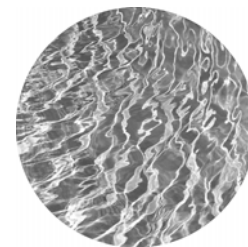

Barr/Milton Watershed Association

Technical Committee



BMW Technical Committee Thursday, January 22, 2009 Metro Wastewater Reclamation District, Administration Building 10:00am – 12:00pm
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Committee Notes

Attendance

Steve Lundt (Metro)
 Ken Heim (ENSR)
 Linda Boyle (Aurora)
 Laurie Rink (FRICO)
 Tammy Allan (CDPHE)
 George (Integral)

Jim Dorsch (Metro)
 Ken Wagner (ENSR)
 Joni Nuttle (CDPHE)
 Al Polonsky (City of Denver)
 Alice Wood (Integral)

1. Water Quality Modeling

Ken H. stated that he completed the 4 scenario runs and plotted the box and whisker plots. The results all made sense and matched similar to the previous runs. The biggest reduction in TP was reducing just Metro and L/E and that any other additions did not change the results much. Ken did state that when you included reduction of internal loading by 70%, that made a big difference. The NPS reductions did not change anything really. Seasonality did help some and might make sense to do it that way.

Ken Wagner will look at a monthly time step to see how the reservoirs behave over the course of a year.

Ken Wagner then talked about his loading memo. He agrees that the reservoirs are co-limited with TN and TP. From the Denver lakes data it looks like background pH for Barr should be around 7.6. pH of 6.5 to 8.5 is normal and it looks like a pH value of 8.5 would give you a TP value of about 0.1 mg/L. Ken W. then went over the summary table and talked about each value and how he got it. Internal loading is a big deal and needs to be addressed. Ken's conclusion is that the summer average TP needs to be 0.1 mg/L or less to satisfy pH. But with so much uncertainty and no correlations, Ken could justify going as high as 0.17 mg/L. Also, the empirical models suggest 0.05 mg/L and from his experience, anything west of the Mississippi River seems to handle twice the models predictions so that puts you also at about 0.1 mg/L. Steve Lundt stated that Metro is concerned about using Denver lake data to determine Barr standards and the large uncertainty with the regressions. Steve stated that Metro is on track to treat to 1.0 mg/L and not 0.1 mg/L. Al Polonski suggested focusing only on the 4 Denver area lakes that get reuse water. Ken Wagner strongly suggested that the TMDL be adaptive and iterative. Pick a number and see how close you get to it and then adjust later. Ken W. also said that it would take 10+ years to see any improvements if you just improve WWTP sources.

We then went over the draft workshop agenda with Ken Wagner. Ken will have about an hour to do the workshop and go through the draft report.

2. TMDL Development

The plan is still to see what the report shows and what is left to be done to write the TMDL.

3. PIP Products

Laurie Rink spoke about the recent Budget committee and that they suggested that a consultant be hired to help out with the development and the products since the grant period has been shorted by a year. Only 17 months left to finish the original products. The budget committee is suggesting getting additional funds from the state to be spent by July of 2010 to help out with these products.

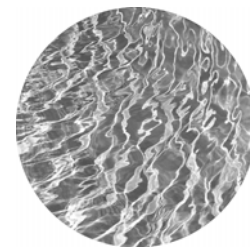
From task 6, there are 8 products

1. Proposed Solutions and Benefits
2. Costs
3. Target Water Quality numbers
4. Feasible Alternatives
5. Allocation Strategy
6. Draft Model and TMDL
7. Outreach Material
8. Final TMDL/Model/TMDL implementation plan

The idea is to write a RFP for a consultant to do products 1,2,4, and 5. Then the Tech committee talked about either sending out a RFP, finding local consultants that are familiar with the area, or continue with AECOM. Steve Lundt suggested going with AECOM and contacting Ken W. to see if they are interested.

Barr/Milton Watershed Association

Technical Committee



BMW Technical Committee
 Thursday, February 26, 2009
 Metro Wastewater Reclamation District, Administration Building
 10:00am – 12:00pm

Committee Notes

Attendance

Steve Lundt (Metro)
 Ken Heim (ENSR)
 Linda Boyle (Aurora)
 Laurie Rink (FRICO)
 Tammy Allan (CDPHE)
 Michelle Ryerson (Metro)
 Kelly DiNatale (consultant)

Jim Dorsch (Metro)
 Ken Wagner (ENSR)
 Joni Nuttle (CDPHE)
 Al Polonsky (City of Denver)
 Darcie Garland-Renn (Integral)
 John Stednick (RMI)

1. Water Quality Modeling

EPA had several folks in attendance and they provided good comments in general. Sandy Spence, with EPA, talked about the process after the development of the pH TMDL. There was also some discussion about dredging the reservoirs. There were some cosmetic corrections for the flow diagram that did not impact the structure of the actual watershed model. There was also discussion over the different costs for the different treatment levels of TP for the wastewater treatment facilities. There were a couple of questions from the audience about the percentages of water and nutrients from the different sub-watersheds. The amount of reduction needs to be shown for each sub-watershed was a suggestion. Overall, the percentage is the best way to show the contributions from each sub-watershed. There was also a question about the partitioning of the inflows to Milton (Beebe Canal vs Platte Valley Canal). Another question that was asked was about additional experiments needed to help reduce the uncertainty, especially with the relationships with chl-a predictions and if any new data can be used to update the model.

