SPOKANE RIVER RESTORATION SCENARIO
FOR THE
DISSOLVED OXYGEN TMDL COLLABORATIVE

SIERRA CLUB
UPPER COLUMBIA RIVER GROUP

NOVEMBER 2005

INTRODUCTION

The Spokane River flows 111 miles from Lake Coeur d'Alene in Idaho to its confluence with the Columbia River in Washington State. It is the defining feature of the region and of great economic and aesthetic value to the people of Spokane and the surrounding area. Unfortunately, during the low-flow summer months, the river and Long Lake (Lake Spokane) are afflicted with low dissolved oxygen (DO), a condition that is harmful to fish and other aquatic organisms.

Seven wastewater treatment plants (WWTP), five municipal and two industrial, discharge pollution effluent to the main stem of the Spokane River.[1] In addition, the Hangman Creek Watershed, a major tributary of the Spokane River, contains ten permitted facilities, six of which discharge to surface waters.[2] Combined, the seven mainstem Spokane River wastewater treatment plants discharge up to 75 million gallons a day in the summer to the river. These discharges, in combination with non-point source pollution from urban and rural runoff, impair water quality and cause violations of state water quality standards for dissolved oxygen (DO) in several segments of the Spokane River and Lake Spokane.[3] As a result, these segments are listed on the State's § 303(d) list as critically impaired water bodies for dissolved oxygen.

A § 303(d) listing means that current wastewater technologies and other pollution control activities, such as Best Management Practices (BMPs) for non-point sources, are insufficient to protect the health of the river and that more stringent measures must be applied to meet water quality standards. 33 U.S.C. §§ 1313(d), 1329; 40 C.F.R. § 130.7. As a result, Ecology must devise a clean-up plan or Total Maximum Daily Load (TMDL) that identifies the pollutants contributing to oxygen depletion, assign pollutant waste load allocations and load allocations to point sources and non-point sources, respectively, and incorporate strategies to control pollutant release from both point and non-point sources. *Id.*

Based on its technical assessment, the Washington State Department of Ecology (Ecology) identified three pollutants of concern associated with dissolved oxygen depletion - BOD, ammonia and phosphorus - with the latter having the most significant impact on algal production in Long Lake and the river.[4] The goal of this TMDL is to

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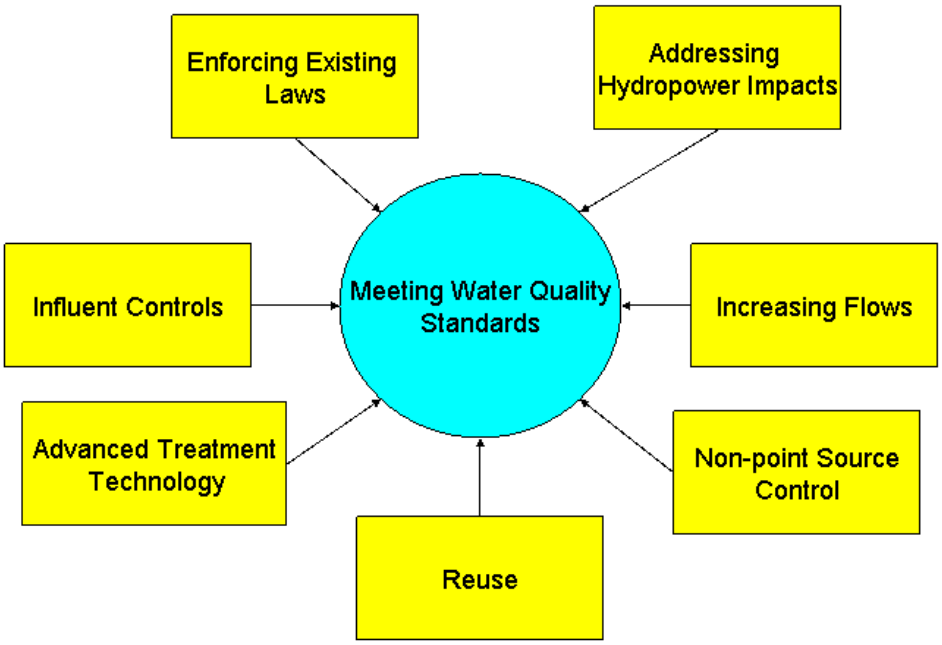
[1] These WWTPs are the City of Coeur d'Alene, the City of Post Falls, Hayden Sewer District, Liberty Lake Sewer & Water District, Kaiser Aluminum, Inland Empire Paper, and the City/County of Spokane.
[2] *See* Hangman TMDL Submittal Draft Report at 22 (Oct. 13, 2005).
[3] *See* TMDL To Restore and Maintain Dissolved Oxygen In the Spokane River and Long Lake(Long Lake), Submittal Report, Public Comment Draft at 8 (Revised October 15, 2004) (hereinafter "Draft TMDL").
[4] Draft TMDL at 10. Ecology used the CE-QUAL-W2 model in its technical assessment. On November 30, 2004, experts representing Ecology, the dischargers, and the Sierra Club, concurred that the model was adequate to support Ecology's conclusion that non-point and point sources of BOD and nutrients would have to be reduced to near background levels to meet the existing DO standard of 0.2mg/l decrease (WAC 173-201A-200).

reduce loading of these pollutants to prevent violations of the dissolved oxygen criteria in Long Lake and to restore the River to health.[5] To do this, the TMDL must include detailed implementation strategies for reducing pollutant loading from all sources, both point and non-point.

The purpose of this document is to inform and provide structure for the development of a comprehensive and enforceable agreement for achieving the pollution reductions required by the TMDL. Specifically, it offers an implementation scenario framework for the finalization of the Washington Department of Ecology's Dissolved Oxygen (DO) Total Maximum Daily Load (TMDL) and implementation plan for the Spokane River. The final product must constitute a clear and earnest effort to restore healthy dissolved oxygen levels to the river.



A successful cleanup will include strategies from the following seven approaches:

(1) influent control and reduction;
(2) advanced treatment technology;
(3) reuse and conservation;
(4) non-point controls;
(5) increases in stream flows;
(6) enforcement of laws and ordinances; and
(7) addressing hydropower impacts.

[5] Draft TMDL at Tables 1 and 2.

Section 2. SUMMARY OF SCENARIO AND TMDL IMPLEMENTATION

Under this scenario, the Sierra Club proposes that the NPDES dischargers to the Spokane River subject to NPDES permits (collectively referred to as "the dischargers") implement a three-phased approach similar to the phased approach set forth in Ecology's draft TMDL. This approach and the commitments of the parties will be reflected in the final TMDL, as well as a memorandum of agreement (MOA) between Ecology and the dischargers, and incorporated into the dischargers' NPDES permits.

In the first phase, the dischargers would implement a series of institutional influent control measures, including the bans on the utilization of phosphorus in commercial/domestic dishwasher detergent and in domestic yard fertilizer, an assessment of industrial/commercial sources followed by an evaluation and revision of industrial pre-treatment programs, aggressive home/yard and industrial water conservation, and an education/incentive program focusing on domestic phosphorus influent reduction. These measures are intended to be near-term and would be implemented within the first 18 months of finalization of the TMDL.

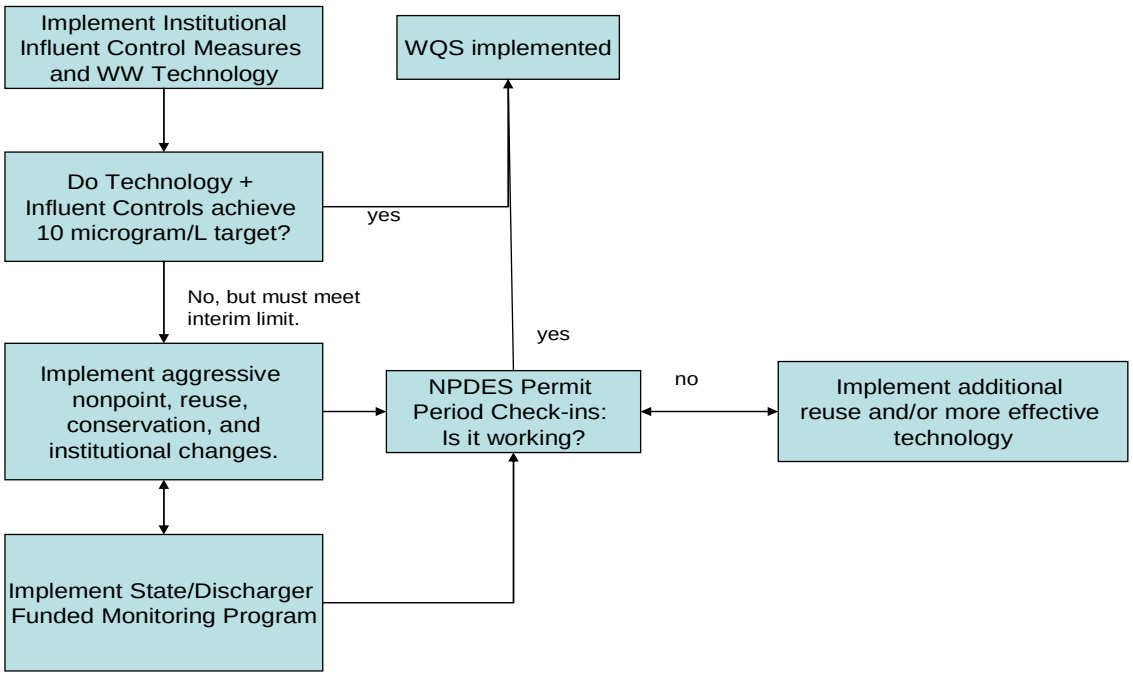
The second component of phase one would be the evaluation and selection of wastewater treatment technology. As set forth in the draft TMDL, the ultimate target for this technology would be effluent that meets the 10 µg/L concentration standard. Based upon the preliminary data available from the City of Spokane WWTP's pilot, as well as the cursory data available from the Technology Workgroup's matrix, it appears that this target may be achievable. Regardless, the initial phase of technology must meet an interim concentration standard of 50µg/L utilizing appropriate averages as set forth in the individual NPDES permits. In the event that the selected technology fails to meet the ultimate TMDL target when coupled with the institutional influent control measures, the remaining phosphorus reduction balance (the "delta") will be addressed through a series of secondary actions.

The second phase of the scenario consists of identifying and designing a series of aggressive reuse, non-point, conservation, and institutional measures designed to address the expected delta in phosphorus reduction. Specific actions will be included in the completion of the detailed implementation plan (DIP), which will occur within 12 months of the finalization of the TMDL.[6] The DIP will set forth a detailed schedule for implementing scenario actions, as well as effectiveness monitoring specific to each action.

[6] As part of an agreement on the implementation of section 303(d) of the federal Clean Water Act, Washington State must prepare a "detailed implementation plan" which includes a monitoring plan and measures of success. *See* http://www.ecy.wa.gov/programs/wq/tmdl/303moa12.pdf.

The third phase of the scenario is implementation. Achievement of the final TMDL target must occur within the completion of four NPDES permit cycles or 20 years, which ever is less, in a manner consistent with the achievement of implementation milestones set forth in the MOA document. If planned implementation activities are not producing expected results (i.e., the achievement of the10 µg/L target), Ecology or other entities will perform additional studies to better identify the significant sources of phosphorus input to the river system. They will then adopt more effective treatment technology and/or deploy more extensive water re-use or conservation programs in order to meet the target.

Notwithstanding any action taken under the scenario, the final TMDL targets for the point sources will be achieved within the scenario timeframe. If these targets are not met, additional actions must occur regardless of the previous or ongoing actions of the parties. Effectiveness monitoring will be utilized to ensure that scenario actions are improving river conditions. Further, the failure of a party to comply with the terms and commitments set forth in the TMDL/TMDL-MOA/DIP will result in a modification of that party's existing or subsequent NPDES permit limit.



SECTION 3. FACTUAL AND LEGAL REALITIES AND LIMITATIONS IMPACTING SCENARIO DEVELOPMENT

a. Collaborative Process Did Not Address Other Pollutants of Concern

The purpose of the TMDL is to address dissolved oxygen in the Spokane River by addressing several pollutants of concern, including phosphorus, carbonaceous biochemical oxygen demand, and ammonia.[7] The information gathered in the TMDL collaborative focused exclusively on addressing phosphorus discharges from point and non-point sources. Because the collaborative failed to address these other pollutants, Ecology will need to ensure that whatever strategy is implemented addresses these pollutants and/or develop a separate implementation strategy for those pollutants.

b. Final Solution must meet Spokane Tribe's Water Quality Standards

Notwithstanding any action of the Washington Department of Ecology, the final plan for addressing the Spokane River in the State of Washington must meet the downstream standards established by the Spokane Tribe. As set forth by the Supreme Court, any NPDES permit issued to a discharger in an upstream jurisdiction must include limitations necessary to comply with the water quality standards of a downstream jurisdiction. *Arkansas v. Oklahoma*, 503 U.S. 91, 107 (1992); *see also Montana v. U.S. Environmental Protection Agency*, 941 F. Supp. 945 (D. Mont. 1996); *City of Albuquerque v. Browner*, 97 F.3d 415 (10th Cir. 1996). Accordingly, the TMDL, DIP, and subsequent NPDES permits must be consistent with the requirements of the Spokane Tribe.[8]

c. Impending PCB TMDL Will Likely Impact Decisions Regarding Dissolved Oxygen Technology

The Spokane River and Long Lake violate the water quality standards for the presence of polychlorinated biphenyls (PCBs) in several segments. Ecology estimates that the PCB TMDL technical report will be finalized after January 2006, with a submittal package going to EPA for approval on or before June 30, 2006. The goal of the PCB TMDL will be to meet the Spokane Tribe's water quality standards (about 34 pg/L) and the new EPA recommended PCB standard to protect human health (64 pg/L). It is likely that this TMDL will determine that the waterbody assimilative capacity for PCBs is less than current loading for existing discharge volumes and that there will be no capacity for new or expanded discharges.

The TMDL collaborative has not addressed the intersection between the phosphorus/DO solution and PCB elimination/reduction.

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[7] Draft TMDL at 3.
[8] Similarly, all NPDES permits issued to Idaho dischargers must be protective of Washington's water quality standards.

d. County Plant Will Be a "New Source"

Spokane County's new facility will be considered a "new source" under the Clean Water Act (CWA). Unlike the existing point sources in the river, the County's new facility is subject to a more stringent standard. 40 CFR § 122.4(i) provides in relevant part:

> No permit may be issued: ... [t]o a new source or a new discharger, if the discharge from its construction or operation will cause or contribute to the violation of water quality standards. The owner or operator of a new source or new discharger proposing to discharge into a water segment which does not meet applicable water quality standards or is not expected to meet those standards even after the application of the effluent limitations required by [Section 301(b)] of [the] CWA, and for which the State or interstate agency has performed a pollutants load allocation for the pollutant to be discharged, must demonstrate, before the close of the public comment period, that:
> (1) There are sufficient remaining pollutant load allocations to allow for the discharge; and
> (2) The existing dischargers into that segment are subject to compliance schedules designed to bring the segment into compliance with applicable water quality standards.

40 C.F.R. § 122.4(i). Two basic propositions may be derived from the regulation. One is that a new source cannot discharge if it will contribute to the violation of water-quality standards. The other is that, when a new discharge is proposed and a TMDL has been established, the proponent must demonstrate that the discharge complies with the TMDL.

Further, Washington law, WAC 173-201A-510(4), does not authorize a compliance schedule for new sources.

Accordingly, as discussed in greater detail below, in order for the new plant to discharge to the river during the critical season, the final TMDL must bifurcate the allocation between the City and the County and the new plant must meet the TMDL requirements once it goes online.

e. Offsets from Non-point Source Reduction can only Occur after there is a Proven Reduction.

