Tehachapi Conservation Action Plan

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Audubon California

The Nature Conservancy
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Tejon Ranch Conservancy

The Tehachapi Planning Team

Audubon California

Reed Tollefson	Kern River Preserve Manager
Alison Sheehey	Kern River Preserve Outreach Director

The Nature Conservancy

Brian Cohen	GIS Specialist
Sophie Parker, Ph.D.	Ecoregional Ecologist
E.J. Remson	Senior Program Manager
Zach Principe	Ecoregional Ecologist

The Tejon Ranch Conservancy

Tom Maloney	Executive Director
Michael White, Ph.D.	Conservation Science Director

Cover Photo: Ian Shive

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EXECUTIVE SUMMARY

The Tehachapi region has been identified as a critically important conservation landscape based on a multitude of factors. These include the region's high levels of biodiversity and habitat integrity, its location at the convergence of four ecoregions, its intact connection between two major mountain systems, and its biological function as a "crucible of evolution". Many of these factors are interrelated, making the protection of a large system of interconnected lands in the region vital to the continuation of the conditions and processes that support them.

The Tehachapi Planning Team includes staff from Audubon California, The Nature Conservancy, and the Tejon Ranch Conservancy. Together they have protected thousands of acres of important habitat in the region. The team formed to prepare this Conservation Action Plan (CAP) for several reasons. First, there is a need for a coordinated approach to conservation in the region. Currently, there is no single regional conservation plan for the area that identifies targets, threats, and actions to achieve conservation over this large area. Second, recent conservation successes (e.g. Tejon and Parker ranches conservation) combined with other existing conservation investments (e.g. Wind Wolves and Kern River preserves) identify the need to build and link these valuable conservation assets. Third, the region and many of its unique habitat types need to be highlighted for future conservation action. There are many opportunities to achieve important conservation at scale in the planning area. Finally, the Tehachapi team is working in subordination to the Southern Sierra Partnership (SSP). The SSP includes other conservation partners that are concurrently preparing a regional conservation plan extending over a larger area of the southern Sierra Nevada range. The SSP has conducted workshops, interviews and research that greatly assisted this planning effort.

The conservation targets developed by the team include oak woodlands, riparian communities, Mojave Desert scrub and Joshua tree communities, grasslands, semi-arid montane (includes sagebrush, pinyon-juniper, and montane chaparral communities), coniferous forests, and migratory and wide-ranging wildlife. Key ecological attributes with status indicators were developed and rated on a scale of poor, fair, good or very good. The riparian communities target is the most threatened in the Tehachapi region.

Threats in the form of stresses and sources of stress were then determined for each target. Stresses were ranked by scope and severity and sources of stress were ranked by contribution and irreversibility. The highest ranking sources of stress across the project area were determined to be land grading and housing development, climate change-induced temperature increases, surface and groundwater diversions, road construction, and presence of existing non-native plant species.

After defining the indicators and developing situations around future threats, objectives were created that meet the criteria of being specific, measurable, achievable, realistic and time-limited. For each objective, strategic actions were created and ranked by cost, benefit, and feasibility. Based on the ranking criteria, six objectives rose to the top:

1) Protect 50-70% (60,000 new acres) of Oak Woodland by 2015

2) Protect 75% of all Riparian Communities by 2015

3) By 2011, ensure effective conservation of at least one elevational transect in the Tehachapi region, identify two additional purchase opportunities

4) By 2012, protect key conservation lands with protected designation in local land use policy/laws

5) Create a minimum viable linkage (to build upon with future land protection) from Tejon Ranch to Sequoia National Forest by 2013

6) Protect 50-70% of Grasslands by 2015

Conservation Action Planning is designed to recognize the shifting nature of knowledge and the challenges conservationists face by encouraging practitioners to view the conservation planning process not as a once-a-decade exercise but as a regular, iterative process of "successive approximations". CAP encourages teams of practitioners to capture their best understanding of the conservation situation, build a set of actions based on that understanding, implement the actions, measure the outcomes of their actions, learn from these outcomes and refine actions over time. Thus this plan represents a first iteration of conservation planning for the region that permits us to begin conservation work with confidence.

1.0 INTRODUCTION

The Tehachapi region has been identified as a critically important conservation landscape based on a multitude of factors. These include the region's high levels of biodiversity and habitat integrity, its location at the convergence of four ecoregions, its intact connection between two major mountain systems, and its biological function as a "crucible of evolution". Many of these factors are interrelated, making the protection of a large system of interconnected lands in the region vital to the continuation of the conditions and processes that support them.

Primary ecological processes supporting and controlling the natural systems of the Tehachapi region are climate, groundwater availability, soils, wind, and topography. Parts of the region contain some of the more imperiled ecosystem types in North America, largely due to impacts associated with increasing human development throughout the Southwest. Human population growth has resulted in an increasing interaction of humans, their houses, machines, pets, and introduced exotic species with the native species, both plant and animal – more often than not to the detriment of the native species. Despite these impacts, the habitats of the Tehachapi region are relatively intact compared to most other regions in California.

The Tehachapi region's high level of biodiversity is related to its location and geology. The region is situated at the crossroads of four ecoregions (Sierra Nevada, Great Central Valley, South Coast, and Mojave Desert) and five geomorphic provinces (Sierra Nevada, Great Central Valley, Coast Ranges, Transverse Ranges, and Mojave Desert) (White et al. 2003). This convergence results not only in a large number of communities present in a small geographic area, but also in distinct plant and animal communities formed from the co-occurrence of species from the various regions. Recent geologic activity has created a topographically diverse landscape which has provided the conditions necessary to allow evolutionary divergence and speciation for many taxa. As a result, the Tehachapi region supports a high number of endemic species (White et al. 2003).

The Tehachapi region not only continues to support high levels of biodiversity, but also supports the conditions necessary to allow species to respond and evolve in response to climate change. The high level of habitat intactness at the landscape scale allows the processes necessary for species to respond and evolve to climate change to remain functional. Fragmentation by roads and development is concentrated in a few small areas in the region allowing for relatively unimpeded species movement. The diverse and often steep topography supports many large elevational gradients over short distances, allowing species to quickly respond to changing temperatures. The diverse topography also supports an abundance of steep canyons which create highly variable microsite conditions at the local scale.

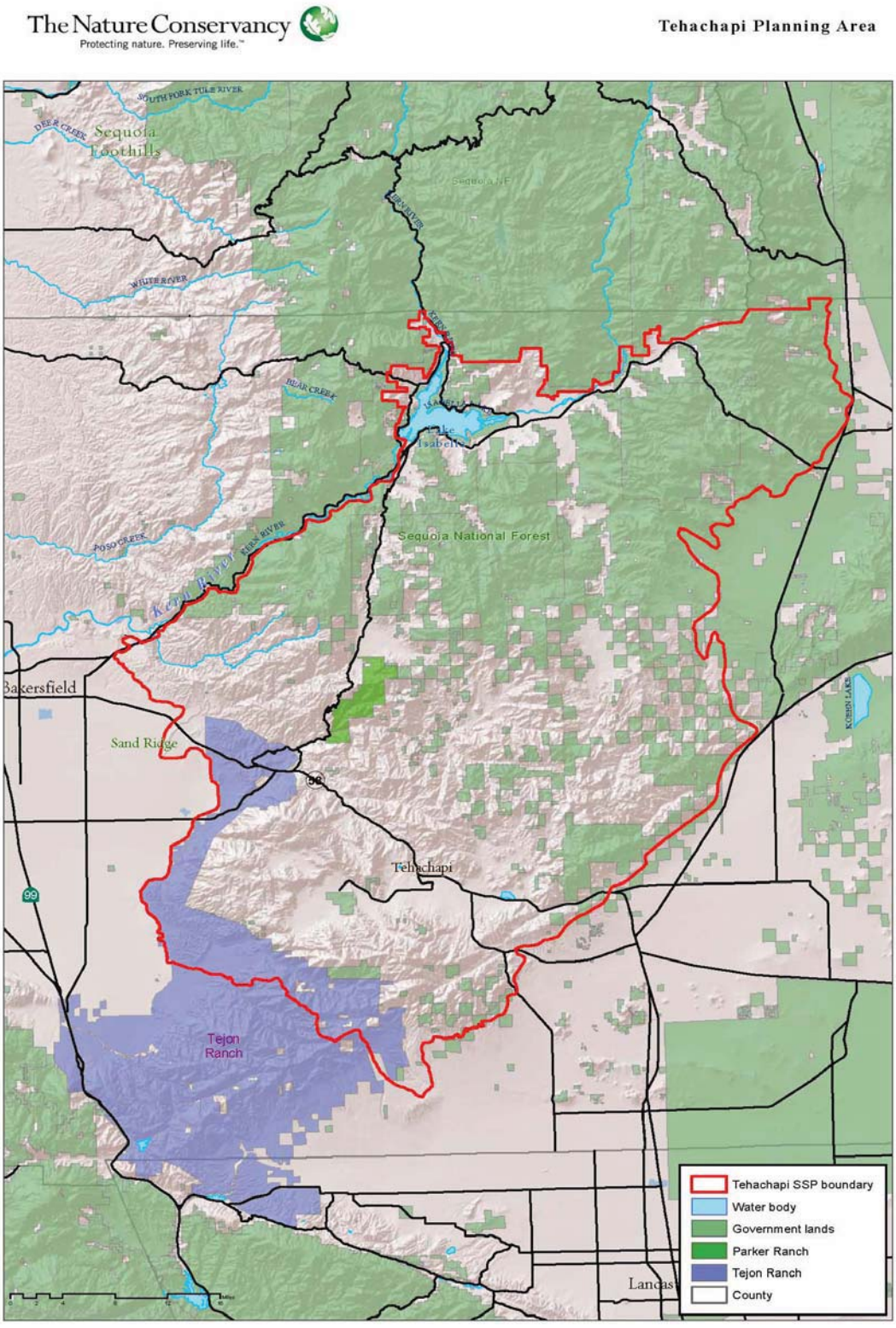
The high level of habitat intactness not only allows local scale responses to climate change, but permits species to move between two major mountain ranges, the Sierra Nevada and Sierra Madre. The importance and influence of what has been coined the "Tehachapi Connection" extends far beyond the connectivity between these ranges as it provides the only remaining connection between the California coast ranges and inland ecosystems. As a result, the Tehachapi Connection has been identified as perhaps the most important wildlife linkage influencing the South Coast Ecoregion (Penrod et al. 2003) and it is likely as important to the Central Coast Ecoregion. To understand the significance of this linkage, one must step back and look at the topography of the west coast of North America. To a large degree, the Central and South Coast ecoregions exist as ecological islands. Many of the plants and animals found in the coast ranges south of San Francisco Bay are essentially isolated from the rest of the continent by the Mojave and Sonoran Deserts to the southwest and intensive human land uses

in the Central Valley. The Tehachapi Mountains and the low elevation bands of habitat on its slopes are thus the last intact connection for species unable to cross desert or human land uses (Mas et al. 2006). The system of passes and valleys separating the Tehachapi and Sierra Nevada Mountains (including Tehachapi Creek, Tejon Creek, Cummings Valley and Tehachapi Valley) also provides the greatest connectivity opportunity for species occupying low lying areas of the Central Valley and Mojave Desert.

The Tehachapi region experiences a Mediterranean climate with hot dry summers and cool wet winters. Within the Mediterranean portion of the region, average temperatures range from 54° to 61° F increasing to 64° F on the eastern mountain slopes near the desert floor. Elevations range from roughly 800 feet in the San Joaquin Valley to Piute Peak at 8,417 feet. Variability in annual precipitation, however, is relatively low for such a large region that covers a nearly 7,000 foot elevation gradient. Precipitation is lowest on the eastern mountain slopes near the desert floor ranging from 4 to 5 inches and highest on the western mountain peaks ranging from 15 to 16 inches. A majority of the region is located between 3,000 and 5,000 feet in elevation and receives 9 to 12 inches of precipitation with an average temperature around 57° F. Precipitation is concentrated from early fall to mid spring with about 90% falling between October 1st and April 30th.

Land ownership patterns in the Tehachapi region can best be described by splitting the region into northern and southern sections. The majority of land in the northern half of the planning region is publicly owned and managed. The Bureau of Land Management is responsible for a variety of lands from small isolated parcels scattered throughout the region to the large Jawbone-Butterbredt area in the northeast. The US Forest Service manages the Sequoia National Forest, which covers a majority of lands in the northwest. Lands in the southern portion of the region are primarily under private ownership. The majority of private lands occur as large ranches which include Rudnick, Loop, Rankin, and portions of Tejon Ranch. However, there is a recent trend, especially in the vicinity of the City of Tehachapi, for large ranches to be divided into small ranchettes. As a result, clusters of ranchettes are starting to dot the landscape and more and more large ranches are being purchased from the ranching families by real estate investors.

Figure 1. Tehachapi Planning Area Map



2.0 METHODS

The Tehachapi planning team consists of staff and partners of The Nature Conservancy (hereafter, "the Conservancy") who are experienced conservation practitioners and scientists working throughout the Tehachapi region. The team is working in conjunction with the Southern Sierra Partnership to develop this Tehachapi Conservation Action Plan (CAP), which is one of two parallel plans that will together comprise a holistic vision of conservation action within the Southern Sierra Nevada and Tehachapi region. Team meetings of both the entire Southern Sierra Partnership, and of the smaller Tehachapi team took place from June through December of 2009. At these meetings, Conservancy staff and partners collaborated to develop conservation targets, threats, and strategic actions.

The methodology used was the Conservation Action Planning methodology. For more information on Conservation Action Planning visit http://conserveonline.org/workspaces/cbdgateway/cap/resources/index_html. CAP is a collaborative, science-based process used to: (1) identify the conservation targets that warrant action, (2) decide where and how to act, and (3) measure effectiveness to achieve continuous improvement. The complete output of the CAP process was captured in a spreadsheet – the CAP Workbook – which has outputs included in the appendices of this report.

Conservation Action Planning is designed to recognize the shifting nature of knowledge and the challenges conservationists face by encouraging practitioners to view the conservation planning process not as a once-a-decade exercise but as a regular, iterative process of "successive approximations". CAP encourages teams of practitioners to capture their best understanding of the conservation situation, build a set of actions based on that understanding, implement the actions, measure the outcomes of their actions, learn from these outcomes and refine actions over time.

At its core, CAP is a framework to help practitioners to focus their strategies on clearly-defined elements of focal targets and fully articulated threats to these targets and to measure their success in a manner that will enable them to adapt and learn over time. The CAP process accomplishes this by prompting a team to work through a series of diagnostic steps that culminate in the development of clearly defined objectives and strategic actions. Together these represent a testable hypothesis of success that forms the basis of an "adaptive" approach to conservation management. Please refer to Appendix A for a glossary of CAP terms.

An additional challenge for the team was to incorporate climate change into the CAP process. The output of eleven climate change models were analyzed and summarized to come up with the best estimate for future climatic conditions in the region. The influence of this single climate change scenario was then assessed on each target by developing a Hypothesis of Change (HoC). Development of each HoC focused on the current understanding of how species and communities will respond to conditions under the selected climate change scenario. The HoCs were then used to inform completion of the CAP Workbook sections addressing climate change for each target.

3.0 CONSERVATION TARGETS

This project covers the Tehachapi sub-region of the larger Southern Sierra region. Once the boundaries of the planning area were selected, the next step was to decide upon focal conservation targets. Focal conservation targets are a limited suite of species, ecological

communities, and ecological systems that are chosen to represent and encompass the biodiversity found in a specific area. Targets serve as the foundation for all project actions. Accurately defining targets greatly increases the potential to set measurable objectives and realize when success is achieved.

As seen in Figure 1, the oak woodlands, riparian communities, grasslands, semi-arid montane and coniferous forests have been determined to be in "fair" condition while the Mojave Desert scrub and Joshua tree communities were determined to be in good condition. The migratory and wide-ranging wildlife target was the only target to receive the status of "very good". As displayed in the following section, the information and calculations for determining the ratings were captured in an Excel spreadsheet. By combining all ratings for all targets, the entire project gets an overall biodiversity health rating of "fair".

3.1 TARGET DESCRIPTIONS

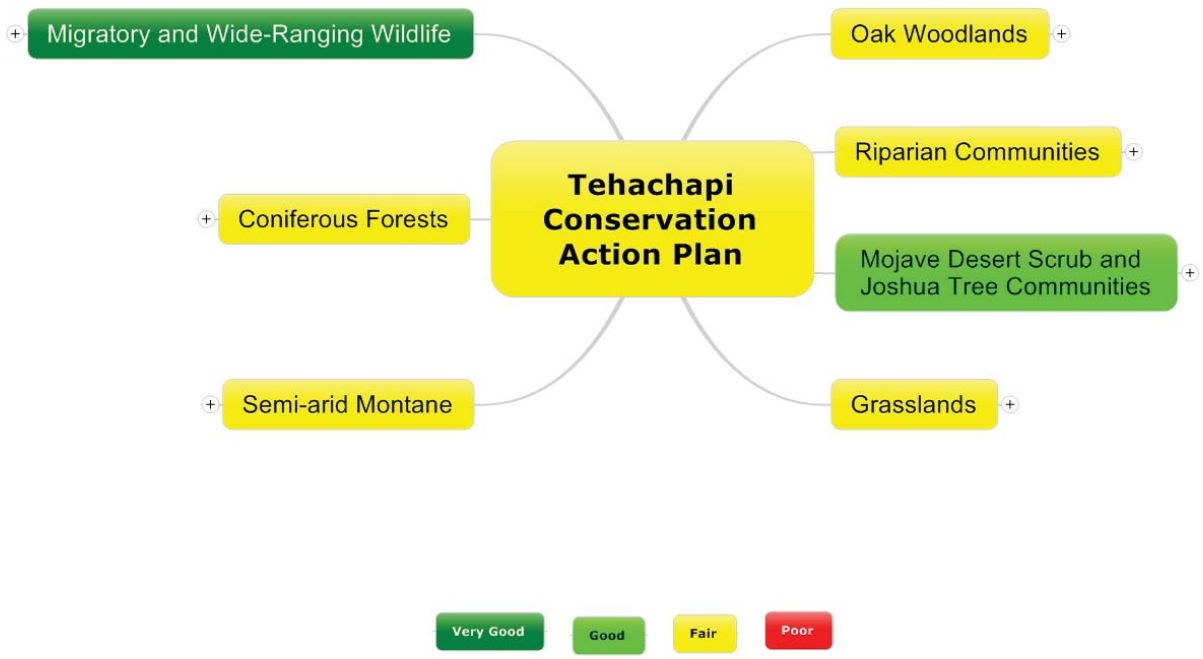
3.1.1 Oak Woodland

This target includes California blue oak (*Quercus douglasii*), interior live oak (*Quercus wislizeni*), and valley oak (*Quercus lobata*) communities found primarily within the foothill region of the southern Sierra Nevada mountains. Oak woodlands (as opposed to scattered oaks or savannas) are defined as having an oak canopy cover of at least 10%. The canopy is dominated by broad-leaved trees, commonly forming open savanna-like stands on dry ridges and gentle slopes. California buckeye (*Aesculus californica*) and gray pine (*Pinus sabineana*) can be significant components of this community as well. While native forbs are thought to have once dominated the understory in these systems, nearly all oak woodlands now support an understory dominated by non-native annual grasses and forbs from Eurasia. Native forbs are often present within the understory, but they rarely dominate. Shrubs are often present but rarely extensive, often occurring on rocky outcrops. Associated shrub species include poison oak (*Toxicodendron diversilobum*), California coffeeberry (*Rhamnus californica*), Manzanita (*Arctostaphylos* spp.), and *Ceanothus* spp.

3.1.2 Riparian Communities

This target includes riparian habitat from the center of the riverbed to the upland edge of the 500 year floodplain. Dominant species in the canopy layer include Fremont cottonwood (*Populus fremontii*), California sycamore (*Platanus racemosa*) and valley oak (*Quercus lobata*). Subcanopy trees include white alder (*Alnus rhombifolia*), boxelder (*Acer negundo*), mulefat (*Baccharis salicifolia*) and Oregon ash (*Fraxinus latifolia*). Typical understory shrub layer plants include California wild grape (*Vitis californica*), wild rose (*Rosa californica*), California blackberry (*Rubus ursinus*), elderberry (*Sambucus* spp.), poison oak (*Toxicodendron diversilobum*), and willows (*Salix* spp.). The herbaceous understory consists of sedges, rushes, grasses, miner's lettuce (*Claytonia perfoliata*), Douglas sagewort (*Artemisia douglasiana*), poison-hemlock (*Conium maculatum*), and hoary nettle (*Urtica* spp.). Montane meadows are also included as part of this target. These areas are influenced by permanent water and are variable in size due to varying sources of permanent presence of surface water throughout the region. The species and structural diversity of riparian communities varies greatly depending on elevation, climate, and soil. These communities are of particular importance to rare nesting and migratory avian species.

Figure 2. Conservation Targets for the Tehachapi Conservation Action Plan



3.1.3 Mojave Desert Scrub and Joshua Tree Communities

These communities subsist in harsh conditions of high temperatures, low moisture and rocky/sandy soils. Desert Scrub habitats typically are open, scattered assemblages of broadleaved evergreen or deciduous microphyll shrubs usually between 0.5 and 2 m in height. Canopy cover is generally less than 50%, with bare ground between plants. This target includes a variety of Mojave Desert shrub species. Creosote bush (*Larrea tridentata*) and blackbrush (*Coleogyne ramosissima*) are often dominants, but many other species can be found in desert scrub communities as well, including catclaw acacia (Acacia greggii), desert agave (*Agave deserti*), coastal bladderpod (*Isomeris arborea*), white brittlebush (*Encelia farinosa*), burrobush (*Ambrosia dumosa*), barrel and hedgehog cactus (Ferocactus and *Echinocereus* spp.), cholla (Cylindropuntia spp.), desert globemallow (Sphaeralcea ambigua), jojoba (*Simmondsia chinensis*), beavertail and pricklypear cactus (*Opuntia* spp.), rabbitbrush (*Chrysothamnus* spp.), desert sand verbena (Abronia villosa), desert senna (*Senna armata*), and Mojave yucca (Yucca schidigera). Forbs and grasses often occur in the shrub understory in desert scrub. These include galleta grass (*Pleuraphis rigida*), and spanish needles (*Bidens bipinnata*). In undisturbed systems, non-native grass species are absent, and native grass species are typically rare. The Joshua tree woodland is a distinct desert scrub community that forms a unique, structurally diverse community type that serves as a definitive and characteristic vegetative symbol of the Mojave Desert. Joshua trees are often found in distinct "woodland" patches which contain a low to dense community of many of the same shrub species found in other types of desert scrub. Joshua trees occur at the same upper elevation limits of the Mojave Desert along with shadscale scrub and blackbrush scrub, although Joshua trees tend to occur on sandier, finer-grained loose soils (TNC 2001). Additionally, structurally they appear to

dominate the landscape in relatively dense woodlands within their preferred bands of soil and temperature regimes, they form less than 20% of the vegetative land cover.

