# An Artificial Distinction: Addressing water quantity concerns under the Clean Water Act

**Merritt Frey, River Network, September 2011**

*"Petitioners also assert…that the Clean Water Act is only concerned with water "quality," and does not allow the regulation of water "quantity." This is an artificial distinction."*
*Justice O'Connor writing for the Supreme Court*
*in 511 U.S. 700(1994) (writing for the majority)*

Although fish and others who rely on our rivers don't see the separation, our legal system has long treated water quality and quantity as unrelated concerns. Water quality is regulated by the federal Clean Water Act, while state laws govern water quantity. Aquatic and riparian habitat protection and restoration has been even more removed – when habitat issues are addressed at all, it is through a hodge-podge of statutes, regulations and voluntary programs at the federal, state and local level.

Even within our landmark water quality law – the Clean Water Act – biological and physical components of our river systems have received far less attention than traditional chemical pollution issues. Although this is slowly changing, the power of the Act has not truly been brought to bear on issues of quantity or habitat.

The goal of the paper is to identify Clean Water Act and related tools that could be better used to drive in-stream flow and habitat restoration and protection efforts. Our research focuses heavily on flow protection and restoration, but touches on habitat issues where appropriate.

Our findings focus on several policy areas – including better utilizing bioassessement data, developing and implementing strong water quality standards, applying the states' 401 water quality certification power more broadly to flow and habitat issues, and expanding creative use of the Total Maximum Daily Load program to better identify and remedy habitat and/or flow-related impairments. Each finding is illustrated with real world examples from the states and includes recommendations for – and limitations to – importing the policy ideas into new states.

## Section 1: Introduction

### Section 1.1: At issue: the barrier between water quality tool and water quantity

Water quantity and water quality have long been seen as separate areas of law. Water quantity is largely left to the states to regulate, either under the riparian doctrine or the prior appropriations doctrine. The riparian doctrine allows land owners with a stream or other waterbody on their land to make reasonable use of the water, as long as that use does not interfere with other users' reasonable use. The prior appropriations doctrine relies on the basic idea that the first users of the water have the first right to use ("first in time, first in right") and that users must make beneficial use of that water in order to preserve their place in line. The riparian doctrine generally applies in the east, while the prior appropriations doctrine largely covers the more arid west.

On the other hand, the Clean Water Act provides a federal approach to protecting and restoring water quality. While much of the day-to-day work of implementing the Act is delegated to the states, the national structure provides some degree of consistency across state boundaries and the federal oversight of agencies like the U.S. EPA and the U.S. Army Corps of Engineers keeps states accountable to the national vision of clean, healthy water.

But the separation between the water quality and water quantity regulation is not as clean as these descriptions might lead us to believe. As a practical matter, water quality and water quality are clearly intertwined. Water quantity supplies must be clean enough to support their proposed uses, from drinking water to irrigation; insufficient water quantity will reduce water quality and even directly destroy the uses (trout spawning, recreation) we are trying to protect when we regulate water quality. In a nutshell: whether we are a human, a fish, or an aquatic insect, we all need both plentiful and clean water.

Yet the idea that quality or quantity can be addressed as if the other is not at all relevant persists. Two sections of the Clean Water Act are usually cited by those making a legal argument for a sharp, bright line between water quality and water quantity concerns – sections 101(g) and 510(2).

Section 101(g) was added during the 1977 amendments to the Clean Water Act. It states:

> "…that the authority of each State to allocate quantities of water within its jurisdiction shall not be superseded, abrogated or otherwise impaired by this chapter."[1]

Section 510(2) provides nothing in the Act shall:

> "…be construed as impairing or in any manner affecting any right or jurisdiction of the States with respect to the waters (including boundary waters) of such States"[2]

This paper will not present a detailed legal argument in support of breaking down the wall between the Clean Water Act and flow protection and restoration. Those interested in the legal arguments generally supporting the idea that the Clean Water Act can in fact address flow

[1] Clean Water Act 101(g).
[2] Clean Water Act 510(2).

concerns (at least in some contexts) may appreciate reading some of the resources cited in this paper.[3]

However,  as background for the ideas in this paper we present here a few excerpts from the most-widely quoted document on the topic of the Clean Water Act and flows – *PUD No.1 of Jefferson County v. Washington Dep't of Ecology* (92-1911) 511 U.S. 700 (1994). (For more on the specifics of this case, please see Section 2.2.3.)  As noted at the beginning of this paper, in the majority opinion on *PUD No. 1* Justice O'Connor called the separation between water quality and water quantity "artificial."  This statement was viewed with some awe in water policy circles – despite how obvious the statement is in the real world, the separation is often seen as sacrosanct in legal circles.  To put the "artificial" statement in context, Justice O'Connor wrote:

> "Petitioners also assert more generally that the Clean Water Act is only concerned with water "quality," and does not allow the regulation of water "quantity." This is an artificial distinction. In many cases, water quantity is closely related to water quality; a sufficient lowering of the water quantity in a body of water could destroy all of its designated uses, be it for drinking water, recreation, navigation or, as here, a fishery.  In any event there is a recognition in the Clean Water Act itself that reduced stream flow, i.e., a diminishment of water quantity, can constitute water pollution."[4]

In the same opinion, Justice O'Connor went on to say:  "Sections 101(g) and 510(2) preserve the authority of each State to allocate water quantity as between users; they do not limit the scope of water pollution controls that may be imposed on users who have obtained, pursuant to state law, a water allocation."[5]

Elsewhere in the opinion, Justice O'Connor referenced several other sections of the Act and U.S. EPA regulations which clearly address water quantity issues. Justice O'Connor also pointed to the legislative history of the Act when Congress added 101(g) in 1977.  The history reads:

> "The requirements [of the Act] may incidentally affect individual water rights .... It is not the purpose of this amendment to prohibit those incidental effects. It is the purpose of this amendment to insure that State allocation systems are not subverted, and that effects on individual rights, if any, are prompted by legitimate and necessary water quality considerations."[6]

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[3] See www.rivernetwork.org/cwaflow for a repository with citations and links to papers, opinions, and other resources in this paper.

[4] *PUD No 1, 511 U.S. 700* (1994).

[5] *PUD No 1, 511 U.S. 700* (1994).

[6] *PUD No. 1, 511 U.S. 700* (1994) quoting 3 Legislative History of the Clean Water Act of 1977 (Committee Print complied for the Committee on Environment and Public Works by the Library of Congress) Ser. No. 95-14 p. 532 (1978).

Justice O'Connor's summary of the issues in *PUD No. 1* serves as an example of the many holes in the legal wall between quality and quantity. And yet in the nearly 40 years since the Clean Water Act was written and the 17 years since *PUD No. 1* was decided by the Supreme Court, little progress has been made in efforts to connect the Clean Water Act's goals and policy tools with in-stream flow protection and restoration.

**Section 1.2: At issue: the barrier between water quality tools and riparian habitat protection**
The health of the riparian corridor (including the structure, vegetation, etc.) is both impacted by and impacts in-stream flow and water quality.[7] For example, flows may drive the reproduction of certain vegetation in the riparian area. On the other hand, the riparian vegetation may shade the creek, maintaining cooler water temperatures necessary to support certain aquatic life uses.

However, although the Clean Water Act's overarching objective embraces the interrelated nature of river systems ("The objective of this chapter is to restore and maintain the chemical, physical and biological integrity of the Nation's waters"[8]), little policy progress has been made in the last 38 years to incorporate the physical and biological realities of the these systems.[9] This is not due to a lack of interest, research and discussion about the need to integrate the chemical, physical and biological worlds within the Clean Water Act. In fact, since the early days of the Act researchers and policy makers have made a compelling case for integration.[10] For an advocate-friendly introduction to the issues of integration, please see Robert Adler's *The Two Lost Books in the Water Quality Trilogy: The Elusive Objectives of Physical ad Biological Integrity*. This paper incorporates both a thoughtful discussion on the failure to address these issues and ideas for moving forward on them.

In this paper, we address possible application of Clean Water Act tools to riparian habitat protection and restoration where those tools are also useful in addressing flow. There is some degree of overlap between the issues of flow and habitat protection/restoration (see particularly physical criteria and 401 certification), and often flow "fixes" will also help address riparian habitat problems. However, our treatment of riparian habitat ideas is secondary to the

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[7] "The riparian corridor includes the stream channel and also extends some distance out from the water's edge. Odum (1971) provides the following technical definition: Riparian habitats constitute an area of vegetation that exerts a direct biological, physical, and chemical influence on (and are influenced by) an adjacent stream, river, or lake ecosystem, through both above- and below-ground interactions. This area of association extends from the rooting systems and overhanging canopies of streamside flora outward to include all vegetation reliant on the capillary fringe characteristic of soils surrounding aquatic environments. Riparian ecosystems can vary to differences in local topography, stream bottom, soil type, water quality, elevation, climate, and surrounding vegetation." See http://water.epa.gov/type/watersheds/archives/chap1.cfm.

[8] Clean Water Act Section 101(a).

[9] See Robert W. Alder, *The Two Lost Books in the Water Quality Trilogy: The Elusive Objectives of Physical ad Biological Integrity*. Environmental Law, Vol. 33:29. 2003.

[10] See, for example, Karr and Dudley, 1981. Ecological perspective on water quality goals. *Environmental Management* 5: 55-68. This is just one example of the work done on the topic throughout the 70s, 80s, and 90s. Please see www.rivernetwork.org/cwaflow for a repository with citations and links to papers, opinions, and other related resources.

flow focus.[11]

**Section 1.3: The scope of this review**

The goal behind this paper was not to suddenly stumble across one incredible insight that would miraculously bridge the chasm between water quality and water quantity law. Short of a major overhaul of the nation's water policy approach, the two areas of law will remain uneasy companions. However, we were charged with searching for policy ideas within the Clean Water Act world where flow (and to a lesser extent, riparian habitat issues) could be or are being addressed.

Our specific task was to identify some of these policy areas and discuss how they might play out in a five-state study area – Colorado, Utah, Nevada, New Mexico and Arizona. As a result, although this paper is written to address possible ideas for pushing the envelope on Clean Water Act implementation around the country, there is a strategic focus on how the ideas might play out in the semi-arid southwest.

Our charge was not necessarily to conduct extensive legal analysis. Instead, in this paper we present ideas from our own experience and from a group of talented legal minds who have wrestled with the quantity/quality connection. We then translate them into possible strategy options for river advocates. We owe a debt of gratitude to thinkers such as Robert Adler, Richard Roos-Collins, Reed Benson, and others who have written extensively on these topics. We are even less poised to present a detailed scientific analysis of the issues related to integrating the three goals of the Act, so again we attempt to connect readers with the thinking of James Karr and others on the issues. Our hope is this paper can bring together the good ideas already in circulation and help turn those good ideas into tools advocates can apply to on-the-ground action for our rivers.

*Section 2* of this paper addresses four policy tools that may be useful in protecting or restoring flows (and to a lesser extent riparian habitat). For each tool we introduce the policy, provide a basic snapshot of the policy tool in the study area, and demonstrate the use of the tool in an example or examples. Lastly, we summarize a mix of possible strategic approaches to applying the policy tool to flow or habitat issues and identify basic strengths and weaknesses of those approaches.

*Section 3* provides a brief summary of our findings and features two categories of suggested next steps: 1) our suggestions of the most compelling strategies from Section 2 and 2) topics for future research and analysis needs if advocates are interested in pursuing those strategies.

Because in the real world (as opposed to the theoretical policy world) little happens without money, *Appendix A* of this paper briefly touches on funding prospects for flow and habitat

[11] Please note that we were tasked with investigating the application of Clean Water Act tools to flow and stream bank habitat (i.e. tamarisk in the riparian zone, etc.). The Act's tools are even more readily applicable to in-stream habitat concerns.

restoration under the Act's funding programs, and describes a few examples of state-based programs.

## Section 2: Clean Water Act tools for flow protection and restoration

The Clean Water Act is a large and complicated statute, with dozens of programs to consider in a paper such as this. We focus on just four possible policy tools (and touch briefly on funding tools in Section 3) – water quality standards, 401 water quality certification, 303(d) impaired waters listing and Total Maximum Daily Load development, and Category 4C waters listing.

We focus on these tools as the most likely tools to be broadly applicable in the study area (and beyond) and to make a concrete difference on the ground. We based our selection of these tools on the review of policy and legal writing on the issue, our own experience working with watershed groups in the field, and feedback from experts in the field (via discussions and conference presentations). Of course other Clean Water Act policy tools may also be applicable to flow or habitat issues.

