Overview of Washington State's Total Maximum Daily Load (TMDL) Effectiveness Monitoring Program

National Water Quality Monitoring Council Conference
Portland Oregon, May 2012

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http://www.ecy.wa.gov/programs/eap/tem/index.html

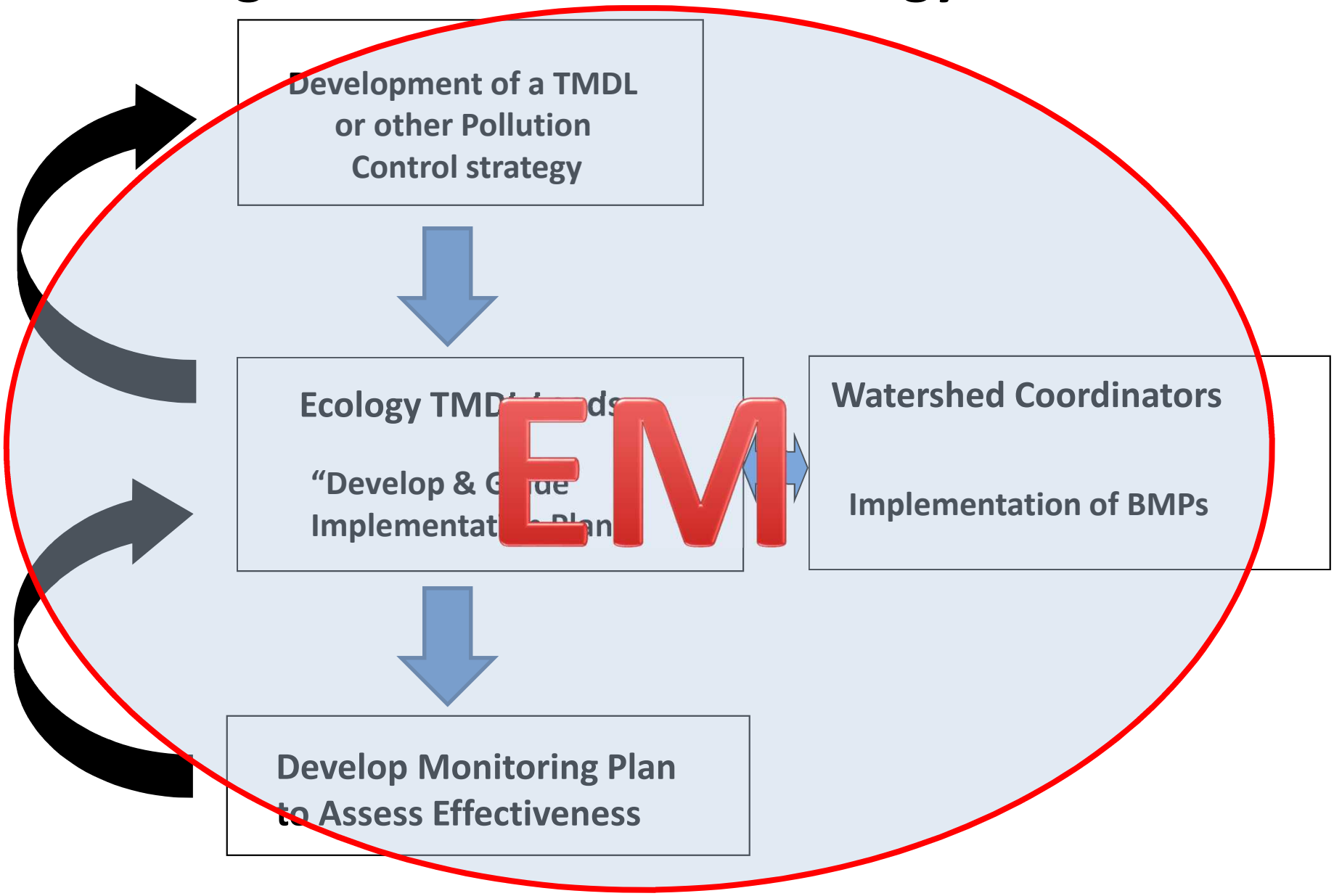
Overview

- Since the inception of Ecology's effectiveness monitoring program in 2001, a total of 119 TMDLs have been evaluated through 18 studies.
- Of those 119 TMDLs, 50 were determined to be meeting target limits, while another 12 have demonstrated improving trends in water quality.
- Of the 50 TMDLs meeting targets, only 5 could be linked to implementation of BMPs.
- No implementation tracking is occurring at a state or federal level.

