

PROC. SECOND NATIVE PLANT REVEGETATION SYMPOSIUM 1987

LOS COCHES MITIGATION AREA A CASE STUDY IN NATIVE PLANT REVEGETATION U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT

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This paper presents a case study for native plant revegetation using the Los Coches Mitigation Area. The actual revegetation covers 1.6 acres. Even on this small project, however, unforeseen problems developed. This paper focuses on how these problems were resolved.

BACKGROUND

Los Coches Mitigation Area is located in San Diego County, approximately seven miles east of Oceanside, in Guajome Regional Park.

The project is a mitigation measure required by the Environmental Assessment (EA) prepared for a flood control project on Los Coches Creek, near Lakeside, California. The project was built by the U.S. Army Corps of Engineers (USACE), and was co-sponsored by the County of San Diego.

The mitigation in the EA was negotiated between the USACE, San Diego County and the U.S. Fish and Wildlife Service (USFWS) in 1984. It required that the County designate thirty acres of Guajome Regional Park (a County park) as a wildlife preserve, and that the County spend \$80,000 to upgrade the wetland areas.

The designated thirty acres is in old field succession. It has a small stream running through the length of it that empties into a marsh. Black Willows (*Salix gooddingii*), Arroyo Willows (*Salix lasiolepis*), Sandbar Willows (*Salix hindsiana*) and Mulefat (*Baccharis glutinosa*) line both banks of this stream, which are spreading over time, according to a study of aerial photographs.

The area is part of the remaining habitat in San Diego County suitable for a state and federally listed endangered bird species, least Bell's vireo (*Vireo bellii pusillus*).

OBJECTIVES

The objectives of the three agencies in developing the mitigation plan were to increase the habitat for the least Bell's vireo, and enhance as much project area as possible with the available funding.

CONCEPTUAL PLAN

The basic plan was to widen the Willow corridor along the stream the maximum distance that funding would allow. Taller trees would be introduced to provide better roosting opportunities for raptors. Willow species and other plant species native to that area would be used to provide additional habitat for the least Bell's vireo.

CONSTRAINTS

Salinity

A soil report determined that most of the area was beyond the tolerable salinity levels of most plants, requiring extensive use of amendments, careful selection of plant species, location of low-risk areas, and decisions of what risks the agencies were willing to take.

Adjoining Recreation Use

The primary purpose of Guajome Regional Park has been to provide recreational opportunities. Recently, a new County master plan has been started that will define a dual purpose--recreation and wildlife preservation. Even with this new emphasis, equestrian trails, nearby development and access for recreation users require design measures to limit access to the mitigation area.

Timing

The time between budget authorization and the upcoming planting season (January-February) did not leave sufficient time to contract grow or collect plants and seeds. All plants materials and seeds had to be available at the time of contract award. In addition, an agreement with Guajome Regional Park required that all construction on the project be completed by February 28 of the same year to prevent disturbance of nesting activity.

Funding

The \$80,000 budget allowed only a few of the thirty acres to be developed. Those few acres required careful selection in order to make the project successful. Installation techniques and plant materials also required evaluation to determine the most cost effective way to implement the project.

THE DESIGN/SOLUTION

Summary

The solution involved revegetating 1.6 acres for the 1987 planting season. A 1200 foot strip, 40 to 120 foot wide was graded to a maximum depth of one foot, flanked by a three foot berm. The cut areas were planted with Willows (*Salix spp.*), Cottonwoods (*Populus fremontii*), Mulefat (*Baccharis glutinosa*), and Mugwort (*Artemisia douglasiana*). The fill areas were planted with Sycamores (*Platanus racemosa*), Cottonwoods, and limited quantities of Elderberry (*Sambucus mexicana*) and Fuchsia-Flowering Gooseberry (*Ribes speciosum*). The edge of the project was planted with California Rose (*Rosa californica*) as a prickly physical barrier. The nearby equestrian trail was moved to maintain a distance of 100 feet from the project. Three test areas were planted to determine plant species tolerance to salinity for future planting.

Grading

The key to this revegetation project was the grading to a maximum depth of one foot to duplicate the conditions of a parallel Willow corridor (1). The spoils were used on-site to create a three foot berm alongside the cut area, to be used as an access barrier, and as an area for plant species that are less tolerant of wet conditions. The grading provides a continuous flow of water following the existing slope to prevent ponding. To prevent erosion, the graded area was compacted initially; the removed vegetation was plowed into the fill material; a maximum slope of 3H:1V was maintained for the berm, the contractor access was limited; and the isolated test area required hand carried equipment.

