LOCALLY DRIVEN WATERSHED RESTORATION

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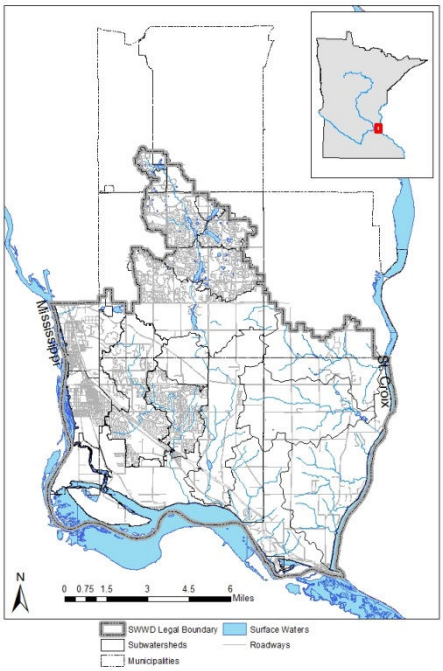
ABSTRACT

In an increasingly complex regulatory environment, it is easy to lose organizational focus on local goals and missions and get caught up in checking boxes for permit requirements. That makes it increasingly important to coordinate and galvanize cross-jurisdiction efforts to achieve common goals. The South Washington Watershed District fills that role. By identifying and filling planning gaps, maintaining a focus on implementation, and routinely assessing progress, the District is able to move everyone toward their shared goals in a cost-effective manner while other local and state agencies take the lead on fulfilling permit programmatic requirements. The success of this approach has repeatedly proven successful for the District and is discussed here in the context of District led restoration efforts for Colby Lake.

INTRODUCTION



The Minnesota Watershed Act, MSA103D, authorizing Watershed Districts was passed in 1955. Established as local, special-purpose units of government, Watershed District boundaries follow those of a natural watershed. Once typically established for flood control or drainage improvement, Watershed Districts are now increasingly focused on water quality issues, particularly in the Minneapolis, St. Paul metropolitan area. The South Washington Watershed District (SWWD) is no different. First established in 1993 for the primary purpose of addressing inter-community flows and flooding concerns, SWWD's focus has grown to include protection and restoration of water resources. SWWD (Figure 1) covers approximately 110 square miles at the confluence of the Mississippi River and the wild and scenic St. Croix River. The District includes portions of two major watersheds (Mississippi and St. Croix Rivers) encompassing 12 lakes and over 120 miles of piped and natural streams.

Figure 1: South Washington Watershed District

REGULATORY FRAMEWORK

The SWWD, like many local agencies, is faced with an increasingly complex stormwater regulatory environment and overlapping responsibilities across jurisdictions. SWWD is itself a non-traditional regulated MS4. Additionally, SWWD is overlapped by several other MS4s including 7 municipal MS4s, a County MS4, and Minnesota Department of Transportation MS4. Each of these MS4s has their own permit and operates their own programs all of which are legally required to have the same basic components.

Reflecting the overlapping MS4s are overlapping landuse authorities. Several entities play a role in landuse planning, rulemaking, and permitting within the District including municipalities, County, and SWWD. Additionally, several regional and statewide agencies exert planning and development approval authority over the local agencies, including the Metropolitan Council, Department of Natural Resources, Minnesota Pollution Control Agency, and others. Typically, that regional and statewide influence is expressed in the form of planning and program requirements. Within the SWWD are several required planning documents all in some way pertaining to water resources including SWWD's Watershed Management Plan, multiple MS4 Stormwater Pollution Prevention Plans, Municipal Local Surface Water Management Plans, Municipal Non Degradation Plans, Alternative Urban Areawide Review Plans, and County Groundwater Plan.

On top of the layered regulatory framework is the Minnesota Pollution Control Agency's (MPCA) new watershed approach for managing impaired waters. Beginning in 2008, MPCA now assesses waters and develops TMDLs or protection plans on a 10 year cycle. It is MPCA's intention to incorporate existing local plans and efforts into one larger TMDL or protection strategy. How they will accomplish that goal remains unclear. Regardless, it sets up a system where one size fits all regulation through State permits is the primary resource management tool. Further, this new approach does not fill the primary gap in the existing planning/management framework—implementation. While a completed TMDL or protection plan will identify pollutant loading reductions and potential strategies for achieving them, they offer little in the form of identifying specific practices or projects. And because local agencies must increasingly devote their limited funding toward meeting regulatory programmatic requirements there is little funding left to devote toward resource specific management.

