



TECHNICAL COMMITTEE MEETING

Monday, June 23, 2014, 8:30 A.M.

Historic County Courthouse, Suite 211

51 South University Avenue, Provo, Utah 84601

ATTENDEES:

Richard Nielson, Utah County
Greg Beckstrom, Provo City
Neal Winterton, Orem City
Dale Goodman, Vineyard, American Fork
Jason Allen, State Parks/Recreation
Reed Price, Utah Lake Commission
Trent Bristol, Forestry, Fire, & State Lands (FFSL)
Tyler Murdock, Forestry, Fire & State Lands (FFSL)
Sara Johnson, Central Utah Water Conservancy District
Hilary Arens, Utah Department of Environmental Quality
Christie Hutchings, Lehi City
Matt Howard, Utah Division of Wildlife Resources
Dennis R. Sorensen, Spanish Fork

VISITORS:

Dr. Ramesh Goel, University of Utah
Garrett Seely, Woodside Homes
Jeremy Smith, Woodside Homes
Robert Krejci, Saratoga Springs Owners Association
Matt Pottenger, Saratoga Springs
Carl Adams, Utah Department of Environmental Quality
Theron Miller, Jordan River/Farmington Bay Water
Quality Council
LaVere B. Merritt, Consultant
Dee Chamberlain, Saratoga Springs Owners Association
Lee Hansen, Citizen
Lawrence Burton, Orem City

ABSENT: Santaquin City, City of Saratoga Springs, Lindon City, Springville City, Mapleton City, Woodland Hills City, Utah Lake Water Users, Division of Water Resources, U.S. Army Corps of Engineers, June Sucker Recovery Implementation Program.

1 **1. Welcome and Introductions.**

2 Chairman Richard Nielson called the meeting to order at 8:33 a.m. He welcomed members and visitors to the
3 meeting. Each attendee was asked to introduce him/herself to the group.
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5 **2. Review and Approve the Technical Committee Minutes; March 24, 2014**

6 Mr. Dennis Sorensen moved to approve the minutes for March 24, 2014. Ms. Sarah Johnson seconded the
7 motion, and voting was unanimous in favor.
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9 **3. Update on Utah Lake Issues, Projects and Priorities**

10 Mr. Reed Price reported on recent projects, issues, and priorities facing the Utah Lake Commission.

11 **a. Carp Removal**– The legislature approved \$500K in appropriated funds from the Endangered Species Mitigation
12 fund. \$200K needed to be matched through other sources. The ULC hoped to receive funding from the Willard Bay
13 Chevron Settlement, but it was not awarded. Instead, funding was secured through the Bureau of Reclamation. The
14 ULC helped secure \$700K for carp removal. Approximately 3 million lbs/yr of carp are removed from the lake, but it
15 would be preferable to remove 5 million lbs/yr. Mr. Carl Adams asked how often the carp are removed from the lake.
16 Mr. Price estimated 80 and 100 times per year.

1 **b. Phragmites**– Mr. Price said a contractor has been hired to smash 300 acres of phragmites on the north end of
2 the lake, and in Provo Bay. An accidental fire on the south side of the lake burned approximately 300 acres of
3 phragmites. Unfortunately, it is growing back, so cattle are grazing the area to keep it short. Mr. Tyler Murdock said
4 fire might not destroy the seed bank, which allows it to grow again. He is working with USU to have some research
5 done on this issue.

6 **c. Draft Integrated Report**– The Draft Integrated Report, which identifies water bodies that are considered
7 impaired, was updated by the state in May. Nearly 100 water bodies were added to the list. Several of the water
8 bodies are associated with WWTP’s in Orem, Provo, and Spanish Fork. He recommended everyone review the report.
9 The Jordan River Farmington Bay group is concerned with some of the new additions. Ms. Arens said public
10 comments are open through July 14, 2014. Mr. Carl Adams said questions and comments should be directed to Emily
11 Flemmer. Ms. Arens said the Integrated Report is the most comprehensive, data rich, integrated report that the
12 division has ever done. Mr. Price said Utah Lake is listed as impaired for phosphorus, TDS and the new report lists
13 PCBs. Mr. Adams said the Integrated Report is a combination of section 305b of the Clean Water Act (which is the
14 general report to congress) and section 303d (specific report of impaired waters). Mr. Price said he would distribute
15 the link to the TC.

