

ADAPTING REGULATORY FRAMEWORKS TO ACCOMMODATE WATERSHED APPROACHES TO STORM WATER MANAGEMENT

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ABSTRACT

The early focus of the Rouge River National Wet Weather Demonstration Project (Rouge Project) was on the control of combined sewer overflows (CSOs) in the older urban core portion of the downstream areas of this 113,442 hectare (438 square miles) Rouge River watershed. As a finite number of point source CSO discharges could be identified and responsibility for each defined, the traditional regulatory approach of issuing National Pollution Discharge Elimination System (NPDES) permits mandating corrective action worked relatively well. 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 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.

The focus of this element of the Rouge Project was to design a regulatory framework that encouraged communities with separated sewers in the upper river areas to voluntarily cooperate in a watershed approach to remediation rather than waiting for a mandate from the federal court overseeing the Rouge River cleanup, or for command and controls from state and/or federal regulators. The communities reached a consensus on a draft watershed approach to storm water management under a general permit where communities and public agencies within a watershed are collectively responsible for a watershed plan and individually responsible for actions required to implement the plan. The Michigan Department of Environmental Quality subsequently issued for public notice a statewide, voluntary watershed NPDES storm water permit largely based upon the recommendations of the communities within the Rouge River watershed.

KEY WORDS

Rouge River National Wet Weather Demonstration Project, Storm Water, Watershed Management, Regulatory Framework, NPDES Permits, Nonpoint Source Pollution

INTRODUCTION

The Rouge River National Wet Weather Demonstration Project (Rouge Project) has developed an unique, watershed-wide approach to municipal storm water discharge regulation under the Clean Water Act. The Rouge Project is a U.S. Environmental Protection Agency (EPA)-sponsored effort to manage wet weather pollution to the Rouge River, a tributary to the Detroit River in Southeast Michigan which has been designated as a significant source of pollution to the Great Lakes system. The Rouge River Watershed is largely urbanized, spans approximately 113,442 hectares (438 square miles), and is home to over 1.5 million people in the City of Detroit and 47 other communities in 3 counties (see Figure 1). Virtually all sanitary and combined sewers in the watershed are connected to the Detroit Wastewater Treatment Plant that discharges into the Detroit River, outside of the watershed. Twenty percent of the watershed is served by combined sewers. Separate sanitary and storm sewers serve most of the remaining areas of the watershed with the exception of scattered pockets and outlying rural areas in the headwaters that still have on-site septic systems. Sources of pollution to the river include industrial and municipal point sources, combined sewer overflows (CSOs), storm water runoff, interflow from abandoned dumps, and resuspension of contaminated sediment.

The Rouge River National Wet Weather Demonstration Project in southeastern Michigan began in 1992 with a primary focus on the control of combined sewer overflows (CSOs) (Kaunelis and Neibert 1994). The Rouge River had been identified as one of forty three tributary areas of concern (AOC) in the Great Lakes by the International Joint Commission Water Quality Board in 1985. A remedial action plan (RAP) documenting water pollution problems and proposing corrective actions was prepared for the Rouge River in 1989 and updated in 1994. The Rouge River RAP cited the remediation of the CSO discharges in the combined sewer area of the lower watershed as a priority, but also recognized the importance of controlling sources of pollution emanating from non-point and storm water discharges in the upper watershed served by separate storm and sanitary sewers, and on-site septic systems (Bean, Schrameck and Davidson, 1994). One work element of the Rouge Project was implementation of the priority recommendations of the Rouge River RAP (Murray, 1994).

