February 6, 2012 Technical Group Meeting Summary

In Attendance:

Phil Trask
Jeff Schnabel
Lisa Willis
Brett Raunig
Marty McGinn
Dorie Sutton
Andrew Ness
Julius Dalzell
Harvey Claussen
Eileen Stone
Rob Zisette, sub-contractor, by phone

Opening

Phil opened the meeting with introductions around the room. Mr. Julius Dalzell from the Vancouver Lake Sailing Club joined the meeting at Harvey's request. Julius has a background in power supply engineering. Phil gave an overview of meeting ground rules. Copies of the ground rules were handed out.

This meeting's agenda is a continuation of the January 19th meeting agenda. We will discuss the remaining techniques not covered at that meeting and discuss the additional studies needed for each technique.

There were no comments or changes to the agenda.

Matrix

Jeff began the discussion of the matrix. At the last meeting our discussion covered techniques through phosphorus inactivation. Jeff gave a brief overview of the changes he made based on input from this group. Changes included:

1. Some of the descriptions under the expected outcome column.
2. Numeric scores were modified based on input from Rob. Rob also provided additional information for the descriptions on page two.
3. The estimated initial cost column was modified from dollar figures to symbols as the ranges are general at this point and specific numeric values could be misleading. (Description of cost ranges is on page two).
4. The category of engineered structural/water level control was added. Right now the only technique included there is a dam.
5. Thom provided a list of techniques on disc and a few are added here. Others were forwarded to Eileen to add to the bibliography. The techniques added here were: 1) under biomanipulation: item c – bivalves; and 2) in the modify lake footprint/wetlands footnote (#4) it was added that floating wetlands

Jeff asked for any comments on these changes.

Thom asked for the addition of nano-iron as a technique under Phosphorus Inactivation. The iron chloride technique listed will be modified to note that it includes various iron techniques.

With no further comments on the changes made, Jeff began the discussion of the remaining techniques.

Algaecides:

In general algaecides are chemicals that take care of the symptom of an algal bloom without addressing the cause of the problem. There are only a couple of compounds that Washington considers legal to use in lakes like Vancouver Lake. They would result in some negative impacts to fish and waterfowl. These algaecides impact all algae, not just blue green algae.

It is important to note that the use of algaecides may not necessarily result in longer swimmable periods within the lake if you wait for a blue green algal bloom before applying. The lake may be closed to swimming for some period because the blue green algae can release toxins after they die off. The benefit depends on how long a blue green bloom would have lasted without chemical application. During a summer when a closure could be a month long, the closure may be shorter with the application of algaecides.

Rob added that algaecides are typically applied before a large bloom to prevent a bloom from getting to that state. If algaecides were used within a swimming enclosure a lesser amount of algaecides would be needed. If there were not an enclosure an algaecide could not be applied just in certain areas without it dispersing and reaching too low of a concentration to be effective.

It was noted that if green algae are killed the decomposing algae could remove oxygen from the water. Also, if the timing of the application is off it could kill all the green algae and open the possibility for the blue green algae to dominate.

Ecology is reviewing rules on algaecides for lakes right now. The algaecides included in the matrix are from those rules. Peroxyhydrate breaks down in the water and is essentially hydrogen peroxide; it lyses cells and it is considered a more benign algaecide than Endothall. Diquat is allowed in Washington waters, but doesn't work for algae in general so is not included in the matrix.

The group agreed to downgrade the effect of algaecides on swimming to zero due to the time needed to stay out of water after algaecide application as well as public perception of swimming in water in which algaecides have been applied. An explanation of the scoring will be put in the notes on page two of the matrix.

Algaestats:

The algaestats technique includes the use of barley straw, microbial mixtures, and dyes.

The placement of barley bales in the water by the pilings near the beach was suggested, possibly within a swimming enclosure.

It was asked if agencies would be on board with putting barley straw, a non-native species, into the lake.

