

## EVALUATING THE ROLE OF TMDL PLANS IN COMMUNITY-SPONSORED WATERSHED RESTORATION EFFORTS

Todd Reeve, Director of Watershed Programs, Bonneville Environmental Foundation, 133 SW 2<sup>nd</sup> Ave. #410, Portland, Oregon 97204, (503) 248-1905, [toddreeve@b-e-f.org](mailto:toddreeve@b-e-f.org)

### ABSTRACT

In the course of evaluating watershed restoration proposals and completed projects across the Pacific Northwest, the Bonneville Environmental Foundation (BEF) has peripherally evaluated the role and potential contributions of TMDLs to the local watershed restoration process. Although there are many exceptions, our reviews indicate that TMDLs are commonly designed and conceived apart from community-based watershed restoration programs. As such, TMDLs often appear to be implemented from a “top down” perspective and may, as a result, carry little weight with the local communities or personnel charged with effecting watershed improvements on private lands. In a majority of cases reviewed by BEF, watershed sponsors viewed TMDLs as a positive step for watershed restoration, but program sponsors did not demonstrate to BEF that TMDL plans are truly integrated within, and critical to, ongoing watershed restoration efforts. Furthermore it is our impression that unless watershed restoration initiatives are firmly supported by local communities, there is little likelihood that TMDL (or any other) restoration methods will maximize success.

### INTRODUCTION

Total Maximum Daily Load (TMDL) plans are designed to restore impaired designated uses and protect watersheds that meet standardized environmental criteria. As such, TMDL plans are often considered to be fundamental to the success of community-based watershed restoration and fisheries recovery efforts.

The steps included in TMDL planning and implementation largely parallel the approach taken by a majority of local watershed restoration groups, and it therefore seems logical to assume that TMDL planning and implementation do, in fact, reinforce local efforts to restore watershed conditions and recover native salmon and trout populations (figure 1).

**Figure 1.**

<b>Step#</b>	<b>TMDL Approach</b>	<b>Watershed Approach</b>
1	Assess quality of water bodies	Assess watershed-biological conditions
2	List water bodies (303d)	Identify biological, physical, and chemical restoration objectives
3	Identify causes of degradation	Identify limiting ecological conditions
4	Allocate pollutant loads	Prioritize restoration actions
5	Improve water quality	Implement restoration actions

However, while community-led watershed restoration efforts in the Pacific Northwest are typically designed to achieve a specific biological outcome (i.e., recover depressed stocks of

native salmon and trout), the TMDL approach focuses primarily upon toxicology and water chemistry (Karr and Yoder in press).

Nevertheless, the clear relationship between a) water chemistry and toxicology, b) environmental conditions within a watershed, and c) the health of biological communities within a watershed has promoted the assumption that TMDL plans are fundamental to community-based watershed restoration efforts across the Pacific Northwest.

This paper strives to evaluate the role of TMDLs in community-based watershed restoration efforts in the Pacific Northwest and present feedback from watershed managers regarding the 1) local perceptions of the TMDL process and 2) views on how the TMDL approach integrates with and reinforces ongoing community-based watershed restoration activities. The paper presents this information in an effort to stimulate discussion and where possible facilitate improvements to the TMDL process that may improve the integration of TMDL plans within ongoing watershed restoration efforts.

## **METHODS**

Since 1998, the Bonneville Environmental Foundation (BEF) has managed a watershed restoration grant-funding program. Community-based watershed groups (including tribes, watershed councils, and other non-profits) submit proposals annually to BEF, requesting support for watershed assessment, restoration, and monitoring projects. BEF completes in depth evaluations of each program that appears to demonstrate consistency with BEF's watershed program criteria.

BEF has evaluated over 120 proposals submitted by non-profit watershed groups across Oregon, Washington, Idaho, and Montana. BEF's program evaluation procedure derives information from site visits, review of completed watershed and biological assessments, and interviews with biologists, project sponsors, and watershed council staff.

BEF's watershed funding criteria require a rigorous level of scientific assessment and monitoring, and as a result BEF routinely evaluates watershed restoration plans and communicates with watershed program sponsors to evaluate the roles of various watershed planning and assessment efforts. Consequently, BEF has evaluated a wide range of Pacific Northwest watershed programs in which TMDL plans are implemented and/or designed alongside community-based watershed restoration efforts. Within such programs, BEF has widely discussed the application of TMDL plans to ongoing watershed restoration efforts.

The information presented in this paper was derived through BEF's 1998-2003 project review process. The methods used to acquire this information are unscientific. No statistical sampling process was applied, and the results presented here simply convey general feedback and perceptions conveyed to BEF by a random selection of grantees and non-profit watershed groups based in Oregon, Washington, Idaho, and Montana.