3.1.4 Grasslands

California grasslands contain many species that also occur as understory plants in oak woodland and other habitats. Plants grow slowly during the cool winter months, remaining low in stature until spring, when temperatures increase and stimulate more rapid growth. Large amounts of standing dead plant material can be found during summer in years of abundant rainfall and light to moderate grazing pressure. This target is primarily dominated by annual grass species introduced from Eurasia, including ripgut brome (Bromus diandrus), soft chess (Bromus hordeaceus) red brome (*Bromus madritensis* ssp. rubens), wild oats (Avena spp.), wild barley (Hordeum spp.) and foxtails (*Vulpia* spp.), among many others. Grasslands also include a wide variety of native forb species, and non-native forbs such as broadleaf filaree (Erodium botrys) are common. However, intact native perennial bunchgrass stands are rare, and native annual grasses are usually absent in California grasslands. Native perennial grasses, found in moist, lightly grazed, or relic prairie areas, include purple needle grass (Nassella pulchra) and Idaho fescue (Festuca idahoensis). Native perennial grasses are most common in untilled areas and in sites high mean annual rainfall. Even when dominated by non-native annual grasses and forbs the California grassland community type serves as important foraging habitat for raptors, and is home to kangaroo rats, kit fox, and many other vertebrate and invertebrate species.

3.1.5 Semi-Arid Montane

Sagebrush, pinyon-juniper woodland, and montane chaparral are all included within the Semi-Arid Montane target. A mosaic of these communities occurs on the slopes of the eastern Sierras. The dominant community depends on rainfall, climate and soil type. Sagebrush stands are typically large, open, discontinuous stands of fairly uniform height. Big sagebrush (*Artemisia tridendata*) is often mixed with other species of shrubs of similar form and growth habit. In better sites, sagebrush stands have an understory of perennial grasses and forbs, including Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), several species of needlegrass (*Achnatherum* and *Nassella* spp.), squirreltail (*Elymus elymoides*), and Sandberg bluegrass (*Poa secunda*). At higher elevations, big sagebrush occurs as an understory in conifer stands. Often the habitat is composed of pure stands of big sagebrush, but many stands include other species of sagebrush (*Artemisia* spp.), rabbitbrush (*Chrysothamnus* spp.), horsebrush (*Tetradymia* spp.), gooseberry (*Ribes* spp.), western chokecherry (*Prunus virginiana* var. *demissa*), curl-leaf mountain mahogany (*Cercocarpus ledifolius*), and bitterbrush (*Purshia tridentate*). After disturbance and during years with excess moisture, annual grasses such as cheatgrass (*Bromus tectorum*) and medusahead (*Taeniatherum caput-medusae*) invade sagebrush stands. Pinyon-juniper habitat is open woodland of low, round crowned, bushy trees that range from less than 10 m to 15 m in height. Crowns of individual trees rarely touch and canopy cover generally is less than 50%. Open groves of overstory trees often include a dense to open layer of understory shrubs and low herbaceous plants. Stand structure varies depending on site quality and elevation. Overstory species composition at lower and mid-level elevations ranges from pure stands of pinyon, either singleleaf (*Pinus monophylla*) or Parry (*Pinus quadrifolia*), to stands of pinyon mixed with junipers (*Juniperus* spp.), scrub oaks (*Quercus* spp.), or Mojave yucca (*Yucca schidigera*). At higher elevations, ponderosa (*Pinus ponderosa*) and Jeffrey pine (*Pinus jeffreyi*) may be found in this habitat. Shrub-size plants in the subcanopy include small individuals of the overstory species, as well as big sagebrush, blackbrush (*Coleogyne ramosissima*), common snakeweed

(*Gutierrezia sarothrae*), Parry nolina (*Nolina parryi*), curl-leaf mountain mahogany, bitterbrush, and rabbitbrush. Grasses and forbs associated with this habitat include western wheatgrass (*Pascopyrum smithii*), blue grama (*Bouteloua gracilis*), and Indian ricegrass (*Achnatherum hymenoides*). Montane chaparral includes species that can vary from treelike (up to 3 m) to prostrate. When mature, it is often impenetrable to large mammals. Its structure is affected by site quality, history of disturbance (e.g., fire, erosion, logging) and the influence of browsing animals. Following fire in the mixed conifer forest habitat type, whitethorn ceanothus-dominated chaparral may persist as a subclimax community for many years. Montane chaparral is characterized by evergreen species; however, deciduous or partially deciduous species may also be present. Understory vegetation in the mature chaparral is largely absent. Conifer and oak trees may occur in sparse stands or as scattered individuals within the chaparral type. Montane chaparral varies markedly with elevational and geographical range, soil type, and aspect. Common species include: whitethorn ceanothus (*Ceanothus cordulatus*), snowbrush ceanothus (*Ceanothus velutinus*), greenleaf Manzanita (*Arctostaphylos patula*), pinemat Manzanita (*Arctostaphylos nevadensis*), hoary Manzanita (*Arctostaphylos canescens*), bitter cherry (*Prunus emarginata*), huckleberry oak (*Quercus vacciniifolia*), sierra chinquapin (*Chrysolepis sempervirens*), Greene's goldenweed (*Ericameria greenei*), mountain mahogany (*Cercocarpus* spp.), toyon (*Heteromeles arbutifolia*), sumac (*Rhus* spp.) and California buckthorn (*Frangula californica*).

3.1.6 Coniferous Forests

Within the Tehachapi Mountains, the conifer forest is dominated by white fir (*Abies concolor*). ponderosa pine (*Pinus ponderosa*), Jeffery pine (*Pinus jeffreyi*), and incense cedar (*Calocedrus decurrens*) are also present. According to the Sierra Nevada Ecoregional Assessment created by the Conservancy in 2001, montane and subalpine coniferous forests of the Sierra Nevada comprise one of the largest and most economically important vegetation regions in California. This region includes most of the east and west slopes of the Sierra from 2,000 to 5,000 ft on the lower margin to 10,000 to 11,500 ft at its upper limit. The elevation of the vegetation zone is higher in the south because warm, dry conditions extend farther upslope than in the north. In general, every 1,000 ft climb in elevation is equivalent to moving a distance of 300 miles north. Increasing elevation brings with it lower temperatures, greater precipitation, shallower soils, and higher winds. These changes are gradual and so are the changes in vegetation which accompany them. The lower montane zone of Sierran coniferous forests is composed of ponderosa pine forests on more xeric sites and white fir forest on more mesic sites with special areas of giant sequoia groves. Above this zone, forming a transition to the higher subalpine forests, are the upper montane red fir (*Abies magnifica*), Jeffrey pine, and lodgepole pine (*Pinus contorta* spp. *murrayana*) forests. The subalpine zone includes several geographically restricted types dominated by the mountain hemlock (*Tsuga mertensiana*), western white pine (*Pinus monticola*), whitebark pine (*Pinus albicaulis*), foxtail pine (*Pinus balfouriana*), and limber pine (*Pinus flexilis*).

3.1.7 Migratory and Wide Ranging Species

This target includes raptors, migratory passerines, bats, and wide-ranging mammals such as the mountain lion (*Puma concolor*). These species are currently doing well in the region due to the relative intactness of the aforementioned conservation targets. The goal is to keep them in good or very good condition by protecting and enhancing the above habitat types and connectivity and preventing impediments to movement.

3.2 VIABILITY OF CONSERVATION TARGETS

Viability assessment begins by identifying key attributes for each of the conservation targets. At its most basic, a key attribute is an aspect of a target's condition that if present, defines a healthy target, and, if missing or altered, would lead to the outright loss or extreme degradation of that target over time. For example, a key attribute for a freshwater stream target might be some aspect of water chemistry. If the water chemistry becomes sufficiently degraded, then the stream target is no longer viable. Often, key ecological attributes can be placed in three categories to better articulate biodiversity health. The categories of size, condition, and landscape context help teams to further analyze which of target's attributes are the most important.

Although key attributes are specific descriptions of an aspect of a target, they are generally still too broad to measure or assess in a cost-effective manner over time. To this end, it is important to develop indicators that can be used to assess the attribute over time. An indicator is what is measured to keep track of the status of a key attribute. Viability assessment begins by identifying key attributes for each of the conservation targets. The rating system is enhanced by determining a category for each key ecological attribute. Size, condition and landscape context are the general categories that apply to most conservation targets and help project teams create a snapshot of overall biodiversity health.

3.2.1 Viability Rating

Any given key attribute will vary naturally over time. It is "acceptable" when it is in the range as determined by critical thresholds, or the estimate of what constitutes an acceptable range. Once the acceptable range of variation for an attribute is established, the viability rating scale can be specified. This scale involves establishing the following boundaries for an indicator based on the thresholds:

Very Good – Ecologically, economically or socially desirable status; requires little intervention for maintenance.

Good - Indicator within acceptable range of variation; some intervention required for maintenance.

Fair - Outside acceptable range of variation; requires human intervention.

Poor - Restoration increasingly difficult; extirpation of target is likely.

The final step in the viability assessment is to use the rating scale that has been constructed and available evidence and/or expert opinion to determine the current status of the conservation target and the desired status of the target for some point in the future. This desired status becomes a goal for the project. The default philosophy is to improve each target at least one level (e.g. from fair to good).

Table 1. Focal Targets, Key Attributes and Indicators for the Tehachapi Region of Southern California.

#	Conservation Target	Category	Key Attribute	Indicator	Current Rating
1	Oak Woodlands	Landscape Context	Connectivity among communities & ecosystems	Proportion adjacent to unconverted habitat (unconverted= rangeland or housing density < 1 unit per 20 acres)	Good
		Condition	Population structure & recruitment	Proportion of sapling to adult trees (sapling= ~30 year age range, trunk diameter 1-10 cm)	Poor
			Presence/abundance of focal native bird species	Number of native cavity nesting birds	Good
		Size	Size / extent of characteristic communities / ecosystems	Total aerial extent	Very Good
2	Riparian Communities	Landscape Context	Water level fluctuations	Stream flow volume & duration. Ground water levels.	Fair
		Condition	Community architecture appropriate to vegetation community type (as determined by dominant keystone native species)	Heterogeneity of age classes of dominant riparian plant species	Fair
			Intact vs. degraded montane meadows (area-weighted: what proportion of total meadow area shows signs of degradation)	Structural heterogeneity of vegetation characteristic of community	Good
			Presence/abundance of focal native bird species	Presence/abundance of native breeding birds (indicated by presence of birds during the breeding season)	Fair
			Species composition / dominance	Presence of invasive species or other non-natives by patch (fine scale)	Good

#	Conservation Target	Category	Key Attribute	Indicator	Current Rating
		Size	Size / extent of characteristic communities / ecosystems	Total aerial extent	Fair
3	Mojave Desert Scrub and Joshua Tree Communities	Landscape Context	Connectivity among communities & ecosystems	Proportion adjacent to unconverted habitat (unconverted= rangeland or housing density < 1 unit per 20 acres)	Good
			Fire regime - (timing, frequency, intensity, extent)	Proportion of Mojave Desert scrub with natural fire regime	Good
		Condition	Landscape integrity	Habitat intactness at scale	Fair
			Presence of key animal indicator species	Presence of desert tortoise burrows	Fair
			Species composition / dominance	Percent relative native cover	Fair
		Size	Size / extent of characteristic communities / ecosystems	Total aerial extent	Very Good
4	Grasslands	Landscape Context	Connectivity among communities & ecosystems	Proportion adjacent to unconverted habitat (unconverted= rangeland or housing density < 1 unit per 20 acres)	Fair
			Soil / sediment stability & movement	Soil slumping and erosion	Good
		Condition	Species composition / dominance	Percent relative native cover	Good
			Vegetation structure	RDM	Good
		Size	Size / extent of characteristic communities / ecosystems	Total aerial extent	Very Good

#	Conservation Target	Category	Key Attribute	Indicator	Current Rating
5	Semi-arid Montane	Landscape Context	Connectivity among communities & ecosystems	Proportion adjacent to unconverted habitat (unconverted= rangeland or housing density < 1 unit per 20 acres)	Good
			Fire regime - (timing, frequency, intensity, extent)	Proportion of chaparral community with natural fire regime	Fair
		Condition	Heterogeneity of age classes across the landscape	Presence of multiple sagebrush age classes at the watershed scale	Fair
			Lack of invasive plant species	Absence of invasive grass species	Fair
			Landscape integrity	Habitat intactness at scale	Fair
			Presence of native herbaceous cover	Percent relative native perennial grass cover	Fair
		Size	Size / extent of characteristic communities / ecosystems	Total aerial extent	Very Good
6	Coniferous Forests	Landscape Context	Connectivity among communities & ecosystems	Proportion adjacent to unconverted habitat (unconverted= rangeland or housing density < 1 unit per 20 acres)	Good
			Fire regime - (timing, frequency, intensity, extent)	Proportion of conifer community with natural fire regime (FRID)	Fair
		Condition	Population structure & recruitment	Proportion of sapling to adult trees	Fair
			Presence of key animal indicator species	Presence of old growth forest indicator species	Fair
		Size	Size / extent of characteristic communities / ecosystems	Maintain minimum patch size	Good

#	Conservation Target	Category	Key Attribute	Indicator	Current Rating
			Size / extent of characteristic communities / ecosystems	Maintaining area of historic sky islands	Good
			Size / extent of characteristic communities / ecosystems	Total aerial extent	Very Good
7	Migratory and Wide-Ranging Wildlife	Landscape Context	Numbers of migrants successfully traversing region	Bats	Very Good
			Numbers of migrants successfully traversing region	Index of migration - passerines	Very Good
			Numbers of migrants successfully traversing region	Migrating raptors	Very Good
			Numbers of migrants successfully traversing region	Viable mountain lion population	Very Good

4.0 THREATS

Conservation targets are frequently degraded or face threats. In this planning effort, threats consist of stresses and sources of stress as defined below. Threat ranking is a process that identifies and prioritizes direct threats and develops actions to address those threats, beginning with the most critical and reversible threats. Two criteria are established for ranking stresses to ensure objectivity – severity and scope. Severity is defined as the level of damage to the conservation target that reasonably can be expected within 10 years given the continuation of the existing situation. Scope is most commonly defined spatially as the geographic scope of impact on the conservation target at the site that reasonably can be expected within 10 years given the continuation of the existing situation.

In this plan we are also considering the long term impacts of climate change. Since climate change induced threats may take many years to manifest themselves the plan also evaluates potential threats from climate change over a 50 year horizon. See Section 6 for more on the impacts of climate change.

4.1 STRESSES

Every natural system is subject to disturbances. For this plan, only human caused destruction, degradation or impairment of conservation targets are considered. Thus stresses are impaired

aspects of targets that result directly or indirectly from human sources (e.g., low population size, reduced extent of forest system). In essence, stresses are degraded key attributes.

4.2 SOURCES OF STRESS

Sources of stress (also known as direct threats) are the proximate activities or processes that have caused, are causing or may cause the stresses (e.g., incompatible management practice or land development). For each stress to a given conservation target there are one or more causes or sources. For the most part, sources of stress are limited to human activities. Thus, tropical storms that blow down large swaths of forest are not threats, but instead part of a natural (and often necessary) disturbance regime. Sources of stress can be currently active, likely to occur in the future (usually defined as within 10 years), or historical. See Appendix B for the detailed ranking of stresses and sources by target.

In addition to ranking the actual direct threat (i.e. stress), the source of that stress is ranked also. The source of stress is ranked based on its (1) level of contribution to the stressed condition and (2) its level of irreversibility. The rankings for the stress and the source of stress are combined to determine the final ranking. A summary of threats, including the final rankings, is presented in Table 2. A detailed summary of threats across the project area can be found in Appendix C.

Table 2. Summary of Threats, with Rank, for the Tehachapi Region of Southern California

Threats Across Targets		Overall Threat Rank
Project-specific threats		
1	Land grading and housing development	Very High
2	Climate change induced temp. changes	High
3	Surface and groundwater diversions	High
4	Construction of roads	High
5	Presence of existing non-native plant species	High
6	Decrease in economic viability of ranching	High
7	Poorly managed cattle and/or sheep grazing	Medium

Threats Across Targets		Overall Threat Rank
Project-specific threats		
8	Invasion of new species (plants, fungi, pathogens, etc.)	Medium
9	Predation by non-native feral animals (cats and/or pigs)	Medium
10	OHV use	Medium
11	Large-scale solar energy development	Medium
12	Increase in frequency of extreme conditions in streamflow.	Medium
13	Wind energy development	Medium
14	Altered fire frequency and intensity	Medium
15	Conversion to agriculture	Medium
16	Utility & Service Lines	Medium
17	Air quality	Low
18	Presence of non-native bird species (i.e. cowbirds and starlings)	Low
19	Mining & Quarrying	Low
20	Oil & Gas Drilling	Low
21	Poorly managed timber harvesting	Low
22	Problematic Native Species	Low
	Threat Status for Targets and Project	Very High

As displayed in Table 2, the top five sources of stress are land grading and housing development, climate change induced temperature changes, surface and groundwater diversions, construction of roads, and presence of existing non-native plant species. The next

section goes over in detail the situation analyses dealing with these threats and how they affect the various conservation targets.

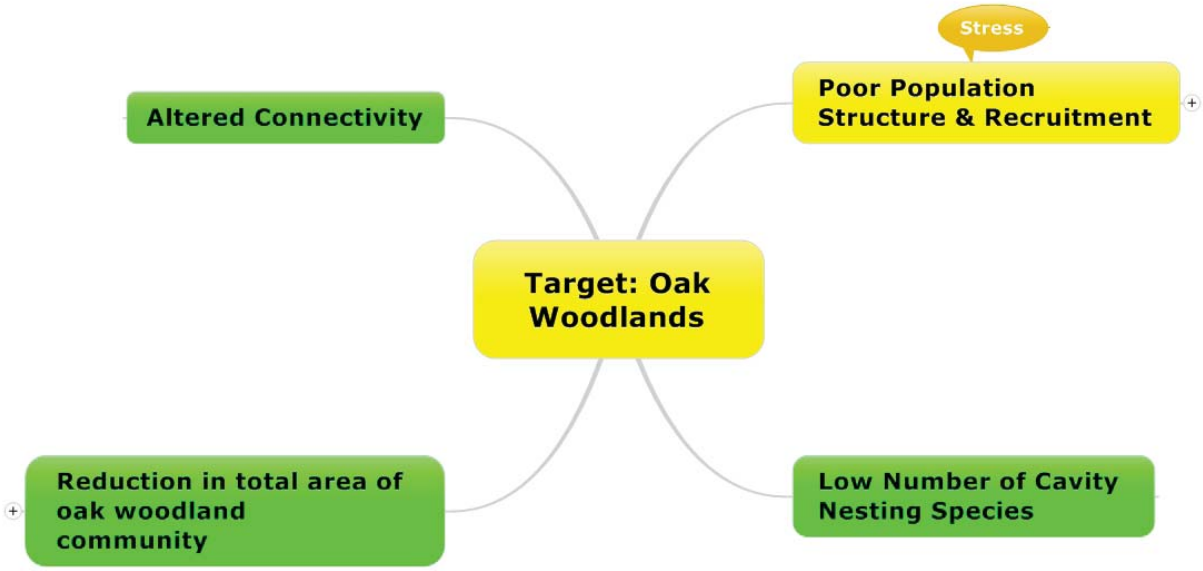
5.0 SITUATION ANALYSIS

Once the status of the conservation targets was determined and critical threats were identified, the recurring and most serious threats became apparent across the system. The group then decided to focus on the "situation" at hand or "situation analysis". It is through this process that we gain a better understanding of what and who is really driving those critical threats, what would motivate these conditions to change, and who might be allies in the efforts to change the trajectory we have defined so far. It was through this process that the team gained a fuller understanding of what and who was really driving those critical threats, what motivations warranted change, and where to focus partnerships.

A complete situation analysis involves assessing the key factors affecting targets including direct threats, indirect threats and opportunities. Each factor can typically be linked to one or more stakeholders. The situation analysis helped the project team understand the project's context - including the biological environment and the social, economic, political, and institutional systems that affect the biodiversity targets in the Tehachapi planning area. It also provides transparency as to precisely what the planning team was considering for causal or compounding factors that contributed to giving the stress a "high" ranking. We selected the highest ranked stresses to and developed a situation analysis for each. These will be the basis for creating work plans and understanding the connection between targets, indicators, and threats.

All targets are affected by climate change induced temperature changes (increases). The situation analyses for targets where this source of stress (direct threat) ranked high are detailed separately in the next section. Note the colors of the boxes in the following diagrams correspond to the stress ranking as explained in 3.2.1

Figure 3. Oak Woodlands Conservation Target shown with Altered Key Ecological Attributes (A.K.A. Stresses).



For oak woodlands, the stresses (or altered key attributes) of altered connectivity, reduction in size, and low number of cavity nesting species were ranked as a “medium” level stress. In earning such a ranking, the team believes that the problems that are likely to occur in the next 10 years resulting from these stresses will not be widespread or severe. The problems occurring from poor population structure and recruitment, however, will increase in the near future.

Figure 4. Oak woodlands situation analysis detailing poor population structure and recruitment.

