

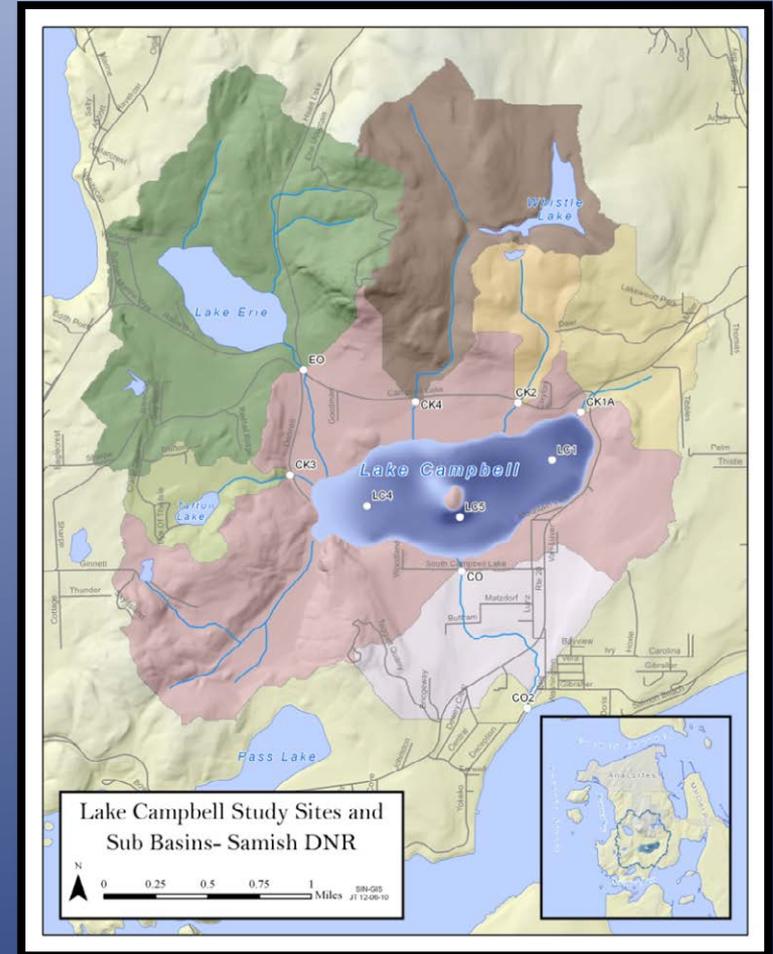


MONITORING, MANAGING AND SUBMITTING WATER QUALITY DATA UNDER CWA 106 AND 319

Samish Indian Nation Presentation for the 2011
National Tribal Water Quality Conference

Location

State of Washington, Fidalgo Island



History

The Samish Indian Nation is a signatory to the Point Elliot Treaty of 1885. A string of clerical errors and miscommunications led during the 1960's and 1970's caused the Samish Nation to lose its status as a federally recognized tribe. It was not until April of 1996, nearly a quarter-century later and after expending virtually all Tribal resources and energy, that a long court battle ended with the Samish Indian Nation regaining its federal recognition



Lake Campbell

**Historical chum, coho,
winter-run steelhead and sea
run cutthroat**

**Managed for non-native
warm water species**

- Poor health of warm water fish due to vegetation issues so grass carp were introduced
- Must be in closed system so gate at outlet
- Indian Creek intermittent stream to Similk Bay

