Barr Lake/Milton Reservoir Watershed Association
BMW Board Retreat
December 3rd, 2019 9:30 am – 3:00 p.m.
REI Flagship Store, Community Room

Minutes

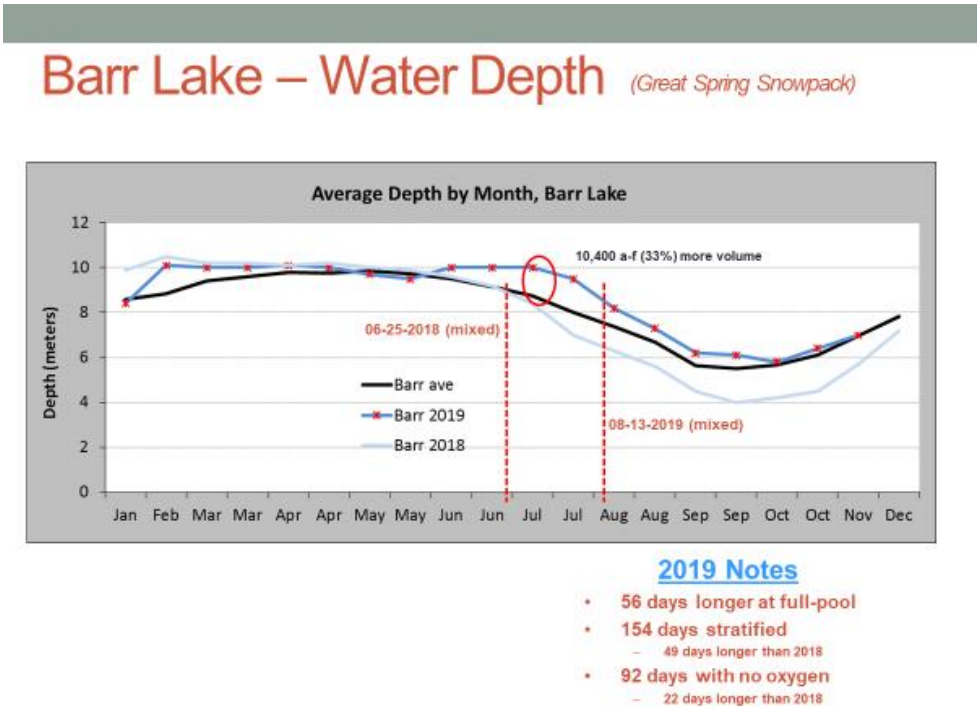
Board Attendance:
Steve Lundt – Metro
James Boswell – Thornton
Julie Tinetti – Centennial
Dan DeLaughter– SPWRP
Brad Cox – DPW
Michelle Seubert – CPW
Erin Jenkins – SPWRP
Chris Douglass – ECCV
Curt Bauers – FRICO
Lauren Barclay – Intern
JM Grenbenc – S. Adams
Chris Douglass - ECCV

Public Attendance:
Amy Conklin – BMW Coordinator

Dan welcomed the group and everyone introduced themselves, while enjoying delicious treats.

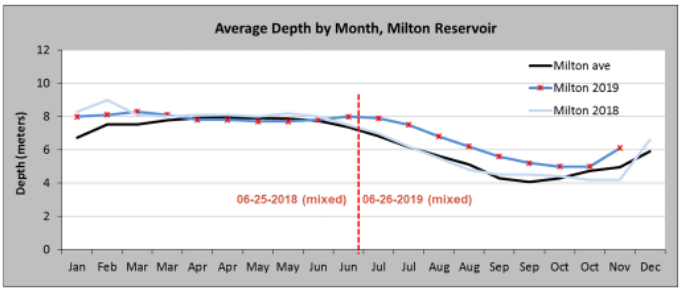
Water Quality Highlights – Steve made a presentation on the water quality in Barr Lake and Milton Reservoir titled 'Stormy Waters'. He noted that there will be one more sampling event in 2019 on December 17th. Lauren Barclay is planning to go with him and get hands on field experience.

