Nonpoint Source Management 5-year Plan for Arizona

STRATEGIC PLANNING FOR MEETING WATER QUALITY PROTECTION AND RESTORATION GOALS RELATED TO NONPOINT SOURCE POLLUTION.

EXECUTIVE SUMMARY

I. Purpose of Document

This document is Arizona's 5-year Nonpoint Source Management Plan (5-year NPS Plan or Plan). It updates the State's Nonpoint Source Management Program (NPS Program) originally developed under the Clean Water Act (CWA) Section 319(h) in 1989-90 and subsequently updated every five years. This document was developed by the Arizona Department of Environmental Quality (ADEQ) as part of its State Fiscal Year (FY) 2020 Performance Partnership Grant (PPG) work plan with the U.S. Environmental Protection Agency (EPA). According to guidance developed by EPA and states, states should periodically review and evaluate their NPS Programs (i.e. every five years), assess goals and objectives, and revise the program as appropriate. The 5-Year NPS plan is used by the state to set goals for addressing nonpoint source pollution and drive programmatic activities toward achieving those goals. This document includes short and long term goals, objectives, and strategies to reduce and prevent nonpoint source pollution to surface and groundwater.

NPS pollution, unlike pollution from industrial and sewage treatment plants (also known as point sources), comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, and groundwater.

ADEQ administers Arizona's NPS Program. In Arizona and nationally, investigations have demonstrated that most water quality impairments are due to pollutant loadings from nonpoint sources. A few examples of common nonpoint sources in Arizona include soil erosion caused by stormwater, runoff from abandoned mines, wastes from pets or livestock, road crossings, poorly maintained or failing septic systems, and runoff from impervious areas (urban areas). Instead of establishing additional permit requirements, reductions in nonpoint source pollutant contributions are generally accomplished through technical and financial assistance, training, education, planning, and implementation of water quality improvement projects. This requires grass-roots involvement, effective education and outreach, and active participation of local, state, tribal, and federal agencies. ADEQ takes an integrated approach to NPS management, with programs throughout the Water Quality Division contributing to achieving NPS goals. This plan describes how these programs will work together and with other partners over the next five years to identify, prioritize and address NPS issues. Annual work plans will provide more in-depth details for specific tasks. The document is organized as follows:

Chapter 1: Overview of Arizona's NPS program – internal program descriptions and external partnerships. Identifying all of the tools that Arizona uses to identify and address nonpoint source concerns.

Chapter 2: Background information about Arizona and its NPS concerns.

Chapter 3: Detailed information about updates to the Strategic Planning Table, an overview of the structure of the table, and the table itself.

A. What Influences ADEQ's Goal Development?

The overall mission of Arizona's NPS Program is: "To achieve and maintain water quality standards through the reduction of nonpoint source pollutant contributions to Arizona's surface and groundwater." Three goals are established in this 5-year Plan to achieve this mission:

1. Identify and prioritize NPS threats and impairments
2. Plan and implement actions to prevent and reduce nonpoint source pollution discharges to protect and restore water quality
3. Evaluate state programs, rules, and authorities to protect and restore water quality for effectiveness and potential need for modification.

Each of these goals has specific objectives and strategies (identified in the Strategic Planning Table, found in Chapter 3 of this document) that will be implemented to achieve measurable outcomes over the next five years. Measures of success will include removing waters from the state 303(d) list and satisfying existing ADEQ and EPA performance measures. More information on how ADEQ will specifically measure its success in implementing this plan can be found in Chapter I Section IV.

The main drivers that influenced the development of goals, objectives, and strategies for this 5-year Plan include:

EPA'S CWA SECTION 319 NONPOINT SOURCE PROGRAM GUIDANCE

EPA's Nonpoint Source Program and Grants Guidelines for States and Territories[1] (NPS guidelines) were revised in December 2013. The revisions provide updated program direction, an increased emphasis on watershed project implementation in watersheds with impaired waters, and increased accountability measures. These guidelines also emphasize the importance of states updating their NPS management programs to ensure that CWA Section 319 funds are targeted to the highest priority activities. The guidelines also encourage coordination with state Total Maximum Daily Load (TMDL) programs to identify and prioritize watershed implementation needs, as well as coordination with Farm Bill programs as a way to leverage investments in water quality. The full guidance can be accessed on the EPA NPS website[2].

EPA'S VISION FOR THE CWA SECTION 303(D) PROGRAM

On December 5, 2013, EPA announced a new collaborative framework for implementing the CWA Section 303(d) Program with States — A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program (303(d) Vision).[3]

This 303(d) Vision enhances the overall efficiency of the CWA 303(d) Program, and in particular, encourages focusing attention on priority waters and provides States flexibility in using available tools beyond TMDLs to attain water quality restoration and protection. It reflects the successful collaboration among States and EPA, which

[1] *See* http://water.epa.gov/polwaste/nps/upload/319-guidelines-fy14.pdf
[2] *See* https://www.epa.gov/nps
[3] *See* https://www.epa.gov/tmdl/new-vision-implementing-cwa-section-303d-impaired-waters-program-responsibilities

began in August 2011. EPA looks forward to continuing its partnership with States to implement specific actions to realize the new Program Vision. With the recognition that there is not a "one size fits all" approach to restoring and protecting water resources, States will now be able to develop tailored strategies to implement their CWA 303(d) Program responsibilities in the context of their water quality goals. The primary goals of the 303(d) Vision are "Prioritization", "Assessment", "Protection", "Alternatives", "Engagement", and "Integration". The Vision set a 2022 goal to "evaluate accomplishments of the Vision and Goals"; ADEQ will participate as EPA and states evaluate the implementation of the Vision and determine the next iteration of the Vision.

ADEQ'S STATE FY2020 STRATEGIC PLAN

Beginning in FY20, ADEQ developed an annual rather than a 5-yr Strategic Plan, as was the case for FY14-19. The FY20 Plan's goal for the Surface Water Improvement Value Stream remains to **reduce the number of impaired waters.**[4] The NPS program will play an important role in meeting this goal by directing outreach, implementation and monitoring resources towards reducing pollution and evaluating project success in reducing the number of impaired waters.

B. Changes to the NPS Program

The heart of the 5-year NPS Plan is its strategic approach outlined in the Strategic Planning Table, found in Chapter 3 of this document. The Strategic Planning Table describes in detail how resources will be allocated to achieve the mission of Arizona's Nonpoint Source Program. The Strategic Planning Table is used to develop the annual program workplans, the NPS funds are split into a Performance Partnership Grant (PPG) and a Projects grant (50/50 split of annual allocation).

This 5-year Plan reflects several changes to Arizona's NPS Program. The focus has shifted from working at the watershed scale to focusing on specific projects that will improve water quality with the ultimate goal of delisting impaired waters. Throughout the state fiscal year 2019, ADEQ staff conducted several problem-solving events to identify the top causes of water quality impairment in Arizona, and the root causes contributing to those impairments. Based on this problem solving and root cause analysis, waters impaired for metals were identified as the top priority, followed by E. coli impairments. See Figure 1 for a full depiction of the Value Stream's FY20 priorities.

MAJOR UPDATES TO ARIZONA'S NPS PROGRAM:

- Enhancing technical excellence using new tools
- Direct fund high priority implementation projects
- Seek additional internal and external funds for project implementation
- Implementing new prioritization strategy
- Focused monitoring to identify sources, fill 305(b) assessment datagaps, and determine project effectiveness

[4] *See* http://static.azdeq.gov/about/adeq_fy2020_strategic_plan.pdf

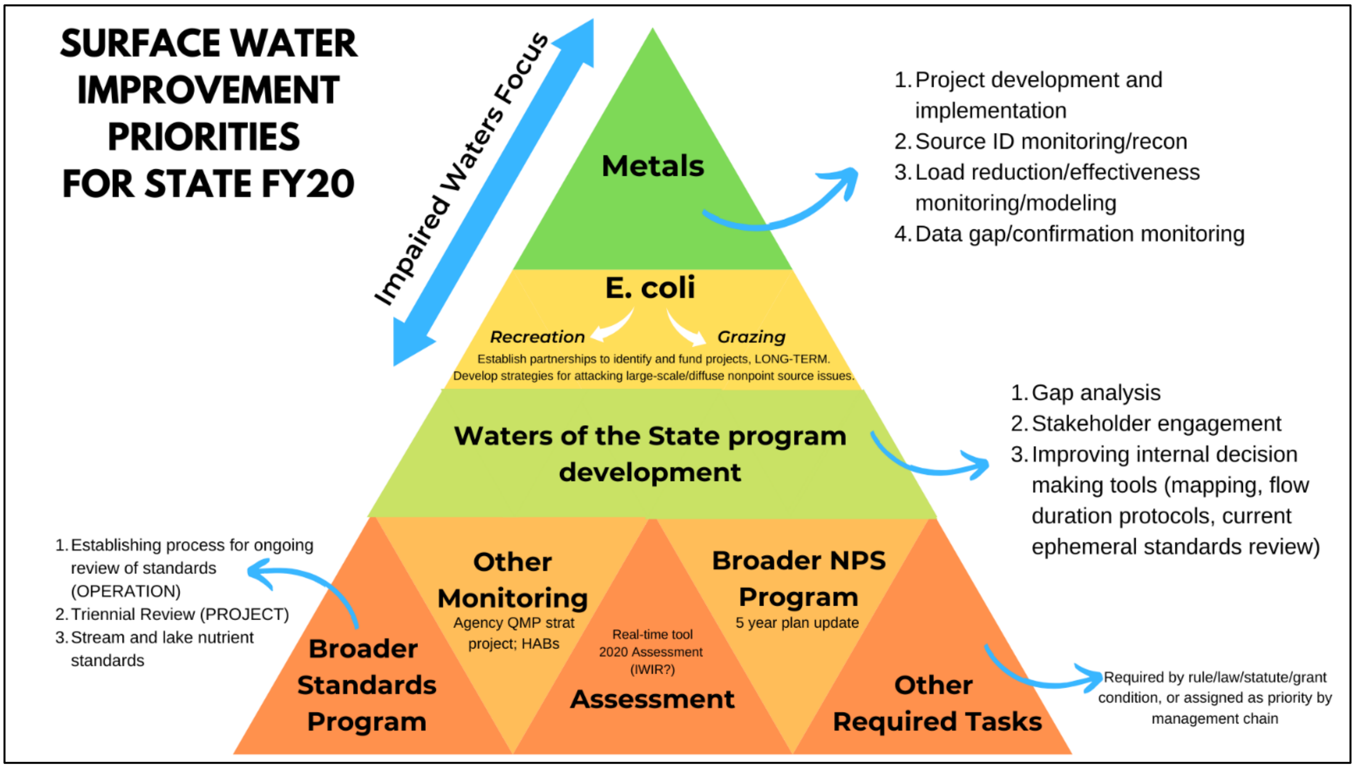

FIGURE 1: SURFACE WATER IMPROVEMENT VALUE STREAM PRIORITIES

While both metals associated with historic mining and E. coli have been identified as priority pollutants causing impairments, the approaches being taken to address them vary. While E. coli impairments in Arizona are frequently associated with watershed-wide, diffuse activities such as recreation or grazing, many metals sources are more discrete, such as tailings piles at abandoned mine sites. As such, ADEQ's approach to E. coli impairments is one of watershed-scale strategy development to realize delists over the long term, while the approach to metals impairments is more driven by priority project implementation to realize shorter-term delists. Figure 2 identifies metals related short-term delist goals and their supporting activities throughout the 5-year plan.

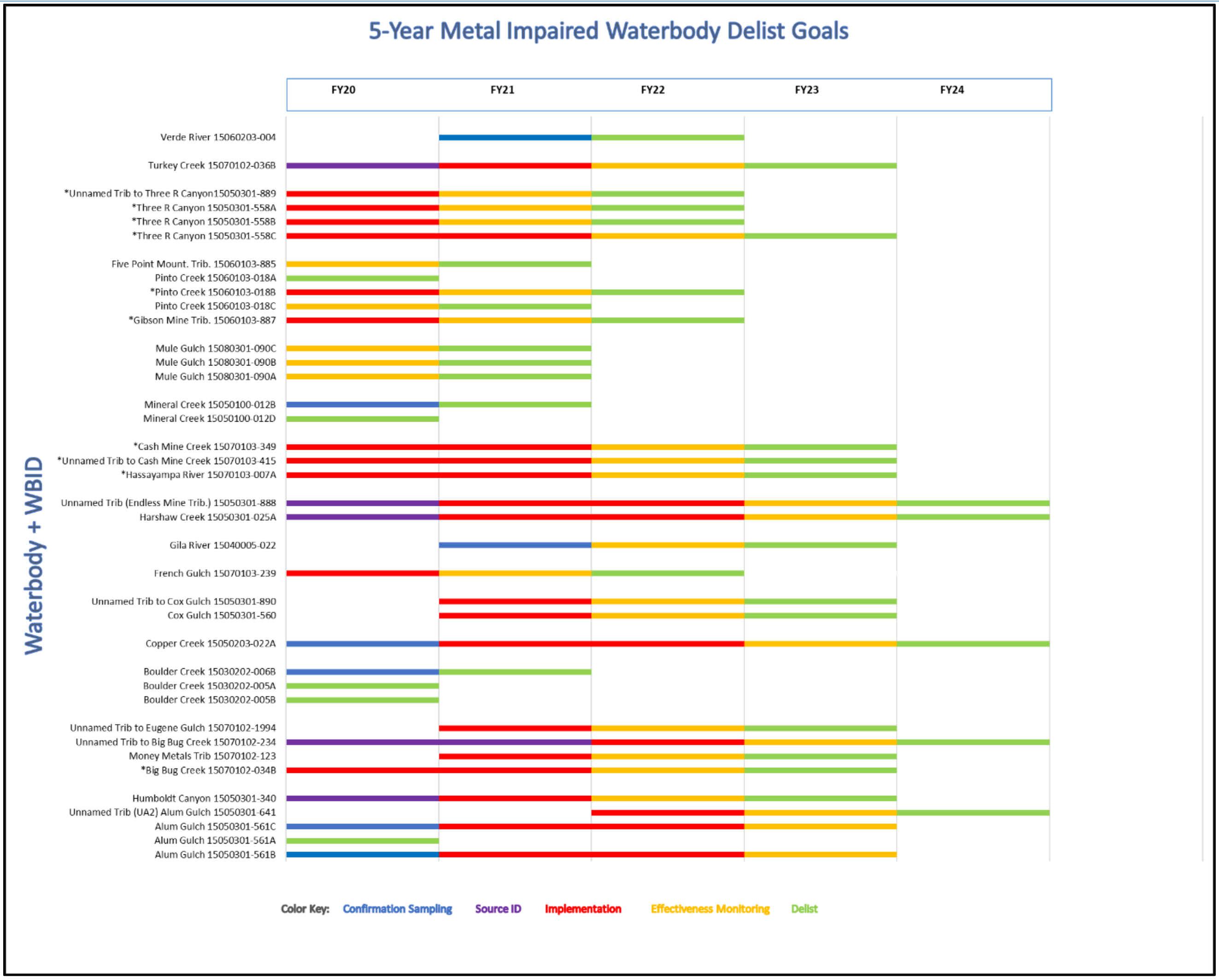

FIGURE 2: 5-YEAR METALS IMPAIRED WATERBODY DELIST GOALS

With the focus on implementing high priority projects, ADEQ has also pivoted to a direct funding approach rather than a competitive grant process. As implementation projects are identified, they are ranked and prioritized based on their impacts on water quality. Projects may be directly implemented in watersheds with an approved 9-Element Watershed Plan by ADEQ capable watershed groups, state agencies, and Native American Tribes. Direct funding of implementation projects may occur when projects are identified that will significantly improve water quality in an impaired water. Realizing that 319 funds are limited in scope and quantity, staff will continue to seek additional internal and external funds for high priority projects identified by both internal and external customers. To maximize the efficiency of water quality sampling activities, the value stream has moved to a holistic approach to fulfilling sampling needs, rather than individual units having their own goals. This will allow an “all-hands” approach to fulfilling high priority data collection needs and provide cross-training opportunities for staff.

