

Fire and the Natural Community Conservation Planning (NCCP) Program

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Abstract. The Natural Community Conservation Planning (NCCP) program is intended to provide for the regional protection and perpetuation of natural wildlife diversity while allowing compatible and appropriate economic growth and development. The first NCCP effort focuses on the coastal sage scrub natural community of southern California. Agricultural and urban growth have reduced CSS by 70 - 90%, affecting approximately 100 species of CSS-associated plants and animals. The influence of wildfires on CSS, including an assessment of impacts of the Fall 1993 fires, is discussed. The NCCP principles of conservation and reserve planning are presented and linked with wildfire and prescribed fire planning issues. Recommendations are made for pre and post-fire planning within and outside NCCP reserve systems.

Keywords: Biodiversity; Coastal Sage Scrub (CSS); fire; Natural Community Conservation Planning (NCCP); rare species; reserve.

Introduction

The Natural Community Conservation Planning (NCCP) program was established by California state law, the Natural Community Conservation Planning Act of 1991. This law (Fish and Game Code, section 2800 *et seq.*) authorized the Department of Fish and Game to develop non-regulatory regional planning guidelines for habitat conservation. The goal of the program is to provide for regional protection and perpetuation of the state's animal and plant species while allowing compatible development and appropriate economic growth.

Southern California's coastal sage scrub habitat is the first community to which the NCCP Program has been applied. All or part of five counties (San Diego, Orange, Riverside, Los Angeles and San Bernardino) are included in the planning area, which covers 6,000 square miles. Approximately 400,000 acres of coastal sage scrub occur within the planning areas, but due to

habitat loss from urbanization and agriculture this acreage represents an estimated 10-30 percent that once existed in southern California.

Thirty-three jurisdictions and agencies and 37 large landowners are actively participating in the NCCP program. San Diego County has three subregional planning efforts; the plan covering the southwestern county is expected to be released for public review during 1994. Orange County has two subregional planning efforts with the plan covering the central/coastal area expected to be released for public review during 1994. An area effort is underway for the Palos Verdes Peninsula (Los Angeles County). Multiple species planning is also underway in Riverside County. NCCP negotiations are currently underway with interested parties in San Bernardino County.

At the heart of all NCCP plans is the identification and long-term protection of large core areas of coastal sage scrub and intermixed habitats and key linking lands. Coastal sage scrub, chaparral, and grassland — the predominant habitats comprising these reserve systems — are vulnerable to wildfires in southern California. How the NCCP plans address reserve management, including the potential for wildfires, will be a significant factor in determining the adequacy of and public support for the plans.

Fire is a natural occurrence in coastal sage scrub and has influenced the evolution of various species of xeric shrub communities of the mediterranean climate regions worldwide (Barbour et al. 1987). Westman (1981) stated that healthy stands of coastal sage scrub occur which have not burned for 60 years or more. Unfortunately, we know little about the "natural" frequency of wildfires in coastal sage scrub. Fire history data for coastal sage scrub in southern California is currently being collated by the California Department of Fish and Game (CDFG) and the U. S. Fish and Wildlife Service (USFWS).

Because the once extensive stands of coastal sage scrub have been dramatically reduced by human activity, effects of wildfires (natural or human-caused) assume a greater significance in the viability of remaining stands. Fire management, including the use of prescribed burns, fuel modification zones, and wildfire response plans will play an important role in the final NCCP plans.

Addressing Wildfires Through Regional Conservation Planning

The Fall 1993 fires in southern California raised the awareness of the public, including those interested in long-term conservation planning. Fire and fuel management will be an important focus in the planning and management of all reserve systems and final subregional or subarea plans should incorporate fire management strategies. These strategies would include pre- and post-fire activities for both managed (prescribed) and wild fires. Results of ongoing and planned scientific research will guide the management of reserves established through the NCCP Program and enable realistic goals to be set.