Purchased in 2000 -80 acres

**TAS submitted in 2003 eligible to
apply for 106-319 funding**



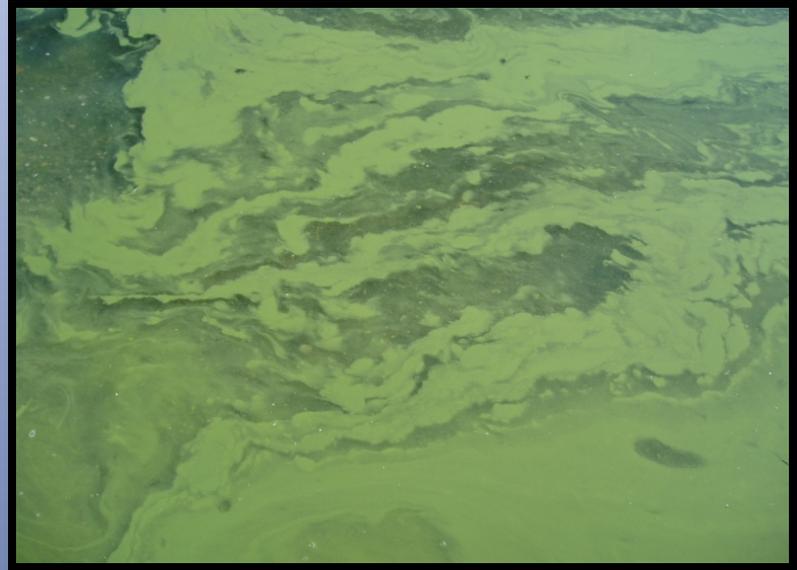
Water quality issues

In 1983 occasional algal blooms (dominated by blue green algae), with phosphorus as the limiting nutrient,.

In the late 1990's the lake was listed by the State of Washington, under Section 303(d) of the Clean Water Act, for non-attainment of the U.S. Environmental Protection Agency (EPA) human health criteria for Total Phosphorus

In 2002 an aquatic plant survey of the lake concluded that follow up work be conducted on nutrient levels within the lake as this directly impacts plant growth.

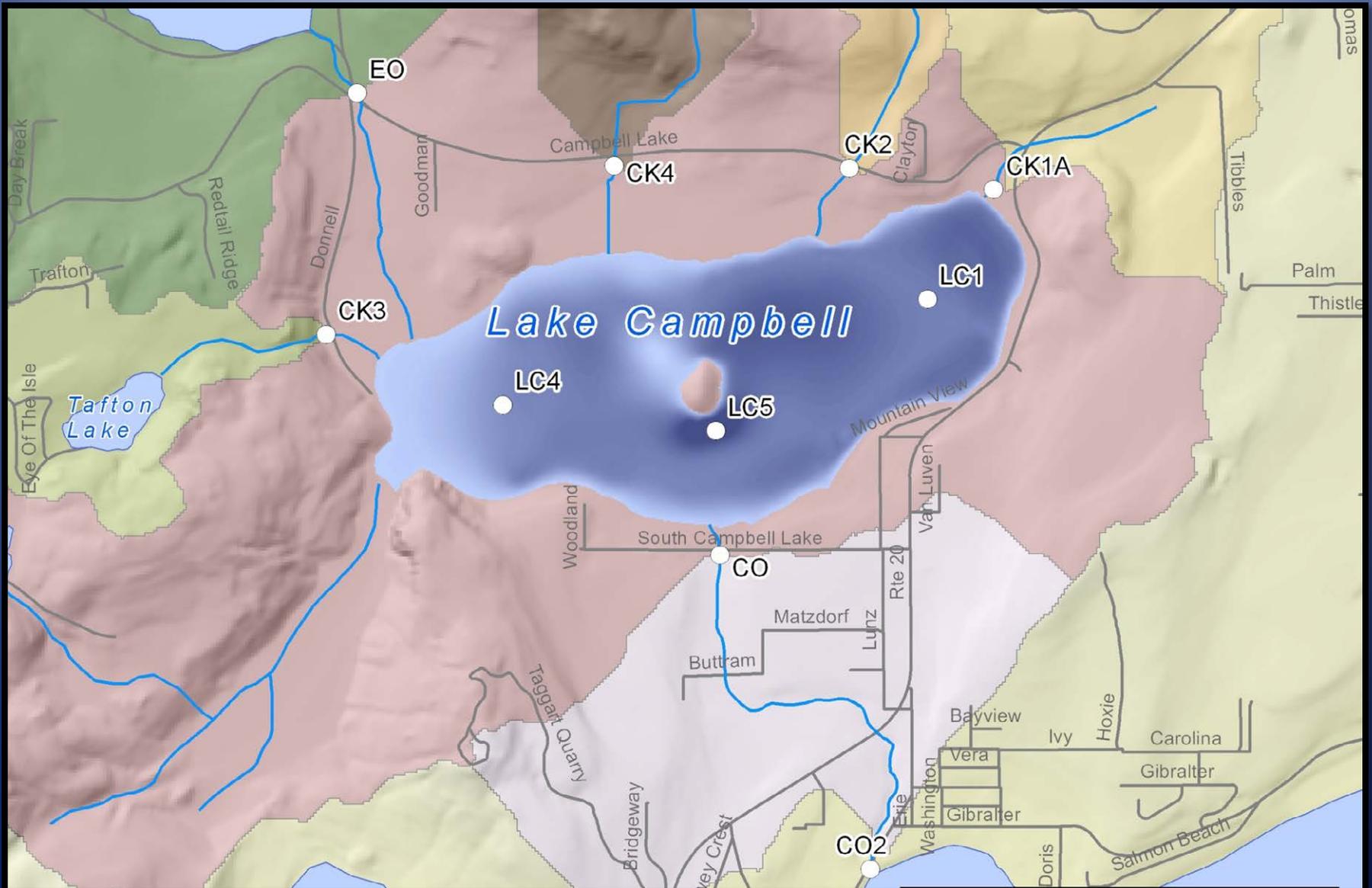
2006-In response to this recommendation, the Samish Indian Nation began the lake Campbell Water Quality Monitoring project. Its purpose is to gather long-term baseline water quality data for the lake and its associated streams.