CHAPTER I: AN OVERVIEW OF ARIZONA'S NPS MANAGEMENT PROGRAM

I. Process Improvement and the Arizona Management System

Accomplishing the goals established in the 5-year NPS Plan with limited resources in this vast and diverse state requires effective planning followed by a continuous cycle of implementation, progress assessment, and adaptive management. Arizona's 5-Year NPS Plan is guided by an emphasis on a watershed management approach, integration amongst programs to protect and restore water quality, and a commitment to streamlining processes to maximize efficiency. This plan aims to create more direct paths to the restoration of water quality in lakes and streams identified as "impaired" waters, protect waters that are meeting water quality standards (high-quality waters), and reduce pollutant loading to groundwater in areas where state aquifer water quality standards are being exceeded. These outcomes are a reflection of ADEQ's continued implementation of the Arizona Management System (AMS) principles.[5]

AMS is a system of tools and principles geared toward eliminating waste and increasing value for customers. It is a way to improve systems and processes to eliminate unnecessary, time-consuming steps and wasteful time-killers that reduce the capacity to focus on what matters most. This is accomplished by continuously improving ADEQ's processes using the Deming Cycle, Figure 3.

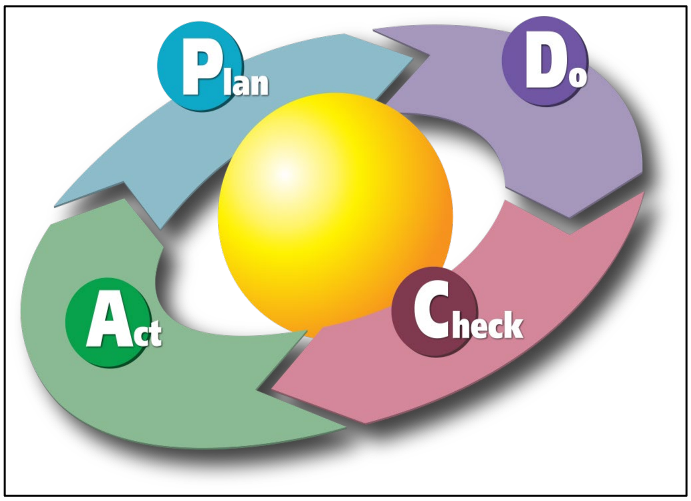

FIGURE 3: PLAN, DO, CHECK ACT - THE DEMING CYCLE

Visual management and standard work are important tools within AMS that are employed at ADEQ. Visual Management tools are designed to keep everyone informed of how the process is performing against agreed-upon measurements, what the process is, and whether or not it's being adhered to. When problems or "andons" are found, they are promptly raised, analyzed through problem-solving and countermeasures are implemented.

Standard work is the documented current single best way to perform a process. The three tenets of standard work are that they have agreed upon steps, be visual and visible at the point of use, and be readily updated. Standard work answers the who, what, when, where, why, and how of a process. It is used for training new employees and is a reference for trained employees. Standard work creates a standard or baseline for improvement and is a key element for visual management process adherence. As processes are continuously improved, standard work is updated to the current best way to perform a process, Figure 4.

[5] *See* https://ams.az.gov/

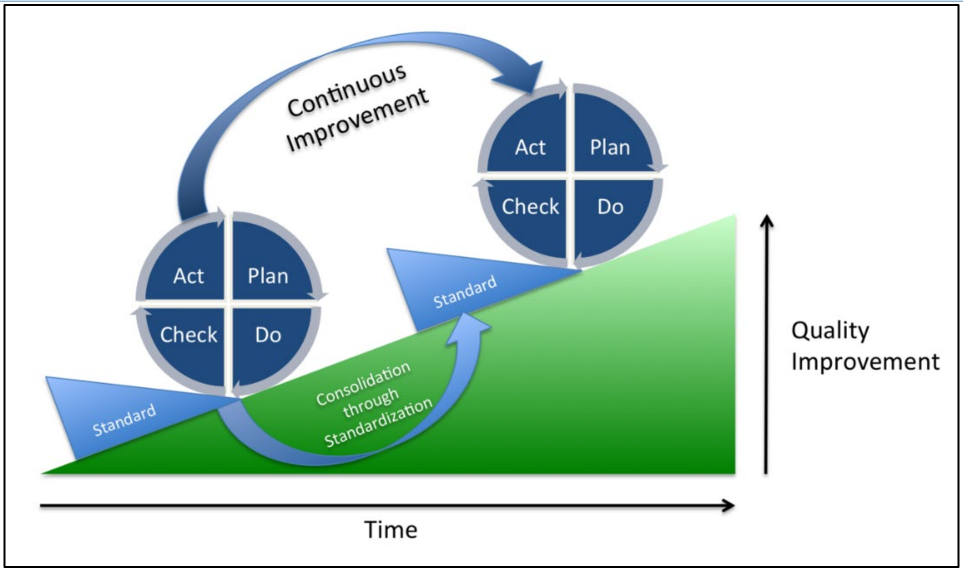

FIGURE 4: STANDARD WORK IS UPDATED AS IMPROVEMENTS TO THE PROCESS ARE MADE

II. Cross-program Coordination: Arizona's Integrated Nonpoint Source Program

A. Integration with Water Quality Division Programs

Programs and teams across ADEQ's Water Quality Division share responsibilities for implementing portions of the Nonpoint Source Program (Figure 5). Integration encourages interactions, even with programs that control point source discharges to surface water. In a given fiscal year, the programs that are funded by NPS or used as a match for NPS funds may vary. Subsequently, many of these programs perform functions that may not be directly tied to NPS funds, but still provide benefits to the NPS program. Annual PPG grant work plans should be consulted for up-to-date information regarding funding allocations. This section includes information on each of the five parts of the cycle depicted below and the programs that contribute to them.

FIGURE 5: ARIZONA'S NPS GOALS ARE ACHIEVED VIA THE COORDINATION OF MANY PROGRAMS

STANDARDS DEVELOPMENT

States, rather than the federal government, propose and codify water quality standards for surface and groundwater. Standards are set based on how the water is used – "designated uses." In Arizona, groundwater is protected for drinking water use; therefore, aquifer water quality standards echo public drinking water quality standards established under the Safe Drinking Water Act. Surface water quality standards, supported by federal recommendations, are developed to protect the health of Arizona's streams and lakes. EPA-approved narrative and numeric standards are applied to protect the following designated uses:

- Aquatic and wildlife
  - Cold water communities (above 5,000 feet in elevation)
  - Warm water communities (below 5,000 feet in elevation)
  - Ephemeral (channel dry except in direct response to precipitation)
  - Effluent Dependent Water (ephemeral conditions except for treated effluent)
- Full body contact (swimming) or partial body contact (incidental contact only)
- Fish consumption (human consumption of aquatic life)
- Domestic water source (drinking water)
- Agricultural livestock watering
- Agricultural irrigation

Types of Water Quality Standards

Numeric criteria are water, sediment, or animal tissue concentration thresholds for chemical parameters and physical conditions that must be achieved (for example, a maximum chemical concentration).

Narrative standards describe conditions that must be maintained. For example, "A surface water shall be free from pollutants in amounts or combinations that…(5) are toxic to humans, animals, plants, or other organisms" *(Arizona Administrative Code R18-11-108(A)(5))*.

Biocriteria use the number and kinds of biological organisms in the surface water to assess its biological integrity or its health.

Arizona's current water quality standards can be downloaded from the Secretary of State's website.[6]

WATER QUALITY MONITORING

ADEQ has both surface water and groundwater quality monitoring programs as required by ARS 49-225.[7] Where possible, water quality studies are conducted in collaboration with other monitoring programs (U.S. Geological Survey, Sonoran Institute, Salt River Project). Information about these monitoring programs is available on ADEQ's website.[8]

»Surface Water monitoring

Water quality data are collected to assess surface water's chemical, biological, and physical integrity. This allows ADEQ to characterize baseline conditions, to assess waters for standards attainment or impairment, to conduct trend studies, to determine reference conditions, and to develop new water quality standards. ADEQ's surface water quality data is uploaded to EPA's Water Quality Exchange on a daily basis making it availalble via the Water Quality Portal.

This 5-year Plan reflects the adoption of a surface water monitoring strategy that will focus on value stream resources on the collection of water quality data to identify pollutant sources, measure effectiveness and fill assessment data gaps. The data collected will prioritize pollutant sources that are contributing to water quality impairments for implementation, increase the percentage of waters for which assessment determinations can be made, and show the improvement in surface water quality to ultimately delist impaired waters.

ADEQ's Comprehensive Monitoring Strategy is a document that provides a vision and strategic direction for ADEQ's water quality monitoring programs per EPA's *Elements of a State Water Monitoring and Assessment Program* (EPA, March 2003), the Clean Water Act (CWA) and Arizona law. The Comprehensive Monitoring Strategy will be updated this planning cycle to reflect the strategy described above, and make recommendations to fill any gaps to support data collection, nonpoint source pollution reduction, and waterbody delist goals.

Probabilistic monitoring provides an unbiased assessment of a waterbody. One of the strengths of probabilistic monitoring is the ability to look at the impact of all parameters on macroinvertebrates, fish or algae. This includes parameters that may not have a water quality standard or implementation procedures such as turbidity and

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[6] *See* http://apps.azsos.gov/public_services/Title_18/18-11.pdf
[7] *See* http://www.azleg.gov/ArizonaRevisedStatutes.asp?Title=49
[8] *See* http://www.azdeq.gov/wqd

bottom deposits, both of which are important indicators for non-point source pollution in Arizona. ADEQ will conduct probabilistic sampling on fish tissue and a selected waterbody type during this 5-yr NPS Plan. The data collected can be used to determine the overall safety of consuming fish from Arizona's lake and indicate the pollutants impacting Arizona's streams and rivers.

Arizona's size and arid climate can pose challenges to the collection of water quality data in intermittent and ephemeral waters. To increase ADEQ's ability to collect samples from these types of waters, ADEQ has implemented several new strategies in recent years, including partnering with agency meteorologists to forecast rainfall amounts at priority sites and the development of remote environmental monitoring (REM) tools that alert staff when field equipment is triggered by flows. Also, staff has implemented strategies that explore alternative methods of gathering pollutant and project effectiveness data, such as utilizing drones to evaluate vegetation growth post-implementation and x-ray fluorescence (XRF) to identify "hot spots" of potential metals on the landscape. Activities to expand upon these efforts and continued application of new technology are described in section 1.1.4 of the Strategic Planning Table.

New to this 5-Year Plan!
Enhancing technical excellence using new tools

»Groundwater Monitoring

ADEQ's Groundwater Protection value stream conducts ongoing monitoring of aquifers to detect the presence of pollutants and determine changes in contamination, compliance with aquifer water quality standards, and effectiveness of best management practices (BMPs).

Historic ADEQ ambient groundwater sampling was conducted and reported by the groundwater basin. Based on the groundwater sampling results and statistical analyses, index wells are selected for re-sampling to determine water quality changes over time (trends). Fact sheets and completed basin studies can be viewed on the ADEQ website.[9]

»Biocriteria

The biocriteria program monitors benthic macroinvertebrates in Arizona's perennial streams. Biological assemblages provide a different picture of water quality than chemical data. Chemical data tends to give a snapshot of what is happening at the time of sample collection, while biocriteria describe how healthy a biological community (for example macroinvertebrates or fish) is over a longer period. During this 5-year planning period, ADEQ will focus on biocriteria data collection on supporting the determination of the effectiveness of metals remediation projects. As surface water quality improves, the macroinvertebrate community should also show improvement.

WATER QUALITY ASSESSMENTS

The Integrated 305(b) Assessment and 303(d) Listing Report (Integrated Report) is completed every two years to detail the status of surface water and groundwater quality in Arizona. The Integrated Report contains a list of Arizona's impaired surface waters (Category 5) and those that are not attaining standards (Category 4—surface waters previously designated as impaired for which either a TMDL has been approved or a plan is being

[9] *See* https://azdeq.gov/groundwater-protection

implemented to attain water quality standards by the next assessment cycle). This report fulfills requirements of the Clean Water Act sections 305(b) (assessments), 303(d) (impaired water identification), 314 (status of lake water quality), and 319 (identification of nonpoint source impacts on water quality). Information concerning this program and the latest assessment and impaired waters list can be found at ADEQ's website.[10]

Monitoring data from all readily available sources are used for assessments, including data from volunteer monitoring groups, grantees doing effectiveness monitoring, other agencies, and permitted dischargers. ADEQ works with outside monitoring entities to assure that all data used is scientifically defensible and meets Arizona's credible data requirements (A.A.C. R18-11, Article 6).[11]

As indicated in the Standards Development sub-section above, a lake or stream reach can have between two and six designated uses. Each designated use is assessed based on the number of times surface water quality standards were exceeded. If sufficient core parameter samples were collected and no/an acceptable number of exceedances exist, then the designated use can be assessed as "attaining." If sufficient exceedances exist, then the designated use can be assessed as "impaired," regardless of whether sufficient core parameter samples were collected. Once each designated use has been assessed, then the surface water is assessed as being in one of the five categories shown in Table 1.

TABLE 1 – ASSESSMENT CATEGORIES

Category Number	Category	Description
1	Attaining All Uses	All uses were assessed as "attaining uses", all core parameters monitored
2	Attaining Some Uses	At least one designed use was assessed as "attaining," and no designated uses were not attaining or impaired
3	Inconclusive or Not Assessed	Insufficient samples or core parameters to assess *any* designated uses
4	Not Attaining	One or more designated use is not attaining, but a TMDL is *not* needed
5	Impaired	One or more designated use is not attaining, and a TMDL is needed

Surface water would be placed in category 4 instead of category 5 if a TMDL has been adopted and strategies to reduce loading are being implemented (4a) or if a TMDL-alternative has been adopted so that standards will be met in the near future (4b). Note that this 5-year NPS Plan establishes new strategies in Chapter 3 that when implemented are intended to result in delisting impairments listed for waters in categories 4 and 5.

ADEQ has developed real-time assessment capabilities allowing ADEQ to determine exceedances of SWQS as data is entered and data needs to fully comfirm the impairment or attainment of designated uses. Continuous data evaluation allows ADEQ to make for informed decisions. For example, if a stream is attaining standards after implementing several priority projects it may negate the need to implement additional projects allowing ADEQ to strategically reevaluate resource allocations. In the FY20-24 planning cycle, staff will work to re-evaluate internal and external real-time assessment tools to develop an enterprise, IT-supportable solution. Real-time assessment

[10] *See* https://azdeq.gov/programs/water-quality-programs/surface-water-monitoring-and-assessment
[11] *See* http://apps.azsos.gov/public_services/Title_18/18-11.pdf

of water quality allows ADEQ to identify problems and prioritize resources based on the most currently available data.

TOTAL MAXIMUM DAILY LOADS (TMDLS) & WATERSHED IMPLEMENTATION PLANNING

A TMDL is the maximum amount (load) of a parameter which can be carried by surface water daily, without causing an exceedance of surface water quality standards and a loss of supported designated uses (e.g. primary contact, aquatic life). A TMDL must be prepared for each surface water listed as impaired unless other actions are being taken that will result in the surface water meeting standards (see discussion above about category 4 or 5). Calculating a TMDL is an important first step in planning what needs to be done in a watershed and/or waterbody to attain water quality standards.

A TMDL is the sum of the load allocations (LAs) plus the sum of the wasteload allocations (WLAs) plus a margin of safety (MOS): $TMDL = \sum LA + \sum WLA + MOS$

Load allocations include nonpoint source pollutant contributions, like loads from runoff from fields, streets, rangeland, or forest land. The natural background level of a contaminant is included in the load allocation for nonpoint sources. Wasteload allocations include point source contributions, like the loads from sewage treatment plant discharges and mine adit discharges. Load allocations and wasteload allocations are based on historic and recent water quality measurements and other environmental information. Once a TMDL is calculated, necessary load reductions are determined by comparing the TMDL to the total measured or modeled load on a source-by-source basis. The margin of safety is included in the calculation to account for uncertainty between the calculation and real life.[12]

TMDL development has long supported many aspects of the Nonpoint Source Program. Monitoring to identify source categories (such as septic systems, grazing, or urban runoff) is used to target key remediation projects. The data can also identify critical conditions when exceedances tend to occur. Critical conditions may be climactic (summer, winter, monsoons), hydrologic (high flows, low flows), or event-based (discharges, spills). These conditions must be considered when identifying strategies to reduce loading and when performing effectiveness monitoring.

