

Location

Tacoma Wastewater Treatment Plant, Tacoma, WA

Sediment Workgroup Members Present

Joanne Snarski, Paul Fuglevand, Lon Kissinger, Glen St. Amant, Teresa Michelsen, Pete Rude, Clay Patmont, Jack Word

Ecology Participants

Chance Asher, Laura Inouye, Brad Helland, Fu-Shin Lee, Russ McMillan, Donna Podger, Pete Kmet, Stacie Singleton.

Audience

Lawrence McCrone, Rob Pastorok, Marian Wineman, Roger McGinnis, Jessi Belston, Nancy Winters, Merv Gosver, Tad Deshler.

Agenda

1. Review of SMS/MTCA Advisory Group Dec 18 meeting – Chance Asher
2. Human health and background considerations for SMS revisions – Donna Podger
3. Elliott Bay background example – Laura Inouye
4. Lower Duwamish background example – Brad Helland
5. Background-based sediment cleanup considerations – Clay Patmont (Anchor Environmental)
6. Discussion of options - Workgroup

Meeting notes are organized by the agenda number and include a short summary of material presented with a brief summary of the main discussion points. Detailed notes on the discussion are included in an appendix.

Acronyms

AKART – All Known Available and Reasonable Technology

ASTM – American Society for Testing and Materials

BPJ – Best Professional Judgment

CERCLA – Comprehensive Environmental Recovery, Compensation and Liability Act

CSL – Cleanup Screening Level

COC – Chemical of Concern

ESA – Endangered Species Act

FW – Freshwater

LDW – Lower Duwamish Waterway

MCL – Minimum Cleanup Level

MTCA – Model Toxics Control Act

PCB – Polychlorinated Biphenyls
PLP – Potentially Liable Party
QA – Quality Assurance
RSET – Regional Sediment Evaluation Team
SMS – Sediment Management Standards
SQS – Sediment Quality Standards
SQV – Sediment Quality Value
TMDL – Total Maximum Daily Load
TOC – Total Organic Carbon
USEPA – United States Environmental Protection Agency
WQ – Water Quality

Meeting Summary

1. Review of SMS/MTCA Advisory Group Dec 18 meeting & Next meeting dates– Chance Asher

a. Ecology Presentation

- At the December 18, 2009 External Advisory Group meeting, a shortened presentation similar to the December 2 Sediment Workgroup meeting was presented, followed by several hours of discussion.
- Many similar issues were brought up by that group. SMS/MTCA Advisory Group looks at the issue from a larger perspective; Sediment Workgroup works through more of the technical details.
- Source control is a key part of achieving and maintaining realistic cleanup levels. Recontamination can be a serious problem. Don't want to hold PLP responsible for contamination that isn't theirs.
- Several issues were identified regarding background: importance of clear definitions; statistical methods; and identifying how samples will be collected and analyzed.
- Several issues were identified as critical for implementation of rule changes: predictability; feasibility in achieving and maintaining cleanup standards; and ability to resolve liability for cleanup sites.
- Meeting dates for Sediment Workgroup were discussed. The January 28, 2010 meeting still planned at this time. April meeting will be on the 20th at Fabulich Center in Tacoma.

2. Human health and background considerations for SMS revisions – Donna Podger

a. Ecology Presentation

- Discuss areas of adjustment that can be used in determining cleanup actions and implementation: setting cleanup standards; remedy selection and implementation; and resolving liability. We've focused on setting cleanup standards, but discuss whether other areas need potential rule revision.

- Reviewed internal process and rationale for selecting MTCA risk levels and background definitions. Reviewed five options and rationale for narrowing to the two options previously presented.
- Reviewed current structure of the Sediment Management Standards and discussed scope of rule revisions to cleanup standards section. Provided diagrams that explain how rule might be revised for options 1 and 2.
- Discussed some considerations that go into setting the risk-based cleanup standard for seafood ingestion pathway, and variability and uncertainty in the variables. These details will not go into rule revision, but we are starting to work on guidance.
- Provided example risk calculations for dioxins and PCB as compared to quantitation limits and example background estimates for Puget Sound.

b. Workgroup Discussion

- Some workgroup members would still like to consider other options that were ruled out: habitat-stratified background; concepts of AKART source control as it applies to regional background; and area background.
- Several workgroup members expressed concern about only revising the cleanup section of the rule and thought that the same numbers should apply to site listing as to cleanup. Also they had concern about not addressing source control in the rule revision. Cannot achieve low cleanup levels without doing source control.
- Workgroup members had concern that Option 1 isn't really meaningful since dioxin and some other chemicals have 10^{-5} risk-based cleanup levels that are below natural background. They want a structure that reflects reality of common contaminants.

3. Elliott Bay background example – Laura Inouye

a. Ecology presentation

- The purpose is to provide an illustration of what regional background values might look like in Elliott Bay. Exercise was done on existing data that was collected for other purposes – not an ideal study design.
- Values are for illustration purpose only; doesn't indicate any decision made by Ecology regarding definitions of background (natural or regional) or established concentrations for Elliott Bay.
- Looked at arsenic, mercury, and PCB data for certain distances from point sources in Elliott Bay. Used data that was more than 400 meters from point sources. For mercury (and arsenic), no difference in data distribution at 400, 800, 1200 meters away. For PCB, limited data at 400 meters; no data beyond that.
- Median and 90th percentiles of natural background used for demonstration. No decisions made on statistical metric – will be discussed at later meeting.
- Looked at Harbor Island data set to see how different regional and natural background cleanup levels might affect ability to determine site boundaries, as an example.

- When comparing median regional background to natural background, made a difference for some chemicals, but not for others.

b. Workgroup discussion

- Conclusions would be different if comparing 90th percentile regional background to 90th percentile natural background.
- Harbor Island example is a unique site – two superfund sites abut one another, not a single area of contamination. Might be useful to find a site that is more contained as an example.

4. Lower Duwamish background example – Brad Helland

a. Ecology presentation

- Another example – study to determine if upstream Lower Duwamish is significantly different than natural background. Also under review by LDW parties.
- Natural background based on BOLD survey data, other data could be used. Deep core data for arsenic also presented.
- Natural background data for dioxin, PCBs, arsenic are not significantly different from upstream Lower Duwamish and BOLD data for natural background. For PAH, 90th percentile is higher in upstream Lower Duwamish.
- Choice of metrics matters, very sensitive to that. How non-detects are treated important for PCB data.

5. Background-based sediment cleanup considerations – Clay Patmont

a. Presentation

- Looked at how other states deal with background – common problem, but most have nothing written. Massachusetts has background definition similar to MTCA natural background, but also has concept of local conditions – similar to area or regional background. What site would look like if add in sources from permitted discharges.
- Port Angeles example – looked at sources, sediment transport patterns, and patterns of contamination relative to natural background. Used OC normalization for values. Dioxin concentrations might represent sources, or may be from ubiquitous urban soil concentrations distributed by stormwater. Different pattern for PCB, looks more like localized sources.
- San Francisco Bay has example of holistic approach to reducing contaminants – developed TMDL for PCB. Goal for 10-fold reduction in 30 years – main component is \$10 billion, four-phase program for source control, mainly stormwater. Cleanup sites will accelerate process to achieve goal – set a level that prioritized which sites will be cleaned up, but site-specific cleanup levels. Holistic approach to achieve long-term goal, cleanups only one part of that. Controversial, hasn't been approved by EPA yet, will have lawsuits.

