Meeting Notes from the DMMP Monitoring Ideas/Brainstorming Workshop on June 20, 2018

DISCLAIMER: This is an attempt to accurately summarize the workshop conversation as it occurred. Ideas and opinion expressed here do not imply DMMP endorsement or applicability to future decision-making.

There appear to be 3 steps to making revisions to the Monitoring Program.

1. How do we re-design program? What are the overall questions? Is there a problem? How to we prevent future problems?
2. What kinds of monitoring should be done on a routine basis?
3. What of the existing program is still needed? What should we give up to make room for new things?

Ideal Components of a Monitoring Program:

Enough data to be confident
Not costly
Clearly defined measures of success or failure
Defensible
Safe/protective
More of a meaningful link between monitoring program and dredged material evaluation
Fit into regional problem-solving to make more defensible in public perception regarding contribution to overall Puget Sound health
Concise/understandable/implementable explanations for rules and where dredged material can be disposed should be available for small/unexperienced dredgers recognizing the breadth of participants in the process

Limitations:

Group's tendency to overcomplicate things – perhaps because of caution to avoid doing anything that could cause environmental harm in the future?
Lack of funding
Unknown impacts
Meaning of existing data is complicated
Continued confusion about regulatory requirements
No agreement on what is enough data
Bioaccumulation is a complex and high stakes topic (RSET and SMS experience)

Summary of Brainstorm Discussion:

Are we asking the right questions? Should we be starting with the existing questions or should we be starting from scratch?

Consider whether there are baseline studies that need to be conducted (but not repeated) to help design the monitoring program and answer some of the basic questions about what is happening and the extent to which there are issues, versus elements that should be part of the routine monitoring program over time.

Q1hypB – how to account for chemical of concern (COC) increases due to other factors (in COCs around disposal sites) especially given what we now know about general regional contamination.

Chemical tracking system (CTS) has issues – update program, don't use estimated data since this leads to finding significant trends in low concentration data. Nexus to bioaccumulation?? Strength of CTS program was that it looks at all COCs in a given class at the same time as indication of problem. Better to focus on tracking specific bioaccumulatives.

Sediment locations for monitoring should track where dredged material goes/went. Dots fixed in time aren't helpful or even meaningful. We have done this with dioxin (randomized stations). We can determine how much sediment accumulated at a given site via the SPI data. Fixed stations already situated there. Tracking bioaccumulative COCs off site – via transects – is more the problem since these don't necessarily track the movement of the lobe/material. We need to fix the transect location problem.

Role for incremental sampling methodology (ISM)? N=30. Characterizes an area rather than a spot. Current site monitoring design is more focused on toxicity/point-by-point vs. for bioaccumulation which is more concerned about exposure over an area.

Hypothesis b in Q1 – Do we need to keep it? Wasn't this just serving as a failsafe in case we couldn't accurately monitor the disposed material? But we've shown that we can monitor it with SPI so we don't really need these transects to answer this question. Alternatively, we could move hypothesis b to Q3.

How do disposal sites fit into Regional Background (RB) framework? We only have RB for a few isolated areas. Are disposal sites tracking what's happening in surrounding water bodies? Scales of RB are massive. Would be sensible to combine data from other programs to derive RB. Particularly important for Commencement Bay and Elliott Bay.

RB not fixed in time, though; it is everchanging. If RB used as a guideline, DMMP would have to track that. Clear that the DMMP will need to get more data to do anything with RB.

If we eliminate COC analysis of transect stations (as has been proposed today), would we lose important comparison point to RB? What's allowed at the site is, by definition, > RB, so exceeding that at the on-site stations wouldn't necessarily mean there's a problem. The critical measure is if we exceed RB at transect (or perimeter) stations.

Acceptable sediment concentrations based on risk (when calculated) are almost always below natural and regional background. But risk-based sediment concentrations expressly calculated for deep water disposal sites (based on exposure assumptions that are different than those used to calculate risk at near-shore cleanups) might turn out to be above even RB depending on the exposure assumptions used. RB can be measured. CSL as it applies to a particular disposal site should be calculated using the specific exposure scenario that you have for that site (what benthic species are present, food web transfer potential, species with human consumption, home ranges etc.). We need to think about what are the reasonable maximum exposures (RMEs) for sites. To determine site specific biota-sediment accumulation factors (BSAFs) we need site specific sediment and tissue data. This could be tricky because the on-site condition changes after each disposal. More sediment and tissue data and exposure analysis are the type of studies needed for redesigning this program.