ADEQ continues to implement EPA's 2013 303(d) Vision goals, described in Section 1 and will participate in the ongoing discussions related to Vision evaluation and potential updates.

IMPLEMENT WATER QUALITY IMPROVEMENT STRATEGIES

ADEQ utilizes many different avenues to address sources of water quality pollution. This section provides information on the Water Quality Improvement Grant program, nonpoint source education and outreach, the Aquifer Protection program, and nitrogen management areas.

»Water Quality Improvement Grant Program

The Water Quality Improvement Grant Program is a reimbursement-based grant program that allows watershed partnerships, landowners, state agencies, local governments, universities, and other entities to leverage their money and resources on projects and activities that will quantifiably reduce nonpoint source pollution in Arizona water bodies. Water Quality Improvement Grants are sub-awards of Arizona's CWA Section 319 funding from EPA. All projects must include methods for measuring success and follow EPA's 2013 Nonpoint Source Program

[12] *See* https://www.epa.gov/tmdl/developing-total-maximum-daily-loads-tmdls

and Grants Guidelines for States and Territories.[13] EPA requires that nine-element watershed-based plans (WBPs) be developed prior to implementing project(s) funded with Clean Water Act §319 funding. The strategic plan in Chapter 3 outlines strategies to expand funding eligibility to not just restoring but also protecting water quality in high-quality or threatened waters.

States must provide a 40 percent non-federal match in order to receive federal NPS funds. ADEQ has historically required that grantees provide a 40 percent non-federal match for all NPS grant funds that they receive via ADEQ's Water Quality Improvement Grant Program. Many grantees are nonprofits, individual landowners or federal agencies. Requiring a 40 percent match from these entities proved challenging or impossible for them, resulting in funding not being pursued for high priority projects. Additionally, when ADEQ direct funds a high priority project, the match requirement must still be met as it applies to all NPS funds that ADEQ receives whether distributed it through a competitive grant process or not. As a countermeasure to requiring a 40 percent match on all awarded grant funds, ADEQ has identified several other mechanisms that can be used match the NPS funds:

- Use a percentage of ADEQ personnel working on NPS and apply match codes to their state funds and count that small percentage towards match of an NPS grant during the first year that the grant is awarded to ADEQ
- Develop a tracking system to use state funds already existing within ADEQ that are used for NPS projects and apply those towards ADEQ's match requirement
- Develop a tracking system with WIFA to use calculate "payback" of borrowed funds from a WIFA NPS grantee as match towards ADEQ 319 funds and projects.

» Direct Fund High Priority Implementation Projects

Historically ADEQ's NPS program has employed a competitive grant process to request proposals for 319 grant awards. In the last 5 years, ADEQ focused these requests for proposals to projects that would improve impaired waters. However, that focus has not resulted in the type of projects that have made widespread, significant improvements in water quality. In the spirit of continuous improvement, ADEQ evaluated the competitive grant process and determined that if ADEQ worked with partners to identify and develop high priority projects we would achieve greater results rather than soliciting projects. Coordination with local external partners and stakeholders will continue as new high priority projects are identified. We will also continue to work with other state and federal agencies to ensure that implementation and outreach efforts are coordinated and mutually beneficial.

New to this 5-Year Plan!
Direct fund high priority implementation projects.

Rather than award all 319 funds through a competitive grant process, ADEQ will direct-fund eligible, high-priority projects as they are identified. We have developed an internal review and approval process that requires projects to have quantifiable load reductions before implementation. If the reductions are not quantifiable pre-implementation, there must be a plan and commitment to determine those reductions post-implementation. All directly funded projects must address nonpoint source water quality priorities

[13] *See* https://www.epa.gov/sites/production/files/2015-09/documents/319-guidelines-fy14.pdf

identified in this plan, be supported by a watershed plan that meets EPA's 9 key elements,[14] and be approved by the Water Quality Division director. In priority areas where a 9 key element plan does not exist and 319 funding will be used ADEQ will work with EPA Region 9 to streamline the development of a plan to fulfill all requirements and facilitate timely implementation. EPA requires ADEQ to obligate 319 funds within a year of receipt. If, within 6 months of receipt, ADEQ anticipates that 319 funds will not be obligated within a year using the direct-fund approach, ADEQ will hold a competitive grant process or develop another approach to obligate remaining funds.

»Seek Additional Internal and External Funds for Project Implementation

ADEQ and EPA have successfully invested over $20 million in Arizona since the inception of the NPS program. However, ADEQ realizes that 319 funds alone cannot address all of the water quality issues in Arizona. NPS pollution is too widespread to be addressed with limited 319 funds and not all priority projects are eligible for 319 funding.

New to this 5-Year Plan!
Seek additional internal and external funds for project implementation

Beginning in FY19, ADEQ sought additional internal and external funds for project implementation. ADEQ leveraged several million dollars in state funds to implement the cleanup of the Hillside Mine tailing pile and adit discharge, in addition to funding preliminary assessments at the 3R Mine and Poland Walker Tunnel sites. Staff will also seek external funding opportunities for both high-priority internal and external implementation projects.

ADEQ will continue to develop a "funding toolbox" by identifying external grants that ADEQ or stakeholders can apply for, leveraging 319 funds with additional or external and internal funds and seeking new sources of funding for project implementation.

»Aquifer Protection Permits (APP)

Arizona has a unique and effective program for protecting groundwater. Anyone owning or operating a facility that discharges a pollutant directly to an aquifer, to the land surface, or the vadose zone (the area between an aquifer and the land surface) in such a manner that there is a reasonable probability that the pollutant will reach an aquifer must obtain an Aquifer Protection Permit. The following facilities are considered to be "discharging" and require either a general or individual permit:

- Surface impoundments, pits, ponds, and lagoons
- Solid waste disposal facilities
- Injection wells
- Land treatment facilities
- Facilities adding pollutants to a salt dome, salt beds, or salt formations, drywells, underground caves, or mines
- Mine tailings piles and ponds, or mine leaching operations
- Underground water storage facilities, if wastewater-effluent is used

[14] *See* https://www.epa.gov/sites/production/files/2015-12/documents/watershed_mgmnt_quick_guide.pdf

- Sewage or wastewater treatment facilities, including point source discharges to navigable waters and onsite wastewater treatment systems (e.g., septic systems).

Rules implemented under this program govern a variety of nonpoint pollutant sources which are not regulated under the Clean Water Act or other federal laws, such as:

- Onsite wastewater treatment systems (septic systems)
- Stockpiles at mining sites
- Certain wastewater discharges (constructed wetlands, reclaimed water reuse)
- Grazing
- Nitrogen fertilizer use for crop production
- Concentrated animal feeding operations (not discharging to a surface water)

The APP program further assists in nonpoint source activities by providing technical support for nonpoint source-funded projects. Examples include participating in technical reviews for nonpoint source grant applications, conducting engineering reviews for grant-funded treatment system installations and upgrades, and coordinating with grant staff to ensure that permit reviews and approvals are completed in a timeline consistent with the grant agreement. Also, surface and groundwater staff will continue to coordinate and share knowledge where source identification or remediation approaches apply to both programs.

»401 Certification/404 Permitting

CWA Section 401 states that no federal permit or license may be issued that may result in a discharge to waters of the US unless the EPA, State, or tribal authority certifies that the discharge is consistent with water quality standards and other water quality goals, or waives certification. Failure to secure a 401 certification or waiver means that the federal permit or license cannot be obtained. Applicants seeking the following are required to obtain a CWA Section 401 Water Quality Certification from ADEQ:

- A CWA Section 404 Permit[15] from the U.S. Army Corps of Engineers (USACE)
- A Rivers and Harbors Act Section 9 or 10 Permit[16]
- A license from the Federal Energy Regulatory Commission[17] for a hydropower facility, or
- Other federal permit or license that may result in a discharge to waters of the U.S.

Under the CWA 404 Program, the USACE has both individual and general permits. General permits can be issued for use in all states (known as Nationwide Permits) or for a region of the country (known as Regional General Permits). An individual permit is required for projects that potentially have significant impacts. Individual permits require an application form describing the proposed activity to be submitted to the USACE. Once the application is complete, the USACE issues a public notice containing the information needed to evaluate the likely impact of the activity. Notice is sent to all interested parties including adjacent property owners, government agencies and others who have requested notice. A hearing may be requested for cause. It is during the public notice of the individual permit that ADEQ performs its CWA Certification review. The issuance of certification means that ADEQ expects that the applicant's project will comply with state surface water quality standards.

[15] *See* http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx
[16] *See* http://www.sam.usace.army.mil/Missions/Regulatory/RegulatoryFAQ/RiversandHarborsAppropriationActof1899.aspx
[17] *See* http://www.ferc.gov/about/ferc-does.asp

»Groundwater Source Protection

In addition to the APP program, the Pesticide Groundwater Quality Protection Program also protects Arizona's groundwater from nonpoint source pollution by preventing or eliminating the pollution of groundwater aquifers from the routine use of agricultural pesticides. The program is responsible for evaluating groundwater data submitted in support of new pesticide product registration, and identifying which active ingredients and products have the potential of polluting Arizona groundwater. The program generates the Groundwater Protection List (GWPL), enforces any data gap violations and conducts regular groundwater monitoring. An annual report on pesticide use is presented to the state legislature.

Under the Environmental Quality Act of 1986, ADEQ requires applicants proposing to register new agricultural-use pesticides with the Arizona Department of Agriculture to submit groundwater protection data for review and approval. After completing a substantive technical review, ADEQ determines if the product's active ingredient poses a threat to groundwater quality.

The term "agricultural use" is defined to include all applications of substances to repel, kill or control any "pest". This includes weeds, insects, rodents, fungi, and microorganisms in the following areas:

- Commercial greenhouses
- Cropland
- Food and fiber production
- Forests
- Irrigation ditches
- Rangeland
- Ground applied seed protection
- Soil fumigation
- Tree and sod farms
- Aquatics

All pesticide product data submitted to ADEQ, including the product chemistry and environmental fate studies of the corresponding active ingredient(s) must be consistent with EPA guidelines for these studies and comply with Arizona environmental (soil) requirements. ADEQ will evaluate the data submitted by applicants, determine their adequacy, validity, and completeness, and inform the intended registrant of the outcome within specific time frames for administrative completeness and substantive technical review.

»Bio-solids Management Program

Biosolids are the treated residuals from wastewater treatment that can be used beneficially. Sewage sludge is not referred to as biosolids unless it has been treated so that it can be beneficially used. On March 31, 2004, the EPA Region 9 approved ADEQ's Biosolids/Sewage Sludge Management Program for implementation in Arizona, except in Indian Country. As of that date, ADEQ serves as the sewage sludge program and enforcement authority in Arizona. The EPA maintains an oversight role.

ADEQ's Biosolids/Sewage Sludge Management Program implements section 503 of the Clean Water Act and requires that any person applying, generating or transporting biosolids/sewage sludge in Arizona must register that activity with the department. Biosolids, if not applied properly, have the potential to contribute nutrients and other pollutants to surface and groundwater. If ADEQ determines that the site restrictions and management practices will not protect public health or the environment, ADEQ may require an Arizona Pollutant Discharge Elimination System (AZPDES) Permit.

The Biosolids Program is regulated under A.A.C. R18- 9-A10.[18] and includes requirements for:

- Treatment, transportation, land application, and management of biosolids
- Septage pumping services
- Class I Management Facilities, other major wastewater treatment plants, and treatment works treating domestic sewage
- Management practices and application of biosolids to reclamation sites

In addition to complying with the requirements in 40 CFR 503, Subpart C, the owner or operator of a biosolids surface disposal site must apply for an APP. Other facilities that must apply for an APP include biosolids composting operations and biosolids processing facilities.

»Nitrogen Management Areas

Arizona has rules in place to designate Nitrogen Management Areas to control nitrogen pollutant loading to groundwater (A.A.C.R18-9-A317(c)).[19] ADEQ may establish a Nitrogen Management Area when existing conditions or trends in nitrogen loading to an aquifer will cause or contribute to an exceedance of the aquifer water quality standard for nitrate. The following restrictions occur within a designated Nitrogen Management Area:

- Agricultural BMPs to reduce nitrogen discharges are required
- Performance of impoundment liners installed before November 12, 2005, must be assessed
- A new onsite wastewater system must employ technologies that achieve a discharge of not more than 15 mg/L of total nitrogen (i.e., a nitrogen reducing, or alternative treatment system is required)
- Additional special provisions may be established as needed

The connection between shallow groundwater and surface water cannot be ignored. Therefore, when surface water is impaired by nutrients (nitrogen and phosphorus), ADEQ may investigate whether the aquifer water quality standards are being met and if the establishment of a Nitrogen Management Area is warranted.

B. Other Federal, State, Tribal, and Local Partnerships

Clean water is everyone's responsibility. It will take a concerted effort to achieve clean water over the long term. Individual homeowners, businesses, municipalities, non-governmental organizations, and state and federal agencies all have a role to play in protecting and restoring clean water.

Arizona uses a variety of formal and informal mechanisms to form and sustain partnerships with State, Tribal, regional, and local entities, private sector groups, and Federal agencies to help implement the NPS Program. Examples include memoranda of understanding (MOU) and other cooperation agreements, letters of support, intra-state agency agreements, cooperative projects, environmental reviews and meetings to share information and ideas. Cooperation agreements such as MOUs are particularly beneficial to the NPS program in that they define clear commitments on behalf of ADEQ and partners to work towards common goals. Examples of these commitments include granting access for monitoring and implementation activities, reporting on land

[18] *See* http://www.azsos.gov/public_services/title_18/18-09.htm
[19] *See* http://www.azsos.gov/public_services/title_18/18-09.htm

management activities that might impact impaired waters, and submitting changes in land management planning to ADEQ for review and comment. These agreements ensure that ADEQ and its partners are consciously working toward common goals with water quality protection and restoration.

This section highlights some of the partnerships that ADEQ participates in to ensure that nonpoint source concerns are prioritized and addressed throughout the state of Arizona.

NATIONAL WATER QUALITY INITIATIVE

EPA and the United States Department of Agriculture's Natural Resource Conservation Service (NRCS) initiated the National Water Quality Initiative (NWQI) in 2012. The NWQI encourages state and federal level coordination between nonpoint source funded programs and the NRCS-managed conservation programs such as the Environmental Quality Incentives Program (EQIP). ADEQ developed a strong relationship with Arizona NRCS staff, identifying joint priority watersheds for NPS and EQIP funding, encouraging stakeholder involvement in these programs, and coordinating resources to monitor the success of projects implemented under the initiative. ADEQ has established an MOU with the state NRCS office to outline commitments toward meeting NWQI goals. This includes ADEQ entering into a Conservation Cooperator agreement, which acknowledges the protections afforded to Farm Bill funding program participants under Section 1619 of the bill.

In FY19, the Arizona NRCS informed ADEQ that they withdrew all of their current NWQI watersheds due to low participation by NRCS cooperators. On April 8, 2020, the NRCS released a national bulletin requiring states to participate in the NWQI, and to submit at least 3 watersheds for NWQI participation by July 3, 2020 for FY2021.[20] ADEQ will work with the state conservation office to find new watersheds that meet the intent of the NWQI program and have a significant number of potential program participants and incorporate ADEQ effectiveness monitoring of NRCS practices into annual monitoring plans as required.

CROSS-BORDER COORDINATION

The Office of Border Environmental Protection (OBEP) is a specialized branch of the ADEQ Director's Office that focuses on the border region of Arizona across the boundary from the Mexican state of Sonora and is located in Tucson at the agency's Southern Regional Office. OBEP's emphasis is on cross-border or trans-boundary issues that impact Arizona's environment and its citizens. This entails working in a bi-national and bicultural setting to facilitate efforts aimed at improving air quality, waste management, and water quality conditions in Arizona border communities. These efforts are further supported through ADEQ's collaboration with other organizations and programs addressing environmental issues along the U.S.-Mexico border region. For purposes of projects or activities undertaken by OBEP, this area is defined in the 1983 La Paz Agreement[21] as a 100 kilometer (62.5 miles) buffer zone on either side of the international boundary between the United States and Mexico. OBEP staff assists the NPS program by working closely with partners on both sides of the border to identify water quality threats and strategies for addressing them. OBEP provides education, outreach and technical support and assists in TMDL development, watershed planning, and groundwater monitoring activities.

