

# **CEDRO CREEK WETLANDS ACTION PLAN**



**New Mexico Environment Department Surface Water Quality Bureau**

## INTRODUCTION

Wetlands are a viable part of New Mexico's ecosystem and assist in maintaining habitats of sensitive species relying on a desert environment. An example of this is in the high desert on Cedro Creek, an intermittent stream that is losing its potential for a diversified habitat to wetland plant and animal species. Approximately 15 years ago, the Cibola National Forest (CNF) (the primary land manager of this watershed) and Bill Zeedyk, a stream restorationist and retired U.S. Forest Service official, began to implement innovative techniques developed by Zeedyk to restore the creek closer to a sustainable-functioning hydrologic system. Overtime, these structures began to show positive results of native wetland vegetation growth and intermittent ponding of perennial water.

The New Mexico Environment Department, Surface Water Quality Bureau (SWQB) Wetlands Program is implementing a strategy to assist with data gathering and development of wetland restoration projects. This approach, entitled Wetlands Action Plan (WAP), is similar to Watershed Restoration Action Strategies in that the Wetland Action Plan summarizes wetland information gathered by watershed groups, governmental agencies, and other interested individuals to create a document describing the type and function of wetlands within a specific drainage. The WAP also describes if wetlands are impaired within the watershed, their location if known, and the type of wetland restoration needed.

In 2004, SWQB the received a grant from the U.S. Environmental Protection Agency to work with the CNF, The Quivira Coalition, and Zeedyk Ecological Consulting, LLC to restore more of Cedro Creek. This plan satisfies a portion of this grant and is created in order to synthesize information collected regarding the wetlands of Cedro Creek watershed. (For purposes of this plan, riparian areas are included as wetlands.)

## **BACKGROUND**

Cedro Creek originates in the Manzanos and flows for nine miles northwest emptying into Tijeras Arroyo near the town of Tijeras, Bernalillo County. The Cedro Creek watershed has a rich native culture, pueblo, and settlement history due to its proximity to the Rio Grande (Lawrence 2002). Evidence in the watershed began early with the Anasazi culture, apparent with pictographs and hunting objects found in the area (Ibid). As early as 1600 A.D. native people were using the area to travel through to the Rio Grande Valley on a frequent basis (Ibid). In the late 1860s, the Griego family began settling the watershed on the basis of the Carnué Land Grant (Ibid). From 1882 to 1890, the Greigo surname was expanded in the area with the acquisition of more homestead patents (Ibid). Ojo de Sabino village was also a part of the Carnué Land Grant (Ibid). Between 1920-1940, farming began in Tijeras Village (Ibid). Evidence of bean fields in Cedro Creek watershed indicates that the floodplain area was also used for farming (Ibid). Within land grant areas, land use also consisted of herding sheep and goats.