As an undulating line provides the maximum possible edge, the undulating line and the combination of wider and narrower thickets improve wildlife habitat value (1). The berm/moat effect discourages access to the project.

Amendments

Initially a soil report was determined to be unnecessary. The agencies involved were concerned about the cost, and a staff biologist did not observe any signs of a salinity problem. When the construction drawings were nearly completed, the County issued the *Draft Wildlife Management Plan* for Guajome Regional Park (2), which indicated a saline area near the project. Another staff biologist determined that the area was exclusively covered with

halophytes, or salt-tolerant plants. At this point, all agency representatives agreed that a soil report was necessary. To cut costs, we delivered the samples to the soils lab directly. Samples were taken at seven locations, approximately every 250 feet, one foot and two and one-half feet deep at each location. The soil report showed ECe ratings (a measure of soluble salts) ranging from 1.8 to 24. An ECe rating of four is the maximum recommended rating for plants that are not salt tolerant (3). Only two locations had acceptable ratings. The risk was accepted to include locations with ECe ratings at or below 6.6, which eliminated three areas. The decision was made to use only a portion of the budget to plant in the lowest-risk areas. After a year, the success rate would indicate whether to use the remaining budget at this site, or to find another site.

Test plantings were installed at these three areas to determine the potential for future planting. Extensive amendments were used for soil preparation and backfill to try to compensate for the saline soil conditions. Roughly one-sixth of the estimated budget went towards these amendments (3):

For soil preparation per 1000 square feet

4 cubic yards nitrogen stabilized organic amendment derived from redwood, fir or cedar sawdust
15 pounds 12-12-12 commercial fertilizer
200 pounds agricultural gypsum

For backfill mix

6 parts by volume soil from low soluble salt areas
4 parts by volume nitrogen stabilized organic amendment
1 pound 12-12-12 per cubic yard of mix
10 pounds agricultural gypsum per cubic yard of mix
2 pounds iron sulfate per cubic yard of mix

The area is getting less saline over time, so eventually will be suitable for Riparian Woodland plantings. The plants and species that initially survive will have a greater chance of surviving over time.

Cuttings

Cuttings were used to revegetate the area with Willows. Initially, wattling (planting of bundled cuttings) was examined as a technique for revegetating this area. After checking on local projects that used Willow cuttings, it was evident that wattling was more expensive (as much as ten times), and was not necessarily more successful (4). As the real advantage in using wattling is for slope stabilization it was deemed unnecessary for this project.

Cuttings were used for Sandbar Willow and Arroyo Willow. Black Willow was also used on this project, but was planted in containers due to the small numbers of plants used. 480 two foot-cuttings of each of the Willow species were planted three foot on center (O.C.). Five-foot O.C. was recommended for optimum wildlife habitat value. The increased density of plantings was expected to compensate for an anticipated survival rate of 70% (4).

Sandbar Willow cuttings were specified to be one-quarter inch diameter, while Arroyo Willow cuttings were to be three-eighths inch (4). The top of the cuttings were cut flush, while the bottoms were cut angled to facilitate rapid and accurate identification of the bottom end when planting (4). They were planted one and one-half foot deep and were specified to be planted within 24 hours of cutting, or stored for up to four days, immersed in water two-thirds from the bottom and covered with dark cloth (4). The cuttings set the planting window of January and February. Even though Willows are dormant from November through February, it is in January and February that the plant energy is utilized for root production (5).

Planting

The plant species list was provided by USFWS to guide habitat creation for the least Bell's vireo. All species, quantities and sizes were checked for availability, as no time was provided to contract grow the plant material. All species were checked for salt tolerance. The most tolerant are the Willows; Cottonwoods and Sycamores are acceptable; Elderberry and Mugwort marginal choices, thus used in limited quantities. Desert Grape (*Vitis girdiana*), was deleted from the plant palate due to low tolerance for saline soils (6).

California Rose, Blackberry (*Rubus ursinus*), and Desert Grape were originally selected to provide a barrier around the project. Desert Grape was deleted per above. Blackberry was deleted because it was thought it might attract children from a nearby housing development. California Rose remained as the barrier planting, spaced triangularly, five foot 0.C.

The large trees, Sycamores, Black Willows, and Cottonwoods, were planted from one and five-gallon containers to see which did better. The smaller container offered better site adaption and root production, while the larger container offered quicker competitiveness with the fast-growing Willows.

