

**Hopi Tribe
Wetland Program Plan (WPP)
2015 – 2019**

Prepared under a
Wetland Program Development Grant
CWA Section 104(b)(3)
From Region IX EPA



The Hopi Tribe
Department of Natural Resources, Water Resources Program (WRP)
P.O. Box 123, Kykotsmovi, AZ 86039
7/31/14

TRIBAL APPROVAL

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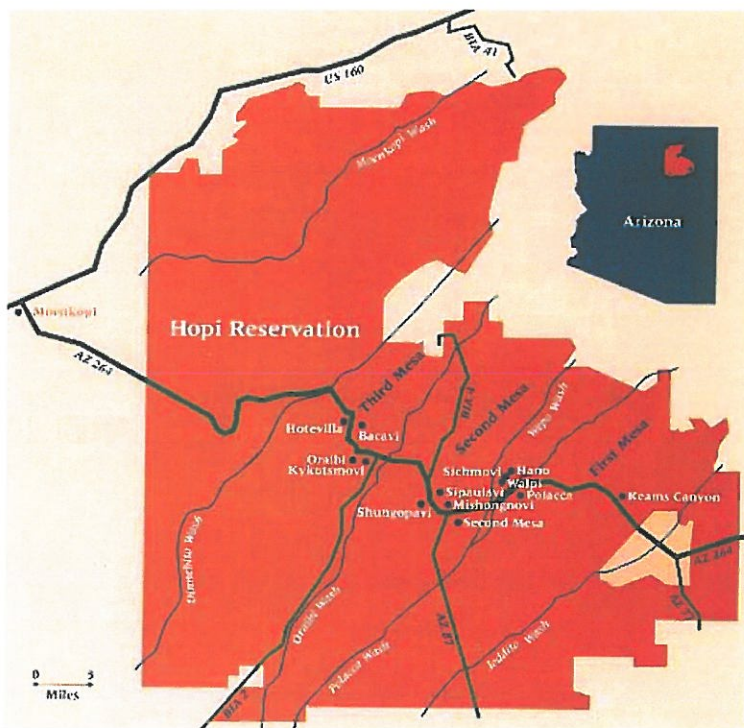
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2.0 Description of Hopi Reservation and Wetlands



The Hopi Reservation, Arizona lies in the Little Colorado Watershed HUC Code: 1502, Dinnebito Wash (HUC 15020017) and Moenkopi Wash (HUC 15020018). Remote springs and geographically isolated wetlands of Black Mesa and surrounding area have sustained the Hopi people for over 2,000 years in an arid and unforgiving environment. Water in its various forms is central to Hopi ceremonial life, but increasing water demand for municipal, industrial, and ranching needs presents increasing threats to culturally and ecologically significant wetlands. The Hopi live among the arid mesas and canyons of northeastern Arizona where precipitation averages only 10- inches per year.

Figure #1: Location Map

The Hopi Reservation, 640,000 acres form District 6, reserved exclusively for Hopi use. With increasing water development for population growth in the area surrounding Hopi lands and groundwater withdrawal for coal mining in the northern part of the reservation the Sole Source

“N” aquifer underlying both the Navajo and Hopi reservations is being stressed. This has caused concern among tribal members, environmental group, and regional water managers regarding the effect that aquifer depletion may be affecting the rare wetlands and associated springs. As wetlands begin to dry up cattle are forced to seek smaller and more inaccessible areas to drink increasing sediment and fecal coliform pollution. These factors indicate that groundwater supplies will become increasingly stressed during a time of greater aridity in the mid-latitudes associated with increasing temperatures and more energy in the water cycle. The impact on isolated wetlands such as are found on the Hopi Reservation is of particular concern in the southwest. They are central to the Hopi religion and although covering a small percentage of the landscape they are critical to maintaining regional biodiversity.

3.0 Timeframe and Overall Goals of the Hopi Wetland Program Plan

The Hopi Water Resources Program (WRP) functions as a regulatory, policy and technical support recommending program for the Hopi Tribe. The WRP is continuing to refine its wetland program begun with the Clean Water Act 104(b)(3) Hopi Tribe Wetland Program Development Grant funds provided by U.S. Environmental Protection Agency with Performance Partnership Grant (PPG) Grant No. BG-9796411-2.