- Need to use area background to facilitate cleanups. It's feasible and based on existing tools and policies. Two different goals – short term goal for cleanup to area background, more holistic approach to get it down to natural background. Keep the two separate.

b. Workgroup Discussion

- Questions about analysis and how risk level goal was established.
- Questions about the source control program – focus mainly on stormwater, funded by whoever owns the pipe (cities and counties mainly).

6. Workgroup Discussion

- Several members like regional background concept, but details need to be worked out – definition, statistical methods, scale, data needs and sampling strategies. They would like to see how it plays out in more case studies, and if TOC normalized data is used. Concept may not work in eastern Washington type of environments.
- Several members liked area background as a realistic cleanup level that would promote more cleanups being done. Then use more integrated program, including source control efforts to reduce sediment concentrations to ultimate goal.
- It was suggested that implementation of a program, like Ecology's previous urban bay action teams, that takes a systematic and integrated approach to cleaning up the watershed including prioritization of source control and cleanup sites is critical. This is the only way to effectively implement bioaccumulation based standards and have an effective program.
- Some members did not like aspects of Option 1: the structure with 10^{-5} risk at the upper level wasn't realistic for common contaminants, didn't like the complexity of adding MTCA method C to sediments, wasn't worth the benefits of the approach, application was too limited.
- Workgroup members discussed topics that need further discussion and prioritization of these issues:
 - Continue to explore the Option 2 regional background approach.
 - Explore Option 1 (MTCA approach) in terms of setting a cleanup standard and the use of cost and feasibility during remedy selection.
 - How to set cleanup standards that are technically achievable but still make progress towards a long-term, more conservative cleanup goal.
 - How to resolve PLP liability.
 - What areas in the SMS have flexibility for making cleanups feasible and final.
 - Further exploration of partial settlements, institutional controls, remediation levels, San Francisco Bay area TMDL approach. Determining clear requirements for compliance and determining when you are done is a critical need.
 - Recontamination - PLP shouldn't be held responsible for recontamination that they didn't cause – how do we get to final clean up under these circumstances?

Audience comments

- Fatal flaw is lack of consideration of total risk. Even if you clean up all the PCBs to natural background, you still have 10^{-3} to 10^{-4} risk for dioxin from natural background.
- Failing in current perspective on how to do human health risk assessment. Need to get away from deterministic approach and compounding conservatism – do more probabilistic analysis. Like idea of habitat-stratified background.
- Problem with tendency to look at gradients from shorelines and use deep basins to define background. Even if you had no other sources, aerial deposition would result in higher concentrations in nearshore areas compared to deep basins.
- Just because MTCA allows 10^{-5} or 10^{-6} risk, doesn't mean it should apply to sediments. MTCA was designed with upland sites in mind, not bioaccumulation exposure. Impossible to meet 10^{-5} in sediment in the world that we live in.
- Area background more contentious and difficult to define than regional background.
- For comparison to urban bays, prefer using reference areas such as Carr Inlet.

Appendix: Detailed Notes of January 7 Sediment Workgroup Meeting

1. Review of SMS/MTCA Advisory Group Dec 18 meeting – Chance Asher

- External Advisory Group Look a at sediment issues from larger perspective. This group (Sediment Workgroup) gets more into the details and provides technical analysis.
- On Dec 18, gave MTCA/SMS External Advisory Group a pared down presentation of what was presented here the last time (Dec 2).
- 2 ½-hour animated discussion. Notes will be available soon.
- Comments were similar to issues brought up here. Comments included:
 - Feasibility for implementation if standards are set too low.
 - Issue of statistics important to work through. Will be working through with Greg Glass and discussing in more detail in a couple of meetings.
 - Predictability is important. Knowing what is needed to resolve liability.
 - Willingness to explore regional background idea.
 - Had comments after meeting about applicability of regional background for freshwater lakes and rivers. Easier to apply regional background concept to Puget Sound. This wasn't a discussion point, but was an email received afterwards.
 - Definition of background is a key issue.
 - Sampling – who will do sampling for regional or natural background. Could be expensive – prefer that Ecology do sampling.
 - Recontamination is a big issue. Source control, what is definition, what is approach.
- Meeting dates: Jan 28th added on for freshwater – still on but still waiting to get contract for Teresa to work on some freshwater aspects. Not changing that yet. April 20th data was changed from the 15th. Location issue on 20th, is 21st an option? Conflict – so will keep on 20th – will be at the Fabulich center.

2. Human health and background considerations for SMS rule revision – Donna Podger

Slide 1: Title

Slide 2: Ecology Subgroup Members

- Presenting on behalf of workgroup. Multidisciplinary team, across regions, across programs. Have been meeting 1-2 times per month to discuss issues in depth.

Slide 3: Outline

Slide 4: Areas of adjustment

- Not a clear straight line from determining protective level to getting it fully implemented. List of some areas in the process where adjustments can be made.
- Categorized in three areas – setting cleanup standards, remedy selection and implementation, and resolution of liability.
- We focused on setting cleanup standards part; want to see if other items warrant further discussion for rule revision. What might be missing? What warrants further discussion? Most of this presentation about first box (setting cleanup standards).

- Engineered controls = caps, wave dampening structures
- Institutional controls = deed restrictions, anchor or mooring restrictions, maintenance requirements for engineered controls.
- Remediation levels currently in MTCA -355. Above cleanup standards. Sometimes used to determine where a cleanup action will occur. Still have to achieve final cleanup standard at compliance point.
- Recovery time frame – want it as soon as possible, but up to 10 years to meet MCL, more to meet cleanup level set below MCL.
- Third box: Compliance in MTCA, has 3 parts location, concentration, time. Concentration also includes what statistical method you use for comparison.
- Interim actions – in MTCA – partial cleanup to reduce risk or gather additional information. Doesn't achieve final cleanup or release liability.
- Sediment Recovery Zone – in SMS – used whenever leave sediment behind that is above SQS level. Not required – “applicable”. Intent usually captured in MTCA documents.
- Partial settlements & mitigation – ideas that have been brought up, not well developed.

Slide 5: Internal Process & Participants

- Workgroup works through ideas in detail; brings to bigger internal group and managers for feedback.
- Started with defining scope and problem statements – wrote issue papers, which were reviewed internally, then had public comment.
- Considered many options, narrowed down to 5 to focus discussion when bringing it forward to other groups. Then narrowed it down to 2 to focus discussion. Other options still open for discussion.