WAC 173-201A-450(1) provides, "A water quality offset occurs where a project proponent implements or finances the implementation of controls for point or non-point sources to reduce the levels of pollution for the purpose of creating sufficient assimilative capacity to allow *new or expanded discharges*." The regulation does not address offset for existing levels of discharge. Regardless, the regulation is clear that "[t]he

improvements in water quality associated with creating water quality offsets for any proposed new or expanded actions *must be demonstrated to have occurred in advance* of the proposed action." *Id.* at 450(2)(b)(emphasis added). Accordingly, water quality offsets may be used for new and expanded discharges only after it is demonstrated that the improvements by the offset actions have occurred and are having the desired water quality benefits.

f. Given the Uncertainties involved in this TMDL, a Phased Approach is Appropriate.

In the context of the TMDL program, EPA's 1991 guidance includes a "phased approach" for TMDLs for situations that are not straightforward or are complex. These include situations where:

- Data and predictive tools are inadequate to characterize and analyze the pollution problem with a known level of uncertainty;
- The point source wasteload allocation (WLA) will be based on a nonpoint source load allocation (LA) for which nonpoint source controls need to be implemented, or
- States desire to collect additional data to verify expected load reductions, evaluate effectiveness of control measures, and ultimately determine whether a TMDL needs to be revised.

EPA indicated that if a phased management approach was pursued, the TMDL should establish a schedule for the installation and evaluation of source controls, additional monitoring, assessment for water quality standards attainment, and if needed, additional predictive modeling. EPA also indicated that States should establish a procedure for reviewing and revising best management practices (BMPs) in TMDL documentation

Given the level of uncertainty and level of complexity in the Spokane River, it is only appropriate that a phased approach be utilized, as reflected in the Draft TMDL.

g. The Spokane River has Multiple Jurisdictions with Multiple Responsibilities.

As acknowledged by the participants to the collaborative process, the Spokane River Basin covers two states, several counties, two Tribes, multiple municipal governments, and includes land managed by several state/federal agencies. Many, many regulatory processes are currently underway that will either positively or negatively impact water quality in the river.[9]

[9] *See* Sierra Club's Spokane-CDA Basin Matrix, included as Attachment A.

Several of these entities have not actively participated in the collaborative. For example, the upper watershed of Latah Creek includes Whitman County, the Coeur d'Alene Reservation, and even the National Forest Service. Ultimate success of a watershed approach requires the cooperation and commitment of all jurisdictions with authorities to affect water quality in the basin.

Accordingly, Ecology and the participating governments in the Spokane River TMDL Collaboration should work to develop a relationship with these other jurisdictions that can, at a minimum, coordinate strategy to address non-point pollution and pursue other remedies that transcend jurisdictional boundaries.

SECTION 4. SPECIFIC APPROACHES, STRATEGIES, AND ACTIONS TO ACHIEVE TMDL GOALS

As indicated above, under the first phase of the scenario each of the dischargers will implement an influent control program and identify the wastewater treatment technology that will reach the highest level of treatment.

The specific approaches and strategies detailed below do not represent all the possible options for addressing this problem, nor is it intended that the parties implement every action detailed below. Rather, it is intended that through the finalization of the TMDL, MOA, and DIP, the proper suite of actions is selected to ensure that the TMDL goals and compliance with state and tribal water quality standards are met.

APPROACH A. Influent Control and Reduction

Reduction of the volume and concentration of phosphorus of the influent into treatment plants will reduce the volume of effluent and thus the capacity requirements and treatment costs for wastewater treatment plants. Influent reduction strategies include I/I (influent & infiltration) control, water conservation, restrictions on use of phosphorus products, and industrial pre-treatment requirements. Advances in wastewater treatment technologies have eliminated concerns that increase in pollutant concentrations caused by water use reductions will increase pollutant discharges.

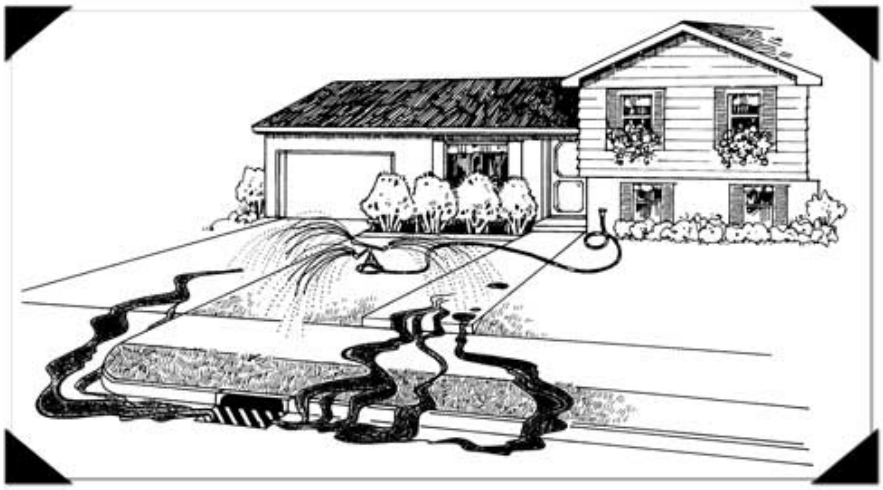
As discussed in greater detail below, specific actions to reduce both the volume and concentration of influent to the WWTPs include:

1. Municipal dischargers will conduct water audits and adopt water conservation measures to reduce water use by their customers.
2. Municipal dischargers will implement programs to reduce industrial sources of phosphorus and implement additional pre-treatment requirements.
3. Municipal dischargers will adopt ordinances to ban the sale and/or use of dishwashing detergent that contains phosphorus (both commercial and

domestic use) and restrict the use of household fertilizers containing phosphorus.

4. Municipal dischargers will adopt measures to investigate and control I/I losses in municipal sewer systems.
5. Municipal dischargers will develop education/incentive programs focusing on phosphorus reduction, such as home garbage disposals, etc.

Strategy: **<u>Water Conservation</u>**



The Flows & Loading (F&L) and Reuse & Conservation (R&C) Workgroups both examined the question whether decreasing total influent flows to treatment plants would provide a phosphorus reduction benefit.

It is generally believed that reducing influent flows will increase the concentration of phosphorus in the influent, but may not affect the concentration of phosphorus in the effluent of those plants that use effluent filtration. Most of the municipal plants are within the range of 5-8 mg/L of influent phosphorus.

However, if the volume of effluent discharged from the plants is reduced through conservation, and the concentration of phosphorus in the effluent remains stable, then the total volume of phosphorus into the Spokane River will be reduced by the same proportion as the flow reduction. For example, a 10 % reduction in total flows through a treatment plant could result in a 10% reduction in pounds of phosphorus discharged into the Spokane River.

It is also generally believed that a reduction of influent flows will save money in operational costs, but not capital costs. The savings in operational costs could occur in lower energy consumption and lower chemical consumption. Since most treatment

processes are designed for peak hydraulic flows, it was felt that minimal savings would occur on capital costs.[10]

The R&C Workgroup did not consider specific goals, strategies or actions for water conservation, and instead concluded, based on information from a western Washington wastewater treatment system, that a 5 to 20% reduction in indoor residential water usage represents a reasonable range for municipal water utility goal setting.

The R&C Workgroup did not collect data for or analyze the benefits of commercial/industrial conservation. Nor did the workgroup consider the benefits of outdoor residential conservation in terms of potential reduction of groundwater pumping and associated increases in instream flows in the Spokane River.[11]

Water Quality Benefits of Water Conservation

Water conservation coupled with pollutant source reduction can be an effective approach to reducing the adverse effects of both point and nonpoint source pollution. Three general types of water conservation may produce three particular benefits to the Spokane River TMDL.

First, indoor residential water conservation may reduce influent flows to wastewater treatment plants, reducing phosphorus loading to the plants and reducing costs of plant operations. This type of benefit was considered and approved by the R&C Workgroup as discussed above.

Second, outdoor residential water conservation may seasonally reduce municipal pumping from the Spokane-Rathdrum Aquifer and produce a benefit for streamflow restoration. As a whole, our region utilizes notoriously high quantities of water during summer months, primarily to irrigate lawns and gardens.[12] Because of the intimate connection between the aquifer (the source of municipal water supply) and the Spokane River, reduction in outdoor use could result in partial restoration of streamflow in the River. [13]

Third, agricultural water conservation coupled with other nonpoint source pollution controls could reduce sediment loading and nutrient runoff in the tributary watersheds. This in turn would improve water quality contributions to the Spokane River, as well as

[10] Flows & Loading Workgroup, Memorandum to Steering Workgroup and Full Group regarding Flows & Loadings (9/11/05).
[11] *See* streamflow restoration discussion.
[12] *See* Middle/Little Spokane River Watershed Management Plan (draft June 2005) at 58, Table IV.I.A. *See* Attachment B.
[13] *See* streamflow restoration discussion.

improving water quality (and quantity) in Hangman Creek and the Little Spokane River.[14]

Related Laws, Policies & Processes

In 2003, Washington adopted a new water conservation law that requires municipal water suppliers to establish and meet conservation goals. RCW 70.119A.180. The Department of Health is now in the process of adopting rules to guide implementation, but will not be finished until late 2006. While water utilities could independently begin implementation, it is not believed that any of the water suppliers in the Spokane region have done so.

Idaho has no state laws governing water conservation. Both states require efficient water use as a prerequisite to the exercise of water rights, but neither has defined this term in any meaningful way.

At the local level, both Idaho and Washington are in the process of adopting watershed management plans for the Spokane watershed. In Idaho, the recently adopted "Rathdrum Prairie Groundwater Management Plan" will eventually require all water users to "agree to a simple list of conservation measures." Public water suppliers applying for new water rights or changing existing rights must adopt formal water conservation plans.[15] IDWR is currently considering implementation.

In Washington, watershed plans have been completed for the "middle" Spokane River (state line to Little Spokane confluence), the Little Spokane River, and Hangman Creek.[16] Although both plans contain general recommendations regarding water conservation, neither plan contains any enforceable, specific, proactive measures that will lead directly to water conservation by any water user.

Some public water suppliers in the region are taking steps toward adopting and implementing water conservation plans. Notably, four Spokane River dischargers have

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[14] *See generally* EPA's resource document on the relationship between water conservation and the clean water, "Cleaner Water through Conservation," at http://www.epa.gov/OW/you/intro.html. A prime example of the success of this approach is found in the lower Yakima River basin, where increased efficiency in water use has been key to meeting TMDL targets for sediments and turbidity. *See* http://www.ecy.wa.gov/programs/wq/tmdl/watershed/yakima_wq/loweryak-update.html ("Since an overwhelmingly high percentage of the pollution in the lower Yakima comes from erosion of soil from farms, many growers will need to make significant changes in irrigation practices and irrigation water management.")

[15] *See* Attachment C (Final Order Adopting Groundwater Management Plan for the Rathdrum Prairie, 9/15/05). The plan references EPA's Water Conservation Plan Guidelines (U.S. EPA 1998) as a basis for planning. *See* http://www.epa.gov/owm/water-efficiency/wecongid.htm.

[16] The Hangman Creek plan has received final approval, while the Middle/Little Spokane plan is currently pending with county commissioners. The Middle/Little Spokane River (WRIA 55/57) watershed plan may be viewed at http://www.spokanecounty.org/wqmp/projects/ASP/Home.asp. The Hangman Creek (WRIA 56) watershed plan may be viewed at http://www.sccd.org/water/hangman/.

begun conservation efforts. Liberty Lake Sewer & Water District offers free low flow fixtures and landscape irrigation audits to its customers.[17] The City of Post Falls imposes some lawn watering restrictions on its customers.[18] The Spokane City Council recently adopted a water stewardship resolution directing the City Water Department to develop a 5-part water conservation program.[19] In addition, a few public water suppliers who connect to wastewater systems have adopted water conservation measures. At the industrial level, Inland Empire Paper is recycling significant quantities of process water within its plant.

Actions: <u>Adoption of Municipal Water Conservation Programs</u>

1. Each municipal discharger will adopt an aggressive water conservation plan to control both indoor and outdoor residential, commercial, and internal water use, as described below.

2. Each municipal discharger will enact ordinances requiring use of low-flow fixtures (toilets, washing machines, dishwashers, showerheads) in all new construction, ordinances requiring phased retrofit for existing residences and buildings (e.g., 10 years or when replacement needed, whichever comes first), and develop and funding rebate programs. Each discharger will develop and fund an incentive/rebate program to promote installation and use of low flow fixtures and appliances.[20]

3. Each municipal discharger will develop a residential outdoor irrigation water use reduction program that includes establishing standards for watering lawns and gardens, penalties for overuse, technical assistance and rebates/funding for household installation and use of water efficient irrigation equipment.

4. Each municipal discharger will adopt an effective water rate structure designed to induce consumer water use, both indoor and outdoor.[21]

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[17] http://www.libertylake.org/water_conservation.htm

[18] Post Falls households may not water between noon and 6:00 p.m., and are encouraged to water only every other day of the week. While these measures reduce peak demand, it is not clear whether they reduce overall water use in Post Falls. http://www.postfallsidaho.org/waterWW.htm.

[19] *See* Attachment D (Spokane City Council Resolution No. 2005-0112). *See* also http://www.spokanewater.org/.

[20] There are an extraordinary number of resources for municipal water conservation planning and implementation. *See* Attachment E for copies of water conservation materials provided to the Spokane City Council.

[21] The Washington Dep't of Health has produced a series of publications on water pricing. http://www.mrsc.org/Subjects/Environment/water/wc-measures.aspx#Conspricing; the Municipal Research & Service Center (MSRC) provides links for seven Washington municipal ordinances adopting water conservation rates. http://www.mrsc.org/Subjects/Environment/water/wc-rates.aspx.

5. Each municipal discharger will develop a program to audit internal water system leakage and internal water use (municipal buildings, etc.), and will install low-water fixtures and adopt operational controls to reduce system water use.[22]

6. Each municipal discharger will establish a commercial water reduction program. This program will establish water consumption standards for categories of water use (e.g., restaurants, car washes), adopt ordinances to require water usage consistent with the standards, develop commercial water audit and technical assistance activities and schedules, and develop and fund rebate and incentive programs to replace commercial water use fixtures.[23]

7. Spokane County will expeditiously adopt the conservation program discussed in the Spokane County Wastewater Facilities Plan (similar to the one conducted by the LOTT wastewater agency). This program would allocate a budget for in-home water conservation measures over a period of 2-3 years, with a focus on replacing toilet fixtures, shower heads, and clothes washers.

Actions: <u>Integration with Washington's new municipal water conservation law</u>

1. Municipal dischargers in Washington will coordinate the adoption of a water conservation plan with the goal of setting and implementing requirements of the municipal water conservation law, RCW 70.119A.180. Absent timely regulatory guidance from the Department of Health, municipalities will move forward with their programs, but confer in advance with DOH to ensure ultimate consistency with state rules.

2. Each Washington municipal discharger will assess the economic benefit derived from reduction of water flow to the sewage treatment plant in relation to the expenses associated with wastewater services. This analysis will be developed and shared with all public water suppliers who serve households also served by the discharger for use in the "cost effectiveness" calculation required for water conservation planning under RCW 70.119A.180(4)(a)(A).

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[22] As an example of a successful effort by a municipality to control internal water use, the City of Tacoma reports savings of 5.8 mgd with leakage control and better management of reservoirs, transmission lines and meters. *See* http://www.ci.tacoma.wa.us/water/WaterConservation/conservacc.htm.

[23] Examples of commercial & industrial water audit conservation programs include the City Albuquerque, N.M., (free water audits to commercial and residential customers, post-audit savings of between 8 and 30%), *see* http://www.cabq.gov/waterconservation/auditformici.html, and San Jose, California (Flow Audit Study to assess methods to reduce commercial and industrial discharges into the wastewater system), *see* http://www.ci.san-jose.ca.us/esd/fas.htm.

Action: Integration with the Rathdrum Prairie Groundwater Management Plan

1. Municipal dischargers in Idaho will coordinate the adoption of a water conservation plan with the water conservation planning requirements of the Rathdrum Prairie Groundwater Management Plan. Absent timely regulatory guidance from the Idaho Department of Water Resources, municipalities will move forward with conservation planning and implementation, but confer in advance with IDWR to ensure ultimate consistency with state requirements.