100 Cottonwoods were also planted 1300 feet on either side of the project along the existing Willow corridor to provide additional roosting opportunities for raptors. These were all planted from five-gallon containers to help them compete with the existing Willows (7).

As Sycamore required the driest conditions, they were only planted on the crest of the berm. These plants were specified to not be inoculated for heart rot, as heart rot is desired as it results in cavities used for nesting birds (8).

Staking was not recommended, as the trees would develop stronger branching if not dependent from the time of planting (9).

The planting window for these species was November through February, but the more restrictive planting window for the cuttings, January through February, was used.

Seeding

All plant species used in the two seed mixes were taken from the USFWS list for least Bell's vireo habitat. All were checked for availability as, again, no time was provided for contract seed collection.

Seed Mix A, Mulefat (12 lbs/acre) and Mugwort (3 lbs/acre) were used in the cut area of the project. The Mugwort was a risk, but the Mulefat has a greater salt tolerance (10). Both were used, despite the risk, because the seeding was not expensive.

Seed Mix B was used to cost effectively revegetate the old trail that was scarified. Seeding was necessary for erosion control and for a quick cue to recreation users that the area was no longer a trail. It included:

Artemisia californica
Eriogonum fasciculatum
Eschscholzia californica
Haplopappus squarrosus
Lotus scoparius
Lupinus bicolor
Mimulus puniceus
Phacelia taracetifolia
Sisyrinchium bellum

California Sagebrush
California Buckwheat
California Poppy
Haplopappus
Deerweed
Pigmy-leaved Lupine
Mission Red Monkey Flower
Lacy-leaved Phacelia
Blue-eyed Grass

and was applied at ten pounds per acre.

Tests

Areas where the soil report indicated extensive salinity were planted with five of each container plant and sample cuttings and seeding. The first contract, this 1.6 acres, used 56% of the total budget. If these areas have a high survival rate, the remaining funds will be spent to expand the project to these areas using the successful plant species. Some additional planting of successful species may be done in the original area, depending on the overall results. If the test areas do not succeed, other sites will be considered, or other actions on that site will be considered.

Trail

To minimize impacts from adjoining recreation use on the existing willow corridor and the project area, an equestrian trail was moved. The trail was as close as ten feet to the willows. It was relocated so that it is no closer than 100 feet at any point. This involved grading and compacting a new trail and scarifying and seeding the old trail. The vegetation removed from the new trail was plowed into the old trail.

Maintenance Period

An eight-month maintenance period is specified in the contract. The specifications recommend additional water to counteract the saline conditions. The specifications require replacement of all container plants that die within the maintenance period seeding of areas with gaps greater than twelve square inches, and replacement of Willow cuttings in excess of 30% die-off. All replacements must occur within the planting window January-February, of 1988.

Contract Administration

If not directly administering a contract, to require the contractor to submit plant and seed sources within seven days of the notice to proceed in the specifications. Limit contractor activity around the site as much as possible to reduce erosion. Restrict damage to existing vegetation. Establish excellent rapport with the Contract Administrator, or Contracting Officer to avoid independent decisions by unknowledgeable people. Instructions to field personnel can be prepared to outline critical issues and to explain why specific methods and materials are used. These explanations can prevent unacceptable substitutions from being made.

Ongoing Administration

A Memorandum of Understanding is to be drafted by USFWS and the County covering the administration of the project area. The area is to be administered as a wildlife reserve, allowing passive recreation uses, and precluding any structural improvements.

SUMMARY OF SOLUTIONS

SALINITY

- only lower-risk areas were planted this year
- extensive use of soil amendments
- careful selection of plant species
- use of test areas before committing the entire budget
- recommending additional watering
- will consider *Atriplex* spp. harvesting as an experimental part of next year's project (11)

ADJOINING RECREATION USE

- dense plantings
- barrier plantings around periphery of project
- moving equestrian trail 100 feet from project area
- administering area for passive recreational use