Rob noted that he has only seen the use of barley straw in ponds and it is not realistic for a lake of this size. The group discussed the public image problem of swimming with loose straw in the water and the negative impact on aesthetics from rotting straw. Could the straw be bound to avoid pieces escaping? It could be, but a high surface area increases effectiveness; a long log of straw bales would not be as effective.

The effect on swimming was changed to "1" because it was thought to be a little better for swimming than algaecides. The rationale will be noted on the second page of the matrix.

Of these techniques, Jeff sees a dye to shade out blue greens as most likely to be accepted. All of the listed algaestats can be permitted. However he doesn't know of any large lakes that have used any of these algaestats in Washington.

Artificial Circulation:

The technique of Artificial Circulation encompasses aeration systems and fountains. In deeper lakes oxygen/air is injected at the bottom. However, there is not a hypolimnetic layer with dissolved oxygen issues at Vancouver Lake so this doesn't seem as likely to succeed.

Lake circulation is used to promote non-blue green algae by constantly stirring lake water, causing a disadvantage for blue green algae compared to diatoms/heavier algae. Blue green algae typically have a competitive advantage over other algae due to their buoyancy/ability to be higher in the water column and thus get more light for photosynthesis. If looking at the small circulation units such as the Solar Bee, about 100 units would be needed around the lake. This would have a negative effect on aesthetics and sailing and to a slightly lesser extent a negative impact on crew.

Thom thought the circulation technique would be less effective once/if we achieve a state of clear water. If we achieve a clear water state, light would penetrate to the lake bottom and then circulation would not push blue green algae out of photosynthetic zone.

Another potential method would be the injection of air bubbles into lake water through a network of lines across the lake bottom.

It was asked if the depth changes at Vancouver Lake would be an issue for any of these techniques.

Rob responded that aeration lines wouldn't be installed in water shallower than five feet, and the small units are adjustable. These units would only be in operation in the spring and summer when algae are actively growing.

If wind is already re-suspending sediment and nutrients as many believe, would the presence of such wind run counter to adopting a technique that would further mix the water column?

Rob answered that these techniques work in deeper areas that aren't as readily mixed by wind. Also, wind sweeps blue green algae to the shoreline. These methods push water in multiple directions, so water is better horizontally mixed. Large blue green algae blooms are usually not in windy, turbid lakes. These units are geared for stagnant weather. When there are high winds (e.g., winter) you do not get blooms.

Harvey noted that at the Sailing Club they see heavy winds between 4-8pm in the spring and summer. Rob remarked that if wind is prevalent throughout the summer then circulators would not make a difference to blue green algal blooms.

The group was asked for comments on the likelihood of success column for Algaestats, Algaecides, and Artificial Circulation. The group agreed that the ratings are fine at the current scores.

It was noted that a group of small circulators could be clustered in one area of concern. This has been done in large reservoirs, allowing for the use of fewer units. We also could have one or two of the larger devices instead. Also, the term "solar bee" should be changed to mini circulators in our documents.

Jeff asked Rob about a large circulator in a lake like this: what can you do before sucking up mud? Rob explained that large circulators are meant for deeper systems. We don't have layering in Vancouver Lake. Large units are typically used for stratified lakes, and installed in the deepest part of a lake.

Any circulation technique should be ranked low for likelihood of success at if it is windy everyday at Vancouver Lake.

<u>Dam to control water level/nutrient inputs</u>

At this point a dam is the only technique listed under the section "engineered structural techniques."

Jeff described the technique. A dam would result in an increase in depth. In theory if wind mixing is our source of nutrients from sediments, algae would be reduced by having greater water depth. The chief negative effect of a dam would be on salmonid use. A dam would mean a lot of money and would be contrary to the current efforts to remove barriers to salmon migration nationwide.

Thom commented that if active fish management is included as part of such a dam, along with more habitat created within the lake, and water quality is improved, then he does not see the installation of a dam as a negative impact on salmonid use, but a positive. Thom elaborated that a dam could allow for management of salmon and carp, as well as sea-run cutthroat trout that are documented at Burnt Bridge Creek. The fish management could be in the form of a fish wheel with a series of gates allowing for carp to go in one area and salmon to go in another. The question of juvenile salmonid passage was raised, which Thom felt could be addressed during high water with a series of grates at the top of the dam.

