

Working Toward a Humboldt - Del Norte Conservation Vision: Identifying Regional Conservation Priorities



*Photos courtesy of North Coast
Regional Land Trust*

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Project Overview

Introduction

In the spring of 2004, The Nature Conservancy (TNC), Save-the-Redwoods League (SRL), and the North Coast Regional Land Trust (NCRLT) brought together public and private partners to begin developing an integrated and collaborative conservation vision for the Humboldt and Del Norte region of California. More specifically, the planning effort sought to identify conservation alternatives and foster strategic actions that balance local economic interests and natural resource conservation. While this process posed significant challenges, it also raised the hope and possibility of an expansive brand of conservation capable of addressing the full range of values defining the North Coast, its landscapes, and the sustainability of the communities occurring there.

Two planning workshops brought together public agencies, academics, landowner groups, and non-profits interested in working together to define a common conservation vision for the two-county region. This document picks up where workshop participants left off in defining a collaborative vision for conservation on the North Coast by: 1) outlining and attempting to integrate conservation priorities for The Nature Conservancy, Save-the-Redwoods League, and the North Coast Regional Land Trust; and 2) beginning to establish where, why, how, and by whom land-protection projects can be strategically implemented to ensure the greatest and most lasting conservation success for the Humboldt & Del Norte region. Included in the appendices is a summary of workshop findings, in some cases still in preliminary or incomplete form, as developed during the planning sessions.

It is the hope of all the people who contributed to this vision that future conservation in the region will be part of a larger, coherent design – one that, if fully implemented, will secure the future ecological and economic viability of the region through enhanced protection of the natural habitats and compatible working landscapes that create Humboldt & Del Norte Counties’ unique sense of place.

Brief History of Project

The motivation for this project sprang from a desire to streamline the regional planning processes of The Nature Conservancy, Save-the-Redwoods League, and the North Coast Regional Land Trust into one integrated regional conservation vision.

The Nature Conservancy’s “California North Coast Ecoregional Plan” (TNC 2001) and Save-the-Redwoods League’s “North Coastal California: A Stewardship Report” (SRL and BLM 2001) served as the foundation and beginning point of the planning effort. The Nature Conservancy’s Efroymson Workshop Series, a conservation planning process that has been used in more than 300 locations around the globe, was chosen as a tested planning tool that could bring a focused, results oriented process to the task.

Participants with diverse regional perspectives and an ability to accommodate priorities outside of their immediate sphere of influence were invited to participate (For a complete list of participants, see Appendix 1). The group met for 2 workshops, 2.5 days each, to discuss the planning area, identify conservation target systems, stresses, sources of stress, and strategies important to the area, and discuss important areas of focus for protection of the unique natural and cultural resources of the region.

After targets were identified, the three sponsoring organizations worked together to define initial conservation areas that would protect: 1) the most important ecological systems of Humboldt & Del

Norte Counties, and 2) the most important working landscapes that provide contiguous open lands, wildlife corridors, and buffers for natural species.

This plan ultimately aims to maintain the landscape of the region as an intact system of forestlands, rangelands, reserves and recreational lands with high native species diversity, functional connectivity and dynamic ecosystem processes, by building on existing conservation lands, linking disjointed open space parcels, conserving compatible working landscapes, and protecting the watersheds of many important aquatic systems.

The following organizations (as well as others who could not attend the meetings but who have done important conservation work in the region) deserve tremendous thanks for their participation and contribution towards developing this vision:

- Alexandre Family EcoDairy Farms
- Bureau of Land Management
- California Department of Fish and Game
- California Coastal Conservancy
- California Department of Parks and Recreation
- Del Norte County
- Humboldt County
- Humboldt County Farm Bureau
- Humboldt State University
- Jacoby Creek Land Trust
- Legacy – The Landscape Connection
- Mad River Biologists
- Natural Resources Conservation Service
- NOAA Fisheries
- Northcoast Environmental Center
- Pacific Seabird Group
- Redwood Community Action Agency
- Redwood National and State Parks
- Smith River Alliance
- The Buckeye Conservancy
- UC Cooperative Extension
- USFWS Humboldt Bay National Wildlife Refuge
- USGS California Cooperative Fisheries Research Unit

Situational Context

Ecoregional Context

The California North Coast Ecoregion represents the southern extension of the temperate rain forests of the Pacific Northwest. It is characterized by a series of mountain ranges that parallel the coast. Elevations range from sea level to over 2,100 meters (7,000 feet) on the crest of the Yolla Bolly Mountains. Between the fog-shrouded mountain ranges, long, narrow valleys and the region's largest rivers weave toward the coast. Numerous other smaller streams originate in the first coastal mountain range and flow directly to the ocean. With a cool, foggy climate, these counties are home to the tallest conifer in the world, the coast redwood, as well as a great diversity of flora and fauna. Species of concern include the northern spotted owl, marbled murrelet, California red-legged frog, Del Norte salamander, coho salmon, steelhead and tidewater goby.

Important coastal systems in the region include grasslands, bald hills and coastal terrace prairies; dune communities; coastal estuaries with salt marsh, brackish marsh and eelgrass beds; and closed-cone pine forests. Lowland areas near the coast are dominated by redwood and Douglas-fir-tan oak forests. Inland, the ecoregion is dominated by Douglas-fir-tan oak forest, Oregon oak woodland, annual grasslands, and mixed evergreen forests. Higher elevations contain montane mixed coniferous forests (white fir, ponderosa pine, and Douglas-fir). The interior southeastern portion of the ecoregion is characterized by mixed chaparral, foothill pine, and blue oak.

In 2001, The Nature Conservancy of California (TNCC) completed a conservation plan for the North Coast ecoregion of California (TNC 2001). This plan identified a "portfolio" of conservation areas -- defined by TNC as a network of biologically rich and viable systems that collectively embrace the unique natural diversity of the ecoregion. The plan further identifies five "Action Areas" (aggregations of portfolio conservation areas) based on biodiversity value, threat and opportunity including: Napa/Sonoma/Lake Counties, Mendocino Coast, Eel River, Humboldt-Bay/Mattole River, and Smith River/lower Klamath tributaries. The latter three are included, at least partially, in the Humboldt – Del Norte Study Area.

In 2000 and 2001, Save-the-Redwoods League and the Bureau of Land Management convened a series of workshops for groups working in the North Coast on land management and conservation, in order to better understand the landscape and discuss ongoing land conservation efforts across the region. A specific goal was to identify non-regulatory actions that contribute to the maintenance and restoration of natural and healthy ecosystems. The workshops led to the creation of a document entitled "North Coastal California: A Stewardship Report" which presented a snapshot in time of the range of conservation initiatives and opportunities present in 11 focus areas across the landscape. It did not attempt to synthesize or prioritize among them – rather it was a starting point for further exploration.

The North Coast Regional Land Trust is currently engaged in a range of conservation planning activities that emphasize the integration of ecological, economic, and community values across the region. Conservation targets include biological resources and wildlands, farm and dairylands, ranch and timberlands, recreational areas, and cultural, educational, historic, and scenic resources. Geographic areas of emphasis include: a) the coastal plains of Del Norte and Humboldt Counties, which include prime agricultural lands, significant coastal and biological resources, and human

population centers; and b) contiguous landscapes involving extensive ranchlands with little or no residential development, such as those occurring in eastern Humboldt & southwestern Trinity Counties and in the Wildcat Hills near Cape Mendocino. NCRLT's "Farmland Conservation Study" is scheduled to be completed shortly and will address the protection of agricultural lands of coastal Humboldt County. NCRLT also recently began work on its "Strategic Conservation Action Plan" for the North Coast.

Stakeholders and Partners

A history of conservation success and strong public support for conservation in the Study Area provide material to build a common conservation vision. Beginning with the birth of the Klamath and Shasta-Trinity National Forests in 1905, public agencies and non-profit organizations including the Save-the-Redwoods League, U.S. Forest Service, California Coastal Conservancy, California Department of Fish and Game, National Park Service, California State Parks, Bureau of Land Management and a number of local non-profits and land trusts have worked to protect natural areas within the region. These entities and many others are important partners in the effort to protect natural areas through region-wide initiatives.

In addition, several groups, including the North Coast Regional Land Trust and The Buckeye Conservancy, have been working with ranchers, timberland owners, farmers, and dairy landowners to conserve working landscapes and associated habitats.

Though there are many successful conservation efforts and many important groups at work and deserving of mention, a few recent conservation highlights include:

- The creation of the 112,513-acre Redwood State and National Parks – the world's largest redwood preserve.
- The Upper Mattole River and Forest Cooperative, a partnership of the Bureau of Land Management, California State Parks, California Department of Fish and Game, State Wildlife Conservation Board, California Coastal Conservancy, California Department of Forestry, Restoration Forestry, Save-the-Redwoods League, and Sanctuary Forest, Inc., that own and manage approximately 4000 acres in the headwaters of the Mattole watershed, protecting old-growth forest and salmonid habitat.
- Acquisition of the 25,000-acre Mill Creek property adjacent to the Redwood State and National Parks by the Save-the-Redwoods League in 2002, completing protection of the Mill Creek and Rock Creek watersheds.
- Save-the-Redwood League's "Corridor from the Redwoods to the Sea", a landscape scale project that seeks to maintain natural connections and wildlife corridors between the King Range National Recreation Area and Humboldt Redwoods State Park. 5000 acres have been protected so far.
- North Coast Regional Land Trust's "Six Rivers to the Sea Project", a project aiming to protect working farm and ranchlands in a contiguous belt of working landscapes.
- The Five Counties Funding Group's effort to identify and remove barriers, and improve salmon passage and water quality throughout the region's rivers.
- The California Wilderness Coalition's effort to map wildlife corridors and linkages throughout the region.

For a complete list of partners involved in important conservation work in the area, please see Appendix 1.

Land Use Patterns, Policies, and Trends

Though significant lands have been preserved in parks and national forests, more than two-thirds (108 of 168) of the portfolio sites identified in The Nature Conservancy California North Coast Ecoregional Plan in the Study Area are on private land. These sites are mostly unprotected and highly threatened by fragmentation from suburban and rural development, and incompatible timber harvest practices. Encouraging best management practices and preventing subdivision in large rural working timberland and rangeland landscapes has the potential to protect vast intact areas of habitat, and create a network of wildlife movement corridors. However, due to negative timberland and agricultural industry trends, rapidly increasing land values, and population growth in the region, the window of opportunity to do so will not last long.

Although Humboldt and Del Norte Counties have historically been very productive timber regions, timber industry dynamics in California have undergone a major downward shift in the past twenty years, negatively impacting the industry, as well as the local community and the environment. A number of factors have negatively influenced the industry, driving land conversion to other uses. One important factor is a regional reduction in supply due to intensive harvest without immediate re-supply. In addition, an inconsistent domestic housing market, declining Asian markets in the 1990s, and an increasing foreign lumber supply with relatively lower cost from Canada, Brazil, Chile, and Russia have had negative impacts. Further, conflict between the industry and the environmental community resulting in lawsuits, as well as intensifying regulation, have increased operating costs. The high cost of complying with regulations is a particular burden on smaller landowners who lack sufficient timber to offset those costs. With forestland owners facing growing difficulty maintaining the viability of working forests in California, pressure to extract resources in an unsustainable manner to increase profits has grown, and conversion to other more profitable uses such as vineyards and residential development is a real, immediate threat.

Market volatility, increasing regulation costs, and consolidation and corporitization of producers, distributors and retailers in the agricultural economy are driving increased farmland and rangeland conversion to other uses in the state as well. Residential development and subdivision as well as conversion of open rangeland to more intensive agricultural uses, primarily cultivation of wine grapes, are the main threats.

In the North Coast ecoregion, land values have risen dramatically in recent years. Population growth and an increasing demand for housing are contributing to rising land costs in this historically rural area. Changing demographics have played a role in increasing real estate values, with the scenic beauty and quiet lifestyle of the region attracting residents from other areas. The California Department of Finance projects the area's population will nearly double by 2020. These new residents, who are generally older and wealthier than local residents, can afford vacation homes or retirement properties at prices above what many locals can afford to pay for their primary residences.

Although these changes in the agricultural and forest industries represent a challenge, they also present a tremendous opportunity to preserve intact forest landscapes and agricultural lands before they change hands and are broken up into smaller parcels. Existing positives to build on include:

- The presence of several experienced conservation partners already engaged in conservation efforts within the region.
- Significant blocks of already protected land provide a foundation for additional conservation work that emphasizes landscape connectivity and function.
- Large ranchlands and timberlands still exist in the region and offer opportunities to protect large areas from conversion and subdivision by working with willing landowners.
- Incompatible forest practices, and listing of threatened and endangered species such as northern spotted owl, marbled murrelet, and salmonids, have engendered widespread public support for landscape scale conservation initiatives in the area.
- Strong community support for maintaining the rural feel and quality of life in the region.

By focusing on protecting large, intact landscapes, biologically rich areas and compatible working landscapes, this conservation vision presents an opportunity to preserve some of Humboldt and Del Norte Counties' most important landscapes from conversion to more intensive uses.

Conservation Vision

General Project Description

The Humboldt Del-Norte Study Area encompasses most of Del Norte and Humboldt Counties, extending from the Smith River basin south to the northern reaches of Mendocino County and includes the Mattole River, East Branch South Fork Eel River, Lower North Fork Eel River and Hulls Creek basins. It extends from the coast eastward to the edges of the Smith River, Lower Klamath River (at confluence with the Trinity River) and Redwood Creek basins in Del Norte and Humboldt Counties, and eastward to the eastern edge of the Mad River basin in Trinity County.

The Study Area captures a diverse range of habitats throughout the North Coast. This 3,289,317-acre area supports vast stands of redwoods and Douglas-fir forests, salmon-rich streams, oak woodlands, serpentine grasslands, coastal estuaries and many other natural systems.

The forest landscapes of the coastal mountains are central to the Study Area. Not only do they serve as large blocks of intact habitat, they also provide key linkages between the natural areas of the coast, and the extensive wildlands of the Six Rivers, Shasta-Trinity and Klamath National Forests that stretch north to Oregon and east to the Central Valley. These forested mountains harbor a significant number of northern California's free-flowing rivers including the Winchuck River, Smith River, Lower Klamath River, Redwood Creek, Little River, Elk River, Salmon Creek, Salt River, Bear River, and the Mattole River.

These rivers and their riparian habitat are critical to the survival of declining river and forest species, including coho, chum and Chinook salmon, steelhead and cutthroat trout, river and western brook lamprey, green sturgeon, eulachon, reticulate sculpin, tidewater goby, Del Norte salamander, southern torrent salamander, foothill yellow-legged frog, northern red-legged frog, tailed frog, northwestern pond turtle, Karok Indian snail, Aleutian Canada goose, marbled murrelet, northern spotted owl, bald eagle, bank swallow, northern goshawk, pacific fisher, California wolverine, and white-footed vole (California Natural Diversity Database, 2000).

Other unique features of the Study Area include its diverse range of rare coastal habitats including coastal prairies, coastal forests, coastal dunes, estuaries and coastal wetlands. In particular, Humboldt Bay has been singled out for special attention in this document as it is one of California's largest and most biologically important coastal estuaries. Its wetlands, intertidal mudflats and eelgrass beds provide essential habitat for a great diversity of life, including 141 invertebrate species, 110 fish species and 251 bird species. In addition, Humboldt Bay supports the third largest aggregation of eelgrass beds in the Pacific northwest region (LeValley et al. 2004).

Key Conservation Targets

Due to the involvement of a wide group of participants with diverse interests, both ecological and socioeconomic conservation targets are addressed as part of this planning process. During the first workshop, 27 participants worked together to select a list of targets that best represented the natural and cultural diversity of the region.

The group focused on natural communities, using the assumption that natural communities act as ecological umbrellas for a host of associated species at this planning scale. In addition, the group

identified a list of “socioeconomic” targets – elements that are important to sustainability in the region and for the important role they play as adjacent, matrix, and buffer areas to the natural community targets that were selected.

Ecological and socioeconomic targets are listed by thematic group below in Table 1. For a complete list of conservation targets identified in the TNC California North Coast Ecoregional Plan clipped to the Humboldt-Del Norte Study Area, see Appendix 4. A more complete list of sensitive species occurring in the Study Area is also included in Appendix 5 of this report.

