

Barr Lake/Milton Reservoir Watershed Association  
 BMW Board Retreat  
 February 27<sup>th</sup>, 2018 9:00 am – Noon  
 Metro Wastewater Reclamation District

**Minutes**

**Board Attendance:**

Steve Lundt – Metro  
 Chris Douglass - ECCV  
 Dan Delaughter – L/E WWTP  
 Laurie Rink – FRICO  
 Charlene Seedle – South Adams  
 Sarah Reeves – SPCURE  
 Michelle Seubert – CPW

Drew Damiano – United Water  
 James Boswell – Thornton  
 Harvey Harper – ERD (phone)

**Public Attendance:**

Amy Conklin – BMW Coordinator

Dan welcomed the group and everyone introduced themselves.

**Updates/Action Items**

General Public to Address Board – No one from the public was present.

Chair’s Report –

Spill reporting protocols – A recent spill at Bluff Lake Nature Center prompted Dan to inquire about BMW spill reporting protocols. Currently, Tri-County Health notifies Steve if there is a spill in our watershed. The Board asked that **Amy** ask Tri-County Health to be notified as well. Steve will be the primary contact, with Amy as the second.

Annual Report – The Board concluded that producing a very brief Annual Report would be a good idea now that Publicly Owned Treatment Works (POTWs) are beginning to implement Regulation 85 improvements. **Amy** will add it to her next contract and begin work in July by asking members for any content they would like to contribute. The hope is to have it ready to hand out at the Annual meeting and BBQ in September.

Treasurer’s Report

As of the January 31<sup>st</sup>, 2018, we have a balance of **\$207,235.41**. Laurie noted that all expenses are not within budget. The Board voted to move \$700 from Unexpected Opportunities into Website Maintenance and \$300 from Unexpected Opportunities into Meeting Support. There was a Thumbs up vote to make the change.

CMF – Membership Dues. The Board discussed retaining membership in the Colorado Monitoring Framework concluding that it is a good organization to retain membership in. **Laurie** will represent BMW at CMF meetings. There was a Thumbs Up vote to pay the membership dues.

<b>December Expenses - Paid</b>	
1993 - Applewood Bookkeeping	\$ 40.00
1994 - Joy Labadie, website	\$ 80.00
1996 - Amy Conklin, coordination	\$ 4,274.60
<b>January Expenses - Paid</b>	
1995 - TWS Financial, tax prep	\$ 525.00
1997 - Amy Conklin, coordination	\$ 1,258.75
1998 - Joy Labadie, website	\$ 150.00
1999 - Applewood Bookkeeping	\$ 40.00
<b>February Checks to Sign</b>	
2000 - Amy Conklin, coordination	\$ 3,393.24
2001 - Joy Labadie, website	\$ 50.00
2002 - CMF Membership	\$ 4,850.00
2003 - Applewood Bookkeeping	\$ 40.00
<b>Total Dec - Feb Expenses</b>	<b>\$ 16,150.34</b>

Update on External Influences – This item was not discussed and will be added to the April Board meeting Agenda.

Coordinator Updates (Amy C.)

Approval of the January 23<sup>rd</sup> Meeting Minutes – There was a Thumbs Up vote to approve the meeting minutes once the meeting dates at the end of the minutes are corrected.

Bike Tours – The Board reviewed the history of the bike tours and concluded that they wanted to be able to track the costs for the tours. The task will be pulled out as a separate line item next year. BMW is willing to be the lead and apply for the mini grant. BMW is willing to be the face of the tours but doesn't want to be the sole funder.

Website - SSL certificate and checking links – The Board concluded the website doesn't need a SSL certificate and we can ask the intern to spend some time checking the links on the site.

By-laws changes for March 19<sup>th</sup> - Laurie's recommendation is to have attorney review the By-laws and Financial Policy changes being proposing. Amy Woodis is willing to review By-laws. There was a Thumbs Up vote to retain Amy Woodis to review the By-laws and Financial Policy with **Laurie** as the point of contact. Amy's fee would be an in-kind contribution from Brown and Caldwell. One question to answer is whether the Board can increase membership dues without Stakeholder approval.

