BOARD OF WATER AND SOIL RESOURCES

Watershed-Based Implementation Funding Allocation Formula White Paper

Purpose

As watershed-based funding expands as the primary mechanism through which the Board of Water and Soil Resources (BWSR) distributes Clean Water Fund grants, BWSR staff, management, and the Board found it is necessary to revisit the allocation formula developed in 2017 for the watershed-based funding pilot program to ensure a robust process and to make recommendations on what changes, if any, need to be made. The purpose of this white paper is to document the history of the short-term pilot allocation development, to explain principles and rationale used in the process, and to identify important factors for consideration in the development of a long-term allocation formula.

Introduction

In December 2017, BWSR implemented a pilot program to allocate $8.7 million in Clean Water Funds on a non-competitive, watershed basis to those areas across Minnesota that had completed comprehensive watershed planning, called Watershed-based Funding (WBF). The purpose of the WBF pilot program was to provide systematic and predictable funding for collaborating local governments to pursue clean water solutions based on a watershed's highest-priority needs.

In developing an allocation formula for the pilot program, BWSR sought to find an equitable and systematic method to provide implementation funding to the pilot One Watershed, One Plan (1W1P) watersheds and metropolitan surface water/groundwater management plans without creating false expectations for unsustainable future funding. The allocation formula also needed to recognize the future growth in the number of 1W1P watersheds across the state, and the complexity of the seven-county metropolitan area (Metro) which has been planning on a watershed basis for over 30 years under the Metro Surface Water Management Act.

The following criteria guided the development of the pilot allocation recommendations:

- Be transparent, simple, and easy to understand
- Be systematic and equitable
- Maximize environmental benefits
- Provide for periodic review and revision
- Balance resource needs with available capacity
- Be developed in consideration of future funding available

While the intent was to create a long-term funding allocation formula as part of the pilot program, the innate complexities of designing a new formula coupled with the relatively short time frame for creating the program resulted in a simple, short-term pilot funding allocation formula. The pilot formula provided a minimum allocation of $250,000 to each of the five 1W1P pilots and each of the seven Metro counties, with the remaining

funding allocated on the percentage of private land area within each 1W1P pilot area relative to the combined pilot area, and the percentage of total land area within the Metro relative to the total Metro (Table 1). A full, detailed account of the pilot allocation development process and budget assumptions is described in the Watershed-Based Funding Pilot Allocation: A Brief History (Appendix A).

Table 1: FY18-19 Watershed-Based Funding Formula and Biennial Allocations

7-County Area	% of Area (based on sq. mi. of Metro)	Allocation ($250,000 + % of Area)
Anoka County	15%	$ 826,000
Carver County	13%	$ 749,200
Dakota County	20%	$ 1,018,000
Hennepin County	20%	$ 1,018,000
Ramsey County	5%	$ 442,000
Scott County	13%	$ 749,200
Washington Co.	14%	$ 787,600
Total, Metro	100%	$ 5,590,000
One Watershed, One Plan Pilots	% of Private Lands (based on acres)	Allocation ($250,000 + % of Private Lands)
Root River	32%	$ 851,301
Yellow Medicine	16%	$ 551,712
Lake Superior	7%	$ 387,059
Red Lake	23%	$ 677,551
North Fork/Crow	21%	$ 642,377
Total, 1W1P	100.0%	$ 3,110,000

As BWSR prepares to move from a pilot to a long-term WBF program in FY2020-2021, it was necessary to revisit the funding allocation formula, both to be sure that BWSR is thorough and transparent in its funding process and to allow for more robust dialogue to occur on the topics outlined below. This revisit was important not only to provide clarity to stakeholders and local governments, but also to ensure that WBF dollars deliver unquestionable progress towards Minnesota's clean water goals.

Insights from the Pilot Process

A major goal for the pilot program was to deliver insight and experience that would inform future decisions. While the final pilot allocation formula reached was simple, BWSR staff researched many potential factors on which the allocation could be based and considered and compared the relative merits of using these factors and consistent statewide data sources to inform the allocation. This paper will outline the major category of factors that where explored, challenges considered in the pilot process and options for consideration for a long-term allocation process.

Minimal (base) amount

Providing a minimal amount of funding to each watershed for implementing their comprehensive watershed management plan was considered a strong means for equitable distribution across watersheds. In the pilot, $250,000 was used based on the premise that this amount could support a prioritized project, program or key staff position.

Equal Allocation

An equal allocation of available watershed-based funding among the pilot organizations was considered, as this would be a simple and unbiased method. However, it was decided that this would not be justifiable or defensible due to the highly variable needs and sizes of watersheds across the state.

Plan Implementation Cost

Basing allocations on actual water resource needs identified in comprehensive water management plans developed under the 1W1P program was considered as an alternative to formula based on land characteristics, resource risk factors, or demographics. This method was a potentially equitable solution for watershed-based funding that included a way for the local partnerships to collectively drive allocations based on plan costs. It was decided that basing allocations on stated plan needs has the potential to drive inflated plan costs in the short term as the majority plans have yet to be or are being developed across the state. With this potential in mind, it was recommended this option be considered after 2027 and/or once the state has fully converted to the 1W1P model.

Demographics

A number of demographic data sources to address the equitability of the allocation were considered during the development of the pilot formula, such as the area-normalized tax capacity or the population density of a watershed. Such factors could also address the ability of a watershed to generate funding to implement conservation work. However, sources of data relating to tax capacity are not available on a statewide watershed basis. Additionally, further consideration would be needed whether Clean Water Fund dollars should be prioritized for those areas with higher population densities and tax bases (i.e. where more Minnesotans live and pay taxes) or to those less populated areas where local funding is scarcer. For the pilot, these factors were omitted from the allocation formulas for both the Metro and the 1W1P watersheds.