Lake Campbell Monitoring Program

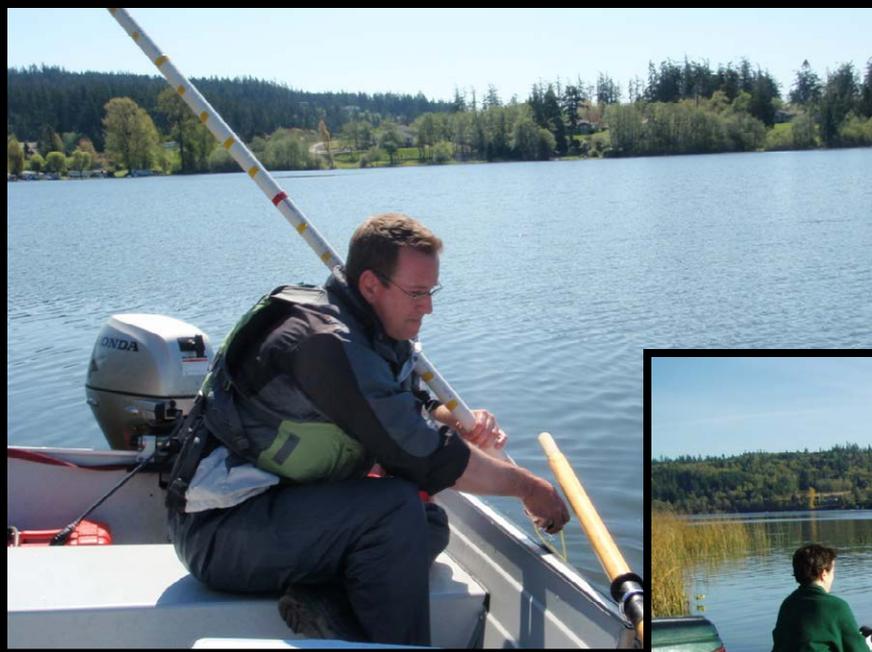
- We are now in our 5th year of data collection
- We monitor
 - Basic YSI multiprobe parameters (DO, Cond,pH,Temp)
 - Fecal coliform, nitrate/nitrite, total phosphorus, chlorophyll, turbidity
 - Secchi Depth and more recently, continuous temperature
- Sample all inflows, the outflow and 3 lake sites including depth profile sampling in lake

