PERALTA CREEK RESTORATION AT BUTTERS CANYON

OAKLAND, CALIFORNIA

LONG-TERM MANAGEMENT PLAN

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INTRODUCTION

There are creeks in the Oakland hills that remain deeply forested, exhibiting a sense of wildness similar to historic conditions. Peralta Creek at Butters Canyon is one of these creeks. The canyon’s forest of native trees shields views of the surrounding neighborhood, provides shade over a seasonal creek and a narrow winding drive, and creates a distinct East Bay hills landscape. Butters Canyon lies at the headwaters of Peralta Creek off Joaquin Miller Road. Butters Drive leads along the southern edge of the site atop a steep, north facing slope above Peralta Creek. The drive and the creek are heavily shaded by mature bay, redwood, and oak trees, and underlain by both native and invasive understory species. Although invasive species such as ivies and periwinkle have colonized the site, Butters Canyon still exhibits intact native plant communities.

Over the past century, the colonization of the site by invasive plants has reduced native plant and habitat diversity. Invasive plants, coupled with the absence of natural disturbances such as fire and disease, have allowed the site to evolve into plant associations dominated by bay trees and underlain by an understory comprised of large areas of non-native ivies. The isolated nature of the canyon, now cut off from larger regional open space lands, has exacerbated the decline of ecosystem health and affected the canyon’s plant community integrity, making it increasingly susceptible to large-scale changes such as fire and Sudden Oak Death.

In 2000, active interest in preservation and restoration of the Butters Canyon ecosystem took on a new direction, when as an outgrowth of the Friends of the Last Wild Canyon, the Butters Land Trust was founded to acquire land and conservation easements in the canyon. Preservation of Butters Canyon’s unique character was the Trust’s motivation. As a result, a need arose to develop a management tool to preserve the Canyon’s future. To help fill this need, the City of Oakland approached the Butters Land Trust with the opportunity to work with restoration consultants funded through Measure DD funds. Their common goal was to develop a community based land management plan for the canyon.

This community based plan evolved to become the Butters Canyon Long-term Management Plan (LTMP). The plan developed out of site investigations and restoration proposals that were explored with the community through a series of meetings. The LTMP looked at existing conditions, past restoration efforts, and the future vision for the canyon. The Butters Land Trust, community advocates, and City of Oakland representatives all took part in its creation and will all be involved in its implementation.
Urban Ecological Restoration Strategy
The LTMP's restoration approach for Butters Canyon is not an attempt to recreate its historic ecology and habitat. Today, the canyon and its surroundings have been altered to the point that striving to meet historic restoration goals is neither appropriate nor feasible. In the early to mid 19th century, when the canyon was still integrated into the larger East Bay landscape, it weathered fire and disease. These disturbances were regular events that naturally ran their course and as a result increased biodiversity and the canyon’s resiliency. After a natural disturbance, native plants and animals re-colonize the area and create a patchwork of disturbed areas in differing stages of recovery. Now that Butters Canyon is an isolated island of wildland with substantially less biodiversity than historic levels, the rate of native re-colonization is substantially reduced and the risk of a dramatic disturbance to the canyon has increased.

As a consequence of its isolation and urban location, Butters Canyon is now facing these ecological challenges:

- Reduction in small scale episodic natural disturbances such as fire has reduced biodiversity and increased the risk of larger more detrimental disturbances
- Opportunistic invasive and non-native vegetation has colonized the site, displacing native plants and disrupting native plant communities
- Loss of biodiversity has reduced the integrity of the native plant communities and weakens the canyon’s resiliency to change
- Urban disturbances such as the introduction of garden plant species and illegal dumping of waste and plant debris.

The Urban Ecological Restoration Strategy for Butters Canyon acknowledges its urban neighborhood, the feasibility of restoration implementation, and future maintenance and monitoring needs. The strategy strives to work thoughtfully and incrementally to enhancing ecological integrity and sustainability. It purposely avoids overly ambitious goals such as full eradication of non-native species, and instead focuses on the promotion and protection of native plant communities.

To address Butters Canyon’s restoration challenge the LTMP strategy focuses on these three elements:

1. Increase the canyon’s resiliency to disturbance by increasing and managing plant diversity.
2. Defend the site’s special areas and native plant communities.
3. Restore the canyon incrementally and at a scale that ensures efforts are sustainable.

Since Butters Canyon is more susceptible today than in the past, protecting the canyon from large-scale disturbances is imperative. To meet this goal, canyon management needs to reduce the likelihood of disturbance and the resulting impact. Examples of disturbance reduction include: removing dead branches and vegetative debris that form fire fuel loads to decrease fire risk; increasing plant diversity to help to reduce the impact of Sudden Oak Death within the canyon; policing illegal dumping that can lead to the spread of invasive species and the displacement of native plant communities.
How to Use this Document

The Long-Term Management Plan has been created to guide restoration efforts within Butters Canyon. It is intended to serve restoration volunteers, City of Oakland staff, Butters Land Trust members, and the greater Butters Canyon community through both initial and long-term canyon restoration efforts. The LTMP offers specific goals and activities for restoration, as well as a vision for its future stewardship. In addition, it outlines the steps to successfully plan and run a restoration event and includes an Assessment Checklist and a Work Plan / Diary complete with a tools and materials list. In addition, the LTMP includes restoration plans and specifications to guide an initial contractor-led restoration project. And finally, it serves as a resource document for restoration techniques and contacts.

The Long-Term Management Plan approach to restoration is divided into Initial Restoration Goals and Activities and Long-Term Restoration Vision and Activities. The former lays out recommended near-term measures volunteers as well as restoration contractors can initiate to begin the restoration process. These initial goals and activities are then complemented by longer term measures which layout a sustainable vision for the canyon.

The LTMP is intended for three users: (1) those interested in investigating the ecology of the site and the long-term vision of restoration at the canyon; (2) volunteers seeking guidance towards restoring the site; (3) restoration contractors working at the site. Below are some of the ways the plan can be utilized:

- Readers interested in an introduction to the canyon’s setting and ecology can use sections of the LTMP to learn about local plant communities and some of the forces acting on its health and integrity.
- Reviewing the plan’s Introduction and Initial and Long-Term Restoration sections will give the user an overview of the site and its potential for restoration.
- For volunteers, either led by the City of Oakland, the local Butters Land Trust, or other group, the LTMP offers step by step measures for planning restoration work. Volunteer group leaders should first get acquainted with the overall document and vision for the canyon restoration and then turn to the section on Planning a Restoration Event. This section spells out the necessary steps to plan a successful restoration event, from assessing site conditions using the Assessment Checklist, to developing the Work Plan / Diary for the “day of” volunteer restoration activities.
- Contractors can use the document to guide a variety of professional restoration activities.
- The Techniques section outlines specific measures for restoration implementation from Controlling Invasive Species to installing Erosion Control and Soil Bioengineering methods.
- As a reference, a Resources section is included with contacts and links to restoration information.
SITE INVENTORY

A general inventory of Butters Canyon was conducted during the summer of 2006. The inventory documented general site vegetation patterns and locations of special features and elements of interest to restoration and planning efforts. A Site Inventory Diagram (p. 7) was developed to characterize the canyon and to use in presentations to the Butters Land Trust, the City of Oakland, and the local community at a series of public meetings. This inventory was used as the baseline for discussions and determinations regarding the Contractor Restoration Construction Documents (plans), Urban Ecological Strategy, Goals, and Vision.

Key Site Conditions and Plant Communities

Site Character
Butters Canyon is a downward sloping canyon incised into the Oakland Hills by the historic flow of Peralta Creek. The creek bisects the site and runs in an open and relatively stable channel. The creek flows through this site for approximately 1,500 feet from a culvert at elevation 1,015 feet at the top of the site to a culvert under Butters Drive at approximately 900 foot elevation. Peralta Creek runs in a north and westerly orientation and runs dry in mid-summer—further downstream it runs perennially. On the south and west sides of the canyon, at the top of steep side slopes is Butters Drive. This shady, and narrow curving road serves residential users, walkers and bicyclists as a pleasant change from the typical neighborhood street, and also serves as a means to avoid traffic on busy Joaquin Miller Road. North and east of the creek on south facing slopes are residences and an open, sunny section of Robinson Drive that affords views of the canyon’s extensive tree canopy.

Boundaries
The majority of the site is shaded by tree canopy, predominantly bay, with oak, redwood, buckeye, and some invasive trees species. The site is physically in good condition although invasive species have colonized much of the understory. Native understory is struggling throughout the site as invasive species such as ivy, vinca, and broom, crowd out native flora. The site has very little debris or litter, due in large part to clean-up efforts by Land Trust members and volunteers.

The setting of Butters Canyon extends well beyond the property boundaries managed by Butters Land Trust, the City of Oakland, and any participating private land owners in the canyon. The LTMP envisions the canyon as a whole, encompassing private properties outside of the scope of this plan solely in an effort to better understand the canyon ecology. Some privately owned parcels are willing participants in the Butters Canyon restoration planning project; other parcels are not expected to participate. In every case private property rights and privacy are upheld and there is no explicit or implied intent to perform restoration activities on private lands. Due to the complex geography of the site some site inventory work may have identified site
elements on or near private property. Boundary data use in the LTMP was provided by the City of Oakland’s GIS and aerial survey resources. This afforded a reasonably accurate depiction of the site though no formal engineering survey was conducted. The various private property boundaries came from City of Oakland parcel data.

Plant Communities
Butters Canyon exhibits a series of plant communities. The location and composition of these plant communities is a result of differences in site conditions. Variations in solar aspect, availability of water, soil type, and built features such as roads have influenced the current mosaic of plant community. The dominant canyon plant community, the California Bay Forest, is located primarily along the north facing slope off Butters Drive. This slope receive less direct sunlight and retains moisture longer than the sunny, and dry south facing slopes which maintain favorable conditions for both the Coastal Sage Scrub and Oak Woodland communities. The Riparian Forest on-site is typically limited to the upper watershed of the creek.

The Butters Canyon plant communities are typical of those one would expect to find in the Oakland Hills prior to development of the East Bay. Over time these communities tend to shift, expanding and contracting as local and regional conditions change. The plant community changes within Butters Canyon over the last 50 years have been significant. For example, the Coastal Sage Scrub may be present due to the past removal of trees from private parcels. Yet today this community is in turn being slowly overtaken by the adjacent Oak Woodland. This natural process of succession is typical of Northern California’s larger landscape and it highlights the dynamic quality of the East Bay ecology—grassland develops into sage scrub, which in turn becomes woodland dominated by bay trees. Grazing, fire, and disease are the historic disturbances that interrupted this progression in the Oakland Hills and led to a stable plant community mosaic. In wild landscapes these disturbances are common and are critical for the maintenance of a healthy ecosystem.