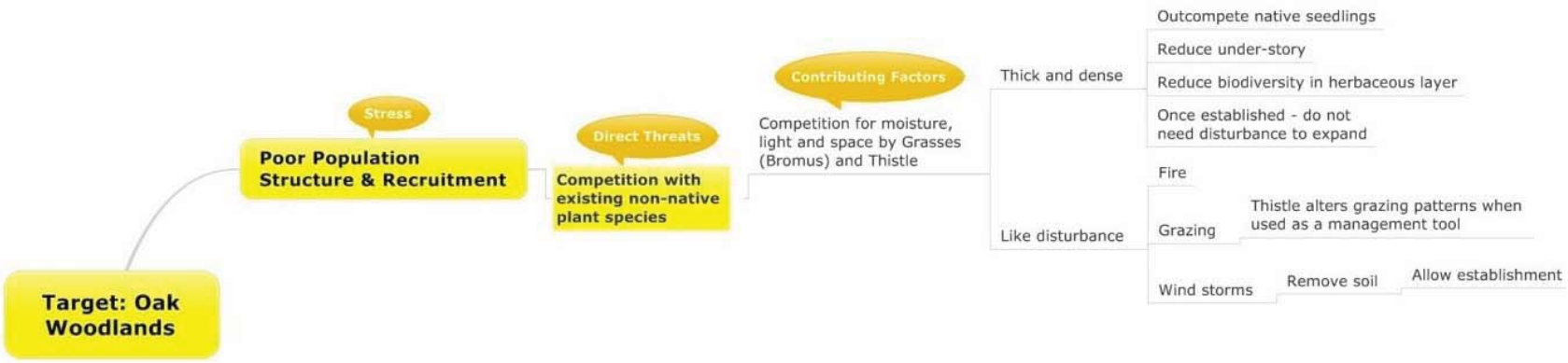
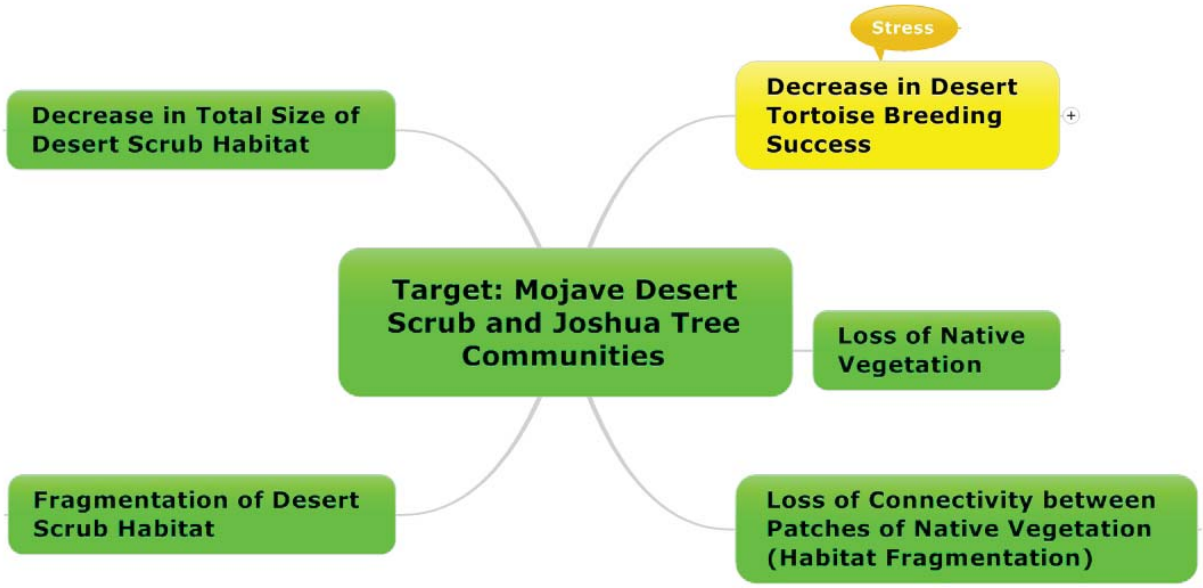
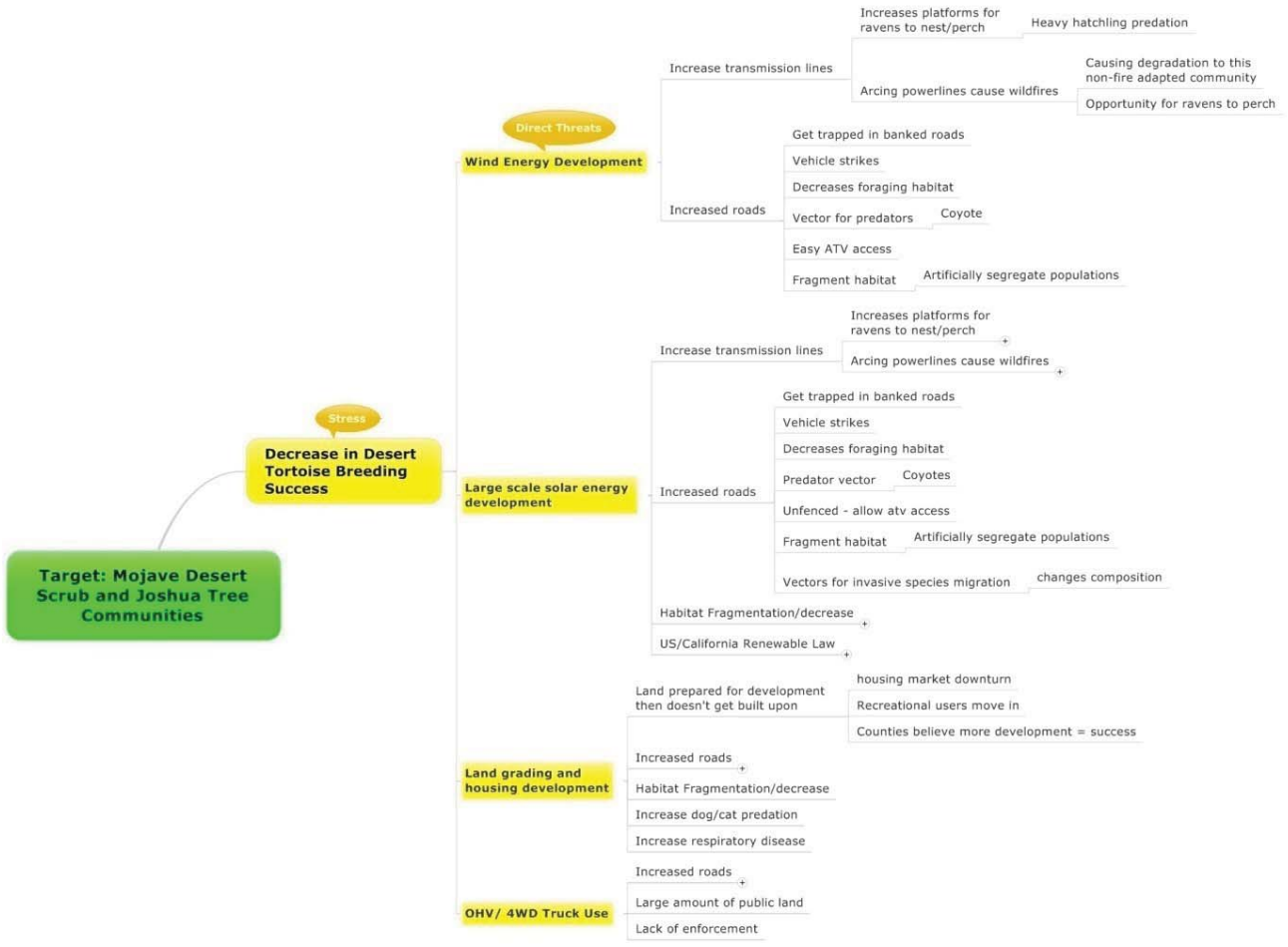


Figure 5. Mojave Desert Scrub and Joshua Tree Communities Conservation Target shown with Altered Key Ecological Attributes.



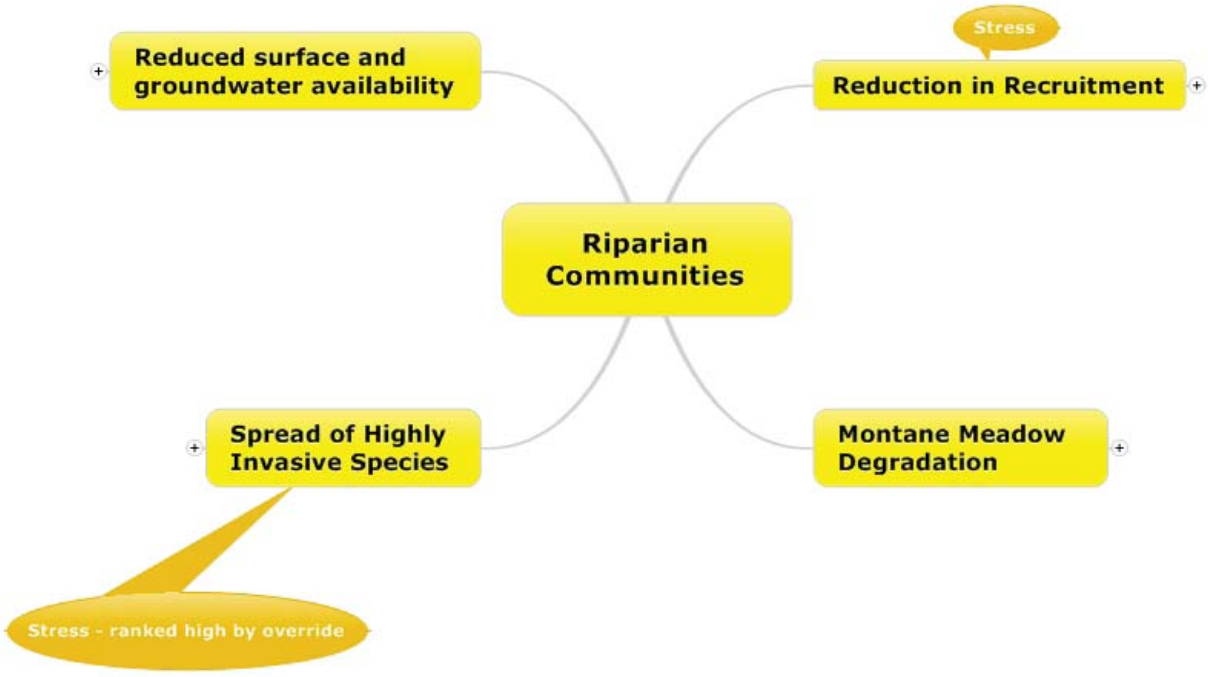
Although there are many potential stresses for the Mojave Desert Scrub and Joshua Tree Communities target, only one rises to the top in terms of priority. The decrease in desert tortoise breeding success has earned the highest ranking stress and warrants additional detail.

Figure 6. Mojave Desert Scrub and Joshua Tree Communities situation analysis detailing desert tortoise breeding success.



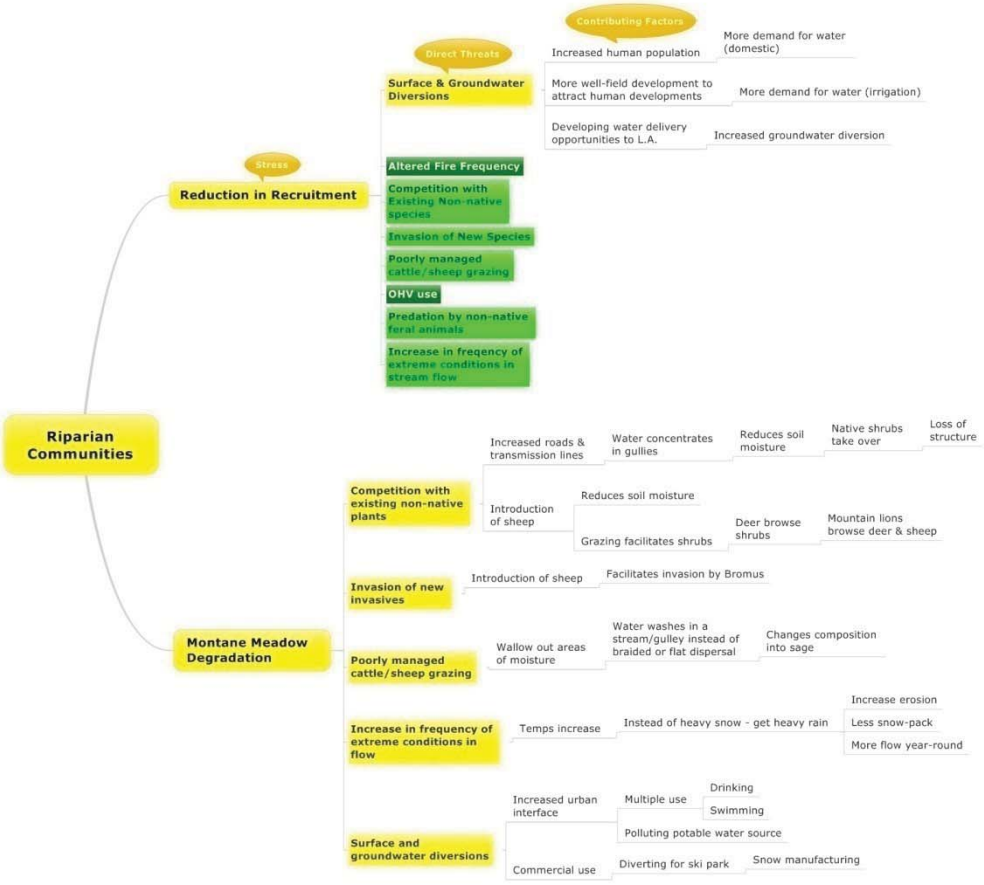
While there were multiple highly ranked threats, there was much overlap in the situations. Problems arise from transmission lines and roads and should be further developed in the conservation objectives section.

Figure 7. Riparian Communities Conservation Target Shown with Ranked Stresses.



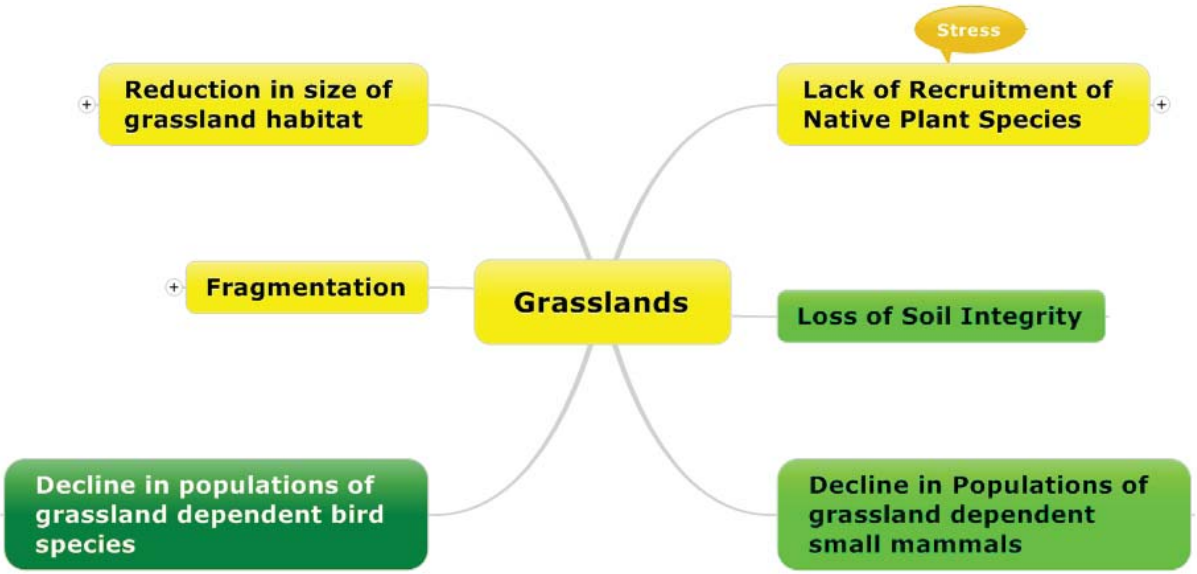
The riparian communities target is the most threatened of the conservation targets in the project. The planning team focused on deciphering the situation analysis further for reduction in recruitment of new riparian woody vegetation and montane meadow degradation as displayed in Figure 7.

Figure 8. Riparian Community Situation Analysis Detailing Reduction in Recruitment and Montane Meadow Degradation.



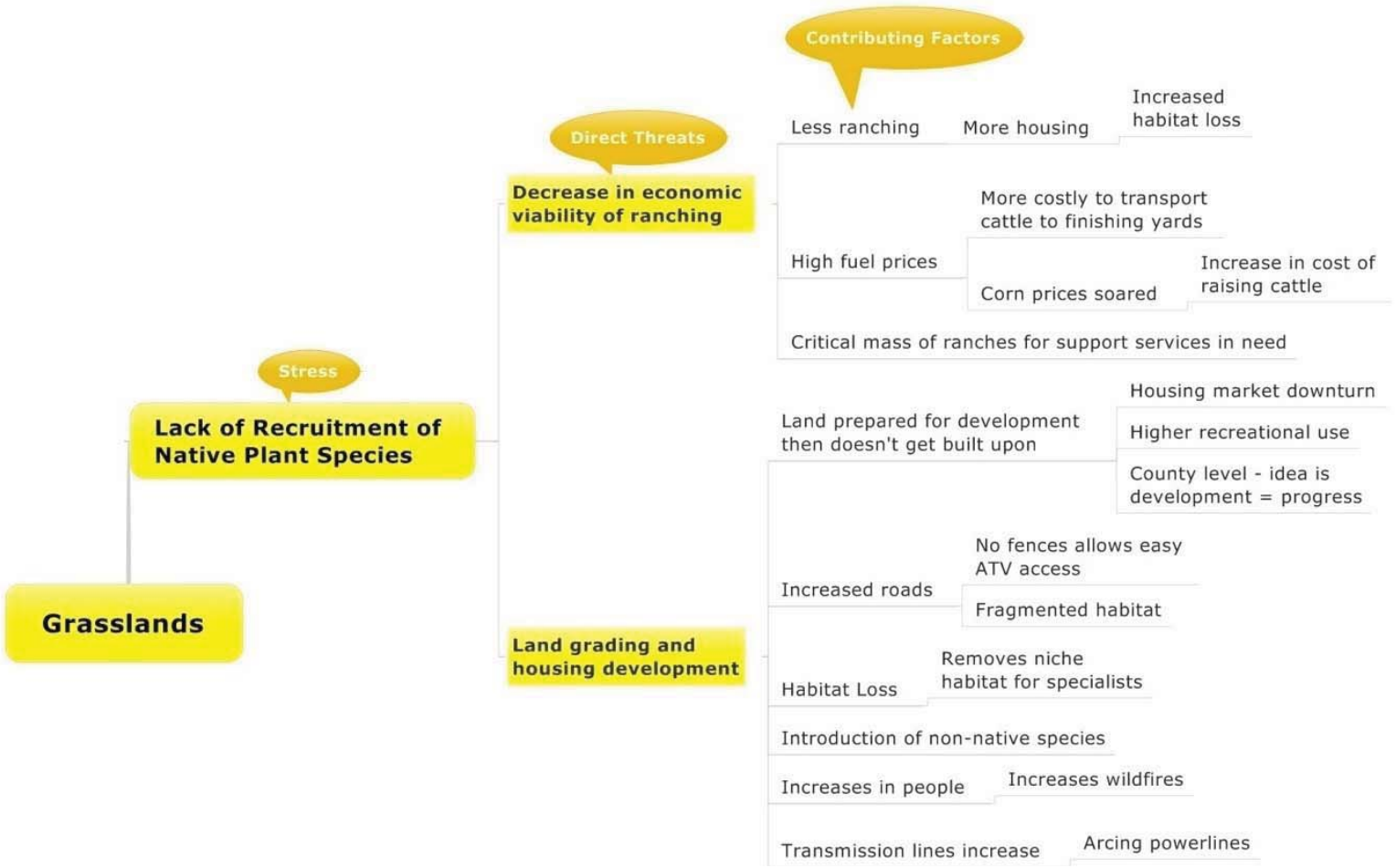
In examining the situation in a little more detail, surface and groundwater diversions are the driver for native woody vegetation being altered. The montane meadow is threatened on several fronts. The advantage from this particular view is the threats that are only ranked at a "medium" level, which represents a lower priority for action.

Figure 9. Grasslands Conservation Target Shown with Ranked Stresses.



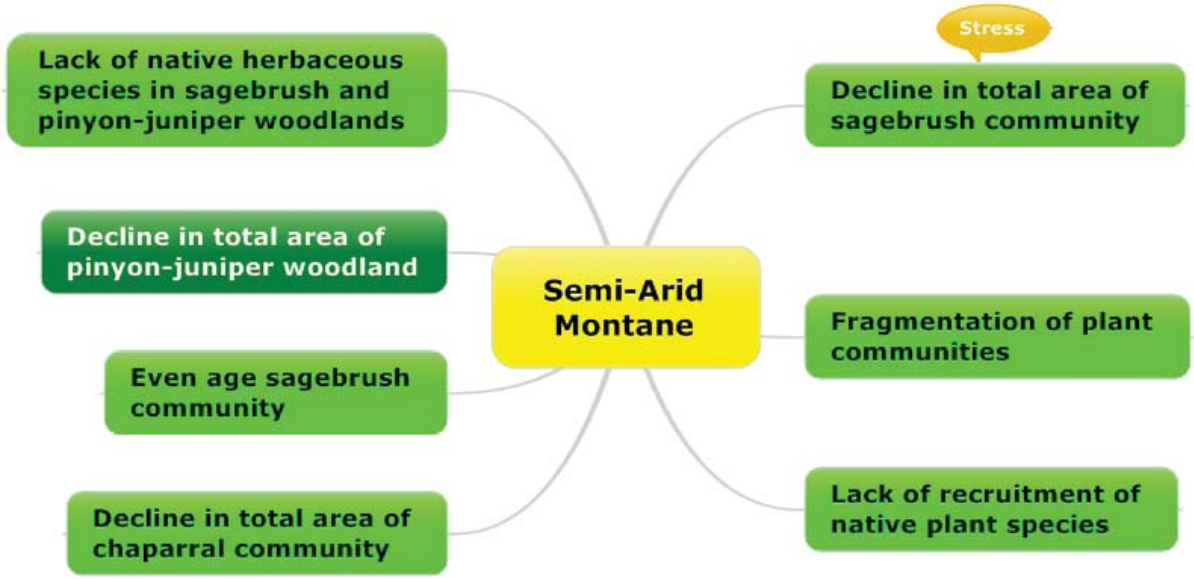
The grasslands conservation target has the major stressors of lack of recruitment of native plant species, fragmentation and reduction in size of grassland habitat. Lack of recruitment became the focus of the planning team for additional effort in creating the situation analysis that is outlined in Figure 9 below.

Figure 10. Grassland Situation Analysis Detailing Lack of Recruitment of Native Species.



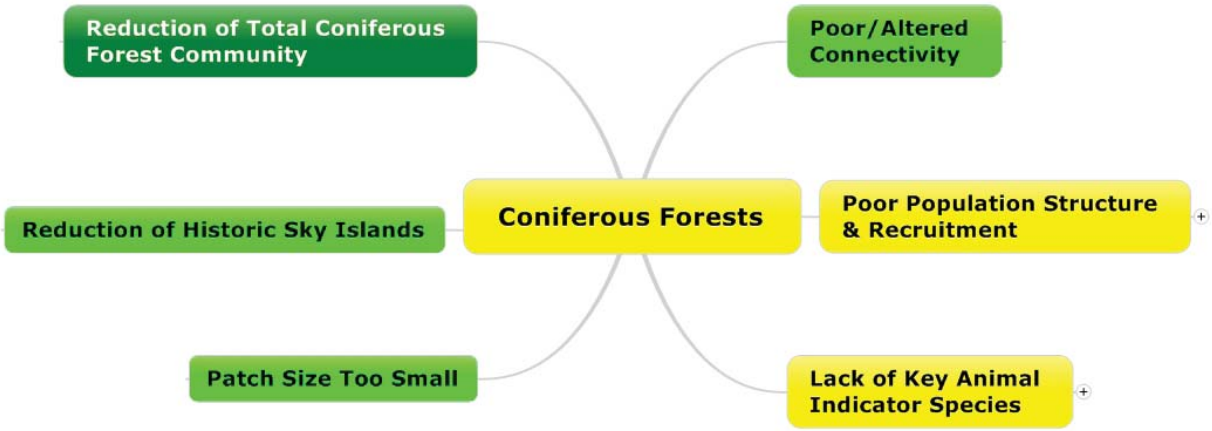
The lack of economic viability of ranching exacerbates other threats including invasive species, land grading and housing development. Large expanses of land that are being managed for grazing are more feasible for restoration than land that has been developed. However, the potential for invasive species to proliferate on inappropriately managed ranch lands can also negatively impact the grassland target.

Figure 11. Semi-Arid Montane Conservation Target Shown with Ranked Stresses.