The overall purpose of the Wetland Program Plan (WPP) is to maintain or increase wetland area and functionality by standardizing wetland data collection and utilizing a model spring assessment protocol as well as standardizing sampling regimes. Along with the promulgation of WQS for wetlands and regulatory authority under Section 401 of the Clean Water Act (CWA), wetland decisions on priority restoration projects, functionality, and net loss will be standardized to increase protection.

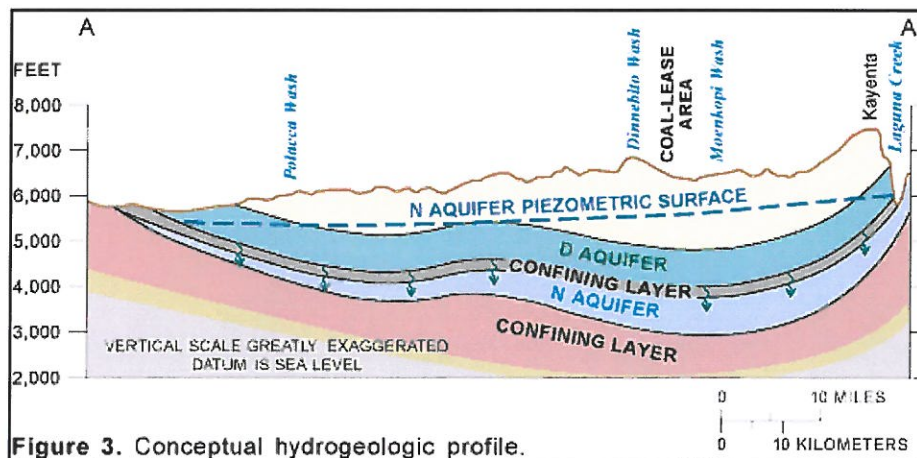


Figure #2: Geologic cross-section Hopi Reservation.

Scrutiny is increasing on this aquifer due to potential approval the Environmental Impact Statement for the continued operation of Navajo Generating Station and Peabody Western Coal Company’s mine. Along with population increases in the Tuba City/Moencopi area mining impacts have the potential to decrease spring flow and wetland area. Monitoring under the WPP

will ensure that any impacts to the sole source “N” or Navajo aquifer fed springs such as Susungva and Coldwater will be immediately noted. The “N” aquifer is composed of the Navajo Sandstone, the Kayenta Formation, and the upper portion of the Wingate Sandstone, all Jurassic in age. The increasing stress upon and depletion of the “N” Aquifer will be carefully monitored for its effect on wetlands dependent upon the Navajo Aquifer. This Wetland Program Plan will be implemented from 2015 to 2019.