Lake Campbell Monitoring Program

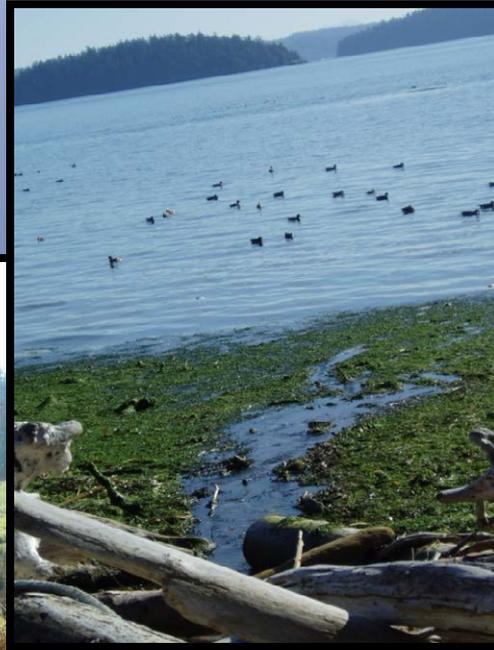


Sampling Methods-Lake Sites

- 2m integrated sampler for collecting grab samples-chlorophyll, nutrients, fecals, turbidity
- YSI brand multiprobe at surface and one meter intervals to bottom
- Standard secchi disk -visibility



Sampling Methods-Stream Sites



- Grab Samples for Nutrients, Fecals and Turbidity
- YSI Multiprobe



Sampling Results

- Lake
 - Phosphorus-All years violate the TMDL
 - Summer Average Temperatures regularly exceed 20°C (70°F which is 5° higher than a 1981 study)
 - Summer algal blooms continue to be severe
 - Periodic summer pH levels have exceeded 9

Data Management

- We started out in a simple MS Access relational database.
- Currently we are using SQL/Server database with a MS Access user interface that is compatible with STORET submissions

The screenshot displays the Microsoft Access interface. The left-hand pane shows the 'Custom' view with a tree structure of database objects: Data Tables (dbo_Activity, dbo_MonitoringLocation, dbo_Organization, dbo_Project, dbo_Result), Domain Tables, Data Entry (CAMPBELL_YSL_AppendQuery, CIPRESS_YSL_AppendQuery, FIDALBAY_YSL_AppendQuery), Support Queries, Support Forms, Query Samples and Templates, and Unassigned Objects (Adams Site Comparison for Nutri..., CAMPBELL, CIPRESS, FIDALBAY). The main window is titled 'Main Form' and contains a 'Project' section with fields for 'ProjectIdentifier' (Lake Campbell) and 'ProjectDescriptionText' (Water quality monitoring for the Lake Campbell watershed. Funded by an EPA 106 Grant). Below this is an 'Activity' section with fields for 'ActivityStartDate' (8/31/2001), 'MonitoringLocationIdentifier' (LC1), 'ActivityStartTime' (11:55:00), 'ActivityTypeCode' (Field Mtr/Obs), and 'ActivityIdentifier' (8/31/2001-LC1-11:55:00-Field). A table below the activity section lists characteristics and their measurements:

CharacteristicName	ResultMeasureValue	ResultMeasureUnitCode	ResultDetectionCondi	RDQLMTMeasure	RDC
Depth, Secchi disk depth	1.3	m			
Depth, below bottom surface	3.65	m			

At the bottom of the form, there are navigation controls for records, showing 'Records: 1 of 5' and a search field.

Data Management

- Our database was developed in house with three main goals in mind
 - Become a central warehouse for all of our water quality work not just Lake Campbell
 - Allow us to easily conduct local water quality data analysis and quickly turn numbers into information
 - Meet “STORET compatible format” submittal requirements

Data Management

- Database is designed to force data collected through a “node” that is housed at the NWIFC in Olympia, Wa to STORET
- Database has complex interface with our multiprobes using scripts written in Python
- Database is very user friendly, however, behind the scenes SQL/Server is well beyond normal capabilities and requires a specialist on staff for any updating and troubleshooting

Data Management

- Development of database took a .75fte 6 months to complete
- Staff is still learning how to query data out of the database

