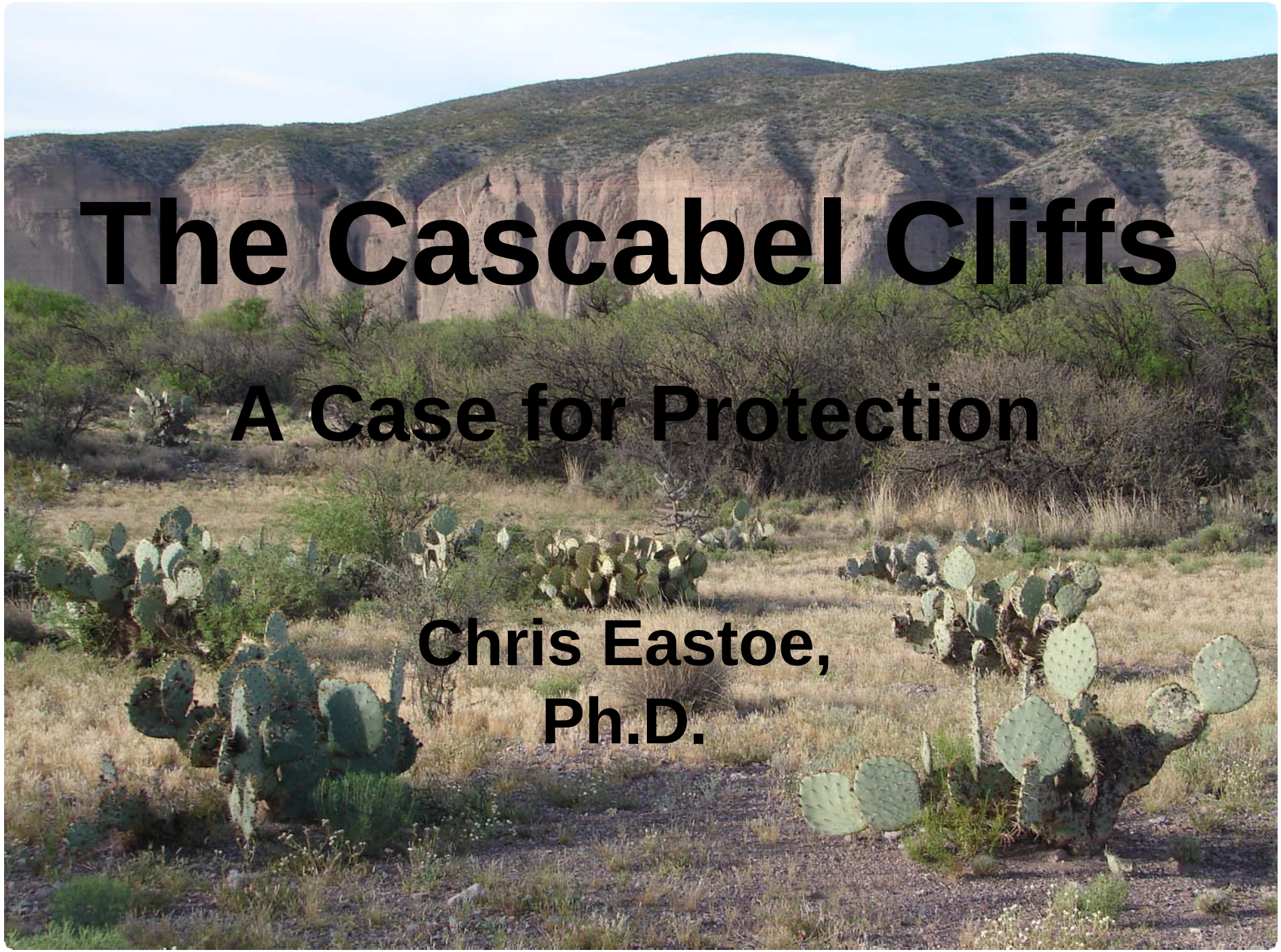
The Cascabel Cliffs
A Case for Protection