Invasive Plants
The most recent disturbance to occur within Butters Canyon is the arrival of invasive plants. As is shown in the Site Inventory Diagram, Figure 1, ivy, Himalayan blackberry, vinca, acacia, and other non-native, invasive plants have taken over much of the canyon, displacing the diverse composition of native plants. The result is a landscape composed of a couple species of invasive plants with only remnant native species. Some species such as ivy have already taken over large areas of the site, while other species such as cotoneaster are found only in isolated locations, but threaten colonization. Unlike natural disturbances that create favorable conditions for native plant community changes over time, invasive species infestations simply supplant the native plant community with a less diverse assemblage of plants and reduce the habitat value and overall health of the ecosystem.

Setting the stage for the LTMP’s Plant Community framework, a description of the canyon’s major plant communities follows below:

CALIFORNIA BAY FOREST
At Butters Canyon, Bay Forest covers the north and northeast facing slopes, creating a dramatic and welcoming bower over Butters Drive that attracts walkers and cyclists searching for shade and a sense of solitude. The Bay Forest at Butters Canyon is composed of multi-age stands of bay trees, *Umbellularia californica*. There are also small populations of coast live oak, *Quercus agrifolia*; and coast redwood, *Sequoia sempervirens*; and some invasive, non-native flowering plums. The understory is a mix of native and invasive non-natives. Natives include California hazelnut, *Corylus cornuta var. californica*; creeping snowberry, *Symphoricarpos mollis*; currants, *Ribes spp.*; California wild rose, *Rosa californica*; and sword fern, *Polystichum munitum*.

Bay’s characteristics provide advantages over many plants and ensure it maintains a strong presence in the canyon. This is accomplished by two strategies: shading, and allelopathic leaf debris (chemical in the leaves that inhibits competing seed germination). The shade cast by the Bay Forest is deep, and along with the allelopathic leaf duff, prevents the vigorous growth of new native plants. Additionally, bays use their
NOTES:
LIMITS OF INVENTORY MAY NOT FOLLOW PARCEL LINES AND INCLUDE PROPERTIES NOT ASSOCIATED WITH BUTTERS LAND TRUST.
LOCATIONS OF INDIVIDUAL CALIFORNIA BAY TREES REPRESENT SIGNIFICANT TREES ON THE NORTH FACING SLOPE ONLY. BAY CANOPY IS THE DOMINANT CONDITION ON SITE, OUTSIDE OF AREAS NOTED ON PLAN.

SOURCES:
INVENTORY: RESTORATION DESIGN GROUP, SITE VISITS AND CONSULTATION WITH MICHAEL THILGEN, SEPTEMBER 2006 AND BUTTERS LAND TRUST, OCTOBER 2006.
PARCEL OWNERSHIP: BUTTERS LAND TRUST, CITY OF OAKLAND, PRIVATE owner.
BASEMAP INFO: CITY OF OAKLAND IT/GIS DIV.
growth habit to take further advantage of the site and prevent other plants from displacing them. As bays grow, their branches arch out and bow to the ground, collapsing onto other plants, including oak trees. When the bay branches reach the soil they sprout new bay trees from their fallen branches and establish new bay trees that maintain the cycle of landscape dominance.

The bay canopy dominance has opened an opportunity for invasive, non-native species to colonize the Bay Forest. Ivy and vinca are invasive species that have been the most successful; growing vegetatively, they appear unaffected by allelopathic leaf litter. As a result, large sections of Bay Forest are underlain by ivy and vinca, and the bay shade and allelopathy are significant impediments to eradication and native plant restoration.

**OAK WOODLAND**

In Butters Canyon the iconic Northern California Oak Woodland landscape is limited to the drier south and southwest facing slopes. The oak canopy is dominated by coast live oak, *Quercus agrifolia*, and the occasional California buckeye, *Aesculus californica*. Oak trees are valuable habitat trees and provide shelter and a food source to native birds and wildlife. Like the California Bay Forest, Oak Woodland is a late successional plant community. It often expands outward into Coastal Sage Scrub when not limited by natural disturbances. Conversely, Oak Woodland can be displaced by Bay Forest as bay trees utilize their competitive advantage to crowd out oak trees trying to establish themselves on the shadier north facing slopes.

The Oak Woodland is typically underlain by oak leaf litter and native plants such as toyon, *Heteromeles arbutifolia*; California hazelnut, *Corylus cornuta var. californica*; and oso berry, *Oemleria cerasiformis*. It has also been colonized by invasive, non-native species such as French broom. The margins of the woodland are being colonized by invasive acacia trees.

**RIPARIAN FOREST**

The ephemeral flow of Peralta Creek supports a unique composition of plants along its banks that can be distinguished from the surrounding California Bay Forest and Oak Woodland. This plant community typically supports a variety of moist soil species such as willow, *Salix spp.*; alder, *Alnus rhombifolia*; and elderberry, *Sambucus mexicana* for canopy and shrubby species such as, currant, ferns, snowberry, rush, and native blackberry.

At Butters Canyon much of the Riparian Forest has been displaced by the California Bay Forest as the Bay Forest has successfully competed for space along the left bank (looking downstream) of Peralta Creek. The Riparian Forest within Butters Canyon has a few locations of mature riparian vegetation and that is typically limited to willow species in the upper creek area. These occur where openings in the Bay Forest have allowed sunlight to reach the understory. Again, in this community we see evidence of the shading and canopy dominance of the Bay Forest.

**COASTAL SAGE SCRUB**


Coastal Sage Scrub is ubiquitous throughout the East Bay hills, as it tends to eventually colonize former grazed or native grasslands. An example of this transformation is also the result of fire suppression especially in areas adjacent to residential areas. Coastal Sage Scrub in Butters Canyon is in turn now being overtaken by Oak Woodland, as oaks take advantage of the open character of the scrub for germination. Trees will soon shade out the sage scrub species and Coastal Sage Scrub will have to look for open canopy or grassland areas to move into.
INITIAL RESTORATION GOALS AND ACTIVITIES

The Initial Restoration Goals and Activities are those that can be achieved within a short time frame by volunteers and/or a restoration contractor. Four main activities are highlighted. Goals provide overall guidance on canyon restoration, while Volunteer Restoration Activities (p. 10) specify specific tasks for volunteers. To provide volunteers with the rationale for the selection of these activities, a section called Background for Volunteer Restoration Activities (p. 12) is included.

Contractor Activities are covered by both the Restoration Plans (pp. 16-18), and discussion in the section on Contractor Activities (p. 14). In addition, the plans are supported by technical specifications outlining restoration materials and procedures, and also by a preliminary cost estimate. These documents can be found in the Appendix.

Initial Restoration Goals

Six initial restoration goals grew out of public meeting discussions which included the Butters Land Trust, the community-at-large, and the City of Oakland. They were also influenced by the project’s site inventory and analysis. These goals are built on the foundation of the Urban Ecological Restoration Strategy (p. 2) and address site specific and community-wide aspirations for land management in the canyon.

1. Reduce invasive and non-native vegetation
2. Increase native vegetation and biodiversity
3. Address fire safety/abatement requirements in Butters Canyon
4. Protect the water quality of Peralta Creek
5. Promote stewardship and community support
6. Increase awareness of the watershed ecosystem (plants, insects, animals, birds, and people)

The first two goals directly address increasing diversity within the canyon and will result in an ecosystem with enhanced native plant community integrity, biodiversity, and resiliency to detrimental change.

The third goal addresses the risk of fire in the canyon. Creating a fire abatement goal ensures that proactive management of the canyon will reduce the risk of large scale fire and manage the canyon’s natural habitat and surrounding properties. Integrating fire abatement into other restoration goals ensures that fire abatement practices do not adversely affect other goals such as water quality and habitat.

The fourth goal is to protect the water quality of Peralta Creek. Peralta Creek supports aquatic life both within Butters Canyon and downstream. In addition it serves to treat local storm water run-off as it flows through its riparian corridor. A water quality goal ensures that restoration work and long-term management actively support reducing erosion and increasing native vegetation along the creek.

The final two goals focus on long-term care. Inviting community members to participate in restoring the canyon increases local stewardship of the resource and ecological awareness.
Volunteer Restoration Activities
Volunteers currently maintain Butters Canyon. This group of committed people typically gathers at two City-wide events, Creek to Bay Day in the fall and Earth Day in the spring. Additional volunteer events occur on an as-needed basis and are typically organized through individuals associated with the Butters Land Trust or the immediate neighborhood. This section and the following section on Planning a Restoration Event provide guidance to these volunteer efforts.

Four priority restoration activities address crucial restoration management concerns. These activities should be integrated into every volunteer event and should occur at least two times a year. The priority restoration activities include the following:

1. Invasive Plant Control
2. Soil Erosion Management
3. Trash Removal and Fire Abatement
4. Native Plant Establishment

Each activity and recommended action is noted below. Recommended actions focus on existing restoration areas to ensure that past work is not lost through neglect and critical canyon-wide activities. Additional information (Background for Volunteer Restoration Activities) related to these activities is at the end of this section.

1. INV ASIVE PLANT CONTROL

Objective: To control invasive plant colonization of Butters Canyon and eradicate select areas of invasive plants.

What to do at volunteer events:
Restoration Areas:
• Control vinca, ivy, ehrharta and acacia.

Canyon-wide:
• Cut ivy from the base of trees.
• Remove plum, acacia, and eucalyptus saplings.
• Remove new infestations of broom, ehrharta, cape ivy, and other aggressive invasive species.

Refer to Technique #1: Invasive Plant Control under the Techniques section of this report for help identifying the various species and appropriate control methods.

2. SOIL EROSION MANAGEMENT

Objective: Monitor the canyon to ensure that soil erosion is not occurring and to stabilize soils if a need emerges.

What to do at volunteer events:
Restoration Areas:
• Ensure that newly cleared and planted slopes have adequate vegetative cover and/or are protected by wattles and coir fabric. Stabilize areas of concern.

Canyon-wide:
• Survey the creek and slopes for signs of erosion. Stabilize areas of concern.
• Contact Butters Land Trust and seek additional assistance from a restoration professional if erosion poses an imminent threat.

Refer to Technique #2: Erosion Control, Technique #3: Seeding, and Technique #4: Soil Bioengineering under the Techniques section of this report for help identifying and implementing the appropriate erosion stabilization approach.
3. TRASH REMOVAL AND FIRE ABATEMENT

Objective: To remove trash and debris from Butters Canyon and comply with fire abatement requirements.

What to do at volunteer events:

Canyon-wide:
- Remove all debris and litter.
- Remove dead vegetation to comply with City of Oakland fire abatement requirements.
- Trim or prune grasses and low-lying vegetation to comply with City of Oakland fire abatement requirements.
- Address other fire abatement requirements if determined by City or restoration professionals.
- Contact City of Oakland to report dumping if necessary.

Refer to Technique #10: Trash Removal, and Technique #9: Fire Abatement under the Techniques section of this report for additional guidance and resources.

4. NATIVE PLANT ESTABLISHMENT

Objective: To ensure the health of native plants and the integrity of their respective plant community habitats.