Density of Water Resources

The density of water resources of each watershed was also discussed as a potential formula factor during the process, as a way to assess and prioritize funding based on which watersheds had the most water to manage. However, this led to questions of which waters would be included in this measurement: Would only surface waters be counted, or would groundwater be included? Would wetlands and ditches be a part of the water resources accounted for? In consideration of these ambiguities, a water resource density factor was not used in the pilot allocation.

Prioritization of Resource Concerns

A challenge consistently encountered throughout the pilot allocation process was the issue of ranking regionally distinct resource concerns across the state. Minnesota's landscapes and water resources are diverse, and it is difficult to evaluate the benefit of protecting relatively pristine waters against that of the legally-required work of restoring impaired waters impacted by nutrient and sediment pollution. From 2009 to 2018, approximately 20% of Clean Water Funds from BWSR have funded projects, practices, and programs targeted at protecting water resources not yet impaired, with 80% spent on restoration efforts for impaired waters[1].

To illustrate the difficulty of representing specific resource concerns within the allocation, Figure 1 shows three maps created by the University of Minnesota's Natural Capital Project as part of a return on investment study of the Clean Water Fund. Were either groundwater vulnerability or frequency of lake visitation to be chosen as a state-wide resource concern within the allocation formula, high priority areas of the omitted resource concern would be left with less funding. Alternatively, if both factors were included, resource prioritization would be muted as the opposing high and low priority areas appear to cancel each other out.

[1] Paul Radomski & Kristin Carlson (2018): Prioritizing Lakes for Conservation in Lake-Rich Areas, Lake and Reservoir Management, DOI: 10.1080/10402381.2018.1471110
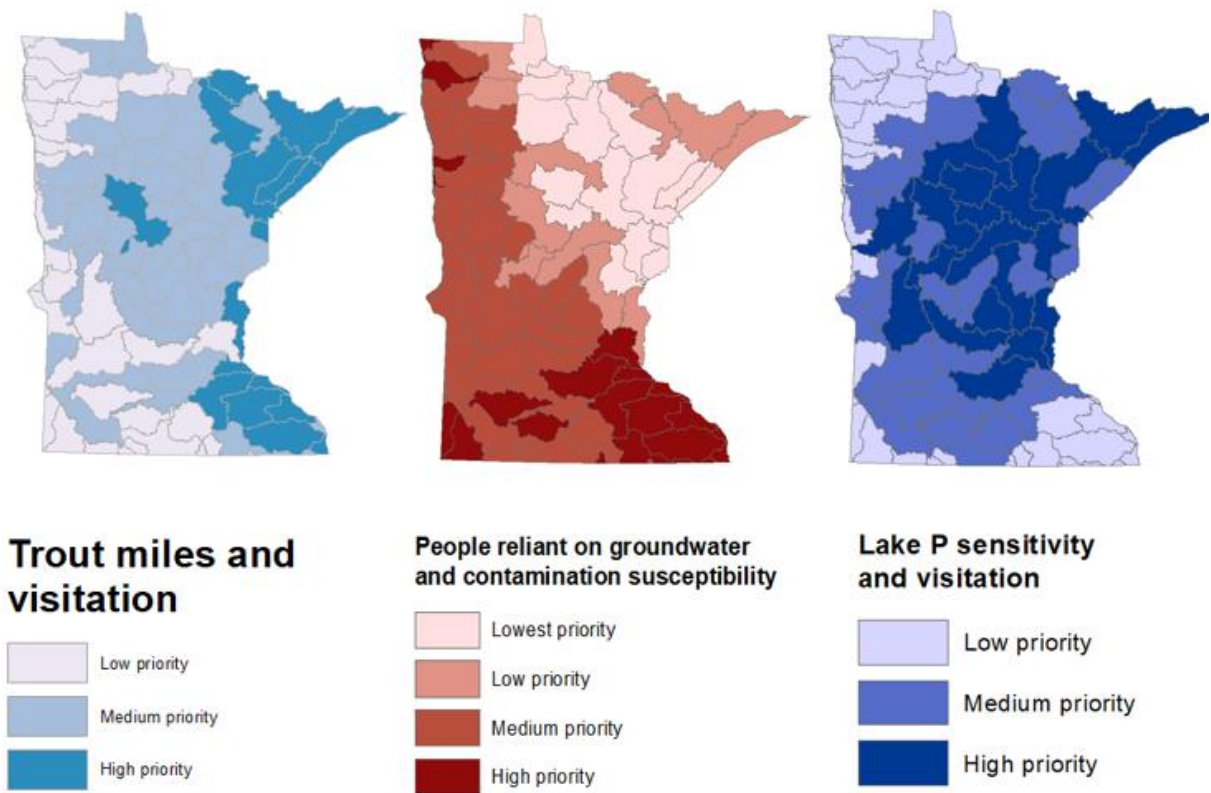
Trout miles and visitation

	Low priority
	Medium priority
	High priority

People reliant on groundwater and contamination susceptibility

	Lowest priority
	Low priority
	Medium priority
	High priority

Lake P sensitivity and visitation

	Low priority
	Medium priority
	High priority

Figure 1. The map on the left show trout streams that are visited the most frequently by watershed; the map in the center shows statewide groundwater vulnerability by watershed; the map on the right shows watersheds by frequency of lake visitation.