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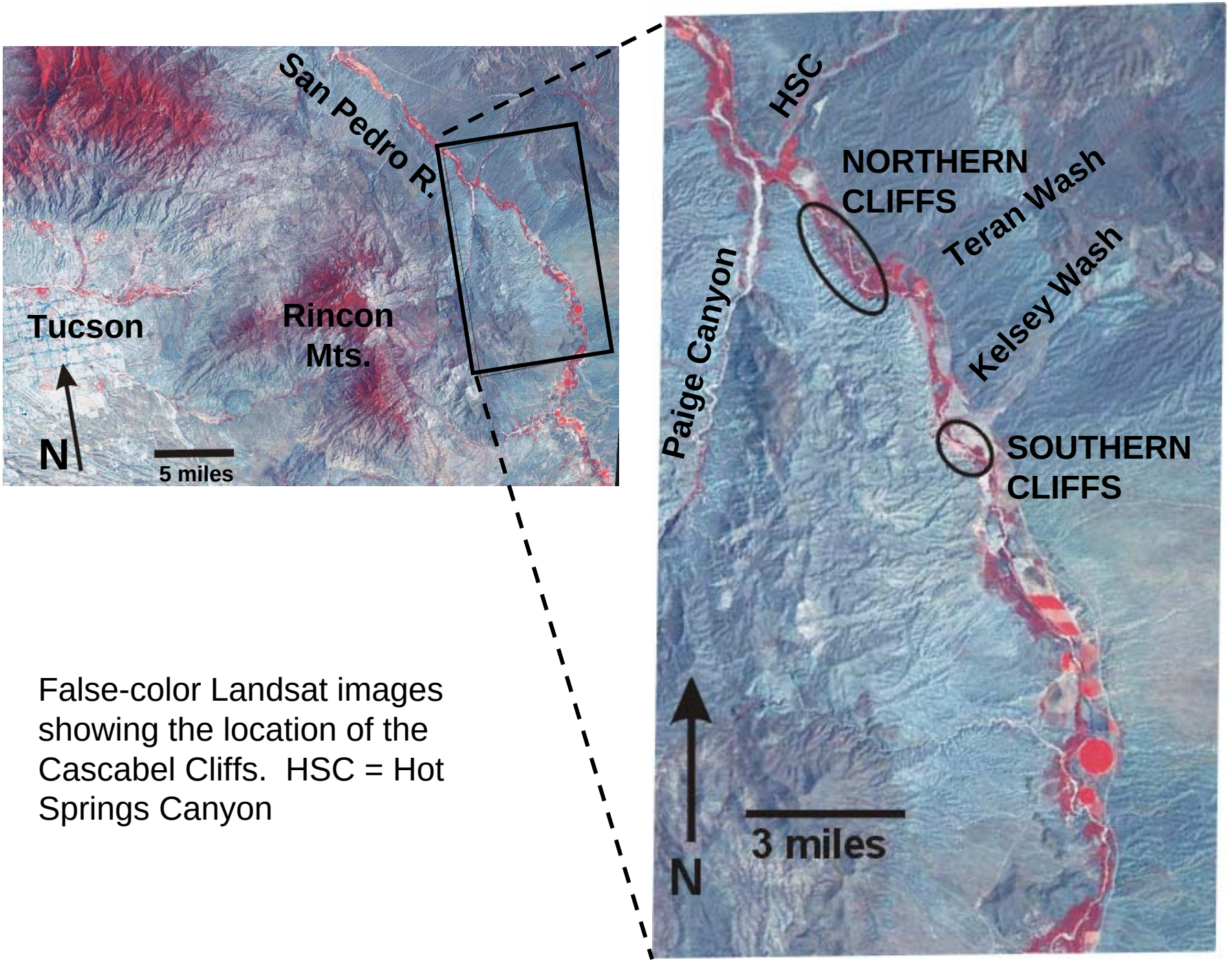
Ph.D.