Action: Coordination among dischargers and public water suppliers

1. Each municipal discharger providing sewer service to households served by a non-discharger water supplier will establish indoor residential water conservation standards for use by non-discharger water suppliers. For non-discharger water suppliers who decline to utilize these standards, municipal dischargers will establish an appropriate surcharge for households in those service areas.

Action: Adoption of industrial water conservation programs

1. Each industrial discharger will audit internal water use and adopt recycling technologies as an alternative to discharge. Industrial dischargers will undergo phased reduction of permitted effluent discharge as contemplated under the Clean Water Act NPDES program.[24]

Action: Agricultural water conservation

1. Spokane County will establish standards for efficient agricultural water use designed to reduce soil erosion and nutrient runoff and thereby promote nonpoint source reduction in Spokane River tributaries. These standards will be incorporated into appropriate county codes. The County, working with the conservation district, will develop and fund a stepwise compliance program ranging from voluntary participation to enforcement.

Strategy: Pre-treatment

Next to human wastes, a variety of industrial and commercial dischargers contribute the most phosphorus to the influent streams of wastewater treatment plants (WWTP). The contribution of phosphorus from these commercial and industrial sources accounts for

[24] Examples of successful industrial water conservation programs include the Simpson Tacoma Kraft mill in Tacoma, Washington reduced water consumption by 10 million gallons per day by installing equipment to treat and recycle water within the plant. *See* http://www.simpson.com/environment.cfm. Crown Cork & Seal in Portland, Oregon saved 8.5 million gallons of water and $46,000 per year by changing operation of flow-control valves and switching from water to air-cooled equipment. *See* http://www.sustainableportland.org/energy_Crown_Cork.pdf.

approximately 46 percent of the non-ingested phosphorus load discharged into WWTPs. Reducing the commercial and industrial phosphorus contribution to WWTPs by one half would reduce the total non-ingested phosphorus discharged to WWTPs by almost 23 percent. [25]

Numerous commercial, industrial, and institutional businesses utilize phosphorus for such activities as cleaning and sanitizing, metal preparation, finishing and painting, and food processing. Such enterprises include agricultural co-ops, car/truck washing facilities, dairies, food processing plants, meat packing and locker plants, metal finishing facilities, municipal water treatment plants that add phosphorus to drinking water, nursing homes, hospitals, research facilities, restaurants, and schools. Many of these, especially food processing plants, contribute a significant amount of CBOD as well.

Traditionally, industrial/commercial pretreatment programs focused on end-of-pipe solutions to control the discharge of industrial/commercial wastewater phosphorus, thus increasing the cost of wastewater treatment and requiring larger amounts of harsh treatment chemicals. Indeed, there are currently no pretreatment regulations, standards or requirements for phosphorus reductions from such businesses in the region.

Appropriate pretreatment programs designed to reduce phosphorus from these sources can reduce influent loadings of phosphorus and reduce influent water (hydraulic loading) thus avoiding the need to invest in additional sewer and treatment capacity, reducing chemical, energy and sludge management costs, reducing water demand, and increasing the life of existing water supplies.[26] For example, the City of St. Cloud, Minnesota implemented a Phosphorus Management Plan that included strict pretreatment controls, biological treatment, modifications to city and local codes, and education and outreach to commercial businesses and residents. As a result, the City reduced the amount of phosphorus coming into its POTW by 32% and the amount of phosphorus leaving the facility by 48%.[27]

Appropriately crafted pretreatment regulations can also benefit industry by enhancing environmental performance, reducing water consumption, lowering operating costs, and reducing regulatory burdens. For example, by implementing a phosphorus reduction program in its manufacturing process, Electrolux Home Products, a freezer manufacturer, dropped its phosphorus loading by 90%.[28] Rochester Powder Coating, a job shop that paints sheet metal parts using powder coatings, reduced its phosphorus discharge by 98% over two years by using pollution prevention practices.[29]

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[25] Minnesota Pollution Control Reports, http://www.pca.state.mn.us/publications/reports/pstudy-section4.pdf.
[26] *See* Minnesota Technical Assistance Program at http://mntap.umn.edu/POTW/index.htm.
[27] http://mntap.umn.edu/pmp/stcloud.htm.
[28] http://mntap.umn.edu/POTW/electrolux.htm.
[29] http://www.p2pays.org/ref/04/03462.htm. For more examples, *see* http://mntap.umn.edu/POTW/industrial.htm

Related Laws, Policies, and Processes:

Municipalities and counties have a legal duty to protect WWTPs from discharges of pollutants into the collection system by industrial/commercial users which may interfere with treatment process, pass through to receiving waters, or contaminate WWTP sludge. The primary regulatory mechanism to control these pollutants is through pretreatment standards and requirements. 33 U.S.C. § 1317; Title 40 Chapter 403 C.F.R; RCW 90.48.260; WAC 173-208-090, 173-216-150. Excise taxes and/or effluent strength charges may also reduce influent pollutants.

Both the City and County of Spokane have pretreatment programs as conditions of their combined NPDES permit, but neither include mandatory phosphorus control. According to the City of Spokane's Annual Pretreatment Report for 2004, the City is currently regulating nine industrial facilities under its pretreatment program – Inland Northwest Dairies, EZ Loader Boat Trailer, Inland Empire Plating, Spokane Metal Finishing, American Linen-Steiner Corp., Hollister-Stier Laboratories, Lloyd Industries, Baker Commodities, and Mister Car Wash.[30] Four others, Tripleplate Chrome and Bumper Repair, Evergreen Powder Coating, American West Chrome, submitted statements that they do not discharge wastewater to the sewer, but the City conducted no inspections.[31] The City is currently conducting an Industrial Wastewater Survey to identify other non-domestic users, which should be subject to the Pretreatment Program. These include powder coating and metal finishers, pharmaceutical manufacturing, large laundries and car washes, large photo finishers, and large x-ray finishers.[32]

The County currently regulates seven businesses under its pretreatment program - Columbia Lighting, Kemiron, Mica Landfill, Novation, Honeywell Electronic Materials, Galaxy Compound Semiconductors, and Lloyd Industries, which anodizes aluminum on bakeware.[33] It too conducts an ongoing industrial survey to identify commercial users appropriate for regulation.

Actions:

1. Municipal dischargers will ensure adequate funding for their pretreatment programs to identify and regulate those non-domestic users who contribute phosphorus loading to WWTPs.

2. Ecology will work with the applicable governmental entities and industrial users to identify and implement appropriate phosphorus reduction processes applicable in various industrial settings. Although local governments may decide to create

[30] Annual Report at 16.
[31] *Id*. at 5.
[32] *Id.* at 14.
[33] Spokane County Annual Pretreatment Report 2004 at 6 (March 30, 2005).

incentive programs to induce adoption of such pollution prevention strategies, it is the Legislature's intent that pretreatment costs be born by industries. *See* RCW 70.146.010.

3. Ecology and the municipal dischargers will develop a program of education and technical assistance for industrial, commercial, and institutional businesses that contribute phosphorus (and other nutrients) to WWTPs.[34]

4. Municipal dischargers will enact ordinances amending pretreatment requirements and standards under their respective sewer codes to require all known, available and reasonable phosphorus removal and other pollution prevention measures by industrial/commercial users.

5. Municipal dischargers will amend sewer rates to provide incentives for compliance with phosphorus reducing pretreatment requirements and standards. For example, the standards could require the connecting customer to maintain a waste stream that is cost-effective and equitable to treat and will not cause WWTP violations or loss of nutrient load allocation capacity. This should be a condition of sewer service availability.

6. The TMDL participants will explore the potential for regional regulatory overlay for phosphorus reduction strategies for both domestic and commercial users.

Strategy: <u>Household Phosphorus Elimination</u>

Household phosphorus from detergents, soaps, and fertilizer is a significant and unnecessary source of phosphorus into wastewater treatment plants and septic systems, and directly into the River and its tributaries as non-point source pollution.

Dishwasher Detergent

A significant source of phosphorus is dishwasher detergent. As illustrated in the table below, several of the best-selling automatic dishwasher detergents have 6 to 8 percent phosphorus content by weight (about the same as the phosphorus content of Miracle-Gro, a common houseplant fertilizer). The average household uses 36 pounds of dishwasher detergent each year, releasing 2 pounds of phosphorus into groundwater supplies (via septic systems) or into wastewater treatment facilities.[35] A 1993 study for the Twin Cities metropolitan area, prepared for the Minnesota Pollution Control Agency (MPCA), estimated that automatic dishwasher detergents contributed 8 to 9 percent of the total

[34] *See, e.g.*, examples of technical assistance guidance, Attachment F.
[35] *See* http://www.hrwc.org/pdf/04_spraas.pdf.

phosphorus contained in the water coming into the 11 Metropolitan Wastewater Treatment Plants.[36]

Phosphorus Content of Major Detergent Brands[37]

Phosphorus free*	Bi-O-Kleen, Country Save, Ecover, Seventh Generation, Wave
1.6%	Palmolive Gel
3.7 - 4.5%	Electrosol Gel
4.0%	Great Value Gel, Safeway Gel, Simply Clean Gel,
4.3%	Sunlight Gel
4.5%	Cascade Gel, Electrosol Powder
5.3%	IGA Pwd, Sunlight Pwd
5.5%	Sun Sations Pwd, Western Family Classic Pwd,
6.0%	Home Best Pwd, Simply Clean Pwd, Western Family Power Formula
6.3%	Great Value Pwd
6.4 - 7.4%	Cascade Pwd
6.5%	Cascade Complete Gel
7.4%	Safeway Pwd
8.0%	Safeway Tablets
8.7%	Cascade Power Tabs, Electrosol Gelpacs, Electrosol Tabs, Palmolive Triple Action Tabs

* Phosphorus free is defined as containing 0.5% phosphorus or less

The most obvious remedy to address phosphorus from dishwasher detergent is to ban it. There were remarkable benefits to water quality across the Nation from local and state efforts to ban phosphorus in laundry detergent. A USGS study indicated, "Phosphorus concentrations decreased significantly at four of seven stations on the French Broad River after the phosphate [laundry] detergent ban was imposed for North Carolina in 1988."[38] Similar benefits from a laundry detergent ban in the Spokane River were discussed at the Flows and Loading Workgroup. Overall, the results of several state phosphorus laundry detergent bans indicate significant benefits from banning phosphorus:[39]

Maryland: Implemented ban in December, 1985. Between 1985 and 1992: 30% decrease in influent phosphorus concentrations; 16% decrease in

[36] Barr Engineering Company, Phosphorus Reduction Study for the Twin Cities Metropolitan Area – Final Report (1993), prepared for the Minnesota Pollution Control Agency.
[37] *See* http://www.co.missoula.mt.us/wq/Nutrients/automatic_dishwasher_detergents.htm.
[38] USGS, Phosphorus in Streams of the Upper Tennessee River Basin, 1970-93 (1998), available at http://pubs.usgs.gov/of/1998/ofr98-532/pdfs/PhosphorusPDF.pdf.
[39] *See* http://www.chesapeakebay.net/status/status_print.cfm?sid=128&print=yes.

discharged municipal phosphorus loads. Annual savings of $4.4 million sludge management.

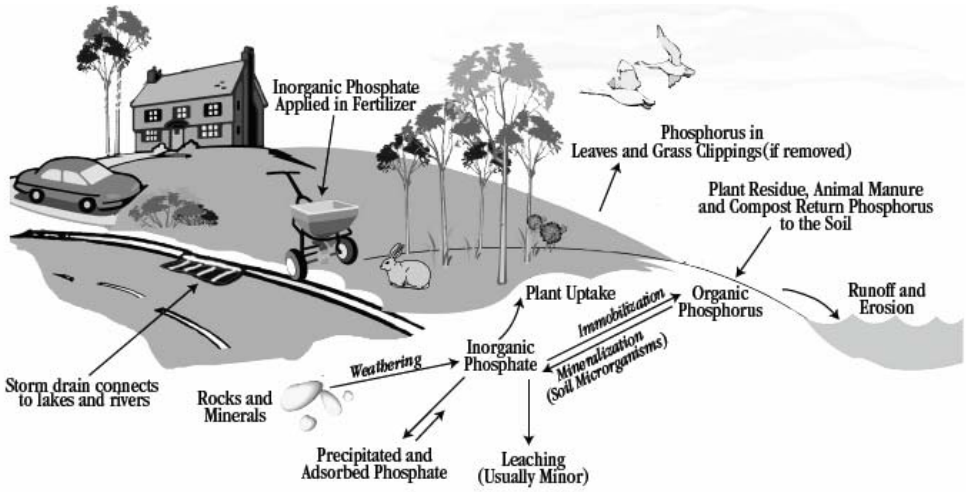
D.C.: Implemented ban in September, 1986. Between 1986 and 1992: 26% decrease in influent phosphorus concentrations; 25% decrease in chemical usage; 14% decrease in sludge volume. Annual savings of $6.5 million in O&M costs, representing 10% of the Blue Plains operating budget.

Virginia: Implemented ban in January 1988.[40] Between 1988 and 1992: 34% decrease in influent; 50% decrease in effluent phosphorus concentrations. 3 of 11 major plants reduced costs and chemical usage 13-40%.

Phosphate-free dishwashing detergent is now available at competitive prices (e.g., Seventh Generation dishwashing detergent has zero phosphate content and is sold at Albertsons and Fred Meyer) and is as effective in cleaning as those products containing phosphorus.[41]

Fertilizer

Like dishwasher detergent, lawn fertilizer is a source of phosphorus both to the wastewater treatment plants and directly to the river (non-point runoff).[42]



The most obvious way to address the point and non-point contributions from fertilizer is the development of a ban. According to the USGS, "Runoff from lawn sites with nonphosphorus fertilizer applications had a median total phosphorus concentration that

[40] Va. Code Ann. § 62.1-193.1.
[41] *See Consumer Reports* (March 2005).
[42] For a comprehensive list of 26 peer-reviewed reports on the impacts of fertilizer to water quality, *see* http://www.state.me.us/dep/blwq/doclake/fert/research.htm.

was similar to that of unfertilized sites, an indication that nonphosphorus fertilizer use may be an effective, low-cost practice for reducing phosphorus in runoff."[43] Data collected by the Three Rivers Park District and University of Minnesota found that the banning of phosphorus fertilizer in one suburban community resulted in a 23% reduction in the amount of phosphorus reaching the storm water system.

Garbage Disposals

Another significant source of phosphorus to wastewater treatment plants is garbage disposals. Disposals can add 50% to the volume of solids in a sewer system or septic tank. A study conducted in Minnesota found, "Food soils and garbage disposal wastes account for approximately 28 percent (725,000 kg/yr) of the non-ingested phosphorus discharged to POTWs."[44] Solids also add nitrogen, phosphorus, grease, and organic matter to the wastewater. Food wastes from potato peels and meats are quite high in phosphorus. Because of the increased burden they impose on the wastewater system, garbage disposals are illegal in Japan.

Increase in Pollutant Loading Caused to Septic Systems by the Addition of Garbage Disposal[45]

Parameter	Increase in pollutant loading (%)
Suspended solids	40–90
Biochemical oxygen demand	20–65
Total nitrogen	3–10
Total phosphorus	2–3
Fats, oils, and grease	70–150

Garbage disposals also require a substantial amount of running water to work effectively. The same result can be accomplished without water by disposing of kitchen waste in a compost pile when appropriate. According to EPA, "Eliminating the use of garbage disposals will significantly reduce the amount of grease, suspended solids, and BOD in wastewater." Similarly, eliminating or reducing the use of garbage disposals would benefit phosphorus reduction efforts.

[43] USGS, Effects of Lawn Fertilizer on Nutrient Concentrations in Runoff from Lakeshore Lawns, Lauderdale Lakes, Wisconsin, (2002), available at http://wi.water.usgs.gov/pubs/wrir-02-4130/wrir-02-4130.pdf.
[44] Minnesota Pollution Control Agency, Detailed Assessment of Phosphorus Sources to Minnesota Watersheds (2004), available at http://www.pca.state.mn.us/publications/reports/pstudy-section4.pdf.
[45] EPA, Onsite Wastewater Treatment Systems – High-Organic-Strength Wastewaters, available at http://www.epa.gov/ORD/NRMRL/pubs/625r00008/fs2.pdf.

