

## Overview

Parcel 508-061-15, known as Chah-GAH-Cho, consists of 9.5 acres located to the west and south of the Mill Creek Market Place off of Central Avenue in McKinleyville, California. It is owned by the McKinleyville Land Trust (MLT), a non-profit group.

The McKinleyville Land Trust received a grant from the Coastal Conservancy in 1997 to develop a Habitat Restoration Plan for this site. The overall goal of the plan is to enhance habitat value while maintaining public access.

### **Brief site description:**

The property is bounded on the east by Central Avenue, on the north side by the Mill Creek Market Place and by land slated for future commercial development, on the west side by farmland (cattle are grazed), and on the south side by a private residence (forested area which is an extension of the Mill Creek corridor).

Over eighty-five percent of the acreage was in pasture prior to the construction of the Mill Creek Market Place in 1994-95 and the majority of the site currently remains in open field. Red Alder (*Alnus rubra*), California Blackberry (*Rubus ursinus*), and seedling Douglas fir (*Pseudotsuga menziesii*) are rapidly moving into the open grassland in the southern region of the site bordering the forest. Himalaya Berry (*Rubus discolor*), an aggressively invasive exotic species, and dog-hair stands of Red Alder (native) are established and spreading, most notably in the southeast quarter of the site where extensive ground disturbance occurred during the construction of the shopping plaza.

Along the southern side of the parcel, second growth Sitka Spruce (*Picea sitchensis*) forest extends south off site into the Mill Creek riparian area across Turner Road. Directly behind the Salvation Army Store in the Mill Creek Market Place, a small spring fed wetland is located in the southeast corner of Chah-GAH-Cho. This area contains wetland indicator species, though standing water has been observed only in the rainy months. A gully drains water south from the wetland carrying it to a drainage ditch which runs along the north side of Turner Road and eventually empties into Mill Creek. Himalaya Berry has encroached onto the slope ascending into the wetland where a semi-open canopy allows light to penetrate. English Ivy (*Hedera helix*), another invasive exotic species, has largely covered the forest floor and climbed the trunks of trees, most notably bordering the periphery of the forested wetland in the southeastern section of Chah-GAH-Cho.

## Habitat Restoration Plan, Summary of Proposed Actions

### 1) Invasive Exotic Plant Removal/Control

The following invasive exotic species which are known to become serious problems in wildlands have been identified on the site, and are targeted for removal: English Ivy, Himalaya Blackberry, Contoeaster (*Cotoneaster pannosa* and *Cotoneaster franchetii*), and Holly (*Ilex aquifolium*). Additional exotic species identified on site, with lesser tendencies to become invasive, will also be removed: Darwin Barberry (*Berberis darwinii*), Gum Tree (*Eucalyptus* sp.), Canada thistle (*Cirsium arvense*), Foxglove (*Digitalis purpuria*), and Crocosmia (*Crocosmia x Crocosmiiflora*). Invasive exotic species known to exist in proximity to the site will be removed should/if infestation occurs: Pampas Grass (*Cortaderia jubata*), Scotch Broom (*Cytisus scoparius*), and German Ivy (*Senecio mikanioides*). Removal will primarily be accomplished mechanically or with hand tools. Herbicides will probably not be utilized. It is recommended that the site be monitored quarterly for the presence of invasive species.

### 2) Extend the Sitka Spruce forest northward from the Mill Creek riparian area – increasing the forested buffer of the Mill Creek corridor.

Revegetation/reforestation of approximately ½ of the pastureland with native species found in the Sitka Spruce forest along the southern portion of the site, to include: Sitka Spruce (*Picea sitchensis*), Douglas fir (*Pseudotsuga menzesii*), Grand Fir (*Abies concolor*), Red Alder (*Alnus rubra*), and Willow (*Salix* sp.). Reforestation will occur by a) naturally occurring succession, or b) concerted effort to plant tree seedlings and over time reintroduce native understory shrubs/forbs.

### 3) Maintain a section of the parcel in “open” grassland on the western side of the site in order to preserve the scenic vista which now affords citizens of McKinleyville with a premier view of the Mad River bottom lands, Humboldt Bay, and the Pacific Ocean.

Two alternatives are proposed for retaining the open prairie: a) a regime of seasonal mowing, or b) conducting periodic controlled burns in conjunction with local CDF. It is proposed that plots of native coastal prairie grasses/forbs be introduced in the section of open grassland which is currently comprised almost entirely of exotic species.

### 4) Create a series of loop trails accommodating public access and enjoyment.

Entering the site from the parking area on the west side of Kmart an entrance sign is proposed to be placed. The following trail configuration is recommended as “phase

1" (phase 2 trails should be designed after habitat restoration activities are completed). Create nested loop paths heading west skirting the edge of the proposed open prairie area or passing through the newly reforested region (see color map). A smaller nested loop trail circling the knoll (mid-site). A spur path forking from the larger loop trail a short distance from entry. Several benches may be placed strategically along the knoll loop and the prairie loop pathways for enjoying the scenery. No direct access to the small wetland or forested area proximal to the private residence due south of the site are currently recommended for phase 1. If monies are not available for hardened surface trails, they could simply be mown initially. However, should funding be obtained, a hardened surface (on the prairie loop path) is most durable and friendly to all age groups along with providing access to the physically handicapped. Trails should be constructed and maintained utilizing a combination of manual labor and small equipment as needed.

**5) Provide opportunities for community involvement in the restoration effort.**

A hands-on approach to caring for this site will be encouraged. Local families, individuals, school groups, scout troops, etc. will be invited to participate in the restoration of habitat at Chah-GAH-Cho. By actively involving citizen volunteers in the restoration process (for example, caring for newly planted plots, removing exotic plants, trail building) it is hoped that the community will cultivate a sense of ownership and concern for Chah-GAH-Cho.

**6) Incorporate art as a means to mark significance and meaning the restoration of Chah-GAH-Cho.**

Painters, photographers, poets, etc. may be invited to work in conjunction with the McKinleyville Land Trust, local schools, and community members to focus their talents on Chah-GAH-Cho. Events and projects could be designed to commemorate, signify, and explore the community's relationship to natural areas/landscapes. We will also invite local artists (including students) to use Chah-GAH-Cho as a subject place for their work.

**7) Allow collection of plant species by local Native Americans for basket-making.**

Select portions of Hazel, Sitka Spruce, Woodwardia ferns, Red Alder, Scouring rush, Buck brush, Oregon grape, California wax myrtle, and Maidenhair ferns are used by Wiyot and Yurok basket and hat weavers. It is proposed that local Native American basket and hat makers be permitted (i.e. issued a permit) to collect these native plants, once established within a self-sustaining plant community, at Chah-GAH-

Cho. This activity will be considered appropriate only when it is consistent with both the habitat restoration and long-term management goals of Chah-GAH-Cho.

## Existing Site Conditions (reference accompanying map)

- 1 Central Avenue forms the 'spine' of the McKinleyville commercial district. Traffic can be heavy and increasing congestion along with increased noise can be expected.
- 2 Mill Creek Marketplace is a hub of activity. Noise and ambient light, are de facto long-term neighbors for Chah-GAH-Cho. While Chah-GAH-Cho is 'linked' to the Mill Creek corridor riparian flora and fauna, the fact remains that it lies directly adjacent to development.
- 3 Reasonably level points of entry (which avoid steep cut banks) are limited. The least congested area for visitor parking, and the most aesthetically appealing entrance to the site is located to the rear of the Kmart.
- 4 The western half of the site is far less impacted by the presence of traffic and commercial activity. Of particular note, the open 'old field' which gently slopes to the west affords a spectacular panoramic view of the lower McKinleyville terrace, the Mad River floodplain, the Lanphere-Christensen dunes and the ocean beyond. For someone walking westward out into the site the experience is miles away from the commercial hustle and bustle that exists but a stones throw away. Preserving the existing view is one of the plan's goals. Simultaneously this will offer an opportunity to introduce native coastal prairie species to Chah-GAH-Cho.
- 5 Though much of McKinleyville is fast losing the character of its 'rural' heritage, on the tract of land bordering Chah-GAH-Cho to the west, cattle still graze. As long as grazing continues, the view to the ocean will be unobstructed. It is important to note that past and present human intervention secured this open vista. Should the owner of this tract no longer promote intervention, the forest will return. This would effectively remove the spectacular view from the Chah-GAH-Cho site.
- 6 A recently built housing development to the northwest is typical of the development pattern that has occurred in McKinleyville in the last decade, where old farms are subdivided. Even though Chah-GAH-Cho lies shoulder to shoulder with the burgeoning pressures of an increasing population, it retains the capacity to provide a

place where citizens will be able to experience a sense of “the country”.

- 7 Directly behind Kmart, zoned commercial, plans are underway to develop the remaining tract of open old field to the north of Chah-GAH-Cho. Two sides of the Chah-GAH-Cho land lie adjacent to commercial development. This fact, in part, will dictate the way in which habitat restoration is planned. While reforestation will provide habitat, it will also provide a buffer.
- 8 Along the entire southwestern border of Chah-GAH-Cho, on an adjacent privately owned parcel, a mature second growth forest is ‘part of the scene’. Trails snake off into the forest and the remains of abandoned make-shift camp sites suggest this wooded area provides transient shelter. Seedlings from this forest are rapidly moving north into Chah-GAH-Cho’s old field.
- 9 A private residence is located close to the southern border of Chah-GAH-Cho. Maintaining privacy for this owner will be important. Once the Chah-GAH-Cho restoration is underway, and public visitation actively encouraged with the construction of footpaths, Clearly, much of the existing character of Chah-GAH-Cho is derived from the proximity of the mature second growth forest on this resident’s land.
- 10 Centrally located, close to the highest point of land on Chah-GAH-Cho, a remnant stand of Sitka Spruce grows on the ‘knoll’. From this site one can obtain a particularly stunning view to the west. It offers the only sheltered vantage point in the old field and provides a buffer from the Mill Creek Marketplace. Impenetrable thickets of native Blackberry currently claim the knoll and are fast spreading into the old field.
- 11 South of the Salvation Army Store a spring drains into a series of catchment basins, then into a gully, and eventually into Mill Creek via Turner Road. These early impoundments may have provided water for livestock. This is the only area of Chah-GAH-Cho which provides wetland habitat. The site is fragile with steep eroding banks. An overgrown trail leads one to the lower impoundment where winter rains create a small pond. Himalaya Berry and English ivy, two invasive exotics, are present in this region. The

ivy is already a serious threat to the native ground cover. The proximity of Central Avenue traffic noise is a detraction.

- 12 Mill Creek Falls is located on private land across Turner Road south of Chah-GAH-Cho. The wooded region along Chah-GAH-Cho's southern border is tied to the greater Mill Creek corridor, providing a rich extended habitat connecting the hills above the McKinleyville terrace to the west and the Mad River flood plain.

## Existing Vegetation Communities

The 9.5 acre site comprising Chah-GAH-Cho lies on the central McKinleyville terrace just north of the Mill Creek corridor, Mill Creek Falls, and Turner Road. All but a small portion of the site consists of open grassland, however the forest in the Mill Creek corridor and Berry species are rapidly sending pioneers northward with species of Sitka Spruce, Douglas-Fir, and Red Alder moving into the southern margins of Chah-GAH-Cho. The site is composed of basically two vegetation communities: forest and open grassland.

According to Chad Roberts<sup>1</sup> :

“The Mill Creek corridor retains much of its naturally occurring vegetation. The primary plant association present in the corridor is a mixed coniferous/deciduous forest. The dominant tree species in this forest are Sitka Spruce, Red Alder, and western redcedar. Grand Fir, shore pine and big leaf maple (*Acer macrophyllum*) are “minor” species. A sub-canopy layer of shorter stature tree species occurring throughout the corridor includes considerable arroyo willow (*Salix lasiolepis*), pacific wax myrtle (*Myrica californica*), cascara (*Rhamnus purshiana*), and red elder (*Sambucus racemosa*). The woody shrub layer is dominated overall by salmonberry, although “prairies” tend to have abundant California Blackberry (*Rubus ursinus*), which is common in the ground cover throughout the central terrace.

The forest is not uniform throughout. Drier or more upland parts of the forest, such as that west of Central Avenue, include abundant salal, sword fern (*Polystichum munitum*), and California huckleberry in the shrub layer. In the uplands west of Central Avenue, Douglas-Fir is a common canopy tree.”

He notes that:

“Slough sedge is the dominant ground cover in wet areas and that abundant bracken fern, skunk cabbage, soft rush (*Juncus effusus*), and water parsley (*Oenanthe sarmentosa*) are also common in the herbaceous vegetation layer in scattered forested wetlands. The “prairie” sub-association is really a phase in the successional development of the coastal forest association.”

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<sup>1</sup> R. Chad Roberts. “Hydrology and Ecology in the Mill Creek Corridor, McKinleyville, California”. Mar. 1995. p. 22. Referencing Franklin and Dyrness, Natural Vegetation of Oregon and Washington, 1973.



## Second Growth Forest

The majority of the forested area lying within Chah-GAH-Cho's boundaries is found in the southeast corner of the site between Central Avenue, the Mill Creek Marketplace, Turner Road and a private landowner (to the south/southwest). It is observed that this area consists of relatively young forest which appears to have encroached on grassland as recently as 50 to 70 years ago. Patches of grassland species such as Orchard grass (*Dactylis glomerata*) can still be found in openings within this forest.

From the southeastern fenceline northwards there exists a gradation of older canopy dominant trees to younger sub-canopy trees. The encroachment has more or less followed the spring-fed gully northward where there is a zone of older alder trees around the spring (south of the Salvation Army Store) with a slightly more diverse understory. The terrain adjacent to the spring shows evidence of earlier impoundment and may have provided water for livestock.<sup>2</sup> These observations are consistent with historical records which indicate that this site was part of a larger forty acre tract which supported livestock, an orchard, and sustained limited cultivation since the mid-1850's. Between 1942 and 1990 the forty acre parcel was rented out to various families who had some livestock, but were not 'farmers' in the general sense of the word.<sup>3</sup>

In the rainy winter months as the water table rises, water collects in the three descending catchment basins before spilling into a branch/gully and on down into a broad wetland south of the site towards Mill Creek. In the dry summer months even the upper basin at the seep/spring retains little water. Vegetation near the spring is characterized by typical wetland indicator species such as Skunk cabbage (*Lysichitum americanum*), Rush (*Juncus sp.*), Water parsley (*Oenanthe sarmentosa*), Common horsetail (*Equisetum arvense*), and *Scripus microcarpus(?)*<sup>4</sup>. The banks are crowded with ferns, Lady fern (*Athyrium felix-femina*), Deer fern (*Blechnum spicant*), and Sword fern (*Polystichum munitum*) as the basins and gully descend deeper into the shade of the forest canopy to the south.