Tech committee spent some time talking about doing extra chl-a monitoring in the reservoirs. Ken W. suggested doing several samplings in a day with a compost sampler. The goal would be to get several chl-a readings in one day to get a better average chl-a reading for one day. Steve Lundt said that it would be no problem to spend a day on each reservoir collecting chl-a samples. To get a composite, need to build a 10-20 foot tube that can collect the water column. The other option is to do just a large number of chl-a grabs all around the reservoir. Another idea is to use a fluorometer and taking readings as you motor around the reservoir. By collecting more chl-a, this will help reduce the uncertainty bars around a target. This will help with probabilities of the TMDL to justify the load numbers.

The other field test would be using limno-corrals in Barr to test various in-reservoir management tools, alum and mixing. You could install 3 corrals that would have a diffuser at the bottom and you could monitor the water vs the reservoir for about a week to see if anything changes. This can also happen with adding alum. Would also need 2-3 corrals to do a control as well as test the actual reservoir. The cost estimate for such testing would be around \$30-\$50K. This kind of test would be done for about a week to avoid any water drawdown issues.

Laurie asked Joni Nuttle about in-reservoir TP and internal loading and if the State has determined how to categorize it. Joni said no but said that they are flexible for how it goes. Could any testing or in-reservoir work be funded by NPS and Tammy said basically no that the internal loading is considered point source. Joni stated that she will contact EPA about this topic of PS vs NPS for internal loading.

Kelly DiNatale asked Ken W about various algal types for the modeling output. Kelly's idea is to look at % shift or quantity in species when TMDL is met. Laurie Rink stated that she liked the idea of using limno-corrals to do small pilot tests. Steve Lundt then reminded the committee that since April 2007, very little effluent from Metro has been pumped by the Burlington Pumps into the ditch so the current situation is actual testing one of the modeling scenarios. Ken W. was very interested in this and requested 2007-2008 reservoir TP data.

Steve Lund then updated the committee about Metro's recent modeling efforts by Bill Lewis. Steve said that Metro staff is reviewing the draft report, will meet with Lewis, and then provide the information to the committee and BMW Association. The plan is Metro will submit modeling report comments by March 31st that will include input from Lewis's modeling efforts. The goal is not to have dueling models/modelers but to help close in on the unknowns and uncertainties. By having AMEC, AECOM, and now Lewis all looking at the data and watershed, a converging of all results and assumptions will help build a better plan and pH TMDL.

Ken H. stated that he will send an e-mail to Darcie explaining what modeling trainees need to have software wise. Then Darcie will send it out to the stakeholders to see who wants to be trained on the models. Ken H. then will coordinate a 2-3 2-hr webx training of the model. There will be no instruction booklet but Ken H. will do something to provide a detail explanation of the modeling training.

2. TMDL Development

Both Ken W. and Ken H. terminated their call in and the committee talked about the draft proposal that was written by Steve Lundt and Laurie Rink for AECOM. Laurie Rink stated that she has arranged a meeting with Lucia from the State NPS program to talk about using the mini grant funds and the extension options for paying for this continued effort to complete the TMDL and other products. Tammy Allan stated that there is a new internal Division process and procedures to approve NPS grant funded contracts. This new approval process by the Division is just getting started but the BMW association would probably have to follow it if they entered a new contract with AECOM to write the TMDL. Linda Boyle asked if BMW could avoid this new internal approval process if they just extended the existing contract with AECOM. Kelly DiNatale suggested some minor changes in the language of the proposal draft. The plan is to ask the committee for comments within the next week, Steve will finalize the draft, and then it will be sent to Ken W. The goal is to have Ken W. be able to respond with a proposal in time for the BMW board meeting at the end of March.

The committee then talked about the different options with developing some kind of phased or tiered TMDL approach. Steve Lundt was tasked to e-mail the committee Laurie Rink's e-mail that summarizes the options. The committee overall things that some kind of phased approach makes sense.

3. BMW WQ Database

The question was asked about doing another update to the database like before or use the Data Sharing Network (DSN) to gather new data. Money is leftover from Integrals 2008-09 contract to do an update

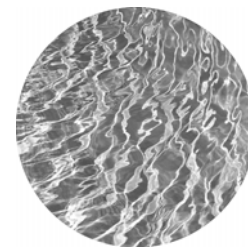
and need to decide what to do with the money and also what to do for 2009-10 coordinator contract. It was suggested to look in the DSN to see how many of the BMW Database entities are actually providing uploads to the DSN. It was also suggested to ask Ken H. about what database outputs are needed to work with the watershed and reservoirs models. The database that can provide the best output to link to the models would be a benefit. Steve Lundt will check into the BMW database to see how many DSN users there are and will ask Ken H. about what he prefers for the model.

