

Upper San Pedro Partnership



Open Space Subcommittee

Hydrologic Protection Areas Final Report

April 25, 2001

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In memory of Karl Becker

*In time I judged my standard of living not
by what I had but by the quality and size of
open space around me.*

Jim Dale Vickery
Open Spaces

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USPP Open Space Subcommittee Hydrologic Protection Areas Final Report

INTRODUCTION

The Open Space subcommittee of the Upper San Pedro Partnership (USPP) recently identified stream segments that are valuable components of a functioning San Pedro watershed. The subcommittee acknowledges putting recommended protection measures in place will entail many additional complexities. First and foremost is the respect of individual property owners rights. Private owners must be consulted and convinced of the benefits of a protection strategy. Ultimately, the buy-in of private land owners and public land management agencies is needed to successfully protect any drainage corridor over the long term.

The specific mechanisms used, the identification of parties responsible for implementing the various phases, the funding of the efforts, and the prioritization of action steps along specific drainage segments are significant challenges. Rather than studying and formulating a grand over-all plan to protect all identified segments, the subcommittee recommends an incremental and more opportunistic approach. This complex issue does not call for a "one size fits all" approach and has identified the more significant drainages in the area as an initial step. Other ongoing efforts should be initiated on various segments that take advantage of existing land ownership patterns, landowner sentiments, availability of funding and similar factors. All stakeholders should be encouraged to initiate actions where practical and effective.

For example, BLM and The Nature Conservancy should continue the ongoing protection efforts along the washes draining Coronado National Memorial. At the same time, there are potential avenues for protection of Arizona State Trust Lands that could be pursued on one or more of the identified segments that fall on such lands. Local governments can implement planning, zoning and development policies that would be very helpful. Such diverse efforts should be constantly reassessed by the Partnership for success and efficiency. Lessons learned can then be applied to remaining segments.

OVERVIEW

The Sierra Vista subwatershed of the San Pedro River originates in Sonora, Mexico and flows north into southeastern Arizona. The San Pedro River watershed is an international basin with various characteristics that make it an important area to semi-arid hydrology and ecology.

The subwatershed represents a transition area between the Sonoran and Chihuahuan deserts and topography, climate, and vegetation vary substantially across the watershed. Elevation ranges from 3,780 to 9,500 feet above mean sea level and annual rainfall ranges from 10 to 30 inches per year. Vegetation types include desert scrub, grasslands, oak woodland-savannah, mesquite bosque, riparian forest, coniferous forest, and agriculture. The Sierra Vista subwatershed encompasses an area of approximately 1,740 mi², of which 696 mi² is in Mexico and 1,044 mi² is in Arizona. The subcommittee examined only that part of the Sierra Vista subwatershed that is within Cochise County.

The San Pedro River and its associated riparian habitat represents a premier wildlife movement corridor and important surface water and groundwater conditions. The main stem of the San Pedro should be considered a hydrologic protection area.

The proposed wildlife movement corridors contain many different types of habitats. These include such diverse habitats as riparian forests, pinyon-juniper and pine-oak woodlands, grasslands, perennial and intermittent streams, and desert washes. Many of these habitats are now contiguous but fragmentation of these vegetation types would greatly decrease their value and function as wildlife habitat.

Wildlife and essential pollinators move freely from the surrounding mountains to the San Pedro Riparian National Conservation Area. Species may cross the watershed divide and blend with populations in adjacent valleys. Many neo-tropical birds, bats, butterflies and moths depend on the diverse native vegetation to assist in their annual migration. These species will travel to the United States and Canada before returning with their young to Central America.

COMMUNITY SUPPORT

Public support for the preservation of open space has been demonstrated several ways.

On February 17, 1998, the Cochise County Board of Supervisors unanimously adopted the Naco Community Plan, developed by the Cochise

County Planning Department and the Naco Community Planning Committee – the first of its kind in Cochise County. This plan will guide growth and be used by the Planning Department staff as the basis for recommendations on rezoning requests, special use permits, subdivisions, Board of Adjustment requests, and master development plans. The plan, which contains specific policies, goals and elements addressing open space and historic preservation, was approved by the Naco Community Association and went through two public hearings, demonstrating wide support from residents.

Specifically, the policies related to washes, including Greenbush Draw, are stated in the Plan as follows:

Goal : Preserve the drainageways in their near natural state.

Policy: Manage drainageways to mitigate flooding and decrease erosion from run-off

Policy: As part of the rezoning, special use, subdivision and master development plan processes, require dedication of drainageways, reasonably related to the new development, to serve as natural breaks in the developed landscape and define the natural boundaries of Naco.

Policy: As part of the above processes, provide for a reasonable continuation of vegetative and wildlife habitats and linked walking and jogging paths affected by the development.

In 1999, Bisbee residents sent numerous letters to Congressman Kolbe regarding the protection of the Mule Mountains as a wildlife corridor. The impetus for these letters was a proposed, unregulated subdivision (36-acre parcels) near Juniper Flats. The letters expressed residents' desire to address and protect the Mule Mountains as a natural corridor between the Sulphur Springs Valley and the San Pedro Riparian National Conservation Area.

Another indication of local support for stream protection is the ongoing effort by the residents of Palominas to develop a community plan with Cochise County, similar to the Naco planning effort, but unique to the Palominas area's needs. The draft Palominas plan identifies undeveloped open space and washes as important areas that need addressing. This plan will be proposed for adoption by the Board of Supervisors as part of the County's Comprehensive Plan sometime in 2001.

Some stream protection measures are more formal such as the case of the City of Sierra Vista General Development Plan, VISTA 2010. It contains an open

space element with policies reflecting the goal of 'establishing a system of open spaces throughout the city that preserve scenic and natural resources and provides for outdoor recreation'. The city utilizes its Surface Water Plan as the framework of its open space system and also has created an "Adopt-A-Wash" program to encourage stewardship of its washes.

APPROACH

The subcommittee divided the Sierra Vista subwatershed into four parts. The division allowed smaller groups to examine the streams on a more manageable basis and took advantage of people's knowledge of the area. The north-flowing San Pedro River was the central division line, separating east from west. The division lines separating north from south were chosen to ensure the quadrants were "watershed independent".

The four quadrants were named after town-sites or cities within each quadrant. The southwest area is the Hereford Quadrant, the northwest area is the Huachuca City Quadrant, the southeast area is the Bisbee Quadrant and the northeast area is the Tombstone Quadrant.

EVALUATION CRITERIA

The criteria used to evaluate the streams included categories for natural recharge, flow volume, development likelihood and wildlife movement corridors. By having these criteria as separate evaluations, the matrix allows for each category to be weighted differently depending on the particular application. Details of each category are listed in the next section.

Natural Recharge

Each stream was evaluated based on potential natural recharge. The rating criterion is based on the general geologic category the specific stream crosses the most. This rating is meant as a general guide, since actual recharge for a particular stream can vary from location to location. Current studies by the U.S. Geological Survey will help quantify recharge for streams within the Sierra Vista subwatershed.

Ratings included high recharge potential for alluvium and surficial deposit areas, medium recharge potential for sedimentary rock areas, and low recharge potential for all other geological types.

Flow Volume

Each stream was evaluated based on stream flow volume. A review of the accompanying map shows that precipitation amounts are greater with higher elevations. Criterion is based on headwater location.

Rating included high flow volumes for streams originating from areas of 20 inches or more of annual precipitation, medium flow volumes from a region of 12 to 20 inches annual precipitation, and low flow volumes from regions of less than 12 inches of annual precipitation.

