



A Step-by-Step Technical Guide



Plan for Better Water Quality Step-by-Step

Improvements in water quality do not just happen. They take hard work, cooperation, and most of all, planning. Watershed Improvement Plans (WIPs) focus remediation efforts at projects critical to water quality improvements.

The goal of this manual is to assist community-driven efforts to develop and implement a WIP. The plan will identify priority projects and mitigation activities needed to remove an identified impairment.

This process was developed to remediate watersheds with impairments identified through ADEQ's assessment and impaired waters listing process; however, the methods described are applicable to any watershed with clear evidence of excessive pollutant loading to surface or ground water.

WIP development should complement and will be coordinated with other watershed activities, such as development of a Total Maximum Daily Load (TMDL). A TMDL analysis is developed by ADEQ to estimate pollutant load reductions needed to meet water quality standards. If a TMDL has already been developed, the WIP will use the information in the TMDL, such as probable pollutant source categories, and identify and prioritize projects needed to reduce source loads. WIPs will provide the strategies, schedules, milestones, and funding commitments needed to implement corrective actions at the local level. If a TMDL is being developed, WIP development is expected to shorten TMDL development or may even eliminate the need for completing the TMDL, thereby providing more resources for implementing critical projects.

In Arizona, the major causes of impairments are frequently non-regulated activities that require locally-coordinated changes in land management and voluntary implementation of Best Management Practices (BMPs). WIP development puts the power where it needs to be, at the local level. ADEQ's programs will provide the technical support needed to support scientifically sound decisions. The process should create strong public involvement, a knowledgeable community, and the commitments needed to support long-term improvements.

This document describes six steps to developing and implementing a Watershed Improvement Plan:

1. Assemble background information
2. Survey the watershed
3. Analyze surveys, evaluate alternatives, and set priorities
4. Develop written plan
5. Implement the plan
6. Monitor and evaluate effectiveness

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The Planning Process

STEP 1

Educate the Watershed Improvement Council (WIC) and assemble background information

Actions	Lead Person or Agency
Assemble and educate the WIC <ul style="list-style-type: none"> Broad representation of community landowners, decision makers, and other stakeholders who might be affected Establish respect for diverse opinions Educate WIC members concerning pollutant of concern Determine further education needs for WIC members 	
Learn about the impairment <ul style="list-style-type: none"> Characteristics of the pollutant(s) of concern and potential public health or environmental concerns Water quality standards that apply Monitoring and other evidence of impairment Potential sources of pollutant, including natural conditions Status of TMDL development 	
Learn about the watershed <ul style="list-style-type: none"> Review reports and existing materials about the watershed (examples: water quality assessment reports, TMDLs, watershed plans, and land use maps) Discuss potential pollutant sources in the watershed 	
Learn about potential pollutant mitigation measures <ul style="list-style-type: none"> Actions already taken to reduce pollutant loading Likely Best Management Practices (BMPs) Potential regulatory authority 	
Determine resources available, schedules, steps, roles, and responsibilities <ul style="list-style-type: none"> Discuss goals, scope, methods, schedules, and steps established in the grant Determine resources and expertise available and needed Establish roles and responsibilities 	

Abbreviations used in this document:

ADEQ = Arizona Department of Environmental Quality

APP = Aquifer Protection Program Permit
(ground water discharge permit)

AZPDES = Arizona Pollutant Discharge
Elimination System (surface water discharge
permit)

BMP = Best Management Practices (mitigation and
restoration techniques)

GIS = Geographic Information System (computer
assisted mapping and spatial analyses)

NEMO = Nonpoint Source Education for Municipal
Officials

TMDL = Total Maximum Daily Load – The maximum
pollutant amount (load) which can be carried by a
surface water without causing an exceedance of water
quality standards.