Slide 6: Risk levels

- Different risk levels and different risk assumptions for other standards.
- MTCA Standards 10^{-6} for single chemical/pathway, 10^{-5} for multiple, and some other conditions.
- WA water quality standards – 1×10^{-6} but use ingestion rate of 6.5 grams/day and use bioconcentration factor (BCF), doesn't include contamination from fish's diet.
- CERCLA 10^{-4} to 10^{-6}
- Other states, upland 10^{-5} to 10^{-6} . Oregon uses 10^{-6} for sediment.
- Chose same levels as MTCA because SMS authorized under MTCA, most cleanups done under MTCA authority, MTCA regulations used for other media at site. Also authorized under WQ statutes, which use 10^{-6} .
- Chose to use “reasonable maximum exposure” scenarios as basis for cleanup levels – same as MTCA.

Teresa: Water Quality fish consumption rate, isn't that being revised?

Lon: Yes, 6.5 g is correct for WA

Donna: Acknowledged that there has been talk to change WA water quality standards fish consumption rate, but there is no schedule to do so.

Slide 7: Background Definitions

- MTCA and CERCLA both use “natural background” but have different meanings. MTCA “natural” background includes some anthropogenic sources, such as aerial deposition.
- CERCLA “natural background” definition similar to SMS non-anthropogenic.
- CERCLA anthropogenic and MTCA area background have similar definitions – but CERCLA allows final cleanup at that level, MTCA does not.
- Considered new definitions of background. Regional background at intermediate scale between natural and area. Will talk more about that.
- Habitat stratified background considered, but concerned that site may encompass several habitat types, and intertidal areas have higher concentrations because of outfalls, but also more human exposure and important habitat value.
- AKART background – what you have left after applying AKART to sources. Thought this would be difficult to determine.

Jack-For habitat stratified background, deeper water has fine grained sediments, changes contaminant distribution, etc. Would not necessarily reject this idea based on comments put forth in talk.

Perfectly good reason to consider deep water habitat different than shallow water habitat. Referring to study (Seahurst) on baseline, 120 stations over several years; concentrations increase with water depth. Looked at 140 organics, metals at 120 stations. *Can we get the study?* Hard copy to be provided. This data as close to non-anthropogenic background as you can get.

Donna - Elliott bay more contaminated at shoreline than at depth.

Teresa - That’s because you talking about contaminated sediments, not natural background.

Teresa- Elliott Bay, sediment transport patterns, sandy inshore and contaminants swirl around at mid-depths. Without sources, just “natural” material, then higher concentrations would be associated with finer higher TOC sediments.

Conclusion: Want to have more discussion on habitat-stratified background.

Brad –What is difference between Regional vs. AKART background?

Teresa – think that regional background once you have eliminated all the sites, is what’s left from the sources that are not fully controlled, for example Elliott Bay CSOs and stormwater outfalls. Those are probably your AKART background. AKART background and regional background are similar – don’t think we need a separate term called AKART background, but need to consider the relationship of source control to the definition of regional background.

Jack- In source control – two things to think about source of sediments, vs. source of contaminants.

Source of sediment carries naturally occurring metals into the system, not much you can do about that. If you have a source of contaminants that is still occurring, will cause recontamination of cleanup sites. These are two different source control issues.

Clay – Area background, why was that not pursued?

Donna– will cover in a later slide. Could still put that option on the table for discussion.

Slide 8 – Background conceptual model.

- Simplified version of a site in an industrial setting. Shows different scales for background, and concept of regional background.

Teresa - For freshwater, if you can identify the PLP – then that’s not regional background by this definition.

Chance - Also an issue of how to you determine background in river environments?

Teresa - "Away from sources" may not work in some areas

Jack, - May have other ways to get at natural background- glacial clays. May be able to find areas with organic residues, can get to natural levels.

Slide 9- Discussion of options

- Combined different risk levels, decision frameworks and background definitions into 15 different options and debated pros and cons. Had sticker dot vote in our group to determine top 5 for further discussion.
- Took top 5 out for discussion in number of different internal venues and got feedback. Described top 5 options.
- Options 3 and 4 were excluded because in application they don't look much different from options 1 and 2.
- Option 5, majority of staff did not support it. Definition of area background allows values "not from your site", so could potentially include very high numbers. Thought this was not protective enough for a final cleanup value.

Jack- How to get to 10^{-6} on exposures?

Donna - Will get to that in later slide.

Teresa- worried about risk and remedy selection- when technical feasibility comes into play is important. Would like to see the standard discussed separately rather than the considerations that go into remedy selection – like the MTCA approach. Standards set on bioaccumulation will be low, but let that be the standard. Then can use cost and feasibility to select a remedy and give flexibility in the part of the process where we have control over what we do.

Brad - would need clarification – what do you do if you set a low standard and then the remedy doesn't get you there. Or what do you do if you set a high standard you can achieve but it's not protective. Regulatory framework needs to address what does the standard really mean, what do you do in addition to the remedy to meet the standard.

Slide 10 – Sediment Management Standards Structure

- SMS has three purposes: source control, listing cleanup sites, setting sediment cleanup standards.
- Each purpose calls on 2 levels of criteria – SQS is lower level – correlates to no effects.
- Higher level has 3 different names, depending on which purpose – SIZmax, CSL, MCL. Benthic at upper limit of minor effects. Narrative for human health the same in both – no significant effects to human health.
- We are only revising section on setting sediment cleanup standard – section -570. We are not planning to revise SQS or CSL criteria.

Lon – So you are not proposing adding human health risk numbers?

Donna - not to the SQS and CSL criteria – only in the section -570 cleanup levels.

Glen - So there will be no provision for listing a site based on human health?

Chance - Not directly.

Teresa - Before you told us it wasn't being applied to source control, which we have some concerns about. Now you are also saying that you aren't applying the human health narrative to the section that lists sites?

Chance - We'll still have the narrative standard, but what we are focusing on in terms of details is how you actually get to setting cleanup standards. That's what we are focusing on for human health. That doesn't mean that for source control the human health criteria do not apply. We're just looking at the specifics on how we set a cleanup standard for human health at this point. We're really trying to focus the rule revision. The rule itself is still protective of human health. Whether it's source control, listing a site, or setting a cleanup standard, we are still looking to define a process that is more clear for setting a cleanup standard at this point, and later having a process for the others.

Glen – The reasons for coming up with a better human health standard – consistency, etc – the same reasons exist for listing a cleanup site. You face the same challenges you are trying to rectify for setting cleanup standards are important for those other purposes.

Teresa - The sections are identically worded now and should be identically worded in the revised rule. Lon, want to revisit Teresa's discussion from last time that most cancer risk-based standards are below background.

Donna: Have a slide on that later.

Slide 11 – Current structure of the rule for setting sediment cleanup standards.

- Sediment cleanup standard set in a range as close as possible to the objective, based on cost, feasibility and net environmental effects.
- In this case, objective equal sediment quality standards. No effects level for benthic. Numeric and biological criteria for Puget Sound, all other water bodies, human health are a narrative.
- Upper level is upper threshold of minor effects for benthic organisms, and but narrative for human health is the same as SQS – no significant threat to human health.

