

## **ACHIEVING MULTIPLE OBJECTIVES THROUGH A SINGLE WATERSHED PLAN**

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The prevalence and effectiveness of using a watershed approach to water resource management has resulted in “watershed planning” requirements or recommendations in a wide range of individual Federal, State and local programs to restore and protect water resources. Many of these individual programs envision the same basic elements to a watershed plan. However, achieving the particular goals and objectives of each individual program through a watershed plan may not result in a plan that meets requirements of other programs. The Rouge River National Wet Weather Demonstration Project (Rouge Project) has attempted to identify the requirements of a generic comprehensive watershed management plan to meet multiple program objectives. Those program requirements need to be balanced with stakeholder goals, objectives, and available resources.

The Rouge Project in Southeast Michigan is a working example of how a systematic watershed approach to pollution management can result in cost-effective and ultimately greater and faster achievement of designated uses in a water body. In addition, multiple program objectives are being achieved through the development of comprehensive watershed management plans. The Rouge Project has expanded from a program to build and evaluate alternative approaches to control combined sewer overflows (CSOs) to a comprehensive watershed-based pollution abatement initiative. The Rouge River Watershed is largely urbanized, spans approximately 438 square miles and is home to over 1.5 million people in 48 communities and 3 counties.

The Rouge Project has spent considerable effort to build institutional and regulatory frameworks necessary to accommodate a watershed approach to wet weather pollution management. Part of this framework is a watershed-based general permit for municipal storm water discharges issued under the National Pollutant Discharge Elimination System (NPDES) program. This storm water permit program was developed jointly by the Rouge communities and the Michigan Department of Environmental Quality (MDEQ) and is based on the concept of cooperative, locally-based watershed management. Communities and agencies in over 95 percent of the watershed have applied for coverage under this innovative, watershed-based permit program. The MDEQ permit requires permittees to participate in watershed management planning for a self-determined subwatershed unit. The subwatershed management plans form the basis for implementing watershed goals and objectives that will result in achieving water quality standards. The Rouge communities will also use these watershed management plans to achieve other program objectives, such as those under the federal TMDL program and the state Clean Michigan Initiative.

This paper identifies what the Rouge Project has found to be the elements of a “comprehensive watershed management plan” which will achieve multiple program objectives. The paper presents information on the implementation of the comprehensive watershed management plans to meet the

elements of individual water resource management programs. It discusses the challenges and successes of the overall effort. Finally, the paper discusses the flexibility that can result from using the watershed approach in addressing CSO controls, SSO controls and other issues. This information will be useful to other geographic areas in their development and implementation of comprehensive watershed management plans.

Although the early focus of the Rouge Project was on the control of CSOs in the older urban core portion of the watershed, monitoring data collected by the Project showed that many pollution problems stem from a lack of coordinated storm water management and non-point source pollution upstream of CSO discharges. As the concerns expanded to sources of pollution in the upper portion of the watershed above the CSO discharges and the water quality improvement focused more on the watershed-wide approaches, the lack of a defined regulatory framework to address storm water pollution and diffuse sources of non-point pollution became a major obstacle to further progress in improving water quality and restoring beneficial uses to the Rouge River. Rouge communities believed that a general storm water permit would be an alternative regulatory mechanism that would provide incentives for watershed management and improve water quality.

Beginning in 1995, the Michigan Department of Environmental Quality (MDEQ), the Rouge Project and the communities in the Rouge Watershed jointly developed an innovative, watershed-based NPDES general permit (“General Permit”) for municipal storm water discharges which was issued on July 31, 1997 (MDEQ, 1997). This collaborative process was outlined in a report “Adapting Regulatory Frameworks to Accommodating Watershed Approaches to Storm Water Management” (Fredericks, et al., 1997) The General Permit incorporates the following elements:

General:

- Coverage will be voluntary until the permits under the USEPA Phase II storm water are required (note that USEPA has endorsed Michigan’s proposal to use the Voluntary General Storm Water Permit in lieu of permits that would otherwise be required by the Phase II regulations) ;
- Only public agencies who own, operate, or control storm water are provided the opportunity for coverage;
- Subwatershed size is established by the potential permittees during the application process, and,
- Application and permit process have limited required actions, the focus is to establish desired outcomes.

Requires permittee to develop:

- *Illicit Discharge Elimination Plan (IDEP)* that has the goal of eliminating raw sewage discharges and includes addressing failing septic systems and improper connections of sanitary sewers to storm drains and open waterways. The IDEP is due at the time of permit application.
- *Public Education Plan (PEP)* designed to inform residents and businesses what actions they should take to protect the river. The PEP is designed to inform residents and businesses what actions they should take to protect the river. The PEP is due at the time of permit application.
- In cooperation with others, a *Watershed Management Plan* to resolve water quality concerns which includes: short and long-term goals for the watershed, delineation of actions needed to achieve the goals, estimated benefits and costs of management options, an opportunity for all stakeholders to participate in the process. The Watershed Management Plan is due two years after the certificate of coverage is issued to the applicant.

