

State of the Lake 2001

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The hot, fiery summer of 2000 finished up with no major change in the water quality of Flathead Lake, although the lake received a large dose of nutrients from the airshed as a result of the smoke from the fires and dust from dry rural roads. Indeed, nutrient loading from the airshed continues to be a primary pollution concern. But, no blooms of pollution algae occurred in the lake probably because the increase in late summer loading was offset by lower inputs from the river during the spring freshet.

Due to the hot summer, the heat content of the lake was high and therefore the lake stayed ice-free throughout the winter, even in most of the bays. The winter was very dry and snow in the mountains was substantially below normal. By late summer we may see the lowest river flows on record because most of the snow in the high country is already gone. The spring freshet that normally brings a large turbidity plume of sediments into the Lake was very short and the plume did not reach the midlake sampling station off Yellow Bay.

Water quality in the lake continues to decline at a slow rate (see Figure 1). Data for 2000 have not yet been verified, but the preliminary number is about on the trend line. The numbers for spring 2001 also are consistent with the long term trend. We continue to observe a strong relationship between water quality and inputs of the plant growth nutrients nitrogen and phosphorus from the watershed and from atmospheric fallout on the lake surface. The dissolved oxygen deficit in the deep-water areas of the lake first observed in Big Arm Bay a decade ago and now in the main lake was again evident in 2000. This underscores the gradual decline in water quality because excess algae produced by nutrient loading from human sources is being decomposed by bacteria in the deep portions of the lake, thereby reducing the oxygen concentrations.

The Mysis population continues to oscillate between 40 - 60 per m² in relation to predation by lake trout and other lake fishes. The lake trout population remains robust whereas the native cutthroat and bull trout remain scarce, based upon gill net surveys by Tribal and State fisheries managers. Studies suggest that the large lake trout population is responsible for the decline in native fishes. The lake trout are very effective competitors for food and they are voracious predators, likely consuming young native fishes. More research on the lake's food web is needed to clarify these relations, however.

The Flathead Lake Biological Station monitors nutrient inputs from the major tributaries and the airshed. The in-lake responses (primary production and related variables such as water clarity, chlorophyll and dissolved oxygen concentrations) to nutrient loading are measured at the deepest point in the lake about 2 miles off of Yellow Bay Point. We also monitor the mysids in a lakewide census effort each fall. This

information is essential to the efforts to reduce nutrient loading (the so-called TMDL activities) and to management of the lake's fisheries.

In the 2001 Legislature, Senator Bob Keenan and Reps. John Brueggeman and Stan Fisher worked hard to procure monitoring funds for the next two years from the Montana Department of Environmental Quality pending receipt of money from EPA. Thanks to our legislators for supporting the monitoring work.

In spite of this strong show of support, it is unlikely the funds will meet all of our needs on Flathead Lake and we need to be working on other area lakes and streams. Therefore, I strongly encourage gifts to the FLBS endowed Research and Monitoring Fund [that] will give FLBS the ability to deal directly with water quality problems in the Flathead Basin. I thank the Flathead Lakers for their gift of \$4,000 to the FLBS Research and Monitoring fund.

A final point concerns the recent fuel spills in the lake. I encourage vigilance by citizens to prevent toxic spills and I encourage support of the dedicated people that respond when accidents do happen. Such spills are sources of toxic contaminants and recent work in cooperation with Tribal fisheries managers has again confirmed bioaccumulation of mercury within the lake's food web, which culminates in the lake trout since they are the top consumer species and they live a long time. We do not know the source of the mercury contamination and it is not high enough to be a major health factor for most people, although pregnant women or young children should not eat these fish. Certainly, in a lake as pure as Flathead, we should not be observing any contamination of the foodweb.

In summary the state of Flathead Lake in 2001 remains as it has in the past few years:

- steadily declining water quality as a result of increased anthropogenic nutrient loading;
- concern about water flux through the lake due to continuing drought and recent changes in hydropower operations in the Columbia River related to changing electrical markets and salmon restoration activities;
- continued strong influences on the lake's food web by the prolific, mysid-fed lake trout population; and,
- concern about bioaccumulation of mercury and other toxic materials in the lake's foodweb from unknown sources.

Nonetheless, Flathead Lake remains one of the cleanest large lakes on earth and we are proud of the grassroots efforts of the Flathead Lakers and others to keep it that way. The scientists at FLBS will continue to do our best to provide you with the best possible scientific information about your lake.

Figure 1