What to do at volunteer events:

Restoration Areas:
- Assess health/vigor of native plants in past restoration areas.
- Replace dead plants and replant bare areas.
- Remove invasive species encroaching in newly planted area.
- Control masses of invasive plants encroaching on the perimeter.
- Prune or remove trees that threatening to crush or unfavorably shade out plants in the restoration areas. Obtain City of Oakland tree permit if required.
- Repair existing structures such as tree stakes, deer fencing, wattles and coir fabric.
- Assess area watering needs and commit to a minimum watering regime during the first dry season following new plant establishment.

Canyon-wide:
- Consider what activities are desirable to achieve desired balance of plant community boundaries and characteristics. See the Long-Term Restoration Vision and Activities section of this report for further information on management of each of the site’s plant communities.

Refer to Technique #5: Planting, Technique #6: Watering, Technique #7: Pruning / Tree Felling, and Technique #8: Deer Protection under the Techniques section of this report for additional guidance and resources. Refer to the Long-Term Restoration Activities section of this report for recommended planting lists for new planting.
Background for Volunteer Restoration Activities

1. INVASIVE PLANT CONTROL

The colonization of native habitat at Butters Canyon by invasive, non-native plants (trees, shrubs, ground covers, grasses, and forbs) poses the most persistent and obvious threat to the ecology of Butters Canyon. Invasive plants are now commonly understood to be the primary non-development threat to habitat in the region, and their control is a significant challenge to land stewards. Site wide eradication of invasives at Butters Canyon is not feasible in the current ecological context. The financial demands of a wholesale eradication followed by intensive maintenance and monitoring is an unrealistic goal. However, a measured and strategic approach to invasive plant control, coupled with limited on-going spot eradication is feasible and appropriate.

The LTMP recommends addressing invasive plant control from both a canyon-wide perspective and within specific plant communities. It recommends isolated, canyon-wide infestations be addressed before taking on the challenge of large masses of invasive species, in particular ivy. This site wide approach focuses restoration effort on isolated infestations that can be removed effectively before they get a foothold, e.g., isolated populations of Cape ivy, thistle, broom, ehrharta, pittosporum, and cotoneaster. In addition, acacia, eucalyptus, and young plum tree sprouts should be removed from the entire site while they are still small enough to be pulled by hand or cut with a pruning saw. Mature trees should only be felled by a licensed arborist. Also of concern is ivy climbing trees. Ivy can kill mature trees if allowed to climb into the canopy. It is relatively easy to remove, making it a high priority activity.

2. SOIL EROSION MANAGEMENT

Soils at Butters Canyon lie on steep slopes incised by the historical flows of Peralta Creek. Site soils are characteristic East Bay hills soils; shallow, high clay content, and susceptible to erosion. The site should be regularly monitored for new areas of erosion. Minor slumps and slides do not require immediate attention but should be monitored and addressed with professional consultations should they degrade. Minor erosive events along the active channel of Peralta Creek should be addressed in the same manner. Careful management and restoration of the site will further stabilize site soils both on side slopes and within Peralta Creek and its tributaries. Some key considerations to safeguard against soil erosion include:

- Encourage sheet flow: Minor flow from neighboring residential downspouts can quickly become a rill, or gully. As the gully incises into the erodible soils, significant erosion can result. Spreading flow so that it does not collect into a rill will reduce erosion. This can be done by blocking or filling the rill while it is small and directing the water to sheet flow down the hill. Installing straw wattles following the contour of the slope can also assist in encouraging sheet flow where rills are beginning to develop. Consider planting natives and installing coir fabric and wattles in areas where rills are developing.

- Maintain vegetation along and within the creek corridor: The stability of Peralta Creek is directly linked to the amount of vegetation present. The roots help stabilize the soil and provide a hard surface to control incision. Peralta Creek should be assessed annually to determine if channel incision or active head cutting (water falls) is occurring. Planting big-leaf maple and white alder 10 to 20-feet upstream of a headcut can help stabilize the creek in the future. Preventative maintenance can occur by anticipating areas of risk and planting plants just upstream. Willow and dogwood stakes can also be planted at the location of the headcut, but like the alder, both require direct sunlight to grow successfully.

- Protect bare slopes, especially in restoration areas. Use coir fabric or wattles, and additional restoration plantings to stabilize bare slopes.
3. TRASH REMOVAL AND FIRE ABATEMENT
Debris and litter are typical concerns for wildland areas with public access. Butters Canyon is surrounded by homes and public roadways, it is both readily accessible and secluded. The secluded nature of the site is its beauty and its bane. Without eyes on the site from neighboring residents, dumping and litter occur without sanction. Fortunately, it does not appear that litter, inorganic debris, or vegetation dumping is a critical issue at the site. There are some minor areas of debris on-site such as concrete in the upstream area east of the culvert (this may be on private land), and tires and concrete block rubble in the creek in various areas. Monitoring and removal of debris and litter is important in establishing a level of community care for the canyon, and to-date the Butters Land Trust has been vigilant on this front. The community’s efforts to keep the site litter and debris free are resulting in fewer instances of on-going littering and dumping.

Most of the litter enters the site from the roadways or from washing down the creek during the winter high flows. Once litter is removed from deep within the site it is anticipated that it will likely only be found along the roadways and in the creek. The restoration tasks for keeping the site clean include an initial task of removing remnant litter from deep within the site, and more regular removal of litter around the creek and roads. Litter dumped within the Butters Drive and Robinson Drive rights-of-ways should be reported to the City of Oakland.

Debris is also an issue for fire abatement. Brush piles that consist of small branches and leaves pose a fire risk and should be removed from the site. Large branches and downed tree trunks are less of a fire risk and provide quality habitat. All debris created from restoration work weeding should be removed from site, both from a fire abatement standpoint and for the risk of spread and re-sprouting of weedy invasive species. Dead branches and leaves should be removed from fallen trees and hauled off-site.

4. NATIVE PLANT ESTABLISHMENT
Assessing previous restoration areas for drought, deer predation, and invasive species will ensure that previous restoration efforts are not lost. Following this strategy places emphasis on restoration quality, not quantity. It further challenges stewards to persist in ensuring plant establishment trumps expanding the extent of restoration on-site. Efforts to eradicate invasive species and plant native species must be followed by diligent, long-term care for restoration areas. As Butters Canyon restoration areas grow in scope, so will the required commitment to maintaining these areas until they become established, and as a result require less maintenance effort. Maintenance of previous restoration areas should follow the recommendations of the restoration tasks for each plant community.
Contractor Activities / Plans & Specifications

WORKING WITH A CONTRACTOR

Using a professional contractor can give a huge lift to any restoration project. Contractors can pursue work in larger blocks of time and commit significant resources to a restoration task. Utilizing a contractor gives a project an opportunity to accomplish a large amount of work in a relatively short period of time, and create a significant leap towards meeting a project’s Initial Restoration Goals. In addition to their ability to focus significant resources to a project they also bring highly specialized skills and valuable empirical experience. Their expertise in erosion control techniques, tree felling, and the use of high risk mechanical equipment such as chain saws provide a compliment to volunteer-based restoration skills and energy.

Several of the restoration tasks proposed as Initial Restoration Activities for the canyon are most effectively accomplished by a professional contractor. Tasks that require material procurement, site staging, vehicles for debris hauling, and capital expenditures are tasks best suited to professional contractors. A partial list of activities suggested for contractor completion is included below:

- Removal of pine trees and the limbing-up of dead pines for habitat snags in Restoration Area #4
- Removal of invasive non-native trees in Restoration Areas #5 and #6
- Pruning selected bay tree limbs affecting young oak recruitment in Restoration Area #7
- Installation of wattles and other erosion control measures following clearing in several Restoration Areas
- Ground preparation and planting of large native plants and trees
- Hauling and disposal of restoration related debris

Hiring a professional contractor can appear to be a challenging task, but the results are rewarding, and the process can be fairly straight forward. First you want to create a short list of say 6 (you may only get 3) contractors from references. Consult first with other non-profit groups working in restoration. Then check with local restoration advocates, and regional restoration design firms.

Once you have your list of potential restoration contractors you are ready to contact each one to ascertain their interest level and experience with your specific project. Telephone interviews are an excellent way to initiate the investigation. Should you arrive at a few that seem to meet your needs then an in-person interview is the next step. At the interview ask the same questions of each company and record answers for later discussion with your larger group of decision makers.

Contact references offered by the company as well as ones associated with their past work; hearing only from clients that love their work will not tell the complete story of what working with them will be like. Check with colleagues to get the straight scoop. Be sure to ask about their skill at project budgeting, limiting change orders, staying on a schedule, promptness and thoroughness, special skills, their dedication to restoration, and their familiarity with projects and locations such as yours. Also review their payment requirements and ensure that the billing is fair to both client (you) and the restoration company.

To move forward from the select list of contractors you need to decide how you want to work. Are you ready to take your project out to bid, say with the plans and specifications included in this Appendix? Or would you be more comfortable selecting a contractor and negotiating a bid based on the plans and specifications but tailored to your immediate budget and restoration needs. Either way will work and either way has advantages. You need a fair bid for your project and the contractor needs a fair price or wage. Bidding, if the timing and economy are in your favor should work out the best, but a negotiated bid can lead to a more friendly and cooperative experience for all involved.

Design-build firms will work with you to create the specific restoration implementation tasks that meet your budget. Other firms are accustomed to bidding (giving you a fixed price) for your project based on a set of plans and specifications, such as the ones in the Appendix.
You can proceed by soliciting bids for your plans and specifications, or you can solicit proposals based on more generalized direction. It will depend on you comfort with the bidding and contracting process.

Once you are ready to proceed with soliciting bids or proposals, it helps to have a pre-bid or pre-proposal meeting on-site (for all interested companies at once). At this meeting you walk the site with company representatives, review your past work effort, explain your goals, and layout the project at hand. Pre-bid meetings enhance contractor confidence in the project and the client and typically make bids reflect the actual on the ground conditions. This doesn’t necessarily lead to lower bids or proposals, but it does lead to a more solid contractor price that is less susceptible to increases down the road when previously unknown site conditions or tasks come to light. Do not hide project tasks or expectations from contractors—put everything on the table and then expect a fair price in return. The pre-bid meeting can be conducted by the restoration consultant, or the client.

Once bid and proposals come in, have a review process in place with a restoration design consultant to ensure you are getting a fair price for the work advertised. When the final contractor—either lowest bidder or the best bidder (based on your criteria)—is selected, you begin to negotiate the final contract price and terms. Negotiations will include payment schedule, project calendar schedule, coordination with client representative, submittals for project materials and procedures, permits, and complying with City requirements.

When contractors provide bids for restoration work they need to know what is to be done and how. The PS&E spell out the entire project. During the project and at its completion they are used to answer questions, settle disagreements of scope and cost, and finally to determine if the project is completed. Finally, the Plans and Specifications become the record drawings or as-builts, describing the restoration work completed at a particular place and time. Secondary functions of Plans, Specifications, and Cost Estimates include the ability to inform and document volunteer restoration efforts. Should a contractor not be used to complete the work called out in the Plans and Specifications, either in part or in whole, then the responsibility will fall to volunteers. Having a set of professional Plans, Specifications, and Cost Estimates will provide volunteers with a guide to complete the work, a plan to record what was completed and what was altered.

