

Summary of Desired Uses by Organization

Desired Uses	WDNR	City of Madison	Dane Co.	CARPC	City of Fitchburg	Friends of BMC	MMSD	SWTU	USRWA	Town of Verona
Nature-based recreation			X	X	X	X		X	X	X
Scenic beauty			X			X	X	X		
Stormwater conveyance / flood protection		X	X		X		X			X
Trout stream (Class II)	X	X				X		X		
Wildlife habitat			X	X		X	X	X	X	

Pre-meeting survey results from Dec

Q3. Please rank the relative importance of the following potential uses of BMC to you and the organization you represent:



Summary of Attributes by Desire Uses

Attributes	Nature-based recreation	Scenic beauty	Stormwater conveyance / flood protection	Trout stream (Class II)	Wildlife habitat
Baseflow (sufficient to support existing flora & fauna)		X		X	X
Cold water temperature				X	
Floodplain connection			X		
Flow capacity (water quantity)	X		X		
Habitat				X	X
Ice Age Trail	X				
Native vegetation		X			X
Non-eroding / stable banks		X	X	X	
Springs				X	
Trout (reproduction / recruitment)				X	
Water quality				X	X
Wading birds (herons, egrets, kingfishers)		X			X
Wetlands (quality)	X	X			

Summary of Potential Project Categories by Desired Uses

Project Categories	Nature-based recreation	Scenic beauty	Stormwater conveyance / flood protection	Trout stream (Class II)	Wildlife habitat
Dredging	X		X		
Baseflow augmentation	X			X	X
Groundwater recharge (infiltration, conservation)				X	
Bank restoration / stabilization		X	X	X	
Invasive species removal		X			X
Remove channel obstructions	X		X		
Watershed management plan					
Wetland restoration		X	X		X
Fish habitat (In stream riffle and pool projects)				X	
Trail and Parks projects (cooperative projects with Ice Age Trail Alliance/ Dane County Parks, including maintenance)	X				
Shoreland buffers (native buffer installation, riparian buffer purchase program)		X			X
Community access (boardwalks, piers, wildlife view areas to provide visibility and access)	X				
Education and Outreach (signage, etc...)	?		?	?	?

More specific project examples that could fall under different project categories depending on the details:

Fitchrona Rd/Goose Lake water level control	X		X	Maybe	
Low flow release structure from City Madison Nesbitt Road basin				Maybe	

Summary of Information Gaps

Groundwater

- More information about groundwater (WDNR)
- Can we modify groundwater withdrawals to protect / improve / enhance baseflows? (WDNR)
- What are the negative impacts of pumping groundwater to supplement flow (Dane Co.)
- Could controlled surface water flows be supplemented with groundwater to achieve more consistent flows and dilute warmer/less “clean” surface waters. Concerns over using drinking water to supplement creek? (City of Fitchburg)
- Another question is based on the groundwater and stormwater models and data and predictions of groundwater and stormwater levels, is the current water sources (groundwater and stormwater) sufficient to maintain a healthy stream of those sources are managed correctly (protecting groundwater inlets, tributaries etc; managing stormwater so it benefits the stream water inputs. (MMSD)
- Would be great if we could have more groundwater information to know the quantity and quality and where it is to ascertain if a groundwater pump system could be installed that could provide a controlled supplantation of flow to BMC when it is needed, and at the same time the system would also have some type of additional water that would recharge or replace the groundwater that was pumped. That excess water could be from the storage of the stormwater or infiltration of the stormwater that comes through the goose lake area? (MMSD)
- Need to know a good deal more about soil types and water table in the area where we would recharge and refill the shallow aquifer. (City of Madison)

Flow

- Causes of low flow in BMC (WDNR)
- What kind of sustained flows could realistically be provided from controlled discharge of surface waters? (City of Fitchburg)
- Feasibility study of low flow weir or release structure (Town of Verona)
- How is the stream expected to perform in a natural state, what is the expected hydrology and water quantity for a stream with the watershed attributes it resides in (MMSD)
- Determine 50 and 100 year impact related to decreased base flow, maintaining base flow and increasing base flow during drought and flooding events (USRWA)

Costs

- Long-term operation and maintenance costs and who is responsible (Dane Co.)

- A comprehensive study including modeling of the feasibility and costs and benefits of restoring connectivity of historic and new tributaries and wetlands. This could possibly be a 2025 project for UW Madison Water Resources Mgmt Workshop (USRWA)
- Feasibility and costs and benefits study (USRWA)

Water Quality

- Is the water quality/temperature conducive to achieving other goals of this group? (e.g. trout stream) (City of Fitchburg)
- What is the expected water quality for a stream of this size and type in a watershed of this size and type. (MMSD)

Community Input

- Community wide survey to ascertain support for such projects (Town of Verona)
- Landscape architects could be engaged in a community visioning process (USRWA)

