Riley-Purgatory-Bluff Creek Watershed District
Board of Managers Monthly Meeting

Wednesday, February 3, 2016 – 5:30pm
RPBCWD District Office
14500 Martin Drive Suite 1500
Eden Prairie

Agenda

1. 5:30pm Board/CAC Workshop

2. 7:00pm Regular Board Meeting Starts
3. Call to Order

4. Approval of the Agenda Action

5. Major Plan Amendment: Lake Riley Alum and Riley Creek Action

6. Public Hearing: Order of Alum Treatment Action

7. Reading and approval of minutes Action

Board of Manager Meeting January 6, 2016

8. Hearing and discussion of matters of general public interest Information

Anyone wishing to address the Board of Managers on an item not on the agenda may come forward at this time the chair will recognize the speakers one by one. Speakers are requested to state their name and address for the record. Comments will be limited to 5 minutes per speaker.

9. Citizen Advisory Committee Information

10. Treasurer’s Report Action

   a. Update on the Treasurer’s report

11. Engineer’s Report Information

12. Staff Report Information
   a. Lakes and Creek Report

13. Board Action Action
   a. Consent Items:
i. 2015-048: Pagel II  
ii. 2015-050: Arbor Glen – Permit Extension  
iii. 2015-062: MnDOT SP 1002-100 TH 5 – Permit Extension  
b. 100 Year Floodplain Profiles

14. Manager’ Discussion  
   a. Plan Amendment Local Water Surface Management Plan  
   b. Upcoming Meeting

15. Upcoming Events
   
   • CAC Meeting, Monday, February 15, 2016, 6:30pm  
     District Office  
   • Board Meeting, Wednesday, March 2, 2016, 7:00pm  
     District Office

16. Adjourn
7.4b Other Watershed Improvement Programs

7.4b.1 Lake Riley Alum Treatment

Need

In 2002, the District completed the Lake Riley Use Attainability Analysis. In this study, alum treatment was identified as the best management practice to reduce phosphorus internal concentrations. Since 2002, the District has not implemented alum application because the carp population in the lake was excessive and an alum treatment would therefore not be effective.

The District has aggressively pursued carp research and management with Dr. Peter Sorensen at the University of Minnesota Aquatic Invasive Species Research Center, and the carp population in Lake Riley is now greatly reduced. The District has also pursued research on the restoration and maintenance of native vegetation in Lake Riley and other lakes in the watershed with Dr. Raymond Newman of the University of Minnesota Department of Fisheries, Wildlife and Conservation Biology. Both the Sorensen and Newman labs now recommend an alum treatment for Lake Riley. An alum treatment will address internal phosphorus loading, restore water clarity, allow native vegetation to reestablish, and stabilize sediment.

Description

The District will implement an alum treatment program for Lake Riley in the context of a combined effort to address both internal and external pollutant loads to the lake. An updated Use Attainability Analysis will guide the coordination of a phased alum treatment with other best management practices to address external loading and thereby provide an integrated approach to restoring Lake Riley's water quality and habitat.

The District will first conduct an alum dosing study to ensure that the proper dose is applied, that the alum treatment is effective for the long term, that the treatment targets the appropriate phosphorus sediment pool, and that the treatment does not involve overdosing and excessive costs. The dosing study will provide treatment specifications, contractor selection, treatment monitoring and post application monitoring. The District anticipates two alum applications over a two or three year period, as guided by monitoring results.

Estimated Cost: $50,000 for engineering (dosing study, project oversight and monitoring); $500,000 (alum application).

Funding

The District would expect to fund this project by means of its watershed-wide ad valorem levy. However, if there are cost-sharing or grant opportunities with other public agencies, the District would explore these as sources of funding as well.
7.4a.5 Riley Creek Water Quality Improvement

Need
Riley Creek, within the municipal boundary of Chanhassen, Carver County and Eden Prairie, Hennepin County, has a catchment of 10 square miles, with mild topography in the upper and middle portions of the watershed and a steep, north-valley wall of the Minnesota River on the downstream end of the watershed. Riley Creek originates from Lake Lucy and Ann, and flows through Lake Susan, Rice Marsh Lake, and Lake Riley before it begins its descent to the Minnesota River. Riley Creek’s discharge outlet is at Grass Lake, within the floodplain of the Minnesota River.

In 2007, the District completed the Lake Riley Outlet Improvements and Riley Creek Lower Valley Stabilization Feasibility Study. The study determined that the Lower Valley of Riley Creek requires stabilization in order to limit erosion of the stream channel and the steep valley bluffs. The Lower Valley of Riley Creek is about 3.8 miles long and up to 1,000 feet wide, descending from Lake Riley to the Minnesota River floodplain. The Minnesota Pollution Control Agency (MPCA) placed Lower Riley Creek on the 303 (d) list of impaired waters for elevated turbidity levels. Lower Valley of Riley Creek flows into the Minnesota River which is also on the 303 (d) list of impaired waters. The elevation change in this area of the creek is about 140ft.

In 2013, the District did a stream assessment between Upper Riley and Middle Riley (State Highway 5 to Lake Susan) to document areas of erosion, encroachments, or other concerns along this reach of Riley Creek. The assessment identified that reaches between Upper Riley and Middle Riley will require restoration due to severe erosion. The creek between Middle Riley and Lower Riley (Rice Marsh Lake to Lake Riley) was in overall good conditions.

As a result of both studies, the District has determined that the creek needs to be stabilized. The first focus of the District is the stabilization project on the Lower Valley of Riley Creek and then Riley Creek between Upper and Middle Riley. The project in the Lower Valley should be implemented in order to help meet water quality goals of the MPCA. The upper reaches of Riley Creek should also be implemented as it would reduce sediment and phosphorus loads to Lake Susan which is on the impaired waters list for nutrients (2010). The District recently conducted a Creek Restoration Action Strategy Study that looked at all reaches on all three creeks to determine which reaches were in most need of repair. Reach E was identified as severe site.

Description

Lower Valley of Riley Creek was divided into reaches based on landmarks and similar channel characteristics, and erosion areas were measured and prioritized. Severe erosion is evident in a 3,000-foot stretch of creek located midway between Dell Road and Eden Prairie Road known as Reach E. Reach H was also determined
as high priority stabilization efforts and thus restoration will first focus on those sites.

Riley Creek between Upper and Middle Riley was also divided into reaches where erosion sites were also determined. Restoration efforts in this reach will first focus high priority stabilization efforts.

Stabilization efforts will:
- Evaluate existing vegetation and thin trees where possible to provide greater sunlight to ground vegetation
- Grade eroded banks, add toe protection to prevent further undercutting and plant with native plants
- Placement of rock vanes and root wads to reduce force against stream banks
- High bank stabilization measures which can either be bank grading and vegetation or vegetated reinforced soil slope technique

Estimated Construction Cost for Creek Restoration at Reach E and D3: $1,500,000

Funding

The District would expect to fund these project elements by means of its watershed-wide ad valorem levy and in partnership with the Lower Minnesota River Watershed District. However, if there are cost-sharing or grant opportunities with other public agencies, the District would explore these sources of funding as well. Some of this work may be suited for the District’s cost-share program, in which case procedures and funding would be determined under those program criteria.
RESOLUTION NO. 16-01

RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
BOARD OF MANAGERS

RESOLUTION TO ADOPT MAJOR AMENDMENT TO WATERSHED MANAGEMENT PLAN FOR LAKE RILEY ALUM TREATMENT PROJECT

Manager __________ offered the following resolution and moved its adoption, seconded by Manager ____________:

WHEREAS the Riley Purgatory Bluff Creek Watershed District (District) is responsible for the preparation, adoption and implementation of a watershed management plan for the Riley Purgatory Bluff Creek watershed pursuant to Minnesota Statutes section 103B.231, subdivisions 3 through 10, directed by the District’s third-generation Watershed Management Plan that achieves the purposes of Minnesota Statutes Ch. 103B and 103D;

WHEREAS in 2002, Lake Riley was listed by the Minnesota Pollution Control Agency as impaired because of high nutrient (phosphorus) levels, but the carp population in the lake was too high for alum treatment to be effective at reducing nutrients;

WHEREAS in May 2004, the District Engineer (Barr) presented the Engineer’s Report for the Lake Riley Water Quality Improvement Project, including an option to treat Lake Riley with a combination of alum-plus-lime to improve water quality, and determining that such treatment would have no long-term adverse impacts on natural resources;

WHEREAS the District has undertaken significant efforts, in collaboration with University of Minnesota researchers, to reduce the carp population in the lake to a level that now presents favorable conditions for alum treatment to reduce lake phosphorus levels;

WHEREAS on March 4, 2015, the District Board of Managers determined that implementation of an alum treatment program would be a cost-effective and efficient component of a comprehensive and multifaceted approach to reducing Lake Riley nutrient levels;

WHEREAS on March 4, 2015 the District Board of Managers directed the District administrator to take the necessary administrative steps to issue notice of and distribute a plan amendment describing a Lake Riley alum-treatment program for review and comment to the necessary recipients in accordance with Minnesota Statutes section 103B.231 and Minnesota Rules chapter 8410, and generally to make the proposed Lake Riley alum-treatment program amendment available to all interested parties;

WHEREAS on June 22, 2015, the District held a duly noticed public hearing to hear testimony from interested parties on the proposed amendment, and the Board of Managers considered all comments received on the proposed amendment;

WHEREAS in July 2015 Wenck Engineering prepared for the District a technical memo
recommending an alum dose for Lake Riley to lower redox-phosphorus peaks;

**WHEREAS** on November 4, 2015, the Board of Managers voted to submit the proposed plan amendment, all written comments received on the draft plan amendment, and a record of the public hearing to the Metropolitan Council, the state review agencies, and the BWSR for final review;

**WHEREAS** on January 27, 2016, following final agency review, the Minnesota Board of Water and Soil Resources approved this amendment to the District’s watershed management plan;

**WHEREAS** the Board of Managers finds that the proposed amendment provides an important addition to the District’s implementation program by identifying a specific project and setting forth a schedule, timing, and details, together with the estimated cost, the need for the project, financial sources, and the financial effect that the project will have on the local government units or the District;

**NOW, THEREFORE, BE IT RESOLVED** that the Riley Purgatory Bluff Creek Watershed District Board of Managers hereby adopts the attached amendment in accordance with Minnesota Statutes section 103B.231, subdivision 10-11, and authorizes its immediate implementation with the effective date of February 3, 2016;

**BE IT FURTHER RESOLVED,** that Board of Managers directs the administrator to print the amendment in the form of replacement pages for the plan, each page of which to be renumbered as appropriate and to include the effective date of the amendment; and further directs the administrator to transmit a copy of this amendment to the distribution list of agencies and individuals who have received a copy of the plan, including the clerks of each of the local governmental units within the watershed and to Hennepin County and Carver County, within 30 days of adoption.

The question was on the adoption of the resolution and there were ____ yeas and ____ nays as follows:
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<th>Yea</th>
<th>Nay</th>
<th>Abstain</th>
<th>Absent</th>
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<tr>
<td>BISEK</td>
<td>CHADWICK</td>
<td>CRAFTON</td>
<td>FORSTER</td>
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Upon vote, the chair declared the resolution ___________.

Dated: __________________________.

____________________________________
Mary Bisek, Secretary

* * * * * * * * *

I, Mary Bisek, secretary of the Riley Purgatory Bluff Creek Watershed District, do hereby certify that I have compared the above resolution with the original thereof as the same appears of record and on file with the District and find the same to be a true and correct transcription thereof.

IN TESTIMONY WHEREOF, I set my hand this _____ day of ____, 2016.

____________________________________
Mary Bisek, Secretary
RESOLUTION NO. 16-02
RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
BOARD OF MANAGERS

ORDERING THE LAKE RILEY ALUM TREATMENT PROJECT

Manager __________ offered the following resolution and moved its adoption, seconded by Manager ___________:  

WHEREAS in 2002, the Riley Purgatory Bluff Creek Watershed District (District) completed the Lake Riley Use Attainability Analysis, identifying alum treatment as the best management practice to reduce phosphorus internal concentrations, but did not implement alum application because the carp population in the lake was excessive and an alum treatment would not have been effective;

WHEREAS in May 2004, the District Engineer (Barr) presented the Engineer’s Report for the Lake Riley Water Quality Improvement Project (Project), including an option to treat Lake Riley with a combination of alum-plus-lime to improve water quality, and determining that such treatment would have no long-term adverse impacts on natural resources;

WHEREAS the District has undertaken significant efforts, in collaboration with University of Minnesota researchers, to reduce the carp population in the lake to a level that now presents favorable conditions for alum treatment to reduce lake phosphorus levels;

WHEREAS in March 2015, the District Board of Managers determined that the implementation of an alum treatment program would be a cost-effective and efficient component of a comprehensive and multifaceted approach to reducing Lake Riley nutrient levels;

WHEREAS in March 2015, the District Board of Managers directed the District administrator to take the necessary administrative steps to issue notice of and distribute a plan amendment describing a Lake Riley alum-treatment program for review and comment to the necessary recipients in accordance with Minnesota Statutes section 103B.231 and Minnesota Rules chapter 8410, and generally to make the proposed Lake Riley alum-treatment program amendment available to all interested parties;

WHEREAS in July 2015 Wenck Engineering prepared for the District a technical memo recommending an alum dose for Lake Riley to lower redox-phosphorus peaks;

WHEREAS on January 27, 2016, the Board of Water and Soil Resources Board approved the amendment to the District’s watershed management plan; and on February 3, 2016, the Board of Managers adopted the plan amendment in accordance with Minnesota Statutes Section 103B.231, subdivision 10-11, and authorized its immediate implementation;
WHEREAS on February 3, 2016, the District held a duly noticed public hearing on the Project, in accordance with Minnesota Statutes Section 103B.251, subdivision 3, to give interested members of the public an opportunity to comment on the Project;

NOW THEREFORE BE IT RESOLVED that the Board of Managers finds that the Project, pursuant to the recommendations of the District Engineer and Wenck Engineering enumerated above, is consistent with the Lake Riley nutrient reduction objectives of the District, and that the proposed project will be conducive to public health, will promote the general welfare, and complies with the Watershed Law, the Metropolitan Water Management Planning Law, and the District’s Plan as amended;

BE IT FURTHER RESOLVED that the Board of Managers hereby confirms the Engineer’s report, and orders that the Project be established and implemented through the coordination of a phased alum treatment with other best management practices to address external loading and thereby provide an integrated approach to restoring Lake Riley’s water quality and habitat, and that the Engineer, under direction of the Administrator, proceed with making the necessary surveys, plans and specifications, and advertise for bids, and that the Administrator proceed, with the advice of legal counsel, to develop any necessary and appropriate site access or use agreements and necessary property rights for the Project for the due consideration and approval by the Board of Managers;

The question was on the adoption of the resolution and there were _____ yeas and ____ nays as follows:
<table>
<thead>
<tr>
<th>Yea</th>
<th>Nay</th>
<th>Abstain</th>
<th>Absent</th>
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<tr>
<td>BISEK</td>
<td>CHADWICK</td>
<td>CRAFTON</td>
<td>FORESTER</td>
</tr>
</tbody>
</table>

Upon vote, the president declared the resolution ____________.


____________________________________
Mary Bisek, Secretary

* * * * * * * * * *

I, Mary Bisek, secretary of the Riley Purgatory Bluff Creek Watershed District, do hereby certify that I have compared the above resolution with the original thereof as the same appears of record and on file with the District and find the same to be a true and correct transcription thereof.

IN TESTIMONY WHEREOF, I set my hand this _____ day of ________, 2016.

______________________________
Mary Bisek, Secretary

* * * * * * * * * *
MEETING MINUTES
Riley-Purgatory-Bluff Creek Watershed District
January 6, 2016, Board of Managers Monthly Meeting

PRESENT:
Managers: Mary Bisek, Secretary
Richard Chadwick
Jill Crafton, Treasurer
Perry Forster, President
Leslie Yetka, Vice President

Staff: Claire Bleser, RPBCWD Administrator
Michelle Jordan, RPBCWD Water Quality & Outreach Coordinator
Scott Sobiech, Engineer (Barr Engineering Company)
Louis Smith, Attorney (Smith Partners)

Other attendees: Peter Iversen, CAC
Dorothy Pedersen, CAC
Larry Koch, CAC
Bill Satterness, Eden Prairie Resident
Sharon McCotter, CAC
Laurie Susla, CAC, LLCA

2 and 3. Regular Board Meeting Starts and Call to Order

President Forster called the Tuesday, December 1, 2016, Board of Managers Monthly Meeting to order at 7:03 p.m. at the RPBCWD District Office at 14500 Martin Drive, Suite 1500, Eden Prairie, MN 55344. He reported that prior to this meeting the Board met for a Management Workshop starting at 5:30 p.m. He stated that the workshop was about the Treasurer’s Report and 8410 Review [Meeting Agenda Item 1].

4. Approval of the Agenda

Manager Bisek requested the addition to the agenda under Board Action an item to approve the revised budget. President Forster stated that it would be added as agenda item 12b7. Manager Crafton moved to approve the agenda as amended. Manager Bisek seconded the motion. Upon a vote, the motion carried 5-0.

5. Organizational Actions

a. Elections of Officers of the RPBCWD Board of Managers

President Forster opened the nominations for president. Manager Yetka moved to nominate Perry Forster for president. Manager Crafton seconded the motion. Manager Chadwick commented that he would prefer not to be an officer this year because he is new to the Board. President Forster called for nominations two more times and upon hearing none, closed the floor for nominations. Upon a vote, the motion carried 5-0.

President Forster called for nominations for vice president. Manager Bisek nominated Leslie Yetka for vice president. Manager Crafton seconded the motion. President Forster called for nominations
two more times and upon hearing none, closed the floor for nominations. **Upon a vote, the motion carried 5-0.**

President Forster nominated Jill Crafton for Treasurer. Manager Bisek seconded the motion. President Forster called for nominations two more times and upon hearing none, closed the floor for nominations. **Upon a vote, the motion carried 5-0.**

President Forster called for nominations for Secretary. Manager Chadwick moved to nominate Mary Bisek as secretary. Manager Yetka seconded the nomination. President Forster called for nominations two more times and upon hearing none, closed the floor for nominations. **Upon a vote, the motion carried 5-0.**

Manager Bisek asked if the Board should elect a secretary pro-tem. Attorney Smith responded that the Board could take that action at any meeting as necessary.

Administrator Bleser reminded the Board that in the past the Board has had two managers on the Personnel and Governance Committee. She asked if those two managers, Manager Bisek and Manager Crafton, would like to remain on the committee.

President Forster called for nominations for the Personnel and Governance Committee. Manager Yetka nominated Manager Bisek and Manager Crafton to be the Personnel and Governance Committee. Manager Chadwick seconded the motion. President Forster called for nominations two more times and upon hearing none, closed the floor for nominations. **Upon a vote, the motion carried 5-0.**

b. **Designation of Official Publication**

President Forster read aloud the list of the District’s current list of official publications: Sun Sailor, Sun Current, Chaska Herald, Chanhassen Villager, and Eden Prairie News. Manager Bisek moved to approve the list as read as the District’s designated official publications for 2016. Manager Crafton seconded the motion. Upon a vote, the motion carried 5-0.

c. **Appointment of the Technical Advisory Committee**

Administrator Bleser reviewed with the Board the list of names included in the meeting packet: Bill Monk, Robert Bean, Jr., Leslie Stovring, Will Manchester, Steve Segar, Terry Jeffery, Paul Hornby, Randy Anhorn, Paul Moline, Mellissa Jenny, Kate Drewry, Jenny Skancke, Mike Wanous, Steve Christopher, Joe Mulcahy, and Linda Loomis. Manager Crafton asked if a Mn/DOT name should be on the list. Administrator Bleser responded yes, Beth Neuendorf of Mn/DOT should be added to this list. Manager Crafton moved to approve the list as amended to serve as the District’s Technical Advisory Committee. Manager Yetka seconded the motion. **Upon a vote, the motion carried 5-0.**

d. **2016 Meeting Calendar**

President Forster pointed out the District’s proposed 2016 meeting calendar as listed in the meeting packet. He noted that there may be times throughout the year when the District will need to hold special meetings, which would be duly noticed. Manager Crafton moved to approve the District’s 2016 projected meeting calendar. Manager Bisek seconded the motion. **Upon a vote, the motion carried 5-0.**

e. **Designation of Bank**

President Forster stated that the District’s official bank has long been KleinBank, and he read aloud the address of KleinBank in Chanhassen. Manager Crafton moved to continue with KleinBank as the
District’s official bank. Manager Chadwick seconded the motion. Upon a vote, the motion carried 5-0.

f. Designation of Depository for Permit Financial Assurances
President Forster said that the Depository for Permit Financial Assurances has been Smith Partners LLC. Attorney Smith pointed out that Smith Partners LLC does not receive any funds on behalf of the District but only receives surety documents, which are kept in a locked safe. Manager Bisek moved to approve having Smith Partners LLC continue as the District’s Depository for Permit Financial Assurances. Manager Chadwick seconded the motion. Upon a vote, the motion carried 5-0.

6. Reading and Approval of Minutes

a. December 1, 2015, RPBCWD Monthly Meeting
Attorney Smith requested that on page 2 under the Treasurer’s Report the first sentence be revised to remove the words, “have nothing to do with” and insert in their place, “are separate from.” Administrator Bleser recommended that the phrase Treasurer’s Report replace the phrase “financial statements” in a number of places, and she read through the specific sentences where the edit should be made.

Manager Crafton moved to approve the minutes as amended. Manager Bisek seconded the motion. Upon a vote, the motion carried 5-0.

7. Hearing and Discussion of Matters of General Public Interest

Larry Koch of 471 Bighorn Drive in Chanhassen commented that he had a list of items that he hopes the Board will turn into resolutions. He stated that he would like:

- The Board to secure a decent podium for meetings.
- A report on the issue about the sound from next door
- The managers to speak into the sound system microphones
- To have workshops called what they are: meetings, and to list workshops as one item on the meeting agenda with public participation in the workshop being at the managers’ discretion.
- Have a least one copy of the meeting materials available to the public; even better, secure a projection system in which the meeting materials can be placed on the projector to be projected for the group to see.

Mr. Koch said that he has several comments on the Treasurer’s Report and he could share these during the Treasurer’s Report agenda item or now.

Manager Yetka said that she thinks it is important to have a distinction between workshops and meetings because workshops are time for the managers to discuss items without taking action, and it is important for the Board to have workshop time to go through issues. There was discussion about this issue.

Administrator Bleser provided an update on the steps being taken to improve the acoustics of the District office so that it will be easier to hear during meetings and so the space will be more functional. Manager Chadwick asked Attorney Smith whether he had an opinion on whether workshops should be included as part of the Board’s regular meetings especially in light of the Open Meeting Law.

Attorney Smith responded that in terms of the Open Meeting Law, the law requires all meetings of the Board to be noticed and open to the public. He said that if the Board decides to designate a meeting as a workshop,
meaning that it is a study session and no action will be taken, what the Board calls it is really a matter of public relations regarding the public’s understanding of what is happening. Attorney Smith said that in terms of the Open Meeting Law requirements, the Board has fully met them. He pointed out that the Board is required to always have a set of materials available to the public at all meetings, whether workshops or other meetings.

Manager Chadwick remarked that he agrees with Mr. Koch that the Board should have a projector because it would make the meetings easier to follow.

Administrator Bleser stated that she will look at the costs of a projector and can bring that information back to the Board next month.

Mr. Satterness said that he would like to offer a suggestion about the Plan Process, which is agenda item 12bii1.

8. Citizen Advisory Committee (CAC)

CAC President Dorothy Pedersen thanked Manager Chadwick for attending the CAC’s most recent meeting and for bringing the group a copy of the handbook developed by the Minnesota Association of Watershed Districts. She reported that the CAC decided at its previous meeting to try to improve communications between the CAC’s Board and the District’s Board of Managers so that each group is of greater benefit to each other.

She said that the CAC now includes on the top of the CAC’s minutes what items the CAC would like the Board perhaps to focus on from the CAC. Ms. Pedersen said that the CAC hopes that regarding those items that the CAC brings to the Board it will respond one way or another to the CAC. She said that the CAC feels many times that it brings stuff and gets nothing coming back in the CAC’s direction and so the CAC doesn’t know if the Board is interested or not or wants the CAC to work more on something or not. Ms. Pedersen said that the CAC is asking the Board for more guidance on the bullet list on the top of the CAC’s minutes each month. She said that the CAC is a group of people that want very much to help the managers and help the watershed and wants a good spirit of cooperation.

She said that the CAC sent the Board a possible budget format a couple of months ago. She asked for a response to it from the Board and noted that the CAC thinks there are some pretty good things in there that the watershed could incorporate. Ms. Pedersen said that she doesn’t think that the CAC’s recommendations were addressed in tonight’s workshop.

She provided an update on the lake matrix that the CAC is working to put together. She said that the CAC thinks this matrix will be very beneficial and the CAC hopes it will be beneficial to the managers as well as the CAC.

Ms. Pedersen reiterated that the CAC is looking for some kind of reply back to the CAC on items that the CAC is bringing to the Board. She said the reply can be in whatever manner the Board sees fit, whether it is by the Board addressing it at meetings or sending communications to the CAC between Board meetings. She remarked that the CAC is a wonderful group of people who want to try to do things for and with the Board. Ms. Pedersen thanked the Board and recorder for providing the CAC with draft minutes of the Board’s meeting and said that having the minutes saved the CAC a lot of time at its meeting. She asked for questions and comments. She added that the CAC loves having Michelle Jordan as a CAC-Board liaison.

Ms. Pedersen added that the CAC is looking for specific actions to be taken on the CAC’s motions out of a menu of actions including that the Board tables it, discusses it, directs it to staff, directs it to CAC, approves or denies it, or modifies it.

There was discussion about how the Board could handle the CAC’s motions.

Manager Chadwick remarked that he thinks the Board needs to acknowledge the work that the CAC has done and
thank the committee for the work it has been doing. He said that he hopes the handbook from MAWD will help the Committee and the Board to speak the same language and follow the same rules.

Manager Yetka commented that it is important for the District to have a citizen body that can look at issues and provide recommendations to the Board and be the voice of the watershed. She said that the challenge is the process. Manager Yetka stated that she thinks that the information that comes to the Board should be vetted by District staff. She said that she gets concerned when staff is bypassed.

Manager Bisek asked for clarification in the CAC’s language about the budget, and she wondered if the CAC is referencing the District’s budget document or the Treasurer’s Report.

Manager Chadwick mentioned language included in the MAWD handbook about how any person can request an item to be added to a meeting agenda as long as the request is received on week prior to the meeting, and if this requirement is met, then the Board’s president decides whether the item goes on the meeting agenda. Administrator Bleser read the language about this point directly from the MAWD handbook.

Administrator Bleser noted that there is a CAC-Board workshop in February and explained that the focus of the workshop will be on communication pathways and being a successful watershed as a whole.