Jack – non-polar organics should be TOC normalized – not TOC normalized to a single value. TOC normalization really gets at bioavailability. Original SMS chemicals not based on TOC normalization, nor are they based on extraction efficiency of the metals.

Chance - yes, we recognize that we have some updating to do on the numeric criteria, but not updating numeric standards in this rule revision.

Slide 12 – Potential SMS Revisions:

- Proposed structure for how the rule revision might work.
- Still have sediment cleanup standard set in a range for benthic.
- Basic one-tier structure for human health – same criteria at both the upper and lower level.
- Ecological narrative would probably be the same at both upper and lower tier.
- Would have an alternative method also – as proposed for options 1 and 2 – could have different conditions for when higher cleanup standards are allowed.

Glen - clarification, box that says ecological bioaccumulation- does that mean non-benthic organisms, not just strictly bioaccumulation? Yes.

Teresa - where will direct effects to fish fit in? Need to have a term that isn't just bioaccumulation or fish and ESA-protected species get left out.

Donna - Ecological narrative is a topic for a future meeting, maybe can discuss that more then.

Pete - human health included in both brackets- range can collapse?

Donna – yes – for this part of the rule revision the human health criteria is the same at both ends – there is no range. The alternate methods allow for a higher cleanup level at the higher range.

Slide 13: Option 1 Alternative method

- Option 1 alternative method allows higher cleanup standards in some conditions – Option 1 based on MTCA Method C. Conditions don't need to be the same as we use for benthic.
- Lower level is still the same.
- Max allowable level now lowest of MCL for benthic, area background or 10^{-5} for a single carcinogen, total site risk still 10^{-5} .

Glen -regulatory question, if allow 10^{-5} risk, are you in compliance with WQ standards?

Teresa -Like regional background concept, but concerned about regulatory compliance with other laws.

Joanne - 10^{-5} risk level, how does it play out?

Donna – if it is a human health carcinogen, often there is no range because 10^{-5} is usually below natural background. If driven by benthic criteria, still have a range. Also, really only makes a difference if you have a single carcinogen – still 10^{-5} for multiple carcinogens.

Pete- Most sites have a human health piece.

Teresa- We need to look at a structure that works for what is actually out there.

Donna- This option has a lot of limitations for applicability. And this only makes a difference if you have a single carcinogen, for multiple carcinogens doesn't make any difference, still a total site risk of 10^{-5} .

Q. This is essentially method C? This is status quo.

Teresa - Method C is not typically used in sediments.

Donna - What we are saying is we would put this method into the SMS.

Clay - For sites with PCB and dioxin – it all just goes to background, this alternate method isn't useful.

Slide 14 Option 2 Alternative method

- This is similar to option 1 alternative method in structure, now have regional background at the upper level.

Slide 15 Considerations in setting cleanup standard

- Seafood ingestion pathway example, risk level is not the only thing that goes into determining cleanup level. Show relationships from risk level to sediment concentration.
- Numbers across top are things to measure; circles in bottom are sources of variability. We choose a number, but actually all of these are a range of numbers.
- Use reasonable maximum exposure concept - 95th percentile– for example, in fish consumption of Suquamish tribe 767 grams/day.
- Variability in what fish people eat, variability in how different kinds of fish, bivalves, crabs accumulate chemicals.
- Lot of complexity in determining the tissue-sediment relationship.
- Sediment variability comes into play with compliance, but also in determining tissue-sediment relationship. Hard to know what a fish was exposed to when it was swimming around acquiring body burden, easier for bivalves.

- Will not be putting the details of this into the rule, but are starting on guidance so can be done more consistently. We welcome assistance with developing this guidance in the future.
- In some cases, what numbers go into the exposure assumptions make a difference in the cleanup level, in some cases it doesn't because so far below background levels.

Slide 16 – Comparison of risk levels, background, quantitation limits for dioxin.

- Quantitation limits on right, what is actually reported in EIM database.
- Risk based levels are examples based on some assumptions – Suquamish 95th percentile of fish consumption 767 gr/day and USEPA national recreational fishing consumption rate of 17.5 grams per day, assumes all the fish eaten came from site, used BSAF of 1 from literature values, which is kind of conservative.
- Natural background number comes from DMMP analysis – about 4 pptr. This is just example, not saying natural background is 4 pptr.
- Risk-based level for seafood ingestion way below background and below quantitation limits. Risk-based level for dermal/incidental ingestion only is above background.

Clay - why are you not using OC normalized?

Donna - this is an example, this is the data I had available.

Other comments: Relationships would probably not change with OC normalization. BOLD study had no TOC relationship, but also very low concentrations, and samples taken from different areas. Some places have shown TOC correlation with dioxin.

Lon - what statistic was used for natural background?

Laura: BOLD data plus several other main basin data sets, Kaplan Meier for non-detect, upper tolerance level of 90th percentile.

Lon: Might be good to look at other statistics.

Jack - detection limit ranges are worrisome.

Slide 17- Comparison of risk, quantitation limits, background for Total PCB

- Similar to other slide in risk assumptions. BSAF of 10 based on literature values – kind of conservative.
- Suquamish seafood ingestion scenario still way below background, but recreation fishing ingestion scenario and natural background number both around the quantitation limits. Actual natural background number depends on detection limits and how non-detects are treated in the calculation.
- SQS and CSL are currently in the rule for protection of benthic life.
- Background numbers here are based on some existing data and are just for illustration – don't take them too seriously. Laura will discuss more in her presentation. Showing 50th to 90th percentile range, regional is based on existing Elliott bay data removing all data within 400 m.

Teresa - detailed questions on how risk was calculated; Fu Shin used Aroclor risk factors. How should risk for PCBs be calculated? Should we be using dioxin slope factors for the co-planar PCB? May need to revisit this. Not sure the relationship presented here would be true.

Donna - This is an illustration – there are a lot of assumptions that went into the risk calculations, could spend a lot of time talking about those.

3. Elliott Bay background example – Laura Inouye

- Purpose is to use real data as an example. Does regional background have enough flexibility to meet cleanup standards? What are alternative methods?
- Not talking about statistical metrics today.
- For example purpose only. Limited existing data, other data could be used.
- Show some examples of different chemicals and how that might impact site boundaries in an example. Lot of information available in handout.
- Used 90th percentile of BOLD data as an example for natural background.
- Trying to define how you get away from point source – looked at different distances. Ended up using 400m from shoreline and dredge disposal site and Renton outfall. Don't see any change in data distribution for mercury after 400 m away.

Question: What depth were samples taken at? Answer: Maps available, but were away from shoreline, but not way out there.