Levels of Effectiveness

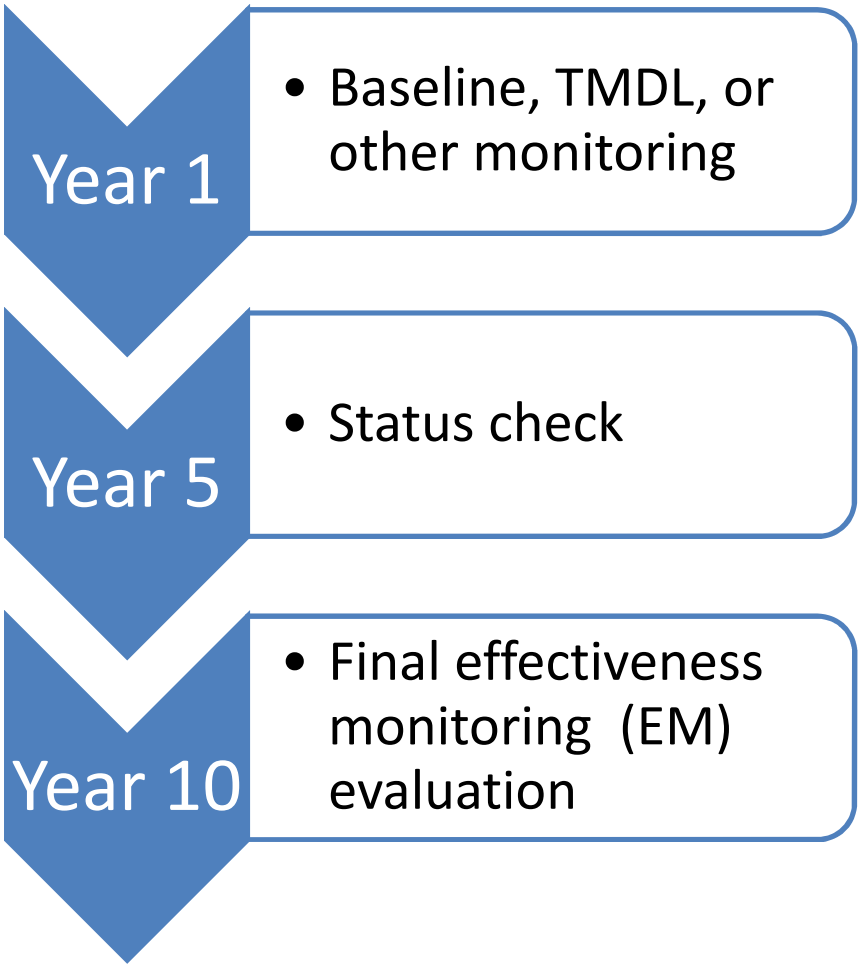
Level	Questions
Program	•Are waters with Section 319 or state funded projects improving? •Are impaired segments meeting water quality standards?
Pollution control plan (i.e., TMDL)	Is water quality improving? Are interim target measures being met? Are additional implementation measures needed? Are discharges meeting NPDES limits?
Individual best management practices (BMPs)	Is the pollution control measure successful at controlling pollution load?

Washington's State's TMDL Strategy



Monitoring Plan

- A multi-year sampling approach allows for adaptive management.
- Include a source tracking component.