**Technical Committee** – Steve presented a proposal from Integral to do additional modeling using the watershed and in-lake models. The proposed work is to make sure the models will be adequately updated and validated in preparation for hearings in 2022 and 2027. The current proposal would use water quality data from 2011 – 2017 to validate the models. The modeling would include updates such as the Northern Treatment Plant coming online and the Burlington pumps being turned off. Laurie noted that there is a reasonable likelihood that the Burlington Pumps will be up and operational within a 2-year period. James concurred. Ken Wagner would re-evaluate his internal loading estimate. The Technical Committee (TC) recommends we use Integral and do the modeling. We're hoping it is an easier effort because we can use the Data Sharing Network (DSN) to get the data. In about a year, Integral could give us a memo on how well the model reflects reality and maybe evaluate some treatment scenarios, especially for in canal treatment. Ken would evaluate loading amounts and sources to identify changes to loading estimates. The TC concluded that the models are sufficiently detailed for our watershed.

BMW had budgeted \$30,000 for modeling in the 2017-18 fiscal year. This proposal is \$55,000. Laurie would like some clear explanation of how the modeling will help with implementation into the future and how the model update is preparing us for 2022 and 2027. It can be part of the justification for increasing dues. The Management scenarios haven't been articulated but the proposal calls for 5 scenarios. Laurie would like to make sure that the scenarios evaluated reflect reality. Steve pointed out that none of our modeling scenarios show us getting to the TP goal in the TMDL. Chl-a can be met but it is hard to get to the TP goal.

Steve can work with Ken Wagner to articulate how the modeling effort supports BMWs efforts to be ready for hearings in 2022 and 2027. Steve sees the modeling effort supporting work that may be required for site-specific standards and a Use Attainability Analysis (UAA). Dan's recollection is that the modeling effort is to make sure the model is validated with the data that has been collected. This effort would be the first time we've run the model against eight (8) years of data. The management scenarios and presentation tasks may not be needed for this effort. It would be helpful to understand how the results of the modeling efforts could be incorporated into the White Papers. The Board requests that the TC develop a couple of paragraphs about how the modeling efforts fit into implementation of the TMDL. There may be justification for validating the model and maybe running scenarios as they come up. The topic will be revisited in April.

Monitoring station – Steve reported that the stormwater monitoring station needed to get a new power source from Xcel. He is working with Xcel to get the power and the concrete pad for the station has been poured. GEI has ordered equipment and will begin sending us invoices. The goal is to have the stormwater monitoring station operational by the end of March.

**Harvey Harper Call** - Steve reviewed that last month the Board had a discussion about how we wanted to prioritize and fund implementation projects. Harvey was asked to call in and review his work on in-canal treatment. The original concept of constructing in canal treatment was to address background loads coming from upstream reservoirs. Laurie and Steve gave many presentations on in canal treatment with the obstacle being funding. Who will pay for it?

Harvey reviewed the work he presented in June of 2014. He evaluated treatment options for water going into Barr Lake. They looked at constructed wetlands and some other options concluding that alum treatment would be the most efficient and cost effective. They identified the best location for the treatment works which is a property on the south side of the lake owned by FRICO.

Included in the effort was an inflow analysis to help design a treatment strategy. The flows into



Figure 4-11. Assumed Annual Floc Depositional Areas in Barr Lake.

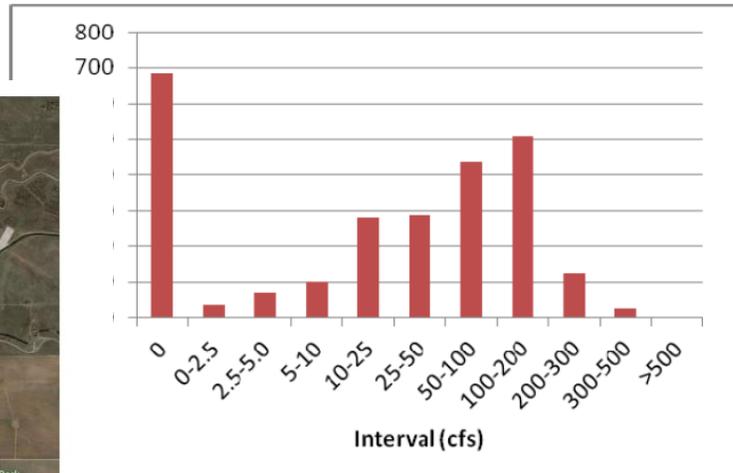


Figure 2-2. Frequency Distribution of Inflows to Barr Lake.

Barr are extremely variable. They also looked at discharge rates. To reduce phosphorus (P), we'd need to treat a range of discharge rates. P concentrations are

highly variable in the inflows and are primarily Soluble Reactive P which is highly available for algal growth. Alum is very effective in removing SRP. Nitrogen (N) is also variable but not as important as P in regulating algal growth. The highest loading occurs in the fall and winter. Other times of the year the loadings are substantially less. Jar testing was conducted to evaluate pH impacts of adding alum with pH remaining above 7 in all the tests. P was dramatically reduced by alum addition in the jar tests but very little N was removed. The alum was very efficient at removing P even at relatively low doses. A list of pros and cons of the different treatment options was developed.