The forest canopy consists of Douglas-Fir, Red Alder, Sitka Spruce, Grand Fir, Cascara (*Rhamnus purshianus*), Willow (*Salix sp.*) near the wetland area, and one Eucalyptus tree. The dominant shrub species in this young forest are SalmonBerry (*Rubus spectabilis*) and ThimbleBerry (*Rubus parviflorus*). Dominant herbaceous flora include California Blackberry, Lady fern, Deer fern, Sword fern, and the aggressive invasive exotic English ivy (which has already become a problem). In the springtime False Lily of the

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<sup>2</sup> A descending series of what appear to be three catchment basins steps down the steep slope to a gully which drains to the south--towards Mill Creek. Leonel Arguello, project botanist, has surmized that these impoundments could have been created for watering livestock.

<sup>3</sup> Susie Van Kirk, "A Cultural View of Dje'gedjoho", Sept. 1998, p.3.

<sup>4</sup> According to Leonel Arguello the identity of this plant is inconclusive.

Valley (*Maianthemum dilatatum*) and, Self heal (*Prunella vulgaris*) are dominant under a portion of the coniferous canopy.

### **Grassland/Old Field**

Grassland predominates Chah-GAH-Cho. Grazed and mown until recently, this area consists of a mix of primarily non-native grasses and forbs, as well as scattered shrubs and trees, many of which are native and several of which are exotics. Although not analyzed statistically, the grassland unit can be split into the western and eastern halves, separated midway by an 'island' stand of young conifer trees.

To the east, directly south of the Mill Creek Marketplace and west of Central Avenue in an area that sustained major soil disturbance during construction of the shopping mall, 'dog-hair' stands of Red Alder saplings cover the cutbanks, densely populating areas where bare soil was exposed. In the eastern grassland the dominant herbaceous species include California Blackberry, Sweet vernal Grass (*Anthoxanthum odoratum*), Vetch (*Vicia hassei* and *Vicia hirsuta*), Ox-eye Daisy (*Leucanthemum vulgare*), Canada goldenrod (*Solidago canadensis ssp. elongata*), Self heal (*Prunella vulgaris ssp. vulgaris*), and Clover (*Trifolium sp.*). Shrubs in this area include Coyote Bush (*Baccharis pilularis var. consanguinea*) and Lupine (*Lupinus rivularis*). Along the southern margin, tree species encroaching into the open space include Sitka Spruce, Douglas-Fir, and Red Alder.

In the western two thirds of the site where grassland predominates, the common dominant herbaceous species include Sweet vernal grass, Sheep Sorrel (*Rumex acetosella*), English Plantain (*Plantago lanceolata*), Velvet Grass (*Holcus lanatus*), Stickwort (*Spergula arvensis*), and spreading thickets of California Blackberry. The common shrub is Coyote Bush. Encroaching northward from the forest to the south, Sitka Spruce, Douglas-Fir, Grand Fir, Red Alder, and Willow are colonizing the grassland.

### **Knoll/Remnant Stand**

Of note, in between the eastern and western grasslands, to the southwest of the parking area behind Kmart, there is a segment of uneven ground on a knoll with dips and depressions that has escaped mowing. This appears to be a remnant of a copse (perhaps a wood lot?) which shows up on early aerial photographs (1941, 1949), when it was much larger (Refer to Appendix ???) Today two large Sitka Spruce trees remain surrounded by younger pioneering Douglas-Fir and Sitka Spruce of varying ages. Several large Sitka Spruce stumps with diameters in excess of 2 feet can be found within the dense tangle of California Blackberry on the knoll.

Botanist Leonell Arguello noted that this small island stand has an understory unlike the second growth forested area located in the southeast of Chah-GAH-Cho which gives evidence of having been pastureland. Underneath the sparse canopy on the knoll

are species such as Evergreen Huckleberry (*Vaccinium ovatum*), Pink flowering current (*Ribes sanguineum*), Himalaya Blackberry, SalmonBerry, Coast Man-root (*Marah oreganus*), Foxglove (*Digitalis purpurea*), and dominant thickets of California Blackberry. The California Blackberry vines are extending from this foci in all directions. It would appear that the rapidly encroaching conifers and the spreading vines of California Blackberry will convert the remainder of the open grassland to forest if left unmanaged.

## **Chah-GAH-Cho Flora**

To date a Preliminary Vegetation List (see pages 12-14) of ninety-five plant species have been identified and should continue to be augmented over time.

Of the ninety-five plants identified, forty-five are native to this region, and forty-six are exotic species. The majority of the exotic plants on the site are found in the old field, which is composed almost entirely of plants of European origin with the exception of California Brome (*Bromus carinatus*). It was not clear whether one plant, *Rosa sp.* was a native or exotic, and it's origin is listed as 'unknown'.

Of the forty-six species which are non-native (exotic), seven species: Eucalyptus (*Eucalyptus sp.*), Cotoneaster, Holly, English Ivy, Himalaya Berry, and Foxglove are problematic in that they are capable of aggressively displacing native species given the right set of conditions. English Ivy has already become a problem in the southeastern forested segment of Chah-GAH-Cho. Himalaya Berry should be removed before it becomes entrenched in the semi-sunny region near the spring. Shade-tolerant Holly which 'suckers', and Cotoneaster also need to be removed. All three (Holly, Cotoneaster, and Himalaya Berry) produce fruit that is eaten and dispersed by birds. If immediate eradication by the roots is not possible, an effort should be made to cut back fruit bearing limbs/branches. The single Eucalyptus tree, which prefers sunnier conditions, should be removed. A key component of the habitat restoration effort at Chah-GAH-Cho will be the concerted focus on removing invasive exotic species from the site.

# Chah-GAH-Cho

## Preliminary Vegetation Species List <sup>5</sup> June 1998

### Trees

<i>Abies concolor</i>	Grand Fir
<i>Alnus rubra</i>	Red Alder
<i>Eucalyptus sp.</i>	Gum Tree*
<i>Picea sitchensis</i>	Sitka Spruce
<i>Pseudotsuga mensiezii</i>	Douglas-Fir
<i>Rhamnus purshianus</i>	Cascara
<i>Salix sp.</i>	Willow

### Shrubs

<i>Baccharis pilularis var. consanguinea</i>	Coyote Bush
<i>Berberis darwinii</i>	Darwin Barberry
<i>Ceanothus thrysiflorus</i>	Blue Blossom
<i>Corylus cornuta var. californica</i>	Hazelnut
<i>Cotoneaster franchetii</i>	Cotoneaster*
<i>Cotoneaster pannosa</i>	Cotoneaster*
<i>Galtheria shallon</i>	Salal
<i>Ilex aquifolium</i>	Holly*
<i>Lonicera involucrata</i>	Twinberry
<i>Myrica californica</i>	Pacific Waxmyrtle
<i>Ribes sanguineum</i>	Pink flowering Currant
<i>Rosa sp.</i>	Rose***
<i>Rubus parviflorus</i>	Thimbleberry
<i>Rubus spectabilis</i>	Salmonberry
<i>Sambucus racemosa</i>	Elderberry
<i>Vaccinium parvifolium</i>	Deciduous Huckleberry
<i>Vaccinium ovatum</i>	Evergreen Huckleberry

### Ferns and Fern Allies

<i>Athyrium felix-femina</i>	Lady Fern
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<sup>5</sup> Introduced species are noted by an asterisk\*. Invasive exotic species are noted by a double asterisk\*\*. Unknown origin is indicated by three asterisks\*\*\*

*Blechnum spicant*  
*Equisetum arvense*  
*Polystichum munitum*  
*Pteridium aquilinum var. pubescens*

Deer Fern  
Common Horsetail  
Sword Fern  
Bracken Fern

## Forbs

*Bellis perennis*  
*Brassica napus*  
*Cerastium arvense*  
*Cirsium arvense*  
*Claytonia perfoliata*  
*Conium maculatum*  
*Crocoshmia x crocosmiiiflora*  
*Daucus carota*  
*Digitalis purpurea*  
*Disporum smithii*  
*Epilobium angustifolium*  
*Erechtites minima*  
*Erodium cicutarium*  
*Fragaria chiloensis*  
*Galium aparine*  
*Geranium dissectum*  
*Hedera helix*  
*Hypericum perforatum*  
*Hypochoeris radicata*  
*Iris douglasiana*  
*Juncus sp.*  
*Leontodon taraxacoides*  
*Leucanthemum vulgare*  
*Linum bienne*  
*Lotus corniculatus*  
*Lupinus rivularis*  
*Maianthemum dilatatum*  
*Marah oreganus*  
*Narcissus sp.*  
*Lysichiton americanum*  
*Oenanthe sarmentosa*  
*Plantago lanceolata*  
*Plantago maritima*  
*Prunella vulgaris ssp. vulgaris*  
*Ranunculus repens*  
*Raphanus sativa*

English Daisy \*  
Turnip/Field Mustard\*  
Field Chickweed  
Canada Thistle\*  
Miner's Lettuce  
Poison Hemlock  
Crocoshmia\*  
Queen Anne's Lace\*  
Foxglove\*\*  
Disporum  
Fireweed  
Australian Fireweed\*  
Storksbill/Filaree\*  
Beach Strawberry  
Goose Grass  
Cranesbill\*  
English Ivy\*\*  
St. John's Wort\*  
Hairy Cat's Ear\*  
Douglas' Iris  
Rush  
Hawkbite\*  
Ox-eye Daisy\*  
Flax\*  
Birdsfoot Trefoil\*  
Lupine  
False Lily of the Valley  
Coast Man-root  
Daffodil\*  
Skunk Cabbage  
Water Parsely  
English Plantain\*  
Coast Plantain  
Self heal\*  
Buttercup\*  
Wild Radish\*

<i>Rubus ursinus</i>	California Blackberry
<i>Rubus discolor</i>	Himalaya Berry**
<i>Rumex crispus</i>	Curly Dock*
<i>Rumex acetosella</i>	Sheep Sorrel*
<i>Scirpus microcarpus</i>	Sedge
<i>Scrophularia californica</i>	California Figwort
<i>Solidago canadensis ssp. elongata</i>	Canada Goldenrod
<i>Sonchus oleraceus</i>	Common sow Thistle*
<i>Spergula arvensis</i>	Stickwort*
<i>Taxaxacum officinalis</i>	Dandelion*
<i>Trifolium dubium</i>	Shamrock/Little hop Clover*
<i>Trifolium repens</i>	White Clover*
<i>Trifolium pratense</i>	Red Clover*
<i>Trifolium subterraneum</i>	Subterraneum Clover*
<i>Trillium ovatum</i>	Western Trillium
<i>Vicia hassei</i>	Vetch
<i>Vicia hirsuta</i>	Vetch*
<i>Vicia sativa ssp. nigra</i>	Narrow leaved Vetch*
<i>Viola sempervirens</i>	Redwood Violet
<i>Whipplea modesta</i>	Modesty/Yerba de Selva

## Grasses

<i>Aira praecox</i>	Slender Hairgrass*
<i>Anthoxanthum odoratum</i>	Sweet vernal Grass*
<i>Bromus carinatus</i>	California Brome
<i>Dactylis glomerata</i>	Orchard Grass*
<i>Festuca arundinacea</i>	Tall Fescue*
<i>Holcus lanatus</i>	Velvet Grass*
<i>Lolium multiflorum</i>	Italian Ryegrass*
<i>Poa bulbosa</i>	Bulbous Bluegrass*
<i>Poa pratense</i>	Kentucky Bluegrass*
<i>Vulpia bromoides</i>	Vulpia*
<i>Vulpia megalura</i>	Vulpia*

## Invasive Exotic Plant Management Plan

### What is an exotic species?

An exotic species of plant is one which occurs in a given place but whose origins are from another part of the world. Human actions--direct or indirect, deliberate or accidental--are largely responsible for exotic plant dispersal to a new site. The term exotic is used synonymously with alien, non-native, and introduced. California's mild Mediterranean climate presents a favorable set of growing conditions for a great diversity of non-native plants from temperate climates around the world. It should come as no surprise that many exotic plants from Asia, Africa, Central and South America, and Europe have taken hold in California.

The first non-native plants were brought into California during the Mission Period (1769-1824) when the first European colonists (Spanish) introduced their domestic animals and various 'useful' plants from their homelands. Later, during the course of the Mexican occupation, followed by American pioneer settlement, many more exotic species of plants found their way into native California landscapes. "By 1900 about one hundred and twenty exotic plants were 'established' in the state." <sup>6</sup> At present at least 1,045 exotic species have become 'naturalized' (i.e. have self-replacing populations) in California<sup>7</sup>.

### Why target selected exotic plants for removal?

An important precept of conservation biology focuses on maintaining functioning ecosystems, with viable populations of all species within a given indigenous community.<sup>8</sup> Because a number of exotic plants alter natural habitats such that they impair the natural function of many native plant communities, many exotics have proven to be ecologically harmful. From an ecological perspective, certain exotic plants (invasive exotics) behave like weeds. The concept of a weed is, in fact, very anthropocentric. We say a plant behaves like a weed when it exhibits a pattern of rank growth that tends to choke out more 'desirable' plants (i.e. plants humans deem of value or use). There are also native species (indigenous to natural habitats on the northern coast of California) which exhibit aggressive opportunistic weed-like behavior

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<sup>6</sup> Elizabeth McClintock, "Escaped Exotic Weeds in California," *Fremontonia*, (Jan., 1985)

<sup>7</sup> John M. Randall, Marcel Rejmanek, and John C. Carter, "Characteristics of the Exotic Flora of California," *Fremontonia*, (Oct., 1998)

<sup>8</sup> Chad R. Roberts, *Hydrology and Ecology in the Mill Creek Corridor, McKinleyville, California*, (1995), p. C-6.

when presented with disturbed soil conditions whether manmade or natural. Natural events such as lightning-induced fires, flooding, earthquakes, erosion, even a tree falling create a disturbance which may provide habitat for invasive exotics. "In terms of an ecological classification, most of our native weed-like species are early successional or 'pioneer species'. Disturbed conditions are characteristic of pioneer species."<sup>9</sup> The ubiquitous native Red Alder, California Blackberry, and Western Coltsfoot are common examples. Far outranking naturally caused disturbance, human activity is the most prevalent cause of habitat disturbance worldwide. McKinleyville is no exception. Logging, agriculture, grazing, and recent urbanization have produced conditions which favor species which require, or at least are tolerant of, frequent disturbance and the ecological conditions present in early successional stages. Disturbance occurs whenever the composition or structure of a habitat is disrupted. Degrees of disturbance vary. Human settlement frequently involves changes in the water table, microclimactic conditions, ambient light levels (from deep shade to bright sun or visa versa), bare soil exposure and/or soil compaction on a large scale. Disturbance always brings in a sudden flush of opportunistic pioneer species. When disturbance (natural or manmade) is coupled with the introduction of opportunistic invasive exotic plant species, natural patterns of succession may no longer be able to compete with the aggressive new-comers.