- *Storm Water Pollution Prevention Initiative (SWPPI)* which includes evaluation and implementation of BMPs to minimize impacts of new development and redevelopment. The SWPPI is a subset of the Watershed Management Plan and is due 2.5 years after the certificate of coverage is issued to the applicant.
- *Monitoring and Reporting Plan* including schedule for revisions to the Watershed Management Plan.

The subwatershed storm water management plans developed by the communities and other public agencies do not require state approval. However, the individual pollution prevention initiatives emanating from the watershed planning process require state approval as the activities specified in the initiatives become permit requirements upon approval.

A total of 44 communities and agencies who own, operate, or control storm water systems in the Rouge River Watershed have coverage under Michigan's watershed-based General Permit for municipal storm water discharges.

While the basic requirements for what must be in the watershed plan are detailed in the regulations, the permittees within a hydrologic or subwatershed unit are allowed considerable freedom in deciding upon their own priorities, remedial actions and schedules. Pollution prevention initiatives that are expected to be proposed by the communities will likely involve a commitment to continue or expand current activities like soil erosion and sedimentation control; implement new activities to address priority issues such as failing septic systems, and implement regional projects to reduce the frequency and velocity of storm flows in the river.

As stated above, one of the primary goals of the Rouge Project is to demonstrate that an urban river system can be restored and protected using a watershed approach. Currently, the Rouge Project activities are a combination of regulatory requirements and other voluntary activities that are being coordinated by subwatershed. The Project has learned that the use of the watershed approach has emerged as the most cost-effective and logical approach to water resource management. There is a clear inter-relationship of the pollution sources within a watershed that demands an inter-related approach to a solution. Therefore, the heart of the success of a watershed protection and/or restoration effort is the development of a sound watershed management plan for a specific watershed.

The State of Michigan has incorporated watershed planning components into a number of water resource management programs. Four such programs are summarized below.

- **TMDL Program:** Various segments of the Rouge River are listed on the federal Clean Water Action Section 303(d) list for various parameters. The total Maximum Daily Loads (TMDLs) for these segments are not scheduled for completion until approximately 2005. The river will require multiple TMDLs that may result in conflicting implementation strategies in the watershed as a whole. Under the USEPA's proposed TMDL regulations (USEPA, 1999a; USEPA 1999b), use of the watershed approach is encouraged, an approach already being implemented in the Rouge Project.
- **Storm Water General Permit:** Almost all of the communities within the Rouge River Watershed have obtained their Certificates of Coverage (CoC) under Michigan's NPDES General Permit for municipal storm water discharges. One requirement of the storm water General Permit is for each CoC holder to participate in the development of a long-term

comprehensive watershed management plan for a self-determined hydrologic unit. Among other programmatic elements, this plan must identify specific activities each community or agency will undertake during the first permit term toward meeting the goals of the watershed management plan.

- **Clean Michigan Initiative:** In July, 1998, the State of Michigan passed and began implementing its Clean Michigan Initiative (CMI), a \$675 million general obligation bond dedicated to fund projects for “Clean Water, Clean Parks, and Clean Communities.” (State of Michigan, 1998) Funding awards under two categories of grants, the Non-Point Source Pollution Control Grants and the Clean Water Fund, are based on an “approved” watershed management plan.
- **Water Quality Trading Program:** The State of Michigan is in the process of completing its Water Quality Trading Program rules (MDEQ, 1999). Through this program, the trading of nutrients in impaired water bodies (for which TMDLs have not yet been developed) can only occur where an approved watershed management plan has been developed. Unlike other “approvable” watershed plans, the watershed management plan for the trading program must include a “cap” and allocations.

As described previously, the seven subwatershed advisory groups in the Rouge Watershed developed watershed management plans as required under the Michigan storm water General Permit. Obviously it is desirable to develop only one “comprehensive watershed management plan” that will meet stakeholder goals and objectives as well as all applicable program requirements for the above listed four programs and any other programs that emerge. Therefore, the Rouge Project subwatershed management plans have a goal of being comprehensive watershed management plans that will meet objectives of multiple programs. By doing so, both the watershed communities and regulatory agencies will save time, money and effort by having one plan that fulfills multiple objectives. In addition, these comprehensive plans will provide much needed certainty to the communities, counties and other stakeholders in planning for watershed management activities and expenditures.