In an attempt to account for these regional differences, BWSR staff discussed if dollars should first be allocated by major river basin or directly to a watershed planning area. By first allocating to river basins based on resource issues at a regional scale, a second allocation could be made to the watersheds within each basin allowing for comparison between similar resource issues. Ultimately, however, this option was declined for use in the pilot as it still required ranking of diverse resource issues.

Now that Minnesota has solid, statewide data to inform both protection and restoration strategies, comprehensive water management plans developed under the 1W1P program must prioritize those projects, practices, and programs that are most likely to make measurable progress toward clean water goals. Grounded in the science provided by Watershed Restoration and Protection Strategies (WRAPS), Groundwater Restoration and Protection Strategies (GRAPS), and other state reports, each watershed will have its own unique set of restoration and protection goals.

Looking forward, a question to be considered is: how much funding should be allocated to implement efforts to protect unimpaired waters versus efforts to restore impaired waters, and should that decision be made on a state-wide or watershed-by-watershed basis?

Formula Complexity

The guiding principle that any formula should be transparent and easy to understand led BWSR toward limiting the number of variables in a potential formula where possible. Additionally, staff recognized that a more complex formula may provide a false sense of precision due to the likelihood that many of the factors may be correlated, thus minimizing the impact of each individual factor. This was something that the Government Accountability Office also noticed when reviewing the Natural Resources Conservation Services allocation for EQIP in 2006 (GAO -06-969). At the time there were over 30 factors in the EQIP funding formula. Recognizing one factor alone may not be robust enough, the challenge is balancing a formula that helps allocate dollars in accordance with the Legacy Amendment without creating such complexity. Based on this information, ideally, a funding formula would be limited to no more than three factors.

Key ideas and options for consideration for long-term allocation

The WBF allocation formula describes how BWSR will distribute implementation funds to eligible recipients. To assist in developing the allocation formula for fiscal years 2020 and 2021, BWSR held multiple meetings (facilitated by staff from the Metropolitan Council) with local government stakeholders in the Metro, and with statewide local government and BWSR staff stakeholders (facilitated by staff from the Department of Natural Resources) in 2018 and 2019. Many factors and methods to systematically and equitably provide funding to the 1W1P planning areas, and areas covered by Metro surface water and groundwater management plans, were considered in these meetings. The key ideas and options carried forward for consideration by the BWSR Board included:

- Any formula should be transparent and easy to understand.
- Primary factors in the formula to consider include:
    - **Private lands** (factor used for the pilot WBF allocations outside the Metro)
    - **Watershed area** (factor used for the pilot WBF allocations inside the Metro)
    - **Water resource density** (e.g. square or linear miles of water resources. New potential factor with added complexities of how to quantify or incorporate groundwater and the potential for increased formula complexity if included.)
    - **Tax-based** (new factor suggested through the Metro stakeholder process with the added complexity of lack of a statewide, watershed-based data set)
    - **Maintain a minimum amount per area** (method used in for the pilot WBF with the added caveat that it should not encourage splitting planning boundaries for the purposes of receiving additional funds)
- To the extent possible, one consistent formula should be used across the state.
- The formula should not attempt to establish priorities or values for water resources; these are best determined at a watershed scale as part of the local planning process.

- To the extent possible, application of the formula should minimally maintain the amounts allocated through the pilot WBF program and at the same time not increase such to create false expectations of unsustainable future funding amounts as the number of participants in 1W1P increases across the state.
- Application of the formula should recognize and consider the general complexity of watershed management in the Metro area by taking into account the existing surface water and groundwater management plans in the Metro and the additional complexity of watershed planning for watersheds that span the Metro boundary. To the extent possible, application of the formula should encourage or incentivize watershed-wide partnerships spanning the Metro boundary while recognizing potential for perceptions of unfairness that may occur if funds are distributed in a Metro allocation as well as in an overlapping allocation to a 1W1P area that spans the Metro boundary.

Narrowing of Factors

After reviewing the ideas and options above, the BWSR board, through the board's Water Management and Strategic Planning and Grants Program and Policy committees, chose to:

- Investigate groundwater as an additional factor and an important component of the Clean Water Fund. Through review, the committees determined a consistent statewide data set does not exist in a manner that can be applied to an allocation formula and directed staff to work with other agencies to develop such a data set, specifically looking at groundwater vulnerability, for future consideration.
- Eliminate consideration of a tax-based factor such as tax capacity because there currently are no statewide watershed-based data sets available.
- Eliminate consideration of watershed area in lieu of including acres of private lands per watershed and the amount of public water per watershed.

The two factors the committees recommended to move forward for final development into an allocation formula are:

- **Private lands**: Area of non-federal, non-state, non-tribal land within a planning boundary determined at a 40-acre resolution with ownership assigned to the majority landowner[2].
- **Amount of public waters[3]**: Shoreline miles of lakes, wetlands, rivers, streams, and ditches that meet the definition of public water.

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[2] Data based on the 2008 USGS Landcover Inventory used for the Gap Analysis Project. Actual parcel data not available/accessible at a statewide scale.
http://www.mngeo.state.mn.us/chouse/land_own_general.html

[3] Public waters are all water basins and watercourses that meet the criteria set forth in Minnesota Statutes, Section 103G.005 , subd. 15 identified on
Public Water Inventory maps authorized by Minnesota Statutes, Section 103G.201
https://www.dnr.state.mn.us/waters/watermgmt_section/pwi/maps.html

Based on discussions, the committees indicated private lands should be weighted higher than the amount of public waters in an allocation formula because water quality problems and threats are generally more pronounced on privately held land and is where most conservation provided by local governments is targeted.