UNIVERSITY PARTNERSHIPS

[20] See National Bulletin 300-20-21, National Water Quality Intiative (NWQI) Watershed and Source Water Protection Area Section and Criteria for Planning and Implementations Phases of NWQI Fiscal Year 2021, issued by Jimmy Bramblett, April 8, 2020

[21] *See* https://www.epa.gov/sites/production/files/2015-09/documents/lapazagreement.pdf

Arizona's NPS Program has historically collaborated extensively with the University of Arizona (UofA) to fund efforts that provided technical support and education to watershed stakeholders. These efforts included water quality monitoring and data analysis, education and outreach efforts focused on priority watersheds, load reduction modeling for planning and reporting purposes, technical assistance to Water Quality Improvement Grant recipients, and developing a volunteer monitoring program. ADEQ will continue to work with the UofA on implementation project load reduction modeling but is seeking to expand our partnerships across Arizona. ADEQ is collaborating with USDA Agricultural Research Service to conduct data collection in the Walnut Gulch experimental watershed to develop sediment versus E. coli rating curves to help determine load reductions from rangeland management implementation projects. ADEQ has also had preliminary discussions with Arizona State University to partner on E. coli and metals transport studies in arid stream systems. These collaborations, and others, will continue to be expanded upon during this 5-yr NPS Plan.

TRIBAL PARTNERSHIPS

Waters on tribal lands are not assessed by the state and are not included in the development of the 305(b)/303(d) Integrated Report. This fact, combined with Arizona's focus on restoring waters that are assessed as impaired, has limited the potential for extensive partnerships with tribal entities in recent years. Arizona's NPS program will coordinate efforts with ADEQ's Tribal Liaison, EPA Region 9, and tribal contacts to identify and act upon opportunities for partnerships where tribal lands influence or are influenced by water quality impairments, as well as new opportunities to coordinate on protection activities moving forward. Annual state work plans will identify more specific partnership goals as these opportunities develop.

LOCAL PARTNERSHIPS

Due to the non-regulatory nature of Arizona's NPS Program, a high level of importance is placed upon encouraging voluntary participation in watershed planning and implementation efforts. An informed, involved public is a critical part of making nonpoint source improvements to water quality. Arizona's NPS Program has provided funding to watershed groups to lead local monitoring efforts and develop watershed plans, and provided technical support via internal programs and partnerships. In addition to providing education to the public, strong partnerships help educate ADEQ about local concerns and priorities while enabling ADEQ to make stronger connections between those concerns and ADEQ water quality improvement goals.

III. Prioritization

A. Coordinated Prioritization Strategies

Prioritization is important. Spreading resources all over the state without defined focus does not achieve the measurable results that the NPS Program is required to demonstrate at the agency division, state, and federal levels. ADEQ has committed to an approach of identifying high priority projects and building partnerships to determine what needs to be done to address the problems in those areas and implementing strategies to restore/protect accordingly.

Having an integrated NPS Program means that many different factors must be taken into consideration when prioritizing nonpoint source activities. In addition to coordinating CWA Section 319 and 303(d) goals as described above, Arizona's NPS Program coordinates between internal programs to look at water body and watershed prioritization based on many factors, including:

- Identified Value Stream FY20-24 Priorities (metals and E. coli)
- Human health concerns

- Impacts to perennial and intermittent streams
- Ecosystem health including ecological risk
- The vulnerability of the surface or groundwater to additional environmental degradation
- Likelihood of achieving demonstrable environmental results
- The extent of alliance with other state and federal agencies to coordinate resources and actions

New to this 5-Year Plan! Implementing new prioritization strategy

As discussed in the Executive Summary, ADEQ has clarified our priorities to focus staff and resources on delisting impaired waters. Our highest priorities are metal impairments followed by E. coli impairments based upon the number of impairments posing potential human health risks on perennial and intermittent waters. Projects that protect human health, regardless of the source of impairment, will be prioritized for implementation.

Historic, inactive mines occur across Arizona and are the main sources of metals degrading water quality. Current high priority projects include the 3R Mine, Poland Walker Mine, McKinley Mill, and the Storm Cloud Mine. As additional sites are identified, they will be ranked and prioritized for remedial actions. ADEQ has several options for addressing these sites, ranging from voluntary to compliance with enforcement actions. As part of the focus on metal impairments, ADEQ is seeking to establish alternative and sustainable internal and external funding sources to remediate mine sites.

The main sources of E. coli in Arizona are related to land management activities, recreation and failing septic systems. This 5-year plan will focus ADEQ efforts on developing education and outreach material for safe recreational habits in addition to implementing projects to improve water quality in highly recreated waters. The program is also developing a strategy to address impairments that are impacted by grazing practices. ADEQ will develop and implement the strategy in the Babocomari River watershed. ADEQ will also develop a strategy to educate homeowners who have on-site (septic) systems on proper maintenance activities. Additionally, ADEQ will work with delegated authorities to prioritize unsewered, high-risk areas for additional investigation.

» Focused monitoring to, identify sources, fill 305(b) assessment data gaps and determine project effectiveness

To provide clarity and focus resources the value stream has implemented a change in the annual monitoring strategy. Rather than individual projects being prioritized for data collection, the data needs for the entire value stream have been combined and prioritized. Data needs include source identification, effectiveness monitoring and filling data gaps to make assessment determinations. Staff set weekly goals and prioritize stormwater sampling when conditions warrant.

New to this 5-Year Plan! Focused monitoring to identify sources, fill 305(b) assessment datagaps and determine project effectiveness

The focused monitoring strategy will also be applied to the Arizona Water Watch (AWW) Citizen Science program. AWW will engage volunteers and stakeholders to help fulfill ADEQ's water quality improvement goals by creating multi-volunteer opportunities and guiding volunteers to locations where there are water quality needs. Multi-volunteer opportunities include water quality sampling (ex. chemistry, E. coli, multi-parameter probe), source identification, trash clean-up/public education near waterbodies, wet/dry mapping, storm flow collection, and use of the AWW app to update flow regime maps.

Volunteers will collect data within the three strategic categories identified by ADEQ: grazing, mining, and recreation in identified priority areas in addition to collecting data gap sites to feed the Statewide Assessment. AWW will focus the volunteer groups to these priorities by holding an annual meeting/training, sharing data gap site maps, and individually asking for groups to collect data (ex. when a storm is coming, asking a group to collect a sample). Additionally, AWW will pilot a "buddy" system, where a volunteer can partner with a trained ADEQ staff for fieldwork. The buddy system will help twofold: volunteers gain experience from trained ADEQ personnel and an ADEQ staff member have a second person to go in the field to meet safety requirements.

IV. Measuring Success

A. Delisting Impaired Waters

Although most water quality improvement project proposals will result in water quality improvements at a specific site, it can be difficult to determine which projects will lead to lasting improvements in watershed health and will significantly reduce pollutant loading at the watershed-level.

This plan refocuses resources to reduce pollutant loadings causing surface waters to be listed as impaired. Although other goals are included in the strategic plan, the strategies are primarily aimed at identifying impairments and sources of pollutant loading, and then implementing water quality improvement and education projects. ADEQ wants to move beyond mitigation to actual re-designation of these impairments to be attaining all uses.

This plan sets new goals, objectives, and strategies to achieve long-term success in reducing pollutant loads. Although focused on delisting surface water impairments, the strategic plan provides broader goals and strategies to also address groundwater issues and the protection of water resources.

This plan reflects a shift to decision making based on the potential of achieving measurable, beneficial outcomes. ADEQ wants to be able to measure improvements in surface water and groundwater quality. Water Quality Improvement Grant project funding will be primarily directed to projects that lead to removing surface waters from the state's impaired waters list. Grants must contain an effectiveness monitoring component, with meaningful measurements to determine project success. Locally-driven efforts need to be empowered to implement water quality improvement projects that will have a quantifiable benefit to the larger watershed. Education efforts should induce measurable and lasting behavioral changes.

B. EPA Performance Measures

NONPOINT SOURCE REDUCTIONS IN NITROGEN, PHOSPHORUS, AND SEDIMENT

EPA tracks the estimated annual reduction in millions of pounds of nitrogen and phosphorus and tons of sediment from nonpoint sources to water bodies. Load reductions achieved under CWA Section 319-funded projects must be reported to EPA annually. ADEQ reports required nitrogen, phosphorus, and sediment reductions on an annual basis via EPA's Grant Reporting and Tracking System (GRTS), and in the Nonpoint Source Annual Report. Also, Arizona tracks reductions in pollutants of concern in such as *E. coli* and metals in GRTS.

WATERBODIES WITH PRIMARILY NPS-IMPAIRMENTS RESTORED

EPA tracks the number of water bodies identified by States (in 2000 or subsequent years) as being primarily NPS-impaired that are partially or fully restored as a result of restoration efforts. NPS Success Stories is the primary metric of the national NPS Program success.

By "fully restored", EPA means that all designated uses are now being met. By "partially restored", EPA means either of the following two conditions are being met:

a. A water body that has a use that is initially impaired by more than one pollutant, but after restoration efforts meets the criteria for one or more (but not all) of those pollutants or

b. A water body that initially has more than one use that is less than fully supported, but after restoration efforts, one or more (but not all) of those uses becomes fully supported.

The measure includes not only water bodies restored by 319-funded projects but all primarily NPS-impaired water bodies that a state fully or partially restores, regardless of funding source. Under CWA 319 grant conditions, states are required to develop and submit NPS Success Stories in the GRTS database Success Story tool. Arizona's goal is to submit at least one NPS success stories per year.

The NPS success stories align well with the ADEQ surface water improvement value stream's goal to reduce the number of impaired waters. Although ADEQ's goal is to completely restore or delist waters, they may require several projects or years for that to occur. Therefore, partial or incremental water quality improvements will be recognized and celebrated both at the state and federal level. In addition to developing NPS success stories, ADEQ tracks the progress toward delisting waterbody using the Arizona Management System. As an example, ADEQ is developing a metric that will track the time to implement improvement projects on priority waters with a goal to improve efficiencies to reduce the time it takes to implement future projects. These metrics will likely be modified throughout the 5-yr Plan but will be shared with EPA staff as part of ADEQ's annual NPS reporting.

303(D) PERFORMANCE MEASURES (WQ-27 AND WQ-28)

As part of the 303(d) Vision process described above, EPA developed new performance measures to replace the former measure WQ-8 (often referred to as the "pace" metric). Rather than using the pace of TMDL development to measure program success, the new approach will be to measure the percent of state priority areas that are being impacted by TMDLs or alternative restoration approaches. There are two 303(d) performance measures:

- WQ-27 ("Key Measure"): This required measure tracks the extent of priority areas that are identified by each state that are addressed by EPA-approved TMDLs or alternative restoration approaches for impaired waters that will achieve water quality standards. These areas may also include protection approaches for unimpaired waters to maintain water quality standards. This measure is expressed as a percentage of the watershed area.

- WQ-28 ("Complementary Measure"): WQ-28 tracks the state-wide extent of activities leading to completed TMDLs or alternative restoration approaches for impaired waters, or protection approaches for unimpaired waters. This is an indicator metric and reporting on it is not required by EPA. However, since it allows reporting on incremental activities and activities outside of state-identified priority areas, it provides states with an opportunity to present a more complete picture of its restoration and protection activities.

C. ADEQ Strategic Plan Performance Measure

The previous ADEQ NPS 5-year plan discussed a Master Target List Waters and a goal to improve water quality in 50% of monitored waters. For this Plan, that goal has been further focused to not only improve water quality in a subset of monitored waters but to reduce the number of waters identified as impaired. The new strategies listed below and discussed previously in this plan show how the NPS program can help achieve the value stream's performance measure.

- Enhancing technical excellence using new tools
- Implementing a new prioritization strategy
- Direct fund high priority projects
- Seek additional internal and external funds for project implementation
- Focused monitoring to fill 305(b) assessment data gaps, identify sources and determine project effectiveness

D. Potential Program Impacts of Proposed Federal Navigable Waters Protection Rule

On January 23, 2020, EPA and the Army Corps of Engineers released their revisions to the definition of Waters of the United States (WOTUS). While the final rule has not been published in the Federal Register as of the writing of this plan, ADEQ anticipates a significant reduction in the applicability of the Clean Water Act and its programs to waters within the state of Arizona. Currently, the Clean Water Act is Arizona's primary tool for protecting and regulating surface waters. ADEQ initiated a stakeholder process in the fall of 2019 to determine what type of state program would need to be developed to protect waters of the state that are not protected under the Clean Water Act. It is anticipated that the development of a state program will include legislative and rulemaking actions, which would take place over multiple years. ADEQ plans to have a state program outline and analysis of legislative and rulemaking actions needed to implement the program completed by the end of state FY20 (see Goal 3).

Nonpoint source impacts are a concern for waters throughout Arizona regardless of whether they fall under federal or state jurisdiction. ADEQ anticipates the need to re-evaluate the prioritization of federal nonpoint source dollars to reflect the specific nonpoint source concerns impacting the waters that are retained as WOTUS. This may lead to modifications to this 5-year plan and its projected scope and goals (see Goal 3).

CHAPTER TWO: CONDITIONS IN ARIZONA

Arizona is a Southwest desert state, with significantly different physical, social, and economic conditions from those across most of the United States. These conditions must be considered when implementing any environmental protection program and to be effective, Arizona's NPS program must also be innovative.

I. Physical Conditions

So how hot and dry is it? Figure 6 shows Arizona's four deserts: Sonoran, Mohave, Great Basin, and Chihuahuan. The desert regions of the state receive between three to twelve inches of rain a year.

Arizona is also one of the hottest places to live in the United States with average high temperatures around 104º F between June and August. In Phoenix, it has reached as high as 122º (1990) and Lake Havasu City has recorded the state's highest temperature of 128º (1994).

The hydrologic impact of such dryness and heat is that 89% of the surface waters are ephemeral washes that flow only in response to runoff events and many lakes dry out to become mudflats or meadows, especially during droughts. Only a handful of lakes in Arizona are natural, while several hundred lakes were created as water reservoirs or for recreation or irrigation purposes. Many of these constructed lakes are shallow and eutrophic (i.e., high production of organic compounds, resulting in excess algae and submerged aquatic plants, low oxygen, and high pH).

Sediment transport in ephemeral desert streams is an issue in Arizona. When naturally vegetated deserts are disturbed (grazing, recreation, agricultural land, or urban development), the natural, organic safeguards that hold the topsoil against erosion are destroyed.

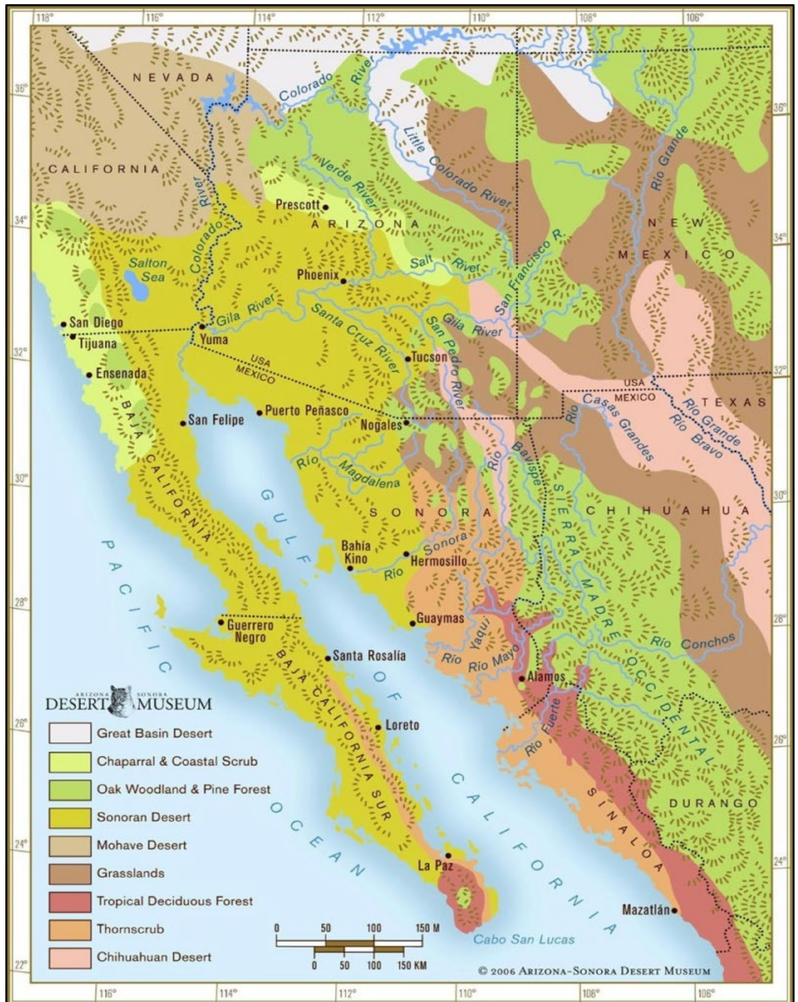

FIGURE 6: ARIZONA'S DESERTS

Groundwater in Arizona is naturally replenished (recharged) at very slow rates because of little precipitation, high evaporation losses, and the depth to which water must travel to recharge deep aquifers. Deeper groundwater sources that have not been impacted by human activities are generally the source of drinking water for rural residences or mixed with surface water for municipal drinking water systems.