"Many exotic species have become naturalized in native plant communities, and function as native species without obviously altering ecosystem functions."<sup>10</sup> Most of these plants do not present a major threat to indigenous plant populations. This plan will target those species for eradication that have previously demonstrated disruptive species-level, community level, or ecosystem level effects in the coastal regions of Northern California. It is important to note that while the future goal of restoration efforts at Chah-GAH-Cho are directed towards reestablishing native habitat to the degree that it is reasonably feasible, the entire site has suffered profound disturbance. Though the 9.5 acres which comprise Chah-GAH-Cho have escaped development, the site is located immediately adjacent to the urban fabric of the central McKinleyville business district. It is true that remnants of the Sitka Spruce forest association that existed prior to Euro-American settlement are found in the southernmost section of the site which extends northward from the forested Mill Creek corridor, but this habitat has been seriously compromised.

Based on the California Exotic Pest Plant Council (CalEPPC) list : "Exotic Pest Plants of Greatest Concern in California, August 1996" and the North Coast Chapter, California Native Plant Society's "Dirty Dozen - Invasive Exotic Plants on the North Coast"<sup>11</sup> , the

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<sup>9</sup> Joe R. McBride, "Natives That Behave Like Weeds", *Fremontia*, (Jan., 1985)

<sup>10</sup> Exotic Plant Management Plan and Environmental Assessment for Redwood National Park, DOI/NPS. Dec. 1994. p. 4.

<sup>11</sup> Reference Appendix I



following three species found on the site are considered of most concern: English Ivy, Cotoneaster, and Himalaya Blackberry. They are categorized among the “most invasive wildland pest plants” (List A-1, CalEPPC). These three “most invasive” species have taken foothold in the southeast portion of the Chah-GAH-Cho site, with the most noticeable impact by English Ivy which is now seriously displacing native forest floor groundcovers and choking trees in the forest canopy. These three species will be targeted for removal where feasible or control on an ongoing basis.

The California Exotic Pest Plant Council has also listed plants they are watching closely that exhibit tendencies to become invasive and for which more information is needed. Three species identified growing at Chah-GAH-Cho are included in this list: English Holly, Foxglove, and Ox-eye Daisy. Effort should be made to target these species for removal, or at least control, particularly the English Holly as it is spreading in the forested area of Chah-GAH-Cho and, along with the English Ivy, appears to be displacing native species.

From the list of plant species which CalEPPC identifies as “considered for listing” but not listed at this time, one species, Wild Radish (*Raphanus sativus*) is growing at Chah-GAH-Cho. The MLT’s option should probably lean towards removing or controlling it since the restoration effort emphasizes native plants

### **Invasive Exotic Plant Management Program Objectives**

1. Maintain the Chah-GAH-Cho flora with periodic site investigations for the purpose of encouraging the flora to reflect those species growing within the boundaries of Chah-GAH-Cho. This should include notation as to whether a plant is native or exotic, and whether the California Native Plant Society or the California Exotic Pest Plant Council has targeted this exotic species as being potentially problematic to the preservation of wildlands. A botanist should be involved in this effort. It may be possible to arrange for this task to be accomplished by supervised *graduate students* or interested *volunteers* with the appropriate experience and/or credentials.
2. Conduct field surveys and prepare a distribution map of each ‘disruptive’ or ‘potentially disruptive’ exotic species identified (referencing current CNPS & CalEPPC data). Denote numbers (estimates), population centers, and spreading centers. This could be accomplished by a high school biology class under the field supervision of a teacher in coordination with a local botanist.
3. Set up and coordinate an on-going Program, enlisting local volunteer ‘labor’ (and enthusiasm), to participate in the control and removal of invasive exotic plants at Chah-GAH-Cho. For example, one way to accomplish this might be to incorporate an ‘adopt-a-plot’ strategy, whereby a family, a scout troop, a school class, 4-H club, garden club, local business, Rotary Club, Senior Center Activity Group etc. signs on to ‘caretake’ a

delineated segment/portion of Chah-GAH-Cho. This might include participating in organized “Invasive Exotic Plant Bashing Parties” which could be open to the community at large (scheduled and supervised). Adoption would also include a commitment to routinely visit “your (group’s) plot” to observe/record findings, pick up trash, and keep spread of targeted invasive exotic species in check. Such a program must include appropriate education with “hands-on” training for participants.

4 Increase public understanding of the threat of exotic plants to native habitats/communities using Chah-GAH-Cho as an example. It relates to the future of individual yards and gardens, neighborhoods, and public open spaces in the community of McKinleyville.

### **Control Techniques:**

#### **English Ivy CalEPPC A-1 List:**

A shade tolerant perennial vine native to Europe and Asia, English Ivy has escaped from garden cultivation (ornamental) and formed a thick groundcover in the forested area along the southern border of Chah-GAH-Cho. Robust vines now creep rapidly up trees into the canopy. Berries are produced annually and eaten by many birds. Ivy is dispersed as birds defecate the seed. Vines weigh down branches which can lead to branch/trunk breakage on smaller diameter woody stems. The dense shade created in the vine choked-canopy and the thick layer of vines creeping over the native groundcovers along the forest floor out-compete native species. Once established, English Ivy is difficult to eradicate, but control is feasible, if labor intensive. As above ground portions of the plant are removed, sprouts reappear rapidly from the roots and produce flowers within two years. Though broadleaf selective herbicides prove effective when applied locally in late spring, herbicides would only be used after very careful consideration by the McKinleyville Land Trust Board of Directors. Efforts to control/eradicate this tenacious invasive exotic should initially be limited to labor intensive mechanical means.

**Control:** Remove all above ground portions of the plant using hand tools to cut exposed stems. Climbing ivy must be severed and the vines pulled down off trees. Dig out exposed rooting stems to prevent sprouting. Tackle outlying ivy infestation first, and work towards densely populated centers of growth. The site must be monitored for a period of three years and all new growth removed immediately. Because even a tiny fragment can generate new growth, the debris must be carefully bagged and disposed of to prevent spread.

*Caution: English Ivy leaves and berries contain the toxin Hederin (a saponin glycoside) and hederagenin. In susceptible humans, handling can cause contact dermatitis, sometimes severe, with linear and vesicular lesions similar to those caused by Poison*

*Oak.*<sup>12</sup> *Gloves and protective clothing should be worn when handling this plant, and volunteers cautioned about the potential hazard.*

### **Cotoneaster CalePPC A-1 List:**

Cotoneaster is a large evergreen shrub pruned to resemble a small tree. It is native to southwest China. Cotoneaster has escaped garden cultivation and is now naturalized in many areas along the coast. Birds eat the red pulpy fruits which ripen in late autumn/early spring, and seed is dispersed widely. Cotoneaster prefers ample light and is commonly found thriving in open areas or along forest edges.

**Control:** Cut back all above ground growth to the ground with hand tools and remove roots. If roots are not dug up, Cotoneaster will sprout new growth. If it is not feasible to dig up the root system (because of size or location) new shoots should be removed monthly for one to two growing seasons or until the plant dies back. Continued quarterly monitoring of the Chah-GAH-Cho site for new seedlings root sprouts will be necessary since the very popular *Cotoneaster pannosus* is ubiquitous in northcoast gardens and seed dispersal should be expected. *A concerted effort to educate local nurseries, landscape gardeners, and the community at large as to the invasive nature of this garden favorite may be beneficial in raising public consciousness.*

### **Himalaya Blackberry CalePPC A-1 List:**

Contrary to its name, Himalaya Blackberry is not from Asia. It is native to Europe. It was introduced in 1890 for the benefit of its tasty berries. Birds and mammals find the berries as appealing as humans do and quickly disperse the seed into surrounding habitat. This domestic escapee forms dense impenetrable thickets along open fence lines, grasslands, and riparian areas. It can become completely dominant if left alone. The stiff unyielding canes grow between 20 and 30 feet in length and are fiercely armed with thorns. Mature plants develop massive root burls which are difficult to extricate, underscoring the advantage of prompt removal when new seedlings are discovered.

**Control:** First, the long canes must be cut back (using loppers/clippers or weed whacker) to the swollen root. This should be accomplished in spring when the plant is in flower. Then, the swollen root burl, and as many roots as possible, should be dug out to prevent sprouting. In well-established colonies of mature plants this is heavy work without large equipment, but it can be done. If time and enthusiastic labor are not sufficient to completely remove whole patches, tackle the 'outliers' first and work plant by plant into the denser center. It may take several seasons to completely remove the root burls of all mature plants. In the interim keep canes cut back on a regular

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<sup>12</sup> Thomas C. Fuller and Elizabeth McClintock, *Poisonous Plants of California*, (Berkeley, California, 1986) pp 80-81.

basis during the growing season. Once mature plants have been removed, a regular monitoring regime should ensure the early identification and speedy removal of all new seedlings. And there will be new seedlings cropping up as long as birds, mammals, and patches of Himalaya Blackberry are found on the Northcoast.

**English Holly CalEPPC Listed “Need More Information”:**

Native to southern and central Europe and the British Isles, with glossy deep green evergreen foliage and red berries, holly has long been a popular garden plant promoted by the nursery trade. It grows best in areas protected from sun with plenty of moisture, hence northcoast forest habitat has proved conducive to the naturalization of this species. Birds consume the berries and the seed is consequently dispersed. Holly roots and branches sucker freely and numerous young plants can be found growing in a halo around the parent tree. After an English Holly tree is cut down the root system will send up new growth indefinitely unless the roots are removed too. As a shade tolerant species, it competes very successfully with the indigenous forest species. The California Exotic Pest Plant Council is watching this plant closely and gathering more data. Holly grows in the southeastern half of the forested area at Chah-GAH-Cho. Though less threatening as an invasive exotic than CalEPPC A-1 species, this plant should be targeted for removal from the site.

**Control:**

Remove all above-ground portions. Dig out the root system to prevent new growth from sprouting. Tamp disturbed soil back into place and mulch with forest duff. Following a concerted effort to remove all visible traces of holly, a regular monitoring regime should ensure the early identification and speedy removal of all new seedlings or resprouting roots. *A concerted effort to educate local nurseries, landscape gardeners, and the community at large as to the invasive nature of this garden favorite may be beneficial in raising public consciousness.*

**Foxglove CalEPPC listed “Need More Information”:**

The tall striking purple stalk of Foxglove in bloom is a garden favorite. The nursery trade suggests planting Foxglove in full, partial, or light shade in rich moist soil, conditions which are prevalent along the northcoast. It is no surprise that this ‘freely self-sowing’ plant has naturalized. Foxglove is present along the southern portion of Chah-GAH-Cho along the forest’s edge. In deference to the goal of promoting native habitat, the existing small population of Foxglove can easily be removed before it spreads.

**Control:**

Pull plants out by hand ensuring that the roots are taken along with the foliage. Preferably this task should be accomplished prior to the time seed is setting. A quarterly monitoring regime should ensure the early identification and speedy removal of all new seedlings. *A concerted effort to educate local nurseries, landscape gardeners, and the community at large as to the invasive nature of this garden favorite may be beneficial in raising public consciousness.*

**Ox-eye Daisy CalEPPC listed “Need More Information”:**

The ‘common white daisy’ is ubiquitous in temperate climates in open meadows, pasturelands, and along roadsides. Grazing domestic stock carry a host of Eurasian forbs and grassland species wherever Euro-Americans and their livestock have settled. The ‘old field’ at Chah-GAH-Cho was, until recently, grazed since the mid-nineteenth century when the first settlers moved into the coastal terrace north of the Mad River. The ground cover in the old field at Chah-GAH-Cho is populated almost entirely with non-native Eurasian forbs and grasses associated with domestic livestock. While this plan will recommend methods for reintroducing native coastal prairie species into the western side of the site now part of the old field, complete eradication of non-natives in this area would be a monumental task. Since adjacent agricultural lands to the west are currently in pasture and seed dispersal will be impossible to contain, an effort may be made to control the spread of Ox-eye Daisy rather than complete removal.

**Control:**

A regime of seasonal mowing and/or prescribed burning to maintain the selected open area free of encroaching forest species, may also work to inhibit seed dispersal of the Ox-eye Daisy. No concerted effort to target existing daisy plants for removal is recommended at this time; however, regular monitoring should assess the need to reevaluate this determination.

Three other species, included in the CalEPPC A-1 List, are known to be growing in close proximity to the Chah-GAH-Cho site [Pampas Grass (*Cortaderia jubata*), German Ivy (*Senecio mikanooides*), and Scotch Broom<sup>13</sup> (*Cytisus scoparius*)]. In the event these species invade Chah-GAH-Cho at a future date, or were not identified in the initial flora, they will be targeted for removal.

**Pampas Grass CalEPPC A-1 List:**

A native to Argentina, Pampas Grass develops viable seed without pollination resulting in a tremendous output of millions of seeds per plant. This plant is an exceedingly

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<sup>13</sup> McKinleyville has large colonies of *Cytisus sp.* growing in the Central Avenue corridor near Dow’s Prairie. Whether this is Scotch Broom, Portugese Broom, or French Broom should be determined. All three species are listed in category A-1 of CALEPPC, and all three spread rapidly by seed which is viable for decades.

successful invader. The lightweight, wind dispersed seed of a single plant can result in rapid widespread infestation. Chah-GAH-Cho lies just to the south of a rapidly expanding colony of *Cortaderia* growing in the neighboring property to the north. This adjacent parcel is slated for development in the near future and though grading and construction are likely to destroy existing plants it must be presumed that extensive reseeding has occurred. No *Cortaderia* has been identified growing at Chah-GAH-Cho, but it must be assumed that seed has had an opportunity to reach the site. Quarterly monitoring should catch new starts which must be removed immediately before they have a chance to set seed.

