Summary of Putah Creek Mercury Bioaccumulation Issues

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In1995 the Davis South Campus Superfund Oversight Committee (DSCSOC) Found that the Site Evaluation of the Public Health and Environmental Impacts of the UCD/DOE LEHR National Superfund Site Located on the University of California, Davis (UCD) Campus Next to Putah Creek Did Not Include Measurement of Excessive Bioaccumulation of Hazardous Chemicals in Putah Creek Fish

- Millions of Dollars Had Been Spent Per Year Over the Previous Five Years in LEHR Site Investigations, Including Measurements of Putah Creek Water and Sediments
  - The LEHR Site RPMs - US EPA; Cal EPA DTSC and CVRWQCB; and DHS; as well as the PRPs - UCD and DOE and Their Consultants Did Not Understand the Potential Public Health Significance of Bioaccumulation of Hazardous Chemicals in Putah Creek Fish

DSCSOC Contacted ATSDR (Agency for Toxic Substances Disease Registry) For Help

- ATSDR Is Part of the US Public Health Service and Is Responsible for National Superfund Site Public Health Assessment

ATSDR Had Funding to Conduct Studies of Excessive Bioaccumulation in Putah Creek Fish Near LEHR

Fish, Water, and Sediment Samples Collected by US EPA Region 9, Which Were Analyzed by US EPA National Air and Radiation Environmental Laboratory (NAREL) in Alabama

- Collected 141 Fish in August and September 1996 from Four Locations in Putah Creek Near LEHR

Issued Report, "Health Consultation: Fish Sampling in Putah Creek," dated April 4, 1997.

ATSDR Conclusions

1. *"Mercury and Lead Concentrations in Some Fish Collected From Putah Creek Pose a Public Health Hazard.*
2. *Based On the Samples that EPA Region 9 Collected in August and September 1996, Neither the Water Nor the Sediment in Putah Creek Directly Poses a Public Health Hazard.* [This Conclusion Did Not Consider Sanitary Quality Issues of Inadequately Treated Wastewaters Discharged by the UCD Campus Wastewater Treatment Plant and the Extensive Contact Recreation that Occurs in Putah Creek Just Downstream of the Campus Wastewater Treatment Plant Discharge.]
3. *Radionuclides, Organic Pesticides, Polychlorinated Biphenyls (PCBs), and Metals Other Than Mercury and Lead Were Not Present in the Fish, Water, or Sediment Collected From Putah Creek in Concentrations that Pose a Public Health Hazard."*

ATSDR Recommendations

1. *"Conduct an Additional Fish Study to Define the Concentration of Mercury and Lead*

in Different Fish Species Within Selected Length Ranges.

2. *Until Further Data are Available, Post a General Fish Advisory for Areas of Putah Creek Near the Former LEHR Site; Elevated Concentrations of Mercury and Lead in the Collected Fish Justify the Advisory.*"

Comments on Study and Conclusions

Highest Concentrations of Mercury and Lead Were Found in Fish Taken Near UCD Campus Wastewater Treatment Plant Discharge and Part of the LEHR Site Stormwater Runoff to Putah Creek

UCD Administration Refused to Post Putah Creek and/or Notify the Public of the Health Hazards of Eating Putah Creek Fish Near Its Campus Wastewater Treatment Plant Discharge

The Area of Putah Creek Near the Campus Wastewater Treatment Plant Discharge Was Extensively Used By the Public for Fishing and Contact Recreation

UCD Administration Attempted to Discredit Study by Claiming That the Study Included Analyzing Fish Composites That Included Small Fish in the Composite

If the Small Fish Had Not Been Included in the Composite, the Concentrations of Mercury in the Composite Would Have Been Higher Than Those Reported

ATSDR Has a Higher Allowed Level of Mercury in Fish Than US EPA Guidelines for Protection of Public Health

If US EPA Mercury Guidelines Had Been Used the Problem Would Have Been Greater Than That Reported

Radioactive Mercury Found in Fish, Indicating that UCD was Likely Discharging Radioactive Mercury to Putah Creek