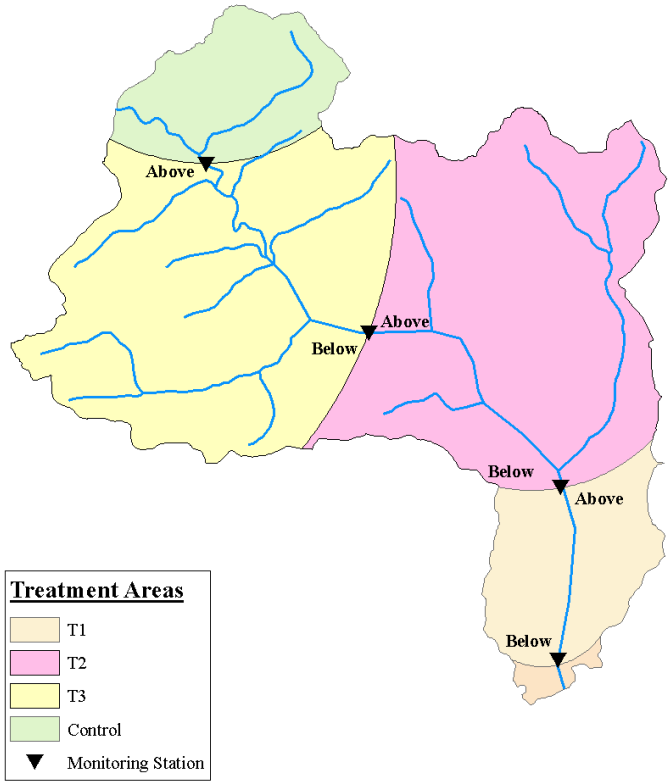


Effectiveness Monitoring Strategy

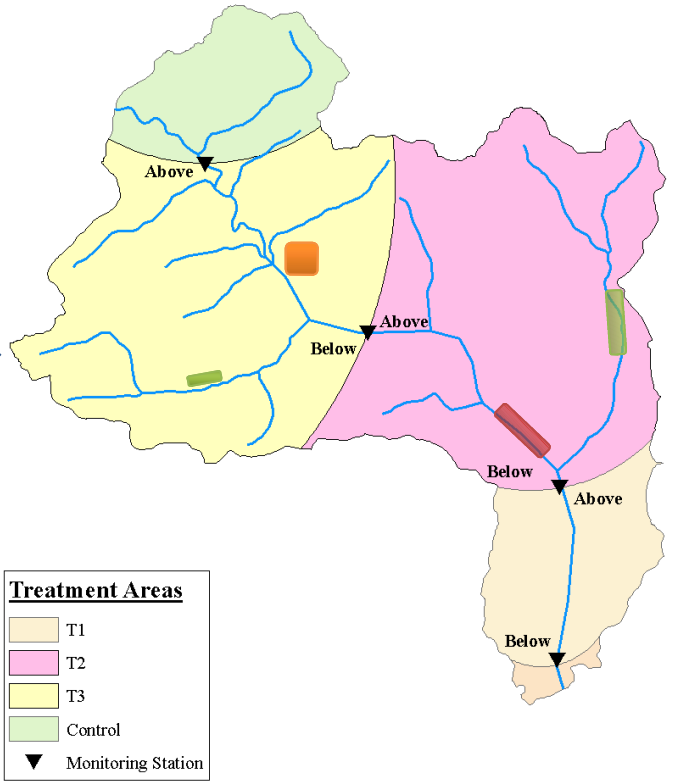
- Integrate a monitoring strategy for effectiveness monitoring into pollution control plans.
- Use multiple indicators (water quality, bioassessment, habitat, land use index).
- Incorporate some statistical precision.
- Use a “weight of evidence” approach to evaluate effectiveness.
- Results must be in a context that can be used for both management and on-the-ground decisions.