In addition to guiding these volunteer efforts, the Plans, Specifications, and Cost Estimates can also be used to assist in the development of future restoration design consulting. PS&E can serve as the basis for future restoration design phases. Instead of starting from scratch, the restoration consultant will have a foundation of information to build on, effectively reducing their scope of service.

**RESTORATION PLANS**
Construction Documents (Contractor Project)
*See pages 16-19*

**SPECIFICATIONS**
*See Appendix*

**COST ESTIMATE**
*See Appendix*
Butters Canyon Restoration Plan
LONG-TERM RESTORATION VISION AND ACTIVITIES

The Long-term Restoration Vision and Activities relate to ecosystem management at a large scale with the objective of promoting diversity through preservation. The Vision presents the future of land management at the canyon. It is framed by the four Butters Canyon plant communities, see diagram on page 23.

Long-Term Restoration Vision

The Long-Term Restoration Vision is intended to provide the overarching guidance for the restoration at Butters Canyon. It is a visual reminder of the essential character of the site, and the underlying rationale to preserve this precious resource. The Vision illustrates an overall view of the greater Butters Canyon landscape, and as such it reaches figuratively beyond the Butters Land Trust and City of Oakland property parcel boundaries. The process of envisioning the canyon landscape and its future restoration is best served by viewing the canyon setting as a whole; separate from its ownership boundaries. Many of the physical factors influencing the site: surface water runoff, available sunlight, tree canopies, and seed dispersal span legal property boundaries. Having a vision for the canyon at-large also accommodates changes in property management and ownership boundaries over time. This in turn allows the Long-Term Management Plan to adapt to changes in site conditions. It should be noted that while graphically the Vision reaches beyond the Butters Land Trust boundaries, this should not be construed to impose restrictions on, or modify the rights of, private land owners in the canyon.

The Long-Term Restoration Vision is framed by the site’s plant communities. It presents these communities in an idealized Restoration Vision diagram (p. 23) where each plant community is in a managed state of balance relative to its neighbors. It does not reflect the current limits of the canyon’s plant community. These idealized boundaries reflect the most appropriate locations and extents of the four plant communities based on the site’s physical characteristics, local plant ecology, and the project’s Urban Ecological Restoration Strategy. Along with identifying the canyon’s plant communities, the Vision calls out specific site characteristics and details that inform the restoration. One example is the recommendation that the characteristic closed California bay and oak canopy over Butters Drive should be preserved.

A discussion based on the individual plant communities follows.
CALIFORNIA BAY FOREST
The vision for Butters Canyon’s California Bay Forest looks significantly different than what is found on-site today. The California Bay Forest canopy would be a mix of California bay *Umbellularia californica* and other species including coast redwood *Sequoia sempervirens*, coast live oak *Quercus agrifolia*, big-leaf maple *Acer macrophyllum* and California buckeye *Aesculus californica*. Although bay would continue to be the dominant species, the total number of other trees would be greater. This mixed canopy would reduce the amount of allelopathic leaf litter from the California bay. This diverse canopy would have openings allowing sunlight to reach the ground. The understory would be void of invasive, non-native species such as ivy, vinca, and Himalayan blackberry. Sunlight, along with the reduced bay leaf litter, would support a much greater diversity of native shrubs, ferns and forbes, including California hazelnut *Corylus cornuta*, Indian plum *Oemleria cerasiformis*, currants *Ribes spp.*, and Pacific bleeding heart *Dicentra formosa*.

OAK WOODLAND
The Oak Woodland plant community would contain large openings in the tree canopy, a mixture of tree species, and variety of low growing herbaceous plants that have adapted to a greater exposure to sunlight than plants found in the California Bay Forest. A mature Oak Woodland is further defined by a composition of different age classes of oak trees. In typical woodland some oaks are dead and decaying, providing cavity nesting sites for birds and shelter for amphibians, others are young and ready to replace those near the end of their lives. The idealized woodland would contain a mixture of tree species: Coast live oak *Quercus agrifolia*, California buckeye *Aesculus californica*, and an occasional madrone *Arbutus menziesii*. French broom and other invasive, non-native plants will be absent from the understory and in their place will be native, purple needlegrass *Nassella pulchra*, Douglas iris *Iris douglasiana*, and California poppy *Eschscholzia californica*.

RIPARIAN FOREST
The existing Riparian Forest is in large part overwhelmed by the California Bay Forest. The Vision depicts a more substantial Riparian Forest plant community along both sides of Peralta Creek. The ephemeral nature of the creek within the site supports slightly less riparian vegetation than commonly found in moister creek corridors. This coupled with the pressure from the advancing Bay Forest has resulted in a lack of riparian vegetation along the creek. Opening the bay canopy and augmenting the bay trees with riparian species such as white alder *Alnus rhombifolia*, willow *Salix spp.*, elderberry *Sambucus mexicana*, dogwood *Cornus stolonifera*, and Ninebark *Physocarpus capitatus* species will bring back this rich habitat to the site. Both the California bay and the Riparian Forests will benefit from reducing bay canopy. Areas of open light will encourage growth and recruitment of riparian tree species as well as a greater diversity of understory shrubs including currants *Ribes spp.*, thimbleberry *Rubus parviflorus*, coffeeberry *Rhamnus californica*, and wood fern *Dryopteris arguta*.

COASTAL SAGE SCRUB
Coastal Sage Scrub is the most vulnerable of the four plant communities. Scrub species, if not managed, will be overtaken by the Oak Woodland. The Restoration Vision strives to protect the existing patches of this plant community by removing encroaching young native trees before they shade out Coastal Sage Scrub habitat. A restored Coastal Sage Scrub community would be dominated by California sagebrush *Artemisia californica* and coyote brush *Baccharis pilularis*. Additional species include purple needlegrass *Nassella pulchra*, bush monkey flower *Mimulus aurantiacus*, silver bush lupine *Lupinus albifrons* and California buckwheat *Eriogonum fasciculatum*. To protect the canyon from fire, large areas of dead wood would be removed, leaving some dead wood to provide forage and cover for native bird and other wildlife species.
Long-Term Restoration Activities

The Long-Term Restoration Activities noted below are intended to guide future land management decisions for the canyon. Their goal is to enhance, stabilize, and preserve the diversity of Butters Canyon over the long-term. These Activities support the Vision for the canyon.

One of the greatest challenges in restoration work is to gauge the appropriate rate to tackle new restoration areas. Work in new areas, especially invasive plant control, should not be conducted unless repeat visits can be made to control newly sprouting invasive plants. Over time the amount of weed growth will diminish; however there may be increases in weeds in the following 1-3 years as aggressive weedy species hold fast to there areas. The third and fourth year after the first round of weeding will require less maintenance. It should be noted that restoration areas will always require some level of invasive plant monitoring and weeding.

When choosing a new restoration area, it is best to do so by plant community. Choosing which plant community to work in is a decision that can be made by the stewards or the group leader, and should take into account available volunteer labor, community interest and overall plant community health. Higher priority should be given to plant communities that are at risk of becoming less diverse without intervention and that are currently in poor health. For example, as of this writing, the Bay Forest should be selected first, followed by Oak Woodland, Riparian Forest, and Coastal Sage Scrub. This order takes into account the amount of invasive species colonizing the Bay Forest and the difficulty of controlling invasives and establishing native plants under the dense bay canopy shade. Bay Forest is the top priority because the existing invasive understory is currently the greatest risk to Butters Canyon habitat. Oak Woodland is the next priority due to the amount of California bay encroaching on the Oak Woodland areas, as well as the number of invasive trees such as acacia colonizing the oak woodland. Riparian Forest is third priority because of its limited area, and the relative feasibility of restoration in riparian areas. There is also a substantial volunteer interest in protecting the riparian species and encouraging greater plant diversity in this community. The final priority is Coastal Sage Scrub. This community is in relatively good health, and not in dire need of restoration. Still, the maturation of tree canopy displacing scrub shrub habitat puts the long-term status of this plant community at risk.

The Activities noted below are organized around the four canyon plant communities identified in the Site Inventory. Included are also Special Restoration Areas within three of the communities, and a Plant List and Seed Mix appropriate for the community.

CALIFORNIA BAY FOREST

The California Bay Forest requires extensive removal of invasive species. This is a time consuming task that will require repeat visits to previous work areas to keep back the ivy, vinca and other invasive species. Once these species are removed, cleared areas can be planted with native plants. Bare areas should be covered with coir fabric prior to planting.

The diagram to the right illustrates the recommended progression for restoration through the site within each individual plant community. So, for instance, in the Bay Forest, the progression is generally from the south to the north, with the Special Area near the entry path. The top priority restoration area is labeled with a “1” and should be considered for restoration first. The progression continues numerically to the final area. Within priority areas the restoration work should work from the edges of previous restoration areas outwards towards new priority areas. In most cases this should involve working from upstream to downstream through the canyon, and working from the top of the banks to the creek.
Bay Forest Special Restoration Area

Within the California Bay Forest a *Special Restoration Area* has been determined that merits additional attention. This special area is intended to create a native plant display around the Butters Land Trust sign. The goal for the area is to create an example of the diversity and beauty of what the restored canyon would look like. This area is an opportunity to educate the public of the Trust’s restoration efforts and to achieve two restoration goals: increase stewardship for the canyon; and increase ecological understanding of the canyon. By locating along Butters Drive, it makes it easily accessible for quick weeding and maintenance sessions and visible for passersby walking or biking.