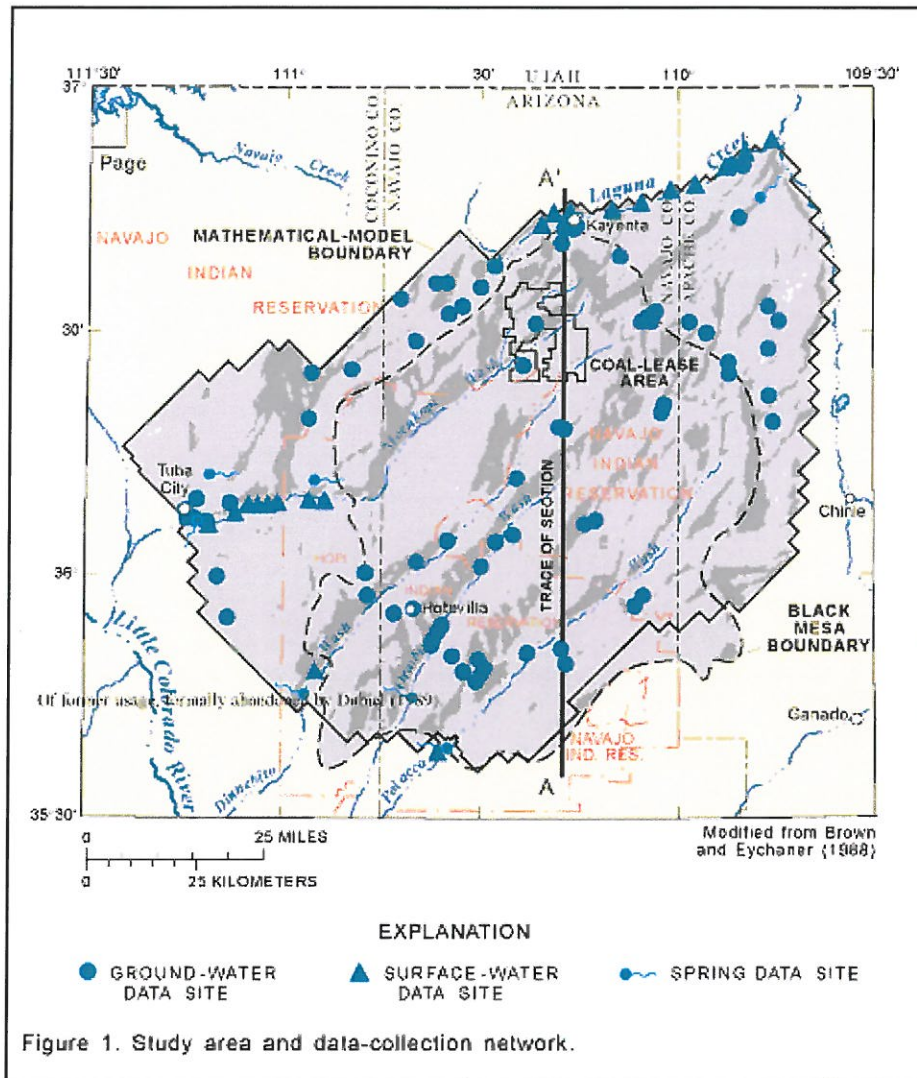


Figure: #3: “N” Aquifer monitoring sites for mine water supply.

4.0 Core Elements to be Addressed in the WPP

The Hopi WRP created a Wetlands Program Plan (WPP) to address the components of the Core Elements Framework (CEF) and apply them to the unique culture and waters of the Hopi lands. The CEF consists of four elements: *Monitoring and Assessment*, *Regulation*, *Voluntary Restoration and Protection*, and *WQS for Wetlands*. WRP will initially focus upon *Monitoring*

and Assessment by defining the long term benefits and the goals of the tribe in protecting wetlands.

The monitoring techniques will be piloted at a restoration site, selected through the actions under Core Element Voluntary Restoration and Protection.

1) Core Element Wetland Monitoring and Assessment (2015-2017)

- Create base map of all springs and wetlands on the Hopi Reservation using GPS and GIS Technologies. (*Monitoring and Assessment Objective: Objective: #1, Action: c.*)
- Define and characterize all springs and wetlands to the Springs Stewardship Institute system. (*Monitoring and Assessment Objective: Objective: #2, Action: a., d.*)
- Establish scientifically derived benchmarks for future wetlands restoration success and associated required monitoring and analytical techniques. Monitoring data, including water quality, bioassessment, and geospatial will be entered into the newly restructured Hopi water quality database and integrated with the Springs Stewardship Institute database. The monitoring techniques will be piloted at a restoration site, selected through the actions under Core Element Voluntary Restoration and Protection. Previous restoration activities by other departments will be investigated and if data allows the efficacy of efforts will be evaluated. (*Monitoring and Assessment Objective: Objective: #2, Action: a., d.*)

2) Core Element Wetland Regulation (2016-2018)

