

# **Native American Traditions and Riparian Restoration: Ecological Field Experiments in Anza-Borrego Desert State Park**

**A proposal from The Land Conversation, Inc.  
to the California State Department of Parks and Recreation, Colorado Desert District**

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*The plants have had this interaction with people for all these thousands of years and in the last 500 years the interactions just stopped. And the plants have no idea what to do.*

-- Richard Bugbee (Payoomkawichum [Luiseño]), 2004

## **Introduction**

Founded in 2004 and directed by the author of this proposal, The Land Conversation, Inc. (TLC) is an organization that helps to restore ecosystems and revitalize languages and cultures. We increase expertise in ecology, history, language, and cultural studies among people of all ages and diverse cultures by coordinating the resources offered by schools, universities, tribes, community-based organizations, and public agencies. In July 2004, TLC received funds for its Traditional Land Management Research Program from the San Diego Foundation's Blasker-Rose-Miah Fund and Colonel Frank C. Wood Fund. The purposes of this research program are to investigate traditional human-environment interactions as windows into historical ecology, and to apply traditional practices as methods for ecological restoration.

With this document, The Land Conversation proposes a five-year program to enhance riparian plant and animal habitat in Anza-Borrego Desert State Park's San Felipe Valley property using innovative methods – namely, by reintroducing indigenous people's interactions with willows (*Salix* spp.) and other plants. These interactions – which may include pruning, coppicing, or burning – can provide a habitat-enhancing “disturbance” similar to scouring by floods. The program offers other potential benefits as well, including increased collaboration between State Parks and tribal agencies, new educational opportunities, and a demonstration of the integration of ecological restoration with indigenous cultural and linguistic revitalization.

## **Historical background**

Anza-Borrego Desert State Park's lower San Felipe Valley and Sentenac Cienega comprise highly significant historical, cultural, and natural areas (Figure 1). Lying along the Southern Emigrant Trail, the area was traversed and settled by an ethnically diverse set of native peoples for many centuries before it became a stop on the major land route into southern California for nineteenth-century Euroamerican travelers. Today it forms part of a critically important migratory route for birds and habitat for several rare and endangered species. Though the landscape has changed considerably since the arrival of Europeans and Euroamericans, San Felipe presents an opportunity to re-establish centuries-old interactions between people and their environment.

Archaeologists have found evidence that people transiently occupied the Sentenac area as long as 12,000 years ago (Long and May 1970). Sustained settlement most likely started around 1,000 years ago (Schwaderer 2001). Late Prehistoric peoples made use of an extensive trail system for resource exploitation and trade, stretching to the coast and to the Colorado River and beyond. Recent studies have shown that residents of the Sentenac Cienega area may have cultivated corn about 1,000 years ago (Davis and others 2005); the well-established trade network could have provided access to the seeds for these crops.

Any crop-agriculture economy was relatively short-lived; the area's people eventually chose more efficient economic strategies. A multicultural mix of people occupied the cienega seasonally, hunting ducks, geese, bighorn sheep, deer, pronghorn, rabbits, rodents, lizards, snakes, and insects, and taking advantage of such plant resources as agave, mesquite, oaks, saltbush, catclaw, cholla, wild plum, native grasses, tule roots, pollen, and yerba mansa (Aldern 2002; Cline 1984; Schwaderer 2001). Willows provided the raw material for a wide variety of products and purposes, including houses, bows, acorn granaries, cradleboards, clothing, and fuel (Aguilar 2004; Bugbee 2004; Dumas 2004; see also Spier 1923). Southern California ethnographic studies, as well as an analysis of charcoal deposits from Sentenac Cienega, show a history of regular burning by prehistoric peoples – presumably in order to foster desirable species and plant habits (Shipek 1993; Davis and others 2005).