**Control:**

Since no Pampas Grass was noted growing at Chah-GAH-Cho during the botanist's field inspections in the spring and early summer of 1998, routine inspections should identify most invaders before they reach mature size. New seedling plants can be simply pulled or dug out without too much difficulty. Removing mature plants is far more difficult. If a manual approach is taken, the large dense root masses must be dug out with pulaskis and shovels. Pampas grass is shade intolerant and once reforestation occurs, it should not be a problem in the forested areas. In the proposed open coastal prairie area on the western portion of Chah-GAH-Cho, a vigilant regime of monitoring coupled with an invasive exotic plant removal program will be necessary to keep infestation at bay. *A concerted effort to educate local nurseries, landscape gardeners, and county/city road maintenance crews<sup>14</sup> as to the invasive nature of this exotic species may be beneficial in raising public consciousness.*

**German Ivy CalePPC A-1 List:**

Introduced as a garden ornamental, German Ivy is a native to South Africa. It is a perennial vine with large glossy bright green leaves and showy yellow flowers. This species has the potential to become extremely disruptive because of its adaptability to both sun and shade conditions coupled with the fact that it is capable of rooting from every leaf node. It forms dense mats in the open sun and will climb over vegetation and up trees, smothering native species which cannot out-compete it. Of note, German Ivy does not spread via seed on the north coast. German Ivy has not been identified growing on the Chah-GAH-Cho site, but the potential for infestation exists as *Senecio mikanoides* is known to grow in the vicinity.

**Control:**

Manual removal of the entire plant and root system must be exceedingly thorough as it has the ability to root at all nodes. An attempt to remove all live material from the soil should be made even though the root systems extend quite deeply in to the soil. Because even a tiny fragment can generate

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<sup>14</sup> Bi-annual mowing in late spring and early winter prevents both flowering and seed dispersal.

new growth, the debris must be carefully bagged and disposed of to prevent spread. Monitoring, in this instance, should be stepped up to an investigation of sites where eradication efforts have occurred every two weeks post-removal until no trace of new growth is noted at which time strict surveillance would be replaced by the quarterly monitoring regime.

**Scotch Broom CalEPPC A-1 List, and  
French Broom CalEPPC A-1 List:**

Infestation of Scotch Broom and/or French Broom could pose a serious threat to the open lands at Chah-GAH-Cho. These species were introduced into California gardens as ornamentals in the later half of the nineteenth century. Once naturalized, they became widespread pests because of their ability to form dense, impenetrable thickets which eliminate any other vegetation. Both species seeds remain dormant and viable for decades. Colonies of Broom are extensive in the McKinleyville area and since seed can be dispersed by birds, transported via vehicle tires, or muddy shoes and tools, there are chances of infestation into the open field. At present neither species has been noted growing at Chah-GAH-Cho. Quarterly monitoring at Chah-GAH-Cho must include a vigilant lookout for possible Broom infestation even though at present neither Scotch or French Broom plants are known to be growing on the site.

**Control:**

Mechanical controls include pulling the plants out and prescribed burning. It is important to note that even if all plants are removed, buried seed in the soil could continue to pose a threat for years. Small plants can be pulled by hand (best accomplished when the ground is soft after rains). Larger plants will require more time and effort and the use of a weed wrench with the assistance of shovels and pulaskis. Any roots or woody stems left in the ground will resprout. Broom requires good light and is suppressed in shady conditions. Forested areas of the site will not provide optimum habitat for Broom. The portion of Chah-GAH-Cho which is to remain in grassland will continue to provide opportunity for Broom to move in, thus a quarterly monitoring regime to catch new starts will be necessary. Early removal of 'young' plants will be key to control should infestation occur in the future.

## Reforestation

### **Purpose:**

At present only a small area in the southeast corner of the site and a narrow band along the south central fenceline of the site provide forested habitat. The objective of a concerted reforestation program at Chah-GAH-Cho is to encourage the introduction of a mosaic of native species representative of the remnant Sitka Spruce forest found to the south of the site, ultimately for the purpose of enhancing diversity and increasing habitat values. The reforestation effort will increase the total area of forest canopy within Chah-GAH-Cho's boundaries while simultaneously creating a buffer of vegetation between Chah-GAH-Cho and the commercial and residential development which borders the site to the east and north.

### **Goal:**

Restoration efforts will assist and augment succession from old field to forest, moving northward into select segments of Chah-GAH-Cho and expanding the habitat values found in the existing biological community which parallels the Mill Creek corridor along the southern regions of the site. Ultimately it will provide a natural forest setting accessible to the citizens of the community, enabling visitors to the site the opportunity to both experience and enjoy the indigenous flora and fauna native to McKinleyville.

### **Proposal:**

This plan proposes three sub-regions within Chah-GAH-Cho where reforestation will be encouraged. For each of the three sub-regions, a distinct prescription for reforestation is recommended.

### **Existing Vegetation - Sub-Regions A, B, and C: (Reference 'Reforestation' map)**

**Sub-region 'A'** The first sub-region 'A' is located between Central Avenue on the east, the Mill Creek Market Place to the north, and the existing forested southeast corner of Chah-GAH-Cho. Hundreds of Red Alder, initially colonized this region following ground disturbance associated with the construction of the shopping center; most noticeable along the steep cutbacks. In addition to Red Alder, numerous Douglas fir saplings have since moved into sub-region 'A'.

**Sub-region 'B'** Sub-region 'B' is located west of sub-region 'A'. The western edge of sub-region 'B' lies along an imaginary line which runs between the southwestern corner of the blacktop parking area behind the Kmart Garden Center and the existing forest to the south. This area appears to have retained grassland from the farmstead and there is less evidence of profound earth disturbance or erosion. Colonization of Red Alder has progressed at a far slower pace in this sub-region



(compared to sub-region 'A') with unbroken sod grasses retaining some degree of competitive advantage, though berry bushes are rapidly colonizing the area. Young Douglas-Fir are beginning to colonize this grassland.

**Sub-region 'C'** Sub-region 'C' is located in the western half of the site (existing open grassland) and will eventually envelop the proposed 'prairie' sub-region in a broad sweeping deep arc, moving out from the existing southern forested area in a swath that includes the copse on the knoll, and expanding as it curves north and westward to the fence-line along Chah-GAH-Cho's western boundary. The majority of this grassland was not affected during the construction of the shopping center. The old-field was last mowed four or five years ago. Isolated specimens of Coyote bush and some Blue blossom sporadically dot the otherwise treeless segment of sub-region 'C'. Numerous young Douglas-Fir trees, and several Sitka Spruce seedlings are colonizing in the vicinity of the knoll (where two large Sitka Spruce trees stand in a dense native Blackberry thicket). Along the southern margin of sub-region 'C' tree species encroaching into the grassland include Sitka Spruce, Douglas-Fir, Grand Fir, Red Alder and Willow. Bracken fern and native Blackberry are thick in the southwest corner where they have moved northward into Chah-GAH-Cho from a square of old pasture land beyond the southwest boundary.

## **Forest Restoration Plan**

### **Sub-Region 'A'**

The revegetation of forest species in sub-region 'A' will be allowed to occur naturally with no additional planting of new tree seedlings. Red Alder trees already dominate sections of this sub-region where intense ground disturbance occurred and where top soil was removed or eroded. Over time the Red Alder, which naturally fix nitrogen, will serve to restore soil fertility. Douglas-Fir, a sun tolerant early colonizer prominent in the forested area due south of this region, is already sending pioneers into the area and will continue to do so. Leaf and needle litter will accumulate in the increased shade on the young forest floor which will gradually lower the pH of the soil (increased acidity) and add organic matter. Understory species of shrubs and forbs found in the forest to the south will eventually work their way north into this young forest as conditions move from sun to shade increasing the moisture regime. California Blackberry will likely increase as long as sunny conditions prevail. Thimbleberry and Salmonberry which enjoy a dappled sunlight will respond as the young alders mature. Evergreen Huckleberry and Salal will find the partially sunny conditions, increased soil moisture, and fertility suitable habitat. Eventually Sword fern, Red Huckleberry, Evergreen Huckleberry, Salal and other shade tolerant species will dominate the understory as the Douglas-Fir shade this area. The very wet soil conditions directly around the spring source may continue

to be more open and sun-dappled as they will favor Alder, Berry bushes, and the wetland ground covers.

**Two forms of intervention in Sub-region 'A' are recommended:**

1) The 'dog hair' stands of Red Alder should be thinned such that a select number of healthy individuals can reach maturity. Thin such that an irregular pattern of 'clumps and gaps' is created with the spacing between individual trees approximately 7 to 8 feet. Selectively retain tall robust individuals. Thinning might proceed over the course of several seasons, allowing for as much leaf canopy as possible to cast shade and accumulate leaf litter. Very young Alder seedlings can be removed by simply pulling the entire tree, root and all, out of the ground in the wet winter months. Thinning of larger saplings should be done by cutting the sapling trunk at or near the ground. This will retain the organic matter in place without further soil disturbance (avoid any unnecessary soil disturbance, because Himalaya Berry, and other weedy species are likely to colonize any disturbed areas).

It is important to note: An exception to this method of removal (cutting) should be considered if individuals from the 'dog hair' stands can be utilized in the other two sub-regions where reforestation is proposed. Phase one: If the 'dog hair' stands of Red Alder are to serve as sources for seedlings, the first phase of the 'thinning' process should be done coincident with wet soil conditions in January or February when the trees are dormant. Transplant young Alder saplings three to four feet high to sub-regions 'B' and 'C'. Again, because of the soil disturbance it will be important to firmly tamp down the disrupted area of soil as each sapling is removed and cover with leaf mulch. Phase two: thin the remaining 'dog-hair' stand as described above. Much depends on whether the MLT elects to pursue contracting work out or to work with volunteers. If funding is available, the work of procuring seed, growing starts, and planting trees could be accomplished by contract.

2) In addition to thinning Alder, intervention and assistance in establishing native forest vegetation in Sub-region 'A' should be in the form of a vigilant effort to keep invasive exotic species out of this area. (Refer to the section on Invasive Exotic Plant Management.) All Himalaya Berry roots should be dug out and the resulting area of soil disturbance tamped down firmly and mulched with forest duff. English Ivy which has become dominant in the understory of the forest to the south must not be allowed to expand into any new areas. A concerted war against Ivy in the woods to the south must be waged to contain it from spreading further.

Further Note: Native California Blackberry is present in this area. It can be expected to form dense thickets as long as the predominantly sunlit conditions persist. Eventually shade will curtail its growth. Because no formal trails are proposed for sub-region 'A', and because it may be wise to curtail human use which

has unfortunately brought a good deal of trash into the area, allowing native Blackberry to run its course should not be viewed as a problem.

### **Sub-Region 'B'**

Soils in this sub-region appear to have undergone less ground disturbance during the construction of the shopping center and suffered little erosion. Red Alder colonization, though present, does not present the dog hair' stands found in sub-region 'A' of Chah-GAH-Cho. Given the approximate structure and composition of the existing forested area along Chah-GAH-Cho's southern border, reforestation in sub-region 'B' will entail an initial planting of native trees to augment existing pioneer specimens of Douglas-Fir, Sitka Spruce and Red Alder which have already begun to reclaim the oldfield grasses along the southern edge of sub-region 'B'.

The following tree species are recommended for planting: Douglas-Fir (40%), Grand Fir (35%), Sitka Spruce (20%) and Cascara (5%). A sampling of native shrub species including California Wax myrtle, Hazel, Salmonberry, and Thimbleberry could also be planted. A plant ecologist should be consulted for advise on planting order, season, etc.

Following the initial planting of trees and shrubs, cumulative leaf litter and needle fall will increase organic content and soil moisture, and eventually lower the pH creating a more acidic soil. With the advent of shade and suitable soil conditions, those species of shrubs and forbs found in the forest understory to the south can be expected to eventually work their way north. Once the initial planting takes hold, except for the continued removal of invasive exotic species, natural processes will ultimately be allowed to determine the composition of sub-section 'B'.

### **Sub-Region 'C'**

Little if any of open grassland in the western segment of Chah-GAH-Cho was affected during the construction of the shopping center. The old field was last mowed four or five years ago. Isolated specimens of Coyote bush and Blue blossom sporadically dot the grassland. Numerous saplings of Douglas-Fir and some Sitka Spruce are colonizing sub-region 'C' in the vicinity of the knoll. Along the southern margin tree species encroaching into the grassland include Sitka Spruce, Douglas-Fir, Grand Fir, Red Alder, and Willow.

Prior to planting trees in sub-region 'C', a prescribed burn or mowing is recommended in this sub-region to remove fuels including tall grasses and forbs and dense thickets of California Blackberry (Reference Cyclic Prescribed Burning, p. 45).

Protecting young trees from fire/mowing on the site will encourage a more rapid forest development and should be done to the maximum extent feasible.

The mix of tree species recommended to be planted in sub-region 'C' are: Douglas-Fir (30%), Grand Fir (30%), Sitka Spruce (20%), Red Alder 15%, and Cascara (5%). A 'sampling' of native shrub species which tolerate both sun and shade including California Wax myrtle, Red Flowering Current, Hazel, Salmon Berry, Thimble Berry, Evergreen Huckleberry, and Salal could also be planted.

Following the establishment of the initial planting of trees and shrubs, the young forest will begin to mature to a point where shade is predominant and leaf litter, needle fall, and increased moisture have altered the existing soil conditions. At that point, starts of shade-loving shrubs and forbs can be introduced. This may take place in six to eight years (possibly sooner). Species such as Sword fern, Coast man-root, Deciduous Huckleberry, Evergreen Huckleberry, False Lily of the Valley, False Solomon's Seal, Salal, Western trillium, and Redwood violet are some of the species that could be planted once adequate shade cover and soil conditions are available.

Except for the continued removal of invasive exotic species, natural processes will ultimately determine the composition of the newly established forest in sub-section 'C'. Given the distance from the forest to the south, restoration of sub-section 'C' would benefit from the introduction of forest groundcover and understory species.

## Quantities

Quantities were calculated on the assumption that one new seedling tree would be planted a minimum distance of 8 feet from adjacent trees and that 90% of the trees will survive. Calculations reflect that planting will occur in a random pattern of clumps separated by enough space for a pick-up truck or small tractor to pass between clumps (to facilitate access during installation, and subsequent mowing and watering maintenance regimes).

