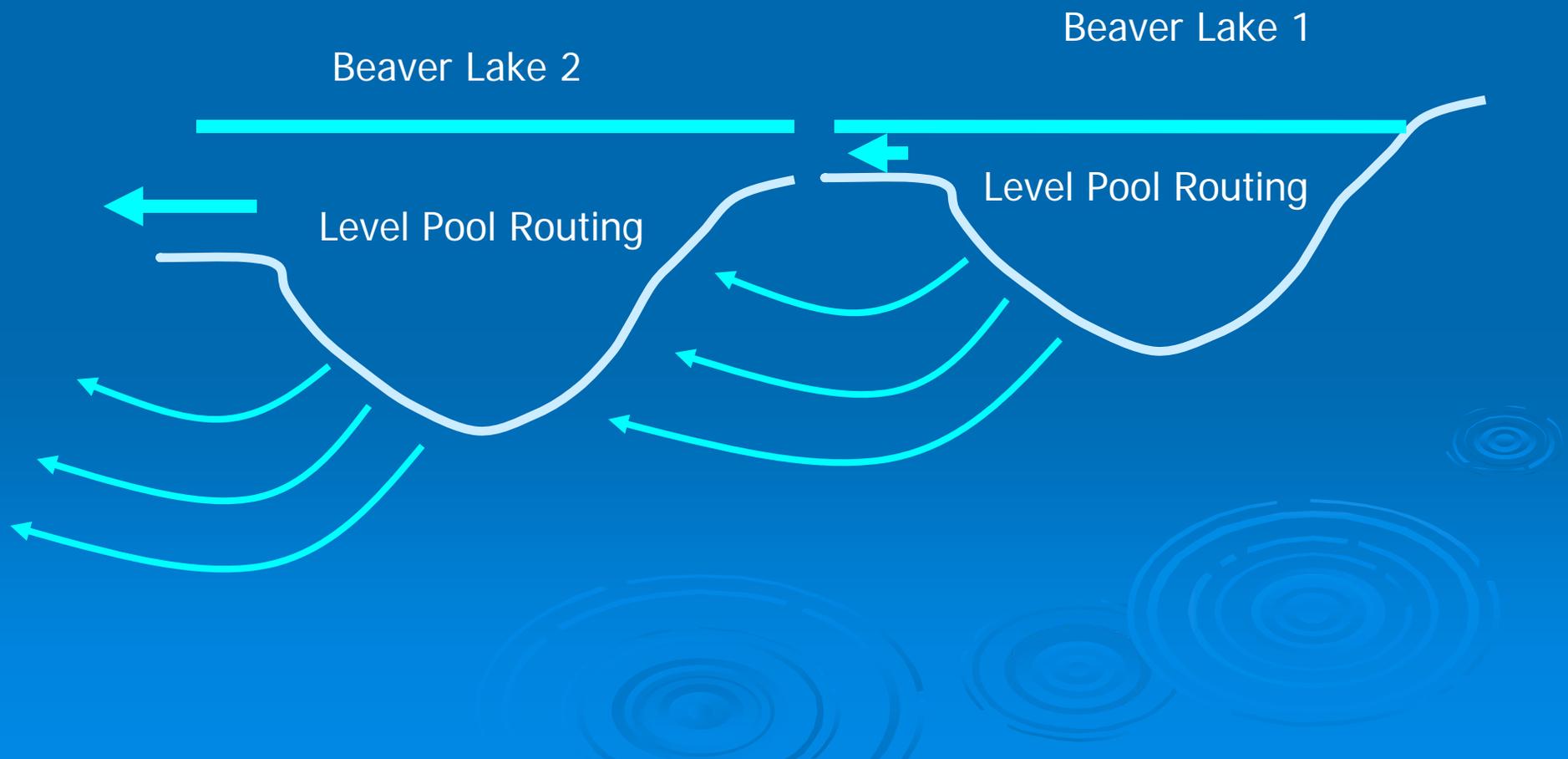
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5 May 2009

Beaver Lake Watershed

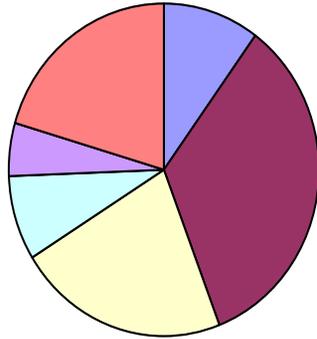


Note: Land Covers were digitized from a map scale of 1:2400
2006 Orthographic Photography Obtained from City of Sammamish.

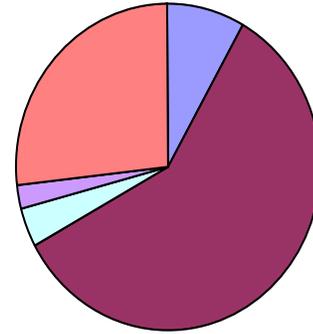
Conceptual Hydraulics Modeled Between Beaver Lake 1 & Beaver Lake 2



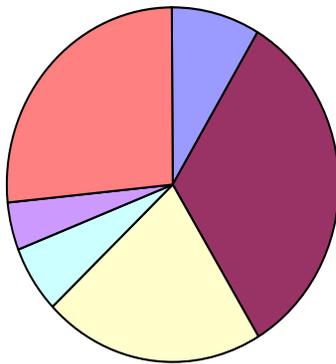
Beaver-2 1997 percent inputs



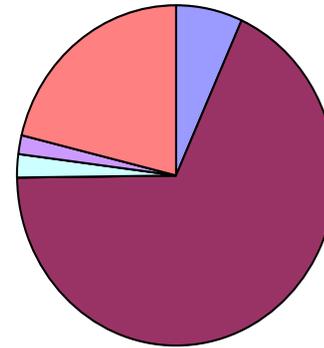
Beaver-1 1997 percent inputs



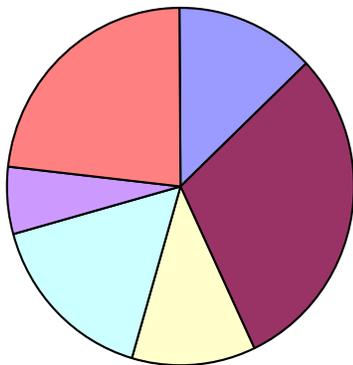
Beaver-2 2000 percent inputs



Beaver-1 2000 percent inputs



Beaver-2 2005-2006 percent inputs



Beaver-1 2005-2006 percent inputs