- Showing values for both median and 90th in regional area, but used median of regional background for example.
- Used Harbor Island data set for example – how would it affect site boundaries. Used median of regional background for example. Arsenic example, can bound site upper and lower end. Mercury – insufficient data to establish site boundary to north. If using natural background, can't determine site boundary to south, but could if you used regional background median value. With PCBs, regional background higher, gives a lot more flexibility. Could establish site boundaries based on regional background for PCB, but not natural background. Statistical metric is important, but aren't talking about those in detail yet.

Comment – using regional median compared to natural 90th – would be different if compared 90th and 90th.

Comment -Two superfund sites abut each other. This is a unique site – not a single area of contamination – multiple sources and a big area of contamination. Might be useful to find a site that might be a little more contained. Puget Sound Naval Shipyard.

Clay has a site that can show you – Port Angeles.

Teresa - Mentioned that it would expand site boundaries – may expand it if you only looked at benthic, but the site really was that big. Regional background may give more predictability. Doesn't expand site boundaries from what it actually ended up being. We are clarifying – not expanding site boundary because of background. Concerned about the terminology used of “expanding the site” – you are not expanding the site.

Glen - What is 51 PCB regional background based on?

Laura: That is the median of the remaining 12 values after you take out all the data within 400 m of shoreline, dredge disposal area and Renton outfall.

Pete - Used “site” in several different ways. What is definition in this context? What is administrative definition of the site.

Teresa - Site boundaries don't get established until cleanup decisions.

Chance - Look at this in a more generic sense for this example.

<<Break>>

4. Lower Duwamish Example – Brad Helland

- Purpose – another example. Would upstream Lower Duwamish background be significantly different than natural background. Also under review discussion with LDW participants.
- Used USV BOLD for natural background. Used deep core data for arsenic from literature.
- Limitations in data – use of existing data.
- Upstream data n=71 being used for regional background example. Different methods for dealing with non-detects, in some cases doesn't make any difference.
- PAH a little higher in upstream Duwamish than BOLD.
- Upstream of Duwamish sandier, faster flowing, not all of the 71 have higher TOC and higher percent fines. In the future, will review upstream data for percent fines and TOC, and then compare similar types of particles to the Lower Duwamish. This data is just for discussion purposes.
- Data not significantly different for dioxin, PCBs, arsenic. Arsenic cores tighter data distribution than BOLD.
- Difficult to determine influence of point sources. Some data were excluded that were near CSO, but only had one "outlier" that was obviously influenced. Other data pretty well behaved. Not the case in Elliott Bay, many different sources.
- Regional background sometimes significantly different than natural, sometimes not.
- Choice of metrics matters, sometimes very sensitive to that.

4. Background-based sediment cleanup considerations – Clay Patmont (Anchor Environmental)

- Look at other states what they do. Look at the Port Angeles example; look at what San Francisco Bay has done.
- A. Other state definitions
 - All states have to deal with this issue for sediments, but most states don't have anything written down. Common problem, some deal with it at risk assessment phase, some deal with it in remedy selection.
 - Most deal with don't want to select an action that will re-contaminate.
 - Mass. has a background definition. Background definition similar to MTCA -definitely include atmospheric deposition of anthropogenic sources.
 - Also have a concept of local conditions - lot like area background, a little like regional background. What the site would look like if you add in the sources from permitted discharges. Important for remedy selection -gets down to recontamination.
- B. Port Angeles example:
 - We defined regional background defined by hydrodynamics. Port Angeles sediment transport study. Most of bay is connected hydraulically, might be able to distinguish west part of the bay.
 - Bold data samples. 90th percentiles OC normalized.
 - Tried to merge PCB congener and Aroclor data.
 - OC normalization for west harbor data. Correlation between TOC and PCB concentrations. Average concentration is just a little bit higher than the bold data.

- Map of – areas of background at or below bold dataset. Dark green – areas that are at or below BOLD data, OC normalized. Blue – less than 1.5 times bold data. Yellow areas – more than 5 times natural background.
 - Dioxin concentrations in Harbor might represent sources, and they might not. Port Angeles urban soil study - concentrations may or may not be related to Rayonier stack, but high contributions even far away. May be related to backyard burning or other ubiquitous sources. Similar to background concentrations in bay – so may be due to diffuse sources. Problems with identifying sources in urban areas.
 - Different pattern for PCB. Looks more like localized sources.
 - Illustrate how regional background, natural background concepts might unfold in Port Angeles. Dioxin mostly diffuse source. For PCB, looks more like contributions of diffuse sources and some cleanup sources.
- C. San Francisco Bay approach
- Know a lot about PCB in SF Bay, has been a lot of research. Developed a plan through TMDL process. Goal is to get to 10 ppb in tissue (based on 32 grams/day fish ingestion rate). Goal is to get 10-fold reduction in 30 years.
 - 3 parts to implementation:
 - Centerpiece Urban runoff controls – 30 yr, \$10 billion investment – 4 phase program.
 - Navigation dredge disposal is net loss – can dispose back in bay if concentration <99th percentile.
 - Intentionally did not look at setting bay-wide cleanup level. Every decision will be a balance of feasibility and impacts. Sediment cleanup sites defined as places where greater than 180 ppb (margins of bay). But then do cleanup based on site-specific risk assessment.

Jack - Ubiquitous nature of tissue contamination – showed it wasn't anything site-specific, but more related to new source – so source control was highest priority.

Lon - That is a very optimistic tissue level.

Clay - Trying to get a 10-fold reduction in 30 years. Controversial, has had a lot of debate in the last few years. Has finally gone from CA to USEPA for approval.

Q: What are they getting for \$10 billion dollars in source control?

Clay: Look at load reduction plans. Want to take 20 and knock it down to 2. Four-phase program. To get to goal - primary centerpiece was source control.

- Internal sources - dredging is a net loss of contaminants, moving from nearshore to deep areas of Bay, or out of bay.
- Bed erosion or in-bay contaminated sediment – question whether these are even sources to the fish. Evidence not convincing that sediment is the major source of contamination to pelagic fish, but is convincing that ongoing sources are causing contamination. TMDL didn't quantify inputs from sediment. Progress only attained by source control, cleanup of sites can accelerate it.

Chance - Need to emphasize that the sediment-fish relationship we are just talking about PCB, not the same for other contaminants. Toxics Loading Study has similar results but it was a limited study and treated exposure in the main basin of Puget Sound (deeper water) the same as exposure in the near shore. It also did not study the benthic community or bottom dwelling animals.

Donna - Where is funding coming from for source control?

Clay – Funding is incumbent on counties and those who own outfalls. Make those with outfalls responsible for paying. Will be a legal challenge – just because they own the outfall doesn't mean they are responsible.

Q- Wastewater or stormwater?

Clay - Wastewater largely controlled. Stormwater control a major component of reduction.

Jack - Same thing going on with mercury, selenium – looking at sources versus cleanup. This process took about 10 years.

Q-What are risk levels or 32 grams/day? What is it based on.

Jack - Looked at different community types – don't have tribal but have some high end values. 10^{-6} cancer risk. Took about 10 years to make this plan.

Clay - Lot of questions whether they will actually achieve it. First will have to deal with lawsuits.