- The goal of the regulatory program would be to strive for “no net loss” or to increase known wetland areas and to preserve the function and quality of the wetland area. . (*Regulation Objective: Objective: #1, Action: a. b.; Objective: #3, Action: b.*)
- The Hopi Department of Natural Resources along with WRP will utilize a spectrum of Best Management Practices (BMPs) to manage wetland areas in a manner that will be consistent with Hopi cultural values as well as protects or improves the vitality of the overall wetland ecosystems. BMP’s will be implemented on springs which display notable degradation or at the request of village officials to maintain water quality. The Hopi Tribe Water Code, developed in accordance with principles of sound water management and protection, and including water quality standards will be used to promote and enforce BMP’s. (*Regulation Objective: Objective: #3, Action: c. Objective: #2, Action: g.*)

3) Core Element Water Quality Standards for Wetlands and Objectives (2016-2018)

- Develop wetland water quality standards for insertion into the U.S EPA approved Water Quality Standards for the Hopi Tribe. (*Regulation Objective: Objective: #2, Action: a., b.; Water Quality Standards Objective: #3, Action: d.*)
- Determine the most effective use of the Clean Water Act Section 401 Water Quality Certification for the protection of tribal springs and wetland resources and make a presentation to council. Common activities with the potential to impact Hopi wetlands that will be scrutinized are road construction, power line construction, and municipal activities near village springs. (*Water Quality Standards Objective: #2, Action: e.; Regulation Objective: Objective: #1, Action: a., b.; Objective: #2, Action: c., g.*)

- Determine the most effective enforcement mechanism for the protection of Tribal wetlands resources; meet with the Hopi Wildlife and Range Programs to discuss enforcement implementation. (*Regulation Objective: Objective: #2, Action: e., c.*)
- Incorporate wetlands protection and community understanding of the springs and wetlands functions, values and cultural use into Public Education and Outreach programs. The wetland protection ethos will be central to presentations made to students at Career Day and Hopi Youth Work Study programs. (*Voluntary Restoration and Protection Objective: Objective: #1, Action: a., b.*)

4) Core Element Wetland Voluntary Restoration, Protection and Objectives (2015-2019)

- On the basis of water quality standards and Springs Stewardship Institute protocols The Hopi Water Resources Program will list and identify the locations of impaired wetlands and specific impairment and cause. (*Voluntary Restoration and Protection Objective: Objective: #1, Action: a., b.; Monitoring and Assessment Objective: Objective: #3, Action: d.*)
- Identify and determine the most impaired wetlands and most vulnerable within the Hopi Reservation. (*Voluntary Restoration and Protection Objective: Objective: #1, Action: a., b.; Water Quality Standards Objective: #3, Action: b.*)
- Document specific needed wetland restoration projects and associated restoration methods for each wetland restoration project. (*Voluntary Restoration and Protection Objective: Objective: #1, Action: b.; Water Quality Standards Objective: #3, Action: b., c.*)
- A highly impaired and vulnerable site will be restored and monitored before and after in order to determine the success of the restoration techniques. Staff will be trained on wetland restoration and monitoring techniques. Product: Five staff trained in wetland restoration and monitoring; monitoring reports of site pre- and post restoration. (*Voluntary Restoration and Protection, Objective 3, Action a, b; Objective 4, Action b,c*)

5.0 Past EPA Wetlands and Spring Protection Grants

The Hopi Tribe has completed several competitive EPA grants relating to spring protection and wetlands, submitting timely progress reports and final technical reports. Representative projects are:

Hopi Water Resources Program: Hopi Tribe Wetland Program Development - BG-97961411-2, CWA Section 104(b)(3) WPDG Track 1 FY2012 – FY2014 (in progress)

Projected Outputs: Development of the Hopi Tribe Wetland Program Plan, Wetland Bioassessment QAPP, development of wetland monitoring protocols, Water Quality Standards for Wetlands, training of four Hopi WRP employees in wetland assessment protocol.

Projected Outcomes: An enhanced knowledge of wetland health and condition, increased knowledge of the location of culturally significant seeps and springs, coordination of wetland protection efforts among tribal programs, promotion and acceleration of research into which wetland areas are most at risk from aquifer depletion.