WIC = Watershed Improvement Council

WIP = Watershed Improvement Plan



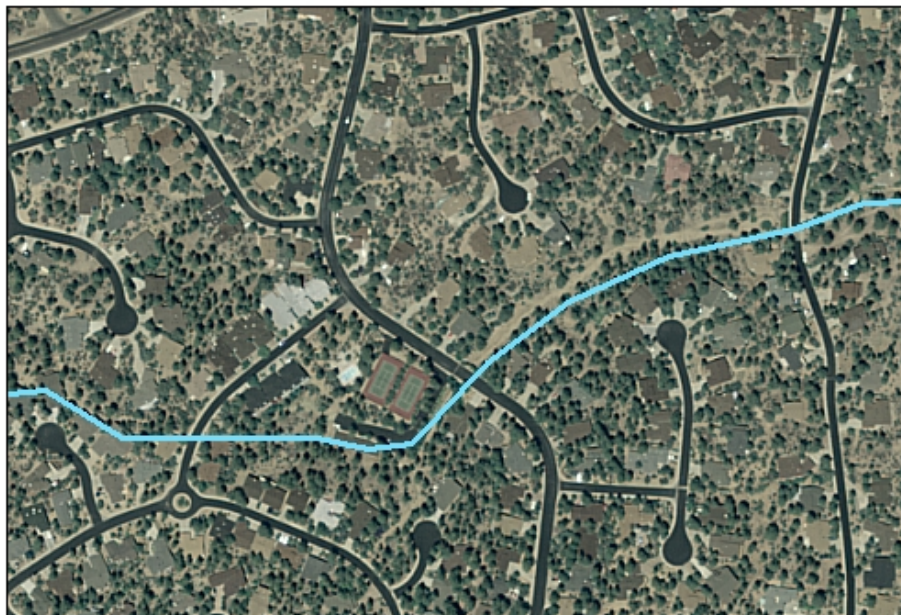
The Planning Process

STEP 2

Survey the Watershed	
Preliminary Survey Efforts	Lead Person or Agency
Identify target areas for field surveys <ul style="list-style-type: none"> Subdivide watershed by categories (e.g., land uses, sewerage versus non-sewered area, etc) Use GIS covers, aerial photos, county records, WIC member, and other information sources to identify potential sources and target areas Review existing reports (e.g. watershed reports, TMDLs, grazing allotment environmental assessments and permits, AZPDES permits, APP permits, surveys, flood management surveys and reports) 	
Develop field survey methods <ul style="list-style-type: none"> Write a survey plan, addressing each type of survey Write pollutant monitoring plan (QAP and SAP). Coordinate monitoring with ADEQ's TMDL Program and other on-going monitoring. Obtain equipment, develop field forms, and develop field maps Develop database and methods of tracking information collected Obtain ADEQ review and approval 	
Notify land owners and community <ul style="list-style-type: none"> Get permission for survey work Provide information to the public about purpose of survey work 	

Note: Survey will identify:

1. Key sites – where pollutant discharge or deterioration can be measured.
2. Reference sites – conditions at sites should be targets for mitigation efforts
3. Potential sites for on-the-ground water quality improvement projects



Aerial Photo
Manzanita Wash
Prescott, AZ



Physical Survey	Lead Person or Agency
<p>Implement the physical survey and monitoring plans</p> <p>For example if impaired by nutrients or bacteria, the field survey might focus on the following activities and evidence.</p> <p>Survey would concentrate on areas within 150 meters of an impaired surface water or its tributaries</p> <ul style="list-style-type: none"> • Livestock operations (grazing, corrals, etc) <ul style="list-style-type: none"> ▪ Runoff could enter surface water ▪ Livestock wastes near stream bank ▪ Livestock in surface water or no fencing to keep livestock out of the water ▪ Poor riparian conditions or inadequate vegetation for filtering runoff • Crop Production <ul style="list-style-type: none"> ▪ Runoff could enter surface water ▪ Note irrigated area return flow locations ▪ No cropland filter strips on irrigated lands • Waste water disposal <ul style="list-style-type: none"> ▪ Septic system age, location, or type of system indicates that it may be contributing nutrient or bacteria loads ▪ Sewer line or manhole locations indicate that they may be contributing nutrient or bacteria loads • Recreation areas <ul style="list-style-type: none"> ▪ Inadequate or poorly maintained toilet or trash facilities ▪ Wildlife – trash interactions noted ▪ Excessive fecal accumulation due to pet wastes or feeding ducks ▪ Riparian and stream bank damage due to recreation activities • Urban storm water <ul style="list-style-type: none"> ▪ Stream bank erosion due to storm water runoff noted ▪ Household wastes or pet wastes observed within riparian area ▪ Poor riparian conditions or inadequate vegetation for filtering runoff 	
Implement pollutant monitoring plans to assist in determining sources	
Implement monitoring plan to determine hydrological conditions (flow regimes and tributary contributions)	