Appendix A

Watershed-based Funding Pilot Allocation: A Brief History

Outline

Summary

In 2017 BWSR staff, local government partners, BWSR committees, and the Board worked to develop and approve a funding allocation for watershed-based funding for the pilot 1W1P program. Given the short timeframe to create an allocation formula and recognizing the opportunity to use the pilot process to inform a long-term funding allocation in the future, BWSR decided to implement a short-term allocation formula for the life of the pilot with the intention to revisit this process later. Criteria were developed to guide and define the allocation process, and categories and data sources on which funding could be prioritized were identified. These data and their impacts on an allocation were considered and debated, with questions of diverse resource needs, demographic distribution, and equity of funding all entering the discussion. Eventually, two formulas were adopted, one for the seven-county metro area and one for the five pilot One Watershed, One Plan areas.

Watershed-Based Funding Pilot Program: Allocation History

Introduction

In December 2017, the Board of Water and Soil Resources (BWSR) implemented a pilot program to allocate $8.7M in Clean Water Funds to those areas across Minnesota that had completed comprehensive watershed planning on a non-competitive, watershed basis.   The purpose of the Watershed-based Funding (WBF) pilot

program was to provide systematic and predictable funding for collaborating local governments to pursue clean water solutions based on a watershed's highest-priority needs.

In developing an allocation, BWSR sought to find an equitable solution that provided a systematic means of providing implementation funding to the pilot One Watershed, One Plan (1W1P) watersheds and metropolitan surface water/groundwater management plans without creating false expectations of funding amounts that would not be sustainable overtime, recognizing the future growth in the number of 1W1P watersheds across the state, and recognizing the complexity of the seven-county metropolitan area (Metro), which under the Metro Surface Water Management Act has been planning on a watershed basis for over 30 years.

The following criteria guided the development of the allocation recommendations:

- Be transparent, simple, and easy to understand
- Be systematic and equitable
- Maximize environmental benefits
- Provide for periodic review and revision
- Balance resource needs with available capacity
- Be developed in consideration of future funding available

While the intent was to create a long-term funding allocation formula as part of the pilot program, the innate complexities of such an endeavor coupled with the relatively short time frame for creating the program, resulted in a short-term funding allocation formula (Table 1).

As BWSR sets forth to establish a long-term WBF program, revisiting the funding allocation formula is imperative to both ensure BWSR is allocating funding to deliver unquestionable benefit towards Minnesota's clean water goals and is fully transparent in its funding decisions.

Table 1: FY18-19 Watershed-Based Funding Formula and Biennial Allocations

7-County Area	% of Area (based on sq. mi. of Metro)	Allocation ($250,000 + % of Area)
Anoka County	15%	$ 826,000
Carver County	13%	$ 749,200
Dakota County	20%	$ 1,018,000
Hennepin County	20%	$ 1,018,000
Ramsey County	5%	$ 442,000
Scott County	13%	$ 749,200
Washington Co.	14%	$ 787,600
Total, Metro	100%	$ 5,590,000
One Watershed, One Plan Pilots	**% of Private Lands**	**Allocation** ($250,000 + % of Private Lands)

Root River	32%	$	851,301
Yellow Medicine	16%	$	551,712
Lake Superior	7%	$	387,059
Red Lake	23%	$	677,551
North Fork/Crow	21%	$	642,377
Total, 1W1P	100.0%	$	3,110,000

As part of developing the watershed-based funding pilot program, BWSR staff regularly met with an internal staff team (Clean Water Team), local government partners (Local Government Water Roundtable Work Group), BWSR Executive Team, and BWSR Board Committees (Grants Program and Policy and Water Management and Strategic Planning) to discuss the guiding principles, policy, assurance measures, and development of an allocation formula.

The timeframe for developing a pilot program was 9 months from when the legislation passed in May 2017 to the time the funds were appropriated. The pilot program was approved by the BWSR board in December of 2017.

Although the final formula for the pilot program was simple, much work was done by BWSR staff in researching and developing a more complicated formula. Figure 1 illustrates BWSR's vision for how watershed-based funding will grow over time as the number of comprehensive watershed management plans across the state increase. The future amount of available implementation funding will grow over time but the balance between funds available for competitive grants and watershed-based funding will change. The future amount of competitive funds is planned to decrease, which is supported by the Local Government Water Roundtable recommendation that 85% of clean water fund implementation dollars be awarded through a non-competitive process to implement approved comprehensive watershed management plans, and that 15% remain available for competitive grants. This concept was an integral part of the initial allocation discussions, as it provided a basis for determining what the expected amount of funds would be available for plan implementation at the midpoint of the life of the funding from the constitutional amendment. This helped form the basis of an allocation estimate for the pilots that accounted for future funding levels.

