San Diego Association of Governments
Florida Canyon Habitat Restoration
Final Report
Project Period: 11/8/2018 – 11/7/2020
SANDAG Contract Number: 5005502

Executive Summary

Florida Canyon is a 147-acre ecological preservation in the heart of Balboa Park. Originally set aside and designated as official parkland in 1868, the preserve hosts a wide variety of native plant and animal life, including a handful of threatened and endangered species protected under the Multiple Species Conservation Program (MSCP) and Multiple-Habitat Planning Area (MHPA) programs. Florida Canyon Open Space is an ecological area of significant importance, as it is one of the last expanses of habitat in Downtown San Diego. Though the canyon has remained largely in its natural state since being designated as official parkland, the habitat within Florida Canyon Open Space area has been damaged and depleted for numerous decades due to increased recreational use, human encroachment, urban expansion, loss of connectivity, and an un-designated trail system. This damage has directly led to systemic erosion and the degradation of the biological health of the canyon.

3 sites within Florida Canyon, totaling approximately 2 acres, were identified as the project location due to extensive habitat loss, erosion, presence of invasive species, impacts from human presence and encroaching urban development. Ecological restoration of these heavily depleted areas was the primary project goal. The main objectives of the project were to preserve existing native species, control invasive species, re-establish native vegetation and habitat, control erosion, establish a designated trail system, fence sensitive areas to reduce disturbance, and install interpretive signage.

This project accomplished several goals that were identified for the restoration of several sections within the Florida Canyon corridor. Our intent was to identify these areas, establish a perimeter, restore and protect the three selected sites. The sites chosen yielded visible results and are complete.

The largest of the 3 sites, terrestrial Site 1, was the most significantly damaged areas that resulted in a significant loss of native vegetation, invasive species establishment and erosion. Revegetation of the site was necessary in order to limit access, close rouge trails, reestablish habitat and reduce erosion. This site is adjacent to one of the most widely used encampment areas in the entirety of Balboa Park.

Site 2 had a very significant erosion scar that resulted from the creation of a rouge trail. It ran from the top side of the canyon through the full length of the slope. Being a rouge trail running almost strait down the slope, it lent itself highly prone to erosion. The depth of the erosion scar at its deepest was 3.5 feet and the width of the erosion pattern was the similar in width. The erosion resulted in exposing the hard pan soil with larger rocks and less nutrient soil. The goal for this site was to create erosion checks, slow the turbidity of the overland flow and to plant native vegetation to enhance the retention of the remaining soil and further assist in the recovery of the erosion scar. The area was posted with restrictive signage and temporary fencing was erected and maintained. All project goals for this area were accomplished. One

noticeable consequence of closing the rouge trail is several more were created. However, the new illegal trails meandered the slope better and are not as prone to the heavy turbidity of running straight downhill.

A temporary run of “T post” fencing was erected around both terrestrial sites. Green lath fencing was originally used, though it was discovered by using hemp or cotton rope a perimeter could be established and managed easily. The areas were patrolled daily and constant repairs to the fencing took place.

Site 3 consisted of a small section of riparian area at the low point of the canyon which contained many exotic and invasive species. The goals for the area were to have all exotic plants removed and to treat the invasive species. San Diego Gas and Electric agreed to partner on this task and removed over 100 palm trees from the riparian zone. We were able to see a quicker implementation of the restoration and we were also able to coordinate several follow up visits for the herbicide treatment of the regrown invasive vegetation. By removing the overwhelming numbers of invasive plants, the site was opened up for the establishment of native species. Some of the invasive plants that were removed and treated had well established themselves in this section, making this area the most visible restoration of the three sites. We will need to continue to manage this area by re-treating the invasive over time.

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Project Background

Florida Canyon is a 147-acre native plant preserve within Balboa Park, located in the heart of Downtown San Diego. The canyon was first designated as official and protected parkland in 1868 at the time that the 1,200-acres of Balboa Park were set aside for recreational use. Since then, the preserve has remained largely in its natural state, hosting a wide variety of original vegetation and habitats. The preserve is part of the Multiple Species Conservation Program (MSCP) and Multiple-Habitat Planning Area (MHPA), and thus its habitat, vegetation and wildlife are officially protected.