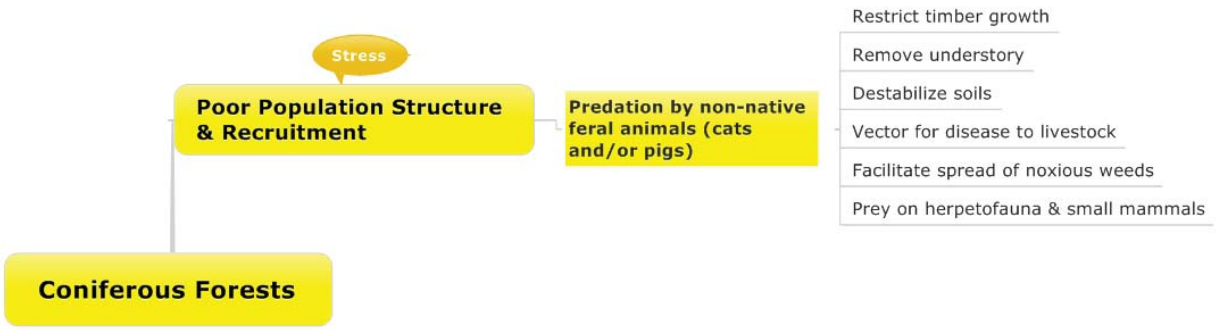
The current health rank for the semi-arid montane target is fair based on viability criteria. However, the future threats are not in a position to dramatically alter the current condition.

Figure 12. Coniferous Forest Conservation Target Shown with Ranked Stresses.



As displayed in Figure 11, poor population structure and recruitment and lack of key animal indicator species are the stresses that warrant attention for the coniferous forests.

Figure 13. Coniferous Forest Situation Analysis Detailing Poor Population Structure and Recruitment.



The most pressing stress for the Coniferous forest is the predation by non-native feral animals destroying seeds and seedlings while destabilizing soils and providing a vector for disease.

Figure 14. Migratory and Wide-Ranging Wildlife Conservation Target Shown with Ranked Stresses.

Currently, the migratory and wide-ranging wildlife conservation target is in very good condition and has no pressing stresses.

6.0 CLIMATE CHANGE

In the context of this CAP, we define climate change as changes in the Earth's climate that are driven by human activity. Warming temperatures, changes in precipitation regimes, shifting weather patterns, and rising seas are all possible outcomes of a changing climate. These changes can lead to accelerated deleterious effects to people and ecosystems including economic losses, increased risk of drought and flood, wildlife at risk, and increased disease and displacement of human populations. While the degree of change likely to occur is somewhat uncertain and difficult to predict, the resolution of climate prediction models is constantly improving.

The Tehachapi planning team examined the particular aspects of climate change and created what we call "Hypotheses of Change" for each of the community-level target within our planning area. For the purposes of our planning exercise, we chose a fifty-year time horizon, and assumed that the following changes would occur over this period of time:

- Unprecedented levels of atmospheric CO_2
- Unprecedented temperatures at all elevations
- Stable or slight decrease of total precipitation, with more falling in the form of rain, and
- More extreme storm events.

These assumptions represent a plausible scenario of climate change over the next half-century, and are supported by agreement among climate models. A situation analysis exercise was conducted for those targets in which climate change induced temperature increases were considered a "highly" ranked source of stress. The results of the exercise are in the table and figures below. A literature search revealed the following information regarding how specific changes in particular climate factors would influence our targets.

Table 3. Hypotheses of Change.

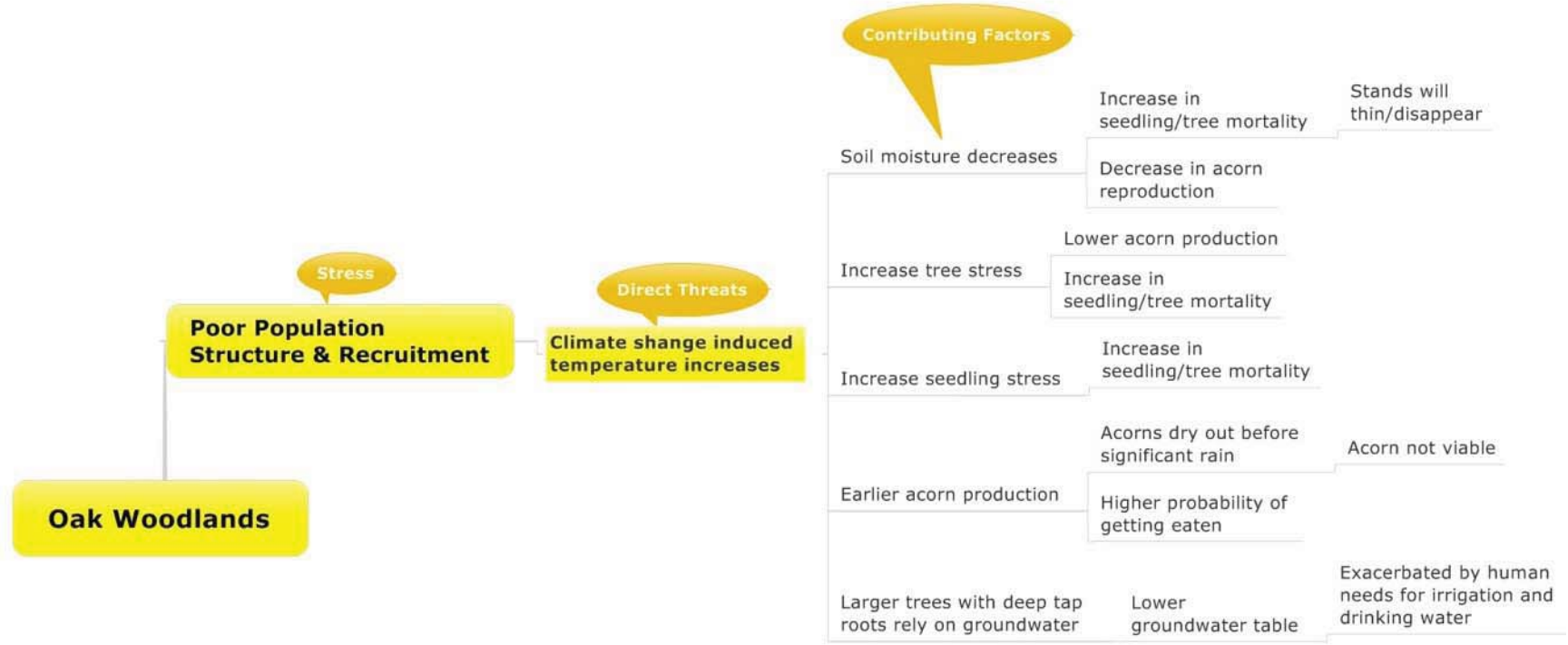
Predicted responses of target communities to hypothesized changes in climate over the next 50 years.

Target	Climate Factor Prediction	Response Variable	Direction of response	Related References
Mixed Conifer Forest	warmer temperatures	forest structure	large tree mortality will increase due to drought stress	Bouldin (1999); Brown et al. 2004; Ferrell (1996); Fried et al. 2004; Lenihan et al. 2008; Littell et al. (2009); Lutz et al. (2009); McKenzie et al (2004); Miller et al. (2008); Panek et al (2008); Safford et al. (2008); van Mantgem et al. (2004); van Mantgem and Stephenson (2007); van Mantgem et al. (2009); Westerling and Bryant (2008); Westerling et al. (2006)
		fire severity	larger and more frequent fires and conversion to chaparral	

Semi-Arid Montane	warmer temperatures	fire frequency	increased drought stress will lead to drier conditions and more frequent fires	Chambers (2007), (2008), and GTR (2004); Bradley (2008); Miller IJWF (2008); Taucsh personal communication (2009)
		native cover	fires will reduce native cover	
		pinyon/juniper health	drought stress will kill trees	
Target	Climate Factor Prediction	Response Variable	Direction of response	Related References
Oak Woodlands	warmer temperatures	oak seedling recruitment	reduction in soil moisture will increase seedling mortality; acorn production may be earlier	Bradford et al. (2007); Davis et al. (1991); Swiecki and Bernhardt (1998)
		size of existing oak woodland stands	rate of mortality of existing oak trees will increase- stands will thin and some will disappear	Mackenzie, Jason (2009)
Grasslands	warmer temperatures	flowering onset	all species earlier	Cleland et al. (2006)
		species composition	favors some forbs	Zavaleta et al. (2003b)
	higher CO_2 concentration in atmosphere	species composition	favors late-season species	Field et al. (1996); Chiariello and Field (1996); Zavaleta et al. (2003b)
		species diversity	fewer forbs	Zavaleta et al. (2003a)
Mojave Desert Scrub and Joshua Tree Communities	warmer temperatures	plant productivity	reduced plant growth (if hotter in summer); more plant growth (if warmer in winter)	speculation
		species composition	shift towards more drought-avoiding species (i.e. invasive annual grasses)	speculation
	higher CO_2 concentration in atmosphere	plant productivity	more plant growth (high CO2 offsets neg. effects of higher temps and drought)	Hamlerlynk et al. (2000)

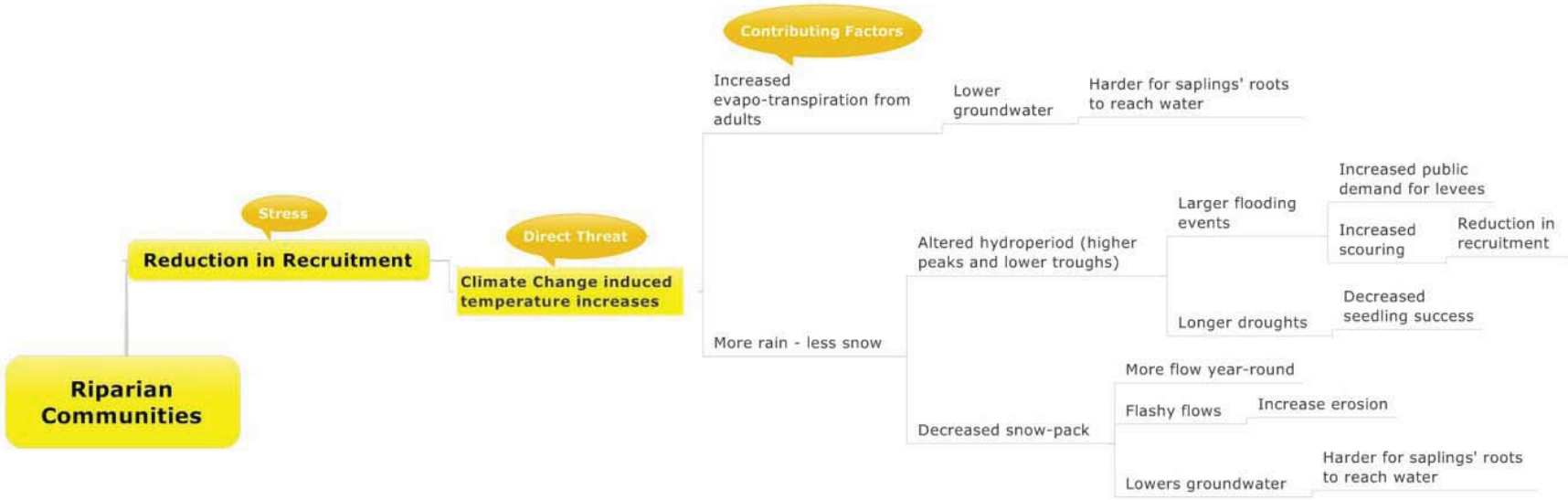
			range expansion due to increased tolerance for low temps with high CO2	Loik et al. (2000)
		species composition	anthropogenic CO2 increases will drive ecosystem change even in the absence of significant climate change	Dole et al. (2003)
			more shrubs and woody species	Polley et al. (2002)
			elevated CO2 may have its greatest positive effect on Mojave Desert shrub recruitment when accompanied by increased rainfall	Housman et al. (2003)
Riparian Communities	warmer temperatures	flooding/saturation of riparian areas	above 5,000 ft, peak runoff will shift to earlier in season b/c of reduced snowpack, causing more flooding at low elevations	3 years of baseline data from KREW study by USDA Forest Service Pacific Southwest Research Station; Vorster (2005); Sequoia Riverlands Trust (2004), (2008)

Figure 15. Oak Woodlands Situation Analysis Detailing Poor Population Structure and Recruitment and Climate Change Induced Temperature Increases.



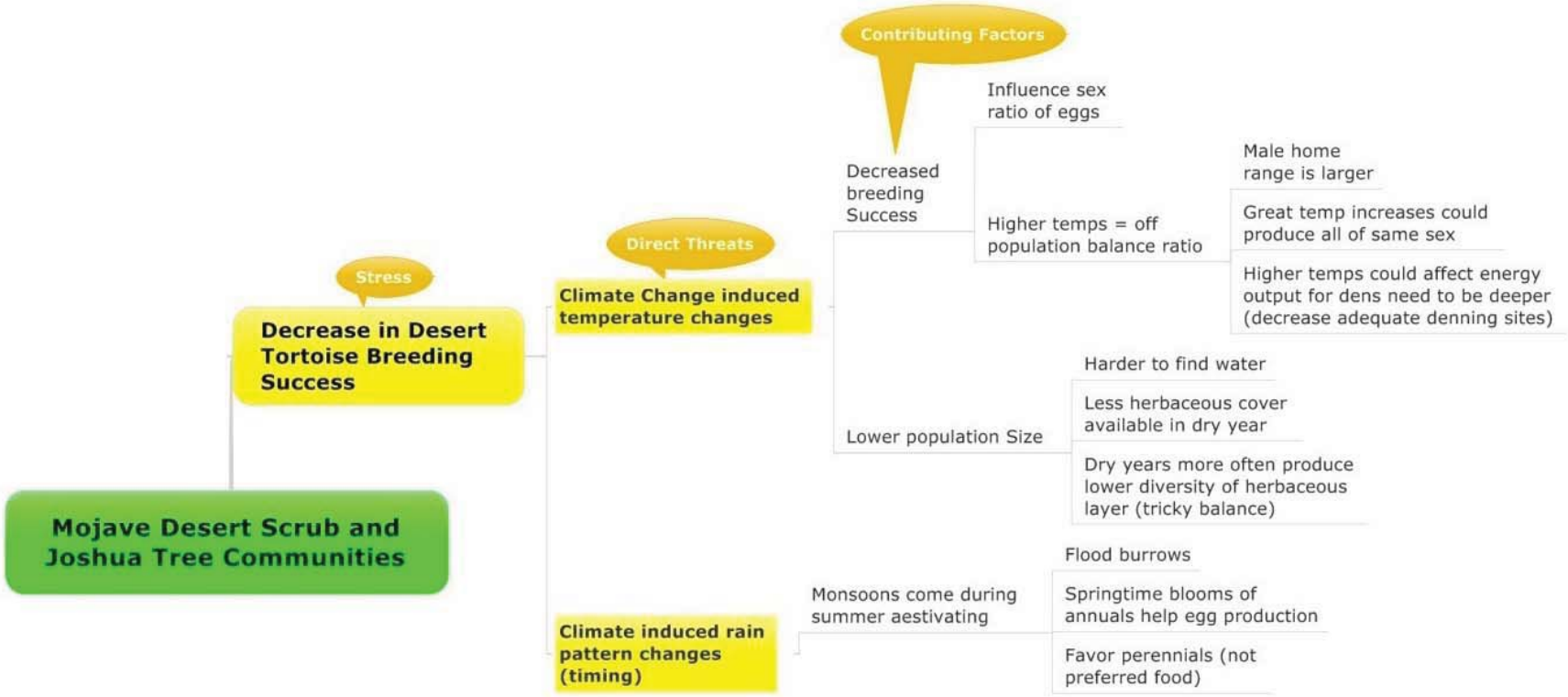
As displayed in Figure 14, the planning team predicts that the warming climate will adversely affect the population structure of the oak woodland target. As with other targets, the population structure and recruitment of the oak community are already affected by the threat of competition for moisture light and space from invasive species. Warmer temperatures exacerbate the effects of all of the other known threats.

Figure 16. Riparian Communities Situation Analysis Detailing Reduction in Recruitment and Climate Change Induced Temperature Increases.



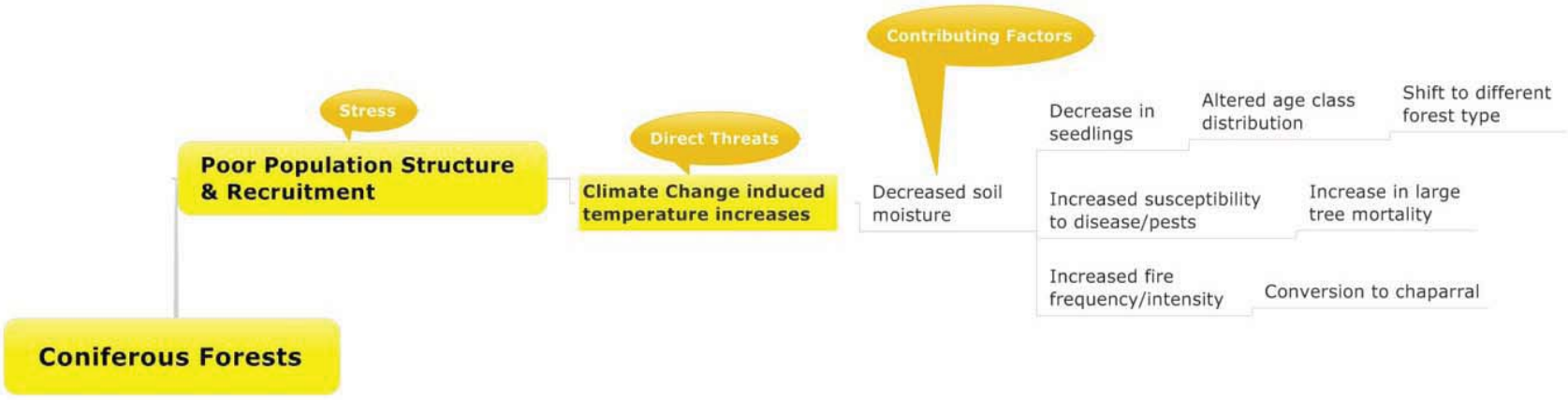
For riparian communities, climate change induced temperature changes affect recruitment by changing the timing, extent and duration of how water is cast upon and transferred across the landscape.

Figure 17. Mojave Desert Scrub and Joshua Tree Communities Situation Analysis Detailing Decrease in Desert Tortoise Breeding Success and Climate Change Induced Temperature Increases and Climate Induced Rain Pattern Changes.



The desert tortoise represents one of the keystone species of the Mojave Desert scrub and Joshua tree communities target. A warming climate will adversely affect breeding success as well as other population dynamics of the desert tortoise. Aside from the direct effects of changing the sex ratio of eggs, more energy is predicted to be needed in other life stages including burrowing, foraging, and finding mates.

Figure 18. Coniferous Forest Situation Analysis Detailing Poor Population Structure and Recruitment and Climate Change Induced Temperature Increases.



The coniferous forests are predicted to undergo additional stress due to warmer temperatures brought on by climate change. Altered population structure and recruitment of the forest is expected to drive future problems. Decreased soil moisture is predicted to reduce seedling success, increase fire frequency/intensity and increase susceptibility to disease and pests.

7.0 CONSERVATION OBJECTIVES

Objectives are specific and measurable statements of planned achievement. For the Tehachapi region, conservation objectives were selected that would enhance target viability or abate critical threats. For each objective, specific strategic actions were defined. To prioritize the objective, the associated strategic actions were evaluated based on benefits, feasibility, and cost. The objectives were then prioritized by group (A, B or C) with the strategic actions prioritized within each objective. These conservation objectives with ranked strategic actions are presented in Table 3. The objective groupings represent the priorities for implementation by the planning team with ranked strategic actions. Group A consists of mostly protection strategies while Group B focuses on restoration activities.

