CHAPTER 3: UPLANDS MANAGEMENT ACTION PLAN

Context

Upland habitats in the Salmon Creek Watershed—steep, forested ridges; open, rolling grasslands; and coastal scrub—provide key ecological functions that protect soil, air, and water quality, as well as water quantity. Native plants associated with these habitats evolved under the specific environmental conditions of the region and often have unique adaptations necessary to provide these functions. Many species of animals are dependent upon the upland habitats and associated native vegetation communities. (See Figure 3 for a map of watershed vegetation.)

Looking out from Ocean Song Farm and Wilderness Center. Photo courtesy of Kathleen Kraft.

Complex interactions between soils, climate, vegetation, and water, with variations of topography in the mix, drive the natural processes that determine the quantity and quality of water in the streams, as well as habitat conditions for aquatic and terrestrial animals. Multi-storied forest canopies and well-managed grasslands intercept rainfall, softening its erosive impact on the soil below, slowing water flowing over the ground surface, and promoting infiltration and groundwater recharge. Plant litter on the ground increases this effect. The root systems of trees, shrubs, and grasses stabilize the land, keep the soils in place, and provide pathways for rainwater to travel deep into the ground. Natural disturbance regimes, such as fire, drought, and disease outbreaks, play an important role in maintaining habitat diversity. Research indicates that biodiverse systems composed of native species are more resilient and can recover more quickly from such disturbances than simplified systems, such as monocultures or those composed primarily of nonnative species (Walker 1992, Tilman et al. 1998).

An example of the interdependency of natural processes and habitat in the Salmon Creek Watershed is found in redwood forests. Regeneration of redwoods and their understory counterparts depends on the microclimate that mature redwoods create. The many fine needles of redwoods intercept and condense fog, which then drops to the ground to substantially increase the water available to the redwoods themselves and the tree seedlings, shrubs, ferns, fungi, and soil around them (Dawson 1998). When large patches of redwood forest are cleared, as occurred throughout the Salmon Creek Watershed beginning in the mid 1800s, this process of moisture capture and fog drip is diminished. In turn, groundwater recharge is reduced, which ultimately affects summer baseflow in nearby streams.

In this watershed and throughout California, the annual grasses and livestock practices brought to the region by early settlers have contributed to the conversion of native perennial grasslands to simplified communities of nonnative annual grasses (Stromberg et al. 2007). The perennial grasses native to the Salmon Creek Watershed typically have large root systems to access limited water in the soil during the dry summers and, therefore, have tremendous potential to hold soil and buffer erosive forces. The short-

Native California oatgrass (Danthonia californica) along Coleman Valley Road. Photo courtesy of Kathleen Kraft

lived annual grasses with their shallow roots are not as effective at trapping and holding moisture, preventing erosion, or storing biomass.

Both forests and grasslands serve a major role in carbon storage and nutrient cycling. Inappropriate clearing of forests and tilling of soils accelerate the release of carbon to the atmosphere and reduce the ongoing carbon sequestration that trees or grasslands would have provided. Nutrients absorbed from the soil are used for plant growth and incorporated into leaves, stems, roots, and seeds. These, in turn, provide essential nutrition for wildlife and livestock. As plants and animals die and decay, nutrients are released back into the soil. Inappropriate logging, clearing for new construction, and some agricultural practices remove nutrients from the watershed.

Although 50% of the watershed is occupied by forests and woodlands, little active management of these lands presently occurs. While most redwood and Douglas-fir in the watershed have been logged at least once in the past, logging activity in modern times is minimal with less than 100 acres cut in the last 10 years. Active forest management can benefit forest and woodlands by reducing fuel loads, increasing fire safety, and improving forest health. Potential products generated from these lands include lumber, fire wood, carbon sequestration, open space, and scenic beauty. Utilizing sustainable methods, these benefits can be utilized and enjoyed while protecting soil stability, water quality, and wildlife habitat.