### 2.1: Water quality standards

#### 2.1.1.: Introduction

Water quality standards provide the basis for the vast majority of major Clean Water Act programs, and have been used to influence in-stream flow decisions. Water quality standards are made up of three pieces: 1.) designated uses, 2.) water quality criteria and 3.) an antidegradation policy. Water quality standards are developed by the states (and in some cases tribes) within systems established by the U.S. Environmental Protection Agency (EPA), which reviews and approves or disapproves state standards.

Designated uses define the human uses and ecological conditions that a state officially recognizes and should then protect – they may be uses that are currently supported, or they may be goals for the future. Designated uses are assigned to all waters of the U.S. within a state, and often to specific segments or areas of a larger waterbody. At a minimum states' uses must include recreation and aquatic life protection.[12] Some states have very broad use categories (e.g., aquatic life or recreation) while others are more specific (e.g., cold water fishery or swimming).

Water quality criteria are descriptions of the conditions (chemical, physical or biological) necessary in order to support the designated use or uses. Criteria may be numeric (e.g., a minimum of 5.0 mg/L of dissolved oxygen at any time) or narrative (e.g., free from scum or floating debris). Chemical criteria are by far the most widely adopted. Some physical criteria (e.g., temperature) are fairly widespread while others (e.g., stream bank stability or channel form) are essentially non-existent. Biological criteria (e.g., direct measures of the

[12] 40CFR 131.10(a)

macroinvertebrates, fish or vegetation communities) represent a relatively new frontier for states developing criteria, with some states leading the way and many others far behind.

The antidegradation policy and its related implementation procedures are different creatures. Antidegradation is a statewide policy applied to all waterbodies and many implementation activities. In a nutshell, antidegradation is about protecting water quality from unnecessary degradation. The policy is usually set up using a three-tier approach, which mimics the federal structure:

- Tier one: protect existing uses. No activities are allowed to harm or eliminate an existing use or to lower water quality below criteria.
- Tier two: maintain high water quality where it exists. This involves avoiding lowering water quality unless it can be proven there is no feasible alternative and that the lowering of water quality supports important local social and economic development.
- Tier three: firmly protect "outstanding" waters. For waters designated as outstanding recreational or ecological resources, degradation is simply not allowed.

How can water quality standards be used to protect or restore flows and habitat? Let's investigate the prospects of each of the three pieces of standards.

2.1.1.1: Designated uses and flow

On the surface, maintenance of designated uses seems to quite clearly require flow protection– how long will a fish survive in a stream with no water? Who will swim in a stream or lake with no water? The connection between Clean Water Act requirements to protect designated uses and the need to protect flow are so obvious as to be hard to explain.

The connection between protecting designated uses and protecting flows goes beyond just the presence or lack of water in a stream. Timing of flows, peak flows, and other hydrology issues must be addressed to protect many aquatic life uses (e.g. spawning triggers, fish passage, etc.) and recreational uses (e.g. peak flows for whitewater rafting).

However, few policy or legal connections have been explicitly made between use protection and flow protection. On the policy front, U.S. EPA has been loath to address the designated use/flow connection and most states have avoided the topic.[13] (See water quality criteria section below and the TMDL section later for exceptions to this general statement.) Slightly more motion has been seen on the legal front, as referenced in the *PUD No. 1* references earlier.

*PUD No. 1* represents one of the clearest examples of tying the protection of a designated use directly to in-stream flow requirements. The case is described in more detail in the 401 water

[13] For a fleshed out discussion of this fact, see Reed D. Benson. Pollution Without Solution: Flow Impairment Problems Under Clean Water Act Section 303. Stanford Environmental Law Journal, Vol. 24: 199-267. 2005.

quality certification section (see Section 2.2) of this paper, but it is worth noting here that the protection of a designated use formed the basis for the in-stream flow requirement in this case.

In *PUD No. 1*, the river in question – the Dosewallips River – was designated as a "Class AA" water, the highest designation possible in Washington. Designated uses for the stretch of river affected by the hydroelectric project include salmon migration, rearing, spawning and harvesting. Washington state's water quality standards mandate that these "existing beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurious to [such] . . . uses will be allowed." No water quality criteria for flow existed, but the Supreme Court found that the in-stream flow requirement was justified based directly on the need for flow to protect the designated uses. Again, see the 401 certification section for more on this story.

2.1.1.2: Water quality criteria and flow

Clearly the most direct way to connect criteria and flow is to establish water criteria for in-stream flow. However, other criteria such as biocriteria or even more traditional criteria which are flow-related may be just a powerful (or more powerful) as in-stream flow criteria for protecting the overall health of an aquatic ecosystem.

*In-stream flow criteria*

First, let's look at in-stream flow criteria as a tool. In-stream flow criteria are relatively rare nationally, and non-existent in the study area. Where they exist however, in-stream flow criteria can be a powerful tool. Explicit in-stream flow criteria can provide the firmest basis for regulatory action to protect flows in order to protect water quality.

Nationwide only a handful of states have in-stream flow criteria in place and, given the political reality of flow issues in the southwestern U.S., it seems unlikely that the study area states will develop them in the near-term. Still, in-stream flow criteria could provide the most direct connection between water quantity needs and Clean Water Act implementation tools. So while states – and particularly Western states – may be resistant to the idea of in-stream flow criteria, advocates can clearly make a strong case for them. And although U.S. EPA has not pushed for adoption of in-stream flow criteria as a national priority, policy priorities can always change. For example, U.S EPA's Region 4 (the southeastern part of the U.S.) has put their states on notice that in-stream flow criteria need to be addressed. In part as a result of that effort, Tennessee recently adopted criteria for flow protection for its aquatic life and recreation designated uses.[14]

In-stream flow criteria are not silver bullet however. The criteria are not self-implementing (i.e., they do not protect or improve in-stream flow by their very existence, but rather require some sort of additional policy tool (e.g., 401 certification) to trigger their power. In addition,

[14] Tennessee Chapter 1200-4-3-.03(3) (o): "Flow – Stream or other waterbody flows shall support the fish and aquatic life criteria" and Tennessee Chapter 1200-4-3-.03(4)(m): "Flow – Stream flows shall support recreational uses."

historically the power of in-stream flow criteria has been handicapped by overly-simplistic criteria development. For example, minimum in-stream flow requirements miss the mark in protecting aquatic ecosystems dependent on complex flow regimes and other factors.

*Biocriteria*

Other types of criteria may provide as strong or nearly as strong a basis for protecting in-stream flow. One of the most talked about criteria/flow angles is biocriteria. U.S. EPA describes biocriteria this way:

> **"**The presence, condition and numbers of types of fish, insects, algae, plants, and other organisms are data that together provide direct, accurate information about the health of specific bodies of water. Studying these factors as a way of evaluating the health of a body of water is called biological assessment. Biological criteria (biocriteria) on the other hand, are a way of describing the qualities that must be present to support a desired condition in a waterbody, and they serve as the standard against which assessment results are compared."[15]

The flow connection here is readily apparent – if biocriteria are defining the qualities that must be present to support a healthy aquatic community, flow is both directly and indirectly (i.e., flow will impact all kinds of factors such stream bottom conditions, aquatic vegetation, etc.) an important driver (although not the only driver) of the aquatic community's health.

However, biocriteria do not directly measure in-stream flow, hydrologic regime, or the health of riparian habitat. Instead, biocriteria are an indicator (albeit a very direct one) of the health of aquatic and plant life in a system. If monitoring demonstrates a violation of the biocriteria, additional work must be still be done to show if the violation is a result of flow or habitat changes, chemical parameters, or other causes. However, the opposite may also be true – simply establishing in-stream flow requirements may not result in a healthy ecosystem or improvement in achieving biocriteria. To achieve the goal of a healthy system, we of course need to consider diverse factors (flow, water quality, habitat, etc.) and measuring the status of the biological system is the only way to integrate all those factors and achieve a complete picture of the system.[16]

Bioassessment is a related concept which may be useful to advocates for flow and habitat protection or restoration. U.S. EPA defines bioassessement as, "**…** an evaluation of the biological condition of a waterbody using biological surveys and other direct measurements of resident biota (e.g. macroinvertebrates, fish, etc.). Bioassessements both support development

[15] U.S. EPA's Biocriteria and Bioassessement Basics webpage at http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/biocriteria/basics.cfm as accessed 4/12/2010.
[16] For more information on the need to integrate multiple factors to truly understand (and improve) aquatic ecosystem health, see Karr and Dudley, 1981. Ecological perspective on water quality goals. *Environmental Management* 5: 55-68.

of biocriteria and decisions about attainment of biocriteria."[17] As noted in the strategy section, bioassesement programs are active around the country and in all of the study area states. These programs collect extensive data that documents riparian area health, flow, and basic hydro-geomorphology data.

*Physical criteria*

As mentioned earlier, some physical criteria parameters such as temperature are widely applied. But most physical parameters are not addressed at all by state standards programs (although a few are, such as stream bottom deposits). So, factors that may be very flow-related or drive habitat issues such as stream geomorphology, streambank stability, etc. are generally not included in state Clean Water Act structures. Arizona is in the process of developing geomorphic physical criteria, but is years away from proposing them.[18] The other states in the study area are not currently considering these types of criteria.

Physical criteria could be a good tool for addressing both flow and habitat alteration issues. Stream shape, bank stability and other factors are directly influenced by flows – whether the lack of flows or changes in the hydrologic patterns (e.g. timing, peaks, etc.). Physical criteria could also be tied to riparian habitat. For example, invasive riparian species such as tamarisk might dramatically change a stream's geomorphic structure and lead to a violation of the physical criteria.

*Flow-related or dependent criteria*

As described in more detail in the impaired waters section of this paper (Section 2.3), even where in-stream flow or biocriteria do not exist more traditional parameters may be related to flow. Examples include temperature (lower stream flows result in a lower volume of water which heats up more easily), sediment-related parameters (changes in stream flow may result in stream bottom deposits, etc.), total dissolved solids (salts are concentrated in less volume of water) and many other parameters. Again, see Section 2.3 for a wider discussion of this idea.

<u>2.1.1.2: Antidegradation and flow</u>

As described earlier, antidegradation is a core piece of water quality standards. As such, antidegradation applies to a variety of core Clean Water Act programs, and beyond.

When thinking about applying antidegradation in the flow context, it pays to think through how each "tier" of antidegradation protection might apply. Under Tier 1 protection, a state can not allow the removal of an existing use. Therefore, if a change in flows (or habitat alteration) would remove a use, that action would not comply with the antidegradation policy. See 401 certification example in Section 2.2.

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[17] http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/biocriteria/basics.cfm last accessed 4/12/2011.

[18] Merritt Frey. *Implementing the Clean Water Act in the Intermountain West: An Overview*. November 2009.

For Tier 2 situations, the antidegradation policy allows a review of whether to allow a reduction in flows (i.e. can the project occur as proposed at all), rather than just how to allow the reduction (i.e. what minimum flows, etc. might be required, etc.). The agency should do this by applying the alternatives test and social and economic review required under the Tier 2 protections. If there are feasible alternatives or if the proposed project does not result in important social and economic development in the area, the proposed project would not comply with the antidegradation policy.

Tier 3 protections for particularly outstanding waters could arguably (although we could find no example where this had been tested) protect flows altogether. In these waters, no degradation of water quality is allowed and removing flows would most likely result in concentrating pollutants, which would degrade water quality.

When it comes to flow and habitat issues however, antidegradation has rarely been applied. For an example of the possible power of antidegradation in protecting flows, see Section 2.1.3.

**2.1.2: Study area roundup**

As mentioned earlier, no state in the study region has established water quality criteria for in-stream flow.

Table A: In-stream flow criteria in the study area states

| State | In-stream flow criteria exist |
|---|---|
| Arizona | No |
| Colorado | No |
| Nevada | No |
| New Mexico | No |
| Utah | No |

On the other hand, three of the five states exempt water quality standards violations during low flow conditions. These exemptions mean rivers may be unsafe for people or aquatic life during drought conditions. The exemptions may also reduce any motivation dischargers might have to advocate for in-stream flow protection because they have less of a need for flow to dilute discharges.

**Table B: Low flow exemptions in the study area states**

| State | Low flow exemption | Notes |
|---|---|---|

| | exists | |
|---|---|---|
| Arizona | No | The state does have a use category for "Effluent-Dependent Waters."[19] |
| Colorado | Yes | Low Flow Exceptions: "Water quality standards shall apply at all times; provided, that in developing effluent limitations or other requirements for discharge permits, the Division shall normally define critical flow conditions using the following low-flow values…"[20] The regulation goes on to describe those values. |
| Nevada | Yes | "The specified standards are not considered violated when the natural conditions of the receiving water are outside the established limits, including periods of extreme high or low flow .....".[21] |
| New Mexico | No | |
| Utah | Yes | "Intermittent Waters: Failure of a stream to meet water quality standards when stream flow is either unusually high or less than the 7-day, 10-year minimum flow shall not be cause for action against persons discharging wastes which meet both the requirements of R317-1 and the requirements of applicable permits."[22] |

Most states in the region have recently or are currently developing biocriteria, particularly for smaller rivers and streams. The biocriteria may prove useful in better identifying flow or habitat impaired waters in upcoming monitoring and reporting cycles for the 303(d) and/or the Category 4C waters reports (see Section 2.3 for a discussion of why this might matter). However, most states are indicating reluctance to use the biocriteria in other regulatory programs.