1996 Was a Drought Year With Low Flows in Putah Creek During the Late Summer and Fall - Prevented Fish Migration From Putah Creek Area Where the UCD Campus Wastewater Treatment Plant Discharges to Putah Creek

Elevated Concentrations of Mercury in Fish Near Campus Wastewater Discharge May Be Due to the Inadequate Treatment of the Campus Wastewaters Which Leads to Sludge Deposits in Putah Creek That Enhance Methylmercury Formation in the Vicinity of the Wastewater Treatment Plant Discharge

UCD Under CVRWQCB Order to Improve Treatment of Campus Wastewaters

New Campus Wastewater Treatment Plant Under Construction

US EPA NAREL Did Not Use Adequate Sensitivity in Chlorinated Hydrocarbon Measurements to Determine if Several of the Chlorinated Hydrocarbons are Present in Putah Creek Fish at Hazardous Levels

1996 Studies Demonstrated that There is a Potentially Significant Public Health Problem Associated With Eating Putah Creek Fish in the Vicinity of LEHR

Need For Additional Studies

ATSDR 1997 Studies

Collected 152 Fish and Crayfish at Five Locations in Putah Creek During October/ November

1997

Issued Report, "Health Consultation: Survey of Fish in Putah Creek (Phase II)" September 16, 1998

ATSDR Results

1. *"All Largemouth Bass Samples Contained Mercury. The Mercury Concentrations in the Samples Ranged From 0.11 Milligrams of Mercury Per Kilogram of Fish (mg/kg-fish) to 0.81 mg/kg-fish. The Largemouth Bass Contained the Highest Levels of Mercury That Were Found in This Survey.*
2. *The Highest Levels of Lead Were Found in Crayfish. All Crayfish Samples Contained Lead. The Lead Concentrations in the Samples Ranged From 0.15 mg/kg-fish to 1.1 mg/kg-fish."*

ATSDR Conclusions

1. *"The Concentrations of Mercury in Some Largemouth Bass in Putah Creek Are at Levels of Health Concern for Fetuses and Nursing Children Whose Mothers Eat These Fish.*
2. *The Concentrations of Lead and Other Metals in Crayfish in Putah Creek Are Not at Levels of Health Concern for People Who Eat These Fish.*
3. *The 101 Bluegill, 4 Carp, 1 Channel Catfish, and 1 Black Bullhead Fish That We Caught Did Not Contain Toxic Metals at Levels of Public Health Concern.*
4. *None of the Radiological Analyses of Any of the Fish Indicate That Radionuclides in the Fish Pose a Public Health Hazard.*
5. *None of the Analyses Indicate that Metals or Radionuclides in Water Pose a Public Health Hazard.*
6. *None of the Analyses Indicate that Metals or Radionuclides in Sediment Pose a Public Health Hazard."*

ATSDR Recommendations

"Women of Child Bearing Age, Especially Those Who Are Pregnant or Are Nursing, Should Refrain From Eating Largemouth Bass From Putah Creek."

Overall Conclusions From Studies

Some Fish in Putah Creek Contain Excessive Mercury Compared to Both ATSDR and US EPA Guidelines for Protection of Public Health

Largemouth Bass Contain the Greatest Mercury Concentrations

Other Fish Such As Bluegill Contain Excessive Mercury Compared to US EPA Guideline Values

The Public Should Be Warned About the Public Health Hazards of Eating Putah Creek Fish

Studies Are Needed to Define the Full Extent of Excessive Mercury Bioaccumulation in Putah Creek Fish From Lake Berryessa to the Yolo Bypass During Both Wet and Dry - Drought Conditions. There Should Be Ongoing Monitoring of Excessive Bioaccumulation in Putah Creek Fish

Source of Mercury is Likely Former Mercury Mining Above Lake Berryessa

UCD Wastewater and Stormwater Runoff May Contribute Directly or Indirectly to the Excessive Mercury Bioaccumulation Problem

Need to Define Primary Sources of Mercury That are Accumulating in Putah Creek Fish To Excessive Levels Based on US EPA Guidelines

Use Benthic Invertebrates Mercury Content As Indicator of Areas of Putah Creek Where Methylmercury is Being Generated at Sufficient Rates to Cause Excessive Bioaccumulation

