

## ***Indirect effects subcommittee call, 01/12/06***

BB – Brock Bernstein  
BD – Bridgette Deshields  
DM – Dave Montagne  
DMo – Dave Moore  
EK – Ed Kimura  
SP – Susan Paulsen

The following are pretty much stream of discussion notes from the conference call.

Human health.

EK – always a concern because of fish consumption and does have the identification of sensitive population. Whole question of risk level comes up and EPA guidelines are listed in IRIS guidelines. Will this come under jurisdiction of OEHHA, re defining acceptable risk levels?

DMo – risk level re consumption defined elsewhere and then have to link back to meaningful level in sediments.

DM – Board does have to define in the objective because is a factor that affects the calculation. Does not bind OEHHA.

EK – was a fish contamination conference and whole issue centered on mercury as well as arsenic and others. Cancer risk came up balanced re benefits of eating fish and that whole issue still around. And have to defer to those EPA guidelines.

BB – any suggestions re the guidance for site-specific risk factors?

EK – can't make any comments yet.

DM – question and that is who has jurisdiction over listing for fish? Is it Water Board or EPA?

SP – State Board and EPA

DM – talking about listing white croaker for human consumption

EK – EPA has fish advisories and OEHHA does that for California and they generally concur.

DM – what is the potential for conflict or contradictory outcomes if Board and OEHHA working in parallel.

EK – and FDA and WHO also

BB – sounds like possible overlap with OEHHA and EPA is a policy issue

BD – when get down lower re process for evaluating for indirect effects will get more into details

BB – what about consumption rates?

EK – method of preparation just as important as method of preparation, liver and lipid organs.

Under B.Alternative 4, should be subsistence fishers or sensitive fishers and not just sport fishers. Need to identify subsistence and ethnic. Would need to do risk assessments for all consumers and should apply to all populations not just the sensitive populations.

BB – any other comments?

EK – not just talking about fishes but also about shellfishes and crustaceans as well. Depends on what species are talking about because species behave differently. Don't know how include that but want to ensure that consumption model for human health includes shellfish as well as fin fishes.

DMo – will be important for development of models. Easier to make linkage back to sediment with shellfish than with fin fish.

SP – want to ensure that a way to groundtruth the data.

EK – I agree and this whole area of BSAF etc. depends on how do the calculations. Presentation was all abstract and question whether have any real data.

SP – remember discussion at last SSC meeting and the shellfish not in the plan in any way. Not sure whether shellfish will be in there at all.

EK – have some data from SD Bay

SP – but know that we don't have similar info from other places in the state.

EK – are other things in terms of the whole process here. Not mentioning something may mean not doing anything. Need to at least put a flag here as a data gap. That's come up any number of times.

DMo – do shellfish because is a potential consumptive item but re site specificity have a hard time applying a generic process that looks like they are developing at all these different places with foodwebs different, and also consuming populations, etc. Not sure that a generic model will get us where we want. Concern about Macoma.

DM – Macoma used as a surrogate and an example.

EK – Macoma doesn't always reflect a broad spectrum of bioaccumulation.

DM – in outline, does propose narrative objectives and does mention shellfish.

BB – concern is that not seeing a lot of shellfish focus from SFEI.

## Wildlife

EK – objected to conceptual site model. Only talked about certain pathways that don't include all ones that might encounter. Don't show any for direct ingestion of benthos or sediments themselves. Risk assessments for mammals, birds, fishes all have certain percentage of direct ingestion of sediment, as high as 60% (BD) depending on dietary habits.

BD – not sure what pathways are actually being included, based on presentations.

EK – I raised issue of water pathway and is important for copper. But they said that's a water quality issue.

SP – if most of the copper in the water column comes from the sediments would want to include that. Think we have a mechanism in place for dealing with that through TMDLs which have to combine all of that. Not sure we would want to include the water pathway because there's a mechanism for that that is well ahead of the SQO process. If get a listing for copper based on water concentrations, then TMDL is going to have to look at all sources including sediments and atmosphere. Don't know if should bring that into this framework because the TMDL process is ahead of this one.

EK – we're in the midst of that right now.

SP – where this is going to be important is deciding what acceptable levels are and may come up with different level if only take a narrow focus on sediments. Am arguing to keep this as simple and related to sediments as can especially where already have a program in place.