NCCP reserve design

The NCCP program assembled a Scientific Review Panel, five nationally recognized conservation biologists, to prepare Conservation Guidelines to guide the regional conservation planning effort (Murphy et al. 1993). Six basic tenets of conservation biology are recommended for inclusion in all regional and subregional plans:

1. Species that are well-distributed across their native ranges are less susceptible to extinction than are species confined to small portions of their range;
2. Large blocks of habitat containing large populations of the target species are superior to small blocks of habitat containing small populations;
3. Blocks of habitat that are close together are better than blocks far apart;
4. Habitat that occurs in blocks that are less fragmented internally is preferable to habitat that is internally fragmented;
5. Interconnected blocks of habitat serve conservation purposes better than isolated blocks, and habitat corridors or linkages function better

when the habitat within them resembles habitat that is preferred by target species; and

6. Blocks of habitat that are roadless or otherwise inaccessible to humans serve to better conserve target species than do roaded and accessible habitat blocks.

Following these criteria, the participating local jurisdictions, in coordination with private parties, California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service (USFWS), will design and implement a reserve system. Size and configuration of each reserve area, the connectivity, and other design criteria will be established using local data and consulting the best scientific information available.

Impact of 1993 Wildfires On the Coastal Sage Scrub Community

Eighteen significant wildfire episodes occurred in southern California over a two week period in the Fall of 1993. Combined assessments from CDFG and USFWS indicate that approximately 76,000 ha (189,000 ac) of natural habitat burned within six counties (54% within the NCCP planning area). Thirteen of the 18 fires were located within the coastal sage scrub community planning area and contained coastal sage scrub habitat. Fires located within Ventura and northern Los Angeles were not within the NCCP planning area. These fires emphasize the need for regional conservation planning and reinforce the importance of the above reserve design elements.

Reserve design tenets, in (1) and (2) above, are relevant because wildfire is one event that may alter the population of a species. Severe wildfires, drought and other chance events can greatly affect populations locally, while leaving other areas unaffected. It will be important to design the reserve systems so that small populations are not isolated leaving them vulnerable to wildfires and other stochastic events. Regional planning that conserves a number of larger habitat areas and populations of sensitive species are less likely to be affected by stochastic events.

The importance of tenets (3) and (5) relating to dispersal, patch proximity, and recolonization was also demonstrated by the Fall 1993 wildfires. Patches of burned coastal sage scrub closest to unburned patches are being recolonized most rapidly. In designing a reserve, it is important that habitat areas retain connectivity, which would enable wildlife recolonization from unburned "source sites" into burned areas.

According to data from the USFWS (1993) the amount of coastal sage scrub burned within Orange, Riverside and San Diego counties, totaled 12,140 ha 30,000 ac) (including 1,600 ha of mixed coastal sage scrub/grassland habitat). This represents 29 percent of the habitat within the planning area burned and 7.6 percent of the total coastal sage scrub in the five NCCP counties burned. It is estimated that habitat for 159 pairs of California gnatcatchers and 407 pairs of coastal cactus wrens burned.

The CDFG assessed impacts of the fires utilizing its Natural Diversity Data Base (NDDDB) system, the GAP Analysis project, and field visits. Staff recorded the number of all occurrence records for each NDDDB-tracked element (animal, plant, or natural community) within the area burned by the 18 wildfires (CDFG 1993). A total of 50 different elements were found, including 14 vertebrates, 9 natural communities, 3 invertebrates, and 24 vascular plants. Only 5 of the 18 burned areas contained no NDDDB elements within them.

Twelve of the 18 sites had State or Federally designated rare, threatened or endangered species occurrences. The Stephens' kangaroo rat (*Dipodomys stephensi*) occurred at three of the fire sights and six had records of the California gnatcatcher (*Poliopitila californica californica*). Other threatened or endangered species occurrences included least Bell's vireo (*Vireo bellii pusillus*), Belding's savanna sparrow (*Passerculus sandwichensis beldingi*), Lyon's pentachaeta (*Pentachaeta lyonii*), marcescent dudleya (*Dudleya cymosa ssp. marcescens*), Conejo buckwheat (*crocatum*), San Diego thornmint (*Acanthomintha ilicifolia*), slender-horned spineflower (*Dodechahema leptoceras*), Laguna Beach dudleya (*Dudleya stolonifera*), thread-leaved brodiaea (*Brodiaea filifolia*), Santa Susana tarplant (*Hemizonia minthornii*) and Santa Monica Mountains dudleya (*Dudleya cymosa ssp. ovatifolia*).

Department personnel were contacted by fire agencies on five of the fires and toured four of the wildfire sites. Subsequent inspections of other fires occurred on a sporadic basis through post-burn monitoring activities. The assessment of the fires included general field reconnaissance and aerial surveys.