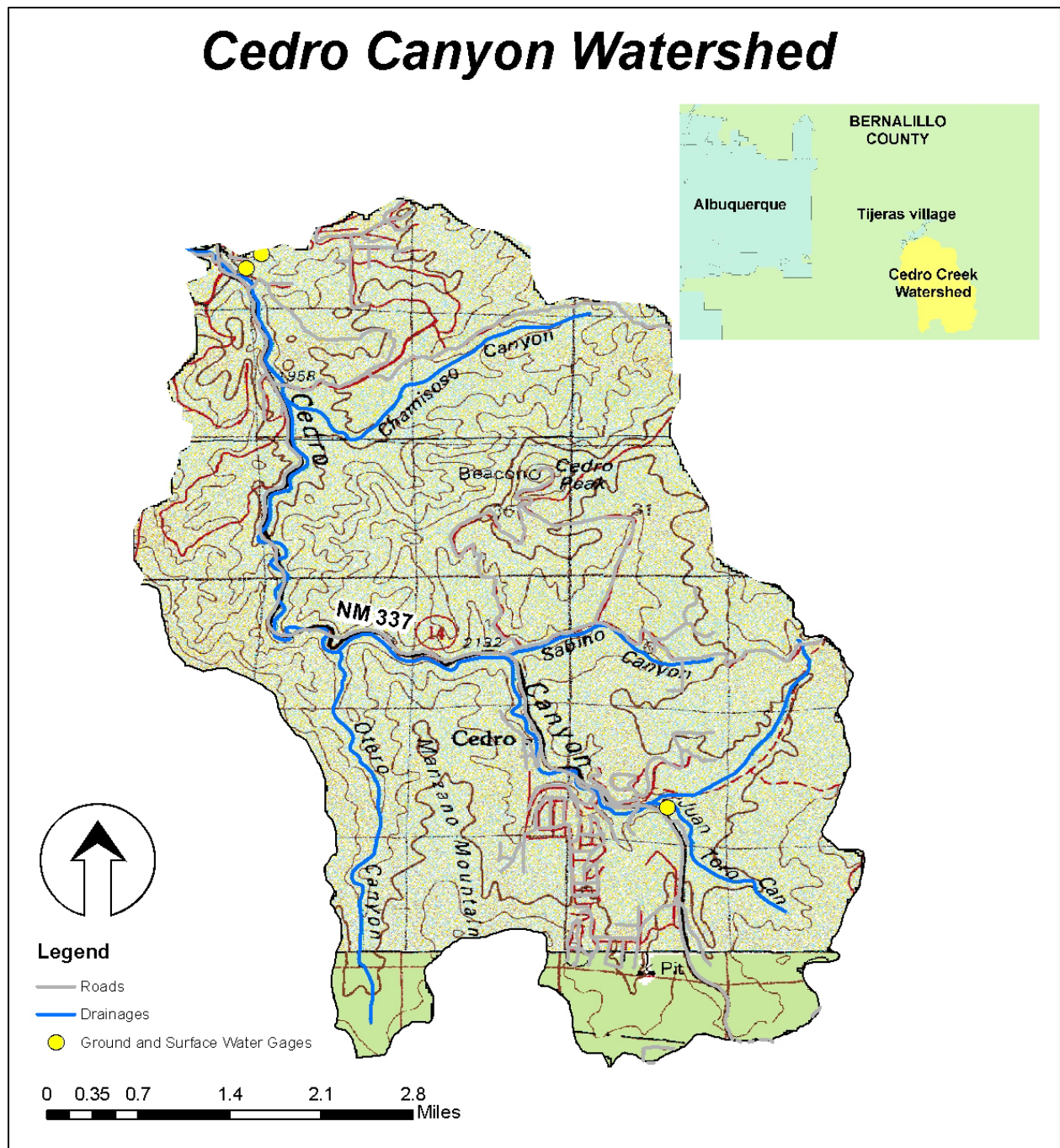
Once threats of raids from Apache and Navajo diminished, additional villages in the watershed began formation after 1863 (Ibid). The Village of Juan Tomás was established during this period and the land was used for agricultural purposes, and at one time for logging (Ibid). Corridors through Cedro Creek watershed covered a wide area as indicated by pictogliffs, petrogliffs, and wagon roads (Ibid). In the 1950s, the most utilized conduit was replaced by State Highway 14 (later numbered 337). The watershed was also used for locations of aircraft beacons in the 1930s to 1940s, trash dumps, and prospect mining (Ibid).

Current use in the watershed includes residential, conduit through State Highway 337, recreational purposes, and prospecting. The recreation occurring in this area includes rock climbing, off-road vehicle use, bicycling, hiking, and camping.



In present day the Cibola National Forest (CNF) Sandia Ranger District manages most of the watershed. However, there are some community inholdings within the District boundaries that originated as historical pueblos.

Map 1



Cedro Creek watershed is on the eastern side of the Manzano and Manzanita Mountains in central New Mexico. The Manzano and Manzanita Mountains were formed by tectonic movements following the deposition of the Galisteo formation (Brown 1962). The canyon primarily contains limestone from the Upper and Middle Pennsylvanian and Madera Formation. This formation's upper and lower members contain limestone shales and siliciclastic medium to coarse grained rocks (Read, et al. 1998). Geologic cross sections created by the New Mexico Bureau of Mines and Mineral Resources (Read, et al. 1998) show Sandia Formation beneath the Madera Formation near Cedro Peak and Otero Canyon. The Sandia Formation contains sandstones, siltstones, silty shales, and limestones greenish in color with abundant sand (Ibid). The layers of limestone and sandstone contain fractures that hold water accumulated during heavy rains and snowmelt, releasing at later periods (Chronic 1987). This alters the hydrology of the watershed and more importantly offers opportunity for wetlands to grow atop bedrock.