The most scenic reaches along the San Pedro River are to be found where two sets of cliffs line the west bank of the river at Cascabel. The southern cliffs are located near the Heaven Sent Ranch, opposite Kelsey Wash. The northern cliffs begin near the confluence of Teran Wash with the river, and extend about 3 miles downstream. Two types of landform are present in the both areas: sheer cliffs and a combination of cliffs and badlands, the latter occurring to the north of the sheer cliffs in both cases. In the northern area, the sheer cliffs are in beds of brown sediment, and rounded cliffs with associated badlands have formed in overlying beds of gray sediment.

In addition to their scenic value, the Cascabel Cliffs are of interest for their geological, biological and cultural significance. Furthermore, the active alluvial fans and the mesquite bosque at the foot of the northern cliffs provide a large area of relatively undisturbed habitat for a considerable variety of plants and animals.

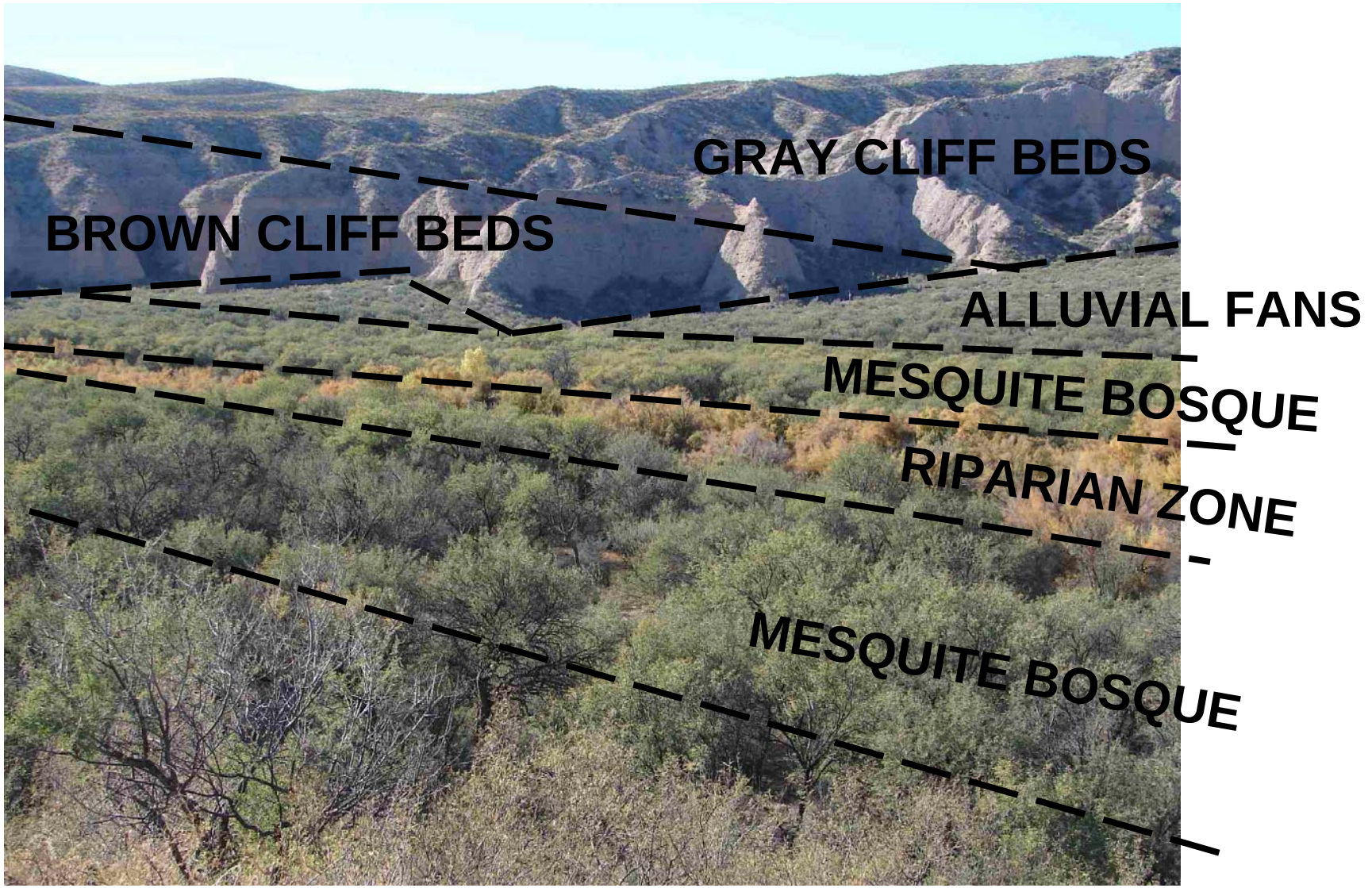
The purpose of this presentation is to bring the values of the Cascabel Cliffs and the land at their feet to the attention of the public, with a view to encouraging protection of these features from activities leading to damage or defacement .