After the arrival of Europeans, San Felipe Valley was subjected to periods of heavy livestock grazing and fire suppression. Recently large-scale fires have increased in frequency. The changes in San Felipe resulting from all these factors have included a reduction in grass, vastly increased siltation in the cienega and a lowered water table upstream, plus modifications in streamside vegetation, mesquite distribution, and animal populations (Aldern 2002).

For an example of the evidence of changes in the hydrology of the area, see Figure 2, which shows a view of San Felipe Creek taken nearly 80 years ago, just upstream from the cienega. Carl Sauer commented that the gully he photographed in the 1920's was entirely “induced by man.” Years of heavy grazing and “careless cultivation”

in the valley increased runoff into Banner and San Felipe Creeks, carving deep gullies and dumping silt into Sentenac Cienega (Sauer 1929; see also Davis and others 2005). These changes in the stream channel have likely resulted in changes in the flood regime alongside San Felipe Creek south of Highway 78. Though willow trees occur south of the highway, the author has observed comparatively little new growth on these trees at heights from the ground of 0-2 meters.

During the late twentieth century San Felipe and Sentenac experienced an invasion of exotic tamarisk trees (*Tamarix* spp.). Recently the State Park has removed tamarisk from much of the Sentenac Cienega area, and removal efforts continue farther up the watershed. Unfortunately, herbaceous invasive plants such as smotherweed (*Bassia hyssopifolia*) have now colonized much of the area formerly occupied by tamarisk (Paul Jorgensen and Larry Hendrickson, personal communications).

### **Riparian habitat**

Though its hydrology has changed over time and exotic plants have invaded, much of San Felipe Valley provides prime riparian habitat. For several nesting birds, the most critical component in riparian habitat is a dense shrub layer (Bell 1997). Dense understory is most likely to occur in willow stands four to seven years after a disturbance such as a flood or fire, but may also occur in younger riparian habitat.<sup>1</sup>

Re-establishment of historic disturbance patterns may be the single most effective approach to riparian restoration. Bell (1997) suggests, "... revegetating is not necessarily the best way to create habitat. The best way to address habitat loss in southern California riparian systems is through a comprehensive program of eradication of ... invasive aliens, and relying on natural physical processes ... for the recovery of native natural communities and species." In the absence of natural flood dynamics, which might be the case at Sentenac Cienega due to the altered surface hydrology described above, restorationists may have to introduce disturbance to the system themselves. According to Franzreb (1990), "To restore and maintain the preferred habitat requires either natural periodic scouring precipitated by a quick release of impounded water, or by **some other mechanical or manipulative means**, such as bulldozing of habitat or use of controlled burn" [emphasis added].

### **Traditional interactions**

Traditional human-willow interactions can provide the manipulative means to restore and maintain riparian habitat. These traditional interactions – such as regular pruning, coppicing, and burning – can foster dense undergrowth and vertical stratification. As Richard Bugbee (Payoomkawichum [Luiseño]), noted in an interview,

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<sup>1</sup> As an example, Paul Jorgensen reports that several least Bell's vireos (*Vireo belli pusillus*) have colonized a portion of San Felipe Valley that burned less than three years ago, in the Pines Fire of 2002.

You harvest [willow] one year and you come back the next year and you just have the most perfect willow growing out of there. It's fat, green, flexible, straight – it's just really nice willow. If I have to build a house, I try to gather it where I've gathered it before. It's really hard if I skip a season, because it gets all tangled up. You have to end up using a bunch of brown stuff, and the brown stuff doesn't bend too well (Bugbee 2004).

Manuela Aguiar (Pai Pai / Kumiai) states that regional, traditional methods are precise; the willow-gatherer carefully promotes re-growth.

To cut willows correctly, you cut them on the outside. And you cut fresh growth. You don't cut the whole thing down; you just take parts of it – this is for both houses and bows. We cut from the outside, but you have to know how far in to cut it off, because you want it to grow back. So you don't just cut it all the way down to the trunk. You cut it off, then you can have a place where eventually it can grow back out (Aguiar 2004).