Related Laws, Policies & Processes:

RCW Chapter 70.95L bans the use of laundry detergents with greater than 0.5% phosphorus content and dishwashing detergents with greater than 8.7% phosphorus. An effort is underway to amend this bill to reduce the phosphorus content of dishwasher detergent to under 0.5%. *See* House Bill 2322.

The Liberty Lake Water and Sewer District recently enacted a resolution calling for the elimination of phosphorus in dishwasher detergent.[46]

Actions:

1. Each municipal discharger will enact an ordinance banning the local sale, distribution, and use of all soaps, dishwashing detergent, and fertilizer with phosphorus content greater than 0.5%.[47]

2. Each municipal discharger will develop a program to reduce the use of garbage disposals and develop an education/incentive program to encourage the use of garbage disposal alternatives, such as home composting. Incentives could include free or low cost composting containers.

3. Each discharger and Ecology will encourage public support for the adoption of House Bill 2322 and other similar legislative efforts to ban phosphorus in consumer products.

Strategy: <u>Infiltration & Inflow Control</u>

Additional flows into the WWTPs from inflow & infiltration (I/I) into sewer pipes creates additional amounts of influent subject to treatment. Infiltration occurs when groundwater enters the sewer system through cracks, holes, faulty connections, or other openings. Inflow occurs when surface water such as storm water enters the sewer system through roof downspout connections, holes in manhole covers, illegal plumbing connections, or other defects.

I/I, which is essentially clean water, takes up WWTP capacity and can result in unnecessary costs for treatment of this water. It can even lead to unnecessary expansion of the treatment plants to handle the extra capacity. These costs get passed on to the consumer.

[46] Included as Attachment G.
[47] Examples of proposed bans are attached as Attachment H.

Identification and reduction of I/I reduces the quantity of influent into WWTPs and is an effective tool to reduce the quantity of effluent discharged by treatment plants.

Action:

1. Each municipal discharger will conduct an assessment of the relative contribution of I/I and, if reasonable, develop a program to eliminate/reduce additional influent associated with I/I. Actions could include: (1) manhole wall spraying; (2) insituform pipe relining; (3) manhole frame and lid replacement; and (4) disconnecting illegal plumbing, drains, and roof downspouts.

Strategy: **Education/Incentive Program**

Many of our actions have small, yet cumulatively significant effects on the phosphorus load into WWTPs and directly into the river. These actions include picking up pet waste, landscaping, controlling erosion around homes, car washing, and proper disposal of leaves and grass. The design of parking lots, driveways, yards, and buildings also affects the amount of waste water and pollution that contributes to the dissolved oxygen problem.

Related Laws, Policies & Processes:

There are several entities and organizations that have programs to encourage low impact household practices such as reduced yard watering, composting, and xeriscaping.

Actions:

1. The dischargers and Ecology will develop education/outreach information on environmental impacts of phosphorus and household actions to reduce phosphorus discharges into WWTP or the river. Examples include stormwater drain marking programs.[48]

2.. The dischargers and Ecology will develop education/incentive programs to address other common sources of phosphorus, including:
   - Proper pet waste collection and disposal;[49]
   - Proper yard management techniques;[50]
   - Development of a river-friendly community carwash program.[51]

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[48] *See* http://cfpub2.epa.gov/npdes/stormwater/menuofbmps/invol_6.cfm.
[49] *See* http://cfpub2.epa.gov/npdes/stormwater/menuofbmps/poll_3.cfm.
[50] *See* http://cfpub2.epa.gov/npdes/stormwater/menuofbmps/edu_6.cfm.
[51] *See, e.g.,* the City of Tacoma's program, http://www.ci.tacoma.wa.us/waterservices/education/carwash.htm.

3. The dischargers will develop a program to provide education and economic incentives for low impact commercial and residential development.[52]

APPROACH B. Advanced Wastewater Treatment Technology for Existing Dischargers

Based on its technical assessment, Ecology identified three pollutants of concern associated with dissolved oxygen depletion, CBOD, ammonia, and phosphorus, with the latter having the most significant impact on algal production in Long Lake and the river.[53] Wastewater dischargers and non-point sources must reduce their loading of phosphorus to near background levels or 10 µg/L during the critical period, April through October, in order to avoid violating water quality standards.

The goal of the TMDL is to reduce nutrient loading from April to October to prevent violations of the dissolved oxygen criteria in Long Lake as set forth in Tables 1 and 2 in the Draft TMDL. To do this, the TMDL appropriately focuses on removing the largest controllable sources of pollutants, effluent from the seven Spokane River treatment plants, as quickly as possible. Doing so allows the TMDL participants to observe resulting changes in the river while implementing other controls. This is a sensible approach and one that should be adopted here.

Under the Clean Water Act, TMDLs must include strategies to reduce all pollutants of concern from non-point as well as point sources. 33 U.S.C. §§ 1313(d), 1329. This section of the scenario, however, deals primarily with phosphorus loading associated with municipal and industrial wastewater.[54]

There are three main technology-based strategies for reducing phosphorus loading from wastewater treatment plants: (1) reducing phosphorus in the effluent through end-of-pipe advanced wastewater treatment alternatives; (2) maximizing facility operations for pollutant removal; and (3) developing permits that provide the maximum incentives and opportunities for pollutant reduction.

It is anticipated that these strategies, along with the other strategies outlined in this implementation scenario, will be incorporated into an MOA between Ecology and the dischargers. These strategies will also be incorporated into enforceable NPDES conditions.

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[52] *See* http://cfpub2.epa.gov/npdes/stormwater/menuofbmps/edu_7.cfm.

[53] Draft TMDL at 10. Ecology used the CE-QUAL-W2 model in its technical assessment. On November 30, 2004, experts representing Ecology, the dischargers, and the Sierra Club, concurred that the model was adequate to support Ecology's conclusion that non-point and point sources of BOD and nutrients would have to be reduced to near background levels to meet the existing DO standard of 0.2mg/l decrease (WAC 173-201A-200).

[54] As discussed above, it must be stressed that all dischargers must also reduce CBOD and ammonia loading as set forth in the draft TMDL.

Related Laws, Policies & Processes:

Municipal and industrial point source dischargers are subject to effluent limitations in their NPDES permits designed to prevent or limit the release of pollutants into surface waters and to achieve state water quality standards. 33 U.S.C. §§ 1311, 1314; Ch. 90.48 RCW.

In general, effluent limitations are technologically based. However, in critically impaired rivers where technology- based limitations are inadequate to achieve water quality standards, states must establish TMDLs for the pollutants of concern at levels necessary to achieve applicable water quality standards. 33 U.S.C. § 1313(d)(1)(C). No NPDES permit may issue that conflicts with the TMDL and all permits must include any legally applicable requirements necessary to implement the TMDL. 40 C.F.R. § 130.12; WAC 173-220-130. Permit limits must also control all pollutants that have the potential to cause or contribute to water quality violations. 40 C.F.R. § 122.44(d)(1).

Permits for existing sources may include a schedule for coming into compliance with water quality criteria. WAC 173-201A-520(a). Compliance schedules for existing dischargers must ensure compliance with the TMDL within the shortest practicable time and, in general, should not exceed the five-year term of the permit. In no case should the compliance schedule exceed ten years. Compliance schedules are not available for new discharges. *Id*.

Compliance schedules are developed on a case-by-case basis and, for the interim period during which compliance with water quality is deferred, interim effluent limits will be formally established based on Ecology's best professional judgment. The interim limits may be numeric or nonnumeric (e.g. requiring treatment plant upgrades, operational changes or pollution prevention strategies). *See* WAC 173-201A-520(b).

Where expected compliance exceeds one year, a schedule of compliance for interim requirements and their completion dates will be detailed in the permit. However, no more than one year will elapse between interim dates. WAC 173-201A-520(b).

For industrial wastewater facilities, permits must include average monthly and maximum daily quantitative mass and/or concentration limitations, or other such appropriate effluent limitations for the level of pollutants. For domestic facilities, permits must include average weekly and monthly quantitative concentration and mass limitations, or other such appropriate limitations. WAC 173-201A-520.

Strategy: <u>Advanced wastewater treatment selection</u>

Introduction to AKART

The § 303(d) listing by definition signifies that existing wastewater technologies are not adequate to protect water quality. Hence, the Spokane River wastewater dischargers must upgrade their systems by evaluating and adopting the best technology reasonably available that achieves the greatest phosphorus reductions. The draft TMDL determined that the target instream concentration of phosphorus is around 10 µg/L during the critical period, April through October. If, through upgrades, a discharger meets this seasonal limit, it would not cause or contribute to water quality violations and would therefore be in compliance with state and federal laws. However, dischargers who cannot meet this seasonal limit will need to implement other strategies that, in combination with end-of-pipe reductions, bring the plant into compliance. Clearly, there is great incentive to optimize end-of-pipe reductions.

Washington law requires municipal and commercial dischargers to use all known, available, and reasonable methods of treatment (also known as AKART), to control pollutants in the discharger's wastewater. RCW 90.48.520, 90.52.040, 90.54.020; WAC 173-220-130. AKART is a technology-based approach to limiting pollutants from wastewater discharges and represents the most current methodology that can be reasonably required for preventing, controlling, or abating the pollutants associated with a discharge. WAC 173-201A-020.

All NPDES permits issued by Ecology must ensure compliance with AKART. RCW 90.48.520; WAC 173-220-130(1)(a).[55] The precise level of treatment, which constitutes AKART, primarily involves an engineering and economic analysis as to what treatment methods are "available" and "reasonable" with respect to the particular installation in light of the factual circumstances. In some circumstances, AKART may be zero discharge.[56]

The question, then, is what is AKART for purposes of end-of-pipe phosphorus reduction for municipal and industrial wastewater treatment plants? While the answer is not yet clear, there is information indicating reductions from 10 µg/l to 50 µg/l are possible.

Survey of Technology in Other Communities

As a part of the TMDL Collaboration, the Technology Work Group (TWG) gathered data from over 115 wastewater treatment plants within the Nation in an attempt to determine

[55] The EPA administers NPDES permits in Idaho and must condition the three Idaho dischargers' NPDES permits to ensure compliance with Washington's water quality standards. 40 C.F.R. § 122.4(d). Likewise, Ecology must condition Washington permits to ensure compliance with the Spokane Tribe's water quality standards.
[56] *See* Water Quality Program Permit Writer's Manual at. IV-29.

the levels of phosphorus reduction being achieved by these plants.[57] The workgroup identified five tertiary treatment technologies with full scale WWTP applications that demonstrated promise for meeting Spokane River dissolved oxygen targets. This data provided a limited view of what is being attained at various locations under specific conditions, but it did not provide the level of detail necessary for a complete AKART evaluation.[58] Moreover, what is AKART for municipal plants will differ from industrial ones, and may also differ for plants of different size. Because of the significant information gaps, the group concluded that more in-depth analysis was needed.

Nevertheless, despite significant information gaps, the TWG data revealed that some WWTPs are achieving phosphorus reductions near target levels. Two of these are the Walton (4.5 mgd) and Stamford (0.5 mgd) WWTPs in New York, both of which are using Parkson's Dual Sand (D2) technology. [59] As their DMR data below show, these plants have been achieving monthly average phosphorus concentrations near 10µg/L since 2003 and 2004, respectively.

Walton Apr-Oct monthly average effluent total phosphorus

year	Month	reported avg	sensored data 1/2 <values
2003	APR	<0.0068	0.0034
	MAY	<0.007	0.0035
	JUN	<0.012	0.0060
	JUL	<0.009	0.0045
	AUG	<0.007	0.0035
	SEP	<0.007	0.0035
	OCT	<0.006	0.0030
2004	APR	<.008	0.0040
	MAY	0.02	0.0200
	JUN	0.025	0.0250
	JUL	<.01	0.0050
	AUG	<.065	0.0330
	SEP	0.001	0.0010
	OCT	<.007	0.0035
2005	APR	<0.007	0.0035
	MAY	<0.007	0.0035
last report	JUN	<0.011	0.0055
Apr - Oct AVG Tot Phosphorus			0.0077

[57] *See* Attachment I, TWG WWTP Data.
[58] *See* Attachment J, Memorandum, 10/21/05 Amended Submittal of Preliminary Information, Spokane River TMDL Collaboration, TWG 9/27/05 Matrix and Narrative, TWG; 6/22/05 Memo, Evaluation Criteria, Technology Workgroup.
[59] *See* Attachment K, 5/18/05 and 9/27/05 emails from Dave Ragsdale, EPA.

Stamford Apr-Oct monthly average effluent total phosphorus

Year	Month	Avg month TP	sensor data 1/2 <value
2004	APR	<0.009	0.0045
	MAY	<0.012	0.0060
	JUN	0.011	0.011
	JUL	0.022	0.022
	AUG	0.011	0.011
	SEP	0.013	0.013
	OCT	0.006	0.006
2005	APR	<0.006	0.003
	MAY	0.009	0.009
	JUN	0.008	0.008
last report	JUL	0.030	0.030
	Avg TP		0.0112

City Pilot Test

In addition, three wastewater treatment vendors, Parkson, Zenon, and U.S. Filter, conducted pilot testing at the City of Spokane's wastewater treatment plant and achieved very encouraging results. The preliminary numbers from Parkson and U.S. Filter showed a monthly average of 15µg/L and 16µg/L, respectively.[60] Although these were only small scale tests, Parkson stated that it sees no barriers to full scale up. In fact, Parkson currently has plants ranging from 5.5 mgd to 23 mgd that are using its Dyna-Sand filtration process.[61]

Cost of Treatment & Potential Savings

Although the TWG did not collect data on capital, operation or maintenance costs, Parkson estimated that installing its Dyna-Sand D2 process at the City of Spokane's WWTP would cost approximately $0.35 to $0.50 per gallon, whereas smaller installations such as Liberty Lake Sewer and Water District were estimated to cost approximately $0.70 to $1.00 per gallon.[62] At $0.50 per gallon, installation for a 44 mgd facility would cost $22,000,000.[63]

Which technology the dischargers choose will determine what other strategies they must adopt to come into compliance with their permits. It may be that, as existing dischargers adopt differing strategies and achieve *proven* phosphorus reductions, pollutant trading or

[60] *See* Attachment L.
[61] *See* Attachment M. Parkson Corporation, Partial Reference List.
[62] *See* Attachment N. Dept. of Ecology, Len Bramble email, 4/12/05.
[63] Although this estimate may be low, it is still considerably less than the City WWTP's estimate of $105,000,000 presented to the City Council's Public Utility Committee in October 2005.

"water quality offsets" between sources will be an option.[64] The lower the phosphorus concentration in the effluent, the closer the discharger will be to compliance and the fewer supplemental strategies will be required.

Risk

One issue regarding choice of advanced wastewater treatment processes under these circumstances is that of risk allocation. The trend in consulting engineering contracts is towards strictly defining the allocation of risk in all contracts. In the case of WWTP design, the cost of potential adverse outcomes must be borne by either the water authority, the consultant, or, in the case of design-build, the contractor. Because the discharger relies on the consultant to build according to permit requirements, it is the consultant who most often bears the process risk. Such an outcome would clearly be counterproductive here, where the level of phosphorus reduction attainable through technology is uncertain.

Because Ecology exercises the ultimate regulatory authority to determine what conditions will result in permit violations, Ecology should recognize these uncertainties and work carefully with the dischargers to condition the permits in ways that account for these. Only if this is done at the outset will the consultants have the appropriate incentive and ability to recommend the technology best suited to the discharger given the stated TMDL goals.

Alternatives to Conventional Wastewater Treatment Systems

Natural aquatic systems, including wetlands, lakes and ponds, have waste treatment and utilization potential inherent in their dynamics. Borrowing from these mechanisms, ecological engineers have developed natural treatment systems for wastewater treatment, water restoration and watershed protection.