Development Likelihood

Each stream was evaluated based on development likelihood. The rating criteria included:

- land ownership status (private, state or federal)
- existing infrastructure to support development (roads and utilities)
- topography and remoteness limiting or enhancing development
- pending subdivision plats or master development plans
- existing zoning
- existing restrictions on the land such as land grant status and conservation easements
- current parcel splitting activity

Ratings included high development potential, medium development potential, and low development potential.

Wildlife Corridors

Wildlife corridor ratings are based on research by Dr. Christine Hass. She focused on washes as potential travel corridors only between the Huachuca Mountains and the San Pedro River. Her rating criteria included:

- Roads – higher traffic increases wildlife mortality and interferes with wildlife movement.
- Housing Areas - more development and increased density interferes with movement
- Path Length - shorter is better

For more detailed information, see the publication “Landscape fragmentation and connectivity for carnivores in the Upper San Pedro Basin.” Fort Huachuca Wildlife Office, Fort Huachuca, AZ” by C.C. Hass, 2000.

Ratings used from this study identified streams as high, medium, or low potential for wildlife movement. Many streams considered by the subcommittee were not included in this study. It is recommended that the Upper San Pedro Partnership sponsor an expanded analysis of the entire Sierra Vista subwatershed.

TOMBSTONE QUADRANT

The Tombstone Quadrant extends from just north of Willow Wash on the north to slightly south of Government Draw on the south. The eastern boundary is roughly the eastern boundary of the San Pedro watershed along the Dragoon Mountains. The San Pedro River forms the western boundary of the quadrant.

This subcommittee selected three streams within the quadrant, each with multiple tributaries. Wildlife movement corridors are also a consideration.

The Tombstone Quadrant Committee selected the following washes:

Willow Wash
Walnut Gulch
Government Draw

These washes drain the Tombstone area and include important recharge potential for this quadrant. Soils are permeable closer to the San Pedro River, but permeability degrades to the east of Tombstone.

Conglomerate seals the wash floor in many areas to the east, and recharge potential is questionable in those portions.

Habitat along these washes is typical of that found along ephemeral streams in the Sierra Vista subwatershed. Riparian vegetation lines the banks and increases in density in the vicinity of the San Pedro River. This vegetation diminishes as the distance from the river increases. These streams offer wildlife movement corridors from the San Pedro River to the Dragoon Mountains.

Views from stream courses examined vary depending on vegetation, but in general are important to the overall character of the land. A significant cienega exists just north of Davis Road. That cienega and surrounding basin, although privately owned, should be considered for designation as open space.

The US Department of Agriculture (USDA) Agricultural Research Service

(ARS) operates several run-off gauges along and in Walnut Gulch. The largest flume in the world crosses the gulch about five miles west of Tombstone, and significant recharge occurs in that portion of the wash. Years of data are available on flows in various parts of the wash, and the designation of this gulch and adjacent properties as open space is essential to maintain the wealth of information that the ARS program provides.

Several private wells pump groundwater not far from the river. Development potential appears to be high east of Tombstone. Specifically, the Bachmann Springs project just north of the Tombstone quadrant will inevitably attract development. Much of the land near the river is in state land trust ownership. Development could be triggered on state trust lands if and when the auction process takes place.

BISBEE QUADRANT

The Bisbee Quadrant extends from the Mexican border to slightly south of Government Draw on the north. The eastern boundary is roughly the eastern boundary of the San Pedro watershed along the Mule Mountains. The San Pedro River forms the western boundary of the quadrant.

This subcommittee selected eight streams within the quadrant, each with multiple tributaries. Wildlife movement corridors from the river to the Mule Mountains in the eastern part of the quadrant are also a consideration.

The Bisbee Quadrant Committee selected the following washes:

- High Knolls/Sandy Bob Springs Canyon
- Banning Creek
- Stagg Ranch Wash
- Schoolhouse Draw
- Spring Creek
- Greenbush Draw
- Cline Ranch Wash
- Cline Jr. Wash

The USGS has estimated that recharge from the Mule Mountains and Tombstone Hills is approximately 2,750 acre-feet per year, with an additional 1,000 acre-feet per year estimated to come from Greenbush Draw. These two areas together represent a significant amount of water entering the San Pedro River hydrologic system.

Ephemeral streams are more difficult to quantify, but a recent study by the USGS indicated a significant part of the March baseflow in the San Pedro River was water recharged along the river floodplain and through ephemeral streams. The Mule drainages, Greenbush Draw and valley ephemeral streams constitute critical components of the Upper San Pedro watershed.

This quadrant is less likely to be developed for residential use for the following reasons:

- The land is too rough for safe road construction.
- The water table is deep and uncertain.
- Utility expansion is prohibitive.
- Few property owners have unrestricted marketing prospects.

HEREFORD QUADRANT

The Hereford Quadrant extends from the Mexican border to slightly south of Soldier's Creek on the north. The western boundary is roughly the western boundary of the San Pedro watershed along the Huachuca Mountains. The San Pedro River forms the eastern boundary of the quadrant.

This subcommittee selected 12 streams within the quadrant, each with multiple tributaries. Wildlife movement corridors from the river to the mountains in the western part of the quadrant are a consideration.

The Hereford Quadrant Committee selected the following washes:

- Charleston Wash
- Donnet-Fry Wash, includes Buena High School, Mountain Mesa and Coyote washes
- Lewis Springs
- Bakarich McCool, includes large north fork tributary
- Garden Canyon Wash, includes southern tributary
- Two unnamed washes, located between Garden Canyon and Ramsey Creek
- Ramsey Canyon Wash
- Carr Canyon/Richards Ranch Wash

Miller Canyon Wash
 Hunter Canyon Wash
 “Three-Canyons” Wash
 Stump Canyon Wash, includes large tributary
 Palominas Wash, located north of SR 92
 Brown/Bob Thompson Wash

These streams drain the Huachuca Mountains and include some of the most important recharge areas within the Sierra Vista subwatershed. Most of these streams not only contribute to mountain front recharge but also connect to the San Pedro River. Recharge near the San Pedro allows for more immediate and positive influence on baseflows.

The listed ephemeral streams provide riparian vegetation from the San Pedro River through a variety of vegetation zones and link the river to the Huachuca Mountains in many instances.

The Hereford Quadrant includes the area of highest groundwater use within the subwatershed. The area has a concentration of private wells between the Huachuca Mountains and the San Pedro River. Additionally, this area will most likely experience additional development as the city of Sierra Vista grows.

Another use factor is the Tombstone pipeline, which originates in Miller Canyon and transports water from the Huachucas to Tombstone.

Because of the high water production from the mountains coupled with high water use, more streams have been identified as important for protection of open space in this quadrant than any other. Development along these streams would adversely impact potential recharge rates. By protecting more streams, the natural recharge capabilities of the quadrant should be preserved.

HUACHUCA CITY QUADRANT

The Huachuca City Quadrant extends north from the southern watershed limit of Soldier’s Creek to the northern limit of the Babocomari River. The western boundary is the Cochise County/Santa Cruz County line. The San Pedro River forms the eastern boundary of the quadrant.

This subcommittee selected nine streams within the quadrant, each with multiple tributaries. Wildlife movement corridors from both the San Pedro and Babocomari Rivers to the Huachuca, Whetstone and Mustang Hills mountains are also a consideration.