It was noted that fish are likely entering through the flushing channel as well so that if carp are being targeted the flushing channel would need to be managed as well.

Right now a dam is noted as having a low likelihood of success because strictly making the lake deeper would not solve the blue green algae issue and permitting would not be easy at a time when many dams are being removed.

Rob agreed that just making the lake five feet deeper is not going to change the water quality of the lake. The primary benefit of a dam at Lake River would be to reduce the input of nutrients from Salmon Creek via Lake River into the lake at high tide, allowing for a greater input of water from the Columbia River. Having the ability to control water levels can also help with water level drawdown, carp removal and other aspects. Maintaining water levels could reduce the tidal effect on shoreline plants if that is a plant stressor.

Jeff commented that we still need to learn from USGS about what amount of Salmon Creek water and nutrients come into the lake. Under additional studies needed for a dam both USGS and fish use information are noted.

It was asked if a dam and higher water level would increase the residency time of water within the lake. Rob noted that we wouldn't want to increase residency time, but could avoid such an increase by flushing the lake periodically with Columbia River water.

Phil commented that from the preliminary USGS data the flushing channel flows were less than 200 cfs, and Lake River flows were approximately 2500 cfs. There is a magnitude of difference between those two flows. At Salmon Creek flows are relatively low, so there is a question about loading from Salmon Creek into Vancouver Lake.

Rob compared Lake River inflow to Columbia River inflow, concluding that Lake River nutrient levels are very likely being impacted by Salmon Creek.

Thom mentioned there are potential impacts from the WDFW property between Vancouver Lake and Salmon Creek due to the break down of dikes at Shillapoo Lake. We should look at the larger area beyond Vancouver Lake. There are already negative impacts from this sediment load, so if we were to put in a dam it should be put upstream of this sediment input.

Phil mentioned that if all potential "engineered structural" techniques are to be listed under this category, the category might include modification of the flushing channel, which could be opening up the culverts to make the flushing channel function more like a natural system. The group agreed to add flushing channel modification to the matrix under the engineered structural grouping.

Marty asked about other potential changes to the flushing channel, such as increasing flushing channel flow by adding culverts.

Lisa mentioned the Corps conclusion from their 2009 modeling of modifications to the flushing channel, which was that larger culverts would not have a significant impact on the lake.

Phil noted that the Corps modeling strictly looked at the residence time of a particle of water - the path time for movement from one end of the lake to the other. The question they were answering was how much faster would a particle move? Residence time is currently 34-36 days. With the change proposed in the model it would be only a few days difference, which they considered an insignificant difference in residence time.

It was noted that at the time of year with low water is when the flushing is needed, there may not be enough of a head differential for a significant amount of water to enter the lake.

Jeff noted that we promised the Steering Group that the Technical Group would have a vetted version of this to the Steering Group and then to the Partnership for their input. We need to finish looking at the remainder of the matrix. How do the numbers for effects of a dam look to the group?

Lisa asked if the impact on salmonid use should be zero because there is not significant salmonid use. For example, WDFW will not consider potential habitat work in the lake as riparian habitat mitigation for salmon.

Phil said he would agree for summer salmonid use, but if we look at the lake when most juvenile fish are available it is typically February through June/July, and then the lake provides good backwater habitat for rearing and migrating juveniles. There is scrub-shrub habitat along the fringe of the lake that is saturated with water, and in the 1980s salmon were found in the lake.

It was suggested that during the high water time a dam could be lowered to allow for migration, and that Lake Washington has good salmonid use along with their lock system.

Thom believes that a dam is our biggest tool of control as he sees it impacting the nutrients in the lake more than any other method we have.

In discussion of effect on salmonid use, the group agreed that a zero on effects means a neutral effect and the group is not in agreement if it would be positive or negative. Therefore a question mark will be used to denote an unknown effect from a dam on salmonid use.