One of the biggest impacts to water quality in both Barr Lake and Milton Reservoir is the inflow and outflow management controlled by FRICO. This year Barr Lake remained full for a longer than normal number of days which should have resulted in improved water quality; but didn't. (Dilution can be the solution to pollution.). Barr Lake remained at full pool 56 days longer than normal staying stratified for 154 days; 49 days longer than 2018. When the lake is stratified, the bottom layer of water becomes isolated and doesn't mix with the rest of the water column. Under these conditions, the dissolved oxygen (DO) is consumed; the water becomes anoxic. Under anoxic conditions, the Phosphorus (P) that is bound in the sediments is released (aka internal loading), becoming an important source of P to the system. There were no anomalies with the temperature profiles; temperatures were what we would expect to see from a stratified lake.



Milton also had more days at full pool in 2019 than in 2018, but because the lake is shallower, about 8 meters instead of 10 meters at Barr Lake, Milton didn't remain stratified. It was stratified for only one day longer in 2019 than in 2018. Because Milton Reservoir is shallower than Barr Lake, the water mixed more easily. Eight meters appears to be the limit for when a lake stratifies or mixes in both water bodies.

Milton – Water Depth *(Great Spring Snowpack)*

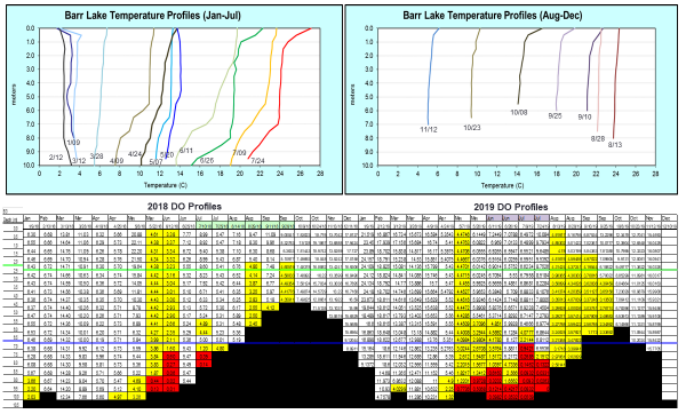


2019 Notes

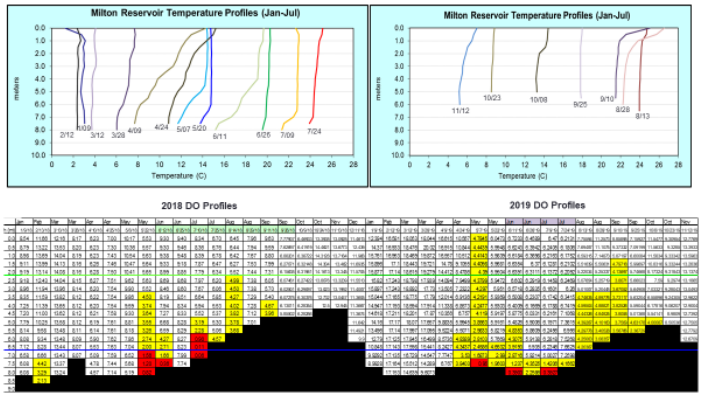
- 56 days longer at full-pool
- 111 days stratified
  - 1 days longer than 2018
- 21 days with no oxygen
  - 0 days longer than 2018

In both water bodies, there were blooms of diatom algae under the ice in the spring creating the low DO and increased internal loading. In August, there were algae blooms in both water bodies creating low DO and increased internal loading. In both lakes the DO standard was not attained, the pH standard was not attained, and more P was released from the sediments than in other years. The lake model is structured so that the internal loading amount is based on the number of days the lakes are stratified, so no adjustment to the internal loading assumption is needed. However, the shallow nature of Milton Reservoir, combined with the inflow and outflow management, makes it hard to model.