Table C: Biocriteria in the study area states

| State | Biocriteria exist | Biocriteria language |
|---|---|---|
| Arizona | Yes, narrative with a quantifiable implementation procedure | "A wadeable, perennial stream shall support and maintain a community of organisms having a taxa richness, species composition, tolerance, and functional organization comparable to that of a stream with reference conditions in Arizona." [23] |
| Colorado | No | Colorado does have Policy 2010-1 – Aquatic Life Use |

[19] Arizona R18-11-113
[20] Colorado 31.9.1
[21] NAC 445A.121(8)
[22] Utah R317-2-9
[23] Arizona R18-11-108.E

| | | |
|---|---|---|
| | | Attainment. The policy lays out the bioassessment tool (multimetric index) and numeric thresholds – but the state isn't calling them "biocriteria." However, the policy will be used for identifying impaired waters in the next cycle. |
| Nevada | No | n/a |
| New Mexico | Yes, narrative | "Surface waters of the state shall support and maintain a balanced and integrated community of organisms with species composition, diversity and functional organization comparable to those of natural or minimally impacted waterbodies of a similar type and region."[24] |
| Utah | No, but narrative under development | Proposed language: "The taxonomic composition, richness or functional organization of an assemblage of aquatic organisms shall not differ from comparable measures observed at reference sites. Violations of this criterion will be determined using scientifically defensible and statistically rigorous methods and other information.<br><br>This biological criterion alone shall not be used for regulatory and enforcement actions, such as the development or enforcement of Utah pollution discharge elimination system permits. However, biological assessment methods that have been approved by the Executive Secretary, following consultation and review by the Board and other interested parties, may be used to assess support of biological uses as assigned in R-317-2-6. Biological assessment methods may also be used, in combination with other information, to support the development of site-specific standards, new or refined aquatic life use categories, or to support the need for new permit limits."[25] |

We also researched flow-related or dependent criteria in the study area to identify any particularly important criteria that may tie to flow or habitat issues. In addition to the biocriteria discussion, we suggest temperature, total dissolved solids, and sediment-related criteria are the most broadly relevant criteria to consider. In addition, in certain situations parameters such as nutrients, dissolved oxygen and other dissolved constituents may relate to

[24] New Mexico 20.6.4.13(M)

[25] Working draft for proposed narrative biocriteria presented to the Water Quality Standards work group and available online at http://www.waterquality.utah.gov/WQS/workgroup/2011/meeting05-16/5-NarrativeBiologicalStandard.pdf.

flow and provide a method for reaching flows and/or habitat issues. The decision of which criteria to focus on will vary from state to state, and perhaps even from situation to situation.

**2.1.3: Example(s) in action**

Tennessee, antidegradation, and water withdrawals

Although PUD No. 1 relied in part on compliance with antidegradation when supporting the state's minimum in-stream flow conditions, relatively little has been done with antidegradation and flow or habitat protection. Work in Tennessee provides an exception.

The state uses antidegradation in 401 water quality certification process (see section 2.2 for more information on 401 certification) as well as state permitting processes for habitat alteration and/or water withdrawals to address both water quantity and water quality concerns. The agency reviews withdrawal proposals and other permits to ensure uses will be protected, to protect high quality waters through antidegradation alternatives and social and economic justification requirements, and to protect outstanding waters.

One of the most interesting aspects of the Tennessee approach is that they ask the question of whether to allow a withdrawal under antidegradation (i.e. can the withdrawal occur at all), rather than just how to allow the withdrawal (i.e. what minimum flows, etc. might be required). The agency does this by applying the alternatives test and social and economic review required by Tier 2 protections.

The logic here is as follows: 401 water quality certification requires the state to certify that the permit will result in compliance with water quality standards. Water quality standards include antidegradation. For those parameters where quality is better than the criteria, antidegradation requires that the applicant show there is no feasible alternative to the proposed degradation and that the degradation will result in local economic and social development. If the agency decides there are in fact alternatives or if the degradation does not support important local economic and social development, the proposal does not comply with antidegradation, hence does not comply with water quality standards, and hence the 401 certification must be denied.

This example illustrates the power of antidegradation to trigger a discussion of alternatives to dams, withdrawals, habitat loss, etc. Just as importantly, the example underlines the ability of states to require economic review of the proposal – something that is rarely done in this fashion. However, the example also again makes the point that standards are not self-implementing – 401 certification or some other policy tool is needed to apply antidegradation in the real world.

**2.1.4: Possible strategies for connecting standards and flow**

*Strategy A: Strengthen and clarify designated uses to better connect uses to flow needs.*

If advocates are interested in using Clean Water Act tools to protect flows or habitat, having appropriate designated uses in place will form the basis of this work. Having "appropriate" uses includes two concepts:

1. Appropriately detailed designed uses. If a strategy relies on designated use protection as its underlying driver, it will be critical to have the designated use reflect the specific requirements of aquatic life and people. For example, if a state simply lists "aquatic life" as its designated use, a state may establish a flow requirement which provides just enough water to keep a fish tolerant to harsh conditions (e.g. heat, etc.) alive. If the stream is really supporting native trout or sensitive species, those flows would allow the loss of those specific species while still technically supporting the generic use. The designated uses in the study area are more detailed than this example, but could benefit from additional detail. Some states (particularly Nevada and Utah) could particularly benefit from attention to uses. In addition, Arizona and Colorado have established troubling categories for effluent-dependent waters, which need to be addressed.

2. The right designated uses on the right waterbodies or segments. It will be important to be sure the assigned designated uses reflect the reality on the ground. For example, if a stream segment is designated as a warm water fishery but is really a cold water fishery, it will be harder to use tools such as 401 water quality certification to advocate for enough, cold water in the segment – the designated use and related standards will set the wrong goal for the process.

*Strategy B: Pursue in-stream flow criteria as the most direct route to connecting standards and flow.*

In-stream flow criteria will be hard (some might say impossible) to establish in the study area. However, in-stream flow criteria are the most explicit tool for ensuring flow is considered in all Clean Water Act program decisions. As a result, we suggest establishment of in-stream flow criteria is worthy of at least a strategic discussion among advocates in the study area. Strategy discussion should go beyond the idea of statewide in-stream flow criteria (which will likely be dismissed out of hand) to investigate more subtle ideas such as:

- The possibility of removing or modifying low-flow exemptions from the standards.
- In-stream flow criteria for specific, special waters (e.g. perhaps blue ribbon trout streams or streams that are otherwise designated as special or critical habitat).

In other parts of the country, pursuing in-stream flow criteria may be the first order of business. For example, Region 4 of U.S. EPA is actively urging their states to consider creating in-stream flow criteria during their Triennial Review process.[26] The development of in-stream flow criteria must move beyond the idea of minimum in-stream flows to

[26] As discussed by Lisa Perras Gordon and Susan Hansen of U.S. EPA Region 4 at a May 2, 2011 workshop "Flow Protection through Federal Water Quality Law and Regulation" at Flow 2011 in Nashville, TN.

incorporate the new and improved approaches for establishing criteria based on the flow regimes required to protect the entire aquatic ecosystems.  As an aside, moving in-stream flow criteria forward will likely be easier (although still not easy) in the less arid parts of the country  and those areas outside of the prior appropriations system.

*Strategy C:  Push development of strong biocriteria and physical criteria which tie flow and riparian habitat to use support.*

Biocriteria could be a very helpful tool in in-stream flow efforts – and will provide additional, broader benefits in the water quality arena.  Although the flow connections are very clear when one contemplates the language of most narrative biocriteria, it will remain challenging to translate biocriteria compliance into specific flow protections. However, we strongly suggest advocates engage with their state's biocriteria process, particularly as it relates to impairment decisions. Why? Biocriteria are even more important for flow and habitat protection than in-stream flow criteria alone because biocritiera can integrate flow, habitat and water quality concerns.

While a longer-term prospect, we suggest advocating for physical criteria may be a strong strategy for advocates concerned about flow and habitat alterations. This area deserves additional research, but could provide a mechanism for addressing both low and high flows, as well as riparian habitat changes such as invasive riparian species or stream bank structure.

*Strategy D:  Better track and analyze bioassessement data in the states to help identify habitat impaired waters (including those impaired by invasive species) and flow impaired waters.*

This is an area that deserves more research. Although all the states in the study area have bioassessement programs, more could be done with the data collected through the programs – particularly as it relates to habitat data.  Generally speaking, state bioassessement programs collect extensive biological data (ranging from samples of in-stream macroinvertebrates to fish shocking results to riparian corridor assessments).

Some of the data are cataloged and analyzed, but much of it is simply filed away.  Data related to indices such as macroinvertebrate data appear to be routinely analyzed and used. On the other hand, data collected related to riparian vegetation, stream geomorphology and other direct habitat measures is often left on paper forms and never translated into a form useful for analysis.  As a result, data that river advocates could use to help identify habitat and flow problems are lost in drawers.

Reportedly, the data forms containing this information used to be scanned and converted to usable electronic data using a system funded by U.S. EPA. That funding no longer exists, and the states have largely been unable to keep up the system.

*Strategy E:  Develop the legal and policy arguments for applying antidegradation principals to flow and riparian habitat issues.*

Antidegradation could be an important tool for flow and habitat protection when applied in concert with other strategies. Although the policy connections are quite clear in theory, there is limited track record of applying antidegradation in this context. Discussions and analysis to support advocates efforts to use antidegradation to protect flows would be helpful.

### 2.1.5: Strengths and weaknesses

*Strengths*

- Designated uses and criteria such as in-stream flow and biocriteria are the most explicit policy tool connections to flow and habitat conditions on the ground. These policy tools directly measure the health of a system and the goals we have for those systems – particularly in the case of biocriteria.
- Antidegradation may be a powerful tool for protecting in-stream flow or habitat, as opposed to many of the policy tools focused on restoring flows.
- Work on more traditional criteria (temperature, etc.) may help with flow and habitat issues. This work may be more comfortable (and hence easier to move forward) for both river advocates and agency staff. However, this approach runs the risk of oversimplifying the needs of the systems by focusing too narrowly on one problem and hence missing the overall needs of the system. See Strategy K for more information.

*Weaknesses*

- The most fundamental weakness of any strategy under the standards heading is that standards are NOT self-implementing. For example, even where in-stream flow criteria exist they must be implemented via a permitting process, 401 certification or 303(d) listing. So, the strategies listed here cannot be stand-alone approaches.
- Development of criteria can be very time-consuming and technical. For example, river advocates may not have the capacity to engage on the technical details of biocriteria development.

## 2.2: 401 water quality certification

### 2.2.1: Introduction

One of the Clean Water Act's strongest tools for protecting physical and biological values of our rivers is also one of the most under-utilized – 401 water quality certification. Water quality certification allows states to review and veto or place conditions on activities requiring a federal license or permit that may result in a discharge. States can place an incredible array of conditions (or deny certification) if necessary to comply with their water quality standards (including designated uses such as aquatic life uses) and other policies.

Water quality certification is triggered by the application for a federal license or permit, which includes but is not limited to wetland dredge and fill permits, Federal Energy Regulatory

Commission hydropower licensing, pollution discharge permits in areas where U.S. EPA issues the permits, and more. In fact, the relevant language in the Act is quite broad:

> "Any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the navigable waters at the point where the discharge originates or will originate, that any such discharge will comply with the applicable provisions of sections 301, 302, 303, 306, and 307 of this Act."[27]

So, in order to have 401 certification available as a policy tool you must have a federally licensed or permitted activity which may result in a discharge to a water of the U.S. Some courts have found that water quality certification is not triggered by a federal license or permit with a nonpoint source discharge (e.g. a grazing permit).[28] This is not a settled legal matter, [29] but is currently dramatically limiting the types of permits to which states apply their 401 certification authority.

When faced with an application for 401 certification, a state can:

1. certify the project;
2. certify the project but with required conditions necessary to comply with water quality standards;
3. deny certification (and hence deny the permit); or
4. waive its certification authority.

This process is a rare chance to fundamentally change the way an activity is conducted or to stop it altogether. Through the 401 certification process, river advocates can make the case for very specific conditions to protect flow, riparian habitat, and water quality. Various 401 certification processes have successfully required in-stream flows, habitat restoration or protection, very specific best management practices, monitoring, and more. If a state places a 401 condition on a federal permit, it <u>must</u> be incorporated into the permit. Alternatively, if a state denies 401 certification of a federal permit, the permit is not valid and the activity can not be allowed.

