

Habitat Conservation Planning in San Diego County, California: Lessons Learned After Five Years of Implementation

Keith A. Greer

San Diego County is attempting a proactive conservation planning effort to protect endangered, threatened, and other sensitive species at the landscape level. This plan is being completed under the State of California's Natural Community Conservation Planning (NCCP) program. When completed, a series of individual Habitat Conservation Plans (HCPs) will provide a system of interconnected reserves designed and managed for biological conservation. The NCCP program has been the center of significant controversy since its inception, yet it has been touted as a national model. This paper explores some of the key lessons that have been learned during implementation of the largest and most complex HCP approved under the NCCP—the Multiple Species Conservation Program—since its adoption five years ago. The exploration of the successes and impediments faced by the Multiple Species Conservation Program should help others developing habitat conservation programs in their future efforts to protect endangered species and their habitats.

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California harbors eight of the 21 most endangered ecosystems in the United States (Noss, LaRoe, and Scott, 1995). The large number of endemic species, coupled with a high degree of habitat loss, has resulted in California being second only to Hawaii in the number of federally listed threatened and endangered species (United States Fish and Wildlife Service, 2004). One-fifth of all federally threatened or endangered species reside in California, with over 200 additional species either listed by the state as endangered, considered candidates for federal listing, or

otherwise considered regionally sensitive (City of San Diego, 1998).

Southern California is specifically recognized both as a hot spot for endangered species (Dobson et al., 1997; Rutledge et al., 2001) and as an area under tremendous growth pressure (San Diego Association of Governments, 1999; Southern California Association of Governments, 2002). One out of every 17 people in the US calls southern California home, with an expected population increase of 5.5 million people by 2020 (San Diego Association of Governments, 1999; Southern California Association of Governments, 2002). The struggle between population growth, economic prosperity, and dwindling habitat for native species has been compared to an impending train wreck.

Southern California is undergoing an intensive proactive effort to plan and protect an interconnected system of natural habitat to conserve endangered species at the landscape level. This program falls under a statewide initiative known as the Natural Community Conservation Planning (NCCP) program (California Department of Fish and Game, 2004). Using a 6,000-square-mile pilot project area in southern California, the program will try to conserve large tracts of habitat while balancing the socioeconomic needs of five counties (San Diego, Orange, Riverside, San Bernardino, and Los Angeles) encompassing 59 cities. When completed, the southern California pilot program will result in several Habitat Conservation Plans (HCPs) developed under the umbrella of the state's NCCP program that will provide an interconnected network of open space throughout five counties (Figure 1). Habitat Conservation Plans are comprehensive plans, authorized under the federal Endangered Species Act [Section 10(a)], that promote the conservation of large blocks of habitat for the protection of listed and—in many cases—non-listed species. Plans for growth may affect federally listed

Affiliation of author: Multiple Species Conservation Program, City of San Diego, San Diego, California

Address correspondence to: Keith A. Greer, Multiple Species Conservation Program, City of San Diego, 202 "C" St., MS 5a, San Diego, CA 92101; (fax) 619-236-6478; (e-mail) Kgreer@sandiego.gov.

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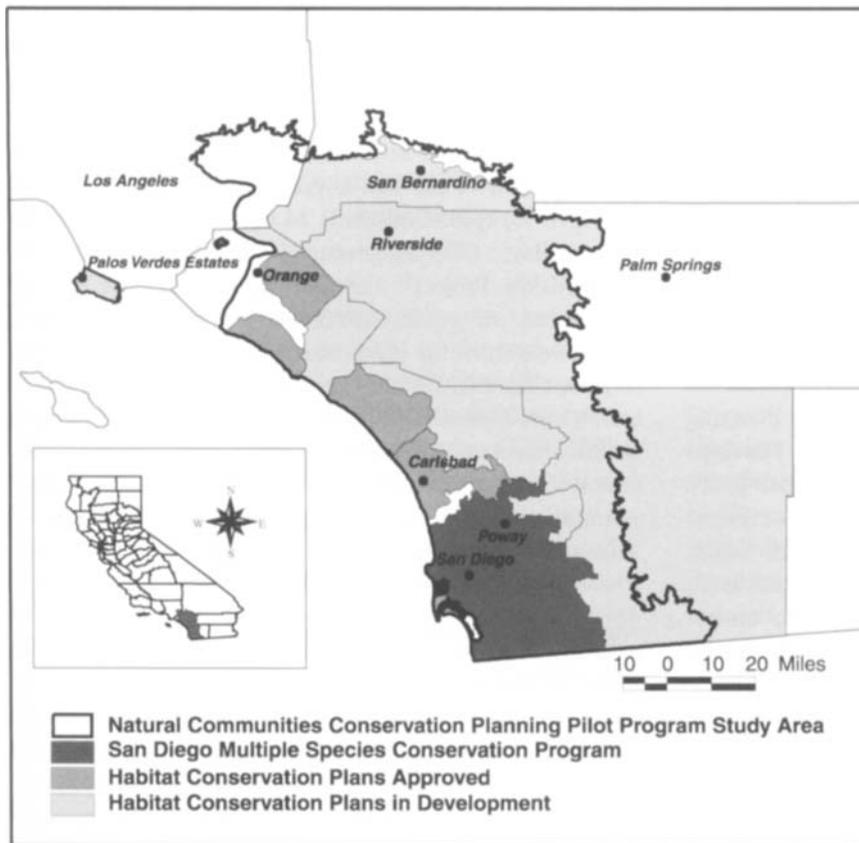