**Long-Term California Bay Forest Restoration Activities**

- Remove and control invasive trees, shrubs, and ground covers such as plum, broom, ivy, periwinkle, and ehrharta
- Protect existing plants including shrubs and ferns from being smothered by invasive plants
- Prune bay tree branches to provide openings in the canopy for other tree species to regenerate (buckeye, oak)
- Thin bay trees for fire protection where very dense with small branches
- Plant and water new plants

**Bay Forest Plant List**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Size / Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big-leaf Maple</td>
<td>Acer macrophyllum</td>
<td>Treepot / 20-feet</td>
</tr>
<tr>
<td>California Hazelnut</td>
<td>Corylus c. v. californica</td>
<td>D-16 / 3-foot</td>
</tr>
<tr>
<td>Wood Fern</td>
<td>Dryopteris arguta</td>
<td>1 gal / 2-foot</td>
</tr>
<tr>
<td>Toyon</td>
<td>Heteromeles arbutifolia</td>
<td>D-40 / 5-foot</td>
</tr>
<tr>
<td>Oceanspray</td>
<td>Holodiscus discolor</td>
<td>D-16 / 5-foot</td>
</tr>
<tr>
<td>Indian Plum</td>
<td>Oemleria cerasiformis</td>
<td>1 gal / 5-foot</td>
</tr>
<tr>
<td>Sword Fern</td>
<td>Polystichum munitum</td>
<td>1 gal / 2-foot</td>
</tr>
<tr>
<td>Flowering Currant</td>
<td>Ribes s. v. glutinosum</td>
<td>D-16 / 3-foot</td>
</tr>
<tr>
<td>California Rose</td>
<td>Rosa californica</td>
<td>D-16 / 3-foot</td>
</tr>
<tr>
<td>Thimbleberry</td>
<td>Rubus parviflorous</td>
<td>Treeband / 3-foot</td>
</tr>
<tr>
<td>California Blackberry</td>
<td>Rubus ursinus</td>
<td>Cuttings / 3-foot</td>
</tr>
<tr>
<td>Bee Plant</td>
<td>Scrophularia californica</td>
<td>D-16 / 2-foot</td>
</tr>
</tbody>
</table>

**Bay Forest Seed Mix**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>California Fescue</td>
<td>Festuca californica</td>
</tr>
<tr>
<td>Red Fescue</td>
<td>Festuca rubra ‘Molate’</td>
</tr>
<tr>
<td>Bee Plant</td>
<td>Scrophularia californica</td>
</tr>
<tr>
<td>Solanum</td>
<td>Solanum americanum</td>
</tr>
</tbody>
</table>

**Contact:** Pacific Coast Seed to determine seed quantity, specific mix, percentages, and pounds
OAK WOODLAND

The Oak Woodland is susceptible to broom infestations and this should be monitored and addressed within the entire plant community. As depicted in the Vision, the extent of Oak Woodland is expected to grow overtime as management of the Bay Forest moves forward. As bay trees are thinned, conditions more favorable to oak woodland, such as increased sunlight, will be created and the oaks and buckeyes will flourish.

Special Restoration Area

A small area adjacent to the footpath has been designated for special attention. This special area supports a number of wetland indicator species and may be the result of a subtle change in available water. Caring for this area to protect and enhance these plants will improve the overall diversity of the site and support the special character of Butters Canyon. To protect this resource, weeding in the area should be carefully conducted to preserve and protect the existing native plants. Trail maintenance or grading should be careful not to alter the existing drainage in the area. Improving, and preserving the leafy duff layer indicative of a healthy oak woodland should also be included.

Long-Term Oak Woodland Restoration Activities

- Remove invasive trees, shrubs and ground covers such as acacia, broom, ivy, and ehrharta
- Preserve and protect large woody debris for habitat
- Remove brush piles and smaller debris for fire abatement
- Maintain a rich leaf litter duff layer by keeping fallen oak leaves on the ground. Consider adding recycled organic mulch if the ground is bare.
- Prune bay tree branches to reduce the risk of branches crushing young oaks and to allow light down to the ground to accommodate the reestablishment of native understory species
- Remove young bay seedlings and small trees by hand before they shade out young oaks
- Plant and water new plants

Oak Woodland Plant List

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Size / Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>California Hazelnut</td>
<td>Corylus c. v. californica</td>
<td>D-16 / 3-foot</td>
</tr>
<tr>
<td>Toyon</td>
<td>Heteromeles arbutoflia</td>
<td>D-40 / 5-foot</td>
</tr>
<tr>
<td>Douglas Iris</td>
<td>Iris douglasiana</td>
<td>Bulb / 2-foot</td>
</tr>
<tr>
<td>Indian Plum</td>
<td>Oemleria cerasiformis</td>
<td>1 gal / 5-foot</td>
</tr>
<tr>
<td>Sword Fern</td>
<td>Polystichum munitum</td>
<td>1 gal / 2-foot</td>
</tr>
<tr>
<td>Coast Live Oak</td>
<td>Quercus agrifolia</td>
<td>Seed / 2-foot</td>
</tr>
<tr>
<td>California Rose</td>
<td>Rosa californica</td>
<td>D-16 / 3-foot</td>
</tr>
<tr>
<td>Snowberry</td>
<td>Symphoricarpas albus</td>
<td>D-16 / 3-foot</td>
</tr>
</tbody>
</table>

Oak Woodland Seed Mix

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Yarrow</td>
<td>Achillea millefolium</td>
</tr>
<tr>
<td>Mugwort</td>
<td>Artemisia douglasiana</td>
</tr>
<tr>
<td>Western Rye Grass</td>
<td>Elymus glaucus</td>
</tr>
<tr>
<td>California Fescue</td>
<td>Festuca californica</td>
</tr>
<tr>
<td>Cow Parsnip</td>
<td>Heracleum lanatum</td>
</tr>
<tr>
<td>Torrey Melic Grass</td>
<td>Melica torreyana</td>
</tr>
<tr>
<td>Bee Plant</td>
<td>Scrophularia californica</td>
</tr>
<tr>
<td>Solanum</td>
<td>Solanum americanum</td>
</tr>
</tbody>
</table>

Contact: Pacific Coast Seed to determine seed quantity, specific mix, percentages, and pounds.
Special Area:
Enhance rushies and other vegetation along path and near the base of the slope.
RIPARIAN FOREST

Though Peralta Creek run ephemerally through the site it still supports numerous riparian plant species. Recently, changes in the plant community structure of the canyon and the evolutionary adaptation of the Bay Forest and colonizing invasive, non-native plant species has degraded riparian area diversity and extent. The Riparian Forest can best be enhanced by discouraging the advancement of bay canopy, selectively eradicating invasive, non-native species, and protecting the banks of Peralta Creek.

Special Restoration Area

There is a native California rose patch adjacent to the trail that has captured the attention of many volunteers and Butters Land Trust members. This rose patch is of particular importance and has been for special attention. To ensure its long standing viability weeding should occur here regularly to keep invasive plants such as Ivy and Periwinkle from encroaching on the shrubs. Mature plants should not require any additional watering; however additional tending to this area will enhance the existing plants and help to preserve the special character of Butters Canyon.

Restoration Activities within each Priority Area

- Remove invasive trees, shrubs and ground covers especially Ivy from the creek
- Allow fallen trees and wood to remain in and along the creek for habitat
- Remove brush piles and smaller debris for fire abatement
- In areas of bare soil, prune trees to let light to the ground and plant willows, dogwood and California Blackberry to stabilize the slopes.
- Remove young bay seedlings and small trees by hand before they shade out young oaks
- Plant and water new plants

Riparian Forest Plant List

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Size / Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Alder</td>
<td>Alnus rhombifolia</td>
<td>5 gal / 15-feet</td>
</tr>
<tr>
<td>Red-twig Dogwood</td>
<td>Cornus stolonifera</td>
<td>Cuttings / 2-foot</td>
</tr>
<tr>
<td>Wood Fern</td>
<td>Dryopteris arguta</td>
<td>1 gal / 3-foot</td>
</tr>
<tr>
<td>Ninebark</td>
<td>Physocarpus capitatus</td>
<td>Cuttings / 2-foot</td>
</tr>
<tr>
<td>Sword Fern</td>
<td>Polystichum munitum</td>
<td>1 gal / 2-foot</td>
</tr>
<tr>
<td>Coffeeberry</td>
<td>Rhamnus californica</td>
<td>1 gal / 5-foot</td>
</tr>
<tr>
<td>California Rose</td>
<td>Rosa californica</td>
<td>D-16 / 3-foot</td>
</tr>
<tr>
<td>Thimbleberry</td>
<td>Rubus parviflorous</td>
<td>Treeband / 3-foot</td>
</tr>
<tr>
<td>California Blackberry</td>
<td>Rubus ursinus</td>
<td>Cuttings / 3-foot</td>
</tr>
<tr>
<td>Willow</td>
<td>Salix spp.</td>
<td>Cuttings / 2-foot</td>
</tr>
<tr>
<td>Mexican Elderberry</td>
<td>Sambucus mexicana</td>
<td>1 gal / 3-foot</td>
</tr>
<tr>
<td>Bee Plant</td>
<td>Scrophularia californica</td>
<td>D-16 / 2-foot</td>
</tr>
</tbody>
</table>

Riparian Forest Seed Mix

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Fescue</td>
<td>Festuca rubra ‘Molate’</td>
</tr>
<tr>
<td>Cow Parsnip</td>
<td>Heracleum lanatum</td>
</tr>
<tr>
<td>Green Rush</td>
<td>Juncus effusis bruneus</td>
</tr>
<tr>
<td>Iris leafed Rush</td>
<td>Juncus xiphooides</td>
</tr>
<tr>
<td>Torrey Melic Grass</td>
<td>Melica torreyana</td>
</tr>
<tr>
<td>Scarlet Monkeyflower</td>
<td>Mimulus cardenalis</td>
</tr>
<tr>
<td>Monkeyflower</td>
<td>Mimulus guttatus</td>
</tr>
<tr>
<td>Bee Plant</td>
<td>Scrophularia californica</td>
</tr>
<tr>
<td>Solanum</td>
<td>Solanum americanum</td>
</tr>
</tbody>
</table>

Contact: Pacific Coast Seed to determine seed quantity, specific mix, percentages, and pounds
COASTAL SAGE SCRUB
This plant community is best managed by protecting it from intrusions by oak trees from the adjacent Oak Woodland. Removing, or transplanting young oaks and other trees before they begin to shade the scrub species will maintain the conditions necessary for the scrub community to thrive. No Special Restoration Area is highlighted for the Coastal Sage Scrub. The community as a whole is a Special Restoration Area. Its proximity to the trail off Robinson Drive lets visitors enjoy this landscape type as they descend to Peralta Creek. Maintaining and enhancing the habitat value of this visually distinctive plant community through the recommended Restoration Activities below is the most appropriate means to accomplishing the Vision for this community.

Restoration Activities within each Priority Area
- Remove invasive trees, shrubs, and ground covers such as eucalyptus, broom and ehrharta
- Remove young oaks or use new seedlings as transplants for the Oak Woodland
- Remove most dead scrub and smaller debris for fire abatement. Leave some dead areas for habitat.
- Plant and water new plants

Coastal Sage Scrub Plant List

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Size / Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>California Sagebrush</td>
<td>Artemesia californica</td>
<td>D-40 / 3-foot</td>
</tr>
<tr>
<td>Coyote Brush</td>
<td>Baccharis pilularis</td>
<td>D40 / 5-foot</td>
</tr>
<tr>
<td>Fleabane</td>
<td>Erigeron foliosus</td>
<td>D-16 / 1-foot</td>
</tr>
<tr>
<td>California Buckwheat</td>
<td>Eriogonum fasciculatum</td>
<td>D-40 / 3-foot</td>
</tr>
<tr>
<td>Silver Bush Lupine</td>
<td>Lupinus albilfrons</td>
<td>D-40 / 3-foot</td>
</tr>
<tr>
<td>Monkey Flower</td>
<td>Mimulus aurantiacus</td>
<td>D-40 / 3-foot</td>
</tr>
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Coastal Scrub Shrub Seed Mix

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
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</thead>
<tbody>
<tr>
<td>White Yarrow</td>
<td>Achillea millefolium</td>
</tr>
<tr>
<td>Mugwort</td>
<td>Artemisia douglasiana</td>
</tr>
<tr>
<td>Fescue Bunchgrass</td>
<td>Festuca idahoensis</td>
</tr>
<tr>
<td>Deerweed</td>
<td>Lotus scoparius</td>
</tr>
<tr>
<td>California Melic Grass</td>
<td>Melica californica</td>
</tr>
<tr>
<td>Needlegrass</td>
<td>Nassella lepida</td>
</tr>
<tr>
<td>Purple Needlegrass</td>
<td>Nassella pulchrum</td>
</tr>
<tr>
<td>California Coast Phacelia</td>
<td>Phacelia californica</td>
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<tr>
<td>Blue-eyed Grass</td>
<td>Sisyrinchium bellum</td>
</tr>
<tr>
<td>Annual Lupine</td>
<td>Lupinus bicolor</td>
</tr>
</tbody>
</table>

Contact: Pacific Coast Seed to determine seed quantity, specific mix, percentages, and pounds
PLANNING A RESTORATION EVENT

This chapter provides the steps for planning and running a restoration event. As mentioned, two main events: Creek to Bay Day in the fall and Earth Day in the spring are the key volunteer events. Other smaller events are anticipated to be promoted by local volunteers including the Butters Land Trust.