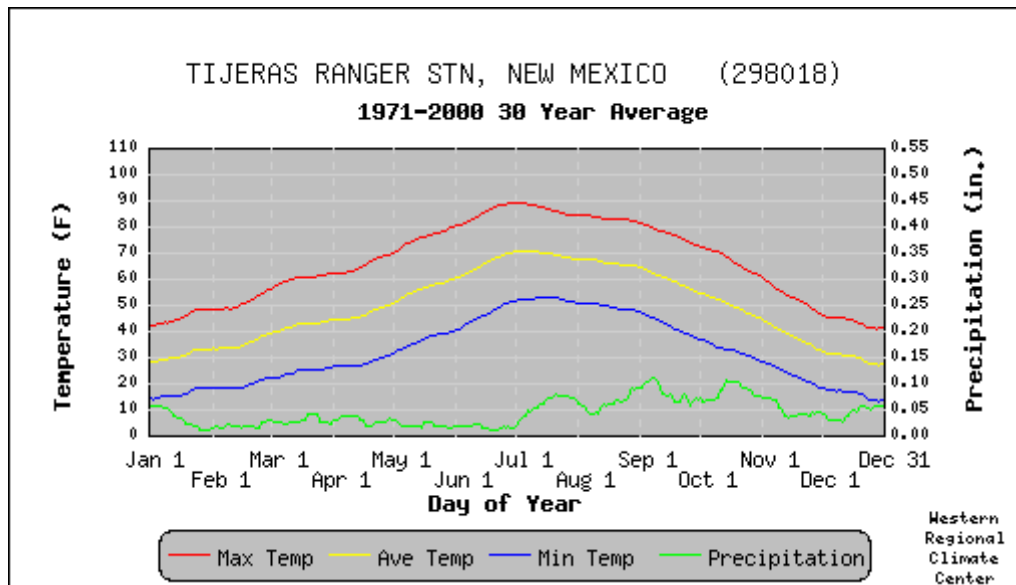
### **Cedro Creek Watershed Hydrology**

Cedro Creek contains ephemeral and intermittent flows from south to north. The creek decreases by approximately 800 feet from headwaters to the confluence with Tijeras Arroyo. Most of the stream flow is due to spring season flows. As previously mentioned, the hydrology is affected by the limestone and sandstone fractures releasing water at later dates. The stream also has a number of places that have bedrock stream bottoms, where pools form. This geology maintains water in some portions of Cedro Creek intermittently year-round. The main tributaries of Cedro Creek are at Juan Toro Canyon, Sabino Canyon, Otero Canyon, and Chamisoso Canyon.

The watershed is located within the Rio Grande-Albuquerque eight-digit hydrologic unit code. The watershed is approximately 19.5 square miles. Average total precipitation from 1971

until 2000 at Sandia Ranger Station (also named Tijeras Ranger Station) was approximately 16 inches (WRCC 2008). The 30-year average temperature and precipitation graph in Figure 1 demonstrates that at Tijeras Ranger Station, the majority of precipitation falls during the monsoon season.

**Figure 1 (WRCC 2008)**



According to a ground water gage installed at Tijeras Ranger Station (see Map 1), the water table has dropped by approximately thirty feet from 1969 to 1995. However, only three measurements were taken. The first two measurements were taken in March and April 1969. The second measurement was taken in June 1995, which is the driest period for this watershed. The drop in the ground water level could be due to the lack of precipitation that occurs during June. It could also be from the recent increase in population and therefore water needs in Tijeras Canyon.

Although there is no streamflow gage located on Cedro Creek, streamflow was measured at Juan Toro Canyon at the confluence with Cedro Creek (see Map 1) from 1959 to 2006 once a year during the monsoon season averaging to approximately 23 cubic feet per second. The U.S. Geological Survey gage number 08330400 drainage area is 1.52 square miles.

Historically, the Cedro Creek drainage area had a larger floodplain evidenced by availability of land to be used for agricultural purposes. The old and current roads have altered the hydrology and shruken the floodplain of this watershed. Impervious surface from the road causes more rapid runoff at locations determined by road drainage. This increases the opportunity for erosion and lessens the availability for strong wetland sedges and rushes to grow, as they had in the past.