Figure 1. Natural Community Conservation Planning program pilot study area, southern California.

threatened or endangered species. The HCPs provide guidelines for growth that define allowable impacts to federally listed species that are consistent with conservation. Landowners or local jurisdictions are pre-authorized for development projects that are consistent with the HCP (i.e., no additional US Fish and Wildlife Service permit is required). Similarly, under the NCCP, the State of California uses HCPs as the basis for granting permits for projects that may affect state-listed species (Fish and Game Code 2835). In this way, California has streamlined the permit process by establishing guidelines that protect species and provide greater certainty for developers.

Habitat Conservation Plans are seen as a way to balance the biological, economic, and social needs of a region and, as such, are controversial by their nature (Kaiser, 1997; Mueller, 1997; Rolfe, 2001). At the same time, the land use police powers of local governments (e.g., zoning, subdivision, discretionary permits) (Fulton, 1999) and the range size of many endangered species (Press, Doak, and Steinberg, 1996) have made local government involvement in the development and implementation of HCPs attractive for conservation planning (Duerksen et al., 1997). Stoms (2001) states, “I suggest that conservation of

biological diversity will be more cost-effective and socially acceptable when it is integrated into the land use planning process more explicitly than it currently is” (p. 1).

San Diego County is at the forefront of large-scale regional habitat planning. The first plan of four regional HCPs in San Diego County, the Multiple Species Conservation Program (MSCP), was approved over five years ago under the NCCP. The MSCP study area covers approximately 900 square miles in southwestern San Diego County and includes the City of San Diego, portions of the unincorporated County of San Diego, and ten other jurisdictions. The planning area is bordered by Mexico to the south, National Forest lands to the east, the Pacific Ocean to the west, and the San Dieguito River Valley to the north (Figure 1).

The goal of this article is not to reexamine the planning process or the political compromises made by the NCCP plans; these have been amply covered by others (Beatley, 1994; Fairbanks and Toma, 1994; Layzer, 2002; Pollak, 2001a; 2001b; Rolfe, 2001; Silver, 1997). Instead, this article examines several key lessons that have been learned thorough past successes and pending impediments to the completion of this unique approach toward long-term

species conservation. Former Secretary of the Interior Bruce Babbitt has stated that the MSCP should serve as “a model for the nation how to plan for and balance the needs of man and nature” (Nature Conservancy, 1999). This examination of the MSCP will provide insights for future multi-species conservation efforts.

Lessons Learned: Successes

Strong Political Support and Leadership

Although this article focuses on implementation of the MSCP, I would be remiss if I did not identify the need for strong political support and leadership during the planning process, as well as the implementation phase. Development, adoption, and implementation of regional HCPs can take years. As Janet Fairbanks, Regional Planner for the San Diego Association of Governments, succinctly states, “There needs to be a champion at the elected [official] level; preferably someone with name recognition who understands the importance of the process, as well as the product” (Fairbanks, 2003). For the MSCP, former Mayor of San Diego Susan Golden and County Supervisor Pam Slater were instrumental in keeping the process moving and stepping in to develop policy guidance to staff at critical junctures in the planning process. Similarly, implementation of these plans will take years to complete. Subsequent administrations need to embrace the importance of these plans during their implementation. When former Mayor Golden left office after her term was over, her successor, Mayor Dick Murphy, made the implementation of the MSCP one of ten goals for his administration (City of San Diego, 2004c). The lesson to be learned is that without strong leadership, these plans can languish and could ultimately fail under changing political administrations.