Figure 1: Vision for Clean Water Fund Transition

Clean Water Fund transition to
Watershed Based Funding
2018-2029

$120M

$9.75M

| 13% OF STATE COVERED | 28% OF STATE COVERED | 48% OF STATE COVERED | 68% OF STATE COVERED | 88% OF STATE COVERED | 100% OF STATE COVERED |

FY18-19 · FY20-21* · FY22-23* · FY24-25* · FY26-27* · FY28-29*

■ Watershed-based Funding   ■ Competitive Funding

*Projected amounts
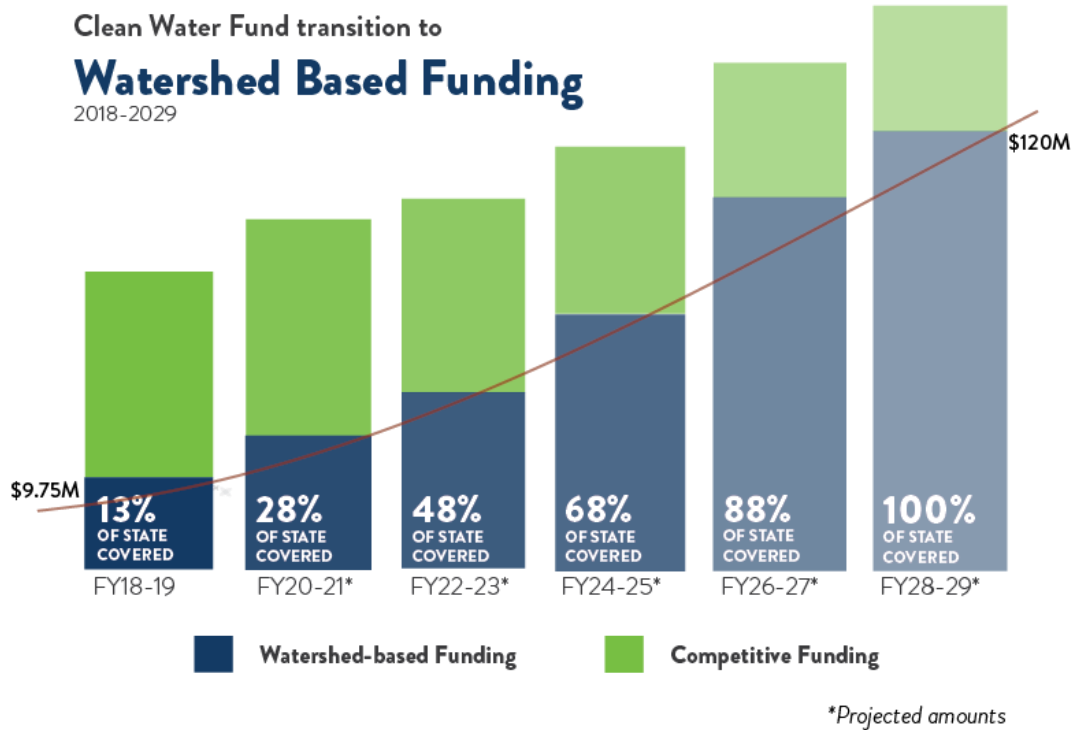
Factors

Many factors could have been included when developing an allocation formula. BWSR staff began by identifying broad categories that would address environmental benefit, available capacity, and equitability. The following six categories were used by BWSR staff to identify potential factors to be included in an allocation formula. These factors needed to have available state-wide data and be representative of the category and criterion under which they were identified (Table 2):

- **Resource Needs/Issues:** Factors that quantify and sort watersheds by the resource issues present that affect water quality.
- **Return on Investment:** Factors that sort watersheds by how great of an impact on water quality the state's investments is likely to achieve.
- **Ability to Pay:** Factors that consider how capable the local government units (LGUs) within a watershed partnership are at generating revenue to collaborate on restoration and protection efforts. This largely relates to population and tax base.

- **Willingness to Implement:** Factors would sort watersheds by the capability of the LGUs involved with conservation to implement restoration and protection projects, and by how closely local water goals align with state water goals.
- **Equitable:** Factors that attempt to normalize the allocation by some common watershed characteristic, such as land area, tax capacity per acre, or the number of local government units involved in conservation work per watershed.

A non-formulaic allocation under which the available funds would be equally distributed among all the watersheds was also considered.

Table 2 – Factors and Data Sources considered, but not limited to, for Pilot Watershed-Based funding allocation formula

Factor	Data Source	Description/Rationale
Soil Erosion Risk	Ecological Ranking Tool http://beaver.nrri.umn.edu/EcolRank/soil-erosion-risk/	The potential for soil erosion is based on a number of factors, including climate, soil type, slope, and slope. These were summarized using factors from the Universal Soil Loss Equation. The Soil Erosion data layer represents a general risk score for potential soil erosion on a 0-100 point scale, 100 being the highest risk.
Water Quality Risk	Ecological Ranking Tool https://beaver.nrri.umn.edu/EcolRank/water-quality/	The risk score for Water Quality ranges from 0-100, with larger values indicating areas that are more likely to contribute overland runoff than smaller values. This risk was defined by two data sources: Stream Power Index and Proximity to Water
Environmental Benefits Index (EBI)	Environmental Benefits Index (EBI) https://beaver.nrri.umn.edu/EcolRank/ebi	This Environmental Benefits Index (EBI) is a composite score of multiple ecological benefits. The score is based on a 0-300 scale, where a score of 300 is most valuable from a conservation perspective. The EBI is the sum of the three independent layers described elsewhere on this site: soil erosion risk, water quality risk, and a wildlife habitat quality layers.
Drinking Water Supply Management Area Vulnerability	Minnesota Department of Health https://www.mda.state.mn.us/protecting/waterprotection/waterprotectionmapping	Drinking water supply management area (DWSMA) vulnerability is an assessment of the likelihood for a potential contaminant source within the drinking water supply management area to contaminate a public water supply well based on the aquifer's inherent geologic sensitivity; and the chemical and isotopic composition of the groundwater.
Phosphorus Risk from Uplands	DNR Watershed Health Assessment Tool https://www.dnr.state.mn.us/whaf/about/scores/water_quality/non_point.html	This metric quantifies the risk of phosphorus mobilization from upland non-point sources.