### **Proposed program**

The Land Conversation proposes to reintroduce traditional willow harvesting methods in Sentenac Cienega area. We will measure the resulting vegetation structure and compare it to vegetation in designated control sites. We hypothesize that the traditionally harvested sites will exhibit a better-developed understory when compared to control sites.

Figure 3 shows a possible general arrangement of study sites. A series of sixteen 0.1-hectare (quarter-acre) study sites along the main creek channel and a tributary drainage will be randomly selected in an approximately 35-hectare area south of State Highway 78. We have chosen this area for several reasons. Here, for example, we avoid the large gullies that are still present north of the highway. Also, many sensitive archaeological sites south of the highway presumably lie buried by the large quantity of silt deposited during the historic period, out of reach from any disturbance by the proposed program's activities (Sue Wade, personal communication). In addition, working in this area should avoid sites where endangered least Bell's vireos and southwestern willow flycatchers are currently known to occur (Wells and Kus 2001; Paul Jorgensen, personal communication).

Please note that a variety of willow species occur in the proposed test area, all of which have both cultural and habitat value. We will await approval from State Parks of the concept outlined by this proposal before we precisely locate our experimental sites and before we determine exactly which willow species will become the focuses of our study. Please note also that we propose two types of manipulations for the test area. In separate visits to the proposed study area Bonnie Salgado and Paul Gonzalez, members of the Santa Ysabel Band of Diegueño Indians, both stated that since the area's willows haven't been harvested or maintained for many years, there is little of the young, flexible growth needed for uses such as house-building or cradleboard-making. Ms. Salgado and Mr. Gonzalez suggest that most of the area needs to be "cleaned up" so that usable willow can emerge within the next few years. Therefore we will treat some 0.1-hectare

areas, such as those indicated by green circles in Figure 3, by coppicing willows and aggressively removing exotic herbaceous plants. In other experimental areas, indicated by yellow circles in Figure 3, traditional gathering of willows will take place without prior modification of the vegetation. Land Conversation staff will work in collaboration with tribal consultants and State Parks to locate and sequence the harvesting or manipulations of vegetation to minimize impact on sensitive species.

We will measure the effects of manipulations on vegetation structure using a “stacked cube” transect method based on a model described by Kus and others (2002). Depending on the precise location of the experimental sites, randomized transects already put in place by State Parks may also provide relevant data. The Zoological Society of San Diego’s department of Conservation and Research for Endangered Species (CRES) will provide consultation and support regarding program methodology and analysis of measurements. Below is a suggested timeline for the proposed program.

**May 2005 State Parks suggests modifications and approves conceptual plan.**

**June 2005 Specific experimental sites identified and flagged; initial, baseline inventories completed**

**June -  
Sept. 2005 Regulatory review and permits**

**October 2005 Begin traditional harvesting and manipulation of vegetation in test sites. These activities will take place during the period of October-March each year of the program, in order to avoid the nesting period for endangered species in the area.**

**Annually Measure vegetation structure using “stacked cube” transects; report results to all partner agencies.**

**June 2010 Final report to all partner agencies.**

In addition to conducting the ecological research described above, The Land Conversation will design related educational curriculum and conduct workshops for teachers through its partnership with the University of California’s Center for Research on Educational Equity, Assessment, and Teaching Excellence (CREATE). We will implement this curriculum in elementary and high schools as well as in tribal youth programs. A critical component of the curriculum will be the observations and active participation of K-12 students and research assistants from local universities in the ongoing fieldwork. We will also recruit adult volunteers to participate.

Plant materials gathered by Native Americans during the program will be used by individual artisans or for instructional purposes at tribal youth programs and in adult classes conducted by the Southern California Tribal Chairmen’s Association’s Parent Information Resource Center. Tribal agencies will be able to use program activities as

springboards for indigenous language lessons – either directly in the field or subsequently as Native speakers narrate videos shot to document field activities. Thus ecological restoration will be linked to Native cultural and linguistic revitalization.