Other

- A bank survey would be needed (and may already exist). (City of Madison)
- Have there been any studies done related to insects or macroinvertebrates? (CARPC)
- Wetlands (City of Fitchburg)
- Permitting requirements (MMSD)
- As the stream is returned to its natural state with no artificial inputs or sources of water, an instream flow study that looks at what the natural hydrograph is and the flora and fauna in the stream and what the hydrograph and water quality elements are needed for the success of those species and ensuring that the stream can perform the way it needs and support those species in all seasons. (MMSD)
- Would be great if we could have a consulting firm prepare alternatives to the goose lake stormwater pond project that would help BMC and the stormwater issue. For example alternatives that look at using the excess water in the high storm events in another way – e.g. slow stormwater release, groundwater supplementation, or other? The goal of the alternatives analysis would be to see what options there would be to store and use the excess water when BMC needs it the most (MMSD)
- Natural Resource inventory (Town of Verona)
- Ice Age Trail and Dane County long range plans (Town of Verona)

Worksheet: Desired Use, Attributes and Questions

01.17.2024 individual exercise

Badger Mill Creek Stakeholder Group

This worksheet builds upon the work done to date by the Badger Mill Creek Stakeholder Group to understand priorities, scientific information, and information gaps related to the health and resilience of Badger Mill Creek. It is designed to help the group begin to consolidate and focus its knowledge of priorities, information, potential projects, and information gaps.

Name	Organization
Melissa Michaud	CARPC

Please complete one worksheet per desired use. You may fill out additional worksheets if your group has additional priorities and/or expertise. Please write legibly (or type) and email to Mike and Alison once complete.

1. Pick a desired use of Badger Mill Creek that is important to your organization or the people you represent. It could also be a desired use for which you can provide expertise. *Desired uses might include, for example: a place for nature-based recreation (e.g. bird watching, walking), wildlife habitat, stormwater / flood conveyance, a Class 2 trout fishery, scenic beauty, a place for water-based recreation (e.g. canoeing, kayaking), a warm water fishery, etc.*

Desired use	Why you selected it
Wildlife Habitat	Preserving wildlife habitat here contributes to biodiversity and regional ecosystem resilience.

2. Fill in attributes that you believe are important to maintain or improve that end use. Be as specific as possible in terms of parameters, location, seasonality or other factors as appropriate. *Attributes may include, for example: Native vegetation, natural meanders, cool water temperatures, baseflow near current levels, reduced chloride levels, reduced phosphorus levels, natural reproduction of trout, presence of green heron and egrets, quality wetlands, instream trout habitat, floodplain connection, invasive species removal, monitoring, walking paths, no channel obstructions, no excess sediment, etc.*

Attribute	Why this attribute is important to the desired use (if known)
Native vegetation	Native vegetation provides food for pollinators, nesting habitat for songbirds, and shelter for small mammals.
Presence of wading birds	Their presence can be indicators of ecosystem health.
Invasive species removal	Can improve natural communities and ecological processes.

3. For each attribute, identify projects to strengthen those attributes or information gaps you believe exist for the group or for the larger community. Attributes or projects may be listed multiple times if helpful.

Attribute	Project to strengthen that attribute	Information gaps related to this attribute or project
Native vegetation/Invasive species removal	Continued or more expansive invasive species removal. Replace with native vegetation.	Unknown
Presence of wading birds	Maintain prey population (fish and insects) by either maintaining or improving the quality of the creek.	Have there been any studies done related to insects or macroinvertebrates?

4. What questions or recommendations do you have related to this desired use, these attributes, or these or other potential projects?

None at the moment.

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Desired use	Why you selected it
A place for recreation (both nature-based and water-based)	The Badger Mill Creek corridor provides valuable open space for recreation.

2. Fill in attributes that you believe are important to maintain or improve that end use. Be as specific as possible in terms of parameters, location, seasonality or other factors as appropriate. *Attributes may include, for example: Native vegetation, natural meanders, cool water temperatures, baseflow near current levels, reduced chloride levels, reduced phosphorus levels, natural reproduction of trout, presence of green heron and egrets, quality wetlands, instream trout habitat, floodplain connection, invasive species removal, monitoring, walking paths, no channel obstructions, no excess sediment, etc.*

Attribute	Why this attribute is important to the desired use (if known)
Walking paths	Prevents additional disturbance to native vegetation when there are dedicated and easily identifiable paths.
No channel obstructions (including excess sediment)	Allows for better passability of canoes and kayaks.

3. For each attribute, identify projects to strengthen those attributes or information gaps you believe exist for the group or for the larger community. Attributes or projects may be listed multiple times if helpful.

Attribute	Project to strengthen that attribute	Information gaps related to this attribute or project
Walking paths	Add educational signage	Unknown
No channel obstructions (including excess sediment)	Continue to position fish stick habitat along the sides of the creek. Periodic dredging?	Unknown

4. What questions or recommendations do you have related to this desired use, these attributes, or these or other potential projects?

None at the moment.