Boots on the Ground

Social Survey	Lead Person or Agency
Before implementing education and outreach projects, determine: <ul style="list-style-type: none"> • Desired outcomes (e.g., What behaviors need to change?) • Target audiences (examples: age, occupation, interests, visitors) • Existing knowledge of pollutant problems and mitigation methods (BMPs) • Reasons not implementing practices, projects, or improvements 	
Existing and past education and outreach efforts <ul style="list-style-type: none"> • What has been tried and how effective were they in terms of long-term impacts? • Ideas from other states, organizations, watersheds 	
Investigate regulatory authority that could be used to reduce pollutant discharges Examples: Stormwater management under AZPDES, agriculture nitrogen BMPs and grazing BMPs under general Aquifer Protection Permit (APP) Program, CAFO permits (AZPDES and APP), federal and state grazing permits, local ordinances, septic system general permits (APP and county health), planning and zoning, deed restrictions, and conservation easements.	
Determine underlying issues that could impede implementation or long-term success of projects.	
Share survey results with community.	
Financial Survey	Lead Person or Agency
Investigate funding sources and opportunities to assist with implementation (grants, WIFA funds for infrastructure or technical assistance, Water Protection Funds) <ul style="list-style-type: none"> • Document their project selection criteria, funding timetables, and priorities • Identify common interests 	
Investigate partnerships with private companies, schools and other partners that could assist in implementation and education.	



Slide Rock on Oak Creek

The Planning Process

STEP 3

Analyze survey results, evaluate alternatives, and set priorities

Actions	Lead Person or Agency
Interpret physical survey results and report findings to WIC <ul style="list-style-type: none"> • Determine key sites and report findings at sites • Determine reference sites and conditions • Determine potential project sites 	
Interpret social survey results and report findings to WIC <ul style="list-style-type: none"> • Determine educational needs and priorities • Recommend regulatory authorities that could assist with mitigation 	
Interpret financial survey results and report findings to WIC	
Use technical expertise to determine feasible and effective potential mitigation methods.	
Complete a cost effectiveness comparison of potential mitigation methods and projects to select best mitigation methods. At a minimum compare: <ul style="list-style-type: none"> • Costs • Complexity (permits, size, extent of watershed, technical difficulty) • Effectiveness (past experience, estimated load reductions) • Longevity and ongoing maintenance • Land owners desire, commitment, and resources to maintain • Educational training or technical support needed • Resources available (funding, training, public support, etc) 	
Estimate load reductions <ul style="list-style-type: none"> • Estimate load reductions needed to achieve standards • Estimate load reductions from priority projects 	
Determine public participation opportunities during implementation, maintenance, and education phases	
Provide public meetings or forums to discuss findings and get further input	



The Planning Process

STEP 4

Write the Watershed Improvement Plan

Actions	Lead Person or Agency
<p>Plans must include elements and be written in the outline format established by ADEQ if 319(h) funds are used.* Key components of the plan include:</p> <ul style="list-style-type: none"> ▪ Water quality concern ▪ Watershed context ▪ Past mitigation efforts ▪ This planning process ▪ The watershed investigation (field methods and findings) ▪ Potential projects and mitigation (BMPs) ▪ Cost-effectiveness comparison ▪ Estimated load reductions ▪ Resource needs and commitments ▪ Priority projects ▪ Education and outreach strategy ▪ Schedule, milestones, and commitments to maintenance ▪ Project evaluation and monitoring 	
<p>Meet with watershed stakeholders (individuals or groups who could be affected by plan implementation) to discuss draft plans and to obtain their input</p>	
<p>Submit final written plan to ADEQ for approval (if grant funds were used)</p>	
<p>Make plan available (e.g., on the internet)</p>	

*Plans must contain EPA's nine key elements as described in EPA's *Handbook for Developing Watershed Plans to Restore and Protect Our Waters*, which can be downloaded at: http://epa.gov/nps/watershed_handbook