Monsoon rains and wildfires are legendary. Monsoon rains are locally intense and rapidly swell streams to flood stage which carry a large amount of sediment and associated pollutants.

Strategies to implement Arizona's NPS program must consider the state's size and physical variability. Arizona extends over 114,000 square miles, which is approximately the size of Pennsylvania, Ohio, and West Virginia combined.

Portions of the Arizona desert landscape are frequently interrupted by "sky islands," which are mountain ranges that support temperate and alpine habitats by absorbing rainfall at the expense of the surrounding flatlands. By climbing from the Tucson desert to the alpine environment on top of Mount Lemmon in the Santa Catalina Mountains, people can experience a climate change equivalent to driving from Arizona to Northern Canada.

Typical of western states, elevations range from 12,633 feet above sea level at the top of Humphreys Peak near Flagstaff to only 70 feet above sea level near Yuma. Elevation changes result in different vegetation, aquatic communities, and soil types. This diversity adds complexity to watershed remediation activities because multiple reference conditions may be needed within even a relatively small watershed.

II. Land Ownership

Arizona is a patchwork of federal, state, tribal, and private land ownership (see Figure 7). Only 17% of the land is available for private and corporate ownership. In Arizona, federal land management agencies have frequently taken the lead in bridging jurisdictional divides that occur within a watershed. This has been encouraged by the Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management (2000) that sought broad community-based planning and management and resulted in the Arizona Coordinated Resource Management Memorandum of Understanding (MOU) (1999).

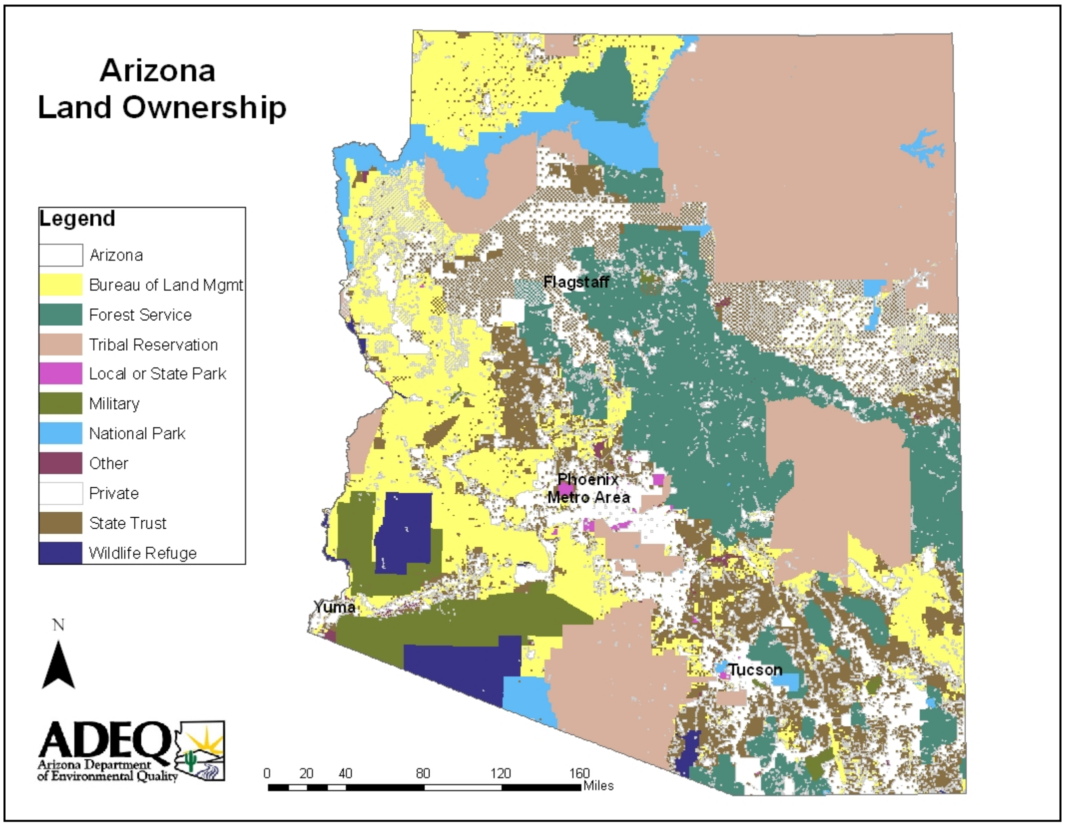

FIGURE 7: ARIZONA LAND OWNERSHIP

Arizona is also home to 21 federally recognized Native American Nations and tribal reservations occupy about 28% of the land. Arizona's water quality statutes and rules do not apply to these lands. Each tribe, in conjunction with the EPA, may develop standards, monitor and assess waters, develop an NPS program, and implement water quality improvement projects. Water quality protection programs have developed independently on each reservation, and with few exceptions, have not been integrated with ADEQ's water quality protection programs. ADEQ continues to invite tribes to investigate ways to better collaborate in the integration of our respective programs, participate in resource planning, and better target resources to reduce nonpoint source discharges to surface and groundwater.

III. Land Use Impacts

A. Managing Crop Production

Areas of the state involved in crop production in 2005 are shown in Figure 8, created by the Arizona Geographic Information Council, the Arizona Cotton Research and Protection Council, and the University of Arizona in 2008.

- Blue = Townships with 6-356 fields under production
- Green = Townships with 1-5 fields under production
- White = Townships with no fields under production
- Yellow = Tribal lands (no crop info)
- Beige = Land grant areas (no crop info)

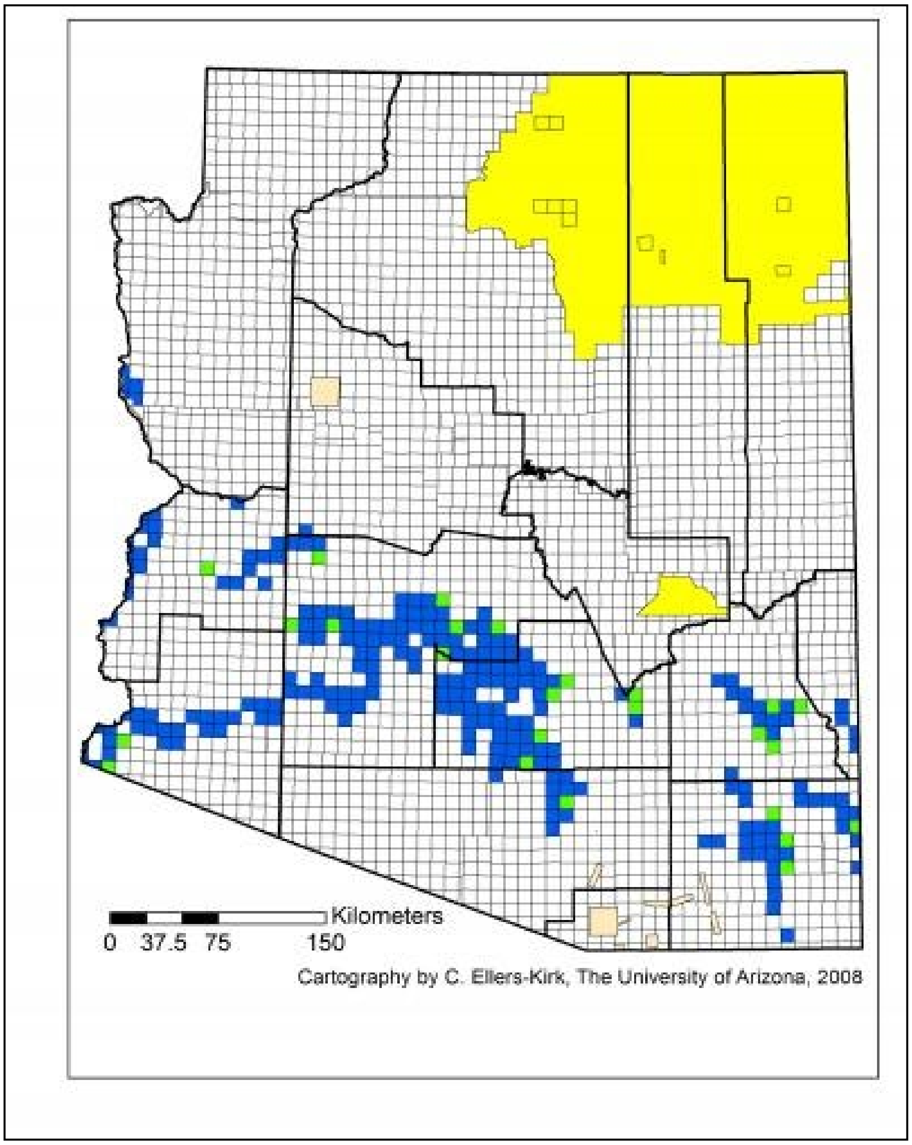

FIGURE 8: CROP PRODUCTION IN ARIZONA

Although crop production is limited, it is intense in some areas such as Yuma, a leading supplier of winter vegetables throughout the United States.

The major pollutants contributed by crop production are sediment, pesticides, total dissolved solids (salinity), selenium, and nutrients (nitrogen and phosphorus from fertilizers). When nutrients are applied more than a plant needs, nutrients can wash into aquatic ecosystems where they cause excessive plant or algae growth, reduce swimming and boating opportunities, create foul-tasting water, and can lead to fish kills. Wind can also carry soil particles from a farm field and transport them to surface water.

Irrigation water is applied to supplement natural precipitation or to protect crops against freezing or wilting. Inefficient irrigation can cause water quality problems. In arid areas like Arizona, rainwater does not carry residues deep into the soil. Excessive irrigation can then concentrate residues such as pesticides, nutrients, disease-carrying microorganisms, selenium, and salts (total dissolved solids) in the top layers of soil. Irrigation return flows from the fields may also include these concentrated residues. In Arizona, canals frequently provide both the water for irrigated crop production and a conduit for pollutant-laden runoff being returned to surface waters.

Pesticides, herbicides, and fungicides are used to kill pests and control the growth of weeds and fungus. Pesticide application in, including over and near, Waters of the United States is regulated under the Pesticide General Permit (PGP) (A.A.C. R18-9-C90). The permit applies to all areas in Arizona, except Indian Country. The PGP authorizes chemical and biological pesticide discharges to, over, and near Waters of the U.S. for the following five use patterns:

- Mosquito and Other Flying Insect or Pest Control;
- Weed, Algae, and Vegetation Control;
- Animal Pest Control;
- Forest Canopy Pest Control; and
- Specific Approvals (a pesticide discharge activity not covered by one of the other four patterns, but determined to be within the purpose and intent of the PGP by the department in advance of the pesticide discharge).

If the proposed pesticide discharge activity does not fall within one of the use patterns and cannot be covered as a specific approval, the operator must obtain coverage under another permit to discharge to a water of the U.S. Additional information about the PGP can be found online on ADEQ's website.[22]

Pesticides can contaminate water through direct application, runoff, and wind transport. They can kill fish and wildlife, poison food sources, and destroy the habitat that animals use for protective cover. To reduce contamination from pesticides, farmers apply Integrated Pest Management (IPM) techniques based on specific soils, climate, pest history, and crops. IPM helps limit pesticide use and describes application techniques that will minimize pesticide movement from the field. The Arizona Pest Management Center[23] at the University of Arizona provides technical support for implementing IPM in Arizona.

Application of nitrogen fertilizer in Arizona is regulated under general permit A.A.C.-R18-9-401 through the Aquifer Protection Permit Program. This is a general permit, in rule, which outlines BMPs that if followed should result in compliance with the rule requirements. Another APP general permit (A.A.C. R18-9-403) applies to concentrated animal feeding operations (CAFOs) to address runoff, storage, and disposal of animal manure. The use of BMPs is required to reduce pesticide, nitrogen, and phosphorus loadings to Arizona's surface waters and groundwater.

B. Managing Livestock Grazing

Much of Arizona is used for grazing, with more than 1,000 grazing allotments on public lands and grazing on tribal lands. Because of urban expansion, ranchettes with assorted livestock now occur even in urban areas.

Livestock and other grazing wildlife are drawn to water and the surrounding riparian vegetation in an arid climate. In some cases, a perennial stream or spring is the only source of water for livestock and wildlife. Grazing can contribute sediment and animal wastes containing nutrients (nitrogen and phosphorus) and disease-causing organisms (bacteria) to surface waters. Soil disruption and reduction in natural vegetative cover associated with grazing can increase the erosion and destabilize stream channels.

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[22] *See* http://www.azdeq.gov/environ/water/permits/pgp.html
[23] *See* http://cals.arizona.edu/apmc/

Overgrazing can expose soils, increase erosion, encourage invasion by non-native plants, destroy fish habitat, and reduce the filtration of sediment necessary for building stream banks, wet meadows, and floodplains.

Grazing impacts on surface water can be minimized by properly managing these agricultural activities. Arizona has adopted grazing Best Management Practice rules (A.A.C. R18-9-501) to encourage the implementation of these practices. The U.S. Forest Service has adopted an Adaptive Management Approach that can require modifying the number of animals grazing on the property or BMP implementation to promote the carrying capacity of the land before the permit is renewed. Permit adjustments are based on monitoring the soil, vegetation, and riparian conditions. This Adaptive Management Approach is successfully improving rangeland conditions in Arizona.

In addition, ADEQ utilizes NPS funding to identify and fund grazing-related projects via TMDL, watershed planning, and WQIG activities. Water Quality Division staff also participate in CRM activities and environmental reviews for changes to grazing land management on lands owned by other state and federal agencies.

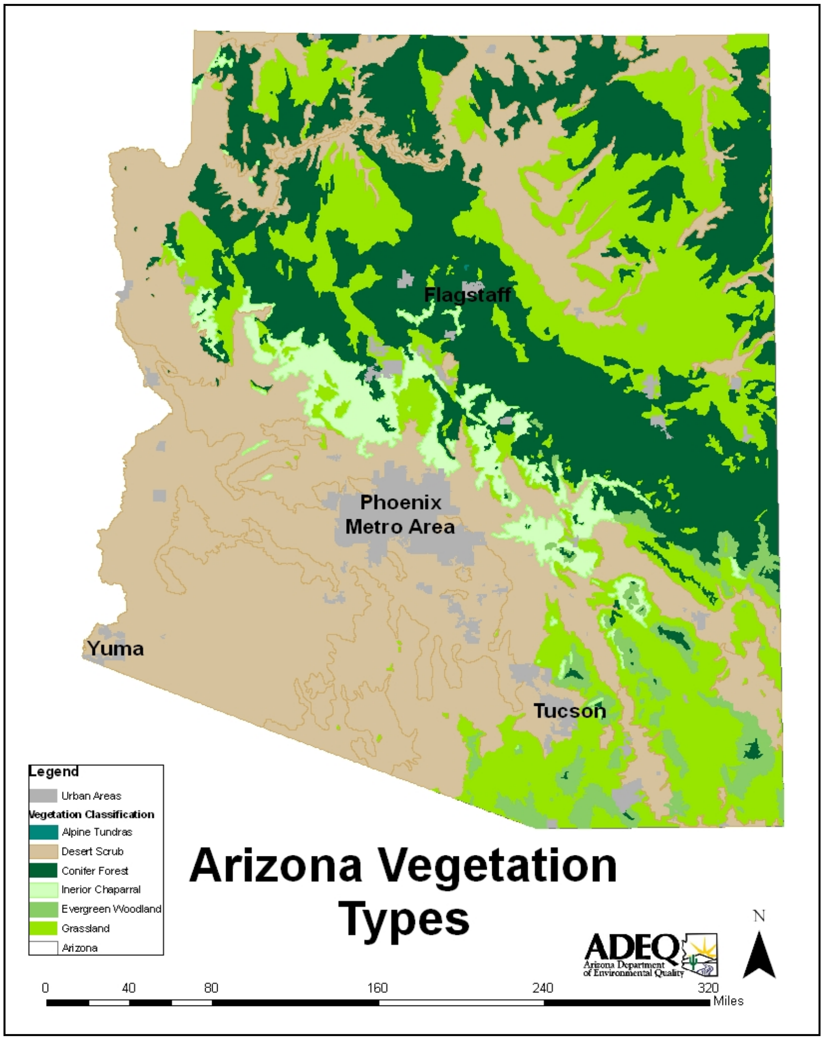

FIGURE 9: ARIZONA VEGETATION TYPES

C. Managing Forested Areas

Arizona's harvestable forests extend from the Colorado Plateau in northern Arizona along the Mogollon Plateau into southeastern Arizona (see Conifer Forests and Evergreen Woodlands in Figure 9). This area consists mainly of steep foothills and mountains.