Study Design

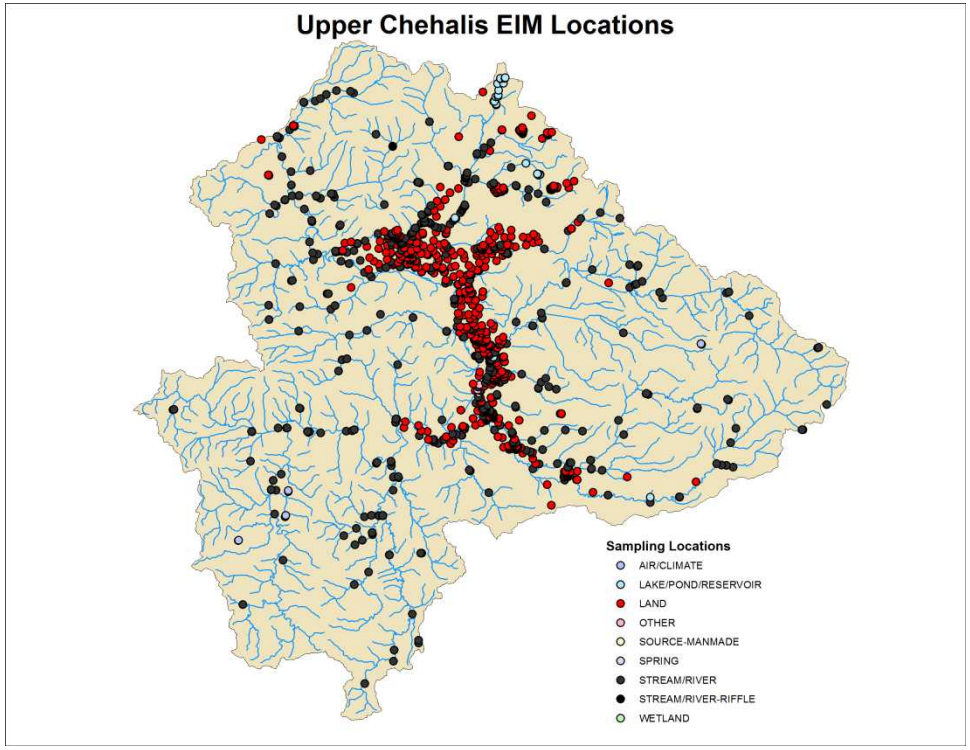
Before Implementation



After Implementation

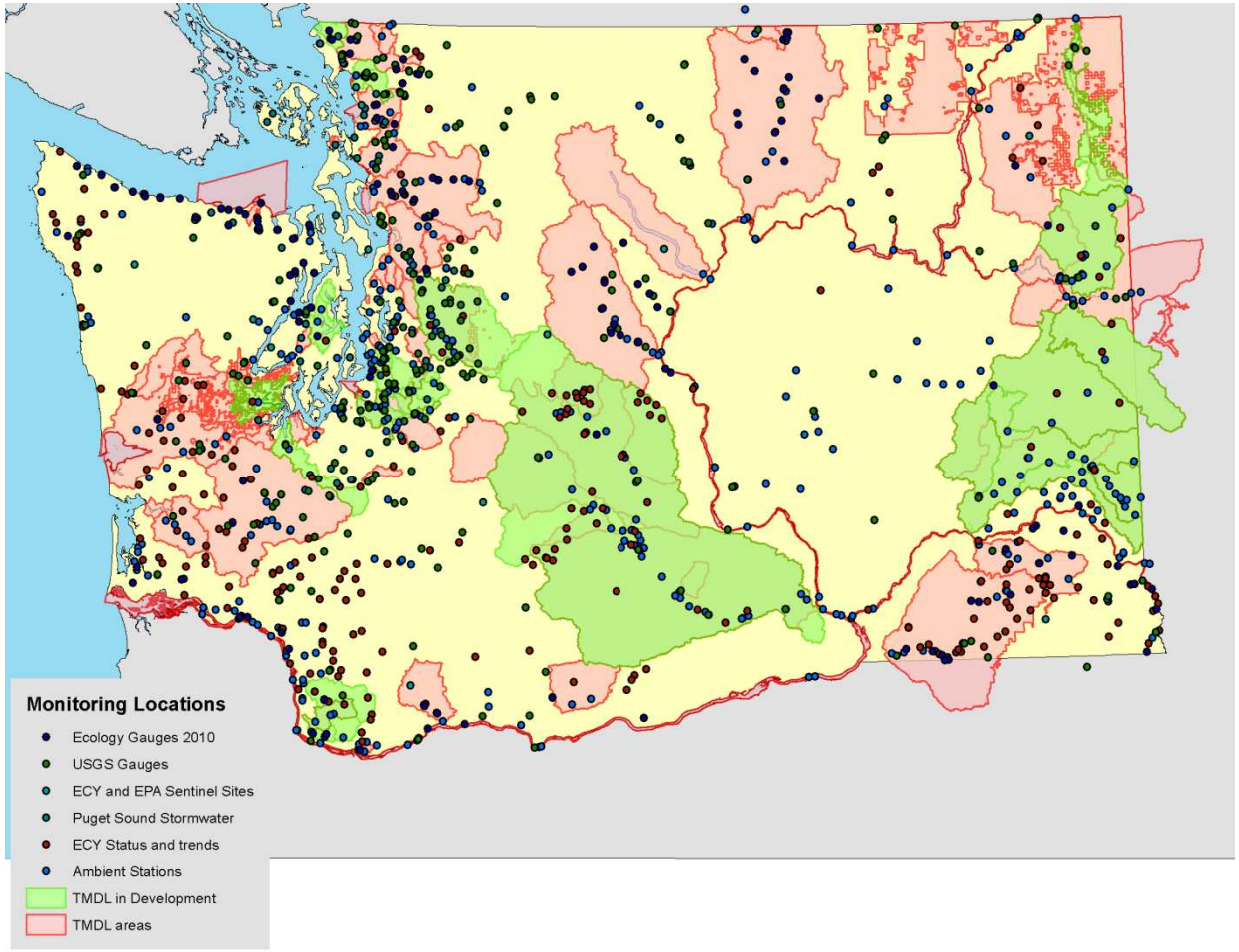


Existing Data