- Source control does have to be a centerpiece of achieving goals for clean sediment. In our rule revisions, really need to distinguish between what long-term goals are and what we need to do in the short term. Even though the sediment management program is not a source control entity, need to recognize the importance of that.
- Have been successful to achieve cleanups, but this rule revision could de-facilitate making cleanups happen.
- Think we should use area background to make it work – it is based on existing tools and policies.
- The rule revision should at least clarify expectations about the risk of recontamination. Have to minimize the risk of recontamination -Rule revisions need to make that more clear.
- Along with area background, source control and MNR (monitored natural recovery) is where we all are going to be.

Laura – big difference between San Francisco Bay dredging and what happens in the Sound – they have very deep water sites, not true here. Be careful about trying to apply what happens in San Francisco Bay and try to apply it here.

5. Workgroup Discussion

Chance - Questions to focus discussion:

- Want to identify whether these two options are still most feasible. Hearing from Clay that area background is another option.
- If we are going to continue to discuss the two options, what specific topics need to be discussed?
- Important question – will regional background approach result in cleanup standards that are achievable?
- Are the other areas than just setting sediment cleanup standards that we need to consider for rule revision? (Slide provides list)
- If we get time, want to talk about how to identify and screen out sources for regional background.

Teresa - Address questions 3,4,5. Slightly different point of view, but have a lot of same points as Clay.

At one time, had strong Urban Bay Action Team (UBAT). Looked at what are sources, what are cleanup sites. Looked at watersheds from an integrated and holistic standpoint. Ecology has become

more reactive than proactive. If we're going to put in bioaccumulation-based standards, which I think legally you have to do, we need to go back to the original concept that Ecology – talking about more overarching structure – not just sticking in area background. This will be the only way to have an effective program. Would vote for regional background over area background. Initially UBATs and EAP – could be used to collect data and define regional background. Can prioritize the bays. Bold survey with existing data – are adequate for natural background in Puget Sound. Need to go back to ranked site list and sources and really take a look at sources. Say we are going to start here – start at top of watershed or hotspots – take a proactive approach – start at top and work our way down. Brad presented Lower Duwamish – upstream sediment may be much cleaner than regional background in Elliott Bay. Need a logical progression approach. Then we get all of our hotspots down to regional background, then need to work on source control. Then cleanup program needs to go to USEPA, Water Quality Program and say – we have the authority to have source control for dischargers. There has to be that logical progression – need to have a plan for each bay. We used to have these plans – need to get those teams back. Develop a target and develop an approach that makes sense.

Teresa: Really don't want to see a Method C section added to rule – don't want duplication of MTCA. SMS rule is already hard to understand - need to be clear. Can we put some context in the rule of how we are going to approach this? Let's use tools we already have – not add complex sections. Don't like area background and think it runs afoul of water quality laws. Regional background concept can work.

Jack – whether you call it watershed management or urban bays– the biggest part of solution is getting at what is causing the contamination – not necessarily getting the sediments out first. It is more important to look at for all systems whether watershed or urban bay. May not be a problem in every watershed, but may affect a lot of them. Lower Duwamish is an example. Need to control sources upstream before we clean up sediment.

Brad – data don't show that contaminant loading is coming from upstream area.

Jack – Freshwater environment is ionically poor environment– may not see sediment contamination in the freshwater environment, but as salinity increases – flocculates and particulates fall out – and deposit in marine environment. Contaminants become particulate in the marine environment and become a sink for the freshwater contaminants. Need to think of it differently.

Brad – This argument has been advanced before. We've taken lots of sediment samples and spared no cost to get low reporting limits, suspended samples, and water concentration – only thing we didn't do is bedload. Impacts pretty much start at River Mile 5. Where is recontamination coming from – although haven't ruled it out, really doesn't look like from upstream of Lower Duwamish.

Joanne – conceptually agree – but need to have flexibility –need to do navigation projects that overlap cleanup areas – look for improvement of an area, recognizing that we may not meet the goal. We can't wait for source control to happen before doing navigation dredging. Can make progress.

Pete - This is a watershed issue – get sources figured out first. Seems like that is out of the scope of the SMS rule revisions. Is this outside of the scope of what Ecology will work on?

Chance – There has been a management decision that this out of scope of rule revision right now– but need to hear from you – still need to have longer term plan on how to do this. Doesn't mean it can't

be discussed, it just can't dominate the discussion because we will get outside those bounds. We could talk forever about source control.

Teresa – if you have a watershed plan together – but a lot of sources controlled – but Ecology is still working at top of watershed. If port can show that they are making things better for now, but they aren't getting any buy-off from Ecology – then go ahead and do the project. Then when Ecology gets down to that part of the watershed, then the Port has to do the whole cleanup. There needs to be some logical progression for cleaning up an area.

Chance – know this is important – want feedback.

Lon – In looking at the two options, somewhat artificial structure – when you look at carcinogens it all collapses to background. Look at a structure that mirrors what actually happens. Run the numbers for Dioxin, PCB if it all falls to background, just have a structure that falls to background. Also look at data needs you will have to have to support this – how are you going to get at regional background. Maybe make it Puget Sound-specific.

Donna - Good to think of running through our known scenarios. Also need to think of how this applies to eastern Washington, and contaminants we don't even know about yet.

Laura - We have come up with cases where cleanups are not set on background.

Lon - Maybe come up with chemical-specific, or make it Puget Sound-specific.

Chance - Still grappling with the regional background or natural background issue to answer that question.

Lon – And how you will do comparison too.

Brad - Whether you look at source control, timing, or whether data collapse to one decision point. Are we going to have a standard that is the floor...or are we going to have a standard, such as area background but we are still going to require work that is below that standard. Can only go one of two ways – how are you going to define standard, and what does that standard mean. What actions are you going to do beyond that standard. If you can't get all the way there – are you going to get some sort of settlement – partial settlement. Idea of reaching some sort of partial settlement may incentivize cleanup.

Paul – Concern that if standard is too low – too complicated – it's already shutting down projects. Acute toxicity issues are getting shut down in the process – spend 10-20 years studying them. Like going into the doctor with a broken arm and they run all kinds of tests – 15 years later, they fix your broken arm. I would look more towards area background. Although it may not meet all regulatory concerns, area background will facilitate this acute and obvious cleanup. Area background – look for ways to be more allowable in the criteria – lower criteria means less cleanups get done. Lower cleanup values means that there are more incentive to push back. Higher cleanup values mean more willing to clean up. Dioxin – make one company pay for everything – they will fight it instead of do it. Don't be afraid to look at a higher cleanup value – may get you a cleaner Puget Sound.

Paul - As we go broad of all the things we look at – cleanup for PCBs, then have stormwater discharge that cause problems – still have a cleanup that is not protective. Thea Foss is an example. \$20 million spent on study and cleanup and then stormwater re-contaminates. Process is so consuming – we don't step back and say what difference does this make in the long term. The broader you make the list, the more likely that you are not going to sustain the cleanup - becomes the impossible site.