Thom would like to add hiking enjoyment as a beneficial use column because having a hiking trail over a dam would increase enjoyment. The group decided that the aesthetic column should not be restricted to "sight/smell" but include enjoyment by users such as hikers.

Jeff asked what water level would be considered for a dam. Responses were to consider the current high water level and a level of 10 feet higher.

Marty asked for the name of the technique to be changed to say "lock" instead of "dam", as that is the technique the group has been discussing.

Jeff noted that we have completed the algal related technical questions for the group. The remaining techniques are all prescriptive towards a specific recreational item. The group was asked if they had additional comments before we move to the discussion on additional studies.

Harvey commented that if we were able to raise the level of the lake for spring/summer then the lake would be more amenable to the micro bubble technique.

Thom noted that there was a proposal in the 1980s to have swimming enclosure and warm water pumped in.

Marty suggested changing the swimming enclosure to lower cost: a change to $-$$ was noted.

Additional Studies:

Jeff began the discussion on additional studies recognizing that USGS finishes their field work at the end of 2012 and the report is due in 2013. For other studies identified the two major holes are sediment and fish analysis. There is no Partnership funding for additional studies at this time.

We could ask what studies are wanted in order to make a decision, or if only a sediment or fish study were possible, which is most critical?

Lisa noted that with the studies discussed many are in the lake and stay within the lake, but for a technique like the dam to raise water level 10 feet, this would impact other partners, not just Vancouver Lake. We would need to look at that those external impacts. Phil commented that the PC Trask GIS staff could develop a map of the horizontal extent of the lake if the water level was raised by installation of a dam.

Thom said that helpful studies would include: what is needed to manage Columbia River inflow of nutrients through the flushing channel; sources of nutrients to Salmon Creek; and sources of nutrients to Burnt Bridge Creek.

Phil described how the USGS work and fish and sediment studies are studies of the lake. A request to trace sources is a request for studies outside of the lake, a second tier of research. Such studies are under the jurisdiction of other parties, not the Partnership. For example the Burnt Bridge Creek question will be partially answered by the TMDL already underway there.

Thom commented that if we don't look at nutrient sources and what will reduce those sources, then we are not committing to managing nutrients. Thom does not see how we will get funding from external sources if we do not have the commitment to look at outside sources.

Thom's concern was noted and the group agreed to move forward with the discussion of in-lake research.

On which research is more critical, one way to determine this would be to look only at the techniques that are most likely to succeed/be implemented. We could then look at which studies are most needed for those techniques. For example, maybe a likely technique would not require research on fish use.

Jeff reviewed the Research Plan for the group:

Under the sediment study listed, the study of physical mechanisms (re-suspension) and the study of chemical mechanisms were ranked as high, or critical for cyanobacteria management. These two studies re directly related to sediment phosphorus loading.

A fish community study ranked as moderate, or useful for cyanobacteria management.

It was noted that knowledge of fish use could be very important to expand the potential pool of funding sources.

Phil said that at this point of matrix development, which looks at lake issues from a course scale, the Technical Group should re-read the Five Year Research Plan, which looks at the lake issues at a fine scale. Everyone should look at the Research Plan before the next meeting.

We can also sort the techniques in the matrix by likelihood of success and/or beneficial use. The group agreed to such a sorting by likelihood of success. The project management team will conduct this sort prior to the next Technical Group meeting.

Brett asked what Thom thought. Thom replied that he would like to see the matrix refined with more narrative from the Technical Group, as well as comments to make the prices more meaningful.

The questions for the Technical Group are really what are the potential actions and how likely are they to succeed?

We could look at feasibility of implementation (permitting, etc.). For example, something like the algaecide is highly successful and cheap, but is it really feasible? What is the technical likelihood of success and social feasibility? However, it was noted that we have the Steering Group for financial considerations and the full Partnership for consideration of social feasibility.

Meeting Closure

We will look to schedule another Technical Group meeting in a few weeks.

Eileen will send the group the Five Year Research Plan and a new matrix based on this meeting. Everyone is asked to come to the next Technical Group meeting having read both documents.