Table 1 – Conservation Targets by Thematic Group

Thematic Groups	Targets
Forests, Ecological	Coastal redwood - old growth
	Redwood forest ecosystem
	Low-elevation Douglas-fir/hardwood - old growth
	Low elevation Douglas-fir/hardwood - ecosystem
	Montane forests (Douglas-fir without hardwood & with true fir)
	Port Orford cedar
	Marbled murrelet
	Wide-ranging wildlife species
Forests, Socioeconomic	Industrial & commercially owned forest
	"Family forest"
	Visitor experience
Aquatics	Native fish assemblages - area wide view
	Riparian corridor function/condition
	Floodplains and fluvial wetlands
	Drinkable, fishable, swimmable water quality
	Upland wetlands, seeps, springs, ponds & lakes
Coastal Areas and Estuaries	Coastal forests (shore pine and sitka spruce)
	Coastal scrub
	Coastal prairie
	Small coastal lagoons / estuaries
	Coastal freshwater marsh
	Coastal salt marsh
	Dunes and sandy beaches
Humboldt Bay	Tidal marsh (salt and brackish)
	Inter-tidal mudflat
	Eel grass
	Tidal water column
	Freshwater marsh
	Pacific Brant
	Native fish assemblage
	Shellfish
Bottomlands and Grasslands, Ecological	Native oak woodlands
	Bald hills prairies
	Serpentines (& rock outcrops)
Bottomlands and Grasslands, Socioeconomic	Family ranches & rangelands
	Public recreation lands
	Family farms & farmlands
	Family dairies & dairylands

Systems, Stresses, and Sources of Stresses

Once targets were selected, the group used TNC's "5S" methodology (used to develop conservation area plans and site-specific conservation plans) to assess Study Area targets (TNC 2003). The process involves an assessment of the Study Area's target **systems**, defined as highest priority natural communities and species, the **stresses** to those systems, and **sources** of those stresses. Coupled with consideration of situational factors such as land use, ownership patterns, partners, and stakeholders, this analysis forms the basis for identifying areas of initial project focus and immediate **strategies** for conserving these areas.

Using TNC's standard planning process and a great facilitator, systems were evaluated and assessed for viability by looking at ecological attributes (size, condition and landscape context) and indicators of these attributes. Stresses were evaluated and ranked by degree of severity and scope. Sources were evaluated and ranked by their contribution to stresses and their irreversibility.

The conservation partners broke into four thematic groups to identify and evaluate important targets within the Study Area. The four thematic groups chosen were:

- ❑ Forests – This group was tasked to look at both the natural and working forest landscapes and identify socioeconomic targets as well as ecological targets.
- ❑ Coastal / estuarine (including Humboldt Bay) – In addition to general analysis of coastal areas in the Study Area, the coastal/estuarine group added a more detailed assessment of systems, stresses and sources for Humboldt Bay due to its importance in the region.
- ❑ Aquatics – This group was tasked to look at the rivers and streams in the Study Area with a particular focus on anadromous fish due to the key role these fish play in this system.
- ❑ Grasslands and bottomlands – This group was tasked to look at both the natural and working grassland and bottomland landscapes and identify socioeconomic targets as well as ecological targets.

Findings for each of these four groups, as well as geographic areas prioritized for conservation follow. For a complete list of individual targets and their stresses and sources of stresses, please see Appendices 2 and 3.

Priority Forest Systems

The redwood forest ecosystem was the primary focus of the forest working group as it is a globally unique and charismatic forest type in the Study Area. The Study Area is home to the majority of the world's remaining ancient coast redwood forest and includes the most extensive stands of coast redwood forest in the world. Save-the-Redwoods League played a leading role within the forest group in the workshops and subsequent follow-up and has been developing a conservation vision for the range of the redwoods. The primary arenas of conservation activity for SRL's ongoing work will be:

- * **Viable parks and reserves** – areas within and adjacent to existing protected areas that need to be managed primarily for natural values to sustain the ecosystem over time.
- * **Privately owned ancient redwood forests**
- * **Connecting forest landscape** – the broader forest landscape, managed for multiple conservation values.

For the redwood forest ecosystem to be able to sustain itself over time, three components must be present: intact ancient forest, a viable and representative network of parks and reserves, and a forested, connecting matrix landscape. The connecting matrix forest landscape may be managed for timber production, residential uses, or just left to recover. The essence is that it supports, and in turn is supported by the core parks and reserves – areas managed with preservation of their natural function as the paramount goal. These components each have an implied spatial scale, from stand to watershed to landscape, and serve as the hierarchy that can be used to stratify conservation strategies. While each component can be mapped with reasonable accuracy, the conservation areas shown on Map 1 primarily represent the viable parks and reserves embedded within the broader connecting matrix forest landscape. Each conservation area on the map builds on existing redwood conservation lands within a sustainable redwood forest ecosystem, managed for multiple resource values. A brief profile of each redwood conservation area is included below:

1. **Grizzly Creek** - This 21,000-acre redwood conservation area includes the ancient redwood forests along the banks of the Van Duzen River, a tributary to the Eel River. This area contains some of the most easterly protected ancient redwood forest. The conservation area is comprised of the Grizzly Creek watershed to the north and the Root Creek watershed to the south. Grizzly Creek enters the Van Duzen in the heart of the Grizzly Redwoods State Park, while Root Creek enters just upstream of the Cheatham Grove Unit of the Park. Approximately 7% of the conservation area is currently conserved in Grizzly Creek Redwoods State Park and the Van Duzen County Parks.
2. **Humboldt Bay Watershed**- This 20,000-acre redwood conservation area includes the Elk Creek and Salmon Creek watersheds that drain the forested hills above Humboldt Bay. The upper watersheds are heavily forested and include the spectacular Headwaters Forest Reserve – a 7,400-acre reserve that contains a 3,000-acre stand of ancient redwood forest. This forest was acquired through a Federal/State partnership and is now managed by the BLM. In contrast to most other ancient forest reserves which are lower in elevation, this is relatively high elevation mixed redwood – Douglas-fir forest. The lower portions of Salmon Creek are protected in the Humboldt Bay National Wildlife Reserve. Humboldt Bay is one of California’s largest and most ecologically significant coastal lagoons. Approximately 18% of this conservation area is currently protected.
3. **Humboldt Coastal Lagoons** - This 53,000-acre redwood conservation area includes the coastally draining watersheds of Big, Stone and Freshwater Lagoons (south to north) and the coastal strip south of Patrick’s Point State Park. This chain of lagoons is among the most pristine in the State. The park was established to protect the spectacular coastal habitat at the entrance of what became Redwood National Park. Although small in acreage, the ancient forest in this conservation area is ecologically interesting. Ancient redwoods mix with Sitka spruce and grand fir and are buffeted by winter storms. The coastal strip south of Patrick’s Point State Park has been developed and broken up into parcels. Approximately 10% of this conservation area is protected.
4. **Humboldt Redwoods State Park** - This 129,000-acre redwood conservation area includes the world’s largest contiguous stand of ancient redwood forest, as well as a sizable grove that contains the tallest trees in the world. Most of the park lies along the South Fork Eel River and two of its tributaries, Bull Creek and Canoe Creek. The park is bisected by Highway 101 and the Avenue of the Giants, with both roads running parallel to the river. A series of small communities lie along the Avenue of the Giants – the original redwood highway and now a

popular scenic alternative to Highway 101. Approximately 41% of the conservation area is protected in Humboldt Redwoods State Park.

5. **Jedediah Smith and Del Norte Coast Redwoods State Parks (Smith River)**- This 64,500-acre redwood conservation area includes the primeval forests of Jedediah Smith Redwoods State Park and Del Norte Coast Redwoods State Park, both within Redwood National and State Parks. The conservation area encompasses the coastally draining watersheds north of the Klamath River to Crescent City, and the Mill Creek watershed, a tributary to the wild-and-scenic Smith River. Mill Creek has been identified as one of California's premiere wild coho salmon nurseries. The upper 25,000-acres of the watershed were acquired for addition to Jedediah Smith in 2002 in a project spearheaded by the SRL. The League and its project partners are currently engaged in an ambitious project to restore old forest characteristics to the watershed. Jedediah Smith Redwoods State Park protects the headwaters of Jordan Creek that drains into the Lake Earl State Wildlife Area. Approximately 66% of this conservation area is protected.
6. **Prairie Creek** - This 44,400-acre redwood conservation area includes the Prairie Creek watershed and the southern watersheds at the mouth of the Klamath River. Prairie Creek and its tributaries are almost completely protected within Prairie Creek Redwoods State Park and Redwood National Park. Little Lost Man Creek, a tributary to Prairie Creek, is one of very few sub-watersheds in the redwood region that is largely intact, never having experience logging. The conservation area is bisected by the Highway 101 Newton B. Drury scenic parkway, an old section of Highway 101 that runs through the heart of Prairie Creek Redwoods State Park. In addition to its ancient redwood forests, the Park is renowned for its herd of Roosevelt Elk which is often seen in the chain of meadows that run through the heart of the conservation area. Approximately 78% of the conservation area is protected.
7. **Redwood Creek** - This 156,000-acre redwood conservation area includes the Redwood Creek watershed. Prairie Creek joins Redwood Creek just north of Orick and flows to the ocean just north of Humboldt Lagoons. The lower third of the watershed is protected in Redwood National Park, established to protect old growth groves in 1968. The Park was expanded in 1978 to include second growth forests in the lower watersheds. Beginning in 1978, the National Park Service began to implement a watershed restoration program within the upper watershed. That program continues to this day. The conservation area also includes the Lacks Creek Late Seral Reserve, managed by BLM to protect rare low-elevation ancient Douglas-fir forests. The Lacks Creek Late Seral Reserve is within the Redwood National Park Park Protection Zone (PPZ). National Park staff have more review authority over timber harvest plans in the PPZ than upstream from the zone. The conservation area is bisected by Highway 299. Approximately 36% of the conservation area is protected.
8. **Richardson & Benbow (South Fork Eel River)** - Located in southern Humboldt County, this 57,800-acre redwood conservation area includes the sub-watersheds that drain into Richardson Grove State Park, Benbow Lake State Recreation Area and John B. Dewitt State Reserve. Richardson Grove and John B. Dewitt State Reserve were established to protect alluvial flat ancient redwood groves on the South Fork Eel River. Benbow Lake State Recreation Area was

established around a seasonally dammed lake on the South Fork Eel River. Approximately 6% of this conservation area is protected.

- 9. Upper Mattole** - This 17,500-acre redwood conservation area includes the upper watershed of the free-flowing Mattole River. The Mattole River leaves the conservation area and flows north and west for more than 30 miles, paralleling the un-roaded Lost Coast until it empties into the Pacific west of Petrolia. The conservation area is home to the Upper Mattole River and Forest Cooperative - a group of public, private and non-profit land owners and managers dedicated to cooperative management of their land to protect its conservation values. Approximately 16% of the conservation area is protected.

Priority Aquatic Ecosystems

Freshwater ecosystems are a conservation priority in the Study Area, and represent one of the biggest conservation challenges in the region due to persistent stressors. The system targets identified in the workshops include: native fish assemblages, riparian corridor function/condition, floodplains and fluvial wetlands, water quality, and upland wetlands, seeps, springs, ponds and lakes. These targets span a broad range of aquatic ecosystems and are intended to capture the primary components that need to be addressed for aquatic ecosystem conservation. As targets *per se*, they are difficult to map well (or at all) and our representation of them on Map 1, primarily nests them within conservation areas. This is achieved in two ways: 1) the conservation areas of all three partners are mapped primarily as watersheds, and 2) select rivers and streams are buffered where the watershed was too large.

The economic benefits of aquatic ecosystem conservation are considerable in this region and range from municipal water quality to sustainable agriculture and fisheries. The economic dimensions of aquatic conservation will likely engender creative strategies that meet the needs of a broad range of stakeholders.

While a comprehensive discussion of the aquatic conservation areas on Map 1 is beyond the scope of the document, we do want to call attention to those areas that stand out for exceptional values. Below is a brief discussion of these areas.

- 1. Redwood Creek** - All partners prioritized this watershed as a conservation area. Most of Redwood National Park is included in this area; however, much of the watershed is unprotected. The creek supports a phenomenal number of juvenile Chinook salmon (Larry Serpa, personal communication), as well as Aleutian Canada goose, coast cutthroat trout, Del Norte salamander, foothill yellow-legged frog, northern red-legged frog, southern torrent salamander, summer steelhead, tailed frog and tidewater goby populations (TNC 2001). Upland areas support northern spotted owl, pacific fisher, and marbled murrelet (TNC 2001). The upper watershed connects the Redwood National Park to Six Rivers National Forest, two late-seral reserves, and rugged portions of the Hoopa Valley Reservation.
- 2. South Fork Eel River** - Much of the upper watershed has been prioritized by SRL and TNC for conservation. This river supports both coho and Chinook salmon as well as steelhead, foothill yellow-legged frog, northwestern pond turtle, southern torrent salamander and tailed frog, and has outstanding riparian conditions (TNC 2001). Upland areas support northern spotted owl and red tree vole (TNC 2001).

3. **Humboldt Bay Watershed** — Humboldt Bay is one of the largest estuarine systems on the West Coast of North America. All 3 partners have prioritized targets that collectively extend across the watershed and contribute to its function, health, and integrity. Targets include upland old growth redwood stands, native salmon and steelhead populations, water quality, wetlands, and unique natural communities associated with the coast and/or coastal estuaries.
4. **Smith River** – The Smith River has the finest steelhead run in the state and 47% of all coast cutthroat trout are found in this basin (TNC 2001). Chinook and coho salmon, as well as Del Norte salamander, foothill yellow-legged frog, northern red-legged frog, southern torrent salamander, tailed frog and tidewater goby are also found in the watershed (TNC 2001). Wetlands, estuaries, and a variety of other unique natural communities of the coast are also associated with the lower watershed.
5. **Mattole River** – Seven TNC portfolio sites and three SRL priority conservation areas lie in this watershed. The upper Mattole watershed provides some of the best coho habitat left in the Study Area (TNC 2001). The Mattole also supports Chinook, steelhead, foothill yellow-legged frog, tailed frog and southern torrent salamander (TNC 2001).

Priority Coastal / Estuarine Areas and Humboldt Bay

The coastal portion of the Study Area is extensive, spanning over 200 miles. Because of the ecological importance of Humboldt Bay to the region, it was broken out of the coastal/estuarine thematic group and has its own set of systems and stresses separate from the remainder of the coastal area. The system targets for the coastal/estuarine portion of the Study Area include: coastal forests (shore pine and Sitka spruce), coastal scrub, coastal prairie, small coastal lagoons/estuaries, coastal freshwater marsh, coastal salt marsh, and dunes and sandy beaches. The system targets for Humboldt Bay include: tidal marsh (salt and brackish), inter-tidal mudflat, eelgrass, tidal water column, freshwater marsh, Pacific brant, native fish assemblages, and shellfish.

Coastal terrace prairie was identified as one of the most threatened systems, due in large part to alteration of fire regimes. Since coastal terrace prairies are distributed in a patchy manner throughout the coastal portion of the Study Area, it is difficult to identify a few priority areas. However, restoration of natural fire regimes in coastal park lands with significant area of coastal terrace prairie (such as Redwood National Park), and protection of additional areas of coastal terrace prairie currently on private lands are the priorities. Better mapping of distribution and condition of existing coastal terrace prairie would help to prioritize place-based conservation actions.

While a comprehensive discussion of the coastal/estuarine priority conservation areas on Map 1 is beyond the scope of the document, we do want to call attention to those areas that stand out for exceptional values for coastal and estuarine systems. Below is a brief discussion of these areas.

1. **Lake Earl and the Coastal Plain** - Lake Earl and the coastal plain between the Smith River and Crescent City include beach, coastal dune, lake, wetland, and coastal forest habitats. Eleven miles of dune systems are found along the coast here. Lake Earl is the largest coastal lagoon in California and supports a diverse assemblage of fish and wildlife. It also has one of the largest tidewater goby populations in California and supports cutthroat trout, coho salmon, and steelhead. The Lake Earl area has 5,000 acres of wetlands (including 2,300 acres of sub-

tidal estuarine habitat, 1,600 acres of freshwater marshes, and 900 acres of flooded forest and scrub-shrub wetlands). Around the wetlands are shore pine and Sitka spruce forests. More than 250 species of birds use Lake Earl and it is an important stop on the Pacific Flyway for migrating waterfowl and shorebirds. The area is a key staging area for migrating Aleutian Canada goose. Much of the land in this area is public, including the Lake Earl Wildlife Area (5,100 acres) and Tolowa Dunes State Park. There are private lands around the lake, however, and there is conflict over lake level management. For example, breaching of a sand bar on the lake protects private property from flooding but negatively impacts the lake ecosystem (SRL and BLM, 2001).