The Management Strategic Plan for Conserved Lands in Western San Diego County (MSP) identifies high-priority MSP species for conservation, several of which were identified as existing within the project site using the California Natural Diversity Database (CNDDB) and by conducting biological surveys onsite. MSP Species identified as currently existing onsite include orange-throated whiptail (*Cnemidophorus hyperythrus beldingi*), wart-stemmed ceanothus (*Ceanothus verrucosus*), snake cholla (*Cylindropuntia californica* var. *californica*), American peregrine falcon (*Falco peregrinus anatum*), San Diego barrel cactus (*Ferocactus viridescens*), willowy monardella (*Monardella viminea*), San Diego mesa mint (*Pogogyne abramsii*), costal California gnatcatcher (*Polioptila californica californica*) and Nuttall's scrub oak (*Quercus dumosa*). Several MSP species were also identified as historically existing onsite, including San Diego thorn-mint (*Acanthomintha ilicifolia*), California adolphia (*Adolphia californica*), San Diego goldenstar (*Bloomeria clevelandii*), variegated dudleya (*Dudleya variegata*), Palmer's goldenbush (*Ericameria palmeri* spp. *palmeri)*, and Blainville's horned lizard (*Phrynosoma blainvillii*). There is also potential that other MSP species may utilize the proposed project site, such as Swainson's hawk (Buteo swainsoni), coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*), southwestern willow flycatcher (*Empidonax traillii extimus*), American peregrine falcon (*Falco peregrinus anatum*), yellow-breasted chat (*Icteria virens,*) western bluebird (*Sialia mexicana*), least Bell's vireo (*Vireo bellii pusillus*) and several other MSP species. The vegetation types found within Florida Canyon include chaparral, coastal sage scrub, maritime succulent scrub, riparian scrubs, nonnative vegetation, and urban/developed. Restoration of these habitats is beneficial to the MSP species listed above.

The project addressed an urgent need to reduce habitat loss, thus protecting remaining habitat, by controlling invasive species, controlling erosion, directing recreational activities away from critical habitat and reducing human encroachment though the establishment of designated trail systems and fencing of areas undergoing ecological restoration. In order to accomplish defined objectives and goals, funding awarded through this grant was used to hire a professional environmental restoration contractor to assist with implementation of the project.

Success of reducing the impact to this area with the removal of invasive species, re-vegetation and fencing was likely to produce an 80% containment perimeter around and at the ingress and egress of selected sights.

<u>Terrestrial Revegetation - Site 1</u>

Site 1 was located near the intersection of Park Boulevard and Morley Field Drive, at the northwest corner of Florida Canyon on the west slope. The site had been overrun with individuals who had used the area to

shelter themselves. Unfortunately, this activity lends to the destruction of plants and soils, as well as creates a higher potential for fire. The overuse of this area for decades resulted in several rouge trails which contributed to a higher degree of erosion below the site on the main trail. The project goals for this site were revegetation of the area, closing rouge trails, and mitigating erosion.

Terrestrial Revegetation - Site 2

Site 2 was located to the southwest of the Velodrome, on the central eastern slope of the canyon. This site contained a large erosion scar resulting from a rouge trail that evolved from the repetitive use of the area leading from the top park of the canyon to the trail below. The illegal trail has been worn and eroded to the point that hard pan soil and sedimentary rock was well exposed. Loss of vegetation in this area was a major contributor to the erosion. The project goals for this site were revegetation of the area, closing rouge trails, and mitigating erosion.

Riparian Exotic & Invasive Species Removal - Site 3

Site 3 was located in the small stretch of riparian habitat between Morley Field Drive, Upas Street and Florida Drive on the north end of the canyon. This riparian site contained many exotic vegetation species as well as some common invasive plant species. Upstream from the site in the 1980's, a landscape was installed and maintained by the neighbors which spread exotic species into the riparian area. The City has since intervened with the activities, ceasing the use of exotic species in the area. However, the exotic species and other invasive species were well established throughout the site. The creek bed also contained hundreds of invasive Mexican fan palms and Canary Island date palms, whose seeds end up in runoff and establish themselves in urban streams channels, changing the hydrology of the watershed. The project goal for this site was removal of exotic and invasive vegetation.

