The Role of BMPs in 303(d) Listed Waters: A New Alternative to TMDLs

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Total Maximum Daily Load Analyses (TMDLs) are being conducted nation-wide to address 303(d) listed waters. The TMDL strategy can be broken into two basic phases; first is the detailed calculation of a permissible load that will attain state water quality standards. Second is the creation and execution of a plan to achieve load reductions identified in phase 1. Currently, most states are focused on the first phase in order to meet court ordered deadlines. Implementation is usually deferred pending completion of the court's decree, which will make more resources available for phase 2. However, determining TMDL targets has proved problematic in wildland forest environments when applied to non-point source pollutants such as sediment, because discerning between anthropogenic and natural sediment is difficult, and because a reliable quantification of instream loads is complex. Natural sediment discharge is highly variable as a result of various watershed interactions driven by stochastic disturbance events (fire, drought, flood, wind, insects, disease, and others). The expense of data collection needed to reliably establish numeric targets can easily exceed the cost of simply fixing the obvious problems. July 2004 Environmental Protection Agency [EPA] guidance states that where an existing regulatory program, such as watershed restoration and implementation of Best Management Practices (BMPs), is expected to achieve water quality standards, a TMDL is not required (Category 4B) (USEPA 2004a). While the 4B option has been used very infrequently, the potential benefits of streamlining the TMDL regulatory process to focus on remediation instead of the dubious quantification of permissible loads is obvious.

Keywords: *total daily maximum load (TMDL); 303(d) listed waters; watershed restoration; best management practices (BMPs); Category 4B*

Introduction

Under Section 303(d) of the Clean Water Act (CWA), states are required to identify waters where existing water quality does not meet state water quality standards. Most states have interpreted this direction and listed waters degraded by nonpoint sources without regard for whether any existing regulatory process is in place. All National Forest System (NFS) lands require the implementation of best management practices (BMPs) to identify and treat existing water quality problems and to prevent future ones (Forest Service Manual 2532.03). Currently, 18,318 NFS stream segments or 2,201 streams have been included on state lists of impaired waters, often with little or no quantitative information (EPA, unpublished 1998 data – as of October, 2004, this was the most recent complete compilation of 303 data). Generally, listing has not considered existing BMP and ongoing watershed restoration programs designed to achieve the same result. These lists of impaired waters are formally updated by the states every two years. Once on the list, the landowner must either show that the listing is in error or submit to the establishment of a Total Maximum Daily Load (TMDL) and eventually a restoration plan. Some within the various state water quality regulatory community feel that Forest Service programs are inadequately funded to achieve restoration in a timely manner. They may see the TMDL process as a lever that will result in accelerated restoration. In practice on NFS lands, just the opposite may occur, as fixed resource dollars are spent on needlessly complex TMDL assessments, leaving even less for the repair of often easily identified water quality problems.

Guidance issued by EPA in July 2004 pursuant to Sections 303(d) and 305(b) of the Clean Water Act for reporting assessment and listing of stream status (USEPA 2004a) contains information on the components of the required report for 2004. The states are required to place water bodies in one of five categories:

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Category 1: All designated uses are met;
Category 2: Some of the designated uses are met, but there is insufficient data to determine if remaining designated uses are met;
Category 3: Insufficient data to determine whether any designated uses are met;
Category 4: Water is impaired:
4A – a TMDL(s) has been completed,
4B – existing control measures are expected to result in the attainment of water quality standards (WQS) in a reasonable period of time, a TMDL is not needed, and
4C – waters are impaired entirely by something other than a pollutant.
Category 5: Water is impaired: a TMDL is needed.

As mentioned earlier, EPA's 1998 data lists 18,318 impaired segments on NFS lands. Often, multiple segments are located on a single stream, so the active number of listed streams is 2,201. The situation is particularly acute in Montana, which is reported to have nearly one half of all 303(d) listed segments in EPA's Region 8 (including North Dakota, South Dakota, Nebraska, Wyoming, Colorado and Utah [Personal communication, Julie DalSoglio, EPA Region 8, 8 June 2004]).

NFS streams have had a particularly high incidence of listing across the country, principally because they represent a very high percentage of monitored small streams, not necessarily because they represent poor water quality. Real problems exist on NFS lands, but the listing process in combination with ambiguous state standards for sediment and temperature have resulted in some very questionable results.

In Montana, each watershed with one or more Category 5 segments may require preparation of a TMDL. A TMDL is the calculation of the amount of pollutant that a waterbody can receive from point and nonpoint sources, plus natural background and a margin of safety, without exceeding water quality standards. In Montana, for example, the TMDL assessment process uses a watershed approach that may include multiple impaired segments. To reach a reasonable level of scientific credibility, the process has evolved into a complex study with many of the same data requirements as the six-step watershed assessment process currently employed in the USDA Forest Service (RIEC and IAC 1995). Costs for completing approved TMDLs in Montana have generally ranged between $150,000 and $300,000, and completion and approval can take more than two years (personal communication, Ron Steg, EPA R-8). These represent all state and federal costs to create the TMDL but do not include restoration and monitoring. Estimated federal costs are approximately $50,000 per TMDL, which represents the cost of collaboration with state agencies.