4. New Items

Jim Dorsch talked about an Army Corps of Engineer funding source to do environmental aquatic restoration projects. There was a recent meeting with Denver and the Corp to talk about generating a list of potential projects. Jim D. suggested that BMW might want to get on that list. The Corps is focusing on the S. Platte basin and Denver area. Wetlands are a good example and there needs to be a cost-sharing sponsor. The Corps funds are a very slow process so there should be time for BMW. They are also trying to work with Adams County to find projects.

Barr/Milton Watershed Association

Technical Committee



BMW Technical Committee Thursday, April 09, 2009 Metro Wastewater Reclamation District, Administration Building 10:00am – 12:00pm
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Committee Notes

Attendance

Steve Lundt (Metro)	Jim Dorsch (Metro)
Ken Wagner (ENSR)	Linda Boyle (Aurora)
Joni Nuttle (CDPHE)	Kelly DiNatale (consultant)
Laurie Rink (FRICO)	Al Polonsky (City of Denver)
Tammy Allan (CDPHE)	Darcie Garland-Renn (Integral)
Michelle Ryerson (Metro)	Jimmy McCutchan (CU)

1. Water Quality Modeling

The committee went over the modeling report comments with Ken Wagner. Ken W. went over each comment and gave his thoughts about them. Stakeholders that provided comments by March 31st were: Metro, FRICO, Kelly DiNatale, Aurora, and WQCD. L/E did provide comments in hard copy and will be added to the spreadsheet of comments that Integral developed. There were a total of 119 comments.

Ken stated that he had no major problems with the comments and that most all of them were reasonable and will try to address them all except for the WQCD comments. Ken W. asked Tammy and Joni for clarification on their comments since they did provide specific editing comments. Tammy Allan agreed to provide a more detailed matrix of all the factual errors and inconsistencies and will provide that to Ken W. soon.

Close to half of the comments were simple spelling and grammar edits. There were a few comments that required more work by the Technical committee to agree upon before sending to Ken W.

Ken W. then updated the committee about Ken Heim being laid off at AECOM. His replacement modeler will be Theresa McGovern and she helped some with linking SWAT to WASP so she is familiar with the project. The plan to do modeling training will change. Ken H. has completed the webx training packet but training may be done face to face with Theresa to run actual scenarios for the TMDL development phase.

2. TMDL Development

We then went over the scope of work that we requested from Ken W. Ken stated that it was definitely appropriate for AECOM to do task A (TMDL) but thought that the work to develop working papers on feasibility and implementation would be done more appropriately by someone more local. The idea to focus just on the development of the TMDL first was suggested by the group.

3. Metro Modeling Efforts

Metro has asked their water quality modeler to look further into estimating the actual percentage of Metro TP and TN that gets into the actual reservoirs. This question was not addressed with the assessments or the AECOM modeling. The plan is to have Jimmy McCutchan give a summary presentation to the stakeholders in April. To be best prepared, Jimmy was asked to give the same talk to the Technical Committee so that the committee and Jimmy could be best prepared for the stakeholder meeting.

Jimmy gave his talk. Ken W. had to hang up half way through but it was agreed that Jimmy and Ken would speak by phone to go over the modeling results. Ken W. stated that he thought the effort was data driven, done well, and had no heartburn over any of it. Jimmy summarized how they did a mass balance model of the South Platte River to the Platte Valley Canal and also with the Burlington Ditch. Jimmy's presentation will be available on the BMW website and along with the final report.

Jimmy stated that the Metro load to Barr was on average around 30%. This is quite a bit lower than the estimated 55% from AECOM. The possible reason is that not all of the effluent pumped goes into Barr. Metro TN to Barr was 22%. For Milton, it was estimated that Metro TP and TN was 50% and 61%.

The committee asked a few questions, suggested to keep it shorter for the stakeholder meeting, and provide a comparison of his results to both AMEC and AECOM.

4. 2009 Monitoring

There was not enough time to talk about the additional monitoring efforts for 2009 and this was pushed to the next meeting.

5. New Items

Steve wanted to discuss some potential near-term water quality improvement ideas to the group but time ran out also for this item.

6. Next Meeting

It was decided to have the next meeting at the normal date and time for April (April 23rd).

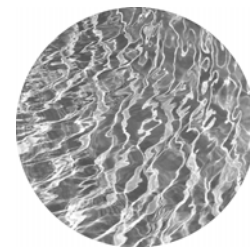
Conference call meeting between Ken W. and Jimmy McCutchan

On April 13th, Steve Lundt arranged a conference call for Jimmy and Ken. Steve Lundt and Jim D. sat in also. Ken W. has some basic "how did you" questions for Jimmy. There was concern about where is the TP going if only 30% is going into Barr. Ken W. stated that his method to get 55% was a rough estimate and that he would go back and get the actual modeling loading numbers for Metro. Ken was also going to make sure flows to Horsecreek were also included.

Overall, the conversation went very well. Both consultants learned from each other and provide only constructive comments. Result, is that both will go back and refine their models based on what they learned.