Some pre-fire data on habitat type and species composition and density are available for the California Fire and Laguna Canyon Fire. For example, 70% of the 3,600 ha (9,000 ac) Southwestern Riverside County Multi-Species Reserve burned. About 800 ha of Riverside sage scrub, nearly 50% of the sage scrub habitat within the Reserve, burned (Wagner 1993). Preliminary 1992 and 1993 breeding season data are available for California gnatcatcher and coastal cactus

wren in five locations within the Laguna Beach Fire in Orange County (Bontrager et al. 1995). These five areas were surveyed for the two bird species in December, 1993, following the burn. Preliminary results indicate an approximate 30 percent increase in the number of gnatcatchers at the study sites (Bontrager et al. 1995). The 1994 breeding season will provide a better understanding of post-fire behavior of gnatcatchers in this area.

The preliminary survey results for the cactus wren indicate a slight decline for this species. The reasons for this are unknown, but are assumed to have been either (1) they were directly killed by the wildfire, (2) they may have gone undetected, or (3) they dispersed to areas farther away from the area surrounding the burn (Bontrager et al. 1995). Surveys during the 1994 breeding season will undoubtedly reveal more insights to post-fire behavior of cactus wrens.

In San Diego County, preliminary results from post-fire vegetation monitoring in a portion of the Guejito Fire indicate that pre-fire established species (native and non-native) on the site are resprouting and germinating abundantly. Incidental observations of wildlife utilizing the site include California gnatcatcher and numerous other passerines, raptors, San Diego horned lizard, Northern red diamondback rattlesnake, and mule deer (California Department of Fish and Game, and U.S. Forest Service, Pacific Southwest Fire Laboratory, unpublished data 1994).

The Fall of 1993 wildfires were large and numerous, however, the vegetation communities of southern California and their associated wildlife have evolved with and are adapted to periodic fires. The pre-fire habitat conditions are expected to return in a number of years. Regional conservation planning efforts will continue to plan for areas that were burned.

Fire Management Within Reserves

As discussed above a fire management component will be an essential part of approved NCCP plans. In addressing fire and fire management, each NCCP plan should incorporate the unique natural variability within each reserve as well as growth pattern throughout the NCCP area.

Native Americans used fire to manage their land (Timbrook et al. 1982), however formal use of fire as a management tool for species conservation planning in California is less than two decades old (Biswell 1989). Designing fire management regimes, which will ensure viable regional ecological reserves in southern California, has only begun and will necessarily evolve with time. Fire management in an increasingly

urban environment will require new and refined approaches.

Management within the NCCP reserve system can be divided generally into pre-fire and post-fire activities. Pre-fire activities such as weed abatement, fuel management of buffer zones, and prescribed burns are done to decrease the chances of a catastrophic wildfire. Prescribed burns can be done to reduce fuel loads and create a mosaic of fire treated vegetation stands within the natural habitat areas. Post-fire activities include treatments applied to burned areas to protect life and property (e.g., to alleviate erosion, sedimentation or flooding), or to modify the pre-fire vegetation composition. Monitoring before, during, and after each pre- and post-fire activity should supply information to assist land managers in effectively and adaptively managing reserves.

Pre-fire activities

The NCCP plans may develop a prescribed fire management plan as a component of the overall NCCP reserve design. Effective prescribed burning through a burn patch mosaic would reduce fuel loads and the size and impacts of any future, unplanned wildfires. Appropriately applied prescribed burns could mimic the natural fire element in the coastal sage scrub ecosystem.

Monitoring selected research sites will be important to obtain long-term information on fire conditions. This information can be utilized for an ongoing prescribed burn management program that will be incorporated into the overall reserve management design. One important aspect of the design will be to better understand historical fire exclusion and the resulting wildfires caused from unnatural fuel accumulation. Major fire events caused from human-induced fuel accumulation could adversely influence biodiversity in the coastal sage scrub. Monitoring selected research sites will lead to refinements in our knowledge of appropriate fire frequencies for this community.

There are several elements that are important in any pre-fire management plan:

1. A fire resource management policy developed and incorporated by all affected agencies. Close coordination with regulatory agencies on all related fire management activities and an agreed upon protocol including the roles of all participating agencies. This would clearly present the purpose of the plan and define the role of each agency in each fire event. A structured network should be developed to routinely share this information among other agencies.