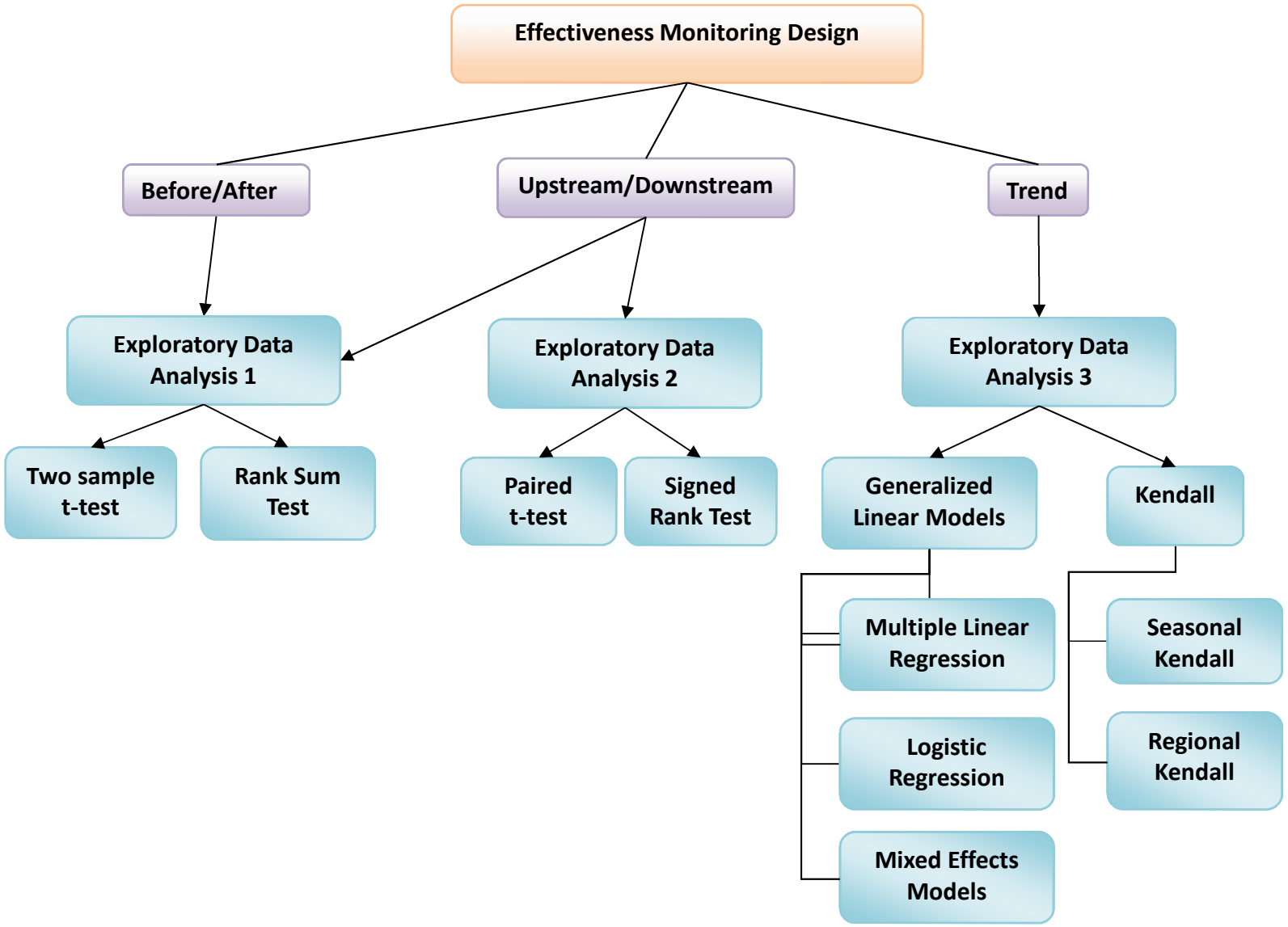


- Ecology's Environmental Information Management (EIM) System.
- Physical, chemical, and biological data for Washington.