Point sources are derived from a specific location while nonpoint sources are derived from the general landscape rather than a discrete discharge point. The actual TMDL equation also includes provisions for a margin of safety and future human growth.

On NFS lands in the western United States, sediment, temperature, or both, are most commonly the pollutants of concern. In cooperation with the Montana Department of Environmental Quality (MDEQ) and EPA Region 8, personnel from national forests in Montana have contributed large amounts of time to assist the state in meeting a court-imposed schedule for TMDL completion [See 20 September 2000 Court Order in Friends of the Wild Swan, Inc. v. US EPA, No. CV-97-35-M-DWM (D. Mont.)]. In some cases Forest Service personnel have written the entire TMDL and in others they were active contributors to the process. Where available, both EPA and MDEQ have provided supplemental funding. The following forests are currently working with EPA and MDEQ on TMDL projects:

Helena National Forest
- Participant in the Blackfoot Headwaters TMDL

Kootenai National Forest
- Funded by EPA to complete the Yaak TMDL

Lolo National Forest
- Collaborator on Upper Lolo TMDLs
- Funded by MDEQ for the St. Regis TMDLs
- Team member and partially funded for Prospect Creek TMDL
- Participant in Bobtail Creek TMDL

Flathead National Forest
- Developed the Big Creek TMDL
- Funded by EPA to complete TMDLs for the Flathead Headwaters
- Participated in the Swan TMDL

Beaverhead National Forest
- Team member on the Ruby TMDL

Though these ten projects represent a large effort on the part of forest staff, a number of additional TMDLs will be written for NFS watersheds over the next five years.

Evolution of the BMP Alternative

State and Congressional interest in pursuing opportunities for speeding up the TMDL process on national forests grew following a United States District Court ruling in Montana (Sierra Club Inc.; Alliance for the Wild Rockies v. Deborah Austin as Lolo National Forest Supervisor), which stated that a project involving timber harvest and watershed restoration could not continue until the TMDL was completed because, without knowing the maximum allowable load, there was no standard to judge impacts against. This decision was appealed to the 9th Circuit Court, and the TMDL portion of the case was eventually overturned. However, litigants have indicated continued interest in pursuing TMDL related issues, and since implementation and monitoring are still on the horizon for most TMDLs, future grist for litigation seems assured.

These events caused the Montana State TMDL Advisory Group (appointed by the state Governor) to request that MDEQ begin exploring alternative ways to speed the TMDL process. Montana's Senator Max Baucus became interested and assigned a Congressional Fellow to help resolve the issue. As a result, a meeting was held on 4 and 5 May 2004 with representatives from the Washington offices of EPA and the Forest Service, Senator Baucus's office, MDEQ, Montana State Lands, and the Northern Region (R1) of the Forest Service. Placing waters into EPA Category 4B was discussed as one alternative that could be useful in speeding the recovery of degraded waters.

Preliminary investigation of the 4B process and its possible benefits showed that there were theoretically widespread benefits. There were a number of 303(d) listed waterbodies on NFS lands that several members of the review team were familiar with, where it was highly likely that the cost of treating the pollutant sources using existing restoration BMPs would be significantly less than the cost of producing the TMDL. Bristow Creek on the Kootenai NF and Taylor Fork on the Gallatin NF were identified as initial test watersheds.

As a result, discussion and development of the Taylor Fork Category 4B report was begun. Identified restoration needs were funded and the majority of needed work was completed in the 2005 field season. The final Taylor Fork 4B report was submitted to Montana DEQ in August 2005. This effort could result in a significant breakthrough in the regulatory process, since it redefines the role of restoration, BMP application, and monitoring to significantly speed the recovery of degraded waters, though other priorities have slowed MDEQ's review and approval of the report.

Category 4B as Described by EPA

The choice of whether to pursue Category 4B remains with the states and affected agency. Current regulations do not require TMDLs for all listed waters. When to establish TMDLs and when they are not appropriate is described by EPA guidance (USEPA 2004a). It states "....it best serves the purposes of the Act to require the State to establish TMDLs and submit them to EPA for approval only where such TMDLs are needed to 'bridge the gap' between existing effluent limitations, other pollution controls and water quality standards (WQS)." For waters with sufficient controls, EPA states "...establishing TMDLs would not contribute to accomplishing the goals of the Act and could draw resources from areas where there are water quality problems [50 FR 1775, 11 January 1985]. To use category 4B, the state must demonstrate that "other pollution control requirements (e.g., best management practices or needed restoration) required or agreed upon by local, state or federal authority" [see 40 CFR 130.7(b)(1)(iii)] are expected to address all water-pollutant combinations and attain all WQSs [water quality standards] in a reasonable period (USEPA 2004a)."