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Name	Organization
Laura Hicklin, Joleen Stinson & Jeremy Balousek	Dane County Land & Water Resources Department & Dane County Parks

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Desired use	Why you selected it
a place for nature-based recreation, wildlife habitat, stormwater / flood conveyance, scenic beauty	We selected all of these because they can be realistically achieved without major human intervention

2. Fill in attributes that you believe are important to maintain or improve that end use. Be as specific as possible in terms of parameters, location, seasonality or other factors as appropriate. *Attributes may include, for example: Native vegetation, natural meanders, cool water temperatures, baseflow near current levels, reduced chloride levels, reduced phosphorus levels, natural reproduction of trout, presence of green heron and egrets, quality wetlands, instream trout habitat, floodplain connection, invasive species removal, monitoring, walking paths, no channel obstructions, no excess sediment, etc.*

Attribute	Why this attribute is important to the desired use (if known)
Native vegetation/ invasive species removal	Habitat, scenic beauty, sediment reduction, plant and animal biodiversity
Quality wetlands	Flood protection, habitat, scenic beauty, sediment reduction, plant and animal biodiversity
Floodplain connection	Flood prevention, stability of channel banks
Ice Age Trail	Maintain national scenic trail corridor

3. For each attribute, identify projects to strengthen those attributes or information gaps you believe exist for the group or for the larger community. Attributes or projects may be listed multiple times if helpful.

Attribute	Project to strengthen that attribute	Information gaps related to this attribute or project
Native vegetation/ invasive species removal	Remove invasive species and replace with native vegetation, through partnership with volunteers	
Quality wetlands	Restore wetlands where possible	
Floodplain connection	Restore wetlands where possible	
Ice Age Trail	Work with the Ice Age Trail Alliance on trail maintenance	

4. What questions or recommendations do you have related to this desired use, these attributes, or these or other potential projects?

What are the negative impacts of pumping groundwater to supplement flow? Both short and long term. Especially as clean water will increasingly become a more precious and scarce resource.

Any solution that is seriously considered must look at long-term operation and maintenance costs and who is responsible.

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Name	Organization
David Rowe	DNR - Fisheries

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Desired use	Why you selected it
Trout Stream Trout Fishing	Statutory obligation of Agency

2. Fill in attributes that you believe are important to maintain or improve that end use. Be as specific as possible in terms of parameters, location, seasonality or other factors as appropriate. *Attributes may include, for example: Native vegetation, natural meanders, cool water temperatures, baseflow near current levels, reduced chloride levels, reduced phosphorus levels, natural reproduction of trout, presence of green heron and egrets, quality wetlands, instream trout habitat, floodplain connection, invasive species removal, monitoring, walking paths, no channel obstructions, no excess sediment, etc.*

Attribute	Why this attribute is important to the desired use (if known)
Cold Water Temp	Biological requirements
Base Flow/velocity	creates Habitat space
Trout Natural reproduction	Sustains population
Trout recruitment Natural/stocked	creates recreational fishery
Physical Habitat	Supports biological community

3. For each attribute, identify projects to strengthen those attributes or information gaps you believe exist for the group or for the larger community. Attributes or projects may be listed multiple times if helpful.

Attribute	Project to strengthen that attribute	Information gaps related to this attribute or project
Base flow	Ground water Protection	Ground water depletion
Base Flow	Supplementation pumping	Ground water source
Temp	Ground water Protection	Ground water vs Surface water Contribution

4. What questions or recommendations do you have related to this desired use, these attributes, or these or other potential projects?

What are causes of low flow in BMC
 or is current flow expected/normal.
 Can we modify groundwater withdrawals in area/
 watershed to protect/improve/enhance Baseflows

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Name	Organization
Ben Schulte	City of Fitchburg

Please complete one worksheet per desired use. You may fill out additional worksheets if your group has additional priorities and/or expertise. Please write legibly (or type) and email to Mike and Alison once complete.

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Desired use	Why you selected it
-Stormwater Conveyance -Nature-based recreation	-The City of Fitchburg desires to construct a project aimed at alleviating flooding along Fitchrona Road. As currently proposed, Badger Mill Creek would see higher peak flows following rain events as a result of upstream improvements. - The general area surrounding Badger Mill Creek and Goose Lake provides a great recreational amenity for many residents of Fitchburg. Anything that creates additional, or improves existing recreational uses is desirable.

2. Fill in attributes that you believe are important to maintain or improve that end use. Be as specific as possible in terms of parameters, location, seasonality or other factors as appropriate. *Attributes may include, for example: Native vegetation, natural meanders, cool water temperatures, baseflow near current levels, reduced chloride levels, reduced phosphorus levels, natural reproduction of trout, presence of green heron and egrets, quality wetlands, instream trout habitat, floodplain connection, invasive species removal, monitoring, walking paths, no channel obstructions, no excess sediment, etc.*

Attribute	Why this attribute is important to the desired use (if known)
Native Vegetation/Quality Wetlands (Nature-based recreation)	These attributes were selected as they provide aesthetic value enhancing nature-based recreation.