Harvey reviewed that letting the floc migrate into the lake is the cheapest option but there may be permitting issues surrounding letting floc incorporate into the lake sediments. They evaluated where in the lake the floc might migrate concluding that it would migrate into the deeper parts of the lake and close to the inlet. They also calculated the amount of floc that would be generated. In Harvey's experience, the floc integrates into the lake sediments and doesn't form a separate layer. The cost for an in-canal alum treatment system would start at about \$800,000- 900,000. More P could be removed by adding more alum. He estimates

that the cost of P removal would be about \$25 per pound; \$50 per kilogram. Alum was by far the least expensive option and very effective.

The Board discussed that the option of removing 2,500 kg/yr was originally selected to remove the background loads from the upstream reservoirs. Upstream reservoirs contribute about 2,500 kg/yr of P to Barr and Milton. Some of the other upstream dischargers are considering using in-canal treatment with pollutant trading options. Some POTWs are exploring the option of using in canal treatment instead of upgrades at the plant. Metro may be interested in exploring the option of in canal treatment for Milton if it made sense. The price of removing the last little bit of pollutant in the discharge gets increasingly expensive.

The costs of a pilot study are just as expensive as building a permanent system. We would be the first in the state to implement in canal treatment. There may be some ways to reduce costs but that would require additional work to design a cheaper system.

One of the big questions to be resolved is whether or not the floc can migrate into the lake. Floc in the sediments would help reduce internal loading. We may want to consider the flexibility of being able to capture at least some of the floc. The next step may be working

**TABLE 5-1**

**SUMMARY OF CONSTRUCTION, O&M, AND  
TOTAL PHOSPHORUS MASS REMOVAL COSTS FOR  
THE ALUM INFLOW TREATMENT OPTIONS**

OPTION	CONSTRUCTION COST (\$)	ANNUAL O&M COST (\$)	MASS TP REMOVAL COST <sup>1</sup>	
			\$/kg	\$/lb
1. <u>2,500 kg TP/year</u>				
a. Floc Discharge to Lake	1,161,456	133,618	59.50	26.98
b. Full Floc Capture	1,776,474	148,428	75.90	34.42
c. Partial Floc Capture	1,538,005	144,923	70.20	31.84
2. <u>14,500 kg TP/year</u>				
a. Floc Discharge to Lake	1,211,256	443,392	25.00	11.34
b. Full Floc Capture	5,212,658	491,953	41.00	18.59
c. Partial Floc Capture	3,369,980	471,572	33.70	15.28
3. <u>53,250 kg TP/year</u>				
a. Floc Discharge to Lake	1,334,856	1,326,851	18.20	8.25
b. Full Floc Capture	12,085,361	1,475,634	30.20	13.70
c. Partial Floc Capture	7,022,987	1,407,483	24.60	11.16
4. <u>68,160 kg TP/year</u>				
a. Floc Discharge to Lake	1,334,856	1,569,759	16.60	7.53
b. Full Floc Capture	14,205,839	1,746,355	27.80	12.28
c. Partial Floc Capture	8,097,689	1,664,297	22.50	10.20

1. 20-year present worth cost,  $i = 4\%$

with the regulators. We would also need to identify the partners who are going to fund the effort. When would we want to put it in place. After we line up the partners, then we would meet with the regulators. We would need to establish the assurances needed from regulators before we are comfortable building the system.

If in canal treatment could replace some of the work needed to comply with Reg. 85, it would become more attractive. POTWs may want to see how the lakes respond to the removal efforts to meet Reg. 85. The Board will continue considering in canal treatment before the water quality improvement from POTWs implementing Reg. 85 requirements are observed.

There is a market in FL for alum floc cake for use in restoring wetlands from agricultural use. The alum floc is blended into the soil. It is also used as filter media for stormwater treatment. If there isn't a secondary market for the alum floc cake, it can be used as clean fill. We may have to demonstrate that the floc was clean enough for disposal. If the floc is clean enough, it could be mixed with POTW biosolids and applied per usual.



After 30 days  
Once completely dried, the floc forms into a rock hard material that will not re-dissolve

Unless someone steps up to say they are considering using in canal treatment, we may not want to expend money evaluating the option any further. However, it might be a good time to have Colorado regulators talk to Florida regulators to work through permitting issues. BMW is aware of all the organizations using Alum in Colorado and has been in contact with them. It is believed that if an existing permittee wanted to use alum, Aluminum and sulfate would be added as constituents in their permits.