The connection between the 401 certification tool and in-stream flow protection is particularly strong. In the rare cases where a state has explicit in-stream flow criteria, water quality certification clearly can use those criteria as the basis for denial or conditioning of a permit.

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[27] Clean Water Act, Section 401(a)(1)
[28] See Oregon Natural Desert Association vs. Dombeck, 172 F.3d 1092 (9th Cir. – Or. 1998).
[29] See for example: Scott Smithline, *Section 401 of the Clean Water Act and its Application to Nonpoint Source Pollution in California,* 30 Golden Gate U.L. Rev. (2000), http://digitalcommons.law.ggu.edu/ggulrev/vol30/iss1/7.

However, water quality certification can just as readily rely on the need to protect a designated use or uses for its power – clear cases for flow protection could be made in many situations for most uses, from aquatic life to recreation and beyond. Water quality certification can also, of course, be applied based on biocriteria or other more traditional water quality criteria which can be tied to flow regimes (e.g. temperature, dissolved oxygen). In addition, 401 certification can premise its conditions or denials on "any other appropriate requirement of State law."[30]

### 2.2.2: Study area roundup

The development of 401 certification programs in the study area states varies. For example, two of the states have 401 certification regulations, one is developing regulations and two states have no regulatory structure for the program. A lack of regulations does not necessarily mean a state's program is poor, and having regulations in place does not guarantee a strong program. However, the absence of a structured process for 401 certification may suggest a lack of engagement on the state's part with the program and may make it harder for citizens and others to engage in the process.

**Table D: Study area states with 401 certification regulations in place**

| State | 401 certification regulations in place? | Notes |
|---|---|---|
| Arizona | No | However, Arizona does have extensive statutory language about the 401 program. See A. R. S. 49-202. |
| Colorado | Yes | |
| Nevada | No | |
| New Mexico | Yes | New Mexico also has statutory language about 401 certifications. See NMSA 74-6-5. |
| Utah | No | However, regulations are under development. |

Another example of the variability of the state programs is illustrated by the range of the number of 401 certifications issued. Annual use of 401 certification in the region ranges from a low of 12 (Utah) to a high of 120 (New Mexico). The number of 401 certifications issued does not directly correlate with the quality of the program as many factors affect the numbers. For example, U.S. EPA issues the point source discharge permits in New Mexico (but not in the other states). As a result, the point source discharge permits in New Mexico are federal permits, triggering 401 certification by the state. So, New Mexico has a larger pool of opportunities for issuing 401 certification.

**Table E: Study area states number of 401 certifications issued in a recent 12 month period[31]**

[30] Clean Water Act Section 401(d)
[31] Merritt Frey. *Implementing the Clean Water Act in the Intermountain West: An Overview*. November 2009, page 66. Please see this report for sources and caveats. http://www.rivernetwork.org/sites/default/files/chapter4.pdf

| State | Time period | Number issued |
|---|---|---|
| Arizona | Fiscal year ’08 (July ‘07-June ’08) | 63 |
| Colorado | Calendar year ‘08 | Approx. 50 |
| Nevada | Annual estimate | Approx. 60-80 |
| New Mexico | Calendar year ‘08 | Approx. 120 |
| Utah | Annual estimate | Approx. 12 |

States rarely use the ultimate power of denying 401 certification, but most states in the study area have proven willing to deny 401 certification when necessary. Discussions with state agency staff suggest that although denials are rare, the threat of a denial is often enough to motivate permit applicants to modify a project to better protect water quality, habitat or flow.

**Table F: Study area states ever denying a 401 certification**[32]

| State | Ever denied a 401 certification? |
|---|---|
| Arizona | Not in staff’s memory |
| Colorado | Yes, on “very rare” occasions |
| Nevada | Yes, very rarely |
| New Mexico | No |
| Utah | Yes, once |

Like other states, states in the study area fairly routinely apply their 401 certification authority to “traditional” permits such as 404 wetlands and stream alteration permits, FERC hydropower licenses and – where applicable – U.S. EPA-issued pollution discharge permits. However, no state in the study area reported conditioning other permits, such as mining permits or Special Use Permits from the U.S. Forest Service or other federal land management agencies.[33]

### 2.2.3: Example(s) in action

The most famous 401 water quality certification and in-stream flow case: *PUD No. 1*[34]
The Dosewallips River was caught in a power struggle between the state of Washington and the federal government. The struggle began in 1982, when Jefferson County Public Utility District and the city of Tacoma proposed to build a new hydroelectric project on the Dosewallips River.

[32] Merritt Frey. *Implementing the Clean Water Act in the Intermountain West: An Overview*. November 2009, page 66. Please see this report for sources and caveats. http://www.rivernetwork.org/sites/default/files/chapter4.pdf
[33] Merritt Frey. *Implementing the Clean Water Act in the Intermountain West: An Overview*. November 2009, page 66. Please see this report for sources and caveats. http://www.rivernetwork.org/sites/default/files/chapter4.pdf

[34] This story has been paraphrased from Katherine Ransel. *The Sleeping Giant Awakens: PUD No.1 of Jefferson County v. Washington Department of Ecology*, 25 Envtl. L. 255 (1995).

The Elkhorn Project would have diverted water from the river to generate electricity and discharge the water back to the river a little more than one mile downriver.

About 75 percent of the water would leave the river for power generation. Because the project required a license from the Federal Energy Regulatory Commission, it also needed a 401 certification from the state certifying that the project was in compliance with water quality standards.

The Dosewallips River was designated as a “Class AA” water, the most protective aquatic life use designation possible in Washington state. Uses for the stretch of river affected by the hydroelectric project include salmon migration, rearing, spawning and harvesting. The state's water quality standards mandate that these "existing beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurious to [such] . . . uses will be allowed."

The Washington Department of Ecology, relying on the expertise of the region's fisheries agencies and tribes, determined that the salmon fishery in the Dosewallips would be harmed if the project withdrew the amount of water it proposed for electrical generation.

The agency required, as a condition of certification, a minimum in-stream flow ranging between 100 and 200 cubic feet per second (cfs), depending on the season. Tacoma challenged the state's authority to condition the certification on a minimum in-stream flow, but the Washington Supreme Court concluded that the in-stream flow requirement was a proper exercise of state authority under Section 401. It also held that states may impose any conditions which are reasonably necessary to enforce numeric and narrative criteria. The Court pointed out that Washington's standards specify that "aesthetic values shall not be impaired."

The case then moved on to the U.S. Supreme Court. The Court affirmed the Washington Supreme Court in a seven-to-two opinion.  Importantly, the Supreme Court held that the use designations of water bodies — such as the salmon fishery on the Dosewallips — could form the basis of Section 401 conditions. The Court found there may well be occasions when the criteria alone would not protect the designated uses.

Pushing the envelope on 401 certification triggers: Fay Creek

An exciting recent (2011) example of the power of 401 certification to address flows involves Fay Creek, a tributary to the South Fork of Kern River in California.  The courts found the U.S. Forest Service acted arbitrarily and capriciously when they re-issued a Special Use Permit (SUP) to operate a diversion and small dam on Forest Service lands without seeking 401 water quality certification from the state.[35]  The SUP had allowed a rancher to take 100 percent of Fay Creek’s flow.

[35] United States District Court, E.D. California.  Sequoia Forestkeeper v. United States Forest Service, et al. No. CV F 09-392 LJO JLT.  March 15, 2011.

According to the local group who challenged the SUP – Sequoia ForestKeeper – the lack of in-stream flows have clearly harmed aquatic and riparian habitat:

> "The increased diversions have caused lower stream flows below the diversion dam during the rainy season, resulting in higher water temperatures and reduced dissolved oxygen levels, both of which are detrimental to trout. Stream flows below the diversion dam during the critical summer period have been reduced to levels incapable of sustaining the entire stream habitat. Local residents have noticed dry stream beds where trout once thrived and willow and cottonwood trees dying along the stream course. The only hope for recovery of downstream sections of Fay Creek, where populations of fish and other aquatic organisms have been killed and riparian habitat has been damaged, is if water is permitted to flow again."[36]

Again according to the local group (and inquires with legal experts on the topic appear to support this claim), this is the first time a Court has held that the Forest Service must seek 401 certification for a SUP before it can allow a water diversion from an existing dam. The 401 certification may make a huge difference in the future of Fay Creek, because California requires at least some flow in the creek at all times to protect downstream resources, such as fish and riparian vegetation.

This decision is particularly exciting because it may push the boundaries of 401 certification "triggers." See Strategy G below.

**2.2.4: Possible strategies for connecting 401 certification and flow**

*Strategy F: More broadly pursue flow or habitat conditions on permits traditionally addressed by 401 certification.*

River advocates may want to more consistently advocate for in-stream flow conditions on permitting activities already regularly triggering 401 water quality certification. These include 404 wetland and stream alteration permits, new or re-issued hydropower licenses from the Federal Energy Regulatory Commission, Nuclear Regulatory Commission permits, and EPA-issued NPDES permits (relevant only in New Mexico and tribal lands within the study area).

Historically, most in-stream flow conditions applied through the 401 certification process have been placed on FERC hydropower permits. This makes sense because the connection between these permits and flows is fairly direct – if a dam or diversion is put in place to generate power, flows are changed. Hence conditions to protect minimum flows or the timing of flows are intuitive.

[36] Ara Marderosian. "Fay Creek: Victim of Lake of Enforcement and Greed." The Sequoia Seedling, Volume 2, November 2003. Page 4.

However, any activity which triggers 401 certification review is a viable candidate for flow conditions. The license or permit at issue does not need to be for an activity which causes changes in flow or dewaters a stream. The Supreme Court has written: "…401(d) is most reasonably read as authorizing additional conditions and limitations on the activity as a whole once the threshold condition, the existence of a discharge, is satisfied."[37] So, for example, an EPA-issued NPDES permit could be conditioned by a state or tribe to require that the flows from a facility be released in a manner protective of downstream habitat (i.e. perhaps mimicking the natural hydrograph).

Our initial research did not unearth any examples where flow conditions were placed on the broader range of "traditional" 401 certification triggers. Additional research for examples would be wise, as would the development of a strategic approach for making the case for these types of conditions.

*Strategy G: Expand the universe of permits regularly triggering 401 review – especially for U.S. Forest Service and Bureau of Land Management permits – and advocate for flow or habitat conditions.*

This is one of the most exciting areas for further research, thinking and action. As the Fay Creek example shows, the universe of activities that could be drawn into 401 certification – and hence receive in-stream flow conditions – is larger than the "traditional" world of FERC and 404 permits. River advocates could be pushing the applicability of 401 to include a host of activities permitted by Forest Service/Bureau of Land Management/Park Service, federal construction projects, etc.

In our research we looked just at the possibilities within the U.S. Forest Service permitting world. In a 2010 review of the application of 401 water quality certification in the study area, (and actually around the Intermountain West) we found that no state was applying their 401 certification power to Forest Service permits. The Forest Service generally issues several kinds of permits, including grazing and timber permits, mining permits, and Special Use Permits.

Much of the activity permitted through the Forest Service systems may generate nonpoint source pollution, rather than point source. As noted earlier, some courts have found that water quality certification is not triggered by a federal license or permit with a nonpoint source discharge (e.g. a grazing permit). While this is not a settled matter of law, without additional legal developments the usefulness of 401 certification tool may be severely limited in many parts of the study area where nonpoint sources of pollution are the main or only activities.

However, many of the permitted activities should be triggering 401 water quality certification, but are not. Since the Fay Creek decision, discussions with staff at the U.S. Forest Service headquarters in D.C. suggest guidance is under development to help identify

[37] *PUD No 1, 511 U.S. 700* (1994).

when Special Use Permits for dam and diversion projects on Forest Service lands trigger 401 certification. This alone will greatly expand the number of 401 certification trigger points. For example, there are hundreds of small (and not so small) dams on Forest Service lands. 401 certification could be triggered when existing dams' SUPs are renewed and when new dams are proposed. How big of an opportunity is this? It isn't totally clear, but a quick analysis demonstrates this involves more than a few, limited situations.

**Table G: Existing dams on U.S. Forest Service Lands in Study Area States**[38]

| State | USFS Dam Count |
|---|---|
| Arizona | 48 |
| Colorado | 336 |
| Nevada | 5 |
| New Mexico | 6 |
| Utah | 144 |
| **Total** | **539** |

These data likely largely underestimates existing dams, given limitations in the GIS dataset.