Securing Federal and State Cooperation

Since its adoption, the MSCP has conserved nearly 61% of the intended 171,917-acre target of key habitat areas and linkages. The pace of land acquisition has surprised nearly everyone involved in the program. Cooperation between the local, state, and federal governments has been the catalyst for conserving a large majority of this property. Support for acquisition has been aided by two state bonds, Proposition 12 (March 2000) and Proposition 40 (March 2002), which have brought millions of dollars into the region. Local jurisdictions continue to meet the cost-sharing commitments outlined in the MSCP plan—each local jurisdiction will be responsible for acquiring one-half of the lands to be acquired by public means (City of San Diego, 1998, pp. 4–18). As of March 2004, \$41.6 million had

been spent in the City of San Diego alone for land acquisition; of this, \$21.3 million (51%) came from local contributions.

A major victory for conservation came in the way of the establishment of the San Diego National Wildlife Refuge on April 10, 1996. Consisting of three separate units (San Diego Bay, Otay-Sweetwater, and the Vernal Pool Stewardship Project), the San Diego National Wildlife Refuge has brought in both federal funding for acquisition and momentum for local, state, and federal partnerships. Without the NCCP, the San Diego Refuge either would never have been established or it would have been limited to disconnected, isolated fragments of natural habitat. The lesson to be learned is that securing local, state, and federal commitment and cooperation for land acquisition is critical for implementing regional HCPs.

Maintaining Jurisdictional Autonomy

Early in the development of the MSCP, some of the participating jurisdictions and stakeholders believed that a single, consensus-based regional conservation plan could be developed with the specificity necessary for implementation at the jurisdictional level. After several attempts to develop consensus on a range of plan alternatives, the focus of the effort changed to the development of a regional umbrella plan (framework plan) with standards for developing individual jurisdictional-level “subarea plans.” Each subarea plan would be developed by the local jurisdiction and negotiated with wildlife agencies. Permitting each local jurisdiction separately allowed for a phased implementation of the MSCP and kept the process moving.

It was naive to assume that a single plan could have been developed that addressed all of the political, social, and economic concerns of the 12 separate jurisdictions participating in the MSCP. The goal of the conservation planning effort was to tailor a plan that protected endangered and threatened species, while allowing the cities and the County to retain authority over local land use decisions. Assuming that land use decisions could be addressed at the regional level was in conflict with the desired goal of local land use control.

In developing its subarea plan, each participating jurisdiction was allowed the flexibility to design a plan and implementing strategy that could best fit its existing planning and regulatory structure. Jurisdictions chose different implementing strategies. For example, the City of Poway plan limits new clearing to no more than two acres

of habitat on any legal lot. The City of San Diego opted to design a preserve system that allowed for 90% conservation within a defined preserve system, allowing for limited encroachment on private property in order to allow for reasonable use. The County of San Diego uses a combination of established preserve boundaries (“hardlines”) and development standards in a mitigation ordinance to develop a preserve system.

While each jurisdiction maintains autonomy, the benefits derived from the plan are dependent on the participation of the other jurisdictions. For example, the City of San Diego was not allowed to approve impacts for three species until the County adopted its subarea plan (City of San Diego, 1998, pp. 3–24). The umbrella framework plan and the jurisdictional subarea plans have allowed local governments to move forward on their own timing and under their own regulatory strategies. If local jurisdictions are to be involved in HCPs, flexibility and autonomy are necessary to assure that the jurisdictions can tailor implementation of the HCP to their existing development and permit process and proceed on their own timelines as dictated by their local elected officials.

Role of Independent Scientists

A strong criticism of regional HCPs as envisioned by the NCCP has been the lack, or perceived lack, of independent scientific review (Silver, 1997; Witham, 2001). In their review of 208 HCPs, Kareiva et al. (1999) stressed the importance of the early establishment of a scientific advisory committee and an increased use of independent peer review. As part of the initial NCCP coastal sage scrub pilot project, the California State Department of Fish and Game established a set of General NCCP Process and Conservation Guidelines (California Department of Fish and Game and the California Resource Agency, 1993) with the assistance of a five-member scientific review panel (Murphy et al., 1992). The scientific review panel was not involved in the review of the individual conservation plans that subsequently resulted from the Process and Conservation Guidelines. That task was left to the state and federal wildlife agencies in conjunction with biological consultants paid to work on the plans. This led to the criticism that the HCPs lacked scientific accountability.