With this program, TLC proposes a truly community-based citizen science initiative, one that can be highly productive for all partners. The outcomes for the State Park can include expanded positive collaboration with tribal members and agencies, as well as the potential demonstration of an innovative method for restoring riparian habitat. We look forward to the Colorado Desert District's response to this proposal, to continuing discussion, and to working together in the years ahead.

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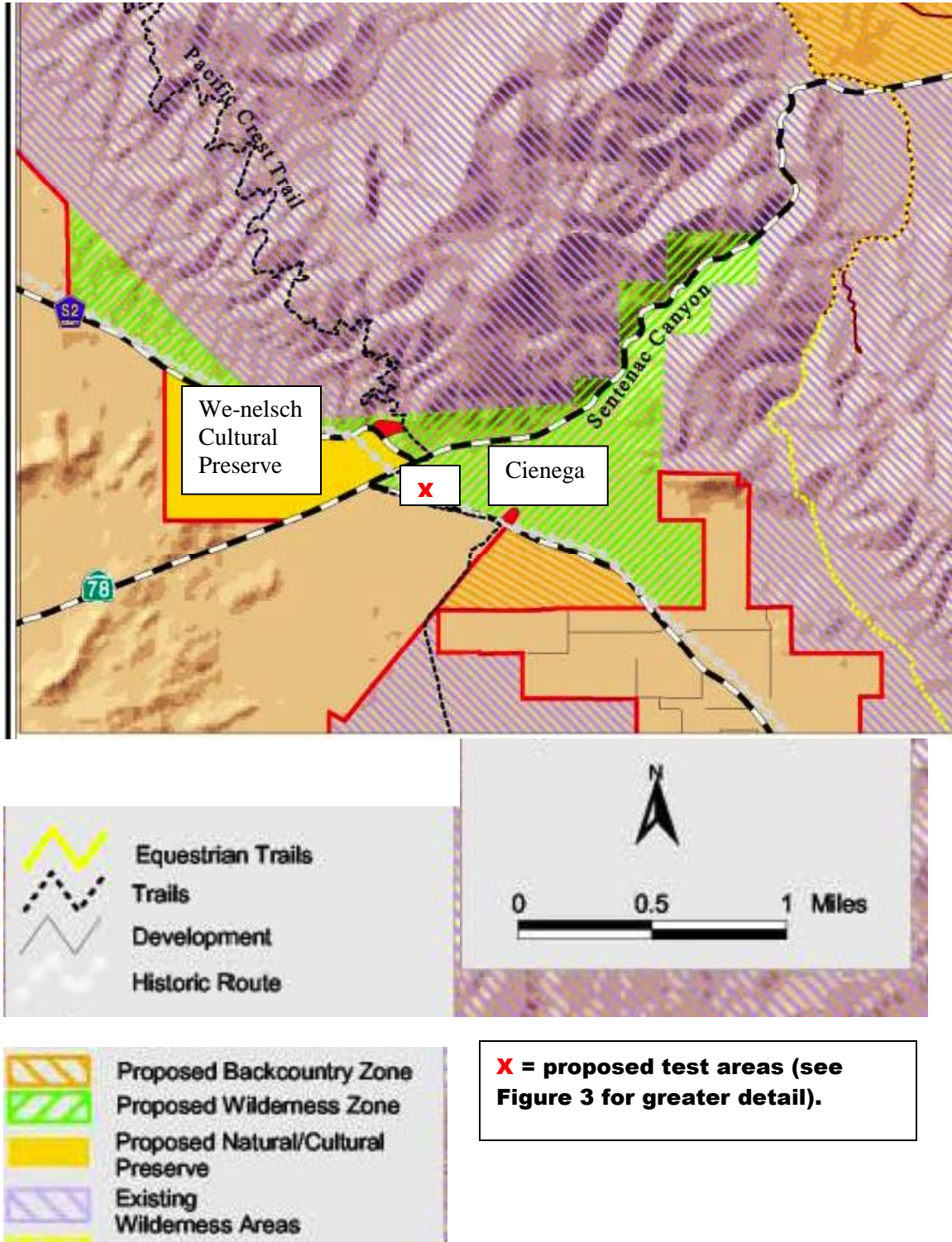
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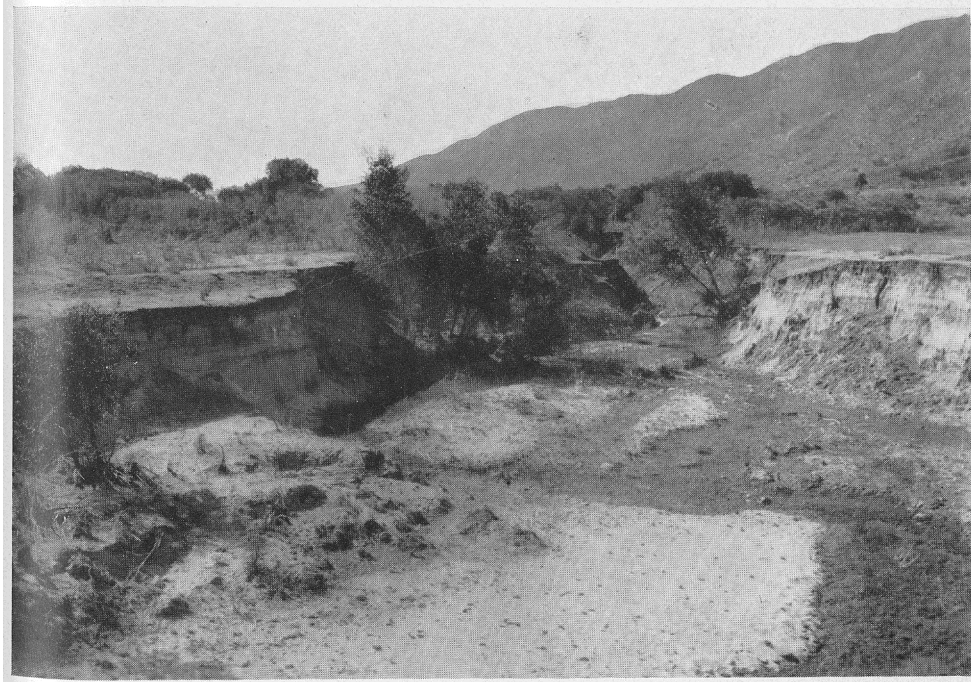
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**Figure 1. Lower San Felipe Valley – Sentenac Canyon and Cienega Area**  
(Modified from the Anza Borrego Desert State Park Preliminary General Plan, Figure 6-10, accessed on April 28, 2005 at <http://www.parks.ca.gov/pages/21299/files/figure6-10.pdf>).