Water quality-related issues associated with timber harvesting are caused by riparian vegetation destruction, road construction and use, and the dragging and loading of logs. Poor harvesting and transport techniques can result in increased erosion and sediment production. Timber harvesting BMPs address maintenance and protection of riparian buffers, road management, re-vegetation of disturbed areas, the use of sediment control structures, and prescribed burns.

Wildfires are another source of nonpoint source pollution from forested lands. Drought conditions, dense tree stands, and a bark beetle infestation have recently increased the likelihood of wildfires in Arizona. When wildfires occur in Arizona's pine forests, the effects on soil conditions, hardening of the surface soils, and removal of vegetation buffer areas can increase erosion rates exponentially. A 5-year flood event can act like a 100-year flood event when wildfires consume most of the vegetative buffers that formerly slowed the rate of water flow. The effects of fire on a watershed depend on burn severity and hydrologic events that follow a fire. The U.S. Forest Service is now using prescribed burns to control the intensity of the burn and impacts to water quality.

D. Managing Urban and Developed Areas

Urban areas contain “hardscapes” (e.g., pavement, sidewalks, and buildings) which prevent rain water from percolating into the ground. This increases the amount of flood flows, and therefore, the potential force of runoff. Flood waters can result in erosion and stream bank deterioration, and in urban areas pavement can also be a source of grease and oils from automobiles and a variety of pollutants spilled on the pavement.

Arizona’s urban areas are also shown in Figure 6. The Phoenix metropolitan area is by far the largest metropolitan area in Arizona, with an estimated population of 4.2 million, or 65% of the State’s total population of 6.4 million (2010). Arizona has experiences periods of extremely rapid population grown in recent years. For example, between 2000 -2007 Phoenix population grew an estimated 20%. By 2025 (the end of this 5-year Planning horizon), Arizona’s total population is anticipated by the Arizona Office of Economic Opportunity to be over 7.8 million.[24]

Flood events in the late 1970s led the Maricopa County Flood Control District (the greater Phoenix metropolitan area), to establish flood control regulations to reduce the impacts of flood waters in this urban area. A drainage report and stormwater or flood management plan is now required for each commercial, industrial, and multi-family residential development. The plan must define the stormwater hydrology for the drainage area, outline potential problems, and recommend solutions. Drainage retention basins, which are often required by these plans, double as parks and greenbelts across this metropolitan area.

Stormwater management is also regulated under the Clean Water Act provisions administered by ADEQ through the Arizona Pollutant Discharge Elimination System (AZPDES) permit program. These regulations apply to storm water runoff once the water enters the streets in heavily populated urban areas (at least 50,000 people and density of 1,000 people per square mile). To reduce negative impacts from storm water, the NPS Program works with numerous agencies such as county flood control agencies, municipalities, the AZPDES Stormwater Permit Program, and other watershed partners.

SUSTAINABLE GROWTH

Arizona recognizes the need to invest in communities that are committed to developing in a sustainable manner. Communities that consider environmental impacts related to growth and development are more likely to develop in a way that reduces impacts on their watersheds. The NPS Program is coordinating with local and state efforts to provide low impact and sustainable land development. Growth and construction in Arizona offers many opportunities to apply new Low Impact Development (LID) approaches to land development (or re-development). LID promotes principles such as preserving and recreating natural landscape features, minimizing effective impervious surfaces so that a site captures storm water as a resource rather than discharging it as waste. By implementing LID principles and practices, water can be managed in a way that reduces the impact of “built” areas and promotes the natural movement of water within an ecosystem or watershed.

In 2008, the Arizona Department of Commerce introduced the Smart Growth Scorecard. “Smart Growth” is a continuous planning process to guide the preservation, development, or redevelopment of a neighborhood, community, or region to promote the goals and ambitions of its residents. The Scorecard is an incentive-based

[24] *See* https://www.azcommerce.com/oeo/population/

tool to help cities, towns and counties evaluate their growth management efforts and encourage more comprehensive strategies that lead to smarter land use decisions. Entities applying for grants and loans from participating state discretionary funding programs must reference a Scorecard. This approach also encourages citizens, non-profit organizations, and other entities to talk with their community leaders, make sure a Scorecard is filled out, and ultimately encourages implementation of Smart Growth practices. The NPS Program requires that all Water Quality Improvement Grant applications from counties and incorporated municipal entities reference a completed Smart Growth Scorecard to be considered eligible for grant funding.

PHYSICAL ALTERATIONS

Land development has resulted in many physical alterations to stream channels that have left the stream banks less stable and more susceptible to erosion and related water quality degradation. For example, the straightening or hardening of a stream channel removes a stream's natural ability to absorb energy from large volumes of water. This increases the speed at which the water flows, increasing erosion, undermining streambanks, and degrading habitat.

Removal of properly functioning riparian areas, excessive pumping of groundwater, and surface water diversions can also alter stream channels and result in hydromodification. In drier states like Arizona, over pumping of groundwater near stream beds can change the water level and may actually cause the stream to dry up. Water rights and other water supply issues involved in these hydro-modifications are a major concern for communities throughout Arizona.

Road and infrastructure crossings of streams also must be considered because of impacts on stream characteristics. The design of a stream crossing will determine whether a stream behaves naturally. Improperly constructed bridges and culverts can increase downstream erosion and create potentially unstable and dangerous situation at the crossing. In remote areas of Arizona, some road crossings are actually in-stream experiences (see Figure 10). If not properly "hardened," these crossings can be a significant source of sediment.

FIGURE 10: LOW WATER STREAM CROSSING

ADEQ identifies and addresses impacts to water quality due to physical alterations via 401 certifications, TMDLs, watershed planning, and WQIG activities. BMPs for addressing these unstable physical alterations focus on restoration of stream channels to more stable meandering streams and development of healthy riparian areas. This restoration work relies on stream bank bioengineering which uses plant materials in combination with natural and synthetic support materials for slope stabilization, erosion reduction, and vegetation establishment.

ONSITE WASTEWATER TREATMENT SYSTEMS

Onsite household wastewater disposal systems (e.g., septic systems) treat and dispose of domestic wastewater. Even a new conventional septic system will remove only 15-20% of the nitrogen discharged into the system and may allow nitrate concentrations to build up in aquifers. In many areas septic systems were built before current onsite wastewater system rules were established. Although they may continue to be used until they fail, these "grandfathered" systems are more likely to be inadequately sized or improperly located. Improperly designed or maintained systems can become conduits for pollutants to groundwater or surface water. Because of these issues and concerns, septic systems are considered a significant nonpoint source of pollutants to groundwater and surface water. The control of nutrient and pathogen loadings to waters begins with proper design and installation of an onsite wastewater disposal system. The absorption field should never be situated within the 100-year floodplain or within close proximity to groundwater. Onsite systems need to be inspected and maintained regularly. Bacteria present in the system decompose the sewage; therefore, chemicals should not be poured down the drain because they could destroy the beneficial bacteria and impair the effectiveness of the sewage treatment process.

In Arizona, onsite wastewater systems are regulated under the Aquifer Protection Permit Program (see APP discussion Chapter 1). ADEQ has delegated authority to issue many of these permits to county health departments based on staffing proficiencies.

As of July 2006, any person transferring property served by an onsite wastewater treatment system is required to perform an inspection of the system and report to ADEQ the location and physical condition of the system, operational deficiencies, and description of any repairs completed prior to transfer. The inspector must also report whether the septic tank or other treatment container was pumped or otherwise serviced, or if not serviced, why not. This inspection report must be provided to the person to whom the property is being transferred. This record may become very useful in developing water quality improvement strategies in watersheds where surface waters or aquifers are impaired by bacteria, nutrients, or other pollutants associated with onsite wastewater treatment systems (A.A.C. R18-9-A316).[25]

E. Managing Recreation Areas

Arizona's beautiful landscapes and mild winters attract many tourists to rural areas of the state. Surface waters are a magnet for recreation, which can result in water quality impairments through off-road vehicle use, boating, horseback riding, fishing, swimming, hunting, hiking, mountain biking, and camping (Figure 11).

Use of off-road vehicles can increase erosion and sediment issues. Scars from off-road traffic cover both dry desert and forested areas. Reducing off-highway vehicle traffic in already damaged areas can help initiate restoration and in turn reduce erosion and sediment.

Boating is also a popular outdoor activity on Arizona's reservoirs, lakes, and streams. Disposal of human waste can be an issue on large reservoirs and motorized boats can degrade water quality due to petroleum related discharges.

[25] *See* http://www.azsos.gov/public_services/title_18/18-09.htm

FIGURE 11: CAMPING ALONG THE COLORADO RIVER IN THE GRAND CANYON

Strategies to control pollution sources from recreation activities have included: composting toilet facilities, providing garbage bags and containers at trail heads, improving parking facilities near trail heads, restrictions on gas-powered motors, and "leave-no-trace" education. It appears that the most important strategies for reducing impacts have been to provide adequate supervision and maintenance at recreational areas. Having a "presence" at a recreational area cannot be overrated.

The Nonpoint Source Management Program will continue to find and support innovative strategies to reduce wastes left at recreational sites and damage to riparian areas, stream banks, and upland areas from a variety of activities along and in Arizona's surface waters. Planned strategies such as increased monitoring of recreational areas are described in Chapter 3.

F. Managing Mining Operations

Arizona's Department of Mines and Mineral Resources (now part of the Arizona Geological Survey) declares that Arizona is the number one mining state in the nation with the largest value of non-fuel mineral production in the United States. Two subsets of mines should be considered: active mines and inactive mines. An inactive mine has not been abandoned, but is not operating. The State Mine Inspector's office has inventoried over 10,000 abandoned mines (see Figure 12) but estimates as many as 100,000 abandoned mines in Arizona.[26] In 2019, there are 380 active, full-time mines[27] in Arizona. Active mines are required to obtain AZPDES permit coverage and meet applicable permit conditions to protect surface water quality. Abandoned mines that do not have a viable responsible party, where there is no intention to mine in the future, and where remedial activities would negate the need for AZPDES permit coverage may be eligible for 319 funds.

[26] *See* https://asmi.az.gov/how-many-mines
[27] *See* https://asmi.az.gov/sites/default/files/documents/files/Directory%20of%20Active%20MInes%20OFR-19-04%28ActiveMines2019%29.pdf

Historically, mines have engaged in large-scale physical alterations of stream channels, creating large pits which collect water after rain events, and flowing adits. Typically, mining operations are located near sources of water to aid in extraction and delivery of mined ores and byproducts. Abandoned mine workings, tailings piles, and overburden stockpiles often erode directly into the stream channels when it rains. Active mining operations in Arizona are regulated under point source programs (NPDES on tribal lands, AZPDES, and the APP Program). However, historic mining areas may be significant sources of pollutant loading to both surface water and groundwater. Management strategies to address pollutants from mining operations include stormwater detention berms, re-vegetation, passive wetland treatment cells, geotextile encapsulation, and other erosion control practices. In some cases, remediation may require more expensive treatments, such as removal of tailings piles from a stream bank or pumping of contaminated groundwater. If pollutant impairment is significant, contamination may be addressed through the federal and state "Superfund" remediation programs, such as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or the state's Water Quality Assurance Revolving Fund (WQARF).

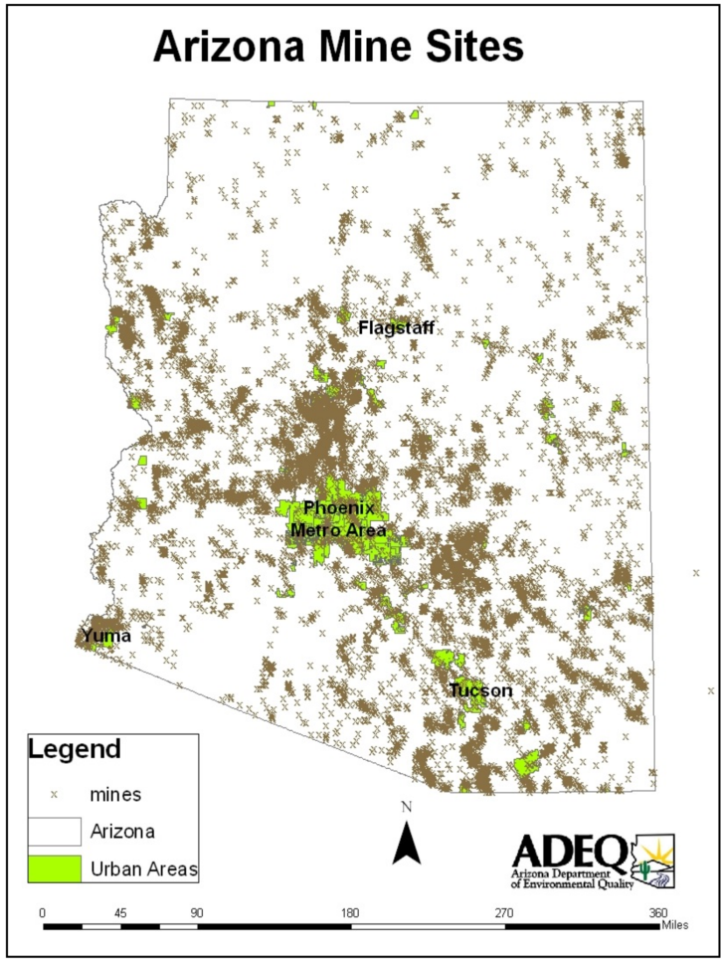

FIGURE 12: MAP OF ARIZONA MINE SITES

The U.S. Department of Interior and U.S. Department of Agriculture have made a concerted effort to identify, prioritize, and remediate abandoned mines on federal lands in Arizona. These efforts have led to several mine remediation actions in areas where mine wastes have impaired surface waters. Clean-up of mine wastes is expensive and complex. It will take coordinated efforts to identify funding sources and bring agencies and private entities together to implement corrective actions at even the highest priority areas.

G. Land Use Implications

It is clear that inadequate land management practices cause significant nonpoint source problems. For each land use, BMPs have been identified that are likely to reduce or mitigate pollutant loadings. Regulations to control land uses have also been created. To aid watershed partners in identifying appropriate measures to reduce pollutant loadings, ADEQ partnered with the University of Arizona NEMO program in 2010 to develop a BMP manual of watershed remediation methods specifically appropriate for Arizona's hydrological and geological conditions. The manual is available online.[28] for view and download. ADEQ plans to expand upon these recommendations based

[28] http://issuu.com/aznemo/docs/bmp?e=2477955/2609255

on actual data collected from BMPs implemented within Arizona, as well as provide additional education and training for watershed partners about BMPs and the legal authorities available to reduce nonpoint source loadings.

V. Pollutants of Concern

Every two years, ADEQ provides a comprehensive report on the status of surface water quality that identifies impaired waters and pollutants causing impairments to fulfill requirements of Clean Water Act sections 305(b) and 303(d). The most current report can be downloaded from the Assessments page[29] of the ADEQ website.