2. **Humboldt Coastal Lagoons** - This area includes the Redwood Creek watershed and a chain of lagoons along the coast including Freshwater, Stone, Dry, and Big Lagoons. Along the coastal strand there are scattered remnant stands of Sitka spruce and coastal shrub. The lagoons support populations of tidewater goby and anadromous fish including coho, Chinook, and steelhead, although upstream sedimentation, artificial breaching of the bars, introduced species, and barriers to fish migration are adversely affecting these species. Redwood Creek, which feeds into the lagoons, is an important anadromous fish stream. Redwood National and State Parks and Humboldt Lagoons State Park are in this area. The coastal lagoons and adjacent watersheds are managed by California Department of Fish and Game, California State Parks, Humboldt County Parks, Simpson Timber Company, Big Lagoon Rancheria, and small private interests (SRL and BLM, 2001).
3. **Humboldt Bay** - Humboldt Bay is the second largest estuary in California, after San Francisco Bay. It contains a diverse mixture of habitats including tidal marsh (salt and brackish), freshwater marsh, tidal flats, tidal channels and sloughs, open water, and eelgrass beds. The eelgrass beds in the bay are the most extensive in the State and provide habitat or forage for numerous species of fish, invertebrates, and waterfowl. Humboldt Bay is a critical stop for migratory waterfowl, including brants. The bay habitats support at least 141 invertebrate species, 110 fish species, and 251 bird species (LeValley et al. 2004). The coastal dune systems along the north and south spit contain approximately 1600 acres of open dunes, vegetated dunes, and dune forests and are some of the least disturbed dunes on the west coast. Much of the dunes are on public lands, while the wetlands around the bay are on both private and public lands. The upper watersheds are heavily forested but primarily owned by private timber companies (SRL and BLM, 2001).
4. **Eel River Estuary** – The Eel River estuary lies at the mouth of one of the North Coast's largest rivers. The Eel River drains 3,600 miles of watershed and forms a delta where it meets the sea. The delta includes freshwater, brackish, and salt marshes, tidal sloughs and channels, and open water habitats. Along the coastal strand are dune systems and coastal Sitka spruce forest. The flood plain at the mouth extends for 33,000 acres. The estuary supports dozens of species of fish including longfin smelt, green sturgeon, coho and Chinook salmon, steelhead, and Pacific lamprey. The open water and marsh habitats are a critical stop on the Pacific Flyway for many species of waterfowl and shorebirds. The delta has one of the largest populations of western snowy plover on the North Coast (TNC 2001). The intensive logging upstream has resulted in significant deposition of sediment in the estuary that has adversely impacted ecosystem function and populations of anadromous and estuarine-dependent fish. Within the Eel River delta, there are 2,000 acres of public lands, primarily managed by California Department of Fish and Game (Table Bluff Ecological Reserve and the Eel River

Wildlife Area). The coastline area north and south of the Eel River estuary is primarily in private land ownership (SRL and BLM, 2001).

Priority Grasslands and Bottomlands

The economic vitality of the region is directly tied to the condition and productivity of its natural resources. This is especially true in the lowlands where the majority of the region's human population is concentrated. The areas delineated by North Coast Regional Land Trust on Map 1 represent the areas where the intersection of agricultural, recreational and ecological values is most pronounced. The grasslands and bottomlands group broke out their targets, stresses and sources into ecological and socioeconomic categories. The targets identified by the socioeconomic group during the workshops include: family ranches and rangelands, public recreation lands, family farms and farmlands, and family dairies and dairylands. The target systems identified for ecological values include: oak woodlands, bald hills prairies, and serpentines and rock outcrops. Many of the ecological targets in the grasslands and bottomlands section are embedded in the broader Study Areas identified on Map 1. Outside of public land, many of the river bottoms and coastal plains in the region are currently in agricultural production and are important conservation areas for ranches and dairies. Specific conservation priority areas include:

1. **Redwood Creek** - The bottomlands alongside the lower estuary consist of prime agricultural soils that support several productive, family-owned dairy farms.
2. **Smith River** - Expansive bottomlands involving prime agricultural soils occur on the coastal plain and support numerous family-owned dairy farms. The North Fork Smith River also has important ecological targets including serpentine outcrops and barrens (TNC 2001).
3. **Mattole River** – Conserving working ranchlands of the North Fork and lower mainstem of the Mattole offer opportunities to prevent further fragmentation of the watershed as a result of subdivision and development. In addition, the North Fork Mattole River has significant unprotected, rare bald hills prairie (TNC 2001).
4. **Eel River** – East Branch South Fork Eel River, Kekawaka Creek, Hulls Creek and the Lower North Fork Eel River have all been identified as priority areas for conserving Oregon oak woodland on the North Coast (TNC 2001). Indian Creek, Hulls Creek, and Lower North Fork Eel River drainages have been identified as priority areas for conserving Mixed North Slope Cismontane Woodland (TNC 2001).
5. **South Fork Van Duzen River** – This drainage has been identified as a priority area for protecting Oregon oak woodland (TNC 2001).

Strategic Approach

Long Term Ecological Vision (Goals)

- **Regional** - Maintain the Humboldt-Del Norte Study Area as an intact system of forestlands, rangelands, reserves and recreational lands with high native species diversity, functional connectivity and dynamic ecosystem processes.
- **Forests** -- Maintain the redwood and associated coastal forests, rivers and streams as an intact system of old-forest reserves, parks and appropriately managed timberland with high native species diversity, older forest characteristics and dynamic ecosystem processes.
 - Protect, restore and enhance degraded watersheds of core redwood forest parks and reserves.
 - Protect unobstructed habitat corridors between redwood forest parks and reserves, as well as corridors between these parks and reserves eastward to the Six Rivers National Forest and westward to the Pacific Ocean.
 - Maintain and enhance the existing high quality visitor experience in the network of core parks and reserves.
 - Encourage a viable sustainable forest products industry that values high native species diversity, functional connectivity and dynamic ecosystem processes.
- **Aquatics** -- Maintain and restore the ecological components and processes indicative of functional aquatic ecosystems across the Study Area to secure viable populations of water-dependent birds, fish and wildlife within a natural range of distribution and abundance.
 - Restore the structural and compositional characteristics of functioning riparian areas to sustain aquatic biodiversity by minimizing channel alteration, sedimentation from forestry practices, restoring natural vegetation along streams and rivers, and restoring connectivity between riparian systems and floodplains.
 - Sustain and restore native fish assemblages to reflect the full complement of fish species historically present in the Study Area with a focus on native anadromous fish species.
 - Improve watershed functioning and restore water quality and quantity within natural range of variation by protecting important upland aquatic sites such as wetlands, springs and lakes and minimizing water diversions and excessive sedimentation and pollution from forestry and agricultural practices.
- **Coastal / Estuarine (including Humboldt Bay):** Protect and restore coastal (forests, prairies, scrub), estuarine (marsh, eelgrass, estuaries and lagoons), and beach and dune systems in intact functional landscapes that allow for natural processes, provide habitat for coastal/estuarine dependent species, and provide critical linkages between terrestrial/aquatic/marine environments.
 - Protect and restore coastal prairie and remnant coastal forests (Sitka spruce, shore pine) and maintain these patch communities in a functional coastal scrub matrix.
 - Protect and restore coastal estuaries and lagoons (particularly the most threatened components such as salt marsh, brackish marsh, and eelgrass beds) and the ecological processes needed to sustain them (freshwater inputs, tidal exchange, etc.).
 - Protect and restore coastal dunes and beaches that provide important habitat for threatened plants, shorebirds, and other species.

- Maintain and restore important linkages between marine, estuarine, aquatic and terrestrial systems that are important for estuarine-dependent species such as salmonids, shorebirds, waterfowl, and native shellfish.
- **Grasslands and Bottomlands:** Protect and restore grasslands, ranchlands, and oak woodlands in functional landscapes that allow for natural processes, provide habitat for resident species, and provide critical linkages between core habitat areas.
 - Protect and restore grasslands and maintain functional blocks of this habitat.
 - Protect ranch and farmlands as key buffer lands and as part of a functional working landscape matrix supporting both people and wildlife.
 - Protect and restore oak woodlands.
 - Protect and restore important linkages between natural and working grassland and bottomland landscapes and the upland and coastal systems that are important for area-dependent species such as ungulates and carnivores.

Areas of Collaborative Interest

Given the broad range of conservation issues addressed by the partner organizations and the largely undeveloped character of the region, a large proportion of the Study Area has been identified for its conservation value. While the selected conservation areas are organized by the thematic resource groups from the workshop, many of the areas were chosen for multiple conservation values. The conservation areas are shown on Map 1 and are broken out by the organization that is likely to take the lead within this area. The map, however, can only tell a part of the story. A broad range of partners including private individuals, nonprofit organizations, public agencies and private businesses will be involved in achieving lasting conservation in the area, and will have diverse conservation goals.

In the initial Efroymson workshops, maps of vegetation, rare species, and land ownership were provided and participants were asked to help refine conservation area boundaries, identify conservation targets, and design core reserves, buffers and linkages. Using existing protected lands as the initial framework, workshop participants helped identify large blocks of lands containing important conservation targets that would serve as core areas or nodes in the conservation design. Other lands located on the periphery of core nodes with lesser amounts of conservation targets were designated as buffer lands. Both working and non-working landscapes were considered. Potential landscape linkages across fragmented areas between core nodes were not addressed by the group, as that work was simultaneously being completed by Legacy – The Landscape Connection under contract to the California Wilderness Coalition, a participating partner group. Their work ultimately will be incorporated into this vision when it is completed.

The initial mapping and analysis that served as a basis for the Efroymson planning workshops was done at various times over the last several years and was not done specifically in preparation for the workshops. Therefore, not all of the selected conservation targets may be represented within a particular conservation area. This is most true for the coastal/estuarine targets. Some of this discrepancy is a function of slightly different planning goals and analytical scale of planning processes among the sponsoring partner organizations, and some is a function of the difficulty of mapping the targets. While many of the system targets identified in the worksheets are critical components of the region's landscape, they have not been adequately mapped yet and cannot be mapped without a significant investment.

The highest ranking priority conservation areas across all identified target systems include:

- Redwood Creek
- Mattole River/Six Rivers to Sea
- Humboldt Bay
- Smith River
- South Fork Eel River

Key Strategies – In order to preserve the integrity and function of regional landscapes, the partners will focus on preventing fragmentation of large holdings and supporting compatible land uses using the following five main strategies:

1. **Land Protection** – Protect key properties in the Study Area through fee acquisition, conservation easements, and/or limited development.
2. **Land Use Planning** – Facilitate protection of functional landscapes throughout the region by working with local governments, planners, and developers to plan well-designed open space, set-asides, mitigation, and growth management, including support for the following:
 - Humboldt General Plan Update
 - Public funding for open space through state bond issues and local funding initiatives
3. **Partnerships** – Further develop and maintain partnerships with key landowners, organizations and agencies to bolster successful protection of nodes, corridors, natural areas and working landscapes within the Study Area.
4. **Land Management** – Work with private landowners to develop best management practices for working landscapes, forests, ranches, dairies, and farmlands. Provide incentives and technical assistance to landowners for this purpose.
5. **Conservation Science/Planning** – Determine information gaps related to the targets and fill them as needed to successfully plan for and implement conservation projects in Humboldt Bay, coastal systems, upland wetlands, oak woodlands, bald hills prairies and other grasslands.

5-year Objectives

1. Forests

- **Land Acquisition:** Secure strategic core and buffer forestland tracts to protect critical habitat and enable restoration of natural processes. Secure working forest conservation easements (WFCEs) on priority connecting matrix forestland. Support acquisition of Goose Creek inholding for addition to the Six Rivers National Forest. Develop funding sources for forestland protection, including preservation, and working forest conservation easements.
- **Restoration:** Restore old forest conditions and naturally functioning riparian habitat to young forest plantations by supporting forest science research, improving restoration techniques, and supporting the restoration of Mill Creek. Establish a forest restoration learning network to bring together restoration practitioners to share experiences.

- **Planning and Science:** Establish network of reference watersheds and stands to monitor trends in forests over time. Support scientific inquiry into restoration of old forest characteristics and truly sustainable forest management.
- **Compatible Economic Development:** Promote sustainable forest management as an alternative to conversion of forests to incompatible uses through support of forest science research and acquisition of WFCEs on strategic forestland properties. Convene a group of scientists to inform forest management standards on private timberland.
- **Forest Regulations:** Support reform of the Forest Practice Rules to streamline permitting while maintaining and, where appropriate, enhancing forest management standards.

2. Coastal / Estuarine (Including Humboldt Bay)

- **Conservation Easements and Land Acquisition:** Protect privately-held coastal prairie through purchase or easements.
- **Restoration and Land Management:** Reduce invasives in coastal marsh habitat and reduce additional invasions through monitoring, removal, restoration, and supporting the establishment of Humboldt Bay – Eel River Estuary as National Estuarine Research Reserve.
- **Restoration:** Develop regional restoration plan with thorough mapping of invasives and native dune communities to prioritize sites for native dune restoration.
- **Restoration and Land Management:** Map current extent of coastal terrace prairie. Develop vision of historic/baseline coastal terrace prairie (extent and composition) to guide restoration and encourage development of adaptive management plans to maintain prairie and reduce encroachment of scrub and forests on county, state and federal lands.

3. Aquatics

- **Management:** Reform ecologically harmful forestry practices to minimize the loss of diverse structural components near riparian areas and to prevent increased sedimentation near stream crossings due to timber harvest, or road building and maintenance.
- **Restoration:** Engage in collaborative processes, research and restoration activities to mitigate effects of fish barriers from dams or inadequate stream crossings. Use existing passage databases to prioritize restoration activities.
- **Policy:** Work with local, regional and state regulatory agencies to improve the quantity, timing and quality of water in the river systems to mimic the variations in the natural hydrography. This includes addressing groundwater overuse, the frequency, magnitude and timing of water diversions. Support zoning ordinances that recognize and protect important aquatic resources, particularly in areas where new residential development is anticipated.
- **Conservation Easements:** Establish conservation easements with stream protection provisions for properties bordering important stream reaches.

6. Grasslands and Bottomlands

- **Conservation Easements:** Retain functional landscapes and working lands by establishing conservation easements on key properties (or by securing fee-title ownership where appropriate).
- **Land Management:** Work with farmers and ranchers to encourage resource protection via best management practices. Encourage use of existing Natural Resources Conservation Service and Resource Conservation District programs where applicable. Promote conservation of natural habitats and associated wildlife species, including consideration for movement across the regional landscape between core areas through the development of unique landowner incentives and technical assistance programs. Assist landowners and land managers in

developing adaptive management plans to maintain forest and stream habitats, grasslands and oak woodlands. Implement prescribed burning and manual eradication programs to slow or stem conversion of oak woodlands to Douglas-fir forests.

- **Mapping, Conservation Planning and Research:** Map current extent of grasslands. Develop an oak woodlands management plan for Humboldt County. Conduct research on the structure and dynamics of oak woodlands to determine patterns and causes of regeneration or lack of regeneration.
- **Policy:** Work with county governments to establish policies that minimize conversion of essential habitats to agricultural lands. Work with county government to establish policies that minimize conversion of working landscapes. Develop agricultural lands conservation campaign and promote initiatives within agricultural communities, including the Farm Bureau and Natural Resources Conservation Service. Participate in General Plan updates.
- **Advocacy:** Encourage increased production of sustainable value-added agricultural products.

Conclusions and Next Steps

The Efrogmson workshops and resultant Humboldt-Del Norte Conservation Vision document are important first steps in a collaborative conservation planning effort to protect the natural and socioeconomic values of the North Coast. In working together to define initial conservation areas that will protect: 1) the most important ecological systems of Humboldt & Del Norte Counties, 2) and working landscapes that provide contiguous open lands, wildlife corridors, and buffers for natural species, the partner organizations have begun to coordinate efforts and establish where, why, how, and by whom land protection projects can be strategically implemented to ensure the greatest and most lasting conservation success for the Humboldt & Del Norte region. Further detailed planning efforts by each individual partner organization will continue to build on this initial endeavor and affect conservation success in the Study Area.

It is hoped by all those involved in this effort that in working together to create a cohesive and coordinated conservation vision for the region we can increase the amount of natural habitats and compatible working landscapes that are protected in Humboldt & Del Norte Counties.

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Appendices

Appendix 1 – Key Contacts

Appendix 2 – Target Systems and Stresses

Appendix 3 – Sources of Stress by Target System

Appendix 4 - TNCC North Coast Ecoregional Plan Conservation Targets

Appendix 5 – Sensitive Species of the Study Area

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Partners performing conservation work in the region

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Ancient Forest International	NOAA Fisheries
Bureau of Land Management	Northcoast Environmental Center
California Alternatives to Toxics	North Coast Regional Land Trust
California Department of Fish and Game	North Coast Sierra Club
California Department Forestry & Fire Protection	Pacific Forest Trust
California Native Plant Society	Pacific Seabird Group
California State Parks	Redwood Community Action Agency
California Wilderness Coalition	Redwood National & State Parks
Cattleman's Association	Redwood Region Audubon Society
California Coastal Commission	Restoration Forestry, Inc.
California Coastal Conservancy	Salmon Forever
Del Norte County Community Development Department	Sanctuary Forest
Environmental Protection Information Center	Save-the-Redwoods League
Friends of Del Norte County	Seventh Generation Fund
Friends of the Dunes	Simpson Timber
Friends of the Eel River	Six Rivers National Forest
Friends of the Van Duzen	Smith River Alliance
Hoopa Tribe	The Buckeye Conservancy
Humboldt County Farm Bureau	The Nature Conservancy
Humboldt County	Trees Foundation
Humboldt North Coast Land Trust	Trout Unlimited
Humboldt State University	Trust for Public Land
Humboldt Watershed Council	UC Cooperative Extension
Institute for Sustainable Forestry	United States Fish & Wildlife Service
Jacoby Creek Land Trust	US Geological Survey, California Cooperative Fisheries Research Unit
KRIS	Wildlife Conservation Board
Legacy - The Landscape Connection	Wyott Tribe
Mattole Restoration Council	Yurok Tribe
Mid Mattole Conservancy	

Appendix 2 – Target Systems and Stresses by Thematic Group

1. Forests, Ecological

□ Systems

The following are the target systems identified for conservation within the natural forest landscape of the Study Area: old growth coastal redwood, redwood forest ecosystems, low elevation Douglas-fir and hardwood old growth, low elevation Douglas-fir and hardwood ecosystems, montane forests (Douglas-fir without hardwood and with true firs), Port Orford cedar, marbled murrelet, and large scale habitat for wide-ranging species. Table 1 lists systems in columns, and overall rank threat to target systems at the bottom of each column.