16 **d. Nutrient Permit Limits**– The Water Environment Association Conference was held in April. At the conference,
17 they recommended that the DWQ impose a technology based standard of 1mg/liter of phosphorus on WWTP’s. This
18 proposal is currently open for public comments. Municipalities are concerned with this issue, especially because there
19 is potential for the limit to be made even stricter. The Governing Board has asked Mr. Price to work with the state and
20 WWTP’s to determine an appropriate phosphorus limit for Utah Lake. The Utah Lake Commission was invited to work
21 with waste water district managers in Salt Lake, Davis, and Weber Counties to conduct research on Utah Lake.

22 **e. Dock Amendment**– Mr. Price said Forestry, Fire & State Lands has a proposal to amend the Utah Lake Master
23 Plan, which would allow private boat docks at Utah Lake. They will present the Dock Amendment to the Governing
24 Board Executive Committee and the Technical Committee for review and recommendations. Finally, it will be opened
25 for public comments. Mr. Murdock said public comments would mostly be intended for state agencies. He said a final
26 packet should be available by Thursday, June 26th.

27 Mr. Jason Allen asked if the issue of camping on the docks had been addressed. Mr. Murdock said camping is not
28 allowed on sovereign lands, and it had not been discussed specifically with this amendment.

29 **f. Outreach**– Mr. Price said nearly 600 children attended the 4th grade field trips at the Utah Lake State Park. The
30 Utah Lake Festival was held on June 7th and a lot of people attended.

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32 **4. Presentation and Discussion by Garrett Seely with Woodside Homes.**

33 Mr. Garrett Seely sought advice for completing a section of trail near the Talons Cove Golf Course in Saratoga
34 Springs. He provided maps to identify the area of discussion. He said an engineer proposed a design to reroute the
35 trail on top of an unused drainage canal. He contacted Wardley/wdf-ay LLC, who owns a 50 ft wide swath of ground
36 that goes down the middle of the canal, about acquiring the land. He has not heard back from them.

37 Mr. Robert Krejci wanted to know if there were plans to fill in the canal. Mr. Price believed Saratoga Springs was
38 working toward dedicating funding for a cultural analysis and determination of jurisdictional wetlands in the area.

39 Mr. Murdock suggested they check with Saratoga Springs about boundary line agreements for this area. He said
40 Wardley made an agreement to deed some property to the state for trail development. According to written
41 agreements, the trail would be maintained by the HOA, but Mr. Murdock said FF&SL has approach the city about
42 maintaining the trails.

43 Mr. Price displayed the Utah County parcel map. If the land were deeded to the state, Woodside Homes could
44 then submit an application to FF&SL to use the land for trail development. The city had funding for a cultural analysis
45 as well as a jurisdictional wetland determination. If wetlands would be affected, then mitigation would be required.

46 Mr. Neal Winterton asked if the TC should endorse the completion of the trail. Mr. Nielson agreed with the need
47 to complete the trail and asked for a motion to support it. Mr. Neil Winterton motioned to endorse the proposal as
48 illustrated on the map. Ms. Sarah Johnson seconded the motion, and voting was unanimous in favor.

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2 **5. Presentation and Discussion by Dr. Ramesh Goel.**

3 Dr. Ramesh Goel discussed the research to determine nutrient fluxes and sediment oxygen demand at Utah Lake.
4 He said the study objectives were to (1) quantify phosphorus specification/fractionation in sediments from selected
5 locations, (2) evaluate the mineralogy of sediments using X-ray diffraction at selected locations, (3) evaluate sediment
6 and water column oxygen demand (SOD and WC) and nutrient dynamics associated with sediments and water column
7 at 3 locations, (4) evaluate sediment nutrient fluxes at five additional locations under varying pH and DO.

8 He said phosphorus stays and recycles within a system and attaches to minerals. He displayed the phosphorus
9 cycle. Phosphorus chemistry is heavily pH dependent. Nitrogen, unlike phosphorus, is easy to handle in a system
10 because eventually it will become nitrogen gas.