A. Pollutants Causing Stream and Lake Impairments

NPS pollution remains the nation's largest source of water quality problems. The primary (listed descending from the greatest number of impairments) nonpoint source pollutants causing impairments based on Arizona's 2016 305(b) /303(d) Integrated Report are:

- Metals and low pH
- E. coli bacteria
- Suspended sediment
- Nutrients or related parameters (nitrogen, phosphorus, low dissolved oxygen, high pH)

Sources of these pollutants include livestock grazing, recreation, crop production, mining, forestry, and wildlife. Some lakes and streams are listed as impaired for more than one pollutant. Currently Arizona has 160 impaired or not attaining waterbodies caused by 262 pollutants. Although in a few drainages point sources may be contributing, these impairments are primarily the result of nonpoint source contributions. The pollutants causing impairments in Arizona's surface waters are similar to nationally identified concerns; however, strategies to reduce nonpoint source pollutant impacts must consider sources of pollutants and conditions discussed in this Chapter that are not similar to eastern or Midwestern states.

B. Groundwater Pollutants of Concern

Groundwater contamination problems in Arizona can be separated into the general source categories depicted in Table 2, below. Potential groundwater contamination from point sources is generally controlled through APP Program requirements. An APP is required for anyone owning or operating a facility that discharges a pollutant either directly to an aquifer or to the land surface in such a manner that there is a reasonable probability that the pollutant will reach an aquifer (see discussion of APP Program in Chapter 1).

TABLE 2 – MAJOR CONSTITUENTS OF CONCERN IN GROUNDWATER

Pollutants	Major Source(s)
Nitrates Bacteria Total dissolved solids (TDS)	Agriculture crop production and animal feeding operations
Volatile organic compounds (VOCs)	Commercial and industry users of solvents
Nitrate Bacteria Total dissolved solids (TDS)	Inadequate on-site wastewater treatment
Metals Sulfate Radioactive constituents	Mining (Current and historic mines and associated facilities)

[29] *See* https://azdeq.gov/programs/water-quality-programs/surface-water-monitoring-and-assessment

Total dissolved solids (TDS)	
Petroleum products	Underground storage facilities (e.g. gas stations)
Arsenic, metals Fluoride Nitrate Radioactive constituents Total dissolved solids (TDS)	Natural occurring

Nitrate and total dissolved solids (TDS) are commonly sampled constituents of concern in groundwater. Many constituents occur naturally in Arizona, sometimes at concentrations exceeding water quality standards. A variety of nonpoint sources, however, can increase the concentrations of these constituents in groundwater. The 1,766 wells and springs that were monitored for nitrate by the ADEQ ambient groundwater monitoring program between 1995 and 2015 are shown in Figure 13, which is an increase of 289 sites since the last Plan in 2009. Ten percent of the sites sampled had nitrate concentrations above the drinking water maximum contaminant level of 10 mg/L. The sites exceeding nitrate standards were commonly wells located in or near major expanses of irrigated farmland in central and western Arizona. Elevated nitrate concentrations can also occur in wells impacted by septic systems, especially in areas having a high density of these onsite wastewater disposal systems. Not all elevated nitrate concentrations, however, are caused by human activities. Nitrogen accumulated in the soil by native legume plants in the Sonoran desert can also dramatically impact nitrate concentrations.

The same group of 1,766 wells and springs was also monitored for TDS (Figure 14). About 44 percent of the sites sampled had TDS concentrations above the aesthetic guideline for drinking water (a secondary maximum contaminant level) at 500 mg/L set by the EPA. The elevated concentrations of TDS can occur due to natural deposits of salts, but they are also associated with human activities such as irrigation recharge, mining, and wastewater treatment. High TDS concentrations occur throughout the state but are common in wells located near major expanses of irrigated farmland in central and western Arizona.

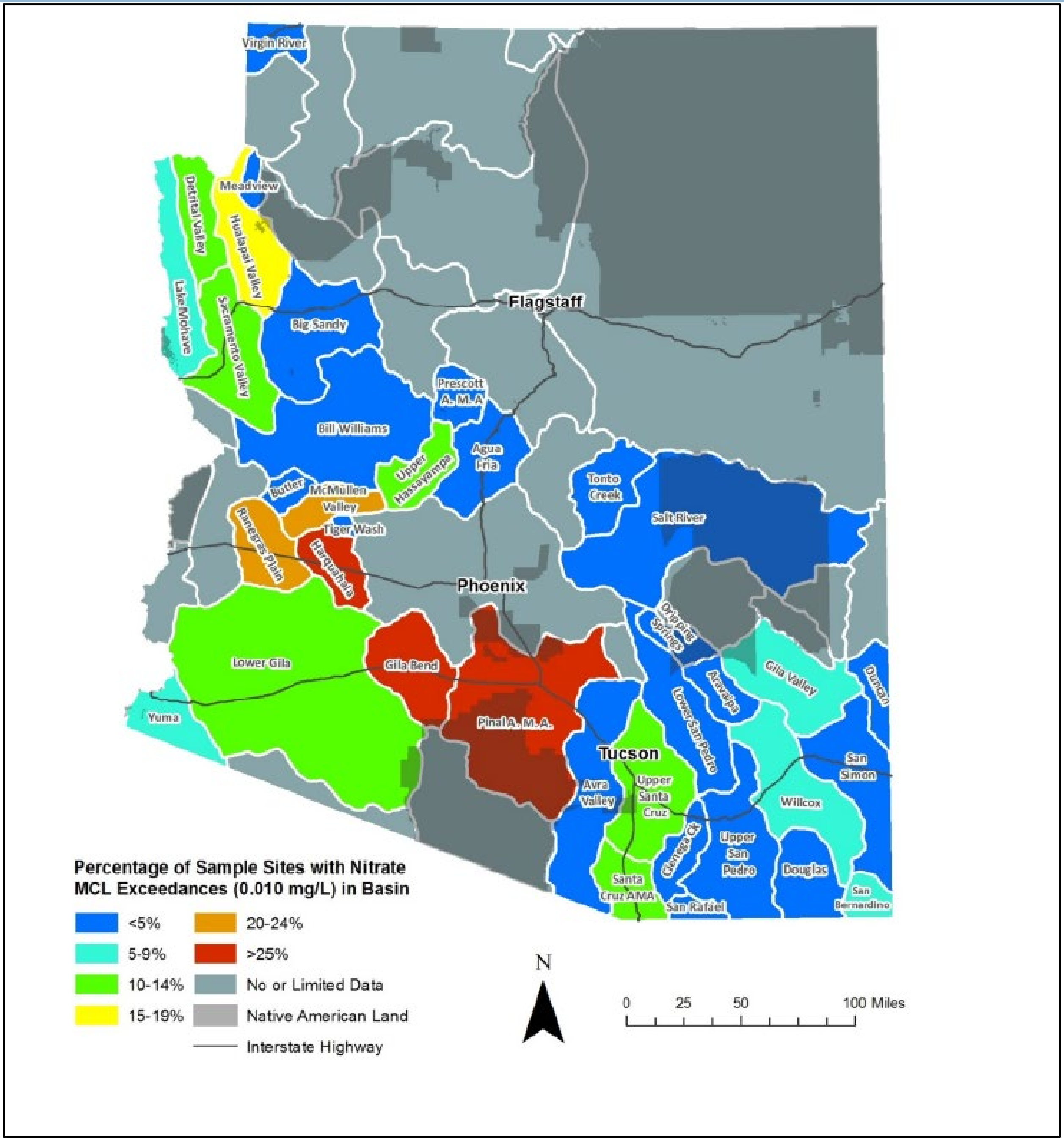

FIGURE 13: NITRATE CONCENTRATIONS IN WELLS

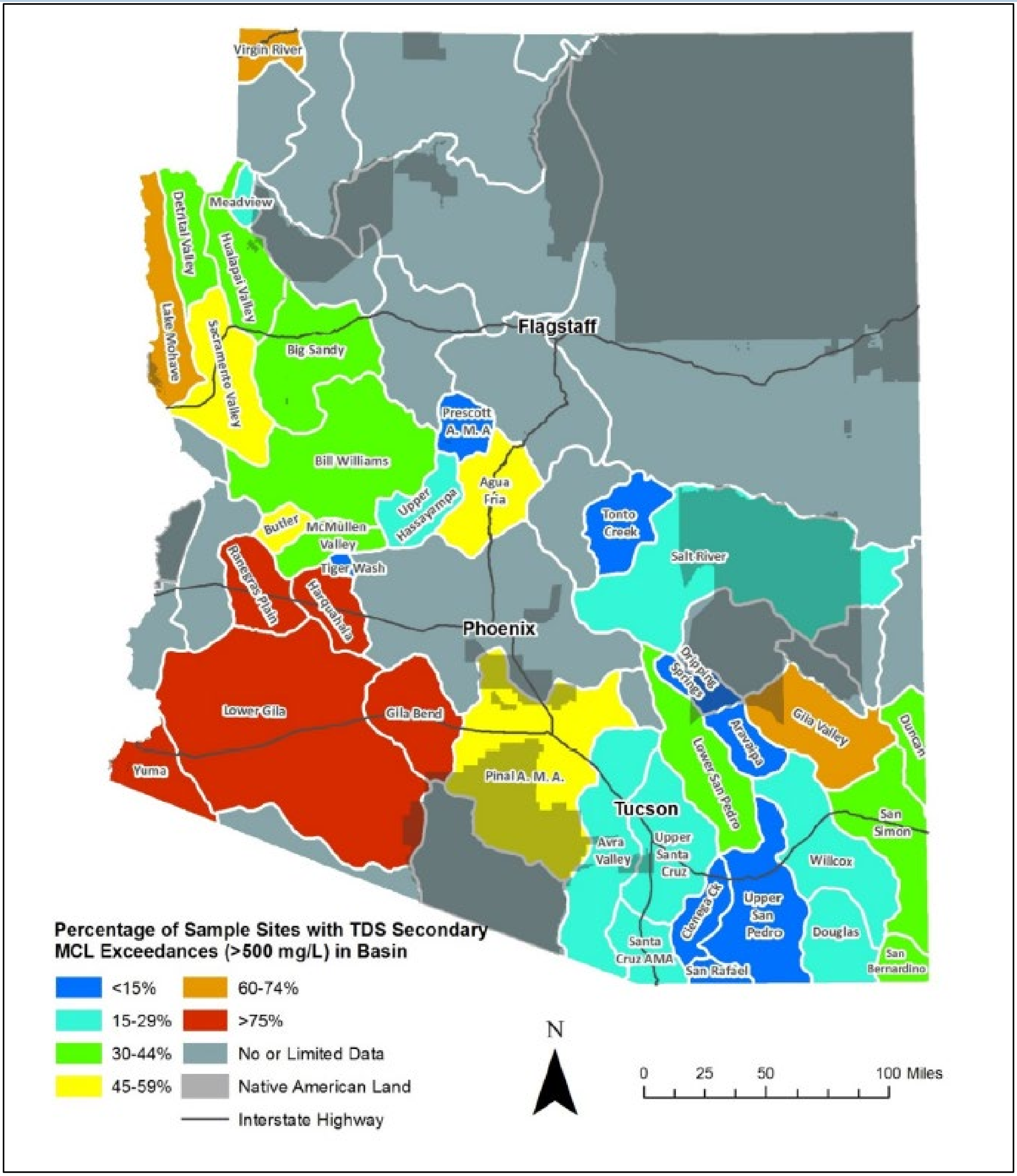

FIGURE 14: TDS CONCENTRATIONS IN WELLS

C. Reducing These Pollutant Impacts

To reduce pollutant loading, all activities within the watershed must be reviewed to determine the types of pollutants they may contribute to surface water and groundwater. As discussed in the first chapter of this plan, Arizona has many programs to prevent pollutant loading, identify impairments, and reduce these loadings.

Additional innovative strategies have been identified in the next chapter that will support Arizona's Nonpoint Source Program further in preventing and mitigating these impairments.

CHAPTER 3: NONPOINT SOURCE STRATEGIC PLAN

I. The Components of a Strategic Plan

The strategic plan describes how resources will be allocated to achieve the mission of Arizona's Nonpoint Source Program: **to achieve and maintain water quality standards through the reduction of nonpoint sources pollutant contributions to Arizona's surface and groundwater.** The components of the strategic plan are goals, objectives, strategies, and milestones

- **Goals** are 'the big picture'. Goals show staff what the world will look like after they achieve the objective or desired outcomes. They are broad and inclusive, but attainable and realistic.
- **Objectives** break down the goals by describing the types of changes that will need to be made to achieve the goal.
- **Strategies** are the specific actions that will accomplish the changes (objectives) needed to meet the goals.
- **Milestones** are the steps, stages, or phases of implementing the strategy. They should be quantifiable and their completion should indicate a clear measure of success toward achieving the associated goal.

Strategic planning begins with the end in mind by establishing broad goals and objectives. Three broad goals were established for this strategic plan, as discussed in the Executive Summary:

1. Identify and prioritize NPS threats and impairments
2. Plan and implement actions to prevent and reduce nonpoint source pollution discharges to protect and restore water quality
3. Evaluate state programs, rules, and authorities to protect and restore water quality for effectiveness and potential need for modification.

Objectives and strategies are then selected to achieve each goal. Definable milestones that function as measures of success are then developed for each strategy to direct implementation of the plan and to evaluate success. Milestones will be monitored and results analyzed to document whether and how well desired outcomes were achieved. Analyses provide the information needed to direct strategic plan changes. Annual reports submitted to EPA will discuss the progress in meeting ADEQ's NPS Program goals by discussing how well annual milestones were met. ADEQ anticipates that this strategic planning table may need to be updated during the 5-year planning period to reflect changes in resources, shifting priorities, improved strategies or rule changes. Any future amendments to the strategic plan and annual reports will be posted to the ADEQ Watershed Improvement website.[30]

This table will be used to track progress in meeting 5-year planning goals as part of ADEQ's NPS Annual Report to EPA Region 9.

[30] *See* https://azdeq.gov/programs/water-quality-programs/watershed-protection

Arizona's FY20-24 Strategic Planning Table

Throughout this five-year planning cycle, ADEQ will update this strategic planning table to reflect changes in resources, shifting priorities, improved strategies, or state and federal rule changes. This FY20-24 Strategic Planning Table will be updated on a yearly basis via the Annual Reports submitted by ADEQ to EPA.[1] Any future amendments to the strategic plan and annual reports will be posted to the ADEQ Watershed Improvement website.[2]

1.0 Goal: Identify and prioritize NPS threats and impairments

1.1 Objective:

Monitor surface and groundwater quality and analyze data to fulfill state and Clean Water Act requirements.

1.1.1 Strategy

Develop a comprehensive monitoring strategy that coordinates with NPS priorities

Milestone

- Complete Comprehensive Monitoring Strategy Report (FY20)

1.1.2 Strategy:

Conduct ambient water quality monitoring to aid in assessment determinations

Milestones

- Complete sampling per annual work plan (Annually)
- Implement a focused sampling approach to combine data gap, source identification and effectiveness monitoring activities across the value stream (FY20)
- Close 20 data gaps annually to reduce the number of unassessed perennial waters from the previous 305(b) assessment report. (FY20-24)

1.1.3 Strategy

Conduct Probabilistic Survey and evaluate trends since last probabilistic survey

Milestones

- Complete probabilistic fish report (FY20)
- Select waterbody type for probabilistic study (FY21)
- Complete probabilistic survey on selected waterbody type (FY22)
- Conduct trend analysis on probabilistic survey data (FY23)

1.1.4 Strategy:

Develop and implement in-field tools to increase the success of data collection efforts and identify potential sources and water quality improvements more efficiently.