Hopi Water Resources Program: The Bacavi Terrace Gardens Restoration Project - EPA 319 competitive grant BG-97961406-2 2009. Improved water quality at the Bacavi Terrace Gardens springs.

Outputs: Design plans for protecting springs from runoff and improving drainage; 30 feet of stone retaining wall; Repair of 180 feet of terrace garden walls; 6 rock waterbars; 3 brush weirs and 180 yds² of erosion control fabric ; Construction of one dip drain and two ditches on roads above terrace gardens; Repair of large headcut on terrace gardens

Outcomes: Improved spring water quality; Reduction of erosion of nearby fragile slopes; Increased NPS knowledge of community members and a renewed sense of stewardship towards terrace gardens and springs. Progress quarterly reports and in an end of project evaluation report.

Hopi Water Resources Program: The Hopi Springs Sediment Reduction Project - EPA 319h grant C9-96953901 - 2009. Improved water quality at two springs by protecting them from sediment-laden runoff.

Outputs: Design plans for protecting springs from runoff and improving drainage; 350 feet of protective stone walls were constructed; Installation of two culverts to improve road drainage.

Outcomes: Improved water quality; Reduction of slope erosion; Increased NPS community awareness and renewed spring stewardship by community members; Progress on this project was reported to the *EPA* in quarterly reports and in an end of project evaluation report.

Hopi Water Resources Program: The Hotevilla Springs Sediment & Nutrient Reduction Project - EPA 319 grant BG-97961406-3 2010. The project improved water quality at several springs at the Hotevilla Terrace Gardens protecting them from sediment-laden runoff and manmade sources of nitrates.

Outputs: Engineering design plans for protecting springs from runoff and improving drainage around springs were created by an environmental engineering firm; Construction of 90 foot stone retaining wall to protect springs from blowing dune sand; Stone linings constructed around three springs to protect them from stormwater runoff; Installation drainage control to route stormwater around springs; Removal of four pit toilets.

Outcomes: Improved spring water quality, Reduction of erosion of nearby fragile slopes, Removal of manmade source of nitrate, Increased NPS knowledge of community members, Renewed sense of stewardship towards terrace gardens and springs by community members, Progress in quarterly reports and in an end of project report.

Hopi Water Resources Program: Sunlight Mission Road Erosion Control & Sediment Reduction Project - EPA 319 competitive grant BG-97961406-4 - 2010. The project was to protect a historic Hopi spring from sediment washed off the road and to reduce the sediment discharge to Wepo Wash watershed.

Outputs: Numerous gullies repaired in roadbed, Roadbed graded and compacted, Aggregated applied to the entire 2.1 mile length of the road.

Outcomes: Maintenance of spring water quality, Reduction in erosion of roadbed and adjacent fragile slopes, Reduction of sediment discharge to Wepo Wash watershed, Increased NPS knowledge of community members. Progress on this project was reported to the EPA in quarterly reports and in an end of project evaluation report.

Hopi Environmental Protection Office: Hopi Tribe Comprehensive Wetland Monitoring - EPA Grant # CD-98985101-01

Outputs: Collection of baseline data for assessments of wetlands, vegetation, wildlife, and archeological surveys, hydrologic monitoring, report entitled *Using Remote Sensing Techniques and GIS Tools to Identify and Map Wetland Vegetation Associations and Riparian Environments on the Hopi Indian Reservation, Arizona*.

Outcomes: Increased public involvement in wetland appreciation and preservation, deeper understanding of Hopi wetland conditions and processes, greater tribal capability in hydrologic and wetland assessment.

Hopi Environmental Protection Office: Hopi Tribe Wetland Program – Restoration and Demonstrations - EPA Grant # CD-999744-01-2

Outputs: Rehabilitation demonstration projects at Kalbito Spring, Keams Canyon, Talastima (Blue Canyon), Dennibito Wash, and Polacca Wash. Participation in Wetlands Month activities in conjunction with reservation schools.

Outcomes: Improved Hopi wetland conditions and protection, greater tribal capability in restoration and wetland rehabilitation. Increased knowledge among Hopi youth in wetland processes and preservation.