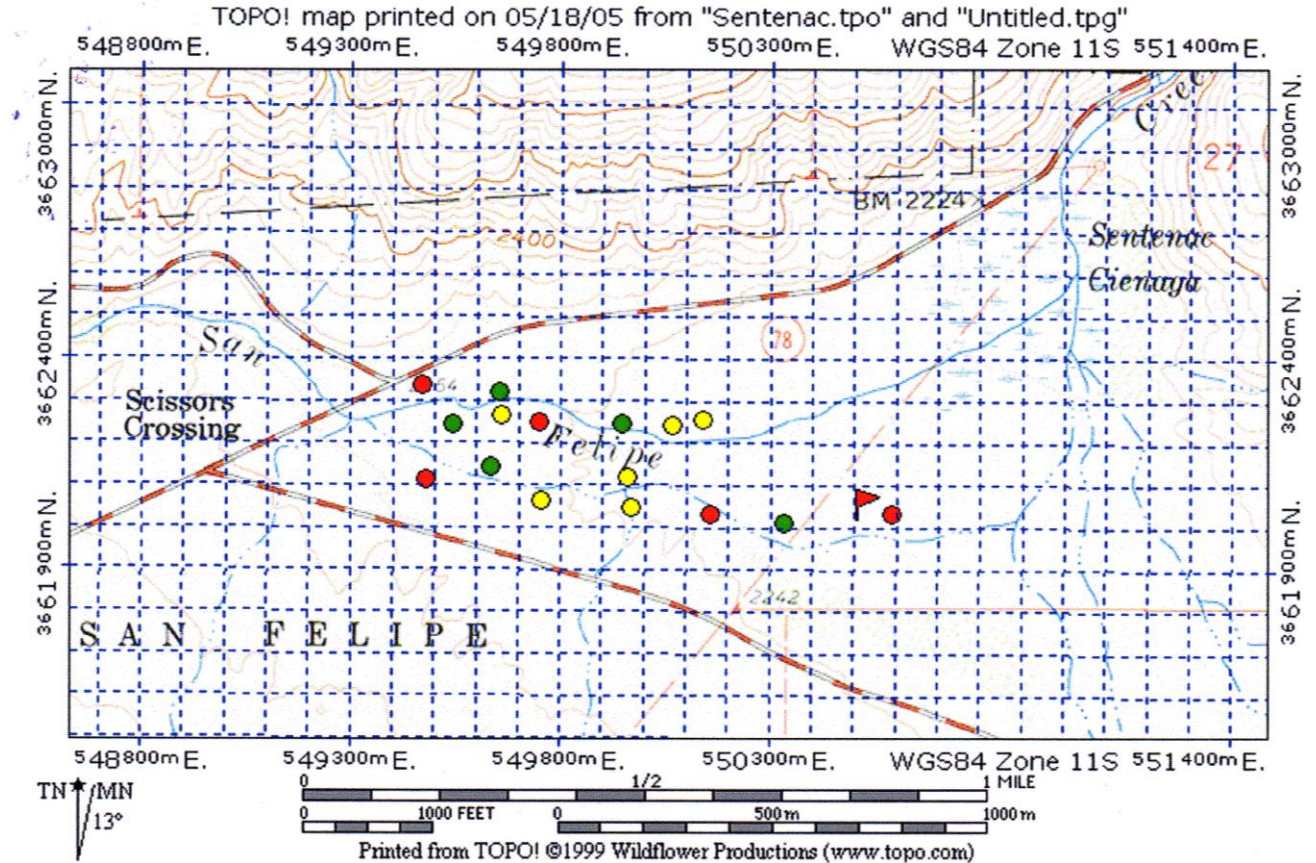




**Figure 2.** Carl Sauer took this photograph from the old bridge over San Felipe Creek at Scissors Crossing in 1927. His explanation reads, in part: “Active ravine cutting into floor of San Felipe Valley at site of old Indian village... Recent careless cultivation of the floor of the fill is said to have originated the ravine which has destroyed much of the old field and is now cutting headward rapidly in the valley. The entire feature apparently is induced by man.” (Reprinted in Aldern 2002 by permission of the publisher, from Carl Sauer, “Land Forms in the Peninsular Range of California as Developed about Warner’s Hot Springs and Mesa Grande,” *University of California Publications in Geography*, Vol. 3, No. 4 (1929), Plate 37b.)

Figure 3.

**Ecological Field Experiments in Sentenac Cienega Area  
Anza-Borrego Desert State Park  
Proposed by Jared Aldern, The Land Conversation, Inc.  
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**MAP KEY**

- Red flag** = Area with willows and cottonwoods recently planted by State Park crew.
- Green circle** = Possible area for extensive modification of willows (coppicing and pruning), plus removal of exotic herbaceous plants.
- Yellow circle** = Possible area for traditional willow-gathering activities.
- Red circle** = Possible control area (inventory and monitoring only; no modification or gathering).
- Blue grid squares** = 1-hectare (2.47-acre) areas