Floodplain Connection (Stormwater Conveyance and Nature-based recreation)	Improved floodplain connections would be desirable to help attenuate higher peak flows that may result from changes in conveyance from Goose Lake to BMC. This may also provide enhanced aesthetics and improve recreational uses such as bird watching. Floodplain connection may provide additional benefits outside of the selected such as improved water quality.
Baseflow Enhancements (Stormwater Conveyance)	This could be important to the desired use of stormwater conveyance if the source of water is from the Goose Lake drainage area.

3. For each attribute, identify projects to strengthen those attributes or information gaps you believe exist for the group or for the larger community. Attributes or projects may be listed multiple times if helpful.

Attribute	Project to strengthen that attribute	Information gaps related to this attribute or project
Native Vegetation/Quality Wetlands	Enhance riparian and upland areas with native vegetation where this has not already been completed. Improve quality of water discharged to wetlands and provide some level of control of water levels within wetlands.	Would need to discuss more with wetland experts to ensure that water level control could be used to benefit these specific wetlands.
Floodplain Connection	Identify locations where floodplain reconnection may be feasible and develop plans for reconnection.	
Baseflow Enhancements	Use of control structures upstream of BMC to regulate discharge into creek.	Is the water quality/temperature conducive to achieving other goals of this group? (e.g. trout stream) What kind of sustained flows could realistically be provided from controlled discharge of surface waters? Could controlled surface water flows be supplemented with groundwater to achieve more consistent flows and dilute warmer/less "clean" surface waters. Concerns over using drinking water to supplement creek?

4. What questions or recommendations do you have related to this desired use, these attributes, or these or other potential projects?

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Name	Organization
Brian Christian, Pat Bergen	Friends BMC Environmental Corridor

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Desired use	Why you selected it
Environmental Corridor	<p>BMC is the cornerstone of an important environmental corridor comprised of interconnected aquatic, riparian and upland habitats. It provides an important role as a link, connecting greenspace to the north (Badger Prairie Park), northeast (Goose Lake) and southwest (Sugar River state natural area and county property/Sugar River to the south). Aquatic habitat is represented by a healthy Class II trout stream, with trout being important indicator species. Riparian and upland habitats are ecologically connected with BMC and currently support a variety of stream-dependent species (e.g., herons, egrets, kingfishers)</p> <p>The BMC corridor provides fishermen, hikers, and bikers an opportunity to connect with nature. The area is heavily used, and significant volunteer effort is ongoing to manage and improve habitat in the corridor.</p> <p>BMC is a rare urban asset. A natural area with a high-quality stream adds great value to the Madison area and is an important reason why we have a very desirable place to live. The pressures to develop within and adjacent to BMC are and will continue to be high which make protecting and investing in this asset even more critical.</p> <p>Dane county has invested heavily in the BMC and SR watersheds. It is appropriate to build upon that effort.</p>

2. Fill in attributes that you believe are important to maintain or improve that end use. Be as specific as possible in terms of parameters, location, seasonality or other factors as appropriate. *Attributes may include, for example: Native vegetation, natural meanders, cool water temperatures, baseflow near current levels, reduced chloride levels, reduced phosphorus levels, natural reproduction of trout, presence of green heron and egrets, quality wetlands, instream trout habitat, floodplain connection, invasive species removal, monitoring, walking paths, no channel obstructions, no excess sediment, etc.*

Attribute	Why this attribute is important to the desired use (if known)
Augment baseflow.	Per WDNR, TU, USRWA, the greatest implication of the MMSD decision that negatively affects BMC is the loss of stream flow and associated loss of aquatic habitat, particularly in times of drought as occurred in the summer of 2023. Reproducing trout provide a meaningful indicator of stream health and good baseline data are available (Ole report) that characterize the current health status of BMC. The health of interdependent riparian and upland habitats will be supported by maintaining the health of BMC.

3. For each attribute, identify projects to strengthen those attributes or information gaps you believe exist for the group or for the larger community. Attributes or projects may be listed multiple times if helpful.

Attribute	Project to strengthen that attribute.	Information gaps related to this attribute or project
Augment baseflow.	Connecting wetlands to the stream (e.g., remeander) and identification of additional sources of ground water have been proposed to address this attribute. Enlist experts as applicable (e.g., WDNR, TU, USRWA, and the University of Wisconsin Water Resource Management group) to guide and develop the optimal plan	The Friends are not experts in hydrogeology/stream biology. As such we will rely on the knowledge of experts to implement the most applicable plan toward this goal.

4. What questions or recommendations do you have related to this desired use, these attributes, or these or other potential projects?

We recommend the conservation of 20+ years of improvement in the H&R of BMC. The Class II trout stream classification provides a current and appropriate standard for prioritizing projects that maintain the H&R of BMC. BMC is a rare gem in our urban setting. The benefits, environmental and to human well-being, of a H&R BMC corridor make Dane county a desirable place to live and need to be preserved.