DM – agree, TMDL is going to be where all these issues get sorted out.

EK – would feel better if at least noted that there is this other pathway through the water column, so that someone else doesn't bring it up.

DMo – re sediment ingestion, have to account for assimilative efficiency, site specific and organism specific, for processing the sediment. Not necessarily straightforward re translating sediment concentrations into indirect effects and higher trophic levels.

EK – gets back to whole conceptual model which only has fishes.

DMo – sort of agreeing with Ed on, re understanding contribution to body burden would be helpful to understand the different pathways.

EK – whole question of triad and risk assessment, found that to be kind of flaky for the indirect effects. Risk assessment chart, one case showed that had bioaccumulation but sediment quality was OK and concluded that was no risk. Ignores that can have low levels of sediment chemistry and lots of bioaccumulation.

SP – and was proposing sort of staged implementation rather than the full triad, only have lab bioaccumulation for example if see some other impact. That's going to be very critical, how that would work.

EK – doesn't make sense to me. How put all the pieces together re integrating the sequential application and then integrating the direct and the indirect effects.

DM – think they're completely independent, can fail on each independently.

EK – yes, but generally do the direct effect first, right?

Others – start simultaneously but the indirect steps would be staged.

EK – already have sediment chemistry data.

DM – yes, to indicate whether is chemical pollution. And will have metrics for a handful of chemicals. That line of evidence just to say that there is chemistry present in the system.

EK – other approach is one done by Peter Chapman and he used the tetrad method and look at chemistry to assess potential for bioaccumulation and then look for indirect effects.

DM – looking differently here, see if there are fish that pose a risk and then see if can tie to sediments.

DMo – like Ed's approach, look at the chemistry and see if there are bioaccumulatives

SP – but fish data are the data likely to have now.

EK – can give you some misleading information.

[confusion about whether the direct will affect the indirect effects assessment]

BB – some concerns about the sequential approach.

SP and DM – comfortable with that

EK – Ben did lot of work with fish mobility. May have high contamination of fish but benthic chemistry could be low and vice versa, question comes into play re how to assess area of concern re fish contamination. Some merit to sequential application but key question is how to tie the fish to the sediments.

SP – if have hot fish in your waterbody, will get a listing and then up to the TMDL to determine where they fit. More I think about it, the more I think that the SQO fits within the TMDL process. Some offramps such as sole source or have very clearly identified local hotspot, but otherwise I think you do kick into TMDL land.

DM – that's the nature of sediment contamination.

Ekk – trying to relate that now with runoff from creek that's causing contamination.

DM – difference between direct effects, no search for causation, and indirect effects, which includes an attempt to identify causal linkage to sediment. And issue of whether is a chemical cause or not is in play in the direct effects, where could be other sources of toxicity and impact. Very different than fish, where focus is, for example, on mercury.

DMo – but that would be a jumping off point for TMDL where would have to establish causality.

DM – ???

SP – still don't understand how this is going to work, need a flowchart.

DMo – second that. One thing if have a population exceeding a threshold, but other issue is whether there are contaminants that represent a potential threat down the road. Need to have screening tools for that problem.

DM – concern that fish contaminated but sediments are not? Or vice versa?

DMo – saying the latter, where fish don't meet a threshold yet but could be an impending problem. Or have a shellfish population that nobody's looked at.

EK – not much here on how to address site-specific issues. Using model for case studies for two areas.

DM – saying will have two case studies and this is the type of thing you'd have to do in every setting. Is entirely site-specific.

EK – means have to have some knowledge of the system.

DMo – re benthic tissue (p. 8), absolutely have to have that as part of the work, because could have sediment chemistry that's not bioavailable and this would help to identify that. Best answer lies in resident organisms if can collect enough of them.

SP – is very difficult.

DM – heard in SSC re inclusion in direct effects and was passed over. Not discussed yet in indirect effects. Only one discussed so far is a lab assay.

Dmo – could be ancillary data. **Play a role in establishing causality for direct effects, but also from standpoint of better measurement of what's transferred out of sediments into organisms for possible transfer to higher trophic levels.**

EK and DMo – certain inverts can get rid of contaminants.

Discussion of assumptions and implications of lab uptake tests.

