

Babine Lake-Sockeye Salmon Nursery Ecosystem Structure, Functioning and Productive Capacity. Year 1 of 3

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The DFO and LBN wish to develop a collaborative partnership for monitoring Babine Lake ecosystem structure, functioning and productive capacity to realize the cost-benefits of developing local limnological sampling capacity within LBN. The LBN Senior Biologist participated in five limnology sampling sessions between June and October, 2016. Six LBN fisheries technicians and the LBN junior Biologist also observed the limnology sampling on two sampling dates. Limnological sampling was executed by LBN senior biologist Mark Tiley under the guidance of DFO scientists including Dr. Dan Selbie. Limnological data was collected at five monitoring stations used by the DFO periodically since the 1960's to assess how lake productivity, water quality and food web interactions that potentially affect juvenile sockeye salmon growth, fitness and survival may have changed compared to historic conditions. A Van Dorn water sampler was used to collect water samples at discrete depths from which nutrient concentration, alkalinity, pH, turbidity, phytoplankton species composition and relative abundance and bacteria species composition and relative abundance were collected. Zooplankton abundance and species composition was determined by conducting vertical pulls through a measured volume of water to depths of 25 or 30m. Zooplankton collected for isotope analysis was collected by using horizontal zooplankton tows. Other data collected included photosynthetic rate, light attenuation and water conductivity, dissolved oxygen and temperature profiles and Secchi depth. The LBN senior biologist was instructed on water sample filtering techniques to determine various phosphorus and nitrogen fractions, phytoplankton (chlorophyll *a*) biomass and phytoplankton species composition. The LBN Senior Fisheries Biologist also preserved zooplankton samples and water samples for bacterial counts. It is now felt that LBN can implement a scientifically rigorous sampling program to assess Babine Lake ecology independently though correspondence with Dr. Dan Selbie would be maintained to ensure sample and data quality and provide assistance in data analysis and interpretation.

The LBN Senior Fisheries Biologist and other LBN fisheries staff also conducted beach seining for Dr. Selbie in June 2016 to capture sockeye fry located within the Babine Lake littoral zone for future isotope analysis. The LBN Senior Fisheries Biologist also observed Ph.D. students collect sediment core samples. The LBN Senior biologist observed DFO hydroacoustic sampling and concurrent trawls for quantifying juvenile sockeye salmon in Babine Lake. The LBN Project Biologist and the LBN Junior Biologist assisted with the SFC assessment of juvenile sockeye salmon abundance in Nilkitkwa Lake and Morrison Lake which also utilized the same hydroacoustic sampling and trawl sampling methods used by the DFO in Babine Lake.