The following five slides include a satellite view of the Cascabel area, showing the location of the cliffs, and slides illustrating the landforms and vegetation zones.



False-color Landsat images showing the location of the Cascabel Cliffs. HSC = Hot Springs Canyon

The southern cliffs, located near the Heaven Sent Ranch.



Geological and vegetation zones of the northern cliff area.

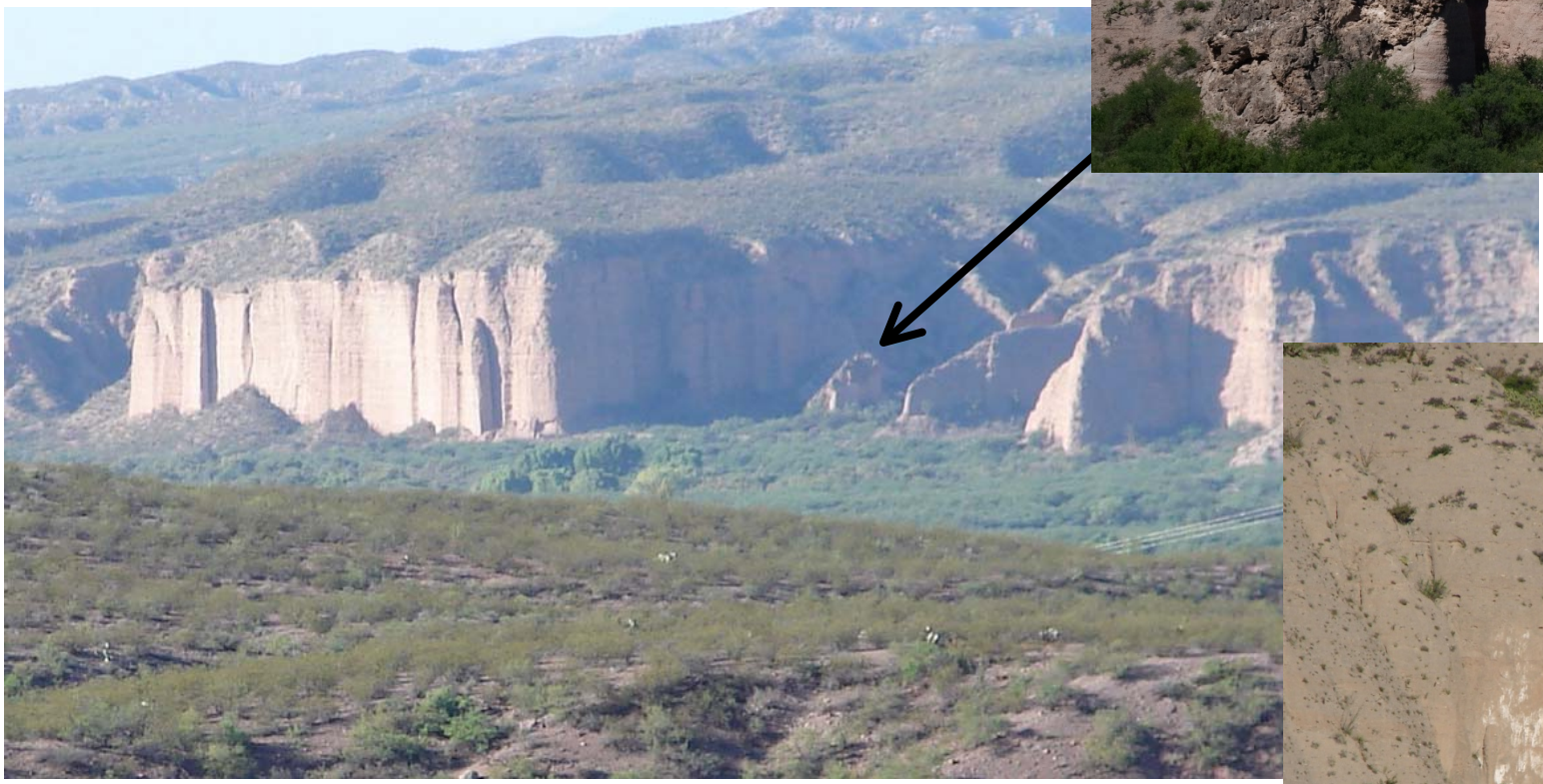
Northern cliffs: typical landforms of the brown cliff-forming beds.

