Connecting Mercury Remediation Policy to Tribe and Community Benefits

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Acknowledgements

• Tribes: Paula Britton, Sarah Ryan, Irenia Quitiquit, Kathleen Sloan, Tom Keegan, Roselynn Swenya, Justin Nalder, Michael DeSpain, Alan Bacock, Loyette Meza, Fred Burrows, Julie Randal, Christine Medley, Steven Escobar, Bryanna Vaughn, Mikaela Griffiths, Kelly Swearingear, Christina McDonald

• Community: Southeast Asian Assistance Center

• April Negrette, Aubrey White, Luke Lippert, Mark Lubell (UCD)

• Alyce Ujihara (CDPH), Janis Cooke and Michelle Wood (Regional Board 5), Amanda Palumbo and Rik Rasmussen (SWRCB)

• Diane Fleck, Janet Hashimoto (USEPA)
Mercury Causes Predictable Health Impacts to Known Populations

- Delta region: tens of thousands of subsistence anglers and their family members at risk from mercury in fish (Shilling, 2009; Shilling et al., 2010)
- Subsistence anglers from two dozen ethnicities, including recent and 2\textsuperscript{nd} generation immigrants from Southeast Asia and Eastern Europe

<table>
<thead>
<tr>
<th>MEAN</th>
<th>Rates of local (total) fish consumption for Delta anglers (N = 513, field component)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Southeast Asian (N=286)</td>
<td>41 (50) g/day</td>
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<tr>
<td>Lao (N = 54)</td>
<td>47 (54) g/day</td>
</tr>
<tr>
<td>African-American (N = 32)</td>
<td>31 (48) g/day</td>
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<tr>
<td>Women child-bearing age (N = 217)</td>
<td>38 (54) g/day</td>
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<thead>
<tr>
<th>MOST-SENSITIVE</th>
<th>Rates of local (total) fish consumption for Delta anglers (95\textsuperscript{th}%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>African-American</td>
<td>242 (252) g/day</td>
</tr>
<tr>
<td>All Southeast Asian</td>
<td>129 (180) g/day</td>
</tr>
<tr>
<td>Lao</td>
<td>310 (318) g/day</td>
</tr>
<tr>
<td>Women child-bearing age</td>
<td>227 (263) g/day</td>
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</tbody>
</table>
How much mercury is consumed from Delta study, compared to EPA standard (7 micro-grams/day)?

<table>
<thead>
<tr>
<th></th>
<th>Mean Rates of local (total) mercury intake for Delta anglers (N = 513)</th>
<th>Most-Sensitive Rates of local (total) mercury intake for Delta anglers (95th%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Southeast Asian</td>
<td>(N=286) 14 (17) ug/day</td>
<td>African-American 128 (131) ug/day</td>
</tr>
<tr>
<td>Lao</td>
<td>(N = 54) 27 (29) ug/day</td>
<td>All Southeast Asian 63 (75) ug/day</td>
</tr>
<tr>
<td>African-American</td>
<td>(N = 32) 16 (21) ug/day</td>
<td>Lao 161 (164) ug/day</td>
</tr>
<tr>
<td>Women child-bearing age</td>
<td>(N = 217) 16 (21) ug/day</td>
<td>Women child-bearing age 95 (105) g/day</td>
</tr>
</tbody>
</table>

ds of Sierra Nevada
Mercury Causes Predictable Health Impacts to Known Populations

- Members of California Tribes in gold and mercury mining areas and in downstream areas continue traditional practices of eating fish almost every day, putting them at high risk of health impacts from mercury.
• Very important – this map represents the fished areas by interviewed tribes, as shown, and should not be used to delimit ALL tribe fish use.