ActivityIdentifier	DataLogger	SampleDateTime	ResultDetect	CharacteristicName	ResultsSample	ResultMeasure	ResultUnit
03/01/11-09:57:02-LC1-0.1-YSI				Dissolved oxygen satur		93.2	%
03/01/11-09:57:02-LC1-0.1-YSI				Temperature, water		3.16	deg C
03/01/11-09:57:02-LC1-0.1-YSI				Dissolved oxygen (DO)		12.48	mg/l
03/01/11-09:57:02-LC1-0.1-YSI				Conductivity		0.145	ms/cm
03/01/11-09:57:02-LC1-0.1-YSI				Specific conductance		0.249	mS/cm
03/01/11-09:57:02-LC1-0.1-YSI				pH		7.78	None
03/01/11-09:57:02-LC1-0.1-YSI				Salinity		0.12	ppth
03/01/11-09:59:21-LC1-1.0-YSI				Dissolved oxygen satur		87.4	%
03/01/11-09:59:21-LC1-1.0-YSI				Temperature, water		3.14	deg C
03/01/11-09:59:21-LC1-1.0-YSI				Dissolved oxygen (DO)		11.72	mg/l
03/01/11-09:59:21-LC1-1.0-YSI				Conductivity		0.145	ms/cm
03/01/11-09:59:21-LC1-1.0-YSI				Specific conductance		0.248	mS/cm
03/01/11-09:59:21-LC1-1.0-YSI				pH		7.65	None
03/01/11-09:59:21-LC1-1.0-YSI				Salinity		0.12	ppth
03/01/11-10:00:15-LC1-2.0-YSI				Dissolved oxygen satur		87.2	%
03/01/11-10:00:15-LC1-2.0-YSI				Temperature, water		3.13	deg C
03/01/11-10:00:15-LC1-2.0-YSI				Dissolved oxygen (DO)		11.69	mg/l
03/01/11-10:00:15-LC1-2.0-YSI				Conductivity		0.145	mS/cm
03/01/11-10:00:15-LC1-2.0-YSI				Specific conductance		0.249	mS/cm
03/01/11-10:00:15-LC1-2.0-YSI				pH		7.61	None
03/01/11-10:00:15-LC1-2.0-YSI				Salinity		0.12	ppth
03/01/11-10:01:42-LC1-3.0-YSI				Dissolved oxygen satur		86.3	%
03/01/11-10:01:42-LC1-3.0-YSI				Temperature, water		3.13	deg C
03/01/11-10:01:42-LC1-3.0-YSI				Dissolved oxygen (DO)		11.57	mg/l
03/01/11-10:01:42-LC1-3.0-YSI				Conductivity		0.145	ms/cm
03/01/11-10:01:42-LC1-3.0-YSI				Specific conductance		0.248	mS/cm
03/01/11-10:01:42-LC1-3.0-YSI				pH		7.56	None
03/01/11-10:01:42-LC1-3.0-YSI				Salinity		0.12	ppth
03/01/11-10:11:17-LC5-0.1-YSI				Dissolved oxygen satur		91.6	%
03/01/11-10:11:17-LC5-0.1-YSI				Temperature, water		3.07	deg C
03/01/11-10:11:17-LC5-0.1-YSI				Dissolved oxygen (DO)		12.20	mg/l
03/01/11-10:11:17-LC5-0.1-YSI				Conductivity		0.145	mS/cm
03/01/11-10:11:17-LC5-0.1-YSI				Specific conductance		0.249	mS/cm
03/01/11-10:11:17-LC5-0.1-YSI				pH		7.56	None
03/01/11-10:11:17-LC5-0.1-YSI				Salinity		0.12	ppth
03/01/11-10:12:18-LC5-1.0-YSI				Dissolved oxygen satur		88.3	%
03/01/11-10:12:18-LC5-1.0-YSI				Temperature, water		3.08	deg C
03/01/11-10:12:18-LC5-1.0-YSI				Dissolved oxygen (DO)		11.85	mg/l
03/01/11-10:12:18-LC5-1.0-YSI				Conductivity		0.144	ms/cm
03/01/11-10:12:18-LC5-1.0-YSI				Specific conductance		0.248	mS/cm
03/01/11-10:12:18-LC5-1.0-YSI				pH		7.51	None

Information Usage

- Data is shared with the Lake Management District and Skagit County
- We are currently working on outreach materials showing study results to the residents surrounding the lake

Questions???