**Wetland Vegetation**

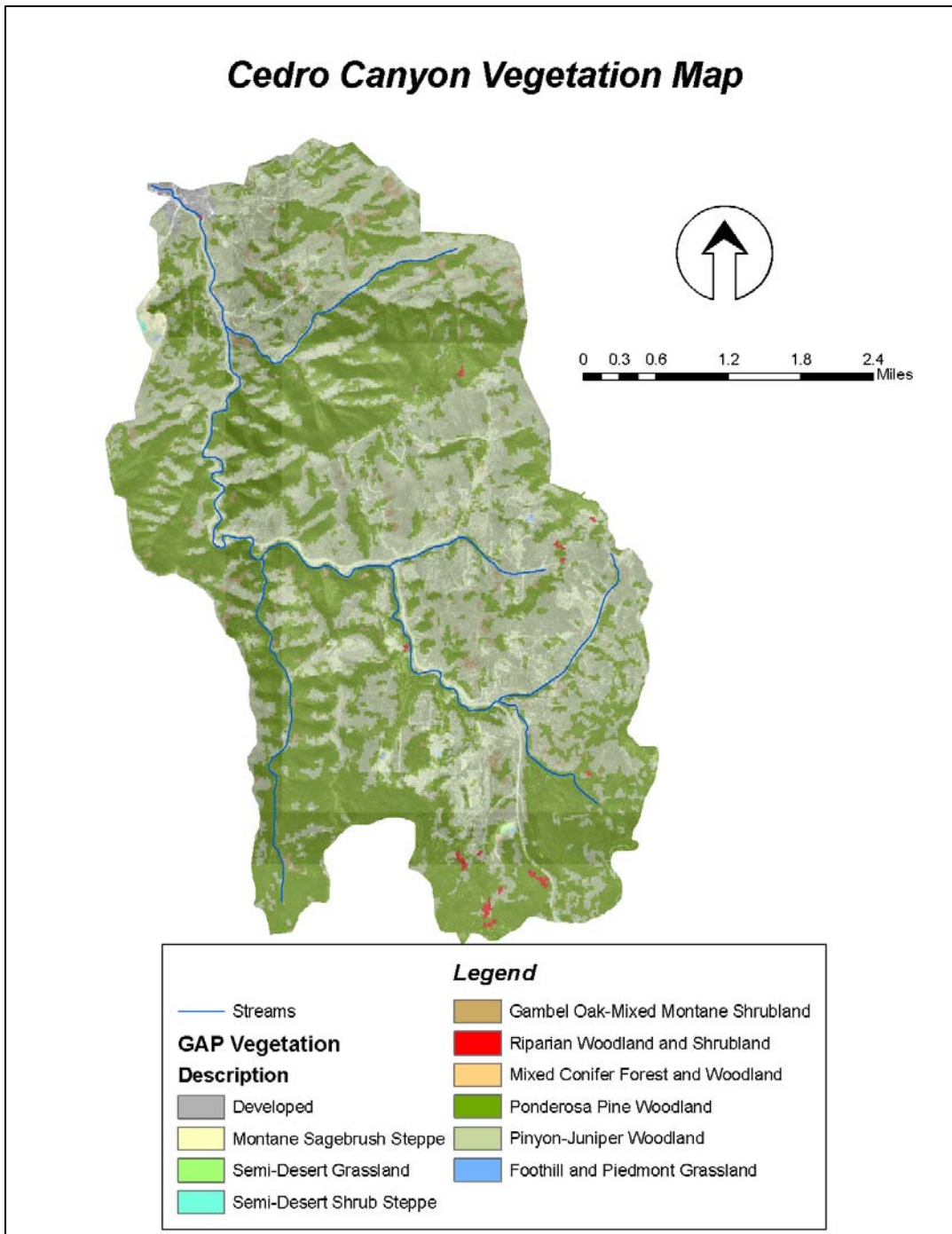
Steve Vrooman Restoration Ecology developed a report based on monitoring the effects of structures that were placed in Cedro Creek as part of the 2004 restoration grant. They sampled wetland vegetation at four locations using either Line Point Intercept or Greenline Survey methods (Vrooman 2005). At these sites, only 19% of the vegetation sampled is listed as having

**Table 1: Wetland Vegetation in Cedro Creek Watershed (Vrooman 2005)**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Wetland Indicator Status</b>	<b>Occurrence in Wetlands</b>
Canada Wildrye	<i>Elymus canadensis</i>	Facultative Plant	67%-99%
Geranium	<i>Geranium richardsonii</i>	Facultative Plant	67%-99%
Pennyroyal	<i>Mentha pulegium</i>	Obligate Wetland Plant	> 99%
Baltic rush	<i>Juncus Balticus</i>	Obligate Wetland Plant	> 99%
Narrowleaf Willow	<i>Salix exigua</i>	Obligate Wetland Plant	> 99%

a presence in wetlands according to the Natural Resource Conservation Service PLANTS database (Vrooman 2005). These species are listed in the Table 1. Vrooman conducted a post-restoration survey in fall of 2007 which will include a report of vegetative changes, if any, once

**Map 2**





structures were installed. Results of this report will be included in the Wetlands Action Plan. Vrooman's 2005 survey is not consistent with the landcover descriptions from the Southwest Regional GAP Analysis Project (as shown in Map 2) published by NatureServe in 2004. Currently, large scale assessments like that of the GAP Analysis Project are not accurate to the scale of Cedro Creek watershed. The watershed would benefit from a more detailed wetland survey.