While there are many exceptions to the general conclusions presented herein, in some cases it is likely that our results are indicative of regional attitudes and perceptions. In other cases, it is possible that the feedback presented to BEF is not indicative of larger regional views.

## **RESULTS**

### **Large-scale, Regional Observations**

BEF's review of Pacific Northwest watershed restoration programs suggests that regional perceptions regarding the role of TMDL plans in community-based watershed restoration efforts vary substantially by region. Our reviews, for example, suggest that community-based watershed restoration efforts in Montana and Idaho are commonly aligned with TMDL assessment, planning, and funding mechanisms. In contrast, BEF's review of community-based watershed programs in Oregon and Washington indicates that TMDL plans are commonly considered to be peripheral to ongoing watershed restoration efforts.

Statewide watershed funding programs, such as the Oregon Watershed Enhancement Board and Washington's Salmon Recovery Funding Board, do not exist in Montana and Idaho. Moreover, Montana and Idaho have not experienced the proliferation of community-based watershed groups (i.e. watershed councils) to the same extent as Oregon and Washington. TMDL planning and implementation, however, is ongoing in many Idaho and Montana watersheds, and a majority of the watershed programs reviewed by BEF in Montana and Idaho assert that the TMDL process and associated funding mechanisms (319 funds) are critical to community-based efforts to restore watershed conditions, improve water quality, and recover depressed stocks of native salmon and trout.

Despite the water quality focus of TMDL planning and funding, many watershed groups in Montana and Idaho suggest to BEF that they are utilizing the momentum and funding behind the TMDL process to build local efforts to improve watershed conditions and ultimately recover depressed populations of native fish (generally bull trout and Westslope cutthroat). As a result, non-profit watershed groups in Montana and Idaho indicate that TMDL efforts are fundamental to the community-based watershed restoration process. As a result, TMDL plans appear to be at the core of a number of grass roots efforts to restore watershed conditions in Idaho and Montana. This conclusion appears to be particularly pronounced in areas where other major watershed funding sources are not readily available.

In Oregon and Washington, responses to BEF's project review process suggest that TMDLs are commonly viewed as peripheral to ongoing community watershed efforts. A majority of local watershed managers express hope that TMDLs will produce watershed improvements that complement ongoing fisheries recovery efforts, but of the programs reviewed by BEF, only a minority appeared to truly integrate TMDL planning and implementation efforts into existing watershed recovery efforts.

Within Oregon and Washington (and a select few programs in Idaho and Montana with access to hydropower mitigation funding) there are substantial resources available to support ongoing watershed restoration and salmonid recovery efforts. Currently, the Pacific Coast Salmon

Recovery Fund, Washington's Salmon Recovery Funding Board and the Oregon Watershed Enhancement Board, among others provide considerable support for watershed restoration in both Oregon and Washington. In addition, community and tribal-based watershed restoration efforts within the Columbia basin are eligible for funding from the Bonneville Power Administration's Fish and Wildlife Program, the Northwest Power and Conservation Council's (NPCC) Fish and Wildlife Program, and other funding sources focused on anadromous salmon recovery.

Concurrent with the widespread sources of watershed funding, a systematic and scientific methodology has been incorporated into much of the watershed work undertaken within Oregon, Washington (and select Columbia Basin watersheds within Idaho and Montana). For example, the Independent Scientific Advisory Board, NPCC's project review process, OWEB's Watershed Assessment manual, and other scientific advisory boards and processes serve to infuse some level of scientific methodology into much of the watershed restoration work funded in Oregon and Washington. As a result of widespread funding opportunities and the systematic framework applied through funding mechanisms, watershed restoration efforts in Oregon and Washington are comparatively well-organized and established.

Our results suggest, furthermore, that well-established watershed restoration programs commonly maintain preconceived ideas regarding watershed restoration planning and implementation and typically possess a specific watershed and fisheries restoration ideology. Where momentum for community-based watershed restoration is particularly evident (as in the majority of Oregon and Washington programs reviewed by BEF) watershed planning and restoration appear to function largely independently of TMDL planning and implementation. Managers from a majority of these well-established groups suggest that TMDLs may produce results that complement ongoing watershed restoration efforts, but for the most part these programs operate independently of TMDL efforts.

In summary, BEF's region-wide inquiries and review suggest that, where watershed funding has generally been (or is still) scarce, the TMDL process and associated funding appear to be closely integrated within community-based watershed restoration efforts. In many circumstances, our reviews even suggest that community watershed restoration efforts would not exist without the TMDL process and associated funding available to support local watershed restoration efforts.