The goals identified for this project meet goals laid out in the MSP by removing exotic and invasive vegetation, reestablishing native vegetation, expanding habitat for MSP species, and preventing erosion and destruction MSP habitats. The project goals would be met with straight forward approaches. An environmental contractor would be hired to assess the site, make recommendations, and complete the restoration tasks. Revegetation would be completed by installing native container stock as well as native cactus cuttings taken from healthy strands of cholla cactus within the canyon and through hand seeding the areas with a custom seed mix. Rouge trails would be closed by fencing of the areas, revegetation and installation of cactus cuttings, especially at trail access points, and erosion would be addressed through vertical mulching and installation of fiber rolls to create check and dams. Exotic and invasive species removal would be done with a combination of methods, such as manual removal and herbicide treatments.

Transient Encampments within Florida Canyon

Florida Canyon has been damaged by transient encampments and it is difficult to keep encampments out of the area. To address this, fencing has been installed around the project site and the Rangers are monitoring the area more frequently.

Potential Vandalization (based on frequent vandalization in other areas of the park)

Balboa Park has had recent vandalism that could affect the restoration efforts in Florida Canyon. As with the transient encampments, the installed fencing and increase in Ranger monitoring will address this issue as well.

Project Goals

- Within 6 to 12 months removal of invasive plant material reduced un-checked growth and decreases chance of increase of invasive plant material downstream.
- Within 6 to 12 months the selected project sites will be protected from human encroachment and by decreasing rouge trails with fencing and patrols will decrease erosion and further damage to approximately 2 acres of highly utilized natural land.

Work Performed by Task

Task 1- Fencing and Fencing Maintenance

Budget: $0.00
Spent: $0.00
Match for Task: N/A in kind services provided by the City of San Diego

Preliminary fencing was put up around the restoration area in order to contain the area to reduce encroachment and trespass to allow for successful restoration efforts. In addition, the boundary fencing and signage had established a harder perimeter lending to less unauthorized use of area. There is significantly less encroachment issues due to the direct enforcement of the perimeter of the site. All signs and postings are perimeter and will continue to serve as perimeter control.

Task 2- Monitoring

Budget: $0.00
Spent: $0.00
Match for Task: N/A In kind services provided by the City of San Diego

City staff collected data about the different species present in the restoration area, including invasive and non-invasive plant species as well as wildlife seen in the area. Data included the relative abundance of each species and samples of plants that were analyzed to confirm the species. Data was also collected concerning the amount of erosion damage in the area caused by run off, loss of vegetation and human activities. Presence of trash and other damage caused by human activity was also noted.

Task 3- Pre Project Administration

Budget: $0.00
Spent: $0.00
Match for Task: N/A In kind services provided by the City of San Diego

The City of San Diego Park and Recreation Department's Supervising Management Analysts and Associate Management Analyst, started processes to set up the grants to be active in the City's management system SAP, including the fund number, grant number, internal order, and cost center needed for contract administration and invoicing purposes.

Task 4- Contractor fees for invasive species containment and removal, erosion control, and revegetation.

Budget: $43,957.00
Spent: $43,320.98
Match for Task: $0.00

Terrestrial Revegetation Site 1

Site 1 was the heaviest used site of the 3 restoration sites, and therefore needed the most pre-restoration work completed. The site was cleared of trash and debris prior to the start of restoration work. Fencing and signage was established around the site to secure it during work. Green lath fencing was originally used, though it was discovered by using hemp or cotton rope a perimeter could be established and managed easily. This site is adjacent to one of the most widely used encampment areas in the entirety of Balboa Park. The area was patrolled daily and constant repairs to the fencing took place.

Once the site was ready to be turned over to the environmental contractor, RECON, restoration work began. In April 2019 the first round of invasive species were targeted and removed by manual labor, such as dethatching. Mulch was also used to help control invasive species. Several treatments would be necessary to control the invasive species such as mustards, wild radish, and crown daisy, as they would likely return with winter and spring rains. Invasive species monitoring and continuous treatment will be necessary for the success of this restoration.

Cactus cuttings were collected from the site in April 2019. Species collected from the site include coast prickly pear cactus *Opuntia littoralis* and coast cholla cactus *Cylindropuntia prolifera*. They would be allowed to scar for 7 to 10 days, then installed along with native plant container stock in strategic areas for revegetation, closure of rouge trails and erosion control.