It is very important to note there is no one methodology to follow in developing watershed management plans. Instead, there are a series of choices to reach the desired endpoint. A watershed plan is a framework for how, where and when management tools will be applied. Innovation is encouraged to reach the goals for restoring/protecting watersheds. Note that the terms “watershed” and “subwatershed” can be used interchangeably.

The elements listed below can be done in sequence or in parallel because they are interrelated and support each other. Use of an iterative approach to setting goals and implementing actions to achieve standards is an integral part of all of the following elements. In defining the elements of a watershed management plan it must always be kept in mind the need to address all sources of pollution and all of the other stressors (i.e. lack of habitat, flow variability, etc.) that prevent the attainment of water quality standards.

1. Establish the subwatershed baseline of necessary information.
2. Define the short-term and long-term goals for the watershed.
3. Identify deviations from goals/target levels.
4. Identify sources of problems.
5. Allocate pollution/stressor reduction responsibilities to ensure allocations will lead to the attainment of the watershed management plan goals including water quality standards.
6. Implement a plan for achieving the goals of the watershed management plan and the TMDL.

7. Define the process for evaluating/assessing the effectiveness of the achievement of the water quality standards and designated uses.
8. Describe the process for modifying and/or revising the watershed management plan based on the evaluation/assessing of effectiveness of the plan in achieving water quality standards and designated uses.
9. Describe the long-term water quality monitoring program to support the watershed management plan.
10. Describe the financial and institutional options and arrangements that will be in place to assist in the success of implementing the subwatershed management plans.

Logic says that watershed plans will need to have a mix of regulatory controls and management actions to manage and control the sources that are impacting the watershed. If these impacts are successfully controlled it is likely to result in attainment of designated uses. The balancing of targeted management actions and controls can direct the combined efforts of point source dischargers, non-point sources and stakeholders to the most serious watershed impacts to effectively manage and control and provide the most favorable basis for considering options. The approach to such prioritization will need to be addressed in a watershed management plan.

Concepts and approaches to phasing of needed controls will need to be explored. For example, as part of a watershed plan, it is feasible to allow the existing NPDES permit limits to remain in place (marking time) while other watershed items take place. This is justified/allowed under present policy and regulations. The key is to use the watershed approach to delineate the full set of items that will occur in the holistic watershed approach that will, if done, achieve designated uses. This includes management actions and controls beyond the chemical-specific effluent limits. The approach that compliance schedules can provide time to develop sufficient information to warrant alternative water quality based effluent limits for a particular permittee can be addressed in a watershed management plan. There may be a need for sequencing of actions/management controls to achieve the designated uses. Issues relating to present water quality standards remaining in full force and effect with full recognition that interim water quality standards are being used in decision-making need to be explored in any watershed management plan.

## **SUMMARY**

Watershed management plans provide an excellent framework to coordinate the numerous regulatory and non-regulatory programs associated with water resources management. Some of the multiple program requirements which can be coordinated through use of a single watershed management plan include (but are not limited to): re-issuance of NPDES permits on a watershed basis, implementation of the water quality trading programs, implementation of the Section 319 non-point source program, development and implementation of the Watershed Restoration Action Strategies envisioned under the federal Clean Water Action Plan, implementation of monitoring programs, and addressing the requirements of the TMDL program. This latter program provides some unique opportunities for using a watershed management plan to meet desired objectives.

The TMDL program is used to address violations of specific chemical standards in specific reaches of rivers. The prevailing TMDL program often will not result in the attainment of water quality standards for that river. As currently defined, a TMDL should address what is causing a non-attainment of a water quality standard and then establish the maximum load of a specific parameter that is causing the non-attainment. TMDLs are site specific and parameter specific. If more than one parameter is in violation of a water quality standard on a reach of river, more than one TMDL must be developed. TMDLs often do not adequately address the physical and biological aspects of restoring a river. A watershed management

plan creates an opportunity to bundle TMDLs, to strike an appropriate balance between controls over discharges and polluted runoff and to consider other water-related problems in the watershed, including wetland loss, sediment contamination, aquatic species habitat degradation, drinking water protection, and health of riparian areas. By having a completed comprehensive watershed management plan with its attendant specification of the amount of pollution or other stressors that needs to be reduced/addressed to meet water quality standards, the plan in effect becomes a TMDL to allocate pollution control or management responsibilities among sources in a watershed. Therefore, upon approval of the watershed management plan by the State and EPA, the plan will constitute an approved TMDL thus preventing the need to do a TMDL on each river segment.

By taking a more comprehensive approach to restoring the health of the aquatic system in the watershed, a comprehensive watershed management plan can result in improvements in environmental conditions that are mutually reinforcing, with higher long-term success rates. Water bodies impaired by polluted runoff in most instances will require a watershed-wide effort to achieve the necessary restoration and clean water goals. Development of a multiple objective comprehensive watershed management plan is also an opportunity to identify and demonstrate innovative approaches to restoring water quality and protecting public health and the environment.