Fires, whether started by lightning or people, are thought to have significantly shaped the vegetation of coastal California (Lightfoot and Parrish 2009). Native Americans of the region used managed burning for a number of purposes, including as a tool to increase the density and vigor of edible bulbs, grasses, and other valued plants. High fire frequencies tend to favor grassland over woody plant communities. Native American fire regimes likely resulted in a landscape of increased diversity with a patchwork of burned and unburned areas (Lightfoot and Parrish 2009). Today, prescribed fire is rarely used in the watershed and unintentional fires are typically suppressed. As a result, fuel loads have increased. The spread of Sudden Oak Death (SOD) and flammable invasive species, such as gorse, adds to the risk of catastrophic, widespread wildfires.

Changes to upland conditions from land-use practices can have wide-ranging impacts on the health of the land, streams, and ocean and on their ability to support humans and native wildlife. Upland stewardship choices that protect or restore natural processes are key to sustaining biodiversity and well-functioning habitat throughout the watershed. Since most of the watershed's residents live in the uplands, achieving upland enhancement goals will depend on collective positive action on property of all sizes from backyards to ranches.

Goals

- Uplands include the native plant communities historically known from the watershed and support robust populations of native wildlife.

- Upland habitats are resilient and biologically diverse with intact ecological functions.
- Upland ecosystems and their management help maintain high water quality and sufficient water supplies for humans, terrestrial and aquatic species.

Uplands Recommendation 1: Manage forests and woodlands to maintain diversity and ecosystem function.

Scientific Reasoning

Forests and woodlands help to protect the quality of water in the Salmon Creek Watershed. Healthy forests increase stormwater infiltration, stabilize slopes, and slow erosion. Logging and clearing in the watershed have altered the age structure and composition of remaining forests. Today's forests are younger, with more closely spaced trees and a denser, brushy understory. This can create a high fuel load of flammable branches. The spread of SOD is changing forest composition and increasing the risk of high-intensity wildfires (UCCE et al. 2008). Maintaining diverse, self-sustaining redwood and mixed evergreen forests will entail protecting existing healthy stands and addressing risks from fire and disease.

Forests also play a key role in carbon cycling. Mature forests sequester and store large quantities of carbon in plants and soil. Protecting mature forest enhances the watershed's ability to absorb and store carbon, potentially mitigating the effects of climate change.

Action 1a. Provide education and technical support for landowners to manage healthy forests.

Specific actions may include removal of dead or diseased tanoaks and invasive species, replanting with native trees of local origin, thinning unhealthy young trees or crowded stump sprouts, and building swales to increase on-site water capture.

Implementation Measures

- Conduct a watershed workshop or small forest "fair."
- Provide information on websites. Distribute handouts at local events.
- Encourage landowners to develop Forest Improvement Plans that address forest health and sustainability and assist landowners in applying for grants for funding plan preparation.
- Encourage landowners to utilize NRCS EQIP Forestry CAP (Conservation Activity Plan) to help fund development of Forest Improvement Plans by Registered Professional Foresters working in partnership with Cal Fire.
- Encourage landowners to utilize NRCS EQIP to implement Forest Improvement Plans.
- Promote management of existing redwood forest to encourage development of late seral stands.
- Coordinate with local conservation corps to provide low-cost work crews to assist landowners.

Action 1b: Identify priority areas for forest and woodland conservation, including late-successional redwoods that provide habitat for special-status species.

Knowing where important forest and woodland tracts exist, in combination with records of special-status species, will help identify opportunities for conservation through education, landowner agreements, or conservation purchases.

Implementation Measures

- Target high priority areas.

Action 1c: Implement a fuel-load management program in cooperation with Cal Fire.
Management actions may include downed wood removal, thinning of crowded and unhealthy trees, thoughtful understory management, and controlled burns.

Implementation Measures

- Target high priority areas.
- Organize neighborhood meetings with Cal Fire and local fire departments.
- Coordinate with local conservation corps to provide low-cost work crews to assist landowners.
- Assist neighborhoods in organizing and finding funding for chipping programs.