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Name	Organization
Greg Fries	City of Madison Engineering

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Desired use	Why you selected it
Stormwater Conveyance and cold water fishery	<p>I think it is important to recognize the HAVE to and the WANT to – the UBMC is a major drainageway for the SW portion of the City of Madison and that cannot reasonably be changed. At this point roughly 85% of the watershed is developed. While more recent development has likely contributed to increases in baseflow – there remains a significant portion of the watershed that was developed without stormwater treatment.</p> <p>I think it is important to acknowledge that this function will continue and we have to manage for what we want after acknowledgement of the existing system limitations.</p> <p>That said I totally recognize the desire to continue and expand the cold water fishery that has developed over the last 20+ years and I believe there are projects tied to SWM that could do that in conjunction with a shallow well that would supplement flows during low flow conditions.</p>

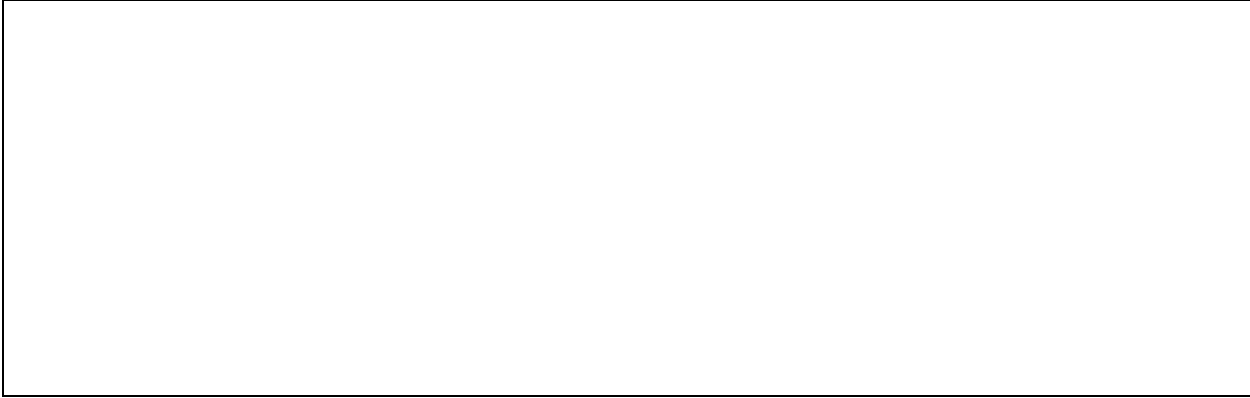
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Attribute	Why this attribute is important to the desired use (if known)
Baseflow	While I believe a number of examples listed above are important, given my limited background in fisheries of this type I assume flowing cool water is a primary need (meaning without that none of the other important stuff will matter).
A secondary would be limited erosion and stable banks	This can be done in many ways - I would assume native grasses and occasional logs and overhanging trees would be the preferred approach but I defer to others with more knowledge of these systems.

3. For each attribute, identify projects to strengthen those attributes or information gaps you believe exist for the group or for the larger community. Attributes or projects may be listed multiple times if helpful.

Attribute	Project to strengthen that attribute	Information gaps related to this attribute or project
Baseflow	I think that a shallow well and water supplement could be engineered and then an infiltration system using perhaps gooselake water could "refill" that shallow ground water.	Need to know a good deal more about soil types and water table in the area where we would recharge and refill the shallow aquifer.
Bank Stabilization	Since we have I understand a naturally reproducing population of cold water species here now I assume limited erosion is needed to maintain the spawning habitat.	A bank survey would be needed (and may already exist).

4. What questions or recommendations do you have related to this desired use, these attributes, or these or other potential projects?



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Name	Organization
Martin griffin	Madison met sewerage district

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Desired use	Why you selected it
Recreation, flora and fauna reflective of what the stream can natural support; urban watershed stormwater / flood management; natural scenic beauty;	I couldn't choose one because a stream isn't just one thing. The main desired use is that the stream reach the highest potential it can be based on the watershed characteristics. DNR showed a tool that they can identify what a stream flora and fauna assemblage should look like for a natural stream in any given watershed. This is different than managing the stream for one specific use that the stream may not be suited for (e.g. class 1 trout fishery). Also the use of the stream should continue to be naturally managing the water in the watershed. This is an urban stream system and it should continue to have a use as a way to convey stormwater and flood abatement as it naturally has done. Meeting these uses should enhance the natural beauty of the stream corridor

2. Fill in attributes that you believe are important to maintain or improve that end use. Be as specific as possible in terms of parameters, location, seasonality or other factors as appropriate. *Attributes may include, for example: Native vegetation, natural meanders, cool water temperatures, baseflow near current levels, reduced chloride levels, reduced phosphorus levels, natural reproduction of trout, presence of green heron and egrets, quality wetlands, instream trout habitat, floodplain connection, invasive species removal, monitoring, walking paths, no channel obstructions, no excess sediment, etc.*

Attribute	Why this attribute is important to the desired use (if known)
Water quality and quantity	The amount of baseflow and the desired hydrograph should fit what the intended use fo the stream us. I identified the use should be what a

	natural stream in this area can support. So the water quality and quantity should fit that model. For example if the DNR tool shows that the stream should support a diverse assemblage of fishes, the water quality attribute should be such to match what those fish assemblages need. Same with water quantity
Water quality	Within the parameters for all constituents typically measured to assess stream health (nutrients, DO, chloride, metals, etc)
Water quantity	Sufficient amount of water that is necessary for the stream to be healthy. This amount of water may be different between seasons.