The Huachuca City Quadrant Committee selected the following washes:

- Babocomari River
- Soldier Creek
- Harkey Draw (Rain Valley Drainage)
- Slaughterhouse Wash
- Huachuca Canyon
- Sycamore Canyon
- Unnamed drainage running from Cottonwood Peak area in the
Whetstone mountains
- Blacktail Canyon
- Manila Canyon

These important streams drain the northern sections of the Huachuca Mountains and southern sections of the Whetstone Mountains and provide significant recharge. This quadrant includes the important Babocomari River drainage. This river originates in Santa Cruz County and flows to the east. Although not part of the subcommittee's review, significant parts of the Upper Babocomari fall within the newly designated Las Cienegas National Conservation Area.

Habitats along these washes are typical of that found along ephemeral streams in the Sierra Vista subwatershed. Riparian vegetation exists along segments of the Babocomari, especially along the perennial reaches near the San Pedro River. The Babocomari and other candidate streams offer excellent wildlife migration corridors from the river to the mountains within and beyond the Sierra Vista subwatershed.

Most groundwater wells and land developments are concentrated around Huachuca City. Future development within the quadrant will most likely occur along the privately owned sections west of Huachuca City.

POTENTIAL STRATEGIES FOR HYDROLOGIC PROTECTION AREAS

Many possible protection strategies exist and can be used within the Sierra Vista subwatershed. Although not a complete list, some strategies could include conservation easements along identified washes and possible acquisition by Upper San Pedro Partnership members or private entities; voluntary dedication of washes to the County; voluntary downzoning to larger minimum lot sizes (10, 18 or 36 acre lot sizes); use of existing setbacks from washes as stated in Co-chise County Floodplain Regulations; and voluntary private deed restrictions on development adjacent to washes.

In order to preserve wildlife movement corridors, Dr. Hass proposed a dual buffer system along washes, with a smaller core area along each wash preserved as wildlife habitat without development and limited recreational use; emphasis on maintaining vegetation cover.

Beyond the core area would be a larger, secondary buffer with minimal or low-density housing, guidelines for alteration of vegetation, and wildlife-friendly road crossings, such as bridges and overpasses instead of culverts.

Dr. Hass recommends for suitable wildlife corridors that a 200 meter core buffer and a 1000 meter secondary buffer be considered, for a total width of 1200 meters. However, these are preliminary recommendations and additional analyses are required.

ACKNOWLEDGMENTS

Data used for the maps in this document comes from the “San Pedro River Basin Spatial Data Archive” CD produced and distributed by Environmental Protection Agency (EPA) and the US Department of Agriculture (USDA) Agricultural Research Service (ARS) and the Semi-Arid Land Surface Atmosphere (SALSA) program.

The data are available on-line at:
http://www.epa.gov/crdlvweb/land-sci/html2/sanpedro_home.html

CRITERIA TABLE

0 = low , 1 = medium , 2 = high, TBD = To Be Determined

Quadrant Stream	Natural Recharge	Flow Volume	Development Likelihood	Wildlife Corridors
Tombstone				
Willow Wash	1	2	0	TBD
Walnut Gulch	1	2	1	TBD
Government Draw	2	1	1	TBD
Bisbee				
High Knolls/Sandy Bob Springs Canyon	2	2	1	TBD
Banning Creek	1	2	1	TBD
Stagg Ranch Wash	2	1	0	TBD
Schoolhouse Draw	2	1	0	TBD
Spring Creek	2	2	0	TBD
Greenbush Draw	2	1	1	TBD
Cline Ranch Wash	1	1	0	TBD
Cline Jr. Wash	1	1	0	TBD
Hereford				
Charleston Wash	2	1	2	TBD
Donnet-Fry Wash	2	1	2	TBD
Lewis Springs	2	1	2	TBD
Bakarich McCool	2	1	1	TBD
Garden Canyon Wash	2	2	2	0
Two un-named washes	2	1	2	TBD
Ramsey Canyon Wash	2	2	2	1
Carr Canyon/Richards Ranch Wash	2	2	2	1
Miller Canyon Wash	2	2	2	1
Hunter Canyon Wash	2	2	2	1
“Three-Canyons” Wash	2	1	2	TBD
Stump Canyon Wash	2	2	2	TBD
Palominas Wash, located north of SR 92	2	1	2	TBD
Memorial Wash	2	1	1	2
Huachuca City				
Babocomari River	1	1	1	2
Soldier Creek	2	2	0	0
Harkey Draw (Rain Valley Drainage)	2	1	1	TBD
Slaughterhouse Wash	1	2	1	1
Huachuca Canyon	2	2	1	0
Sycamore Canyon	1	2	1	TBD
Unnamed drainage	1	2	1	TBD
Blacktail Canyon	1	2	1	2
Manila Canyon	1	1	1	TBD

