SECTION 1

Why a *WIPS*?, and How to Use It

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PREFACE

This *Watershed Improvement Plan and Strategy (WIPS)* is an inventory and data resource in support of a science-based approach to watershed resource planning. Watershed remediation work to improve deteriorated conditions is often supported by federal funds made available through Section (§)319 provisions of the Clean Water Act (CWA). This *WIPS* is a required component in New Mexico to securing §319 non-point source pollutant grant funding through the U. S. Environmental Protection Agency (EPA) and New Mexico Environment Department (NMED; 2006b). The CWA requires each state to identify surface waters within its boundaries that are not meeting, or expected to meet, water quality standards. In 1998 a statewide task force identified 21 out of 83 New Mexico watersheds as Category I, "in need of restoration." The Gila River is designated as a Category I watershed (NMED, 1999).

Figure 1. Gila River watershed at Wilderness boundary, Gila National Forest. September, 2006. Photo courtesy NMED, Silver City.

The Gila River flows 600 miles from its headwaters in the mountains of southwestern New Mexico to its confluence with the Colorado River near Yuma, Arizona. The origins of its name are unknown, although different authors postulate varying theories for it. Corle (1951) traced it back to one used by the Yuma people near the Colorado River confluence, who told Spanish explorers in 1539 their name for it: *Hah-quah-sa-eel*. In New Mexico, the river and its tributaries occupy one of the more remote and beautiful corners of the southwestern U.S.

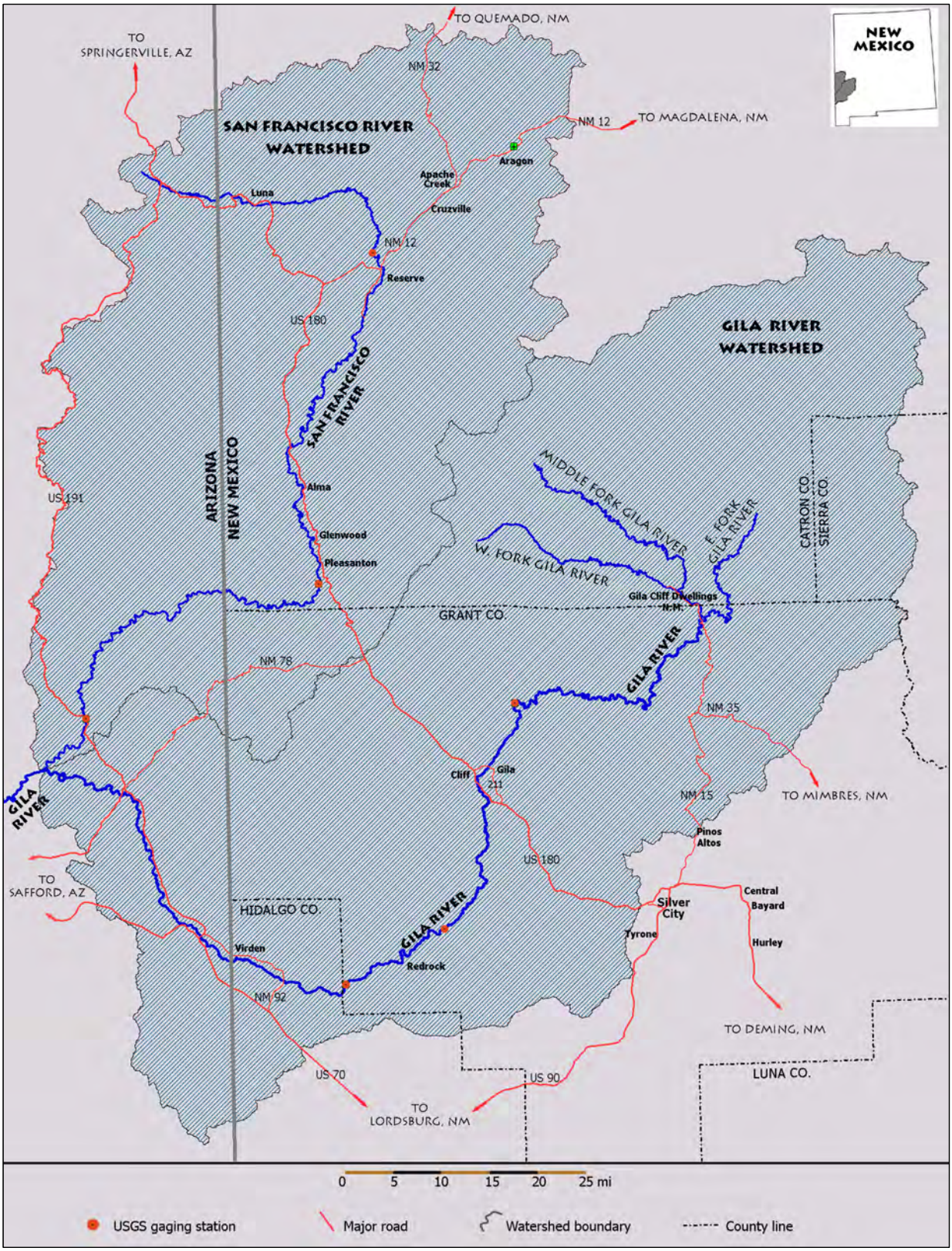
The three forks of the Gila River flow through the forested mountains of the Gila Wilderness (Figure 1) to join just south of the Gila Cliff Dwellings National Monument, a site where the most striking evidence of this region's prehistoric human presence is preserved (Figure 2). The river's course continues through deep canyons and alluvial valleys across 100 miles of New Mexico landscape before it reaches the Arizona state line. One of the Gila's most significant tributaries is the San Francisco River. From its headwaters in Arizona, the San Francisco crosses into New Mexico and flows for about 90 miles near the state line before topography sends it back toward its confluence with the Gila in Arizona, about 40 miles to the west of the border between the two states (Map 1). At their confluence, the two rivers drain a total of about 6,840 sq. mi.. Nearly 80% of this total area (5,340 sq. mi.) lies within their New Mexico basins. Most of the land traversed by the San Francisco River and higher elevation reaches