3. For each attribute, identify projects to strengthen those attributes or information gaps you believe exist for the group or for the larger community. Attributes or projects may be listed multiple times if helpful.

Attribute	Project to strengthen that attribute	Information gaps related to this attribute or project
Water quantity	Allow stream to run free and protect all natural sources of water to the stream. And if necessary enhance the natural sources of water to the stream	How is the stream expected to perform in a natural state, what is the expected hydrology and water quantity for a stream with the watershed attributes it resides in
Water quality	Quality of the water should be in line with the water quality of a healthy natural stream with groundwater and surface water inputs located in an area of the watershed it is located in	What is the expected water quality for a stream of this size and type in a watershed of this size and type.

4. What questions or recommendations do you have related to this desired use, these attributes, or these or other potential projects?

As the stream is returned to its natural state with no artificial inputs or sources of water, an instream flow study that looks at what the natural hydrograph is and the flora and fauna in the stream and what the hydrograph and water quality elements are needed for the success of those species and ensuring that the stream can perform the way it needs and support those species in all seasons.

Another question is based on the groundwater and stormwater models and data and predictions of groundwater and stormwater levels, is the current water sources (groundwater and stormwater) sufficient to maintain a healthy stream if those sources are managed correctly (protecting groundwater inlets, tributaries etc; managing stormwater so it benefits the stream water inputs).

Worksheet: Desired Use, Attributes and Questions

01.17.2024 individual exercise

Badger Mill Creek Stakeholder Group

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Name	Organization
Kathy Lake	Madison Metropolitan Sewerage District

Please complete one worksheet per desired use. You may fill out additional worksheets if your group has additional priorities and/or expertise. Please write legibly (or type) and email to Mike and Alison once complete.

1. Pick a desired use of Badger Mill Creek that is important to your organization or the people you represent. It could also be a desired use for which you can provide expertise. *Desired uses might include, for example: a place for nature-based recreation (e.g. bird watching, walking), wildlife habitat, stormwater / flood conveyance, a Class 2 trout fishery, scenic beauty, a place for water-based recreation (e.g. canoeing, kayaking), a warm water fishery, etc.*

Desired use	Why you selected it
Steam, stormwater conveyance, habitat	Current uses

2. Fill in attributes that you believe are important to maintain or improve that end use. Be as specific as possible in terms of parameters, location, seasonality or other factors as appropriate. *Attributes may include, for example: Native vegetation, natural meanders, cool water temperatures, baseflow near current levels, reduced chloride levels, reduced phosphorus levels, natural reproduction of trout, presence of green heron and egrets, quality wetlands, instream trout habitat, floodplain connection, invasive species removal, monitoring, walking paths, no channel obstructions, no excess sediment, etc.*

Attribute	Why this attribute is important to the desired use (if known)
Springs	Natural springs in the area add flow and control temperatures.
Flow	Stagnant water could lead to smells, warmer water and impede some of the current uses.
Upstream flooding (Nesbitt Rd/Goose Lake)	Overall hydrology of the area should be considered and a plan that helps mitigate upstream flooding and high ground water may be beneficial downstream, if designed to acknowledge and include that.

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3. For each attribute, identify projects to strengthen those attributes or information gaps you believe exist for the group or for the larger community. Attributes or projects may be listed multiple times if helpful.

Attribute	Project to strengthen that attribute	Information gaps related to this attribute or project
Flow	Dredging	Permitting?
Flow	Obstruction removal, design of culverts for variety of flow conditions.	Ownership, permitting?
Upstream flooding/high ground water mitigation	Overall hydrologic planning, surface and groundwater considerations for the upstream watershed with a broad lens	A design consultant would need to be engaged and paid to analyze with this lens. Someone would have to pay for this.

4. What questions or recommendations do you have related to this desired use, these attributes, or these or other potential projects?



Alison Lebwohl <alisonlebwohlconsulting@gmail.com>

Topf Wells <topfwells@gmail.com>

Wed, Jan 31, 2024 at 7:31 PM

To: Mike Rupiper <mrupiper@eorinc.com>, Alison Lebwohl <alisonlebwohlconsulting@gmail.com>, alisonlebwohl <alisonlebwohl@gmail.com>, Robert Bohanan <rbrtbohanan52@gmail.com>, Pat Bergen <bergen_pat@yahoo.com>, Brian Christian <bchristi490@gmail.com>

1. Desired Use: A healthy Class 2 trout stream as documented in Oele's assessment.*

Why: SWTU has worked for over 30 years to improve and maintain BMC as an improving Class 2 trout stream. Such streams are rare and valuable resources in southern WI urban areas.