11 Samples were taken at 12 locations including Provo Bay, the entrance to Provo Bay, 1.3 miles W of the Provo river
12 outlet, SW Goshen Bay, Goshen Bay, .5 miles W of Geneva Steel, Dry Creek (outlet of Utah Lake), 2 miles E of Saratoga
13 Springs, 1 mile E of Pelican Point, Site #3, and a mid-lake deep site. Each sample underwent 5 steps of methodology,
14 including; (1) Loosely sorbed P- Sequential extraction using NaCl under oxygen free conditions (2) Fe and Mn bound P-
15 Sequential extraction using BD reagent under oxygen free conditions. (3) Polyphosphates bound to clay and aluminum
16 oxides- Extracted using NaOH sequentially (4) Ca bound P- extracted using HCl (5) Residual P- Sediment dried, boiled
17 in HCl.

18 Utah Lake contains a lot of calcium-bound phosphorus. Whole-rock and clay X-ray diffraction (XRD) analyses were
19 performed on each sample in the XDR using a Bruker D8 Advance X-ray diffractometer. All of the percentages were
20 dominated by calcite minerals in Utah Lake. He said this information complements the results found in the
21 phosphorus testing. Mr. Laverre Merritt asked which specific kinds of calcium minerals were involved. Mr. Goel said
22 that they did not differentiate, but that it was mostly calcium polyphosphate and calcium phosphate because of their
23 low pH.

24 They then studied the oxygen sediment demand. Three SOD chambers were installed at two locations in 2010,
25 one location in 2011, and five locations in 2013. (Depending upon the availability of the motor boat from UDWQ.) An
26 image showing the observed SOD, WC and estimated ambient DO depletion rates was displayed. He said the
27 information could indicate that algae and phytoplankton are flowing into the Jordan River. Mr. Merritt asked when
28 this data was collected. He replied that it was most likely done in July and August. Mr. Merritt said that Provo Bay
29 does not have much turbidity and has high nutrient flux.

30 He said we typically see this type of sediment oxygen demand in highly organically rich sediments, but Utah Lake
31 sediments are calcite rich and we are still seeing a lot of SOD; there must be organic sediments underneath.

32 The nutrient fluxes for pH manipulations show high ammonia concentration in Provo Bay. This information was
33 not surprising because of how productive the area is, however, it was surprising that they did not see corresponding
34 results for phosphorus. He said this data suggests that there are not many nutrients coming out of Utah Lake.

35 The study produced the following results: (1) In terms of mineralogy, Utah Lake sediments are dominated by
36 calcite mineral. The white murkiness (turbidity) occasionally seen in Utah Lake water could be due to the physical re-
37 suspension of calcite rich sediments. (2) The total P (TP) varied from a low of 282 mg P/kg of sediments to a highest
38 value of 1747 mg P/kg of sediments. Based on the limited literature, it can be concluded that Utah Lake sediments are
39 low to medium P loaded. The good news is that most of this sediment P is calcium bound and has very low potential
40 to be released in the water column based on the pH variation history of Utah Lake. Calcium bound P is released at low
41 pH values. (3) In terms of total (TS) and volatile (VS) solids, all but Provo Bay entrance sites showed consistent results
42 in which case TS averaged close to 30 % and VS averaged close to 5 %. (4) Long sediment core samples revealed that
43 TS increased with depth whereas VS decreased with depth. VS can be used as surrogate for organic matter. Hence, it
44 can be concluded that organic matter percentage decreased with depth. (5) All but Goshen Bay site showed SOD
45 greater than 1.0 g/m²/d. (6) The WC oxygen demand was higher than SOD at all sites except at the Geneva Steel site
46 where the WC rate was equal to the SOD flux. (7) The pH variations did not affect SOD values. (8) Except at the Provo
47 Bay site, low nutrient fluxes were recorded at all other sites. In terms of concentrations, these were typical of those
48 generally observed by UDWQ in their monitoring efforts. (9) Ammonia nitrogen release was observed at all sites due
49 to pH drop during in-situ flux experiments. The release was highest at the Provo Bay Site. Measurable P releases were
50 recorded at Provo Bay, Geneva Steel and Utah Lake outlet sites

1 Mr. Merritt said it is possible that the loading (amount per kilogram) is due to the constant precipitation of the
2 calcite from the water column to the bottom.