of the Gila River is part of the Gila National Forest, where their watersheds are similar in many ways. This is reflected by the work of most of the groups and agencies active on these watersheds, whose efforts encompass both of these rivers and their tributaries.

Figure 2. Site at Gila Cliff Dwellings National Monument, 2005. Photo courtesy NMED, Silver City.

Evidence of human habitation here dates back at least 20,000 years. In this semi-arid region, humans have always recognized the value of these streams. Their flows create and are sustained by a landscape that helped to inspire the U.S. Forest Service in 1924 to designate the upper watershed as the first wilderness area in the country. Today, they provide significant water supply, recreation, economic, and aesthetic benefits for the watershed's inhabitants. Because their natural flow regimes in New Mexico remain mostly—and uniquely—unaltered, they support one of the largest remaining riparian ecosystems in the Southwest.

These rivers are the region's most precious resource, and this is the most fundamental reason to be concerned with the health of their watersheds. Excessive rates of sediment runoff or erosion, loss of wetlands and riparian cover, and dense forest cover prone to high-intensity wildfire are conditions present both on mainstem river segments and within the subwatersheds tributary to them. Such conditions frequently result in impairments to water quality. River flows are not constrained by the political and legal boundaries of land management responsibility or ownership, and the effects of impaired watershed health may extend far downstream of their source.



Map 1. Watersheds of the Gila and San Francisco Rivers at their confluence in Arizona, including major roads, political boundaries, communities, and USGS streamflow gaging station locations.

WHY A *WIPS*?