A seed mix was sown by hand on November 21, 2019 including species such as California buckwheat *Eriogonum fasciculatum,* black sage *Salvia mellifera,* deerweed *Acmispon glaber,* coyote brush *Baccharis pilularis,* California sunflower *Encelia californica,* clustered tarweed *Deinandra fasciculata and* chamise *Adenostoma fasciculatum.* Winter 2019 and Spring 2020 brought a good amount of seasonal rain, which allowed the seeds to sprout and become established.

Erosion sites were properly filled and leveled accordingly. Logs were used to help re-define approved trails adjacent to the restoration area. Vertical mulch was installed to control future erosion. Native plants that suit the restoration area were planted in the site. 200, 1-gallon container plants were installed & thoroughly watered in the entirety of the project. Fiber rolls, vertical mulch and gravel bag check dams were installed in addition to the plants. More recently, loose mulch (using chips

from fallen trees that are not eucalyptus) was utilized after having problems with rodents tearing through fiber rolls that were used initially; mulch spreading at eroding sites helps to combat the problem.

During the time frame of February to late March 2020, during the initial offset of COVID 19, our main contractor was unable to continue some of the services that were scheduled, and a contract extension had to be submitted to receive the final service for all the sites. We creatively had another land-based contractor assist Site 1 in the interim. They were critical in assisting in Site 1, removing weed and discarded rubbish. Approximately 15 bags of trash were removed from a large contingent of unsheltered individuals who had established themselves along the eastern perimeter of the site. There are still a few hold outs in the area, and contacts and enforcement are being made on a continual basis to protect the integrity of the site and its temporary fencing. The encroachment issue is easier to address at Site 1 due to the area being filled in by native vegetation.

The south-eastern area of the Site 1 is being filled in nicely by *Deinandra increscens* (tarweed), in the majority of the old trafficked rouge trails in the areas. The erosion below the sight was also not as heavy as years past and the continued growth will continue to retain the hydrodynamics down slope. The existing native plants in the site responded with significant growth from the seasonal winter and spring rains. The ability to control and manage the invasive weeds proved to be a significant step in the revegetation process. The native plants that were planted along the western banks unfortunately suffered a 65% mortality rate. However, the plants that were planted that did survive are becoming well-established and are connecting with established vegetation in the site.

The temporary fencing and signage along with the extra patrols in the area added to this sections current recovery. The strategy will be to create a more robust barrier to contain the unwanted pedestrian use and continue to patrol and enforce the laws associated to the protected area. The area has also had several flyovers at 50 feet above ground level with a UASs (drone) to monitor environmental factors and progress in the protected identified site. Rangers have conducted numerous contacts and have educated and enforced statutes pertaining to the protection of the site. Rangers have also conducted numerous foot patrols in the area to prevent unwanted encroachment activity and fire.

Terrestrial Revegetation Site 2

The erosion measures that were put in place limited the significance of the erosion of Site 2. Some of the plants that were planted in Site 2 were having a hard time establishing themselves due to the exposure of the hard-pan soil at the top of the slope. However, the ones that are thriving are decreasing access to area both physically and visually. This area had a much lower mortality rate than Site 1. The fencing and signage in place had significantly minimized off-trail use on the main erosion feature. However, it was noticed that other sections that parallel the erosion started to develop. A ranger was able to increase enforcement, and erected additional signage to mitigate this issue. The success of this area is just as noticeable to the unaided eye as in Site 1.

There has been significant growth in and around the large erosion pattern identified in Site 2. As well in this site, the natural vegetation growth has been aided by the routine weeding. As this area has larger sections of hard-pan soil exposed, the was concern regarding the establishment of native vegetation, however, the native plants that did take are establishing themselves just fine. The erosion pattern also had a considerable amount of checks and retention installed to prevent further erosion.

Riparian Site

Site 3, the riparian restoration site, has had significant improvement. The majority of the target exotic and invasive species have been removed or treated and are awaiting re-treatment. Although not part of the Grant funding, all the larger palm trees at the site have been removed by SDG&E contractors, and the smaller ones have been cut and have received initial treatment. The density of invasive plants during the COVID 19 gap of our contractor's ability to treat the site lent to a larger rate of spread of the invasive plants, since they were cut and treated last.

