

Project 1c: Determining Mercury Concentrations in Fish Species from Representative California Reservoirs.

Background: State and Regional Board staff has agreed to attempt to develop a statewide mercury TMDL control program for lakes/reservoirs with elevated mercury concentrations in fish. At present there are about 75 impaired lakes/reservoirs on the 303(d) list. The number is expected to increase in the next listing cycle. The TMDL will try to address both present and future listings. Impaired lakes/reservoirs are broadly distributed across the state, including the Trinity Alps, Sierras, Coast Range and Southern California. For this effort State Board staff has agreed to develop the fish tissue objective while a group of Regional Board staff selected from Regional Boards with one or more impaired lakes will write the control program. Regional Board staff committed to deliver their product to the State Board for adoption by June/July 2013.

Regional Board staff does not yet know the exact formulation of the proposed State Board fish tissue objective. However, the new objective will be expressed in terms of the mercury concentrations of fish species present in impaired reservoirs and being consumed by people and wildlife. The fish tissue objective(s) must protect both humans and wildlife species consuming fish. Methylmercury load reductions will be calculated from the difference between the fish tissue objective and the existing mercury concentrations in fish being consumed from each lake. For reservoirs where only 1-2 fish species have been sampled, Regional Board staff is concerned that load reductions calculations will be not as accurate as for reservoirs from which three or more fish species have been sampled. In particular, Regional Board staff believes there are data gaps in fish mercury information in mid- and high-elevation reservoirs. These reservoirs typically do not have largemouth bass and often have only have been sampled for 1-2 other species (e.g., rainbow or brown trout or other black bass).

The Regional Board TMDL group will obtain information about the geographic distribution of fish species in California lakes/reservoirs. This information would be collected by calling reservoir managers, including the managers of all impaired lakes, examining the bycatch data from electro shocking and consulting with fishery experts from the University of California, Fish and Game and Regional Board staff. Regional Board staff would use this information to determine species likely present in each impaired reservoir. Regional Board may ask MLML staff to conduct this work and provide a report.

Board staff must also determine the range of mercury concentrations in the fish species present and being consumed by people and wildlife in each impaired lake. Strong positive correlations were observed in the Delta between the concentration in a standard 350 mm largemouth bass and the concentration in specific size classes of all other co-occurring species. There is a data gap of mercury data in small fish that has not allowed us to evaluate whether similar correlations occur in mercury-impaired California reservoirs. We surmise that there will be relationships between apex predators, like bass and trout, and other fish species in each reservoir, assuming that the fish assemblage is feeding at different trophic levels of the same food chain. We propose to select a suite of representative reservoirs and collect individuals from all fish species and size classes in these reservoirs and analyze them for mercury. The data would be used to determine whether there are predictable relationships between specific size classes of each species and a standard 350 mm largemouth bass or other apex predator.

Study Plan We envision that there may be five representative geographic regions requiring fish collections. The underlying assumption being that these geographic regions may support different fish assemblages feeding at different trophic levels in different food chains. The assemblages are from low and high elevation Sierra lakes (this includes the Trinity Alps), the coast range north and south of San Francisco Bay, and Southern California. The need for additional food chain information may become obvious once the fish distribution data are compiled and analyzed. The fish distribution information should become available in January/February of 2012 and could help inform the summer fish sampling program. We also propose that all other available lake/reservoir fish tissue data be collated and analyzed. A preliminary assessment of what data may be available is now being done by MLML. Regions 2 and 4 have indicated that they already have sufficient information for all large and small fish present in their reservoirs to ascertain whether mercury correlations exist. If correct, then we will only need data from three representative geographic areas: low and mid/high elevation Sierra Lakes and the Coast Range north of San Francisco Bay. Tentatively, we propose collecting mercury concentration information from three reservoirs in each geographic area. This would result in the examination of mercury concentrations in nine reservoirs or three different fish communities.

If BOG conducts this study, the TMDL group would also request that BOG also evaluate the small-large fish mercury correlations. This would include both new data as well as information already available from Region 2 and 4.

Note that the Regional Board TMDL group anticipates releasing a draft Statewide TMDL staff report by July 2012. Thus, if BOG collects fish mercury from a wider range of fish species in and collects data and analyzes small versus large fish mercury relationships in 2012, the new information would most likely not be incorporated into the initial TMDL effort. However, the Regional Board TMDL group feels strongly that additional fish data collected in 2012 or later would be useful for stakeholder and State Water Board deliberations about the proposed TMDL program (occurring in 2013) and in revisions of the TMDL program, which will be required on a periodic basis.