TIMING

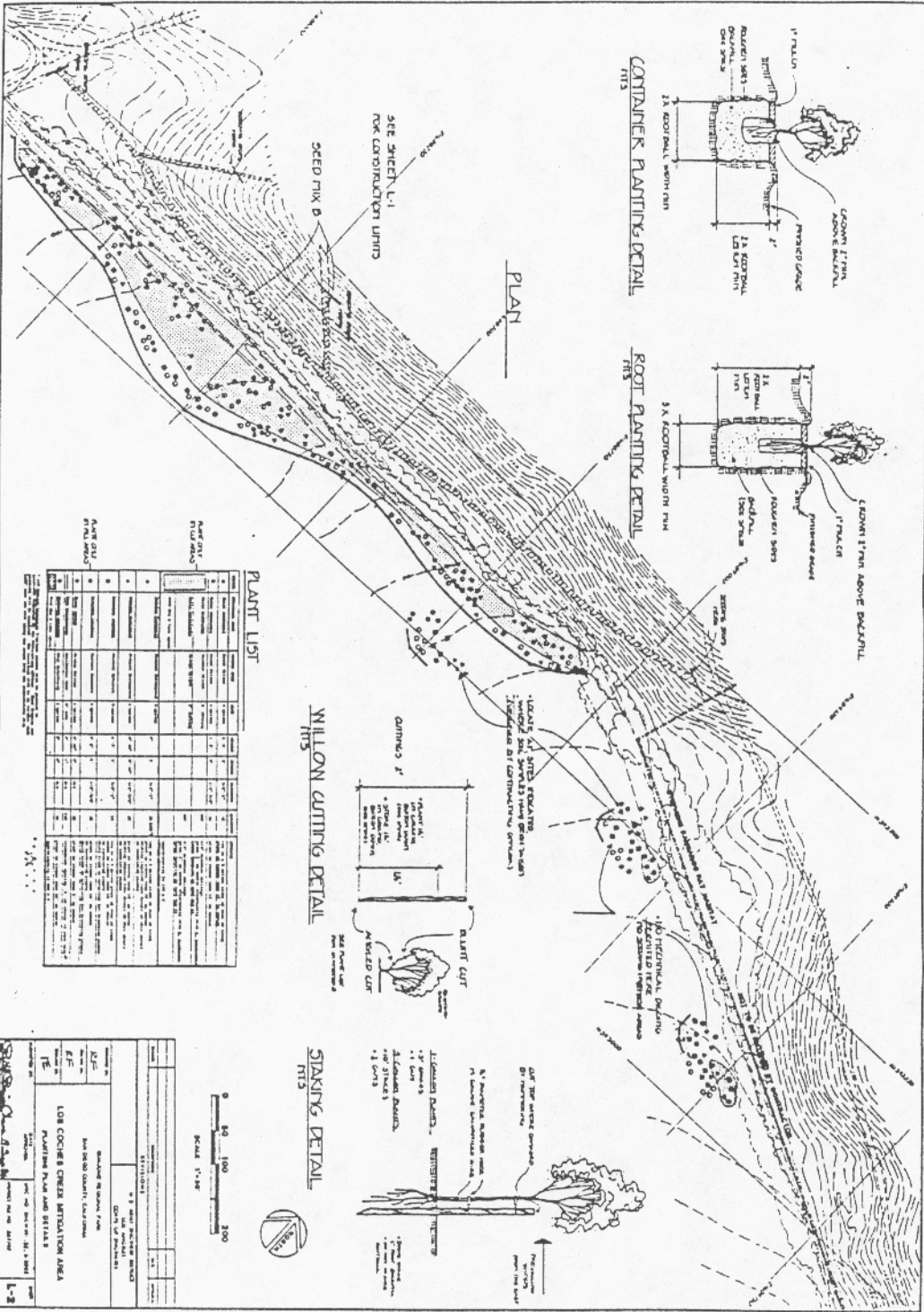
- insuring that plants and seeds were available

FUNDING

- use of smaller containers (one and five gallon and four inch tubes for the *Rosa californica*)
- use of seeding for old trail and understory of Willows
- use of Willow cuttings over container plants or wattling
- on-site spoils disposal
- simple grading of trail
- testing survival of plant species in risky areas

KEY RECOMMENDATIONS

- always have a soil report prepared
- consult with local professionals, native plant and seed sources, and others who have done similar projects
- check availability of all plants and seeds within project timeframes
- obtain plant and seed sources from contractor immediately
- identify and analyze risks so that all involved can make decisions they can accept



CONTAINER PLANTING DETAIL
RT3

ROOT PLANTING DETAIL
RT3

WILLOW CUTTING DETAIL
RT3

STAKING DETAIL
RT3

PLANT LIST

NO.	PLANT NAME	QUANTITY	NOTES
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LOG COCHES CREER ATTENUATION AREA
PLANTING PLAN AND DETAILS

DATE: 10/15/2013
DRAWN BY: [Name]
CHECKED BY: [Name]

SCALE: 1" = 50'

PROJECT: [Name]

DATE: 10/15/2013

1-3