What does the Forest Service have to do to demonstrate that Category 4B applies to a given situation? Recent EPA guidance (USEPA 2004a) identifies the information necessary to support a determination that waters may be moved to Category 4B:

1. Identification of the controls to be relied upon: What are the problems and what BMPs or restoration will be prescribed?
2. A description of the authority under which the controls are required: Are BMPs required as a component of Forest Plans or other relevant National Environmental Policy Act [NEPA] documents?
3. Documentation that the controls are adequately stringent to result in attainment of applicable water quality standards within a reasonable period of time. In most cases this can be a straightforward literature review or practical examples of similar restoration applied to similar situations, however, more extensive modeling can also be done if warranted.
4. Assurances that the controls will be implemented. A watershed restoration plan with a line officer's signature and a proposed schedule, for example, will usually suffice.

The TMDL approach and BMP application have substantial overlap as well as important distinctions. However, the practical differences are few. First, the watershed restoration-BMP (4B) approach does not require

the calculation of a TMDL. Second, the 4B approach requires the identification and repair of the problem immediately or within a reasonable timeframe. The TMDL approach defers restoration work until phase 2, and in many states, actual restoration is voluntary. Third, both approaches require monitoring sufficient to attainment of water quality standards. In either case, should monitoring show inadequate improvement, additional measures can be implemented. If standards are not achieved, the state retains the authority and option to require a TMDL.

Both the TMDL and 4B approaches demonstrate the need to assure that either the load reductions identified in the TMDL, or the watershed restoration and BMPs identified as 4B controls, are stringent enough to achieve water quality standards. According to EPA's guidance on development of sediment TMDLs (USEPA 1999), this "linkage" analysis can range from simple to complex. The more simple approaches mentioned in the guidance include linkage analyses based on empirical, index, or inference approaches. The more complex methods rely on mathematical or process models. The appropriate level of analysis depends upon several technical and practical factors such as the pollutant at issue, the hydraulic characteristics of the waterbody, the relevant temporal and spatial representation needs, the level of accuracy needed, and stakeholder interests. Ideally, the linkage analysis will be supported by monitoring data, allowing the analysis to associate waterbody responses with flow and loading conditions. When dealing with natural background loadings as well as wide fluctuations in pollutant loadings from nonpoint sources, the professional judgment of resource experts is often used to construct the linkage analysis. This approach relies on established principles as well as any new approaches documented in the literature relevant to the pollution situation in question. Where qualitative approaches to linkage are used, all assumptions, theories that provide the basis for linkage, expert and literature citations, and provisions for follow-up monitoring should be identified (USEPA 2004b).

The following steps would be taken after a waterbody is moved to category 4B:

1. Monitor the implementation of the restoration measures and BMPs to ensure they are completed and correctly put into practice.
2. Monitor the effectiveness of the restoration measures and BMPs towards achieving standards. This could include monitoring the effectiveness of the BMPs and restoration practices in meeting compliance with water quality standards, or through monitoring of appropriate surrogate measures such as upslope or in-channel measures. A statistically valid sub-sample or benchmark site could be used in the monitoring design. The Northern Region proposes adopting the R-1 Draft Aquatic Ecological Unit Inventory Technical Guide for physical channel measurements (tiered to PACFISH/INFISH Biological Opinion protocols, the aquatic conservation strategies for federal lands). These data can then be compared to other similar watersheds from the greater population of measured streams.
3. Based on monitoring results, either redesign or add new watershed restoration measures or BMPs where needed, or provide information on the need to modify the water quality standards target.

If monitoring shows that controls are not implemented or they are not effective (e.g., BMPs are not implemented fully, or the monitoring data shows no trend towards meeting standards), the control measures would be adjusted or redesigned where needed. If after modifying or adapting controls, progress towards water quality standards is not taking place, consideration will be given to re-instating the waterbody back into Category 5 of the state's Integrated Report. In some cases it may be determined that modification of the water quality standard or target is appropriate because local natural geologic or thermal conditions preclude ever reaching the established numeric criteria.

Summary

TMDLs will only be developed for waters classified as "Category 5". Placing waters in Category 4B rather than conducting TMDL analysis may hold several advantages. First, Category 4B may prove more cost effective and result in more rapid restoration of water quality. Second, the approach may also reduce the threat of projects being litigated for not having TMDLs in place. To date, few if any agencies have attempted to place waters in Category 4B.

EPA and MDEQ are currently working with the Northern Region of the USDA Forest Service to develop a list of Category 4B waters on NFS lands. This approach could greatly speed the recovery of water quality and reduce costs by eliminating TMDL preparation by emphasizing thorough identification of restoration needs, conducting the restoration, and designing a pragmatic approach to monitoring. Managers are likely to also find this approach attractive since it is more efficient, fosters new partnerships, provides agencies more flexibility when administering multiple use responsibilities, and builds upon existing BMP and restoration programs.

The Gallatin National Forest Taylor Fork Category 4B report was formally submitted to Montana DEQ under

a Regional Forester cover letter in August 2005. Due to other priorities, the state has not given an official response to the report. However, all essential restoration projects have now been completed, and it is anticipated that ongoing monitoring will demonstrate water quality standard attainment and the waterbody will be reclassified as Category 1 (all designated uses are met). As a result, there will no longer be a need for completion of a TMDL and the Taylor Fork 4B will become a tangible demonstration of the effectiveness of the Category 4B approach.

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