Table 1

Threats Across Systems		Coastal redwood - old growth	Redwood forest ecosystem	Low-elevation DF/hw - old growth	Low elevation DF/hw - ecosystem	Montane forests (DF w/out hw & w/true fir)	Port Orford cedar	Marbled murrelet	Wide-ranging wildlife species	Overall Threat Rank
1	Poor road construction and/or maintenance	Very High	Medium	-	Low	-	Very High	-	?	Very High
2	Incompatible forestry practices	High	High	Very High	High	Medium	-	Very High	?	Very High
3	Fire suppression	Medium	Medium	Very High	High	Medium	-	-	?	High
4	Pathogen introductions	-	-	-	-	Medium	Very High	-	?	High
5	Human refuse	-	-	-	-	-	-	Very High	?	High
6	Rural residential development	Low	Medium	-	High	-	-	High	?	High
7	Oil spills	-	-	-	-	-	-	Low	?	Low
8		-	-	-	-	-	-	-	?	-
Threat Status for Targets and Site		High	Medium	Very High	High	Medium	Very High	Very High	?	Very High

*Wide-ranging species are being evaluated for incorporation in the project by Legacy- The Landscape Connection.

□ Stresses

There are eight major stresses to these target systems including: alteration of fire regime with an increase in ladder fuels; modification of water levels and changes in natural flow patterns in streams and rivers; increased sedimentation in streams and rivers; altered composition and structure of forests including simplification of stand age and reduction in species diversity; habitat fragmentation; invasion by exotic non-native species; extraordinary parasitism/predation/disease including heavy nest predation of marbled murrelet by corvid species, and severe spread of disease in Port Orford Cedar populations; and habitat destruction including reduced nesting habitat for marbled murrelets.

Table 2

Stresses (Altered Key Ecological Attributes) Across Systems		Coastal redwood - old growth	Redwood forest ecosystem	Low- elevation DF/hw - old growth	Low elevation DF/hw - ecosystem	Montane forests (DF w/out hw & w/true fir)	Port Ordford cedar	Marbled murrelet	Wide- ranging wildlife species
1	Alteration of natural fire regime	Medium	Medium	Medium	High	Medium	-	-	?
2	Modification of water levels, changes in natural flow patterns	-	High	-	-	-	-	-	?
3	Sedimentation	Very High*	-	-	-	-	-	-	?
4	Altered composition, structure	Low	Medium	Very High*	Medium	Medium	High	-	?
5	Habitat fragmentation	Medium	Medium	Medium	Medium	-	-	-	?
6	Invasion by exotic non-native species	Low	Medium	-	-	-	-	-	?
7	Extraordinary predation/ parasitism/disease	-	-	-	-	Medium	Very High	Very High	?
8	Habitat destruction							High	?

*indicates user override.

2. Forests, Socioeconomic

□Systems

The following are the target systems identified for conservation within the working forest landscape of the Study Area: industrially and commercially owned forest, “family forest”, and visitor experience (recreation). Table 3 lists systems in columns, and overall rank threat to target systems at the bottom of each column.

Table 3

Threats Across Systems		Industrial & commercially owned forest	"Family forest"	Visitor experience	Overall Threat Rank
1	Catastrophic, stand replacing event	-	-	Very High	High
2	Complicated, unpredictable, uncertain regulatory environment	High	High	-	High
3	Residential development	-	Low	High	Medium
4	High road density	-	-	High	Medium
5	Local supply / global demand	Medium	High	-	Medium
6	Product technology / product substitution	Medium	Medium	-	Medium
7	Cost of production	Medium	-	-	Low
8		-	-	-	-
Threat Status for Targets and Site		Medium	High	Very High	High

□Stresses

The major stresses to the working forest target systems are listed in Table 4.

Table 4

Stresses (Altered Key Socioeconomic Attributes) Across Systems		Industrially & commercially owned forest	"Family forest"	Visitor experience
1	Absence of flora and fauna			Low
2	Bright night skies			Low
3	Permanent loss of TPZ land from production (conversion)	Medium	Medium	
4	Air pollution			Low
5	Noise pollution			High
6	Impaired long-term value	High	Medium	
7	Impaired short-term value	Medium	High	
8	Loss of ancient awe-inspiring trees			Very High*
9	Low market value of unit commodity (i.e. mbf)	Medium		
10	Management for non-forest products		Low	
11	Market vulnerability		Medium	
12	Visual simplicity			High

*indicates user override.

3. Coastal / Estuarine (Including Humboldt Bay)

□Systems

The following are the target systems identified as important for conservation within coastal areas of the Study Area: coastal forests (shore pine and Sitka spruce), coastal scrub, coastal prairie, small coastal lagoons/estuaries, coastal freshwater marsh, coastal salt marsh, and dunes and sandy beaches. Table 5 provides a ranking of key threats to coastal and estuarine systems and an overall summary threat rank for each system. The threat ranking is based on current threats and does not incorporate historic threats that may already have reduced the viability of these systems. The group did not have time to address small coastal lagoons/estuaries or dunes and sandy beaches. Coastal terrace prairies and coastal freshwater marshes are the most threatened systems.

Table 5 – Coastal / Estuarine

Threats Across Systems		Coastal forests (shore pine and sitka spruce)	Coastal scrub	Coastal prairie	Small coastal lagoons / estuaries	Coastal freshwater marsh	Coastal salt marsh	Dunes and sandy beaches	Overall Threat Rank
1	Residential development	Low	Medium	High	?	High	-	?	High
2	New and upgraded roads	-	-	-	?	High	-	?	Medium
3	Invasive and alien species	-	Medium	Medium	?	-	High	?	Medium
4	Incompatible grazing practices	-	Low	Medium	?	Medium	-	?	Medium
5	Invasion of native tree species	-	-	Medium	?	-	-	?	Low
6	Incompatible crop production	-	-	Medium	?	-	-	?	Low
7	Global climate change	-	-	Medium	?	-	-	?	Low
8	Fire suppression	-	-	Medium	?	-	-	?	Low
9	Conversion to agriculture	Low	Low	-	?	-	-	?	Low
10	Recreation	-	-	-	?	-	Low	?	Low
11		-	-	-	?	-	-	?	-
Threat Status for Targets and Site		Low	Medium	High	?	High	Medium	?	High

Humboldt Bay, due to its large size, is uniquely important in the ecoregion and warranted additional focus by the coastal/estuarine group. Humboldt Bay has different targets and threats than many of the smaller estuaries or lagoons in the region. The following are the target systems identified for conservation within Humboldt Bay: tidal marsh (salt and brackish), inter-tidal mudflat, eelgrass, tidal water column, freshwater marsh, Pacific brant, native fish assemblages and shellfish. Table 6 provides a ranking of key threats to coastal and estuarine systems and an overall summary threat rank for each system. The threat ranking is based on current threats and does not incorporate historic threats that may already have reduced the viability of these systems. The group only had time to assess tidal marsh, inter-tidal mudflat, and eelgrass habitats. Tidal marsh was considered the most threatened system.

Table 6 – Humboldt Bay

Threats Across Systems		Tidal Marsh (salt and brackish)	Inter-tidal mudflat	Eel Grass	Tidal water column	Freshwater Marsh	Pacific Brant	Native fish assemblages	Shellfish	Overall Threat Rank
1	Shipping/port development	High	Medium	Low	?	?	?	?	?	Medium
2	Dredging	High	Medium	Low	?	?	?	?	?	Medium
3	Invasive/alien species	High	-	Medium	?	?	?	?	?	Medium
4	Construction of ditches, dikes, drainage or diversion systems	High	-	-	?	?	?	?	?	Medium
5	Oil/toxic spill events	Medium	Medium	Medium	?	?	?	?	?	Medium
6	Conversion to aquaculture	-	Low	Medium	?	?	?	?	?	Low
7	Marina development	-	-	Medium	?	?	?	?	?	Low
8	Industrial discharge	-	Medium	-	?	?	?	?	?	Low
9	Commercial/industrial development	-	Medium	-	?	?	?	?	?	Low
10	Non-point source runoff	-	Low	-	?	?	?	?	?	Low
Threat Status for Targets and Site		High	Medium	Medium	?	?	?	?	?	High

□ **Stresses**

The major stresses to the coastal/estuarine target systems are: alteration of natural fire regime; modification of water levels, changes in natural flow patterns; altered composition and structure including lack of recruitment; degradation of suitable soils; habitat fragmentation; and habitat destruction.

Table 7 – Coastal / Estuarine

Stresses (Altered Key Ecological Attributes) Across Systems		Coastal forests (shore pine and sitka spruce)	Coastal scrub	Coastal prairie	Small coastal lagoons / estuaries	Coastal freshwater marsh	Coastal salt marsh	Dunes and sandy beaches
1	Alteration of natural fire regime	Medium	-	High	?	-	-	?
2	Modification of water levels, changes in natural flow patterns	-	-	-	?	Low	Low	?
3	Altered composition/structure	Medium	Medium	High	?	High	High	?
4	Degradation of suitable soils	-	-	Medium	?	-	-	?
5	Habitat fragmentation	Low	Medium	Medium	?	High	High	?
6	Habitat destruction	Low	Medium	Medium	?	Low	Low	?

The major stresses to Humboldt Bay systems include: modification of water levels and changes in natural flow pattern; altered composition/structure including loss of native species; sedimentation and turbidity; habitat destruction/conversion including reduced areal extent of salt marsh and mudflats; toxins/contaminants; and reduced primary productivity.

Table 8 – Humboldt Bay

Stresses (Altered Key Ecological Attributes) Across Systems		Tidal Marsh (salt and brackish)	Inter-tidal mudflat	Eel Grass	Tidal water column	Freshwater Marsh	Pacific Brant	Native fish assemblage	Shellfish
1	Modification of water levels, changes in natural flow pattern	Medium	-	-	?	?	?	?	?
2	Altered composition/structure	High	-	Medium	?	?	?	?	?
3	Sedimentation	Low	Medium	Low	?	?	?	?	?
4	Habitat destruction/conversion	Low	Low	Medium	?	?	?	?	?
5	Toxins/contaminants	-	Medium	-	?	?	?	?	?
6	Reduced primary productivity	-	-	Medium	?	?	?	?	?

4. Aquatics

□Systems

The following are the target systems identified for conservation within the natural aquatic areas of the Study Area: native fish assemblages, riparian corridor function/condition, floodplains and fluvial wetlands, water quality, and upland wetlands, seeps, springs, ponds and lakes. Table 9 lists systems in columns, and overall rank threat to target systems at the bottom of each column. The group did not have time to address upland wetlands, seeps, springs, ponds and lakes.

Table 9

Threats Across Systems		Native fish assemblages - area wide view	Riparian corridor function/condition	Floodplains and fluvial wetlands	Drinkable, fishable, swimmable water quality	Upland wetlands, seeps, springs, ponds & lakes	Overall Threat Rank
1	Commercial/industrial development	-	-	Medium	Very High	?	Very High
2	Incompatible forestry practices	Medium	Very High	-	Very High	?	Very High
3	Road construction and maintenance	High	High	-	Very High	?	High
4	Leveeing/flood control	-	Very High	High	-	?	High
5	Dams and diversions	Medium	Medium	-	Very High	?	High
6	Conversion to agriculture	Low	Very High	Medium	Medium	?	High
8		-	-	-	-	?	-
Threat Status for Targets and Site		Medium	Very High	Medium	Very High	?	Very High

□Stresses

There are 6 major stresses to the aquatic target systems including: sedimentation; fragmentation including interruption of stream connectivity; organic pollutants; altered composition/structure including inadequate overstory/canopy, even-age tree composition, reduced species diversity and increased channel width; thermal alteration; and modification of water levels and changes in natural flow patterns.

Table 10

Stresses (Altered Key Ecological Attributes) Across Systems		Native fish assemblages - area wide view	Riparian corridor function/condition	Floodplains and fluvial wetlands	Drinkable, fishable, swimmable water quality	Upland wetlands, seeps, springs, ponds & lakes
1	Altered composition/structure	Medium	Very High	-	-	?
2	Modification of water levels, changes in natural flow patterns	High	-	High	Very High*	?
3	Sedimentation	High	-	-	Very High*	?
4	Fragmentation	-	Medium	-	-	?
5	Organic pollutants	-	-	-	High	?
6	Thermal alteration	High	-	-	Very High*	?

*indicates user override.

5. Grasslands and Bottomlands, Ecological

□Systems

The following are the target systems identified for conservation within the natural grasslands and bottomlands of the Study Area: oak woodlands, bald hills prairies, and serpentine and rock outcrops. Table 11 lists systems in columns, and overall rank threat to target systems at the bottom of each column. The group did not have time to address bald hills prairies.

Table 11

Threats Across Systems		Serpentines (& rock outcrops)	Native oak woodlands	Bald hills prairies	Overall Threat Rank
1	Parasites/pathogens	High	Medium	?	Medium
2	Fire suppression	Medium	High	?	Medium
3	Invasive/alien species	-	High	?	Medium
4	Incompatible grazing practices	Low	Medium	?	Low
5	Road construction and use	Medium	-	?	Low
Threat Status for Targets and Site		Medium	High	?	Medium

□Stresses

There are 3 major stresses to the natural grasslands and bottomlands target systems including: alteration of natural fire regime, altered composition and structure, and habitat destruction and conversion.

Table 12

Stresses (Altered Key Ecological Attributes) Across Systems		Serpentines (& rock outcrops)	Native oak woodlands	Bald hills prairies
1	Altered composition/structure	High	High	?
2	Alteration of natural fire regime	High	High	?
3	Habitat destruction or conversion	Low	High	?

6. Grasslands and Bottomlands, Socioeconomic

□Systems

The following are the target systems identified for conservation within the working grasslands and bottomlands of the Study Area: family ranches and rangelands, public recreation lands, family farms and farmlands, and family dairies and dairylands. Table 13 lists systems in columns, and overall rank threat to target systems at the bottom of each column. The group did not have time to address public recreation lands.

Table 13

Threats Across Systems		Family ranches & rangelands	Public recreation lands	Family farms & farmlands	Family dairies & dairylands	Overall Threat Rank
1	Resistance to change & limited exposure	-	?	-	Very High	High
2	High market demand for residential/commercial property	Medium	?	High	High	High
3	Costs of competing products are externalized	High	?	High	-	High
4	Unwillingness of consumers to pay more for a locally-produced, value-added products	High	?	High	-	High
5	Distance from large markets & poor transportation systems	High	?	Medium	-	Medium
6	Low returns for input compared to other careers	-	?	-	High	Medium
7	Dysfunctional regulatory system	High	?	-	-	Medium
8	Residential, recreation, & wildlife-related values conflict with agricultural uses	Medium	?	High	Medium	Medium
9	Benefits not apparent or initially realized	-	?	Medium	-	Low
10	Landowner liability	-	?	-	-	?
11	Vandalism, theft, littering, etc.	-	?	-	-	?
12	Lack of recreational infrastructure	-	?	-	-	?
Threat Status for Targets and Site		High	?	High	High	High

□Stresses

The major stresses to the working grassland and bottomlands target systems are listed in Table 14.

Table 14

Stresses (Altered Key Socioeconomic Attributes) Across Systems		Family ranches & rangelands	Public recreation lands	Family farms & farmlands	Family dairies & dairylands
1	Conflict over agricultural activities (with neighbors)	Low	?	-	-
2	Conversion to other uses	Medium	?	High	High
3	Limited land availability/ high cost of land	High	?	High	Medium
4	Regulatory costs/disincentives	High	?	-	-
5	Weak markets for local products	Very High	?	High	-
6	Too few ranches/dairies/farms to sustain support services	Medium	?	Medium	Low
7	Limited pool of ranchers/ dairymen who will continue operations	Medium	?	-	High
8	Limited profitability	Very High	?	-	-
9	Technological/educational limitations	-	?	-	Medium
10	Unexplored niche markets	-	?	-	Very High
11	Lack of infrastructure (trails, roads, signs, etc.)	-	?	-	-
12	Overuse	-	?	-	-

Appendix 3- Sources of Stress by Thematic Group

Sources of Stresses by Target System - Forest, Ecological

□ Sources of Stresses

The highest ranking sources of stress for forest systems include: poor road construction and/or maintenance; incompatible forestry practices including intensive even-age silviculture and harvest of old-growth trees; fire suppression; pathogen introductions; deposition of human refuse; and rural residential development.