The scope of this issue is not that limited though. Special Use Permits cover activities from recreational events, to ski resorts, to marinas. Where those permits have the potential to result in a discharge – or at least a point source discharge as currently interpreted by the courts – the 401 certification process would be triggered. So, if a Special Use Permit is proposed for a new or expanded ski area and that ski area would result in a discharge (for example, stormwater runoff) the state agency can invoke its 401 certification power on the SUP and require protection or augmentation of in-stream flows and/or habitat.[39]

Mining permits from the Forest Service also represent an area in need of additional research. While some mining activities may not result in the potential for a discharge from a point source, others will. For those permitted activities, 401 certification should be pursued.

*Strategy H: Pursue a legal strategy to raise the question of 401 certification coverage of nonpoint source permits and licenses.*

This legal strategy is beyond the scope of this paper. However, it is worth noting here that advocates may want to consider approaches to raising the question of 401 certification for nonpoint source permits and licenses despite *Dombeck*.

[38] Numbers generated from using data from ftp://nhdftp.usgs.gov/DataSets/National//NHDDamEvents_fgdb.zip.

[39] Although some may argue 401 certification adds little value in these circumstance (as there may well be a discharge permit issued directly by the state), 401 certification gives the state many more options than a typical discharge permit process would. 401 conditions can be based on broader water quality standards concerns and provides a wider range of condition options. Also 401 certifications can be based on "any other appropriate requirement of State law" (see 401(d)) such as wildlife protection rules, etc. This concept has been applied using provisions of tribal law as well.

### 2.2.5: Strengths and weaknesses of 401 certification to consider

*Strengths*

- Does not require explicit in-stream flow water quality criteria – 401 certification can apply directly to the protection of an aquatic life use or recreational use. Antidegradation can also be used as a basis for flow conditions.
- Once the 401 certification process is triggered, the types of conditions which could be applied (e.g. minimum flows, timing of flow, etc.) is very broad. The Supreme Court has written: "…401(d) is most reasonably read as authorizing additional conditions and limitations on the activity as a whole once the threshold condition, the existence of a discharge, is satisfied."[40]
- The license or permit at issue does <u>not</u> need to be for an activity which causes changes in flow or dewaters a stream. Again, once the threshold condition of a discharge exists additional conditions and limitations can be applied.

*Weaknesses*

- 401 certification is only triggered by the application for a federal license or permit, so its use is limited. However, the list of activities that trigger this tool may be broader than you think – see Strategy G above.
- Some courts have found that 401 certification is not triggered by a federal license or permit with a nonpoint source discharge (e.g. a grazing permit).
- Review and action through the 401 certification requires an active role from the state or tribal government. If those entities are not engaged and willing to push for in-stream flow, there is little that can be done.

## 2.3: Identifying and restoring flow (and habitat) impaired waters

Section 303(d) of the Clean Water Act establishes a common sense approach for addressing restoration of waters not achieving water quality standards. The Act requires three basic steps: 1) identify the impaired waters (i.e. those not achieving water quality standards), 2) prioritize those impaired waters for restoration and 3) develop Total Maximum Daily Loads (TMDLs) – essentially pollutant "budgets" that identify the maximum amount of a pollutant that a waterbody can receive while still achieving water quality standards.

The first two steps are implemented through the creation of the 303(d) list of impaired waters (also known as Category 5 of a state's Integrated Report on water quality). States are to develop the 303(d) list, and submit the list to U.S. EPA for review and approval/disapproval every two years.

The third step – development of a TMDL – is also generally done by the states, with U.S. EPA again providing oversight review. TMDLs generally describe the impairment, establish the

[40] *PUD No 1, 511 U.S. 700* (1994).

pollutant budget or cap, and allocate the allowable budget among various sources of the pollutant. (In other words, a TMDL is a cleanup plan for a waterbody.) Lively legal debates have addressed the question of whether a TMDL must also include an implementation plan to achieve the pollutant reductions in the TMDL. As a practical matter, most states now include some sort of implementation discussion in or alongside their TMDLs, although the details often fall far short of what the conservation community desires.

Whether or not implementation is spelled out in an associated plan, TMDL allocations trigger reductions in point source discharge permit limits, leading to enforceable reductions in the pollutant of concern. Implementation is not as structured when it comes to allocations for nonpoint sources of pollution, such as agricultural runoff. In the case of nonpoint source reductions, the TMDL process relies on existing programs – largely voluntary programs – for implementation.

How impairments related to flow alteration fits into this process is hotly debated. Much of this debate centers on the difference between “pollution” and “pollutants” in the Clean Water Act.

The Act defines pollution as “…the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.”[41] This broad definition would clearly include flow alteration – whether low flows or high flows – and habitat alteration. On the other hand, the Act defines a pollutant as “…dredged spoil, solid waste, incinerator wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.”[42] So the definition of pollutant is a narrower definition than pollution, and does not directly address flow or habitat alteration.

Why does this matter? For several reasons. First, the language of 303(d) includes a muddy mix of the terms “pollution” and “pollutant.” Second, U.S. EPA has developed regulations and guidance to implement 303(d) which further muddy the waters.[43]

The statute first says “Each State shall identify those waters within its boundaries for which the effluent limitations required by section 301(b)(1)(A) and section 301(b)(1)(B) are not stringent enough to implement any water quality standard applicable to such waters.”[44] This identification is the basis for the 303(d) list of impaired waters, and it clearly would include waters impaired by flow alterations. In addition, the section goes on to say “The State shall establish a priority ranking for such waters, taking into account the severity of the pollution…”[45]

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[41] Clean Water Act Section 101(a).
[42] Clean Water Act Section 502(6).
[43] This entire discussion is heavily influenced by analysis in Reed D. Benson. Pollution Without Solution: Flow Impairment Problems Under Clean Water Act Section 303. Stanford Environmental Law Journal, Vol. 24: 199. 2005.
[44] Clean Water Act Section 303(d)(1)(A)
[45] Clean Water Act Section 303(d)(1)(A)

Again, this second step clearly includes flow alterations (i.e. pollution as opposed to strictly pollutants).

However, when the statute goes on to discuss the actual establishment of TMDLs, the case for including flow alterations grows weaker. The statute says TMDLs shall be established "…for those pollutants which the Administrator identifies…."[46] So here the language uses the narrower term "pollutants," which does not include flow alteration. However, the same section of the statute goes on to say "Such loads shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety…."[47] Seasonal variations may well include flow.

So the statute is confusing in that it appears to require water impaired by flow alteration be identified and prioritized for restoration on the 303(d) list, yet also appears to not require TMDLs to be developed for these waters.[48]

U.S. EPA's regulations and guidance further cloud the situation. U.S. EPA has changed its position several times on whether waters impaired by flow or habitat alterations should be listed on the 303(d) list or not. Currently, U.S. EPA's guidance advises states to identify waters impaired by flow or habitat alteration, but to list them in Category 4C of their Integrated Report (which combines reporting requirements under 305(b) and 303(d) of the Act). U.S. EPA has been more consistent in its interpretation that TMDLs are not required for waters impaired by flow alteration.

The legal problems and the confusion around the connection between flow and Clean Water Act restoration tools has lead to a general lack of activity in this area. However, advocates should investigate a range of possible strategies for better connecting flow restoration with water quality restoration. These strategies fall under two general areas:

1.) Using the traditional 303(d) listing and TMDL process to protect or restore flows, or
2.) Embracing the use of Category 4C to identify flow-impaired waters and establishing policy tools to protect or restore flows and habitat.

Please note: Questions surrounding the ability (or lack there of) the TMDL program to truly restore aquatic ecosystems (as opposed to limiting a pollutant or pollutant) are larger than the treatment they receive in this paper. For insights into the larger world of concerns with the TMDL program as a tool to truly address the biological integrity of aquatic ecosystems, start with a 2004 paper by James Karr and Chris Yoder: "Biological Assessment and Criteria Improve Total Maximum Daily Load Decision Making."[49]

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[46] Clean Water Act Section 303(d)(1)(C)
[47] Clean Water Act Section 303(d)(1)(C)
[48] Reed D. Benson. Pollution Without Solution: Flow Impairment Problems Under Clean Water Act Section 303. Stanford Environmental Law Journal, Vol. 24: 199. 2005.
[49] James Karr and Chris Yoder. Biological Assessment and Criteria Improve Total Maximum Daily Load Decision Making. Journal of Environmental Engineering. 130:594-604. 2004.

**2.3.2: Study area roundup**

In this section we present some preliminary information about how the states in the study area are identifying waters impaired by flow or habitat alteration and whether/how the states' TMDL processes address flow. Please note that all information presented in this section relies on the states' reporting mechanisms, which vary widely among states and are limited in terms of how waters are assessed, what information is reported, and other factors. Still, the information presented here represents the current understanding of the status of waters for purposes of the Clean Water Act.

**Table H: Summary of 2008 impaired waters listing in study areas states**[50]

| State | Total stream miles | Stream miles assessed | Impaired stream miles | Percent of assessed impaired |
|---|---|---|---|---|
| Arizona | 90,375 | 2,764 | 1,106.6 | 40% |
| Colorado | 107,403 | 73,117.8 | 10,461.3 | 14% |
| Nevada | n/a | n/a | n/a | n/a |
| New Mexico | 110,741 | 6,252.4 | 3,531.0 | 56% |
| Utah | n/a | n/a | n/a | n/a |

*Identifying waters impaired by flow- or habitat alteration-related factors*

Traditionally, impaired waters reporting has included an identification of both the cause of an impairment (i.e. the parameter) and the source of the impairment (i.e. the activity or system contributing to the impairment).[51] There was little to no consistency between states in the categories used under cause or source headings.

Some states appear to have interpreted the pollution/pollutant debate to mean that the cause (e.g. temperature or mercury) of the impairment needs to be a pollutant. Hence many state impaired waters reports include flow alterations or habitat alterations on their list as the source (e.g. wastewater treatment plant, mine, Concentrated Animal Feeding Operation) of a 303(d) listed impairment as long as there is a pollutant to list as the cause. For example, a state might list a water as impaired by low dissolved oxygen (cause) with the source listed as flow alteration.

Other states in the study area are moving at least some flow or habitat alteration impaired waters to Category 4C (New Mexico and Utah) or some other list (Colorado). No state in the

[50] U.S. EPA Summary of Impaired Waters and TMDLs, 2008 data. Nevada and Utah did not submit 2008 303(d) lists.). http://iaspub.epa.gov/waters10/attains_nation_cy.control?p_report_type=T

[51] More recently, impaired waters reporting seems to be limiting information to the parameter causing the impairment without providing information on the source of that parameter.

study area has established a programmatic or consistent approach to restoring waters placed in these lists.

**Table I: Use of Category 4C in the study area states**

| State | Utilizes 4C? | Stream miles in 4C | Notes |
|---|---|---|---|
| Arizona | No | 0 | |
| Colorado | No | 0 | Places waters on "Monitoring and Evaluation List."[52] |
| Nevada | No | n/a | Nevada has not updated their list since 2006. However, they do not plan on using 4C when the list is updated. |
| New Mexico | Yes | 184.3 | New Mexico explicitly provides for 319 funding priority for 4C waters, as well as 303(d) listed waters. |
| Utah | Yes | 511 | The state is considering using a 4C listing as a trigger for more intense 401 water quality certification review of proposed permits. |

Many parameters (causes) could be related to flow or habitat alterations. Why? Any pollutant in a stream will be more concentrated (and hence more likely to violate concentration-based water quality criteria) if flows are lower. So many impaired water listing causes could hypothetically be tied to flow reductions or other changes to the flow regime. Making these connections will likely require site-specific analysis to demonstrate a linkage between quality and quantity (see, for example, the Ohio example in Section 2.3.3). Some parameters are more closely tied to flow reductions and/or habitat alterations, and so the linkages may be easier to demonstrate. The most obvious of these are temperature (small volumes of water tend to heat up quicker; removing or changing riparian vegetation may reduce stream shade and hence increase temperature, etc.), dissolved oxygen and sediment-related parameters. The following state snapshots summarize each state's listings for parameters which could be related to flow or habitat alteration.[53] Undoubtedly many of these listings are caused by other sources (i.e. dissolved oxygen problems could be the result of low flows or the result of a wastewater treatment plant…or both).

[52] 5 CCR 1002-93.2.2: "Colorado's Monitoring and Evaluation List identifies water bodies where there is reason to suspect water quality problems, but there is also uncertainty regarding one or more factors, such as the representative nature of the data. Water bodies that are impaired, but it is unclear whether the cause of impairment is attributable to pollutants as opposed to pollution, are also placed on the Monitoring and Evaluation List. This Monitoring and Evaluation list is a state-only document that is not subject to EPA approval."