The section guide volunteers or agency representatives through the initial assessment of the site and the subsequent development of a work plan for the event.

Note that full-size Assessment and Work Plan/Diary sheets are provided in the Appendix.

The Restoration Event

Restoration implementation is supported by two LTMP documents, an Assessment Checklist / Base Map, and a Work Plan/Diary. Together these two forms create a historical record of site conditions and restoration efforts, and a guide for future work. The proposed two-step process is outlined below.

WHY PLAN AHEAD

Planning ahead for a restoration event at Butters Canyon will pay off handsomely the day of the event. Restoration events are few and usually brief 4-6 hour work parties. Events benefit from thoughtful planning efforts, and run smoother and more efficiently. Documenting planning efforts furthers restoration events by ensuring future planners have access to past event records such as the proposed Assessment Checklist and Work Plan/Diary forms. Restoration records such as these are an invaluable source of informal restoration data that over time can be used to assess the success of different restoration strategies. Eventually, this collection of restoration Assessments and Work Plan/Diaries becomes the history of the community’s restoration efforts in Buergers Canyon.

Step One: Assessing the Site

When planning for the restoration event is on the horizon, the designated event planner’s first task is to assess the current status of the Canyon. This site assessment can be as simple as a quick walk around the site looking for general changes in the landscape and maybe an evaluation of how past restoration areas are doing. Or it can be a more involved assessment of the general site and/or specific site areas. Either way, the important thing is to get to the site—look around—and document what you see.
Following these steps will help focus assessment efforts:

1. Months prior to the event, place event planning on the Butters Land Trust’s scheduled Board Meeting agenda to review the LTMP restoration goals, past work, and future projects.
2. Revisit restoration goals to guide decision making.
3. Elect an Event Planner(s) to lead the effort.
4. Event Planner performs a quick review of the past 1-3 years of Assessment Checklist, Base Map, and Work Plan/Diary forms to understand past efforts, successes, and failures.
5. In the weeks prior to the event, the Event Planner takes the Assessment Checklist, Base Map, and camera to the site. Complete the following tasks:
   - Review Assessment Checklist and enter the date, time and weather. Complete the Assessment Checklist and annotate Base Map while moving through the site.
   - Travel the entire site by walking along Butters Drive, following existing trails and visiting recent restoration areas, especially those completed in the last 3 years.
   - Note “Big Changes” on the site—slides, fallen trees, invasive plant infestations, debris piles, and litter.
   - Photograph past restoration areas and typical conditions and areas of concern.
   - Complete the Assessment Checklist and Base Map.
6. Proceed to Step Two: Developing the Work Plan/Diary

To complete the Work Plan/Diary use these steps as a guide:

1. Complete Assessment Checklist as described above in Step 1.
2. Check the Restoration Maintenance Calendar to see which tasks are most appropriate for the season.
3. Estimate the number of volunteer hours likely.
4. Prioritize tasks, and if time permits, schedule other Long-Term Restoration Activities.
5. Prepare a list of tools, plants, materials, water source for plants, and event supplies.
6. Schedule and coordinate plant and material deliveries and debris hauling.
7. Fill out the Work Plan/Diary.
8. Send out instructions to volunteers and supporting contractors and suppliers.
9. Ensure that Diary entries are made after the event is completed to record what has been achieved.

Top Priority Activities
1. Invasive Plant Control
2. Soil Erosion Management
3. Trash Removal and Fire Abatement
4. Native Plant Establishment

Step Two: Developing the Work Plan/Diary
The Work Plan/Diary document is the agenda for the restoration event. It provides the event planner with directions for what to do and in what order. It also assists in organizing what to purchase prior to the event and what tools and supplies volunteers will need. The Work Plan/Diary is based on Step One: Assessing the Site, and requires planners to prioritize a list of restoration event tasks. The process of developing the Work Plan/Diary should follow the task priorities in the Volunteer Restoration Activities section of this report and as outlined below.
### Calendar

<table>
<thead>
<tr>
<th>JANUARY</th>
<th>FEBRUARY</th>
<th>MARCH</th>
<th>APRIL</th>
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<th>JUNE</th>
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<tbody>
<tr>
<td>Remove Broom</td>
<td>Limit access to steep slopes</td>
<td>Monitor soil for erosion</td>
<td>Remove ivy, periwinkle, invasive grass and shrubs</td>
<td>Remove ivy, periwinkle, invasive grass and shrubs</td>
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</tr>
<tr>
<td>Limit access to steep slopes</td>
<td>Monitor soil for erosion</td>
<td>Monitor soil moisture and water plants younger than 2 years old if necessary</td>
<td>Monitor soil moisture and water plants younger than 2 years old if necessary</td>
<td>Water plants younger than 2 years twice a month</td>
<td>Water plants younger than 2 years twice a month</td>
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<tr>
<td>Monitor soil for erosion</td>
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### SUMMER

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<th>OCTOBER</th>
<th>NOVEMBER</th>
<th>DECEMBER</th>
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<tbody>
<tr>
<td>Remove ivy, periwinkle, invasive grass and shrubs</td>
<td>Tree removal</td>
<td>Tree removal</td>
<td>Prepare areas for planting</td>
<td>Planting after the rains begin</td>
<td>Planting until soil becomes saturated</td>
</tr>
<tr>
<td>Water plants younger than 2 years twice a month</td>
<td>Fire abatement clearing</td>
<td>Fire abatement clearing</td>
<td>Fire abatement clearing</td>
<td>Ensure coir is used for all bare soil areas</td>
<td>Limit access to steep slopes.</td>
</tr>
<tr>
<td></td>
<td>Water plants younger than 2 years twice a month</td>
<td>Monitor soil moisture and water plants younger than 2 years old if necessary</td>
<td>Water plants younger than 2 years twice a month</td>
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### FALL

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<th>DECEMBER</th>
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<tr>
<td>Monitor soil moisture and water plants younger than 2 years old if necessary</td>
<td>Prepare areas for planting</td>
<td>Planting after the rains begin</td>
<td>Planting until soil becomes saturated</td>
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<tr>
<td>Weeding</td>
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<td>Ensure coir is used for all bare soil areas</td>
<td>Limit access to steep slopes.</td>
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<tr>
<td></td>
<td></td>
<td>Seed</td>
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</table>
Assessment Checklist and Work Plan/Diary

ASSESSMENT CHECKLIST
Complete this checklist using the Base Map to describe and locate specific site conditions. Check box if condition is found.

Recorder’s Name/Phone  Date/Time  Weather Notes (current and seasonal weather/rain)

INVASIVE PLANT CONTROL
Objective: To control invasive plant colonization and eradicate select areas of invasive plans.

- Are invasive species encroaching in restoration areas?  Y □  N □
- Is ivy on trees anywhere in the canyon?  Y □  N □
- Are there new plum, acacia, or eucalyptus saplings?  Y □  N □
- Are there new infestations of highly invasive species (cape ivy, broom, ehrharta)?  Y □  N □

SOIL EROSION MANAGEMENT
Objective: To ensure that soil erosion is not occurring and to stabilize soils as needed.

- Do restoration areas have adequate vegetative cover and/or are protected by coir fabric?  Y □  N □
- Is erosion evident along the creek?  Y □  N □
- Is there erosion from roadway or residential site drainage?  Y □  N □
- Is it necessary to obtain outside assistance to address erosion concerns?  Y □  N □

TRASH REMOVAL AND FIRE ABATEMENT:
Objective: To remove debris and comply with fire abatement requirements.

- Is there any trash to collect?  Y □  N □
- Is there dead vegetation to be removed in compliance with fire abatement requirements?  Y □  N □
- Are there grasses or low-lying vegetation to be trimmed in compliance with fire abatement requirements?  Y □  N □
- Are there other concerns related to compliance with fire abatement requirements?  Y □  N □
- Is it necessary to contact the City of Oakland to report dumping?  Y □  N □

NATIVE PLANT ESTABLISHMENT

Objective: To ensure health of native plants and their respective plant communities.

- Are there bare areas and/or dead plants to be replanted?  Y □  N □
- Are there isolated areas of invasive species to be removed?  Y □  N □
- Are there masses of invasive plants encroaching on the perimeter to be controlled?  Y □  N □
- Are there trees threatening to crush or unfavorably shade the restoration area?  Y □  N □
- Is there evidence of under watering and a need to commit to a watering regime for new plants?  Y □  N □

Long-Term Plant Management within Canyon

Assess Bay Forest health looking at Bay Collapse, S.O.D., re-sprouting of young bays, encroachment on Riparian Forest. Note impressions.

Assess Oak Woodland health looking at young oak recruitment, S.O.D., oak leaf duff layer condition. Note impressions.

Assess Riparian Forest health looking at creek bank vegetation stability, willow growth or decline, bay encroachment. Note impressions.