Barr/Milton Watershed Association

Technical Committee



<p>BMW Technical Committee Thursday, April 23, 2009 Metro Wastewater Reclamation District, Administration Building 10:00am – 12:00pm</p>

Committee Notes

Attendance

Steve Lundt (Metro)
 Ken Wagner (ENSR)
 Linda Boyle (Aurora)

Jim Dorsch (Metro)
 Darcie Garland-Renn (Integral)
 Laurie Rink (FRICO)

1. Water Quality Modeling

Committee spoke with Ken Wagner again on the file list of 174 comments that now included all of L/E, DEH, and the updated list from WQCD. It was decided that the committee would categorize the comments into 4-5 groups: Grammar, General statements & Opinions, Working Paper comments, Consistency, and Controversial comments. The plan is to have the Tech committee decide how to resolve the controversial comments.

2. TMDL Development

Steve Lundt stated that he was concerned about waiting on and relying on 319 grant money to complete the TMDL. The committee then talked about a plan B if the money was not available from the NPS program. Laurie stated that the grant contract still says a deadline of July 2011 and that the plan B would be to proceed with normal contract schedule. Another idea is to have a special assessment from the stakeholders to pay for the \$60,000 TMDL scope from AECOM. Also, the committee could begin to work on a TMDL themselves using material and information that has already been put together.

3. Temporary Modification Update

The committee talked about where the group was with the Temp Mod pre-hearing statement that was drafted up by ECCV's attorney. Sarah J. provided feedback on the draft and had three issues with it:

First: The first sentence is not exactly correct. Uncertainty "involved in the current TMDL planning process" is not grounds for a type iii temporary modification. The uncertainty that prompted our proposal was about the attainment of the underlying standard.

Second: I would shorten up the description of the BMW Association, the history and the TMDL process. This is about the underlying standard, not the TMDL. I believe the 4 phases of your "TMDL Project" extend past the actual development of the TMDL, so there may be some disagreement about when the uncertainty about the underlying standard is actually going to be addressed.

Third: My understanding when I left the meeting at Metro (April 6, 2009) was that one of the major concerns was that the Division not conclude that the underlying standard was NOT attainable. I thought your SB&P language was going to focus on the Division not giving up on meeting the underlying standard. I really don't see that in your language.

Laurie Rink suggested submitting the pre-hearing statement and then work informally with the Division on refining the language as it gets closer to the hearing. The concern is that Kipp S. thinks we are back to square one coming up with a pre-hearing statement that the board will agree on. The deadline is April 28 and there also has to be a vote by the stakeholders. It would be very difficult to finalize a statement and get by off by the Division by the 28th. Amy Woodis blessed the committee by coming in to give her take on the situation. Amy W. suggested a revised version that addresses Sarah J.'s first and second issues without having to change up the statement too much. Laurie Rink then suggested that the stakeholders vote on a pre-hearing statement so that it can be submitted. Then work with the division to refine it for the hearing. Laurie Rink will e-mail out Amy's version to the group.

4. Near-term Rehabilitation Ideas for Barr

Steve Lundt stated that he would like for the committee to spend some time looking into possible projects that could improve water quality in the near-term for Barr Lake. Most of the discussion lately has been around policy and regulatory schedules that are looking out 20 years. There are some things that can be done now to improve water quality until WWTP upgrades are completed and the pH TMDL is implemented.

Idea 1: have Metro effluent pumped to the Denver Reuse plant, treated to 1987 drinking water standards with a TP level of about 0.17 mg/L and then have that water pumped to the Burlington Ditch. This could be a temporary situation until Metro's phosphorus reduction facilities are built.

Idea 2. In-canal alum treatment system could reduce TP before getting to Barr Lake. The idea is to build a slow-release alum system and flocculation collection basin all within the Burlington Ditch. This could be done on a seasonally basis during the fill season. The alum could then be collected and removed from the ditch when the flows are turned off during the summer.

These ideas need to be funded by grants and other programs that are looking to build facilities that are going to improve water quality conditions. Steve Lundt suggested getting away from the NPS grant money and find new sources of money for such projects.

Laurie Rink suggested coming up with a list of questions that need to be answered for these ideas. For example, costs to do them, water rights implications, state regulations, and discharge permit requirements. Steve agreed to work with Denver Water about the reuse idea. Laurie Rink will be speaking with FRICO about the use of alum in their system.

5. 2009 Monitoring

It was discussed at the last modeling workshop and tech committee meeting to collect more chl-a data and to look into doing limnocorrals. Steve Lundt said that he will draft a monitoring plan to collect more chl-a data this summer and that Metro will do it.

As for the limnocorrals, this will cost a significant amount (on the order of \$50,000 or more). With the current funding situation for BMW, the committee decided it was best to focus on the chl-a monitoring and postpone the limnocorral study. In the meantime, more information can be gathered about the corrals, how to do in-lake studies, and where to find used corrals. Steve will check with NALMS about any used limnocorrals that might be available.

6. New Items

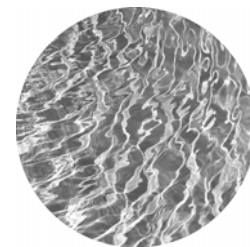
None

7. Next Meeting

May 28th, 10am to noon at Metro.