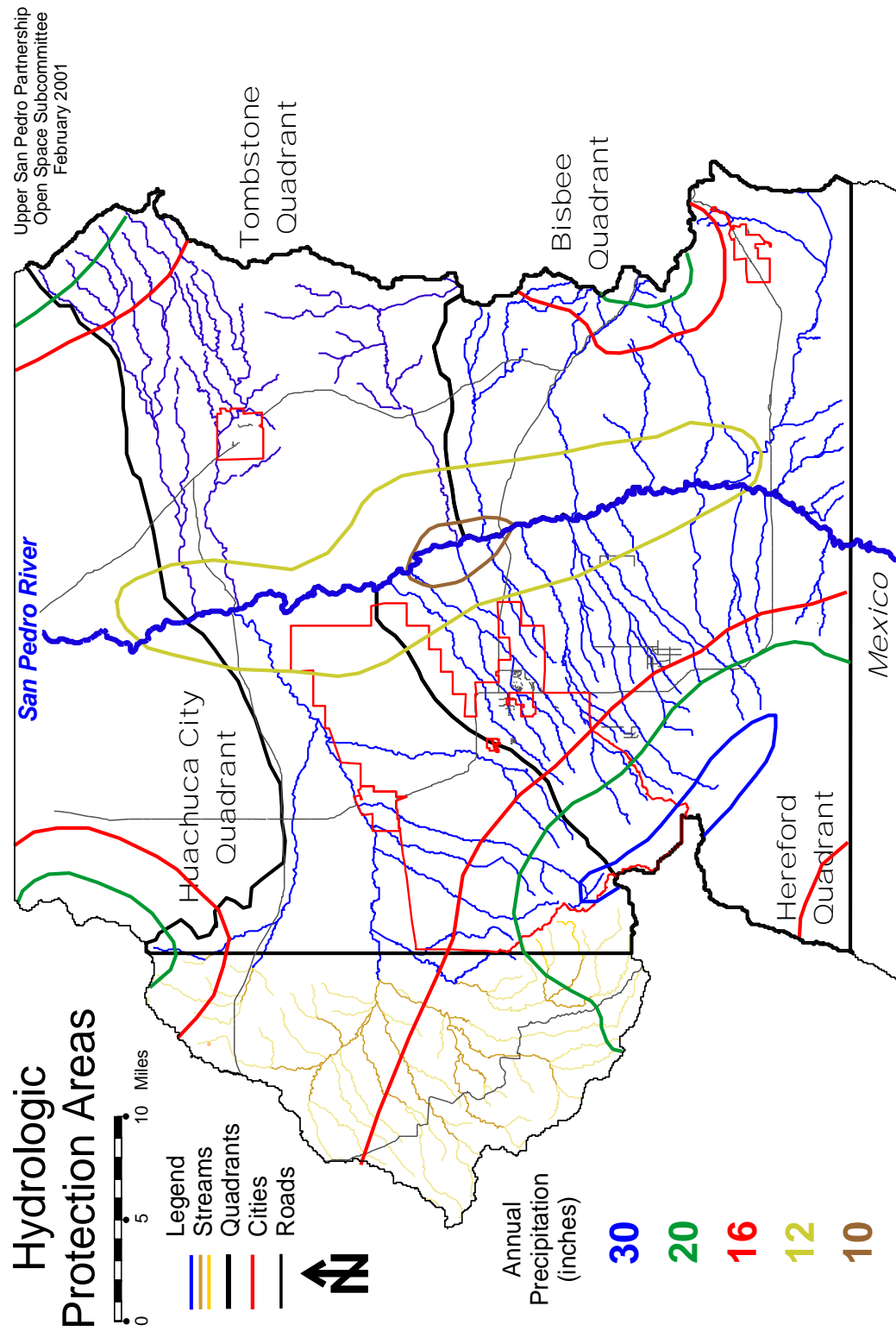


Figure 1. Sierra Vista Subwatershed Annual Precipitation

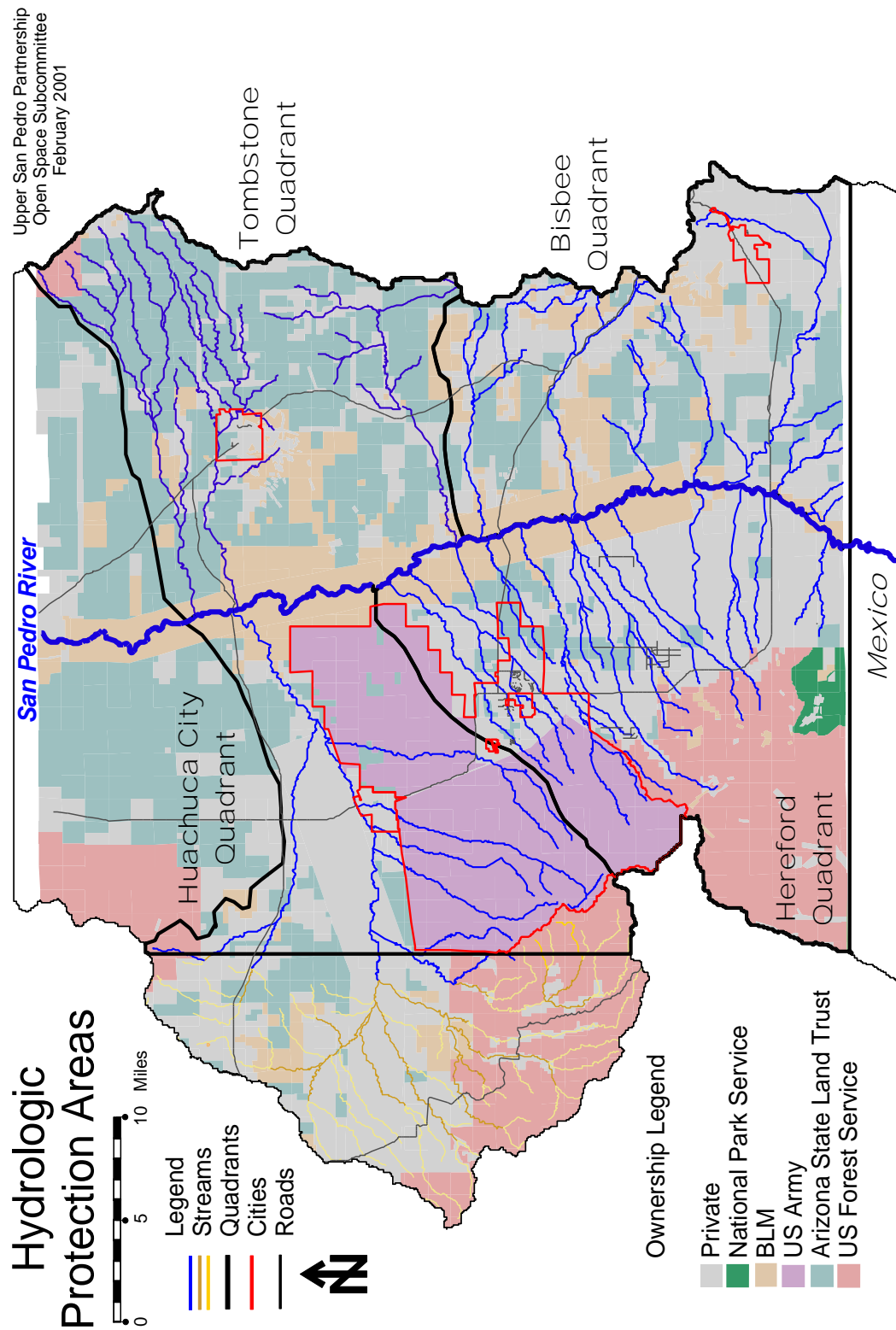


Figure 2. Sierra Vista Subwatershed Land Ownership