* Focusing on BMC as a healthy 2 trout stream does not mean that SWTU ignores other important ecological functions or resources in or near BMC. Rather BMC remains a healthy 2 stream if and only if it flows through a sound and resilient stream corridor and watershed. BMC will have to have stable streambanks and better connections to the floodplain. It will have clean riffles, springs, and groundwater discharge, which means that urban and ag runoff will be controlled. The stream will have a wide and healthy variety of native invertebrates and other fish species. The corridor should have native vegetation that should be lovely to look at and hike. It will host many bird and insect species.

2. Attributes. a) cold water with high DO levels. b) sufficient quantity of water. c) ample and varied habitat for all stages of a trout's life cycle and all the aquatic and terrestrial flora and fauna, which are normal and often necessary parts of a trout's life. d) stable, healthy stream corridor. e) control of urban and ag runoff.

Why. I think all of these are necessary and obvious elements for a healthy trout stream. Some are connected to one another. Stream habitat is substantially degraded when stream banks are steep and eroding. Runoff carries toxins and pollutants that reduce or eliminate fish and bugs.

Quantity is vitally important. I don't think the group and MMSD in particular have acknowledged what I think is a clear inference from David Rowe's and Mike Sorge's presentations. There is a high probability that BMC will be harmed as a trout stream and that some stretches of the stream where trout now live and where major restoration projects have occurred might only support warm water forage fish.

3. Attribute b is the most important to BMC at this point in its history. A project to replace MMSD's discharge with good quality water might well secure BMC's future. The information gap is huge. For now we have no idea if such a project is possible.

4. I stated my overriding concern in my comments on Quantity.

Topf Wells

Worksheet: Desired Use, Attributes and Questions
01.17.2024 individual exercise
Badger Mill Creek Stakeholder Group

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Name

Organization

Robert Bohanan

Upper Sugar River Watershed Association

Please complete one worksheet per desired use. You may fill out additional worksheets if your group has additional priorities and/or expertise. Please write legibly (or type) and email to Mike and Alison once complete.

1. Pick a desired use of Badger Mill Creek that is important to your organization or the people you represent. It could also be a desired use for which you can provide expertise. *Desired uses might include, for example: a place for nature-based recreation (e.g. bird watching, walking), wildlife habitat, stormwater / flood conveyance, a Class 2 trout fishery, scenic beauty, a place for water-based recreation (e.g. canoeing, kayaking), a warm water fishery, etc.*

Desired use

Why you selected it

A tributary and corridor within broader watersheds that contributes a variety of ecosystem services possibly with a designation like wildlife / natural area supporting a resilient plant and animal community, recreation, fishing, hiking, bicycling, paddling, and education.

BMC is part of several watersheds that provides a variety of ecosystem services across multiple stakeholder groups, municipalities and communities.

2. Fill in attributes that you believe are important to maintain or improve that end use. Be as specific as possible in terms of parameters, location, seasonality or other factors as appropriate. *Attributes may include, for example: Native vegetation, natural meanders, cool water temperatures, baseflow near current levels, reduced chloride levels, reduced phosphorus levels, natural reproduction of trout, presence of green heron and egrets, quality wetlands, instream trout habitat, floodplain connection, invasive species removal, monitoring, walking paths, no channel obstructions, no excess sediment, etc.*

Attribute	Why this attribute is important to the desired use (if known)
Maintaining base flow at sufficient level to support existing flora and fauna	Ecosystem services will be degraded by loss of habitat, both in stream, riparian and upland, especially in times of predictable drought
BMC provides spawning habitat and refuge for a variety of fish species, notably trout	Trout may be clearly reviewed as a keystone species and indicator species affected all parts of the aquatic foodweb
BMC connects hydrologically and biologically with upland habitats and wetlands	Groundwater recharge and discharge are influenced by base flow and hydrology in BMC
BMC and the environmental corridor is a community asset used for fishing, hiking, biking and in parts paddling	BMC and the environmental corridor degradation from likely negative effects from base flow will reduce its aesthetic, recreational, economic value to communities with similar effects reaching in to other watersheds.
BMC currently provides a degree of mitigation or buffering/resilience to climate and weather changes, especially drought and floods	Increased frequency of extreme weather effects are part of our current climate regime. Significant decrease in base flow with potentially significant portions of the upper reaches of BMC becoming intermittent further reduces resilience.

3. For each attribute, identify projects to strengthen those attributes or information gaps you believe exist for the group or for the larger community. Attributes or projects may be listed multiple times if helpful.