9. Treasurer’s Report

Manager Crafton announced that there is a change to the Treasurer’s Report to reflect an additional expense for postage. She said this increases expenses by $182.48 and decreases net income by the same amount. She talked about reconciling items from the District’s 2015 budget. Manager Crafton said that in a later agenda item, staff will recommend that the Board approve moving $80,000 from Contingency to Permit Review and Inspection, $55,000 from Contingency to Legal Services, and that the Recording Services are separated out of Office Administration Costs and to move $15,000 pulled from the Contingency and the Reserve funds to the new line item for Recording Services.

Manager Crafton moved to approve the Treasurer’s Report as amended to reflect the additional expense of $183.48. Manager Yetka seconded the motion.

Manager Chadwick commented on the items in the report that he has a hard time understanding, particularly multi-year projects. Administrator Bleser addressed Manager Chadwick’s questions.

Mr. Koch offered his suggestions about the Board’s Treasurer’s Report and reporting process:

- He would like to see the detailed report available on the District’s website
- He thinks it would be a best management practice to quarterly review a detailed report, particularly per project and for costs for which the District has not previously budgeted and to have footnotes for those costs to indicate what the cost was for and why it was incurred.
- He wants to confirm that there will be a follow up budget presentation to cover issues brought up previously.
- He would appreciate if the staff and accountant come up with proposed “financial statements” if the CAC can get a chance to look at them and say if these make sense.

Administrator Bleser noted that each month staff and the Engineer report on ongoing projects. She went into further detail about this information.

Upon a vote, the motion carried 4-0 (Manager Chadwick abstained from vote).
Manager Crafton moved to approve paying the bills. Manager Chadwick seconded the motion. **Upon a vote, the motion carried 5-0.**

Administrator Bleser stated that the District incurred some costs in 2015 that were higher than what was allocated in its 2015 budget. She went through the information in front of the Board about the Contingency Fund and went through the document she handed out titled “Treasurer Report.”

Administrator Bleser proposed, as Manager Crafton described earlier, that the Board take action to move $55,000 from Contingency to Legal Services, move $80,000 from Contingency to Permit Review and Inspection, move Recording Services out of Administration to its own line named Recording Services, move $15,000 from Contingency to Recording Services. She added that $16,500 would remain in Contingency after these proposed transfers. Administrator Bleser also requested that the Board take action in the Projects budget to move $8,000 from the Lake Riley-Lake Susan Curlyleaf Pondweed Treatment item to the Starring Lake Plant Management line item in relation to the Eurasian Watermilfoil.

Manager Crafton moved to approve the changes as proposed by Administrator Bleser. Manager Chadwick seconded the motion. **Upon a vote, the motion carried 5-0.**

Administrator Bleser requested that the Board approve closing its safety deposit box at the Chanhassen KleinBank because the box is empty, the District is being charged for it, and staff doesn’t foresee needing to use it. Manager Bisek moved to approve closing the KleinBank safety deposit box. Manager Crafton seconded the motion. There was a short discussion. Manager Chadwick requested that staff contact KleinBank to see if in the future the District needs a safety deposit box, whether it could be provided to the District free of charge based on the District’s long history and account with the bank. **Upon a vote, the motion carried 5-0.**

Administrator Bleser raised the topic of looking into holding the District’s reserve funds within financial products that earn more return than the District’s checking account and that fit into the government guidelines. She shared that Nine Mile Creek Watershed does this with some of its funds. President Forster said that he would like to see more information on the products and their schedules and terms. Manager Bisek said that she would like the Administrator to get Legal Counsel’s opinion on whether or not this is something that the District should be doing. Administrator Bleser said that it sounds like the Board is in favor of her gathering information on this and talking to Legal Counsel. The Board indicated consent with this direction to staff. Administrator Bleser said that she would bring information to the Board at the February meeting. Attorney Smith commented that it is a prudent practice and that the Board will want the documentation presented.

### 10. Engineer’s Report

Manager Yetka asked for more details on the next steps for Task Order 12: Downtown Chanhassen BMP Retrofit Assessment. She asked if the City or Barr Engineering is leading the coordination of a public/property owner engagement process. Engineer Sobiech responded it is through a grant and Barr Engineering is leading the process.

President Forster remarked that many permit applications seem to be missing information. He asked if a checklist could be added to the permit application. Engineer Sobiech said that yes, a checklist can be added to the online application system. He said that he thinks the missing information is due to the applicants not having all of the information gathered but still wanting to get the permit process started.

Manager Crafton moved to approve the Engineer’s Report as submitted. Manager Bisek seconded the motion. **Upon a vote, the motion carried 5-0.**
11. Administrator’s Report

President Forster announced that two of the projects that were finalists for Project of the Year at the Minnesota Association of Watershed Districts conference were RPBCWD projects and one of those was the winner: the Creek Restoration Action Strategy project.

Administrator Bleser said that Michelle Jordan is seeking Board feedback about the District’s Cost-Share Program. Ms. Jordan summarized potential changes to the program and its format, including changes to the program’s requirements about exclusive use of native plant materials. Ms. Jordan recommended that the program move away from that requirement and instead adopt an approved plant list to be used in the water quality Best Management Projects. She recommended that the approved plant list include native plants, native cultivars, and some non-natives. Ms. Jordan explained that the goal of this new procedure would emphasize selecting the right plant for the right space. She said that to move forward with this recommendation, staff could develop two plant list sheets, using information shared from Nine Mile and working with Barr Engineering to help pull the information together.

There was lengthy discussion about plants, pollinators, the development and maintenance of plant lists and the time involved, and concerns about the source of the plants. The Board directed staff to move forward with the development of the information presented by Ms. Jordan and to bring the details back to the Board at a future meeting.

There was a short discussion about the data request for water quality and lake level data.

Manager Yetka moved to accept the Engineer’s Report as presented. Manager Bisek seconded the motion. Upon a vote, the motion carried 5-0.

12. Board Action

a. Consent Items: i. Task Order 6c: WOMP Station; ii. Carver County Soil and Water Conservation District Renewal; iii. Rice Marsh Lake and Lake Susan Alum Task Order

Manager Yetka moved to remove from the Consent Agenda item ii. Carver County Soil and Water Conservation District Renewal. Manager Crafton moved to approve consent items i. and iii. Manager Bisek seconded the motion. Upon a vote, the motion carried 5-0.

ii. Carver County Soil and Water Conservation District Renewal

Manager Yetka stated that regarding the contract renewal with the Carver County Soil and Water Conservation District, in the contract under the Scope of Services, item 3, it states that “… Carver County SWCD will also inspect the installation of the BMP and complete reporting or maintenance inspections as requested by Riley Purgatory.” Manager Yetka wanted to clarify that the District isn’t paying Carver County SWCD to do maintenance and that the requirements of the landowner regarding maintenance isn’t being usurped. Administrator Bleser said no, the cost-share maintenance requirements are not being bypassed or duplicated. She said that what the language Manager Yetka pointed out comes into play for projects like the Family of Christ Lutheran Church’s rain garden project to ensure it put in place correctly. Administrator Bleser said that the Cost-Share Program needs more expertise than the District staff is available to provide and the contract provides the flexibility to provide the expertise.

Manager Yetka moved approval of the service agreement between the Riley Purgatory Bluff Creek Watershed District and the Carver County Soil and Water Conservation District. Manager Crafton seconded the motion. Upon a vote, the motion carried 5-0.
b. Non-Consent Items

i. Appointment of the Citizen Advisory Committee
Ms. Jordan described the application process and the applications received. She provided a variety of options for the Board to consider. There was discussion about the time commitment involved in the role of a citizen advisor, the CAC’s attendance policy, and the geographic distribution of representation on the CAC.

Manager Bisek moved to appoint Douglas Bruce, David Ziegler, David Paulson, and Dennis Yockers to the RPBCWD CAC with the caveat that when staff meets with the appointees, if any indicate that he can’t make the required time commitment then the appointments are reduced by that member/that number of appointees. Manager Crafton seconded the motion. Upon a vote, the motion carried 5-0.

Manager Crafton moved to reappoint the current CAC members. Manager Crafton seconded the motion. President Forster read the names into the record: Jim Boettcher, Sharon McCotter, Laurie Susla, Larry Koch, Peter Iversen, Matt Lindon, Laurie Hable, Paul Bulger, Dorothy Pedersen, and Bob Adomaitis. Upon a vote, the motion carried 5-0.

ii. 10-Year Plan

1. Plan Process
Administrator Bleser introduced the Board to the Draft Plan Update process and the stakeholder engagement matrix. She talked about the first stage, which is to develop an issues identification process, and she went into detail about what this entails.

Administrator Bleser explained that the draft process includes engaging the public with an online survey and through a set of three meetings in May, each meeting targeting one of the three watersheds in the District.

Administrator Bleser talked about the process of prioritizing the issues, and she pointed out that the updated plan builds upon the current 10-year plan. She discussed the plan development phase and the development of the implementation plan. Administrator Bleser continued by talking about the plan review and approval phase.

She said that staff is presenting this draft plan process to the Board to see if there are any comments or concerns about the procedures outlined. Administrator Bleser also pointed out the draft notification letters included in the meeting materials. She explained that the notification letters are required in order for the District to kick-off its 10-year plan refresh.

Administrator Bleser reminded the Board that it received in late November a letter from the Southwest Lake Coalition asking to be part of a the planning process. She pointed out that the stakeholder engagement matrix does not include a list of all of the lake associations for the reason that those members are part of the general public.

Administrator Bleser said that all members of the public have an equal role in sharing their input about water resources issues.

Administrator Bleser responded to questions.

Bill Satterness remarked that he has been pleased that the word process has been
mentioned at this evening’s meeting as it is a word he has been saying here at the Board meetings for three or four years. He stated that the matrix introduced by Administrator Bleser is a huge step forward in improving the process, in developing a systematic and thoughtful way that everything is going to happen. Mr. Satterness said that the process is the foundation and everything else comes later, including goals, priorities, projects. He noted that if the process is inappropriate then it would be unlikely to get satisfactory outcomes.

Mr. Satterness said that it is evident that a lot of good thought went into the plan matrix but there is still some room for improvement. He raised the word stakeholder and said that he is pleased that this word has been part of tonight’s discussion. Mr. Satterness talked about the draft notification letter included in the meeting packet. He read aloud from the letter and asked who are the local stakeholders referenced in the letter and how can the District make sure it gets appropriate input from them. Mr. Satterness talked about his work in the Best Buy strategic planning department and how, even 20 years ago, Best Buy embraced the concept of stakeholders. He described how Best Buy weighted input from its customers and how the company conducted outreach such as through phone surveys of customers and potential customers. Mr. Satterness said that for the watershed its customers are its citizens. However, he said, 90 percent of the citizens in the watershed don’t know that the watershed exists and are not aware that their property taxes pay the $2.5 million budget of the District. He stated that if the District relies on a passive online survey the District will not get a very high response rate. He went through the list of six stakeholder groups identified in the stakeholder engagement matrix and remarked that the cities and agencies are over-represented. He suggested that the District add lakeshore associations as a group to the list of stakeholders identified in the stakeholder engagement matrix. Mr. Satterness said that lakeshore associations are composed of people who are aware and engaged and also are fair and objective. He recommended that the District send a notification letter to the CAC and to each of the lake associations.

Administrator Bleser noted that this plan process is a high-level look and does not go into detail about how the District is going to reach out for input. She said that the District will not simply post a survey on its website as the strategy to gather input.

Managers provided comments on what methods of input gathering worked for other watersheds. Attorney Smith raised the concept of polling and described how the Minnehaha Watershed District conducts regular polling the District’s citizens with a scientifically significant sample and uses the data to inform its planning process. He said he brings this up to point out that there is a resource out there for gathering input.

Managers commented on the idea of polling and the logistics involved. Manager Bisek suggested that staff research scientific polls and the costs involved in undertaking a scientific poll. There were several comments on the high cost of such polls.

Ms. Susla commented that the CAC will need to receive materials in a timely manner so that the CAC has time to comment. She said that hopefully the CAC will be able to see things and make recommendations before those things come to the Board so that the Board has the CAC’s comments as the Board is considering materials. Ms. Susla remarked that if the Board is saying that the CAC is representing the public here, then it
is important that the CAC have the opportunity to do that.

Administrator Bleser pointed out in the table where it is proposed that the CAC takes part in the process.

Administrator Bleser said that if the Board is comfortable with the plan process presented then she would like to begin discussion with the Minnesota Board of Water and Soil Resources about the plan process as the District is mandated to do so. She said that if there are no comments about the online survey then the District would like to move forward with releasing it shortly and if there are comments on it then to contact her soon.

Manager Crafton moved to approve the plan process. Manager Bisek seconded the motion. Upon a vote, the motion carried 5-0.

2. Notification Letter
Manager Crafton moved to approve sending the two notification letters as presented. Manager Chadwick seconded the motion. Upon a vote, the motion carried 5-0.

3. Online Survey
Administrator Bleser noted that the online survey is part of the plan process that the Board approved.

4. Task Order 16: Water Management Plan
Manager Crafton moved to approve Task Order 16: Water Management Plan. Manager Yetka seconded the motion. President Forster clarified that the approval includes approving the payment of costs of $167,000. Administrator Bleser clarified that the payment of those costs will be over two years. Upon a vote, the motion carried 5-0.

5. Southwest Lake Coalition Correspondence
President Forster directed Administrator Bleser to send the letter to the Southwest Lake Coalition notifying the group of the District’s plan process and to invite the group to engage in the public meetings, and he directed her to send a copy of the letter to the managers.

6. Visioning Exercise
Administrator Bleser handed out a 10-page visioning exercise document for the managers to complete as a way to engage the managers in the planning process and to initiate their thinking on the current 10-year plan in terms of vision, long-term goals, and short-term goals and about the planning process. She went into more detail about this exercise, and she pointed out that the language captured in the document is verbatim from the District’s current plan. She requested that the managers complete the exercise by the next Board meeting. Administrator Bleser said that she will distribute this workbook to the managers electronically as well. Manager Chadwick asked if this workbook has been given to the CAC as well. Administrator Bleser said no, what she wanted to do was get the managers started on this process, but it can be given to the CAC. Manager Chadwick requested that she distribute the workbook to the CAC.

iii. Task Order 14: Lower Riley Creek Stabilization Reach E and D3
Administrator Bleser reported that this Task Order was not included as a consent item because it includes an optional Phase I Environmental Assessment. She recommended the District include the Phase I Environmental Assessment because although it is not a requirement it is a good best
practice. She stated that there are funds for it. Manager Crafton moved to approve Task Order 14 with the Phase I Environmental Assessment. Manager Bisek seconded the motion. **Upon a vote, the motion carried 5-0.**

iv. **Continuing Education: 2016 Local Solutions: Eastern Regional Climate Preparedness Conference**
Manager Yetka and Administrator Bleser talked about the conference and responded to questions about it. Manager Crafton moved to approve sending Manager Yetka and Administrator Bleser to the conference. President Forster seconded the motion. Manager Bisek made a friendly amendment to the motion to include direction to Manager Yetka and Administrator Bleser to come back to the Board and describe the costs once they are known. **Upon a vote, the motion carried 5-0.**

v. **Task Order 15: H and H Climate Adaption**
Manager Bisek moved to approve Task Order 15. Manager Crafton seconded the motion.

Manager Bisek remarked that she thinks the information being developed, particularly in task 4, would be extremely helpful to the cities and agencies and she would like to see the District partner with them to help fund the work. Administrator Bleser clarified that tasks 1-3 are in the budget and task 4 is optional and comes with an additional cost. She said that all four tasks could be done and the budget for task 4 could come from the contingency build into the District’s 2016 budget. She stated that an alternative is for the funding of the optional task to come from the District’s reserve funds. Engineer Sobiech fielded questions about the tasks.

Manager Bisek clarified that her motion includes approving tasks 1-4. **Upon a vote, the motion carried 5-0.**

vi. **Monitoring Equipment - Lake Susan Spent Lime**
Administrator Bleser announced that tomorrow work begins on the southwest corner of Lake Susan to put in the spent lime treatment, which will reduce the amount of phosphorous entering Lake Susan. She explained that staff would like to purchase data collection equipment to test the efficiency of the spent lime treatment. Administrator Bleser said that the equipment could be used for testing other projects in the future. There was discussion about equipment that the District has previously used.

She noted that the District would recoup the costs in three years. She recommended a not-to-exceed amount of $19,000. Administrator Bleser explained that for the last equipment purchase the District used funds from its survey and data analysis fund and this type of purchase meets the requirement of this fund. She stated that there is $38,000 remaining in the survey and data analysis fund. She proposed using survey and data analysis funds to fund this monitoring equipment.

Manager Crafton moved to approve the purchase of the monitoring equipment at a not-to-exceed amount of $19,000. Manager Chadwick seconded the motion. **Upon a vote, the motion carried 5-0.**

vii. **Approval of Revised Budget**
Administrator Bleser handed out the revised budget and reminded the Board that it received it electronically as well. She explained that the only change to the budget is making recording services a separate line item. She said recording services is now its own line item under office and
staff and has a budget of $15,000. She said that under the overall spreadsheet the managers will see a decrease of $10,000 and a decrease of $5,000 in contingency and reserve funds, respectively. Administrator Bleser asked the Board to approve this budget so it can be formalized as the 2016 budget.

Manager Crafton moved to approve the revised budget. Manager Bisek seconded the motion. Upon a vote, the motion carried 4-0 (Manager Chadwick abstained from vote).

13. Managers’ Discussion

a. Meet/Greet New CAC Members
   Administrator Bleser announced that the Meet and Greet will be an opportunity for the new CAC members to meet the managers, staff, and continuing CAC members. She said that the event will be held on January 20, 2016, from 4 to 6 p.m. at the RPBCWD District Office.

b. Upcoming Meetings
   Administrator Bleser announced that the CAC and RPBCWD Board of Managers Workshop will be held on February 3 at 5:30 p.m. at the District Office, following by the Board of Managers Monthly meeting at 7:00 p.m. in the same location. Administrator Bleser said that she would bring more information about the Freshwater Society’s April event to the February Board meeting.

14. Upcoming Events

- CAC Meeting, Monday, January 18, 2016, 5:45 p.m., Chanhassen Public Library
- CAC/Board Workshop, Wednesday, February 3, 2016, 5:30 p.m., RPBCWD District Office
- Board Meeting, Wednesday, February 3, 2016, 7:00 p.m., RPBCWD District Office

15. Adjourn

Manager Crafton moved to adjourn the meeting. Manager Forster seconded the motion. Upon a vote, the motion carried 5-0. The meeting adjourned at 10:31 p.m.

Respectfully submitted,

________________________
Mary Bisek, Secretary
Requests to the Board:
1. **MOTION:** Ask the Managers to provide to the CAC the criteria/guidelines that the Watershed staff and Engineers use to prioritize lake projects. McCotter/Boettcher. Approved unopposed.

1. Meeting was called to order at 5:52 pm by President Pedersen, attendance is noted above.

2. Additions to the Agenda
   6f. LRAS recommendation to the Managers
   **MOTION:** Approve Agenda with additions. Boettcher/Bulger. Approved unopposed.

3. **MOTION:** Approve the December minutes with minor changes. McCotter/Adomaitis. Approved unopposed.

4. Board Recap: Managers will be addressing the budget format in a workshop. There will be a joint CAC/Board Workshop at the District office Wed. February 3rd at 5:30 pm.

5. Old Business
   a. Lake Matrix Update: Lindon was not at the beginning of the meeting. He is still awaiting for the updates on the UAA’s.
   b. Cost Share Review: Jordan presented an updated version of the Cost Share Application Guidelines with the changes highlighted for easier review.
      -biggest concern is using non-native vs native cultivars
      -will piggyback off of 9 Mile Creeks list of natives vs non-natives
      -there will be 2 rounds of applications: 1st deadline will be April 15, the 2nd deadline would be in June. If there are still funds available the district could accept rolling applications
      -the application is now 10 pages vs 7 pages
      -Jordan asked if the CAC was still interested in remaining involved with the Cost Share Review process. No members were against the idea.
      -Several members stated being involved was a good educational opportunity for them.
Minutes: Monday January 18, 2016  
RPBCWD Citizens Advisory Committee  
Regular Meeting held at District Office  

- There was a general consensus that members would review the applications prior to the CAC meeting, Jordan could answer any clarifying questions at the meeting, then the CAC could approve/disapprove the application.  
- The CAC would like to stay involved in the Cost Share process.  

**MOTION:** The CAC approves the changes to the Homeowner Guidelines document. Bulger/Adomaitis. Passed unopposed.

6. New Business  
   a. Lake Welcome Kit: This is a possible outreach/education/public outreach program to be undertaken by the CAC. There was some discussion as to whether this info should be provided to current residents as well as new residents.  
      **ACTION:** Hable, Bulger, and Koch will meet and report back to the CAC in February on what should be included in a Welcome Kit. Suggestions included Lake Fact Sheet, Annual Report, and AIS information.  
   b. Communicating change issues with neighbors/public: discussion held on how to handle communicating with the public  
      - Urban Water Forum: actions you can do on your lakes. April 23, 2016 at Arboretum. Table the discussion until Feb or March agenda to request funding for attending the forum.  
      - Pedersen informed the group that there is now an inoculation available for ash trees to protect from Emerald Ash Borers. Contact Pedersen if you want further information.  
      - It was asked if we have anything like a Poachers Hotline in our district, Jordan said we did not.  
   c. Calendar Update: Members should review what we want to work on in 2016 and we will discuss at the next CAC meeting. Topics suggested included: Budget, 10 Year Plan, Lake Matrix, Groundwater a presentation like the one given at the Evening with the Watershed, Buffet Strip Legislation, Dayton’s Water Summit in February  
   d. Communications with the Board: will be discussed at the Feb. 3rd workshop.  
   f. LRAS recommendation for the Board. Discussion was held on how the Board/District Staff/Engineers, measure values when determining projects for the lakes in the district. It was felt that there should be criteria for judging the lakes similar to the CRAS. There were several questions on what criteria/guidelines are used to determine the priorities for lake projects.  
      **MOTION:** Ask Managers to provide the CAC the criteria/guidelines that the Watershed staff and Engineers use to prioritize lake projects.  
      McCotter/Boettcher. Passed unopposed.

7. Upcoming Events  
   a. New CAC member meet and greet Wed. January 20, 4-4:30 pm District Office  
   b. CAC/Joint Board Workshop, Wednesday February 3, 5:00 pm District Office
Minutes: Monday January 18, 2016 RPBCWD Citizens Advisory Committee
Regular Meeting held at District Office

   c. Board Meeting Wednesday February 3, 7:00 pm District Office
   d. CAC Meeting Monday February 15, 6:30 pm District Office

8. Adjournment;
MOTION: To adjourn Adomaitis/Iverson, passed unopposed. Meeting adjourned at 8:11 pm.

Respectfully Submitted,

Laurie Hable
Recorder
# RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

Treasurers Report

December 31, 2015

## REPORT INDEX

<table>
<thead>
<tr>
<th>page #</th>
<th>Report Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cash Disbursements</td>
</tr>
<tr>
<td>2</td>
<td>All Fund Performance Analysis</td>
</tr>
<tr>
<td>3</td>
<td>Multi-Year Project Performance Analysis</td>
</tr>
<tr>
<td>4</td>
<td>Project Performance Analysis</td>
</tr>
<tr>
<td>5</td>
<td>Balance Sheet</td>
</tr>
<tr>
<td>6</td>
<td>Opinion Report</td>
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RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
Cash Disbursements All Funds
December 31, 2015

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** See memos on next page **
Memos

The 2014 mileage rate is 0.55 cents per mile. The 2015 mileage rate has increase to 57.5 cents per mile. The 2016 mileage rate is 0.56 cents per mile.

Klein Bank Visa will be paid online.

The Purchase Power invoice of $183.48 was already paid with check #2971, dated 01/04/16. No balance is due.

The negative amount of $5,905.36 under insurance and bonds is due to the prepaid expense journal entry adjustment for prepaid insurance paid in 2015 for 2016.

The negative amount of $3,823.72 under Education and Outreach is due to a refund from the U of M with check #1011030902, date 11/9/15, for $5,000.

The negative amount of $4,005.02 under office costs is due to the prepaid expense journal entry adjustment for prepaid rent, CAM, and utilities paid in 2015 for 2016.

Check #2954, dated 12/29/15, for $150.00 for Jacquelyn Ginter had to be voided, payment stopped, and reissued due to misplacement of check. The $150.00 of the check reissue is reflected in the accounts payable on the balance sheet.