Action 1d: Determine the extent of Sudden Oak Death in the watershed and educate landowners about minimizing spread and managing infected forests.

Implementation Measures

- Coordinate with UCCE to monitor extent of SOD.
- Create outreach materials to educate landowners about how to prevent SOD spread, treat diseased trees, and handle infected wood. Distribute at local events, other watershed workshops, and through websites.
- Develop, publish, and publicize Best Management Practice (BMP) recommendations for private forest and woodland owners.

Uplands Recommendation 2: Protect existing coastal prairie and other grasslands rich in native species and manage for healthy grasslands throughout the watershed.

Scientific Reasoning

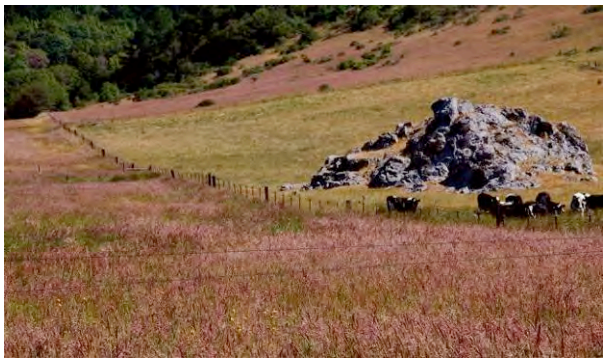
Grasslands in the Salmon Creek Watershed—like grasslands across California—have undergone dramatic changes in the past 200 years. Expanses of native bunchgrass and coastal prairie, rich in native bulbs and annual wildflowers, have been largely replaced by nonnative European grasses. Several native grassland plant species have been extirpated from the watershed, and others are known to be imperiled. Patches of native grassland remain in areas of coastal influence, on serpentine-derived soils, and in other areas of low-nutrient soils within nonnative grassland. However, fire suppression, some livestock grazing practices, and the spread of invasive species are all continuing threats to native grasslands.

Coastal prairie species.
Photo courtesy of Kathleen Kraft

Livestock grazing is a common land use in the Salmon Creek Watershed. Appropriate grazing has the potential to maintain or improve the health of the ecosystem, while high-impact grazing practices can cause severe deterioration of grassland health. Grazing can positively impact rangelands by stimulating plant growth, helping to maintain

optimal leaf area, enhancing nutritive value, removing excess litter, accelerating nutrient cycling, and manipulating botanical composition. In carefully managed conditions, grazing can be used as a control mechanism for invasive and undesirable species. Ecologically based grazing management increases the number of different plant species on rangeland, and creates a mosaic of different habitats that enhance biodiversity. A properly designed grazing system can also be used to provide zones of reduced fine fuel to assist in controlling wildfires.

Protecting and enhancing native grasslands, along with managing annual grassland to increase native species composition, will protect biodiversity and help maintain economically valuable livestock forage. Native perennial bunchgrasses with deep, extensive root systems are very effective at protecting slope stability, an important factor in stream water quality. Healthy grassland also plays an important role in pulling carbon dioxide from the atmosphere and sequestering it in plant tissue and soil.



Velvet grass flourishes in the absence of grazing. Photo courtesy of Jim Colemen

Action 2a: Support watershed ranchers in developing and implementing ranch plans that include sustainable grazing practices.

Implementation Measures

- Coordinate with UCCE and NRCS to support ranchers in developing plans.

Action 2b: Support local research and education efforts to identify and refine management strategies that promote native grassland species.

Implementation Measures

- Establish and support demonstration sites for ongoing education.
- Provide a range of educational materials and tours for ranchers, small grassland owners, and the general public.

Action 2c: Identify priority areas for native grassland conservation.

Action 2d: Develop local seed sources for native grassland plants.