Northern cliffs: the gray cliff-forming beds, and a detail of typical landforms. The canyon in the center of the upper image is the main site of the plant diversity, discussed below.

Geology

The cliffs consist of basin-fill alluvium deposited between 11 and 5 million years ago. Pieces of limestone, granite and metamorphic rock derived from high land to the west were deposited in the San Pedro Basin in large alluvial fans as fine- to coarse-grained gravel with small boulders. The San Pedro Basin is one of many similar Basin-and-Range features typical of southern Arizona. Cliff formation is unusual in such basin-fill deposits. If one looks at the continuation along-strike (that is, more-or-less horizontally) in the same set of alluvial fan beds, it is clear that only limited parts of each deposit can stand as cliffs; the other parts form gentler slopes.

In order to form cliffs, the basin-fill deposits must be hardened by the formation of cementing minerals. One way that this might occur is through the circulation of hot water. Springs have been present in the area. Near the southern cliffs, there is a well-preserved deposit of travertine that formed from a spring issuing from a slope cut into the cliff-forming deposit. The travertine contains imprints of the stems of plants that grew around the ancient spring. At the northern cliffs, a swarm of parallel faults cut the gray beds, and some faults are filled with white material that may have been deposited from circulating hot water (see next slide for illustrations).



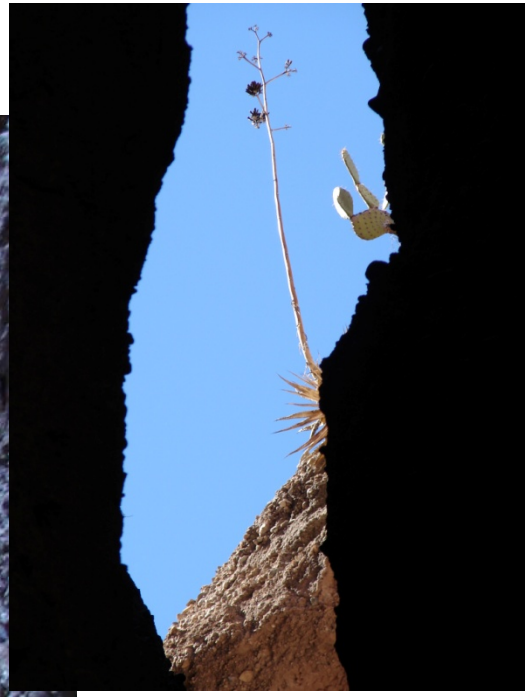
^ Southern cliffs, with travertine deposit (arrow). Detail photo by Jim Flood.

Northern cliffs, white vein deposit in fault >

The Canyons

Rainwater runoff has carved many deep clefts into the gray cliff-forming beds, along with a few broader V-shaped canyons. Extensive slot canyons, better known in the sandstones of the Colorado Plateau, are unusual in the basin-fill alluvium of southern Arizona. The slot canyons at Cascabel commonly have a conical form, and in a few places are closed overhead as a result of the slumping of a large block, or the erosion of a meander-like bend in the canyon (an incised meander).

Slot canyons of the northern cliffs.