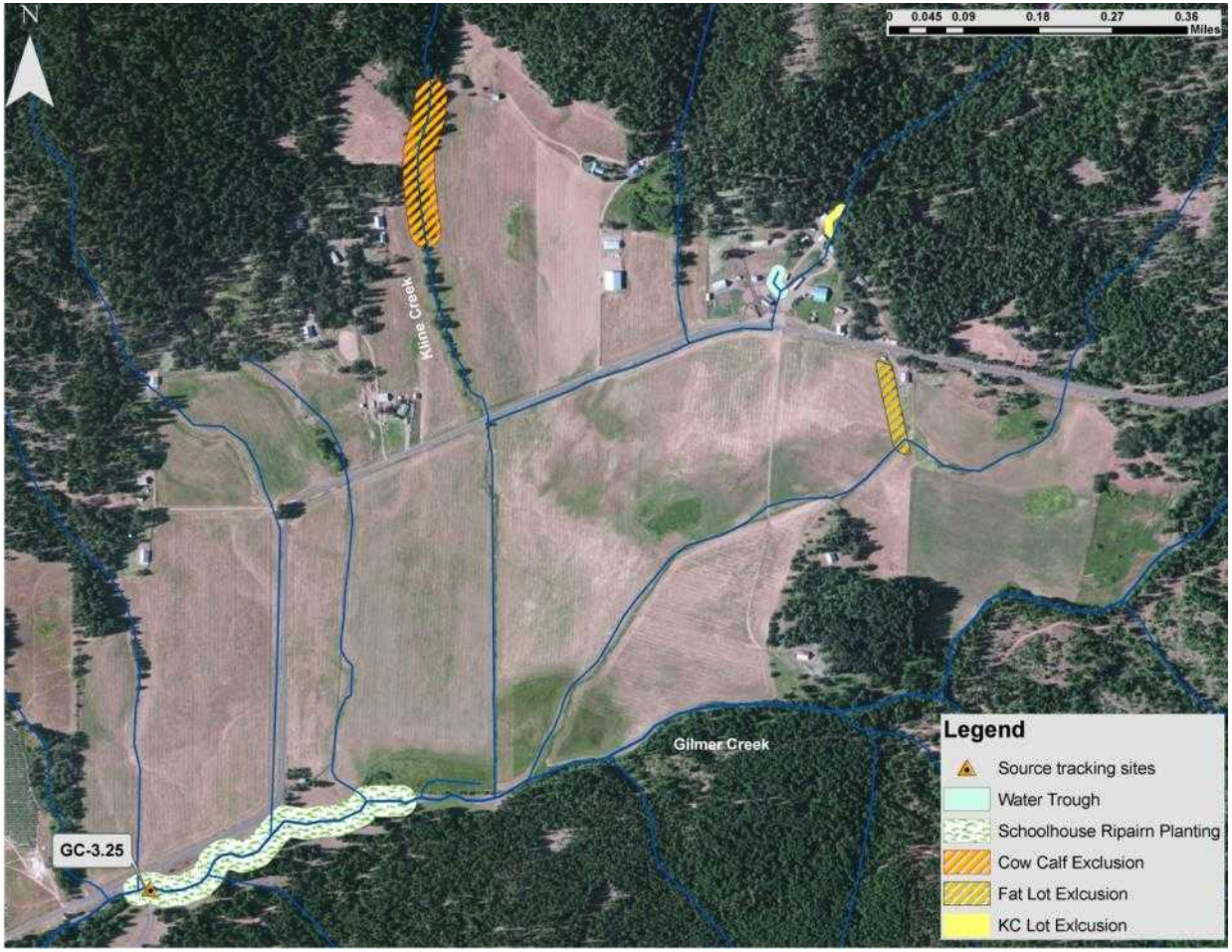
Current Monitoring Efforts



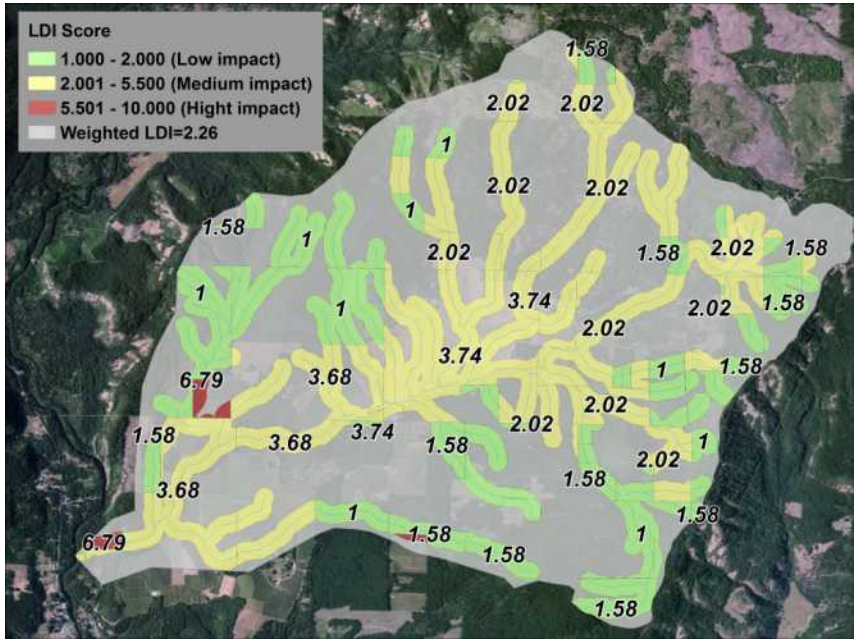
Data Analysis

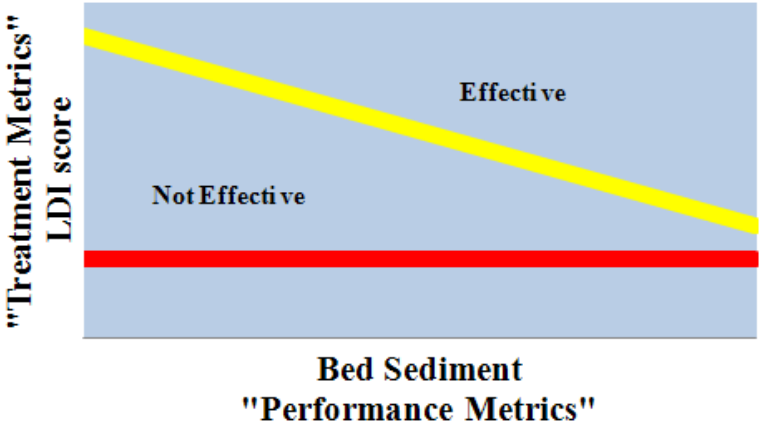


Linking Water Quality Changes to Actions



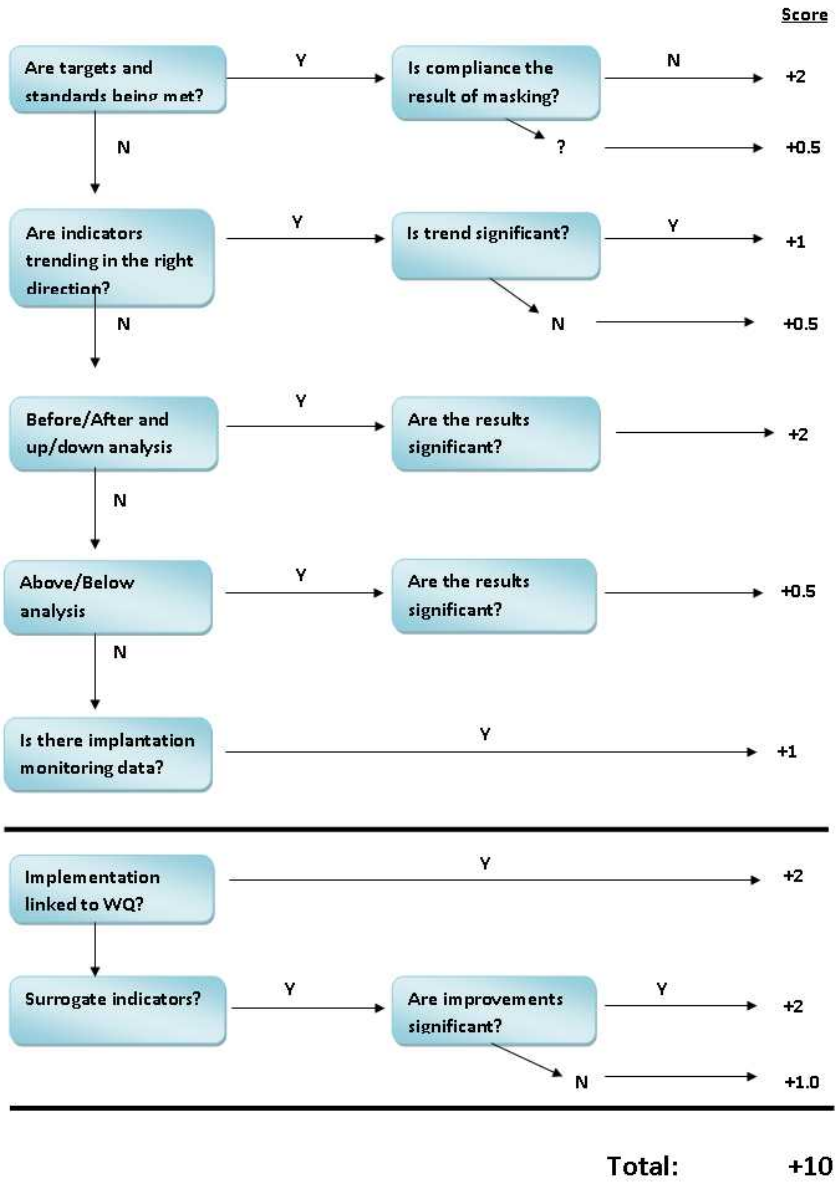