### **Sub-Region 'B': 450 trees**

Douglas Fir 40%, , , , , , --180 seedling trees

Grand Fir 35%, , , , , , --158 seedling trees

Sitka Spruce 20%, , , , , , -90 seedling trees

Cascara 5%, , , , , , , -23 seedling trees

### **Sub-Region 'C' : 2552 trees**

Douglas Fir 30%, , , , , , --765 seedling trees

Grand Fir 30%, , , , , , --765 seedling trees

Sitka Spruce 20%, , , , , , -510 seedling trees

Red Alder 15%, , , , , , -383 seedling trees

Cascara 5%, , , , , , , 128 seedling trees

### **Total Count:**

**945 Douglas Fir, 923 Grand Fir, 600 Sitka Spruce, 383 Red Alder, 151 Cascara**

## **Plant Materials, Sources**

### **Option One: Obtain Seed Stock from Chah-GAH-Cho**

The McKinleyville Landtrust may elect to obtain the sources of all seeds and cuttings from plants now growing on-site, or request permission to obtain seed and/or cutting sources from the forested land south of the site, with the neighboring landowner's permission. This would extend the Mill Creek corridor forest with stock of the same genetic make up. It has not been determined, without further study and analysis, whether there would be an advantage to meticulously retaining the genetic integrity of the species found within this segment of the corridor. Collection on site and directly adjacent to the site would be a matter of convenience, with de facto benefits of maintaining genetic integrity an added bonus. Species recommended for the reforestation of Chah-GAH-Cho are all found on site and in the forest to the south. The introduction of genetically modified trees and, especially, clones needs to be carefully considered and generally discouraged.

Seed collection and rooting cuttings will require lead time. Depending on the optimal time for harvesting viable seed and/or securing necessary cuttings, allow additional time to stratify, germinate and grow seed starts and root cuttings.

Figure it will take a minimum of one to two years (depending on the species) which must be factored into the proposed schedule of installation if seed and cuttings are to be procured from the site.

Collecting seed and obtaining cuttings for rooting would probably be accomplished under contract. Locally both Freshwater Farms and Simpson Nursery propagate seeds and cuttings in their nurseries. Freshwater Farms can also provide on-site collection services and outplanting once starts are ready. Simpson Nursery can also provide names of local contractors who would bid to collect seed and cuttings and then outplant once the starts were ready.

Should the Land Trust decide to obtain plant material on-site and adjacent to the site, they could post a Request For Proposals (RFP) which would enumerate the vision of what the Trust wants to create at Chah-GAH-Cho (could include an estimated budget), to which contractors would respond with a "plan of action". (A RFP outline is provided in Appendix II).

## **Option Two: Obtain Seed Stock from McKinleyville's Elevational Band**

All of the species recommended for planting in the areas to be reforested in sub-section 'B' and 'C' can be obtained from a number of nurseries, Simpson Nursery and Freshwater Farms among them. Simpson grows quantities of Plug 1 bare root stock (one year old) and two year plants (1-1) in pots, which they sell. Approach them as early as possible as they quickly sell all they grow.

Nurseries should be able to document the geographic location of the parent stock. The source of plant material in this option would not be obtained on-site, nor necessarily from the Mill Creek riparian corridor (unless specified by special order). Provided with a species list, Simpson Nursery contracts to procure seed stock from Simpson lands within documented 'elevational bands'. The elevational band for McKinleyville falls within the 092 Seed Zone. Conifer seed is collected in the fall. The seeds mature at varying times, depending on the species and the weather. To ensure the greatest viability a "cut test" is performed to check seed cones prior to collection. A number of local contractors are skilled in this process and the MLT would be wise to work with them, or through one of the local nurseries who employ their services.

## **Planting**

### **By Contract or Volunteer Labor?**

The MLT may elect to contract out-planting. There may be advantages to this if funds are available. Local professional contractors do this for a living. They have experience and equipment and can be held to guarantee a percentage of live plants at the end of one year from the time the starts are set in. The MLT could post a Request for Proposals (RFP) for both outplanting and seed collection (Reference Appendix II).

Undertaking the task of planting 3000 trees is a major endeavor if it is to be accomplished by volunteer labor. It is certainly possible, but will require considerable prep time and prior planning for the dedicated volunteer project leaders, in addition to a host of committed, able volunteers. It should be noted that an experienced contractor can plant 500 trees a day. On the other hand, such an effort would foster one-on-one interest and ownership of the young forest by members of the community. This is of inestimable value.

It is recommended that a combination of contracted work and volunteer labor be utilized for this project, gaining benefits from both. The MLT would be responsible for organizing/coordinating the volunteer teams. a.) The contractor would set in the plants and maintain them through the first year, then conduct an on-site 'workshop' for teams of volunteers who would assume the care required of the young trees in their

respective 'adopted plots'. b.) The contractor would agree to work with teams of volunteers from the onset. In this scenario it is questionable whether a contractor could guarantee a percentage of live trees at the end of the first year. The on-site 'workshop' would be held prior to the actual planting. Volunteers would assist the contractor (who would assume responsibility for supervising the project) with the installation and follow-up care (watering, keeping grass cut around plant plots, inspect for insect or other damage, prune as needed etc.)

### **Installation and Follow-up Care**

In the autumn prior to setting out new tree starts a prescribed burn (mowing is an alternative) should be conducted at Chah-GAH Cho. Planting should take place in the month of January. Glenn LaHar, nursery manager at Simpson, underscores the fact that January is the best planting time as this is the season of greatest dormancy along the northern California coast.

New starts should be set in random groupings (clumps) such that trees within the clumps are spaced approximately 8 feet apart. Because grass will initially be a strong competitor for available moisture, at least until the new trees roots are well established (below the depth of the grass roots), it is suggested that 5 ft. squares of 'weed mat' be laid down at the site of each individual planting after removing as much of the surface vegetation in the 5 ft. square area as possible (burning would already have accomplished much of this). After the weed mat is cut to size, a center 'cross-cut' should be made in each square of weed mat such that the seedling can be planted. After setting each new start in place the weed mat should be secured to the ground with staples. As an option, the weed mat might be top dressed with a layer of mulch for aesthetic reasons in that the Chah-GAH-Cho project should make every attempt to present a pleasing sight to the community. The public will be watching what goes on, and hundreds of black cloth squares could be seen as a detraction.

### **One Year Bare Root or Two Year Potted Plants?**

The MLT may elect to plant the entire area slated for reforestation with one year bare root stock (Plug -1s) or a combination of Plug-1s and two-year potted plants. Two-year trees will be at least 24 inches in height and come with an already developed root system which will give them an advantage. The reforestation project will 'take off' faster, giving visible results, which will be encouraging to volunteers, and favorable to the community at large.



## **Early Maintenance**

As the winter rains subside, and summer dry conditions prevail, the new plants will require watering on a regular basis. By July the soil should be tested for 'moisture stress', with each new seedling to receive 1 gallon of water if testing indicates. A contractor or experienced volunteer will need to monitor the soil conditions.

Contractors are equipped with portable water tanks to handle this job. Mowing (weed whacking) the grass between the squares of weed mat will be beneficial in the first seasons after installation, particularly if plans go forth to implement the introduction of native prairie grassland species into the section of Chah-GAH-Cho which is to remain unforested. The weed mat should provide adequate protection from competitive water hungry grasses which will compete for moisture in the top 8 to 10 inches of soil.

## **Long Term Prescription**

Once established trees reach heights of 10 or 12 feet in the reforested area, the resulting shade and increased organic matter from composting leaf litter will offer suitable habitat for the introduction of native understory plants. At this time the MLT could initiate another round of plant installations to include: Red Elderberry (along the 'edges'), Sword fern, Deciduous Huckleberry, Evergreen Huckleberry, False Lilly of the Valley, Salmonberry, Thimbleberry, Salal, and Coast Man-root. As with the planting of new tree seedlings it will be necessary to adequately prepare the planting beds, i.e. rid planting sites of any exotic vegetation (including the roots) applying mulch and following a watering regime (as needed) during the first year (minimum).

## **Chah-GAH-Cho Prairie**

In time, with little or no intervention, the entire 9.5 acre parcel will revert to forest. In the absence of human stewardship Chah-GAH-Cho will evolve into a viable natural community, an extended mosaic, representative of the mixed conifer/deciduous forest that is found in the Mill Creek corridor to the south of the site. Already Douglas-Fir, Red Alder, Grand Fir, and Sitka Spruce have sent pioneer seedlings into the old field, and thickets of California Blackberry are rapidly spreading.

At present, because human intervention has long kept the forest at bay, one can enjoy a spectacular vista which looks out over the descending slopes to the west into the bottom lands of the Mad River floodplain, to the Lanphere-Christensen Dunes, and the ocean beyond. For the average citizen of McKinleyville no other vantage point (open to the general public) affords such a panoramic breadth. From Chah-GAH-Cho's sloping meadow one can envision what this landscape was like over one hundred years ago. Because the lands lying between the Chah-GAH-Cho prairie and the ocean are in the floodplain, are zoned agricultural, and fall within the Coastal Zone, some semblance of the rural will remain. In a community burgeoning with daily new development, this is a remarkable gift.

In keeping with the stated goal to maintain this open vista, it is proposed that a portion of Chah-GAH-Cho's oldfield on the western side of the site be restored to represent the diverse grassland species of a native coastal prairie. From the knoll (located to the southwest of the Kmart Garden Center, where an island of young conifer and several large Sitka Spruce stand) sloping down to the western fence line, an oblong swath of land will be kept free of encroaching forest. By intentionally maintaining an 'open' grassland, interspersed with scattered finger-like islands with clumps of Hazelnut, Blue blossom, Pink Flowering Currant, Salmonberry, Thimbleberry, and Coyote bush, a mosaic of diverse habitats from prairie to scrub/brush to forest and wetland will offer food and shelter to a wide variety of wildlife at Chah-GAH-Cho.

Two options for maintaining the clearing are presented: 1.) Cyclical Regimen of Prescribed Burning, and 2.) Seasonal Mowing Regime. Grazing, which previously kept this tract free of forest encroachment for the past 150 years, is not presented as a viable option for the McKinleyville Land Trust for several reasons. Since Chah-GAH-Cho will be open to the public with footpaths crossing the prairie grassland, there would be a potential for conflicts between people and livestock. Grazing would also tend to promote non-native grassland species which would effectively prohibit the introduction of native coastal prairie species.

## 1) Cyclical Regimen of Prescribed Burning

For thousands of years Native Americans utilized fire throughout this region to maintain open clearings. This long-standing adaptive relationship between humans and prairie vegetation evolved such that grasslands are considered to be a fire dependent natural system.<sup>15</sup> Fires on the Northern California coast were set at the end of the summer season when the dry grasses turned brown.

In the cultural report prepared by Susie Van Kirk<sup>16</sup> for this habitat restoration plan it is noted:

“How indigenous people may have used the prairies along lower Mad River and on the tablelands above can only be surmised from the ethnographic literature. Loud (1918) wrote:

“Within the forests, at all elevations from sea level to the top of the ridges, there were small open patches, known locally a “prairies”, producing grass, ferns, and various small plants. These prairies if left to themselves would doubtless soon have produced forests, but the Indians were accustomed to burn them annually so as to gather various seeds . . . These prairies were of incalculable value to the Indians, not alone for their vegetable products, but also for the game found upon them . . .”

In general it can be expected that burning will increase the growth of most grassland vegetation. Fire breaks down organic matter, releasing nutrients into the system. It produces ash and charcoal, and promotes prevernal soil warming. Moreover, should an effort to restore native coastal prairie species to the old field be undertaken, diversity is enhanced by cyclic burning because removal of thatch and litter exposes the soil to direct sunlight which increases solar insolation causing seeds in the soil bank to germinate. At maturity this ‘flush’ of new growth releases more seeds back into the grassland. The second season after a burn will have more species than pre-burn, but by the third post-burn year, thatch and litter build-up will once again reduce diversity to near pre-burn levels, necessitating the return of fire to start the cycle over again. It is expected that a majority of the diversity will come from an increase in annual species. Unfortunately, past land uses on the Chah-GAH-Cho site have almost completely removed the natural seed bank of forbs and grasses that would occur in a native northcoast prairie. The site is so thoroughly disturbed that without intervention (i.e. an effort to reintroduce native seed stock) there may be no native species to germinate

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<sup>15</sup> “*Fire Management Plan, Redwood National and State Parks*”, June 1995. pp. IV 34-36.

<sup>16</sup> “*A Cultural View of Dje’gedjoho*”, September 1998.

post-burn. Fortunately, it would appear that Chah-GAH-Cho holds great potential for the restoration of native coastal prairie species. In the long run, Chah-GAH-Cho would benefit from a cyclic regimen of prescribed burning, which would serve to retain the open view-shed while promoting a diverse native prairie habitat.

The time of year in which burning occurs is a primary factor in determining which grassland species will be encouraged and which will be discouraged. Fall burning tends to favor cool-season perennials found on the coast.

The effects of fire will vary and depend on a number of factors such as season, frequency, fire intensity, seasonal precipitation levels, composition of existing vegetation, amount of accumulated litter, etc. Because specific site conditions will always vary from season to season, day to day, no two fires will be alike.

By adopting a plan to utilize prescribed burning on the Chah-GAH-Cho prairie, the 'open' grassland will be maintained.<sup>17</sup> If, in addition, fire is also utilized as a tool for encouraging native species and promoting increased habitat diversity, it would be beneficial to couple such a burn management program with:

- a.) post fire effects monitoring and evaluation
- b.) introduction of native prairie species (grasses and forbs)

In either case, whether or not the MLT is committed to undertaking prairie restoration at this time, efforts should focus on:

- a.) implementing a program for the regular removal of invasive exotic species to including in the grassland (Reference the section on Invasive Exotic Management).
- b.) in preparation for possible future cyclic burning, initiate an educational fire regime.

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<sup>17</sup> It must be noted that botanist Leonel Arguello found many native non-grass prairie species on the site. It is not impossible that in the absence of a concerted effort to introduce native prairie plants, prescribed burning may offer them the advantage they need to move into Chah-GAH-Cho's prairie post-fire. To date, one native grass: California brome has been identified in the existing grassland/oldfield.