When in canal treatment was discussed with the regulators several years ago, they were non-committal but not adamant against it. We need to wait until we're closer to constructing an in-canal treatment before meeting with regulators. L/E POTW is evaluating in canal treatment as an option for plant improvements but it is in the feasibility stage. The analysis will be completed within the next 5 years. Metro may analyze using in canal treatment for Milton but the timing of the analysis is uncertain. One issue that would have to be resolved is potential loss of water storage space. The next step is identifying a discharger who is really interested in building an in-canal system. A lot more details would need to be scoped out before conversations with regulators would start. It's a great a great option for P removal except for the logistics of who's going to pay for it.

**Retreat Timeline and Work Products** – Due to lack of time, work on the white papers will be scheduled for the next Board meeting. The Board should review the drafts that have been completed before the next meeting. Working on the white papers will be the first item on the April agenda, starting with the drafts that are already complete.

**I & E Committee** – Steve reported that the I&E Committee was meeting on March 6. They will be interviewing interns next week. Michelle reported that she will be submitting the grant application for Lake Appreciation Day tomorrow. On April 21<sup>st</sup> the Bird Conservancy of the Rockies will be having a celebration. April 14<sup>th</sup> is the Raptor Run. BMW will be participating in the Furry Scurry in Washington Park in May. Juliana Archeleta will be using the poop emoji balloon. The stormdrain marking App has been updated and an event with middle school students has been scheduled for April. There will be a BMW watershed tour in June of the North Denver Cornerstone Collaborative projects. **Amy** was instructed to begin advertising for the event as it might be very popular and to try to get a head count. **Steve** will ask Denver if they might be able to assist with transportation.

Sarah Reeves reported that a meeting with the EPA Region 8 Director had been scheduled for March 9<sup>th</sup> regarding Corrosion protection options. There would be a call on February 28<sup>th</sup> to organize participants for the meeting and develop a list of questions. The goals of the meeting include listening to EPA's position on treatment options and to try to have EPA understand the unintended consequences of using P to control corrosion. CDPHE must announce their decision for the treatment option Denver Water needs to use by March 20<sup>th</sup>. Denver Water would have two years to implement the preferred option.

### Next Meetings

- I/E Committee Meeting – **March 6<sup>th</sup>, 2018 9am, Barr Lake Nature Center**
- Stakeholder Meeting – **March 19<sup>th</sup>, 2018 9:30 am, Northern Treatment Plant**
- Technical Committee meeting – **March 22<sup>nd</sup>, 2018, 9 am, Metro**

## **BMW I/E Events for 2018**

Date	Event	Activity	Name and contact
3/24/18	L/E WWTP River Clean Up	Pick up trash	Deb P.
Friday 4/6/18	Stormdrain Marking, McAuliffe Middle School	Stormdrain marking	Steve L., Donny R.
Saturday 5/5/18	Furry Scurry Washington Park	Booth, balloon	Donny R., Intern
Saturday 5/5/18	Barr Lake Spring Fishing Clinic	T-shirts, Booth	Michelle S.

Thursday 5/10/18	Tri-City Water Festival	Speak	James and Michelle S.
Wednesday 5/16/18	Denver Metro Water Festival	Booth	
Thursday 5/17/18	Aurora Water Festival	Booth	
Thursday 5/17/18	Boat Safety Celebration and Birding by Canoe	Booth?	Michelle S.
Saturday and Sunday 6/23 – 24/18	South Platte River Fest	Booth	Donny R.
Saturday 7/14/18	Lake Appreciation Day	T-shirts, Booth	Steve L., Michelle S.
Friday 8/3/18	Adams County Fair	T-shirts, Booth	Michelle S.
Saturday 9/8/18	Barr Lake Fall Birding Festival	T-shirts, Booth	Michelle S.
Saturday 9/22/18	Barr Lake Bark in the Park	Pet Waste Message	Michelle S.
Tuesday 9/25/18	World Water Monitoring Challenge	T-shirts, Booth	Deb P.
Saturday 9/29/18	National Public Lands Day, Shoreline Clean up	T-shirts, Booth, pick up trash	Michelle S.
10/9-11/18	Watershed Assembly Conference	Booth, speak	Amy C.
Saturday 10/13/18	Barr Lake Harvest Festival	Help out	Michelle S.
Saturday 10/27/18	Barr Lake Halloween Trail	Help out	Michelle S.
Wednesday 11/7/18	Cherry Creek Stewardship Partners Conference	Booth	Amy C.