The first water quality sampling under the project began in 1993 and by the end of 1994 a supporting geographic information system and modeling effort was in full operation with baseline, automated water quality monitoring sites located throughout the watershed (Mullet, Bristol and Koleda, 1994). The initial sampling, later confirmed during subsequent sampling in 1995 and 1996, documented significant pollution problems in the Rouge River watershed upstream from the CSO discharges. State water quality limits for bacteria and dissolved oxygen were regularly exceeded even in dry weather periods in the upper watershed and highly variable flows caused flooding, exacerbated bank erosion and increased sedimentation that affected the lower river. This information confirmed the suspicions of many that the discharges from separated storm systems in heavily urbanized areas can be significant sources of pollution including fecal coliform bacteria. A similar urban watershed, the Charles River in Massachusetts, was documented to have bacteria contamination problems upstream of CSO discharges most likely attributable to storm sewers and/or non-point sources (Taylor and Gerath, 1996).

At the urging of the federal court overseeing the cleanup of the Rouge River (United States, et al. v. City of Detroit, et al. Case No. 77-71100), one of the first efforts of the Rouge Project was an independent study of financial and institutional arrangements for funding and implementing water pollution controls in the Rouge River. This study was completed in August of 1994, and recommended that the project expand considerations from combined sewer overflow issues to watershed-wide sources of pollution, including storm water from separated sewer systems in the newer suburbs (Murray and Bails, 1994). In March of 1995, a storm water management strategy for the Rouge River was presented to the Rouge Project Steering Committee and later to the elected leadership of the communities. The strategy was designed to develop a practical approach to reduce the water quality impacts of storm water discharges to the Rouge River through the application of watershed-wide management approaches.

The storm water strategy had six major elements: develop a baseline monitoring program; target investigations in identified problem areas; fund demonstration and pilot projects to remediate pollution sources and reduce flow variability; document institutional options and legal impediments to watershed-wide approaches; propose incentives to encourage voluntary participation by communities and other public agencies; and, adopt a plan for short term actions and iterative steps leading to comprehensive, watershed-wide storm water management. Three demonstration subwatersheds were selected to examine how storm water management plans might differ between various areas within the watershed. The three subwatersheds selected represented the following:

- C rapidly developing areas in the headwaters of the Rouge River, with separated sewers and on-site septic systems;
- C areas still undergoing development, but primarily urbanized; and,
- C older, fully developed, suburban areas with both separated and combined sewers.

However before the strategy could be fully implemented, the federal court pushed the issue of a watershed-wide institutional structure by charging the drain commissioners in the three counties and a representative of the city of Detroit with the task of developing a report on how the Michigan State Drain Code could be used to establish an institution to fund and manage water quality in the entire watershed. The subsequent report to the court by the reluctant authors pointed out the severe limitations of the Michigan Drain Code in providing adequate representation and shared authority to the 48 communities involved. The communities, without exception, expressed grave reservations about establishing an institutional arrangement under the Michigan Drain Code.

The Wayne County Department of the Environment met with the Rouge watershed communities and proposed an alternative regulatory framework -- a watershed-based general storm water permit issued under the National Pollutant Discharge Elimination System (NPDES). The communities then asked the court for the opportunity to develop a draft permit acceptable to the communities as well as the state and federal regulatory agencies. The court agreed to provide the opportunity to the communities to attempt a consensus approach to a general storm water permit, but at the same hearing noticed all 48 communities that they were now parties to the case before the court. Previously only those communities with CSO discharges were formally a part of the federal court litigation.

It is within this context that the communities formed a Core Advisory Group (CAG) to attempt to draft a consensus approach to a state general permit for the management of storm water within the Rouge River watershed and concurrently implement the other elements of a storm water management strategy including development of management plans in the three selected subwatersheds.

METHODOLOGY

Representatives of the Surface Water Quality Division of the Michigan Department of Environmental Quality (MDEQ) with delegated responsibility for the NPDES program were invited to participate with the CAG made up of representatives of Rouge communities in the development of a watershed-based, general storm water permit. Staff of the Rouge Project provided facilitation and administrative support for the group. The CAG, with state regulators participating, started the process from the bottom up. The communities outlined the issues that were important to them and how the permit conditions should be drafted to reflect their concerns. At its first meeting the CAG decided to outline the guiding principles that would be used to draft the permit. A list of 14 principles were eventually condensed from the numerous suggestions offered by the communities participating in the technical drafting subcommittee. The principles were listed without respect to priority since the group had decided that all the communities, participating consultants, state regulators, and even the monitors appointed by the federal court would be given an opportunity to rank the suggested guidelines, or to add others.