## **In Preparation for Prescribed Burning<sup>18</sup>**

Prior to burning at Chah-GAH-Cho, the following needs to occur:

- Map out area of proposed burn.
- Contact CDF Battalion Chief, Alan Gradek
- Prepare and submit a Burn Plan for CDF review

In consultation with Alan Gradek, botanist Leonel Arguello has noted that a burn plan would need to consist of the following sections addressing: area description and objectives, discussion of smoke management issues, include a notification check list (neighbors), include maps and permits, and identify the responsible party. The plan in general should be brief and to the point. Issues such as cost, expected fire behavior, fuels and weather prescriptions, equipment and crew, ignition sequence, containment, mop-up, and contingencies would be handled by CDF.

The Suggested Table of Contents for a Chah-GAH-Cho Burn Plan:

1. Unit Description
  - a.) Location
  - b.) Size
  - c.) Boundary Description
  - d.) Slope
  - e.) Aspect
  - f.) Vegetation Type
2. Fuel Loadings
3. Objectives
4. Pre-Burn Considerations
5. Special Precautions
6. Smoke Management
7. Public Involvement and Coordination
8. Notification List
9. Responsible Individuals
10. Signature Page
11. Attachments

Botanist Leonel Arguello has prepared a Prescribed Burn Plan for Chah-GAH-Cho (Reference Appendix III). This burn plan covers an initial burn at Chah-GAH-Cho, to be accomplished prior to reforestation and the possible introduction of native prairie species in the designated open grassland. Following this initial burn (note 'Prescribed Burn Map I' in this section), the results would need to be evaluated prior to preparing

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<sup>18</sup> Recommendations by Leonel Arguello following consultation with Alan Gradek.

the second burn plan (which would focus on a long range prairie maintenance regime, Reference 'Prescribed Burn Map II' in this section). Adjustments might have to be made before each burn cycle but they would be minor.

Leon Arguello has noted he would be available to plan, prepare, conduct, and evaluate the initial prescribed burn at Chah-GAH-Cho, as well preparing a second burn plan (following the evaluation). The CDF has indicated a willingness to conduct the burn in coordination with Arguello. Furthermore, it may be advantageous to involve other local agencies as this would be a great training opportunity for local fire departments in the application of fire for grassland restoration. In calling for volunteer support from members of the MLT and the McKinleyville community at large, there are a number of duties and tasks that do not require special training in fire management which may be assigned: traffic control, public and media relations, education, food preparation for crews, etc.

## **2) Mowing Regime, An Alternative to Prescribed Burning**

While prescribed burning would promote a vigorous grassland community, augment efforts to introduce native prairie species, and curtail the encroachment of advancing tree seedlings from the forested areas of the site, it may not be the course of action the McKinleyville Land Trust is able to pursue at this time. Mowing is a viable alternative.

Though it is administratively less complicated, mowing does not afford the many benefits of fire management. It will be important to weigh the benefits of cyclic burn management in comparison to mowing in that the former offers distinct advantages by increasing species diversity. Mowing does not have the same effect on plant species as cyclic burning. Burning is an oxidizer of organic matter, makes nutrients available to growing plants, stimulates growth by increasing solar insolation to the soil surface by completely removing litter and thatch, and opens the ground for easier planting of native species. Mowing by comparison does not decrease thatch or litter, does not stimulate diversity to the degree that burning can, does not open the ground for easier planting and sowing of native seeds and plugs, and does not make nutrients available for plant uptake. It can however suffice to keep the encroaching forest contained and will work to subdue the towering California Blackberry thickets.

As mown grass is let to lay in the field, it will shade out the new starts of some sun-loving forbs and grasses. It will act as a 'mulch' and will increase soil surface moisture to some extent too. Moderately shade-tolerant starts could get a hold. Should mowing be utilized by the MLT to retain the grassland, removal of new mown grasses as well as thatch and litter should be considered.

As with fire management, it is expected that the timing of mowing will have an effect on the species composition. If mowing occurs in late spring and early summer, before annual grasses and forbs set seed, their numbers could be expected to decrease. Perennial grasses and forbs will have time to recover following a spring mowing, giving them a chance to disperse seed before winter. They could be expected to gain the competitive advantage over time. At present the majority of the grasses and forbs in the oldfield are perennials, albeit exotics, which came into the region with the advent of Euro-American agrarian and husbandry practices.

In addition to seed production, a number of perennials spread by sending roots out from the parent plant. Bracken fern and California Blackberry are two such species found on the site. In the southwest corner of Chah-GAH-Cho a stand of Bracken fern mixed with California Blackberry is already moving north into the grassland. California Blackberry spreads by seed dispersal (birds and small mammals) but it also sends out long runners which can take root at the nodes. A thicket of Blackberry sending out runners in search of a sunlit spot to root is formidable. It certainly provides habitat. At Chah-GAH-Cho these thickets can reach heights of eight to ten feet. In areas where pedestrian foot-paths are planned, mowing/weed whacking/ or burning will be imperative to hold blackberries at bay. Because California Blackberry is endemic to open coastal prairies, a patch of this feisty native may be allowed to flourish, retained somewhere on the prairie and allowed to fruit, but preferably a distance from pathways. Seasonal mowing and/or burning could be accomplished such that island 'clumps' of Blackberry would be retained and allowed to grow over several seasons. These islands could be cut back every several years to limit their spread. California Blackberry probably should be 'part of the scene'.

One distinct advantage to mowing is that it should not present a concern to neighbors, as burning might. However, it will require maintaining vehicular access to the designated prairie area. Actually, vehicular access would also be advantageous if cyclic burning is conducted. One option may be to arrange for access to the prairie via the farm to the west. If this is not possible, access from the rear parking area behind Kmart will be the only alternative once the forest buffer along the northern most segment of the site is planted with tree seedlings and the eleven acre parcel to the north of Chah-GAH-Cho is developed. In any case it will be important to ensure that the ground is not overly wet prior to mowing or considerable compaction will occur.

## Native Coastal Prairie Restoration

Deciding to implement a plan to successfully restore native coastal prairie species into the old field would require a commitment of time and a group of dedicated volunteers. If funding and volunteers are plentiful, the land trust could opt to introduce native coastal prairie species into the entire grassland area slated to remain 'open'. Given limitations, a more manageable approach might be to focus on seeding 'plots' (10 ft. x 10 ft.) into the existing old field. Over time, new plots could be introduced, until a native prairie grassland was established.

In a true northcoast native coastal prairie grassland, grasses would be dominant, with a mix of forbs and shrubs scattered throughout. Initial restoration efforts would entail creating a series of plots 'representative' of a northern California coastal prairie grassland. The following species are suggested:

Coastal hairgrass (*Deschampsia caespitosa* ssp. *holciformis*)

California oatgrass (*Danthonia californica*)

Red fescue (*Festuca rubra*)

California brome (*Bromus carinatus*)<sup>19</sup>

Nodding semaphore grass (*Trisetum cernuum*)

Foxtail grass (*Hordeum brachyantherum*)

Pacific reed grass (*Calamagrostis nutkatensis*)

Douglas' iris (*Iris douglasiana*)

Harvest brodiaea (*Brodiaea elegans*)

Ithuriel's Spear (*Triteleia laxa*)

Blue dicks (*Dichelostemma capitatum*)

Firecracker flower (*Dichelostemma ida-maia*)

Ookow (*Dichelostemma congestum*)

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<sup>19</sup> Botanist Leonel Arguello has identified California brome growing in the Chah-GAH-Cho grassland.



Purple lupine (*Lupinus rivularis*)  
Vetch (*Vicia hirsuta*)  
Rabbit foot clover (*Trifolium bifidum*)  
Balloon clover (*Trifolium depauperatum*)  
Clover (*Trifolium albopurpureum*)  
Valparaiso clover (*Trifolium microdon*)  
Yerba Buena, Indian tea (*Satureja douglasii*)  
California broom (*Lotus scoparius*)  
Aster (*Aster chilensis*)  
Mule ears (*Wyethia angustifolium*)

Of the species listed above, only one: California broom has been identified growing in the existing Chah-GAH-Cho field. (Reference Appendix IV for the California Native Grass Association's list of seed sources and nurseries that specialize in grassland restoration)

#### **STEP ONE: Rid the Planting Area of Unwanted Vegetation**

Competition from existing unwanted vegetation is the most common cause for failure or project abandonment. Dormant/ungermated exotic seed, though not easily visible after the first burn (or initial tilling), will be present. As far ahead of time as possible, begin eradicating existing unwanted plants in the selected 10' x 10' plots. While herbicide application is particularly effective in that it removes unwanted plants without 'disturbing' the soil, the use of an herbicide at Chah-GAH-Cho may not be an option if the site is to provide Native American basket makers an opportunity to collect materials. Step One would need to be accomplished either by prescribed burning or tilling, or a combination of both. If the MLT elects a regime of prescribed burning to manage the 'open' grassland, the initial burn would be conducted in late summer or early autumn. Following this burn the designated plots may be covered with black plastic (minimum time: one month and preferably for several months) or thoroughly tilled, once, then again just when the area begins to 'green-up' after the first rains. If tilling is the selected method, continue to till on a regular basis as new growth emerges right up to planting time, which can occur from late November or early December (depending on the onset of rains) through the end of February. While prairie

restoration efforts may begin immediately after the initial prescribed burn at Chah-GAH-Cho, there may be an advantage to holding off seeding native grasses and forbs in the prairie until the new tree seedlings are set in place within the slated area of reforestation. There are two good reasons to defer prairie restoration: 1) concentrated volunteer effort may be needed to assist with the reforestation especially during the critical first two or three seasons; and 2) there is an advantage to ensuring that ample time is allowed to remove all unwanted vegetation from the selected plot sites prior to seeding or planting natives. The decision to wait a season or two before embarking on restoring the open grassland with natives will depend on the availability of volunteer time and energy.

Waiting until the second season after the initial burn (or tilling) would allow for additional time to cover the plots with black plastic, extending throughout the dry summer months of the following summer. In addition to blocking out light needed for photosynthesis, the black plastic will absorb the sun's heat, raising soil temperatures which will help kill off undesirable plants and remaining viable seed. During this period mow the open grassland around the plots to a height of 4 - 6 inches whenever the grass height reaches 12 inches (to prevent seed heads from forming). If the MLT elects to conduct prescribed burns in the management of the grassland, a second burn would be conducted in the second autumn, this time contained within the perimeter of the proposed Chah-GAH-Cho prairie (Refer to 'Prescribed Burn Map II' in this section). This additional time and effort given to preparing a weed-free seed bed will be rewarded.

While waiting has its benefits, there are reasons to consider going ahead with the immediate establishment of the coastal native prairie too. Initial interest and enthusiasm in the restoration project is likely to be high in the beginning, and can be tapped. Fueling this enthusiasm, the community will be able to witness visible transformation in a shorter time. The MLT will need to weigh the advantages and disadvantages of each approach. Perhaps the ideal scenario might be to plant one or two 'demonstration' plots in the first season, while simultaneously pursuing the more time consuming method of removing vegetation in selected plots located away from footpaths. Select sites for the 'demonstration' plots that are to be planted shortly after the initial autumn burn (or tilling) such that they are located close to one of the footpaths. This will at least allow for a 'preview' of what a full-blown effort in the forthcoming seasons will bring. Local residents will be watching with curiosity, such that there will be a distinct advantage in setting up an opportunity to show off the project's results. It will also allow the MLT to evaluate the success of both approaches. It could be that plots planted with a quick turnaround produce results that prove to be as satisfactory as the plots that are held under plastic through the following summer.

## **STEP TWO: Seedbed Preparation**

After the selected plots have been rid of existing vegetation and just prior to planting (late November), lightly rake the top layer of soil no more than 1" deep. Care must be taken not to actually turn the soil over which could bring any remaining viable weed (exotic) seeds to the surface where they would have the opportunity to compete with the newly introduced native prairie seeds (or plants). Simply scratching the soil surface with a rake will accomplish this.

## **STEP THREE: Planting and Covering**

Broadcast the seeds on top of the ground sometime beginning in late November through the end of February. Mixing the seeds with an inert medium like sawdust, kitty litter, or no-nitrogen fertilizer will make spreading the seeds a bit easier. Very lightly rake the seeds into the soil or, better still, roll the plots with a heavy roller to press seeds into the soil. Good seed to soil contact will be required for proper germination. Light mulching is beneficial. Apply certified weed free straw (rice straw makes an excellent choice) lightly to cover 80 % of the exposed soil allowing at least 20% of the soil surface exposed to sunlight.

## **STEP FOUR: Management**

During the first growing season, whenever fast growing annual exotics reach a height of about 12" it is beneficial to mow the entire open field site (including the newly planted plots) to a height of 6 to 8 inches. This will prevent the undesirable exotic plants from going to seed while allowing sunlight to reach the slow growing perennial native seedlings. During the second year, mow the entire site to a height of 8 inches as soon as exotics present seed heads in late spring. This is likely to delay second year blooms of the newly planted native species, but will help the project in the long run. In the third year, once again mow the entire open field in the late spring when exotics present seed heads, but this time do not mow the selected native prairie plots. Native species should be established in the selected plots by the third year. Hand weeding will remove any exotics within the plots, but the task should be pleasant as one will be enjoying the native blooms in full splendor. As plots become established, hand weed, moving out from the perimeter of the plots into the open field allowing native species to expand outward into areas where exotics are dominant (Reference the Bradley Method in Appendix V).

As initial plots become established a second round of planting can be undertaken, contingent on volunteers willing to devote time to the project. A regime of prescribed burning coupled with mowing to reduce exotic seed head formation would be continued until the entire open field was established in native grassland species. Once established, a two or three year burn regime would be sufficient to maintain the prairie.

Within five to seven years, it is not unrealistic that a native grassland can be created at Chah-GAH-Cho. Aesthetically, burning the established native grassland once every two to three years before the autumn rains begin would probably be less objectionable than an on-going mowing regime.

### **Setting in Plants vs. Seeding**

Bare root and potted plants with already established root systems will bloom the first season, while it will take from two to five years for plants started from seed to bloom. Starting with blooming size plants will yield near instant success in the plots. Larger planting efforts usually employ seeding because it is so much more economical. Most plantings started from seeds have weeds for the first two years. Watching the succession and development of a seedling can be a rewarding and educational experience that brings a greater appreciation for the colorful, diverse native plant communities that once covered our landscapes.

Perhaps, in establishing a native prairie grassland at Chah-GAH-Cho a combination of seeding and setting out 1-3 year old plants would be beneficial. Plots that are set close to the footpaths might be seeded along with the added benefit of setting in plant root stock. As was previously discussed, plots near the footpaths might be seeded the first winter after the initial prescribed burn in order to visibly spike the public's interest and enthusiasm for the project.