2. Sensitive resource areas within the NCCP planning area would be identified. This information, including maps of sensitive species and plant communities, would be made available to all agencies.

3. An analysis of wildfire potential based on past reports of wildfire history and latest fire management scientific applications. Wildfire history should include location, season, and cause of past fires. Fire management scientific application would include such things as measuring climatic factors (e.g., wind velocity, relative humidity, temperature) and vegetation analysis through surveys and mapping.

4. An active fuel hazard reduction management program.

The fire management element of the plan should identify facilities and features that contribute to fire-preparedness. Roads or trails that could be used for access or control lines during fires, staging areas on the perimeter or within the reserve, and potential water sources should be identified.

A fire management program would seek to (1) avoid catastrophic fires that would destroy reserves and threaten adjacent urban residences; (2) serve as an appropriate alternative to reduce fuel load; and (3) develop satisfactory fire management practices in areas supporting rare species and address the issuance of incidental take of listed species by these activities.

There is a need to develop and adopt wildfire management plans for the buffer areas that surround the reserves. Kelly and Rotenberry (1993) have noted that reserve areas near boundaries may be unsuitable for protected species, thus influencing the effective size of the reserve. Additional research coordinated with other agencies will be needed on buffer areas in the NCCP program and fire management will be an important component.

Post-fire activities

NCCP plans should include policies and guidelines for immediate post-fire rehabilitation. Ongoing monitoring and research of selected sites in post-fire areas will be important to direct adaptive management of the reserves. Monitoring and research should include emphasis on trends in overall biodiversity status of rare species, integrity of corridors, etc. Resource rehabilitation, if necessary, should utilize a seed mix from local native species for re-seeding.

A well conceived fire management program is an important resource management tool to maintain the viability of the coastal sage scrub community within a preserve system. Effective fire management programs would not restore ecosystems to wilderness quality but could restore much of the natural character and condition of the vegetation (Biswell 1989)

Management Options Outside the NCCP Reserve Systems

Regardless of the management actions taken to reduce the potential for wildfires within reserve systems, the surrounding lands must exercise adequate precautions to minimize risk from wildfires. No single policy or objective will suffice for fire, and policies and objectives must have adequate flexibility to address potentially competing interests (Brown and Davis 1973). Numerous publications address fire safety at the urban-wildlands interface. Of particular interest to southern Californians are publications by Radtke (1983) and by the Western Fire Chiefs Association (1991).

Recognizing the problems and assessing the risks of fire are critical to a successful coexistence at the wildland interface. The NCCP plans must provide sufficient information to identify the problems and risks at the interface. Natural characteristics of an area can create problems as well as opportunities relative to fire. Topography, vegetation type and continuity, and seasonal weather contribute to the inherent fire problem. The presence of sensitive resources and viewscape or landform (aesthetic) concerns may place constraints on landowner efforts or desires to address fire issues. Risk is then evaluated in light of the available resources for fighting fires, how structures are built and maintained, and what is determined to be an adequate "defensible space" by the landowner and fire agency.

Once these issues are identified, the community's and fire agency's strategies for addressing specific concerns can be prepared. Community land use and zoning should complement the reserve system, minimizing conflicting expectations and uses at the interface. As NCCP plans are being finalized, revisions to current zoning may be needed. Specific codes and regulations that address fire safety may need to be more rigorously enforced or revised. In particular, proper weed abatement standards and building construction codes can greatly reduce the risks posed to developments by creating an adequate defensible space allowing fire fighting operations a reasonable chance to succeed.

If a wildfire occurs, the post-fire hazard mitigation actions taken should benefit both the urban and wild-

land areas. Appropriate mitigation policies and measures should be identified that complement those in the NCCP plans. Of particular concern are measures that stabilize slopes, reduce erosion and runoff, and alter natural drainages. Wherever possible, the decisions to undertake post-fire mitigation should reflect pre-existing policies and practices that are consistent with both the wildland and urban planning documents.

Summary

The planning and establishment of ecological reserve systems through the NCCP program can provide a much better opportunity for reasonably planning and managing the wildland-urban interface than exists presently. Integrating the natural community's needs with those of the developed community's needs relative to wildfires will be an important component of the plans. Properly done, this will reduce conflicts between urban and wildland interests before, during and following wildfires while meeting the reserve system objectives.

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