Barr/Milton Watershed Association

Technical Committee



<p>BMW Technical Committee Thursday, May 28, 2009 Metro Wastewater Reclamation District, Administration Building 10:00am – 12:00pm</p>

Committee Notes

Attendance

Steve Lundt (Metro)
 Joni Nuttle (CDPHE)
 Linda Boyle (Aurora)
 Tammy Allen (CDPHE)
 Chris Piper (Denver Water)

Jim Dorsch (Metro)
 Darcie Garland-Renn (Integral)
 Laurie Rink (FRICO)
 Al Polonsky (Denver Health)
 Ken Wagner (AECOM)

1. Water Quality Modeling

The final report will state the current concentrations and loads and give ranges of targets to achieve the pH standard. The process will follow this: pick a chl-a number of x to meet the pH standard, so link this chl-a to a TP in-reservoir concentration of y, and then get a loading of TP. Ken thought would be to see how this compares to the modeling scenarios and come up with several options to get there. Joni Nuttle stated that EPA wants definite answers, not options.

Then the question was raised what if the absolute TMDL was very different from the implementation plan. Tammy said that the state has flexibility and can also update the TMDL.

The modeling comments have been categorized and the committee will provide final comments on the bigger comments and the controversial comments. Ken will address all comments when he gets them all. The Tech committee will provide comments to Steve Lundt on the bigger comments. Steve will organize them and try to get to Ken in a week.

2. TMDL Development

Ken stated that he needed to finish the modeling report first before starting on the TMDL work. The state had several questions and concerns about the scope of work. Ken went over most of the task items. Ken said that the first task is to work through as a group what the water quality targets are. This will take mediation, not just number crunching. The list of tasks is meant to be done in step-wise fashion. One cannot go back to task 1 if you are on task 7. Ken suggested visiting the BMW about 3 times for the first few tasks. Task A3 is allowable loads and that will be calculated. Then task A8 for load allocations would be another mediation item. Joni asked if the 0.1 mg/L TP was inflow or in-reservoir. Ken said in-reservoir. Task A7 would be calculated also. After going over all the task items, Tammy was okay with it.

Ken then asked how sure we need to be to make the target, 1 out of 5 years (80%), 1 out of 10 years (90%)? Joni said that it is the 85% tile but did not know out of how many years and would check. Joni said that modeling outputs can't be negotiated

Ken stated that it is easier to focus on in-reservoir targets, not the inlet. Also the compliance should be in-reservoir.

Steve asked about if there will be two different TMDLs, one for each reservoir. Ken said that it would be 2 TMDL in one document. Joni stated that the state would like to get a draft of the TMDL to EPA before the public comment period. So send to EPA the MOS/WLA/LA breakdown. Laurie Rink EPA would not see the TMDL until after 2010. Joni stated that it would be wise to get thumbs up from EPA sooner rather than later, no formal process just a quick check to make sure the TMDL is going in the right direction. Ken said that he would internally figure out a schedule and deliverable for people to see.

3. Temporary Modification Update

Nothing was discussed.

4. Near-term Rehabilitation Ideas for Barr

The discussion about reuse water being used for filling Barr Lake was tabled for next time.

5. 2009 Monitoring

Steve Lundt stated that he will put together a draft monitoring plan for chl-a and e-mail it to the tech committee.

6. New Items

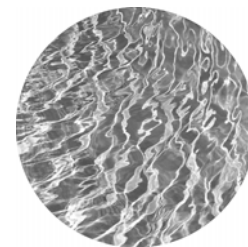
Laurie Rink said that she had nothing to report about FRICO's position or thoughts about using alum in the Barr and Milton system.

7. Next Meeting

June 25th, 10am to noon at Metro.

Barr/Milton Watershed Association

Technical Committee



BMW Technical Committee Thursday, June 25, 2009 Metro Wastewater Reclamation District, Administration Building 10:00am – 12:00pm

Committee Notes

Attendance

Steve Lundt (Metro)

Darcie Garland-Renn (Integral)

Laurie Rink (FRICO)

Al Polonsky (Denver Health)

Jim Dorsch (Metro)

Ken Wagner (AECOM)

Chris Piper (Denver Water)

1. Water Quality Modeling

Ken Wagner is starting to work on the comments and edits. AECOM is pulling out of the model a summary of the contributions from the various different sources and will present that in the final report. Ken plans to address every comment.

Laurie Rink updated the committee on her communications with Tammy. Laurie suggested stopping all work with AECOM until the modeling comments and scope of the TMDL can be resolved with the State. The State has talk about withholding about \$60K from the NPS grant if their concerns are not addressed. Laurie does not want to go further with AECOM and then have no money.

Ken said that he would do the final draft of the modeling report no matter what since they are so far along on it. So it was agreed by the committee to have Ken finish the final draft. Laurie will then arrange a meeting with CDPHE for next week to figure out a plan.

Ken said that it would be nice to include more recent years to the model but that time and money was not there. Obviously, more years to calibrate, the better the models will be. Ken also said that if the uncertainty of the model goes up, so will the MOS and then the allocations will go down.

2. TMDL Development

This item was tabled since the state was not present and things might be put on hold until the modeling report is all figured out.