In sum, SWWD is one layer in an increasingly complex, overlapping landuse and resource management framework with a focus on process and programs resulting in duplication of efforts and limited implementation. In this increasingly complex regulatory environment, it is easy to lose organizational focus on local goals and missions and get caught up in checking boxes for permit requirements. Thus, it is increasingly important that someone act as liaison to coordinate cross-jurisdiction efforts to achieve common goals. The South Washington Watershed District fills that role. By identifying and filling planning gaps, maintaining a focus on management and implementation rather than regulation, and routinely assessing progress, the District is able to move everyone toward their shared management goals in a cost-effective manner while other local and state agencies take the lead on fulfilling regulatory permit and programmatic requirements.

SWWD MANAGEMENT APPROACH

SWWD's uses a standard adaptive management approach (Figure 2) that coordinates and draws from the efforts of other agencies in the District. What sets SWWD apart is that adaptive management drives regulation, not vice versa. SWWD operates an extensive monitoring program in cooperation with its Cities, County, and Soil and Water Conservation District. Long term data collected at lakes and streams throughout the District is used to characterize resource health and identify trends. It is also used to develop and calibrate hydrology and water quality models. Those modeling efforts are then the basis for

(1) resource specific management plans which identify necessary pollutant load reductions to restore or maintain water quality and (2) to drive watershed retrofit analyses that systematically identify the most cost effective projects or practices to achieve the necessary pollutant reductions. Those projects are then pursued through SWWD's various implementation tools including regulation, cost share, capital improvement, and coordinated capital improvement (grants for City capital improvement projects) programs. Following implementation, progress is monitored, models adjusted as necessary to reflect new understanding of the resource and retrofit analyses are revised or repeated.

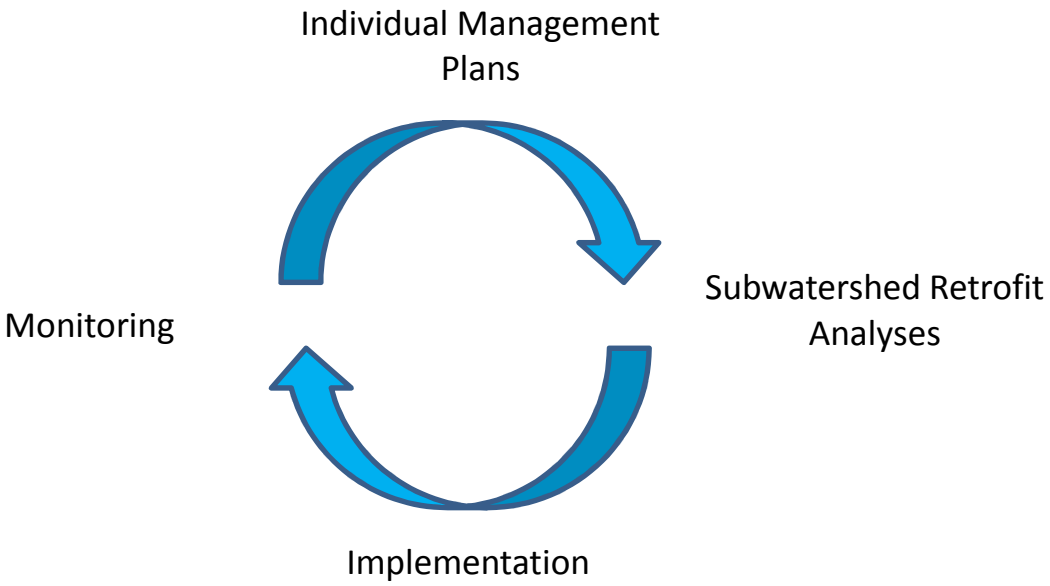


Figure 2: Generalized SWWD Management Framework

COLBY LAKE

In the center of Woodbury, Colby Lake (Figure 3) is a shallow, 70-acre lake that is part of the SWWD's Northern Watershed. The lake receives water from Wilmes Lake to its north and contributes water downstream to Bailey Lake. The total drainage area into Colby Lake is 10.6 square miles, 6.3 of which drain through Wilmes Lake. The watershed is currently landlocked for all but the rarest precipitation events, terminating at a series of regional infiltration basins south of Bailey Lake.