1. Coastal redwood – old growth

Threats - Sources of Stress		Habita fragmentation & associated edge effects	Altere hydrological regim (sedimentation fro watershed)	Altered fire regim	Reduction in siz	Invasive by exotic non-nativ species	Threat to System Rank	
1	Coastal redwood- old growth	Medium	Very High	Medium	Low	Low		
1	Poor upstream road construction and / or maintenance	Contribution	Lo	Very High	-	-	Very High	
		Irreversibility	High	High	-			
		Override						
		Source	Medium	Very High	-	-		-
	Combined Rank	Lo	Very High	-	-	-		
2	Intensive even-age silviculture	Contribution	Very High	Medium	Medium	High	High	
		Irreversibility	High	High	High	Very High		Medium
		Override						
		Source	Very High	Medium	Medium	High		Medium
	Combined Rank	Medium	High	Lo	Lo	Lo		
3	Fire suppression	Contribution	-	-	Very High		Medium	
		Irreversibility	-	-	Very High			
		Override						
		Source	-	-	Very High	-		-
	Combined Rank	-	-	Medium	-	-		
4	Harvest of old trees	Contribution	Lo			Medium	Lo	
		Irreversibility	Very High	-	-	Very High		
		Override	-	-	-			
		Source	-	-	-	High		-
	Combined Rank	-	-	-	Lo	-		
5	Road construction and realignment (i.e. Hwy 101) - County / CalTrans	Contribution	High	Medium		Lo	High	
		Irreversibility	Very High	Medium		Very High		High
		Override						
		Source	High	Medium	-	Medium		High
	Combined Rank	Medium	High	-	Lo	Lo		
6	Rural residential development	Contribution	Lo				Lo	
		Irreversibility	Very High					Medium
		Override						Medium
		Source	Medium	-	-	-		Medium
	Combined Rank	Lo	-	-	-	Lo		

2. Redwood forest ecosystem

Threats - Sources of Stress		Fragmentation of forest cover	Simplification of stand age and structure	Invasion by exotic non-nativ species	Altered hydrologic regime	Altered fire regime	Threat to System Rank	
2	Redwood forest ecosystem	Medium	Medium	Medium	High	Medium		
1	Intensive even-age silviculture	Contribution	Very High	High	High	Very High	Medium	High
		Irreversibility	Medium	Medium	High	High	Very High	
		Override						
		Source	High	Medium	High	Very High	High	
		Combined Rank	Medium	Lo	Medium	High	Medium	
2	Short history of structural recruitmen	Contribution	-	Medium	-	-	-	Lo
		Irreversibility	-	High	-	-	-	
		Override						
		Source	-	Medium	-	-	-	
		Combined Rank	-	Lo	-	-	-	
3	Poor upstream road construction and / or maintenanc	Contribution	Medium	-	High	-	High	Medium
		Irreversibility	Medium	-	High	-	Very High	
		Override						
		Source	Medium	-	High	-	High	
		Combined Rank	Lo	-	Medium	-	Medium	
4	Rural residential developmen	Contribution	Lo	-	High	-	High	Medium
		Irreversibility	Very High	-	Medium	-	High	
		Override						
		Source	Medium	-	Medium	-	High	
		Combined Rank	Lo	-	Lo	-	Medium	
5	Harvest of old trees	Contribution		High				Medium
		Irreversibility		Very High				
		Override						
		Source	-	High	-	-	-	
		Combined Rank	-	Medium	-	-	-	
6	Fire suppression	Contribution					High	Medium
		Irreversibility					High	
		Override						
		Source	-	-	-	-	High	
		Combined Rank	-	-	-	-	Medium	

3. Low elevation Douglas-fir/hardwood – old growth

Threats - Sources of Stress		Unnatural fire regime - timing (frequent) & intensity (hot) & extent (large)	Habita fragmentation	Edge effects	Reduction in siz	Threat to System Rank	
3	low-elevation DF/hw - old growth	Medium	Low	Medium	Very High		
1	Fire suppression	Contribution	Very High	-	High	High	Very High
		Irreversibility	High	-	High	High	
		Override					
		Source	Very High	-	High	High	
		Combined Rank	Medium	-	Medium	Very High	
2	Intensive even-age silviculture	Contribution	Medium	Medium	Medium		Low
		Irreversibility	Low	Medium	Medium		
		Override					
		Source	Low	Medium	Medium	-	
		Combined Rank	Low	Low	Low	-	
3	Harvest of old trees	Contribution	-			High	Very High
		Irreversibility	-			Very High	
		Override					
		Source	-	-	-	High	
		Combined Rank	-	-	-	Very High	

4. Low elevation Douglas-fir/hardwood - ecosystem

Threats - Sources of Stress		Fragmentation of forest cover	Simplificatio of stand age and structure	Unnatural stan development patterns	Altered fire regim	Threat to System Rank	
4	low elevation DF/hw - ecosystem	Medium	Medium	Medium	High		
1	Intensive even-age silvicultur	Contribution	Very High	High	High	High	High
		Irreversibility	Medium	Medium	Medium	High	
		Override					
		Source	High	Medium	Medium	High	
		Combined Rank	Medium	Low	Low	High	
2	Short history of structural recruitment	Contribution	-	Medium	-	-	Low
		Irreversibility	-	High	-	-	
		Override					
		Source	-	Medium	-	-	
		Combined Rank	-	Low	-	-	
3	Poor upstream road construction and / or maintenance	Contribution	Low	-	-	-	Low
		Irreversibility	Low	-	-	-	
		Override					
		Source	Low	-	-	-	
		Combined Rank	Low	-	-	-	
4	Rural residential development	Contribution	Low			Medium	High
		Irreversibility	Very High			Very High	
		Override					
		Source	Medium	-	-	High	
		Combined Rank	Low	-	-	High	
5	Harvest of old trees	Contribution		Medium			Medium
		Irreversibility		Very High			
		Override					
		Source	-	High	-	-	
		Combined Rank	-	Medium	-	-	
6	Fire suppression	Contribution				Very High	High
		Irreversibility				High	
		Override					
		Source	-	-	-	Very High	
		Combined Rank	-	-	-	High	

5. Montane forests (Douglas-fir without hardwood and with true firs)

Threats - Sources of Stress		Unnatural levels of accumulation	Reduced species diversity	Hig pathogen/pest loa	Increase in ladder fuels	Threat to System Rank	
5	Montane forests (DF w/out hw & w/true	Medium	Medium	Medium	Medium		
1	Fire suppression	Contribution	Very High	Medium	Medium	Very High	Medium
		Irreversibility	High	Medium	Medium	High	
		Override					
		Source	Very High	Medium	Medium	Very High	
		Combined Rank	Medium	Low	Low	Medium	
2	Low light	Contribution	-	Very High	-	-	Medium
		Irreversibility	-	High	-	-	
		Override					
		Source	-	Very High	-	-	
		Combined Rank	-	Medium	-	-	
3	Pathogen introductions	Contribution	Low	-	Very High	-	Medium
		Irreversibility	Medium	-	Very High	-	
		Override					
		Source	Low	-	Very High	-	
		Combined Rank	Low	-	Medium	-	
4	High tree densities	Contribution	High	High	High	Very High	Medium
		Irreversibility	High	High	High	High	
		Override					
		Source	High	High	High	Very High	
		Combined Rank	Medium	Medium	Medium	Medium	

6. Port Orford cedar

Threats - Sources of Stress		Infected watersheds	Death of large, old POC	Presence & use of infectious vectors (i.e. roads)	Threat to System Rank	
6	Port Orford cedar	Very High	High	Very High		
1	Poor upstream road construction and / or maintenance	Contribution	Very High	Very High	Very High	Very High
		Irreversibility	Very High	Very High	Very High	
		Override				
		Source	Very High	Very High	Very High	
		Combined Rank	Very High	High	Very High	
2	Pathogen introductions	Contribution	Very High	High	-	Very High
		Irreversibility	Very High	Very High	-	
		Override				
		Source	Very High	High	-	
		Combined Rank	Very High	High	-	

7. *Marbled murrelet*

Threats - Sources of Stress		Reduction in suitable nesting habitat	Nest predation by corvid populations	Adult mortality at land	Adult mortality at sea	Threat to System Rank	
7	Marbled Murrelet	High	Very High	Low	Low		
1	Intensive even-age silviculture	Contribution	Very High	High		Very High	
		Irreversibility	Very High	High			
		Override					
		Source	Very High	High	-		-
		Combined Rank	High	Very High	-		-
2	Rural residential development	Contribution		Low		High	
		Irreversibility		High			
		Override					
		Source	-	Medium	-		-
		Combined Rank	-	High	-		-
3	Human refuse	Contribution		Very High		Very High	
		Irreversibility		Low			
		Override					
		Source	-	High	-		-
		Combined Rank	-	Very High	-		-
4	Collisions with vehicles and power lines	Contribution		Low		-	
		Irreversibility		Medium			
		Override					
		Source	-	-	Low		-
		Combined Rank	-	-	-		-
5	Oil spills - large / catastrophic	Contribution			Medium	Low	
		Irreversibility			High		
		Override					
		Source	-	-	-		Medium
		Combined Rank	-	-	-		Low
6	Oil spills - small / intermittent	Contribution			Medium	Low	
		Irreversibility			High		
		Override					
		Source	-	-	-		Medium
		Combined Rank	-	-	-		Low
7	Harvest of old trees	Contribution	Very High			High	
		Irreversibility	Very High				
		Override					
		Source	Very High	-	-		-
		Combined Rank	High	-	-		-

Sources of Stresses by Target System – Forest, Socioeconomic

□Sources of Stresses

The highest ranking sources of stress for working forest systems include: catastrophic, stand replacing events including clear-cutting and monoculture; and the complicated, unpredictable and uncertain regulatory environment.

1. Industrial and commercially owned forest

Threats - Sources of Stress		Low market value of unit commodity (i.e.mbf)	Impaired long-term value	Impaired short-term value	Permanent loss of TPZ land from production	Threat to System Rank	
1	Industrial & commercially	Medium	High	Medium	Medium		
1	Complicated, unpredictable, uncertain regulatory environment	Contribution	Medium	Very High	Very High	Medium	High
		Irreversibility	High	High	High	High	
		Override					
		Source	Medium	Very High	Very High	Medium	
		Combined Rank	Low	High	Medium	Low	
2	Product technology / product substitution	Contribution	Medium	Medium	Medium		Medium
		Irreversibility	Medium	Medium	Medium		
		Override					
		Source	Medium	Medium	Medium	-	
		Combined Rank	Low	Medium	Low	-	
3	Global market place	Contribution	Very High	Medium	High		Medium
		Irreversibility	High	High	High		
		Override					
		Source	Very High	Medium	High	-	
		Combined Rank	Medium	Medium	Medium	-	
4	Cost of production	Contribution	Very High	Medium	High		Medium
		Irreversibility	High	Medium	High		
		Override					
		Source	Very High	Medium	High	-	
		Combined Rank	Medium	Medium	Medium	-	
5	Economics of the business	Contribution				Very High	Medium
		Irreversibility				High	
		Override					
		Source	-	-	-	Very High	
		Combined Rank	-	-	-	Medium	

2. "Family Forest"

Threats - Sources of Stress		Conversion to non-timberland use	Management for non-forest products	Encumbered short-term value	Market vulnerability	Unpredictable long-term value of forest products	Threat to System Rank	
2	"Family forest"	Medium	Low	High	Medium	Medium		
1	Residential development	Contribution	Medium	Low	-	-	-	Low
		Irreversibility	High	Medium		-	-	
		Override						
		Source	Medium	Low	-	-	-	
		Combined Rank	Low	-	-	-	-	
2	Product technology / product substitution	Contribution	-	Low	High	High	Very High	Medium
		Irreversibility	-	Low	Medium	Medium	High	
		Override						
		Source	-	Low	Medium	Medium	Very High	
		Combined Rank	-	-	Medium	Low	Medium	
3	Complicated, unpredictable, uncertain regulatory environment	Contribution	High	High	High	-	-	High
		Irreversibility	Very High	Medium	High	-	-	
		Override						
		Source	High	Medium	High	-	-	
		Combined Rank	Medium	Low	High	-	-	
4	Local supply / global demand	Contribution	Medium	High	High	High	High	High
		Irreversibility	High	Medium	Very High	High	Very High	
		Override						
		Source	Medium	Medium	High	High	High	
		Combined Rank	Low	Low	High	Medium	Medium	

3. Visitor experience

Threats - Sources of Stress		absense of flora and fauna	dirty air	loss of ancient awe-inspiring trees	bright night skies	human created sounds	visual simplicity	Threat to System Rank	
3	Visitor experience	Low	Low	Very High	Low	High	High		
1	clear cutting	Contribution	High		Low	-	Low	Very High	High
		Irreversibility	High		Very High	-	Medium	Medium	
		Override							
		Source	High	-	Medium	-	Low	High	
		Combined Rank	Low	-	High	-	Low	High	
2	monoculture	Contribution	High		Low	-		Very High	High
		Irreversibility	High		Very High	-		Medium	
		Override							
		Source	High	-	Medium	-	-	High	
		Combined Rank	Low	-	High	-	-	High	
3	High road density	Contribution	High	High		Low	High	Medium	High
		Irreversibility	High	High		High	High	High	
		Override							
		Source	High	High	-	Medium	High	Medium	
		Combined Rank	Low	Low	-	Low	High	Medium	
4	Residential development	Contribution	High	High		High	High	High	High
		Irreversibility	Very High	Very High		Very High	Very High	Medium	
		Override							
		Source	High	High	-	High	High	Medium	
		Combined Rank	Low	Low	-	Low	High	Medium	
5	Catastrophic, stand replacing event	Contribution			Very High				Very High
		Irreversibility			Very High				
		Override							
		Source	-	-	Very High	-	-	-	
		Combined Rank	-	-	Very High	-	-	-	

Sources of Stresses by Target System – Coastal Areas and Estuaries

□ Sources of Stresses

The highest ranking source of stress for coastal/estuarine systems is residential development. Other important stresses include: addition of new roads and maintenance of existing roads, invasion of non-native species, and incompatible grazing practices.

1. Coastal forests (shore pine and Sitka spruce)

Threats - Sources of Stress		Altered disturbance regime	Altered population structure / lack of recruitment	Habitat fragmentation / destruction	Threat to System Rank	
1	Coastal forests (shore	Medium	Medium	Low		
1	Residential development	Contribution		Medium	Low	
		Irreversibility		Very High		
		Override				
		Source	-	-		High
		Combined Rank	-	-		Low
2	Conversion to agriculture	Contribution		Medium	Low	
		Irreversibility		High		
		Override				
		Source	-	-		Medium
		Combined Rank	-	-		Low

2. Coastal scrub

Threats - Sources of Stress		Habitat fragmentation / destruction	Loss of native species	Threat to System Rank	
2	Coastal scrub	Medium	Medium		
1	Residential development	Contribution	High	Low	Medium
		Irreversibility	Very High	Very High	
		Override			
		Source	High	Medium	
		Combined Rank	Medium	Low	
2	Agricultural conversion	Contribution	High	Low	Low
		Irreversibility	Medium	Medium	
		Override			
		Source	Medium	Low	
		Combined Rank	Low	Low	
3	Incompatible grazing practices	Contribution	Medium	Medium	Low
		Irreversibility	Medium	Medium	
		Override			
		Source	Medium	Medium	
		Combined Rank	Low	Low	
4	Invasive and alien species	Contribution	-	High	Medium
		Irreversibility	-	High	
		Override			
		Source	-	High	
		Combined Rank	-	Medium	

3. Coastal prairie

Threats - Sources of Stress		Loss of Characteristic native species	Loss Connectivity	Altered suitable disturbance regime	Loss of minimum dynamic area(habitat)	Degradation of suitable soils	Threat to System Rank	
3	Coastal prairie	High	Medium	High	Medium	Medium		
1	Incompatible development	Contribution	High	High	High	High	High	High
		Irreversibility	Very High	Very High	Very High	Very High	Very High	
		Override						
		Source	High	High	High	High	High	
		Combined Rank	High	Medium	High	Medium	Medium	
2	Incompatible crop production	Contribution	Low	Low	Low	Low	Low	Medium
		Irreversibility	High	High	Medium	High	High	
		Override						
		Source	Medium	Medium	Low	Medium	Medium	
		Combined Rank	Medium	Low	Low	Low	Low	
3	Incompatible grazing practices	Contribution	High		High	Medium	Medium	Medium
		Irreversibility	Medium		Medium	Medium	Medium	
		Override						
		Source	Medium	-	Medium	Medium	Medium	
		Combined Rank	Medium	-	Medium	Low	Low	
4	Global climate change	Contribution	Low			Low		Medium
		Irreversibility	Very High			Very High		
		Override						
		Source	Medium	-	-	Medium	-	
		Combined Rank	Medium	-	-	Low	-	
5	Invasive natives and alien species	Contribution	High			High		Medium
		Irreversibility	Medium			Medium		
		Override						
		Source	Medium	-	-	Medium	-	
		Combined Rank	Medium	-	-	Low	-	
6	Fire suppression	Contribution	High		High	High		Medium
		Irreversibility	Medium		Medium	Medium		
		Override						
		Source	Medium	-	Medium	Medium	-	
		Combined Rank	Medium	-	Medium	Low	-	