The total administrator and staff salaries consist of the regular pay for the month of December as well as the accrued payroll for the year ended 2015.
### RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT

#### ALL Funds Performance Analysis

**December 31, 2015**

<table>
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<th>REVENUES</th>
<th>2015 Budget</th>
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<td><strong>TOTAL REVENUES</strong></td>
<td><strong>$ 2,446,500.00</strong></td>
<td><strong>$1,171,428.14</strong></td>
<td><strong>$ 2,592,351.94</strong></td>
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<table>
<thead>
<tr>
<th>EXPENDITURES</th>
<th></th>
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<tbody>
<tr>
<td>Engineering Services</td>
<td>$ 96,000.00</td>
<td>$ 7,994.50</td>
<td>$ 100,824.23</td>
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<td>Legal Services</td>
<td>130,000.00</td>
<td>3,085.92</td>
<td>125,161.49</td>
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<tr>
<td>Manager Expenses</td>
<td>18,500.00</td>
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<td>12,394.36</td>
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<tr>
<td>Administrator Costs</td>
<td>127,500.00</td>
<td>14,770.07</td>
<td>116,624.70</td>
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<tr>
<td>Staff Costs</td>
<td>121,000.00</td>
<td>13,722.75</td>
<td>114,734.94</td>
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<td>Accounting/Audit</td>
<td>32,500.00</td>
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<td>31,134.72</td>
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<td>Insurance and Bonds</td>
<td>10,000.00</td>
<td>(5,905.36)</td>
<td>3,191.64</td>
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<td>Permit Reviw &amp; Inspection</td>
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<td>9,623.15</td>
<td>152,085.53</td>
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<td>17,579.97</td>
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<td>Office Costs</td>
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<td>50,581.07</td>
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<td>Recording Services</td>
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<td>Dues and Memberships</td>
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<td>5,275.00</td>
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<td>Education &amp; Outreach</td>
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<td>(3,823.72)</td>
<td>76,121.71</td>
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<td>Advisory Committee</td>
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<td>Contingency Reserve</td>
<td>16,500.00</td>
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<td>0.00</td>
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<tr>
<td>Projects</td>
<td>1,562,000.00</td>
<td>74,760.93</td>
<td>955,868.75</td>
</tr>
<tr>
<td><strong>TOTAL EXPENDITURES</strong></td>
<td><strong>$ 2,431,500.00</strong></td>
<td><strong>$115,942.56</strong></td>
<td><strong>$ 1,773,553.60</strong></td>
</tr>
</tbody>
</table>

| Excess (Deficiency)        | $ 15,000.00 | $1,055,485.58             | $ 818,798.34              |

See Accountants Compilation Report
# RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
## Multi-Year Project Performance Analysis
### December 31, 2015

<table>
<thead>
<tr>
<th>Projects</th>
<th>Total Budget</th>
<th>2015 Budget</th>
<th>Month Ended Dec. 31, 2015</th>
<th>Year to Date Dec. 31, 2015</th>
<th>Total Lifetime Costs</th>
<th>Remaining Budget Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purgatory Creek Restoration</td>
<td>$550,000.00</td>
<td>$250,000.00</td>
<td>$4,840.87</td>
<td>$78,840.28</td>
<td>$123,352.32</td>
<td>$426,647.68</td>
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<tr>
<td>Lake Lucy-Spent Lime</td>
<td>130,300.00</td>
<td>0.00</td>
<td>75.00</td>
<td>3,152.16</td>
<td>55,563.35</td>
<td>74,736.65</td>
</tr>
<tr>
<td>Lake Lucy Iron Enhanced WQ</td>
<td>50,000.00</td>
<td>50,000.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>50,000.00</td>
</tr>
<tr>
<td>Lake Susan Improvement</td>
<td>275,000.00</td>
<td>50,000.00</td>
<td>1,464.10</td>
<td>58,869.78</td>
<td>91,163.96</td>
<td>183,836.04</td>
</tr>
<tr>
<td>Lake Susan Improvement Ph 2</td>
<td>150,000.00</td>
<td>150,000.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>150,000.00</td>
</tr>
<tr>
<td>Fish Passage Bluff Creek</td>
<td>115,000.00</td>
<td>0.00</td>
<td>14.26</td>
<td>19,466.54</td>
<td>38,644.21</td>
<td>76,355.79</td>
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<tr>
<td>District Wide Floodplain- Atlas14</td>
<td>220,000.00</td>
<td>110,000.00</td>
<td>13,932.50</td>
<td>117,996.50</td>
<td>222,512.96</td>
<td>(2,512.96)</td>
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<tr>
<td>Chanhassen Town Center</td>
<td>15,000.00</td>
<td>15,000.00</td>
<td>700.00</td>
<td>11,286.50</td>
<td>11,286.50</td>
<td>3,713.50</td>
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<tr>
<td>RML/Lake Riley UAA Update</td>
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<td>0.00</td>
<td>79,499.09</td>
<td>79,499.09</td>
<td>(9,799.09)</td>
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<tr>
<td><strong>Total Multi-Year Projects</strong></td>
<td><strong>$1,575,000.00</strong></td>
<td><strong>$625,000.00</strong></td>
<td><strong>$21,026.73</strong></td>
<td><strong>$369,110.85</strong></td>
<td><strong>$622,022.39</strong></td>
<td><strong>$952,977.61</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Other</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Creek Restoration Assessment Strategy</td>
<td>45,000.00</td>
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<td>36,467.55</td>
<td>36,467.55</td>
<td>8,532.45</td>
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<td>Master Design</td>
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<td>472.00</td>
<td>34,571.05</td>
<td>34,571.05</td>
<td>(14,071.05)</td>
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<tr>
<td><strong>Total Other</strong></td>
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<td><strong>$0.00</strong></td>
<td><strong>$472.00</strong></td>
<td><strong>$71,038.60</strong></td>
<td><strong>$71,038.60</strong></td>
<td><strong>(5,538.60)</strong></td>
</tr>
</tbody>
</table>

| **Total Multi-Year Project Costs**             | **$1,640,500.00** | **$625,000.00** | **$21,498.73** | **$440,149.45** | **$693,060.99** | **$947,439.01** |

See Accountants Compilation Report
## RILEY PURGATORY BLUFF CREEK WATERSHED DISTRICT
### ALL Funds Project Performance Analysis
#### December 31, 2015

<table>
<thead>
<tr>
<th>Project</th>
<th>2015 Budget</th>
<th>Month Ended Dec. 31, 2015</th>
<th>Year to Date Dec. 31, 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIS</td>
<td>$50,000.00</td>
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<td>$53,364.43</td>
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<td>90,549.93</td>
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<tr>
<td>Purgatory Creek Restoration</td>
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<td>78,840.28</td>
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<tr>
<td>Lake Riley/Susan- Curly- leaf treatment</td>
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<td>4,905.60</td>
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<td>Mitchell Lake Plant Management</td>
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<tr>
<td>Red Rock Lake Plant Management</td>
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<td>12,382.81</td>
</tr>
<tr>
<td>Lake Lucy-Spent Lime</td>
<td>0.00</td>
<td>75.00</td>
<td>3,152.16</td>
</tr>
<tr>
<td>Lake Lucy-Plant Management</td>
<td>0.00</td>
<td>0.00</td>
<td>466.81</td>
</tr>
<tr>
<td>Lake Susan Improvements</td>
<td>50,000.00</td>
<td>1,464.10</td>
<td>58,869.78</td>
</tr>
<tr>
<td>Rice Marsh Lake Paleolimnology</td>
<td>0.00</td>
<td>0.00</td>
<td>19,563.00</td>
</tr>
<tr>
<td>Fish Passage Bluff Creek Improvement</td>
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</tr>
<tr>
<td>UAA</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>District Floodplain- Atlas 14</td>
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<td>13,932.50</td>
<td>117,996.50</td>
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<td>Data Collection</td>
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<td>U of M</td>
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<td>Lake Riley Alum Treatment</td>
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<td>Lake Lucy Iron Enhanced WQ</td>
<td>50,000.00</td>
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<td>0.00</td>
</tr>
<tr>
<td>Lake Susan WQ Improvement Phase 2</td>
<td>150,000.00</td>
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<td>0.00</td>
</tr>
<tr>
<td>Buffer Demonstration Site</td>
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<td>0.00</td>
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<td>Purgatory Creek Lakes UAA</td>
<td>200,000.00</td>
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</tr>
<tr>
<td>Chanhassen Town Center</td>
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<td>Silver Lake Paleolimnology</td>
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<td>19,125.00</td>
<td>19,125.00</td>
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<tr>
<td>RML/ Lake Riley UAA Update</td>
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<td>79,499.09</td>
</tr>
<tr>
<td>Starring Lake Plant Management</td>
<td>8,000.00</td>
<td>0.00</td>
<td>7,968.00</td>
</tr>
</tbody>
</table>

**Total Project Costs**

**$1,562,000.00**

**$74,760.93**

**$955,868.75**

See Accountants Compilation Report 5
## Assets

### Current Assets

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>** Checking</td>
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<tr>
<td>Money Market Savings</td>
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<tr>
<td>Savings</td>
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<tr>
<td>Investments</td>
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<td><strong>Total Current Assets</strong></td>
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### Other Assets

<table>
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</thead>
<tbody>
<tr>
<td>Security Deposit</td>
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<tr>
<td>Due from Admin Fund</td>
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<tr>
<td>Due from 509 Fund</td>
<td>$0.00</td>
</tr>
<tr>
<td>Due from BWM Fund</td>
<td>$0.00</td>
</tr>
<tr>
<td>Due from Survey Fund</td>
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</tr>
<tr>
<td>Taxes Receivable</td>
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<td>Delinquent Property Taxes</td>
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### Total Assets

<table>
<thead>
<tr>
<th>Amount</th>
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<tbody>
<tr>
<td><strong>$3,634,330.79</strong></td>
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## Liabilities and Net Assets

### Liabilities

#### Current Liabilities

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<td>Accrued Payroll</td>
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<tr>
<td>PERA Withholding</td>
<td>$1,018.10</td>
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<tr>
<td>Due to Admin Fund</td>
<td>$0.00</td>
</tr>
<tr>
<td>Due to 509 Fund</td>
<td>$0.00</td>
</tr>
<tr>
<td>Due to R&amp;M Fund</td>
<td>$0.00</td>
</tr>
<tr>
<td>Due to Survey Fund</td>
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</tr>
<tr>
<td><strong>Total Current Liabilities</strong></td>
<td><strong>$119,018.30</strong></td>
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#### Other Current Liabilities

<table>
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<tr>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Retainages Payable</td>
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<tr>
<td><strong>Total Other Current Liabilities</strong></td>
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#### Long-Term Liabilities

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deferred Revenues</td>
<td>$2,775.16</td>
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<tr>
<td>Unearned Revenue CWF-Grant</td>
<td>$105,204.00</td>
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<tr>
<td>Permit Escrows</td>
<td>$365,075.00</td>
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<tr>
<td><strong>Total Long-Term Liabilities</strong></td>
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### Total Liabilities

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<tr>
<th>Amount</th>
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<tr>
<td><strong>$594,365.36</strong></td>
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### Net Assets

<table>
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<tr>
<td>Cumulative Fund Balance</td>
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<td>Excess (Deficiency) Current</td>
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<td><strong>Total Net Assets</strong></td>
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### Total Liabilities and Net Assets

<table>
<thead>
<tr>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>$3,634,330.79</strong></td>
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</tbody>
</table>

**COMMITTED FUNDS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>BWM Fund:</td>
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</tr>
<tr>
<td>Committed to Purgatory Creek Restoration</td>
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</tr>
<tr>
<td>R &amp; M Fund</td>
<td>$102,005.00</td>
</tr>
<tr>
<td>Survey Fund</td>
<td>$37,257.00</td>
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<tr>
<td><strong>TOTAL COMMITTED FUNDS</strong></td>
<td><strong>$250,356.00</strong></td>
</tr>
</tbody>
</table>

See Accountants Compilation Report
Riley Purgatory Bluff Creek  
Watershed District  
Minneapolis, MN  

To the Board of Managers:  

We have compiled the accompanying December 31, 2015, Treasurer’s Report of the Riley Purgatory Bluff Creek Watershed District’s statements of Cash Disbursements All Funds, All Funds Performance Analysis, All Funds Project Performance Analysis and Balance Sheet All Funds in the accompanying prescribed form. We have not audited or reviewed the accompanying financial statements and, accordingly, do not express an opinion or provide any assurance about whether the financial statements are in accordance with the form prescribed by the Riley Purgatory Bluff Creek Watershed District.  

Management is responsible for the preparation and fair presentation of the financial statements in accordance with requirements prescribed by the Riley Purgatory Bluff Creek Watershed District and for designing, implementing and maintaining internal controls relevant to the preparation and fair presentation of the financial statements.  

Our responsibility is to conduct the compilation in accordance with Statements on Standards for Accounting and Review Services issued by the American Institute of Certified Public Accountants. The objective of a compilation is to assist management in presenting financial information in the form of financial statements without undertaking to obtain or provide any assurance that there are no material modifications that should be made to the financial statements.  

These financial statements (including related disclosures) are presented in accordance with the requirements of the Riley Purgatory Bluff Creek Watershed District, which differ from accounting principles generally accepted in the United States of America. This report is intended solely for the information and use of the Riley Purgatory Bluff Creek Watershed District and is not intended to be and should not be used by another other than this specified party.  

We are not independent with respect to the Riley Purgatory Bluff Creek Watershed District.  

JMSC, PLLC  
Certified Public Accountants  

January 27, 2016  
Minneapolis, MN
Memorandum

To: Riley-Purgatory-Bluff Creek Watershed District Board of Managers and District Administrator
From: Barr Engineering Co.
Subject: Engineer's Report Summarizing January 2015 Activities for February 3, 2016, Board Meeting
Date: January 29, 2016

The purpose of this memorandum is to provide the Riley-Purgatory-Bluff Creek Watershed District (RPBCWD) Board of Managers and the District Administrator with a summary of the activities performed by Barr Engineering Co., serving in the role of District Engineer, during January 2016.

General Services

a. Participated in January 13th Technical Advisory meeting to gather input on MPCAS' TMDL process, present results of updated hydrologic and hydraulic models for Riley, Purgatory and Bluff Creeks, and discuss 10-year plan refresh process.

b. Met with Administrator Bleser, Greg Williams (Barr) and Karen Chandler (Barr) on January 25th for 10-year plan refresh kick-off meeting. The discussion focused on timeline for public engagement meetings, brainstorm ideas for stakeholder meeting plan formats.

c. Participated in January 25th meeting with President Forster, Administrator Bleser, Melissa Lewis (BWSR) and Linda Loomis (Lower MN WD) to discuss opportunities for including concepts from BWSR’s One Watershed, One Plan process into RPBCWD’s 10-year plan update.

d. Participated in January 6, 2016 Board of Manager’s regular meeting and treasure’s report workshop.

e. Prepared Engineer’s Report for engineering services performed during January 2016.

f. Regular and frequent communication and coordination with Administrator Bleser discussing status of permits, task orders for upcoming projects, and upcoming meeting agenda items.

g. Overall project management, administration, and coordination of task orders.

Permitting Program

a. Permit 2015-031: 10089 Purgatory Road Slope Stabilization: This project involves stabilization of a slump scarp along 35 linear feet of Purgatory Creek. Stabilization will consist of placement of a riprap buttress along the toe of the scarp, scarp regrading, and small amount of fill material for turf restoration. An additional 75 linear feet of streambank will receive a small amount of riprap toe protection to prevent additional scarps. Reviewed photos from site erosion control inspection. Reviewed narrative from project engineer regarding construction approach.
b. **Permit 2015-033: Cedarcrest Drive Storm Sewer Rehabilitation**: This project involves storm sewer repairs at two outlets to Riley Creek in Eden Prairie. Reviewed photos from site erosion control inspection and provided comments to erosion control inspector.

c. **Permit 2015-037: Purgatory Creek Restoration**: This project proposes to restore an approximately 1,100 foot long reach of Purgatory Creek. This is a RPBCWD project undertaken in response to a City of Minnetonka petition. The application remains incomplete (initial notice sent July 17th) because of documentation authorizing the District to perform the work on city owned property. The agreement with the City of Minnetonka is still under review by the city. A meeting is scheduled with the City for February 4th. The permit for this project might be on the March Board agenda.

d. **Permit 2015-048: Pagel II Ice Facility Addition**: This project involves a hockey facility addition on the Minnetonka High School property. The facility will also provide surrounding pavement and stormwater improvements. Application is considered complete as of December 23, 2015. Reviewed revised information submitted on January 25, 2016 and January 27, 2016. Drafted review summary for inclusion in the February 2016 Board Packet.

e. **Permit 2015-050: Arbor Glen**: This project involves construction of a 21 lot residential subdivision at 9170 Great Plains Blvd in Chanhassen. Application is considered complete as of December 28, 2015. Reviewed revised information. Comments provided to applicant on December 2, 2015 still need to be addressed. Drafted review extension request for inclusion in the February 2016 Board Packet.

f. **Permit 2015-053: RBSC Chanhassen, LLC**: This project involves construction of an approximately 4,500 square foot medical building with associated parking at 195 West 79th Street, Chanhassen. Application remains incomplete because of missing the following information a) signed application b) water quality computations c) soil borings at the locations of the proposed stormwater management facility locations including groundwater elevation d) hydrologic computations for the 10-day snowmelt event e) documentation of proof of contaminated soils at the proposed BMP locations and potential BMP locations. Applicant was notified that the application is incomplete on November 16, 2015. Application remains incomplete.

g. **Permit 2015-055: Hampton Inn Eden Prairie**: This project involves removal of existing site development and construction of a 5-story Hampton Inn hotel and associated infrastructure at the southwest quadrant of the intersection of Hennepin County Highway No. 61 and Technology Drive. Application remains incomplete. The applicant will likely be requesting a variance from the minimum and average buffer requirements. A revised submittal was received on January 21, 2016 and will be reviewed for potential consideration at the March Board meeting.

h. **Permit 2015-056: Oster Property**: This project involves removal of an existing cabin and construction of a single family home. The project also involves combining two parcels into one parcel, which requires the project to be considered as a full redevelopment, not a single family home site. Application remains incomplete because of missing the following information a) detail for buffer markers. Reviewed the provided MnRAM assessment for the
wetland. Applicant was notified that the application remains incomplete on January 7, 2016. Discussed project requirements with Administrator Bleser.

i. Permit 2015-058: Park Nicollet Prairie Center Clinic Addition: This project involves construction of a building and parking lot addition to the Park Nicollet Prairie Center Clinic at the intersection of Flying Cloud Drive and Medcom Boulevard in Eden Prairie. Application is considered incomplete because of missing the following information: a) buffer location map indicating the location of the buffer markers, b) detail for the wetland buffer markers, c) modeling for the 10-day snowmelt event, and d) water quality modeling. Applicant was notified that the application is incomplete on December 17, 2015. Discussed review comments with project engineer. A revised submittal was received on January 19, 2016 and will be reviewed for potential consideration at the March Board meeting.

j. Permit 2015-060: Optum 13625 Technology Drive: This project involves construction of two parking lots and associate stormwater facilities at 13625 Technology Drive (south of Technology Drive and east of Mitchell Road in Eden Prairie). Application is considered complete as of January 13, 2016. Discussed review comments with project engineer. A revised submittal was received on January 13, 2016 and will be reviewed for potential consideration at the March Board meeting.

k. Permit 2015-061: Ingram Property Development: This project involves construction of 11 townhomes located north of Pioneer trail immediately west of Riley Creek in Eden Prairie. Application is considered incomplete because of missing the following information: a) buffer location map indicating the location of the buffer markers and b) a detail for the creek buffer markers. Applicant was notified that the application is incomplete on December 30, 2015. Met with City of Eden Prairie staff, developer, and Westwood Engineering on January 21st to discuss comments on the Ingram Property (Riley Bluffs) project. A revised submittal was received on January 25, 2016 and will be reviewed for potential consideration at the March Board meeting.

l. Permit 2015-062: MnDOT SP 1002-100 TH 5: This project involves construction of four acceleration lanes onto TH 5 from TH 101 West (Market Blvd.) and TH 101 East (Chanhassen Rd.) to improve safety. Application is considered complete as of December 21, 2015. Provided review comments to applicant on January 5, 2016 and January 20, 2016. Discussed review comments with applicant. Drafted review extension request for inclusion in the February 2016 Board packet.

m. Permit 2016-001: 9641 Meadowlark Lane – Waterbody Crossing: This project involves installation of a culvert and construction of a crossing over a wetland at 9641 Meadowlark Lane in Chanhassen. Application is considered incomplete because of missing the following information: a) erosion control plan, b) wetland delineation report, c) figure showing edge of buffer and buffer averaging calculations, d) buffer marker detail, e) certified construction plans for the culvert, and f) hydraulic analysis for the design of the waterbody crossing. Applicant was notified that the application is incomplete on January 18, 2016.

n. Permit 2016-002: Minnetonka Public Schools Warehouse Renovation: This project involves rehabilitation and reconstruction of the parking lot and associated storm sewer at the Minnetonka Public Schools Warehouse at 5700 County Road 101 in Minnetonka. Application
is considered incomplete because of missing the following information: a) stormwater runoff volume and rate analysis and b) geotechnical analysis including soil borings at the proposed BMP location. Applicant was notified that the application is incomplete on January 25, 2016.

o. Permit 2016-003: 9641 Meadowlark Lane – Driveway and Home Construction: This project involves construction of a driveway and single family residential home at 9641 Meadowlark Lane in Chanhassen. Application is considered incomplete because of missing the following information: a) erosion control plan, b) site plan showing existing and proposed conditions, c) wetland delineation report, d) figure showing edge of buffer and buffer averaging calculations, and e) buffer marker detail. Applicant was notified that the application is incomplete on January 27, 2016.

p. Permit 2016-004: Round Lake Park: This project involves reconfiguration of trails, parking lots, and ball fields and installation of additional park amenities at the City of Eden Prairie’s Round Lake Park. Application is considered incomplete because of missing the following information: a) cross sections of the infiltration basins, b) geotechnical analysis including soil borings at BMP locations, c) MnRAM or other value assessment, d) figure showing edge of buffer and buffer averaging calculations, and e) buffer marker detail. Applicant was notified that the application is incomplete on January 29, 2016.

q. Met with Administrator Bleser, City of Eden Prairie, and HTPO on January 5th to discuss Round Lake Park redevelopments.

r. Met with Administrator Bleser and representative for 9641 Meadowlark Lane single family home development on January 11th.

s. Met with Administrator Bleser, City of Eden Prairie staff and Chick-fil-a developers on January 12th to discuss the RPBCWD stormwater requirements and City requirements.

t. Met with Administrator Bleser, City of Eden Prairie staff, developer’s engineer and Mr. Notermann (property owner) on January 12th to discuss the RPBCWD permitting requirements.

u. Met with Administrator Bleser and WSB on January 12th to discuss city of Eden Prairie’s planned 2016 improvements at Staring Lake Park and what is needed to meet the RPBCWD permitting requirements. Correspondence with WSB to clarify the wetland buffer requirements in response to additional questions.

v. Preliminary review of Minnetonka Schools Warehouse Renovation project design.

w. Performed erosion control inspections of active sites during the week of January 4th (see attached inspection report). Sent corrective action notices and performed corrective action site re-visits.

x. Updated the completeness checklist to post to the permitting website for use by applicants.

y. Participated in a January 19th meeting with Administrator Bleser and Candice Kantor (Barr) to discuss opportunities to streamline the permit tracking process. Developed a draft permit tracking matrix.
z. Conversations with several project engineers/developers about permit requirements for potential development and redevelopment projects.

Data Management/Sampling/Equipment Assistance

a. Received field data from RPBCWD, uploaded data into EQuIS and verified against the original source document.

Branding and Logo Design and Outreach

a. Barr and District Staff continued development of the Lake Susan Spent Lime Treatment interpretive sign.

Task Order 2b: Riley and Bluff Creek Hydrologic and Hydraulic Model Update

a. Staff finalized the model documentation report that summarizes updates made to the models, presents final calibration results, and water surface profiles along the creeks for the 2-, 10-, and 100-year Atlas 14 design events as well as the 100-year water surface profiles shown in the 1996 SWMP.

b. The final model documentation report was submitted to the District at the January Board meeting. The final model documentation report is the final deliverable for this Task Order.

Task Order 4b: Bluff Creek Fish Passage

a. Responded to questions from Administrator Bleser and city of Chanhassen about the easement needed for the project.

b. The detailed field investigations and design are on hold pending property owner permission to access the site.

Task Order 6: WOMP Station Monitoring

Purgatory Creek Monitoring Station at Pioneer Trail

a. Baseflow grab sampling and training for RPBCWD staff.

b. Downloaded and reviewed data.

c. Planning meeting for 2016-17 monitoring with MCES, RPBCWD, and the City of Eden Prairie.

d. Coordination and meeting with the new WOMP2 MCES coordinator.

e. Setup folders and files for 2016.

Purgatory Creek Monitoring Station at Valley View Rd

a. Baseflow grab sampling and training for RPBCWD staff.

b. Downloaded and reviewed data.


d. Review MCES lab invoices.

e. Setup standing invoices for utilities for 2016.
Task Order 7b: Purgatory Creek Stabilization near Hwy 101—Preliminary Engineering

a. Continued working with District Administrator and Legal Counsel as necessary to complete easement agreements with the private property owners.

b. Edited plan sheets to address comments from District permit review and to make minor adjustments based on the site visit.

c. Worked on editing the contract documents and technical specifications to prepare them for review by legal counsel and approval for bid.

Task Order 8b: Lake Susan Spent-Lime Treatment System Design

a. Minger construction (the contractor for the project) worked with City of Chanhassen staff to trim trees along the walking trail that was used to access the site. Tree trimming was completed by City staff, and Minger construction provided the equipment. Trimming was necessary so large vehicles, such as concrete trucks, could use the trail to access the construction site.

b. Construction activities began on January 7, 2016. Activities included installing erosion control BMPs and tree protection fencing, placing warning signs along the trail, clearing, and excavation for the concrete chamber.

c. The concrete chamber was poured on January 14 and 15th. The underdrain, connection to the existing storm sewer system, and outlet to the creek were installed the following week.

d. Spent lime has been added to the chamber and the grating (i.e., cover) is installed and locked in place.

e. Minger construction will not be working onsite for the next few months. They will return to the site to modify the existing manhole structure in the trail when the stop logs are received from the manufacture. Minger construction informed the District and City of Chanhassen of the long lead time for the stop logs at the preconstruction meeting.

f. Final site restoration will occur in the spring after the snow melts. Site restoration activities will include final site grading around the chamber, installing a grasspave access to the chamber, seeding, and planning. The concrete slabs for a bench and informational sign will also occur during site restoration.

g. The period between completion of the spent lime system and site restoration was planned and coordinated with the City of Chanhassen so that the contractor could drive heavy equipment on the City’s trail when the ground was frozen, which would reduce the potential for damaging the trail.

h. Barr staff has been onsite throughout the construction of the chamber and have been in frequent contact with the contractor to review submittals and answer questions regarding the plans.
Although the system is connected to the existing stormwater system, it is unlikely that any water will be diverted through the system this winter or spring until after the stop logs are installed.

Over the next few months Barr staff will continue to work with the contractor to review submittals for the site restoration portion of the project, and coordinate with the City of Chanhassen regarding the schedule for when site restoration activities will occur.

Task Order 9a: Lake Lucy Iron-Enhanced Sand Feasibility

- Working with Administrator to schedule a stakeholder meeting with property owner and City of Chanhassen.

Task Order 11: Purgatory Creek Watershed Restoration Study

- Continued to develop in-lake water quality modeling parameters for the study lakes, including water quality observations, water elevations and volumes, and lake outlet discharge rating curves. Incorporated Eden Prairie's 2015 monitoring data into the lake water quality modeling analysis. Developing preliminary water balance and in-lake phosphorus modeling for Round, Mitchell and Red Rock Lakes.

Task Order 12: Downtown Chanhassen BMP Retrofit Assessment

- Lead a January 29th meeting between Administrator Bleser, City of Chanhassen Water Resources Coordinator Terry Jeffery, and Barr staff (Greg Fransen and Scott Sobiech) to establish a plan for landowner and public participation in BMP site selection.

Task Order 13a: Lake Susan Watershed Treatment and Stormwater Reuse Enhancements

- Storm event monitoring will continue in the spring of 2016.
- Remaining activities include a comparison of the Riley Creek monitoring data to the modeled/monitored water quality of the Lake Susan Park Pond and the development of an Engineer’s Report which includes ultimate development and comparison of concept-level BMP design options as well as cost-benefit and permit implications.

Task Order 15: 100-Year Floodplain Vulnerability Evaluation (Climate Adaptation)

- Rainfall distributions were developed for additional rainfall events that will be simulated using the District’s hydrologic/hydraulic model.
- Staff began modifying the District’s model so that it can be used to simulate rainfall events larger than the 100-year event. The Atlas 14 100-year event (i.e., 7.4-inches in 24-hours) was previously used to develop the 100-year water surface profile for the creeks. As part of this evaluation the 95-percent uncertainty limit for the Atlas 14 100-year event will be simulated with the model (i.e., 10.0-inches in 24-hours). Modifications to the model include adding
overland flow conduits and extending storage curves to account for the additional stormwater runoff that will be either routed through or stored in the floodplain.

c. Over the next couple of months staff will complete modifications to the District’s model, simulate larger rainfall events, and begin mapping the inundation area along the creeks.