Table 4. Group A Conservation Objectives with Ranked Strategic Actions

#	Objectives and Strategic Actions	Overall Rank
Objective	**Protect 50-70% (60,000 new acres) of Oak Woodland by 2015**	
Strategic action	Acquire fee or easements over strategic range lands.	High
Strategic action	Include transect protection funding in CAPP priorities.	Very High
Strategic action	Include slope orientation and other micro level climate factors in site selection for direct protection.	Very High
Strategic action	Incorporation of key conservation areas in County General Plan & land use regulations.	High
Strategic action	Ensure appropriate mitigation funding/conditions are received from for development/infrastructure impacts and applied within the project area.	Very High
Strategic action	Conserve lands in "elevational transects" or wildlife linkages where practical.	High
Objective	**Protect 75% of all Riparian Communities by 2015**	
Strategic action	Acquire fee or easements over strategic range lands.	High

#	Objectives and Strategic Actions	Overall Rank
Strategic action	Include transect protection funding in CAPP priorities.	Very High
Strategic action	Include slope orientation and other micro level climate factors in site selection for direct protection.	Very High
Strategic action	Protect lands with significant existing riparian resources.	High
Strategic action	Develop strategies to restore flows (e.g. purchase water rights, water management, etc).	High
Strategic action	Incorporation of key conservation areas in County General Plan & land use regulations.	High
Strategic action	Focus conservation in major drainages with highest diversity (e.g. Kern, Caliente, Walker, and Tejon)	High
Strategic action	Focus conservation on areas projected to have long term perennial flows.	High
Strategic action	Ensure appropriate mitigation funding/conditions are received from for development/infrastructure impacts and applied within the project area.	Very High
Strategic action	Explore an "ecosystem services mitigation fee" on water exported from project area.	High
Strategic action	Target areas with large tree canopy (or restoration candidates that can support large canopy).	Low
Strategic action	Maintain/enhance stream passage to higher elevations by protecting key reaches.	High
Objective	**By 2011 ensure effective conservation of at least one elevational transect in the Tehachapi Region, begin two others.**	
Strategic action	Review current BLM plans and ensure that their disposal of properties aligns with our strategies for acquisition and the creation of landscape linkages. Timeline: finish by 2010.	High
Strategic action	Select transect extending from low to high elevation that includes targets with large projected CC stable and expansion areas.	High
Strategic action	Ensure appropriate mitigation funding/conditions are received from for development/infrastructure impacts and applied within the project	Very High

#	Objectives and Strategic Actions	Overall Rank
	area.	
Strategic action	Identify and protect refugia that may facilitate species survival in light of climate change.	High
Strategic action	Include slope orientation and other micro level climate factors in site selection for direct protection.	Very High
Strategic action	Include transect protection funding in CAPP priorities.	Very High
Strategic action	Locate future transects at appropriate latitudes intervals (e.g. separate on north south access to address CC impacts).	High
Strategic action	Promote appropriate management of public lands to help achieve this objective.	High
Objective	**By 2012, protect key conservation lands with protected designation in local land use policy/laws**	
Strategic action	Incorporation of key conservation areas in County General Plan & land use regulations.	High
Strategic action	SSP take action to support SB 375 implementation.	Very High
Objective	**Create a minimum viable linkage (to build upon with future land protection) from Tejon Ranch to Sequoia National Forest by 2013**	
Strategic action	Conserve lands in "elevational transects" or wildlife linkages where practical.	High
Strategic action	Review current BLM plans and ensure that their disposal of properties aligns with our strategies for acquisition and the creation of landscape linkages. Timeline: finish by 2010.	High
Strategic action	SSP promotes long term partnerships with ranching community to retain Williamson Act.	Very High
Strategic action	Review and comment on Caliente Resource Management Plan. Timeline: finish by end of 2009.	High
Strategic action	Ensure protection of wildlife corridor through Tejon Ranch by 2013.	Very High

#	Objectives and Strategic Actions	Overall Rank
Strategic action	Conduct overview and analysis of existing information regarding renewable energy and migration/wildlife movement	Very High
Objective	**Protect 50-70% of Grasslands by 2015**	
Strategic action	Acquire fee or easements over strategic range lands.	High
Strategic action	Include transect protection funding in CAPP priorities.	Very High
Strategic action	Include slope orientation and other micro level climate factors in site selection for direct protection.	Very High
Strategic action	Incorporation of key conservation areas in County General Plan & land use regulations.	High
Strategic action	Ensure appropriate mitigation funding/conditions are received from for development/infrastructure impacts and applied within the project area.	Very High
Strategic action	Conserve lands in "elevational transects" or wildlife linkages where practical.	High

Table 5. Group B Conservation Objectives with Ranked Strategic Actions

#	Objectives and Strategic Actions	Overall Rank
Objective	**By 2012, enhance and maintain north-south migratory flyways for birds and bats to/from Southern Sierra Nevada**	
Strategic action	Review current BLM plans and ensure that their disposal of properties aligns with our strategies for acquisition and the creation of landscape linkages. Timeline: finish by 2010.	High
Strategic action	Review and comment on Caliente Resource Management Plan. Timeline: finish by end of 2009.	High
Strategic action	Conduct a new study within the Tehachapi CAP area using radar and/or observational data to understand the impacts of turbines on bird migration. Complete by 2012.	High

#	Objectives and Strategic Actions	Overall Rank
Strategic action	Develop a science-based set of comments for county, state, and federal agencies regarding permitting of wind energy development by 2012.	Medium
Strategic action	Ensure appropriate mitigation funding/conditions are received from for development/infrastructure impacts and applied within the project area.	Very High
Objective	**Restore stream flows to key perennial streams by 2015.**	
Strategic action	Develop strategies to restore flows (e.g. purchase water rights, water management, etc).	High
Strategic action	Evaluate potential partnerships with fishing, recreation and other conservation groups to meet objective.	Medium
Strategic action	Acquire water rights needed to maintain flows in important drainages.	High
Strategic action	Convert high water usage operations in key drainages to lower water use crops or grazing land.	High
Objective	**By 2013 increase BLM and other agency management of Mojave Desert Scrub and Joshua Tree communities to increase desert tortoise breeding success**	
Strategic action	Create higher designation of protection for "protected" land with managing agencies.	Very High
Strategic action	Make CC data/projections and strategies available to public agencies.	Low
Strategic action	Create renewable energy mitigation funded program for improved land management.	Very High
Strategic action	Assist/support elimination and reduction of edge and in holdings of incompatible uses.	Medium
Strategic action	Review current BLM plans and ensure that their disposal of properties aligns with our strategies for acquisition and the creation of landscape linkages. Timeline: finish by 2010.	High
Strategic action	Review and comment on Caliente Resource Management Plan. Timeline: finish by end of 2009.	High

#	Objectives and Strategic Actions	Overall Rank
Strategic action	Increase capacity within governmental agencies to combat new alien species infestations by developing and funding a rapid response team.	High
Strategic action	By 20XX have major invasive plants (e.g. arundo, tamarisk, lepidium) declared noxious weeds (illegal).	Medium
Strategic action	Improve best management practices by public agencies.	Medium
Objective	**By 2014 protect >75% of 100 year floodplain on key rivers/streams (e.g. Kern, Walker, Caliente, etc)**	
Strategic action	Create alliances with water agencies, ground water mgmt. districts flood control agencies and local water users to develop a floodplain protection program.	High
Strategic action	SSP support and implement a watershed (hydrologic cycle) education program for local community.	Low
Objective	**No new or expansion of existing dams in project area**	
Strategic action	By 2010 determine if key reaches of the Kern River would benefit from designation as Wild and Scenic or other special status preventing export of water.	Medium
Strategic action	Explore an "ecosystem services mitigation fee" on water exported from project area.	High
Strategic action	SSP support water conservation in central and So. CA.	Low
Strategic action	Acquire water rights needed to maintain flows in important drainages.	High
Objective	**Improve Riparian Communities to at least 3 size classes of vegetation in 50% of lands by 2020**	
Strategic action	Include best management practices in all conservation easements.	Medium
Strategic action	By 20xx identify dewatered perennial streams and the cause thereof.	-
Strategic action	Develop strategies to restore flows (e.g. purchase water rights, water management, etc).	High

#	Objectives and Strategic Actions	Overall Rank
Strategic action	Maintain/enhance stream passage to higher elevations by protecting key reaches.	High
Strategic action	Promote fencing and/or appropriate livestock management in Riparian Communities on newly acquired easement land (EQIP and WHIP)	Medium
Strategic action	Promote programs such WHIP and EQUIP to fence X miles of riparian corridor and develop alternative stock watering sources.	Low
Strategic action	Protect lands with significant existing riparian resources.	High

Group C contains objectives that may be considered risky, uncertain or costly. These are the areas that warrant more detailed consideration before implementation is carried out.

Table 6. Group C Conservation Objectives with Ranked Strategic Actions

#	Objectives and Strategic Actions	Overall Rank
Objective	**Promote retention of economically sustainable ranching as a viable land use in appropriate areas.**	
Strategic action	SSP promotes long term partnerships with ranching community to retain Williamson Act.	Very High
Strategic action	Create & implement a BMP certification program for cattle grazing by 20XX.	Low
Strategic action	By 20XX create and fund a program for oak conservation BMP's incentives implemented by NRCS.	Low
Strategic action	Develop a conservation buyer/young rancher program/data base.	Medium
Strategic action	Develop a conservation/ranching collaborative with equal interests to promote retention of ranching.	Medium
Strategic action	Acquire fee or easements over strategic range lands.	High

#	Objectives and Strategic Actions	Overall Rank
Objective	**No additional export of water from project area**	
Strategic action	By 2012 assess potential long term water export threat including additional diversions, ground water extraction and dam/reservoir construction.	Low
Strategic action	By 2010 determine if key reaches of the Kern River would benefit from designation as Wild and Scenic or other special status preventing export of water.	Medium
Strategic action	Evaluate potential partnerships with fishing, recreation and other conservation groups to meet objective.	Medium
Strategic action	Acquire water rights needed to maintain flows in important drainages.	High
Strategic action	Explore an "ecosystem services mitigation fee" on water exported from project area.	High
Objective	**Annually maintain healthy fire regimes throughout the region**	
Strategic action	Collaborate with agencies to determine and implement appropriate non-native roadside fuel reduction measures	Low
Strategic action	Improve best management practices by public agencies.	Medium
Strategic action	Promote appropriate management of public lands to help achieve this objective.	High
Strategic action	Work with agencies to enforce use of spark arresters and educate OHV users about fire. Timeline: finish by 2015.	Low
Strategic action	Collaborate with agencies to make a plan for prescribed burning (controlled burns) in INTACT sagebrush communities	Low
Objective	**Annually maintain or reduce current levels of invasive species in priority areas in the Tehachapi Region**	
Strategic action	Increase capacity within governmental agencies to combat new alien species infestations by developing and funding a rapid response team.	High
Strategic action	Collect invasive species information from a rapid field assessment of Riparian Communities. Timeline: finish by end of 2010.	Low

#	Objectives and Strategic Actions	Overall Rank
Strategic action	Modify CEQA and NEPA to create an exemption for rapid response invasive removal by 20XX.	Very High
Strategic action	By 20XX have major invasive plants (e.g. arundo, tamarisk, lepidium) declared noxious weeds (illegal).	Medium
Strategic action	Evaluate and implement appropriate bio control measures (e.g. UCSB tamarisk).	Low
Strategic action	Assess and manage the threat of wild pigs.	Low
Objective	**Improve oak recruitment so that 50% of Oak Woodlands throughout its range have a ratio of 1 sapling per 2 adult trees by 2050**	
Strategic action	Include best management practices in all conservation easements.	Medium
Strategic action	Assess and manage the threat of wild pigs.	Low
Strategic action	Create & implement a BMP certification program for cattle grazing by 20XX.	Low
Strategic action	Develop best grazing practices for oak woodlands by 20XX.	Medium
Strategic action	By 20XX create and fund a program for oak conservation BMP's incentives implemented by NRCS.	Low
Strategic action	Support a study/survey that will ID issues and solutions for oak recruitment within the project area to be completed by 20XX.	Low
Objective	**Design and implement climate change studies focusing on population recruitment for oak woodlands, riparian, and coniferous forests and breeding success in desert tortoises**	
Strategic action	At least every 5 years update this CAP to include up-to-date CC science.	Medium
Strategic action	Make CC data/projections and strategies available to public agencies.	Low
Strategic action	SSP partners schedule and host CAP update workshops =< every 5 years.	Low

#	Objectives and Strategic Actions	Overall Rank
Strategic action	Revised CAP strategies incorporated in SSP partner conservation plans within 12 months of CAP updates as appropriate.	Medium
Strategic action	Choose "early warning" indicator species for climate change (e.g. change in avian territories) and develop a monitoring program to track changes.	Medium
Strategic action	By Dec. 2010 SSP partners develop/implement a program to improve and collect CC data for area.	Medium
Strategic action	Update CNDDB data and veg data for private lands.	Medium

8.0 MEASURING RESULTS

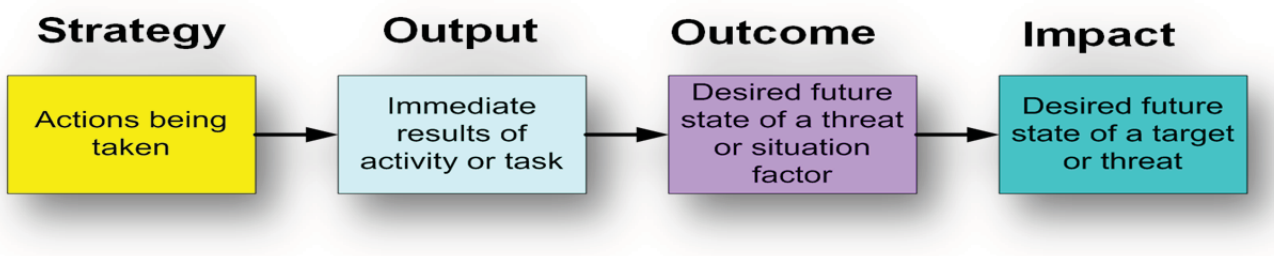
Measuring results is imperative in determining how the biodiversity of interest is doing and in determining whether or not chosen actions are having the desired effects. Status measures are those measures of viability that yield the current condition rating. Clearly defining status indicators facilitates the creation and execution of measurable objectives. Status indicators rated as poor or fair or that are directly related to conservation objectives should be monitored at least annually. Status indicators with a rating of good or very good still warrant monitoring, but at longer intervals.

Strategy effectiveness measures indicate if chosen actions are yielding the intended conservation results. Many times when strategic actions are created, there are assumptions that are taken into account. Without clarifying those assumptions, teams could falsely believe that when they carry out the tasks in their management plan that they will be successful. True success includes not only measuring how effective strategies are, but their impact on the specific indicators of the key ecological attributes that are instrumental in protecting and enhancing biodiversity.

8.1 RESULTS CHAINS

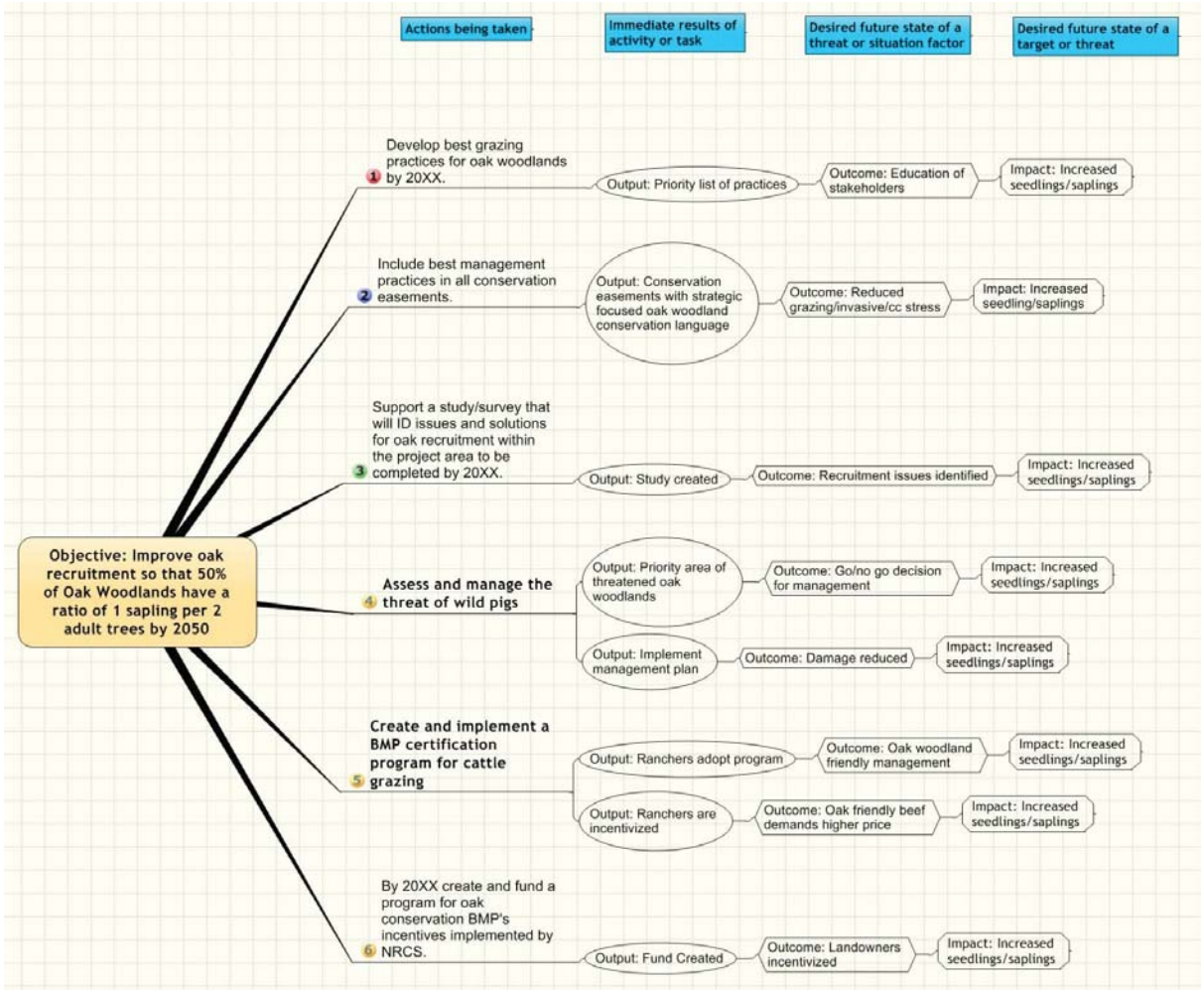
Results chains are a way to connect status and effectiveness measures while keeping transparent the inputs and outputs with expected impacts. These results chains are the product of the planning group where we explored a series of “if…then” statements. The results chain captures the group’s philosophy concerning how a specific activity will contribute to abating a critical threat or enhancing target viability. Different from situation analysis, this method clarifies assumptions and focuses on achieving results. The exercise is represented in the form of a flow diagram starting with strategy and ending with impact.

Figure 19. Sample Flow Diagram of a Results Chain



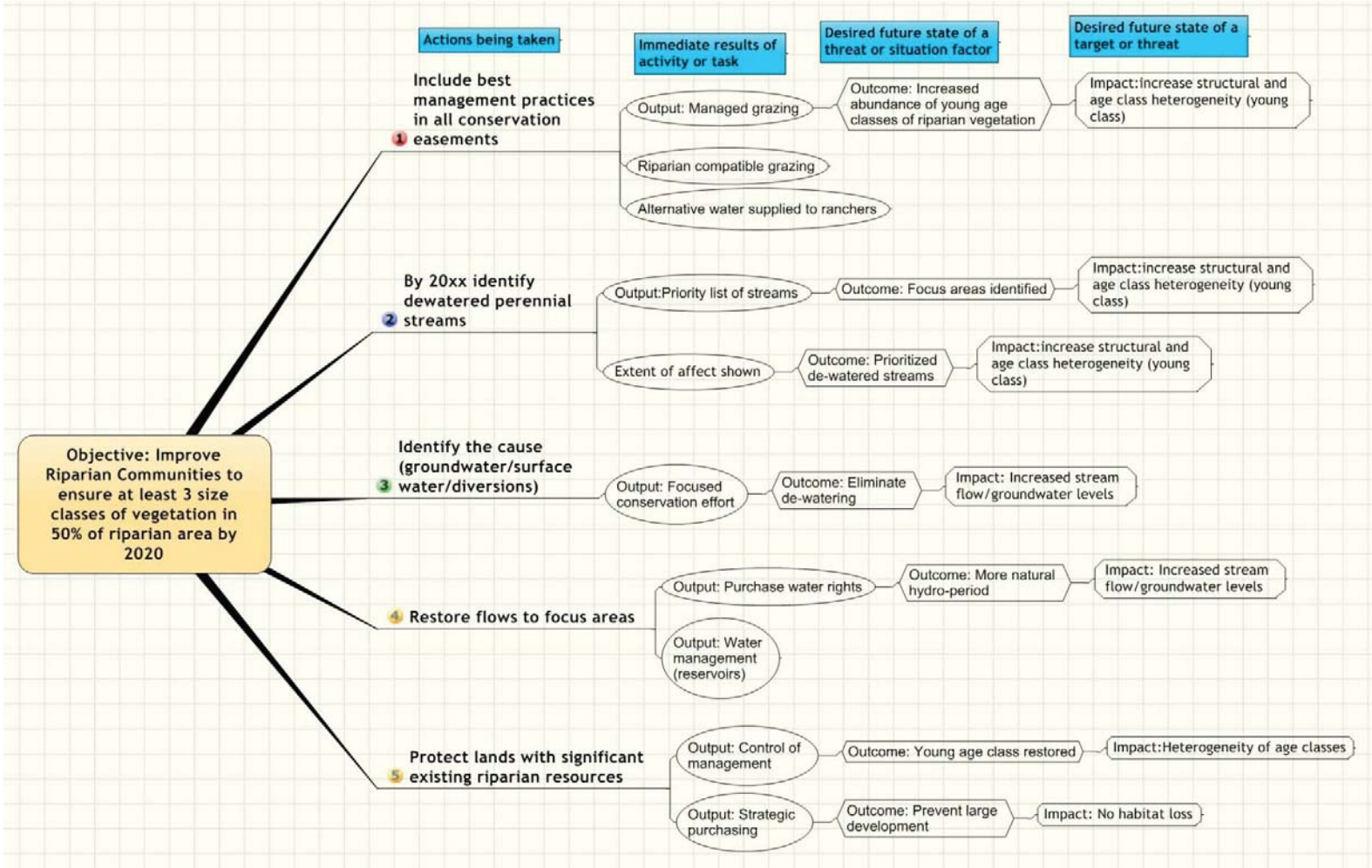
As a first iteration, the planning team chose to create several results chains around risky or uncertain strategies that were developed.

Figure 20. Oak Woodlands Results Chain for improving recruitment



For the oak woodlands target, the above results chain will greatly aid in deciding whether to act or delay implementation by providing an outline for a detailed work plan.

Figure 21. Riparian Communities results chain exploring increasing structural heterogeneity.



The above objective ranked a little lower due to its action steps being broad and potentially less feasible to implement. As above, the implementation decision can be aided by this “road map” for a detailed work plan.

8.2 MONITORING GUIDELINES AND RECOMMENDATIONS FOR PRIORITY INDICATORS

1) Total area protected of oak woodlands

   The total area of oak woodlands protected will be determined by using Geographic Information System (GIS). Baseline vegetation data used was the USFS-CDF EVEG Vegetation data obtained from USDA Forest Service - Pacific Southwest region - Remote Sensing Lab 2001, 2003. Oak woodlands can be mapped every three years using up-to-date county parcel data to track changes in the amount of area protected. Verification of the presence of oak woodlands can generally be completed using aerial images.

2) Total area of protected riparian communities

   Two GIS methods can be used to track riparian community protection. One is based on the USFS-CDF EVEG Vegetation data. The second is based on the total linear distance of creeks, streams and rivers. Vegetation data can under estimate the presence of riparian vegetation as the resolution of vegetation mapping is often too coarse to capture these many of these linear features. Using the distance of creeks, streams and rivers can over estimate riparian vegetation as not all of the areas along these features will contain riparian vegetation. Unless relatively high resolution data exists for the area, field verification may be necessary to accurately map the extent of these communities. GIS can be used to estimate protected riparian communities every three years and field verification can be completed every six years.

3) Number of key conservation areas protected

   Parcel data obtained from the various counties can be compared, using GIS, to key conservation areas to determine the amount of protected lands occurs within each area. Key conservation areas can be mapped every three years using up-to-date county parcel data to track changes in the amount of protected lands.

4) Number of elevational transects protected

   The location of protected lands can be mapped using GIS to determine their location with respect to elevational transects. This exercise will not only identify transects that have been protected, but can help prioritize future transects based on proportion complete and proximity to other completed or potential transects. Elevational transects can be mapped every three years using up-to-date county parcel data to track changes in the amount of area protected.

5) Total area of grassland protected

   The total area of grasslands protected will be determined by using GIS. Baseline vegetation data used was the USFS-CDF EVEG Vegetation data. Grasslands can be mapped every three years using up-to-date county parcel

APPENDICES

Appendix A: Glossary

(Adapted from the CAP Handbook found at: http://conserveonline.org/workspaces/cbdgateway/cap/resources/2/1/handbook)

Target – A limited suite of ecological systems or socioeconomic parameters that are chosen to represent and encompass the full array of focus in a project area. They are the basis for setting goals, carrying out actions, and measuring effectiveness.

Viability - The status or "health" of an ecological system or socioeconomic target. More generally, viability indicates the ability of a focal target to withstand or recover from most disturbances or hurdles and thus to persist for over long time periods.

Key Attribute - Aspects of a target's ecology, sociology or economy that, if missing or altered, would lead to the loss of that target over time. As such, key attributes define the target's viability or integrity.

Indicator - Measurable entities related to a specific information need (for example, the status of a key ecological attribute, change in a threat, or progress towards an objective). A good indicator meets the criteria of being: measurable, precise, consistent, and sensitive. This scale involves establishing the following boundaries for an indicator based on the thresholds – very good, good, fair, and poor.

> Very Good – Ecologically, economically or socially desirable status; requires little intervention for maintenance.
>
> Good - Indicator within acceptable range of variation; some intervention required for maintenance.
>
> Fair - Outside acceptable range of variation; requires human intervention.
>
> Poor - Restoration increasingly difficult; may result in deletion of the target.