[53] All state data was generated from U.S. EPA Summary of Impaired Waters and TMDLs, 2008 data. (except for Nevada and Utah). http://iaspub.epa.gov/waters10/attains_nation_cy.control?p_report_type=T

Arizona
In 2008, Arizona did not identify any waters as impaired with a cause of flow or habitat alteration.  However, many of the listed causes of impairment may have flow or habitat alteration as a source. For example, Arizona lists solids (16.1 percent of impaired stream miles), dissolved oxygen (10.4 percent of impaired stream miles) and turbidity (9.7 percent of impaired stream miles) as their fourth, fifth and sixth most common impairment causes.

In the same listing cycle, Arizona identified the source of impairment on 126.2 stream miles (12.4 percent of impaired miles) as “impacts from hydrostructure flow regulation/modification” and 39.1 stream miles (3.8 percent of impaired miles) as impaired by “loss of riparian habitat.” These numbers seem strangely low in light of the arid nature of Arizona and extensive water development in the state.  This may be partially a reflection of under-reporting of quantity issues and partially because other listed sources may include flow or habitat alterations – for example, “source unknown” is the state’s third largest category (373.5 stream miles or 36.7 percent of impaired miles) and categories such as “rangeland grazing” may well represent an overlap with the habitat alteration category.

Colorado
The situation in Colorado is quite different from Arizona.  Although many of the leading causes of impairments (selenium, E. coli and “Iron/Zinc/Copper”) on the state’s 2008 list of impaired waters may be impacted by flow, they are not usually directly tied to flow reductions or habitat alterations.  If we look for parameters more often tied with flow or habitat changes, we find sedimentation/siltation (117.9 stream miles or 1.1 percent of impaired stream miles), dissolved oxygen (65.3 stream miles or 0.6 percent of impaired miles) and BOD/sediment oxygen demand (12.5 stream miles or 0.1 percent of impaired miles) far down the list of causes.  Similarly, none of the source categories directly reference flow or habitat alterations.

This lack of impairment listings may reflect the state’s use of the Monitoring and Evaluation List.  See the 4C waters discussion for more information.

Nevada
Nevada’s 2006 impaired waters list (the state has yet to finalize a 2008 or 2010 list) identified several causes of impairment that may be related to flow or habitat alteration.  The number one cause of impairment was temperature (1,018 stream miles or 44.6 percent of impaired stream miles).  Other top impairment causes that could be flow related included turbidity (589.5 stream miles or 25.8 percent of impaired stream miles), total suspended solids (559.5 stream miles or 24.5 percent of impaired stream miles), and total dissolved solids (426.6 stream miles or 18.7 percent of impaired stream miles).

Nevada also includes flow alterations in its list of sources of impairment, although not habitat alteration.  The state identifies “flow alterations from water diversions” as the seventh most common source of impairments (58.07 stream miles or 2.5 percent of impaired stream miles) and “dam or impoundment” as its eighth most common source of impairments (28.5 stream miles or 1.2 percent of impaired stream miles).  These source category numbers seem remarkably low for a state with a very arid climate and intense water development. This may be in part due to the bias against listing for flow impairments and in part due to the fact that the number one source of impairment is identified as "source unknown" (2,109 stream miles or 92 percent of impaired stream miles). Many of the "unknown" sources could be related to flow or habitat alterations.

New Mexico

New Mexico takes a different tact than the other states. Six of their top ten causes of impairment on the 2008 list are causes that may commonly be related to flow or habitat alterations and the tenth most common cause is explicitly "low flow alterations" (194.4 stream miles or 5.5 percent of impaired stream miles). The most common cause of impairment is temperature (1,150.9 stream miles or 32.5 percent of impaired stream miles).

The state's source categories also directly address flow and habitat issues. These include "loss of riparian habitat" (1,121.4 stream miles or 31.7 percent of impaired stream miles), "streambank modifications/destabilization" (895 stream miles or 25.3 percent of impaired stream miles), "flow alterations from water diversions" (735.8 stream miles or 20.8 percent of impaired stream miles), "drought-related impacts" (441.1 stream miles or 12.5 percent of impaired stream miles) and "habitat modification – other than hydromodification" (194.3 stream miles or 5.5 percent of impaired stream miles). In addition, smaller categories address dam construction and upstream impoundments

Utah

Utah did not submit a 2008 303(d) impaired waters list. In 2006, the state reported thirteen different causes of impairment. Three of those may commonly be tied to low flows or habitat alteration, including oxygen depletion (44 segments), salinity (43 segments) and temperature (14 segments). (Segments were provided instead of mileage. 229 segments were labeled with causes.) The state report did not address the sources of these impairments.

*Connecting flow and TMDLs*

As discussed earlier and in the examples in the next section, even where states do not list waters as impaired by flow they may address flow through the TMDL process. States may create a TMDL that explicitly includes flow (or habitat) targets. Alternately, they may not explicitly include flow as a target but instead address flow augmentation/management through the implementation plans. (The second approach may simply be more politically palatable). However, we found very little evidence of either approach in the study area states.

**Table J: Has the state ever created a TMDL or TMDLs with flow targets?**

| State | Flow targets ever used?[54] | Notes |
|---|---|---|

[54] According to U.S. EPA's online National Summary of Impaired Waters and TMDLs, at http://iaspub.epa.gov/waters10/attains_nation_cy.control?p_report_type=T. Last accessed April 28, 2011. Confirmed where possible with state agency staff.

| | | |
|---|---|---|
| Arizona | No | |
| Colorado | No | |
| Nevada | No | |
| New Mexico | No | Several recent TMDLs have used load duration curves, which establish different loading limits at different flows: see the Middle and Lower Rio Grande TMDLs for examples. |
| Utah | No | Utah has however created 5 TMDLs for habitat.[55] |

**Table K: Does the state include flow in its implementation discussions?[56]**

| State | Flow addressed in implementation documents? | Notes |
|---|---|---|
| Arizona | No | |
| Colorado | No | No, but state the issue does come up and may come up more in the future. |
| Nevada | No | However, the state is currently updating the Truckee River TMDL and contemplating creating a flow-variable TMDL. |
| New Mexico | Unknown | |
| Utah | Yes, once | East Canyon TMDL referenced a flow augmentation study and suggested minimum flows to address impairment. However, there was no regulatory authority and the flows were not secured. |

### 2.3.3: Example(s) in action

*Ohio: Linking flow changes with more traditional parameters*

Habitat and flow impairments are often thought of as untouchables in the Total Maximum Daily Load (TMDL) world. Common thinking about the program has been strictly focused on calculating a limit for a specific pollutant, which is then apportioned as an overall load among point and nonpoint sources of pollution.

Although load reduction is the heart of the TMDL approach, it doesn't have to be that narrow. For example, the Ohio Environmental Protection Agency (OEPA) has long viewed the TMDL program just a little differently than other states. In part, this is a result of Ohio's extensive biological monitoring program and the existence of strong biological metrics in its water quality

[55] From http://iaspub.epa.gov/waters10/attains_state.report_control?p_state=UT&p_cycle=2006&p_report_type=T.
[56] This chart was created from conversations and email communication with the states' TMDL program staff.

standards which allow the state to focus on attaining designated uses rather than only on a chemical surrogate.

As a result, Ohio TMDLs consider both reducing loads and building assimilative capacity– coming at pollution problems from both sides of the equation. While load reductions might include activities like tightening permit limits and establishing best management practices, increasing a stream's assimilative capacity might also include increasing the shade canopy over a stream or improving in-stream flows. Using both approaches has allowed the state to create TMDLs that both achieve a specific water quality criterion and improve overall stream function.

The state creates TMDLs which link a specific measure – for example, the state's biocriteria standard – with a response indicator such as dissolved oxygen. That response indicator is then tied to an exposure indicator like nutrients or carbonaceous biochemical oxygen demand. Lastly, that exposure indicator is tied to stressors, such as wastewater discharges, habitat modification and flow. So in this example the TMDL might recommend load reductions by changing wastewater treatment plant's permitted discharges for nutrients and oxygen demanding substances <u>and</u> boosting assimilative capacity by restoring the stream channel so it is better able to naturally process the remaining nutrients.

The Middle Cuyahoga TMDL serves as a good example of Ohio's approach. Since the '70s, the Cuyahoga has seen large improvements in chemical and physical water quality. However problems remain, particularly in the biology of the system. For example, the middle Cuyahoga was declared impaired by habitat and flow alteration, excessive nutrient levels and low dissolved oxygen. The OEPA identified flow modification, impoundments and municipal discharges as the sources of these problems.

The overall goal of the TMDL was to achieve Ohio's biological water quality criteria. The TMDL established a target for dissolved oxygen as a proxy for progress toward meeting the biocriteria. To achieve the dissolved oxygen target, the TMDL identified the need to control nutrients and carbonaceous biochemical oxygen demand (CBOD), as well as address impoundments and flow modification problems.

How did the TMDL tie in the impoundments and flow issues? Lake Rockwell, a drinking supply reservoir located on the Cuyahoga mainstem, deprived Middle Cuyahoga of flows. This resulted in very low dissolved oxygen readings below the dam – at times as low as 0.0 mg/L. Two smaller dams located in the Middle Cuyahoga downstream from Lake Rockwell exacerbated the problem and greatly diminished the assimilative capacity of the river, resulting in the need for tighter effluent limits for the wastewater treatment plants discharging to the reach. The physical presence of the dams themselves also harmed designated uses directly by limiting fish passage.

In the TMDL the OEPA laid out two possible implementation scenarios. The first scenario envisioned a voluntary mix of activities that included a minimum release of 3.5 MGD from Lake Rockwell, along with removal or modification of the Munroe Falls and Kent Dams.

However, if the actions identified in the first scenario were not completed within a specified timeframe, the second, regulatory scenario would come into play. In this scenario, much stricter (in some cases zero) pollutant load limitations for CBOD and ammonia would be placed on all six of the wastewater treatment plants in the TMDL study area.

The City of Kent's website describes the decision confronting local governments: "The City was also informed that refusal to pursue and initiate a modification-removal of the dam would result in more stringent permit limits at the City's Water Reclamation Facility (WRF). City officials knew that additional infrastructure at the WRF would be an expensive venture for Kent taxpayers and would yield minimal benefits to the river water quality."[57]

As a result, the first scenario won the day. A minimum flow release from Lake Rockwell was agreed upon. The historic Kent dam was modified in 2004 and the Munroe Falls dam was removed altogether in 2005.

Within a year of removing Munroe Falls dam, OEPA data showed dramatic improvements in the fish community and improvements in dissolved oxygen levels. By December 2009, dissolved oxygen criteria were met in the river, and the condition of the warmwater aquatic life community had improved dramatically, meeting state criteria for the diversity of the macroinvertebrate community and physical habitat. One stretch still does not meet the criteria for healthy fish communities, but it is on the way to full recovery.

By using all the components of the system (physical, biological and chemical) to inform the TMDL process, rather than take a myopic pollutant-specific approach, OEPA was able to offer the two scenarios as a way to meet the challenge. In the end, this type of creative thinking resulted in benefits far beyond simply load reductions for the river, the fish, and the communities along the mighty Middle Cuyahoga.

The take home lesson here is that a flow or habitat problem may be more easily incorporated into the TMDL structure when it is related to a more traditional pollutant. Temperature, dissolved oxygen, nutrients, and many other more traditional parameters can be tied back to flow and habitat concerns. Even if a state is resistant to the idea of a flow or habitat TMDL, it may be possible to make the case that addressing flow or habitat alterations instead of (or along with) the traditional pollutant will save time and money, while providing a wider range of benefits.

Of course the real measure of success is neither the reduction of a targeted pollutant nor the achievement of a particular flow regime…rather success will be measured by the return to health of the ecosystem. This is where this example benefits from Ohio's robust biocritiera program, which will ultimately document success through the recovery of the biological integrity of the system.

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[57] From http://www.kentohio.org/reports/dam.asp.

*Montana example: directly creating flow TMDLs*
Montana provides two very interesting examples of TMDLs that directly tackle flow impairments. The Montana story also illustrates some of the policy challenges associated with developing flow TMDLs.

Deep Creek – a tributary to the Missouri River – provides the first Montana flow TMDL example. Deep Creek was impaired by several factors related to habitat structure and flows:

> "Examination of existing data in this document indicates that aquatic life in Deep Creek is impaired due to several stressors. These stressors are: 1) high total suspended solids, 2) degraded stream habitat (i.e. loss of bank overhang and meander bends), 3) excessive substrate embeddedness, 4) high water temperatures, and 5) excessive dewatering. This results in limited recruitment of trout and poor water quality."[58]

The Deep Creek TMDL was created in 1996 and identified several numeric targets, including water temperature, sediment loads, and minimum flow requirements. U.S. EPA reviewed and approved the Deep Creek TMDL, and explicitly commented positively on the flow components.