### **Species Affected by Wetland Degradation**

According to the New Mexico State Comprehensive Wildlife Conservation Strategy (NMDGF 2006). Cedro Creek is within the eco-region that contains the most birds and mammals than the other southwestern ecoregions. They call this region the Arizona-New Mexico Mountains Ecoregion. The New Mexico Department of Game and Fish state that this ecoregion has eighty species of Greatest Conservation Need (Ibid). However, most of these species do not occur in wetlands or riparian areas. This is another example of how large-scale assessments are too broad for determining species affected by wetlands in Cedro Creek watershed and how more detailed survey for species is needed.

Throughout restoration and wetland planning, federal and state listed species should be taken into consideration. Yellow-billed cuckoo (*coccyzus americanus occidentalis*) is listed federally as a candidate species. With the State of New Mexico it is listed as a sensitive species. According to the Center for Biological Diversity (2007), the cuckoo breeds in riparian forests. The Cibola National Forest lists this bird as transient during Spring and Fall in the Manzanita Mountains. They inhabit vegetation communities of rush/bulrush/sedge/cattail marshes and cottonwood/alder/willow riparian areas (Hubbard 1978) (Finch 1992). However, the cuckoo needs vegetation that grows in permanent moisture and nesting usually requires a riparian forest

of 25 to 100 acres (USDA 1991 and CBD 2007). The cause for the cuckoo's habitat degradation may include invasive, exotic species in riparian areas, riparian eradication, agricultural development, fuel, and development (Howe 1986). Any wetland or riparian restoration that occurs within the Manzanita Mountains will assist the cuckoo. However, the size of individual wetlands and riparian areas in Cedro Creek watershed will most likely not meet the breeding requirements of the cuckoo.

Southwestern willow flycatcher (*empidonax traillii extimus*) is listed as endangered by the New Mexico Department of Game and Fish (NMDGF) and U.S. Fish and Wildlife Service (FWS). The flycatcher breeds during spring, summer, and fall in Bernalillo County. Habitat includes the cottonwood/alder/willow communities and bulrush/rush/sedge/cattail marsh communities, where the flycatcher feeds in layered riparian areas for insects (NMDGF 2007a). It has been cited that the preferred nesting for this bird was the box elder tree (Boucher, et. al 1997). The flycatcher may also nest in willow and rose (NMDGF 2007a). Both of these shrubs and the box elder are found in Cedro Creek. Origins of habitat loss include water diversion, stream channelization, off-road vehicles, and hydrological changes from other uses (Ibid). Some of these causes, such as stream channelization and hydrological changes, occurred in Cedro Creek.

Mexican spotted owl (*strix occidentalis lucida*) is federally-listed as a threatened species and listed by the NMDGF as a sensitive species. Montane riparian of cottonwood/alder/willow communities are important wintering habitat for this species (Stahlecker 1995). However, they use a variety of forest types (DOI FWS 1993). Habitat requirements must include dense, multi-sorted canopy (NMDGF 2007b). In Cedro Creek most of the restoration work will not in the near future result in an uneven-aged canopy because of the degraded canopy that they site had in

the pre-restoration condition. A dense canopy requires perennial water, which overall Cedro Creek does not maintain.

Bald eagle (*haliaeetus leucocephalus alascanus*) is delisted from the federal endangered species list. However, in New Mexico the eagle's status is threatened. Loss of riparian habitat has been noted as a population threat (OSU 1993). Vegetation habitat includes sedge/muhly/fescue, cottonwood/alder/willow, and rush/bulrush/sedge/cattail marsh communities (NMDGF 2007c). All of these vegetation communities exist in the Cedro Creek watershed. The Manzanita mountains regularly hosts the bald eagle without the presence of perennial water (NMDGF 1988). Though, sufficient, permanent moisture for plants, trees, and shrubs of which the bald eagle relies is necessary to the eagle's habitat (NMDGF 2007c).

There are a number of bats that are listed in New Mexico as informal sensitive taxa, one as threatened (*euderma maculatum* - spotted bat), and one with FWS Species of Concern and NMDGF informal sensitive taxa (*corynorhinus townsendii pallescens*). Overall, these bats may use Cedro Creek watershed wetlands and riparian areas to forage on aquatic insects that depend on open water and riparian vegetation.

The black swift (*cypseloides niger borealis*) has informal sensitive taxa status by the NMDGF. Although they feed in wetlands, they nest near waterfalls and swift water. The proximity to nesting sites is not near Cedro Creek watershed and therefore feeding most likely would not be dominant in Cedro Creek.

Bell's vireo (*vireo bellii*) is federally listed as a Species of Concern and listed by NMDGF as threatened. The NMDGF encourages land managers to restore riparian habitats for the benefits of this bird (NMDGF 2007d). However, there is rare abundance in Bernalillo County. Wetland restoration activity in Cedro Creek watershed may or may not affect the bell's vireo.