Stress - Impaired aspects of focal targets that result directly or indirectly from human activities (e.g., low population size, reduced job availability). Generally equivalent to degraded key attributes.

Scope – (when ranking a stress) - Most commonly defined spatially as the geographic scope of impact on the focal target at the site that can reasonably be expected within 10 years under current circumstances (i.e., given the continuation of the existing situation).

> Very High: The threat is likely to destroy or eliminate the conservation target over some portion of the target's occurrence at the site.
>
> High: The threat is likely to seriously degrade the conservation target over some portion of the target's occurrence at the site.
>
> Medium: The threat is likely to moderately degrade the conservation target over some portion of the target's occurrence at the site.

APPENDICES

Critical Threat - Sources of stress (direct threats) that are most problematic. Most often, Very High and High rated threats based on the threat rating criteria of their impact on the focal targets.

Indirect Threats - Contributing factors identified in an analysis of the project situation that are drivers of direct threats. Often an entry point for actions

Strategies - Broad courses of action that include one or more objectives, the strategic actions required to accomplish each objective, and the specific action steps required to complete each strategic action.

Objective - Specific statements detailing the desired accomplishments or outcomes of a particular set of activities within a project. A typical project will have multiple objectives. Objectives are typically set for abatement of critical threats and for restoration of degraded key attributes. They can also be set, however, for the outcomes of specific actions, or the acquisition of project resources. If the project is well conceptualized and designed, realization of all the project's objectives should lead to the fulfillment of the project's vision. A good objective meets the criteria of being: specific, measurable, achievable, relevant and time limited.

Strategic Action - Interventions undertaken by project staff and/or partners designed to reach the project's objectives. A good action meets the criteria of being: linked to objectives, focused, strategic, feasible, and appropriate.

Action Step – The "to do" list under strategic actions. These are the task lists for carrying forward strategic actions.

STRATEGIC ACTION RANKING

Potential strategic actions may be ranked on nine criteria related to Benefits (contribution, threat abatement, viability enhancement, duration, leverage), Feasibility (lead individual/institution, ease of implementation, ability to motivate), and Cost. Descriptions of each of these ranking criteria are included in this section.

Cost - Strategic action costs should be estimated for the time horizon of the strategy, but no longer than 10 years. Overall cost of a strategic action is based on four factors:

One time cost - The amount of any direct, one-time costs.

Annual costs - Other direct costs, excluding staff time that will be accrued annually.

Staff time - The average number of staff (Full Time Employee) required to implement the strategic action.

Number of years - The number of years the strategic action will require staff time and annual costs for implementation.

In ranking the overall cost of a strategic action, the following scale was used:

Low - Less than $50,000

Medium - $50,000 to $250,000

High - $250,000 to $1,000,000

Very High - More than $1,000,000

Benefits - The benefits of a given strategic action may be direct (derive from directly achieving threat and viability objectives) or indirect (enabling or catalyzing the implementation of another strategic action). Four factors were considered to assess the potential benefits of a strategic action:

Contribution - The degree to which the proposed strategic action, if successfully implemented, will contribute to social welfare in the community.

Very High – The strategic action, in itself, achieves one or more objectives.

High - The strategic action makes a substantial contribution towards achieving one or more objectives, but is not by itself sufficient.

Medium - The strategic action makes an important contribution towards achieving one or more objectives.

Low - The strategic action makes a relatively small contribution towards achieving one or more objectives.

Threat Abatement – In the excel tool, utilizing the wizard, threats are selected that will be reduced by one level if the strategic action is carried out. The more associated threats are abated, the higher the strategic action ranking will be.

Viability Enhancement- Estimate any improvement of key ecological attributes to the targets that might reasonably be expected to occur over ten years if the strategic action is successfully implemented. For each key ecological attribute that will be improved by the strategic action by one or more grade levels for a target the ranking will increase. The excel tool ranks this component after associations are made in the wizard.

Duration of outcome - The degree to which the proposed strategic action, if successfully implemented, is likely to secure a long-lasting outcome. Strategic actions likely to achieve enduring, long-lasting outcomes are most desirable; those with short duration less desirable, all other things being equal.

Very High – The strategy, if successfully implemented, is likely to achieve an enduring, long-lasting outcome.

High - The strategy, if successfully implemented, is likely to achieve an outcome with a relatively long (e.g. 10 year) duration.

Medium - The strategy, if successfully implemented, is likely to achieve an outcome of moderate duration.

Low - strategy is likely to achieve an outcome with a very short duration (e.g. handshake agreement.

Leverage - The degree to which the proposed strategic action, if successfully implemented, will contribute to local and regional economic growth.

Very High – Immediate, visible, tangible results and high leverage towards another high impact strategy.

High - Immediate, visible, tangible results or high leverage towards another high impact strategy.

Medium - Moderate leverage.

Low - No apparent leverage.

Feasibility - Overall feasibility of a strategic action is based on three factors:

Lead individual or institution - The availability of a lead individual with sufficient time, proven talent, relevant experience, and good institutional support to implement the strategic action.

Very High – A lead individual ("champion') with sufficient time, proven talent, substantial relevant experience and institutional support is reasonably available and committed to lead implementation of the strategy.

High - An individual with sufficient time, promising talent, some relevant experience and institutional support is reasonably available and committed to lead implementation of the strategy.

Medium - An individual with promising talent and sufficient time is reasonably available, but lacks relevant experience or institutional support.

Low - No lead individual currently available.

Ability to motivate key constituencies - The degree to which key constituencies (e.g., landowners, public officials, interest groups) whose involvement is necessary to implementing the strategic action and their motives are understood and the action appeals.

Very High – The key constituencies and their motives are well understood and the strategic action is likely to appeal to their key motives.

High - The key constituencies and their motives are well understood and the strategic action is likely to appeal to their key motives.

Medium - The key constituencies are somewhat understood and the strategic action may appeal to their key motives.

Low - The key constituencies are not well understood and it is uncertain whether the strategic action will appeal to their key motives.

Ease of implementation - Strategic actions that are less complex, have been successfully implemented previously, fit within the core competencies of the lead institution, and for which funding is accessible have a higher likelihood of success than other actions

Very High – Implementing the strategy is very straightforward; this type of strategy has been done often before.

High - Implementing the strategy is relatively straightforward, but not certain; this type of strategy has been done before

Medium - Implementing the strategy involves a fair number of complexities, hurdles and/or uncertainties; this type of strategy has rarely been done before.

Low - Implementing the strategy involves many complexities, hurdles and/or uncertainties; this type of strategy has never been done before.

Appendix B: Stress Ranking by Target

Target #1 -- Oak Woodlands

	Stresses	Severity	Scope	Stress Rank	User Override
1	Poor or altered connectivity	Medium	Medium	Medium	
2	Poor population structure and recruitment	High	Very High	High	
3	Low number of cavity nesting species	Medium	Medium	Medium	
4	Reduction in total area of oak woodland community	Medium	Medium	Medium	
5				-	
6				-	
7				-	
8				-	

Target #1 -- Oak Woodlands

Threats - Sources of Stress		Poor or altered connectivity	Poor population structure and recruitment	Low number of cavity nesting species	Reduction in total area of oak woodland community	-	-	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*Medium*	*High*	*Medium*	*Medium*	-	-	-	-	
1	Threat	Land grading and housing development								
	Common Taxonomy	*Housing & Urban Areas*								
	Contribution	High			High					Medium
	Irreversibility	Very High			Very High					
	Threat Rank (override)									
	Threat Rank	Medium	-	-	Medium	-	-	-	-	
2	Threat	Construction of roads								
	Common Taxonomy	*Roads & Railroads*								
	Contribution	High			Medium					Medium
	Irreversibility	Very High			Very High					
	Threat Rank (override)									
	Threat Rank	Medium	-	-	Medium	-	-	-	-	
3	Threat	Poorly managed cattle and/or sheep grazing								Medium

Common Taxonomy	*Livestock Farming & Ranching*								
Contribution		High	Low						
Irreversibility		Medium	Medium						
Threat Rank (override)									
Threat Rank	-	Medium	Low	-	-	-	-	-	

Target #1 -- Oak Woodlands

Threats - Sources of Stress		Poor or altered connectivity	Poor population structure and recruitment	Low number of cavity nesting species	Reduction in total area of oak woodland community	-	-	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*Medium*	*High*	*Medium*	*Medium*	-	-	-	-	
4	Threat	Competition with existing non-native plant species								High
	Common Taxonomy	*Invasive Non-Native/Alien Species*								
	Contribution		High							
	Irreversibility		Very High							
	Threat Rank (override)									
	Threat Rank	-	High	-	-	-	-	-	-	
5	Threat	Predation by non-native feral animals (cats and/or pigs)								Medium
	Common Taxonomy	*Invasive Non-Native/Alien Species*								
	Contribution		Medium	Medium						
	Irreversibility		High	Medium						
	Threat Rank (override)									
	Threat Rank	-	Medium	Low	-	-	-	-	-	
6	Threat	Presence of non-native bird species (i.e. cowbirds and starlings)								Medium

	Common Taxonomy	*Invasive Non-Native/Alien Species*								
	Contribution			High						
	Irreversibility			High						
	Threat Rank (override)									
	Threat Rank	-	-	Medium	-	-	-	-	-	

Target #1 -- Oak Woodlands

Threats - Sources of Stress		Poor or altered connectivity	Poor population structure and recruitment	Low number of cavity nesting species	Reduction in total area of oak woodland community	-	-	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*Medium*	*High*	*Medium*	*Medium*	-	-	-	-	
7	Threat	Decrease in economic viability of ranching								Medium
	Common Taxonomy	*Livestock Farming & Ranching*								
	Contribution	Medium			High					
	Irreversibility	Very High			Very High					
	Threat Rank (override)									
	Threat Rank	Medium	-	-	Medium	-	-	-	-	
8	Threat	Climate change induced temp. changes								High
	Common Taxonomy	*Temperature Extremes*								
	Contribution		Very High	Medium	Very High					
	Irreversibility		High	High	High					
	Threat Rank (override)									
	Threat Rank	-	High	Low	Medium	-	-	-	-	
9	Threat									-

	Common Taxonomy								
	Contribution								
	Irreversibility								
	Threat Rank (override)								
	Threat Rank	-	-	-	-	-	-	-	-

Target #2 -- Riparian Communities

	Stresses	Severity	Scope	Stress Rank	User Override
1	Reduction in recruitment	High	High	High	
2	Reduction in older age classes and snags	Medium	Medium	Medium	
3	Montane meadow degradation	High	Very High	High	
4	Reduction in populations of native breeding bird species	Medium	Medium	Medium	
5	Spread of highly invasive species	High	Low	Low	High
6	Reduction in total riparian community area	Very High	Low	Low	
7	Reduced surface and ground water availability.	High	High	High	
8				-	

Target #2 -- Riparian Communities

Threats - Sources of Stress		Reduction in recruitment	Reduction in older age classes and snags	Montane meadow degradation	Reduction in populations of native breeding bird species	Spread of highly invasive species	Reduction in total riparian community area	Reduced surface and ground water availability.	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*High*	*Medium*	*High*	*Medium*	*High*	*Low*	*High*	-	
1	Threat	Altered fire frequency and intensity								Medium
	Common Taxonomy	*Fire & Fire Suppression*								
	Contribution	Low	High	Low		High				
	Irreversibility	Low	Medium	Low		Medium				
	Threat Rank (override)									
	Threat Rank	Low	Low	Low	-	Medium	-	-	-	
2	Threat	Competition with existing non-native plant species								High
	Common Taxonomy	*Invasive Non-Native/Alien Species*								
	Contribution	High		High	Low					
	Irreversibility	Medium		High	Low					
	Threat Rank (override)									
	Threat Rank	Medium	-	High	Low	-	-	-	-	
3	Threat	Land grading and housing development								High

	Common Taxonomy	*Housing & Urban Areas*							
	Contribution			Low			Medium	Medium	
	Irreversibility			Low			Very High	Very High	
	Threat Rank (override)								
	Threat Rank	-	-	Low	-	-	Low	High	-

Target #2 -- Riparian Communities

Threats - Sources of Stress		Reduction in recruitment	Reduction in older age classes and snags	Montane meadow degradation	Reduction in populations of native breeding bird species	Spread of highly invasive species	Reduction in total riparian community area	Reduced surface and ground water availability.	-	Threat to Target Rank
Stresses #		1	2	3	4	5	6	7	8	
Rank		*High*	*Medium*	*High*	*Medium*	*High*	*Low*	*High*	-	
4	Threat	Invasion of new species (plants, fungi, pathogens, etc.)								High
	Common Taxonomy	*Invasive Non-Native/Alien Species*								
	Contribution	High		High	Low			Low		
	Irreversibility	Medium		High	Low			High		
	Threat Rank (override)									
	Threat Rank	Medium	-	High	Low	-	-	Medium	-	
5	Threat	Poorly managed cattle and/or sheep grazing								High
	Common Taxonomy	*Livestock Farming & Ranching*								
	Contribution	High	Medium	High		High				
	Irreversibility	Medium	Medium	High		Medium				
	Threat Rank (override)									
	Threat Rank	Medium	Low	High	-	Medium	-	-	-	
6	Threat	OHV use								Medium

	Common Taxonomy	*Recreational Activities*							
	Contribution	Low	Low	Medium	Low	Low			
	Irreversibility	Low	Low	Medium	Low	Medium			
	Threat Rank (override)								
	Threat Rank	Low	Low	Medium	Low	Low	-	-	-

Target #2 -- Riparian Communities

Threats - Sources of Stress		Reduction in recruitment	Reduction in older age classes and snags	Montane meadow degradation	Reduction in populations of native breeding bird species	Spread of highly invasive species	Reduction in total riparian community area	Reduced surface and ground water availability.	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*High*	*Medium*	*High*	*Medium*	*High*	*Low*	*High*	-	
7	Threat	Predation by non-native feral animals (cats and/or pigs)								Medium
	Common Taxonomy	*Invasive Non-Native/Alien Species*								
	Contribution	Medium	Low	Low	Low	Medium				
	Irreversibility	High	High	High	Low	High				
	Threat Rank (override)									
	Threat Rank	Medium	Low	Medium	Low	Medium	-	-	-	
8	Threat	Presence of non-native bird species (i.e. cowbirds and starlings)								Low
	Common Taxonomy	*Invasive Non-Native/Alien Species*								
	Contribution				High					
	Irreversibility				Medium					
	Threat Rank (override)									
	Threat Rank	-	-	-	Low	-	-	-	-	
9	Threat	Increase in frequency of extreme conditions in streamflow.								High

	Common Taxonomy	*Storms & Flooding*							
	Contribution	High	High	High		Medium			
	Irreversibility	Medium	Medium	High		Medium			
	Threat Rank (override)								
	Threat Rank	Medium	Low	High	-	Medium	-	-	-

Target #2 -- Riparian Communities

Threats - Sources of Stress		Reduction in recruitment	Reduction in older age classes and snags	Montane meadow degradation	Reduction in populations of native breeding bird species	Spread of highly invasive species	Reduction in total riparian community area	Reduced surface and ground water availability.	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*High*	*Medium*	*High*	*Medium*	*High*	*Low*	*High*	-	
10	Threat	Climate change induced temp. changes								Very High
	Common Taxonomy	*Temperature Extremes*								
	Contribution	High	Low	Medium	Low	High	Very High	High		
	Irreversibility	High	High	High	High	High	High	High		
	Threat Rank (override)									
	Threat Rank	High	Low	Medium	Low	High	Low	High	-	
11	Threat	Surface and groundwater diversions								Very High
	Common Taxonomy	*Dams & Water Management/Use*								
	Contribution	High	Low	High	High	Low	High	Very High		
	Irreversibility	High	Medium	High	High	Medium	High	High		
	Threat Rank (override)									
	Threat Rank	High	Low	High	Medium	Low	Low	High	-	
12	Threat	Air quality								-

	Common Taxonomy	*Air-Borne Pollutants*								
	Contribution									
	Irreversibility									
	Threat Rank (override)									
	Threat Rank	-	-	-	-	-	-	-	-	

Target #3 -- Mojave Desert Scrub and Joshua Tree Communities

	Stresses	Severity	Scope	Stress Rank	User Override
1	Loss of native vegetation	Medium	Medium	Medium	
2	Loss of connectivity between patches of native vegetation (habitat fragmentation)	Medium	High	Medium	
3	Decrease in desert tortoise breeding success	High	High	High	
4	Fragmentation of desert scrub habitat	Medium	Medium	Medium	
5	Decrease in total size of desert scrub habitat	Medium	Medium	Medium	
6				-	
7				-	
8				-	

Target #3 -- Mojave Desert Scrub and Joshua Tree Communities

Threats - Sources of Stress		Loss of native vegetation	Loss of connectivity between patches of native vegetation (habitat fragmentation)	Decrease in desert tortoise breeding success	Fragmentation of desert scrub habitat	Decrease in total size of desert scrub habitat	-	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*Medium*	*Medium*	*High*	*Medium*	*Medium*	-	-	-	
1	Threat	Land grading and housing development								High
	Common Taxonomy	*Housing & Urban Areas*								
	Contribution	High	Medium	Medium	High	High				
	Irreversibility	Very High	Very High	Very High	Very High	High				
	Threat Rank (override)									
	Threat Rank	Medium	Medium	High	Medium	Medium	-	-	-	
2	Threat	Conversion to agriculture								Medium
	Common Taxonomy	*Annual & Perennial Non-Timber Crops*								
	Contribution	Medium	Low	Medium	Medium	Medium				
	Irreversibility	Very High	Very High	High	Very High	Medium				
	Threat Rank (override)									
	Threat Rank	Medium	Low	Medium	Medium	Low	-	-	-	

3	Threat	Mining & Quarrying								Medium
	Common Taxonomy	*Mining & Quarrying*								
	Contribution	Low	Low	Low	Medium	Low				
	Irreversibility	Very High	High	High	Very High	Low				
	Threat Rank (override)									
	Threat Rank	Low	Low	Medium	Medium	Low	-	-	-	

Target #3 -- Mojave Desert Scrub and Joshua Tree Communities

Threats - Sources of Stress		Loss of native vegetation	Loss of connectivity between patches of native vegetation (habitat fragmentation)	Decrease in desert tortoise breeding success	Fragmentation of desert scrub habitat	Decrease in total size of desert scrub habitat	-	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*Medium*	*Medium*	*High*	*Medium*	*Medium*	-	-	-	
4	Threat	Large-scale solar energy development								High
	Common Taxonomy	*Renewable Energy*								
	Contribution	High	High	High	High	High				
	Irreversibility	Very High	Very High	Very High	Very High	Very High				
	Threat Rank (override)									
	Threat Rank	Medium	Medium	High	Medium	Medium	-	-	-	
5	Threat	Utility & Service Lines								High
	Common Taxonomy	*Renewable Energy*								
	Contribution	Medium	Low	High	Medium	Medium				
	Irreversibility	Medium	Medium	High	Medium	Medium				
	Threat Rank (override)									
	Threat Rank	Low	Low	High	Low	Low	-	-	-	

6	Threat	OHV use							High
	Common Taxonomy	*Recreational Activities*							
	Contribution	High	High	Very High	High	Medium			
	Irreversibility	High	High	Medium	Very High	Medium			
	Threat Rank (override)								
	Threat Rank	Medium	Medium	High	Medium	Low	-	-	-

Target #3 -- Mojave Desert Scrub and Joshua Tree Communities

Threats - Sources of Stress		Loss of native vegetation	Loss of connectivity between patches of native vegetation (habitat fragmentation)	Decrease in desert tortoise breeding success	Fragmentation of desert scrub habitat	Decrease in total size of desert scrub habitat	-	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*Medium*	*Medium*	*High*	*Medium*	*Medium*	-	-	-	
7	Threat	Altered fire frequency and intensity								Medium
	Common Taxonomy	*Fire & Fire Suppression*								
	Contribution	High	Medium	Medium	Medium	Medium				
	Irreversibility	Very High	Medium	High	Medium	Medium				
	Threat Rank (override)									
	Threat Rank	Medium	Low	Medium	Low	Low	-	-	-	
8	Threat	Invasion of new species (plants, fungi, pathogens, etc.)								Medium
	Common Taxonomy	*Invasive Non-Native/Alien Species*								
	Contribution	Very High	High	Medium	Low	High				
	Irreversibility	Very High	Medium	High	High	High				
	Threat Rank (override)									
	Threat Rank	Medium	Low	Medium	Low	Medium	-	-	-	

9	Threat	Poorly managed cattle and/or sheep grazing								Medium
	Common Taxonomy	*Livestock Farming & Ranching*								
	Contribution	High	Medium	High	High	Medium				
	Irreversibility	Medium	Medium	Low	High	Medium				
	Threat Rank (override)									
	Threat Rank	Low	Low	Medium	Medium	Low	-	-	-	

Target #3 -- Mojave Desert Scrub and Joshua Tree Communities

Threats - Sources of Stress		Loss of native vegetation	Loss of connectivity between patches of native vegetation (habitat fragmentation)	Decrease in desert tortoise breeding success	Fragmentation of desert scrub habitat	Decrease in total size of desert scrub habitat	-	-	-	Threat to Target Rank
Stresses #		1	2	3	4	5	6	7	8	
Rank		*Medium*	*Medium*	*High*	*Medium*	*Medium*	-	-	-	
10	Threat	Wind energy development								High
	Common Taxonomy	*Renewable Energy*								
	Contribution	High	Very High	High	Medium	Medium				
	Irreversibility	High	Medium	High	High	High				
	Threat Rank (override)									
	Threat Rank	Medium	Medium	High	Low	Low	-	-	-	
11	Threat	Climate change induced temp. changes								High
	Common Taxonomy	*Temperature Extremes*								
	Contribution	Low		High	Low	Low				
	Irreversibility	High		High	High	High				
	Threat Rank (override)									
	Threat Rank	Low	-	High	Low	Low	-	-	-	

12	Threat	Air quality								Low
	Common Taxonomy	*Air-Borne Pollutants*								
	Contribution	Medium								
	Irreversibility	Medium								
	Threat Rank (override)									
	Threat Rank	Low	-	-	-	-	-	-	-	

Target #4 -- Grasslands

	Stresses	Severity	Scope	Stress Rank	User Override
1	Lack of recruitment of native plant species	Very High	High	High	
2	Loss of soil integrity	Medium	Medium	Medium	
3	Decline in populations of grassland-dependent small mammals	Medium	Medium	Medium	
4	Decline in populations of grassland-dependent bird species	Low	Medium	Low	
5	Fragmentation	Very High	High	High	
6	Reduction in size of grassland habitat	Very High	High	High	
7				-	
8				-	