3. pH uncertainty

Steve said that this new agenda item will be on the list because the BMW group needs to figure out if the pH standard is in question or not. The Temp Mod passed so now someone needs to do additional studies to figure out whether or not the pH standard is appropriate. This work needs to be done and presented at the December 2012 commission hearing. Laurie Rink said that we need to organize another meeting with CDPHE to figure out what they are expecting from us. The ideas for studies include figuring out background pH levels, figuring out why pH

is high when chl-a is low, figuring out the alkalinity issue and the weak buffering capacity to stay below 9.0, and if there are any impacts to the water uses at higher pH values.

4. Near-term Rehabilitation Ideas for Barr

Steve Lundt updated the committee about a meeting he had with Chris Piper and Jim Dorsch. Basically, the idea to use reuse water instead of Metro effluent is no longer a top idea now that the temp mod is in place. This idea seems to come with many questions. Steve Lundt will do a rough calculation to see if it is even worth it since the reuse plant can only do about 50% of the need (typical pumping rate is 50 MGD and the reuse plant is about 20 MGD). Steve stated that if this idea is to move forward, it needs to come from FRICO and others who would be willing to pay for it. Denver Water or Metro is not in any position to pay for the infrastructure.

5. 2009 Monitoring

Steve Lundt went over the chl-a data and explained again the monitoring plan. Kelly DiNatale asked about doing 2x the Secchi depth for the composite instead of 3 meters. Steve said that the SD was 4.5 meters so doing a composite of 8 meters worth of water at 15 locations would not be manageable in a day. It took about an hour to filter 1,000 ml 15 times at Milton and over 2 hours at barr to filter 2,000 ml 12 times. This monitoring needs to happen within about an hour so two, especially during July and August when BG algae can quickly float to the surface in a matter of hours.

6. New Items

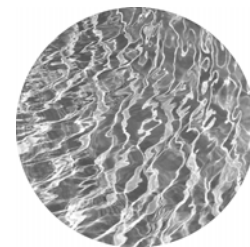
No new items

7. Next Meeting

July 2??, 10am to noon at Metro.

Barr/Milton Watershed Association

Technical Committee



BMW Technical Committee Thursday, July 23, 2009 Metro Wastewater Reclamation District, Manager's Conference room 10:00am – 12:00pm

Committee Notes

Attendance

Steve Lundt (Metro)	Jim Dorsch (Metro)
Darcie Garland-Renn (Integral)	Ken Wagner (AECOM)
Amy Woodis (Metro)	Kelly DiNatale (United)
Linda Boyle (Aurora)	Laurie Rink (FRICO)

1. Water Quality Modeling

Steve Lundt gave a brief update on the status of the final modeling report. Darcie stated that \$7 are left in the contract and don't know how AECOM will charge for the remaining task to do the training.

2. TMDL Development

The plan is to keep Ken Wagner on as the lead through the public comment period. The plan is to amend the existing modeling contract. Laurie R. will write an authorization letter stating that Ken Wagner must stay on as the lead. A question was raised on how this will work out with the state. Ken will be asked to schedule out the summer through end of September on the TMDL tasks. Need to also determine when the modeling training will occur.

3. pH uncertainty

With the temp mod in place for pH, how will BMW prepare for upcoming review hearings with the Commission? One idea is to sit down with Sarah Johnson to see what she has in mind. Amy Woodis suggested that it would be too soon to do that. Jim D. stated that he would think Sarah J. would just want to wait until the TMDL comes out to meet. Laurie R. will e-mail Sarah to ask for her opinion on when she would like to meet.

4. Plan for August Tour

Steve Lundt went over the tour idea of following the reuse water route from Washington Park through Denver to City Park. At City Park, Al P. will coordinate a couple of speakers to talk about the management of the parks and the renovation of the lake at city park.

5. New Items

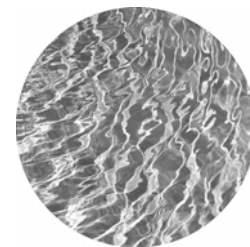
One idea that came up was to go for another NPS grant to help fund an alum study in barr lake or to look at rapid infiltration study as a regional treatment idea.

6. Next Meeting

August 27, 10am to noon at Metro.

Barr/Milton Watershed Association

Technical Committee



BMW Technical Committee
 Thursday, August 27, 2009
 Metro Wastewater Reclamation District, Conference Room A
 1:00pm – 3:00pm

Committee Notes

Attendance

Steve Lundt (Metro)	Jim Dorsch (Metro)
Darcie Garland-Renn (Integral)	Ken Wagner (AECOM)
Amy Woodis (Metro)	Kelly DiNatale (United)
Linda Boyle (Aurora)	Laurie Rink (FRICO)

1. Water Quality Modeling

Joni Nuttle sent a letter on August 24th that commented on the modeling report. This letter was shared at the meeting. Ken Wagner mailed a copy of the model to the State. It was decided that the modeling training would happen in October via webx.

2. TMDL Development

The committee went over the schedule. AECOM is going to first do an internal meeting to talk about the TMDL. Then AECOM will provide an outline of the TMDL. Then after a couple of weeks and a chance to comment on the outline, AECOM will put together a draft of the TMDL by the end of September. Ken Wagner will then come out for a workshop in mid October and present the draft to the stakeholder group. Then the BMW association will go over the draft and look at the implementation/evaluation aspect through the winter. Then the goal is to provide a final draft to the state by the end of July.