## Public Access, Footpaths

It is the intention of the McKinleyville Land Trust to offer the public an opportunity to explore, enjoy, and come to appreciate the restoration of native habitat at Chah-GAH-Cho. To this end, the construction of a series of nested loop trails in the western half of the site is recommended. This plan does not recommend constructing formal trails in the eastern portion of Chah-GAH-Cho for several reasons. The forested wetland around the spring located in the southeast section of the site, while offering a sampling of wetland habitat, is quite fragile with steep eroding slopes. A decision to purposely bring visitors into this area (particularly when the soils are wet but standing water has gone) will jeopardize this small wetland as curious folks are tempted to compact or disturb the areas around the spring which provides suitable habitat for a number of wetland flora and fauna. There are other more suitable sites in the McKinleyville region where larger more accessible wetlands can be enjoyed. The slopes are too steep and the site is too close to the noise and commotion of the Center Avenue commercial activity to merit the elaborate measures of building a boardwalk there at this time. Native Americans may collect basket-making materials from time to time, and periodic removal of the invasive Ivy will occur, but no formal use by the general public is recommended. The owners of the private residence located in very close proximity to the southeastern portion of the site may not welcome a trail in this area. In fact, it may be prudent to discourage visitation to this region of the site by erecting a fence around the perimeter of the eastern portion of Chah-GAH-Cho which would deter casual entry from behind the Salvation Army Store. The private landowner to the south may welcome this, and may be willing to jointly share the cost of erecting such a fence. However, the regularity with which transient encampments are found in the existing wooded area may be one reason to consider a trail in this area. Transient camping may be discouraged by regular "traffic" in the vicinity.

From the trailhead, which is located directly behind Kmart in the vicinity of the Garden Shop, visitors will be able to walk along approximately 3,175 feet of trail. At the entrance to the site, an information board would be placed at the trailhead node that would be visible from the parking area. It would announce the name of the site, and such information as might be welcomed by a first time visitor such as a small birds-eye view of the site showing the location & length of trails, as well informing visitors of any pertinent restrictions that might apply (e.g., 'no bicycles please', 'please stay on pathways, restoration in progress', or whatever message the MLT considers appropriate). Shortly after entering the site at a second node, a larger kiosk-type board could contain more in depth interpretive information explaining the nature of the restoration project, the volunteer 'Adopt-a-Plot' program, the history of the site, etc. (A set of drawings for both the information board and two sizes of kiosks can be found in Appendix VI.)

The gradient on the northern and western sections of the 'Chah-GAH-Cho Loop Trail', the 'Prairie Edge Trail', and the western half of the 'Knoll Loop Trail' would be accessible to mobility impaired visitors restricted to a wheelchair, provided that the surface of the trail tread is hardened.

Following an initial prescribed burn or mowing, the centerlines for the proposed network of footpaths should be staked in the field. From the centerline, off-set stakes should be set in place at right angles to the centerline, and the centerline stakes pulled. If funds are available, a hardened trail surface could be constructed. All organic matter will need to be removed from the trail bed. The trail trench should be cut in a minimum of 6 inches deep and 5 to 6 feet wide. (This will seem too wide initially, but as vegetation will push in at the trail edges, this width will not be excessive, especially if people wish to walk in pairs, meet others on the trail, or are restricted to a wheel chair.) The trail bed should be taken down to the compacted subgrade and geotextile should be laid in the trench. Crushed stone (1/2 inch minus) should be laid down in 2-3 inch lifts. Each lift should be thoroughly watered and rolled to enhance compaction. The finished surface must be even with the existing grade at the trail edges, with an elevated center crown at 2% (for a six foot wide trail this would be approximately 3/4 of an inch rise at the crown). This will be barely noticeable, but sufficient to drain water off the trail surface if the crushed fines are thoroughly compacted.

It always poses somewhat of a dilemma when attempting to bring a 'hard surface' into a natural area. The preference for a natural area would be to opt for a shredded bark surface or a natural earthen surface. However if accessibility is a consideration, that will not suffice. It will be important to select an aggregate material (crushed stone) that is compatible with the character of the site. The MLT might elect to consider keeping some of the trails in a natural state (bark or earthen surface), but offering one or two loops that would be wheelchair accessible.

As a rule of thumb, seek material that is close in color to the existing soil (in this case, a reddish buff brown). The resulting effect is not unpleasant and not too 'urban' in appearance. Limestones make excellent crushed stone pathways because the lime hardens. This is not a material that is readily available in northern California, however, which essentially rules it out. Haul rates on stone are considerable and finding a local source is imperative unless money is no object. A material called 'DG' in the trade, Decomposed Granite, is available in California, but whether sources are readily available in McKinleyville (or Eureka/Arcata) will be the question. DG comes in a range of colors, some of which are very similar to the soils at Chah-GAH-Cho. Bring samples of the material to the site and visit nearby projects where the material has been used prior to purchasing a material.

Of interest, and possible application to this project, reference a brief summary of Resin Pavement in Appendix VII, a unique high strength, tree-resin based binder that can be mixed with aggregate fines to create a strong non-skid natural appearing trail surface.

Until funds are available for preparing a hardened trail surface, paths can be mown or surfaced with a shredded bark mulch.

## **A Place That Belongs to the Community<sup>20</sup>**

### **The Role of Perception, Education, Participation and Art**

The efforts at Chah-GAH-Cho to restore, preserve and create a landscape grounded in respect and appreciation for the indigenous flora and fauna of the region will present a challenge to the McKinleyville Land Trust on several levels.

Our preferred urban and agrarian landscapes have historically been managed to contain and discourage all but selected ecological functions. The 'clean' mown grass and carpet-like 'chem-lawn' yards that perpetuate the suburban aesthetic, and popular fast-growing non-native tree and shrub species surrounding our homes, lining our streets, softening the 'hardscape' in parking islands are the antithesis of a wilder untended aesthetic found in nature. Sites where emergent successional growth presents a brushy scattered array of shrubs, vines, and young saplings can be perceived as being 'messy'. Responses to such landscapes by individuals who do not have a special interest in ecology or native plants often describe such places as 'unkempt' or 'overgrown'. Within the domesticated context of suburban, urban, and agricultural communities, the populace may value 'neatness' more than any other landscape characteristic. While the community's sentiment may favor ecological restoration in theory, they may not be 'tuned-in' to the practices needed to restore and maintain the ecological integrity of a natural community. Practices such as prescribed burning in the designated 'prairie' at Chah-GAH-Cho can produce negative responses from many people. Initially, when the spindly bare-root saplings are set out into the old field within the area slated for reforestation, and weed barrier cloth is stapled in place and topped with bark mulch the site may not be particularly attractive to many in the community.

How might restoration activities at Chah-GAH-Cho be implemented in ways that are sensitive to the public's perceptions and aesthetic concerns, and promote cooperation, involvement, and support?

- 1.) With space limited and proximity to people and residential land use high, such a restoration project can be developed 'garden-like' in nature, serving as a 'symbol' of restoration and an example of native plant diversity. Maintenance might include more intensive, 'traditional' activities such as planting, mowing, and weeding (Reference the Bradley Method in Appendix V). In such areas, soil scarification, burning, and other visually disruptive activities must be carefully

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<sup>20</sup> A number of the suggestions in this section were discussed in an article by Paul H. Gobster in "The Urban Savanna, Reuniting Ecological Preference and Function", in *Restoration & Management Notes* 12:1 Summer 1994.



planned and orchestrated and coupled with a program to educate and inform the local community as to how and why a particular practice is being followed.

2.) Using 'design cues' to 'reveal' restoration activities and processes can serve to convey powerful messages that seemingly 'messy' ecological practices show human care and stewardship rather than neglect and mistreatment. The periphery of the site might be visibly highlighted by a fence that frames and calls attention to the restoration, letting neighbors and the community take special note of the project. Artistically, the decision to construct a unique fence might present the opportunity to explore some interesting creative options. Planting showy forbs and shrubs strategically along the boundaries where they can be seen from key locations in the parking lot behind Kmart and from the Murrish property and the residential neighborhood north of the site will present an appealing sight. Other 'design cues' to consider might be more formalized and symbolic, bringing art into the landscape. 'Art installations' which incorporate the progress, the intent, and stewardship undertaken in the restoration endeavor carry 'meaning' for those who devote volunteer time as well as for the casual observer and the curious visitor, setting it apart as a 'unique' place, a place watched, tended, and cared for. Several such examples are offered in this document, just to get folks thinking along some creative lines. Take note of the 'conceptual' illustration in this section showing cast concrete markers with bright tile inlays and set into the open field to indicate 'plots' which have been 'adopted'. A mural is painted on the back of Kmart. It says something 'special' that belongs to the community is going on here.

Such artistic messages can be interpreted as compelling silent guardians. While this plan offers several ideas, it should by no means limit the scope of such an artistic endeavor, which must ultimately come from the community of volunteers involved with the creation and maintenance of Chah-GAH-Cho. The suggestions are offered as points of departure for any number of creative ideas. The MLT might actively recruit local artists, poets, as well as theater and dance troops to become involved. These individuals might be willing to hold 'collaborative workshops' and 'design charettes' for the purpose of defining the role art could play in 'celebrating' and/or 'exploring the meaning' of the process of restoring habitat at Chah-GAH-Cho.

3.) Involve the public and provide opportunities for members of the community to understand and experience and develop a taste for 'ecological beauty'. Perhaps the most important contribution, hands-on experience, can bring about a deeper understanding of the meaning and purpose of restoration activities. Nature trails open the site to the public for exploring the on-going efforts close up. By enlisting the help of neighbors, local families, school groups, church groups, scout troops, clubs, organizations, and local merchants in the McKinleyville area, Chah-GAH-Cho will 'belong' to the people. Active participation in restoration leads to a greater awareness and appreciation of the indigenous environment. Restoration projects across the country have successfully invited groups out to collect seed, cut brush, participate in

burns, plant seedlings, mow pathways, remove invasive exotics, with the result that those who participate come to know and understand individual plants and plant communities. Such seasonal restoration activities contain elements common to many ritual and festival celebrations, and the symbolism inherent in these events has the power to attract and strengthen ties among individuals, community, and the land. Chah-GAH-Cho becomes a 'heritage landscape', a school for regaining the knowledge and 'spirit' of the 'place'.

## Ethnobotanical Considerations

For millennia, native peoples were dependent on plants for food, medicine, basketry, tools, shelter, clothing, and ceremonial use. Nearly all facets of indigenous culture were augmented by the diverse array of native flora. Native peoples held great respect for the living spirit of plants and prayers were said before gathering. Great care was taken in harvesting to ensure sustained yields.

This ancient relationship with plants was one of watchful *tending* and *protection*, consisting of an array of horticultural techniques. "Through coppicing, pruning, sowing, weeding, burning, digging, and selective harvesting, Native Americans encouraged desired characteristics of individual plants such as larger leaf size, branch elongation, bark color, flowering stalk strength and number, and straighter rhizomes. On a larger scale Indians managed plant mosaics to attract wild game, eliminate brush for increased visibility and ease of movement, and encourage a diversity of food crops."

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Today modern Native American peoples of northwestern California continue a tradition of indigenous horticulture. There has been a revitalized interest in their cultural heritage. Indigenous to the area around Chah-GAH-Cho, members of the Wiyot and Yurok Tribes actively pursue opportunities to tend and gather select plant materials for various cultural uses. The basket makers, in particular, have kept the inherited memory of the 'old knowledge' alive. However, "Weavers today face serious problems in the reduction of quality gathering sites for many materials and the widespread use of chemical applications, ".<sup>22</sup>

With the loss of traditional harvesting grounds in northern California over the course of the last 150 years, today's Native American basket makers are often hard pressed to find an adequate supply of materials. Increased land development coupled with past public lands policies which encouraged fire suppression and generally discouraged any gathering activities has ignored the cultural and environmental needs of indigenous peoples, leaving them with relatively few alternatives for plant procurement. Fire exclusion policies of the U.S. Forest Service, the National Park Service, the Bureau of Land Management and other government agencies have restricted burning, though many of the plant resources gathered by Indian peoples require fire to activate new shoot growth. "The Indian harvesting of renewable, above-ground plant parts (berries, leaves, and seeds) is often seen as an acceptable nondestructive gathering method, while the array of other management and harvesting techniques utilized by Native

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<sup>21</sup> M. Kat Anderson, "California Indian Horticulture," *Fremontia*, (April 1990) p. 7.

<sup>22</sup> Ron Johnson and Colleen Kelly Marks, *Her Mind Made Up: Weaving Caps the Indian Way* (Catalog published in conjunction with an exhibition of Northwestern California Indian caps, Reese Bullen Gallery, Humboldt State University, 1997) p. 11.

Americans such as coppicing, rhizome-severing, corm-digging, and burning are often seen as being in conflict with conservation objectives and possibly harmful to plants.”<sup>23</sup> Euro-Americans have only recently acknowledged the profound influence thousands of years of harvesting by Indian peoples had on the shaping of California plant communities. “Until contemporary thought and research drew attention to the issue, indigenous management of resources was largely ignored, despite the fact that Native Americans used a variety of practices, including burning, pruning, weeding, planting, and the pattern and timing of harvest to manage resources. Everywhere westerners have gone, they have underestimated the skill, ingenuity, and capability of indigenous people to significantly shape their environment, including California landscapes.”<sup>24</sup>

## Gathering Native Plants for Basket Making <sup>25</sup>

At the time of Euro-American settlement, Chah-GAH-Cho was home to the Wiyot people. Prior to Euro-American settlement in the mid-eighteen hundreds, the Wiyot people inhabited the territory surrounding Humboldt Bay from the lower reaches of the Eel River and Mad River, from Little River in the north to Bear Creek in the south.<sup>26</sup> Today only a handful of local Wiyot women weavers continue the tradition of basket making. Leona Wilkinson, born and raised on the Wiyot Reservation on Table Bluff south of Humboldt Bay, began learning the traditions of gathering plants and weaving when she was about twelve years old. These earliest lessons were provided by her grandmothers. In later years she enrolled in a basket making class which rekindled her interest in the weaving tradition of her people. Leona has consciously incorporated those designs and unique combination of plants used by early Wiyot weavers into her basket work. Today Leona is teaching a small group of Wiyot women on Table Bluff to weave. She notes that finding sites to gather the necessary plant materials is very difficult. Traditional Wiyot gathering places no longer exist.