The NCCP Act was amended in 2002 to help resolve this issue. The NCCP Act of 2002, California Fish and Game Code, Section 2810(b), mandates the inclusion of independent scientific analysis and input to integrate the best science available into the design of NCCP reserve plans. To

further the goal of scientific input, the California Department of Fish and Game developed a guidance letter for an independent science advisory process (California Department of Fish and Game, 2002), which recognizes that “The NCCP science advisory process is expected to continue to evolve, and the Department [California Department of Fish and Game] welcomes ideas that could make the process as productive as possible” (p. 1).

San Diego County’s North County MSCP is a model for reducing subjectivity and increasing the scientific accountability of the design of regional HCPs. The County of San Diego is using a computer-automated process for the selection of reserve design alternatives. This approach iteratively applies various algorithms to optimize preserve configurations (McDonnell et al., 2002) based on pre-established criteria. Specifically, the County, based on the recommendation of an advisory team comprised of ten independent scientific experts, is using the Sites reserve selection model (Andelman et al., 1999).

Sites is a customized Geographic Information System (GIS) application that facilitates the design and analysis of various preserve alternatives. The model identifies the smallest area of land, and configurations of land, necessary to meet a stated set of conservation goals. This provides an opportunity to develop alternative reserve designs, taking into consideration a range of social, economic, and biologic factors. The results were provided to the advisory team, which critiqued the reserve design process and provided recommendations to the County and its consultants (Noss et al., 2001; 2002). Reserve selection modeling coupled with the use of a scientific advisory panel is an advantageous way to reduce subjectivity of the design of a reserve system and to increase scientific peer review in the process. The lesson learned is that peer review from independent, third-party scientists is critical to maintain objectivity in light of politically sensitive HCPs.

Smart Growth and the Natural Community Conservation Program

“Smart growth” has become the professional standard for land use planners since its promotion in 1997 by the Governor of Maryland at that time, Parris Glendening. Smart growth attempts to balance the economic, community, environmental, and fiscal needs of a region. The American Planning Association (2002) has adopted a Policy Guide on Smart Growth that refocuses a larger share of regional growth within urban areas already served

by infrastructure. Smart growth reduces the share of growth that occurs on farmlands and in environmentally sensitive areas. Development patterns based on urban and suburban sprawl have had an enormous cost in California that threatens its economic competitiveness and environmental quality (Bank of America, Resource Agency of California, Greenbelt Alliance, and Low Income Housing Fund, 1995). How does the NCCP fit into smart growth strategies within southern California?

The greatest threats to biodiversity are habitat loss and fragmentation (Ehrlich 1986; Wilcove et al., 1998) and the degradation of wildlands by invasive species (Pimentel et al., 2000), all of which are strongly associated with sprawling growth. The NCCP reserves serve as the foundation for an open space system, which, in turn, can serve as the baseline for the development of land use plans that promote smart growth principles (e.g., infill, transit-oriented development). Identifying the key areas for biological conservation allows land use planners to focus development and redevelopment into less sensitive areas.

In San Diego County, the City and the County are both undergoing General Plan updates (City of San Diego, 2004a; County of San Diego, 2004a). A General Plan is the master document for planning for growth in a city or region (California Government Code 65300 et seq.) and establishes land use policies and provides blueprints for future development patterns. Where the MSCP plan has been adopted, it will serve as the basis for the General Plan conservation and open space elements.

As part of its update to the General Plan, the City of San Diego has adopted a strategy that will address growth and improve existing communities by combining housing, commercial interests, employment centers, schools, and civic uses in areas where a high level of activity and improved transit opportunities already exist. The County of San Diego's General Plan 2020 has similar smart growth goals. In both processes, the General Plan is using the adopted MSCP reserve boundaries as the backbone of the open space element.