The initial 14 guiding principles for the watershed-based storm water permit adopted by the technical subcommittee of the CAG were as follows:

- C Cost-Effective/Resource Focus - Establishes a watershed framework for practical, cost effective steps that focus on restoring and/or protecting the natural resource values of the Rouge River and the Great Lakes.
- C Incentives - Creates incentives for local communities and their stakeholders who share common hydrological boundaries to cooperate in establishing workable plans to improve and protect water quality.
- C Certainty/Legal Protection - Provides, to the greatest extent practical, certainty and legal protection for local communities and other regulated stakeholders from the financial obligations and other requirements for storm water management under state and federal law over at least the term of the

permit.

- C Rouge Project Resources/Timeliness - Allows the local communities to access the information and the resources of the Rouge Project, available within the next 18 months, to help them meet the application and permitting requirements, particularly baseline monitoring and problem identification.
- C Flexibility/Sensitivity to Local Issues - Recognizes that the methodology for the most cost-effective management of storm water and other diffuse sources of water pollution in urban areas is not well defined and local communities need the flexibility to select from a menu of alternative approaches that take advantage of local opportunities and recognize local constraints.
- C Iterative Process - Provides for an iterative process to reach long range goals in which the evaluation of the first steps is used to help define what additional actions are needed and appropriate to achieve long range objectives allowing communities to make steady progress without committing large resources for uncertain benefits.
- C Institutional/Financing Options - Permits local communities with their cooperating partners to select the institutional arrangement and financing approach that most appropriately meets their specific needs.
- C Minimum State Requirements/Local Priorities - Limits the number and type of state mandates to encourage local communities to establish their own priorities for actions and schedules to accomplish locally determined objectives.
- C Voluntary Partnerships - Allows communities to apply for coverage on a voluntary basis, and authorizes the state to certify coverage when local units representing a significant majority of the land area involved in the subwatershed have met the application requirements.
- C Integrated Watershed Management - Establishes a process that will allow integration of storm water management among adjacent communities and other public and private entities that collect and discharge storm water into a common hydrologic basin.
- C Holistic/Systems Watershed Planning - Accommodates a holistic, systems planning approach that evaluates all factors (e.g., point and non-point sources, flows, etc.) that limit or threaten the resource and its beneficial uses, and considers a full range of solutions (e.g., effluent trading, interlocking permits conditions, contractual agreements, etc.).
- C Stakeholder Involvement - Recognizes the importance of building local support for water quality improvements by including stakeholders in the establishment of local priorities, preparation of short range action plans and long range strategies, and a continuing evaluation of progress toward meeting objectives.
- C Demonstration Value - Provides a model approach that can be readily transferred from the Rouge River to other urban watersheds in Michigan, and a working example to guide the U. S. EPA in its current efforts to promulgate regulations that authorize watershed approaches to meet storm water permit requirements.
- C Resolution of U.S. District Court Concerns - Meets or exceeds the expectations of the U.S. District Court that the communities and other regulated entities within the Rouge River watershed need to establish a institutional mechanism that will allow them to collectively address the water quality issues consistent with requirements of state and federal laws.

This annotated list of 14 guiding principles was sent to all 48 communities within the Rouge River watershed, county drain commissioners for the three counties involved, the state road agency, federal court monitors, technical consultants and state regulators with a request that each rank the principles in order of importance and suggest any additions to the list. A large percentage of the communities responded to the survey along with other stakeholders. The CAG, while considering the comments of other stakeholders, eventually decided to direct staff to prepare a draft permit based upon the priority rankings of the communities responding to the survey. The Rouge communities ranking of the guiding principles is shown in Figure 2.