Dmo – this is how you build a risk assessment, take endpoint info and know what percent of diet it represents and assimilative efficiencies and can then estimate transfer through that pathway.

SP – can regional boards do that?

DMo – this a very complicated issue. Largest datasets for Nereis and Macoma and largest amount of data for.

EK – but addition of more worm species?

DM – that was for toxicity, but have settled on Macoma as indicator of availability for indirect effects. May be because ...

SP – what if there's not an indirect framework that makes sense by time get to end of that?

BD – that's right.

DM – have same concern

## **Second call, 01/18/06**

EK – lot we don't know about indirect effects and so have to approach with caution. National Academy Press book, 2003, covers a lot of the issues we've been talking about. Bioavailability of Contaminants ..... Learned a heck of a lot more from this book than from the SFEI presentations. Integrates this in a way that lays out the issues. Written by a toxicologist and so a different view. Would expect that people involved in this would be a lot more detailed and so far is superficial. And what's missing is the Gobas work.

BB and BD – early on said that would be using that work but haven't heard much reference to that.

EK – re the sections we didn't get to last time, one thing we've talked about, what do you do with chemical mixtures that bioaccumulate? Would the risk assessment change?

EK and BD – haven't seen the complete list of chemicals.

EK – UC Davis have data on shellfish availability mechanisms and have a whole list of potential food safety hazards. Don't know how much bioconcentration takes place and some chemicals will magnify 1000 fold and if work backward into the sediments then get very low levels.

BB – site-specific approach and would depend on the foodweb.

EK – look at issues under sediment chemistry, Calculation of bioaccumulation factor... on p. 8, want to make sure if is going to require using BAF or BSAF. Question whether is a generic or specific term at this point.

BB – what think about phased approach under XIX.

BD – think punting to the TMDL process an overly narrow point of view. Not always going to be the logical outcome. Could be part of a waterbody that has a TMDL but still being investigated as a site within the waterbody. Would not establish a TMDL for a more localized site. May need to be thinking of other contexts than the TMDL.

BB – so there is a scale that falls between a very small sampling site and the waterbody scale.

EK – earlier discussion re a threshold if 10% of the sites in a waterbody were impaired.

BB – some further definition needed re spatial scales and that different policy contexts applicable to different scales.

EK – shipyards using spatial scale to wiggle out of their responsibilities. But they are the only contaminated source in the area.

DM – and the NPDES avenue we talked about earlier. Still need to go through the process of establishing whether a chemical cause is involved. Need to do an assessment process to identify one or more chemicals, and then determine the likely sources, and at that point it would merge into a TMDL or TMDL-like process.

EK – similar to the Chollas Creek process, impact, initial screening, TIE and then look for sources of chlordane.

DM – question re whether include that sort of process guidance or leave it up to the Boards. Feel that need guidance to ensure is implemented in a uniform way statewide.

EK – mundane things like definitions. Another thing that came up is the issue of histopathology studies in indirect effects. Would recommend doing histopathology.

BD – usually further down the line in the scheme of things. Not a simple thing to do. Maybe say provide the option to do rather than require a particular technique.

EK – concern that can get so hung up on indirect effects that can ignore fact that fish are dying off.

DM – Chris is concerned that this could get very complicated and wants to narrow in on a couple of likely indicators or receptors as a simplifying step rather than considering all possible effects.

EK – still have to address the whole issue .. concern that basin plan includes requirement to protect beneficial uses re rare and endangered species. If basin plan includes something then you have to address it.

BB – maybe that should be a generic piece of guidance.

DM – also not intended to address all issues within the basin plan. Using the sediments as a surrogate. If tried to address every basin plan objective through this SQO then will go crazy.

EK – if impairment, then back to trying to find the source.

DM – but can't address all threats.

EK – but don't want to have the SQO be a way to escape dealing with issues.

BB – the SQO not to replace other tools and approaches but to add to them.

EK – as long as that is clear, then is ok.

Agree that want the details at this point. And failing at the high-level overview also, especially re how this approach works in a policy setting.

EK – re the TMDL process, the CA water quality control policy talks about bioaccumulation. So TMDL can include this. Re the question of who is responsible for setting standards for human and fish health.

BD – Kevin wanted to mention re next week's meeting, don't want to rehash where we are. Spend more time diving into materials. Also wants materials available ahead of time.