The next Montana flow TMDL example tells a different story. In late 2000, Montana again submitted a flow TMDL – this time for Big Creek in the Yellowstone River basin – to U.S. EPA for review. The Big Creek TMDL established a numeric minimum in-stream flow target necessary to support the designated uses. It is worth noting that this TMDL was <u>only</u> for flow – unlike the Deep Creek TMDL which addressed sediment, temperature and other pollutants in addition to flow. Interestingly, when the Big Creek TMDL was submitted for approval water right leases had already been secured to meet the TMDL's flow targets.

However, U.S. EPA refused to take action on the Big Creek TMDL. The agency's response was described by one expert as follows:

> "EPA stated that it was 'not taking formal action pursuant to Section 303(d)(2)" on the submission, based on its rationale that flow impairment was not a pollutant and that TMDLs were appropriate only for pollutants."[59]

What had changed between 1996 and 2000? Again, one expert theorized:

> "Timing is one possible factor – EPA approved the Deep Creek TMDL in 1996, articulated its "no TMDLs for flow" position in 1999, and refused to approve the Big Creek TMDL in 2000. Perhaps the agency would have handled Deep Creek differently if its policy had

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[58] Endicott, Carol and Thomas McMahon. Development of a TMDL to Reduce NonPoint Source Sediment Pollution in Deep Creek, Montana. Report to Montana Department of Environmental Quality. March 1996. Page 56.
[59] Reed D. Benson. Pollution Without Solution: Flow Impairment Problems Under Clean Water Act Section 303. Stanford Environmental Law Journal, Vol. 24: 199. 2005. Page 246.

been developed at the time that the TMDL was submitted, but perhaps not. Unlike Big Creek, Deep Creek was impaired by pollutants (sediment and heat), requiring a TMDL."[60]

In addition to these theories, politics may have come into play. There was an election between the two submissions, leading to a change in Administration.

Since the Big Creek submission, Montana has changed their approach to flow impairments. Montana is operating under a TMDL consent degree, which requires a certain number of TMDLs be produced annually. Although U.S. EPA is not stopping Montana from producing flow TMDLs, they have been clear that they don't consider flow TMDLs official TMDLs, and hence will not count them toward the state's requirements. So, the state is not actively pursuing flow TMDLs at this time.

However, agency staff stressed that they do consider flow as part of implementing TMDLs. For example, on the Lake Helena TMDL's implementation the state worked with a water trust to lease two years of flows to restore the previously totally dewatered Prickly Pear Creek through transfers with irrigators. Excitingly, the irrigators actually benefited enough from the 2-year pilot that they set up a 10 year lease agreement which will maintain flows in Prickly Pear while allowing the irrigators to draw Missouri River water.[61]

There are several lessons in Montana's experience with flow TMDLs. First, the examples show that it is possible to create and implement flow TMDLs – whether as stand-alone flow TMDLs (Big Creek) or as part of multiple parameter TMDL (Deep Creek). But the examples also show that U.S. EPA is not supportive – or at least not consistently supportive – of flow-specific TMDLs. Another possible lesson is that tying flow targets to other parameters may be one way to safely incorporate flow targets into TMDLs. See Strategy K for more information.

**2.3.4: Possible strategies for application of this tool**

*Strategy I: Push for flow and habitat alteration impaired waters to be placed on the 303(d) list.* Advocates may want to advocate for their state to list waters impaired by flow alteration on the official 303(d) list, as opposed to Category 4C of the Integrated Report, whether or not that listing will trigger development of a TMDL.

As described in the introduction, the statue appears to quite clearly require flow-impaired waters to be identified and prioritized as part of the 303(d) listing process. However, U.S. EPA's guidance contradicts this direction. As a result, state approaches vary.

[60] Reed D. Benson. Pollution Without Solution: Flow Impairment Problems Under Clean Water Act Section 303. Stanford Environmental Law Journal, Vol. 24: 199. 2005. Page 247.
[61] Robert Ray, Montana Department of Environmental Quality. Phone conversation with the author. 4/18/2011.

Why would advocates want to advocate for a listing with no TMDL development required as a result of that listing? As a practical matter, two different positive outcomes are possible:

1.) Advocates may want to advocate for 303(d) listing of flow-impaired waters because they also intend to advocate for the development of flow TMDLs. See strategy J below.

2.) Advocates may want to place flow-impaired waters on the 303(d) list because even without TMDL development, some tangible benefits result from listing. For example, many funding programs target impaired waters for priority restoration funding. This funding could be used to lease or purchase in-stream flows. Even where funding is not directly tied to listing, the higher profile provided by listing may encourage other programs to focus on restoring flows.

The downsides of the strategy are that it would be a fairly time and resource intensive effort – especially given the likelihood of litigation - and would still need to be tied to the creation of some sort of TMDL-like or other restoration planning and implementation effort (because although waters would be listed, they would not necessarily receive official TMDLs).

*Strategy J: Advocate for the development of explicit flow and habitat TMDLs.*

As described earlier, the statute language is not helpful on the issue of requiring TMDLs for flow-impaired waters. However, advocates may still want to make the case that the "pollution" versus "pollutant" debate is a moot point if TMDLs are really about ensuring compliance with water quality standards. Advocates could:

1. Directly argue that TMDLs are required for flow-impaired waters. This would likely require litigation, and so the strategy is beyond the scope of this paper.
2. Argue that whether or not TMDLs are required for flow-impaired waters, their state should pursue development of flow TMDLs in order to protect public health and aquatic life. This would be in some ways less of a legal or policy argument, and more of a persuasion argument.

*Strategy K: Advocate for consideration of flow protection or restoration as an implementation mechanism for more traditional "pollutant" TMDLs.*

This may be one of the most immediate and practical strategies for advocates. Application of the strategy will be limited to places where a connection between flow and a pollutant can be made and all the same political problems of any flow discussion will apply, but advocates could make this case today on many rivers around the study area and the country.

Many flow alteration problems will create or exacerbate associated pollutant problems (e.g. high temperature, low dissolved oxygen, nutrients, etc.) that can trigger listing and hence the TMDL program's resources. Reed Benson memorably described this connection as follows:

> "….the lower a stream's flow, the more easily its water quality can be affected by heat or other pollutants. Just as a cup of whiskey in a pint of water could make a fairly stiff drink, but that same cup of whiskey in a gallon water would be little more than flavoring, an identical discharge of contaminants will have a much greater quality impact on a stream flowing at 16 cubic feet per second (cfs) than one flowing at 128 cfs."

Using the Ohio and Montana examples in Section 2.3.3 for inspiration, TMDL debates should include discussion of both sides of the equation for the load of a Total Maximum Daily Load:

Flow x pollutant concentration = load

Flow solutions will face the same challenges as nonpoint source reductions in the TMDL process in that the TMDL process does not create enforceable, regulatory flow tools. However, the TMDL process can get a flow solution on the table as an option (see Ohio example) and advocates can make the case for them as cheaper, more broadly beneficial, etc. than other options. As an important side note: since the TMDL process itself does not create enforceable flow conditions, it will be important for advocates to institutionalize any flow conditions via water rights, leases, etc.

*Strategy L: Advocates may want to advocate for the creation of programs or policies outside of the TMDL program to restore waters impaired by flow alterations.*

While this paper is focused on Clean Water Act tools, we must acknowledge that flow or habitat restoration may be better served by restoration approaches outside of the TMDL program. Our research did not expose a widely applicable approach we felt was dramatically better than the TMDL program but clearly the program's focus on pollutants and loading is not ideal for flow or habitat restoration. Advocates may want to advocate for Clean Water Act identification of flow and habitat impaired waters (whether officially on the 303(d) list as in Strategy I or in Category 4C as in Strategy M) and then develop a state-based restoration program specifically for flow or habitat.

*Strategy M: Advocates may want to advocate for better populating the 4C waters lists in their states and for creating structured, programmatic approaches to restoring those waters once identified.*

This strategy would simply accept U.S. EPA's decision to remove pollution-impaired waters from the 303(d) list and place them into a new, non-regulatory category in the Integrated Report (within the larger 305(b) effort). As a practical matter, this is the path of least resistance for advocates. Advocates would focus on the Integrated Report cycle and request that their state use Category 4C (in the case of Arizona, Colorado and Nevada) and better populate that Category in all states. Data to support populating Category 4C are relatively easily available through the states' bioassesment programs, as well as through the states' wildlife resources programs.

Of course, populating Category 4C will be a meaningless exercise without the creation of some sort of restoration and/or protection strategies for the waters. Advocates will want to consider a range of possibilities, including:

- *The TMDL program approach could be applied to Category 4C waters.* While these may not be "TMDLs" in the legal sense of the word, the same policy approach, stakeholder systems, etc. could be applied to flow or habitat alteration impaired waters. There is nothing stopping states (like Montana) from developing TMDLs for flow – it is just that these are not acknowledged by U.S. EPA.[62] This may be attractive in that it is a familiar approach for agency staff and stakeholders. It may be unattractive due to the animosity toward TMDLs in some places, the resource- and time-intensive nature of TMDL development in many states, and the fact that the concept of establishing "loads" for flow or habitat is awkward.
- *Category 4C waters could be prioritized for restoration funding in much the same manner as 303(d) listed (Category 5) waters.* This would require policy changes in grant programs such as the 319 nonpoint source grants and the State Revolving Fund. Similarly, Farm Bill programs and others could be tweaked to treat 4C waters as if they were 303(d) listed waters. This strategy would increase resources available for in-stream flow protection or habitat restoration even in the absence of a TMDL or TMDL-like restoration plan. Therefore, this approach could "cut to the chase" and simply focus on restoration efforts.
- *Policy protections could be created to protect – or even restore – Category 4C waters.* The range of possibilities here is nearly endless. For example:
    - States could bar the use of stream alteration permits on stretches listed as impaired by habitat alteration. Alternatively, states could at least require individual 401 certification on those permits (which are often general or Nationwide Permits) to allow for site-specific protections.
    - Proposed projects (point source discharges, stream alteration, wetland fill, etc.) on flow or habitat alteration impaired streams could be required to provide additional mitigation in the form of habitat restoration, invasive species removal or in-stream flow rights.

### 2.3.5: Strengths and weaknesses

<u>Traditional 303(d) listing and TMDL development</u>

[62] However, many states are operating under "no stricter than federal" statues which limit what the state can do to go above and beyond federal requirements. Advocates would need to understand the extent of any such limitations in their state.

*Strengths*

- If a waterbody is listed, restoration efforts will receive priority under many funding programs such as the 319 nonpoint source program.
- Again, if a waterbody is listed and a pollutant is involved, it triggers the development of a TMDL. This can expose creative solutions that restore in-stream flow and/or flow regimes. See Ohio example.
- Interest in avoiding a listing may bring interested parties to the table that would otherwise not be amenable to discussions about in-stream flow.

*Weaknesses*

- Without a "pollutant" hook, the waterbody may not be listed and will not receive the benefits of TMDL development.
- Even if listed, the TMDL program has limited enforcement mechanisms in many situations (e.g. largely nonpoint source situations, etc.). However, again creative solutions are possible – see Ohio example.
- State-based limitations on in-stream flow water rights may still limit the practical use of in-stream flow to address impairments.

<u>4C waters listing</u>

*Strengths*

- This may be the most direct path from an implementation tool – 4C listing – to in-stream flow. Category 4C was established particularly to address flow and habitat alteration.
- Some states have good and plentiful data on dewatered or otherwise impaired streams which could populate a robust Category 4C.
- Category 4C doesn't require a connection to a particular pollutant. Entirely dewatered stretches clearly qualify for Category 4C – there's no need to demonstrate a criteria violation to make the "pollutant" connection so the lack of flows simply demonstrates a use is not supported.

*Weaknesses*

- This is a big one: nationally, <u>no action is required</u> under a 4C listing (i.e. no funding prioritization, no TMDL development, etc.). At the state level, we've found no evidence of a programmatic approach to action for 4C waters.
- The use of Category 4C varies wildly from state to state. In fact, many states identify but largely ignore Category 4C waters, while others do not use Category 4C at all.

# Section 3: Wrap up and recommendations

While there are no magic solutions, this scoping study shows there are multiple useful yet under-utilized strategies in Clean Water Act programs that may be used to protect or restore flows and riparian habitat. As stated at the beginning of this paper, short of a major overhaul of the nation's water policy approach, water quantity and water quality law will remain uneasy companions. In addition, although we make the case here that many parts of the Clean Water

Act could be better used to address flow and habitat problems, the programs established under the existing statute struggle to truly address the goals of protecting and restoring biological integrity and ecosystem process.

This paper focused then on how to improve the integration of flow and habitat concerns into the Clean Water Act world, given the existing structures and programs. By starting from the premise of using the existing structure, we did not investigate the very real need to strengthen the Act's ability to look at ecosystems holistically and manage them accordingly. Although it doesn't appear to be in the cards in the near-term, the Act is long-overdue for an update which could provide much better tools for integrating the biological and physical aspects of ecosystems into the regulatory arena.