Chanhassen High School Stormwater Reuse Evaluation

a. This project is to determine the feasibility of stormwater use for irrigation at Chanhassen High School, focusing on three conceptual alternatives for the reuse system, including infrastructure layout and cost estimates.

b. Barr finalized the draft memo for three infrastructure systems and cost estimates. Infrastructure components include a pumping station, storage, piping, irrigation system, and valves and controls.
Barr staff has inspected construction sites in the Riley Purgatory Bluff Creek Watershed District for conformance to erosion and sediment control policies. Listed below are construction projects and the improvement needed for effective erosion control. The sites were inspected January 6th and 7th, 2016.

### Site Inspections

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-002</td>
<td><strong>Mission Hills</strong></td>
</tr>
<tr>
<td></td>
<td>No work has begun.</td>
</tr>
<tr>
<td>2015-005</td>
<td><strong>CSAH 101 Mntka</strong></td>
</tr>
<tr>
<td></td>
<td>Entire site looks good. All exposed soils have been sprayed (spray-tac) or covered with plastic/vegetation mats-prior to snow coverage. Site is dormant. Visible BMP's look good.</td>
</tr>
<tr>
<td>2015-007</td>
<td><strong>Minnetonka Street Rehab</strong></td>
</tr>
<tr>
<td></td>
<td>Sod has been installed and all exposed soil has vegetation mats in place. All snow covered. Catch basin/inlet protection has been removed. Site is 95% complete. Asphalt wear coat still needs to be laid. Site looks good. Site will need to be inspected closer after spring snowmelt.</td>
</tr>
<tr>
<td>2015-008</td>
<td><strong>3520 Meadow Lane</strong></td>
</tr>
<tr>
<td></td>
<td>Construction seems to have slowed. Site BMP’s are adequate. Lot is snow covered.</td>
</tr>
<tr>
<td>2015-010</td>
<td><strong>Children's Learning Adventure</strong></td>
</tr>
<tr>
<td></td>
<td>Earthwork/grading is underway. Rock entrance in place. Inlet protection in place. Site BMP’s look good.</td>
</tr>
<tr>
<td>2015-011</td>
<td><strong>Eden Prairie Ponds</strong></td>
</tr>
<tr>
<td></td>
<td>Wetland flagging has been placed. No construction has started.</td>
</tr>
<tr>
<td>Date</td>
<td>Project Description</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2015-012</td>
<td><strong>Meditech Site Improvements</strong></td>
</tr>
<tr>
<td></td>
<td>Construction activities complete. Inlet protection will need to be removed prior to site closure. (2 catch basins)</td>
</tr>
<tr>
<td>2015-013</td>
<td><strong>Lake Susan Spent Lime Treatment System</strong></td>
</tr>
<tr>
<td></td>
<td>Construction has begun. Silt fence in place. Site is brushed and cleared. Construction limits surveyed and marked. BMP's to date are good.</td>
</tr>
<tr>
<td>2015-014</td>
<td><strong>12420 Sunnybrook Road</strong></td>
</tr>
<tr>
<td></td>
<td>Site has been surveyed. No construction has started.</td>
</tr>
<tr>
<td>2015-016</td>
<td><strong>Blossom Hill</strong></td>
</tr>
<tr>
<td></td>
<td>Construction of first homesite continues. Site is stable for winter months. Visible BMP's are good.</td>
</tr>
<tr>
<td>2015-019</td>
<td><strong>5530 Vine Hill Road</strong></td>
</tr>
<tr>
<td></td>
<td>Bio-logs in place along street side. Site BMP's look good. House construction continues.</td>
</tr>
<tr>
<td>2015-020</td>
<td><strong>Dawn Valley Chapel</strong></td>
</tr>
<tr>
<td></td>
<td>Site construction is still in progress/appears to be on hold during winter months. Site BMP's look good.</td>
</tr>
<tr>
<td>2015-022</td>
<td><strong>8502 Waters Edge Drive</strong></td>
</tr>
<tr>
<td></td>
<td>Shoreline is staked. No construction has been.</td>
</tr>
<tr>
<td>2015-023</td>
<td><strong>Chanhassen East Business Center Parking Lot</strong></td>
</tr>
<tr>
<td></td>
<td>Construction is complete. Site is landscaped. Vegetation mat on slope-no growth observed during December inspection. Will have to wait until spring snowmelt and early growing season to inspect stabilization.</td>
</tr>
<tr>
<td>2015-024</td>
<td><strong>5995 Ridge Rd Shorewood MN</strong></td>
</tr>
<tr>
<td></td>
<td>Irrigation lines exposed on slope. Some house demo/remodeling observed. Minimal site disturbance at this time. Silt fences have been installed on slopes since December inspection. No additional work observed.</td>
</tr>
<tr>
<td>2015-025</td>
<td><strong>Lifetime Fitness Building Expansion</strong></td>
</tr>
<tr>
<td></td>
<td>Construction is 95% complete. Site looks good. Site can be closed.</td>
</tr>
<tr>
<td>Project Number</td>
<td>Project Name</td>
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<tr>
<td>----------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>2015-027</td>
<td>Bloomington Hyland Greens Pond Storm Sewer Maintenance</td>
</tr>
<tr>
<td></td>
<td>Construction has not started.</td>
</tr>
<tr>
<td>2015-029</td>
<td>Shops at Southwest Station</td>
</tr>
<tr>
<td></td>
<td>No work has begun.</td>
</tr>
<tr>
<td>2015-030</td>
<td>Chanhassen Speciality</td>
</tr>
<tr>
<td></td>
<td>BMP’s look good. Building construction underway and parking lot grading continues.</td>
</tr>
<tr>
<td>2015-031</td>
<td>10089 Purgatory Road</td>
</tr>
<tr>
<td></td>
<td>Open Corrective Action(s): Slope above installed riprap does not appear to be constructed per submitted plans. Deadline: 2/6/2016.</td>
</tr>
<tr>
<td></td>
<td>Wenck Associates (Site Representative): responded to the Corrective Action in the attached Technical Memo from Wenck (1/19/2016).</td>
</tr>
<tr>
<td></td>
<td>Site construction appears to be complete. Access to location is stable. Yellow silt curtain still onsite. Soils above installed stabilization rock at creeks edge appear unstable and susceptible to erosion. This area does not appear to be constructed per the plan. Will email representative. Photo of slope taken and emailed to representative.</td>
</tr>
<tr>
<td>2015-032</td>
<td>Centerpoint SE Eden Prairie Reinforcement Project</td>
</tr>
<tr>
<td></td>
<td>Work appears to be completed. Site has been seeded and vegetation mats in place prior to snowfall. BMP’s look good. Will have to inspect after spring snowmelt.</td>
</tr>
<tr>
<td>2015-033</td>
<td>Cedarcrest Storm Sewer Rehab</td>
</tr>
<tr>
<td></td>
<td>Open Corrective Action(s): Construction complete both Inlet #1 and Inlet #2. Inlet#1 may have some areas that need riprap above FES--snow covered. Inlet#2 has some small areas of bare soil. Areas on slope near outlet to creek are not stabilized. Bare soil above FES. Photos taken today-Inlet #1 and on 12/9/15 for Inlet #2. Representative will be emailed about above concerns. Deadline: 2/6/2016. Spoke with Dave Modrow (Eden Prairie) on 1-15-16. Both sites will be addressed after spring snow melt/thaw when the ground is thawed. Barr will inspect again starting in March.</td>
</tr>
<tr>
<td>2015-034</td>
<td>18353 Heathcote Lane</td>
</tr>
<tr>
<td></td>
<td>Wetland flagging in place. Property corner surveyed. No work has begun.</td>
</tr>
<tr>
<td>Task #</td>
<td>Project Details</td>
</tr>
<tr>
<td>---------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>2015-035</td>
<td>LaMettry's Chanhassen</td>
</tr>
<tr>
<td></td>
<td>No work has begun</td>
</tr>
<tr>
<td>2015-036</td>
<td>Saville West Subdivision</td>
</tr>
<tr>
<td></td>
<td>No work has begun</td>
</tr>
<tr>
<td>2015-037</td>
<td>Purgatory Creek at Hwy 101 Restoration</td>
</tr>
<tr>
<td></td>
<td>No work has begun</td>
</tr>
<tr>
<td>2015-038</td>
<td>Improvements to Field 8 at Miller Park</td>
</tr>
<tr>
<td></td>
<td>No work has begun</td>
</tr>
<tr>
<td>2015-039</td>
<td>Miracle Field</td>
</tr>
<tr>
<td></td>
<td>Construction complete. Inlet protection (SE side of project site) needs to be removed prior to site being closed. Will email site representative to get inlet protection removed.</td>
</tr>
<tr>
<td>2015-041</td>
<td>Eden Prairie Center Landscaping</td>
</tr>
<tr>
<td></td>
<td>No work has begun</td>
</tr>
<tr>
<td>2015-043</td>
<td>Tilia Ridge Stormwater Outfall Repair</td>
</tr>
<tr>
<td></td>
<td>Open Corrective Action(s): Appears construction complete. Some small areas of bare soil. Areas on slope near outlet to creek and across the creek where access to site was possible—are not stabilized/uncovered disturbed soils. Erosion control in place. Will email site representative. Deadline: 2/6/2016. 1/15/16: Spoke with Dave Modrow (City of Eden Prairie) site concerns will be taken care of after spring snowmelt/thaw. Barr will inspect site starting in March.</td>
</tr>
<tr>
<td>2015-044</td>
<td>Waterford Road Sump Pump Collection System</td>
</tr>
<tr>
<td></td>
<td>No work has begun</td>
</tr>
<tr>
<td>2015-045</td>
<td>Ravine Stabilization and Restoration</td>
</tr>
<tr>
<td></td>
<td>Construction complete. Slopes/soils stabilized ---no vegetation growing to date. Will inspect after snowmelt and again in late spring to verify vegetation growth and slope stabilization. BMPs that are installed look good.</td>
</tr>
<tr>
<td>2015-046</td>
<td>590 Prairie Center Drive</td>
</tr>
<tr>
<td></td>
<td>Construction continues. Earthwork and footings are being installed. BMP's are adequate. Site looks good. Fill is being placed today. Parking lot area for staging is being scraped clean on inspection date.</td>
</tr>
<tr>
<td>Project Number</td>
<td>Project Description</td>
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<tr>
<td>----------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>2015-047</td>
<td>Neutral Path Comm Belle Plaine to Mpls</td>
</tr>
<tr>
<td></td>
<td>Construction has begun on eastern half and at locations</td>
</tr>
<tr>
<td></td>
<td>throughout site route—minimal disturbance. Underground</td>
</tr>
<tr>
<td></td>
<td>utility marking is present throughout entire site. BMP's</td>
</tr>
<tr>
<td></td>
<td>look to be adequate.</td>
</tr>
<tr>
<td>2015-048</td>
<td>Pagel II Ice Facility Addition</td>
</tr>
<tr>
<td></td>
<td>No site work has begun.</td>
</tr>
<tr>
<td>2015-050</td>
<td>Arbor Glen Chanhassen</td>
</tr>
<tr>
<td></td>
<td>No construction has started.</td>
</tr>
<tr>
<td>2015-051</td>
<td>Chapel Hill</td>
</tr>
<tr>
<td></td>
<td>No work has begun.</td>
</tr>
<tr>
<td>2015-052</td>
<td>Bloomington Pond Maintenance</td>
</tr>
<tr>
<td></td>
<td>Construction has not started.</td>
</tr>
<tr>
<td>2015-053</td>
<td>RBSC Chanhassen LLC</td>
</tr>
<tr>
<td></td>
<td>No work has begun.</td>
</tr>
<tr>
<td>2015-054</td>
<td>480 Bighorn Drive</td>
</tr>
<tr>
<td></td>
<td>Sand that was stockpiled near shore during December</td>
</tr>
<tr>
<td></td>
<td>inspection is gone.</td>
</tr>
<tr>
<td></td>
<td>Unable to view complete work due to snow cover.</td>
</tr>
<tr>
<td></td>
<td>Will have to inspect after spring snow melt.</td>
</tr>
<tr>
<td>2015-055</td>
<td>Hampton Inn Eden Prairie</td>
</tr>
<tr>
<td></td>
<td>No construction has started.</td>
</tr>
<tr>
<td>2015-056</td>
<td>Oster Property</td>
</tr>
<tr>
<td></td>
<td>No construction has started.</td>
</tr>
<tr>
<td>2015-057</td>
<td>9655 Geisler Road Retaining Wall</td>
</tr>
<tr>
<td></td>
<td>Construction completed. BMP's look good for winter.</td>
</tr>
<tr>
<td></td>
<td>Site will need a spring-snowmelt inspection and thru</td>
</tr>
<tr>
<td></td>
<td>growing season until established.</td>
</tr>
<tr>
<td>Project ID</td>
<td>Project Name</td>
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<tr>
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<td>-------------------------------------</td>
</tr>
<tr>
<td>2015-058</td>
<td>Prairie Center Clinic Addition</td>
</tr>
<tr>
<td></td>
<td>Site has been surveyed. No construction has started.</td>
</tr>
<tr>
<td>2015-059</td>
<td>19108 Twilight Trail</td>
</tr>
<tr>
<td></td>
<td>Open Corrective Action(s): Construction has begun. Site BMP's look good with the exception of no catch basin protection at basin in front of property and basin at west corner of property. Street cleanup at curb should also be completed. Rock entrance has been installed. Photos taken. Will email and call representative again. Deadline: 2/6/2016</td>
</tr>
<tr>
<td>2015-060</td>
<td>Optum Parking Expansion</td>
</tr>
<tr>
<td></td>
<td>No construction has started.</td>
</tr>
<tr>
<td>2015-061</td>
<td>Ingram Property</td>
</tr>
<tr>
<td></td>
<td>No construction has started.</td>
</tr>
</tbody>
</table>

Please contact me at 952.832-2687 or dmelmer@barr.com if you have questions on the projects listed above or any additional items that need to be addressed for the erosion control inspections.
To: Dave Melmer, Barr Engineering

From: Dave Parenteau, PE, Wenck Associates, Inc.

Date: January 19, 2016

Subject: Ravine Stabilization Project 10089 Purgatory Road
         Wenck Project # 0094-0098

This memorandum summarizes the need for some of the changes made to the project from
the time of the initial planning and permitting stages to what was able to be constructed
due to permit constraints, and other factors.

During the time span from when the original bids were obtained from the contractor and
when we finally obtained all permits necessary to begin construction, the incision into the
lower bank worsened, as evidenced by the fact that the bank pins we installed during the
initial design phase were nearly completely exposed at the commencement of construction.
It has been our professional opinion that it is this incision of the lower portion of the slope
that is the root cause of the failures of the upper reaches of the slope. This has led to the
upper portion of the scarp advancing into, and further up, the slope.

This was noted during construction and discussed with the contractor and Randy Slick.
Based on accessibility and safety concerns raised by the contractor, we agreed that it was
not practical to attempt to perform the fill placement and slope grading of this upper reach
as planned at this time. Instead the contractor placed additional rock buttress behind the
design crest of the rock fill which is expected to stop further incision of the lower portion of
the slope and therefore minimize the potential for significant progressive failure of the upper
reaches of the slope. There still may be some shallow erosional sloughing of the upper
portions of the scarp, but it is expected that it would be minimal and would eventually
stabilize as slough accumulates on the crest of the riprap.

The root cause of the slope failure at this site is a combination of softening of the soils due
to the seepage occurring at the interface between the sandier more permeable soils and the
underlying less permeable clayey soils, and erosion of the toe at the outside bend of the
stream, which combine to remove/eliminate the buttress effect of the soils on the lower
portion of the slope. Our experience at sites with similar issues, such as those we routinely
deal with in the Coon Creek Watershed is that by stabilizing the toe, as we did here, the
upper bank stabilizes with minimal further sloughing.

We recommended, and the contractor performed, selective tree removal, including the trees
that were overhanging the scarp to reduce the additional loading, seeding and installation of
erosion control blanket on the areas immediately upslope of the head of the scarp, and
placed physical markers to reference to the head of the scarp for periodic monitoring to
ensure there is no significant advancement of the scarp.
In our opinion, it is not practical to attempt to establish vegetation on the remaining scarp area, nor is it practical to safely re-grade the upper reaches of the slope. In order to do so, significant tree removal and additional site disturbance would be necessary, as these activities would need to be performed from the top due to the accessibility of the work area in a safe manner.

Monitoring of the slope will be performed routinely to assess the need for additional work on the slope that could be undertaken at a later date, should site conditions warrant.
General Notes:
1. Construction activities must be conducted so as to minimize the potential transfer of aquatic invasive species.

Construction Notes:
1. Remove marked trees and brush and dispose off-site.
2. Install riprap and geotextile
   - Riprap: Class II and IV granite conforming to MnDOT 3601.2
   - Geotextile: Type IV non-woven conforming to MnDOT 3733.2
3. Install riprap chimney drain
4. Install controlled fill
   - Suitable granular soil from the site (SP, SM)
   - Imported granular fill (SP, SW, SM)
   - Place in maximum 12-inch lifts
   - Compact to minimum 90% Standard Proctor dry density
5. Install 6 inches of compost on controlled fill area, fertilize and seed.
   - Compost: Grade 1 conforming to MnDOT 3890
   - Seed: MnDOT Mix 36-261 (native grass seed mix)
   - Fertilizer: Type 2 conforming to MnDOT 3881
6. Install erosion blanket on top soil/seeded area
   - Erosion blanket: Category 3, Straw 2S conforming to MnDOT 3885. No poly netting allowed.

Figure 4 - Scarp Cross Section
Administrative

10-Year Plan
Notification letters were sent out to the State Review Agencies as well as Local Government Units on January 8th. BWSR was notified of the plan process and found our process to be acceptable and the timing process reasonable. We discussed with the Technical Advisory Committee on January 13th the 10-year plan process. No participants had concerns with the process (please see end of administrator report for notes on the TAC meeting). The survey has been finalized working with a consultant on official launch and will be distributed shortly.

Aquatic Invasive Species
Inspection
No new update.

Riley Purgatory Creek Summit
The District held the Riley Purgatory Creek Summit on January 21. Participants at this summit included MPCA, DNR, Metropolitan Council, City of Chanhassen, City of Eden Prairie, University of Minnesota, BARR Engineering, Wenck Associates, Blue Water Science, Freshwater Scientific, and District Staff. The aim for the summit was to bring all agencies and researchers together to discuss water management plans for Riley Creek chain of lakes as well as Staring Lake and Purgatory Creek Park (Eden Prairie).

The first part of the meeting discussed the Riley Creek chain of lakes. Based on District monitoring, Lake Lucy Carp adult population was near the threshold for estimated carp population. The District will continue to monitor to see if their is an increase in population. No additional management action for carp or plant management is needed.

In discussing Lake Susan, District mentioned that they saw signs of recruitment while surveying the fish population. The District will continue to monitor. Carp population numbers are still under the threshold of concern. Dr Newman discussed possible plant management in that system. Summit members discussed plant management action related to Susan: treat for curleyleaf pondweed or not treat. Members discussed what they had noticed in situation similar to Lake Susan. DNR would be supportive of wither way. The District will be delineating this spring to see extent of distribution to determine if herbicide is warranted. One element to keep in mind if the timing of possible alum treatment of the lake and native plant restoration post-carp control.

In regards to Lake Riley, the district through the University of Minnesota will be delineating for both eurasian watermilfoil as well for curleyleaf pondweed to determine treatment areas. We will also be tracking seedbanks for curleyleaf pondweed.
For Staring Lake, we will be delineating this spring for plants and determine success of control of eurasian watermilfoil and plant management is warranted now that we have carp population levels below the threshold of damage in that ecosystem. We will be working with Dr. Ray Newman. Dr Sorensen and Dr Bajer also discussed possible carp management schemes that the District and City of Eden Prairie should consider for carp birth control: aeration unit in the Staring Lake, Bubble Curtain between the Purgatory Creek Park and Purgatory Creek (downstream).

Data Request
One request came asking for copies of the handouts provided to the manager at the board meeting. The request was fulfilled the same day.

Eden Prairie Local Surface Water Management Plan
Staff briefly discussed with the City of Eden Prairie. The City plans on submitting a new draft within the next few weeks.

Floodplain
Staff discussed with the TAC change floodplain profiles based on Atlas 14 and asked if they were fine with the change in elevations compared to our 96 plan (please see TAC notes appended at the end of this report for more information).

Major Plan Amendment
The BWSR approved our Major Plan Amendment at their January 27, 2016 meeting.

Permitting
We continue to work with potential and current permit applicants.

Permit Violation
The DNR will be working with Mr. Brace Helgeson of 6575 Pleasant View’s property. The restoration Order was issued on January 13, 2016. The RO states that the DNR Hydrologist for Carver County will visit the site with him in the spring to stake out the area of sod that needs to be removed and planted with natives.

Total Maximum Daily Load
The District hosted a kickoff meeting with the TAC to discuss the TMDL project that is occurring in the district. This project is part of the Lower Minnesota River WRAPS (Watershed Restoration and Protection Strategy). Greg Wilson (BARR) and Chriz Zadak (MPCA) presented and led the discussion (Please see notes at the end of this Board Packet from our TAC meeting).

Citizen Advisory Committee

New members
The four new members were contacted about their appointment by the board. Three accepted (Yockers, Ziegler, Bruce) and participated in a brief orientation. Yockers and Bruce were able to attend a meet and greet on January 10th. Several board members and current CAC members
were there to welcome the new members along with staff. Ziegler was not available and stopped by the office the week before. Paulson declined the appointment, due to some changes in professional commitment and concern about taking on too much. Paulson is also a Master Water Steward this year, which represents a considerable time commitment. He may be interested in applying for the 2017 CAC. New members are invited to the Board/CAC workshop on February 3, and will attend their first meeting on February 15.

**January meeting**
The CAC met on January 18th. Meeting minutes are included in the board packet.

**February meeting**
Administrator Bleser will be attending the February CAC meeting to introduce the 10-Year-Plan update process.

**Continuing Education**

**Minnesota Association of Watershed District**
No Update

**The Watershed Game**
Jordan will be attending on training on using The Watershed Game in education programing on February 10th. The Watershed Game (WSG) is an interactive, educational tool that helps individuals understand the connection between land use and water quality. Participants learn how a variety of land uses impact water and natural resources, increase their knowledge of best management practices, and learn how their choices can prevent adverse impacts. Participants apply the tools of plans, practices, and policies that help them achieve clean water goals for protection and restoration while providing for community growth. A new classroom version has been developed and will be included in the training.

**The Art of Hosting**
Jordan is registered for a 3-day introduction to the Art of Hosting, May 11-13. The Art of Hosting is an approach to leadership that scales up from the personal to the systemic using personal practice, dialogue, facilitation and the co-creation of innovation to address complex challenges. The skills that are learned in this training will help in facilitating meeting, workshops, and group conversations.

**Data Collection (J. Maxwell)**

**Rice Marsh Lake Aeration**
Staff received the permit from the MN DNR in November for the operation of the aeration unit on Rice Marsh Lake in 2015. Southwest Newspaper posted public notices of the proposed start date (November 20th) of the unit on November 5th and 12th. The thin ice signs were placed and the aeration unit was started on Monday the 25th. Staff will monitor the unit at least once a week to be in compliance with DNR regulations and to make sure everything is running smoothly.
Winter Field Season
Regular winter sampling occurred at the end of January on the Riley Chain of Lakes (Lucy, Ann, Susan, Rice Marsh, and Riley) and stormwater ponds, (Pond K, Eden, Pond B) with the addition of Lake Susan Park Pond. Zachary Dickhausen, a service learner student from the University of Minnesota, assisted in the winter sampling. These monthly sampling events will be used as baseline data and to analyze chloride concentrations. Staff has been busy analyzing data collected throughout the summer of 2015 for updating the lake fact sheets and annual report.

Lake level sensors were sent in for yearly maintenance/calibration and staff replaced/updated the housing for one lake level sensor because it was in disrepair. The District received the new decon unit recently and will be assembling it later this winter for use next year. Staff and Chris Bonnick from Barr engineering met with a representative with ISCO to finalize the purchase of a monitoring station for the Lake Susan spent lime treatment system. Staff will soon be placing an order for the purchase of the unit. District staff also assisted Wenck staff in the collection of sediment cores on Rice Marsh Lake and Lake Susan. The cores will be used to calculate release rates of phosphorus from the sediments to better apply the proposed alum treatment in the future.

Carp Management
Staff met with key stakeholders about carp management within the District in January 21st. See Riley Creek Summit.

Creek Restoration Action Strategies
The CRAS was finalized and is now available on the District website. Staff has incorporated the most recent creek walks and the 2015 water quality data into the Creek Fact sheets.

WOMP Station - Metropolitan Council
The District has met with the Metropolitan Council and the City of Eden Prairie to discuss the operation of our WOMP stations (automated monitoring stations located on Riley and Purgatory Creek). We have a new coordinator and we are working on the logistics moving forward.

The District will be operating the Valley View and Pioneer Trail WOMP stations during the 2016 field season. Eden Prairie will be operating the Riley Creek station. Staff will take over the monthly grab samples at the two Purgatory Creek WOMP stations to reduce costs of operating
the units. Staff met with Chris Bonnick from Barr Engineering to go over protocol and to ensure consistency of sample collection is kept as the District takes over.

**Education and Outreach (M. Jordan)**

**Adopt a Dock Program**
No new updates.

**AIS Jr Inspector**
The City of Minnetonka asked if the RPBCWD would have an AIS Jr station at their Native Plant Fair on June 8th from 3-7pm.

**Annual Communication**
Limited numbers are left.

**Cost-share Program**
The application and guideline documents have been updated. They are included in the board packet.
The primary changes to the guidelines are (highlighted in yellow in the documents):
- Splitting the original guidelines into three documents, one for each tier of the cost share.
- Additional of a statement that individuals are eligible for one grant per year.
- Reference to the approved plants list, which may contain cultivars/non-natives for stormwater projects.
- Creation of 2 rounds of applications, early and late.
- Inclusion of an application checklist to help applicants plan.
The primary changes to the application are:
- Reformating
- Creation of a fillable pdf.
- Inclusion of the assessment criteria into the application (grey boxes). This is meant both to help staff and the CAC in reviewing, and also to encourage applicants to self assess as they write their applications.

Staff are in contact with Matt Kumka from Barr Engineering and are moving forward on developing the approved plants lists to be used with the cost share.

**Education and Outreach Needs Identification with Cities**
The district, along with Nine Mile Creek Watershed District held a meeting with all the cities in both districts (there is a 3-city overlap). The goal was to evaluate how district Education and Outreach programing in 2015 helped to support city programs and needs, and to identify needs for 2016. There was considerable talk about the winter roads/sidewalk trainings and chloride trainings. There was also conversation about how cities might help identify projects for Master Water Stewards to meet their volunteer hour requirements.
Lakes and Streams Water Quality Report
The Lakes and Streams Water Quality Report has been completed. A brief summary of the data will be presented at the board meeting.