## Soils

According to the Natural Resource Conservation Service (an update of the 1977 soil survey was performed in 2003), the manzano soil complex occupies the northern end of the creek as it flows into Tijeras Creek. This soil is intermittently moist during the rainy season with up to 35 percent clay content, which can contribute to the wetland plant growth during this time (NRCS 2003). South, upstream of the manzano complex is the La Fonda series. This series is intermittently moist during the summer. These soils are easily erodable with moderate permeability. Continuing upstream, the soils in the creek's floodplain belong to the seis complex at thirty to eighty percent slopes. This soil is moist intermittently during April through October. Approximately 0.5 mile, this section of the creek was evaluated for restoration potential and named Ranger Station B and A. This soil series continues up Cedro Canyon, past Chamisoso Canyon, for another 1.5 liner river miles. These 7000 feet of river currently have not been assessed. The next series upstream is a rock outcrop. This is where the majority of the 2005 wetland restoration assessment took place because the limestone maintains water during the runoff and rainy season and releases it at various times, allowing for an opportunity for wetland vegetation to grow when the rest of the watershed is dry. This process is found throughout the watershed, but is prevalent in this middle section. The rock outcrop continues upstream for approximately four miles. Restoration assessment stops at Cedro Village. The seis-silver soil complex finishes the remainder of the floodplain soils in this watershed. The silver series is intermittently moist during the rainy and winter seasons (NRCS 2003). The remainder of Cedro Creek was assessed in this soil complex.

According to the NRCS (2003), the majority of soils adjacent Cedro Creek are intermittently moist, allowing opportunity for wetland vegetation to establish.

## **Location of Wetlands in Cedro Creek Watershed**

No real intensive survey of wetland area has taken place in Cedro Creek watershed. However, based on the soils, geology, and vegetation information presented above, wetlands in the Cedro Creek watershed exist primarily in the riparian areas of Cedro Creek and the major tributaries. Within the Cedro Creek riparian area, the main wetland influence is the bedrock limestone in the middle portion of the creek because of its ability to maintain and release water at later periods when the rest of the watershed is dry. Most of the restoration is focused in this area. However, evaluating the rest of the watershed for wetland potential may also indicate more wetlands that are in danger of not being protected or restored.

### **IMPAIRMENTS TO WETLAND PROTECTION**

In 2006, the federal Supreme Court issued a decision that lessened protection of ephemeral, intermittent, and terminal waters. This decision was made from *Rapanos v. United States*, where the definition of waters of the United States in the Clean Water Act was in question. From this case, the U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (USEPA) currently administers the opinion of Justice Kennedy which states that a wetland or water body must have "significant nexus" with traditional navigable waters (ELI 2007 and USACE 2007). A "nexus," or connection, is "significant" as it pertains to the goal of the Clean Water Act: "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (ELI 2007). According to joint guidance issued by USACE and USEPA, the agencies maintain jurisdiction is if a body of water that flows at least "seasonally" directly abuts the traditionally navigable water (TNW) and/or if proof is found that a water body is affecting the biological, physical, or chemical integrity of the TNW (USACE 2007). Ephemeral and intermittent waters will need to prove the nexus that it has to TNWs.



In New Mexico, USACE considers Pecos, Chama, Rio Grande, Canadian, San Juan, and Animas Rivers to be TNWs. Navajo Reservoir is also a TNW. Cedro Creek is not located within any of New Mexico's closed basins. However, it also does not directly abut what the USACE considers a TNW. Therefore protection under the Clean Water Act for Cedro Creek is limited to the landowners of the watershed. This creates an opportunity for the loss of the wetlands in Cedro Creek.

Additionally, the State of New Mexico does not maintain its own program to protect waters from dredge and material fill. Therefore, the certification used when working in a stream (Clean Water Act Section 401) is only required when the USACE requires their Clean Water Act Section 404 permit to be used and New Mexico is constrained by federal government rules.

Potential for wetland losses in Cedro Creek watershed may also occur with infrastructure located within the watershed. Roads can impact vegetation with the easy dispersal of non-native invasive species and altered flow within the drainage. Flashy flows caused by impervious surfaces from roads cause erosion and allow less opportunity for wetland vegetation to establish. The spread of invasive species is evident in the aerial photographs taken in the 1930s and now. This invasion could be caused from the roads and from past agricultural use altering the soils to be less desirable by local riparian and wetlands vegetation. Roads can also divide habitat cells that weren't previously divided. Highway 337 is a prime example of this as the road splits the river in several locations. The culverts alter the streamflow and river habitat, lowering the downstream streambed. This often results in less opportunity for species movement, particularly by aquatic species (NMDGF 2006).