Target #4 -- Grasslands

Threats - Sources of Stress		Lack of recruitment of native plant species	Loss of soil integrity	Decline in populations of grassland-dependent small mammals	Decline in populations of grassland-dependent bird species	Fragmentation	Reduction in size of grassland habitat	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*High*	*Medium*	*Medium*	*Low*	*High*	*High*	-	-	
1	Threat	Poorly managed cattle and/or sheep grazing								Medium
	Common Taxonomy	*Livestock Farming & Ranching*								
	Contribution	Medium	Very High	Medium						
	Irreversibility	Low	High	Low						
	Threat Rank (override)									
	Threat Rank	Low	Medium	Low	-	-	-	-	-	
2	Threat	Construction of roads								High
	Common Taxonomy	*Roads & Railroads*								
	Contribution		Medium	Low	Medium	High	Low			
	Irreversibility		High	Low	Medium	High	High			
	Threat Rank (override)									
	Threat Rank	-	Low	Low	Low	High	Medium	-	-	
3	Threat	Conversion to agriculture								Medium

	Common Taxonomy	*Annual & Perennial Non-Timber Crops*							
	Contribution		High	High	High	Medium	High		
	Irreversibility		Very High	High	High	Medium	Medium		
	Threat Rank (override)								
	Threat Rank	-	Medium	Medium	Low	Medium	Medium	-	-

Target #4 -- Grasslands

Threats - Sources of Stress		Lack of recruitment of native plant species	Loss of soil integrity	Decline in populations of grassland-dependent small mammals	Decline in populations of grassland-dependent bird species	Fragmentation	Reduction in size of grassland habitat	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*High*	*Medium*	*Medium*	*Low*	*High*	*High*	-	-	
4	Threat	Invasion of new species (plants, fungi, pathogens, etc.)								Medium
	Common Taxonomy	*Invasive Non-Native/Alien Species*								
	Contribution	High		Medium	Medium					
	Irreversibility	Medium		Medium	Medium					
	Threat Rank (override)									
	Threat Rank	Medium	-	Low	Low	-	-	-	-	
5	Threat	Land grading and housing development								Very High
	Common Taxonomy	*Housing & Urban Areas*								
	Contribution	Very High	High	High	High	High	High			
	Irreversibility	High	Very High	Medium	High	Very High	Very High			
	Threat Rank (override)									
	Threat Rank	High	Medium	Low	Low	High	High	-	-	
6	Threat	Wind energy development								Medium

	Common Taxonomy	*Renewable Energy*							
	Contribution		Medium		Medium	Medium	Medium		
	Irreversibility		Low		Low	High	High		
	Threat Rank (override)								
	Threat Rank	-	Low	-	Low	Medium	Medium	-	-

Target #4 -- Grasslands

	Threats - Sources of Stress	Lack of recruitment of native plant species	Loss of soil integrity	Decline in populations of grassland-dependent small mammals	Decline in populations of grassland-dependent bird species	Fragmentation	Reduction in size of grassland habitat	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*High*	*Medium*	*Medium*	*Low*	*High*	*High*	-	-	
7	Threat	Oil & Gas Drilling								Medium
	Common Taxonomy	*Oil & Gas Drilling*								
	Contribution		High	High	High	Medium	Medium			
	Irreversibility		Very High	Medium	Medium	Medium	Medium			
	Threat Rank (override)									
	Threat Rank	-	Medium	Low	Low	Medium	Medium	-	-	
8	Threat	Decrease in economic viability of ranching								High
	Common Taxonomy	*Livestock Farming & Ranching*								
	Contribution			Medium	Medium	High	High			
	Irreversibility			Medium	Medium	High	High			
	Threat Rank (override)									
	Threat Rank	-	-	Low	Low	High	High	-	-	
9	Threat	Climate change induced temp. changes								Medium

	Common Taxonomy	*Temperature Extremes*							
	Contribution	Medium	Medium	Low	Medium	Low			
	Irreversibility	High	High	High	High	High			
	Threat Rank (override)								
	Threat Rank	Medium	Low	Low	Low	Medium	-	-	-

Target #4 -- Grasslands

Threats - Sources of Stress		Lack of recruitment of native plant species	Loss of soil integrity	Decline in populations of grassland-dependent small mammals	Decline in populations of grassland-dependent bird species	Fragmentation	Reduction in size of grassland habitat	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*High*	*Medium*	*Medium*	*Low*	*High*	*High*	-	-	
10	Threat	Competition with existing non-native plant species								Medium
	Common Taxonomy	*Invasive Non-Native/Alien Species*								
	Contribution	High			High					
	Irreversibility	Medium			Medium					
	Threat Rank (override)									
	Threat Rank	Medium	-	-	Low	-	-	-	-	
11	Threat	Air quality								Low
	Common Taxonomy	*Air-Borne Pollutants*								
	Contribution		Medium							
	Irreversibility		Medium							
	Threat Rank (override)									
	Threat Rank	-	Low	-	-	-	-	-	-	
12	Threat									-

	Common Taxonomy									
	Contribution									
	Irreversibility									
	Threat Rank (override)									
	Threat Rank	-	-	-	-	-	-	-	-	

Target #5 -- Semi-arid Montane

	Stresses	Severity	Scope	Stress Rank	User Override
1	Decline in total area of sagebrush community	Medium	High	Medium	
2	Fragmentation of plant communities	Medium	Medium	Medium	
3	Lack of recruitment of native plant species	Medium	Medium	Medium	
4	Decline in total area of chaparral community	Medium	Medium	Medium	
5	Even age sagebrush community	Medium	Medium	Medium	
6	Decline in total area of pinyon-juniper woodland	Low	Low	Low	
7	Lack of native herbaceous species in sagebrush and pinyon-juniper woodlands	Medium	Medium	Medium	
8				-	

Target #5 -- Semi-arid Montane

Threats - Sources of Stress		Decline in total area of sagebrush community	Fragmentation of plant communities	Lack of recruitment of native plant species	Decline in total area of chaparral community	Even age sagebrush community	Decline in total area of pinyon-juniper woodland	Lack of native herbaceous species in sagebrush and pinyon-juniper woodlands	-	Threat to Target Rank
Stresses #		1	2	3	4	5	6	7	8	
Rank		*Medium*	*Medium*	*Medium*	*Medium*	*Medium*	*Low*	*Medium*	-	
1	Threat	Altered fire frequency and intensity								Medium
	Common Taxonomy	*Fire & Fire Suppression*								
	Contribution	Medium		Medium	Very High	Very High	Low	High		
	Irreversibility	Medium		Medium	High	Medium	Medium	Medium		
	Threat Rank (override)									
	Threat Rank	Low	-	Low	Medium	Medium	Low	Low	-	
2	Threat	Competition with existing non-native plant species								Low
	Common Taxonomy	*Invasive Non-Native/Alien Species*								
	Contribution	Medium		Medium	Low	Low	Medium	Medium		
	Irreversibility	High		High	Medium	Low	Low	Low		
	Threat Rank (override)									
	Threat Rank	Low	-	Low	Low	Low	Low	Low	-	

3	Threat	Construction of roads								Medium
	Common Taxonomy	*Roads & Railroads*								
	Contribution		High							
	Irreversibility		Very High							
	Threat Rank (override)									
	Threat Rank	-	Medium	-	-	-	-	-	-	

Target #5 -- Semi-arid Montane

Threats - Sources of Stress		Decline in total area of sagebrush community	Fragmentation of plant communities	Lack of recruitment of native plant species	Decline in total area of chaparral community	Even age sagebrush community	Decline in total area of pinyon-juniper woodland	Lack of native herbaceous species in sagebrush and pinyon-juniper woodlands	-	Threat to Target Rank
Stresses #		1	2	3	4	5	6	7	8	
Rank		*Medium*	*Medium*	*Medium*	*Medium*	*Medium*	*Low*	*Medium*	-	
4	Threat	Land grading and housing development								Medium
	Common Taxonomy	*Housing & Urban Areas*								
	Contribution	Medium	Medium		Low		Low			
	Irreversibility	Very High	Very High		Very High		Very High			
	Threat Rank (override)									
	Threat Rank	Medium	Medium	-	Low	-	Low	-	-	
5	Threat	Problematic Native Species								Low
	Common Taxonomy	*Problematic Native Species*								
	Contribution	High		Medium	Low					
	Irreversibility	Medium		Medium	Low					
	Threat Rank (override)									
	Threat Rank	Low	-	Low	Low	-	-	-	-	

6	Threat	Wind energy development								Medium
	Common Taxonomy	*Renewable Energy*								
	Contribution	Medium	Medium		Low		Medium			
	Irreversibility	Very High	Very High		Very High		Very High			
	Threat Rank (override)									
	Threat Rank	Medium	Medium	-	Low	-	Low	-	-	

Target #5 -- Semi-arid Montane

Threats - Sources of Stress		Decline in total area of sagebrush community	Fragmentation of plant communities	Lack of recruitment of native plant species	Decline in total area of chaparral community	Even age sagebrush community	Decline in total area of pinyon-juniper woodland	Lack of native herbaceous species in sagebrush and pinyon-juniper woodlands	-	Threat to Target Rank
Stresses #		1	2	3	4	5	6	7	8	
Rank		*Medium*	*Medium*	*Medium*	*Medium*	*Medium*	*Low*	*Medium*	-	
7	Threat	Poorly managed cattle and/or sheep grazing								
	Common Taxonomy	*Livestock Farming & Ranching*								
	Contribution	Medium		Medium	Low	Medium	Low	Medium		Low
	Irreversibility	Medium		Medium	Low	Low	Low	Medium		
	Threat Rank (override)									
	Threat Rank	Low	-	Low	Low	Low	Low	Low	-	
8	Threat	OHV use								
	Common Taxonomy	*Recreational Activities*								
	Contribution	Medium	High	Low	Medium		Low	Low		Low
	Irreversibility	Medium	Medium	Medium	Medium		Medium	Low		
	Threat Rank (override)									
	Threat Rank	Low	Low	Low	Low	-	Low	Low	-	

9	Threat	Climate change induced temp. changes								Low
	Common Taxonomy	*Temperature Extremes*								
	Contribution	Medium		Medium	Medium		Medium			
	Irreversibility	High		High	High		High			
	Threat Rank (override)									
	Threat Rank	Low	-	Low	Low	-	Low	-	-	

Target #5 -- Semi-arid Montane

Threats - Sources of Stress		Decline in total area of sagebrush community	Fragmentation of plant communities	Lack of recruitment of native plant species	Decline in total area of chaparral community	Even age sagebrush community	Decline in total area of pinyon-juniper woodland	Lack of native herbaceous species in sagebrush and pinyon-juniper woodlands	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*Medium*	*Medium*	*Medium*	*Medium*	*Medium*	*Low*	*Medium*	-	
10	Threat	Air quality								Low
	Common Taxonomy	*Air-Borne Pollutants*								
	Contribution	Medium								
	Irreversibility	Medium								
	Threat Rank (override)									
	Threat Rank	Low	-	-	-	-	-	-	-	
11	Threat									-
	Common Taxonomy									
	Contribution									
	Irreversibility									
	Threat Rank (override)									
	Threat Rank	-	-	-	-	-	-	-	-	

12	Threat									
	Common Taxonomy									
	Contribution									-
	Irreversibility									
	Threat Rank (override)									
	Threat Rank	-	-	-	-	-	-	-	-	

Target #6 -- Coniferous Forests

	Stresses	Severity	Scope	Stress Rank	User Override
1	Poor or altered connectivity	Medium	Medium	Medium	
2	Poor population structure and recruitment	High	High	High	
3	Lack of key animal indicator species	High	High	High	
4	Patch sizes too small	Medium	Medium	Medium	
5	Reduction of historic sky islands	High	Medium	Medium	
6	Reduction of total coniferous forest community	Low	Low	Low	
7				-	
8				-	

Target #6 -- Coniferous Forests

Threats - Sources of Stress		Poor or altered connectivity	Poor population structure and recruitment	Lack of key animal indicator species	Patch sizes too small	Reduction of historic sky islands	Reduction of total coniferous forest community	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*Medium*	*High*	*High*	*Medium*	*Medium*	*Low*	-	-	
1	Threat	Land grading and housing development								Medium
	Common Taxonomy	*Housing & Urban Areas*								
	Contribution	Medium					Low			
	Irreversibility	Very High					Very High			
	Threat Rank (override)									
	Threat Rank	Medium	-	-	-	-	Low	-	-	
2	Threat	Construction of roads								Low
	Common Taxonomy	*Roads & Railroads*								
	Contribution	Low								
	Irreversibility	Very High								
	Threat Rank (override)									
	Threat Rank	Low	-	-	-	-	-	-	-	
3	Threat	Poorly managed cattle and/or sheep grazing								Medium

	Common Taxonomy	*Livestock Farming & Ranching*							
	Contribution		High						
	Irreversibility		Low						
	Threat Rank (override)								
	Threat Rank	-	Medium	-	-	-	-	-	-

Target #6 -- Coniferous Forests

Threats - Sources of Stress		Poor or altered connectivity	Poor population structure and recruitment	Lack of key animal indicator species	Patch sizes too small	Reduction of historic sky islands	Reduction of total coniferous forest community	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*Medium*	*High*	*High*	*Medium*	*Medium*	*Low*	-	-	
4	Threat	Predation by non-native feral animals (cats and/or pigs)								High
	Common Taxonomy	*Invasive Non-Native/Alien Species*								
	Contribution		High							
	Irreversibility		High							
	Threat Rank (override)									
	Threat Rank	-	High	-	-	-	-	-	-	
5	Threat	Poorly managed timber harvesting								Medium
	Common Taxonomy	*Logging & Wood Harvesting*								
	Contribution			High	High	High				
	Irreversibility			Medium	Medium	Medium				
	Threat Rank (override)									
	Threat Rank	-	-	Medium	Low	Low	-	-	-	
6	Threat	Climate change induced temp. changes								High

	Common Taxonomy	*Temperature Extremes*							
	Contribution		High	High	High	High	High		
	Irreversibility		Very High	Very High	Very High	Very High	Very High		
	Threat Rank (override)								
	Threat Rank	-	High	High	Medium	Medium	Low	-	-

Target #6 -- Coniferous Forests

Threats - Sources of Stress		Poor or altered connectivity	Poor population structure and recruitment	Lack of key animal indicator species	Patch sizes too small	Reduction of historic sky islands	Reduction of total coniferous forest community	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*Medium*	*High*	*High*	*Medium*	*Medium*	*Low*	-	-	
7	Threat	Air quality								Medium
	Common Taxonomy	*Air-Borne Pollutants*								
	Contribution		Medium		Medium	Medium	Medium			
	Irreversibility		High		High	High	High			
	Threat Rank (override)									
	Threat Rank	-	Medium	-	Low	Low	Low	-	-	
8	Threat									-
	Common Taxonomy									
	Contribution									
	Irreversibility									
	Threat Rank (override)									
	Threat Rank	-	-	-	-	-	-	-	-	
9	Threat									-

Common Taxonomy								
Contribution								
Irreversibility								
Threat Rank (override)								
Threat Rank	-	-	-	-	-	-	-	-

Target #7 -- Migratory and Wide-Ranging Wildlife

	Stresses	Severity	Scope	Stress Rank	User Override
1	Decline in migrating raptor populations	Low	Medium	Low	
2	Decline in passerine populations	Medium	High	Medium	
3	Decline in bat populations	Low	Low	Low	
4	Decline in mountain lion populations	Medium	Medium	Medium	
5				-	
6				-	
7				-	
8				-	

Target #7 -- Migratory and Wide-Ranging Wildlife

Threats - Sources of Stress		Decline in migrating raptor populations	Decline in passerine populations	Decline in bat populations	Decline in mountain lion populations	-	-	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*Low*	*Medium*	*Low*	*Medium*	-	-	-	-	
1	Threat	Large-scale solar energy development								Medium
	Common Taxonomy	*Renewable Energy*								
	Contribution	Medium	Medium	Low						
	Irreversibility	Very High	Very High	Very High						
	Threat Rank (override)									
	Threat Rank	Low	Medium	Low	-	-	-	-	-	
2	Threat	Wind energy development								Medium
	Common Taxonomy	*Renewable Energy*								
	Contribution	Very High	Very High	Very High	Medium					
	Irreversibility	High	High	High	High					
	Threat Rank (override)									
	Threat Rank	Low	Medium	Low	Low	-	-	-	-	

3	Threat	Land grading and housing development								Medium
	Common Taxonomy	*Housing & Urban Areas*								
	Contribution	High	High	Medium	Very High					
	Irreversibility	Very High	Very High	Very High	Very High					
	Threat Rank (override)									
	Threat Rank	Low	Medium	Low	Medium	-	-	-	-	

Target #7 -- Migratory and Wide-Ranging Wildlife

Threats - Sources of Stress		Decline in migrating raptor populations	Decline in passerine populations	Decline in bat populations	Decline in mountain lion populations	-	-	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*Low*	*Medium*	*Low*	*Medium*	-	-	-	-	
4	Threat	Utility & Service Lines								Medium
	Common Taxonomy	*Renewable Energy*								
	Contribution	High	Medium	Low	Low					
	Irreversibility	Very High	Very High	Very High	Low					
	Threat Rank (override)									
	Threat Rank	Low	Medium	Low	Low	-	-	-	-	
5	Threat	Construction of roads								Medium
	Common Taxonomy	*Roads & Railroads*								
	Contribution	Low	Medium	Low	Very High					
	Irreversibility	Medium	Medium	Medium	Medium					
	Threat Rank (override)									
	Threat Rank	Low	Low	Low	Medium	-	-	-	-	

6	Threat	Climate change induced temp. changes								
	Common Taxonomy	*Temperature Extremes*								
	Contribution			Very High						Low
	Irreversibility			High						
	Threat Rank (override)									
	Threat Rank	-	-	Low	-	-	-	-	-	

Target #7 -- Migratory and Wide-Ranging Wildlife

Threats - Sources of Stress		Decline in migrating raptor populations	Decline in passerine populations	Decline in bat populations	Decline in mountain lion populations	-	-	-	-	Threat to Target Rank
	Stresses #	1	2	3	4	5	6	7	8	
	Rank	*Low*	*Medium*	*Low*	*Medium*	-	-	-	-	
7	Threat	Decrease in economic viability of ranching								Medium
	Common Taxonomy	*Livestock Farming & Ranching*								
	Contribution	Medium	High	Medium	High					
	Irreversibility	High	High	High	High					
	Threat Rank (override)									
	Threat Rank	Low	Medium	Low	Medium	-	-	-	-	
8	Threat									-
	Common Taxonomy									
	Contribution									
	Irreversibility									
	Threat Rank (override)									
	Threat Rank	-	-	-	-	-	-	-	-	

9	Threat									
	Common Taxonomy									
	Contribution									
	Irreversibility									-
	Threat Rank (override)									
	Threat Rank	-	-	-	-	-	-	-	-	

Appendix C: Summary of Threats Across Targets for the Tehachapi Region of Southern California

Threats Across Targets		Oak Woodlands	Riparian Communities	Mojave Desert Scrub and Joshua Tree Communities	Grasslands	Semi-arid Montane	Coniferous Forests	Migratory and Wide-Ranging Wildlife	Overall Threat Rank
Project-specific threats		1	2	3	4	5	6	7	
1	Land grading and housing development	High	High	High	Very High	Medium	Medium	Medium	Very High
2	Climate change induced temp. changes	High	High	High	Medium	Low	High	Low	High
3	Surface and groundwater diversions		Very High						High
4	Construction of roads	High		Medium	High	Medium	Low	Medium	High
5	Presence of existing non-native plant species	High	High		Medium	Low			High
6	Decrease in economic viability of ranching	High			High			Medium	High
7	Poorly managed cattle and/or sheep grazing	Medium	High	Medium	Medium	Low	Medium		Medium
8	Invasion of new species (plants, fungi, pathogens, etc.)		High	Medium	Medium				Medium
9	Predation by non-native feral animals (cats and/or pigs)	Medium	Medium				High		Medium
10	OHV use		Medium	High		Low			Medium
11	Large-scale solar energy development			High				Medium	Medium
12	Increase in frequency of extreme conditions in streamflow.		High						Medium

	Threats Across Targets	Oak Woodlands	Riparian Communities	Mojave Desert Scrub and Joshua Tree Communities	Grasslands	Semi-arid Montane	Coniferous Forests	Migratory and Wide-Ranging Wildlife	Overall Threat Rank
	Project-specific threats	1	2	3	4	5	6	7	
13	Wind energy development			Medium	Medium	Medium		Medium	Medium
14	Altered fire frequency and intensity		Medium	Medium		Medium			Medium
15	Conversion to agriculture			Medium	Medium				Medium
16	Utility & Service Lines			Medium				Medium	Medium
17	Air quality			Low	Low	Low	Medium		Low
18	Presence of non-native bird species (i.e. cowbirds and starlings)	Medium	Low						Low
19	Mining & Quarrying			Medium					Low
20	Oil & Gas Drilling				Medium				Low
21	Poorly managed timber harvesting						Medium		Low
22	Problematic Native Species					Low			Low
	Threat Status for Targets and Project	High	Very High	High	Very High	Medium	High	Medium	Very High

Appendix D: Detailed Ranking of Strategic Actions for the Tehachapi Region of Southern California

#	Strategic Actions	Overall Rank	Threat Abatement Benefit	Viability Enhancement Rank	Contribution	Duration	Leverage	Benefits	Lead Individual/ Institution	Ease of Implement-ation	Ability to Motivate Key Constituencies	Feasibility	Cost
1	Conduct overview and analysis of existing information regarding renewable energy and migration/wildlife movement	Very High	Medium	-	High	Very High	Very High	Very High	High	High	High	High	Low
2	Create higher designation of protection for "protected" land with managing agencies.	Very High	Very High	Medium	High	High	High	Very High	Medium	Medium	Medium	Medium	Low
3	Ensure appropriate mitigation funding/conditions are received from for development/infrastructure impacts and applied within the project area.	Very High	Very High	Medium	High	High	High	Very High	Medium	Medium	Medium	Medium	Low
4	Ensure protection of wildlife corridor through Tejon Ranch by 2013.	Very High	Very High	-	Very High	Very High	High	Very High	Very High	High	Very High	Very High	Very High
5	Include slope orientation and other micro level climate factors in site selection for direct protection.	Very High	Very High	Medium	Medium	Very High	High	Very High	Very High	High	High	Very High	Very High
6	Include transect protection funding in CAPP priorities.	Very High	Very High	High	High	High	Medium	Very High	High	High	High	High	Low
7	Modify CEQA and NEPA to create an exemption for rapid response invasive removal by 20XX.	Very High	Very High	High	High	High	Very High	Very High	Medium	Low	Medium	Low	Low
8	SSP promotes long term partnerships with ranching community to retain Williamson Act.	Very High	Very High	Medium	High	High	High	Very High	High	High	Very High	High	Medium
9	SSP take action to support SB 375 implementation.	Very High	Very High	Medium	Medium	Very High	High	Very High	High	Medium	High	Medium	Medium
10	Acquire fee or easements over strategic range lands.	High	Very High	Very High	High	Very High	High	Very High	Very High	High	Medium	High	Very High
11	Acquire water rights needed to maintain flows in important drainages.	High	Very High	Medium	Medium	Very High	High	Very High	Medium	Medium	Medium	Medium	Very High
12	Conduct a new study within the Tehachapi CAP area using radar and/or observational data to understand the impacts of turbines on bird migration. Complete by 2012.	High	Medium	-	High	Medium	Very High	High	Medium	Medium	High	Medium	Medium
13	Conserve lands in "elevational transects" or wildlife linkages where practical.	High	Very High	High	High	Very High	High	Very High	High	High	Medium	Medium	Very High
14	Convert high water use ag operations in key drainages to lower water use crops or grazing land.	High	Very High	High	High	Very High	High	Very High	Medium	Medium	Medium	Medium	Very High
15	Create alliances with water agencies, ground water mgnt. districts flood control agencies and local water users to develop a floodplain protection program.	High	Very High	High	High	Very High	Medium	Very High	Medium	Low	Medium	Low	Medium
16	Create renewable energy mitigation funded program for improved land management.	High	High	Medium	High	High	High	High	High	High	High	High	Medium