Master Water Stewards Program
The first Master Water Stewards class was held on Tuesday, January 19, at the Minnesota Historical Society. There are over 80 stewards in the cohort this year. Our district has 8 participants, and is hosting one steward from the Lower Minnesota River Watershed District. We are teaming up with Nine Mile Creek and Minnehaha Creek Watershed Districts as the West Metro group to share the staff/space needs. Classes run every other Tuesday and the location will rotate between Minnehaha Creek Watershed District, Nine Mile Creek, and our, offices.

Nonpoint Education for Municipal Officials (NEMO)
The District is looking to partner with Lower Minnesota River Watershed District and Nine Mile Creek Watershed District to do a program with local decision makers on the Minnesota River.

St. Hubert’s School
Jordan visited the school again on January 26th to facilitate a winter sampling. The students were excited to be out, and to peer below the ice. The chloride level in the pond was higher than the test limits (400 mg/L), and the district will be providing the school with a higher-range kit.
**Scenic Heights School Forest**
Staff are continuing to look into grant opportunities. The current most promising grant requires a conservation easement, and we are looking into the feasibility through the DNR.

**Turfgrass Maintenance Workshop**
A meeting has been set up between several watershed districts and Forton Consulting to decide how to move forward with training.

**Spiritual centers outreach**
No new updates.

**Social media (Twitter, Facebook, Instagram, etc)**
The district has been becoming more active on Twitter and Facebook, and gaining followers.

**Urban Waters Forum** Saturday, April 23, 2016, 8:30am - 12:30pm, MN Landscape Arboretum

An additional planning meeting was held. Speakers have been confirmed and support materials are being developed. A promotions plan has been formulated as well. The forum was mentioned to the CAC as a very good educational opportunity.

**Website**
The website has been updated to include the 10-Year Plan public input survey on the first page.

**Winter maintenance workshops**
A meeting has been set up between several watershed districts and Forton Consulting to decide how to move forward with training.

**Professional Workgroups**

**Hennepin County Natural Resource Partnership**
No new updates.

**Minnesota Association of Watershed District**
Managers and staff attended the MAWD annual meeting and pre-meeting workshops on December 3-5. The workshops included topics such as how a communities can overcome barriers and adapt to the ever increasing effects of climate change, basic watershed board management, and how the new buffer law will be rolled out. The meeting also had multiple informational sessions which highlighted new/recent work, projects, and technologies that have occurred. The District had an informational booth present during the trade show and had many people stop by. Josh Maxwell presented results of the the Creek Restoration Action Strategy and had two other watershed districts express possible interest in the study. The highlight of the conference was the District being awarded the “2015 Program of the Year” for the Creek Restoration Action Strategy.
Watershed Partners
Watershed partners held an informational meeting for administrators of watershed districts, cities, and so forth to explain their 3-year plan and gather support.

AIS Education Workgroup
The various organizations have been contributing materials to the google drive folder.

2015 Projects
Bluff Creek Fish Passage
Appraisal on the property is now complete.

Carp Management on Staring
Please find included in your packet the Carp Management Plan for the Purgatory Creek Chain of Lakes.

Chanhassen Town Center
Work continues on Chanhassen Town Center.

Lake Lucy Spent Lime - Final Memo
The spent lime memo has been finalized. I have included this memo at the end of this report.
The Lake Lucy spent lime project has been

Lake Susan Park Pond
Staff continues to analyze data from that pond to determine if the site needs to be retrofitted to improve water quality. Staff will monitor this site over the winter and through the 2016 field season. This pond collects water from the west-side of the Chanhassen town center.

Purgatory Creek at 101
We are securing final licenses for the restoration.

Lake Susan Water Quality CIP Project
The Lake Susan water quality project began on January 7th and will continue into early spring.
Staff created an informational handout about the spent lime system and placed the materials on both sides of the project. This has proven to be a great education and outreach opportunity as staff has already replaced the educational materials once.
Lake Riley Water Quality Project (Alum)
The Major Plan amendment has been approved by BWSR.

University of Minnesota
Aquatic Plant Progress Report

16 January 2016

Melaney Dunne, graduate student, University of Minnesota, with input from Dr. Ray Newman, University of Minnesota

Work in December and January was focused on completing data analysis of the field season data to include in the upcoming Annual Report and the watershed district summit meeting. Additionally, work also began on the Lake Vegetation Management Plan Annual Report for Lakes Riley and Susan which will be sent to the MNDNR. Melaney has been devising potential studies for her thesis, which may include assessing the effect of snow cover on early season curlyleaf pondweed growth. She is seeking input and advice from the district administrator and other investigators regarding the idea.

The Lake Staring manuscript was unfortunately rejected by Hydrobiologia. However, the revisions will be incorporated and we will be re-submitting elsewhere. Work in January and February will continue on completing the annual reports, planning for and conducting the possible snow cover experiment and developing plans for next field season.

Sorensen Group Progress Report
A final report for the Purgatory Creek Carp Management Plan is included in your board packet. This concludes our grant with the University of Minnesota with the Sorensen Lab.
Objectives
The overall goal of the Technical Advisory Committee meeting was to discuss and receive feedback for the following topics:

1. Lower MN River WRAPS – Chris Zadak MPCA and Greg Wilson Barr Engineering
2. Purgatory Creek Hydrologic/Hydraulics Model – Brandon Barnes Barr Engineering
3. Draft RPBCWD Plan Update Process – Claire Bleser RPBCWD

Attendees
Joe Mulcahy (Metropolitan Council)  Jennie Skancke (DNR)
Claire Bleser (RPBCWD)  Kate Drewry (DNR)
Joshua Maxwell (RPBCWD)  Jason Spiegel (DNR)
Michelle Jordan (RPBCWD)  Chris Zadak (MPCA)
Linda Loomis (Lower MN River WD)  Steve Christopher (BWSR)
Leslie Stovring (Eden Prairie)  Mike Wanous (Carver SWCD)
Rod Rue (Eden Prairie)  Kristen Larson (Carver County WMO)
Dave Modrow (Eden Prairie)  Charlie Sawdey (Carver County WMO)
Bob Bean (Deephaven)  Scott Sobiech (Barr)
Terry Jeffery (Chanhassen)  Brandon Barnes (Barr)
Matthew Lindon (CAC)  Greg Wilson (Barr)

Lower MN River WRAPS
The main objectives of this presentation were to discuss the main purpose of the Watershed Restoration and Protection Strategies (WRAPS) and how Total Maximum Daily Loads (TMDLs) will be developed and incorporated into the WRAPS. Additionally, Greg Wilson (Barr) went through water quality summary data of waterbodies within the RPBCWD.

• The WRAPS being conducted by the MPCA will span over a 10 year timeframe with 8 watershed projects being conducted each year which will include an intensive monitoring schedule.
• The main differences between the old WRAPS studies vs the new include the following:
  o The old WRAPS focused on single TMDLs from single waterbodies within a watershed which were followed up by an implementation plan addressing the problems identified.
  o The new WRAPS will focus on the watershed scale and will include TMDLs, protection strategies for non-impaired waters, biota sampling, and an implementation strategy. They will incorporate all local government studies (many have been already completed) and focus on areas that were missed. RPBCWD has conducted many Use and Attainability Analysis studies (UAA) on a number of lakes and developed the Creek Restoration Action Strategy (CRAS) which will be incorporated into the WRAPS.
• A general schedule of WRAPS and TMDL schedule can be seen on page 3 & 4 of the power point presentation.
Scott Sobiech (Barr Engineering): Who will be reviewing the draft TMDL report? Chris Zadak responded that everyone invited to the TAC meeting should review the plan and provide comments.

- Greg Wilson then went over all the data inputs and the approach to how the TMDLs will be carried out.
- Greg then discussed the main waterbodies being focused on in the RPBCWD which included Hyland Lake, Staring Lake, Lotus Lake, Lake Susan, Lake Riley, Lake Lucy, Lower Purgatory Creek (Staring Lake to MN River) and Lower Riley Creek (Lake Riley to MN River).

Individual PDF maps of the different input variable results will be provided to everyone for review and comment. RPBCWD will email a deadline for comments and this deadline will also be for providing additional data that other agencies have that can be incorporated into the TMDLs that has been missed.

**Hydrologic and Hydraulic Model for Purgatory Creek**

- The main objectives of this presentation were to provide the TAC with the new Hydrologic and Hydraulic Model for Purgatory Creek, what changed from the old model, and how the model will be used moving forward by all the stakeholders involved.
- The main changes from the old model included:
  - Updated specific modeling data (previously from 1970’s).
  - The use of upgraded technology and information to update the model.
  - Updated precipitation data (100 year 24 hour rainfall event changed from 6 inches using TP 140 to 8 inches for Atlas 14).
- Brandon then went through several examples of how the new model fit actual collected field data from storm events and what changes occurred using the old vs new model.

**DISCUSSION:** Claire Bleser (RPBCWD) – The board is interested to see what comes out of the TAC regarding which model will be used in everyday operation of other stakeholders. There has been discussion about continuing the use of the 1996 Hydrologic and Hydraulics Model, switch to the new model (Atlas 14), or use the stricter of the two. The District currently uses the 1996 Hydrologic and Hydraulics Model for permitting, but will most likely adopt the new model with Atlas 14.

  - Kate Drewry (DNR) – Most Watershed Districts are moving forward are using Atlas 14.
  - Kristen Larson (Carver SWCD) – Carver County is adopting Atlas 14.

**COMMENT:** Claire Bleser (RPBCWD) – The RPBCWD board has recently approved looking (mapping) at the areas that would be inundated using the Atlas 14 data to better get a picture of the high risk areas. This information could then be used to build more resilient communities moving forward. The main focus of this next step will ultimately be to focus on the impacts to major infrastructure.

**QUESTION:** Would anyone be interested in being a partner with the District on the inundation/high risk area mapping?

  - Terry Jeffery (Chanhassen) committed
  - Leslie Stovring (Eden Prairie) expressed interest but wanted Claire to send a task order

The overall consensus of the TAC was for the District to use new Hydrologic and Hydrology Model which incorporates Atlas 14 moving forward.
RPBCWD Plan Refresh Process
The District will be updating its Watershed Management Plan and has drafted a plan update process. Claire Bleser (RPBCWD) went through each of the 3 phases of the process, their associated tasks, which stakeholders would be involved in the tasks, and an approximate timeframe of when each task would be completed.

Large Updates to the Plan:

- More detail in the data collection section.
- Flood plain profile updates.
- More detail in the education and outreach section.

Major Gaps in the Current Plan

- Section 7 of the plan has an implementation table that assigns dollar amounts to each lake. The use of these funds does not reflect the current state of the lakes and no specific projects are outlined for that funding to be used. This confuses the public because they expect that specific dollar amount to be used on their lake even if it is not needed.
- Updated floodplain profile.
- Climate data/inundation mapping.
RPBCWD hydrologic/hydraulic model
Atlas 14 update

TAC Meeting
January 13, 2016
agenda

1. why now? what’s changed?
2. overview of model updates
3. overview of results
4. future management considerations
5. next steps
6. questions/discussion
why now? what’s changed?
why now? what’s changed?

- more rain!!
  - Atlas 14 Vol 8 includes precipitation-frequency estimates for Midwestern states
  - Published in 2013
  - ~25% increase in 100-year 24-hour event
rainfall distribution comparison
rainfall distribution comparison
flooding sensitive to changes in precipitation depth and distribution

Normal Water Level
flooding sensitive to changes in precipitation depth and distribution

100-Year Flooding
TP-40

freeboard
flooding sensitive to changes in precipitation depth and distribution

100-Year Flooding
Atlas 14
overview of model updates

• gathered best available information
  - Coordination with municipalities
    ▪ GIS data base
    ▪ as-built plans
    ▪ previous models
  - field inventory
  - field survey
results

• model calibration
  – calibration results

• design events
  – 100-year 24-hour rainfall event
  – water surface profiles
RPBCWD watersheds
calibration locations
Purgatory Creek calibration results
Lotus Lake

2013 Model Notes:
- Lake outlet and downstream culverts assumed clear of debris.

2014 Model Notes:
- Downstream culverts under Tartan Curve and Duck Lake Trail were assumed partially blocked by debris based on field observations.
Bluff Creek calibration results

2013 Model Notes:
- Multiple beaver dams exist throughout the watershed and have been documented by District staff. Beaver dams documented in 2014 were assumed to be present during the 2013 event.
# Riley Creek calibration results
## June 2014 high water comparisons

<table>
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<tr>
<th>Location</th>
<th>Surveyed Water Elevation (NGVD29 ft.)</th>
<th>Modeled Water Elevation at Time of Survey (NGVD29 ft.)</th>
<th>Difference at Time of Survey (NGVD29 ft.)</th>
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<tr>
<td>R5</td>
<td>937.8</td>
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- **R2**: Park Road
- **R4**: Dell Road
- **R5**: W 78th Street
creek profile reaches
Profile – Lotus Lake Branch
profile - Lotus Lake branch

Figure B-9. **Purgatory Creek**: Lotus Lake Branch

Figure B-10. **Purgatory Creek**: Lotus Lake Branch
Figure B-7. Purgatory Creek: Eden Prairie Road to Stodola Road

Figure B-8. Purgatory Creek: Stodola Road to Ridgewood Road

profile – Purgatory Creek
profile – Bluff Creek

Figure B-12. **Bluff Creek**: Minnesota River to County Road 14

*Dimensions for box and arch pipes are listed as height x span
**100-year and 10-year water surface elevations on the Minnesota River are from the 1979 Scott County Effective Flood Insurance Study

Legend:
- Blue line: Atlas 14 2-year Water Surface Profile
- Black line: Atlas 14 10-year Water Surface Profile
- Red line: Atlas 14 100-year Water Surface Profile
- Dashed line: 100-year Water Surface Profile from 1996 RPBCVD Plan
- Channel Bottom
Figure B-21. **Riley Creek**: TCWR Railroad to Lake Lucy

- Atlas 14 2-year Water Surface Profile
- Atlas 14 10-year Water Surface Profile
- Atlas 14 100-year Water Surface Profile
- 100-year Water Surface Profile from 1996 RIPBVD Plan
- Channel Bottom
future considerations

• how will new floodplain elevations be used for management purposes?
• cooperating with the cities will be important for continuing to provide flood protection and minimize impacts to the creek
• still referencing historical data
next tasks – evaluate floodplain vulnerability

- evaluation of rainfall uncertainty
next tasks—evaluate floodplain vulnerability

- evaluation of rainfall uncertainty
- inundation mapping for creeks
- high-level identification of buildings within the floodplain
- identification of creek crossings that overtop
- updated water surface profiles
Questions?
TMDL DEVELOPMENT

LOWER MN RIVER WRAPS

TMDL DEVELOPMENT

January 2016
GOALS FOR TODAY

• WRAPS Overview
• TMDL development steps
• Water quality summary / discussion
• Other?
# General Schedule:

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<th>2014</th>
<th>2015</th>
<th>2016</th>
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<th>2018</th>
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<td>Monitoring (chem/biota)</td>
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<tr>
<td>TMDL development (old listings)</td>
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<td></td>
<td>★★★★</td>
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<tr>
<td>TMDL development (new + some old listings)</td>
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<td></td>
<td></td>
<td>★★★★</td>
<td>★★★★</td>
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<tr>
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<td></td>
<td>★★★★</td>
<td>★★★★</td>
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<tr>
<td>WRAPS development</td>
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<td></td>
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<td></td>
<td>★★★★</td>
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<tr>
<td>- Model scenario runs</td>
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<td></td>
<td>★★★★</td>
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<tr>
<td>- Civic engagement</td>
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<td>★★★★</td>
</tr>
<tr>
<td>- Strategy development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>★★★★</td>
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<tr>
<td>- Report drafting</td>
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<td>★★★★</td>
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## TMDL Schedule:

<table>
<thead>
<tr>
<th>STEP</th>
<th>Est. date</th>
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</thead>
<tbody>
<tr>
<td>Draft allocations, needed reductions (internal, external load), source summary—meet; review/comment</td>
<td>Apr '16</td>
</tr>
<tr>
<td>Draft report—review/comment</td>
<td>May '16</td>
</tr>
<tr>
<td>Revise report</td>
<td>June '16</td>
</tr>
<tr>
<td>Strategy development</td>
<td>&gt;June '16</td>
</tr>
<tr>
<td>Public notice (with other TMDLs, WRAPS)</td>
<td>'18</td>
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</table>
DATA INPUTS

- Lake and stream water quality
- Bathymetry
- Aquatic macrophytes
- Fish
- Internal P loading
- Streambank erosion
- Watershed boundaries and land use/land cover
- Watershed BMPs
- Watershed P & TSS loading and flows
- Point sources
- Climate
APPROACH

• P loads for lakes
  • Watershed—P8 modeling
  • Internal
• Lake response modeling
• TSS loads for creeks
  • Watershed—P8 modeling
  • Load duration curves
• Allocations
  • WLA for MS4 runoff and other point sources
  • LA for non-MS4 runoff and internal loading
• Monitoring and implementation: input from local partners
HYLAND LAKE

- Shallow lake
- Bloomington regulated MS4: complex stormwater conveyances
LAKE LUCY

- Shallow lake
- Recent UAA update
LAKE SUSAN

- Deep lake
- Recent UAA update
STARING LAKE

- Shallow lake
- Part of current Purgatory Creek watershed study
LOTUS LAKE

- Deep lake
- Part of current Purgatory Creek watershed study
RILEY LAKE

• Deep lake
• Recent UAA update
• Alum treatment
Applicant type (check one)
- Homeowner
- Non-profit - 501(c)(3)
- Business or corporation
- Public agency or local government unit
- School

Project type (check all that apply)
- Raingarden
- Vegetated swale
- Lake/creek/wetland buffer
- Shoreline/bank stabilization
- Wetland restoration
- Pervious hard surface
- Infiltration basin
- Conservation practice
- Other:

Landowner information
Name ____________________________ Address ____________________________
City/State/Zip ____________________________ Phone ____________________________
Alt phone ____________________________ Email ____________________________

Primary contact
- Same as landowner (leave blank below)
Name ____________________________ Address ____________________________
City/State/Zip ____________________________ Phone ____________________________
Alt phone ____________________________ Email ____________________________

Project information
Project title ____________________________
Estimated start date ___________ Estimated completion date ___________
Community served ____________________________ Population served ____________________________ Subwatershed ____________________________
Legal description of the property ____________________________
Total project budget ____________________________ Dollar amount requested ____________________________

2-3 sentence summary of project

Is this work required as a part of a permit?  
- No  
- Yes
If yes: describe how the project provides water quality treatment beyond permit requirements in the Project Narrative on page 2.

Authorization
Name of landowner or responsible party ____________________________
Signature ____________________________ Date ____________________________
Project narrative

Summary
Describe the property, history of the site, and past management of the land.

What is the issue to be addressed?

What are the project objectives and expected outcomes?

Which of the cost share goals does the project support? Explain below.
- Improve watershed resources
- Increase awareness of the vulnerability of watershed resources
- Increase familiarity with and acceptance of solutions to improve waters
- Foster water resource stewardship

List other key participants and their roles

Details
Please check the boxes to indicate you have attached the following:
- location map
- record of property ownership
- site plan
- timeline
- plant list (if applicable)
- itemized budget contractor bid

During a 1.1 inch rainfall, the project will capture:

______________ gallons of water  ______________ pounds of phosphorus  ___________ pounds of sediment

Evaluation
How will the project be monitored and evaluated?

How will the results be shared and with whom?

Are there other projects that could be initiated as a result of this one?
Overview

The Riley Purgatory Bluff Creek Watershed District (RPBCWD) Cost Share Program provides funding assistance for projects that protect and conserve water resources, and increase public awareness of the vulnerability of these resources and solutions to improve them.

Eligible projects

Organizations are eligible to apply for one cost-share grant per year. Applications are reviewed and ranked based on their potential to contribute to the goals of RPBCWD’s cost-share program:

• improve watershed resources
• foster water resource stewardship
• increase awareness of the vulnerability of watershed resources
• increase familiarity with and acceptance of solutions to improve waters

Examples of projects:

1) Best management practices (BMPs): raingardens, vegetated swales, pervious pavers
2) Restorations: shorelines and wetlands, buffers, stabilizations
3) Conservation practices like irrigation system rain sensors, and rainwater reuse systems.

Additional eligibility requirements

• Must be a resident of RPBCWD.
• Project must be located within RPBCWD.
• Funding will not be awarded for work required as part of a permit requirement.
• Funding may be awarded toward the incremental cost of BMPs that will provide water-quality treatment beyond permit requirements.

Available funds

Grants for nonprofits and associations are awarded for up to $20,000 or 75 percent of project cost, whichever is less. The RPBCWD Board of Managers reserves the right to consider and award funding exceeding the stated maximums on a case-by-case basis. Cost share dollars are reimbursed upon submittal of a project report and paid receipts.
Reimbursable costs

Applications must be submitted and approved by the board of managers before the project begins. If the final project costs are less than the amount approved for funding, the RPBCWD’s contribution will be limited to the percentage of total costs stated in the funding agreement. Funds may be used to reimburse for design and implementation of the project. Aesthetic elements, and other costs not directly related to the construction or implementation of the water quality project will not be reimbursed.

**PLANTS**

1. Buffers, shoreline and wetland restorations and stabilizations: **only native plants** will be reimbursed. See the approved plants list for recommended natives.
2. Raingardens and vegetated swales: **some native cultivars and non-natives** may be reimbursed. See approved plants list for allowed plants.

**IN-KIND LABOR AND MATERIALS**

Labor and other in-kind contributions can be used for the required 25% match. Labor may be credited at $10 per hour for unskilled labor (site prep, planting, etc) and $20 per hour for skilled labor (installing bio-logs, operating machinery, etc).

**MAINTENANCE**

Maintenance of the project is the responsibility of the grant recipient. Maintenance costs, including labor, will not be credited or reimbursed (see page 3: Maintenance requirements).

Application send to: 14500 Martin Drive, Suite 1500, Eden Prairie 55344

First round applications are due **April 15**.

If funds remain, a second round of applications will be accepted with a due date of **June 15**.

Applications can be downloaded from the RPBCWD website (www.rpbcwd.org), or requested from Michelle Jordan by phone (952-607-6481) or e-mail (mjordan@rpbcwd.org). Completed applications can be submitted to Michelle via email or US mail.

The application should be signed and dated and should not **exceed 10 pages**. Applications will be reviewed by the Citizens Advisory Committee, which will make funding recommendations to the Board of Managers. The applicant is responsible for securing all permits necessary for the work. Incomplete submittals will not be considered.

**Application checklist**

A **complete application** must be submitted on or before the due date and include:

- Signed application cover page
- Application narrative
- Location map (with aerial photo)
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- Construction/installation site plan, designs, and specifications
- Estimate of water captured and pollution removed (if applicable)
- Plant list (if applicable)
- Itemized budget
- Contractor bid (if using)
- Accounting of in-kind contribution of labor and materials, if any (see worksheet)
**Evaluation criteria**

When developing your project, and filling out your application, keep in mind that priority will be given to projects which:

- ☐ Boarder water resources or are within priority drainage areas
- ☐ Provide water quality treatment for large parcels of land
- ☐ Demonstrate strong partnerships and/or citizen support
- ☐ Provide a reasonable budget, work plan, and timeline
- ☐ Are ready to begin as soon as seasonal conditions allow
- ☐ Show educational value (ex highly visible)
- ☐ State clear activities and goals that support fund purposes
- ☐ Provide a comprehensive site plan that includes multiple objectives
- ☐ Contain well-defined, measurable results

**Maintenance requirements**

Maintenance of the project is the responsibility of the grant recipient. Cost share participants must draft and sign a maintenance declaration and record it on the deed to the property. RPBCWD encourages landowners to maintain BMPs in perpetuity, but the effective life period listed below is the minimum number of years that the RPBCWD requires the grant recipient to maintain the BMP. RPBCWD will not provide cost-share funding for restoration of a BMP, the loss of functionality of which was caused by the applicant or present landowner.

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¹ Only the minimum required upland buffer width is eligible for funding.

[Types of BMPs other than those listed in the table may be submitted; the effective life in such cases will be determined on a case-by-case basis by RPBCWD staff in consultation with the applicant.]

**Funding agreement**

Program participants enter into a binding agreement with RPBCWD providing the terms under which cost-share funding is provided. After approval of cost-share funding for the project by the Board of Managers, the agreement for a project will be signed on behalf of RPBCWD. A copy will be returned to the cost-share participant. Amendment of any of the terms of the agreement will be by mutual written agreement signed by all parties to the original contract.

The agreement includes, but is not limited to, such items as promoting and acknowledging the RPBCWD sponsorship, reporting, payment schedule, terms of the agreement and use of funds, cost overruns, and cancellation. The agreement also allows the District access to the project area for evaluation and promotion of the project. Funding will only cover work done after the agreement has been signed.
Public hearing

If the application passes review, it will go to a public hearing. At the hearing, members of the public, including the applicant, may express opinion on whether the project should receive funding. The information and opinions expressed at the meeting will be considered by the Board of Managers in their final funding decision.

Schedule

Project installation must be completed by the date stated in the agreement between the participant and RPBCWD. If unforeseen circumstances delay a project, the participant can request a written extension by contacting RPBCWD staff.

Payment

Reimbursement will only be made after completion of the project. The participant must document completion and have it confirmed by RPBCWD staff via inspection. Applicants must provide copies of paid invoices for all costs and reasonable documentation of labor hours contributed. Claimed expenses will be verified by the RPBCWD as reasonable.

Conformance to Plans

RPBCWD will not reimburse costs expended for construction of a project that does not substantially conform to the approved plans, designs and/or specifications. RPBCWD will not reimburse costs expended for partial completion of a BMP. However, RPBCWD staff will work in earnest with participants to address unexpected conditions, changes in conditions or other eventualities that affect the construction or implementation of a BMP and will present a modification of the cost-share agreement to the Board of Managers when necessary.

Submitted Information

All information, including but not limited to applications, conceptual designs, contractor bids, cost estimates, final designs and specifications, copies of permits and proof of expenditures is subject to disclosure to the public when submitted to RPBCWD, except where specifically protected as non-public by state law.

Reporting Requirement

Within 30 days of the completion of the project, the applicant will complete and submit a project summary report to the RPBCWD using the work plan, timeline and budget submitted as part of the application. A progress report and copy of paid receipts will be required when requests for reimbursement are submitted. Following the project summary report, reports will be required after year 1, 3 and 5. Additional reporting will be required after year 9 for projects receiving more than $10,000.
Overview

The Riley Purgatory Bluff Creek Watershed District (RPBCWD) Cost Share Program provides funding assistance for projects that protect and conserve water resources, and increase public awareness of the vulnerability of these resources and solutions to improve them.