Ideally, the HCP should be adopted along with a regional update of the jurisdictional General Plan and a comprehensive transportation plan. Western Riverside County, California, is attempting to complete such an integrated plan. The Riverside County Integrated Project is a comprehensive program to determine future conservation, transportation, housing, and economic needs in Riverside County. What were normally three separate planning

efforts have been combined into one integrated project (Riverside County Integrated Project, 2003). The Riverside County Integrated Project consists of (1) the Multi-Species Habitat Conservation Plan, (2) a multi-modal transportation plan referred to as the Community and Environmental Transportation Acceptability Process, and (3) an update of the General Plan that will determine the future location of homes, businesses, and jobs. The lesson learned is that the planning and conservation of habitat cannot occur in a vacuum. Regional land use and transportation plans need to be addressed and revised to develop a sustainable strategy.

Lessons Learned: Impediments

No Surprises Policy

A foundation of recent HCPs, including the MSCP, was the tenet of the 1994 "No Surprises Rule" [50 CFR 17.22(b) (5) and 17.32(b) (5)]. In brief, the No Surprises Rule provides certainty that no "commitment of additional land, water or financial compensation, or additional restrictions" will be imposed on those entering into an HCP without their consent. The rule aims to provide for assurances to property owners and local jurisdictions that there will be no surprises in the future from unforeseen circumstances if the HCP is being properly implemented. The burden of risk shifts from the property owners and local jurisdictions to the federal and state governments. This incentive promotes landowners and local jurisdictions to enter into long-term (e.g., 30–50 year) HCP contracts. "A deal is a deal" became the slogan that embodied this concept during the adoption of the MSCP.

In 1996, the Spirit of the Sage Council challenged the ruling, indicating that the No Surprises Rule could result in species extinction by preventing any additional regulatory compensation from a landowner or jurisdiction that entered into an HCP. Without this incentive, the National Association of Home Builders contends that HCPs have no value to landowners and local jurisdictions to justify their expense. The National Association of Home Builders' Michael Mittelholzer states, "If that [No Surprises Rule] goes away, HCPs to us are dead. It undermines the purpose here" (Henry, 2003). On December 11, 2003, US District Judge Emmet Sullivan vacated the No Surprises Rule on the grounds that the US Fish and Wildlife Service did not provide for public review or adequate comment on the policy prior to adoption. The rule and the process have been remanded back to the US Department of the Interior. If the No Surprises

Rule is reinstated, then a model for its implementation lies in the Chula Vista MSCP Subarea Plan (City of Chula Vista, 2002).

As each of the MSCP Subarea Plans, and HCPs in general, are adopted, the description of Unforeseen Circumstances has become more defined and regionally specific. The Chula Vista MSCP Subarea Plan has differentiated Changed Circumstances (a change that can reasonably be anticipated and planned for) from Unforeseen Circumstances by using qualitative and quantitative measures (City of Chula Vista, 2002). As an example, fire history was used to determine the frequency and size of wildfires in the Chula Vista Subarea. Based on statistical analysis of this information, it was reasonable to anticipate that fires could occur in the same location between three and ten years apart and damage up to 30 acres of habitat. A risk assessment, preventive measures, and a planned response have been incorporated into the Chula Vista MSCP Subarea Plan. A list of Changed Circumstances has been included and covers natural events such as fires, floods, climatic drought, and increase of invasive species. If an event falls outside of the identified measure (i.e., repeated fires greater than 30 acres), then the event is considered an Unforeseen Circumstance and the City of Chula Vista is covered under the No Surprises Rule (pending its reinstatement). The use of statistical analysis of regional historical events allows for a risk assessment to be established that is rooted in science and provides all stakeholders a better understanding of what is considered an Unforeseen Circumstance. The lesson learned is to expect policy shifts and lawsuits during the implementation of an HCP and therefore to insulate the plan with a sound, scientific foundation, and to use unambiguous language.

Long-Term Funding

The federal Endangered Species Act, Section 10(a) (2), requires applicants to identify the funding for the mitigation outlined under HCPs. Long-term, secure funding is the single greatest challenge to HCPs throughout the nation (Layzer, 2002). Under the implementing agreement contracts of the MSCP, the jurisdictions were given three years to develop a secure regional funding source. Because of the varying adoption dates of San Diego County's HCPs, a long-term regional funding source has not been established as of the date of publication of this paper (September 2004). Plans already adopted are now operating under financing from the local jurisdictions as part of their normal budget appropriations, in accordance

with approved interim funding strategies. As more plans are adopted, the need for a long-term regional funding source becomes more critical.