Within the existing Clean Water Act structures then, we note the conservation community has long focused on a wish for strong in-stream flow criteria and/or criteria such as biocriteria. The pursuit of in-stream flow criteria should continue as it is the most direct and defensible way to link quantity issues to the Act. However, political realties in the study area – and in many other states – make this a long-term strategy.

So – again assuming we are operating within the existing policy structure – we suggest that flow (and to a lesser extent riparian habitat) restoration will be best served by acknowledging the need for strong designated uses and water quality criteria (e.g., biocriteria, in-stream flow, etc.) while more effectively wielding select policy tools (e.g., 401 water quality criteria, impaired waters programs, etc.) that implement existing water quality standards. Why? While in-stream flow criteria and other use/criteria-based strategies are important and should continue to be pursued, uses and criteria are not self-implementing. That is, even where they exist these criteria need to connect with another piece of the Act or other laws in order to make change on the ground. Where flow criteria do not exist, many Clean Water Act tools can still be applied.

**Leading strategy suggestions**

This paper includes many possible strategies for advocates to consider – maybe too many. We provided the long list of strategies because situations may vary from state to state and case to case. However, we suggest the following strategies provide the most promising leads. We selected these strategies based on consideration of: the near-term effectiveness of the strategy (e.g., could the strategy be implemented now or would it take years of policy development?), the breadth of usefulness of the strategy (e.g., is the strategy widely applicable in the study area and the country?), the likelihood of success with the strategy, and the likely positive impact on-the-ground (i.e., real change in the stream as opposed to simply policy changes) of success with a strategy.

Water quality standards

- Pursue in-stream flow criteria as the most direct route to connecting standards and flow.
- Push development of strong biocriteria and physical criteria which tie flow and riparian

habitat to use support.
- Develop the legal and policy arguments for applying antidegradation principals for flow and riparian habitat issues.

Although we stressed the need to focus largely on policy tools that implement water quality standards, the standards themselves cannot be ignored. Advocating for in-stream flow criteria is a long-term strategy, but one worth investing in for the long-haul. While many states – particularly in the West – are resistant to the idea of in-stream flow criteria, there is a clear case to be made for the need for such criteria. And although it may not seem likely now, states may someday be required to have such criteria in place under the federal structure.[63]

Physical criteria are another long-term project for advocates, but may create some of the best arguments for regulation of flow, water quality and habitat as a whole. Biocriteria is a more near-term prospect because most of the study area states already have a narrative criteria or are developing them. However, biocriteria are several steps removed from on-the-ground action. Antidegradation is another more near-term strategy (i.e. the policies exist in all the study area states now, but need broader and more adequate application) but additional strategic thinking is needed to apply antidegradation with other policy tools (e.g. 401 certification)

<u>401 water quality certification</u>

- River advocates may want to advocate for in-stream flow conditions on permitting activities already regularly triggering 401 water quality certification
- River advocates should be pushing the applicability of 401 beyond 404 permits and FERC licenses to include a host of activities permitted by Forest Service/Bureau of Land Management/Park Service, federal construction projects, etc.

We propose that 401 certification provides some of the strongest strategies for applying the Clean Water Act in a flow or habitat context. While limited to some extent in terms of applicability, our research shows great room for expansion of the application of 401 certification. This is particularly true within the study area, given the extensive federal land management activity in the area.

<u>Impaired waters identification and restoration</u>

- Advocates may want to advocate for their state to list waters impaired by flow alteration on the official 303(d) list, as opposed to Category 4C of the Integrated Report, whether or not that listing will trigger development of a TMDL.
- Advocates may want to advocate for consideration of flow protection or restoration as an implementation mechanism for more traditional “pollutant” TMDLs.

[63] For example, Region 4 U.S. EPA has begun to methodically notify each of the states in their region that in-stream flow criteria development needs to be addressed in their next triennial review of water quality standards. Although this is a regional push, it is coming from the federal agency charged with reviewing and approving all states’ water quality standards programs.

We are also excited about the possibilities for using the 303(d) program to address flow and habitat alteration. These are strategies that can largely be implemented now, although the listing strategy is likely to result in legal battles.

Despite the legal jumble around the question of flow and habitat impaired waters, there is strong interest in bringing flow and habitat issues into the TMDL world as they relate to traditional "pollutants." States in both the east and the west are experimenting with these ideas, and more states have expressed interest in the ideas anecdotally. Advocates have an opportunity to open a discussion about these issues with their state agency, and frame flow issues as a common sense topic for restoration discussions.

**Research and discussion needs**

Many of the topics and strategies described here would benefit from additional research. Our top tier needs for additional research, analysis and community discussion include:

- In-stream criteria – <u>Conservation community discussion</u>: Convene advocates from the study area states to discuss the pros and cons of spending time advocating for in-stream flow criteria given political realties in the region.
- Physical criteria – <u>Research</u>: What should they encompass? What would states need in terms of resources to develop and implement them? How would they be translated and applied in other Clean Water Act programs?
- Bioassessment data – <u>Research</u>: How can advocates encourage their states to better use the data they already have? Further explore what data are consistently collected within a state and across state boundaries. Etc.
- Antidegradation – <u>Strategy and legal theory development:</u> Develop the legal and policy arguments for applying antidegradation principals for flow and riparian habitat issues.
- 401 water quality certification – <u>Strategy and legal theory development</u>: Convene expert legal thinkers to discuss the viability of a legal strategy that addresses the application of 401 certification to nonpoint source pollution.
- Total Maximum Daily loads – <u>Conservation community discussion</u>: Convene advocates to discuss the idea of incorporating flows into more traditional TMDLs for other pollutants. Question: Does encouraging consideration of increasing flows in order to achieve concentration-based water quality criteria simply encourage "dilution as the solution to pollution"?
- Broader strategies – <u>Research and conservation community discussion:</u> Identify river and watershed groups in strategic jurisdictions where some of these strategies could be employed on the ground to create concrete examples of where in-stream flows can be applied in the Clean Water Act context.

# Appendix A: Funding flow and habitat restoration through the Act and other programs

As part of our research, we conducted a review of Clean Water Act and related funding programs that may be applicable to flow and riparian habitat restoration efforts. This review is by no means complete, but did unearth interesting connections and ideas for further reviews.

## A.1 Clean Water Act funding tools

Interestingly, funding programs under the Clean Water Act may be bridging the chasms between quantity and quality and riparian habitat more successfully than the policy programs. States – both within the study region and elsewhere – are increasingly open to using Act funds for habitat restoration particularly and for flow restoration in more limited instances.

<u>319 program example</u>

The Clean Water Act's 319 Nonpoint Source Management Program regularly crosses into habitat issues, and has been used to address flows. In particular, the 319 grant program established in Section 319(h) of Act can be a useful tool for advocates interested in habitat and flow alteration. Under the 319 grant program, states and tribes receive funding allocations from the U.S. EPA which can be used for a wide variety of activities, including on-the-ground restoration.

U.S. EPA's guidance currently emphases funding restoration efforts in 303(d)-listed impaired waters.[64] This may be a problem for flow and habitat alteration if waters impaired by these activities are placed in Category 4C, rather than listed on the 303(d) list (i.e. Category 5). However, many flow and habitat projects have been funded and continue to be funded. For example, according to U.S. EPA's Grant Reporting and Tracking System, nationally 819 319 funded projects have supported in-stream flow assessments and 600 have been for riparian restoration projects.[65]

**Table A-A: Study area state use of 319 funds for flow and riparian habitat related projects[66]**

| State | In-stream flow assessments | Riparian projects |
|---|---|---|
| Arizona | 5 | 10 |
| Colorado | 9 | 3 |
| Nevada | 14 | 21 |
| New Mexico | 16 | 6 |
| Utah | 8 | 29 (appears to include duplicates) |

[64] U.S.EPA. *Nonpoint Source Program and Grants Guidelines for States and Territories.* Oct. 23, 2003.
[65] Data pulled from U.S. EPA's online Grants Reporting and Tracking Database at http://iaspub.epa.gov/pls/grts/f?p=110:199:2764388625378098::NO:::. Last accessed April 11, 2011. Please note that this categories are very general, and multiple categories can be applied to one grant.
[66] Data pulled from U.S. EPA's online Grants Reporting and Tracking Database at http://iaspub.epa.gov/pls/grts/f?p=110:199:2764388625378098::NO:::. Last accessed April 11, 2011.

Ohio example

Ohio has been a leader in directing some of their Clean Water Act State Revolving funds to habitat protection and restoration. The state describes their program this way:

> "The Water Resource Restoration Sponsor Program was created to counter the loss of ecological function and biological diversity that jeopardizes the health of Ohio's water resources. This program funds both preservation and restoration of aquatic habitat to accomplish this goal."[67]

Through the Water Resource Restoration Sponsor Program (WRRSP), Ohio provides an option for applicants to the Water Pollution Control Loan Fund to sponsor habitat restoration and protection efforts. The Fund reduces the interest rate charged to an applicant by an amount which offsets the cost of sponsoring a restoration project.[68]

Ohio EPA disburses about $7.5 million per year through the Water Resource Restoration Sponsor Program (WRRSP). The funds can be used to restore streams or wetlands, and they have been used to remove dams or otherwise address flow concerns. Another $7.5 million/year is available for land acquisition.

Utah example

Inspired in part by Ohio's example, Utah has established a system for directing some of their traditional "bricks and mortar" funding in the State Revolving Fund programs to nonpoint source-related restoration, which includes habitat restoration. Utah works with larger project applicants in the State Revolving Fund program to fund nonpoint source (again, including a lot of habitat restoration work) projects. The state negotiates with a point source loan applicant to include a lower interest rate than the applicant would otherwise receive as long as the incremental financial amount is used for nonpoint source projects. For example, River Network has received funds for habitat restoration in a 4C watershed through such a deal set up with a local wastewater treatment plant.

In addition, the Division of Water Quality's Executive Secretary sets aside $1 million annually from wastewater funds for nonpoint source grants. Nonpoint source loans are also available, although none have been requested.

## A.2 Examples of other funding tools

Of course, Clean Water Act funding programs are not the only – or even necessarily the best – sources of funding for flow and habitat restoration or protection. Our cursory review shows multiple other approaches at the state and federal level, and just a few are featured here.

Arizona example: funding through the state legislature

[67] Excerpted from http://www.epa.state.oh.us/defa/09wrrsp.aspx.

[68] For more information, see http://www.epa.state.oh.us/defa/09wrrsp.aspx.

Arizona is home to the Arizona Water Protection Fund, which specifically targets habitat protection and restoration efforts in the state. The Fund's website describes the program:

> "The Arizona Water Protection Fund is a competitive State grant program that provides an annual source of funding for the development and implementation of measures that will restore, maintain and enhance river and riparian resources throughout Arizona, including projects that benefit fish and wildlife that are dependent on these important resources." [69]

The main source of funding is the state legislature. By statute, the Fund is intended to receive $5 million annually; however, the amount varies (sometimes dramatically) each year. The Fund also receives resources from an in-lieu fee that is collected by the Central Arizona Project for each acre-foot of water sold outside of its tri-county service area.

Colorado example: funding from a check off program

The Colorado Healthy Rivers Fund supports diverse restoration efforts, including those motivated by habitat concerns. This modest-sized Fund receives resources from taxpayers who "check off" their donation on their state tax return. Since the Fund began in 2003, it has generated more than $720,000 for 50 local projects.[70] Projects have included numerous riparian habitat restoration projects, as well as in-stream flow assessments, dam removals, and flow management studies.[71]

Minnesota example: funding from sales tax

In 2008, voters overwhelmingly approved the Clean Water, Land and Legacy amendment to the state constitution. According to the Minnesota Pollution Control Agency, the amendment's goals are to: protect drinking water sources; to protect, enhance, and restore wetlands, prairies, forests, and fish, game, and wildlife habitat; to preserve arts and cultural heritage; to support parks and trails; and to protect, enhance, and restore lakes, rivers, streams, and groundwater.[72]

Under this amendment, the state now initiative revenues from a quarter of a cent sales tax increase to generate tens of millions of dollars a year for the next 25 years. Approximately a third of the revenue raised through the increase is dedicated to the Clean Water Fund. Among other uses, the state plans to use the Fund to develop TMDLs for every watershed in the state over the next ten years, and consideration of in-stream flows will reportedly be part of that effort.

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[69] See http://www.azwpf.gov/.

[70] From http://coloradowater.org/cwpf.php, last accessed April 4, 2011.

[71] From http://coloradowater.org/cwpfrecipients.php, last accessed April 4, 2011.

[72] From: http://www.pca.state.mn.us/index.php/water/water-types-and-programs/clean-water-fund/clean-water-fund.html.