3 Dr. Goel then discussed the next steps that need to take place at Utah Lake. He said future steps would include:
4 (1) Understand P/nitrogen chemistry at more sites. (2) Evaluate the potential of P release across a range of pH and DO
5 conditions, especially at WWTP discharge locations. (3) Evaluate the role of biological processes in contributing to the
6 fate of nutrients. (4) Evaluate nutrient limitation at various locations and relate these with P and N dynamics.
7 (5) Understand the role of organic carbon.

8 Mr. Miller disagreed with the need to treat nitrogen, because the lake is already nitrogen limited. When nitrogen
9 is limited, nature will compensate to encourage nitrogen fixers. He feels research should be focused on
10 nitrogen dynamics and where it is coming from, not just on nitrogen and phosphorus in the lake. Dr. Goel said it was
11 an excellent suggestion and agreed that more data needs to be collected. He said he was hesitant to compare one
12 system to another and that the complete nitrogen cycle must be considered.

13 Mr. Merritt said the changing turbidity and light limitation interacts with the normal cycles of biological uptake
14 and sediment release. Understanding the dynamics is very important in the big picture. We see relatively low
15 phosphorus going down the Jordan River as compared to the 95% that is loading to lake sediments. Dr. Goel said we
16 are not limited by calcium, but by phosphorus.

17 Mr. Hansen commented on the phosphate precipitation in the lake. He said the actual compound formed is not
18 just calcite, but a calcite clay combination. This will bind phosphorus much tighter than if it were just calcite. The clay
19 is actually precipitated in the lake and reduces the phosphorus bioavailability. Reducing the input of phosphates will
20 not make any difference because it becomes biologically unavailable.

21 Mr. Merritt said Utah Lake has very little anoxic conditions at the bottom because of its depth and good mixing.
22 This is why any deep dredging of the lake would be a complete disaster in terms of water quality and algae growth; it
23 would stratify and the bottom would become anoxic. Mr. Merritt said Provo Bay has completely different conditions.
24 Mr. Goel said the phosphorus chemistry is different in wetland sediments. Mr. Theron Miller talked about ortho-
25 phosphorus. He said a scientific meeting is needed to investigate the phosphorus to answer some of the questions
26 that the DWQ has.

27 Dr. Goel said it is important to save our phosphorus resources because it will run out.

28 Mr. Hansen said nitrogen studies need to be done on the lake. He said reduced nitrogen will favor blue green algae
29 on the lake. Dr. Goel said it is a risky conclusion to make unless we have a years worth of data to support that.

30 Dr. Goel said the following things should be considered inside WWTP's. (1) Which one to go for first- P or N or
31 both (2) Targeting both would require plant upgrades (3) Important requirements are the presence of anaerobic,
32 anoxic and aerobic zones in the treatment train and, the presence of rbCOD and alkalinity. He also talked about
33 sidestream treatments, *Struvite precipitation*, Anaerobic Ammonia Oxidation coupled with partial nitrification
34 (DEAMON), and ongoing research.

35 Mr. Hansen said a few technical changes need to be made to the research document. He will give these changes
36 to Mr. Price. He said there is uncertainty with the numbers and is concerned with how accurate they are. He said a
37 group at BYU recently submitted a proposal to the USDA to use anaerobic digestion of waste water to produce biogas
38 in a process to recover ammonia and phosphate. Dr. Goel said they are using the same process.

39 Mr. Adams said if the pH balance is neutral or has slightly acidic conditions, there is a gradient where phosphorus
40 will be released. Mr. Hansen said the pH gradient is more likely to be exponential rather than linear.

41 **6. General comments and ideas for future discussion.**

42 There were no comments.

43 **7. Confirm the next Technical Committee Meeting Scheduled on Monday, July 14, 2014.**

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45 Mr. Mills said the next scheduled meeting is on Monday, July 14, 2014, at 8:30 in Room 211 in the Utah County
46 Historic Courthouse. Mr. Price said the next meeting would be held in July if the dock amendment can be reviewed
47 before then, otherwise it will be in August. He said he would send out an email to inform the group.
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8. Adjourn.

Ms. Sarah Johnson motioned to adjourn the meeting and Mr. Sorensen seconded the motion. Voting was unanimous in favor of the motion and the meeting was adjourned.