Attribute	Project to strengthen that attribute	Information gaps related to this attribute or project
Maintaining base flow at sufficient level to support existing flora and fauna	<p>Connect wetlands and possibly intermittent tributaries within the BMC watershed to supply new sources of water to offset loss of treated wastewater return</p> <p>Installing meanders in the upper reaches of BMC which is largely straight and channelized, possibly to reflect historic channel patters. This could include both narrowing and widening sections as appropriate.</p>	A comprehensive study including modeling of the feasibility and costs and benefits of restoring connectivity of historic and new tributaries and wetlands. This could possibly be a 2025 project for UW Madison Water Resources Mgmt Workshop
BM C provides spawning habitat and refuge for a variety of fish species, notably trout	Place a priority on protecting root wads and other habitat improvement structures previously installed	
BMC connects hydrologically and biologically with upland habitats and wetlands	Determine existing and historic stream-wetland complexes for feasibility. For example, the relatively large, primarily Reed Canary Grass wetland in the upper portion may be a viable source of groundwater and ultimately be improved to increase contribution to base flow of BMC.	Feasibility and costs and benefits study
BMC and the environmental corridor is a community asset used for fishing, hiking, biking and in parts paddling	Identify strategic areas to develop structures such as boardwalks, piers, wildlife view areas to provide visibility and access, including wheelchair and other mobility limited amenities for multiple uses	Landscape architects could be engaged in a community visioning process

BMC currently provides a degree of mitigation or buffering/resilience to climate and weather changes, especially drought and floods

Model the current role of BMC in mitigation of drought and flood

Determine 50 and 100 year impact related to decreased base flow, maintaining base flow and increasing base flow during drought and flooding events

4. What questions or recommendations do you have related to this desired use, these attributes, or these or other potential projects?

Projects and strategies be aligned with definitions of health and resilience.

Projects address the costs of replacing lost or impaired ecosystem services.

Projects provide opportunities to engage communities and stakeholders in raising awareness of the value, concerns, threats of BMC and the associated watershed and that promote stewardship.

Worksheet: Desired Use, Attributes and Questions

01.17.2024 individual exercise

Badger Mill Creek Stakeholder Group

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Name	Organization
Christopher Barnes	Town of Verona

Please complete one worksheet per desired use. You may fill out additional worksheets if your group has additional priorities and/or expertise. Please write legibly (or type) and email to Mike and Alison once complete.

1. Pick a desired use of Badger Mill Creek that is important to your organization or the people you represent. It could also be a desired use for which you can provide expertise. *Desired uses might include, for example: a place for nature-based recreation (e.g. bird watching, walking), wildlife habitat, stormwater / flood conveyance, a Class 2 trout fishery, scenic beauty, a place for water-based recreation (e.g. canoeing, kayaking), a warm water fishery, etc.*

Desired use	Why you selected it
Resilient water asset which has sustained biological, hydrological and geological features	The Town has various desires for the Badger Mill Creek. The Badger Mill creek is an important asset for the entire watershed. In representing the residents of the Town of Verona, its recreational and stormwater conveyance attributes are significant.

2. Fill in attributes that you believe are important to maintain or improve that end use. Be as specific as possible in terms of parameters, location, seasonality or other factors as appropriate. *Attributes may include, for example: Native vegetation, natural meanders, cool water temperatures, baseflow near current levels, reduced chloride levels, reduced phosphorus levels, natural reproduction of trout, presence of green heron and egrets, quality wetlands, instream trout habitat, floodplain connection, invasive species removal, monitoring, walking paths, no channel obstructions, no excess sediment, etc.*

Attribute	Why this attribute is important to the desired use (if known)
Stable stream channel and banks	Controls stream bank erosion and silt deposition. Manage invasive species such as buckthorn, loose strife and phragmite reeds
Consistent water baseflow volume and flow parameters	Provides sustainable water conditions for recreational uses, (canoeing, fishing). This will take various facets. Maintaining consistent water flows especially in low rainfall periods, will support all types of biological life and provide residents with an attractive and authentic experience.

Passive Recreation Hiking birding	Provides opportunist for resident and general public to explore a vibrant urban stream corridor via access points to the Badger Mill Creek
Development controls consistent with floodplain, wetlands and riparian best practices.	Maintain the the natural and undeveloped shoreline and adjacent riparian buffer areas to minimize direct untreated surface runoff.

3. For each attribute, identify projects to strengthen those attributes or information gaps you believe exist for the group or for the larger community. Attributes or projects may be listed multiple times if helpful.

Attribute	Project to strengthen that attribute	Information gaps related to this attribute or project
Stable stream channel and banks	In stream riffle and pool and/or stabilization projects	Natural Resource inventory.
Consistent water baseflow volume and flow parameters	Low flow release structure form City Madison Nesbitt Road basin of Goose Lake area	Feasibility study of low flow weir or release structure
Passive Recreation Hiking birding	Cooperative projects with Ice Age Trail Alliance/ Dane County Parks. I	Ice Age Trail and Dane County long range plans
Development controls consistent with floodplain, wetlands and riparian best practices.	Property development standards, native buffer installation program, riparian buffer purchase program	Community wide survey to ascertain support for such projects

4. What questions or recommendations do you have related to this desired use, these attributes, or these or other potential projects?

Finding a sustainable cold-water replacement for the Nine Springs Force Main may require various short term and long-range approaches and may not be obtainable in the time frame set forth for the force main discontinuation.