Development of aquatic system restoration strategies on a watershed basis is a chance to meet the existing obligations of the current Clean Water Act and other federal laws in a cost-effective and common sense manner. Nothing in the current law requires a watershed approach to address water quality problems, but federal agencies want to offer incentives to develop such watershed management plans.

A water quality restoration effort on a watershed scale, rather than river segment scale, also offers citizens and other stakeholders better opportunities to participate in a water management process that is understandable and meaningful. Achieving multiple objectives through a single watershed plan is very important to the stakeholders in the Rouge River Watershed for four main reasons. First, virtually all of the over 50 communities and agencies in the Rouge River Watershed that own, operate or control storm water discharges have volunteered for coverage under the General Storm Water Permit, which requires development of watershed management plans. Second, the minimal elements of a watershed management plan have not been defined through any consensus fashion to date. Those elements may emerge over time as more experience is gained nationally in implementing the watershed approach. The Rouge Project has defined those minimum elements. These elements build on the pioneering effort of the Michigan General Storm Water Permit. Third, large portions of the Rouge River do not meet water quality standards and therefore will be faced with the need to develop TMDLs in the very near future. The Rouge Project is showing how a comprehensive watershed management plan will completely fulfill the needs of the TMDL program. Fourth, a successful comprehensive watershed management plan as envisioned will result in restoring the Rouge much faster.

The Rouge Project envisions the comprehensive watershed management plan (tied to the TMDL) to set pollution reduction responsibilities among the identified stressors that are causing or contributing to the non-attainment of water quality standards. This goes beyond doing just a load allocation but addresses all of the stressors causing the non-attainment. The Rouge Project sees this as being on the cutting edge. The Rouge Project will demonstrate to others the advantages and workability of the watershed management approach, its relationship to the TMDL program and the advantages of using this comprehensive approach to restoring water quality.

## **CONCLUSIONS AND RECOMMENDATIONS**

The Rouge Project and others have shown that by holistically addressing all sources of pollution, an effective action plan can be implemented to address impairments and restore river uses. An overall integrated solution that addresses the physical, chemical and biological stressors in a waterway is the most cost effective way to proceed. Without this integration, there is a series of “add on” programs that miss an opportunity to encourage an integrated program that addresses all sources of ecosystem stress in a cost effective, prioritized manner. An integrated approach also facilitates achieving multiple program objectives through a single watershed management plan.

The watershed approach is a new way of doing business by the States and EPA. A locally driven approach requires a sharing of power with the regulatory agencies. Overcoming the command and control philosophy is not easy.

It is important to note that watershed planning and implementation does not just happen. It takes time and effort. One of the main issues the Rouge Project has faced is forging a new regulatory framework and building new institutional relationships. The Rouge Project has learned that local units of government want meaningful self-determination in deciding how to achieve water quality objectives. Increased local accountability garners local support and generates peer pressure. It is also critical to have flexibility and at the same time accountability. It is important to look at the resource, beyond individual dischargers, using a range of indicators.

What does the future hold for the Rouge Project? The project anticipates there being a comprehensive process to truly bring together programs dealing with pollutants such as storm water, CSO, and other sources such as flow and habitat destruction and aesthetics. These processes will require innovative regulatory approaches, workable institutional arrangements and use of the holistic approach. A key item will be to build in accountability for water quality/ecosystem health at the local level.

In conclusion, local communities in southeast Michigan and the state regulatory agency are attempting, for the first time, a consensus-based, cooperative approach to watershed management. The watershed management plan will form the basis for implementing watershed goals and objectives that will result in improved water quality and pollution control. This program implements the watershed approach endorsed by USEPA and others and should facilitate watershed-based integration of control programs for different pollution sources such as storm water and CSOs which may be present with a large, urban watershed. This program empowers local government and their stakeholders in identifying problems, choosing from alternative solutions, establishing priorities and schedules and developing common strategies with neighbors. Communities and others involved in this new program are also addressing issues such as coordination of subwatershed efforts within larger watersheds.

Flexibility and innovation must be encouraged in water resources management. Communities should actively use the watershed approach. The Rouge Project is a working demonstration of the watershed approach to restoring an urban river system. Tangible benefits of this approach are faster environmental improvements; cost savings; achieving multiple objectives through a single watershed plan, and, finally the Rouge River is being restored.

Achieving multiple objectives through a single watershed plan is very important to the stakeholders in the Rouge River Watershed. It is hoped that this effort and the work of the Rouge River National Wet Weather Demonstration Project will continue to identify and quantify the benefits of cooperative, watershed-based efforts to protect and restore our nation’s resources.