Gathering plant materials and preparing the various fibers for weaving takes a great deal of time. While the focus is often on the end result, a cap or a basket, the age old practices associated with seasonal gathering require a unique understanding of the growth habits of selected plants and knowledge of the necessary skills required to

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<sup>23</sup> Ibid. p. 13.

<sup>24</sup> Kat Anderson, “Native Californians as Ancient and Contemporary Cultivators,” *Before the Wilderness: Environmental Management by Native Californians*, Thomas C. Blackburn and Kat Anderson, eds. (Ballena Press, 1993) pp. 151-174, as cited by Susie Van Kirk in *A Cultural Look at Gann’s Prairie*, (Prepared for Redwood National and State Parks, 1997) p. 25.

<sup>25</sup> Information obtained by Martha Ruhe during interview with Leona Wilkinson, Wiyot weaver, November 6, 1998.

<sup>26</sup> Susie Van Kirk, *A Cultural View of Dje’gedjoho* (Historical Report prepared for the McKinleyville Land Trust, 1998) p. 3.

treat the fibers in preparation for weaving. Weaving as a 'process', becomes a way of life.

Should Chah-Gah-Cho become a gathering site for Wiyot basket makers, the vegetation management of the site will need to reflect and accommodate the weaver's gathering patterns. The vegetation management of the habitat at Chah-GAH-Cho must also be undertaken with respect to native weaver's concern about the use of pesticides. Plant collection and consequent fiber preparation entail that the weavers come into intimate contact with plants. Hands, fingernails, and teeth are traditionally used as tools to split, debark, and remove pulp and fibrous coatings prior to the actual weaving. No weaver wants to collect or work with plant materials which have grown on sites where herbicides have been used.

## **Basket Making Materials**

There are nine specific native plants which Leona Wilkenson notes are utilized in Wiyot basketry: Sitka Spruce, Willow, Hazelnut, White Grass (also called Bear Grass, *Xerophyllum tenax*), Woodwardia Fern (also known as Chain Fern), Maidenhair Fern (also called Five-Finger Fern), Black Rush Root (also known as Common Horsetail/Scouring Rush), Red Alder<sup>27</sup>, and Oregon Grape (*Berberis aquifolium*).

## **The 'Sticks', the Weft, the 'Overlay'**

Basket making consists of weaving pliable fibers (weft) over and under the stiff foundation 'sticks' (warp). For decorative purposes colored patterns are created by an 'overlay' of select fibers which are wrapped around the weft fibers as they are woven over and under the 'sticks'. Select parts of each plant collected contribute a particular fiber uniquely suited to one of these tasks. Gathering, followed by the preparation of plant fibers for weaving, is an art in itself.

## **Collecting materials for the foundation (warp): the 'sticks'.**

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<sup>27</sup> Though Leona Wilkinson collects local Alder, she noted that she is not a trained botanist and that she does not know whether it is the Red Alder or the White Alder which she collects, it is simply "Alder". The inference in this report to Red Alder bark as a source of dye (red dye) used by northcoast Native American weavers was obtained from two sources: 1. *Plants and People: The Ethnobotany of the Karuk Tribe* by Barbara Davis, and 2. *Her Mind Made Up: Weaving Caps the Indian Way* by Ron Johnson and Colleen Kelly Marks.

Hazelnut shoots, and Willow shoots are used to provide the ridged framework of the basket. The materials used to construct the framework are referred to as the 'sticks'. The following plants provide "sticks".

**Willow:** Leona explained that the 'new' shoots are gathered as the leaves first come out around March. *Willow grows at the Chah-GAH-Cho site. Leona noted that she and other Wiyot weavers have special places where willow is currently obtained.* Fire plays no significant role prior to collection.

**Hazelnut:** Traditionally Hazelnut 'patches' were burned in late summer/early autumn. Two seasons after the burn, new shoots (which are long and straight) are ready for collection. Gatherers never deplete a site, but always leave plants intact for cyclical harvesting. Fire has traditionally played a distinct role in the harvesting of Hazelnut.

### **Collecting pliable plant materials for the 'weaving' (weft):**

**Sitka Spruce:** The massive gnarled roots of large spruce are often exposed near the surface of the forest floor. A weaver wishing to collect Sitka Spruce roots looks for a place where a thick layer of mulch/duff has blanketed the spruce roots. It is here she knows to find the long straight new roots which have emerged from the thick older root system. Penetrating the rich organic mulch bed, young spruce roots grow long and straight in the luxuriant organic medium free of stones and obstructions. Following collection, the weaver will attend to her site by spreading a renewed layer of forest duff and leaf/needle mulch (6-7 inches deep) over the large roots at the base of a tree. Collection sites are revisited periodically as gathering Spruce roots can continue year round. The young spruce roots are first stripped of bark and then boiled to remove the sap. The roots are split, then scraped down to the desired thickness prior to weaving.

**Willow:** Willow root is collected for weaving (weft) material. (The new shoots are collected for 'sticks'). Weavers gather young straight roots wherever Willow is found growing in loose sandy soils, such as along stream beds and gravel bars in the flood plain where the soft unobstructed moist soil conditions allow the roots to grow long and straight. Willows (such as those plants growing at Chah-GAH-Cho) growing in dryer soil conditions do not produce the more desirable long straight roots (though the new shoots can be gathered to use as 'sticks'). Note: While willow does grow at the Chah-GAH-Cho site, the preferred riverbed conditions which are required for root collection do not exist here.

## Collecting plant fibers used as 'overlay' to create decorative colored patterns.

**Common Horsetail:** Leona refers to this plant as 'Black Rush Root'. The black roots of this plant are used as overlay. The pulp is removed from the root, leaving the black sheathing which is then split in preparation for weaving. The use of Black Rush Root is unique to Wiyot basketry. Overlay fibers are wrapped around the weaving fibers as the weft is worked in and out of the 'sticks', creating a dark covering which forms the intricate patterns on hats and baskets. Common Horsetail is ubiquitous in coastal areas where it favors moist soils and is present at Chah-GAH-Cho in the vicinity of the wetland.

**Maidenhair Fern:** The black shiny stems of Maidenhair Fern are stripped of foliage and the pulp removed. The black stem sheathing is wrapped around the weft to create an 'overlay' pattern. Maidenhair Fern is harvested in July/August. Maidenhair Fern is not currently found growing at Chah-GAH-Cho, but could be introduced into the forested region of the site to the south of the spring once Himalaya Berry and Ivy are under control.

**Woodwardia Fern:** Woodwardia Fern stems are harvested in autumn (usually October/November). Leona notes that the Wiyot refer to this plant as "Whalebone Fern". The stem is pounded, yielding two strands of fiber which are dyed a deep red (the bark of Alder is used to dye the fiber.) Woodwardia is not currently found growing at Chah-GAH-Cho, but could be introduced into the forested region of the site to the south of the spring once Himalaya Berry and Ivy are under control.

**Bear Grass:** Leona notes that her grandmother referred to this plant as "White Grass". The central shoots of new growth are a pale whitish color when collected in June/July. White Grass is used as an 'overlay' fiber. Leona noted that in times past Wiyot weavers would have traded for White Grass which is found growing at higher, drier, elevations further inland from the Wiyot coastal territory. Leona notes that she has transplanted a large clump of White Grass to her Bayside yard, where it is thriving and appears to be spreading. Bear Grass/White Grass is a species which was traditionally harvested in association with fires which were set the previous autumn. No Bear Grass grows at Chah-GAH-Cho nor is it naturally found elsewhere in the coastal lowlands locally. Therefore, the plan does not recommend introducing this species at Chah-GAH-Cho.

## Natural Dyes

**Red Alder:** The bark of Red Alder is traditionally used<sup>28</sup> to impart a distinct deep rich red color to the stem fibers of the Woodwardia Fern which is then utilized as an 'overlay' in the creation of red patterning in the design. Red Alder is abundant at Chah-GAH-Cho.

**Oregon Grape:** The roots of Oregon Grape are boiled with porcupine quills, imparting a yellow color. Though Oregon Grape is not currently found growing on the Chah-GAH-Cho site, Leona Wilkinson notes that she has found it growing at sites in the coastal scrub/forest around Trinidad. At present Leona gathers Oregon Grape further inland where it grows more abundantly. Although Oregon Grape has not been identified at Chah-GAH-Cho, plantings of Oregon Grape could be planted into sections of the site slated for reforestation.

## Potential for Creating Gathering Sites at Chah-GAH-Cho

Wiyot weavers would have collected plants utilized in basket making from along the immediate coast. Leona Wilkinson notes that they would also have traded to obtain certain weaving materials (such as White/Bear Grass) from tribes who had access to the higher and drier ridges further inland. White Grass is not found growing within the Wiyot territory around Humboldt Bay. It is found on open dry slopes and exposed ridges (under 6000 ft.) above the fog belt. The sought-after new spring growth occurs in response to burning, and the indigenous peoples traditionally set fires in late summer/early autumn to encourage robust new growth of young White Grass leaves the following seasons in June or July. It is highly unlikely that the plant associations found at Chah-GAH-Cho prior to Euro-American settlement would have included White Grass. Sitka Spruce, Hazelnut, Common Horsetail, and Red Alder probably would have been growing on or near the site and are found growing at Chah-GAH-Cho today.

Though a limited source of Oregon Grape can be found along the coast, more abundant sources have been found along the coast, more abundant sources are found in higher drier areas in mixed conifer forests inland from the regions of summer fog. Woodwardia Fern and Maidenhair Fern prefer shady stream banks and other shady forested moist sites. Neither Woodwardia Fern or Maidenhair Fern have been identified growing at the site currently. It is hard to say whether Woodwardia Fern or Maidenhair Fern were ever growing at Chah-GAH-Cho, but evidently the Wiyot did

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<sup>28</sup> The inference in this report to Red Alder bark as a source of dye (red dye) used by northcoast Native American weavers was obtained from two sources: 1. *Plants and People: The Ethnobotany of the Karuk Tribe* by Barbara Davis, and 2. *Her Mind Made Up: Weaving Caps the Indian Way* by Ron Johnson and Colleen Kelly Marks.



collect these plant materials within their coastal territory according to Leona Wilkinson. The shady forested region in the vicinity of the wetland located in the southeast section of Chah-GAH-Cho could conceivably sustain these plants. If a goal is to establish viable colonies of Woodwardia Fern or Maidenhair Fern, then the creation of formal pathways in this area of the site (encouraging increased foot traffic) should be discouraged or pursued with caution. At present the wooded southeast region of the site is heavily infested with English Ivy which is a rampant invasive exotic and a clear threat to protecting existing or potential native ground covers in this area. Coupled with an aggressive program to remove invasive exotics, it is possible that the introduction of Woodwardia Fern and Maidenhair Fern could be feasible in suitable habitat at Chah-GAH-Cho.

## **Recommendations:**

1) Plant seedlings of Sitka Spruce, Hazelnut, and Red Alder. The Red Alder is already rapidly colonizing the grassland near the forest's edge on the southern portion of the site. The seed source for new starts of Sitka Spruce and Hazelnut could be gathered on site and new starts grown by contract in a nursery.

2) In addition to augmenting the populations of Sitka Spruce, Hazelnut, and Red Alder which already exist on the site, root stock of Woodwardia Fern and Maidenhair Fern could be transplanted to the shaded forest area in the southeast region of Chah-GAH-Cho in the vicinity of the wetland following the instigation of a stringent and continued regimen of English Ivy removal. The source of the root stock could be of 'local' origin with spores collected from nearby populations and grown to appropriate transplant size in a nursery. The Wiyot weavers may have knowledge of preferred sources. Plants are available at Freshwater Farms, but may not be of local origin.

3) The plan proposes clustering shrubby 'island' clumps of Hazelnut, Blue blossom, Pink-flowering currant, Coyote bush, Silk tassel, Salmon Berry and Thimble Berry in 'drifts' within the open grassland. The open prairie region of Chah-GAH-Cho will need to be maintained by human intervention, either by seasonal mowing or prescribed burning. If prescribed burning is chosen as the method to maintain open prairie, Hazelnut would respond favorably. Under a scenario of prescribed burning, in the second year following a fire, basket makers could be invited to collect materials. A regimen of prescribed burning would serve to maintain a section of the site in open grassland/coastal prairie and also be beneficial to promoting the continued supply of basket making materials traditionally harvested in conjunction with deliberately set seasonal fires.

4) If gathering sites are to be developed, local basket weavers will be consulted and MLT will try to include them in the development process and long-term care of such

gathering sites. The Wiyot community in particular should be encouraged to participate since the site is part of their ancestral lands. If basket making materials are gathered, Native American weavers who wish to do so at Chah-GAH-Cho will be allowed to with the understanding that a permit process for gatherers will be required. Permits will be required so that when people are seen gathering, they can be identified. MLT may institute restrictions on gathering as necessary to ensure the survival and viability of plant populations/communities at Chah-GAH-Cho. Decisions regarding management of the site will always remain within the purview of the MLT board of directors.

## **Applicable Permits**

Pursuant to the implementation of the habitat restoration plan for Chah-GAH-Cho, and for the purpose of obtaining information as to the need for any permits, any restrictions, or any limitations, the following individuals/agencies were asked to review the proposed project: David Ammerman on behalf of Calvin C. Fong, Chief, Regulatory Branch, Army Corps of Engineers; Jim Baskin, Planner, County of Humboldt Planning and Building Department/Planning Division; and, Karen Kovacs, Associate Wildlife Biologist, Department of Fish and Game.

Each agency was presented with an overview of the scope of the habitat restoration plan for Chah-GAH-Cho and a site map. Meetings followed: with Jim Baskin at the County Planning Office, an on-site visit to Chah-GAH-Cho with David Ammerman from the Corps of Engineers, and phone conversations with Karen Kovacs, Department of Fish and Game.

Letters from each agency outlining any concerns, considerations, and required permits for the Chah-GAH-Cho habitat restoration plan are included in this document (Reference Appendix VIII).

## **Funding Sources**

Jan Mathews, Projects Coordinator, Natural Resources Services, at Redwood Community Action Agency was asked to compile a list of potential funding sources which might be useful to members of the McKinleyville Land Trust. Her suggestions are found in Appendix IX.

In addition to Ms. Mathews' list the following suggestions may be helpful:

Local/area merchants can be approached. They may welcome the opportunity to offer support

Rotary Clubs seek to support community projects, and might be contacted.

National Tree Trust - David Flanigan, Program Director @ 800-846-8733  
Simpson Timber Company donates trees to this organization.

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