In contrast, where funding continues to be readily available and community watershed efforts are well established, BEF's review suggests that TMDLs are commonly considered to be peripheral to community-based watershed restoration efforts. Generally watershed groups express to BEF that they hope TMDLs will produce some watershed benefit, but they convey myriad concerns with the TMDL process, its applicability to ongoing biological recovery efforts, and the ability for TMDL implementation to produce ecological restoration results.

### **Specific TMDL Concerns**

The majority of watershed groups considered by BEF for funding are well-established non-profit watershed groups or tribal watershed programs that have been in existence for several to many years. These advanced watershed programs implement ecosystem-based restoration efforts with

biological outcomes as primary objectives. Feedback provided to BEF from these groups indicates that TMDLs are frequently not designed and conceived from within local community-based restoration initiatives. Furthermore, our feedback indicates that local watershed groups commonly view TMDLs as peripheral to core watershed restoration efforts.

Primary concerns expressed to BEF regarding the role of the TMDL plans in community-based watershed restoration efforts included concerns regarding 1) community linkages, 2) community distrust and animosity, and 3) scientific credibility.

### ***1. Community Linkages and Support***

A majority of programs reviewed by BEF expressed concerns that TMDLs are commonly not developed from within local community watershed restoration efforts. As a result, watershed managers and local groups reported that TMDLs were usually viewed as tangential or secondary to primary watershed restoration efforts. Moreover, groups were unaware of examples of successful TMDL programs and therefore were unable to verify whether investments of time and money in the TMDL process were likely to produce results compatible with ongoing watershed restoration efforts.

Community members and watershed managers also questioned the basis for TMDL listings of impaired water bodies, and numerous examples of erroneous listings were reported. Additionally, groups were uncertain how progress towards water quality benchmarks was to be measured, and it was unclear what funding or methodology would be available to track progress and ultimately remove water bodies from the 303d list. As a result of these widespread concerns, it was suggested that many watershed groups viewed the TMDL process as a “top-down” agency exercise with little community support or integration within ongoing watershed restoration efforts. It was argued that these widespread concerns were likely to undermine the community’s interest in implementing TMDLs.

### ***2. Community Distrust-Animosity***

BEF’s reviews also suggested that community distrust of and animosity towards the TMDL process were of significant concern to local watershed managers. Erroneous listings and unrealistic restoration objectives, in particular, were cited as primarily responsible for inciting distrust in local communities.

Many groups provided examples of illogical 303d listings, where TMDL standards failed to incorporate specific local or environmental considerations into TMDL planning. In such cases, it was apparent to local groups that unscientific and unrealistic processes were producing unachievable and inappropriate restoration objectives. Moreover, it was argued that such erroneous listings and unrealistic objectives generated distrust of the TMDL process and, in turn, discouraged groups from integrating the process within ongoing community watershed efforts.

Furthermore, the inability for many groups to understand the science or methodology that was applied to create TMDL listings was viewed as an additional impediment to successful TMDL implementation. The criteria used to list water bodies and set standards were commonly not well

understood by a majority of the watershed groups interviewed by BEF. As a result, groups again expressed concern that a “black box” methodology was likely to undermine community participation and distance TMDL implementation from ongoing watershed restoration activities and support. Additionally, it was suggested that the perception of inconsistent application or enforcement of TMDLs was likely to further undermine community support.

### ***3. Scientific Credibility***

The largest concern expressed to BEF by community-based watershed restoration programs was an uncertainty that TMDLs possessed adequate scientific methodology to ensure that TMDL implementation would ultimately produce a functioning ecosystem. Local watershed groups expressed concerns that centered on three primary issues:

- a) Watershed groups indicated that there appears to be insufficient monitoring and ground-truthing to create a science-based TMDL process. Groups were generally concerned that the methodology used to set standards and monitor progress was inadequate to establish accurate and meaningful TMDL standards. Moreover, groups saw limited evidence of a long-term monitoring plan and/or methodology that would be used to monitor progress, de-list impaired water bodies, and allow adaptive management. In addition, groups expressed concerns that there were insufficient funds available to perform critical monitoring and evaluation actions over the long-term.
- b) Of additional concern to watershed groups was the fact that there is little integration of biological criteria and long-term ecological results within the TMDL process, and TMDLs are not designed to support the ecosystem-scale approach required for the restoration of migratory salmon and trout species (Frissell et. al. 1997; Bisson et. al. 1997). With an overwhelming majority of watershed groups working to recover native salmon and trout populations, it was repeatedly expressed to BEF that the migratory lifecycles and complex habitat requirements of native salmonids require a much more comprehensive, ecosystem-scale approach than the TMDL process is likely to deliver.
- c) Watershed groups also expressed concern that TMDL criteria do not include the biological or historical context necessary to appropriately list water bodies and set realistic and achievable restoration benchmarks. Multiple groups highlighted what they viewed as a “one size fits all” TMDL approach as a primary impediment to effective watershed restoration. Moreover, various groups provided biological and historical examples demonstrating that, in certain cases, watershed conditions and biological communities are adapted to unique natural environmental conditions that a “one size fits all” approach cannot adequately evaluate.