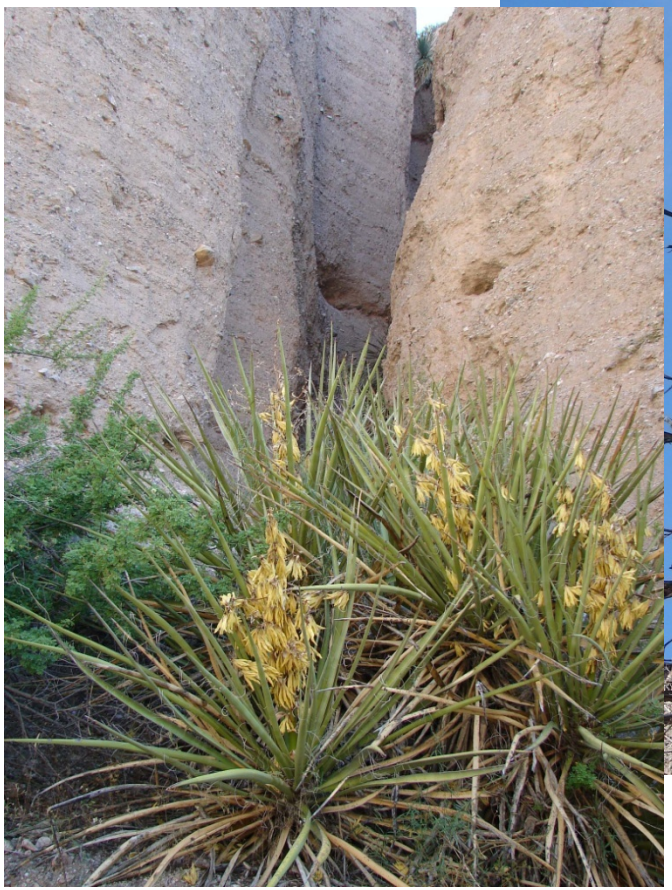


Extremely narrow slot formed as a result of slumping of the right-hand wall >

< Arch formed in an incised meander within a slot canyon

The largest canyon in the northern badlands, and an adjacent canyon to the south, provide sheltered and somewhat isolated micro- environments with a variety of niches for plants. Distinctive plant communities inhabit the south-facing and north-facing slopes. Species characteristic of the San Pedro valley (e.g. saguaro, yucca, wolfberry, acacia, cholla, prickly pear, ocotillo) are found alongside low-elevation desert species that are currently absent from the adjacent valley(e.g. sotol, brittlebush, desert willow, foothills palo verde) and high-elevation species (juniper, paintbrush, snapdragon vine, and a blue penstemon not seen elsewhere at this altitude). These canyons, and to a lesser degree the gentler slopes of the surrounding badlands, appear to constitute a refugium (place of refuge) for species whose ranges have changed with climate since the end of the Ice Age. The following slides illustrate the diversity of plant species in the largest canyon.

May 2, 2010



May 2, 2010

The alluvial fans

At the foot of the northern cliffs and badlands, a set of broad alluvial fans consisting of loose gravel eroded from the badlands extends several hundred feet towards the river. The perennial plant community includes acacia, ephedra, up to 10 cactus species, crucifixion thorn, mesquite, and yucca. In wet years, there are spectacular displays of annuals and four-o'clock, a perennial plant not present elsewhere in the region. The following slides illustrate this plant community.