Lying in the center of one of Minnesota's fastest growing cities, water quality at Colby Lake has long been a concern. Water quality has been monitored by various agencies since 1994 and that monitoring continues today through SWWD. In 2006, Colby Lake was listed as impaired for excess nutrients. Although there is variability from season to season, phosphorus concentrations in the lake are consistently far over the State standard of 60 ug/L for shallow warm water lakes. Similarly, chlorophyll-a concentrations and water clarity measurements have consistently fallen outside State standards. These conditions have made Colby Lake unsuitable for many native species, promoted invasive vegetation, and limited recreation opportunities.

Colby Lake is reflective of the layered regulatory framework typical in the District. It is managed by SWWD, City of Woodbury, and Minnesota DNR. Land use in the Watershed is managed by SWWD, City of Woodbury, Washington County, and Metropolitan Council. This regulatory framework is effective at maintaining existing water quality of the lake, but does not progress toward restoration on its own. To fill that gap, SWWD initiated development of a lake management plan in 2010, outside of the State's TMDL process. Using an existing watershed wide hydrology model, SWWD developed a water

quality model for Colby Lake and its watershed, established hydrology and nutrient loading balances, and identified necessary loading reductions for restoration. To restore Colby Lake, phosphorus loading needs to be reduced from the immediate watershed by 55 kg/growing season, from upstream sources by 70 kg/growing season, and in lake sources by 30 kg/growing season.

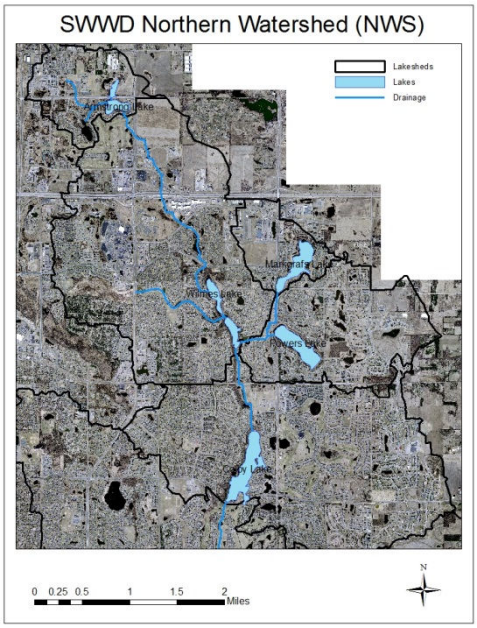


Figure 3: Colby Lake watershed

Subsequently, SWWD and the Washington Conservation District initiated a sub-watershed retrofit analysis. Using the Colby Lake/Watershed water quality model to identify high loading catchments, we then systematically identified BMP retrofit opportunities. The analysis process is adapted from the Center for Watershed Protection's Urban Subwatershed Restoration Manual series. The protocol provides a sufficient level of detail to rapidly assess watersheds and catchments of variable scales and land uses. Protocol processes consist of retrofit scoping, desktop analysis, retrofit field reconnaissance investigation, cost/treatment analysis, and catchment ranking. The 62 catchments of the Colby Lake subwatershed, and their existing stormwater management practices, were analyzed for annual and seasonal pollutant loading. 18 of the 62 catchments were selected and modeled at various levels of treatment efficiency. These 18 catchments are considered to have best potential for retrofit benefit within the Colby Lake subwatershed due to their close proximity to the lake and the limited treatment practices in place within these catchments.

The identified catchments were then examined for retrofit BMPs including: Iron-enhanced Sand Filters on existing stormwater ponds, Neighborhood Bioretention, Pond Outlet Modifications, and Vegetated Swales. BMPs were then modeled for expected water quality benefit and ranked by cost effectiveness. Cost factors include promotion, design and installation and annual O&M. Of the top 10 projects identified, total term costs (30-year) range from $232-$3900 TP kg/yr. The resulting management plan and retrofit reports provide a restoration goal and a plan to get there.

SWWD is currently implementing that plan primarily through voluntary partnerships with other agencies and private landowners. Having a clear goal and a plan to get there provides a start to conversations with potential partners who all share the same goal—restoring Colby Lake. Until now, partners did not have a clear understanding of what needed to be done to achieve that goal. In the case

of Colby Lake, those conversations resulting in better BMPs than were even identified in SWWD's reports. The key to implementing those BMPs was a willingness to share credit for the successes. The willingness to share credit is important for regulatory purposes (i.e. complying with MS4 permits), but more importantly it gives everyone a good public relations story and encourages ongoing collaboration.

With a clear understanding of the Lake's water quality dynamics and a mutual goal, we were able to leverage programmatic efforts of the various overlapping jurisdictions and coordinate implementation with planned capital improvement projects (i.e. road projects).