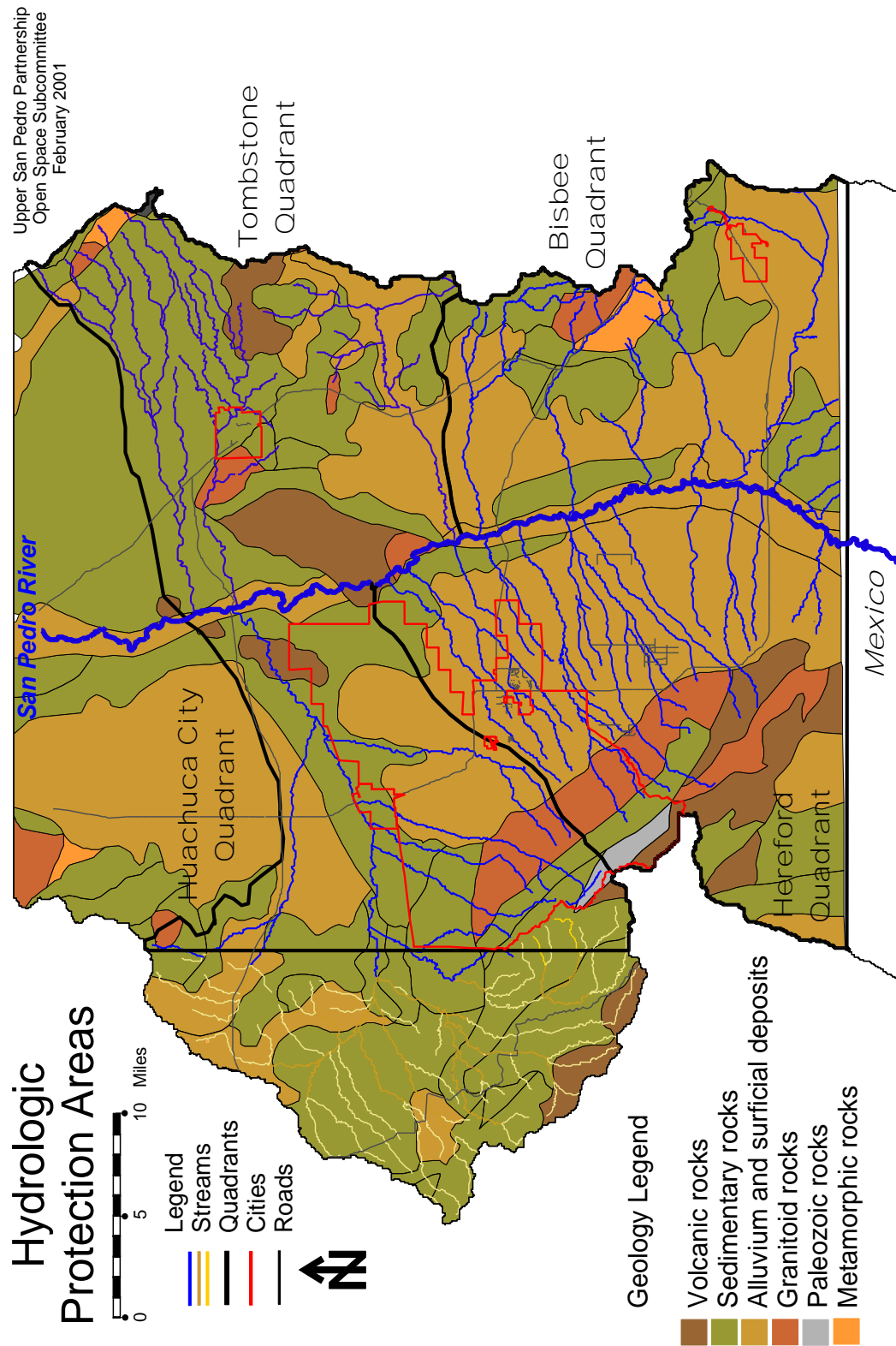


Figure 3. Sierra Vista Subwatershed Geology

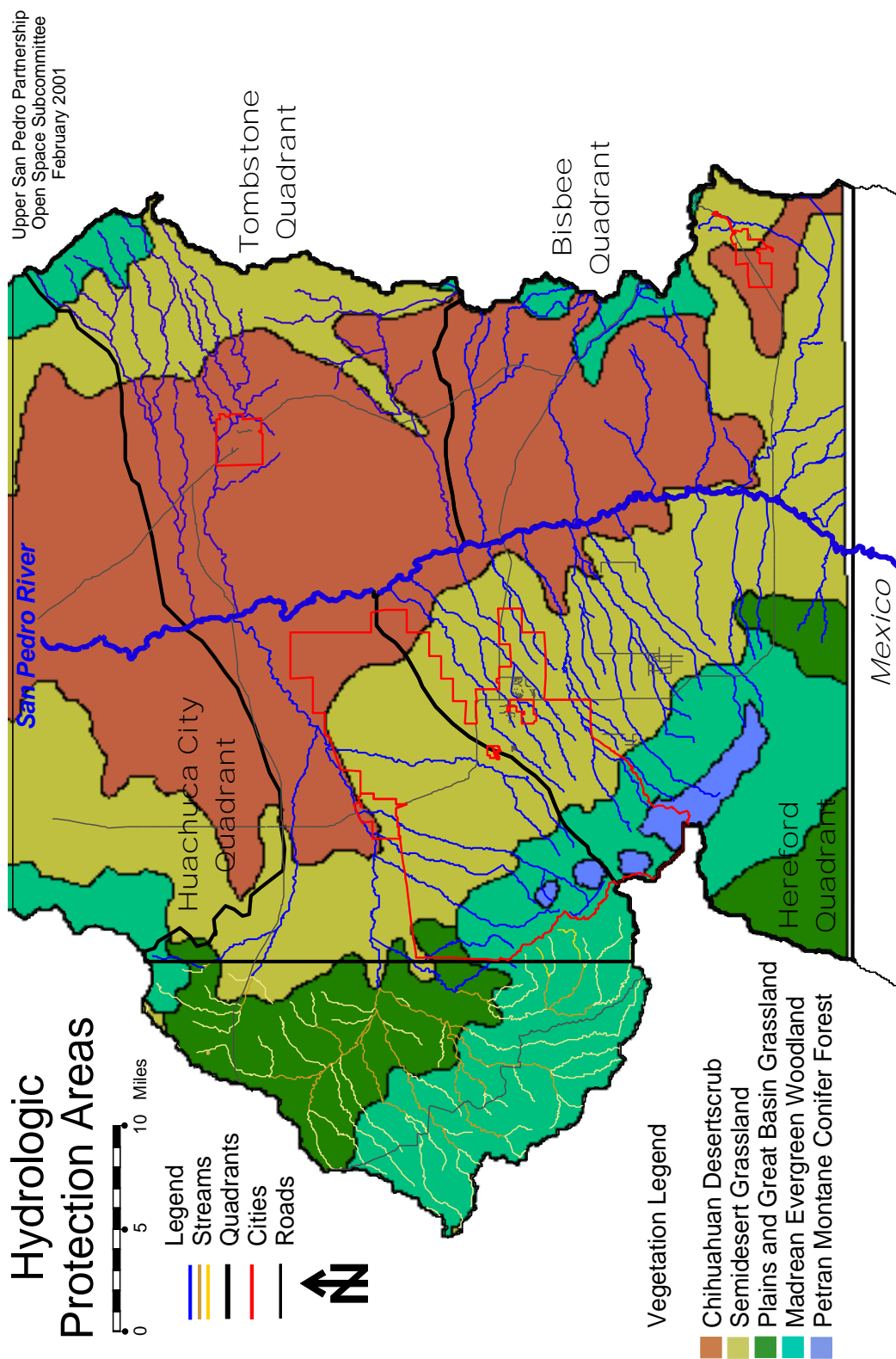
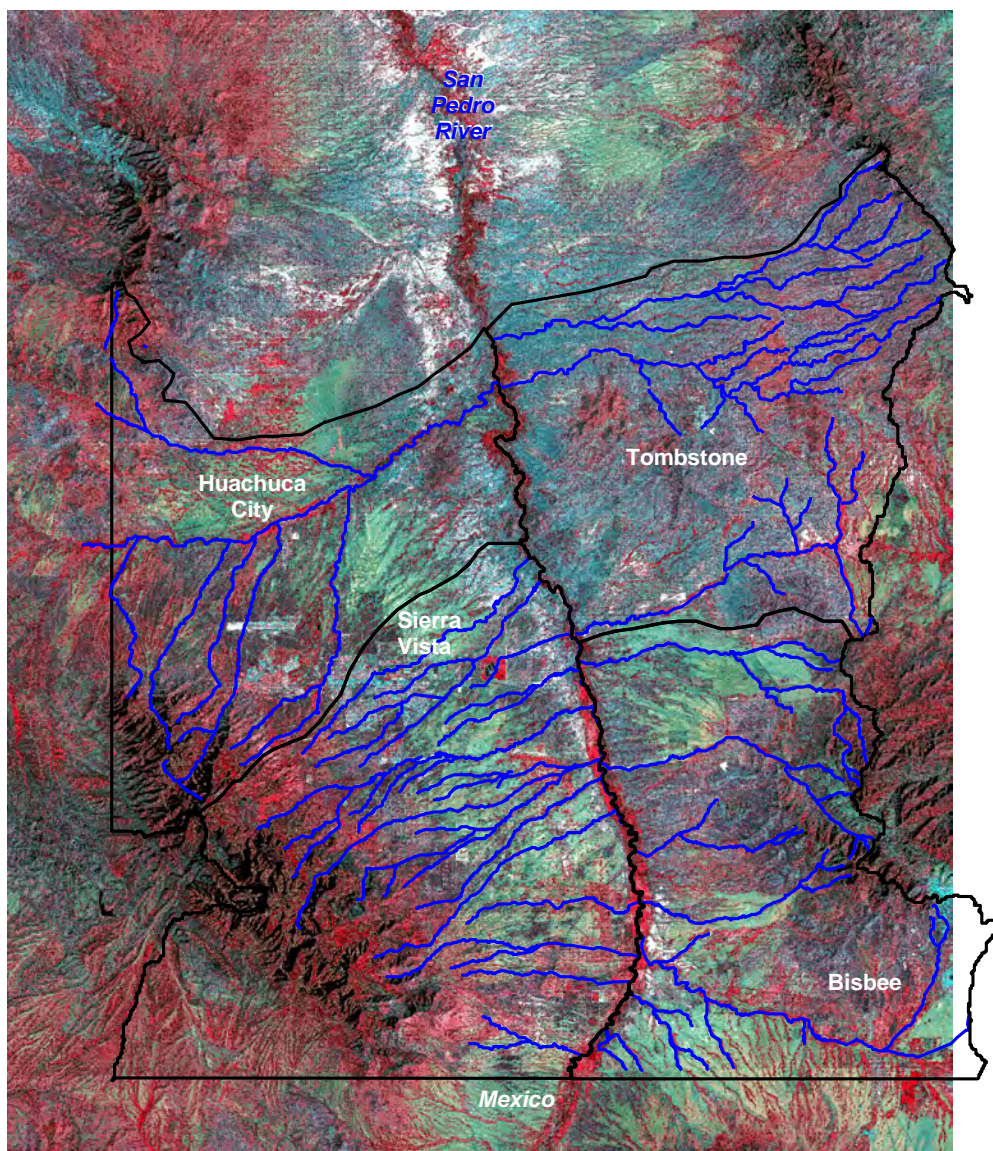