May 2, 2010

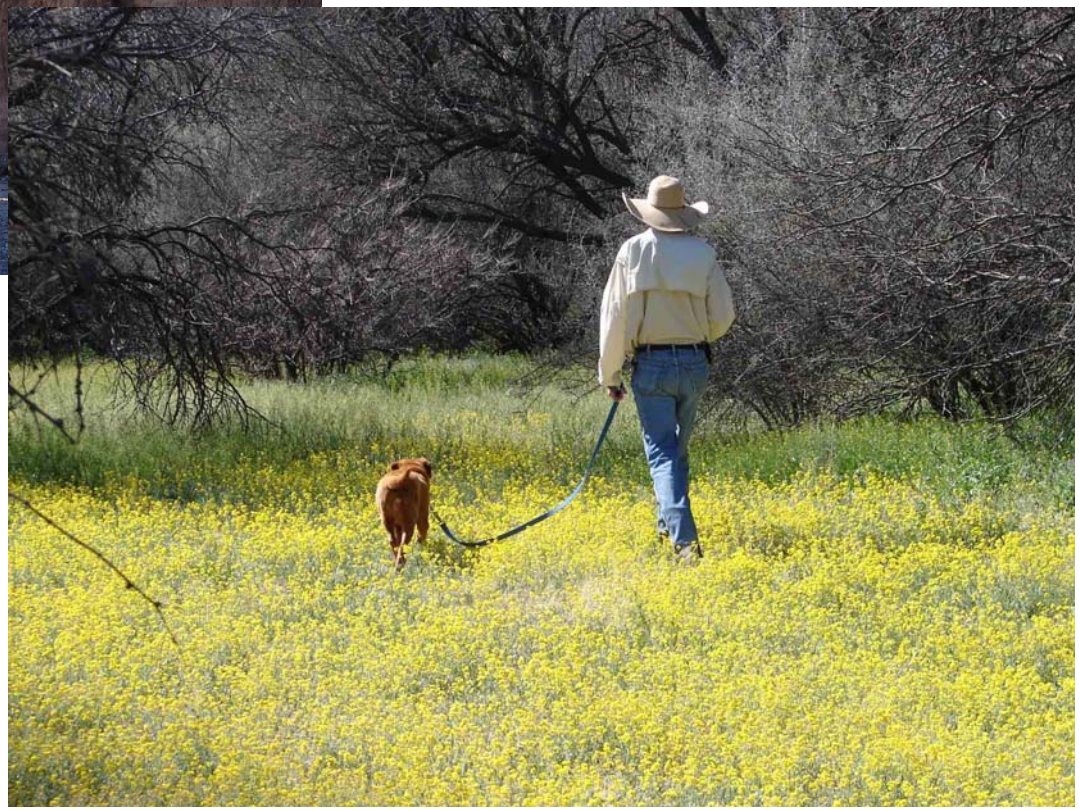
April-May 2010

The mesquite bosque

The level area of ancient river sediments between the alluvial fans (northern cliffs) and the river hosts a bosque of tall (20-30 ft.) mesquite trees, with local clearings.

Much of the bosque near the southern cliffs has been cleared for agriculture.

< Mesquite bosque between the brown cliff-forming beds and the river, northern cliffs.



Bladderpod flowers in a clearing in mesquite bosque at the foot of the gray cliff-forming beds, northern cliffs. >