4. Small coastal lagoons / estuaries – Group did not have time to address.

5. Coastal freshwater marsh

Threats - Sources of Stress		Loss of diversity of FWM types	Loss of areal extent of FWM	Fragmentation of FWM communities, loss of connectivity	Altered hydrologic regime - (timing, duration, frequency, extent)	Loss of native Species number and extent	Threat to System Rank	
5	Coastal freshwater	Medium	Low	High	Low	High		
1	New and upgraded roads	Contribution	Medium		High		Low	High
		Irreversibility	High		High		Low	
		Override						
		Source	Medium	-	High	-	Low	
		Combined Rank	Low	-	High	-	Low	
2	Residential development	Contribution	Medium	Medium	Medium		Medium	High
		Irreversibility	Very High	Very High	Very High		Very High	
		Override						
		Source	High	High	High	-	High	
		Combined Rank	Medium	Low	High	-	High	
3	Invasive and alien species	Contribution						-
		Irreversibility						
		Override						
		Source	-	-	-	-	-	
		Combined Rank	-	-	-	-	-	
4	Incompatible grazing practices	Contribution	Low		Low		Medium	Medium
		Irreversibility	Medium		Medium		Medium	
		Override						
		Source	Low	-	Low	-	Medium	
		Combined Rank	Low	-	Low	-	Medium	

6. Coastal salt marsh

Threats - Sources of Stress		Loss of Composition and diversity of native spp from invasive exotics	Decrease in Areal extent of saltmarsh	Loss of connectivity among communities & ecosystems	Altered Hydrologic regime - (timing, duration, frequency, extent)	Threat to System Rank	
6	Coastal salt marsh	High	Low	High	Low		
1	Recreation	Contribution	Low		Low	Low	
		Irreversibility	Medium		Low		
		Override					
		Source	Low	-	Low		-
		Combined Rank	Low	-	Low		-
2	Forestry practices	Contribution				-	
		Irreversibility					
		Override					
		Source	-	-	-		-
		Combined Rank	-	-	-		-
3	Highly invasive spp	Contribution	High			High	
		Irreversibility	High				
		Override					
		Source	High	-	-		-
		Combined Rank	High	-	-		-
4	Dikes, armoring, tidegates, jetties, railroads	Contribution				-	
		Irreversibility					
		Override					
		Source	-	-	-		-
		Combined Rank	-	-	-		-
5	Grazing Practices	Contribution				-	
		Irreversibility					
		Override					
		Source	-	-	-		-
		Combined Rank	-	-	-		-
6	Oil/toxic spill event	Contribution				-	
		Irreversibility					
		Override					
		Source	-	-	-		-
		Combined Rank	-	-	-		-
7	Operation of drainage or diversion systems	Contribution				-	
		Irreversibility					
		Override					
		Source	-	-	-		-
		Combined Rank	-	-	-		-

7. Dunes and sandy beaches – Group did not have time to address.

Sources of Stresses by Target System – Humboldt Bay

□ Sources of Stresses

The highest ranking sources of stress for Humboldt Bay systems include: shipping/port development; dredging; invasive/alien species; construction of ditches, dikes, drainage or diversion systems; and oil/toxic spill events.

1. Tidal marsh (salt and brackish)

Threats - Sources of Stress		Loss of Native Species	Excessive sedimentation / turbidity	Altered hydrologic regime - (timing, duration, frequency, extent)	Reduced areal extent of saltmarsh	Threat to System Rank	
1	Tidal Marsh (salt and brackish)	High	Low	Medium	Low		
1	Dredging	Contribution	Medium	Very High	Medium	High	
		Irreversibility	Very High	Very High	Very High		
		Override					
		Source	High	Very High	High		-
		Combined Rank	High	Low	Medium		-
2	Oil/toxic spill events	Contribution	Medium			Medium	
		Irreversibility	High				
		Override					
		Source	Medium	-	-		-
		Combined Rank	Medium	-	-		-
3	Highly invasive alien species	Contribution	Very High			High	
		Irreversibility	High				
		Override					
		Source	Very High	-	-		-
		Combined Rank	High	-	-		-
4	Dikes, armoring (riprap), tidegates, jetties, railroad, roads	Contribution	Medium		Medium	High	
		Irreversibility	Very High		Very High		
		Override					
		Source	High	-	High		-
		Combined Rank	High	-	Medium		-
5	Shipping / Port development [need to rank]	Contribution	Very High		Medium	High	
		Irreversibility	High	Medium	Medium		
		Override		Medium			
		Source	Very High	Medium	Medium		-
		Combined Rank	High	Low	Low		-
10	Shipping / Port development [need to rank]	Contribution				-	
		Irreversibility					
		Override					
		Source	-	-	-		-
		Combined Rank	-	-	-		-

2. Inter-tidal mudflat

Threats - Sources of Stress		Loss of areal extent of intertidal mudflat	Reduced sediment stability and increased movement	Loss of sediment quality (toxic pollution)	Threat to System Rank	
2	Inter-tidal mudflat	Low	Medium	Medium		
1	Aquaculture	Contribution	Low	Medium	Low	Low
		Irreversibility	Medium	Medium	Low	
		Override				
		Source	Low	Medium	Low	
Combined Rank		-	Low	Low		
2	Built / infrastructure runoff (non-point sources)	Contribution			Medium	Low
		Irreversibility			High	
		Override				
		Source	-	-	Medium	
Combined Rank		-	-	Low		
3	Commercial/industrial development	Contribution			High	Medium
		Irreversibility			High	
		Override				
		Source	-	-	High	
Combined Rank		-	-	Medium		
4	Dredging	Contribution	Medium	High	Low	Medium
		Irreversibility	High	High	High	
		Override				
		Source	Medium	High	Medium	
Combined Rank		Low	Medium	Low		
5	Industrial discharge	Contribution			High	Medium
		Irreversibility			High	
		Override				
		Source	-	-	High	
Combined Rank		-	-	Medium		
6	Oil/toxic spill events	Contribution			High	Medium
		Irreversibility			High	
		Override				
		Source	-	-	High	
Combined Rank		-	-	Medium		
7	Shipping / Port development [need to rank]	Contribution	Medium	Medium	High	Medium
		Irreversibility	Very High	Very High	Very High	
		Override				
		Source	High	High	High	
Combined Rank		Low	Medium	Medium		

3. Eelgrass

Threats - Sources of Stress		Altered Species Composition and dominance	Reduction in size and distribution of eelgrass beds	Increased sediment instability and movement	Reduced Primary Productivity	Threat to System Rank	
3	Eel Grass	Medium	Medium	Low	Medium		
1	Aquaculture	Contribution	Medium	High		Medium	Medium
		Irreversibility	Medium	High		High	
		Override					
		Source	Medium	High	-	Medium	
Combined Rank		Low	Medium	-	Low		
2	Dredging	Contribution	Medium	Medium	High	Medium	Low
		Irreversibility	High	Medium	High	Medium	
		Override					
		Source	Medium	Medium	High	Medium	
Combined Rank		Low	Low	Low	Low		
3	Highly invasive alien species	Contribution	Very High	Medium		Medium	Medium
		Irreversibility	High	High		High	
		Override					
		Source	Very High	Medium	-	Medium	
Combined Rank		Medium	Low	-	Low		
4	Marina development	Contribution	Medium	Low	Low	Low	Medium
		Irreversibility	Very High	Very High	Very High	Very High	
		Override					
		Source	High	Medium	Medium	Medium	
Combined Rank		Medium	Low	Low	Low		
5	Oil/toxic spill events	Contribution	Low			High	Medium
		Irreversibility	Very High			Very High	
		Override					
		Source	Medium	-	-	High	
Combined Rank		Low	-	-	Medium		
6	Shipping / Port development [need to rank]	Contribution	Medium	Medium	High	Medium	Low
		Irreversibility	High	High	High	High	
		Override					
		Source	Medium	Medium	High	Medium	
Combined Rank		Low	Low	Low	Low		

4. *Tidal water column* – Group did not have time to address.

5. *Freshwater marsh* – Group did not have time to address.

6. *Pacific brant* – Group did not have time to address.

7. *Native fish assemblages* – Group did not have time to address.

8. *Shellfish* – Group did not have time to address.

Sources of Stresses by Target System – Aquatics

□ Sources of Stresses

The highest ranking sources of stress for aquatic systems include: residential and commercial development; road construction and maintenance; levees and flood control measures; dams and diversions; incompatible timber harvest practices including harvesting in riparian zones; and agricultural use and conversion.

1. Native fish assemblages

Threats - Sources of Stress		Appropriate sediment regime	Maintain flow regime	Maintain temperature regime	Obstructed passage	Spatial structure	
1	Native Fish Assemblages -	High	High	High	Medium	Medium	
1	Road construction and maintenance	Contribution	Very High	High		Medium	
		Irreversibility	Medium	Medium		Medium	
		Override					
		Source	High	Medium	-	Medium	-
		Combined Rank	High	Medium	-	Low	-
2	Forestry practices	Contribution	High	Medium	High		High
		Irreversibility	Medium	Medium	Medium		Medium
		Override					
		Source	Medium	Medium	Medium	-	Medium
		Combined Rank	Medium	Medium	Medium	-	Low
3	Dams and diversions	Contribution		High	Medium	High	
		Irreversibility		Medium	Medium	Medium	
		Override				Medium	
		Source	-	Medium	Medium	Medium	-
		Combined Rank	-	Medium	Medium	Low	-
4	Agricultural use	Contribution	Medium	Low	Low		High
		Irreversibility	Low	Medium	Low		Medium
		Override					
		Source	Low	Low	Low	-	Medium
		Combined Rank	Low	Low	Low	-	Low

2. Riparian corridor function/condition

Threats - Sources of Stress		longitudinal connectivity	riparian resilience or stability	Adequate overstory canopy closure	age structure & recruitment	native species composition	width	Threat to System Rank
2	Riparian corridor	Medium	High	High	Very High	High	Very High	
1	Dams and diversions	Contribution	-	High	-	-	-	
		Irreversibility	-	Medium				
		Override						
		Source	-	Medium	-	-	-	-
		Combined Rank	-	Medium	-	-	-	-
2	Leveeing/flood control	Contribution	High	High	-	-	Very High	
		Irreversibility	High	High			High	
		Override						
		Source	High	High	-	-	-	Very High
		Combined Rank	Medium	High	-	-	-	Very High
3	Road construction and maintenance	Contribution	High	High		High	-	Medium
		Irreversibility	High	Medium		Medium		Medium
		Override						
		Source	High	Medium	-	Medium	-	Medium
		Combined Rank	Medium	Medium	-	High	-	High

3. Floodplains and fluvial wetlands

Threats - Sources of Stress			Floodwater storage and water purification
3	Floodplains and fluvial		High
1	Leveeing/flood control	Contribution	Very High
		Irreversibility	High
		Override	
		Source	Very High
		Combined Rank	High
2	Agricultural use	Contribution	Medium
		Irreversibility	Medium
		Override	
		Source	Medium
		Combined Rank	Medium
3	Conversion to Commercial/ Residential	Contribution	Medium
		Irreversibility	Medium
		Override	
		Source	Medium
		Combined Rank	Medium

4. Drinkable, fishable, swimmable water quality

Threats - Sources of Stress			Thermal alteration	Altered sediment regime	Organic pollutants	Altered flow regime
4	Drinkable, fishable, swimmable		Very High	Very High	High	Very High
1	Dams and diversions	Contribution	Very High	Very High	-	Very High
		Irreversibility	High	Medium	-	Medium
		Override				
		Source	Very High	High	-	High
		Combined Rank	Very High	Very High	-	Very High
2	Conversion to Commercial/ Residential	Contribution	Low	Low	Medium	Very High
		Irreversibility	Medium	Low	Medium	Medium
		Override				
		Source	Low	Low	Medium	High
		Combined Rank	Medium	Medium	Medium	Very High
3	Forestry practices	Contribution	High	High		
		Irreversibility	High	Medium		
		Override				
		Source	High	Medium	-	-
		Combined Rank	Very High	High	-	-
4	Road construction and maintenance	Contribution	Medium	Very High		Medium
		Irreversibility	Medium	Medium		Medium
		Override				
		Source	Medium	High	-	Medium
		Combined Rank	High	Very High	-	High
5	Agricultural use	Contribution	Low	Low	High	
		Irreversibility	Low	Low	Low	
		Override				
		Source	Low	Low	Medium	-
		Combined Rank	Medium	Medium	Medium	-

5. Upland wetlands, seeps, springs, ponds & lakes – Group did not have time to address.

Sources of Stresses by Target System – Grasslands and Bottomlands, Ecological

□ Sources of Stresses

The highest ranking sources of stress for ecological grassland and bottomland systems include: parasites and pathogens, fire suppression, and invasive species.

1. Oak woodlands

Threats - Sources of Stress		altered fire regime	altered age structure	conversion to other community types	altered species composition (understory)	habitat conversion	habitat destruction	Threat to System Rank	
6	Native oak woodlands	High	High	High	Medium	Low	Low		
1	fire suppression	Contribution	Very High	Medium	High	-	-	-	High
		Irreversibility	Low	Low	Low	-	-	-	
		Override							
		Source	High	Low	Medium	-	-	-	
	Combined Rank	High	Low	Medium	-	-	-		
2	agricultural conversion & fuelwood cutting	Contribution				Low	Low	Low	
		Irreversibility				Low	High		
		Override							
		Source	-	-	-	-	Low		Medium
	Combined Rank	-	-	-	-	-	Low		
3	incompatible grazing practices	Contribution		Medium		Medium		Medium	
		Irreversibility		Medium		Medium			
		Override							
		Source	-	Medium	-	Medium	-		-
	Combined Rank	-	Medium	-	Low	-	-		
4	invasive/alien species	Contribution			High	Medium	-	High	
		Irreversibility			High	High	-		
		Override							
		Source	-	-	High	Medium	-		-
	Combined Rank	-	-	High	Low	-	-		
5	Parasites/pathogens	Contribution	Low	Low	Low		Low	Medium	
		Irreversibility	High	Very High	Medium		High		
		Override							
		Source	Medium	Medium	Low	-	-		Medium
	Combined Rank	Medium	Medium	Low	-	-	Low		
6	fuels accumulation (?)	Contribution	Low					Low	
		Irreversibility	Medium						
		Override							
		Source	Low	-	-	-	-		-
	Combined Rank	Low	-	-	-	-	-		

2. Serpentine and rock outcrops

Threats - Sources of Stress		altered fire regime	altered age structure	habitat conversion	habitat destruction	Threat to System Rank	
4	Serpentines (& rock outcrops)	High	High	Low	Low		
1	Fire suppression	Contribution	Medium			Medium	
		Irreversibility	Medium	Low	Low		
		Override					
		Source	Medium	-	-		-
		Combined Rank	Medium	-	-		-
2	Incompatible forestry practices	Contribution		High		Medium	
		Irreversibility		Low			Low
		Override					
		Source	-	Medium	-		Low
		Combined Rank	-	Medium	-		-
3	Incompatible grazing practices	Contribution		Low		Low	
		Irreversibility		Low			
		Override					
		Source	-	Low	-		-
		Combined Rank	-	Low	-		-
4	Incompatible mining practices	Contribution	Medium		Medium	Low	
		Irreversibility	Low		High		
		Override					
		Source	Low	-	Medium		-
		Combined Rank	Low	-	Low		-
5	Parasites/pathogens	Contribution		High	High	High	
		Irreversibility		High	High		High
		Override					
		Source	-	High	High		Medium
		Combined Rank	-	High	Low		Low
6	Incompatible recreation vehicle use	Contribution		Low		Low	
		Irreversibility		Low			
		Override					
		Source	-	Low	-		-
		Combined Rank	-	Low	-		-
7	Road construction and use	Contribution		Medium		Medium	
		Irreversibility		Medium			
		Override					
		Source	-	Medium	-		-
		Combined Rank	-	Medium	-		-
8	Incompatible agricultural practices	Contribution			Low	-	
		Irreversibility			Low		
		Override					
		Source	-	-	Low		-
		Combined Rank	-	-	-		-

3. Bald hills prairies – Group did not have time to address.

Sources of Stresses by Target System – Grasslands and Bottomlands,

Socioeconomic

□ Sources of Stresses

The highest ranking sources of stress for working grassland and bottomland systems include: high market demand for residential/commercial property; externalization of costs of competing products; the unwillingness of consumers to pay more for a locally-produced, value-added product; and a resistance to change and limited exposure.