Eligible projects

Organizations are eligible to apply for one cost-share grant per year. Applications are reviewed and ranked based on their potential to contribute to the goals of RPBCWD’s cost-share program:

• improve watershed resources
• foster water resource stewardship
• increase awareness of the vulnerability of watershed resources
• increase familiarity with and acceptance of solutions to improve waters

Examples of projects:

1) Best management practices (BMPs): raingardens, vegetated swales, pervious pavers
2) Restorations: shorelines and wetlands, buffers, stabilizations
3) Conservation practices like irrigation system rain sensors, and rainwater reuse systems.

Additional eligibility requirements

• Must by a resident of RPBCWD.
• Project must be located within RPBCWD.
• Funding will not be awarded for work required as part of a permit requirement.
• Funding may be awarded toward the incremental cost of BMPs that will provide water-quality treatment beyond permit requirements.

Available funds

Grants for nonprofits and associations are awarded for up to $20,000 or 50 percent of project cost, which ever is less. The RPBCWD Board of Managers reserves the right to consider and award funding exceeding the stated maximums on a case-by-case basis. Cost share dollars are reimbursed upon submittal of a project report and paid receipts.
Reimbursable costs

Applications must be submitted and approved by the board of managers before the project begins. If the final project costs are less than the amount approved for funding, the RPBCWD’s contribution will be limited to the percentage of total costs stated in the funding agreement. Funds may be used to reimburse for design and implementation of the project. Aesthetic elements, and other costs not directly related to the construction or implementation of the water quality project will not be reimbursed.

**PLANTS**

1. Buffers, shoreline and wetland restorations and stabilizations: **only native plants** will be reimbursed. See the approved plants list for recommended natives.
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**IN-KIND LABOR AND MATERIALS**

Labor and other in-kind contributions can be used for the required 25% match. Labor may be credited at $10 per hour for unskilled labor (site prep, planting, etc) and $20 per hour for skilled labor (installing bio-logs, operating machinery, etc).

**MAINTENANCE**

Maintenance of the project is the responsibility of the grant recipient. Maintenance costs, including labor, will not be credited or reimbursed (see page 3: Maintenance requirements).

**Application**

Applications must be submitted on or before the due date and include:

- Signed application cover page
- Application narrative
- Location map (with aerial photo)
- Record of property ownership
- Construction/installation site plan, designs, and specifications
- Estimate of water captured and pollution removed (if applicable)
- Plant list (if applicable)
- Itemized budget
- Contractor bid (if using)
- Accounting of in-kind contribution of labor and materials, if any (see worksheet)
**Evaluation criteria**

When developing your project, and filling out your application, keep in mind that priority will be given to projects which:

- Boarder water resources or are within priority drainage areas
- Provide water quality treatment for large parcels of land
- Demonstrate strong partnerships and/or citizen support
- Provide a reasonable budget, work plan, and timeline
- Are ready to begin as soon as seasonal conditions allow
- Show educational value (ex highly visible)
- State clear activities and goals that support fund purposes
- Provide a comprehensive site plan that includes multiple objectives
- Contain well-defined, measurable results

**Maintenance requirements**

Maintenance of the project is the responsibility of the grant recipient. Cost share participants must commit to maintain their BMP for the duration of its “expected effective life” (see table below). If the project is on private property, a maintenance declaration must be recorded on the deed. RPBCWD encourages landowners to maintain BMPs in perpetuity, but the effective life period listed below is the minimum number of years that the RPBCWD requires the grant recipient to maintain the BMP. RPBCWD will not provide cost-share funding for restoration of a BMP, the loss of functionality of which was caused by the applicant or present landowner.

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1 Types of BMPs other than those listed in the table may be submitted; the effective life in such cases will be determined on a case-by-case basis by RPBCWD staff in consultation with the applicant.

**Funding agreement**

Program participants enter into a binding agreement with RPBCWD providing the terms under which cost-share funding is provided. After approval of cost-share funding for the project by the Board of Managers, the agreement for a project will be signed on behalf of RPBCWD. A copy will be returned to the cost-share participant. Amendment of any of the terms of the agreement will be by mutual written agreement signed by all parties to the original contract.

The agreement includes, but is not limited to, such items as promoting and acknowledging the RPBCWD sponsorship, reporting, payment schedule, terms of the agreement and use of funds, cost overruns, and cancellation. The agreement also allows the District access to the project area.
for evaluation and promotion of the project. Funding will only cover work done after the agreement has been signed.

**Public hearing**

If the application passes review, it will go to a public hearing. At the hearing, members of the public, including the applicant, may express opinion on whether the project should receive funding. The information and opinions expressed at the meeting will be considered by the Board of Managers in their final funding decision.

**Schedule**

Project installation must be completed by the date stated in the agreement between the participant and RPBCWD. If unforeseen circumstances delay a project, the participant can request a written extension by contacting RPBCWD staff.

**Payment**

Reimbursement will only be made after completion of the project. The participant must document completion and have it confirmed by RPBCWD staff via inspection. Applicants must provide copies of paid invoices for all costs and reasonable documentation of labor hours contributed. Claimed expenses will be verified by the RPBCWD as reasonable.

**Conformance to Plans**

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2016 Cost Share Program for Homeowners

Guidelines

Overview

The Riley Purgatory Bluff Creek Watershed District (RPBCWD) Cost Share Program provides funding assistance for projects that protect and conserve water resources, and increase public awareness of the vulnerability of these resources and solutions to improve them.

Eligible projects

Individuals are eligible to apply for one cost-share grant per year. Applications are reviewed and ranked based on their potential to contribute to the goals of RPBCWD’s cost-share program:

- improve watershed resources
- foster water resource stewardship
- increase awareness of the vulnerability of watershed resources
- increase familiarity with and acceptance of solutions to improve waters

Examples of projects:

1) Best management practices (BMPs): raingardens, vegetated swales, pervious pavers
2) Restorations: shorelines and wetlands, buffers, stabilizations
3) Conservation practices like irrigation system rain sensors, and rainwater reuse systems.

Additional eligibility requirements

- Must by a resident of RPBCWD.
- Project must be located within RPBCWD.
- Funding will not be awarded for work required as part of a permit requirement.
- Funding may be awarded toward the incremental cost of BMPs that will provide water-quality treatment beyond permit requirements.

Available funds

Grants for homeowners are awarded for up to $3,000 or 75 percent of project cost, which ever is less. The RPBCWD Board of Managers reserves the right to consider and award funding exceeding the stated maximums on a case-by-case basis. Cost share dollars are reimbursed upon submittal of a project report and paid receipts.
Reimbursable costs

Applications must be submitted and approved by the board of managers before the project begins. If the final project costs are less than the amount approved for funding, the RPBCWD’s contribution will be limited to the percentage of total costs stated in the funding agreement. Funds may be used to reimburse for design and implementation of the project. Aesthetic elements, and other costs not directly related to the construction or implementation of the water quality project will not be reimbursed.

**PLANTS**

1. Buffers, shoreline and wetland restorations and stabilizations: **only native plants** will be reimbursed. See the approved plants list for recommended natives.
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**IN-KIND LABOR AND MATERIALS**

Labor and other in-kind contributions can be used for the required 25% match. Labor may be credited at $10 per hour for unskilled labor (site prep, planting, etc) and $20 per hour for skilled labor (installing bio-logs, operating machinery, etc).

**MAINTENANCE**

Maintenance of the project is the responsibility of the homeowner and maintenance costs, including labor, will not be credited or reimbursed (see page 3: Maintenance requirements).

**Application**

send to: 14500 Martin Drive, Suite 1500, Eden Prairie 55344

First round applications are due **April 15**.

If funds remain, a second round of applications will be accepted with a due date of **June 15**.

Applications can be downloaded from the RPBCWD website (www.rpbcwd.org), or requested from Michelle Jordan by phone (952-607-6481) or e-mail (mjordan@rpbcwd.org). Completed applications can be submitted to Michelle via email or US mail.

The application should be signed and dated and should not exceed **10 pages**. Applications will be reviewed by the Citizens Advisory Committee, which will make funding recommendations to the Board of Managers. The applicant is responsible for securing all permits necessary for the work. Incomplete submittals will not be considered.

**Application checklist**

A **complete** application must be submitted on or before the due date and include:

- Signed application cover page
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- Contractor bid (if using)
- Accounting of in-kind contribution of labor and materials, if any (see worksheet)
Evaluation criteria

When developing your project, and filling out your application, keep in mind that priority will be given to projects which:

☐ Boarder water resources or are within priority drainage areas
☐ Provide water quality treatment for large parcels of land
☐ Demonstrate strong partnerships and/or citizen support
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☐ Provide a comprehensive site plan that includes multiple objectives
☐ Contain well-defined, measurable results

Maintenance requirements

Maintenance of the project is the responsibility of the grant recipient. Cost share participants must commit to maintain their BMP for the duration of its “expected effective life” (see table below). RPBCWD encourages landowners to maintain BMPs in perpetuity, but the effective life period listed below is the minimum number of years that the RPBCWD requires the grant recipient to maintain the BMP. RPBCWD will not provide cost-share funding for restoration of a BMP, the loss of functionality of which was caused by the applicant or present landowner.

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1 Only the minimum required upland buffer width is eligible for funding.

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Project installation must be completed by the date stated in the agreement between the participant and RPBCWD. If unforeseen circumstances delay a project, the participant can request a written extension by contacting RPBCWD staff.

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Conformance to Plans

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Submitted Information

All information, including but not limited to applications, conceptual designs, contractor bids, cost estimates, final designs and specifications, copies of permits and proof of expenditures is subject to disclosure to the public when submitted to RPBCWD, except where specifically protected as non-public by state law.

Reporting Requirement

Within 30 days of the completion of the project, the applicant will complete and submit a project summary report to the RPBCWD using the work plan, timeline and budget submitted as part of the application. A progress report and copy of paid receipts will be required when requests for reimbursement are submitted. Following the project summary report, reports will be required after year 1, 3 and 5.
The RPBCWD board put the Lake Lucy spent lime treatment system design (in Wetland LU-A3.4 at Utica Terrace in Chanhsenn) on-hold indefinitely after the March 4, 2015 meeting in response to concerns of the adjacent residents expressed to the Administrator and Engineer at a 2/5/2015 meeting with the homeowners and follow-up discussion. The following is a summary of the outreach and design iterations of the Lake Lucy spent lime treatment system design, through March 2015. Attached are the 30% design plans of the subsurface spent lime treatment system within the right of way along Utica Terrace.

Summary of Design Iterations and Resident Input
The conceptual design of the spent lime system outlined in the 5/1/2014 Engineer’s Report was based on thickness and surface was based on laboratory measurements of the seepage rate of the spent lime material (i.e., the rate at which water will flow through the material). This is a critical component of the design as it determines the amount of time the water is in contact with the spent lime as well as the project footprint. As part of the Lake Lucy spent lime treatment final design, field measurements of the actual seepage rate through the spent lime material were collected at an installation site in Maplewood to improve the reliability of the proposed design. It was discovered that the actual field measured seepage rate was lower than the laboratory rate which lead to an increase in the size (i.e., footprint) of the proposed system. The resulting design was similar to but roughly twice the size of the Conceptual Design 2 outlined in the 5/1/2014 Engineer’s Report – Lake Lucy Spent Lime Treatment System, which required directional drilling of the drainage pipe from the spent lime treatment system under Utica Terrace.

On June 2nd, the Administrator and Engineer met with the property owners to south of proposed project site at 6890 Utica Lane, Mr. & Mrs. Cwodzinski, to discuss the project goals and conceptual design of the spent lime treatment that was presented at public hearing on June 4th. At that time, the property owners did not have any concerns in relation to the proposed project because the project would be within the existing easements.
On June 19th, the District Engineer met with the property owner to the north of the proposed project site at 6831 Utica Terrace, Mr. Jannusch, to discuss the project goals, the conceptual design of the project, and solicit input on impact to existing vegetation. He expressed concerns related to a) the proposed 2 foot increase in the normal standing water in the channel would not be desirable and b) the 2013 City modifications to the Utica Terrace storm sewer and the potential impact the City’s project may have had on the 100-year flood levels on his property. While the property owner was generally okay with the removal of two (2) cottonwood trees and some buckthorn around the project site there was some apprehension. He also requested to be informed of potential design changes along the way.

At the 60% design of the spent lime treatment, Mr. Jannusch’s concerns in relation to the water levels were also addressed by lowering the proposed normal water level to within a few tenths of a foot of the existing outlet pipe bottom and verifying the proposed design did not increase the upstream 100-year flood levels. Lowering the structure in response to the resident concerns about an increase in standing water and the need for a larger footprint due to lower seepage rates increased the excavation extents needed to build the project. As the design progressed, it became evident that temporary construction easements would be needed to facilitate construction and site restoration.

The 60% design meeting was held on 6/30/2014 including the Administrator, City of Chanhassen staff (Terry Jeffery), and Barr project staff to discuss the 60 percent design and allow for feedback from RPBCWD and City staff. Based on feedback from the 60 percent design meeting with City and District staff, design continued on the spent lime treatment system progressing towards the 90 percent design to meet the original schedule outlined in Task Order 5b.

Because of the design modifications, a second meeting with Mr. Jannusch was held on 7/11/2014 to review the 60% design elements including discussion of a temporary construction easement, rough field locating the footprint of the proposed spent lime treatment structure, vegetation impacts and the type of screening vegetation that would be preferred on each of the properties. Mr. Jannusch was very concerned about the extent of excavation and associated loss of vegetation and privacy. Because a temporary construction easement would have been needed and the vegetation removal would have been outside the City’s drainage and utility easement Mr. Jannusch requested some time to consider the potential impacts. He followed-up with the Administrator on 7/14/2014 and indicated that he does not support the loss of all the vegetation and would not approve the temporary construction easement. The Administrator requested that the design consider alternatives that would minimize impacts on the vegetation on Mr. Jannusch’s property (which resulted in shifting the system to the south side of the existing drainage easement).
This change resulted in a second design that minimized impacts on the vegetation on Mr. Jannusch’s property by shifting the system to the southern portion of the drainage easement. This design also required the removal of the recently installed existing outlet structure and beehive, a slightly larger treatment system (that includes an emergency overflow (to replace the existing outlet structure) and built-in skimmer), and sheet pile excavation trench stabilization in select locations to confine construction excavation to the existing drainage easement. A temporary construction easement would still be required on the property to the south of the existing drainage easement for access during construction, excavation, and to provide screening vegetation. These proposed changes will result in an increase in the construction costs of the project.

The new design alternative was discussed with the RPBCWD Administrator and City of Chanhassen staff on 7/17/2014 (the meeting originally scheduled for the 90 percent design review). The plan view of the new alternative was developed including the defined grading and excavation impacts. Although some of the previous design work will still apply to the new alternative, was significant reworking of the construction plans for the new design.

On 9/12/2014, the Administrator and Engineer met with property owners adjacent to the proposed Lake Lucy spent-lime treatment system site. Based on discussions at the meeting, there were increased concerns about potential impacts to the existing vegetation, post-project aesthetics, and project purpose. In response to these concerns, renderings of various design alternatives were developed for discussion with property owner’s to the south of the drainage easement to improve the visualization of what the spent lime system would look like and how landscaping can be used to improve the aesthetics of the area.

Another meeting with the property owner’s to the south (Mr. & Mrs. Cwodzinkski) was held on 10/22/2014 including and presentation and discussion of the renderings, easements, and design revisions. Additional renderings were developed at the request of the property owners to allow for a better visualization of that the area might look like when viewed from their deck.

Because of the property owner’s concerns about the aesthetics of the system, the Administrator and Engineer participated in a November 7, 2014 meeting with City of Chanhassen to discuss Lake Lucy Spent Lime treatment design alternatives including the possibility of placing system completely underground to avoid the aesthetics concerns raised by property owners. The City was okay with an underground unit provided adequate access would be provided.

A 30% concept design was developed for a system completely underground, primarily located within the City right-of-way, completely remove the system from view. This design alternative represents a third unanticipated redesign to address resident concerns. Additionally, several renderings of alternative were developed to help the residents visualize the proposed project.
On 12/19/2014, the Administrator and Engineer met with the City of Chanhassen and to discuss the 30% design of the Lake Lucy spent lime treatment system within the right of way. The City liked the proposed 30% design and had no additional comments on the design.

The Administrator and Engineer participated in a stakeholder meeting on 2/5/2015 with neighborhood residents adjacent to the proposed Lake Lucy Spent Lime System. Additional information on the proposed system's water quality performance and water level fluctuations was developed in anticipation of resident's questions. The meeting included a presentation to inform stakeholders on the need for the project and anticipated project benefits as well as a lengthy question and answer session. While the audience appeared to understand the need for the project, there was no consensus of support for the project. The residents were asked to think about the project and provide feedback, positive or negative, by 2/12/2015. Residents had some follow-up questions and one requested some additional renderings of what the proposed project would look like. Responses to the questions and the additional renderings were provided. However, none of the residents adjacent to the project expressed support for the project to move forward.

Because of the lack of property owner support, the RPBCWD board put the Lake Lucy spent lime treatment system design (in Wetland LU-A3.4 at Utica Terrace in Chanhassen) on-hold indefinitely after the March 4, 2015 board meeting.
Development and implementation of a sustainable strategy to control common carp in the Purgatory Creek Chain of Lakes

Final report to the managers of the Riley Purgatory Bluff Creek Watershed District for the project extension of “Developing and implementing a sustainable program to control common carp in Riley Purgatory Bluff Creek Watershed District Step 1: Developing control techniques in three model lakes”

December 31, 2015

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Synopsis

A final year of applied research in Lake Staring and the Purgatory Creek Conservation Area (PCCA) has reduced the population of adult common carp in this inter-connected system to less than 3,000 with a biomass below 100kg/ha. The project is now complete and this report summarizes all data for the entire Purgatory sub-watershed (Chain of lakes). Lake Staring responded very well to carp removal and control by showing substantial increases in water clarity as well as increases in plant cover and diversity as well as some apparent reduction in total phosphorus since monitoring started in 2010. While most of the recovery in plants was with native species, some exotic plant species are also now present. In addition to the 3000 adult carp present in Lake Staring, we estimate that nearly 3000 juvenile carp are also now present in this lake (and more in the PCCA from which they came). Winter seining was the most effective way to remove adult carp in Staring but its efficacy decreased rapidly with effort, seemingly because the carp learned to avoid nets. While the carp is presently not a problem to the ecology of this system, it will be in few years as the young carp continue to grow and possibly reproduce. Future control effort could focus on preventing more juvenile carp from moving downstream from PCCA to Staring, preventing new spawning by controlling adult movement into the PCCA by using the existing barrier in Purgatory Creek and also removing adults. Removal might be achieved by modifying barrier design and perhaps seining but efforts in 2015 showed that yield might be low, especially with repeat seining attempts throughout a season.
Foreword:

The document is the final report of a 5 year project funded by Riley Purgatory Bluff Creek Watershed District (RPBCWD) “Developing and implementing a sustainable program to control common carp in Riley Purgatory Bluff Creek Watershed District Step 1: Developing control techniques in three model lakes.” The main phase of the project took place in 2011-2014 and the project was extended in December 2014 as a one year no-cost project to focus on a final year of carp control in Purgatory sub-watershed (i.e. primarily Lake Staring). The extension used a new permanent carp barrier that the RPBCWD had installed in Purgatory Creek with the assistance of its engineers. The present report summarizes all findings in the Purgatory sub-watershed (Chain of lakes) since 2011 and efforts at carp control. It was accompanied by a data report which was submitted in early December and its acceptance will signify acceptance of the terms of the contract and the no-cost extension under which the work was conducted. In this report we present the results of our efforts to assess and manage carp within the Purgatory Creek Chain of Lakes (PCCL) between 2011-2015. It is comprised of eight sections. Following an introduction (Part 1) and a brief description of the study area (Part 2) we present initial assessments of carp abundance throughout PCCL (Part 3). We then focus on lakes that contained detectable carp populations and explain processes that drove their abundance and present strategies we tested to control those carp populations (Part 4). We also include a section on the use of the physical carp barrier that was installed in the final (extension) phase of the project to further suppress carp abundance (Section 5). We present a short section on the current status of carp abundance and achieved population control (Section 6) and resulting from it improvements in water quality, aquatic vegetation and native fish (Section 7). We finish with a section on management recommendations that includes several plausible management scenarios whose efficiency we evaluated using a model developed specifically for the purpose of this project (Section 8). The report also includes an appendix on the statistical model we developed to explain and manage carp abundance in this system.

1. Introduction

The common carp (Cyprinus carpio) is among the world’s most invasive fishes. It was introduced to North America in late 1800s and is now widely distributed across the continent. Currently, the common carp (hereafter, “carp”) is present in most lakes in central and southern Minnesota and are especially abundant in productive lakes of the Twin Cities area as well as the prairie lakes of southern Minnesota. In these areas, carp populations commonly reach 300-500 kg/ha, which substantially exceeds the ecological threshold of 100 kg/ha. Above this threshold, studies have shown carp to reduce submerged vegetation and water clarity. The carp is known for degrading water quality in lakes as it roots in the bottom while
looking for food. It uproots aquatic vegetation, increases water turbidity and liberates nutrients from the sediments promoting algal blooms. Managing overly abundant populations of common carp is often necessary to restore and preserve lake ecosystems.

Although the effects of carp on lakes are relatively well understood, it is not known how to control carp populations in ways other than poisoning them with rotenone which is nonspecific. Over the last decade, our group has conducted several studies (including some funded by the RPBCWD) which have shown that controlling carp populations without the use of toxins is possible; our approach is based on exploiting several weaknesses in carp’s life history including its unique behaviors such as forming tight winter aggregations that can be removed with nets (see our previous report for details). We have also documented that recruitment (production of young) in many carp populations is controlled by native fishes that forage on carp eggs and larvae. Further, many carp nurseries are winterkill-prone lakes that lack native predators. Using funding provided by RPBCWD (2008-2014) we demonstrated and implemented a successful carp management strategy in the Riley Chain of Lakes. This effort was subsequently extended for one more year (2015) as a no-cost extension using money remaining from the original contract to develop similar strategies of the Purgatory Chain of Lakes.

2. Study Area

The Purgatory Creek Chain of Lakes (PCCL) is comprised of eight lakes, of which four are directly connected via Purgatory Creek and the remaining systems are connected only intermittently (Figure 1). Lake productivity, depth and size vary substantially among these systems (Table 1). Several artificial and natural barriers restrict carp and fish movement and thus separate the PCCL into sub-units: 1) Lake Lotus, 2) Lake Staring-Purgatory Creek Conservation Area (PCCA) – which functions as one unit and has one population of carp, 3) the other lakes that are only connected occasionally and then only indirectly through underground pipes (Figure 1). Lake Lotus is located at the top of the Chain and is separated from other lakes because of elevation drop and a physical fish barrier at its outflow. Lake Staring and PCCA comprise a single ecological unit that is separated from other bodies of water by an old dam located downstream of Staring and multiple culverts and elevation differences upstream of PCCA. Notably, PCCA is comprised of two sections: the upper pool, which is relatively small and deep, and the lower pool which is much larger and shallow (max depth 1m; Figure 2). In this report, we focus primarily on the lower pool of PCCA because while it is connected with Lake Staring, few carp and fish appear to move between it and the Upper Pool in which we have detected only few adult carp. The Lower Pool plays a key role in carp population dynamics and management where Upper Pool does not. For brevity, we will use “PCCA” to refer to the lower pool of PCCA throughout the report, unless we specifically refer to the Upper Pool of PCCA.
Figure 1. The study area.

Figure 2. Aerial photograph of the Upper and Lower pools of PCCA.
<table>
<thead>
<tr>
<th>Lake</th>
<th>Area (ha)</th>
<th>Maximum depth (m)</th>
<th>Mean summertime Total Phosphorus (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duck</td>
<td>15.4</td>
<td>3.1</td>
<td>.052</td>
</tr>
<tr>
<td>Lotus</td>
<td>99.1</td>
<td>8.8</td>
<td>.050</td>
</tr>
<tr>
<td>Mitchell</td>
<td>46.1</td>
<td>5.8</td>
<td>.063</td>
</tr>
<tr>
<td>PCCA – Lower</td>
<td>~60</td>
<td>1</td>
<td>.132</td>
</tr>
<tr>
<td>PCCA – Upper</td>
<td>~10</td>
<td>3</td>
<td>.110</td>
</tr>
<tr>
<td>Red Rock</td>
<td>39.2</td>
<td>4.9</td>
<td>.082</td>
</tr>
<tr>
<td>Round</td>
<td>12.4</td>
<td>11.2</td>
<td>.046</td>
</tr>
<tr>
<td>Silver</td>
<td>34.0</td>
<td>4.0</td>
<td>.067</td>
</tr>
<tr>
<td>Staring</td>
<td>66.4</td>
<td>4.9</td>
<td>.095</td>
</tr>
</tbody>
</table>
3. **STEP 1 (2011): Assessment of common carp abundance throughout Purgatory Creek Chain of Lakes**

   The first step in developing sustainable management strategies for invasive fish including the common carp is to estimate their abundance throughout the area of concern. To determine how many lakes in the Purgatory Chain of Lakes might have adult carp and where their biomass might exceed the ecologically-damaging threshold of 100 kg/ha we used standard boat-electrofishing and trapnetting surveys in all lakes. These estimates were then verified using mark-recapture to focus subsequent management efforts.

   Our assessments of adult carp abundance and biomass began in 2011. First, we used boat electrofishing to conduct three 20-min surveys in each lake, with the exception of both the upper and lower PCCA and Silver Lake, where the boat could not be launched. The number of carp captured per hour of electrofishing was then used to produce a preliminary estimate of carp number and biomass using an equation developed by Bajer and Sorensen (2012). Second, we conducted late summer lake surveys with small-mesh (3/8 inch bar) trapnets, which are particularly effective at capturing small carp to determine which lakes in the chain were functioning as carp nurseries. Finally, in lakes where carp were found (Lotus and Staring) we conducted mark-recapture estimates to validate boat electrofishing estimates.

   Boat electrofishing surveys conducted in 2011 suggested that adult carp were very abundant in Lake Staring (51 carp/h, Table 2), moderately abundant in Lake Lotus (6 carp/h; Table 2) and absent (not detected) in Duck, Mitchell, Round and Red Rock (PCCA and Silver could not be sampled using this method). Using the observed catch rates we estimated that the density of carp in Lake Staring was ~ 250 individuals per hectare while the density in Lotus was only ~ 30 per hectare (Bajer and Sorensen 2012). These estimates were confirmed and improved by conducting mark-recapture analyses in Staring (2011) and Lotus (2012). Both of these estimates involved the use of different sampling gear to mark and recapture the carp to reduce gear avoidance. In Lake Staring, 331 carp were captured in a baited trap (70 x 70 feet box trap), marked and released of which 71 were then recaptured in a winter seine in January 2011. This allowed us to estimate that Lake Staring was inhabited by ~ 26,000 carp whose biomass was close to 500 kg/ha (Table 4). In Lake Lotus, 286 carp were marked and released in winter 2012 of which 4 were recaptured (among 28) while conducting electrofishing surveys next summer. These numbers suggested that lake Lotus was inhabited by ~1,700 carp whose biomass was ~ 60 kg/ha (Table 4).