Tracks in river mud after monsoon flood

Raptor roost in slot canyon

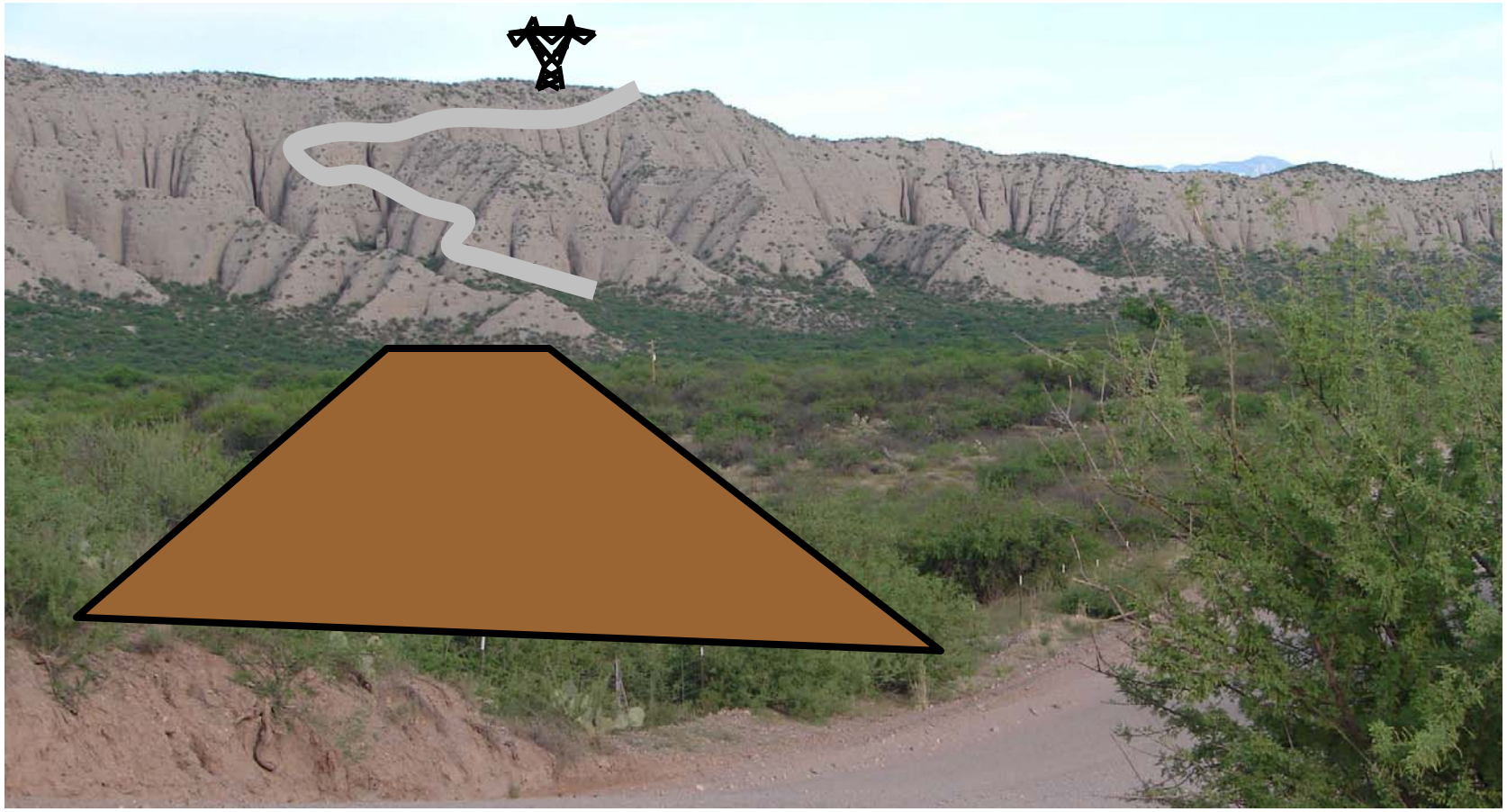
Animals

The bosque and the alluvial fan scrub support a wide variety of reptiles, birds and mammals. The birds for which the riparian environment of the San Pedro valley is famous also depend on these environments for food and shelter, and the cliffs provide roosts for raptors. An exhaustive count of mammals cannot be provided at present, but the list includes coyote, javelina, raccoon, ringtail, deer, large and medium-size cats, coatimundi, grey fox, kit fox, skunks, rabbits and many rodents.

Cultural values

The Sobaipuri Indians clearly used the mesquite bosque as a source of food, as evidenced by a set of metates in the southern cliff area. In the northern cliff area, most traces of Indian settlement are on the eastern side of the river. Scattered agaves found at the foot of the northern cliffs may be escapees from Indian gardens of a thousand years ago.

For the present-day residents of Cascabel, the cliffs – and particularly some of the slot canyons – represent a spiritual focal-point of the district.



Sunzia

This view of the gray cliffs and badlands taken from the Cascabel Road shows the likely route of the proposed Sunzia segment C276 that would cross the San Pedro River in Cascabel. The cliffs would be defaced with a tower and an access road (simulated on the photo), and a 45 to 75 acre swath (brown polygon) of the bosque and the alluvial fan vegetation would be cleared, bisecting these habitats.

SUMMARY. The Cascabel Cliffs are a spectacular element of the scenery in the San Pedro Valley. In addition, the cliffs, badlands and the undeveloped land between them and the river constitute a biological treasure-house. The area pictured above, encompassing the broadest part of the mesquite bosque and the alluvial fan scrub, and a central part of the gray cliffs/badlands, is the area of greatest biological value. It is vulnerable because it is one of very few places where a river crossing is possible on State Trust land. The construction of the segment of the Sunzia transmission line proposed for this location would result in the clearing of scrub and bosque, and the defacing of the cliffs. This is unacceptable to the Cascabel community, and to all Arizonans interested in the preservation of a unique and significant scenic feature.