There May Be Mercury Hot Spots Where Dredging Could Remove Mercury that is an Important Mercury Source Causing Excessive Bioaccumulation of Mercury in Putah Creek Fish

Need to Determine if Lake Berryessa is an Effective Trap for Mercury That is Currently Discharged From Former Mining Areas to Tributaries of the Lake

Need Comprehensive Monitoring of Lake Berryessa Discharges Using Both Chemical and Aquatic Organism Bioaccumulation Monitoring

UCD Administration Now Claiming That the Mercury Problem in Putah Creek is Not Related to UCD's Inadequate Treatment of Its Campus Wastewaters and Stormwater Runoff, Since the 1997 Studies Did Not Show That Fish Taken Near the Campus Wastewater Treatment Plant Discharge Had Greater Concentrations of Mercury Than Those Taken at Other Locations in Putah Creek

1997 Was a Wet Year Where There Was No Barrier to Fish Migration Due to Low Flow. Further, the Increased Flows Would Likely Reduce the Potential For the Sludge Deposits to Remain in the Vicinity of the Wastewater Treatment Plant Discharge and Thereby Contribute to Methylmercury Formation and Excessive Bioaccumulation That Was Found During the 1996 Low Flow Year

Higher Flows May Be Causing Sludge Deposits at Other Locations Downstream That Enhance Methylmercury Formation at Other Locations

LEHR Site Soils Have Recently Been Found to Contain Elevated Mercury Compared to Surrounding Areas

UCD Administration Claims that LEHR is Not Contributing Any Substance in Stormwater Runoff to Putah Creek That is Harmful to the Creek Beneficial Uses

The Facts Are That This Claim is Based on UCD and DOE Using Analytical Methods That Cannot Measure Mercury and Chlordane in Stormwater Runoff at Levels (US EPA Water Quality Criteria) That the US EPA Has Found Can, Under Worst-Case Conditions, Bioaccumulate in Fish to Hazardous Levels for the Use of Fish as Food

LEHR Stormwater Runoff and Campus Wastewaters Could Be

Contributing Mercury to Putah Creek That is Increasing the Level of Mercury Within Fish

Chlordane Was Extensively Used at the LEHR Site by UCD to Control Dog Fleas

Some Soils at LEHR are Highly Contaminated by Chlordane

LEHR Stormwater Runoff Could be Contributing Chlordane, and Possibly Other Pesticides, to Putah Creek That Cause or Contribute to Excessive Bioaccumulation of Chlorinated Hydrocarbon Pesticides in Putah Creek Fish

SFEI Studies Have Shown That Clams Taken From Putah Creek Contain a Variety of Chlorinated Hydrocarbon Pesticides at Elevated Concentrations

Need to Conduct Reliable Studies on Excessive Bioaccumulation of Chlorinated Hydrocarbon Pesticides and PCBs in Putah Creek Fish Using Detection Limits Less Than the US EPA Guideline Values for Consumption of One Meal of Fish Taken From Putah Creek Per Week

For Further Information on These Issues, Consult the Comments by Dr. G. Fred Lee on the ATSDR Studies That are Presented on the DSCSOC Web Site, http://members.aol.com/dscsoc/dscsoc.htm, As Well As G. Fred Lee's Web Site, www.gfredlee.com. Questions on These Issues Should Be Directed to Dr. G. Fred Lee.

Additional information Presented at the May25, 1999 meeting.

Dr. D. Slotton Presented a Summary of his Studies on the Mercury Concentrations Found in Fish and Shellfish from Putah Creek and Other Areas of the Central Valley, Coast Range, and Sierras. These Studies Show That Fish and Crayfish Taken from Essentially All Areas of This Region Contain Excessive Mercury. His Studies do Not Address Whether UCD's Wastewater Discharges or Stormwater Runoff Are Contributing to This Excessive Mercury.

Those Present at the May 25 Cache Creek Mercury Meeting Expressed Concern that the Regulatory Agencies Responsible for Protection of Public Health and the Environment are Not Taking Action to Inform the Public About the Potential Public Health Hazards of Eating Fish Taken from Many of the Streams and Rivers in the Central Valley.