#	Strategic Actions	Overall Rank	Threat Abatement Benefit	Viability Enhancement Rank	Contribution	Duration	Leverage	Benefits	Lead Individual/ Institution	Ease of Implement-ation	Ability to Motivate Key Constituencies	Feasibility	Cost
17	Design and implement climate change studies focusing on population recruitment for grasslands.	High	Very High	Medium	Medium	High	High	High	High	Medium	Medium	Medium	Medium
18	Design and implement climate change studies focusing on population recruitment for oak woodlands	High	Very High	High	Medium	High	High	High	High	Medium	Medium	Medium	Medium
19	Design and implement climate change studies focusing on population recruitment for riparian communities.	High	Very High	High	Medium	High	High	High	High	Medium	Medium	Medium	Medium
20	Develop strategies to restore flows (e.g. purchase water rights, water management, etc).	High	Very High	High	High	High	Medium	Very High	Medium	Medium	Medium	Medium	Very High
21	Explore an "ecosystem services mitigation fee" on water exported from project area.	High	Very High	High	Medium	Very High	Very High	Very High	Medium	High	High	Medium	High
22	Focus conservation in major drainages with highest diversity (e.g. Kern, Caliente, Walker, Tejon?)	High	Very High	High	Very High	Very High	High	Very High	Very High	Medium	High	High	Very High
23	Focus conservation on areas projected to have long term perennial flows.	High	Very High	High	High	Very High	High	Very High	Very High	Medium	Medium	Medium	Very High
24	Identify and protect refugia that may facilitate species survival in light of climate change.	High	Very High	Very High	Medium	Very High	Medium	Very High	Very High	High	Medium	High	Very High
25	Incorporation of key conservation areas in County General Plan & land use regulations.	High	Very High	High	Very High	Very High	Medium	Very High	Low	High	Low	Low	Medium
26	Increase capacity within governmental agencies to combat new alien species infestations by developing and funding a rapid response team.	High	Very High	Very High	High	High	Medium	Very High	Medium	Medium	High	Medium	Very High
27	Locate future transects at appropriate latitudes intervals (e.g separate on north south access to address CC impacts).	High	Very High	High	Medium	Very High	High	Very High	High	Medium	Medium	Medium	Very High
28	Maintain/enhance stream passage to higher elevations by protecting key reaches.	High	High	High	High	Very High	High	Very High	High	Medium	Medium	Medium	Very High
29	Promote appropriate management of public lands to help achieve this objective.	High	Very High	High	Medium	High	Medium	High	High	Medium	Medium	Medium	Medium
30	Protect lands with significant existing riparian resources.	High	Very High	High	Very High	Very High	Medium	Very High	High	Medium	High	Medium	Very High
31	Review and comment on Caliente Resource Management Plan. Timeline: finish by end of 2010.	High	Very High	Low	Medium	High	High	High	Medium	Medium	Medium	Medium	Medium
32	Review current BLM plans and ensure that their disposal of properties aligns with our strategies for acquisition and the creation of landscape linkages. Timeline: finish by 2010.	High	Very High	Medium	Medium	High	Medium	High	High	Medium	Medium	Medium	Low
33	Select transect extending from low to high elevation that includes targets with large projected CC stable and expansion areas.	High	Very High	High	Very High	Very High	High	Very High	Very High	High	Medium	High	Very High

#	Strategic Actions	Overall Rank	Threat Abatement Benefit	Viability Enhancement Rank	Contribution	Duration	Leverage	Benefits	Lead Individual/ Institution	Ease of Implement-ation	Ability to Motivate Key Constituencies	Feasibility	Cost
34	Assist/support elimination and reduction of edge and in holdings of incompatible uses.	Medium	Very High	High	Medium	High	Medium	High	Medium	Medium	Medium	Medium	Very High
35	At least every 5 years update this CAP to include up-to-date CC science.	Medium	Very High	-	High	Medium	Medium	High	Medium	Medium	Medium	Medium	High
36	By 2010 determine if key reaches of the Kern River would benefit from designation as Wild and Scenic or other special status preventing export of water.	Medium	Very High	High	High	Very High	High	Very High	Low	Low	Medium	Low	High
37	By 20XX have major invasive plants (e.g. arundo, tamarisk, lepidium) declared noxious weeds (illegal).	Medium	Very High	Low	Medium	High	Low	High	Low	Medium	Low	Low	Medium
38	By Dec. 2010 SSP partners develop/implement a program to improve and collect CC data for area.	Medium	Very High	-	Medium	Medium	Medium	Medium	High	High	Medium	Medium	Medium
39	Choose "early warning" indicator species for climate change (e.g. change in avian territories) and develop a monitoring program to track changes.	Medium	Very High	-	Medium	Medium	Low	Medium	Medium	High	Medium	Medium	Medium
40	Develop a conservation buyer/young rancher program/data base.	Medium	High	-	Medium	Medium	Medium	Medium	Low	Low	Medium	Low	Low
41	Develop a conservation/ranching collaborative with equal interests to promote retention of ranching.	Medium	Very High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Low
42	Develop best grazing practices for oak woodlands by 20XX.	Medium	High	High	Medium	Medium	Low	Medium	Low	Low	Low	Low	Low
43	Evaluate potential partnerships with fishing, recreation and other conservation groups to meet objective.	Medium	Very High	High	Medium	Medium	High	Medium	Medium	High	High	Medium	Medium
44	Improve best management practices by public agencies.	Medium	Very High	Very High	Medium	Medium	High	Medium	Medium	Low	Low	Low	Low
45	Include best management practices in all conservation easements.	Medium	Very High	Very High	Low	High	Medium	Medium	High	Medium	Medium	Medium	Low
46	Promote fencing and/or appropriate livestock management in Riparian Communities on newly acquired easement land (EQIP and WHIP)	Medium	High	Medium	Medium	Medium	Low	Medium	Low	Low	Low	Low	Low
47	Revised CAP strategies incorporated in SSP partner conservation plans within 12 months of CAP updates as appropriate.	Medium	Very High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
48	Update CNDDB data and veg data for private lands.	Medium	Very High	-	Low	High	Medium	Medium	Low	Low	Low	Low	Low
49	Assess and manage the threat of wild pigs.	Low	High	High	Medium	Medium	Medium	Medium	Medium	High	High	Medium	High
50	By 2012 assess potential long term water export threat including additional diversions, ground water extraction and	Low	Very High	Medium	Low	Low	High	Medium	Medium	Medium	Medium	Medium	High

#	Strategic Actions	Overall Rank	Threat Abatement Benefit	Viability Enhancement Rank	Contribution	Duration	Leverage	Benefits	Lead Individual/ Institution	Ease of Implement-ation	Ability to Motivate Key Constituencies	Feasibility	Cost
	dam/reservoir construction.												
51	By 20XX create and fund a program for oak conservation BMP's incentives implemented by NRCS.	Low	-	High	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Very High
52	Collaborate with agencies to determine and implement appropriate non-native roadside fuel reduction measures	Low	Medium	High	Medium	Medium	Medium	Medium	Low	Medium	Low	Low	Medium
53	Collaborate with agencies to make a plan for prescribed burning (controlled burns) in INTACT sagebrush communities	Low	Medium	Medium	Medium	Medium	High	Medium	Low	Medium	Medium	Low	Medium
54	Collect invasive species information from a rapid field assessment of Riparian Communities. Timeline: finish by end of 2010.	Low	High	Low	Medium	Low	High	Medium	Low	Medium	Medium	Low	High
55	Create & implement a BMP certification program for cattle grazing by 20XX.	Low	High	High	Low	Medium	Medium	Low	Low	Low	Low	Low	Low
56	Develop a science-based set of comments for county, state, and federal agencies regarding permitting of wind energy development by 2012.	Low	Medium	-	Medium	Medium	Medium	Low	Medium	Medium	Medium	Medium	Low
57	Evaluate and implement appropriate bio control measures (e.g. UCSB tamarisk).	Low	High	Low	Low	High	Medium	Medium	Low	Low	Low	Low	Medium
58	Make CC data/projections and strategies available to public agencies.	Low	Very High	-	Low	Low	Medium	Low	Low	Low	Low	Low	Medium
59	Promote programs such WHIP and EQUIP to fence X miles of riparian corridor and develop alternative stock watering sources.	Low	High	Medium	Medium	Medium	Medium	Medium	Low	Low	Low	Low	Medium
60	SSP partners schedule and host CAP update workshops =< every 5 years.	Low	Very High	-	Low	Low	Medium	Low	Medium	High	Medium	Medium	Low
61	SSP support and implement a watershed (hydrologic cycle) education program for local community.	Low	Very High	Medium	Low	Low	Low	Low	Low	Low	Low	Low	Medium
62	SSP support water conservation in central and So. CA.	Low	Very High	High	Low	High	Medium	Medium	Low	Low	Medium	Low	Medium
63	Support a study/survey that will ID issues and solutions for oak recruitment within the project area to be completed by 20XX.	Low	High	High	Medium	Medium	High	Medium	Medium	Medium	Medium	Medium	High
64	Target areas with large tree canopy (or restoration candidates that can support large canopy).	Low	High	High	Medium	Medium	Medium	Medium	High	Medium	Medium	Medium	Very High
65	Work with agencies to enforce use of spark arresters and educate OHV users about fire. Timeline: finish by 2015.	Low	Medium	Medium	Low	Medium	Medium	Low	Medium	Medium	Medium	Medium	Low

#	Strategic Actions	Overall Rank	Threat Abatement Benefit	Viability Enhancement Rank	Contribution	Duration	Leverage	Benefits	Lead Individual/ Institution	Ease of Implement-ation	Ability to Motivate Key Constituencies	Feasibility	Cost
66	By 20xx identify dewatered perennial streams and the cause thereof.	-	-	-				-				-	-

Appendix E: Scoring Worksheet

This worksheet contains the underlying matrices and scoring thresholds used to combine and rank the input of the various worksheets. Descriptions accompany each matrix or scoring threshold table in this worksheet. The contents of this worksheet will help you understand how and why certain rank combinations produce particular results. Changes to the matrices in this worksheet will change the results of scoring in the individual target worksheets and the Summary worksheet.

Viability Ranks in the Assessment of Target Viability Summary Table

Each Target's Category of viability -- landscape context, condition, and size -- is described by Key Ecological Attributes that are measured by Indicators. Unique Key Ecological Attribute - Indicator combinations make up each row in the Assessment of Target Viability table and are ranked as Very Good, Good, Fair, or Poor.

There may be multiple Indicators measuring one Key Ecological Attribute for one Category for a Target; if so, a numeric value is given to each ranked Indicator: Very Good = 4.0, Good = 3.5, Fair = 2.5 and Poor = 1.0. The rank for the Key Ecological Attribute is derived from the average of these numeric values for the Indicators, using the following ranges:

Poor:	1.0 - 1.745
Fair:	1.75 - 2.995
Good:	3.0 - 3.745
Very Good:	3.75 - 4.0

There may also be multiple Key Ecological Attributes for one Category, for a Target; if so, the following describes the scoring method for getting the Category rank from the ranks of multiple Key Ecological Attributes:

If any Key Attribute = Poor, the Category is Poor

If any Key Attribute = Fair, the Category is Fair

If all Key Attributes are all ranked Good and/or Very Good:

- The Category is Good, if the number of, Good, ratings are equal to or greater than the number of Very Good ratings.
- The Category is Very Good, if the number of, Very Good, ratings are greater than the number of Good ratings.

Each Category (landscape context, condition, and size) can be overridden and/or can be weighted at 1.0, 0.75, 0.5, 0.25 or zero.

The weighted average of the Categories (using the same values as used for the Indicators: Very Good = 4.0, Good = 3.5, Fair = 2.5, and Poor = 1.0) yields a score which is converted into a Viability Rank for each target. The conversion back from numbers to ranks is the same as above.

To derive a Site Biodiversity Health Rank, the Viability Rank for each target is normalized to the numeric values for each rank (again Very Good = 4.0, Good = 3.5, Fair = 2.5, and Poor = 1.0), and these Target Viability Ranks are averaged. This average is converted back to a Site Biodiversity Health Rank using the above conversion ranges.

Scoring Worksheet: Stress Ranking (Severity-Scope)

Stress Ranking (Severity-Scope):

Each stress is ranked Very High, High, Medium or Low. The rank of each stress is typically a combination of the Severity ranking for the stress and Scope ranking for the stress. The stress rank is calculated automatically from the first matrix below; for example, if the Scope of the stress is Very High and the Severity of the stress is Medium the overall rank of the stress is Medium.

Users can directly enter an alternative stress rank in the "User Override" cells.

Scoring Worksheet: Threat (Source-Stress Combination) Ranking

Source Ranking

Each source is ranked Very High, High, Medium or Low. A source rank is a combination of the Contribution ranking for the source and the Irreversibility ranking for the source. The source rank is calculated automatically from the first matrix below; for example, if the Irreversibility of the source is Very High and the Contribution of the source is Medium the overall rank of the source is High. Users can directly enter an alternative source rank in the "Override" cells.

Threat (Source-Stress Combination) Ranking

The source rank calculated from the first matrix below is combined with the stress rank (which was calculated from the matrix above.) This combination is done in the threat matrix. There is no user override option for the result of the below matrix.

The Threat-to-Target rank is the summary ranking for all threats associated with a particular source of stress to a conservation target. It summarizes the individual threat ranks shown in each stress column. The Threat-to-Target rank is found in the far right column of the "Threats - Sources of Stress" table in the Stress, Sources worksheets.

The Threat-to-Target rank is at least the highest rank given to any threat associated with a particular source of stress. Thus, if any one of the threats associated with a source of stress is ranked Very High within a target, the Threat-to-Target rank for that source line will be Very High.

If there are multiple threats related to the same source of stress, the Threat-to-Target rank may be adjusted upwards by using the "3-5-7" rule as follows:

Three High rankings equal a Very High.

Five Medium rankings equal a High.

Seven Low rankings equal a Medium.

Using this rule, multiple threat ranks are consolidated into new aggregate threat ranks for each source of stress. In some cases, additional consolidation of the aggregate threat ranks with the remaining threat ranks may be needed to yield the final Threat-to-Target Rank. For example, assume you have the following threats associated with the same source of stress: two High rankings and five Medium rankings across the seven stress columns. The five Medium rankings equal one High ranking. This High rank would be added to the two other High rankings to yield a Threat-to-Target rank of Very High. The computation is therefore: 2H + 5M = 3H =1VH

Overall Threat Ranking - Threat Summary ACROSS ALL TARGETS

Overall Threat ranks are determined by combining Threat-to-Target ranks across all targets affected by that threat. The Overall Threat rank is found in the next-to-last column of the "Summary of Threats for All Targets" table in the "Summary" worksheet.

The Overall Threat rank is determined by the "2 Prime" rule which is as follows:

- Two Very High threat rankings yield an Overall Threat Rank of Very High
- One Very High or Two High threat rankings yield an Overall Threat Rank of High
- One High or Two Medium threat rankings yield an Overall Threat Rank of Medium
- Less than Two Medium threat rankings yield an Overall Threat Rank of Low.

As in the Threat-to-Target ranking, multiple threat ranks are first aggregated using the "3-5-7" rule prior to calculation of the Overall Threat Rank. Thus, three High threat ranks equal one Very High threat rank, five Medium threat ranks equal one High threat rank, and seven Low threat ranks equal one Medium threat rank.

For example, assume that a threat (labeled by its source of stress) has three High rankings and five Medium rankings across the eight target columns. The five Medium rankings equal one High ranking, thus equating to four High rankings. Since three High rankings equal a Very High rank, this equates to one Very High and one High. Under the "2 Prime" rule a Very High Overall Threat Rank requires two, Very High's, so the Overall Threat Rank would be only High.

Scoring Worksheet: Threat Status for the Entire Conservation Project

The Threat Status for the Project is determined using the "2 Prime" rule explained above in the Overall Threat Ranking. It is based on the ranking of the eight highest Overall Threats (sometimes adjusted by the "majority rank override" rule explained below). The Threat Status for a Site is found in the lower right corner of the "Summary of Active Threats" table in the "Summary" worksheet.

Summary ranks are also provided for each Conservation Target in the bottom row of the "Summary of Active Threats" table. These ranks are provided to characterize the overall threat status for each target. The ranks are determined using the "2 Prime" rule explained above in the Overall Threat Ranking. These ranks, however, are NOT used to calculate the overall Threat Status for the Site, which is calculated from the ranks in the Overall Threat Rank column.

Rules for the Threat Status for a project

There are two rules governing the determination of the Threat Status for a Project Rank:

1. "2 Prime" Rule
2. Majority Rank Override Rule

"2 Prime" Rule

The threat status for a project rank is determined by a "2 Prime" rule as follows:

- Two Very High threat rankings yield a Very High rank for the Project.
- One Very High or Two High threat rankings yield a High rank for the Project.
- One High or Two Medium threat rankings yield a Medium rank for the Project.
- Less than Two Medium threat rankings yield a Low rank for the Project.

As in the Threat-to-Target and the Critical Threat ranking, three High threat ranks equal one Very High threat rank, five Medium threat ranks equal one High threat rank, and seven Low threat ranks equal one Medium threat rank.

For example, assume that a project has three High rankings and five Medium rankings as its eight highest threats. The five Medium rankings equal one High ranking, thus equating to four High rankings. Since three High rankings equal a Very High rank, this equates to one Very High and one High. Under the "2 Prime" rule a Very High rank for the Project requires two, Very High's, so the project rank would be only High.

Majority Rank Override Rule

The "2 Prime" rule is more sensitive to threats that affect multiple targets within a project than it is to threats that affect only one target. Unfortunately, in cases where targets are threatened by multiple unrelated threats, the Threat Status of a project may not be ranked high enough. For example, assume a project had targets A, B, and C that were threatened independently at a "Very High" level by threats X, Y, and

Z. Under the "2 Prime" rule the Critical Threat rank of each threat would be "High" and, using the "2 Prime" rule again, the three High ranks would yield a High Threat Status for the project.

To adjust ranks upward in cases such as the example above, the "majority rank override" rule would kick in. This rule states that if a majority (more than 50%) of the targets within a project have a Very High (or High, or Medium...) threat to their target, then the Threat Status of the project would be Very High (or High, or Medium...).

Occasionally, the "2 Prime" rule yields a higher rank than the "majority rank override" rule. The matrix ensures that in all cases, the higher rank is selected.

Strategic Action Ranking

An Overall Rank for a strategic action is calculated from the following factors, all of which are entered in the strategic action wizard:

Overall Benefit Rank	**Method of Ranking**
Contribution	Directly by User
Threat Abatement	Calculated
Viability Enhancement	Calculated
Duration	Directly by User
Leverage	Directly by User
Overall Feasibility Rank – Directly by User	
Lead Individual / Institution	
Ease of Implementation	
Ability to Motivate Key Constituencies	
Overall Cost Rank	
Cost - Either Calculated or Directly by User	

Calculation Methodology for Threat Abatement Benefit Scoring

In the Strategy Ranking wizard, the user selects which of the top sixteen Threats, and which targets affected by that Threat, are addressed by a Strategic Action -- whether the Action is predicted to reduce the Threat rank by one or more ranks (e.g. "Very High" --> "High", "High --> Medium", "High --> Low", etc). The Action is given a threat abatement score equivalent to the current threat rank for that Threat for that Target. Thus, an action that is expected to reduce a "Very High" threat rank by one or more rank classes for Target #1 is assigned a "Very High" benefit for Target #1, and another strategy that is expected to reduce a "Medium" threat rank to a "Low" threat rank is assigned a "Medium" benefit.

A single strategic action may reduce stresses attributed to multiple sources of stress. For example, an action to obtain conservation easements may be predicted to reduce or eliminate threats caused by both primary home development and commercial/industrial development. The Threat Abatement rank is at least equal to the highest benefit rank assigned to any threat addressed by a particular action. Therefore:

- A strategic action that abates the equivalent of a Very High rank yields a Very High benefit.
- A strategic action that abates the equivalent of a High rank yields a High benefit.
- A strategic action that abates the equivalent of a Medium rank yields a Medium benefit.
- A strategic action that abates the equivalent of a Low rank yields a Low benefit.

If an action affects multiple threats the Threat Abatement rank is determined by the "3-5-7" rule as follows:

Three High rankings equal a Very High.

Five Medium rankings equal a High.

Seven Low rankings equal a Medium.

The Threat Abatement rank aggregates all of the action's benefit ranks attributed to any individual threats affected by a particular strategic action. Thus, it can include benefits from multiple targets and multiple threats.

Calculation Methodology for Viability Enhancement Benefit Scoring

The calculations for viability enhancement are similar to those for threat abatement. In the Strategy Ranking wizard, the user selects which Key Ecological Attributes in which Target for which Category -- that is to say which rows from the Viability table -- are addressed by a Strategic Action. A row is selected if the Action is predicted to improve the rating of the Key Attribute by one or more ranks (e.g. "Poor" --> "Fair", "Fair --> Good", "Poor --> Good", etc).

The Action is given a viability enhancement score as follows:

- A strategic action that improves the equivalent of two Poor ranks yields a Very High benefit.
- A strategic action that improves the equivalent of one Poor grade yields a High benefit.
- A strategic action that improves the equivalent of one Fair grade yields a Medium benefit.
- A strategic action that improves less than a Fair grade yields a Low benefit.

If an action affects multiple key ecological attributes the Viability Enhancement rank uses the following equivalencies:

- Two Fair ranks equal a Poor.

- Three Good ranks equal a Fair.
- Very Good ranks have no value.

Overall Strategy Rank

The rankings of Threat Abatement and Viability Enhancement Benefits ranking are combined using the series of scoring matrices shown below to determine the Overall Strategy Rank.

To Calculate the Benefit Rank:

The Threat Abatement rank is combined with the Viability Enhancement rank to get an Initial rank.

The Initial rank is combined with the Contribution rank to get a Second rank.

The Second rank is combined with the Duration rank to get a Third rank.

The Third rank is combined with the Leverage rank to get the Benefit rank.

To Calculate the Feasibility Rank

The Lead Individual/Institution rank is combined with the Ease of Implementation rank.

To Determine the Overall Rank

The Overall Rank is determined by one of the four, Feasibility x Cost matrices. The matrix used depends on the Benefit Rank. For example, if the Benefit Rank is "Medium", then the "Benefits = Medium" Matrix (the fifth matrix below) is used to determine the Overall Rank.

Project Resource Measures

The Project Resource Measures rank six resource indicators with the following four ranks and point values:

Very High	4.0
High	3.0
Medium	2.0
Low	1.0