Process is too scientific, too refined, a lot of sites just sit there under study. Area background (as defined) has some viability – more practical. Encourage cleanup instead of ultimate clean.

Teresa – urge you to make this as least complex as possible. Risk assessment is going to come back to background. There might be exceptions- but main focus needs to be on background. Can use narrative language to capture exceptions. On recontamination of Thea Foss is a positive example – EPA went in with eyes open – knew it would re-contaminate with phthalates – but believed cleanup would reduce overall risk of some toxic compounds – still making a net improvement. It was a planned calculated risk.

Brad - In difference between regional and area background - what would you do to manage risk if leave behind area background?

Clay – I think that really is the issue. Look at Seattle waterfront – several CSO and storm drains – might be cleaned up by 2040 or 2060 – identifiable sources that get mixed into the plume. Can't have a cleanup that requires you to get below that level. For example, you are a site with historical release – want to clean it up and then have to do it again. Most folks don't want to do an interim action.

Donna - If someone who had a historical discharge, should be let out of the liability once they achieve their cleanup and not be held responsible for recontamination? Is that a potential option?

Teresa - Should be able to let PLP be done with cleanup for historical discharges. Then say this is a source control issue.

Donna - I think it's different if it's an ongoing source. If they are a discharger, they are still liable.

Clay – I think that is more of what is going on – ongoing discharges. Old sites get buried. Need to get historical discharges out of the system, but have to have a cleanup standard that is sustainable. Can get a sustainable cleanup standard with area background, but don't think so with regional background.

Brad - What if we could get a partial settlement?

Chance – Let's revisit that when we get to question 4. Trying to take questions in order.

Does regional background provide enough flexibility to set feasible cleanup standard? I think I'm hearing from Paul and Clay that they don't think so. Don't want area background discussion to dominate.

Clay - It depends on how you define it. Probably not if definition we've discussed.

Pete – is regional background what requires level for action?

Chance – yes that would be an action level – monitored natural recovery could be your action. That would be your final cleanup level where you liability is resolved.

Teresa – example that was given used median, should use background upper percentile. That could be a key issue of whether the regional background approach works.

Joann - Whole crux of issue is how you define it – cannot tell if it is vaguely defined.

Donna – Maybe it's a little premature to ask that question. Maybe need to define it better.

Chance – we would like some suggestions about how to tweak that definition. What are some suggestions?

Joann - Maybe we could get a workable definition if you could work through the details and examples. Elliott Bay example was a great place to start. Also some benefit to look it at generally not tied to a

specific process. Problems with data limitations, data bias. Hard to say definitively what metric should be – don't know how that will play out.

Lon - Area background would use points influenced by other sources – that doesn't mean the laugh test.

I wouldn't want to see these high values from outfall or cleanup sites averaged in to what a cleanup level should be. It's more tractable if you can remove the point sources that are kicking the area background up. Otherwise wouldn't have to cleanup any sites because point to the other hotspots.

Comment – The way to address that is address the highest areas first, remove that and bring area background down.

Chance – right now want to put “area background” option in parking lot, focus on the two options and their feasibility.

Glen – No don't want to explore other options. Similar to Lon and Teresa – can't follow the logic of area background getting you to where you want to be. I appreciate the perspective to want to facilitate cleanup – want to do that without losing our target of where we want to go. Need to see consistency and cleanups at a scale that is important. Like the regional concept better. Don't like the area concept – I'm okay if I'm not worse than my neighbor. Think it should be more that there is one set of goals and some flexibility in how you choose actions. Don't want to have too many different goals.

Clay - Ultimate cleanup goal is not area background – but a short-term cleanup program. What is short-term goal to facilitate cleanups, differentiate that from the long-term goal.

Chance - What do you mean by short-term? Interim action?

Clay - What is Ecology going to tell the PLP they need to do right now, even if can't get to ultimate goal.

Chance - What does that mean in terms of cleanup standard? Does that mean the short-term goal is a remediation level? What does that mean in terms of resolving their liability?

Brad - And if the PLP can get partial settlement, does that incentivize cleanup?

Clay - A more experienced PLP may be incentivized by a partial settlement. But not all. Some will not want to do it if it doesn't resolve liability.

Chance - Areas of adjustment slide – setting cleanup standards, remedy selection and implementation, and resolving liability. Let's talk in MTCA or SMS terms. Remediation levels mean you haven't resolved: are all kinds of examples in country – Fox River – cleanup standard for PCB is .25 ppb, only have to dredge or cap down to 1 ppb. Dredge to everything above 1 ppb, but haven't met .25.

Chance - So you have a remediation level and a recovery time frame.

Teresa - Has to be two options – would like to see us get out of 10 year studies, move them toward what are the sources. One approach for little guys who need an answer – go to regional background and you are done. For big corporation – want to go to area background, hotspot removal, program to get eventually to lower level.

Glen – We have been talking a lot about the scale of background. More comfortable about flexibility in the right boxes (remedy selection, resolving liability) than in the left boxes (setting cleanup standards). Let's have a strict standard that is the goal – flexibility with remedy selection, recovery time frame, recovery zone to encourage activities to get to goal (at regional scale).

Teresa- The problem with saying that you are on the hook to get to natural background – could be 100 years - maybe never without a source control program – don't see that as a viable option. There has to be some way for people that aren't responsible for that to do their part and be done.

Glen - Need to think about creative ways to resolve liabilities.

Glen/Teresa: The PLP needs to be done if they are not the cause of recontamination.

Teresa - How do you define boundaries?

Brad - What do you do about parties that are left to prevent stormwater. To prevent flooding, need to get stormwater out of the system– what do we do with that? Do we hold municipalities and counties responsible for something that is unattainable? There are no data to suggest that you can get to that low level.

Teresa - Thea Foss – example – pushed city really hard to get every source, but still ended up with contamination they can't control. Municipalities have a lot of problems controlling their sources.

Brad – With the Thea Foss it was phthalates; in other cases it's dioxin. Problem is that no evidence that you can actually get to the goals established, even for risk driver.

Joann - Idea of load allocation – is the load coming from your site or new discharges – that is a water quality, TMDL concept. It's not explicit, but it is a factor – what is your load to recontamination?

Teresa - Could become an explicit factor – Portland Harbor - they derived TMDL for certain sediment factors.

Chance - Which of these areas do we want to talk about more? Do we want to look at other areas, other than setting cleanup levels, for flexibility? Does that flexibility already exist in SMS and MTCA and just need to be better called out. Any specific ideas for further discussion?

Teresa - I think compliance is the key. When are you done. Don't think MTCA covers it. Sediment sites have a particular combination of conditions. Need to be explicit.

Clay - Can you take the remediation level concept, recognize that it isn't the final cleanup level, but then it's Ecology's responsibility to do source control. Ecology has to put the pieces together, like the Urban Bay Action Team. Can't make the PLP responsible if cleanup level is not achieved. The PLP has to meet remediation level, but release the PLP if they do what Ecology asked. On the hook to monitor only, but no consequence unless recontamination is their fault (their sources are controlled).