Barr Lake – Temperature & DO



Milton – Temperature & DO



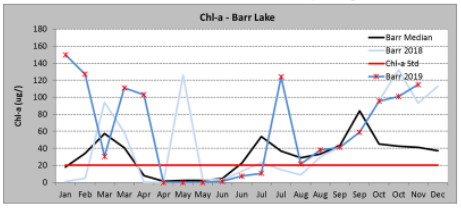
If alum were applied in the lake, the P in the sediments would be permanently bound. The DO standard would still be violated, but the P loading would be reduced. In canal treatment would reduce the spring DO violations. It would be better to apply the alum in canal and have the flocc migrate into the lake than to just treat in the lake.

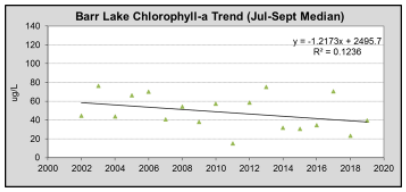
The Board discussed the possibility of managing the P loading coming from the Burlington canal by using a sensor that would shut off the headgate when P concentrations exceeded a certain level, such as 3 mg/L. The obstacle to overcome would be the risk to water rights. If water was not diverted because of the P concentrations, FRICO water rights holders may not have the opportunity to fill their water rights when the P concentrations were lower.

Ken Wagner has concluded that the best option is to use in canal treatment first. If target water quality goals can't be attained with in canal treatment alone, de-stratification measures may be needed as well. Steve has concluded that it doesn't take a lot to degrade the water quality but it takes a lot of energy to fix it once degraded.

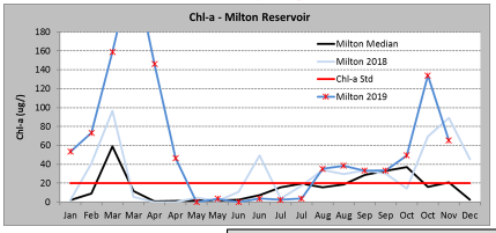
While the P loads in Barr Lake were lower than average, the Chlorophyll a (Chlor a) values were average. Chlor a went to zero after the diatom bloom in February through May, then spiked again in July with the blue green algae bloom. The long term trend shows that average Chlor a levels are steadily decreasing. Milton is typically clearer than Barr. Water Quality in both lake show that Chlor a levels are decreasing and the water quality goals in the TMDL are probably pretty accurate.

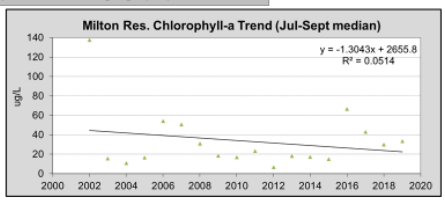
Barr Lake – Chlorophyll-a





Milton – Chlorophyll-a





Steve tried to relate P concentrations to Chlor a values without success because the lake is not yet P limited. We are moving closer to making the lakes P limited. Milton had higher P concentrations but lower Chlor a which is an example of how Milton is hard to model; it doesn't always follow normal trends. Alkalinity levels are getting lower in both lakes, which may have an impact on pH levels in the future.

Stormwater – Steve noted that one week of sampling was missed because the hose in the sampler froze. The P concentrations in the stormwater are lowest during snowmelt and runoff (dilution *is* the solution to pollution). The lowest P concentrations at the Burlington Canal Headgate are in June or July. The weekly P loads coming into Barr lake vary little from the P loads going into the Burlington Canal. About 30,000 kg/yr are coming into Barr Lake with the

loading being pretty steady until the ditch is turned off. GEI will provide an update on storm event data for 2019 in January of 2020. That data should provide some updated load estimates.