Figure 4. Sierra Vista Subwatershed Vegetation

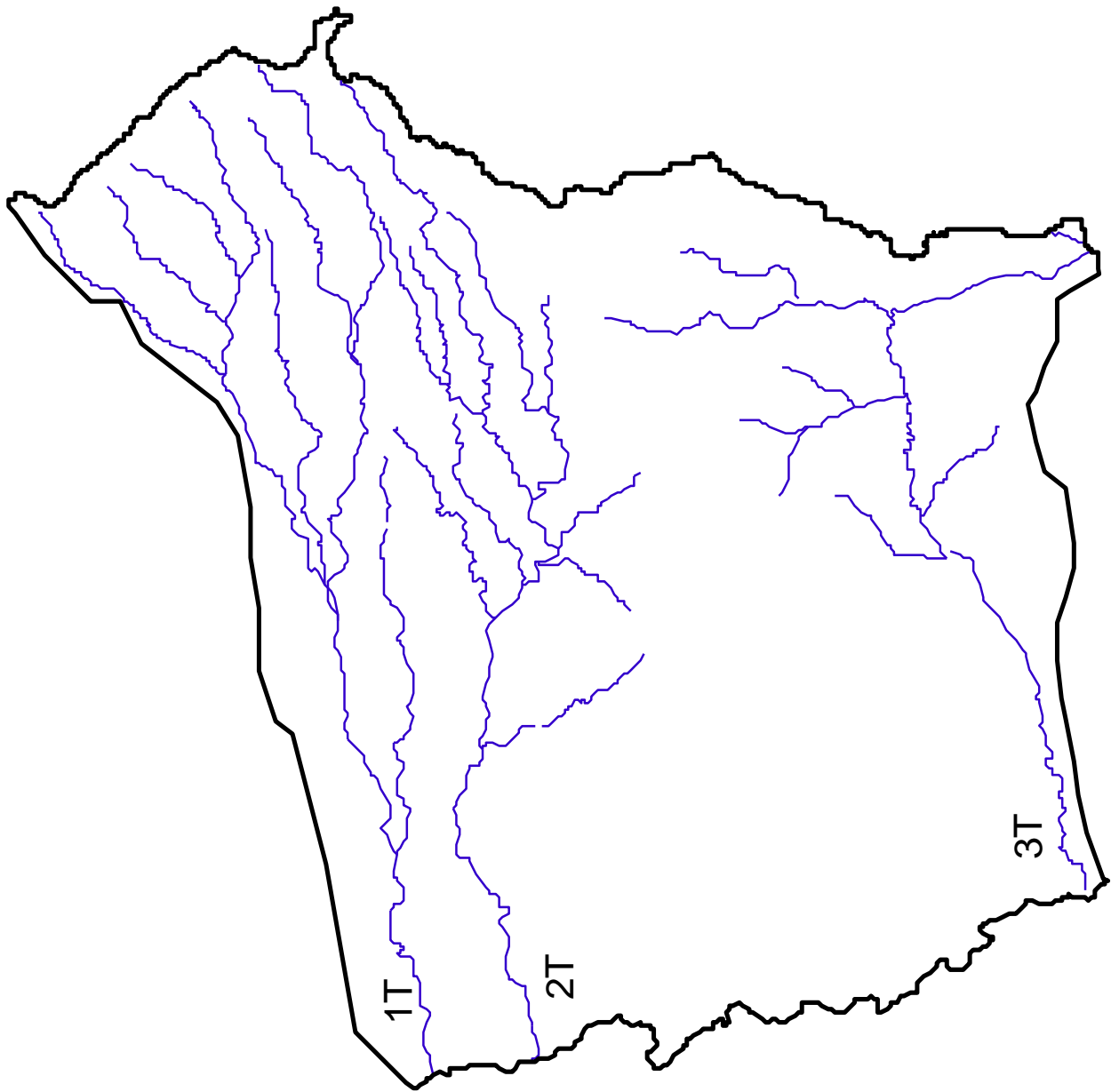
Open Space Candidate Streams

Upper San Pedro Partnership
Open Space Subcommittee, January 2001



False color composite with vegetation shown as red.