Teresa - This is assuming they have all their sources under control.

Brad - If in fact they haven't hit cleanup standard, site isn't closed. Only way to resolve liability is to hit cleanup standard.

Chance - How is that not a partial settlement?

Clay - No, it's a final settlement. Look at Fox River – do prescribed action, not responsible if not achieved. They are released if they do their cleanup.

Brad - Failure to clean up would be due failure to predict it?

State/fed cleanup.

Teresa - Assuming remediation level is higher than background, but may not be the case. Should set site boundaries in a more practical way. The Urban Bay Action Team used chemical signatures to establish site boundaries for sites that blend into each other. Clean it up to regional background – you're done.

Jack – For dioxin-related things, PCB, would like to see a site like Port Angeles, analyzed to regional background, normalized to TOC, rather than just dry weight. Think areas of regional background will be much different for TOC than dry weight.

Lon – Regional background needs a fair bit of examination – Elliott Bay higher than Port Angeles. What is point for what number you are going to discard for inclusion in regional background, what statistic you use is important.

b. Audience comments:

- Fatal flaw is lack of consideration of total risk. If you apply a high tribal consumption rate, the natural background tissue concentration of dioxin gives a 10^{-3} or 10^{-4} risk. For PCB, even if you get 10^{-5} risk, you can spend billions of dollars cleaning up PCB all over bay, but risk would still be 10^{-3} or 10^{-4} for dioxins and furans at natural background concentrations, which you can't do anything about. It's pointless to regulate other chemicals, like PCB down to much lower levels when so much residual risk for seafood consumption even at natural background levels.
- Failing in current perspective in how we do human health risk assessment. Lot of progress – possibly probabilistic approach – get away from deterministic approach with compounding conservatism. Published papers on this Allison Cullen, Dave Burmaster. Bioaccumulation considerations may be moot – if you do human health risk assessment in a more scientific way, you may not be below background. Like idea of habitat stratified background. Didn't hear that recontamination would be at area background because presumably progress being made.
- Tendency to look at gradients from shoreline urban areas and reach out into deep water basins to define background – need to be careful about that – misunderstandings from simplistic approach. PCB is an example. Ideal situation with just ubiquitous aerial deposition. That alone will have a chemical gradient just by fact of thousands of upland acres in stormwater deposited in nearshore areas. If we look in deepwater basins and try to apply to nearshore area, problems that we call recontamination but may be from aerial deposition. Shoreline areas higher than deep basins from aerial deposition and stormwater from upland areas, not necessarily sites or point sources.

Laura - Lot of evidence that rural areas end up capturing a lot of atmospheric deposition – may have higher levels than urban areas.

Lon - Deterministic vs. probabilistic exposure assumptions– deterministic method choose percentile up front when selecting input parameters, but in probabilistic look at range and then choose upper percentile. A lot of work has been done – not seeing major differences in deterministic and probabilistic approaches.

Agree to disagree.

Teresa - In RSET – grappled some similar issues – look at legal determinations of what we need to do for rule. The risk assessment process - don't feel like that part can be changed, even though we would like to change it. Need to find a way to make it workable rather than spending lots of money arguing the risk assessment issues, want to start making some progress.

Comment: Just because MTCA allows 10^{-5} risk that that doesn't need to be transferred to sediments – that risk level was designed for upland exposure regimes not bioaccumulation and seafood consumption – can't attain 10^{-5} risk – it is impossible in the world that we live in. Copper River Chinook are unacceptable risk at those levels.

Lon – That's why we have background

Comment: Area background vs. regional background – defining area background much more contentious and difficult than regional background.

Comment: For comparison to urban bays – prefer using a reference bay such as Carr inlet.

Topics Prioritized for further discussion

Chance – I’m hearing a lot about watershed and source control, not going to prioritize that for further discussion now. That needs to go back to our management team. They need to hear what we’ve heard from you.

- Other areas:
- Remediation Levels / Recovery Time Frame
- Compliance. When are you done.
- Interim Actions, Sediment Recovery zones.
- Partial settlements.
- Let’s continue to explore regional background.
- Let’s have more discussion on area background.

What else?

Teresa - Definitions of natural background, regional background, area background including statistical metrics.

Clay - what sources are included or excluded in each.

Lon - Scale. Is it Elliott Bay? Western Washington? Entire state?

Jack - Habitat-stratified background & TOC normalization. Want to look at Clay’s data TOC normalized. Partial settlements

Joann - Partial settlements is a goal – remediation levels is a way to get there. Set cleanup levels, but have different levels to achieving that goal.

Chance - Let me clarify -have some flexibility for an initial remediation level, but still have some time to meet long term goal.

Teresa - From a port’s perspective we may want to have a project, knowing more will come later, but not be in that process in the meantime. Two opportunities. Ecology tends to look at –once it’s a site, has to get completely cleaned up. But there is another paradigm.

Joanne - Possible improvement due to a short-term effort.

Paul - Under current standards – can have a settlement at CSL. So we are talking about having a range of standards. So what we are talking about is the same concept as we have now – upper level that you can settle out at, and the lower level that is the long-term goal for the waterbody. Getting cleanups done at higher level to facilitate cleanup. Stay with concept of flexible cleanup level that is in SMS and make it work here.

Pete Kmet - Under MTCA we can achieve final cleanup without achieving cleanup standard, if we have institutional controls to control exposure – get a settlement. What kind of institutional controls or exposure control can occur during this time until we reach the final goal?

Teresa - Institutional controls in sediment aren’t viable.

Pete Kmet - This is a topic we will be discussing on the 11th. It directly relates to the idea of remediation levels, partial cleanups, hotspot removal. Under MTCA, a remediation level is not a final cleanup unless there are controls on exposure.

Teresa - There are no legal controls you can put on the environment.

Fish advisories. (Lot of reaction – couldn't catch)

Chance - What we need to further discuss is the idea of remediation levels, long-term goal for final cleanup standard, how we can do that, possible institutional controls.

Glen - If you clean up your problem, even if regional goal has not been met, you're done.

Chance - But I'm hearing you're not supportive of area background as a final cleanup level, Lon, Teresa also.

Clay - I'm not supportive of area background as the final goal either.

Chance - Meeting on 28th, supposed to be freshwater. If that doesn't come through, may continue discussion on this topic. Need to prioritize topics for next meeting: I think – how do you meet lower standard by using more flexible areas in remedy selection, when are you done in terms of compliance, institutional controls, continue discussing regional background.

Teresa - would like definitions of the three backgrounds.

Donna - We had handout with all these regulatory definitions and proposed definition for background, what would you like revised?

Teresa, Lon, Clay - what sources are in or out, what are thoughts on scale.

Chance - I'll send it out, want active feedback.

Glen: Wants at beginning of next meeting – wants to talk in more depth about the site listing and how human health narrative will apply.