   Trapnet surveys conducted in 2011 (and also 2010) showed that YOY carp were present in large numbers in the lower PCCA but only in small numbers in Lake Staring (Table 3). This provided the first indication that lower PCCA might be functioning as a carp nursery for Lake Staring. No YOY carp (or carp of any other age) were captured in trapnets in any other lakes (Table 3). Trapnet surveys continued annually (2012 – 2015) confirming trends observed during the initial years of the project (Table 3).
Table 2. Mean catch rates of common carp using boat electrofishing (EF; catch per hour). * Silver lake was sampled with gillnets instead of electrofishing since boat could not be launched. “-“ no survey conducted.

<table>
<thead>
<tr>
<th>Lake</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duck</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lotus</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Mitchell</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PCCA – Upper</td>
<td>-</td>
<td>9</td>
<td>-</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>Red Rock</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Silver</td>
<td>-</td>
<td>*0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Round</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Staring</td>
<td>51</td>
<td>11</td>
<td>-</td>
<td>20</td>
<td>14.5</td>
</tr>
</tbody>
</table>

Table 3. Mean catch rates of young of year (YOY) common carp in small mesh trapnets. Surveys were conducted in all lakes only in 2011 because electrofishing surveys, which were conducted in all lakes both in 2011 and 2012 showed absence of any carp (YOY or adult) in Duck, Mitchell, Red Rock, Round, and Silver (Table 2); 2010 was a pilot year ahead of schedule; “-“ no survey conducted.

<table>
<thead>
<tr>
<th>Lake</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duck</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lotus</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Mitchell</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PCCA – Lower</td>
<td>210</td>
<td>0</td>
<td>1</td>
<td>9.2</td>
<td>.2</td>
<td>23.8</td>
</tr>
<tr>
<td>PCCA – Upper</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Red Rock</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Round</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Silver</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Staring</td>
<td>1</td>
<td>.2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4. Mark-recapture estimates of carp number and biomass in lakes Lotus and Staring at the beginning of the study (2011).

<table>
<thead>
<tr>
<th>Lake</th>
<th>Number of carp in the lake Mean ± SD</th>
<th>Biomass (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lotus</td>
<td>1829 ± 612</td>
<td>64</td>
</tr>
<tr>
<td>Staring</td>
<td>26,228 ± 5,290</td>
<td>489</td>
</tr>
</tbody>
</table>
4. STEP 2 (2012-2014): Developing a sustainable strategy to reduce the number of carp and their biomass in Lotus Lake and the Lake Staring-PCCA System

Because our initial assessments showed that carp were present in only two systems within PCCL (Lotus Lake and the Staring-PCCA system), we focused our efforts on these systems. In each system we conducted a range of studies to document key attributes of carp behavior and population dynamics needed to develop sustainable management schemes. To do so, we documented the patterns of carp movement and seasonal aggregations, recruitment (survival of young), dispersal of young from nurseries to lakes, and we also tested several removal strategies including winter seining of carp aggregations. Our findings are described separately for each system. We focus on work conducted through 2014 but some 2015 data on carp movement are included.

**Lotus Lake**

Initial evaluations showed that Lotus Lake was inhabited by a relatively low number of old adult carp (Tables 2, 3, 4). This is relatively typical for deep, ecologically stable lakes of central Minnesota with abundant native fish populations (Bajer et al. 2012). Even though the carp spawn in such lakes annually, their eggs larvae and fry are then consumed by native fishes such as bluegills, which dominate those systems. Because carp in Lotus appeared to be controlled by native predators (i.e. there was no recruitment) and because the barrier at the outflow of the lake seems to prevent carp immigration from other lakes (i.e. Staring), we concluded that this population could be managed by simply removing adults using winter seining. Furthermore, because the initial population was relatively small, even a modest removal would ensure that the biomass of carp in the lake would remain well below the threshold that is considered to be ecologically damaging to temperate lakes (100 kg/ha). To do so, we implanted 12 carp with radiotransmitters in the fall of 2011 and tracked their movement within the lake during the winter of 2011-2012. An aggregation of carp was found in the northeast bay area of the lake and was targeted with an under ice seine net on Feb. 17, 2012. A total of 166 adult carp were captured and removed. This technique was difficult to apply in this lake because of its many plants. Adult carp biomass was reduced to 58.5 kg/ha. An additional reduction of biomass was conducted in the September of 2013 when 196 adult carp were caught and removed with a baited box net further reducing carp biomass to 51.7 kg/ha. Although further reductions of carp biomass might be considered in the future by using winter seining or baited box net but they are not essential to improving water quality in Lotus because the existing carp biomass is already quite low.

More recently, to confirm that our management strategy in Lotus Lake was sustainable (e.g. that carp removal did not trigger a population rebound), we conducted trapnet and electrofishing surveys in the fall of 2012, 2013, and 2014 (Tables 2, 3). These surveys showed an
absence of young carp (Table 3) further reinforcing our initial conclusion that native fish are able to control carp reproduction in Lotus and that this population of carp is unlikely to increase.

**Lake Staring - PCCA System**

Processes driving the high abundance of carp in Lake Staring were found to be much more complex than those in Lotus Lake. Briefly, they appear to be attributable to a combination of the ecology and physical conditions in PCCA (the lower pool), which our initial studies suggested to function as a very productive carp nursery for Lake Staring (Table 3). The size and continuity of Purgatory Creek permits extensive movement of both adult and juvenile carp between the PCCA and Lake Staring, complicating the situation. To address these issues we: i) studied the movement of adult carp between Staring and PCCA; ii) investigated the possibility of using temporary instream barrier to block movement and perhaps remove adult carp that we had observed moving; iii) investigated the number and fates of juvenile carp; and iv) developed winter under-the ice seining to remove adult carp from Lake Staring.

**i). Movement of adult carp between Staring and the lower pool of PCCA**

To document movement patterns of adult carp which we suspected to be spawning in PCCA we implanted 10 adult carp with radiotransmitters (ATS, Model F1850) in Lake Staring in the fall of 2010. The number of radiotagged carp in the system was subsequently increased to be between 15 and 30 at any given time throughout 2012-2015. Telemetry showed that each year, up to 90% of carp left Lake Staring and migrated to the lower pool of PCCA to spawn (Figure 3). The migration occurred over 1-3 day periods and although its exact timing varied, it usually occurred in May when water temperatures are above 10°C and there was a sudden increase in water level (Figure 3). However, in 2013 and 2014, the first (usually smaller) spike in carp migration occurred in early April when water temperatures were only ~ 5°C (Figure 3).

Once in PCCA, adult carp typically remained for a period of time that ranged from just few days to over 2 months after which time they nearly always moved back to Lake Staring with a few (between 0 and 30% depending on a year) occasionally spending the winter in PCCA. Movement between the Lower and Upper PCCA was extremely rare but did occur when water levels remained high connecting both basins. Telemetry showed that the adults that remained in PCCA (lower pool) for the winter were able to find a small refuge near the inlet where the water scoured a depression in lake-bottom, while the rest of PCCA was frozen to the bottom (Figure 4). Water drawdowns and elimination of the winter refuge near the inlet could be used as a management strategy in the future both for adult and juvenile carp that overwinter in PCCA (see management section). The refuge near the inlet to PCCA could (and should) be filled in.
Figure 3: Movement of radiotagged adult common carp between Staring and the lower pool of PCCA in 2012, 2013, and 2014. An increase in the percentage of radiotagged carp in PCCA represents a movement of carp from Staring to PCCA, while a decrease represents carp out-migration back to Staring.
Figure 4: Map of the lower pool of PCCA in January 2013 with water depths under ice (blue circles) and aggregation of carp (red circles) in the “refuge” near the inlet. The three red circles near the edges of the lake represent carp that perished in the freeze-out.
iii) Using a physical instream barrier to block the movement of adult carp and remove them

Because nearly all adult carp migrated from Staring to PCCA to spawn each year, and usually in a relatively synchronized fashion (a 1-2 day migration might have thousands of carp), we hypothesized that blocking those fish with a temporary barrier and removing them when they aggregate below the barrier might be used as an effective management strategy. Most importantly this could also stop them from spawning in PCCA. We tested several approaches and temporary barrier designs to assess the feasibility of such a strategy. First, we built a PVC-pipe barrier in Purgatory Creek upstream of Staring in the spring of 2012, following our success with similar structure in Lake Susan. This barrier was maintained daily and several thousands of carp (including most radiotagged fish) aggregated downstream of the barrier over the course of 1-2 days in April 2012. We used backpack electrofishing to remove those fish (Figure 5) but only 400 could be removed in one day as the fish scared easily. Finally, a storm caused a sudden increase in stream water level, which scoured a hole underneath the barrier, allowing these fish to pass. Still, the approach of deploying temporary structures in the creek at the specific times that fish were moving seemed to have good promise if we could secure the bottom to prevent scour.

The temporary instream barrier design was improved in 2013 by reinforcing its bottom edge with landscaping fabric and pavers, but a new problem emerged. First, the carp staged in Lake Staring near the mouth of the creek but would not attempt the upstream migration in large numbers and did not aggregate below the barrier as before– they seemed to learn the barrier was present. Second, DNR stream regulations prevent us from constructing a pad on the bottom of the stream so we had to remove pavers. Thus, when water level came up after another large spring-time storm, a hole scoured under the pavers and a floating tree hit the barrier itself, which the carp detected and migrated to PCCA. This stream is extremely prone to floods and debris. Given these experiences, and also given the fact that adult carp in the system can be removed using means other than a barrier (winter seining; see below), we abandoned the barrier approach in 2014 when the watershed district started planning for a new barrier.
iv) Determining the production of young carp in Staring-PCCA and their fate

Young of year (YOY) carp were never observed in significant numbers in Lake Staring (Table 3), suggesting that nearly all carp in that lake originate from external nurseries, and very likely the Lower PCCA. Annual trapnet surveys conducted in PCCA in late summer (approximately three months after spawning) confirmed a high abundance of young-of-year (YOY) carp in PCCA (lower pool) approximately every-other year (Table 3) suggesting that this systems functions as the carp nursery for Lake Staring. This was in line with the observed annual spawning migrations of adult carp from Staring to PCCA.

The high abundance of YOY carp in PCCA, which occurs approximately every other year (Table 3) is likely attributable to low abundance of native predators in PCCA due to winter freeze-outs and hypoxia, and exasperated by high productivity of this system (nigh nutrient concentrations stimulate zooplankton which larval carp consume). The frequently occurring winter hypoxia is attributable to a very shallow depth of the lower pool of PCCA, which functions as storm water retention basin with highly variable water levels that tend to be lowest in the winter. Whereas winter hypoxia can sometimes be averted by installing winter aeration, which then allows native fish to rebound and control carp eggs and larvae, winter hypoxia cannot be prevented in PCCA by using winter aeration because this system is too shallow. Filling in the
refuge in this area, as suggested above and as recommended in our reports at the time, might work to control carp because it would cause the entire basin to go anoxic.

It is essential to develop a good understanding of the number and fate of the juvenile carp in the nursery to develop a control strategy. To accomplish this, we attempted to conduct mark-recapture analyses of YOY carp in lower PCCA to estimate their abundance in 2013 and 2015. However, in both years, none of the 500+ individuals that were marked were recaptured suggesting that the population was very large (inestimable). Using data from similar systems, which show that 2,000 to 6,000 YOY carp can be produced per hectare in carp nursery lakes (Osborne 2012), we estimate that between 130,000 and 390,000 YOY carp (late summer fry ~ 10-15 cm in length) might have been present in PCCA in those years. Although these numbers are high, they are not necessarily unmanageable for the following reasons: 1) few YOY appear to move from PCCA to Staring during the first year (see below), 2) YOY face high natural mortality rates in PCCA in the summer and their abundance often declines by > 90% between July and October possibly due to high predation by birds, and 3) those YOY that do not migrate to Staring likely to perish due to winter hypoxia (see below).

We also studied the fate of YOY carp in PCCA and how many of them moved to Staring. In both 2013 and 2015 we implanted over 400 YOY carp in PCCA with PIT tags and tracked their movement to Staring by placing two PIT antennas in Purgatory Creek just upstream of Lake Staring. This effort showed that fewer than 10% of YOY carp leave PCCA in the first year of life. In 2013 only one carp was detected by the antennas out of 468 tagged. In 2015, 37 carp were detected by the antenna out of 663 marked. Most of these YOY carp crossed the antenna in July (Fig. 7). The movement occurred at a time when the water level in PCCA and in the stream was declining (Figure 3). It is possible that those fish were escaping bird predation as they were very vulnerable in PCCA during low water periods where only 2-3 deeper areas exist. We also conducted repeated trapnet surveys in PCCA to estimate the mortality rates of YOY carp between July and October of 2013 and 2015. These surveys documented declines in catch rates and suggested that YOY carp experience ~ 4% daily mortality in PCCA, which would suggest that their abundance declined by over 90% between July and October (Fig. 6). However, this would still leave many thousands of juvenile carp in the PCCA at summer’s end. Analysis of trapnet data in spring described variable overwinter survival. These surveys showed that while both the 2011 and 2013 year classes did not survive over the winter. In contrast, the 2010 year class of YOY carp survived in PCCA the winter of 2010/2011 and then left the system in May 2012. We later estimated that approximately 8,000 age-2 carp moved from PCCA to Staring in 2012 (Figure 8).
Figure 6: The average trap net catch rate (CPUE) of young of year common carp in the lower pool of PCCA (marsh; blue) and Lake Staring (lake; red) in 2014 and 2015. The error bars represent the standard error.
Figure 7: The number of PIT tagged YOY carp present in PCCA (blue line), number of PIT tagged carp detected by the antennas downstream of PCCA (orange bars), change in stream water level (in relation to annual mean; yellow line), stream temperature (gray line) in 2013 (top) and 2015 (bottom). The decline in the number of PIT tagged YOY carp in PCCA (blue line) represents natural mortality that was estimated from trapnet catch rates (Figure 6).
Figure 8. Length structure of common carp in lower pool of PCCA ("Wetland") and Staring during 2010-2013. Note the appearance of “small” carp (~280-350 mm) in Lake Staring in Fall 2012. These fish represent approximately 8,000 age-2 carp that moved down from PCCA in the spring of 2012.
v) Removal of adult carp in Lake Staring using winter seining

Adult carp are known to form winter aggregations that can be located using radiotagged adults and subsequently removed with seine nets (Figure 9). This strategy was fundamental in our successful carp management in the Riley Chain of lakes (our previous report) and we applied the same approach in Lake Staring. This started in 2011 when we implanted 10 carp with radiotransmitters to follow their winter aggregations. An aggregation was located and over 10,000 carp were captured in the seine (Table 5). Similar efforts were repeated in every subsequent winter, often several times. Overall, more than 20,000 carp were removed using winter seining, reducing the population in Staring from 26,000 to less than 3,000 carp (Table 5). Overall, winter seining in Lake Staring is feasible, effective and has been proven to be the most effective and practical strategy to remove excessive numbers of carp.

Although seining worked well, several limitations were noted. First, it became apparent carp can learn how to avoid the net if targeted repeatedly, especially within one season. This was evidenced by higher escape rates of radiotagged carp from the net over time (Table 5); the difference between radiotags that were in the area and those that were captured in the net. This could be minimized in the future by carefully planning each seine and conducting it in an organized and swift manner to minimize the opportunities for the carp to escape the net after which event they become much more difficult to catch. A better understanding of bottom topography to place the net, combined with GPS to lay out the corners of the net in relation to the location of carp school, pre-lining the area with twine should be used to improve seining efficiency in all future seining. Further, while the ‘old’ carp may learn how to avoid the seine, younger fish that recruit from PCCA should be much more susceptible after a year and we recommend that winter seining remain an important tool in managing carp in Lake Staring (see management section).
Table 5. Results of winter seining in Lake Staring. After the initial population estimates in 2011, all captured carp were removed from the lake. *released back into the lake to complete mark-recapture estimates; ** does not include ~3,000 YOY carp that moved from PCCA in 2015.

<table>
<thead>
<tr>
<th>Date</th>
<th>Seine #</th>
<th>Captured</th>
<th>Population Remaining in lake</th>
<th>Radiotags in area</th>
<th>Radiotags in net</th>
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<td>1</td>
<td>251*</td>
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<td>26,200</td>
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Figure 9. Winter seining for common carp in Lake Staring – final phase, fish are “landed” in the bag of the net. Photo Jake Osborne.
5. STEP 3 (2015) Carp control after the installation of the carp barrier in Purgatory Creek

In late 2014 Riley Purgatory Bluff Creek Watershed District decided to install a permanent carp barrier in Purgatory Creek within the existing concrete channel under the walking trail bridge just downstream of PCCA (Figure 10). A one year no-cost extension of our contract also went into place allowing us to monitor the barrier, and to remove adult carp. This section reports on: i) The barrier; ii) Tracking YOY and juveniles leaving PCCA; iii) Removing adult carp from Lake Staring system.

i) The Barrier. A barrier was installed by the RPBCWD engineer in March 2015 following designs provided by Barr Engineering after discussions in which we suggested that the new barrier be capable of being shut quickly so it could serve to both trap/remove adult carp migrating to PCCA and (if necessary) to trap them in the PCCA where they might die because of a winter drawdown and freeze-out. We worked with the City of Eden Prairie in 2015 to maintain the new barrier. This partnership was necessary because the screening is very heavy and large machinery is/was required to lift it to remove debris. The design of the barrier also required a small change in plan. Instead of blocking the carp on the way to PCCA (this proved difficult to predict and it was not easy to trap below the new barrier), we decided that the barrier should be opened in early spring to allow the carp to swim into PCCA and then immediately closed behind them to trap them. The barrier might then be kept closed through the end of the year and a freeze-out used in the winter. We also hoped that carp might try to return to Lake Staring after spawning and aggregate on the upstream side of the barrier where they might then be removed. In May 2015, as expected, adult carp swam from Staring to PCCA and the barrier was closed behind them by the City. Some carp attempted to return to Staring approximately a week later when we used backpack electrofishing in combination with large mesh gill nets (to target carp; special DNR permit) and a block net to remove them. In between trapping, the City would often lift the screen to clean it. This scenario occurred four times and we removed a total of 633 adult carp (Figure 11) by mid-July when after one cleaning, the City inadvertently left the screening partially up and several thousand carp escaped. It is extremely difficult to lift the barrier, gauge when it is positioned in the groves and then be sure it is completely down. This problem could be rectified in 2016 with modifications to the barrier (see management section).
Figure 10. Carp barrier below PCCA. The barrier (metal grid) is placed behind a debris rack located upstream.

Figure 11. Removal of carp near the barrier using backpack electrofishing and gillnets.
ii) YOY carp. The adult carp that entered the PCCA in 2015 and could not be effectively removed, spawned and produced many young which are described in Section iv. These YOY carp (as described above in Section 4) numbered in the hundreds of thousands but had experienced 90% mortality by the end of the summer. Unfortunately, our PIT tagging also showed that they were leaving the PCCA by mid-summer at rate of few percent per month. They were able to pass through the barrier. Ideally, the barrier design should be modified in the future either prevent adults from entering PCCA and/or preventing YOY from leaving (a bubble curtain might help to accomplish this).

iii) Adult carp removal continued in Lake Staring and PCCA throughout 2015. This complimented removal at the barrier site (described above). We employed: 1) under-ice seining (described in Section 4); 2) gill nets; 3) open water seining; and 4) baited box nets. A total of 1704 adult carp were removed from the system, including 633 (reported above) from the barrier site and another 155 from gill nets set around observed aggregations in PCCA (Table 6). In Lake Staring, 834 of these fish were removed by winter seining, 12 removed using gill nets set around observed aggregations, 66 removed in an open water seine in front of Purgatory Creek where carp were aggregating to migrate, and 14 were removed using baited box nets that were deployed twice in the littoral area of Lake Staring.

Table 6. Result of removal techniques used in Winter-Fall of 2015. All 1704 fish captured were removed from the system.

<table>
<thead>
<tr>
<th>Lake</th>
<th>Winter Seine</th>
<th>Barrier Site*</th>
<th>Gill Net</th>
<th>Open Water Seine</th>
<th>Baited Box Net</th>
</tr>
</thead>
<tbody>
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<td>Staring</td>
<td>834</td>
<td>-</td>
<td>12</td>
<td>66</td>
<td>14</td>
</tr>
<tr>
<td>PCCA</td>
<td>-</td>
<td>633</td>
<td>155</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Part 6. The state of carp population in Lake Staring in late 2015

As a result of winter seining and systematic removal of carp (see above; Table 5), their abundance was reduced from 26,000 to ~ 3,000 between 2011-2015, while the biomass was reduced from ~ 500 kg/ha to ~ 100 kg/ha (Figure 12). This reduction met our management goal (100 kg/ha) and resulted in improvements in water quality (see Section 7). However, while the numbers of adult carp were low by late 2015, and likely causing little ecological harm, approximately 3000 YOY carp had entered Lake Staring from Lower PCCA (see Section 5), and started to grow rapidly, Their presence was apparent in an electrofishing survey conducted in late October 2015 (Figure 13).
Figure 12. Biomass and abundance of common carp in Lake Staring. Dashed line shows a management goal of 100 kg/ha.

Figure 13. Size structure of Carp in Lake Staring. The last panel demonstrates the age structure of these carp using otoliths. Note age to the right.
Part 7. Improvements in habitat and water quality in Lake Staring as a result of carp management

We monitored water quality (Secchi, TP, ChlA, TSS), zooplankton (species composition), vegetation density and species richness, and native species richness and catch rate in Lake Staring between 2011-2015. Water quality and zooplankton samples were collected every two weeks during May-September of each year from two locations in the lake following identical methods as described in our previous report for the Riley Chain (integrated epilimnetic samples). Water quality samples (TP, TSS, ChlA) were then analyzed by Instrumental Research LLC, following standard methods (as described in the Riley Report). Zooplankton samples were counted under the microscope using a 1 ml well with 50 x 20 mm grid. Vegetation density and species richness were documented annually by conducting vegetation surveys along 10 transects delineated around the perimeter of the lake. The transects were perpendicular to shore and vegetation was visually assessed (% cover over a 4m², species present) along each transect at water depths of 0.5, 1, 1.5 and 2 m. Native fish were surveyed by conducting annual trapnet surveys in late summer or fall of each year. Five trapnets were used and all fish were counted and a sample of up to 30 was measured for length for each species.

Water clarity increased from 2011 to 2015 exceeding 2 m and reaching the bottom of the lake on many occasions in the spring of 2013 and then also in the spring of 2014 and 2015. The improvement in water clarity in the summer was more modest but water clarity in September 2015 was approximately twice as high as during the high carp biomass years of 2011-2012 (Figure 14). ChlA concentrations declined during 2013-2015 with summertime concentrations dropping from approximately 50-60 ug/L before carp removal to 30-40 ug/L after carp removal (Figure 15). TSS followed a similar pattern (Figure 16). TP concentration declined in 2015 and for the first time, summertime TP did not exceed 100 ug/L (Figure 17). Notably, TP in September 2015 was only 40 ug/L, whereas it had exceeded 100 ug/L in all previous years. We suspect that the drop in TP in 2015 was largely attributable to the increased density of aquatic vegetation (and associated with it periphyton) which finally rebounded in 2015 after carp biomass was reduced to ~ 100 kg/ha but the presence of fewer carp may had a role too.

Aquatic vegetation increased in density and species richness following carp removal, with the biggest increases occurring in 2015 when carp biomass was reduced to approximately 100 kg/ha, which we proposed before to be a desired threshold in carp management. Vegetation cover increased from only 6% in 2011 to 40% in 2015. The number of species also increased from 5 to 10 (Table 7).

Catch rates of native fish remained relatively stable throughout 2011-2015 (Table 8), however the status of native fishery might not be accurately portrayed by our fine-mesh trapnet surveys that target predominantly YOY carp (Table 8). DNR conducted comprehensive gillnet
surveys in Lake Staring in 2015 and will also conduct native fish growth rate analyses and those surveys will be more informative about the status of native fishery once they become available. Anecdotally, the number of northern pike and black crappies has increased in lake Staring over the last 5 years.
Figure 14. Mean ± SD Secchi depth in Lake Staring.

Figure 15. Mean ± SD chlorophyll A in Lake Staring.
Figure 16. Mean ± SD total suspended solids concentrations in Lake Staring.

Figure 17. Mean ± SD total phosphorus concentrations in Lake Staring.
Table 7. Vegetation density and species richness in Lake Staring. % cover represents % bottom cover in lake areas shallower than 2 m. Species present in 2015 survey: Curly Leaf Pondweed (*Potamogeton crispus*), White Water Lily (*Nymphaea ororata*), Spatterdock (*Nuphar variegatum*), Flat Stem Pondweed (*Potamogeton zosteriformes*), Coontail (*Ceratophyllum demersum*), Sago (*Potamogeton pectinatus*), Canada Waterweed (*Elodea canadensis*), Narrowleaf Pondweed (*Potamogeton foliosus*), Muskgrass (*Chara*), exotic plant species: Bushy Pondweed (*Najas spp.*). Note: Eurasian water milfoil was also detected in Staring in 2015 but was not found in our standard survey.

<table>
<thead>
<tr>
<th>Year</th>
<th>% bottom cover</th>
<th># of Species</th>
<th>Carp Biomass (kg/ha)</th>
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<tbody>
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<td>40 %</td>
<td>10.0</td>
<td>95</td>
</tr>
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<td>2014</td>
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</tr>
<tr>
<td>2013</td>
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<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>0.7 %</td>
<td>3.0</td>
<td></td>
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<tr>
<td>2011</td>
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<td>5.0</td>
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Table 8. Native fish (ad carp) mean trapnet catch rates in Lake Staring during 2011-2015. LMB = largemouth bass, BLG = bluegill, CAP = carp, CRP = black crappie, BBHD = black bullhead, YEP = yellow perch, NOP = northern pike, GSF = green sunfish, PKS = pumpkinseed sunfish, WSF = white sucker, DRM = freshwater drum, BUF = bigmouth buffalo.

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<tr>
<th>Year</th>
<th>LMB</th>
<th>BLG</th>
<th>CAP</th>
<th>CRP</th>
<th>BBHD</th>
<th>YEP</th>
<th>NOP</th>
<th>GSF</th>
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</table>
8. Management recommendations

We provide separate recommendations for Lotus Lake and the Staring-PCCA System as these two systems differ in their carp abundance and management needs.

Lotus Lake

This population of carp is presently at a level that is not damaging the native ecosystem, and is under control; no management is needed. Nevertheless, monitoring is advised on intermittent basis. We recommend conducting boat electrofishing surveys (3 transects 20 min each repeated on 3 separate days in mid to late summer) every other year to assess the status of carp population paying particular attention to the presence of small carp (< 30 cm). If an increase in catch rates is observed, we recommend using winter seining to remove excessive number of carp.