Landscape Development Intensity (LDI) Index





Weight of Evidence

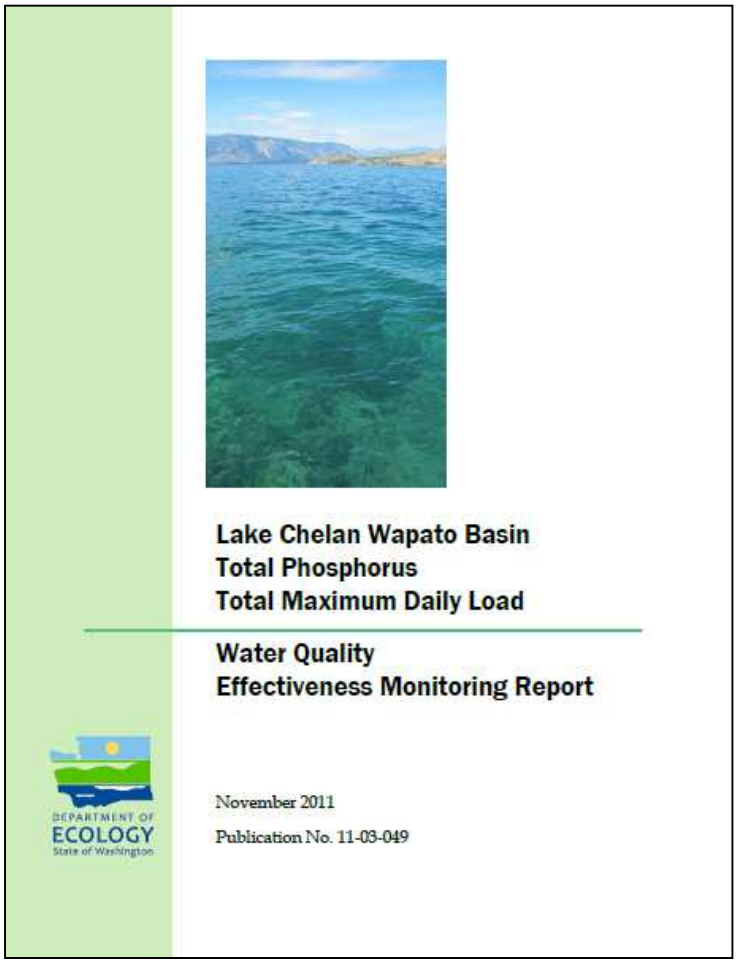
- Costs of statistical designs are expensive.
- Final determination of effectiveness requires a “weight of evidence” approach.