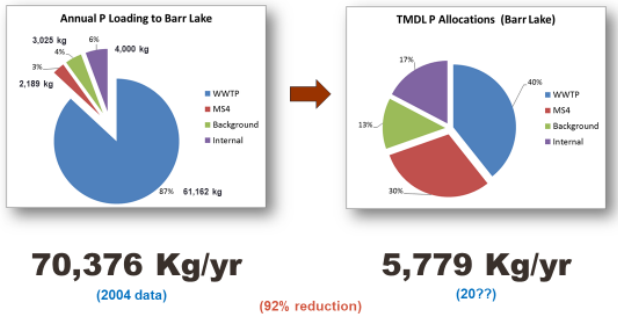
TMDL Allocations

Table 4.1 Barr Lake Load Allocation Strategy

Source	Current Load kg/yr	Current Load %	Rationale	Reduction	Target (kg/yr)
Wasteloads					
Burlington Pump Works	26,075	37.1%	TP Treatment upgrade: 2.8 mg/L to 0.10 mg/L	96.5%	913
Littleton-Englewood WWTP	33,893	48.2%	TP Treatment upgrade: 2.9 mg/L to 0.10 mg/L	96.5%	1,186
Centennial WWTP	1,194	1.7%	TP Treatment upgrade: 0.70 mg/L to 0.10 mg/L	85.5%	173
MS4 Regulated Areas	2,189	3.1%	Some activity over last decade, plus more BMPs	20.0%	1,751
Wasteload Total	63,351	90.1%		93.6%	4,023
Loads					
Upstream Background	3,025	4.3%	75% TP reduction through in-canal treatment to reservoir	75.0%	756
Benthic P Load from Barr	4,000	5.7%	In-lake treatment to inactivate P in upper 10 cm of sediment	75.0%	1,000
Load Total	7,025	10.0%		75.0%	1,756
Total Load	70,376	100%	Target load of 5,900 kg/yr & in-lake July-September concentration maximum of 0.10 mg/L	91.8%	5,779

Phosphorus Reductions

(Barr Lake, 2013 pH & DO Phased TMDL)



70,376 Kg/yr (2004 data)

(92% reduction)

5,779 Kg/yr (20??)

For reference, Steve included slides of the P wasteload allocations from the TMDL. In 2004, the loads to Barr Lake were about 70,000 kg/yr. Since then, the loads have decreased to about 30,000 kg/yr, but the goal is just under 6,000 kg/yr.

South Platte Water Renewal Partners (SPWRP) will have their P treatment online soon. FRICO decides to divert on an hour by hour basis. It may be worth exploring trying to coordinate increased P treatment at SPWRP on days when FRICO knows it will be diverting. Loads coming from 1st, 2nd, and 3rd Creeks can also be significant and can cause load amounts into Barr to be different than just loads coming down the Burlington Canal. It might be worth exploring the option of putting an automatic sampler on one of the creeks to measure loads.

Implementation Plan –

External Influences – The Board noted that there has not been a formal announcement from EPA about their decision on allowing Denver Water (DW) a variance for Optimal Corrosion Control Treatment (OCCT). DW has requested a 3-year conditional approval to prove up that removal of the lead pipes is possible and effective. CDPHE has issued a letter of support for DW's variance request. CDPHE has also issued an approval to DW's modification request to treat with Ortho P at 2 mg/L instead of the original 3 mg/L. Hopefully, they won't have to use Ortho P at all. Even if DW is granted a variance, there exists the possibility that other drinking water providers will have to treat with Ortho P. It remains a potential external influence to the TMDL.

Steve noted that the USGS had completed a sort of longitudinal study of the South Platte River from Chatfield to 120th St.. The longitudinal study was originally proposed as part of the OCCT stakeholder process but morphed into a study of limited use because it was done in October when people weren't watering their lawns and the Burlington was sweeping the river. Hopefully the USGS will issue a report of their methods and results.