3. pH uncertainty

Steve Lundt provided a list of ideas on how to reduce the pH uncertainty. One idea is to calculate an alkalinity mass balance to see where the alkalinity is coming from. Integral will provide a scope for this effort. Alkalinity data are in the BMW database. Steve updated the group about the idea of purchasing limnocorrals to study pH with various treatments. Metro is putting together a pH study plan and that will be shared with the group when it is written. Basically, it will include more pH monitoring in early summer to see how it changes when productivity increases.

4. Long-range Work Plan

Alkalinity and limnocorral study may cost between \$50K-\$100K. Other ideas for budgeting purposes: modeling refinements, modeling work for nutrients, special wetland study, special in-lake study, and other special studies to help with TMDL process. Over the next 5 years, could easily be \$300K - \$600K.

5. New Items

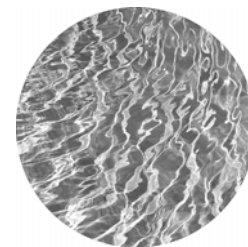
With Milton reservoir being drained this fall for dam improvements, it would be good to have a field trip out to the reservoir to see it empty. Steve will coordinate this field trip.

6. Next Meeting

September 24, 10am to noon at Metro.

Barr/Milton Watershed Association

Technical Committee



BMW Technical Committee
Thursday, September 24, 2009
Metro Wastewater Reclamation District, Conference Room A
10:00am – 12:00pm

Committee Notes

Attendance

Steve Lundt (Metro)	Theresa McGovern (AECOM)
Darcie Garland-Renn (Integral)	Ken Wagner (AECOM)
Amy Woodis (Metro)	Kelly DiNatale (United)
Linda Boyle (Aurora)	Laurie Rink (FRICO)
Chris Piper (Denver Water)	

1. Water Quality Modeling

Training will occur on October 9th and October 22nd. The first training will be mostly a demo and watch. You will need ARCGis 9.2 or 9.3 to run the model. The second training will go over more specific items and be more in-depth. Both sessions will run 2 hours. Theresa will send all the files and information through a leapfile. About 7 people are signed up to take it. The sessions will also be recorded for future viewing.

2. TMDL Development

AECOM did their internal meeting to come up with a plan of attack. Ken will provide a background memo that will include selected targets, how expressions will be selected, how internal loading will be handled, and the idea of a phased approach. Laurie Rink will call Joni N. once they have the draft TMDL. The I/E committee needs to develop a list of events and the tech committee needs to provide a monitoring table. Laurie asked Ken about what flows he used in the TMDL for Milton. There was an old flow database and an updated version. Ken will double check to see what version he used as well as what version Ken H. used. Laurie suggested that the draft goes just to the board, then it will be sent out to all. Ken W. said that the daily expressions will include some consideration in how often the ditches flow.

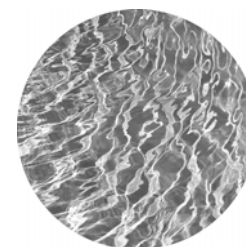
3. New Items

4. Next Meeting

October 22, 10am to noon at Metro.

Barr/Milton Watershed Association

Technical Committee



BMW Technical Committee Thursday, October 22, 2009 Metro Wastewater Reclamation District, Conference Room A 1:00pm – 3:00pm
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Committee Notes

Attendance

Steve Lundt (Metro)	Marc Lorenzen (Integral)
Darcie Garland-Renn (Integral)	Ken Wagner (AECOM)
Kelly DiNatale (United)	Mike Ruby (Integral)
Linda Boyle (Aurora)	Laurie Rink (FRICO)

1. pH, CO₂, and Alkalinity Relationships

Marc L. called in from Montana to talk about his memo about background pH for Barr and Milton. Marc initially stated that he looked at the pH and alkalinity data because of personal interest. Marc stated two things: 1. if CO₂ goes up or down, this does not affect alkalinity, and 2. when in equilibrium with the atmosphere, alkalinity will determine pH. Photosynthesis takes CO₂ out of the water on the timeframe of minutes but it takes days or weeks for the atmosphere to resupply the water with CO₂. If the average alk is 159 (3.18) mg/L, then the atmospheric background pH is about 8.78. This is the equilibrium pH given the alkalinity levels. So to have the pH go from 8.78 to 9.0, it will only take 0.06 mmol/ of CO₂. This is equal to a chl-a of about 15 ug/L. If this is true, then Ken W. made the point that the draft TMDL for 0.1 mg/L in the reservoir is not stringent enough. If the background pH is higher, then there is even less room for nutrients. Ken W. agreed with Marc's estimates but question whether or not the equilibrium pH actually occurs.

2. Modeling Training

3. pH TMDL

If the background pH increase, then there is even less room for nutrient loading. Ken W. talked about average the three load estimates to calculate the allocations. AECOM produced the biggest loading numbers so they allow for bigger allocations. Laurie Rink stated that there are no daily flow values for Milton for both inlets. Ken W. did use the wrong flow database and will recalculate the loads and also the daily expressions. Ken will also double check what flows were used to calculate Big Dry Creek's contributions to Milton. Laurie R. talked about Joni's comment about allocations by specific source. Ken W. then said that he will need some direction on how to divide up the WLA amongst the individual NPDES holders. Do all get a 95% reduction or do all have to treat down to some concentration? The MS4s can't do a 90% reduction, maybe a 60% reduction, so who gets to take on the remaining 30%? Ken will run some of these options to provide a starting point. Joni stated that MS4s can maybe do a 25% reduction.