## **DISCUSSION**

Based on the feedback provided to BEF by a wide range of community-based watershed restoration groups, it appears that many well-established, local watershed programs are uncertain that TMDL implementation will produce significant benefits to existing watershed restoration efforts. This uncertainty regarding the TMDL process and its potential benefits, in turn,

threatens to undermine community support for TMDL implementation. Many of the concerns expressed by local watershed groups are reflected by scientific criticisms of the TMDL process (Karr et. al. in press).

Collective concerns expressed by regional watershed restoration programs indicate that many watershed groups question the legitimacy of TMDL planning and implementation. Local watershed groups, in fact, repeatedly articulated concerns that the science and methodology employed in TMDL plans are poorly understood by local watershed managers and communities. Additionally, as watershed groups work to recover depressed stocks of native salmon and trout, many watershed managers expressed concerns that the TMDL's narrow toxicology and chemistry focus is poorly suited to biological recovery efforts. A majority of watershed groups indicated to BEF that these concerns are likely to undermine community interest in and support for TMDL planning and implementation.

The ability to address ecological concerns independently of landownership boundaries is critical to the success of watershed restoration efforts, and community involvement is fundamental to this process (NWPPC 1992; Huntington et. al. 2000). Therefore, without community support and some level of integration with existing watershed restoration efforts, it is likely that TMDL implementation and any other watershed restoration efforts will be unable to employ the watershed-scale approach necessary to achieve biological restoration objectives (Ebersole et. al. 1997).

## **CONCLUSION**

Successful watershed restoration and salmon recovery efforts require a) strong community support, 2) a watershed-scale approach, 3) a scientific basis for action, and 4) long-term monitoring and evaluation capacity (Bayley 2002; Bisson et. al. 1997; Frissell et. al. 1997). Consequently, where ecological restoration or water quality improvement efforts fail to incorporate these parameters, it is unlikely that restoration results can be maximized.

The feedback provided to BEF from local watershed programs in the Pacific Northwest suggests that there is substantial uncertainty among local watershed groups that the TMDL approach contains the necessary provisions to support the four watershed restoration requisites listed above. As a result, it appears that many local watershed restoration programs continue to view the TMDL process as peripheral to community-based watershed restoration and salmon recovery efforts.

We conclude that where TMDLs are implemented independently of local support and ongoing community restoration efforts, it is likely that investments of time and money in TMDL planning and implementation will fail to maximize the desired results.

## **REFERENCES**

Bayley, P. B. 2002. A Review of Studies on Responses of Salmon and Trout to Habitat Change, with Potential for Application in the Pacific Northwest. Report to the Washington State Independent Science Panel.

Bisson, P.A., Reeves, G. H., Bilby, R.E., and Naiman, R.J. 1997. Watershed Management and Pacific Salmon: Desired Future Conditions. In: Pacific Salmon and Their Ecosystems, Naiman ed. Springer Verlag.

Ebersole, J.L., W.J. Liss, and C.A. Frissell. 1997. Restoration of Stream Habitats in the Western United States: Restoration as Reexpression of habitat Capacity. Environmental Management, Volume 21, No. 1, pp. 1-14

Frissell, C.A., W.J. Liss, R.E. Gresswell, R.K. Nawa, and J.L. Ebersole. 1997. A Resource in Crisis: Changing the Measure of Salmon Management. In: D.J. Stouder, P.A. Bisson, and R.J. Naiman (eds.), Pacific Salmon and their Ecosystems: Status and Future Options. Chapman and Hall, New York, New York.

Huntington, C.W. and S. Sommarstrom. 2000. An Evaluation of Selected Watershed Councils in the Pacific Northwest and Northern California. Prepared for Trout Unlimited and Pacific Rivers Council.

Karr, R.J. and Yoder, C.O. In Press. Journal of Environmental Engineering, in press.

NWPPC, 1992. Columbia River Basin Fish and Wildlife Program. Northwest Power Planning Council, Portland Oregon.