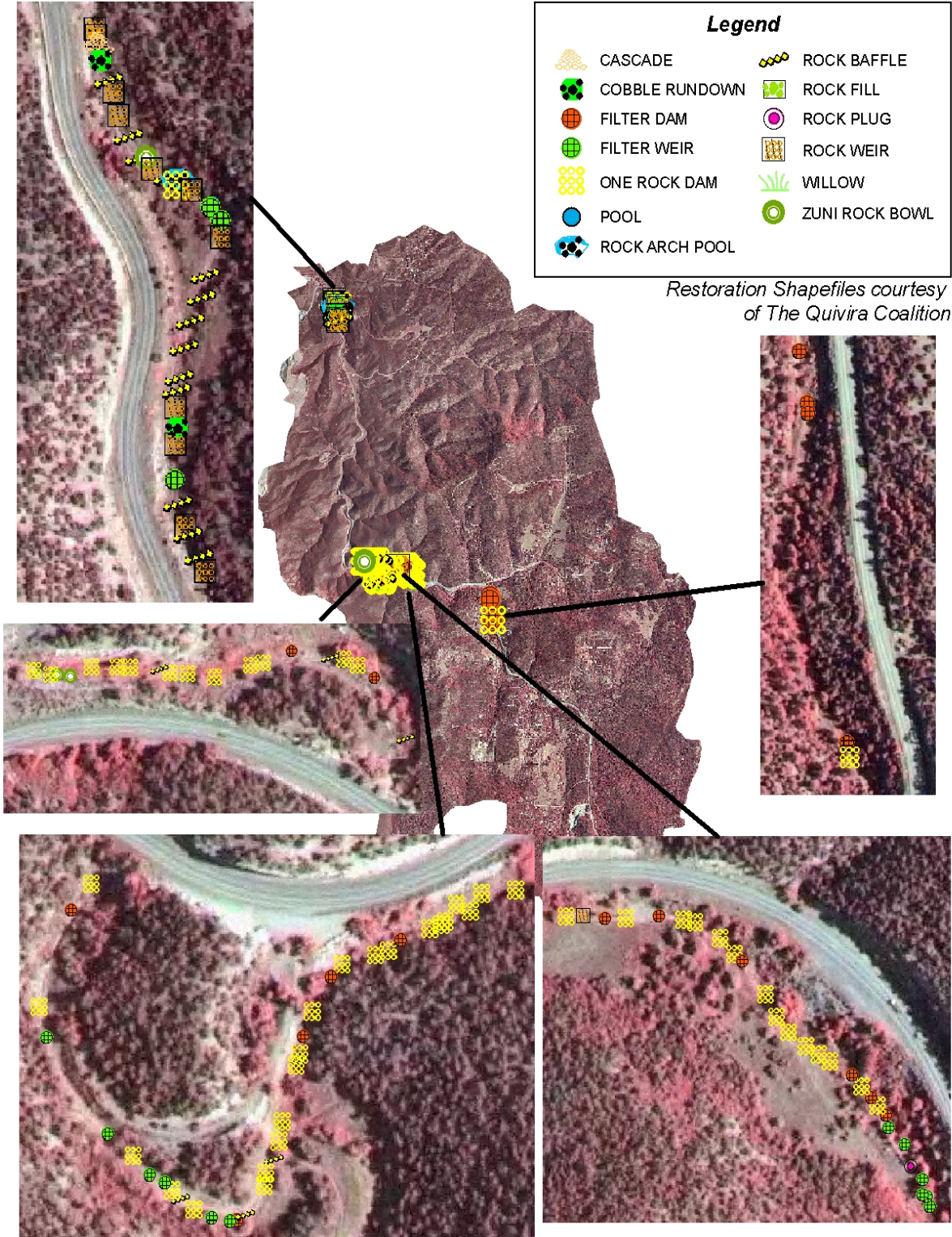
## **PAST WETLAND PROJECTS**

Restoration assessment occurred in Spring 2005 of a portion of Cedro Creek wetlands. Approximately 10 miles of the creek was surveyed by Zeedyk Ecological Consulting, LLC, Quivira Coalition and subcontractors of the Quivira Coalition. From April 2006 through August 2007 volunteers and contractors built numerous structures to assist with headcuts, entrenched streambed, increasing meander lengths, placing creek in original channel, decreasing width in stream, Russian Olive and Siberian elm eradication, and wetland vegetation planting. This occurred on approximately two miles of Cedro Creek. Structures installed were one rock dams, closing eroding trails, rock water harvesting structures, filter dams, rock weirs, Zuni bowls, baffles, vanes, and a rock arch dam. Structure placement and installation was supervised by Zeedyk Ecological Consulting, LLC, restoration designer for the project.