Highly aesthetic and often less expensive than conventional treatment technology, these systems provide ecologically-based solutions to a variety of water problems. They have the ability to purify wastewater, maintain waterbody health and restore stressed natural bodies of water. Uses include treating municipal, agricultural and industrial wastes, protecting and upgrading secondary drinking water supplies, reducing algae, rejuvenating water badly impacted from landfill and septic tank lagoon wastes, and reducing the impact of eutrophication, or nutrient enrichment. In general, these systems are environmentally sustainable and generate less sludge, utilize few environmentally damaging chemicals to precipitate out solids, phosphorus and chlorine, and remove heavy metals and synthetic organic compounds. Such technologies may offer better and longer

[64] WAC 173-201A-450.

lasting solutions to the region's water problems than conventional treatment technologies and should be explored.[65]

Actions:

1. Each discharger must conduct its own investigation, including on-site visits and pilot testing, to assess the ability of various treatment technologies to reduce effluent phosphorus, BOD, and ammonia concentrations to target levels. This includes analysis of technical, environmental, and economic feasibility as it applies to individual facility needs.[66] Optimization of costs will play a role in all approaches. Feasibility and pilot studies will assist in determining what equipment, management techniques and operational procedures can yield the lowest cost per pound for treatment alternatives with the greatest environmental benefits.

2. Dischargers should investigate alternatives to conventional wastewater treatment systems and incorporate these into their engineering and design plans as appropriate.

3. The results of these investigations will be submitted to Ecology and made public. Ecology will solicit public input on the investigations prior to making a determination on AKART.[67]

4. Ecology will, based on the investigations and input received through public comment, determine AKART for each discharger. Each discharger must implement advanced wastewater treatment that meets AKART requirements.

Strategy: <u>Operational maximization</u>

By law, Ecology must incorporate all conditions necessary to comply with the TMDL in the discharger's NPDES permits. These include the requirement that plants optimize operations for maximum pollutant removal. Maximizing operational efficiency in the existing biological phosphorus removal process and adding additional treatment processes may result in significant reduction in phosphorus under current and future operations. Steps taken could include maximizing the fatty acid content of wastewater,

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[65] *See* Oceanarks International at http://www.oceanarks.org/about/.

[66] In December 2000, the South Florida Management District released its final report assessing the technical, economic and environmental feasibility of various water quality treatment technologies to reduce phosphorus concentrations in stormwater runoff in the Everglades. The target concentration was 10 µg/L. The report provides a detailed guide to technology assessment and concluded that several technologies are capable of reaching the final goal. *See HAS Engineers & Scientists, Chemical Treatment followed by Solids Separation Advanced Technology Demonstration Project*, Final Report, (December 2000), available at http://www.hsa-env.com/ .

[67] *See* discuss below on responsibilities of the Department of Ecology.

optimizing the aeration basin configuration, implementing over-all plant-wide strategies for management of phosphorus in recycle flows, and managing secondary phosphorus release.

Action:

1. Each discharger will analyze methods to optimize current and future operations to maximize reductions of CBOD, ammonia, and phosphorus. Each discharger will incorporate optimizing methods into engineering plans, operations, and maintenance programs.

Strategy: <u>Permitting</u>

The TMDL total loading capacity is based on the amount of CBOD, phosphorus, and ammonia that can be assimilated by Long Lake without causing greater than a 0.2 mg/l decrease in dissolved oxygen from natural conditions in the most critical portion of Lake Spokane.[68] According to Ecology's assessment, the capacity of Long Lake to assimilate nutrient loading during the critical period is consumed by a small portion of the existing non-point source load, combined with the natural background condition load. As a result, there is no loading or assimilative capacity for point sources.[69] Nonetheless, even if the non-point sources were completely eliminated, the point source dischargers would still cause violations of water quality standards. Therefore, because both non-point and point sources contribute to water quality violations, both must be reduced.

Water quality will be improved if nutrient loads from either of these sources are reduced. However, reductions in point-source loads are generally more technically and economically efficient than reductions in non-point sources and can be attained with reasonable assurance.

If the point source dischargers can achieve instream target concentrations of 10 µg/L, they will not contribute to or cause water quality violations and hence may continue seasonal discharge. As noted above, however, it is currently uncertain what level of phosphorus reduction is possible with new technology. Nevertheless, this does not foreclose discharge to the river, at least for existing facilities. So long as their permits are conditioned to achieve the goals of the TMDL through compliance schedules and the dischargers are in compliance with these, they may discharge to the river.

Here, the TMDL has been calculated to a fair degree of certainty as to the instream concentration which must be met to attain the water quality standards. However, there remains a fair degree of uncertainty as to the values and levels of control that can be attained by all strategies and the response of the river system to these strategies. Thus,

[68] Draft TMDL at 21.
[69] *Id.* at 24.

permits should be conditioned to reflect these uncertainties and dischargers should not be found in violation if they have appropriately adopted technology that meets AKART requirements, are maximizing operations for pollutant removal, and are moving forward in good faith to implement other identified strategies necessary to achieve instream target concentrations of TMDL pollutants.

Achieving water quality standards and restoring the river's health mandates a watershed, collaborative approach that requires intergovernmental, agency, stakeholder and public involvement. The wastewater dischargers are a key component of this plan, but cannot do it alone. Where they are acting in good faith and in accordance with the MOA, they should be rewarded for their efforts.

Thus, an adaptive approach is needed to determine over time what suite of actions, from technological operations and end-of-pipe controls to non-point source control, reuse, and optimization of phosphorus reduction in sewage influent, will succeed.

Actions:

1. Ecology will investigate permit conditions, such as rolling averages or other appropriate effluent limitations, which are flexible enough to provide incentives to encourage the adoption of advanced technologies.

2. Ecology will incorporate the applicable conditions of the TMDL MOA into the NPDES permits. Notwithstanding these conditions and the phased approach of this scenario, the discharge limits shall not exceed 50 µg/L utilizing appropriate averages as set forth in the individual NPDES permits.

3. An increase in the total volume of discharge shall not be allowed by existing wastewater facilities unless discharge meets the instream target of 10 µg/L or there are load allocations available from demonstrated and proven loading reductions in accordance with WAC 173-201A-450.

Strategy: **<u>New Spokane County/Regional Facility</u>**

The City of Spokane currently supplies wastewater treatment for up to 10 mgd of sewage generated outside the city, in Spokane County. To retire septic systems within the county and to serve future growth, the County proposes to build a new regional wastewater treatment plant. However, as a new discharger, the County cannot receive an NPDES permit unless it is in compliance with the final TMDL effluent concentration requirements upon commencement of discharge. WAC 173-201A-510(4)(a).

An NPDES permit is required for all discharges of pollutants. 33 U.S.C. §1342(a). Ecology issues these permits, but EPA has final approval. 33 U.S.C. § 1342(a)(5)(b). Under the law, discharges by new sources/new dischargers are strictly circumscribed. A

facility which is a new source/new discharger cannot discharge into a § 303(d) listed waterway unless the State has performed a load allocation for the pollutant to be discharged, there are sufficient remaining pollutant load allocations to allow the discharge, and the existing dischargers into that segment are subject to compliance schedules designed to bring the segment into compliance with applicable water quality standards. 40 C.F.R. § 122.4. Under both federal and state law, a facility is a new source/new discharger where it is constructed on a site at which no source is located and which has not received a prior NPDES permit. 40 C.F.R. § 122.2 , 122.29; 40 C.F.R. § 403.3(k); WAC 173-220-150(e)(i).

Two Options for a New County Facility

Seasonal discharge into the river by a new regional facility is not foreclosed, however. Two conventional options are available:

(1) Ecology allocates in the final TMDL a specific load to the County, presumably by reducing the load of the City.[70] The County then incorporates innovative technology capable of achieving the seasonal limits necessary to protect water quality as derived from the TMDL in a manner consistent with its load allocation.

(2) The County adopts seasonal reuse.

The Third Way: Integrated Wastewater Design

Before building a new facility, however, regional planners should utilize the tools of integrated wastewater design to assess the needs outside the sewer service area and how these can best be served. Rather than limiting wastewater management to two alternatives– a centralized plant or single residence septic tanks – many wastewater systems managers around the Nation believe that centralized and decentralized systems may be the best way to serve large, diverse communities. Regional planners should take advantage of the best features of wastewater options and choose solutions tailored to specific conditions and needs.

Numerous municipalities across the nation have integrated systems. One good example is Mobile, Alabama. With a population of 200,000, the Mobile Area Water and Sewer System (MAWSS) is one of a growing number of water utilities that have seriously considered and implemented decentralized, cluster-scale wastewater systems. As in many older cities, Mobile's wastewater system included miles of aging sewer lines suffering from infiltration and inflow during wet weather, grease blockages and other problems. It was also faced with decisions regarding expansion of its service area to accommodate suburban growth in greater Mobile, much of which was outside the current service areas. Like Spokane, this growth had historically utilized conventional septic systems. For at least ten years, suburban-style subdivisions had begun to appear in the

[70] Of course, the City would be required to reduce its permissible loading by an equal amount.

area, the demand for denser development and urban amenities grew, and developers were demanding MAWSS sewer service.[71]

In response, the MAWSS, working with city planners and developers, conducted feasibility studies of cluster wastewater treatment sites and implemented a number of decentralized projects serving schools and subdivisions outside the sewer service area and projects within the urban core, one of which withdraws wastewater effluent from a major sewer interceptor, treats the wastewater with various low operation and maintenance decentralized technologies and uses it to irrigate a newly developed city park.[72] For its urban decentralized project, the MAWSS received a $1,140,000 grant from the National Community Decentralized Wastewater Demonstration Project, a federal program that provides federal grants through the EPA for substantial projects that demonstrate innovative decentralized wastewater concepts suitable for adoption by other communities. Other funding sources are listed on the EPA website, Septic Systems Funding Sources.[73]

Actions:

1. In order to save financial resources and improve infrastructure planning and decision making, regional planning authorities should conduct a study of the applicability and use of decentralized wastewater systems in Spokane County.

2. Consistent with the above described approach, the City of Spokane should work with developers, such as Kendall Yards, to encourage the use of state-of-the-art onsite treatment systems which could recycle treated water for onsite use and provide irrigation opportunities nearby.

APPROACH C. Reuse

The Reuse & Conservation (R&C) Workgroup provided a fairly rigorous analysis of the local potential for use of reclaimed water in irrigation settings (the "concentric circles" exercise). The analysis included fairly limited review, however, of commercial reuse potential. The efforts of the workgroup concluded with report from several of the

[71] *See* Case Studies of Economic Analysis and Community Decision Making for Decentralized Wastewater Systems, available at http://www.rmi.org/sitepages/pid172.php#W04-21.

[72] This is only one of many examples throughout the Nation. For more case studies, *see* Case Studies of Economic Analysis and Community Decision Making for Decentralized Wastewater Systems, prepared by the Rocky Mountain Institute, available at http://www.rmi.org/sitepages/pid172.php#W04-21. For more information on the decentralized benefits, costs and considerations, *see* Valuing Decentralized Wastewater Technologies, prepared by the Rocky Mountain Institute for the U.S. Environmental Protection Agency, November 2004, available at http://www.rmi.org/sitepages/pid15.php.

[73] *See* http://cfpub.epa.gov/owm/septic/linkresult.cfm?link_category=12&view=link.

dischargers, each explaining its view of reuse potential for its plant. The discussion in these memoranda is extremely limited.[74]

"'Reclaimed water' is defined as effluent derived in any part from sewage that has been adequately and reliably treated to a high quality so that it is suitable for beneficial uses."[75] Reclamation and reuse of treated wastewater provides dual water quality benefits. First, it eliminates the effluent waste stream entering the river. Second, reclaimed water can substitute for potable water and lead to reduced groundwater pumping.[76] Depending on season and location, this in turn may have the benefit of improving instream flows in the Spokane River during the critical low-flow season.

Reuse of treated wastewater is a commonly accepted component of municipal and industrial wastewater treatment systems throughout the United States and the world. In areas where water resources are scarce, reclaimed wastewater often provides critical water supply. Because treatment technology is capable of purifying and removing virtually all pollutants, reclaimed water is used to recharge drinking water aquifers (for example in Orange County, California) and even bottled for consumption (e.g., Singapore's NEWater). More commonly, reclaimed water is used in agricultural and industrial applications.[77]

In Washington, reclaimed water is finding a place in the wastewater treatment toolbox, with projects underway and completed in a number of communities. In Idaho, the Hayden Area Regional Sewer Board has been land applying treated wastewater (a form of reuse) for several years.

Current Laws, Policies & Processes

In Washington, the reclamation and reuse of wastewater is governed by a permit program administered jointly by the Departments of Ecology and Health.[78] The agencies have established standards for the treatment of wastewater and the uses for which such water is eligible.[79] Reclaimed water use projects typically require engineering approvals and a special reuse permit. All wastewater treatment facilities must consider opportunities for reclaimed water in their planning phase.

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[74] Many of the documents produced by TMDL collaboration, including those of the Reuse & Conservation Workgroup, are available on the Ross Consulting website at http://client-ross.com/spokane-river/index.htm.
[75] For an overview of Washington's reclaimed water program, *see* http://www.ecy.wa.gov/programs/wq/reclaim/index.html#Introduction.
[76] *See* EPA's webpage on water reuse at http://www.epa.gov/region9/water/recycling/.
[77] *See* the WateReuse Association's website for a wealth of reuse project examples, available at http://www.watereuse.org/.
[78] *See* Washington Reclaimed Water Act, RCW Ch. 90.46.
[79] *See* Water Reclamation and Reuse Standards (DOH and ECY, 1997), available at http://www.ecy.wa.gov/programs/wq/reclaim/standards.pdf.

The Washington legislature funded several demonstration projects for reclaimed water in the 1990's. The Department of Ecology recently issued a report examining the success of those and other projects in Washington.[80] Currently, there are 17 reclaimed water projects operating in Washington (including at Medical Lake), and several more underway.

In Idaho, one Spokane River discharger (Hayden) is already using land application of treated wastewater as a mechanism to avoid season discharge to the river. While Idaho has not adopted standards governing reclaimed water, the Idaho Department of Environmental Quality reviews land application proposals with a view toward maintaining groundwater quality in the Spokane-Rathdrum Aquifer.

Strategies/Actions: Feasibility studies

1. Each discharger will, within two years of completion of the TMDL, conduct a specific and detailed feasibility study of the potential for reclamation and reuse of its wastewater effluent. Studies will be conducted according to the outline set forth in Attachment O and will involve the public through education and outreach activities.

2. Ecology will conduct and publish a review of all water right holders in the Spokane River watershed to assess potential reuse customers.

3. Municipal dischargers will conduct and publish a review of all water utility customers to assess potential reuse customers.

4. The City of Spokane will specifically review the exceptional opportunities for reuse available within a short radius of the Riverside wastewater treatment facility including parks, playfields, federal facilities, cemeteries, golf courses, institutional properties (e.g., on Fort George Wright Drive) and the potential for delivering reclaimed water to the West Plains area via existing infrastructure.

5. Once reuse feasibility studies are complete, each discharger will move forward with programs to maximize construction of reclaimed water facilities and put reused water to use.

Strategy/Action: Regional wastewater facility

1. As an element of developing a wastewater facilities plan conforming to TMDL requirements, Spokane County will re-evaluate siting of the proposed regional wastewater facility plan in tandem with reuse feasibility considerations.

[80]See Case Studies in Reclaimed Water (June 2005) at http://www.ecy.wa.gov/programs/wq/reclaim/index.html

Strategy/Action: Integrated wastewater management

1. Where appropriate, each discharger shall consider development of decentralized wastewater facilities and integrated treatment/siting/reuse for large new developments (e.g., Kendall Yards, Hayden Canyon) or areas with special pollution concerns (e.g., Suncrest).

Strategy/Action: Providing regulatory certainty

1. The Departments of Ecology and Health will timely resolve policy and regulatory questions regarding reclaimed water projects in the Spokane region.

APPROACH D. Non-point Controls

The draft TMDL identifies non-point pollution sources, collectively, as a contributor to the Spokane River dissolved oxygen problem. Consequently, there is general agreement that a vigorous effort to reduce non-point pollution should be part of the overall strategy to improve dissolved oxygen levels in the river.