San Francisco River near Safford

The Planning Process

STEP 5

Implement the plan

Actions	Lead Person or Agency
Obtain funding for implementation of project and associated education and effectiveness monitoring	
Hire and enlist technical assistance and volunteers to implement the plan <ul style="list-style-type: none"> ▪ Involve community volunteers in implementation and maintenance of projects, where possible ▪ Provide education and training to volunteers and interested stakeholders 	
Obtain permits and clearances	
Keep WIC members, stakeholders, and funding agencies informed on progress	
Implement education and outreach components <ul style="list-style-type: none"> ▪ Target education at key audiences ▪ Develop tools to explain water quality problems and mitigation actions ▪ Keep community informed about actions they can take ▪ Provide training as needed 	
Maintain water quality improvement projects and education components	
Pursue additional funding opportunities for further improvement phases, as needed	



Granite Creek Restoration

The Planning Process

STEP 6

Monitor and evaluate effectiveness

Actions	Lead Person or Agency
<p>On-the-ground improvement evaluation criteria Establish criteria to determine long-term effectiveness of on-the-ground water quality improvement project based on desired outcomes (e.g., load reductions, dropping impairment) and long-term impacts.</p>	
<p>Monitoring</p> <ul style="list-style-type: none"> ▪ Develop a monitoring plan to determine effectiveness <ul style="list-style-type: none"> ▪ At key sites and reference sites ▪ For indicator parameters ▪ During critical conditions ▪ Indicate when to be initiated, how often, how long into future ▪ Indicate who will do the monitoring and evaluate data ▪ Indicate how findings will be reported and used ▪ Obtain ADEQ approval of the sampling analyses plan (SAP) and quality assurance plan (QAP) before initiating any monitoring if funded by ADEQ ▪ Implement the monitoring plan and evaluate the data to determine effectiveness of reducing pollutant loading 	
<p>Education evaluation criteria Establish criteria to determine long-term effectiveness of education and outreach components based on desired outcomes (e.g., behavior change, more mitigation projects) and long-term effects.</p>	
<p>Education evaluations Develop and implement methods to determine effectiveness of education and outreach</p>	
<p>Determine and report to WIC and other interested parties aspects of the projects that worked well and how future projects could be improved</p>	
<p>Final grant reports</p> <ul style="list-style-type: none"> ▪ Provide final reports to funding organizations and other partners ▪ Provide documentation of project success or outstanding issues ▪ Provide update reports of long-term effectiveness to funding organizations, if possible. (This will help support efforts to receive additional future grants.) 	



Water Quality Improvement Grants

Arizona Department of Environmental Quality's (ADEQ) Water Improvement Grant Program administers funds from the United States Environmental Protection Agency (EPA) for implementation of nonpoint source management projects under section 319(h) of the Clean Water Act. A water quality improvement grant may be awarded for development and implementation of a Watershed Improvement Plan, as described in this document. If you desire further information, please use contact information below or write to: ADEQ, Water Quality Improvement Grant Program, 1110 W. Washington St., Phoenix, AZ 85007.



Contact Information

ADEQ Water Quality Improvement Grants

Rebecca Bouquot, Unit Supervisor
602-771-4469

bouquot.rebecca@azdeq.gov

Krista Osterberg, Grant Program Coordinator
602-771-4635
Osterberg.krista@azdeq.gov

Diana Marsh, Grant Effectiveness
602-771-4545
Marsh.diana@azdeq.gov

Website: www.azdeq.gov/environ/water/watershed
Toll free: 1-800-234-5677

Master Watershed Stewards

Candice Rupprecht, MWS Coordinator
Water Resources Research Center, Univ. of Arizona
520-792-9591, extension 24
candicer@cals.arizona.edu

Nonpoint (Source) Education for Municipal Officials (NEMO)

Kristine Uhlman, NEMO Coordinator
Water Resources Research Center, Univ. of Arizona
520-621-9591, extension 51
Kuhlman@ag.arizona.edu

Channah Rock, NEMO Coordinator
520-381-2258
Channah@cals.arizona.edu
UA Soils, Water, and Environmental Science Dept
Maricopa Agriculture Center



Sunset at Watson Lake