Funding for all of the San Diego County HCPs is being discussed and evaluated in the context of San Diego County's need for a comprehensive strategy for regional infrastructure. As a result of Proposition 218 (Voter Approval for Local Government Taxes, November 1996), all local bond measures require a two-thirds supermajority vote of the electorate. This makes the timing and composition of a ballot proposal critical. All stakeholders are trying to avoid a fatal vote for regional funding, as occurred in Travis County with the Balcones Canyonlands Conservation Plan (Beatley, 1994).

The San Diego Association of Governments, as the regional planning authority, is advocating an approach for the integration of regional infrastructure (e.g., transportation) and a long-term financing strategy. Regional habitat preservation is one of the nine types of infrastructure that is being analyzed as part of this strategy; the cost of regional habitat preservation is estimated at \$1.3 billion.

A measure to provide for regional infrastructure funding will be placed on the November 2004 ballot as a countywide proposition that would extend a county half-penny sales tax on gasoline for 40 years. This proposition, referred to as TransNet, would generate \$14 billion if approved. San Diego County tends to be fiscally conservative, with the highest gasoline prices in the nation (San Diego Union Tribune, 2004), and gaining the two-thirds support to adopt the measure will be difficult. Strong political leadership and public education will be paramount for success. The lesson learned is that secure, long-term funding needs to be actively pursued during the adoption of a regional HCP.

Protection of Wetland-Dependent Species

Conflict and confusion occurring over what authorizations are provided under the MSCP Implementation Agreement for species dependent on wetland habitat has spun the plan into a five-year federal lawsuit. Mueller (1997) asserts, "The MSCP also allows for the possibility that compliance with the plan may insulate these local governments and landowners from future wetlands mitigation requirements imposed under Section 404 of the Clean Water Act" (p. 27). The MSCP and associated Implementing Agreement acknowledge the protection afforded to 28 species that are primarily dependent on wetland habitat. The MSCP considers these species adequately covered (i.e., protected by

the plan), and the expectations from the local jurisdictions are that impacts affecting these wetland-dependent species will be allowed if they are in conformance with the provisions of the MSCP (e.g., mitigation ratios, avoidance requirements), as is the case for the other 57 species evaluated under the MSCP.

At the same time, the MSCP Implementing Agreement acknowledges that development projects may be subject to federal and state permits, such as federal 404 permits and state (1603) Streambed Alteration Agreements. Two days after the MSCP implement agreement contract was signed by all parties, a federal permit was issued to the City of San Diego that held back authorizing impacts to species dependent on wetland habitat. The City of San Diego's Incidental Take permit (PRT-830421, July 1997) specifically states, "Incidental take of covered species due to mortality or habitat loss within the US Army Corps of Engineers' jurisdictional wetlands is not authorized by this incidental take permit. Incidental take authorization for projects that affect such jurisdictional wetlands shall be authorized through future [Endangered Species Act] Section 7 consultations between the [US Fish and Wildlife Service] and the US Army Corp of Engineers pursuant to section 404 of the Clean Water Act" (p. 4). After seven years of developing the MSCP, the final federal permit held back authorizations that the local jurisdictions expected. Several stakeholder groups have argued that this action is a breach of contract.

To add to the confusion, on January 9, 2001, the Supreme Court ruled that the US Army Corps' attempt to regulate isolated waters exceeded their authority under the Clean Water Act [*Solid Waste Agency of Northern Cook County (SWANCC) v. Army Corps of Engineers*, 531 US 159 (2001)]. The decision has implications for how certain wetland-dependent species may be regulated under the MSCP. A type of wetland affected by the SWANCC decision is the vernal pool; vernal pools are isolated ephemeral wetlands occurring on mesa tops. On January 10, 2003, a joint memorandum issued by the US Environmental Protection Agency and the Army Corps of Engineers indicated that in light of SWANCC, field staff should not assert jurisdiction (i.e., no regulatory permits) over isolated waters that are both intrastate and non-navigable (Federal Register, 2003). Under the federal permit issued under the MSCP, impacts affecting federally endangered vernal pool species were anticipated to occur through a Section 7 consultation in conjunction with a federal 404 permit. Without a federal permit and the corresponding Endangered Species Act Section 7 consultation, how are impacts affecting vernal pool species authorized?