De-watering Permits – The Board reviewed **Dan's letter** to CDPHE regarding General industrial de-watering permits and gave it a **Thumbs Up approval to be sent out**. The letter requests that all new general permits that are being converted into individual permits be required to monitor for P. If the discharges have concentrations above 1.0 mg/L of P, then the permits should have numeric limits as to what the P discharge can be and CDPHE should clarify where the wasteload allocation for the permit is coming from. In the past, CDPHE has said that the wasteload allocation for the industrial dischargers is part of the background allocation. Their argument is that the permits are temporary and not increasing to the overall background load. The BMW position is to measure that assumption.

There has been an effort to improve P concentrations in runoff from de-icing efforts. Some progress is being made. APWA has been holding events to help coordinate de-icing improvements. CDOT has been the gold standard for de-icing techniques and they may be going to P-free deicing materials. BMW could consider organizing a de-icing education event.

Use Attainability – Amy Conklin reviewed Amy Woodis's white paper on Site-Specific standards (SSS) and Use Attainability Analyses (UAA). She summarized the conclusions of the paper and other board discussion as recommending:

- Not spending significant resources to adjust the numbers of the criteria. The current P value in Regulation 85 is 83 ug/l as an average in the mixed layer with a 1 in 5 year exceedance. The target goal in the TMDL is a 100 ug/L maximum with an average concentration of 40 to 60 ug/L in Barr and 46 to 69 ug/L in Milton. The Chlor a criteria in Reg. 85 is 20 ug/L average with 1 in 5 years exceedance. The criteria in the TMDL are 20 ug/L as the 80^{th} percentile with a maximum of 25 ug/L.
- A holistic, watershed based approach is recommended.
- Use of Reg. 85 as an adaptive management tool is also recommended.

The group discussed seeking a SSS for Chlor a at 25 ug/L and including June measurements as part of a median (not average) standard, with a 1 in 5 year exceedance. CPW would be a key stakeholder to get consensus from because the fishing and recreation uses would be key uses to protect. The Implementation Plan (**IP) Committee** will expand the concept further in the IP update.

Michelle had discussed a users' survey at Cherry Creek State Park with Jason Trujillo and learned that the focus of the survey was on the Dog Off Leash Area and changes made to that part of the park. However, CPW may be conducting a survey at Barr Lake this summer. Michelle thought we might be able to add a few questions specific to water quality and its impact to users. The question could focus on the fishermen and paddle sports users. If we can develop a few questions, we can ask Milton to query its users as well. The **IP Committee** can look into this option as well.

Another key component missing in the IP is all the new developments occurring at Publicly Owned Treatment Works (POTWs) from compliance with Reg. 85. As Reg. 85 is getting implemented, it would be good to connect the new developments to water quality improvements. The IP should also include how the BMW TMDL fits into the 10-year road map for water

quality. Facilities may be less likely to participate in the incentive program of Reg. 85 if the BMW TMDL will trump any requirements promulgated in Regulation 85. The discussion should begin as soon as possible, before conflicts arise.

The Board discussed the concern that the standards for warm water bodies adopted by the state are unattainable. Barr and Milton may remain on the 303 (d) list because the standards are unattainable and there are other water quality species for which the water bodies may be listed including Arsenic. If the standards are unattainable, would BMW want to seek SSS? For the water quality species, like Arsenic, that the water bodies get listed for, would BMW seek SSS? These and others are for the **IP Committee** to tackle.

When the BMW develops an IP update, what is the process to getting it enforced? IPs are voluntary and not really enforceable. The enforceability link is adding TMDL limits to discharge permits. Part of BMW's job is to make sure CDPHE is doing its job and enforcing the TMDL.