Factor	Data Source	Description/Rationale
Nitrate getting into surface water	Minnesota Pollution Control Agency https://www.pca.state.mn.us/featured/report-nitrogen-surface-water	Nitrate pollution varies geographically based on soil, climate, geology, land use, and hydrologic alteration. This MPCA report details these factors and models nitrate loads by major watershed across the state.
Watershed Health Score	DNR Watershed Health Assessment Tool https://www.dnr.state.mn.us/whaf/index.html	Watershed Health Scores are calculated to show patterns of health within each of the five components for the state of Minnesota. Using a consistent scale of 0 (least healthy/red) to 100 (best health/green), the health scores compare and contrast ecologically significance relationships across the state.
Total Lake and Stream Density Per Watershed	DNR Data layers	Total area of waterbodies per area of watershed.
Biologically Significant Areas	Minnesota Department of Natural Resources https://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html	A biodiversity significance rank is based on the presence of rare species populations, the size and condition of native plant communities within the site, and the landscape context of the site
Nonpoint Funding Plan Strategies	MPCA Impaired Waters Data Layer	Protect those waters at greatest risk of becoming impaired, restore those waters that are closest to meeting State water quality standards, restore and protect water resources for public health and public use, including drinking water.
Dollars budgeted/unit of conservation applied or pollutant reduction	eLINK	This is a measure of the cost efficiency of pollutant reduction on a per-unit basis.
Dollars budgeted/% of plan to be implemented	Local Data	This is a measure of the cost efficiency of the comprehensive watershed plan under consideration.
Dollars budgeted for local FTEs dedicated to plan implementation	Local Data; eLINK	This is one way to quantify the LGU capacity to implement the comprehensive watershed plans
Normalized net tax capacity	Data not available – Currently does not exist by watershed boundary state-wide; data are available within the Metro.	Tax capacity is a proxy for the LGU's ability to raise local funds to implement conservation.

Factor	Data Source	Description/Rationale
Population Density	Minnesota Department of Natural Resources	Mean population estimate for 2030 per sq. mi per watershed
LGU dollars budgeted for local FTEs dedicated to plan implementation	eLINK	A proxy measurement of LGU capacity to implement
Fund 1W1P priorities that overlap with local water plan priorities	Local water plans/BWSR	An indication of a watershed's priorities relative to state conservation priorities
LGU's job approval authority from NRCS	NRCS	A proxy measurement of LGU capacity to implement; NRCS Job Approval Authority indicates the experience and competence of conservation professionals in design and construction of practices.
Fund 1W1P priorities that overlap with state 25% x '25 priorities	BWSR	An indication of a watershed's priorities relative to state conservation priorities
Number of LGUs in watershed	BWSR	The number of LGUs that would need to be funded within the watershed area
Dollars requested for implementation in plan	BWSR	Estimated cost of plan implementation.
Acres of Public versus Private Lands	DNR GAP Stewardship Assessment Layer	Privately held land is where most conservation provided by local governments is targeted and creates the tax base for local governments.
Watershed Size (acres)	BWSR 1W1P Planning Boundaries Layer	Area is one way of comparing relative need between otherwise-diverse watersheds across the state.
Equal distribution to all watersheds	None needed	Available funding distributed equally among eligible watersheds.
Minimum equal base allocation	None needed	Divide allocation for watershed-based funding equally amongst watersheds regardless of the watershed size, characteristics, or demography.

Narrowing the Options

Using the factors identified in Table 2, BWSR staff reviewed watershed characteristics factor that would lead to an equitable allocation, watershed conditions factor that reflects resource needs and issues, and demographic factor that could indicate the ability for an area to pay. Through this review, and in consideration that complex formulas may provide a false sense of precision, BWSR staff found that selecting only a few meaningful data sources could give a complete sense of the resource need, capacity to implement conservation work, and remain equitable. However, narrowing those factors down is a time-intensive and difficult process as there are many choices to consider.

To meet the directive to use a factor that resulted in an equitable allocation, watershed plan area was selected as a factor. The rationale behind this factor is that land area is a characteristic common to all watersheds that does not require prioritization between landscape characteristics such as dominant land use or relative quality of local water bodies. To meet the directive to identify a factor that inferences the ability of a watershed area to generate local dollars for water management, BWSR staff selected privately held land within the watershed as a factor. The rationale behind this factor is based on the fact that approximately 76% of Minnesota land is privately held.[4] Privately held land is where most conservation provided by local governments is targeted and also creates the tax base for local governments.

In consideration of factors to result in equitable allocation and in order to develop more specific options for consideration, BWSR staff selected natural resource indexes that have been developed by state agencies or academic institutions when considering resource factors. The rationale behind this choice was based on the premise that while Minnesota has a lot of different data that has been collected and compiled, using a source of information that has already been reviewed and is maintained by a state agency provides a transparent data source and has a higher likelihood that the most up to date data will be used over time.

Basins or Watersheds

Minnesota is a diverse state in terms of landscapes and water resources. For example, northeastern Minnesota faces very different water resource issues than southwestern Minnesota does. In attempt to account for these geographic difference, BWSR staff also discussed if dollars should first be allocated by major river basin or directly to a watershed planning area. The motivation for looking at major river basins first was to account for the different resource issues across the state. By first allocating to river basins based on resource issues, a second allocation could be made to the watersheds within each basin allowing for comparison between similar resource issues.

Allocation Options

BWSR staff came up with six different scenarios during the pilot process.

Option 1: Two-tiered allocation. First allocate to basins based on Resource Needs/Issues, then to plan areas based on percent watershed area within the basin and percent private lands.