Non-native invasive species (NNIS) that had been identified were carefully removed from the restoration site. Targeted non-natives were treated with herbicide in the Riparian site. The Drill & Kill method was used to treat non-native trees in the Riparian site. Since removing many of the exotic and invasive species, there is more light that migrates into the riparian area and it has a better ratio of spread amongst the native willows and coastal live oak trees. Park Rangers have also noticed less invasive plants to the south of the micro riparian that connects hydrologically under Morley field Drive. The wind is also allowed to flow through the area with less obstruction, and this enhances the intrinsic recreational experience in the area.

Rangers have continued to monitor this area from the surrounding roads and by driving next to the site, as well as conducting foot patrols to educate, inform, and perform enforcement efforts to decrease the number of encroachments in the area.

With the large number of invasive trees removed and the remaining invasive plants awaiting additional treatment, the next phase of the area's long-term management would be to secure funding to increase the water quality and create a catch retention feature for refuse that flows downstream into the longer stretch of the riparian area south of Morley Field Drive. Additional Willows and a section of *Baccharis salicifolia* (mulefat) along this stretch would complement the few native plants and trees in the area.

Task 5- Quarterly Reporting

Budget: $0.00
Spent: $0.00
Match for Task: N/A In kind services provided by the City of San Diego

The City of San Diego's Parks and Recreation Department horticulturist, management interns, and Park Rangers conducted quarterly monitoring and reporting for all three restoration sites included in this project.

Task 6- Final Reporting

Budget: $0.00
Spent: $0.00
Match for Task: N/A In kind services provided by the City of San Diego

The City of San Diego's Parks and Recreation Department horticulturist and Park Rangers compiled a final report detailing project deliverables, goals, and results.

Task 7- Post Project Administration

Budget: $0.00
Spent: $0.00
Match for Task: N/A In kind services

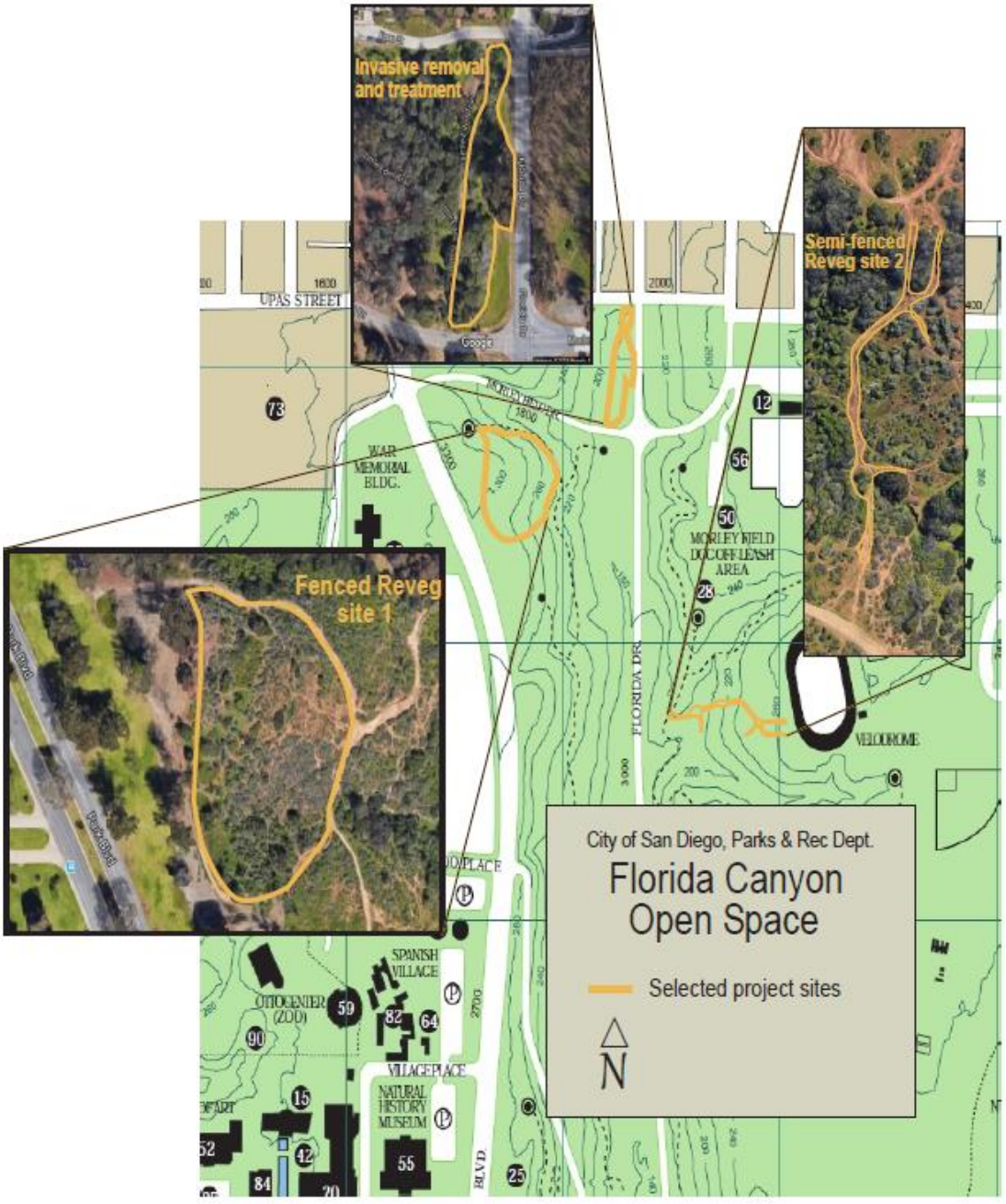
The City of San Diego Park and Recreation Department's Supervising Management Analysts and Associate Management Analyst, completed the grant process in the City's management system SAP, including the finally billing and invoicing.