• The areas shown represent use by 16 of the 146 tribes in CA. If all tribes were interviewed, it is likely that the vast majority of CA waterways would be considered traditionally and/or currently fished.
Mercury Causes Predictable Impacts to Wildlife

• Piscivorous birds and mammals that eat contaminated fish have higher concentrations of toxins, including mercury, which can affect their health and reproduction

• Some of these animals are legally-protected, requiring special consideration
More than 13 years of collaborative science and policy development
Policy Background (Delta TMDL 2010)

- There have been previous studies of fish consumption in the Bay Area (SFEI, 2001; 95th% = 32 g/day), Stockton (Silver et al., 2007, 95th% ~ 40-50 g/day), Delta region (Shilling et al., 2008, 95th% = 127 g/day)

Regional Board used the lowest value possible (32 g/day) for the TMDL
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• Consumption rates drive value of standard:

\[
\text{RATE} \quad \begin{array}{c} \uparrow \quad = \quad \downarrow \\ \text{[Pollutant]} \end{array}
\]
The state has tried to use median and mean fish consumption rates; USEPA recommends 95th, 99th%

The higher the rate, the more stringent the water quality standard and clean-up requirement and the more people protected.
SWRCB Beneficial Uses Action

• May, 2017, three new Beneficial Uses: CUL – cultural uses of waters by tribes (e.g., collection of materials, immersion/contact ceremonies); T-SUB – subsistence fish use by tribes; SUB – subsistence fish use by anyone (i.e., immigrants, non-immigrants)
T-SUB vs. SUB

• T-SUB – recognizes 95\textsuperscript{th} % consumption rate across all tribes of 142 g/day, results in fish tissue standard of 0.04 ppm Hg

• SUB – despite at least as much knowledge of subsistence fishing among non-tribal people as for tribes, no quantitative standard set
T-SUB vs. SUB

• T-SUB – waterway designation process required, no guidance for how this should be done and what constitutes sufficient info, tributary rule will not apply

• SUB – no obvious path for communities/groups to get designation of waterbodies; no obvious path for proving use, quantity of use, besides existing studies

• Significant obstacles – unknown designation process; municipalities, industry, ag
Mercury problems come from abandoned mines, sediment accumulation and poor water quality

- Abandoned mines have been identified, downstream mercury measured and downstream impacts identified
- Reservoirs etc. trap mercury-containing material and often act like incubators to produce methyl-mercury, the very toxic form that gets into fish.
- Agricultural and municipal wastewater discharge can create conditions ripe for methyl mercury formation
Mercury problems come from abandoned mines, sediment accumulation and poor water quality

- In a hearing in February on the 3 beneficial uses, senior SWRCB staff described DOC’s California Abandoned Mines Prioritization Tool as a step toward abandoned mine cleanup.

- Ironically, DOC leadership had just sidelined that project, surprising UCD and Sierra Nevada Conservancy partners.

- It's not obvious what leadership the state will provide on Hg cleanup if the DOC does not want to help prioritize, the SWRCB/Regional Boards make it hard to designate uses, and no one will want to pay
Beneficiaries of BUs

- Use of any or all 3 beneficial uses would protect tribes and disadvantaged and some well-off communities
- Ancillary benefits would accrue to general public and wildlife
- Fish populations are not covered by BUs so may not benefit
Non-beneficiaries of BUs

• Implementation of policies to fullest applicable extent would cost permitted municipal, industrial, and agricultural dischargers because they would have to clean up discharge (dozens of suited consultants at SWRCB hearings this year)

• State might have to find the money to carry out clean-up of legacy pollutants in the absence of permittee actions
Sets up Conflict

• Disadvantaged communities and tribes are placed into conflict with very rich and influential opponents (who don’t want to spend money), including the state itself
Impact on Sierra Nevada Watersheds

• Meeting the needs of downstream human and wildlife beneficiaries means reducing inputs in the watersheds above

• This could be accomplished by abandoned mine cleanup, reservoir re-operation/clean-up, reducing nutrient inputs from waste/ag

• But how to get around the interests who are/should be responsible, but don’t want to hold the bag?
Methylation Conditions

* Points of action
Potential Resolution

• Designate waterbodies using Precautionary Principle
• Dischargers want to limit liability, offset program (funded by dischargers) in combination with state funding (maybe through bond) to spread the load
• Designate a lead state agency to be responsible for abandoned mine lands. They were abandoned once, lets not do it again!
Contact

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