Up to and including the deliberations of the Spokane River TMDL Collaboration, however, there has been a lack of consensus on how to address non-point sources in implementing the TMDL. This lack of consensus has been driven, in part, by the suggestion that Ecology's draft TMDL failed to adequately account for significant non-point sources and put too much emphasis on controlling point sources and not enough on mitigating non-point sources.

To the contrary, Ecology's draft TMDL did address non-point source reduction as required by law. On page 25, the draft states:

> The major tributary watersheds of Hangman Creek (Hangman Creek) and the Little Spokane River are in the process of developing a TMDL for each. The resulting TMDLs and implementation strategies will be coordinated with the Spokane TMDL.

Thus, the expectation was that the technical data from the tributary TMDLs would provide the specifics necessary to formulate non-point strategies. The Draft TMDL conservatively estimated that a 20% reduction of non-point source pollution, coupled with point source reductions, would meet the TMDL goals. This is an appropriate approach. Unlike point sources, non-point source pollution is notoriously difficult to control. Its sources are myriad - such as urban runoff, forestry practices, agricultural practices including crop and animal feeding operations, and recreation, including boats and marinas - and enforcement difficult. As a result, most mixed TMDLs focus first on addressing the largest controllable sources first, point sources, while working on preventive and curative non-point source actions.

An aggressive and effective non-point source program is clearly warranted, but should proceed with conservative expectations. Experiences in other watersheds show that non-point pollution is in fact difficult to control. Similarly, what experience and research there is for the Spokane watershed provides no reasonable basis to assume that a non-point pollution program will be so successful as to render major reductions in point source discharges unnecessary.

A major obstacle to a coherent non-point source strategy at this point is that important analytical and decision-making processes affecting the key tributaries are lagging behind the Spokane River TMDL processes. Both tributary TMDLs are running a year or two behind the Spokane River TMDL. This lag hampered efforts to gather new information about non-point sources through the Spokane River TMDL Collaboration and identify previously unknown sources amenable to swift remediation.The lack of data also makes it difficult, if not impossible, to assign quantities to specific sources or to make scientifically defensible projections about the effectiveness of proposed control measures. The estimated loadings and particularly the rather optimistic estimates of source control effectiveness passed on to the Full Group should be viewed cautiously.

It now appears the largest potential reductions in non-point pollution (such as implementing conservation tillage in the Hangman Creek watershed) will require several years of thoughtful planning, implementation, and refinement. Given the magnitude of the task and the limited public policy tools available to address non-point pollution, it is reasonable to expect that measurable success will require great patience and sober expectations.

The review undertaken by the Non-Point Working Group of the Spokane River TMDL Collaboration confirmed that there are no quick and easy solutions. The review did, however, identify some steps that can be taken in the short term that, at a minimum, will help ensure that non-point pollution in urban growth areas does not offset gains made through the control of point sources.

Related Laws, Policies and Processes:

Tributary TMDLs

Both Hangman Creek and the Little Spokane River are now listed on the State's § 303(d) list due to water quality problems caused by non-point source pollution. TMDL planning processes are underway for both watersheds. It is anticipated these TMDLs will be finalized by 2007. Because both streams contribute to impaired conditions in the Spokane River, both streams should be considered prime candidates for Section 319 grant funds.

In June 2005, Washington promulgated a Water Quality Management Plan to Control

Non-point Sources of Pollution.[81] This Plan, particularly Table 5.1, identifies a variety of programs, strategies, and activities for non-point source reductions that are potentially relevant to non-point problems within the larger Spokane River watershed.

Federal Funding Programs

Section 319 of the Clean Water Act requires states to develop and implement programs to control non-point pollution. Although compliance with Section 319 requirements is largely voluntary, recent EPA guidance has tried to steer federal grant money (disbursed through the 319 program) to watersheds where non-point sources are a primary cause of pollution requiring TMDL listing under Section § 303(d) of the Clean Water Act. EPA recently announced that phosphorus reduction is one of three national goals for Section 319 programs and funding.

Another federal program that has the potential to permanently improve agricultural practices affecting non-point pollution is the Conservation Security Program (CSP) enacted as part of the 2002 Farm Bill. The U.S. Department of Agriculture administers the program through the Natural Resources Conservation Service (NRCS). Fourteen Washington watersheds, including nine in eastern Washington, have already been selected into CSP, enabling hundreds of growers in these watersheds to become eligible for direct payments rewarding management practices that improve water quality. Both the Little Spokane River and Hangman Creek can be nominated for CSP designation but because of the way the program is structured and funded, considerable preparation is required to help landowners become eligible for CSP contracts.

Recently, the Spokane Area Chamber of Commerce successfully lobbied for $250,000 for FY2006 for non-point source research that will be allocated through EPA's Water Quality Program.

State & Federal Rules for Non-point Control

Washington rules stipulate that when activities contributing to non-point pollution are identified, Ecology is required to ensure that best management practices are being utilized so that "violation of water quality criteria shall be prevented."[82] If necessary, Ecology is required to take legal action to enforce compliance.

EPA has issued guidance for TMDL implementation in situations where regulated entities seek reduced waste load allocations (WLA) by proposing to capture an equivalent amount of pollution from non-point sources. In such instances, EPA policy is that "there must be specific assurances that the non-point source reductions will in fact occur" for

[81] Available at http://www.ecy.wa.gov/biblio/0510027.html.
[82] WAC 173-201A-160(3) (the non-point provisions of state water quality standards are governed by the 1997 version of the standards rule).

such offsets to be incorporated into the TMDL.[83]

Similarly, state rules are unambiguous about when proposed non-point pollution control efforts should be credited in compliance situations involving point source controls. Specifically, WAC 173-201A-480, states that water quality improvements from non-point remediation "must be demonstrated in advance" before they can be used to "offset" new or expanded point source discharges that would otherwise lead to pollution levels exceeding surface water quality standards.

Spokane County & Municipal Watershed Plans, Studies, and Ordinances

The first priority in managing any pollution is prevention and one of the most effective ways to prevent non-point pollution is to manage upland uses and activities. To that end, Spokane County has completed several studies and plans reporting on the condition of the tributary watersheds that are relevant to non-point source pollution reductions. In the Hangman Creek watershed, Spokane County recently adopted a watershed management plan prepared pursuant to RCW 90.82. That plan includes a water quality element that provides an extensive summary of water quality studies in the Hangman watershed. The action element of the plan, however, largely defers to the ongoing Hangman Creek TMDL process. The County's watershed plan for the Little Spokane River, currently pending before the County Commissioners, did not include a water quality element.

Spokane County Conservation District recently completed a Shoreline Inventory & Assessment Project to determine the health of riparian and wetland areas adjacent to local waterways.[84] Because non-point source pollution is most commonly caused by land use practices, this report provides a basis for identifying at-risk shorelines where non-point remediation might best be focused.

Pursuant to the Shorelines Management Act, RCW 90.58, Spokane County is currently amending its Shorelines Management Plan.[85] That plan establishes development policies and regulations relating to land use within 200 feet of all waterways in the county. This plan provides a distinct opportunity to address and control land use activities that contribute to non-point source pollution. The Cities of Spokane and Liberty Lake have also adopted Shoreline Plans.[86] The City of Spokane Valley is currently adopting its first Shoreline Management Plan as part of its larger Comprehensive Plan process.

Pursuant to the state Growth Management Act, Spokane County and local municipalities

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[83] *Se* http://www.epa.gov/owow/tmdl/decisions/dec1.html.
[84] *See* http://sccd.org/water/shoreline.
[85] *See* http://www.spokanecounty.org/bp/documents/shorelines/default.asp.
[86] Spokane Municipal Code Chapter 11.15 (Shoreline Management), available at http://www.spokanecity.org/services/documents/smc/?Chapter=11.15, and Liberty Lake City Code Chapter 10-6 (Shoreline Management, adopting Spokane County Shorelines Master Plan), available at http://66.113.195.234/WA/Liberty%20Lake/index.htm.

are required to develop land use plans that identify and protect critical areas, including surface waters and riparian zones. The term "Critical Source Area" describes high impact areas/sources of non-point pollution.[87] These plans lead to adoption of Critical Areas Ordinances, the enforceable element of the planning process.

Strategy: <u>Coordination with Tributary TMDLs</u>

Actions:

1. Ecology and the dischargers will, as contemplated in the draft TMDL, utilize the tributary TMDLs to resolve key technical non-point source questions (e.g., how much nutrient loading in the tributaries is human-caused versus naturally occurring; what are the primary sources of anthropogenic phosphorus loading) and participate in the development of the implementation strategies to reduce phosphorus and other pollutants contributing to the Spokane River dissolved oxygen problem.

2. Ecology will dedicate resources (financial and human) to expeditiously complete the tributary TMDLs.

3. Utilizing the available funding from the Chamber of Commerce, Ecology and the dischargers will develop and implement a Non-point Source Reduction Strategy using data gathered in the TMDLs, Shoreline Inventory processes, and other data/studies to identify critical source areas (specific stream reaches) for non-point pollution loading. With this information, the Strategy will prioritize those stream segments where remedial efforts would be most effective, and then identify the specifically applicable best management practices and other actions that are likely to be the most effective in reducing the identified non-point pollution loading.

Strategy: <u>City & County Storm Water Drainage Systems</u>

Urban watersheds are characteristically heavily covered – 40% and more- with impervious surfaces. These deflect rain water into surface channels where it concentrates into erosive downstream floods. The runoff carries with it oil from cars, parking lots, maintenance yards and storage areas, and heavy metals from old construction materials. Stormwater gets into sewers and increases sewer conveyance and treatment capacity.

Rather than simply routing stormwater into the sewer system, restorative stormwater management strategies significantly reduce inflow to WWTPs by removing stormwater

[87] *See, e.g.,* http://www/bae/ncsu.edu/programs/extension/wqg/brochures/five.html.

from sewer systems by managing precipitation as close to where it falls as is physically and economically feasible.[88] Strategies include:

- Capturing roof runoff in tanks or cisterns for irrigation or indoor gray water use;
- Disconnecting pavement and roof drainage from sewer lines and directing it to adjacent vegetated soil or to infiltration basins;
- Engineering infiltration basins such as "water gardens," dry wells, and subsurface recharge beds to collect runoff and percolate it to the soil;
- Planting trees to intercept a portion of rain water;
- Rehabilitating soils to increase infiltration rates and pollutant-neutralizing microbial activity;
- Reconfiguring driveways, parking lots, and streets to turn more of a site over to pervious, vegetated soil;
- Using porous pavements with open pores that allow water to pass through;
- Routing runoff through vegetated surface channels or "swales" to slow its velocity, remove pollutants and infiltrate it into the soil;
- Restoring historic streams by excavating culverts and creating naturalized open channels.

The City of Spokane has over 300 miles of storm sewers that discharge storm water to the Spokane River. Likewise, the County and other municipalities operate stormwater systems that contribute phosphorus to ground and surface waters. In addition, there are thousands of dry well structures that inject stormwater into the ground, creating a potential source of contamination to groundwater that eventually discharges to the Spokane River or its tributaries.

Ecology is currently developing a general NPDES permit for dedicated stormwater systems (MS4s) in eastern Washington. The systems of the City of Spokane (non-CSO portion of the system), Spokane County, and the City of Spokane Valley will be addressed in this process. It is scheduled that the NPDES permit will be finalized in June 2006.

As part of this permitting process, Ecology must address the TMDL requirements of the Spokane River and other affected water bodies. Participants in the TMDL collaboration process identified reasonable actions that could be taken to reduce the amount of phosphorus and biomass that is carried off by storm water. For areas in Spokane County, the expected cost of reducing loadings from drywell infiltration has been estimated at just over $500,000 per year, with an additional $300,000 per year for enhanced street cleaning. While the primary benefit is to the aquifer and area drinking water, there is a plausible benefit to Spokane River water quality.

[88] Rocky Mountain Institute, Re-evaluating Stormwater, the Nine Mile Run Model for Restorative Redevelopment, available at http://www.rmi.org/images/other/W-ReevalStormwater.pdf.

Actions:

1. Ecology will expeditiously finalize the stormwater NPDES permit for Eastern Washington and municipal dischargers (City of Spokane, Spokane County, and City of Spokane Valley) will implement the requirements of the permit.

2. Consistent with the terms of its NPDES permit, the City of Spokane will implement, in coordination with Ecology, additional inspection and maintenance measures to eliminate dry weather CSO events.

3. Municipal dischargers will include measures such as enhanced street sweeping and leaf pickup from areas where storm runoff originates.

4. Municipal dischargers will assess and implement a program to reduce or eliminate phosphorus in road deicers.

5. Municipal dischargers will develop a program to require the installation and maintenance bio-infiltration swales and/or catch basins in key areas. Because of the protection such measures afford to the Spokane Valley/Rathdrum Prairie aquifer as well as the river, the dischargers should re-engineer as many existing dry wells as is practicable, and require these management practices for new drywells.

6. Each municipal discharger will assess and implement other restorative stormwater management strategies.

Strategy: <u>Reducing Unregulated Septic Contributions to Phosphorus Loading</u>

Preserving a regionally important source of drinking water is the primary public policy objective in efforts to prevent contamination of the Spokane Valley/Rathdrum Prairie Aquifer. There is, however, a strong relationship between the aquifer and the river. During the seasonal low-flow period that is the focus of the draft TMDL, aquifer discharges into the river provide more than half the stream flow.[89] This important connection between aquifer and river underscores the importance of eliminating the known sources of phosphorus and other pollutants that infiltrate to the aquifer.

There are still more than 14,500 on-site sewage disposal sites located in what the Spokane County Public Utilities department considers "areas of concern" for aquifer contamination. At least 14,000 are permitted septic tanks directly over the Spokane Valley/Rathdrum Prairie aquifer.[90] In addition, Spokane County policy allows for the

[89] Spokane Aquifer Atlas at 15.
[90] On-site Sewage Disposal Systems Phosphorous Loading Estimate at 5, HDR Engineering, DRAFT, County "Active Septic Tanks & the Spokane Aquifer," 3/2005 (8/16/05).

installation of new septic systems in areas where sewer lines would be available within six years.[91] Although there are several uncertainties with regard to the fraction of septic-disposed phosphorus that makes its way to the aquifer and the river, there is no question that the pathway exists. In simplest terms, removing or avoiding use of septic tanks can only reduce that part of the non-point phosphorus that enters the river via the aquifer.

The intent of the county's CWMP is to eliminate septic tanks within the county's Urban Growth Area by 2015. Since the adoption of the plan, however, the county recently modified its requirements for sewer hookups because it has not yet received assurances from regulators that it will be permitted to discharge waste water into the Spokane River from a yet to be built sewage treatment plant(s). This moratorium in requiring sewer hookups would be unnecessary if the county's commitment to sewage treatment incorporated the contingency that a new plant(s) would be designed to meet the 10 µg/l effluent target with some combination of advanced sewage treatment, re-use, and conservation.

Actions:

1. Spokane County will aggressively proceed with the mandatory sewer hookups necessary to eliminate the remaining 14,000-plus septic systems that are a potential threat to the aquifer.

2. Until alternative treatment options are in place, Spokane County will assess and implement programs requiring state of the art phosphorus removal technologies for on site systems for multi-unit commercial/residential developments.[92]

Strategy/Action: <u>Using Local Land Use Ordinances to Control Non-point</u>

1. Ecology and municipal dischargers will enforce existing laws and ordinances to prevent future non-point sources.[93]

Strategy/Actions: <u>Coordination with Non-point Reduction Funding Programs</u>

1. Ecology, the dischargers, and conservation districts, will work to identify and obtain available federal funding to address non-point sources in the Hangman Creek and the Little Spokane River watersheds. These programs include the NRCS Conservation Security Program[94], the Conservation Reserve Program, the

[91] 2001 CWMP ES-10 and p. 5-14.
[92] For examples, *see* Etnier, C., Micro-Scale Evaluation of Phosphorus Management: Alternative Wastewater Systems Evaluation, available at http://www.ndwrcdp.org/userfiles/WUHT0322_ES.
[93] *See* below for discussion on enforcement of existing laws.
[94] *See* http://www.wa.nrcs.usda.gov/programs/csp/06ws/index.html.