Conclusions

Florida Canyon is managed by The City of San Diego, Parks and Recreation Department, Developed Regional Parks. The Balboa Park Metropolitan Rangers have 3 primary and 4 secondary Rangers and 1 Sr. Park Ranger assigned to this area. For long term success, regular patrols are conducted to regulate and enforce perimeters and provide direct maintenance to preserve the integrity of the perimeter.

Improvements are noticeable at all three sites successfully representing the restoration efforts and strategies that were used in the canyon. Terrestrial revegetation sites 1 and 2 have temporary delineators that allow for signage and enforcement. The rouge trails were well vegetated and cactus that was planted at the ingress of trails prevents further use. The erosion down slope after the first rain of the season left noticeably less soil and overall damage was reduced. As vegetation continues to establish, erosion should lessen over time. Implementation of plantings and the maintenance of invasive species of the sites has reduced surface run off, leading to less erosion down slope of Site 1 and significantly reduced erosion in the repaired scar at Site 2. The tree canopy in the riparian Site 3 has significant transparency, meaning the areas overall vegetation has been reduced allowing for significant visibility into the riparian area and allowing more light to penetrate the canopy. The area is now defined by native vegetation, as opposed to exotic or invasive vegetation. Sites 1 and 2 will require continuous maintenance of the temporary fencing, signage and enforcement to protect the area long term. Overall, the goals were met that were set forth at the conclusion of this project.

Appendices:


Invasive removal and treatment
Semi-fenced Reveg site 2
Fenced Reveg site 1
UPAS STREET
WAR MEMORIAL BLDG.
MORLEY FIELD DOG OFF LEASH AREA
FLORIDA DR.
VELODROME
SPANISH VILLAGE
VILLAGE PLACE
NATURAL HISTORY MUSEUM
BLVD
City of San Diego, Parks & Rec Dept.
Florida Canyon Open Space
Selected project sites
N

TERRESTRIAL REVEGETATION SITE 1:

November 2020 – Drone footage showing reduction in bare soil (increase in vegetation establishment).

Terrestrial Site 1. Before restoration. Many Invasive species present.

Terrestrial Site 1. After restoration.

Before

During

After

Terrestrial site 1- Before implementation. 2019.

Terrestrial Site 1. Newly installed *Opuntia* cuttings. November 2020

TERRESTRIAL REVEGETATION SITE 2

Terrestrial Site 2- view of erosion control measures & vertical mulch July 2019

Terrestrial Site 2- view of erosion control measures & vertical mulch – July 2019

Representative view of gravel bag check dam & vertical mulch. July 2019

Representative view of installed fiber rolls July 2019

New plants becoming established 2020.

Riparian Exotic and Invasive Species Removal- Site 3:

Riparian Site 3 - April 2019. Many exotic and invasive species present.

Riparian Site 3 - April 2019. Many exotic and invasive species present.

Riparian Site 3 - April 2019. Many exotic and invasive species present.

Riparian Site 3 – November 2020. Exotic and Invasive species removal.