There was a Thumbs Up vote to create an **IP Committee** with **Dan, Steve, Erin, Curt, Brad and Katie Koplitz**. All the meetings of the committee will be announced to the entire board and everyone is welcome to attend. IP updates will be a standing agenda item for the Board moving forward. **Dan** will schedule an IP Committee meeting before the January 28th Board meeting. The goal will be to have categories of things that need to get updated. It is also important to keep track of the things we've accomplished as we move forward. Other topics that may be included in the IP update are BMP removal efficiencies, a Data Visualization Tool, and a Land Use component.

Budget Review –

Chris reported that long term budgeting would be difficult to accomplish until the Board decides what projects we want to pursue. Last fiscal year, BMW had $122,000 in revenues and budgeted $140,000 in expenses. Because the BMW fiscal year runs from August 1st to July 31st, there could be difficulties in tracking multi year expenses. There is a $250,000 carry over which is much more than we thought we'd have in the old 5-year projections. We are not spending what we thought we would when the last round of 5-year projections were developed.

Revising modeling and monitoring efforts may be a recommended expenditure from the IP update. BMW has been advised that pursuit of a UAA or SSS could be as much as $1 million. Another strategy may be to help partners with their capitol projects. The **IP Committee** was encouraged to adopt a goal to develop a Scope of Work for a Consultant to help guide and finalize the focus of the IP update. The goal would be to get the IP update and task list about 80% done and hire a consultant to complete the last phase. Funding sources may likely be a driver of tasks coming from the IP. Knowledge of funding opportunities should be included in the Scope of Work.

Estimates of Carp removal costs – Steve developed estimates of the amount spent harvesting carp and calculated a per pound of P cost. He estimates that about $18,000 have been spent to remove 3,840 carp or an estimated 250 lbs of P. That cost is about $7.20/ lb. If the pounds of fish removed (55,905) and the P they contained is added as well as an estimate of the amount of P they would bioturbate into the water column, the cost per pound drops to $6.96. So, the carp harvesting project is cost efficient and worth continuing. Steve will continue to work with the group in Minnesota to use the carp net and volunteers from Barr Lake. Carp removal is part of the solution to protecting water quality. Steve will keep the Board informed about future carp removal successes.

2019 Board Photo

Developing Wish List of Project – Amy explained that she would like to have the Board work on developing a list of projects they could have ready when funding opportunities are identified. The Board discussed sonic wave disruptors that claim to have the ability to lyse algal cells and concluded that the technology hasn't been proven yet. Steve reminded everyone that the Technical Committee has developed a list of projects, shown at the right. In canal treatment is the only option that has been explored enough to be ready to propose as a water quality management option. In canal treatment is proposed to be a polishing step for water prior to entering Barr Lake. Metro is also considering using in canal treatment for Milton Reservoir. Funding remains the obstacle to in canal treatment.

General Management Options within Lakes and Reservoirs

Ranked in Order

1. **Rules and Regulations** – Restrictions on human actions directed at minimizing impacts
2. **Nutrient Inactivation** – chemical complexing and usually precipitation of nutrients, mainly P
3. **Biomanipulation** – Facilitation of biological interactions to alter ecosystem processes
4. **Aeration or Oxygen Addition** – mechanical maintenance of oxygen levels
5. **Artificial Circulation** – Water movement to enhance mixing and/or prevent stratification
6. **Partitioning for Pollutant Capture** – Creation of in-lake areas, such as forebays and wetlands, to capture incoming pollutants
7. **Dredging** – Removal of sediment under water or dry conditions
8. **Dilution/Flushing** – Increased flow to dilute or minimize retention of undesirable materials
9. **Biocidal Chemical Treatment** – addition of inhibitory substance intended to eliminate species

Developing a data visualization tool may be another project ripe for partnering with others to develop. Cherry Creek Basin Water Quality Authority has developed a tool that could be a good template to follow. **Erin** will present what she's been able to put together so far at the January 28th, 2020 Board meeting. The **IP Committee** will need to work through budgeting for projects and developing a path forward.