Environmental Quality Incentives Program, and other federal funding programs focused on landowner participation.[95]

2. Ecology and the dischargers will work with conservation districts and farm organizations to ensure that growers in the tributary watersheds have completed the necessary steps for eligibility for future federal funding.[96]

3. Ecology, the dischargers and other local governments and conservation districts will work together to pursue State section 319 to fund non-point source mitigation measures.[97]

4. The dischargers will work with conservation districts and farm organizations to identify and obtain other non-point source funding, such as the Spokane County Buffer Initiative Program and the State Department of Natural Resource's Forestry Riparian Easement Program.

Strategy/Actions: <u>Direct Funding & Monitoring</u>

1. Each discharger will commit the funds and resources necessary to implement the Non-point Source Reduction Strategy. Based upon estimates prepared by the Conservation District in the Non-point Workgroup, the cost of full implementation of a non-point source program is $30 to 41 million. These funds shall be utilized solely for on-the-ground projects directed toward reduction of sediment and phosphorus loading to the Hangman Creek and Little Spokane River consistent with the Strategy.

2. Ecology and the dischargers must develop a long-term non-point source monitoring program.[98] The monitoring regime must be capable of detecting changes in water quality that would be attributable to non-point source remediation activities in the tributary watersheds.[99]

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[95] *See* EPA, <u>Catalog of Federal Funding Sources for Watershed Protection</u>, available at http://www.epa.gov/owow/nps/funding.html.

[96] Because grower enrollment in the CSP program is on a cyclical and not an annual basis, failure to prepare growers for contract eligibility at the time the watershed is selected would largely defeat the purpose of having the watersheds listed in the CSP program. *See* http://www.wa.nrcs.usda.gov/.

[97] *See* http://www.ecy.wa.gov/programs/wq/links/funding.html.

[98] *See* discussion on monitoring below.

[99] If, for example, one or more regulated entities seeks to invest in non-point pollution controls as a means to acquire water quality offsets for point source pollution loads, the monitoring program must be capable of detecting and accurately measuring the water quality improvement (pursuant to WAC 173-201A-450) that would enable the water quality offset credit to occur.

APPROACH E. Increases in Instream Flows

Flows in the Spokane River have decreased significantly over the last century. The stream gage at Monroe Bridge, in operation since 1891, records a decrease of more than 1,000 cubic feet per second (cfs) during the late summer 7-day low flow period. See Figure 1 below.

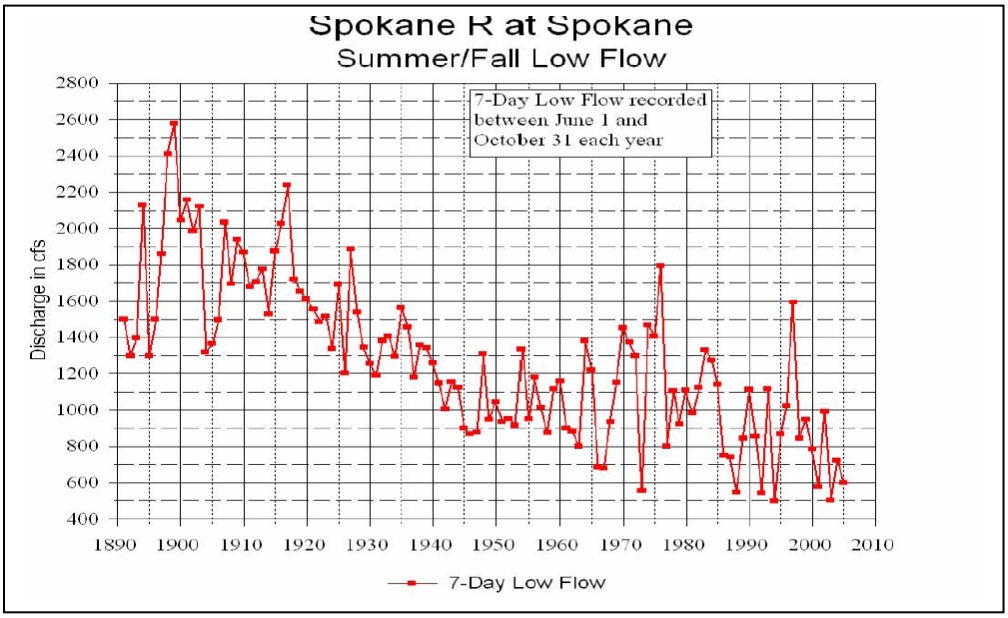


Figure 1: Spokane River annual 7-day low flow 1891-2005. Prepared by Washington Dep't of

Degraded instream flows contribute to violations of the dissolved oxygen water quality standard for the Spokane River. In particular, maintenance of healthy dissolved oxygen levels depends on the availability of cold clean water discharged from the Spokane Aquifer to the River. In addition, effluent limits for dischargers are tied to the 7-day low flow (7Q10) as shown above. As river flows decline, the capacity of the river to absorb pollution effluent also declines.

Degraded instream flows also harm fish habitat, and destroy recreational use and aesthetic enjoyment of the Spokane River. The River's whitewater boating opportunities and scenic beauty are highly prized by the community. These uses are protected under the state water quality standards.

Flow degradation may be attributed to two major causes: (1) groundwater pumping from the hydraulically connected Spokane-Rathdrum Aquifer, and (2) operation of Post Falls Dam. In addition, climate change may affect Spokane River flows, although data and analysis to support this hypothesis has not yet been developed.

The Spokane River Collaboration did not directly address the issue of stream flow restoration as part of its work plan. Nonetheless, in order to maintain healthy water quality, the decreasing flow trend in the Spokane River must be halted and reversed.

Restoration of instream flows is a necessary element of a successful dissolved oxygen water quality clean up plan. Stream flow restoration plan elements contained in this chapter include developing a trust water right program to retire existing water rights and to capture the benefit of water conservation and reuse efforts. The plan also focuses on obtaining a natural flow requirement for minimum discharge from Post Falls Dam.

Related Laws, Policies & Processes:

Instream Flow Setting

Washington implements a statewide instream flow program, but has not established regulatory flows for the mainstem of the Spokane River.[100] Idaho has adopted an instream flow for the reach of the river flowing from Post Falls Dam to the state line. Idaho's flow is variable, requiring 951 cfs from July 1 to October 31, and 2,495 cfs from November 1 to June 30 each year.

The WRIA 55/57 (Middle Spokane) Watershed Planning Unit has recommended a flow of 500 cfs at Barker Road on the mainstem of the Spokane River. At Monroe Street, the Washington Department of Fish & Wildlife recommendation for 2,000 cfs is the governing flow at this time.

The WRIA 54 (Lower Spokane) watershed plan may make a recommendation for a flow at Monroe Street and/or reaches further downriver, but this decision is not expected for several years (the plan is not due until 2009). Spokane County has received funding to study flow needs at around Monroe Street and downstream, and is convening a committee to study instream flow needs. This is a critical reach of the river because it serves as a control point for up gradient pumping in the Spokane Aquifer, east of the City and throughout the Spokane Valley.

Avista Dam Re-Licensing

The Spokane River is a "losing" river between Post Falls Dam and (roughly) Sullivan Road, approximately seventeen miles downstream. As a result, instream flows in this reach are controlled by Post Falls Dam. Avista Corp. recently filed an application with the Federal Energy Regulatory Commission to obtain a new license for its Post Falls

[100] Instream flows have been adopted for the Little Spokane River as set forth in WAC Ch. 173-555. The WRIA 56/Hangman Watershed Planning Unit failed to reach consensus on an instream flow recommendation for Hangman Creek, and Ecology currently is scheduled to establish a flow for the Creek by 2010.

Dam. The new license will contain conditions relating to the amount of flow that must be released from Post Falls during critical low-flow periods.

Because the flow in this reach is directly influenced by the amount of water discharged from Post Falls dam, the WRIA 57 watershed plan recommendation for 500 cfs at Barker Road will be influential, if not controlling, for the Avista dam relicensing and Washington State Section 401 certification processes.

Water Right Permitting

Pumping groundwater from the Spokane-Rathdrum Aquifer affects stream flow in the Spokane River. The negative impacts from groundwater pumping can occur very quickly.[101] The depletion of stream flow is expected to worsen in the future, for two reasons. First, the Idaho Department of Water Resources continues to issue new groundwater rights from the Spokane Aquifer. Second, although a moratorium on new water rights is in place in Washington, a number of municipalities hold inchoate or "paper" water rights. Increased pumping pursuant to these water rights will worsen stream flow conditions in the future.

Both Idaho and Washington are now adopting water supply plans for the Spokane River watershed. Other than the recommendation for flow at Barker Road (discussed above), which is relevant for dam re-licensing purposes, neither plan contains specific recommendations to restore stream flow in the Spokane River.

Idaho and Washington are involved in development of a bi-state study of the aquifer-river system. This study is intended to "provide the means for estimating the effects of additional ground water and surface water withdrawals on the SVRP aquifer and the Spokane and Little Spokane Rivers."[102] Although the study is expected to provide an improved technical basis for understanding the regional hydrologic system, there are no plans to expand the process to address legal, policy or management issues.

Strategy/Actions: <u>Spokane River Stream flow Restoration Program</u>

1. Ecology will establish the Spokane River Stream flow Restoration Program ("Spokane River SRP"). The program will include a dedicated account to accept funds for purchase, lease and administration of trust water rights transactions to benefit the Spokane River. Ecology will solicit funding for the Spokane River

[101] *See* WRIA 55/57 Watershed Management Plan (draft June 2006)(e.g., p. 29: "The response of change in stream flow in the Spokane River at Spokane [Monroe Street] correlates well to pumping of groundwater;" p. 31: "Due to the high hydraulic conductivity of the SVRP Aquifer, the impacts of groundwater pumping in WRIA 57 were immediately visible . . .").
[102] Spokane Valley-Rathdrum Prairie Hydrologic Study, Proposed Project Scope at ii (July 2003). *See* http://wa.water.usgs.gov/projects/svrp/.

stream flow restoration account during the legislative session and direct acquisition funding to the Spokane River SRP.

2. Ecology will include the Spokane watershed as part of the Washington Water Acquisition Program.[103]

3. Each discharger will contribute start-up funds in the amount necessary to implement the Spokane River SRP and will make an annual contribution to the program. Each discharger will provide support, in the form of resolutions and letters to the state legislature, for the Spokane River SRP.

4. Each discharger will analyze its own water rights to determine to what extent those rights may be appropriate for placement into the Spokane River SRP. This analysis will be structured pursuant to a mutually agreed set of guidelines, will involve public input, and will result in a public document.

5. Each discharger will utilize the Spokane River SRP to capture the benefits of its water conservation and reclaimed water use programs by ensuring that "saved water" is placed into trust. [104]

Strategy/Action: <u>Stream flow Advocacy for Dam Relicensing</u>

1. Each discharger will register official support for the Washington state-recommended minimum flow discharge from Post Falls Dam, as established through the WRIA 57 watershed planning process. This support will be in the form of a resolution of the governing board of each discharger and will be transmitted to the Federal Energy Regulatory Commission no later than the final deadline for comments on the draft Environmental Impact Statement for the Post Falls and Spokane River re-licensing projects. Copies will also be transmitted to the Department of Ecology to be made a part of the § 401 Certification record for the Avista relicensing process.

Strategy/Actions: <u>Water Conservation & Stream flow Benefits</u>

1. Each discharger (City of Spokane, Liberty Lake W&S, Post Falls, City of Coeur d'Alene) that also provides potable water to its customers will establish water conservation goals sufficient to ensure that growth in water demand projected for the next 20 years will require no additional pumping from the Spokane Aquifer

[103] *See* http://www.ecy.wa.gov/programs/wr/instream-flows/wacq.html for a description of Ecology's Water Acquisition Program
[104] *See* reuse and conservation discussions.

and will instead be supplied under existing pumping quantities. See Water Conservation Chapter.

2. Each discharger that is not a public water supplier will assess its water use and establish reasonable and effective water conservation goals for its operations. Each discharger will determine whether development of a trust water right is feasible and if so, commit saved water to the Spokane River SRP. [105]

3. Each discharger that accepts sewage from municipalities that are served by other public water suppliers will establish guidelines for water conservation goal setting and implementation, and require compliance with such guidelines as a condition for provision of sewage treatment services.[106]

4. Spokane County will establish water conservation requirements for all public water suppliers and municipalities that are provided sewage treatment services from the new regional wastewater treatment plant. The County will require compliance with such requirements as a condition for provision of sewage treatment services.[107]

Strategy/Action: <u>Interstate Water Issues</u>

1. Ecology will convene, and the dischargers will support, a bi-state meeting to discuss development of an interstate compact for allocation of the ground and surface waters of the Spokane watershed.

APPROACH G. <u>Enforcement of Existing Laws/Ordinances</u>

Several local and state laws/ordinances are currently in place to address new and current sources of water pollution in the Spokane River. It is unclear how or if these laws are implemented in a manner to address phosphorus reduction into the Spokane River.

Local Laws

Spokane County's Shorelines Program prohibits certain activities that would adversely impact phosphorus inputs into the Spokane River[108]. These restrictions include:

- Section 5.2 states, "All dischargers of effluent or drainage from development in shoreline areas will meet the requirements of federal, state, and local health laws and regulations on water quality and pollution prevention."

[105] *See* discussion on streamflow and conservation.
[106] *See* discussion on conservation.
[107] *See* discussion on conservation.
[108] Available at http://www.spokanecounty.org/BP/Documents/Shorelines/cover.pdf.

- Section 5.5 states, "In areas of five percent or greater slope, ground cover shall be retained or replaced with similar vegetation to prevent erosion."

- Section 5.14 states, "Animal feedlots are prohibited in the shoreline area."

- Section 5.17 states, "Adequate buffer areas of permanent vegetation are to be maintained above the ordinary high-water mark to protect against shoreline erosion and to reduce the amount of silt, soul, nutrients, and pollutants entering the water from agricultural runoff."

The City of Spokane's Shoreline Management Ordinance similarly contains restrictions that would benefit Spokane River water quality.

Section 11.15.160(B) states:

> 2. There must be maintained a buffer zone of at least fifty feet of permanent vegetation between agricultural land and the water to retard surface run-off and siltation.
> 3. Where erosion control is necessary, methods such as mulching, crop rotation, strip cropping and contour cultivation will be used in conformance with the guidelines and standards of the USDA, Soil Conservation Service. (Ord. C-23234, Secs. 13.09.010, 13.09.060).

State Laws/Regulations

Ecology has authority to prevent both point and non-point source pollution that causes water quality problems in a water body.

RCW 90.48.080 states:

> It shall be unlawful for any person to throw, drain, run, or otherwise discharge into any of the waters of this state, or to cause, permit or suffer to be thrown, run, drained, allowed to seep or otherwise discharged into such waters any organic or inorganic matter that shall cause or tend to cause pollution of such waters according to the determination of the department, as provided for in this chapter.

WAC 173-201A-510(2) states:

> The director shall, through the issuance of regulatory permits, directives, and orders, as are appropriate, control miscellaneous waste discharges and water quality effect sources not covered by subsection (1) of this section.

(3) Non-point source and storm water pollution.

(a) Activities which generate non-point source pollution shall be conducted so as to comply with the water quality standards. The primary means to be used for requiring compliance with the standards shall be through best management practices required in waste discharge permits, rules, orders, and directives issued by the department for activities which generate non-point source pollution.

(b) Best management practices shall be applied so that when all appropriate combinations of individual best management practices are utilized, violation of water quality criteria shall be prevented. If a discharger is applying all best management practices appropriate or required by the department and a violation of water quality criteria occurs, the discharger shall modify existing practices or apply further water pollution control measures, selected or approved by the department, to achieve compliance with water quality criteria. Best management practices established in permits, orders, rules, or directives of the department shall be reviewed and modified, as appropriate, so as to achieve compliance with water quality criteria.