Figure 5. LANDSAT Imagery, 1990

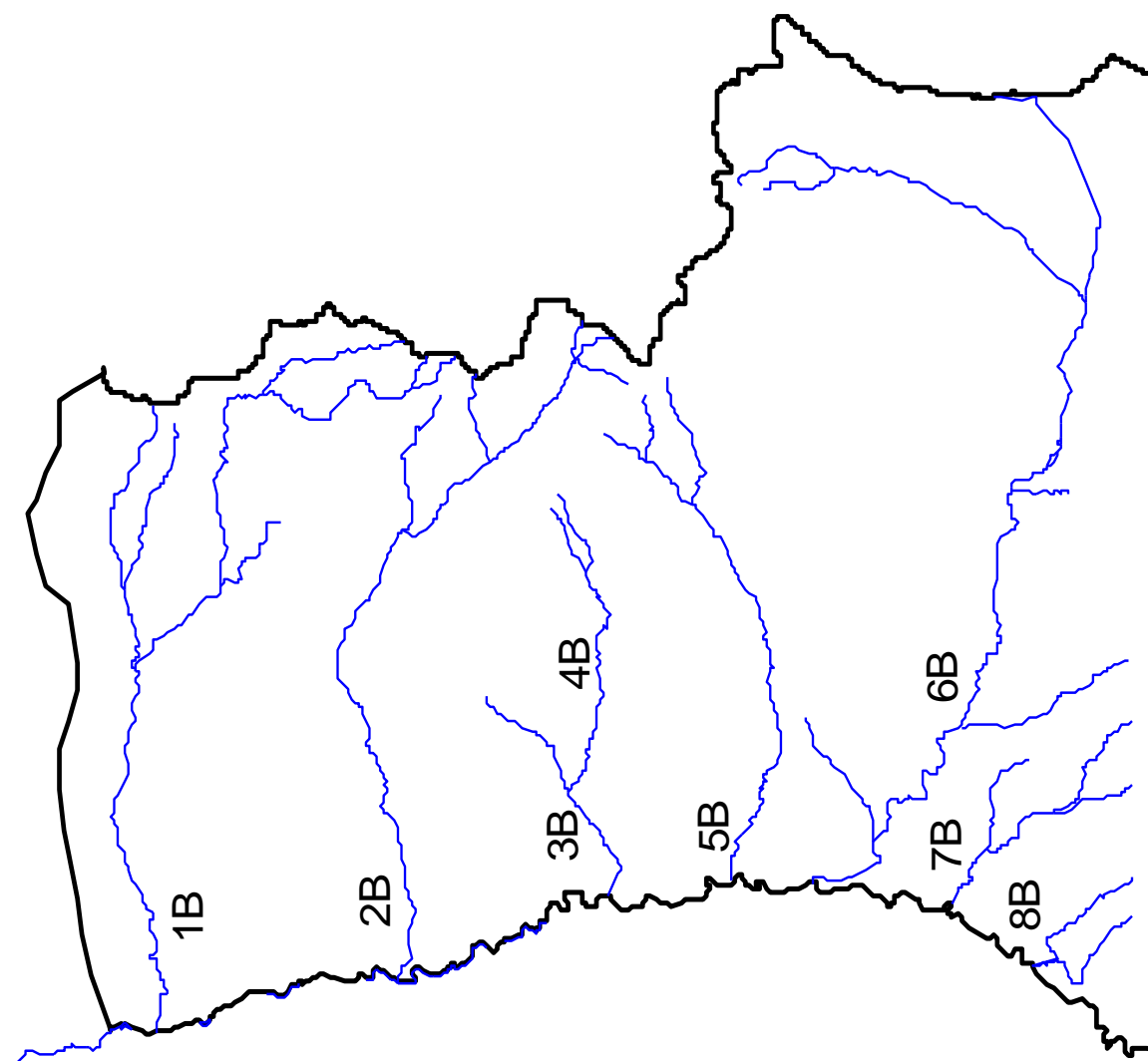


Tombstone Quadrant Streams

- 1T - Willow Wash
- 2T - Walnut Gulch
- 3T - Government Draw

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Figure 6. Tombstone Quadrant Stream Locations



Bisbee Quadrant Streams

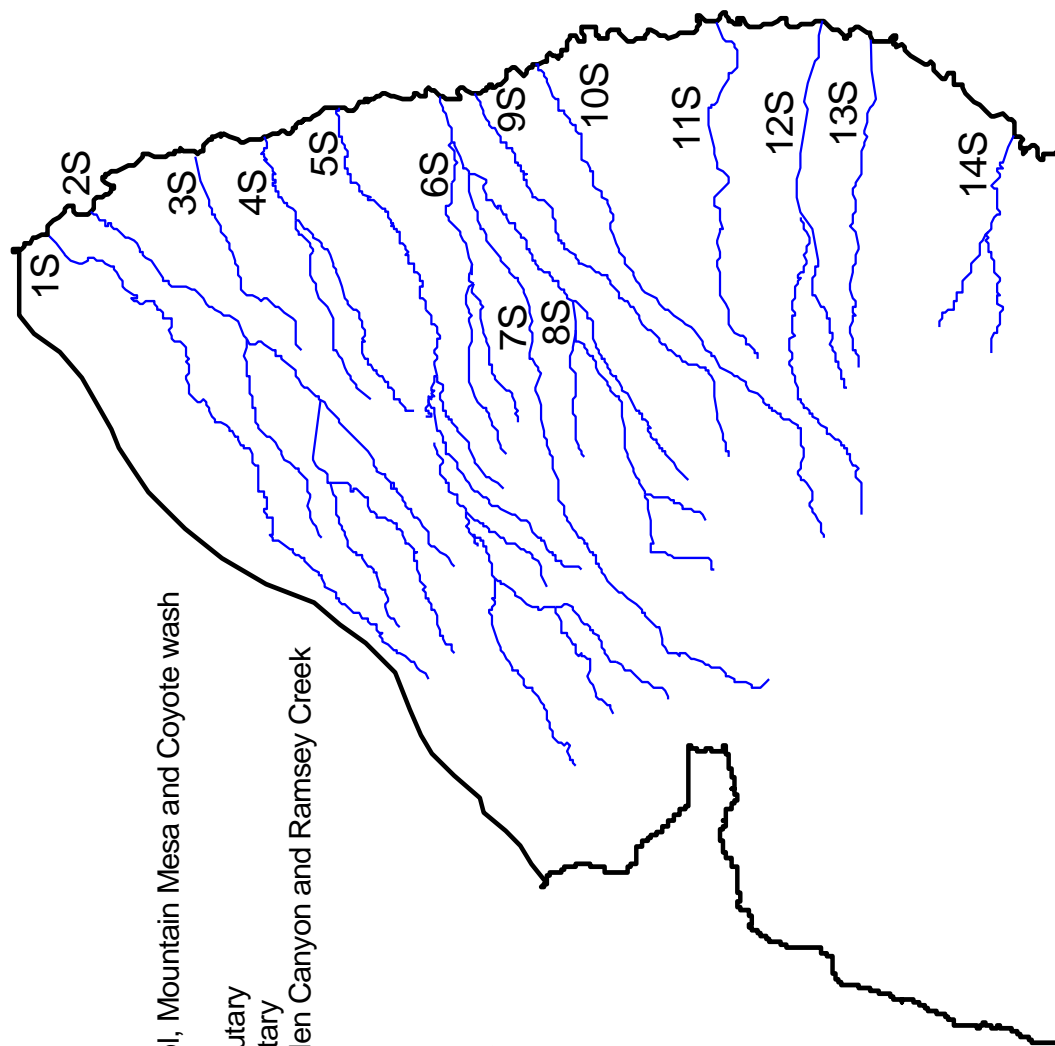
- 1B - High Knolls/Sandy Bob Springs Canyon
- 2B - Banning Creek
- 3B - Stagg Ranch Wash
- 4B - Schoolhouse Draw
- 5B - Spring Creek
- 6B - Greenbush Draw
- 7B - Cline Ranch Wash
- 8B - Cline Jr. Wash

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Figure 7. Bisbee Quadrant Stream Locations

Hereford Quadrant Streams

- 1S - Charleston Wash
- 2S - Donnet-Fry Wash, includes Buena High School, Mountain Mesa and Coyote wash
- 3S - Lewis Springs
- 4S - Bakarich McCool, includes large north fork tributary
- 5S - Garden Canyon Wash, includes southern tributary
- 6S - Two un-named washes, located between Garden Canyon and Ramsey Creek
- 7S - Ramsey Canyon Wash
- 8S - Carr Canyon/Richards Ranch Wash
- 9S - Miller Canyon Wash
- 10S - Hunter Canyon Wash
- 11S - "Three-Canyons" Wash
- 12S - Stump Canyon Wash, includes large tributary
- 13S - Palominas Wash, located north of SR 92
- 14S - Brown/Bob Thompson Wash



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Figure 8. Hereford Quadrant Stream Locations