A watershed planning document like this one is often referred to as a *Watershed Restoration Action Strategy*, or *WRAS*, and the initial draft of this document (*Gila River WRAS*, October 2005) followed this convention. In the ecological sciences, however, "restoration" can refer specifically to "an attempt to create an ecosystem exactly like the one that was present prior to disturbance" (Briggs, 1999). There are a number of difficulties with this approach (see Baker, 2000; Stromberg & Chew, 1999), but among the most profound is a lack of knowledge about what conditions were actually *like* prior to disturbance, the selected time period over which disturbances have occurred, and how to categorize "natural" versus "human" (i.e., reparable) disturbances. This document therefore aims less at returning watershed conditions to some previous state than at supporting and improving conditions of hydrologic and ecosystem resilience on the watershed. To this end, the *WIPS* provides an inventory of current conditions on the watershed, suggested actions to improve them, and a means of documenting the measurable results of those actions. Specific goals and their benefits are numerous and include, but are not limited to: increasing public knowledge and input regarding specific improvements to enhance riparian structure, form and function; improving water infiltration and soil moisture storage throughout the watershed; improving wildlife habitat; providing new opportunities for sustainable economic use; and enhancing recreational opportunities for residents and visitors.

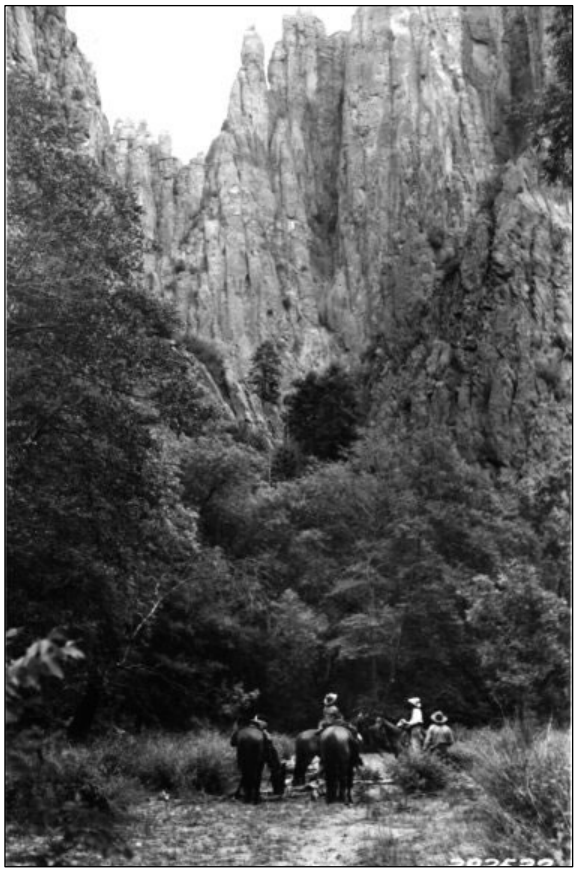


Figure 3. Horseback riders, 1922, on what became the Gila Wilderness two years later. Photo courtesy USDA Forest Service.

Development of the *WRAS* and its revision as the *WIPS* were supported by §319 funding from EPA and NMED. In revising the document, we have relied on guidelines from EPA's *Handbook for Developing Watershed Plans* (2005). A *WRAS* is typically designed to support water quality improvements by implementing measures aimed at reducing contaminant loads to acceptable levels (known as Total Maximum Daily Loads, or TMDLs). The *WIPS* retains a focus on water quality issues, and particularly on subwatersheds identified by NMED to be of special concern. However, watershed planning can go beyond strategies for attaining TMDLs to consider the larger watershed context (EPA, 2005). Other issues directly connected to watershed health include land use history, climate effects, economic sustainability, reduced minimum flows, water transfers, wetland modification, habitat protection, and synergistic effects among these. The *WIPS* is intended to support all actions that are aimed at improving watershed function within the Gila River basin.

HOW TO USE THE *WIPS*

The geographic area encompassed by the Gila River watershed in New Mexico is enormous and diverse. In any given year, strategies designed to improve watershed functioning can typically be implemented only on a small proportion of the watershed. Detailed planning and careful evaluation of results can greatly enhance the effectiveness of this work. The *WIPS* and its ancillary components are intended to provide a foundation for such efforts. It is generally recognized that the most effective watershed planning recognizes the interactions among all of the factors—vegetation and soil types, topography, climate, and land use, for instance—that ultimately influence stream hydrology and water quality. Planning should ideally include measures to enhance the functioning of the entire watershed, from uplands to the stream channel itself. On the scale of the entire Gila watershed, this is an impossible task. However, establishing specific geographic limits within which sets of improvement strategies can be implemented makes detailed planning and evaluation of results more manageable. We use the term *subwatershed* to describe these limits, as the land area from which water reaches any particular point on a stream. It is intended as a flexible concept whose extent depends only on the stream location selected.