The first, state-wide allocation would be made at the major river basin scale using MNDNR's Watershed Health Assessment Framework's water quality index (see Definitions for more information). After the

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[4] https://www.dnr.state.mn.us/aboutdnr/publiclands/index.html

basin allocations were made, the watershed planning areas in each basin would receive a portion of their basin's allocation based on the total size (acres) of the watershed planning area, and based on how much private land (acres) is held within the watershed planning area. The weights of the second allocation factors were not recommended.

Option 2. Allocate to plan area directly by Resource Needs/Issues reflected in Nonpoint Priority Funding Plan.

The Clean Water Accountability Act requires BWSR to prepare a funding plan for how Clean Water Funds are used to address nonpoint source pollution and to consider "water quality outcomes, cost-effectiveness, landowner financial need, and leverage of nonstate funding sources". The result of that planning effort, the Nonpoint Priority Funding Plan (NPFP), was first published in 2016 and updated in 2018. Incorporating the input of leadership from the state agencies involved in protection and restoration of Minnesota's waters, the NPFP set three high-level state priorities for programs and activities funded by the CWF:

- Restore those impaired waters that are closest to meeting state water quality standards
- Protect those high-quality unimpaired waters at greatest risk of becoming impaired
- Restore and protect water resources for public use and public health, including drinking water

These priorities reflect BWSR's commitment to funding both restoration of impaired waters as well as protection of currently unimpaired waters, rather than solely focusing on restoration of impaired waters to meet Total Maximum Daily Load (TMDL) requirements. This is important because those areas where land use has been altered less, such as the largely-forested northeastern region, need support to keep those waters from becoming impaired.

The allocation under this option would be made to watershed planning areas directly based on an index created with the Watershed Assessment Tool, a GIS-based tool created at the University of Minnesota (see Definitions). Watershed planning areas would be ranked using landscape information relating to the high-level state priorities stated in the Nonpoint Priority Funding Plan, specifically drinking water supply vulnerability management areas, nitrogen yield, and row crops locations across the state.

Option 3. Allocate to plan areas directly by watershed area and private lands.

The allocation would be made to watershed planning areas directly. Half of this allocation would be based on the total size (acres) of the watershed planning area, and half of it would be based on how much private land (acres) is held within the watershed planning area. Larger total watershed area and more private land ownership would correspond to a greater allocation.

Option 4. Two-tiered allocation. First allocate to basins based on major river basin area and private lands, then to plan areas based on Resource Concerns/Issues.

The first, state-wide allocation would be based half on the total size (acres) of the major river basin area, and half on how much private land (acres) is held within basin. The secondary allocation within the basin would be made using MNDNR's Watershed Health Assessment Framework's water quality index (see Definitions for more information). The watershed index score would be used to determine how much

each watershed planning area would receive from the basin-wide allocation: a higher watershed score would indicate better current water quality, so those watersheds with the lowest scores (and worse water quality) would receive the most funding.

Option 5. Allocate equally to all plan areas.

Each plan area would receive an equal share of the total funding regardless of any other factor.

Option 6. Allocate based on actual implementation budgets pro-rated up to the amount of available funds.

Allocation would be based on a watershed partnership's budget to implement the goals laid out in the comprehensive watershed management plan as a proportion of total, state-wide implementation budget.

Further Narrowing

Allocation based on the WHAF water quality index was not considered for the pilot to avoid comparing and ranking regionally distinct resource concerns across the state, such a focus on protection of relatively pristine waters in Northeast Minnesota against work on restoring waters impacted by nutrient and sediment pollution in Southern Minnesota. This question of prioritizing restoration of human-impacted waters versus protection of relatively unimpacted waters is a recurring theme in deciding how to approach allocation of state resources. In addition, the MNDNR developers of the WHAF had expressed some initial hesitation when consulted regarding the use of that index to allocate funding since that was not the original intent of the WHAF. Due to time constraints, further investigation of the WHAF as an option was put on hold.

Staff also decided that, while it would be a simple and unbiased method, an equally-distributed allocation was not justifiable due to the highly variable needs and sizes of watersheds across the state.

Pilot Allocation

A. A conservative estimate of $36M in future available funding was used for the pilot. This figure is conservative because it was consistent with the 2017 Clean Water Council 10-year vision (generally 20-30% of CWF annually to Watershed-Based funding). Additionally, this only accounted for CWF 'implementation' funds, as opposed to the other funds and activities accounted for in the Local Government Water Roundtable's estimate.
B. An assumption that all funding areas would have comprehensive watershed management plans by FY28-29. This includes the 7 Metro counties and 60-63 1W1P areas.
C. In order to provide for stable funding for the Metro throughout the process of bringing an increasing portion of the state into the 1W1P program, the fiscal projection for the FY 22-23 Biennium (~$18.5M), when approximately half of the state will be covered by comprehensive watershed management plans, as well as the 9-year average proportion of CWF Competitive Grant requested by the Metro (33%) were used to calculate a target pilot Watershed-Based funding grant amount for the Metro. The recommendation provides for an average biennial grant of about $519,000 for 1W1P pilots and about $872,000 for distribution within each of the seven metro counties.

D. Provide an equal base allocation of $250,000 per biennium

This simple formula met BWSR's goal of an equitable distribution of funds for the pilot program but does not include any factors based on resource need or priority. In addition, it should be considered that, as with any funding allocation, some recipients are disadvantaged by the process. For instance, Ramsey County in the Metro is a small, but highly developed urban area. Planning and construction of best management practices or capital improvement projects is very expensive, but given its small footprint, Ramsey County received at least 40% less CWF dollars than any other metro county. Similarly, among the 1W1P pilots, Lake Superior North received significantly less funding than the other pilot areas as a result of the private land criterion. While the base allocation partially alleviates these disparities, and the goal is not to achieve equal distribution of grant funds, these impacts should be noted.