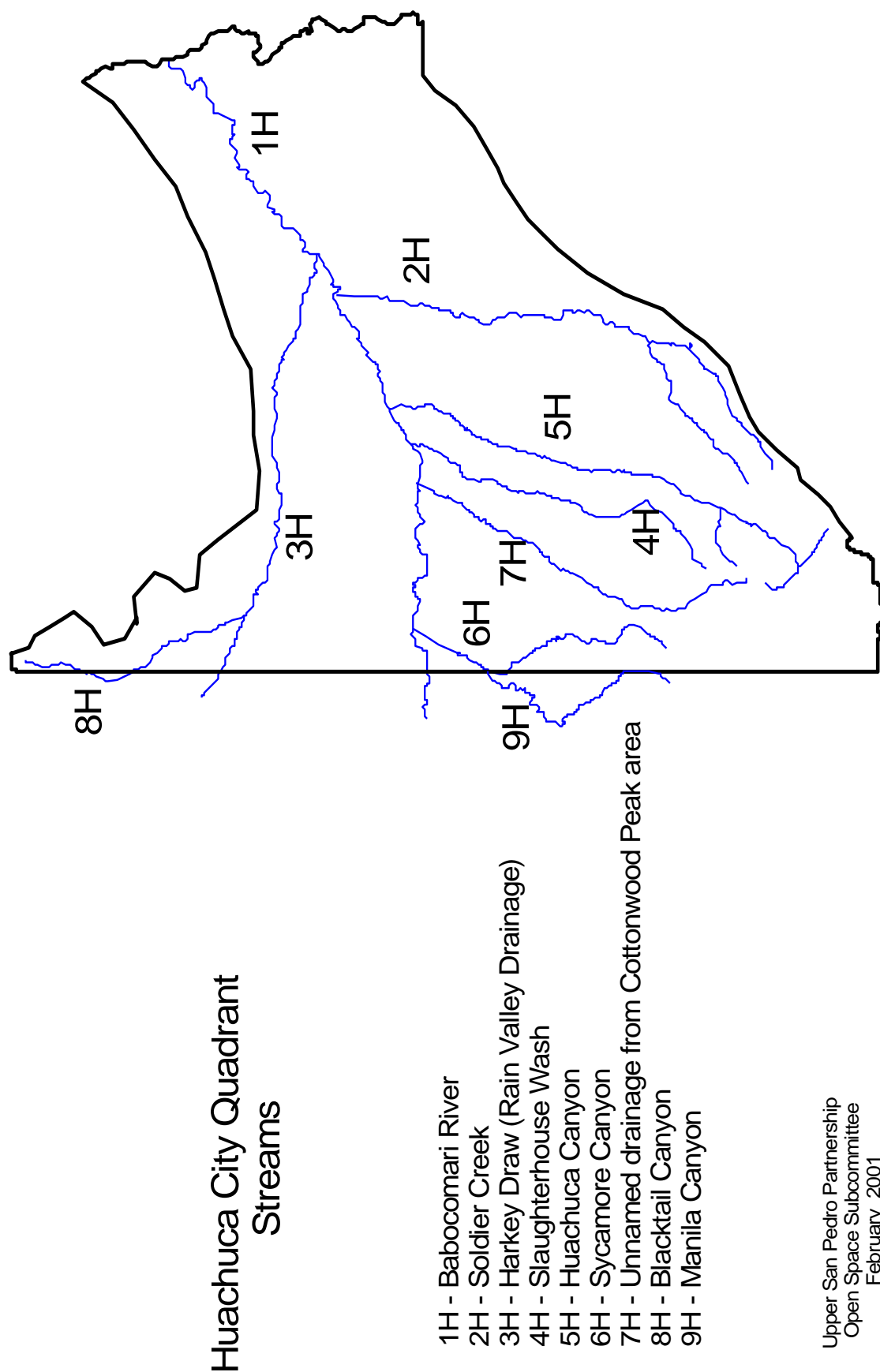


Figure 9. Huachuca City Quadrant Stream Locations

GLOSSARY

Acre-foot...The volume of water that covers an acre with one foot of water, (325828.8 gallons).

Alluvium...Sediment deposited by flowing water, as in a riverbed, flood plain, or delta.

Aquifer...An underground bed or layer of earth, gravel, or porous stone that yields water.

Baseflow ...The part of river flow that is supported from groundwater.

Chihuahuan...An area having the characteristics, such as temperature, rainfall, vegetation, and elevation, of the Chihuahuan desert of northern Mexico.

Cienega...A type of marsh-like wetland. "Cien-agua" - 100 waters.

Climate... The meteorological conditions, including temperature, precipitation, and wind, that characteristically prevail in a particular region.

Conglomerate... A rock consisting of pebbles and gravel embedded in cement-like material.

Coniferous forest...A forest with any number of various mostly needle-leaved or scale-leaved trees or shrubs such as pines, spruces, and firs.

Conservation easement...A legal agreement where a land owner voluntarily restricts or limits a specified type of land use, such as development or agriculture. The land owner may receive financial compensation for giving up these uses.

Conservation Corridor....A linear landscape feature that aids the long term and short term movement of animals and plants between larger patches of habitat dedicated to conservation functions.

Desert scrub...An shrub-dominated plant community frequently with abundant creosote bush, found on low elevation plains and low hills in a desert environment.

Drainageways...A natural drainage network, also a stream or natural channel.

Ecology... The science of the relationships between organisms and their environments.

Ephemeral...A stream that flows only during rainstorms.

Grasslands... An area of grass or grasslike vegetation.

Groundwater...Water that is under the Earth, as opposed to surface water.

Gulch... Another name for an ephemeral stream.

Hydrology... The scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.

Hydrologic Protection Areas... Those areas where natural recharge processes are considered most significant.

Infrastructure... The basic facilities, services, and installations needed for the functioning of a human community.

Intermittent stream... A stream that flows only part of the year.

Landscape linkage... A complex range of community and ecosystem processes that operates over time, allowing plants and animals to move between larger landscapes.

Neo-tropical birds... Birds that spend at least part of their life cycle in tropical habitats of Central and South America.

Oak woodland-savanna... A grassland mixed with oak.

Open space... For use in this report, areas of natural hydrologic recharge and wildlife movement corridors.

Parcel splitting... The division of a property into smaller areas.

Perennial river... A river that flows continually throughout the year.

Plat... A map of a new subdivision. It shows the layout of road and lots, topography and the location of utility easements and common areas.

Precipitation... Any form of water, such as rain, snow, or sleet, that falls to the earth's surface.

Recharge... The movement of surface water into the aquifer.

Riparian... Of, on, or relating to, the banks of a natural course of water.

Sedimentary... Of or relating to rocks formed by the deposition of sediment.

Semi-arid... Characterized by relatively low annual rainfall of 10 to 20 inches and vegetation consisting mostly of short, coarse grasses; not completely arid.

Sierra Vista subwatershed... The southernmost drainage basin of the Upper San Pedro River in the United States.

Sonoran... An area having the characteristics, such as temperature, rainfall, vegetation, and elevation, of the Sonoran desert.

Subdivision... A planned land development conforming to local ordinances.

Surface water... Water that flows over the Earth's surface.

Surficial... Of, relating to, or occurring on or near the surface of the earth.

Tributaries... smaller, contributing streams that feed into a larger stream.

Wash... another name for an ephemeral or intermittent stream.

Watershed... The region draining into a river, river system, or other body of water.

Wildlife movement corridors... Linear landscape feature, such as a wash, stream or ridgeline, that allows for movement of animals between habitats.

Zoning... County regulatory land use designations which specify minimum lot sizes, uses and site development standards.