Lines of evidence to determine if we are being protective enough with site management = risk evaluation and determining background. Important to use a more realistic risk paradigm. For HPAHs, one can make a strong argument that the current SLs are protective for cancer in flat fish. Fleshing out risk issues (rather than simply assuming that risk is less than natural background (NB) and RB) is important for public accountability. Doing this will also answer the question of whether our current target tissue levels (TTLs) are protective enough.

We have a huge data gap given that there is so little tissue data for our disposal sites. Do we have data for what species are present on site? No, but we do have some data at some sites from transect stations (but these are technically offsite).

Do we even need on-site tissue data? We change the nature of the sites all the time by disposing dredged material. Monitoring at perimeter stations makes more sense because these shouldn't change (much). It would be better to monitor species that are in the area in and around the sites. What are the possible non-mobile benthic species?

There is value to conducting lab bioaccumulation testing of on-site sediments. Could do so on a sample collected using ISM methods. This would give us a measure of "bioaccumulative potential". We could compare results to bioaccumulation testing of sediments from the surrounding area to put the on-site data in a larger risk context.

If there's nothing to eat on-site (assuming dredged material disposal buries existing benthos), then what's the issue? This condition will be different for frequently used sites vs infrequently used sites. Disturbance changes the benthic habitat all the time. Ground zero changes all the time.

Not true that sites are biological waste lands. SPI sees benthic organism activity shortly after disposals so much so that sites post-disposal may be an attractive nuisance for benthivores (fish and crabs). It's a hodge-podge.

We need to ask ourselves, what are the practical uses of these data?? If we use on-site bioaccumulation data to calculate a threshold risk value, would these become new guidelines?

Would be good to integrate sediment data vertically (ISM – like). We could get a quasi–historical disposal analysis by coring through past disposal layers. Would create higher field costs vs lab costs. But coring in the water depths at the sites may not be practical/possible.

Another approach to site monitoring is collecting (and archiving) jars of material from projects disposing at the sites and then running a composite using lab bioaccumulation testing. Everyone says that bioaccumulation testing is too expensive but lots of areas of the country do it on all projects (we are just not used to this cost). Need to develop the thresholds for triggering and judging bioaccumulation test data. Determining the TTL for comparison could be done using disposal site-specific risk-based calculations (discussed earlier). This would improve the decision framework. An easier approach would probably be comparing bioaccumulation testing results to the surrounding area/RB in tissue. Analogous line of evidence was used in the Port of Everett SDM.

Q3 Hypothesis E only relates to benthos.

Q2 Hypothesis D could be altered to include bioaccumulation (not just toxicity). Or it could be modified to replace toxicity with bioaccumulation. Do we even need to run bioassays as part of monitoring since this is done on the front end (during dredged material testing) already? We now have years of site monitoring toxicity data that show no toxicity. We need to determine how to set the threshold for unacceptable bioaccumulation (based on risk? RB?) Won't that value then also apply to the dredged material testing program? It may be okay if it changes TTLs (which need revision anyway) but what if new sediment values estimated from these TTLs? Wouldn't this create a new problem with regarding to parity with SMS?

Need to take a realistic look at exposure pathways and exposures related to the deep water disposal sites. Bioaccumulatives have a totally different scale of effect – can't be evaluated on a DMMU-by-DMMU basis. Overall exposure in the embayment is the relevant context for bioaccumulatives.

Large-scale changes in dominant benthos because of climate change must be taken into account when redesigning the monitoring program. Suggest eliminating Q3 hypothesis F or at least decrease frequency of required benthic sampling.

Confirmatory monitoring could be a parking lot for many of these measures. Q2 is, in essence, verifying that the dredged material evaluation procedures are working. But now that we have 30 yrs worth of data showing that the majority of disposed material doesn't exceed SLs, there

isn't the same level of concern. There needs to be a comprehensive look at the history (ranges of concentrations) of COCs at the disposal sites vs what we know went out there (akin to what Windward did for PAHs at Port Gardner and Elliott Bay).

What increase in COC concentrations would we need to see at a site to get a statistically significant difference in RB concentration for a given area? It would put the site in context. How important are disposal sites for orcas, mammals and fish? Another approach would be the comparison of COCs (sediment or tissue) to RB with the goal of not exceeding RB (rather than accounting for the site's contribution %). That approach would probably be easier to explain to others.