Assess Coastal Sage Scrub health looking at Oak woodland and other tree species encroachment. Note impressions.
WORK PLAN / DIARY
Complete this Work Plan to guide the restoration event. After work has been completed note progress as a Diary entry.
Recorder’s Name/Phone  Date/Time  Weather Notes  Volunteers / Hours

GENERAL WORK PLAN GOAL(S)
State the restoration goal(s) to let participants know why they are doing the particular task and how it fits into the big picture of restoration at Butters Canyon.
Priority 1 / Invasive Plant Control Tasks:

Results/Diary Entry:

Priority 2 / Soil Erosion Management Tasks:

Results/Diary Entry:

Priority 3 / Trash Removal and Fire Abatement Tasks:

Results/Diary Entry:

Priority 4 / Native Plant Establishment Tasks:

Results/Diary Entry:

Long-Term Plant Management within Canyon Tasks:

Results/Diary Entry:

TOOLS / MATERIALS NEEDED

TOOLS

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Tool</th>
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<tbody>
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<td>Clippers</td>
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<td>Garbage Bags</td>
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<td>Gloves</td>
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<tr>
<td></td>
<td>Hand Saw / Pruning Saw</td>
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<td>Watering Can</td>
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<td></td>
<td>Weed Wrench</td>
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MATERIALS / SERVICES / CONTACTS

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<td>Water for Plants</td>
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<tr>
<td>Nursery Stock / Cuttings</td>
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</tr>
<tr>
<td>Coir</td>
<td></td>
</tr>
<tr>
<td>Tree Stakes</td>
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<tr>
<td>Deer Fencing Materials</td>
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<td>Soil and Mulch</td>
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<td>Debris Hauling</td>
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<td>Volunteer Support-Food and Drink</td>
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<tr>
<td>City Representatives/Contractors/Consultants</td>
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</tbody>
</table>
TECHNIQUES

The following chapter is a brief “how to” for the common restoration techniques prescribed in the preceding chapters. This chapter can be used as a reference for the work performed on-site by volunteers. The techniques covered in this chapter include:

1. Invasive Plant Control
2. Erosion Control
3. Seeding
4. Soil Bioengineering
5. Planting
6. Watering
7. Pruning / Tree Felling
8. Deer Protection
9. Fire Abatement
10. Trash Removal
1. Invasive Plant Control

BROOM
French (Genista monspessulana)
Scotch (Cytisus scoparius)
Spanish (Spartium junceum)

Notes: Broom is highly invasive. Remove new infestations right away. Focus on large infestations only when enough resources are available to maintain the area.

ID: Yellow flowers and fuzzy compound leaves similar to pea plants. Seed pods present in June-July.

Treatment: Pull out plant and long tap root with weed wrench or digging.

Disposal: Recycle as green waste.

Timing: Pull while ground is soft but before plant goes to seed (January – May). Remove sprouts in the fall.

HIMALAYAN BLACKBERRY
(Rubus discolor)

ID: Shrubby vine with hooked/curving thorns, 3-5 leaflets. (Native blackberry is similar but only has 3 leaflets and fine prickles, not hooked thorns.)

Treatment: Hand pull/dig or cut stems with loppers near ground; dig out roots if possible.

Disposal: Bag and remove from site.

Timing: Check 3-4 times per year.

PERIWINKLE
(Vinca major)

ID: Spreading vine with purple flowers found in shaded areas. Re-sprouts from root fragments.

Treatment: Hand pull or use McLeod to pull roots up from base of stems. Grub to remove root fragments.

Disposal: Bag and remove from site.

Timing: Check 3-4 times per year.
COTONEASTER  
*(Cotoneaster franchetii)*  
*(Cotoneaster pannosa)*  
*(Cotoneaster lactea)*

ID: Evergreen shrub to 10 feet tall

Treatment: Pull with weed wrench or by hand. Cut base near ground; dig out roots if possible.

Disposal: Compost as green waste or chip.

Timing: Check yearly for sprouts.

EHRHARTA  
*(Ehrharta erecta)*

ID: Slender grass to 2 feet tall. Found in dense mats in moist shade.

Treatment: Pull by hand and dig out roots. Weed during the rainy season. Herbicide may be the best option for dense stands.

Disposal: Bag seeds immediately.

Timing: Check 3-4 times per year.

PITTOSPORUM  
*(Pittosporum crassifolium)*  
*(Pittosporum tobira)*  
*(Pittosporum undulatum)*

ID: Evergreen tree or shrub to 35 feet tall.

Treatment: Pull with weed wrench or by hand. Cut base near ground; dig out roots if possible.

Disposal: Compost as green waste or chip.

Timing: Check yearly for sprouts.

PLUM  
*(Prunus cerasifera)*

ID: Deciduous tree with purple or green leaves to 25 feet tall.

Treatment: Arborist should remove large trees. Young saplings can be removed in similar manner as pittosporum and cotoneaster. Base of tree resprouts easily.

Disposal: Compost as green waste or chip.

Timing: Check yearly for sprouts.
**BLUE GUM EUCALYPTUS**  
*Eucalyptus globulus*

ID: Large erect tree to 100 feet.


Disposal: Cut for firewood. Will likely resprout if left on site.

Timing: Check yearly for resprouting.

**MONTEREY PINE**  
*Pinus radiata*

Notes: Not invasive, but non-native and prone to disease and weak limbs.

ID: Three-needle pine with reddish brown bark. Form irregular to 100 feet tall.

Treatment: Arborist should remove larger trees.

Valuable habitat snags can be created by lopping dead trees to 30 feet and limbing. Native pollinators, insects, bats, and numerous birds rely on snags during part of their life cycle.

Disposal: Cut for firewood, chip for mulch. Leave log sections as nurse logs dispersed throughout site to create homes for insects, amphibians and rare plants.

Timing: Check every year for seedlings.

**ACACIA**  
*Acacia melanoxylon*  
*Acacia decurrens*  

ID: Variable foliage. Evergreen tree to 40 feet. Single trunk with gray bark.

Treatment: Pull with weed wrench or by hand. Arborist should remove larger trees. Cut base to 1 foot and macerate stump.

Disposal: Compost as green waste or chip.

Timing: Check twice per year for resprouting and seedlings.
**IVY**

English Ivy (*Hedera helix*)

Algerian Ivy (*Hedera canariensis*)

ID: Ground cover or climbing vine, can become woody.

Treatment: Hand-pull or rake small infestations. Roots will re-sprout; remove as much as possible.

Large areas of ivy can be removed with volunteers rolling large sections up like a carpet. Start at the top of the slope and rolling over the ivy, pulling up the exposed roots as you move downhill. This technique works best with a group of volunteers working together.

Ivy growing on trees should be cut and removed from the trees if possible. Smaller pieces can be pulled off the tree. Leave in trees if damage to the tree is likely.

Disposal: Compost as green waste.

Timing: Check 3-4 times per year.

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**CAPE IVY**

(*Delairea odorata*)

ID: Vine with smooth, bright green leaves with pointed lobes. Grows quickly and can re-root from plant fragments.

Treatment: Remove by hand-pulling and digging out shallow roots.

Disposal: Bag and remove from site; do not compost.

Timing: Check every 4-8 weeks.
2. **Erosion Control**

There are two types of erosion control recommended for Butler’s Canyon: wattles and coir fabric. Wattles are logs of straw placed along the slope contour to capture sediment. Coir is a generic term for natural fiber erosion control fabric. It is used to protect soil exposed by natural or man-made causes such as soil erosion and slumping and the clearing of invasive vegetation. Coir and straw wattles typically last for two years or more. Once installed it does not have to be removed and can be left in place until decomposed.

**Wattles:**
Use wattles in locations where overland flow is likely and in areas where erosion is occurring. Wattles assist in dissipating overland flow and capture sediment before it enters the creek.

- The recommended wattle is 8-inch diameter straw log wrapped in 100% biodegradable netting or burlap. Avoid products with plastic netting.
- Stake at 12 to 18 inch intervals along the wattle.
- On steep slopes place on every 5-foot contour

**Coir Fabric:**
Coir is used to protect and stabilize exposed soils while rooting vegetation establishes.

- The recommended coir fabric is 100% biodegradable coconut fiber. It comes in rolls that cover 2-meters wide by 33-meters long when installed.
- Do not use erosion control fabrics which incorporate any non-biodegradable materials such as synthetic nettings. These nettings will not break down over time and will pose long-term maintenance concerns.
- Installation of coir should follow manufacturer’s recommendations. When installing coir unroll the fabric from the rolls perpendicular to the slope. Coir is always installed and secured at the bottom of the slope first and then successive sections are rolled out one above the other with a 6-inch overlap from one roll to another much like shingles on a roof. The final section should run across the top of the slope.

- Coir is staked with either long metal staples or biodegradable stakes at a predetermined spacing and pattern printed onto the fabric itself.
- Limit walking on coir.
- Seeding is done beneath the coir as the coir is being installed.
- Soil bioengineering and container planting is installed after the coir is installed by cutting through the surface of the coir.
3. **Seeding**

Seeding is best accomplished in late fall when reliable rains can be anticipated. If irrigation will be used, or wet season conditions are delayed, seeding can be accomplished in mid-winter. Spring seeding is less reliable because tender shoots with undeveloped root structures will suffer high mortality at the onset of the summer dry season and weedy species will have germinated and be tough competition for the new seedlings.

- Temperatures should be over 40 degrees Fahrenheit, soil moisture should be adequate, and heavy rains should not be anticipated.
- Prepare the soil surface by removing major debris and smoothing out the soil surface.
- The soil should be void of plants and germinating weeds. These plants will have a head start and out-compete the seedlings.
- Seeding may be installed by broadcasting seed from a mechanical dispenser (belly grinder or other device). Broadcast seed onto bare soil and rake the seed into the soil surface providing an even one-half inch soil cover.
- Keep soil and seed moist until germination occurs and seasonal rains ensure a constant source of moisture. Germination ranges from 4-8 weeks.
- Broadcast seeding can be assisted by the installation of coir fabric either on level or steep slopes. The coir acts like a light mulch layer and protects the seed from wind and desiccation. When seeding with coir, seed immediately ahead of the coir installation one roll width at a time and ensure that the seeded area is not trammeled prior to installing the coir.

4. **Soil Bioengineering**

Soil bioengineering is the practice of using vegetation to stabilize soils. There are numerous types and methods of soil bioengineering. Consult technical manuals for specific details on installation practices, such as this manually created by the Urban Creeks Council. [http://www.urban creeks.org/Bioengineering%20Handbook.pdf](http://www.urban creeks.org/Bioengineering%20Handbook.pdf)

In general, soil bioengineering at Butters Canyon is limited to addressing these conditions: soil slope instability, restoration of Peralta Creek, damaged drainage courses, and riparian area revegetation.

The primary soil bioengineering method used for each of these three conditions would be the installation of live cuttings of native vegetation.

- Harvest cuttings from existing, healthy, and regionally appropriate stands willow, ninebark, dogwood, or native blackberry. Ensure that harvest site species are in fact the specific native species desired and not non-natives or cultivars. Harvesting can be from plant stock on-site or in the immediate neighborhood with the permission of property owners or public agencies.
  - The City of Oakland and the East Bay Regional Park Department are both set-up to assist restoration efforts by providing permits to harvest on public lands.
- Cuttings require water and should only be installed along a creek or seep.
- Harvesting and staking are done only in the rainy season before the end of January.
- Cuttings should be installed within one day of harvesting and care must be taken to ensure cuttings remain moist. Peralta Creek may serve as a helpful water source, and the mature canopy of trees will provide much needed shade.
- Installation of cuttings involves the driving of a pilot hole slightly smaller than the stake diameter and then inserting the stake and driving it into the pilot hole with a mallet.
- Stakes can range in diameter from $\frac{1}{2}$-inch to 4-inch, and in length from 18-inches to 4-6 feet.
- Two-thirds of the cutting should be driven into the soil.
- Space cuttings 2 to 6-feet apart.
5. Planting

Prior to initiating planting efforts at Butters Canyon, attention should be given to planning the implementation. Key elements of this planting planning involve determining the plant types, acquisition strategy and timing, soil preparation, and establishing a watering regime. Planning ahead will lead to an efficient installation process and long lasting restoration results. Review and/or perform the following when planning a new planting project:

- Plant after the first rains of the season; which usually occur in the late fall or early winter.
- Review the Plant Community Plant Lists to select the appropriate plants for the project area. Select species if possible from the local watershed. Ensure that only native species are used to preserve genetic diversity; do not use hybrids, cultivars, or native species selections.
- Develop the plant order and initiate calls several months in advance to local, and if necessary, regional nurseries to determine availability and secure plant orders.
- Ensure nursery suppliers can support the implementation and accommodate the order in a timely manner. It can be beneficial to contract grow plants with a local nursery one-year in advance of the project initiation. Order plants to be delivered to a secure on-site or off-site location at least one week before the work is proposed.
- Prepare the site by removing all invasive plants and debris. Prepare the site soil by loosening the soil if necessary, and evening the slope and grade of the area to be planted. Where appropriate, and in all steep slope areas, install coir.
- If planting through coir cut openings and install the plants by excavating and loosening the planting pit two times the diameter of the plant container or root ball. Planting pit depth shall be only deep enough to accommodate the depth of the root ball so that the plant is planted at the depth it was planted in the nursery.
- Break up the root ball before planting.