Throughout the process of developing the guiding principles and eventually the draft permit, the Wayne County Department of Environment through its Rouge Project staff brought additional information and resources to the CAG. The EPA had formed an Urban Wet Weather Flows Federal Advisory Committee (UWWFFAC) and Wayne County, on behalf of the Rouge Project communities, was selected to serve. The Watershed Subcommittee of the UWWFFAC was involved in similar discussions during the same time frame at the national level. The ideas and concepts emerging from this federal advisory group on watershed approaches to storm water management were shared with the Rouge CAG. The process to develop a Rouge River watershed storm water permit became a real life example of how a regulatory framework intended to encourage locally based, watershed management to protect and enhance water quality would actually work. Similarly, the Michigan communities and agencies that had recently been issued Phase I NPDES storm water permits were brought into the discussion to relate their experiences in attempting to meet regulations imposed upon them and to share their recommendations on the proposed watershed-based general permit.

RESULTS

Once the Rouge communities and the CAG presented the draft NPDES permit prepared by the Rouge Project staff and listened to the comments of state regulators and other stakeholders, they determined they had taken the draft permit as far as they could toward a consensus document. Wayne County presented the draft storm water permit at a hearing before the U.S. District Court in late 1996. The Michigan Department of Environmental Quality (MDEQ) assured the court that it would immediately begin to take the draft prepared on behalf of the communities and respond with a proposed state permit early in 1997. As might be expected, the first MDEQ draft permit shared with the communities differed from the one proposed by the local communities. However, many of the concepts important to the communities were contained in the draft voluntary, statewide, watershed-based, NPDES storm water permit proposed by the MDEQ. Some of the concerns expressed by the communities were incorporated into the draft state permit before it was formally issued for comments under the public notice process.

The public-noticed draft general storm water permit was voluntary and contained very few minimum requirements. It allowed the establishment of subwatersheds based on a local petition, allowed communities to establish their own priorities and schedules for action, provided for innovative solutions, recognized the need for an iterative remediation process, and provided some assurance that once provided coverage under the general permit, communities would have increased certainty on future requirements and protection from third party actions under state and federal law. Most of the comments received during the public notice process came from the Rouge communities that had participated in the original drafting process. The key points of contention centered around issues of control. While the proposed permit by the state offered "flexibility" in the MDEQ's words, the local view was that what the state viewed as flexibility was in reality a reversion to traditional command and control in which the local communities could request variances, exceptions or options, but it was up to the state agency to grant them. The public-noticed state permit contained few criteria that the state would be bound to follow in consideration of requests or submissions coming from the local communities or agencies seeking coverage. Despite assurances from the MDEQ that the state would be reasonable in its exercise of discretionary authority, local communities remained skeptical. Many communities suggested that unless provisions were included to allow communities and other public agencies the opportunity to drop out of the process without penalty once the state decisions were made to accept or reject locally-generated pollution

prevention programs, they would not seek coverage.

At the time this paper was prepared for publication, the final MDEQ watershed-based, general NPDES storm water permit had not been issued. Participants at the state and local level remain optimistic that a general permit acceptable to both the state and public agencies authorized to seek coverage under the permit can be implemented. Although the final Michigan watershed general storm water permit has not been finalized, it is likely that it will incorporate the following elements:

- C coverage will be voluntary until the final federal Phase 2 NPDES storm water regulations are promulgated in 1999;
- C only public agencies will be provided the opportunity for coverage;
- C minimum requirements will include a program to identify and address improper sanitary connections to the storm sewer system and failing on-site septic systems, and a storm water education program targeted to homeowners and businesses to change practices that contribute to water pollution;
- C subwatershed storm water management plans must be developed with an opportunity for all stakeholders to participate in establishing goals, action plans, and in evaluating results;
- C a pollution prevention plan and schedule of actions for each public entity seeking coverage will be required within two years of the application for coverage;
- C the subwatershed storm water management plans developed by the communities and other public agencies will not require state approval; however, the individual community pollution prevention plans emanating from the watershed planning process will require state approval.