Staring-PCCA System

The population of adult carp in Staring-PCCA is currently at a level slightly below our management threshold of 100 kg/ha and does not appear to be causing a problem to the native ecosystem at present. However, active management is required to maintain the population at this level because Lake Staring contains over 3000 YOY carp which in 2-3 years will be large enough to likely cause problems. Further, because a small number of YOY still reside in the PCCA and the problems of recruitment suppression using the barrier are not yet solved, there is threat of the population increasing rapidly. The production of young carp in PCCA and their subsequent movement to Staring is the primary problem that needs to be addressed. While it might be difficult to eliminate the production of young carp in PCCA (which would require a complete elimination of adult carp in that system), the survival of young and their spread to Staring probably could be controlled using winter drawdowns and changes to barrier design. Control of recruitment and additional adult removal, even if modest, should be able to control carp as shown by a statistical model we have created (see Appendix). Maintenance of the barrier is presently managed by the City of Eden Prairie and the RPBCWD is advised to speak with them about possible maintenance issues.

Management recommendations for Staring-PCCA

1. Control the production, survival and dispersal of young carp from PCCA to Staring
   a. Fill-in the deep winter refuge located by the inlet to the Lower PCCA so that winter freeze-outs can occur more effectively.
b. Consider modifying the barrier so that it can reduce the outmigration of young carp from PCCA to Lake Staring. Even a 50% reduction in outmigration would make a difference (Model; Figure 18). This might be accomplished with bubble or sound curtains or perhaps better screening.

c. Prevent adult carp from entering PCCA to spawn. This might be achieved by keeping the present physical barrier at PCCA outlet in place continuously and achieving a 100% winter freeze in PCCA to kill all adults. However, this strategy may not succeed since even a low number of adult carp in PCCA (which can enter both from downstream and upstream – upper PCCA) is likely to produce high numbers if age-0.

d. Prevent young carp from recruiting in Lake Staring. Although we have not witnessed production of young carp in Lake Staring, this lake has winter-killed in the past and could produce carp. Installation of an aeration system in Lake Staring is recommended.

2. Monitor and remove adult carp from Lake Staring

a. Use telemetry-guided winter seining when biomass exceeds 100 kg/ha based on electrofishing surveys). Seining might be needed every other winter (see Appendix) and removal of at least 50% adults might be a reasonable goal. Note that (Section 4) that carp learn to avoid nets quickly so the first attempt each season is especially important. Because of the large number of YOY in Lake Staring this year and fact that they are just now becoming catchable by net, a seine in 2016 is advised.

b. Use the existing barrier to remove adults, if possible. At the very least, the barrier design should be modified so that it functions in a predictable manner (i.e. so that it can be closed properly and maintained in closed position – twice in 2015 it failed to close properly and many carp escaped (see Section 5 above). Another option would be to invest a trapping system. Carp removal at the barrier is not essential for carp management because adults can also be removed using winter seining, but would accelerate it. If this could be pursued, a few options are plausible:

   b.i. If the managers decide to use the existing physical barrier, one could let the carp swim into PCCA, close the barrier behind them and control them using winter freeze-out. This is especially reasonable if chances of winterkill can be improved and the chances of movement of any young that might be spawned reduced (see above).
b.ii. Alternatively, if the present barrier is not going to be modified, conduct removal in the stream during spawning migration – this is possible but labor intensive due to the need for daily telemetry surveys in the spring, precise timing of the barrier operation, and maintenance of the barrier.

b.iii. Retrofit the existing barrier – The barrier neither keeps YOY carp in, nor reliably blocks adults at present. These critical deficiencies could be addressed through modifications that could add bubble curtains and new gate structures, or perhaps an entirely new structure should be considered if the budget permits. This new structure might incorporate both a bubble curtain to stop downstream moving young, rotating self-cleaning screens and perhaps a trap to automatically trap and remove adults while perhaps leaving native fish. A custom (new) design would be required but structures with automated carp traps are found in Oregon while air curtains have been designed by the University and Fish Guidance Systems Ltd. (UK).

3. Conduct annual boat electrofishing surveys to monitor the abundance of carp in Lake Staring. At least three 20 min electrofishing transects should be conducted and mean catch rate per hour calculated and used to estimate carp biomass (for details see our Riley report).

4. Conduct annual trapnet surveys in both Lake Staring and Lower PCCA to monitor carp recruitment: 5 small-mesh trapnets set overnight in August –September each year. The presence of carp < 200 mm characterizes a recruitment event. If it occurs, special attention should be placed on conducting effective freeze-outs in PCCA during the following winter.

5. Use our statistical model and data to adjust strategies as needed; use adaptive management (see below).

9. APPENDIX: Carp population dynamics model for Staring-PCCA and its use in management recommendations

We developed an individual-based population dynamics model for carp in the Staring-PCCA system, which can be used for management purposes. The model simulates a sequence of events that is repeated each year and which includes springtime migrations of adults to PCCA, return from PCCA to Staring, recruitment of young in PCCA, survival of young in PCCA and
their dispersal to Staring, overwintering either in PCCA or Staring, winter aggregations in Staring and their potential removal with nets. In addition, the model also simulates natural mortality, growth and aging. All model parameters (for example the movement from Staring to PCCA in the spring) are defined by certain probability values which we derived from empirical observations. These values are allowed to range within a certain limit to incorporate variability from one year to the next.

The model can be used to test several management scenarios such as winter seining, a barrier to stop and remove certain numbers of adults or an acoustic deterrent system to reduce the outmigration of juvenile carp from PCCA to Staring. These options can be used singly or in combination and different levels of winter seining or barrier efficiency can be applied (see management recommendations below). A computer file containing a version of the model that RPBCWD managers might use is also included on a flash drive.

Modeled management scenarios:

We model four management scenarios for Staring-PCCA that might be both effective and practical. Each model run starts with the existing population in Lake Staring: 2,500 adults, 1000 age-2, and 3,000 YOY (age-0) carp. Each scenario was run for 30 years and repeated 10 times. The goal is to maintain the biomass in Staring at \(\leq 100\) kg/ha. Other important assumptions include: adult carp perform annual spawn migrations to PCCA and then return, recruitment occurs in PCCA every other year (on average), winter draw-downs are performed in PCCA every other year and, whenever applied, result in eliminating 95% - 100% carp that overwinter in PCCA. Modeled management scenarios are:

1. **Do nothing** – this represents what would happen if the existing population in Lake Staring was not managed at all.
2. **Deploy a Juvenile deterrent systems (bubble barrier)** – the model assumes that the only management approach used is a new acoustic bubble barrier that reduces the migration of age-0 carp from PCCA to Staring by 50% of their normal values.
3. **Winter-seining** – the model assumes that the only management option is winter seining in Lake Staring that is conducted every other year and each time 50% carp \(> 360\) mm (mesh size) are removed.
4. **Seine and juvenile bubble barrier** – combination of scenario 3 and 4.

**Results**

1. **Do nothing** – carp exceed 100 kg/ha within 5 years and returned to pre-management biomass level \~ 500 kg/ha (Figure 18)
2. Juvenile bubble barrier – overall biomass increases to levels above 100kg/ha within 5 years and was slightly lower than the “do nothing” scenario (Figure 18).

3. Winter seining of adults – if 50% of all adult carp could be removed every other year (something we were not always able to achieve), then population would remain at ~ 200 kg/ha (Figure 18).

4. Seining + Juvenile bubble barrier – If 50% of all adults can be removed and the YOY blocked by 50% then the population should oscillate ~ 100 kg/ha, occasionally exceeding it. This could be improved further by, for example, intensifying winter seining during particular years (Figure 18).

It should be noted, however, that it is extremely difficult to simulate exact biomass levels 30 years into the future given carps enormous reproductive potential, varying levels of natural mortality, winter freeze-outs, and the complex nature of processes that drive their abundance in Staring-PCCA. However, our results suggest that a synergistic strategy that combines a modest level of adult removal with a moderately effective juvenile dispersal barrier is most likely to be effective in this system (Figure 18).

Figure 18. Results of four potential management scenarios in Staring-PCCA. Shown is carp biomass in Lake Staring over 30 years. Each scenario was repeated 10 times and the mean
response is plotted. Shaded areas show ± 1 SE. Dashed line represents the management goal of 100 kg/ha.

10. References


Riley Purgatory Bluff Creek Watershed District Permit Application Review

Permit No: 2015-048

Received complete: December 23, 2015

Applicant: Dennis Peterson, ISD #276

Consultant: Doug Fell, Clark Engineering and Steven Gebauer, Solution Blue

Project: Pagel II Ice Facility Addition – Hockey facility addition on the Minnetonka High School property including surrounding pavement and storm water improvements. An underground infiltration system will provide storm water quantity, volume and quality control.

Location: 18301 Highway 7, Minnetonka

Reviewer: Candice Kantor and Scott Sobiech, Barr Engineering

Rules: Applicable rules checked

<table>
<thead>
<tr>
<th>Rule Conformance Summary</th>
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<tbody>
<tr>
<td>Rule B: Floodplain Management</td>
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<tr>
<td>X Rule C: Erosion and Sediment Control</td>
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<tr>
<td>Rule D: Wetland and Creek Buffers</td>
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<td>Rule E: Dredging and Sediment Removal</td>
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<td>Rule F: Shoreline/Streambank Stabilization</td>
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Rule Conformance Summary

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<th>Comments</th>
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<td>J</td>
<td>Stormwater Management Rate</td>
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<td>Volume</td>
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<td>Maintenance</td>
<td>See Comment</td>
<td>See Rule Specific Permit Condition J1.</td>
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<td>Permit Fee</td>
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<tr>
<td>M</td>
<td>Financial Assurance</td>
<td>NA</td>
<td>Governmental Agency</td>
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**Project Description**

The proposed redevelopment will consist of construction of a hockey facility addition and associated pavement and storm water improvements at the Minnetonka High School property in Minnetonka. The project includes an underground infiltration system for stormwater treatment. Stormwater not retained in the underground infiltration system discharges to the existing storm sewer system on the site. The project site information is summarized below:

1. **Total Site Area:** 5.46 acres
2. **Existing Site Impervious Area:** 3.36 acres (146,360 square feet)
3. **New (Increase) in Site Impervious Area:** 0.805 acres (35,066 square feet) (24% increase in site impervious area)
4. **Disturbed Site Impervious Area:** 1.516 acres (66,025 square feet) (45% of existing site impervious area disturbed)
5. **Total Disturbed Area:** 1.84 acres

**Exhibits:**

1. Permit Application dated October 8, 2015.
3. HydroCAD Modeling (existing and proposed conditions) dated October 2, 2015 (revised January 25, 2016).
6. P8 Model received December 8, 2015.
7. P8 Model Inputs received December 23, 2015.
8. MIDS Calculator File received January 25, 2016 (revised January 26, 2016).

**Rule Specific Permit Conditions**

**Rule C: Erosion and Sediment Control**

The project will alter 1.84 acres (80,150 square feet) of surface area. Because more than 5,000 square feet of surface will be altered, the project must conform to the requirements in the RPBCWD Erosion and Sediment Control rule (Rule C, Subsection 2.1).

The erosion control plan prepared by Solution Blue includes installation of silt fence and sediment filter log, inlet protection for storm sewer catch basins, stabilized construction entrances, placement of a minimum of 6 inches of topsoil, decompaction of pervious areas compacted during construction, and
retention of native topsoil onsite. The proposed project conforms to the erosion and sediment control requirements of Rule C.

**Rule J: Stormwater Management**

The project will alter more than 1.84 acres (80,150 square feet) of surface area. Because more than 5,000 square feet of surface will be altered, the project must meet the criteria of RPBCWD’s Stormwater Management rule (Rule J, Subsection 2.1). The criteria listed in Subsection 3.1 will apply to the disturbed areas and additional impervious surface on the project parcel because the project will only increase the site imperviousness by 24 percent and only disturbs 45 percent of the existing impervious surface on the parcel (Rule J, Subsection 2.3).

The developer is proposing construction of an underground infiltration system to provide the rate control, volume abstraction, and water quality management on the site. A sump manhole with a SAFL baffle will provide pretreatment for the underground infiltration system.

**Rate Control**

In order to meet the rate control criteria listed in Subsection 3.1.a, the 2-, 10-, and 100-year post development peak runoff rates must be equal to or less than the existing discharge rates at all locations where stormwater leaves the site.

The applicant used a HydroCAD hydrologic model to simulate runoff rates for pre- and post-development conditions for the 2-, 10-, and 100-year frequency storm events using a nested rainfall distribution, and a 100-year frequency, 10-day snowmelt event. The existing and proposed 2-, 10-, and 100-year frequency discharges from the site are summarized in the table below. The proposed project conforms to RPBCWD Rule J, Subsection 3.1.a.

<table>
<thead>
<tr>
<th>Modeled Discharge Location</th>
<th>2-Year Discharge (cfs)</th>
<th>10-Year Discharge (cfs)</th>
<th>100-Year Discharge (cfs)</th>
<th>10-Day Snowmelt (cfs)</th>
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<tr>
<td>Ex</td>
<td>Prop</td>
<td>Ex</td>
<td>Prop</td>
<td>Ex</td>
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<td>South Storm Sewer</td>
<td>7</td>
<td>3</td>
<td>18</td>
<td>5</td>
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**Volume Abstraction**

Subsection 3.1.b and 2.3 of Rule J requires the abstraction onsite of 1.1 inches of runoff from all disturbed and additional impervious surface of the parcel. An abstraction volume of 6,053 cubic feet is required from the 1.51 acres (66,025 square feet) of new and reconstructed impervious area on the project for volume retention. Soil borings performed by Braun Intertec show that soils in the project area are silty sand and poorly graded sand with silt; the MN Stormwater Manual indicates an infiltration
water infiltrates at a rate of 0.45 inches per hour for such soils. The Applicant proposes an underground infiltration system with pretreatment of runoff provided by a sump manhole with a SAFL baffle. Soil borings performed by Braun Intertec show no groundwater to a boring depth of 23 feet. This indicates that groundwater is at least 3 feet below the bottom of the proposed underground infiltration system (Rule J, Subsection 3.1.b.ii).

The proposed project will remove an existing underground stormwater management system which provides treatment for runoff from an existing artificial turf soccer fields adjacent to the proposed addition. Because the project is removing the existing treatment from the site, the proposed underground infiltration system was sized to account for the stormwater treatment provided by the existing system. The proposed project will provide volume abstraction for an additional 1.86 acres of impervious area (80,891 square feet) that is treated by the existing system. An abstraction volume of 13,468 cubic feet is required from the 3.37 acres (146,928 square feet) of total impervious area requiring treatment by the project. The table below summarizes the volume abstraction on the site. The proposed project is in conformance with Rule J, Subsection 3.1.b.

<table>
<thead>
<tr>
<th>Required Abstraction Depth (inches)</th>
<th>Required Abstraction Volume (cubic feet)</th>
<th>Provided Abstraction Volume (cubic feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>13,468</td>
<td>14,262</td>
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</table>

**Water Quality Management**

Subsection 3.1.c of Rule J requires the Applicant provide for at least 60 percent annual removal efficiency for total phosphorus (TP), and at least 90 percent annual removal efficiency for total suspended solids (TSS) from site runoff. Because the proposed project is removing an existing underground stormwater management system from the site, water quality treatment is provided for the site including the area treated by the existing underground stormwater management system. The Applicant is proposing an underground infiltration system to achieve the required TP and TSS removals. A MIDS calculator file was developed to estimate the TP and TSS removal capacity of the proposed BMP and is summarized in the table below.
<table>
<thead>
<tr>
<th>Pollutant of Interest</th>
<th>Required Removal (%)</th>
<th>Estimated Removal (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids (TSS)</td>
<td>90</td>
<td>93</td>
</tr>
<tr>
<td>Total Phosphorus (TP)</td>
<td>60</td>
<td>92</td>
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</tbody>
</table>

The engineer concurs with the modeling, and finds that the proposed project is in conformance with Rule J, Subsection 3.1.c.

**Low floor Elevation**

No structure may be constructed or reconstructed such that its lowest floor elevation is less than 2 feet above the 100-year event flood elevation according to Rule J, Subsection 3.6. The low floor elevation adjacent to the underground infiltration system is less than 2 feet above the 100-year event flood elevation of the underground infiltration system. Applicant provided an analysis in accordance with Appendix J1 to demonstrate conformance with Rule J, Subsection 3.6 as summarized below.

<table>
<thead>
<tr>
<th>Low Floor Elevation of Building (feet)</th>
<th>100-year Event Flood Elevation of Underground Infiltration System (feet)</th>
<th>Freeboard (feet)</th>
<th>Minimum Permissible Depth to Groundwater from Appendix J1 (feet)</th>
<th>Actual Depth to Groundwater from Soil Boring (feet)</th>
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<tr>
<td>959.2</td>
<td>963.1</td>
<td>Utilized Appendix J1</td>
<td>15.5</td>
<td>&gt;23</td>
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The minimum distance between the building and the underground infiltration system is 14 feet. Based on Plot 1 in Appendix J1, the minimum permissible depth to the water table is approximately 15.5 feet at the building location. The actual depth to the groundwater table is greater than 23 feet based on soil borings resulting in adequate separation between the groundwater table and the low floor, thus conforming to Rule J, Subsection 3.6.

**Maintenance**

Subsection 3.7 of Rule J requires the submission of maintenance plan. All stormwater management structures and facilities must be designed for maintenance access and properly maintained in perpetuity to assure that they continue to function as designed.
J1. Permit applicant must provide a draft maintenance and inspection plan. As a public entity, the school district may comply with this requirement by entering into a maintenance agreement with the RPBCWD.

**Applicable General Requirements:**

1. The RPBCWD Administrator shall be notified at least three days prior to commencement of work.
2. Construction shall be consistent with the plans and specifications approved by the District as a part of the permitting process. The date of the approved plans and specifications is listed on the permit.
3. The applicant must provide the name and contact information of general contractor responsible for the site.

**Findings**

1. The proposed project includes the information necessary, plan sheets and erosion control plan for review.
2. The proposed project conforms to Rule C.
3. The proposed project will conform to Rule J if the Rule Specific Permit Conditions listed above are met.

**Recommendation:**

Approval, contingent upon:

1. Continued compliance with General Requirements.
2. Rule specific permit conditions above.

By accepting the permit, when issued, the applicant agrees to the following stipulations:

1. Per Rule J Subsection 4.5, upon completion of the site work, the permittee must submit as-built drawings demonstrating that at the time of final stabilization, stormwater facilities conform to design specifications as approved by the District.

**Board Action**

It was moved by Manager ____________, seconded by Manager __________ to approve permit application No. 2015-048 with the conditions recommended by staff.
Memorandum

To: Riley Purgatory Bluff Creek Watershed District Board of Managers
From: Barr Engineering Company
Subject: Permit Application 2015-050: Arbor Glen – Extension of Review Period
Date: January 29, 2016
Project: 23270053.14

Project Description

Permit No: 2015-050
Received complete: December 28, 2015
Applicant: Tom Giannetti
Consultant: Dan Schmidt, Sathre-Bergquist, Inc.
Project: Arbor Glen – Construction of a 21-lot single family home subdivision. An underground infiltration system and a NURP pond are proposed to provide storm water quantity, volume and quality control. An existing wetland is located on the southern portion of the site.
Location: 9170 Great Plains Blvd, Chanhassen, MN

Rules Implicated:

<table>
<thead>
<tr>
<th>Rule B: Floodplain Management</th>
<th>Rule H: Appropriation of Public Waters</th>
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<tr>
<td>Rule C: Erosion and Sediment Control</td>
<td>Rule I: Appropriation of Groundwater</td>
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<td>Rule D: Wetland and Creek Buffers</td>
<td>Rule J: Stormwater Management</td>
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<td>Rule E: Dredging and Sediment Removal</td>
<td>Rule K: Variances and Exceptions</td>
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<tr>
<td>Rule F: Shoreline/Streambank Stabilization</td>
<td>Rule L: Permit Fees</td>
</tr>
</tbody>
</table>

Recommendation

On October 9, 2015, Tom Giannetti submitted a permit application for construction of a 21-lot single family home subdivision. The Applicant is proposing an underground infiltration system and a NURP pond to provide storm water quantity, volume, and quality control. There is an existing wetland located on the southern portion of the site requiring wetland buffers. Based on the Engineer’s review of the submitted plans, the latest site layout and stormwater management approach does not provide the required wetland buffer, rate control, volume abstraction, or water quality treatment. The application was considered complete on December 28, 2015. Because the project needs to be redesigned to achieve the required wetland buffer, rate control,
abstraction, and water quality, the Applicant requested a 60 day review extension to revise the plans.

The 60-day permit review period for Permit 2015-050 expires on February 26, 2016 which is before the Board’s regular March meeting. Therefore, staff recommends that the Board extend the review period to April 26, 2016 as requested by the Applicant, for permit 2015-050 Arbor Glen to allow the Applicant time to supply the revised design and the Engineer time to complete a review and verify that all the necessary documentation has been submitted and that the project will meet the applicable District rules. The application may be subject to any changes in the RPBCWD rules, including additional permit fees.
Memorandum

To: Riley Purgatory Bluff Creek Watershed District Board of Managers
From: Barr Engineering Company
Subject: Permit Application 2015-062: MnDOT SP 1002-100 TH 5 – Extension of Review Period
Date: January 29, 2016
Project: 23270053.14

Project Description

Permit No: 2015-062
Received complete: December 21, 2015
Applicant: MnDOT
Consultant: Hailu Shekur, MnDOT
Project: MnDOT SP 1002-100 TH 5 – Construction of four acceleration lanes onto TH 5 from TH 101 West (Market Blvd.) and TH 101 East (Chanhassen Rd.) to improve safety. A biofiltration basin is proposed to provide storm water quantity, volume and quality control. Existing wetlands are located at the TH 101 West portion of the site.
Location: On TH 5 at TH 101 West Junction (Market Blvd.) and TH 101 East Junction (Chanhassen Rd.), Chanhassen, MN

Rules Implicated:

| Rule B: Floodplain Management | Rule H: Appropriation of Public Waters |
| Rule C: Erosion and Sediment Control | Rule I: Appropriation of Groundwater |
| Rule D: Wetland and Creek Buffers | Rule J: Stormwater Management |
| Rule E: Dredging and Sediment Removal | Rule K: Variances and Exceptions |
| Rule F: Shoreline/Streambank Stabilization | Rule L: Permit Fees |

Recommendation

On December 21, 2015, MnDOT submitted a permit application for construction of improvements to Trunk Highway 5 including acceleration lanes onto Trunk Highway 5 from Trunk Highway 101 West (Market Blvd.) and Trunk Highway 101 East (Chanhassen Rd.). The Applicant is proposing a biofiltration basin to provide storm water quantity, volume, and quality control. There are existing wetlands at the intersection of Trunk Highway 5 and Market Blvd. requiring wetland buffers. Based on the Engineer’s review of the submitted plans, the latest site layout and stormwater management approach does not provide the required wetland buffer, rate
control, volume abstraction, or water quality treatment. Because the project needs to be revised to achieve the required wetland buffer, rate control, abstraction, and water quality, the Applicant requested a 12 day review extension to revise the plans.

The application was considered complete on December 21, 2015. The 60-day permit review period for Permit 2015-062 expires on February 19, 2016 which is before the Board’s regular March meeting. Therefore, staff recommends that the Board extend the review period to April 19, 2016 to accommodate the Applicant’s request and as provided by MN Statutes section 15.99, for permit 2015-062 MnDOT SP 1002-100 TH 5 to allow the Applicant time to supply the revised design and the Engineer time to complete a review and verify that all the necessary documentation has been submitted and that the project will meet the applicable District rules. The application may be subject to any changes in the RPBCWD rules, including additional permit fees.
RESOLUTION NO. 2016-03

RILEY-PURGATORY-BLUFF CREEK WATERSHED DISTRICT
BOARD OF MANAGERS

ADOPTING UPDATED HYDROLOGIC AND HYDRAULIC MODEL AND
FLOOD ELEVATIONS

Manager __________ offered the following resolution and moved its adoption, seconded by Manager __________.

WHEREAS accurate and complete flood elevation information based on a robust rainfall data set for the Riley-Purgatory-Bluff Creek watersheds is critical to the Riley-Purgatory-Bluff Creek Watershed District’s effective and successful pursuit of its statutory purposes and the goals and priorities in its water resources management plan;

WHEREAS RPBCWD has commenced a 10-year update of its water resources management plan and an accurate and complete flood elevation model based on best-available rainfall data is essential to the effectiveness and utility of the plan;

WHEREAS Minnesota Statutes sections 103D.341 and .345 direct each watershed district to adopt rules and implement a regulatory program to protect water resources in accordance with the district’s watershed plan, and the Riley-Purgatory-Bluff Creek Watershed District has duly adopted and enforces rules and issues permits accordingly;

WHEREAS the RPBCWD rules require permit applicants to prepare stormwater-management and related plans and designs to manage runoff to effectively protect water resources, and the RPBCWD Stormwater Management Rule in particular requires analysis of the 2-, 10- and 100-year storm events using the most recent National Weather Service stormwater-data set, called Atlas 14;

WHEREAS the RPBCWD engineer has analyzed changes in the RPBCWD floodplain models and flood-management elevations resulting from the incorporation of Atlas 14 data, and reported findings to Board of Managers and the Technical Advisory Committee; and

WHEREAS the Technical Advisory Committee concurred in the soundness and utility of the engineer’s analysis and modeling for regulatory, planning and other relevant purposes.

NOW, THEREFORE BE IT RESOLVED that for watershed-management planning, assessing compliance with the RPBCWD rules and all other relevant purposes, effective February 4, 2016, the Riley-Purgatory-Bluff Creek Watershed District Board of Managers adopts the December 2015 Hydrologic and Hydraulic Model and associated watershed flood elevations, as may be finalized with such further inconsequential adjustments and refinements as may be deemed necessary by the engineer to ensure the accuracy and completeness of the model.
The question was on the adoption of the resolution and there were __ yeas and __ nays as follows:

<table>
<thead>
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<th>Yea</th>
<th>Nay</th>
<th>Abstain</th>
<th>Absent</th>
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<tr>
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<td>CHADWICK</td>
<td>CRAFTON</td>
<td>FORSTER</td>
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Upon vote, the chair declared the resolution adopted.

* * * * * * * * * *

I, Mary Bisek, secretary of the Riley-Purgatory-Bluff Creek Watershed District, do hereby certify that I have compared the above resolution with the original thereof as adopted February 3, 2016, by the Riley-Purgatory-Bluff Creek Watershed District Board of Managers and on file with RPBCWD and find the same to be a true and correct transcription thereof.

IN TESTIMONY WHEREOF, I set my hand this _____ day of ________, 2016.

______________________________
Mary Bisek, secretary