- Create a low berm around the plant just outside of the root ball to hold water from rain and irrigation water. Soak the plant thoroughly while planting and when the installation is complete.
- Stake trees only if they need support. Trees are best grown without staking, allowing small diameter trunks to develop strength on their own. Trees are often staked simply to identify and protect the tree. When staking use one non-treated wood 2” x 2” stake, approximately 6-foot long. Drive the wooden stake into the soil a minimum of 2-feet and use Arbor Tape or other biodegradable tying tape to secure the tree to the stake. Secure the tape to the stake with a nail or screw, and to the tree with a generous loop to prevent constriction of the trunk as it grows.
- Plant spacing is determined by type and species. Avoid regular spacing for any planting installation. Start with triangular spacing as noted and then breakdown the spacing pattern by increasing and decreasing the spacing and creating irregular layout orientations.
- Hold larger shrubs and all trees well off the edge of the Butters Drive or Robinson Drive
- Plant container sizes will vary with nursery and type of plant (tree, shrub, forb). Smaller, deeper containers will provide young, loose, deep rooted plants that may adapt better to the native soil conditions at Butters Canyon.
6. Watering

Many restoration plantings can successfully establish by taking advantage of the usually predictable winter rainy season. If the rainy season is reasonable, and cuttings and container stock are planted early in the winter, new plantings have more of an opportunity to establish root systems that allow them to survive the spring/summer/fall dry season; however, unless the season’s rains extend late into the spring, relying on a single winter establishment period will likely result in significant plant mortality. Adding supplemental watering at key intervals through the dry season will not only increase plant survival but also plant health and long-term vigor.

- Water three times a month from April to September for at least the first two years after planting. Water more frequently during the first year and in drought or unusually hot conditions.
- At the point when drying soil begins to stress plantings, supplemental watering should be applied. This can be as early as February or as late as May.
- For new container plantings and cuttings, supplemental water will greatly increase plant viability.

Establishing On-site Water Sources
Collecting or storing water on-site in large scale containers can be a feasible and helpful method for more extensive restoration projects.

- Water storage can be from rain and/or creek flows. Storage can be accomplished in below ground or above ground tanks or either plastic, concrete, or wood.
- Storage units can also be filled by trucks.
- On-site storage facilitates a consistent source of water that is readily available.
- Requires capital costs and built structure on-site.
- Maintenance can become an issue in the long-term.

Transporting Water to the Site
Transporting water to the site to support restoration efforts can serve small and large scale projects.

- For small restoration areas transport can be accomplished with small containers transported in vehicles.
- Willing neighboring residential water can be brought to the site with multiple hose extensions.
- Commercial watering trucks.
7. Pruning / Tree Felling
Pruning and tree felling are key techniques required for restoration. A brief discussion of some of the important considerations will be included; however, for a more comprehensive discussion, review references to other documents. For information on when and why to prune see the Long-term Restoration Vision and Activities chapter (p. 21).

Pruning:
- Pruning involves the careful removal of no more than 25% of the large and small branches from any one tree and large shrub.
- Prune for structure being sure to keep the overall canopy shape while reducing the overall density of branches.
- Pruning must be done with proper equipment, loppers and pruning saws in well sharpened condition.
- Remove small branches from the site for fire safety.

Tree Felling:
- Tree felling of small trees up to 12-inches in diameter and 15 or 20-feet in height can be accomplished by careful, experienced volunteers using proper equipment and taking appropriate safety measures.
- These smaller trees can either be felled using a pruning saw or a small chain saw.
- Larger trees, or any tree posing a safety hazard, however small, should be felled by licensed professional arborists and foresters.

8. Deer Protection
Deer are common on-site and they are heavily browsing the existing restoration plantings. Newly planted restoration plantings are particularly vulnerable and should be protected. The two general strategies are described below.

Enclosing an entire restoration area: This strategy is recommended when an area is densely planted with many young new plants.

- Polygrid fencing is a durable solution that can be reused should enclosures be moved after plant establishment. Posts can be as light as 10-foot lengths of 5/8-inch rebar, driven by hand in moist soil to hold 7-foot exposed. Polygrid fencing to a height of 7-foot is then secured with snap ties. Rebar posts can be spaced every 7 to 10-feet.
- Ensure large enclosures do not completely cut off deer migration routes through the site, and monitor fencing especially in the drier months for signs of wear or attempted access. If deer can easily walk around the enclosure they are less likely to try to go through.
- At one or more locations provide removable clips to allow access into the fenced area for maintenance and watering.

Plant Cages: If only a few plants need to be protected, individual cages can be created.

- Chicken wire cages can be created by circling chicken wire around three 4-foot long, 5/8-inch diameter rebar posts stuck in the ground. The posts can be set 3-feet above ground.
- The chicken wire can be bought it a local hardware store as a 4-foot roll.

General Notes:
- Combining large enclosures with some individual plant cages has been a successful compromise to large-scale fenced enclosures.
- Determining the length of time deer fencing should be kept in place can only be determined on a case-by-case basis; typically 3-5 years is required.
- Alternative measures using natural and synthetic substances are generally agreed not to be effective.
9. Fire Abatement
Managing Butters Canyon for fire abatement can result in both fire hazard management and habitat diversity. The general goal is to reduce fuel loads in the canopy of fire hazard trees and on the ground. Four potential steps to take in Butters Canyon are:

1. Remove the site’s invasive, fire hazard tree species such as Eucalyptus, Acacia, and Monterey Pine.
2. Remove downed, dry woody debris on the ground.
3. Remove invasive species completely or at least cut invasive vegetation including non-native grasses to a 4-inch height. Take particular care to cut grasses and weedy species off Robinson Drive were Acacia trees are slated for removal.
4. Selectively prune low lying and collapsing bay branches that pose a fire fuels threat. Ensure that the integrity and form of the individual bay trees is not compromised and that pruning supports the goals of a sustainable and diverse California Bay Forest.

When in doubt about fire abatement measures, err on the side of less impact and consult with a restoration professional. Look at the City of Oakland’s Creekside Living page at http://www.oaklandpw.com/Page157.aspx for recommendations. One current resource on this site is the City of Oakland’s Environmentally Sensitive Vegetation Management Do’s and Don’ts.

10. Trash Removal
Debris is both an aesthetic and functional concern at Butters Canyon. Volunteers are doing an excellent job of caring for the canyon, policing the site and removing litter and debris. It has been proven on other sites that continued vigilance on litter removal will lead to a reduction of litter and dumping.

Debris and Litter can either be mixed and thrown away as consolidated solid waste or sorted to accommodate recycling. Debris can be removed in trucks or placed in rented roll-off dumpsters. The Alameda County Transfer Station at 2615 Davis Street in San Leandro is the closest station for dropping off debris. Construction and general debris is $100/ton and green waste is $22/cubic yard. Green and general waste loads must be delivered in separate trucks. The Oakland Department of Public Works Agency can provide locations for electronic, toxic, or other specialty waste materials disposal.

When handling green waste generated from invasive plant removals care must be taken not to allow any of this debris to return to the site or any other site, however disturbed. All leaves, stems, roots, seeds must be carefully removed, temporarily stored on-site and then carefully transported to the County Transfer Station. Use plastic bags, tarps, or closed containers to hold all invasive species debris.

For illegal dumping within the right of way of public roadways, the procedure is to call the City of Oakland Public Works hotline at 510.615.5566. Additional information on illegal dumping can be found at http://www.oaklandpw.com/Page108.aspx#leo.
RESOURCES

Restoration in the East Bay is supported by a wealth of publicly accessible resources. Support is available from the City of Oakland’s Public Works and Community & Economic Development Agencies as well as local non-profits working in restoration.

A key resource for restoration at Butters Canyon is the local advocacy group, Butters Canyon Land Trust. Their mission is to conserve wild landscapes in Butters Canyon and along Peralta Creek, to promote environmental awareness throughout the watershed, to preserve vital habitat for all Bay Area residents to enjoy. These dedicated volunteers secure available real estate for open space and restore and manage these properties for the community. There web site, noted at left, contains a deep list of associated organizations and links for restoration.

An associated group, the Friends of Sausal Creek, a nearby Oakland Hills creek, maintain a strong restoration advocacy and a native plant nursery to support other Oakland restoration efforts—contact: nursery@sausalcreek.org for information.

Other links for restoration work in the Bay Area include:
- City of Oakland Creek Protection Ordinance; oaklandpw.com/creeks
- Guide to San Francisco Bay Area Creeks, offered by the Oakland Museum, museumca.org/creeks/

In addition to non-profit and governmental organizations there are private restoration companies and firms that can be located through professional organizations such as the American Society of Landscape Architects, California Landscape Contractors Association, and the American Institute of Certified Planners.

Contacts
City of Oakland Watershed Improvement Program
Design Construction Services Department, CEDA
250 Frank Ogawa Plaza, #5301
Oakland, CA 94607
510.238.3961  oaklandpw.com

Butters Canyon Land Trust
3039 Burdeck Drive,
Oakland, CA 94602
jwolford@california.com

Urban Creeks Council
1250 Addison Street, #107,
Berkeley, CA 94702
510.540.6669  urbancreeks.org

Civicorps Schools
formerly East Bay Conservation Corps
1021 3rd Street,
Oakland, CA 94607
510.992.7800  ebcc-school.org

Friends of Sausal Creek
P.O. Box 2737
Oakland, CA 94602
510.501.3672  coordinator@sausalcreek.org
Sausal Creek Native Plant Nursery  nursery@sausalcreek.org

California Coastal Conservancy
1330 Broadway, 13th Floor
Oakland, CA 94612
510.286.1015  coastalconservancy.ca.gov
APPENDIX

1. Specifications for Contractor Restoration Project

2. Preliminary Estimate of Probable Construction Costs

3. Assessment Checklist and Work Plan/Diary Forms