Methylmercury in Fish of American and Bear Watershed Reservoirs

**The Problem**
The ability of the Office of Environmental Health Hazard Assessment (OEHHA) to issue mercury fish consumption advisories that are protective of human health is contingent upon the availability of adequate fish tissue data. To determine if non-site specific advisories are protective of human health, it is necessary to fill gaps in fish tissue data and determine if site-specific data exceeds fish tissue mercury levels used to establish the Statewide Advisory for eating fish from California Lakes and Reservoirs without site-specific advice. This is especially crucial for water bodies in mining-impacted regions where some species may have higher fish tissue mercury levels than those utilized by OEHHA to develop non-site specific advisory tissue levels (ATLs).

**Mercury in Reservoirs**

- **Mercury Methylation**
  - Mercury cycling in reservoirs
  - This figure shows thermal stratification (lighter blue color for warm top water, and darker blue for cold deep water). There's very little mixing between top and bottom water with the result that oxygen is depleted in bottom waters, which enhances methylmercury production.

**Fish Tissue Sampling and Analysis Protocol**

- **Sampling Sites**
  1. Lake Oehlert (pymo) located in 1999 when the Army Corps of Engineers completed the North Bank Dam on the California River. The dam was later built on the North Bank Dam on the American River. The dam was later built on the North Bank Dam on the American River.
  2. Rolph Reservoir is on the statewide Mercury Program list and is located in a watershed with extensive historical ground mining activity (Department of Conservation, 2000).

- **Mercury Bioaccumulation**
  - Data collected in May 2015 shows a significant difference in mercury levels in fish from the Rolph Reservoir. The highest mercury levels were found in brown trout, followed by rainbow trout, catfish, bullhead, and sunfish.

**Effective-ness of Fish Consumption Advisories**

- **Posting fish consumption advisories is the primary mechanism for reducing human exposure to mercury in fish.**
- **Sensitive populations, including women, children, ethnic minorities, and tribal groups may not be adequately protected.**

In addition to fish tissue analysis, this research will examine the effectiveness of posting advisories as a means of protecting human health by analyzing angler knowledge of the three critical components of fish advisories: species, population group, and frequency of consumption. The Sacramento River Angler Survey developed by UC Davis and the California Department of Public Health will be used to conduct pre and post advisory-posting surveys at the two sample water bodies. The results of angler knowledge, pre and post, on the three critical components will be compared.

**Anticipated Results**

Existing fish tissue data for the region available from the California Environmental Data Exchange Network (CEDEN) suggests that resident fish of all species exceed the mercury screening values established by OEHHA. It is anticipated that the posting of advisories will improve angler knowledge, however, language and cultural barriers may prevent key population groups from receiving the information required to protect human health.

**Research Questions**

1. What are the 90th percentile mean mercury concentrations in parts per million (ppm) of the muscle tissue of commonly consumed fish species (brown trout, rainbow trout, bass group, catfish and bullhead group, crappie, and sunfish group) in two water bodies located in the CABY region of the Sierra Nevada?

2. How do 90th percentile mean fish tissue mercury concentrations (by species) compare to OEHHA’s mercury health screening values (SVs) of 0.08 ppm?

3. Are current fish consumption advisories, designed by OEHHA for lakes and rivers with non-site-specific advisories, protective of the health of anglers consuming catch from the CABY region water bodies selected for analysis or do 90th percentile mean fish tissue mercury concentrations (by species and water body) from sampled water bodies exceed the 90th percentile mean mercury concentration upon which the non-site-specific advisories are based?

4. Do anglers surveyed at Rolph Reservoir and Lake Clementine demonstrate improved levels of knowledge on the three components of fish consumption advisories (species, population group, frequency of consumption) after non-site specific advisories are posted?