Weight of Evidence

Weight of Evidence Score	Level of Evidence
0-3	Poor
4-7	Good
8-10	Excellent

Reports



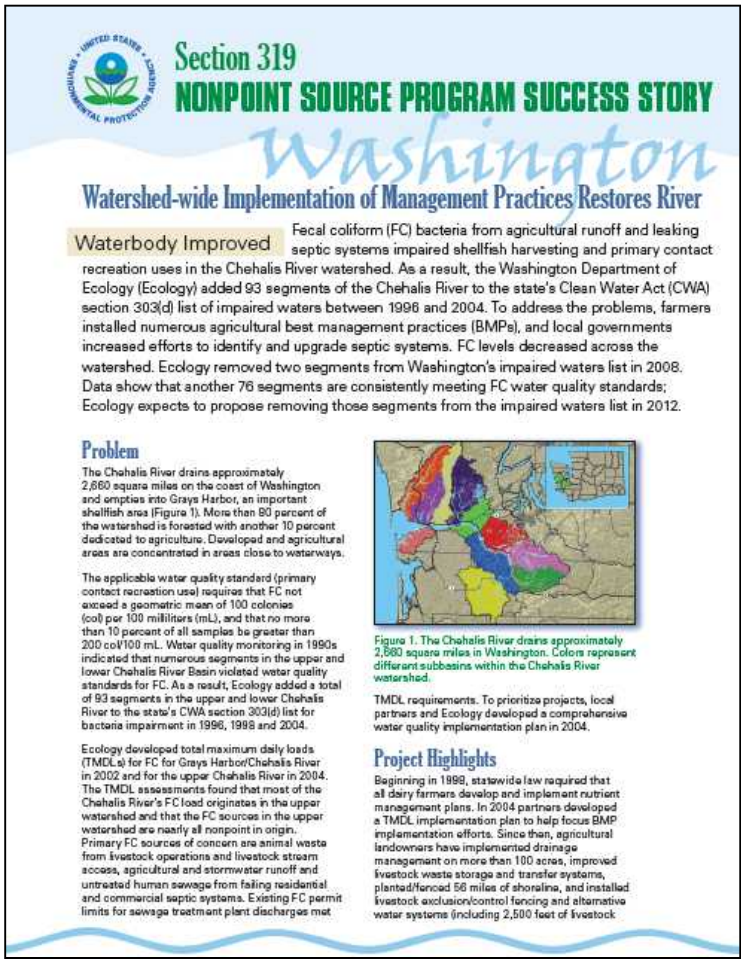
Lake Chelan Wapato Basin
Total Phosphorus
Total Maximum Daily Load

Water Quality
Effectiveness Monitoring Report

DEPARTMENT OF ECOLOGY
State of Washington

November 2011

Publication No. 11-03-049



Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY

Washington

Watershed-wide Implementation of Management Practices Restores River

Waterbody Improved

Fecal coliform (FC) bacteria from agricultural runoff and leaking septic systems impaired shellfish harvesting and primary contact recreation uses in the Chehalis River watershed. As a result, the Washington Department of Ecology (Ecology) added 93 segments of the Chehalis River to the state's Clean Water Act (CWA) section 303(d) list of impaired waters between 1996 and 2004. To address the problems, farmers installed numerous agricultural best management practices (BMPs), and local governments increased efforts to identify and upgrade septic systems. FC levels decreased across the watershed. Ecology removed two segments from Washington's impaired waters list in 2008. Data show that another 76 segments are consistently meeting FC water quality standards; Ecology expects to propose removing those segments from the impaired waters list in 2012.

Problem

The Chehalis River drains approximately 2,660 square miles on the coast of Washington and empties into Grays Harbor, an important shellfish area (Figure 1). More than 80 percent of the watershed is forested with another 10 percent dedicated to agriculture. Developed and agricultural areas are concentrated in areas close to waterways.

The applicable water quality standard (primary contact recreation use) requires that FC not exceed a geometric mean of 100 colonies (col) per 100 milliliters (mL), and that no more than 10 percent of all samples be greater than 200 col/100 mL. Water quality monitoring in 1990s indicated that numerous segments in the upper and lower Chehalis River Basin violated water quality standards for FC. As a result, Ecology added a total of 93 segments in the upper and lower Chehalis River to the state's CWA section 303(d) list for bacteria impairment in 1996, 1998 and 2004.

Ecology developed total maximum daily loads (TMDLs) for FC for Grays Harbor/Chehalis River in 2002 and for the upper Chehalis River in 2004. The TMDL assessments found that most of the Chehalis River's FC load originates in the upper watershed and that the FC sources in the upper watershed are nearly all nonpoint in origin. Primary FC sources of concern are animal waste from livestock operations and livestock stream access, agricultural and stormwater runoff and untreated human sewage from failing residential and commercial septic systems. Existing FC permit limits for sewage treatment plant discharges met

Figure 1. The Chehalis River drains approximately 2,660 square miles in Washington. Colors represent different subbasins within the Chehalis River watershed.

TMDL requirements. To prioritize projects, local partners and Ecology developed a comprehensive water quality implementation plan in 2004.

Project Highlights

Beginning in 1998, statewide law required that all dairy farmers develop and implement nutrient management plans. In 2004 partners developed a TMDL implementation plan to help focus BMP implementation efforts. Since then, agricultural landowners have implemented drainage management on more than 100 acres, improved livestock waste storage and transfer systems, planted/fenced 56 miles of shoreline, and installed livestock exclusion/control fencing and alternative water systems (including 2,500 feet of livestock

Existing Challenges

1) Inadequate funding at the state and federal level.
2) Lack of implementation tracking of either federal or state funded projects (although it is a requirement).
3) Lack of policy on when/how to conduct effectiveness monitoring.
    - EAP recommends a strategy however, it is still up to TMDL leads to make decisions.
4) Lack of coordination between local efforts.

Questions?

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