(c) Activities which contribute to non-point source pollution shall be conducted utilizing best management practices to prevent violation of water quality criteria. When applicable best management practices are not being implemented, the department may conclude individual activities are causing pollution in violation of RCW 90.48.080. In these situations, the department may pursue orders, directives, permits, or civil or criminal sanctions to gain compliance with the standards.

(d) Activities which cause pollution of storm water shall be conducted so as to comply with the water quality standards. The primary means to be used for requiring compliance with the standards shall be through best management practices required in waste discharge permits, rules, orders, and directives issued by the department for activities which generate storm water pollution. The consideration and control procedures in (b) and (c) of this subsection apply to the control of pollutants in storm water.

Actions:

1. Ecology and each municipal discharger will review existing pollution control authorities, including Shorelines Management Plans, Critical Area Ordinances, comprehensive plans, and other land use regulations, and dedicate needed resources to aggressively enforce such measures to address new and current sources of water quality degradation.

2. The County will include additional measures in their current Shorelines Management Plan amendments to address activities that lead to phosphorus inputs into the river, including conservation tillage, streamside fencing, and riparian buffer/revegtation requirements.

APPROACH H. Hydropower Impacts

The five Spokane River dams, currently operated by Avista, are undergoing a relicensing process with the Federal Energy Regulatory Commission (FERC). Avista's current license expires in 2007. As part of the relicensing process, Avista must obtain certifications under the Clean Water Act from the States of Idaho and Washington that the operation of its dams does not result in violations of state water quality standards.

The presence and operation of Avista's Spokane River Project, including Nine Mile and Long Lake dams, have affected several water quality parameters in the Spokane River, specifically including dissolved oxygen and sedimentation rates. Substantial amounts of sediment have been and continue to be deposited behind Nine Mile and Long Lake dams.

According to Avista's own reports, continued sedimentation of Nine Mile and Long Lake Reservoirs will continue into the new license term. Only 75% of sediments will pass through Nine Mile reservoir and, during the next 50 years, Long Lake reservoir will lose as much as 20% of its storage volume. However, there is no detailed assessment of the biological and water quality-related impacts of this problem.

Impoundment of water by the Avista's dams impacts the ability of the river to assimilate nutrients, which in turn leads to algae blooms and low dissolved oxygen. Obviously, without the dam and reservoir, there would not be a dissolved oxygen problem in this portion of the river.

Avista indicated in its final license application that it "will also continue its recent voluntary financial support of the existing Hangman Creek Watershed restoration program, or similar program" in the amount of $10,000 a year to address sediment impacts in Hangman Creek.

Avista further proposed to "[c]onduct a feasibility study to identify potential mechanisms for improving the dissolved oxygen levels in the discharge at Long Lake HED and

evaluate which alternatives are reasonable and feasible to improve dissolved oxygen levels. Using these study results, Avista will develop and implement a dissolved oxygen Enhancement Plan for discharges at Long Lake HED. Included in this plan will be dissolved oxygen monitoring."

Related Laws, Policies & Processes:

The Federal Power Act requires FERC, in issuing hydropower licenses, to consider not only the power generation potential of a river, but also to give equal consideration to energy conservation, protection of fish and wildlife, protection of recreational opportunities, and preservation of general environmental quality. 16 U.S.C. § 797(e). Accordingly, FERC will place conditions on a license, called protection, mitigation, and enhancement measures (PM&Es), to ensure that the existence and operation of a dam does not unduly damage or otherwise impact the environment. 16 U.S.C. § 803(a)(1). In sum, when making a licensing decision, FERC must assure that the project achieves a balance of beneficial uses of the affected waters and lands.

Further, when a hydropower project undergoes relicensing, each project must obtain a Clean Water Act Section 401 Water Quality Certificate from state water quality agency or agencies where its project is located. These certificates often contain measures designed to protect the water quality of a river and its resources. 33 U.S.C. § 1341(a)(1). FERC must include these measures in the new license for the dam.

Actions:

1. Avista and Ecology will ensure that requirements of the § 401 certification and FERC license are implemented in a manner consistent with the goals of the Spokane River TMDL and MOA. Accordingly, Avista will coordinate with the dischargers and Ecology in the implementation of all license measures impacting Spokane River dissolved oxygen levels.

2. Avista, Ecology, and the dischargers, with participation of the Spokane Tribe, will assess short-term measures to ensure that discharges from Long Lake meet the Spokane Tribe's water quality standards.

3. Avista will study the long-term impacts of the continued "fill-in" of Long Lake Reservoir toward achievement of water quality standards and develop appropriate mitigation measures to reduce and/or eliminate such impacts, including operational measures and/or enhanced commitment to tributary non-point reduction measures.

4. Avista, Ecology, and the dischargers will study options to address in-reservoir dissolved oxygen levels, including the feasibility of in-reservoir aeration/oxygenation, operational measures, and other in-reservoir restorative

technologies. Such measures should be utilized if monitoring data indicates that other approaches are not effective in meeting water quality standards.

5. Avista will support the adoption of the recommended minimum instream flow and will take appropriate action to amend or otherwise notify the Federal Energy Regulatory Commission of its support.

SECTION 5. DEPARTMENT OF ECOLOGY RESPONSIBILITIES

As the water quality agency for the state, Ecology is the entity ultimately responsible for determining compliance with targets of the TMDL and achievement of the water quality standards. Further, both the TMDL Guidance Document and the Ecology-EPA MOA detail Ecology's responsibilities in developing implementation strategies. These include:

- ensuring meaningful public participation;
- providing technical assistance, including information concerning funding sources, to affected persons and agencies;
- issuing NPDES permits in conformity with the plan;
- monitoring the success of the plan and the compliance of the participants, and
- providing incentives for compliance and enforcement proceedings as necessary.

In order to provide the public with the maximum level of understanding and participation and in order to provide the highest level of accountability, Ecology should make all documents produced in relation to the TMDL, including the MOA, DIP, and AKART analysis, available for public review and comment. In addition, Ecology should provide annual reports on the implementation of the TMDL to interested parties and make such reports available on the Ecology webpage.

SECTION 6. MONITORING/REPORTING

Monitoring is an integral component of the overall implementation to measure the effectiveness of the applied WWT technologies and other scenario components on the dissolved oxygen levels in the Spokane River and associated beneficial uses. A robust monitoring plan is essential to demonstrate success of pollution controls contained in the DIP, as well as the need for additional action.

According to WAC 173-220-210, any discharge authorized by a permit is subject to monitoring requirements as may be reasonably required by Ecology. The EPA-MOA, EPA Guidelines, and TMDL Guidance Document require detailed monitoring plans where implementation will be phased in over time. All permits must require effluent and ambient monitoring necessary to show that the effluent limits are being met and re-opener clauses allowing Ecology to modify or revoke the permit if the permit limits or

the permittee fail to attain specified targets. 40 C.F.R. § 122.44; s*ee also* WAC 173-220-180, -190.

Effectiveness monitoring is a key component of any TMDL implementation strategy. Effectiveness monitoring evaluates whether the management activities achieved the desired effect or goal. Success may be measured against controls of baseline conditions, or desired future conditions. This type of monitoring addresses the effectiveness of a particular project against standards or a desired outcome. For example, it would try to answer the question: did vegetative buffer strips along the margin of the stream produce an effective buffer for the reduction of phosphorus? This type of monitoring is designed to assess both the specific effects of individual management actions and the overall cumulative effect of non-point source management programs statewide.

Under this scenario, Sierra Club proposes that Ecology and the dischargers, in coordination with the monitoring expected to occur under the terms of Avista's new FERC license, perform monitoring and analysis to determine effectiveness of the implementation strategy.

Monitoring will include the following:

a. Dissolved oxygen/phosphorus/ammonia/CBOD monitoring of the Spokane River. An ambient water monitoring program must include collection and analysis of physical, chemical, and biological data. The data will be used to assess compliance with NPDES permits and the efficacy of non-point source cleanup strategies.

b. Monitor other physical/chemical parameters known to affect dissolved oxygen: This could include sediment from the tributaries, as well as temperature.

c. Track Spokane River flows: Flows into and through Long Lake impact dissolved oxygen levels.

b. Discharge monitoring reports prepared by NPDES permit holders. In addition to standard DMRs, for existing dischargers, Ecology will include a compliance schedule setting forth interim targets and monitoring schedules as necessary to assess the efficacy of implemented controls.

c. Implementation progress monitoring. Ecology will develop and circulate a quarterly report that indicates levels of progress for each party that is charged with responsibilities for implementation.

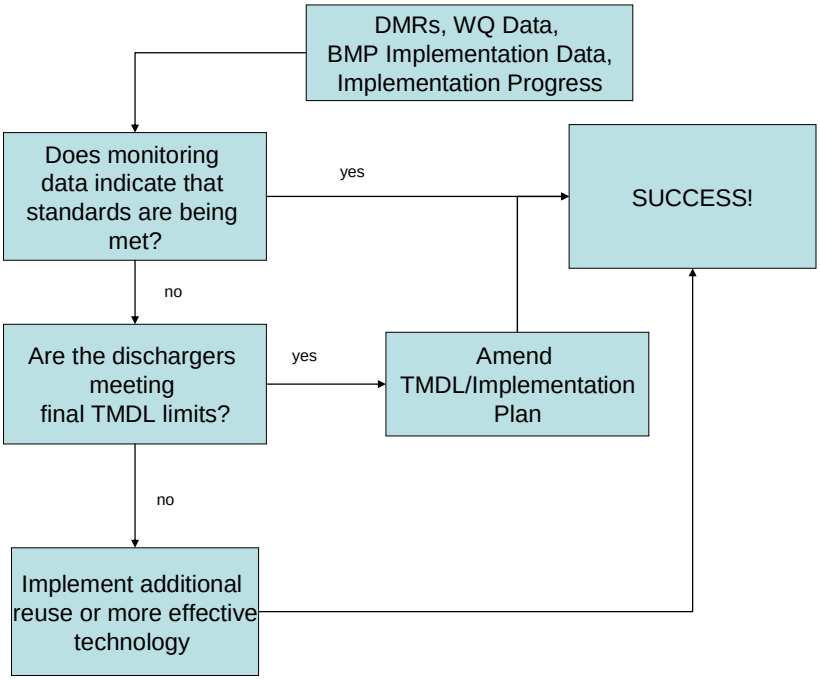
In addition, pursuant to the Ecology-EPA MOA, the monitoring program must include interim and final targets to determine if the plan is working. The final targets must meet

water quality standards at the end of the planned period. For point sources, a schedule of compliance will be specified in the permit, which will set forth interim requirements, the dates for their achievement, and reporting requirements. WAC 173-220-140. Reports must be made available to the public for inspection.

For non-point sources, the TMDL must specify outcome-based, measurable targets for regular monitoring. Normally, Ecology must specify in the implementation plan other more restrictive measures which will be applied should initial measures not be implemented or successful. Because TMDL water quality planning is newly underway in Hangman Creek and the Little Spokane River, development and implementation of the monitoring plan should be coordinated with that effort.

SECTION 7. EVALUATION AND TMDL AMENDMENT

The monitoring and progress reports described above will be used as a basis for assessing the need for implementing additional phosphorus discharge reduction limits on NPDES dischargers. Further, the TMDL, DIP, and corresponding NPDES permits shall be amended if (1) progress in implementation is not accomplished according to established milestones, (2) interim effluent targets are not met, or (3) ambient water quality monitoring indicates that dissolved oxygen in the Spokane River is worsening.



SECTION 8. REASONABLE ASSURANCE

When establishing a TMDL, States allocate reductions of a particular pollutant among the pollutant sources in the waterbody. These sources may include both point sources and non-point sources. In allocating reductions to the various sources, States must provide reasonable assurance that those sources will meet their allocated amount of reductions. Reasonable assurance is defined as "a demonstration that TMDLs will be implemented through regulatory or voluntary actions, by Federal, State or local governments, authorized tribes or individuals." 40 C.F.R. § 130.2(p).

In this case, there needs to be a demonstration that the suite of actions implemented in a phased approach is reasonably certain to occur. An appropriate vehicle for establishing this assurance is the development of an enforceable memorandum of agreement (MOA) between the regulatory agency (Ecology) and the dischargers. The terms of the MOA, in turn, would be reflected in Ecology's decision documents, including the final TMDL, DIP, the § 401 certification for Avista, and NPDES permits for each individual entity. This approach of incorporating terms of a TMDL MOA into NPDES permits is not without precedent and has been implemented by the State of Michigan on the Kalamazoo River/Lake Allegan watershed in southwestern Michigan.[109]

At a minimum, the MOA must include the following elements: (1) a clear statement of actions each party must take; (2) time frames to implement those actions; (3) enforcement mechanisms; (4) commitment of funding, including the identification of funding sources; and (5) reporting requirements.

The elements of the MOA include the specific actions each entity will implement during the term of the agreement in order to meet TMDL targets. These actions will be further refined in subsequent documents, including the DIP and NPDES permits.

The MOA must contain a description of time frames and milestones that each party shall achieve in order to comply with the MOA. Ecology will develop appropriate schedules of compliance in accord with state law. These schedules will be included into the DIP and NPDES permits. Achievement of the time frames and milestones will be assessed through annual reporting requirements that will be submitted to Ecology and made available to the public. At a minimum, the MOA should include the following milestones:

By the end of the first year, the following actions will be completed:

a. AKART investigation and analysis for advanced wastewater treatment, pretreatment pollutant prevention measures, and maximization of operations for pollutant control;
b. Reuse feasibility study;

[109] *See* http://www.michigan.gov/deq/0,1607,7-135-3307_11105-22185--,00.html.

c. Completion of non-point source pollution control strategy; and
d. Adoption of influent control program, including the adoption of local codes for phosphorus bans.

By the end of the second year, the following actions will be completed:

a. AKART engineering, economic, and environmental analysis completed and design submitted to Ecology with reasonable assurances for phosphorus, CBOD, and ammonia reductions;
b. "Delta" identification completed – determine the difference between technologically achievable phosphorus reduction and instream target concentration of 10 µg/L for each facility;
c. Begin development of strategies to reduce delta to meet water quality criteria; and
d. Phosphorus bans in place.

By the end of the third year, the following actions will be completed:

a. Wastewater treatment upgrades to commence;
b. Implementation of monitoring program, and
c. Begin implementation of program to reduce delta to meet water quality criteria.

By the end of the fifth year, the following actions will be completed:

a. New technology is installed and operational;
b. Continue other strategies;
d. Adapt as necessary.

By the end of the fifteenth year:

a. If goals of TMDL are met, great!
b. If not, implement aeration or other restoration technology.

By the end of the twentieth year:

a. If TMDL goals are not met, implement additional treatment technology and/or reuse or other appropriate measures.

The MOA should recognize that several vehicles exist for addressing disputes and ensuring compliance. First, the MOA should include measures for ongoing meetings on at least an annual basis of the collaborative parties to identify and address concerns, as well as measure success. These meetings should be open to the public and allow an opportunity for public comment. Second, the MOA and, in turn, the NPDES must explicitly bind the parties to the agreed upon actions. Third, the MOA must not preclude any available remedies for public review and enforcement of the commitments, such as challenges to NPDES permits. Fourth, disputes regarding the specific terms of the

TMDL or DIP should be addressed in a manner consistent with Ecology's TMDL Dispute Resolution Policy.[110]

A critical element of ensuring that a reasonable level of certainty exists that the TMDL will be implemented is a commitment of funding. The MOA must contain a long-term commitment of the parties to funding the strategies. To the extent practicable, the MOA should identify the dollar figures each entity commits, the commitments of Ecology, as well as outside sources of funding that the parties will endeavor to obtain to assist in the efforts.

Given the long-term nature of this approach, it is essential that the public is well informed on the status of the implementation efforts. Accordingly, on at least an annual basis, each party to the MOA, including the Department of Ecology, should prepare a report containing a status of implementation efforts, a summary of monitoring reports, and other relevant information. These reports should be made available to Ecology and posted on Ecology's webpage.

[110] *See* http://www.ecy.wa.gov/programs/wq/tmdl/watershed/documents/dispute-policy.pdf.