1. Family ranches and rangelands

Threats - Sources of Stress		conversion to other uses	conflict over agricultural activities (with neighbors)	limited land availability	regulatory costs/disincentives	weak markets for local products	too few ranches to sustain support services	limited pool of ranchers who will continue operations	limited profitability	Threat to System Rank
1	Family ranches & rangelands	Medium	Low	High	High	Very High	Medium	Medium	Very High	
1	high market demand for residential/commercial property	Contribution	Very High							Medium
		Irreversibility	Very High							
		Override								
		Source	Very High	-	-	-	-	-	-	
Combined Rank	Medium	-	-	-	-	-	-	-		
3	residential, recreation, & wildlife-related values conflict with agricultural uses	Contribution		High		High			Low	Medium
		Irreversibility		Medium		Medium			Low	
		Override								
		Source	-	Medium	-	Medium	-	-	Low	
Combined Rank	-	Low	-	Medium	-	-	Low	-		
4	unwillingness of consumers to pay more for a locally-produced, value-added products	Contribution					High	High	High	High
		Irreversibility					Low	High	High	
		Override								
		Source	-	-	-	-	Medium	High	High	
Combined Rank	-	-	-	-	High	Medium	Medium	-		
5	costs of competing products are externalized	Contribution					High	Medium	Medium	High
		Irreversibility					Medium	Medium	Medium	
		Override								
		Source	-	-	-	-	Medium	Medium	Medium	
Combined Rank	-	-	-	-	High	Low	Low	-		
6	distance from large markets & poor transportation systems	Contribution					High			High
		Irreversibility					Medium			
		Override								
		Source	-	-	-	-	Medium	-	-	
Combined Rank	-	-	-	-	High	-	-	-		
7	lack of diversification and value-added production	Contribution								-
		Irreversibility								
		Override								
		Source	-	-	-	-	-	-	-	
Combined Rank	-	-	-	-	-	-	-	-		
8	dysfunctional regulatory system	Contribution				Very High				High
		Irreversibility				Medium				
		Override								
		Source	-	-	-	High	-	-	-	
Combined Rank	-	-	-	High	-	-	-	-		

2. Family farms and farmlands

Threats - Sources of Stress		high cost of land	competing uses	weak market demand	lacking critical mass/will of farmers to support available and affordable services	Threat to System Rank	
3	Family farms & farmlands	High	High	High	Medium		
1	high market demand for residential/commercial property	Contribution	Very High	Very High			High
		Irreversibility	High	High			
		Override					
		Source	Very High	Very High	-	-	
	Combined Rank	High	High	-	-		
2	unwillingness of consumers to pay more for a locally-produced, value-added products	Contribution		Medium	Very High		High
		Irreversibility		Low	Low		
		Override					
		Source	-	Low	High	-	
	Combined Rank	-	Low	High	-		
3	costs of competing products are externalized	Contribution		High	Very High		High
		Irreversibility		Medium	Medium		
		Override					
		Source	-	Medium	High	-	
	Combined Rank	-	Medium	High	-		
4	distance from large markets & poor transportation systems	Contribution		High	Medium	Medium	Medium
		Irreversibility		Medium	Low	Low	
		Override					
		Source	-	Medium	Low	Low	
	Combined Rank	-	Medium	Low	Low		
5	lack of diversification and value-added production	Contribution		Medium	High	Medium	Medium
		Irreversibility		Low	Low	Low	
		Override					
		Source	-	Low	Medium	Low	
	Combined Rank	-	Low	Medium	Low		
6	alternative land-use values	Contribution	Very High	Very High		High	High
		Irreversibility	Medium	Medium		Medium	
		Override					
		Source	High	High	-	Medium	
	Combined Rank	High	High	-	Low		
7	benefits not apparent or initially realized	Contribution			High	Very High	Medium
		Irreversibility			Medium	Low	
		Override					
		Source	-	-	Medium	High	
	Combined Rank	-	-	Medium	Medium		

3. Family dairies and dairylands

Threats - Sources of Stress		conversion to urban development	limited pool of dairymen	technological/educational limitations	limited land availability	unexplored niche markets	# dairies low	Threat to System Rank
5	Family dairies & dairylands	High	High	Medium	Medium	Very High	Low	
1	high market demand for residential/commercial property	Contribution	Very High		Medium		Low	High
		Irreversibility	Very High		Very High		High	
		Override						
		Source	Very High	-	-	High	-	
	Combined Rank	High	-	-	Medium	-	Low	
2	zoning that enables subdivision and development	Contribution	Medium		Medium		Low	Medium
		Irreversibility	High		High		Medium	
		Override						
		Source	Medium	-	-	Medium	-	
	Combined Rank	Medium	-	-	Low	-	-	
3	low returns for input compared to other careers	Contribution		Very High			Very High	High
		Irreversibility		High			High	
		Override						
		Source	-	Very High	-	-	-	
	Combined Rank	-	High	-	-	-	Low	
4	beef grazing	Contribution			Medium		Medium	Low
		Irreversibility			Low		Low	
		Override						
		Source	-	-	-	Low	-	
	Combined Rank	-	-	-	Low	-	-	
5	ecological restoration/reversion	Contribution			Medium		Low	Low
		Irreversibility			High		High	
		Override						
		Source	-	-	-	Medium	-	
	Combined Rank	-	-	-	Low	-	Low	
6	nursery/floral	Contribution			Medium		Low	Low
		Irreversibility			Medium		Medium	
		Override						
		Source	-	-	-	Medium	-	
	Combined Rank	-	-	-	Low	-	-	
7	resistance to change & limited exposure	Contribution				Very High	High	Very High
		Irreversibility				High	Medium	
		Override						
		Source	-	-	-	-	Very High	
	Combined Rank	-	-	-	-	Very High	Low	
8	large ownerships	Contribution			High		High	Low
		Irreversibility			Medium		Medium	
		Override						
		Source	-	-	-	Medium	-	
	Combined Rank	-	-	-	Low	-	Low	

4. Public recreation lands – Group did not have time to address.

Appendix 4 – TNCC North Coast Ecoregional Plan Conservation Targets

TNCC NORTH COAST ECOREGIONAL PLAN TARGETS CLIPPED TO THE HUMBOLDT-DEL NORTE STUDY AREA	
TNC PORTFOLIO SITE	TARGET
NCTR13	ANNUAL GRASSLAND
NCTR13	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR13	MIXED EVERGREEN FOREST
NCTR13	MONTANE MIXED CHAPARRAL
NCTR13	NORTHERN SPOTTED OWL
NCTR13	RED TREE VOLE
NCTR13	SIERRAN MIXED CONIFEROUS FOREST
NCTR13	THLASPI CALIFORNICUM
NCTR13	UPLAND DOUGLAS-FIR FOREST
NCTR13	PACIFIC FISHER
NCTR49	ANNUAL GRASSLAND
NCTR49	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR49	MIXED EVERGREEN FOREST
NCTR49	NORTHERN SPOTTED OWL
NCTR49	PACIFIC FISHER
NCTR71	ANNUAL GRASSLAND
NCTR71	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR71	MIXED EVERGREEN FOREST
NCTR71	NORTHERN SPOTTED OWL
NCTR71	RED TREE VOLE
NCTR71	PACIFIC FISHER
NCTR74	ANNUAL GRASSLAND
NCTR74	COAST RANGE MIXED CONIFEROUS FOREST
NCTR74	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR74	LIMNANTHES BAKERI
NCTR74	MIXED EVERGREEN FOREST
NCTR74	MIXED NORTH SLOPE CISMONTANE WOODLAND
NCTR74	MONTANE MIXED CHAPARRAL
NCTR74	NORTHERN SPOTTED OWL
NCTR74	OREGON OAK WOODLAND
NCTR74	UPLAND DOUGLAS-FIR FOREST
NCTR76	ANNUAL GRASSLAND
NCTR76	COASTAL DOUGLAS-FIR
NCTR76	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR76	MIXED EVERGREEN FOREST
NCTR76	MIXED NORTH SLOPE CISMONTANE WOODLAND
NCTR76	NORTHERN SPOTTED OWL
NCTR76	RED TREE VOLE
NCTR84	ANNUAL GRASSLAND
NCTR84	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR84	MIXED EVERGREEN FOREST

NCTR84	NORTHERN SPOTTED OWL
NCTR84	OREGON OAK WOODLAND
NCTR84	RED TREE VOLE
NCTR84	UPLAND DOUGLAS-FIR FOREST
NCTR84	WET OR MONTANE MEADOWS
NCTR97	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR97	EPILOBIUM OREGANUM
NCTR97	LATHYRUS BIFLORUS
NCTR97	LUPINUS CONSTANCEI
NCTR97	MIXED EVERGREEN FOREST
NCTR97	NORTHERN SPOTTED OWL
NCTR97	OREGON OAK WOODLAND
NCTR97	SIERRAN MIXED CONIFEROUS FOREST
NCTR97	UPLAND DOUGLAS-FIR FOREST
NCTR97	UPPER MONTANE CONIFEROUS FOREST
NCTR97	UPPER MONTANE CONIFEROUS FORESTS
NCTR97	PACIFIC FISHER
NCTR109	ANNUAL GRASSLAND
NCTR109	BEACHES AND COASTAL DUNES
NCTR109	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR109	COASTAL DOUGLAS-FIR WESTERN HEMLOCK FOREST
NCTR109	COASTAL WETLAND
NCTR109	GRAND FIR/SITKA SPRUCE
NCTR109	LAYIA CARNOSA
NCTR109	MIXED EVERGREEN FOREST
NCTR109	NORTHERN COASTAL SCRUB
NCTR109	NORTHERN SPOTTED OWL
NCTR109	SIDALCEA MALACHROIDES
NCTR109	WESTERN SNOWY PLOVER
NCTR109	PACIFIC FISHER
NCTR111	ANNUAL GRASSLAND
NCTR111	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR111	MIXED EVERGREEN FOREST
NCTR111	MIXED NORTH SLOPE CISMONTANE WOODLAND
NCTR111	NORTHERN SPOTTED OWL
NCTR111	OREGON OAK WOODLAND
NCTR111	RED TREE VOLE
NCTR134	MCDONALD'S ROCK CRESS
NCTR134	MIXED EVERGREEN FOREST
NCTR134	NORTHERN SPOTTED OWL
NCTR134	RED TREE VOLE
NCTR134	THLASPI CALIFORNICUM
NCTR134	UPLAND DOUGLAS-FIR FOREST
NCTR134	PACIFIC FISHER
NCTR143	ANNUAL GRASSLAND
NCTR143	BALD HILLS PRAIRIE
NCTR143	COASTAL DOUGLAS-FIR
NCTR143	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR143	NORTHERN SPOTTED OWL
NCTR143	RED TREE VOLE

NCTR143	PACIFIC FISHER
NCTR147	ANNUAL GRASSLAND
NCTR147	COAST RANGE MIXED CONIFEROUS FOREST
NCTR147	LIMNANTHES BAKERI
NCTR147	LUPINUS MILO-BAKERI
NCTR147	NORTHERN SPOTTED OWL
NCTR147	OREGON OAK WOODLAND
NCTR147	ULTRAMAFIC MIXED CONIFEREROUS FOREST
NCAQ351	ANNUAL GRASSLAND
NCAQ351	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCAQ351	MIXED EVERGREEN FOREST
NCAQ351	NORTHERN SPOTTED OWL
NCAQ351	OREGON OAK WOODLAND
NCAQ351	PACIFIC FISHER
NCTR170	ARABIS MACDONALDIANA
NCTR170	ARCTOSTAPHYLOS CANESCENS SSP SONOMENSIS
NCTR170	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR170	ERIOGONUM KELLOGGII
NCTR170	MIXED EVERGREEN FOREST
NCTR170	NORTHERN INTERIOR CYPRESS FOREST
NCTR170	NORTHERN SPOTTED OWL
NCTR170	SEDUM EASTWOODIAE
NCTR170	SILENE CAMPANULATA SSP CAMPANULATA
NCTR170	UPLAND DOUGLAS-FIR FOREST
NCTR170	PACIFIC FISHER
NCTR200	ABRONIA UMBELLATA SSP BREVIFLORA
NCTR200	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR200	GRAND FIR - SITKA SPRUCE FOREST
NCTR200	MIXED EVERGREEN FOREST
NCTR200	NORTHERN COASTAL SCRUB
NCTR200	NORTHERN SPOTTED OWL
NCTR200	OENOTHERA WOLFII
NCTR200	PACIFIC FISHER
NCTR200	PORT ORFORD CEDAR FOREST
NCTR218	BENSONIELLA OREGONA
NCTR218	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR218	MIXED EVERGREEN FOREST
NCTR218	MONTANE MIXED CHAPARRAL
NCTR218	NORTHERN SPOTTED OWL
NCTR218	PACIFIC FISHER
NCTR218	SIERRAN MIXED CONIFEROUS FOREST
NCTR218	WET/MONTANE MEADOW
NCTR230	ANNUAL GRASSLAND
NCTR230	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR230	MARbled MURRELET
NCTR230	NORTHERN SPOTTED OWL
NCTR230	RED TREE VOLE
NCTR230	VAUX'S SWIFT
NCTR230	PACIFIC FISHER
NCTR235	ARABIS MACDONALDIANA

NCTR235	BOSCHNIAKIA HOOKERI
NCTR235	CARDAMINE NUTTALLII VAR GEMMATA
NCTR235	COASTAL DOUGLAS-FIR - WESTERN HEMLOCK FOREST
NCTR235	LEWISIA OPPOSITIFOLIA
NCTR235	MARbled MURRELET
NCTR235	NORTHERN SPOTTED OWL
NCTR235	STREPTANTHUS HOWELLII
NCAQ300	COAST CUTTHROAT TROUT
NCAQ300	COHO SALMON (CENTRAL CA, SO. OR./NO. CA ESU)
NCAQ300	NORTHERN RED-LEGGED FROG
NCAQ300	SOUTHERN TORRENT (=SEEP) SALAMANDER
NCAQ300	STEELHEAD (CENTRAL CA COAST, NORTHERN CA ESU)
NCAQ300	TAILED FROG
NCAQ300	STEELHEAD STREAM
NCAQ300	SHORT-RUN COHO SPAWNING STREAM
NCAQ300	RAINBOW TROUT STREAM
NCAQ300	FISHLESS STREAM
NCAQ302	COAST CUTTHROAT TROUT
NCAQ302	COHO SALMON (CENTRAL CA, SO. OR./NO. CA ESU)
NCAQ302	FOOTHILL YELLOW-LEGGED FROG
NCAQ302	NORTH COAST RIPARIAN FOREST AND SCRUB
NCAQ302	NORTHERN RED-LEGGED FROG
NCAQ302	STEELHEAD (CENTRAL CA COAST, NORTHERN CA ESU)
NCAQ302	TAILED FROG
NCAQ302	EEL RIVER
NCAQ302	CUTTHROAT TROUT STREAM
NCAQ302	STEELHEAD STREAM
NCAQ302	CHINOOK STREAM
NCAQ302	RAINBOW TROUT STREAM
NCAQ302	FISHLESS STREAM
NCAQ308	COHO SALMON (CENTRAL CA, SO. OR./NO. CA ESU)
NCAQ308	CHINOOK SALMON (CA COASTAL ESU)
NCAQ308	FOOTHILL YELLOW-LEGGED FROG
NCAQ308	SOUTHERN TORRENT (=SEEP) SALAMANDER
NCAQ308	NORTHWESTERN POND TURTLE
NCAQ308	STEELHEAD (CENTRAL CA COAST, NORTHERN CA ESU)
NCAQ308	TAILED FROG
NCAQ308	EEL RIVER
NCAQ308	SHORT-RUN COHO SPAWNING STREAM
NCAQ308	CHINOOK STREAM
NCAQ308	STEELHEAD STREAM
NCAQ308	RAINBOW TROUT STREAM
NCAQ308	FISHLESS STREAM
NCAQ308	RIPARIAN
NCAQ309	CHINOOK SALMON (CA COASTAL ESU)
NCAQ309	COHO SALMON (CENTRAL CA, SO. OR./NO. CA ESU)
NCAQ309	FOOTHILL YELLOW-LEGGED FROG
NCAQ309	SOUTHERN TORRENT (=SEEP) SALAMANDER
NCAQ309	STEELHEAD (CENTRAL CA COAST, NORTHERN CA ESU)
NCAQ309	TAILED FROG