4. NPS Grant for Limnocorral study

Steve Lundt provided details about purchasing limnocorrals. A 3 or 4-meter diameter corral would cost about \$1,500 each. It was agreed to go for a NPS grant and that Laurie R. would work on the application. Steve Lundt would work on the in-kind estimates from Metro.

5. New Items

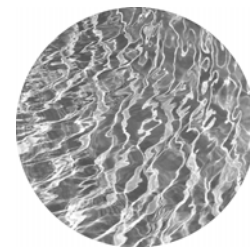
Integral handed out a proposal to do the alkalinity study

6. Next Meeting

November 23, 1pm to 3pm at Metro.

Barr/Milton Watershed Association

Technical Committee



BMW Technical Committee
 Monday, November 23, 2009
 Metro Wastewater Reclamation District, Conference Room A
 1:00pm – 3:00pm

Committee Notes

Attendance

Steve Lundt (Metro)	Jim Dorsch (Metro)
Darcie Garland-Renn (Integral)	Ken Wagner (AECOM)
Kelly DiNatale (United)	Amy Woodis (Metro)
Linda Boyle (Aurora)	Laurie Rink (FRICO)
Jerry Rice (Rice)	Joni Nuttle (CDPHE)

1. pH TMDL

The comments for the draft TMDL are due today. This is the list of who has commented: Metro will, Blair C., Kelly D., BDCWA, Joni later today, L/E most likely, and EPA. Ken W. went over all the comments that he has as of today. Ken will look into BDCWA comments about make sure he used the right flow data. Ken will check to make sure Ken H. used the right Milton flow data. Ken will change all P values to ug/L. Ken W. thought the idea by Blair to allocation H and OH ions would not be implementable. EPA has three main comments: 1. issue with the 100 ug/L TP target, they need more support for this number, 2. not sure about the percent reductions for the load allocations by NPS, and 3. the WLA need to be broken out into individual and group WLA. Internally, the comments need to be organized and agreed upon before sending to Ken W. Steve L. will put them all in one spreadsheet to go over in December.

2. NPS Grant for Limnocorral study

Laurie R. went over the application. Steve L. stated that in order for Metro to be a cooperator for this grant application, the District Manager must approve it. The plan is to get final word from the district manager by the first of December.

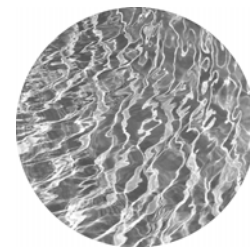
3. New Items

4. Next Meeting

December 17, 10am to noon at Metro.

Barr/Milton Watershed Association

Technical Committee



BMW Technical Committee
 Thursday, December 17, 2009
 Metro Wastewater Reclamation District, Conference Room A
 10:00am – 12:00pm

Committee Notes

Attendance

Steve Lundt (Metro)
 Alice Wood (Integral)
 Kelly DiNatale (United)
 Linda Boyle (Aurora)

Jim Dorsch (Metro)
 Ken Wagner (AECOM)
 Al Polonsky (DEH)
 Laurie Rink (FRICO)
 Joni Nuttle (CDPHE)

1. pH TMDL

The committee went over the spreadsheet of comments. They focused on the comments that were not looked at last time. Aurora provide comments and Ken W. did not know how to address some of them. Linda B. will ask JillP-K for more clarification. Ken W. was confused by BDCWA's agreement that the creek is a NPS. Ken W. said that it is both a NPS and a PS. For the model, it is a PS. He will change the name of it in the table. Ken W. asked the committee to come up with a final description of the effluent pumps to the Burlington Ditch. Steve L. said that he will work with Chris P. and Laurie R. to supply Ken W. with a final description. The committee went over Metro's comments also. Ken will work on the background alkalinity estimate. Joni N. stated that any WLA greater than 10% needs to have a WLA in the TMDL. If a group has a combined load of 5% or 10% then they will need a WLA as a group. Joni N. stated that she will verify these percentages with Phil H. Ken W. said that there is about \$11K left in the contract and is right on schedule.

2. 303(d) Listing for Ammonia and D.O.

Steve Lundt provided a spreadsheet of D.O. profiles for both reservoirs. Barr Lake will not have a D.O. issue most likely once the updated footnote 9 is approved in June. Milton may still have a problem with DO. Steve L. also provided a summary of the ammonia data and the violations. Both reservoirs have violations in the epi and hypo but it is unclear how the 85% tile rule works when doing the calculations.

3. Technical Committee Budget Items for 2010 and 2011

When the adaptive implementation plan is written, the Tech committee will have a better idea on what it will take to implement the TMDL. The committee will try to come up with some cost estimates, especially if the NPS grant is awarded.

4. BMW Data Request

Alice W. will contact or see who is putting data into the DSN and if the DSN can be used to update the database.

5. New Items

6. Next Meeting

January 28, 10am to noon at Metro.