DISCUSSION

The state and local communities have never before attempted a consensus, cooperative approach to establish an NPDES permit in Michigan. Negotiations did result in a compromise set of common NPDES permit conditions for Michigan communities subject to Phase I Clean Water Act storm water regulations. However, negotiation and compromise is not quite the same as reaching a consensus through cooperation to achieve a common objective. The communities and the state regulatory agency are still struggling with the process of reaching consensus in the Rouge River watershed. What has been learned on both sides is that the traditional regulatory approaches used in NPDES permits do not lend themselves well to the control of storm water or to the concept of cooperative, locally-based watershed management.

In his article, *Crafting Better Urban Watershed Protection Plans*, Thomas Schueler thoughtfully documents eleven reasons why local watershed plans often fail and outlines twelve key elements of effective local subwatershed management plans (Schueler, 1996). Many of the failures cited by Schueler can be traced to the inadequacy of the existing watershed-based regulatory schemes, or the lack thereof. One of the key failure points identified by Schueler was that many watershed management plans simply had no regulatory implications and were never implemented. His identification of twelve key elements to successful approaches again focuses attention on the barriers to watershed management presented by traditional regulatory approaches.

The key to successful storm water management may be long term management of land and its uses rather than pipes. Land use decisions are typically made at the local level and without the active cooperation of local public agencies in storm water management, it may be virtually impossible to successfully manage storm water

to protect water quality. It was apparent from the process used by the local Rouge communities to develop the draft storm water permit that development controls and regulations could be used much more cost-effectively to achieve water quality objectives than any approach available to the state to regulate the discharge from thousands of storm sewer outfalls. In many cases, storm sewers, unlike sanitary sewers, are not owned by public agencies or are owned and operated by multiple public agencies within the same political jurisdiction. Focusing on the discharge of individual storm water pipes will lead to endless debates about ownership, and responsibility for maintenance and control of illicit and illegal discharges.

CONCLUSIONS

The Rouge River National Demonstration Project has identified the key elements needed in a regulatory framework for storm water management to encourage participation and acceptance by local governments. These elements may not be easily accommodated in existing state and federal regulatory frameworks. The watershed approach to a general storm water permit may work in Michigan, but it is a cumbersome process particularly when state and federal regulators view any significant change in NPDES permit approaches as a threat to the successful, traditional point source control program. Even with complementary federal rules or guidance to states encouraging watershed approaches to storm water management, a new regulatory vehicle, other than one called an NPDES permit, may be needed. This new regulatory vehicle may also facilitate watershed-based integration of control programs for different pollution sources such as storm water and combined sewer overflows which may be present within a large, urban watershed.

Large watersheds like the Rouge River with diverse physical characteristics, varying levels of development, and a broad range of problems and potential remedies, need to be examined at the subwatershed level where stakeholders share common interests. Schueler suggests that the ideal subwatershed scale should be 518 to 3,885 hectares (2 to 15 square miles) (Schueler, 1996). The subwatershed planning units selected in the Rouge River for storm water planning were somewhat larger. However, it became evident in this project that building consensus among Rouge communities would be extremely difficult when they do not share common problems or have similar opportunities for corrective actions to restore or protect water quality. Regulatory frameworks for watershed management of storm water need to recognize differences among communities and allow plans to be constructed on hydrologic boundaries that are small enough to allow communities the flexibility to choose their own partners based on shared interests.

Incentives are needed to encourage local communities and other public agencies to work together on watershed planning. Grant funds have been used in the past to encourage local investments in water pollution control facilities. However, non-monetary incentives like greater flexibility and real delegation of authority to local stakeholder agencies may work equally as well, if not better, since large new state or federal grant funds for storm water management are unlikely.

If effective watershed management in urban areas is to be more than a handful of anecdotal success stories where the right combination of resources, commitment and talent has overcome the obstacles, then a new regulatory framework needs to be provided. That new framework must recognize the strong role that should be exercised by local government and their stakeholders in identifying problems, choosing from alternative solutions, establishing priorities and schedules, and developing a common strategy with their neighbors. The regulatory framework needs to be a part of whole set of incentives that encourage rather than discourage local accountability and cooperation on a watershed basis.