There are very few readily available commercial sources of native grassland seed derived from Salmon Creek Watershed sources. A few commercial sources of California native grassland seed exist, but generally the seed provided is not of local origin. Many native plant populations show local variation. Using local seed ecotypes helps maintain local biodiversity and may also increase the likelihood that planting efforts will be successful. Making local seed available would support landowners and land managers in using appropriate natives in restoration efforts.

Implementation Measures

- Develop database of locations where key grassland species for restoration occur, and where landowners are willing to allow seed collection.
- Offer workshops identifying key grassland species for restoration use, methods of seed collection, and options for seed increase.
- Support development of a community seed bank.

Uplands Recommendation 3: Reduce impact of invasive species populations on habitat quality and function.

Nonnative and invasive velvet grass (Holcus lanatus). Photo courtesy of Trent Draper

Scientific Reasoning

Invasive species are abundant in the watershed. In particular, gorse, French broom, Scotch broom, and Himalaya blackberry have reduced habitat values, increased fire hazards, and reduced rangeland quality. Removing these species and educating residents about their impacts will help restore important ecosystem functions to the uplands of the watershed.

Action 3a: Inform residents about invasive plant species, removal techniques and timing to avoid erosion and wildlife impacts, and native species suitable for residential or rangeland plantings.

Implementation Measures

- Hold a weed-whacking workshop.
- Partner with local nurseries and distributors to provide free native plants, protectors, and other revegetation products to participants.
- Provide information on websites. Distribute handouts at local events.

Action 3b: Promote removal of gorse, French broom, Scotch broom, and Himalaya blackberry infestations and replanting with appropriate native species.

Implementation Measures

- Provide use of weed wrenches for a nominal fee.
- Organize neighborhood work parties.
- Provide free native plant(s) and disposal of invasive plant material.

Action 3c: Monitor new occurrences of invasive species and contribute to regional weed management databases and efforts.

Uplands Recommendation 4: Preserve undisturbed upland habitat and its connectivity.

Scientific Reasoning

Keeping large tracts of land undeveloped is important to the health of the Salmon Creek Watershed in several ways. Many wildlife species depend on being able to move throughout large territories to find the food, water, shelter, and breeding habitat they need to survive. A few local examples include deer, bobcats, mountain lions, spotted owls, and pileated woodpeckers (Crooks 2002, George and Brand 2002). Other species have smaller territories but require adjacent patches of different habitat types for different life stages or functions. Fragmentation of habitat also has negative effects on native plant communities. Compared to intact, continuous habitat, small patches of native forest or grassland have smaller plant population sizes, greater isolation from other populations, and higher proportions of disturbed "edge" areas. As a result, fragmented plant communities are more likely to be invaded by nonnative species and to decline in diversity over time (Minor et al. 2009). Fragmentation can also reduce pollinator populations and their crucial services to native plants and some crops (Keitt 2009). Finally, maintaining large tracts of undeveloped or low-intensity agricultural land

contributes to the beauty and serenity that many residents of the watershed value, and to the ability of local agricultural producers to sustain their livelihood.

Action 4a: Identify and protect areas needed for wildlife corridors and critical habitat.

Action 4b: Encourage use of wildlife-friendly fencing.

Most fences should allow for adequate passage of non-livestock species (i.e., smaller species should be allowed to pass under or climb over freely, and deer should be able to jump over). Fences should be constructed out of materials that will prevent entanglement and should be highly visible to wildlife. They should not restrict movement through critical habitats (e.g., stream corridors, wetlands). Unneeded perimeter fencing that excludes wildlife from large areas of habitat should be avoided. Remnant fences in rural residential neighborhoods left from past agricultural operations should be removed or modified if they unnecessarily impede wildlife movement.

Implementation Measures

- Develop informational materials to post on websites and distribute at workshops, local events, and landowner visits.

Uplands Recommendation 5: Remove invasive species from coastal dunes.

Future funding is needed to develop recommendations for restoration and protection of coastal dunes in the Salmon Creek estuary.