We strongly encourage stakeholders to develop detailed plans at the subwatershed scale. Developing and implementing a detailed, effective subwatershed plan depends on coordinated work among willing landowners, management and liaison agencies, and practitioners. Any watershed plan will incorporate a number of improvement practices, and hundreds of technical and financial sources are available to assist in implementing these practices. The *WIPS* helps stakeholders locate and use these resources. Applications for funding assistance are increasingly judged by whether or not they address watershed issues on a holistic basis, including the formation of partnerships between private and public entities. EPA supports watershed planning efforts with funding and technical assistance that includes a template for coordinated watershed plan development (EPA, 2005). The *WIPS* and EPA's planning template can help landowners and others who want to develop integrated, coordinated watershed plans and to locate technical and financial support for project implementation.

Table 1 summarizes the planning template. The *WIPS* sections shown in the table provide information on potential partners, proposal development support, data, technical or financial resources, and methods for measuring results from improvement practices. Different users will find some sections of the *WIPS* more pertinent than others. For projects supported with §319 funding (see *WIPS* Sections 4 and 5), EPA *requires* additional, specific components, referred to as "Nine Key Elements" for watershed planning. These elements are highlighted in the table as boxed tasks: items a through i. Not all of the steps and tasks described in the table are necessarily sequential, and most will benefit from iterative development. For example, stakeholders who join the process after initial steps are complete may have access to additional information that could help guide the planning effort.

Each of these steps and tasks is covered in detail in the EPA (2005) *Handbook*. To request a copy, or to access individual chapters, go to: http://www.epa.gov/owow/nps/watershed_handbook/.

Table 1. Summary of watershed planning process suggested by EPA, including the nine key elements required for §319-funded practices, and sections in the *WIPS* containing relevant planning resources and data. Boxed items in the table are EPA's required "Nine Key Elements" for §319-funded planning and remediation projects.

PLANNING STEPS	TASKS	WIPS SECTION(S)
BUILD PARTNERSHIPS	Locate key stakeholders List issues of concern Establish initial goals Conduct public outreach	Section 7
CHARACTERIZE THE [SUB]WATERSHED	Gather existing data to compile into a subwatershed inventory Identify data gaps and collect additional data	Section 3
	a) Identify causes and sources of pollution (biological, physical, and/or chemical)	Section 4 Section 5
	Identify other impairments to watershed function Estimate pollutant loads (NMED/SWQB data available)	
FINALIZE GOALS AND IDENTIFY POTENTIAL SOLUTIONS	Document management objectives	Section 4 Section 5 Section 6
	b) Identify specific indicators and quantify targets, including pollutant load reductions	
	Identify critical areas for implementation of practices	
	c) Identify most effective management practices to achieve targets	
DESIGN YOUR IMPLEMENTATION PROGRAM	d) Develop an implementation schedule e) Identify interim "milestones" to be achieved (e.g., map all water sources; obtain clearances) f) Develop measurement criteria (what to measure) g) Outline a monitoring plan (how to measure) h) Develop an information component (to evaluate progress and communicate results) i) Outline technical and financial assistance needed for implementation of project components	Section 4 Section 5 Section 6 Section 7
	Assign responsibility for plan review and revision	

Table 1, continued.

IMPLEMENT THE PLAN	Implement initial management practices Monitor results Document results Broadcast results	Results documented in *WIPS* and GIS provide an information resource to support other efforts
MEASURE PROGRESS AND MAKE ADJUSTMENTS	Review and evaluate progress Analyze monitoring results Document all progress and results in annual work plan Disseminate information Adapt future management practice details and begin implementation process	

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