Definitions

'One Watershed, One Plan' Areas (also referred to as Watershed Planning Areas) – As stated in the One Watershed, One Plan Guiding Principles, for locations outside of the seven-county metropolitan region, plan areas are based on the state's delineated 8-digit hydrologic unit code (HUC-8) watersheds. http://www.bwsr.state.mn.us/planning/1W1P/1W1P_Guiding_Principles.pdf

Watershed Assessment Tool – A prioritization tool developed by the University of Minnesota used to assess 1W1P areas based on criteria specific to the major watershed basin (Red River, Rainy River and Arrowhead, Upper Mississippi, St. Croix, Minnesota River, Southeast, and Southwest Minnesota) in which they are located.   This tool was used in the One Water, One Plan Transition Plan created by BWSR in 2016.

https://www.leg.state.mn.us/docs/2016/mandated/160582.pdf

Watershed Health Assessment Framework (WHAF) – A mapping interface created by MNDNR that incorporates state-wide natural resource data from state, university, and national databases into a variety of watershed indices based on five components of watershed health: hydrology, geomorphology, biology, connectivity, and water quality. The water quality score health considered for use in creating the WBF allocation is assigned using the following indices:

- Water quality assessments. This index uses chemical and biological-indicator water quality assessments conducted by the MPCA to determine the percentage of water bodies within each watershed which do not meet water quality standards.
- Non-point source pollution. This index uses estimates of both agricultural and urban non-point source pollution to reach a score for each HUC-8 watershed. Agricultural inputs are estimated using chemical and nutrient application rates per watershed, and urban inputs are estimated using the total impervious land cover area and amount of land within 200 meters of a stream within each watershed.
- Localized pollution sources. This index uses six pollution sources to give a localized pollution score: registered animal feedlots with more than 50 animal units, MPCA-identified potential contaminant sites (such as air pollution sources, solid waste dumps, and petroleum tank leak sites), superfund sites, wastewater treatment plants, septic systems, and open pit metal mines.

Using these three indices, a combined water quality health score is reached for each of the state's 81 major watersheds.

Water Quality Component Mean Health Score

https://www.dnr.state.mn.us/whaf/about/index.html
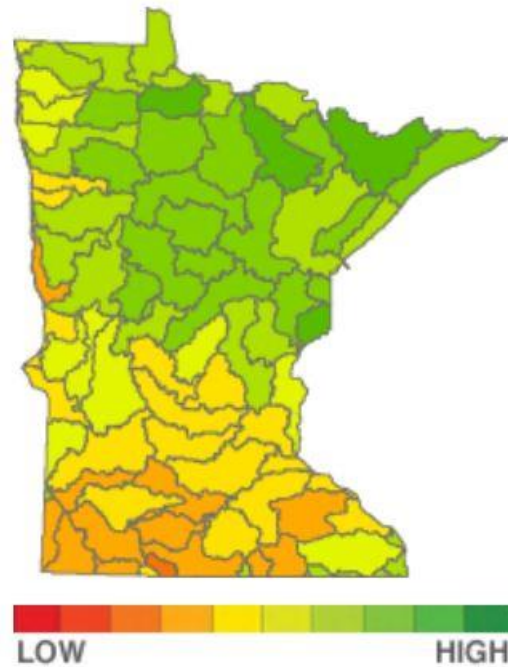
Ecological Ranking Tool and Environmental Benefit Index (EBI)

This tool was developed in 2011 by BWSR in partnership with the University of Minnesota. The Environmental Benefit Index (EBI) was meant to help prioritize land for CRP enrollment based on GIS layers estimating soil erosion risk, water quality risk, and wildlife habitat quality. The soil erosion risk estimate is made using a modified Universal Soil Loss Equation (USLE), based on soil and slope characteristics. The water quality risk is based on Stream Power Index (SPI), which measures erosivity of overland flow using a parcel's land slope and drainage area, as well as the parcel's proximity to water bodies. The wildlife habitat quality layer is comprised of several GIS layers and models estimating the biodiversity of parcels statewide.

https://beaver.nrri.umn.edu/EcolRank/

DNR Gap Assessment Project (GAP) Stewardship Dataset

This landcover inventory, last updated in 2008, was undertaken to provide land ownership information for the USGS Gap Analysis Project to identify gaps in biodiversity protection. Ownership is determined at a 40-acre resolution, with ownership of each quarter-quarter section assigned to the majority land owner, e.g. MNDNR, National Forest Service, or Private Landowners.

http://www.mngeo.state.mn.us/chouse/land_own_general.html

Drinking Water Supply Management Area Vulnerability

This is an assessment by the Minnesota Department of Health (MDH) of the vulnerability of Drinking Water Supply Management Areas (DWSMAs) to be contaminated. The web mapping application of this data is hosted by the Minnesota Department of Agriculture (MDA).

https://www.mda.state.mn.us/protecting/waterprotection/waterprotectionmapping

NRCS Job Approval Authority

As a way to balance the need for safe, durable, and efficient structural work with a limited number of Professional Engineers, the Natural Resources Conservation Service (NRCS) grants approval for local conservation professionals who are not Professional Engineers to design and implement conservation practices and structures pending NRCS training, experience, and demonstrated competence.