Due to the close proximity Cedro Creek watershed has to Albuquerque, many volunteer groups and school children assisted with the construction of many of these structures. Map 3 displays where work was completed during this time period.

Map 3

## Cedro Creek Restoration 2005-2007



## FUTURE WETLAND PROJECTS

Wetland protection for Cedro Creek watershed wetlands should engage various levels of involvement from the public and government officials. Three main efforts need to take place to ensure protection and restoration of these wetlands:

- 1.) Inclusion of inholding communities such as Cedro Village in additional assessments and restoration is necessary to assist with protection of wetlands in the watershed particularly because there is not much protection by the federal or state government. Most of the inholdings are located on flatter ground that may hold wetland vegetation species. This is evident since the villages were formed at that location for agricultural purposes.
- 2.) Entities that are interested in protecting Cedro Creek watershed wetlands should perform research for other protection opportunities and/or lobby legislators to offer better state-wide support of protecting intermittent or ephemeral wetlands.
- 3.) The remaining portion of the 2005 restoration recommendations still needs to be completed, which encompasses approximately six miles of streambed. Below is a table of structures recommended by Bill Zeedyk that have yet to be built.

**Table 2: Cedro Creek Restoration Reconnaissance Notes and Structure Recommendations**

<b>Reach Name/ Priority</b>	<b>Reconnaissance Notes</b>	<b>Structure Recommendations</b>	<b>Length (ft.)</b>	<b>Hydrology</b>
Talus Slope/1	Headcut	Headcut control	1,119	Ephemeral
Black Willow/1	Headcut	Headcut control, fix filter dam	1,733	Perennial interrupted
Towhee Falls/1	Headcut	2 filter dams and one rock dam	1,313	Perennial interrupted
Mahogany/1	Cutbanks from road	Filter dam, baffles, weirs	1,736	Ephemeral

<b>Reach Name/ Priority</b>	<b>Reconnaissance Notes</b>	<b>Structure Recommendations</b>	<b>Length (ft.)</b>	<b>Hydrology</b>
Bear Track/1	Headcuts, non-native vegetation	Headcut Control, one rock dam, log and fabric filter dam, masonry structure trail crossing, weir, move bike trail, baffles, rock and fabric dam	2,733	Ephemeral
Sabino - Falls/2	Overloaded with sediment, aggrading stream, Juan Tomas road crosses stream.	2 one rock dams.	575	Perennial interrupted
Sabino - Cattail/2	No structures needed.	NA	471	Perennial interrupted
Ponderosa/2	Erosion	One rock dams	1,411	NR
Sandstone/2	Headcut	NR	1,195	Ephemeral
Cascade/2	NR	One rock dams, water catchments for wildlife	2,603	Ephemeral
DK/2	Tires in creek and headcuts.	2 Headcut control structures, mega filter dam reinforcing rock trash, 3 filter dams, 4 one rock dams, baffle, living elms, living weir, rock arch	1,905	Perennial interrupted
VW/2	Culvert is acting as a fish barrier, a lot of exposed bedrock in stream and in canyon, old car in stream.	3 filter dams, a spring cleaner structure, spring enhancement, baffle, one rock dam	1,099	Perennial interrupted and ephemeral
Tunnel Canyon/2	Nice meander pattern, channel should be relocated, creek captured old road, not running in bottom of valley, meander is being drained, creek is moving too much sediment and debris from upstream for this size of drainage because of the fire activity and settlement impact, alluvial fan blow-out.	Sloping weir, baffle, plug channel in two locations, one rock dam.	4,553	Ephemeral



<b>Reach Name/ Priority</b>	<b>Reconnaissance Notes</b>	<b>Structure Recommendations</b>	<b>Length (ft.)</b>	<b>Hydrology</b>
Juan Tomas/3	Steep banks, long-straight sections, berm presence, headcuts	NA	NA	NA
Sink/3	3 headcuts down to bedrock.	4 one rock dams, baffle, headcut control, 2 weirs	1,227	Perennial interrupted
Poker Chip/3	Headcuts	Headcut control	585	Ephemeral
Otero Canyon/3	Early meander in creek, incision, cheat grass, trail could have better drainage, foot traffic across creek, straight section, exposed bedrock,	Possibly move bike trail in a few places	5,572	NA
R&D/NA	Good floodplain			Ephemeral
Dead Man/NA	Headcuts	NA	NA	NA
Pine Flat/NA	Sediment moving into drainage. Headcut.	NA	NA	NA

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