Amy presented the conceptual outline the I&E Committee discussed for a presentation on the BMW experience with OCCT. It may be a good presentation to make at conferences such as the Colorado Watersheds conference, the Cherry Creek Stewardship Partners conference and potentially others. **Amy** will work on the outline and present it at the January 28th, 2020 Board meeting.

Review of BMW Policies - James commented that, as Secretary, he had reviewed the documents and had no comments. The Board discussed that the policies had gone through an extensive review last year. The Board gave a Thumbs Up approval to the October 22nd 2019 meeting minutes. The Board had no comments on the draft tax return. The Board approved a $375 honorarium to Carol Delynko for her work on the BMW website. **Steve** will purchase a gift card for her and let Amy know when its available. Moving forward, **Amy** will request that Carol invoice BMW for her time on a monthly-ish basis.

Review memberships – The Board concluded that:

- Heritage Sporting should become a BMW member. **Amy** will prepare an invoice for them and **Curt** will follow up. **Michelle** will prepare a guestimate of the value of the service they provide to Heritage with boat inspections.
- Colorado Stormwater Council – **Brad** will ask them if they would consider joining BMW and allowing BMW to join the CSC as we've done with other stormwater entities.
- McDonald Farms – **Dan** will send Amy good contact information for them and **Amy** will send them an invoice.

BMW Board 2020 'Schedule'

- January 28, 2020 – Meeting at South Adams Water and Sanitation District – Thank you **JM**!
  - **Amy** will present an outline for a presentation paper on the BMW OCCT experience. Too many acronyms (TMA). Amy will reach out to DW to get their feedback on the outline.
  - **Erin** will present what she's done with a Data Visualization Tool
- February 25, 2020 – Stakeholder meeting – Barr Lake Nature Center – Thank you **Michelle**
  - **Steve** - Water Quality update
  - **Chris** – ECCV update
  - **Julie** – Centennial update
- March 24, 2020 – Metro, Thank you **Steve**
  - **IP Committee** – progress report and brainstorming opportunities and funding
  - **Dan/Erin** – Industrial Permit update

- April 28, 2020 – Metro, Thank you **Steve**
    - **GEI or Steve** – Stormwater quality update
    - **IP Committee** - Update
- May 26, 2020 – Metro, Thank you **Steve**
    - Presentation from Lobbyist – **Amy** will work with **Michelle** to get CPW lobbyist to talk to the Board about the legislative process and what would be required for passing P-free fertilizer legislation
- June 23, 2020 – North Denver Cornerstone Collaborative tour – **Amy** will work with **Brad** to set it up
    - Include information on improvements at City Park
- July 28, 2020 – Meet at Metro, Thank you **Steve**
    - **Steve** – will try to set up a tour of Metro's P recovery facility
    - **IP Committee** – Update, maybe draft
- August 25, 2020 – Meet at Metro, Thank you **Steve**
    - **Amy** will invite other watershed groups to attend this meeting and give them lunch. We can ask for an update on activities in Chatfield (including Chatfield Reallocation), Bear Creek (including progress on their TMDL) and Cherry Creek
    - **Curt** (?) – Present on how FRICO plans to operate in regards to the conservation pool at Chatfield
    - **IP Committee** – present final draft?
    - Preparation for Annual meeting and BBQ
- September 22, 2020 – meet at Barr Lake, try to engage more stakeholders, thank you **Michelle**
    - **Michelle** – will help arrange golf cart tour to area where in-canal treatment would be built
    - **Steve** – will present in-canal treatment concept, maybe Harvey Harper can call in
    - **Amy** – will reach out to WQCD (Meg Parish, Joni Nuttle, Nicole Rowan, Patrick P.)
- October 27, 2020 – Meet at Metro, thank you **Steve**
    - General catch up from whatever we didn't get to or need to get to.
    - Other topics – PFAs, invite Paul Winkle to talk about Arsenic and fishing
- November 24, 2020 – Board Retreat

3:00 Adjourn