Implementation began with installation of two dozen raingardens through the Colby 1st Neighborhood on the West side of the lake. The raingardens were constructed in City right of way with new curb inlets that direct street runoff into the gardens. Structures were installed as part of a City road reconstruction project. As part of that same reconstruction project, the District helped the City fund several retrofits, including street narrowing to reduce impervious area, installation of sump structures, and modification of poorly functioning ponds. The success of the partnership on this first project changed how water quality improvements are incorporated into capital improvements. Now, rather than discussed on the back end of project development as part of a regulatory discussion, improvements are developed along with the larger project itself. This new approach led to the largest and most beneficial project to date.

During planning for reconstruction of a County highway that runs along the East side of Colby Lake, the County and City actively worked to incorporate identified improvements into the project. However, they found that even more could be done. Instead of installation of several sand-iron filters in existing ponds, the project grew to include two golf course water reuse systems. The two systems provide more than double the treatment that would have been required for the road project, reduce groundwater pumping for irrigation by 40 million gallons per year, help fully achieve the necessary load reduction for the immediate Colby Lake watershed, and resulted in widespread publicity throughout the metropolitan area.

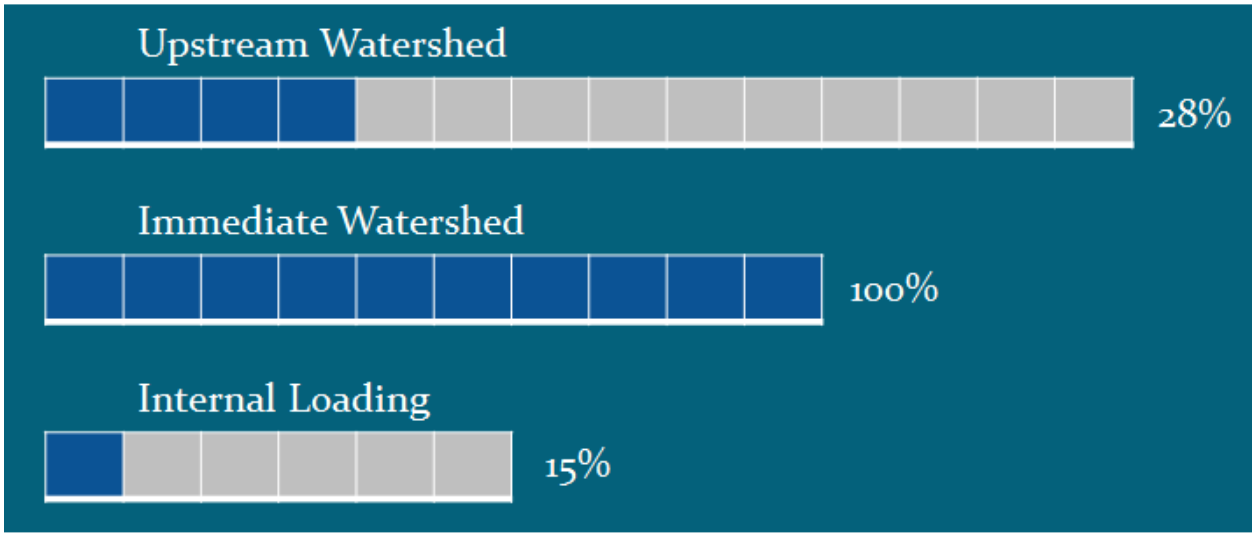


Figure 4: Load reduction progress to date.

Through targeted neighborhood stormwater retrofits, large scale stormwater reuse systems, and several smaller projects, the District and its partners have reduced phosphorus loading to Colby Lake by over 75 kg/summer growing season which represents over 50% of the load reduction necessary to restore the lake. That reduction includes all of the necessary load reduction for the immediate Colby Lake watershed (figure 4). The reduction has been achieved over the course of 3 years which compares very

favorably to the 10 assessment/planning/implementation timeline typical of the State's TMDL process and has been achieved in a manner that does not add yet another layer of regulation. Additional collaborative projects are currently being planned in upstream areas, including additional roadway retrofits, and campus wide retrofits on two 100 acre commercial properties. Once complete, we expect to have met the necessary upstream load reduction to restore Colby Lake.

CONCLUSION

Regulatory burden on local governments can distract from effective management and take essential resources away from protection and restoration efforts. Local agencies must keep focus on its own mission and goals and increasingly coordinate efforts and resources with other jurisdictions. Staff and agencies must build in funding flexibility which allows for extensive coordination with overlapping jurisdictions, maintain focus on local missions and goals, and not be afraid to share or give up credit for successes.