NCAQ309	SHORT-RUN COHO SPAWNING STREAM
NCAQ309	STEELHEAD STREAM
NCAQ309	CHINOOK STREAM
NCAQ309	RAINBOW TROUT STREAM
NCAQ309	FISHLESS STREAM
NCAQ321	CHINOOK SALMON (CA COASTAL ESU)
NCAQ321	COHO SALMON (CENTRAL CA, SO. OR./NO. CA ESU)
NCAQ321	SOUTHERN TORRENT (=SEEP) SALAMANDER
NCAQ321	STEELHEAD (CENTRAL CA COAST, NORTHERN CA ESU)
NCAQ321	SHORT-RUN COHO SPAWNING STREAM
NCAQ321	CHINOOK STREAM
NCAQ321	STEELHEAD STREAM
NCAQ321	RAINBOW TROUT STREAM
NCAQ321	FISHLESS STREAM
NCTR235	CHINOOK SALMON (CA COASTAL ESU)
NCTR235	COHO SALMON (CENTRAL CA, SO. OR./NO. CA ESU)
NCTR235	STEELHEAD (CENTRAL CA COAST, NORTHERN CA ESU)
NCTR235	SHORT-RUN COHO SPAWNING STREAM
NCTR235	CHINOOK STREAM
NCTR235	RAINBOW TROUT STREAM
NCTR235	FISHLESS STREAM
NCAQ329	COAST CUTTHROAT TROUT
NCAQ329	STEELHEAD (CENTRAL CA COAST, NORTHERN CA ESU)
NCAQ329	CHUM SALMON
NCAQ329	TIDEWATER GOBY
NCAQ329	EULACHON
NCAQ329	GREEN STURGEON
NCAQ329	SOUTHERN TORRENT (=SEEP) SALAMANDER
NCAQ329	TAILED FROG
NCAQ329	FOOTHILL YELLOW-LEGGED FROG
NCAQ329	DEL NORTE SALAMANDER
NCAQ329	EULACHON/STURGEON/SALMON SPAWNING RIVER
NCAQ329	LOWER KLAMATH SCULPIN/DACE/SUCKER STREAM
NCAQ329	CHINOOK STREAM
NCAQ329	STEELHEAD STREAM
NCAQ329	RAINBOW TROUT STREAM
NCAQ329	FISHLESS STREAM
NCAQ329	NORTH COAST RIPARIAN FOREST AND SCRUB
NCAQ350	CHINOOK SALMON (CA COASTAL ESU)
NCAQ350	CHUM SALMON
NCAQ350	COAST CUTTHROAT TROUT
NCAQ350	COHO SALMON (CENTRAL CA, SO. OR./NO. CA ESU)
NCAQ350	DEL NORTE SALAMANDER
NCAQ350	SOUTHERN TORRENT (=SEEP) SALAMANDER
NCAQ350	STEELHEAD (CENTRAL CA COAST, NORTHERN CA ESU)
NCAQ350	TAILED FROG
NCAQ350	CUTTHROAT COHO RIVER
NCAQ350	CHINOOK STREAM
NCAQ350	RAINBOW TROUT STREAM
NCAQ350	FISHLESS STREAM

NCAQ351	ALEUTIAN CANADA GOOSE
NCAQ351	CHINOOK SALMON (CA COASTAL ESU)
NCAQ351	COAST CUTTHROAT TROUT
NCAQ351	STEELHEAD (CENTRAL CA COAST, NORTHERN CA ESU)
NCAQ351	TIDEWATER GOBY
NCAQ351	DEL NORTE SALAMANDER
NCAQ351	NORTHERN RED-LEGGED FROG
NCAQ351	SOUTHERN TORRENT (=SEEP) SALAMANDER
NCAQ351	FOOTHILL YELLOW-LEGGED FROG
NCAQ351	TAILED FROG
NCAQ351	REDWOOD JUGA
NCAQ351	STEELHEAD STREAM
NCAQ351	CHINOOK STREAM
NCAQ351	CUTTHROAT TROUT STREAM
NCAQ351	RAINBOW TROUT STREAM
NCAQ351	FISHLESS STREAM
NCAQ353	ALEUTIAN CANADA GOOSE
NCAQ353	COAST CUTTHROAT TROUT
NCAQ353	COASTAL WETLAND
NCAQ353	COHO SALMON (CENTRAL CA, SO. OR./NO. CA ESU)
NCAQ353	NORTHERN RED-LEGGED FROG
NCAQ353	OREGON SILVERSPOT BUTTERFLY
NCAQ353	STEELHEAD (CENTRAL CA COAST, NORTHERN CA ESU)
NCAQ353	TIDEWATER GOBY
NCTR401	BEACH LAYIA
NCTR401	BEACH/SHORE PINE
NCTR401	BEACHES AND COASTAL DUNES
NCTR401	COASTAL AND VALLEY FRESHWATER MARSH
NCTR401	COASTAL WETLAND
NCTR401	DUNE HOLLOW OR SWALE
NCTR401	GRAND FIR/SITKA SPRUCE
NCTR401	MENZIES'S WALLFLOWER
NCTR401	NORTHERN DUNE SCRUB
NCTR401	NORTHERN FOREDUNE GRASSLAND
NCTR401	OTHER
NCTR401	WESTERN LILY
NCTR401	WESTERN SNOWY PLOVER
NCTR405	ALEUTIAN CANADA GOOSE
NCTR405	BANK SWALLOW
NCTR405	BEACH/SHORE PINE
NCTR405	BEACHES AND COASTAL DUNES
NCTR405	COASTAL WETLAND
NCTR405	DUNE HOLLOW OR SWALE
NCTR405	EMPETRUM NIGRUM SSP HERMAPHRODITUM
NCTR405	GRAND FIR/SITKA SPRUCE
NCTR405	LATHYRUS PALUSTRIS
NCTR405	LILIUM OCCIDENTALE
NCTR405	MENZIES'S WALLFLOWER
NCTR405	NORTHERN DUNE SCRUB
NCTR405	NORTHERN FOREDUNE GRASSLAND

NCTR405	OREGON SILVERSPOT BUTTERFLY
NCTR405	OTHER
NCTR405	PHACELIA ARGENTEA
NCTR405	RED FESCUE GRASSLAND
NCTR405	SAND DUNE PHACELIA
NCTR405	STELLER (=NORTHERN) SEA LION
NCTR405	TRIENTALIS ARCTICA
NCTR405	VIOLA LANGSDORFII
NCTR405	WESTERN LILY
NCTR405	WESTERN SNOWY PLOVER
NCTR406	COASTAL WETLAND
NCTR406	GRAND FIR/SITKA SPRUCE
NCTR406	LATHYRUS PALUSTRIS
NCTR406	LILIUM OCCIDENTALE
NCTR406	NORTH COAST RIPARIAN FOREST AND SCRUB
NCTR406	WESTERN LILY

Appendix 5 – Sensitive Species of the Study Area

Sensitive Species of the Study Area (CDFG 2000)

Case	Frequency	Species/Target Name	Common Name
1	25	<i>Abronia umbellata</i> ssp. <i>breviflora</i>	pink sand-verbena
2	11	<i>Accipiter cooperii</i>	Cooper's Hawk
3	7	<i>Accipiter gentilis</i>	Northern Goshawk
4	3	<i>Accipiter striatus</i>	Sharp-shinned Hawk
5	1	<i>Agelaius tricolor</i>	Tricolored Blackbird
6	1	<i>Anisocarpus scabridus</i>	scabrid alpine tarplant
7	1	<i>Anomobryum julaceum</i>	slender silver-moss
8	5	<i>Aquila chrysaetos</i>	Golden Eagle
9	4	<i>Arabis aculeolata</i>	Waldo rock cress
10	15	<i>Arabis koehleri</i> var. <i>stipitata</i>	Koehler's stipitate rock cress
11	23	<i>Arabis macdonaldiana</i>	Mcdonald's rock cress
12	2	<i>Arborimus albipes</i>	white-footed vole
13	83	<i>Arborimus pomo</i>	red tree vole
14	3	<i>Arctostaphylos canescens</i> ssp. <i>sonomensis</i>	Sonoma manzanita
15	1	<i>Arctostaphylos stanfordiana</i> ssp. <i>raichei</i>	Raiche's manzanita
16	6	<i>Ardea alba</i>	Great Egret
17	10	<i>Ardea herodias</i>	Great Blue Heron
18	4	<i>Asarum marmoratum</i>	marbled wild-ginger
19	54	<i>Ascaphus truei</i>	western tailed frog
20	1	<i>Asplenium trichomanes</i> ssp. <i>trichomanes</i>	maidenhair spleenwort
21	5	<i>Astragalus agnicidus</i>	Humboldt milk-vetch
22	3	<i>Astragalus pycnostachyus</i> var. <i>pycnostachyus</i>	coastal marsh milk-vetch
23	9	<i>Bensoniella oregona</i>	bensoniella
24	3	<i>Boschniakia hookeri</i>	small groundcone
25	1	<i>Branta canadensis leucopareia</i>	Aleutian Canada Goose
26	2	<i>Calamagrostis crassiglumis</i>	Thurber's reed grass
27	2	<i>Calystegia atriplicifolia</i> ssp. <i>buttensis</i>	Butte County morning-glory
28	9	<i>Cardamine nuttallii</i> var. <i>gemmata</i>	yellow-tubered toothwort
29	5	<i>Carex arcta</i>	northern clustered sedge
30	5	<i>Carex leptalea</i>	flaccid sedge
31	10	<i>Carex lyngbyei</i>	Lyngbye's sedge
32	5	<i>Carex praticola</i>	meadow sedge
33	1	<i>Carex saliniformis</i>	deceiving sedge
34	16	<i>Carex serpenticola</i>	serpentine sedge
35	5	<i>Carex viridula</i> var. <i>viridula</i>	green sedge
36	23	<i>Castilleja affinis</i> ssp. <i>litoralis</i>	Oregon coast Indian paintbrush
37	19	<i>Castilleja ambigua</i> ssp. <i>humboldtiensis</i>	Humboldt Bay owl's-clover

38	27	Castilleja miniata ssp. elata	Siskiyou Indian paintbrush
39	8	Charadrius alexandrinus nivosus	Western Snowy Plover
40	2	Clarkia amoena ssp. whitneyi	Whitney's farewell-to-spring
41	3	Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh
42	1	Coastal Brackish Marsh	Coastal Brackish Marsh
43	1	Coastal Douglas-fir Western Hemlock Forest	Coastal Douglas-fir Western Hemlock Forest
44	1	Coastal Terrace Prairie	Coastal Terrace Prairie
45	12	Cordylanthus maritimus ssp. palustris	Point Reyes bird's-beak
46	2	Corynorhinus townsendii townsendii	Townsend's western big-eared bat
47	1	Cypseloides niger	Black Swift
48	2	Darlingtonia Seep	Darlingtonia Seep
49	1	Didymodon norrisii	Norris's beard-moss
50	1	Discelium nudum	naked flag-moss
51	1	Draba carnosula	Mt. Eddy draba
52	4	Egretta thula	Snowy Egret
53	1	Elanus leucurus	White-tailed Kite
54	2	Empetrum nigrum ssp. hermaphroditum	black crowberry
55	1	Empidonax traillii	Willow Flycatcher
56	10	Emys (=Clemmys) marmorata marmorata	northwestern pond turtle
57	2	Epilobium nivium	Snow Mountain willowherb
58	8	Epilobium oreganum	Oregon fireweed
59	5	Erigeron bloomeri var. nudatus	Waldo daisy
60	3	Eriogonum kelloggii	Kellogg's buckwheat
61	2	Eriogonum nudum var. paralinum	Del Norte buckwheat
62	24	Eriogonum pendulum	Waldo buckwheat
63	6	Erysimum menziesii ssp. eurekaense	Humboldt Bay wallflower
64	1	Erythronium hendersonii	Henderson's fawn lily
65	12	Erythronium revolutum	coast fawn lily
66	8	Eucyclogobius newberryi	tidewater goby
67	2	Falco peregrinus anatum	American Peregrine Falcon
68	3	Fissidens pauperculus	minute pocket-moss
69	8	Gentiana setigera	Mendocino gentian
70	12	Gilia capitata ssp. pacifica	Pacific gilia
71	8	Gilia millefoliata	dark-eyed gilia
72	1	Glyceria grandis	American manna grass
73	2	Gulo gulo	California wolverine
74	4	Haliaeetus leucocephalus	Bald Eagle
75	1	Horkelia congesta ssp. nemorosa	Josephine horkelia
76	1	Lathyrus biflorus	two-flowered pea
77	9	Lathyrus japonicus	sand pea
78	6	Lathyrus palustris	marsh pea

79	9	<i>Layia carnosa</i>	beach layia
80	16	<i>Lewisia oppositifolia</i>	opposite-leaved lewisia
81	16	<i>Lilium occidentale</i>	western lily
82	2	<i>Limnanthes bakeri</i>	Baker's meadowfoam
83	1	<i>Limnephilus atercus</i>	Fort Dick limnephilus caddisfly
84	7	<i>Lomatium martindalei</i>	Coast Range lomatium
85	2	<i>Lupinus constancei</i>	The Lassics lupine
86	5	<i>Lupinus elmeri</i>	South Fork Mtn. lupine
87	1	<i>Lycopodiella inundata</i>	bog club-moss
88	115	<i>Lycopodium clavatum</i>	running-pine
89	18	<i>Martes americana humboldtensis</i>	Humboldt marten
90	40	<i>Martes pennanti pacifica</i>	Pacific fisher
91	1	<i>Meesia triquetra</i>	three-ranked hump-moss
92	1	<i>Microseris borealis</i>	northern microseris
93	1	<i>Minuartia decumbens</i>	The lassics sandwort
94	7	<i>Mitella caulescens</i>	leafy-stemmed mitrewort
95	1	<i>Monadenia fidelis pronotis</i>	rocky coast Pacific sideband (snail)
96	2	<i>Monardella villosa ssp. globosa</i>	robust monardella
97	5	<i>Monotropa uniflora</i>	Indian-pipe
98	55	<i>Montia howellii</i>	Howell's montia
99	1	<i>Myotis evotis</i>	long-eared myotis
100	1	North Central Coast Summer Steelhead Stream	North Central Coast Summer Steelhead Stream
101	12	Northern Coastal Salt Marsh	Northern Coastal Salt Marsh
102	1	Northern Foredune Grassland	Northern Foredune Grassland
103	1	Northern Interior Cypress Forest	Northern Interior Cypress Forest
104	6	<i>Nycticorax nycticorax</i>	Black-crowned Night Heron
105	2	<i>Oceanodroma furcata</i>	Fork-tailed Storm-Petrel
106	21	<i>Oenothera wolfii</i>	Wolf's evening-primrose
107	40	<i>Oncorhynchus clarki clarki</i>	coast cutthroat trout
108	4	<i>Oncorhynchus kisutch</i>	Coho salmon - central California ESU
109	1	<i>Oncorhynchus kisutch</i>	Coho salmon - southern Oregon / northern California ESU
110	7	<i>Oncorhynchus mykiss irideus</i>	summer-run steelhead trout
111	167	<i>Pandion haliaetus</i>	Osprey
112	4	<i>Phacelia argentea</i>	sand dune phacelia
113	2	<i>Phalacrocorax auritus</i>	double-crested cormorant
114	10	<i>Pinguicula vulgaris ssp. macroceras</i>	horned butterwort
115	71	<i>Plethodon elongatus</i>	Del Norte salamander
116	1	<i>Potamogeton foliosus var. fibrillosus</i>	fibrous pondweed
117	1	<i>Puccinellia pumila</i>	dwarf alkali grass
118	2	<i>Rallus longirostris obsoletus</i>	California Clapper Rail
119	33	<i>Rana aurora aurora</i>	northern red-legged frog
120	24	<i>Rana boylei</i>	foothill yellow-legged frog
121	107	<i>Rhyacotriton variegatus</i>	southern torrent salamander
122	3	<i>Riparia riparia</i>	Bank Swallow
123	3	<i>Romanzoffia tracyi</i>	Tracy's romanzoffia

24	1	Rubus nivalis	snow dwarf bramble
25	1	Sagittaria sanfordii	Sanford's arrowhead
26	5	Sanguisorba officinalis	great burnet
127	1	Saxifraga nuttallii	Nuttall's saxifrage
128	1	Scirpus subterminalis	water bulrush
129	2	Sedum eastwoodiae	Red Mountain stonecrop
130	7	Senecio bolanderi var. bolanderi	seacoast ragwort
131	96	Sidalcea malachroides	maple-leaved checkerbloom
132	6	Sidalcea malviflora ssp. patula	Siskiyou checkerbloom
133	10	Sidalcea oregana ssp. eximia	coast checkerbloom
134	1	Sisyrinchium hitchcockii	Hitchcock's blue-eyed grass
135	4	Sitka Spruce Forest	Sitka Spruce Forest
136	2	Smilax jamesii	English Peak greenbriar
137	3	Spergularia canadensis var. occidentalis	western sand-spurrey
138	3	Speyeria zerene hippolyta	Oregon silverspot butterfly
139	1	Sphagnum Bog	Sphagnum Bog
140	4	Streptanthus howellii	Howell's jewel-flower
141	1	Swertia umpquaensis	Umpqua green-gentian
142	9	Thermopsis robusta	robust false lupine
143	1	Thlaspi californicum	Kneeland Prairie pennycress
144	10	Tracyina rostrata	beaked tracyina
145	1	Trichodon cylindricus	cylindrical trichodon
146	2	Trientalis arctica	arctic starflower
147	1	Triquetrella californica	coastal triquetrella
148	11	Upland Douglas-fir Forest	Upland Douglas-fir Forest
149	162	Usnea longissima	long-beard lichen
150	2	Vaccinium scoparium	little-leaved huckleberry
151	1	Viburnum ellipticum	oval-leaved viburnum
152	2	Viola langsdorfii	Langsdorf's violet
153	3	Viola palustris	marsh violet
154	19	Viola primulifolia ssp. occidentalis	western bog violet