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ROUGE RIVER WATERSHED
Figure 1

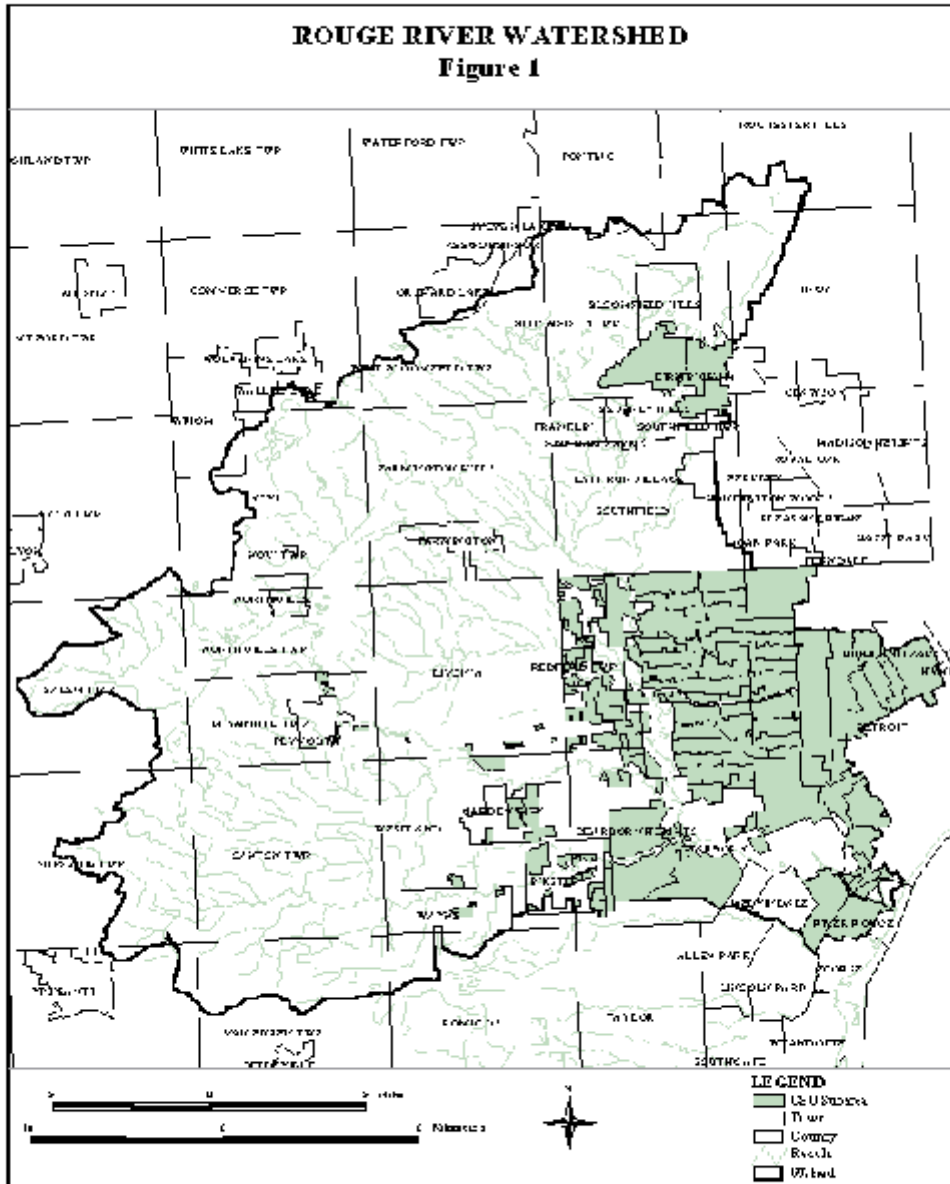
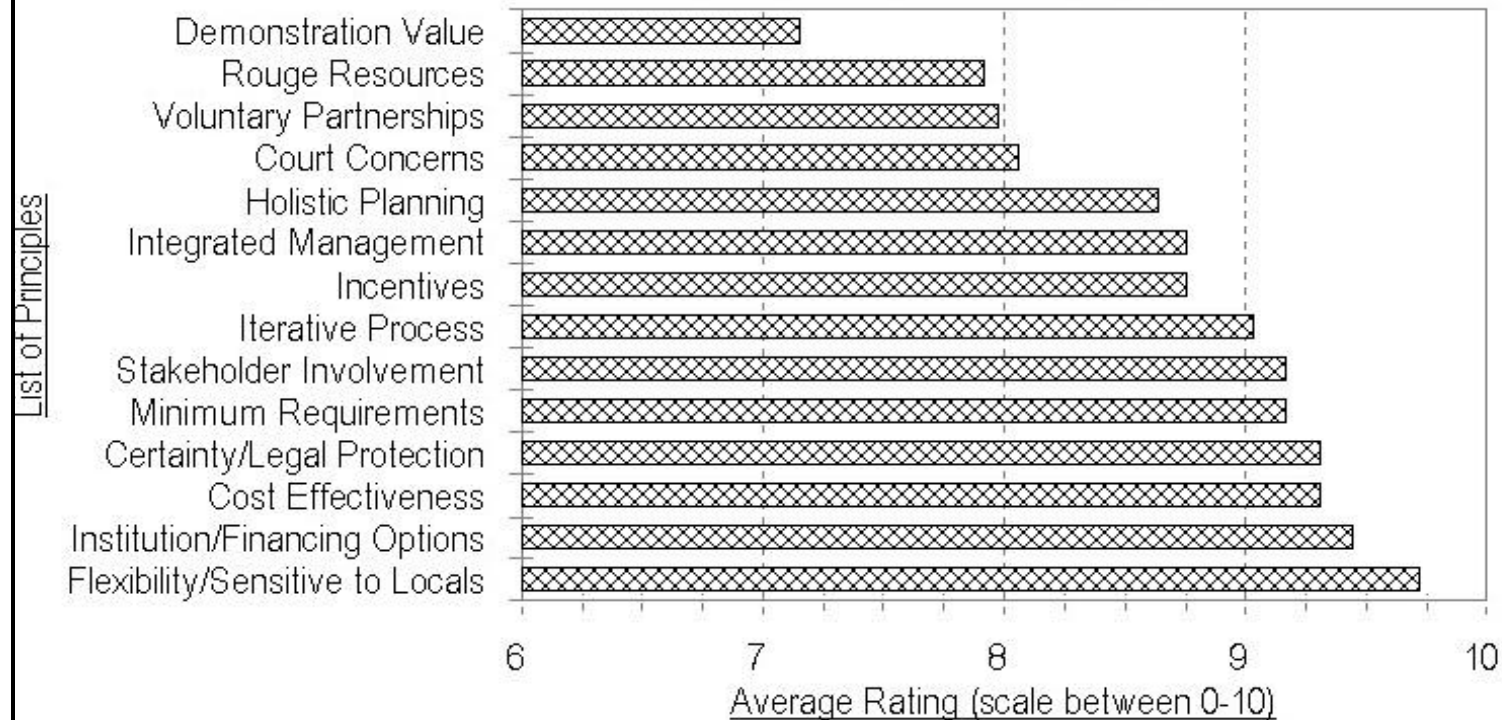


Figure 2

**General Permit Guiding Principles
Listed in Reverse Order of Importance**



NOTES: Results based on receipt of 24 surveys. Surveys were rated on a score of between 0 and 10. Very important = 10, Somewhat important = 6.67, Not very important = 3.33, Should not be listed = 0. RPO staff/consultant responses were not included. Other suggested principles submitted by survey respondents were: conclusion of litigation, ensure accountability, provide for public education, characterize physical/biological resource, and resolution of financing concerns.