Milestones

[1] ADEQ will submit draft annual reports to EPA each year in July, with final versions following in September.
[2] *See* https://azdeq.gov/programs/water-quality-programs/watershed-protection

- Continued development and deployment of at least 10 remote environmental monitoring (REM) telemetry to improve sample and data collection (Annually)
- Perform dry soil metal characterization using X-ray Fluorescence (XRF) tool at 5 sites to aid in mine site prioritization (Annually)
- Expand use of field leach method to quantify potential runoff from 5 mine sites to aid in site prioritization (Annually)
- Use Unmanned Aerial Vehicles (drones) to aid in plan development and post-implementation effectiveness of both mine and grazing related projects
- Develop partnership and deploy a lake monitoring buoy to collect data that may help predict conditions resulting in Harmful Algal Blooms (HABs) (FY21)
- Reevaluate priorities for equipment needs on an annual basis, redeploy as necessary, and report in annual NPS report (Annually)

1.1.5 Strategy:

Conduct source identification monitoring to identify and quantify pollutant sources contributing to impaired/not-attaining waters

Milestones

- Determine monitoring needs to identify and quantify suspect pollutant sources to high priority waters (Annually)
  - 6 waterbodies (Lynx Creek, Davidson Canyon, 3R Canyon, Copper Creek, Babocamari River, Walnut Gulch) (FY20)
  - 5 waterbodies (Lynx Creek, Copper Creek, Babocamari River, Davidson Canyon, Walnut Gulch) (FY21)
  - 4 waterbodies (TBD) (FY22)[3]
  - 4 waterbodies (TBD) (FY23)
  - 3 waterbodies (TBD) (FY24)
- Complete data collection according to annual FY sampling plan (FY20-24)
- Analyze data and update priority project rankings based upon results (Annually)

1.1.6 Strategy:

Conduct effectiveness monitoring in waters where water quality improvement/protection efforts have been implemented.

Milestones

- Collect water quality data to determine if projects implemented were effective at improving water quality including NRCS NWQI projects as appropriate (Annually)
- Determine effectiveness monitoring needs to quantify improvements to high priority waters (Annually)
  - 5 waterbodies (Alum Gulch, Boulder Creek, Mule Gulch, Pinto Creek, Copper Creek) (FY20)
  - 7 waterbodies (Hassayampa River, Boulder Creek, 3R Canyon, Pinto Creek, French Gulch, Oak Creek, Big Bug Creek) (FY21)
  - 6 waterbodies (TBD) (FY22)
  - 6 waterbodies (TBD) (FY23)
  - 3 waterbodies (TBD) (FY24)
- Use effectiveness monitoring data to delist waters as applicable (FY22, 24)

[3] TBD waterbodies will be identified through the NPS Annual Reports submitted to EPA.

- Develop at least 1 NPS success story and submit to EPA via GRTS (annually by July 1st)
    - Boulder Creek (FY20)
    - Pinto Creek (FY21)
    - Hassayampa River (FY22)
    - Oak Creek (FY23)
    - Big Bug Creek (FY24)
- Collect Data for the evaluation of bioassessment tools for effectiveness monitoring at 20 sites on metals impaired streams (FY20-FY23)
- Evaluate Index of Biological Integrity (IBI) and results of metals bioassessment study (FY24)
- Write a report summarizing the findings of the bioassessment study (FY24)

1.1.7 Strategy:

Work with external agencies and volunteer partners to collect data to fulfill monitoring goals.

Milestones

- Train at least 10 volunteer groups to assist in fulfilling sampling plan goals (Annually)
- Develop volunteer data portal for individual volunteer groups to enter and retrieve their water quality data (FY20)
- Develop or update volunteer visual aids including Sample and Analysis Plan, video lessons, handbook, and reference guides (FY20)
- Direct volunteer groups to focus on agency high priority water data needs (Annually)

1.1.8 Strategy:

Complete and submit the 305(b)/303(d) integrated report on a biannual schedule.

Milestones

- Use a real-time assessment tool to guide data collection to minimize data gaps and determine the current status of monitored waters (Weekly)
- Enhance real-time assessment tool to an enterprise, ADEQ IT-supported tool (FY21)
- 2020 CWA 303(d) List and supporting 305(b) report (FY20)
- 2022 CWA 303(d) List and supporting 305(b) report (FY22)
- 2024 CWA 303(d) List and supporting 305(b) report (FY24)

1.2 Objective:

Prioritize internal resources toward the protection of high priority waters

1.2.1 Strategy:

Protection of high priority waters including monitoring for antidegradation of outstanding Arizona Waters and identification of other high priority waters

Milestones

- Update and complete antidegradation implementation procedures for water quality standards (FY23)
- Use GIS tools to identify high-quality waters for protection (FY23)
- Evaluate water quality of existing Outstanding Arizona Waters for antidegradation (FY24)[4]

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[4] Outstanding Arizona Waters are listed in the Arizona Administrative Code, R18-11-112: https://apps.azsos.gov/public_services/Title_18/18-11.pdf)

2.0 Goal: Plan and implement actions to prevent and reduce nonpoint source pollution discharges to protect and restore water quality

2.1 Objective:

Work with internal and external partners to develop and implement strategies for addressing impairments influenced by **mining-related** nonpoint sources

2.1.1 Strategy:

Develop prioritization methodology for metals impaired stream reaches and contributing mine sites

Milestones

- Complete an inventory of potential sources on currently metal impaired waters (FY21)
- Prioritize stream reaches and mine sites, using ADEQ's surface water improvement priorities strategy for FY20[5] (FY20)
- Rank impaired stream reaches and mine sites for project implementation based on ADEQ's surface water improvement priorities strategy (FY21)
- Update prioritization list (Annually)

2.1.2 Strategy:

Identify and pursue additional funding sources for mine remediation projects

Milestones

- Develop standard work to establish partnerships with external entities to cooperatively implement projects (private landowners, land management agencies) (FY20)
- Develop talking points to approach external entities for possible funding support (FY20)
- Use priority ranking to pursue additional internal (non-319) and external funding sources for high priority projects (Annually)
- Pursue the establishment of state funding source to address inactive mine sites (FY24)

2.1.3 Strategy:

Direct fund projects on high priority waters

Milestones

- Develop and implement standard work to secure internal approval for direct funded 319 projects (FY20)
- Develop a process to determine when surface water discharges from abandoned mines are impacting unregulated private drinking water wells (FY20)
- Establish a process for ensuring that all 319 direct-funded projects meet EPA's 9 key elements for watershed-based plans (FY21)
- Use prioritized sources to compete for internal funding sources (319, WQARF, PPG) (Annually)
- Continue to maximize internal match for 319 project funds to minimize grantee match requirements (Annually)

2.1.4 Strategy:

Implement projects at high priority mine sites that are impacting human health or contributing to impairments of perennial and intermittent waters

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[5] *See* ADEQ's FY20-24 Nonpoint Source Pollution Five Year Plan, Executive Summary, Figure 1

Milestones

- Implement projects at Lead Queen Mine, 3R Mine, Poland Mine, Storm Cloud Mine, and McKinley Mill (FY20)
- Implement projects at Gibson Mine, Cash Mine, Senator Mine, McCleur Mine, Zonia Mine (FY21)
- Implement high priority projects in the Harshaw Creek watershed, (FY22)
- Implement high priority projects in the Lynx Creek watershed (FY23)
- Implement 2 high priority projects (FY24)

2.1.5 Strategy:

Measure the effectiveness of mine remediation projects

Milestones

- Conduct effectiveness monitoring (Annually)
- Calculate actual versus estimated load reductions for each project implemented (As necessary for projects implemented in 2.1.4)
- Delist waters that are now meeting standards (FY22 and FY24)
- Reevaluate implemented BMPs where expected load reductions are not realized(Annually)

2.2 Objective:

Work with internal and external partners to develop and implement strategies for addressing impairments influenced by **recreation-related** nonpoint sources

2.2.1 Strategy:

Develop prioritization methodology for E. coli impaired stream reaches and contributing land uses/sources

Milestones:

- Develop an inventory of potential sources on currently E.coli impaired waters (FY21)
- Prioritize stream reaches and land uses, using ADEQ's surface water quality improvement priorities strategy[6] (FY21)
- Rank impaired stream reaches and land uses for project implementation based on ADEQ's surface water quality improvement priorities strategy (FY21)
- Update prioritization list (Annually)

2.2.2 Strategy:

Develop a recreational outreach communications plan

Milestones

- Create recreation/healthy beach habits website (FY20)
- Develop a social media outreach strategy for promoting safe and no/low impact recreation practices (FY20)
- Test targeted social media outreach during high use recreation time in Oak Creek (Memorial Day weekend) (FY20)

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[6] *See* ADEQ's FY20-24 Nonpoint Source Pollution Five Year Plan, Executive Summary, Figure 1

- Evaluate success and adjust social media communications plan based on Oak Creek pilot results (FY21)
- Implement targeted ads – continue to use based upon FY21 engagement results (FY22)
- Implement targeted ads- explore use on other high-risk recreation sites (FY23)
- Implement targeted ads (FY24)

2.2.3 Strategy:

Partner with external entities to assist with healthy beach habits and public education

Milestones

- Engage land mangers on recreational management in high priority watersheds (FY20)
- Collect pre and post-holiday E. coli samples during the high use recreational season (May-September) to quantify recreational impacts (FY20-21)
- Identify sustainable funding ideas/toolbox for external education programs (FY21)
- Implement trash clean ups (Annually)

2.2.4 Strategy:

Implement projects to decrease E.coli loading in highly recreated waters (e.g. Oak Creek)

Milestones

- Review and prioritize highly recreated E. coli impaired waters (FY20) (see also Strategy 2.2.1)
- Analyze GIS system tools for high priority nonpoint source areas (FY20)
- Implement 2 high priority projects (FY21)
- Implement 2 high priority projects (FY22)
- Implement 2 high priority projects (FY23)
- Implement 2 high priority projects (FY24)
- Delist 5 impaired/not-attaining stream reaches (FY24)

2.2.5 Effectiveness Monitoring

Measure the effectiveness of projects implemented on highly recreated waters

Milestones

- Conduct effectiveness monitoring (Annually)
- Calculate actual versus estimated load reductions for each project implemented (As necessary for projects implemented in 2.2.4)
- Delist waters that are now meeting standards due to nonpoint source program activities (FY22 and FY24)
- Reevaluate impaired waters where expected load reductions are not realized (Annually)

2.3 Objective:

Work with internal and external partners to develop and implement strategies for addressing impairments influenced by **grazing-related** nonpoint sources

2.3.1 Strategy:

Establish new and build upon existing relationships with land managers and owners to identify and plan implementation projects that will reduce pollutant loadings contributing to impairments related to grazing.

Milestones

- Develop a conceptual site model (CSM) following ADEQ's mitigation process for KOUI sites (Known, Ongoing, Unauthorized Impact to human health or the environment) for NPS mitigation identify opportunities where source mitigation practices dovetail with the interest of the ranching community for the satisfaction of mutual goals (FY20)
- Develop and document strategy for addressing E. coli impairments in the Babocamari River Watershed (FY20-21)
- Coordinate with the NRCS State Office to identify new NWQI watersheds (FY20)
- Develop and implement sample plans within new NWQI watersheds (FY22-24)
- Determine next priority grazing impacted watershed to adapt Babocamari River strategy to (FY24)

2.3.2 Strategy:

Determine BMPS effectiveness to ensure future implementation projects will reduce E. coli loads that are contributing to impairments of perennial and intermittent waters in grazed lands

Milestones

- A minimum of four 319-funded rangeland improvement projects previously implemented will be evaluated on the effectiveness of respective BMPs (FY21)
- Effective BMPs will be cataloged and imported to GIS to generate a map of specific opportunities for projects (BMPs) that consider geographic and physical constraints (FY21)
- Implement 2 high priority projects based on developed strategy and landowner commitment (FY22)
- Implement 2 high priority projects (FY23)
- Implement 2 high priority projects (FY24)

2.3.3 Strategy:

Measure the effectiveness of implemented projects to reduce E. coli from grazed lands

Milestones

- Conduct effectiveness monitoring (Annually)
- Develop sediment vs E. coli rating curves using data collected from Walnut Gulch experimentation watershed (FY21)
- Calculate actual versus estimated load reductions for each project implemented (As necessary for projects implemented in 2.1.3)
- Delist waters that are now meeting standards (FY22 and FY24)
- Reevaluate impaired waters where expected load reductions are not realized (Annually)

2.4 Objective:

Work with internal and external partners to develop and implement strategies for addressing impairments influenced by **septic-related** nonpoint sources

2.4.1 Strategy:

Identify high priority septic areas

Milestones

- Develop and implement an outreach strategy to municipal and county officials in unsewered areas near E. coli impaired waters (FY21)

- Update ADEQ septic density map with input from local entities to prioritize areas for additional investigation (FY21)
- Develop a risk matrix for prioritizing individual onsite systems or communities (FY22)

2.4.2 Strategy:

Determine potential funding options for addressing high priority septic areas

Milestones

- Potential funding sources for septic upgrades identified (FY23)

2.4.3 Strategy:

Work with partners in high priority areas to identify and implement remedies for high priority septic system related issues

Milestones

- Develop necessary handouts, website, and a video to help inform the public about proper septic maintenance (FY21)
- Implement 2 high priority projects (FY23)
- Continue implementation of high priority projects (FY24)

2.5 Objective:

Identify alternative funding sources to support priority restoration projects.

2.5.1 Strategy:

Build effective relationships to identify or develop shared water quality restoration priorities, capitalize on existing programs and leverage funding

Milestones

- ADEQ will meet with local, state and federal agencies, environmental organizations and other groups to build new effective relationships, identify or develop shared water quality improvement priorities, capitalize on existing programs and leverage funding (Annually)
- Identify other groups and/or agencies and organizations doing work in NPS priority watersheds and objectives for potential coordination and leveraging and track information (FY21)
- Develop a strategy to coordinate with other entities to develop possible collaboration and leveraging opportunities (FY22)
- Increase the number of NPS-related priority watershed projects which collaborate with other local, regional, state and federal entities, or foundations, to leverage funding for projects that will provide load reductions. (FY22-FY24)

2.5.2 Strategy:

Secure or leverage funds from alternative (non-319) state, federal, and/or local sources to implement priority projects.

Milestones

- Develop a strategy to coordinate resources with other local, regional, state and federal entities via ADEQ project technical leads (FY20-21).
- Identify alternative NPS-related local, regional, state and/or federal resources identified NPS Programs/Projects and update NPS “funding toolbox” (Annually)

- Apply for or leverage at least $500,000 of non 319 funds to implement high priority projects (Annually)

2.5.3 Strategy:

Implement priority projects via alternative or split funding sources

Milestones

- Implement ADOT pull out reduction project (ADOT/319 Funds) (FY20)
- Implement 3R Mine remedial action using 319 and USFS funds (FY21)
- Complete site assessment (PPG) and remedial actions (319) at McKinley Mill and Storm Cloud Mine (FY21)
- Implement Poland Mine remedial project on private (319) and USFS (USFS) land (FY21)
- Assist project sponsors or ADEQ technical leads in obtaining funding for water quality reclamation and improvement projects from a wide range of sources including but limited to those stated in the NPS Funding Tool Kit (Annually)
- Actively administer, encourage and track volunteer opportunities at all priority project locations (Annually)

3.0 Goal: Evaluate state programs, rules, and authorities to protect and restore water quality for effectiveness and the potential need for modification

3.1 Objective:

Comply with or propose to modify state statutory requirement (ARS 49-203(A)(3)) to adopt, by rule, a nonpoint source management program to address discharges to navigable waters.

3.1.1 Strategy:

Engage in public outreach activities to gather input on the key benefits, features, and components for developing a rule-based NPS management program

Milestones

- Conduct stakeholder outreach and develop benefits, features, proofs document (FY24)
- Evaluate stakeholder input and decide on the need for rulemaking to implement the NPS Program (FY24)

3.2 Objective:

Improve current water quality standards, assessment and listing rules to provide more effective protection for Waters of the U.S.

3.2.1 Strategy:

Evaluate current water quality standards, assessment and listing rules to provide more effective protection for Waters of the U.S.

Milestones

- Conduct a Triennial Review of surface water standards to update standards criteria per EPA updated criteria recommendations (FY22)
- Evaluate current or create new “implementation procedures” documents for unused narrative standards in WQS rules (FY24)
- Evaluate and/or revise the Impaired Waters Identification Rule (IWIR) to include new standards (nutrient criteria), and revised assessment and listing criteria (FY24)

3.3 Objective:

Review impacts of proposed WOTUS rule changes to nonpoint source management in Arizona

3.3.1 Strategy:

Engage in stakeholder/customer/public outreach activities to gather input on actions necessary to close gaps resulting from the proposed WOTUS rule change

Milestone

- Develop draft Waters of Arizona program outline (FY20)
- Finalize program outline with stakeholder input (FY21)
- Develop program (FY22)
- Implement program (FY23)

3.3.2 Strategy:

Determine NPS priorities if proposed revised WOTUS Rule goes into effect in Arizona

Milestones

- Revise the 5-yr NPS Plan, as needed, within 6 months of determining the final rule impacts to Arizona (FY21)