The US Fish and Wildlife Service, in pending litigation, has indicated that any impacts affecting endangered vernal pool species can only be authorized through an individual federal permit [i.e., project level 10(a) permit]. Wetlands, especially vernal pools, are major points of contention among MSCP stakeholders. It is critical that any federal or state permit associated with an HCP be provided and reviewed prior to signing an implementing contract.

Monitoring Success

Once established, monitoring the success of an HCP is critical to assure that the underlying assumptions and obligations are met. Monitoring under the MSCP has been separated into two general categories: (1) "compliance monitoring"—monitoring to assure that the obligations and agreements made under the HCP are being met—and (2) "effectiveness monitoring"—monitoring the species and habitats to assure that the biological conservation provisions of the HCP (e.g., population persistence and resilience) are being achieved.

The process for compliance monitoring has had little controversy. Annual audits are prepared of the loss and gain of habitat by jurisdictions participating in the MSCP. These audits use a GIS and customized software (Habitrak) to account for loss and gain by habitat type and to demonstrate that the gain of habitat is in rough step with the loss, diverging by no more than 10% during any given year. These reports are provided to the wildlife agencies and presented to the public during an annual public workshop. Some jurisdictions are posting the reports on their Web sites (City of San Diego, 2004b; County of San Diego, 2004b). Compliance for individual projects has been incorporated into the existing land development review process. Each land development project is reviewed against the jurisdiction's MSCP subarea plan requirements. An evaluation is reported to the public as part of the environmental review under the California Environmental Quality Act (CEQA).

Effectiveness monitoring has been a greater challenge. Under the MSCP, a Biological Monitoring Plan was prepared (Ogden Environmental and Energy Service, 1996). After several years of field monitoring of rare plants, sensitive birds, and general habitat conditions, there is general agreement that the objectives and methodologies of the monitoring plan should be re-examined. Several recommendations have been made but not yet adopted. A few of the major issues are these: (1) How should trends of species with very high annual

population variability be detected? (2) What are the most effective methodologies for rare plant and bird surveys? (3) How does one collect compatible information and detect trends across the entire NCCP planning area? (4) Are there new technologies that can be employed to provide for a more cost-effective approach? The greatest hurdle has been the fragmented approach to the monitoring effort, with no one lead agency looking at the entire program. As the NCCP matures, the state and federal wildlife agencies, as well as the other participating stakeholders, must take a new look at the existing biological monitoring program.

The Biological Resources Division of the United States Geological Survey (USGS) and the Wildlife and Habitat Data and Analysis branch of the California Department of Fish and Game are working cooperatively toward an integrated monitoring data warehouse. Ideally, this database would be centralized, with data fields that could be used by all organizations conducting biological monitoring. Synthesized data could be provided to the public and made available via the Internet. Such a system would allow researchers to review data from multiple sources across multiple regions and to promote an adaptive monitoring and trend analysis program. The USGS is well on its way toward a national amphibian monitoring and data warehouse as a part of the National Amphibian Research and Monitoring Initiative (United States Geological Survey, 2003). A similar multi-scale monitoring data warehouse for the NCCP could be built from the USGS effort. Because monitoring data will be collected across multiple jurisdictions at multiple scales, regional consensus on methodologies and a database structure will be critical. The lessons learned here are that the goals of the monitoring program need to be clearly identified, methodologies need to be periodically reviewed (and modified if necessary), and information needs to be collected in a single place for analysis and public dissemination.

Conclusion

The NCCP is an ambitious attempt to proactively conserve habitat communities prior to the need for listing species as endangered or threatened. The MSCP is one of the most complex and challenging plans to emerge under the NCCP. It has been over five years since the adoption of the MSCP, and significant successes have contributed to its implementation. Strong political leadership has been maintained throughout changing administrations. Acquisition of habitat has occurred rapidly as a result of shared responsibilities and cooperation between local, state, and

federal governments. Plans are being created with the flexibility and autonomy needed by the local jurisdictions, while providing for independent third-party scientific input. At the same time, impediments face the program that warrant continued diligence on the part of all of the stakeholders. The assurance of a secure long-term regional funding source is one of the biggest hurdles and one that is highly dependent on all of the stakeholders working in cooperation. Federal lawsuits over primary tenets of the MSCP, and confusion with regard to the assurances provided as a result of the MSCP, have occurred to impede its implementation. Finally, the MSCP will ultimately be judged for its effectiveness in conserving threatened and endangered species. In this regard, a comprehensive review and revisions of the MSCP monitoring plan become critical. With regard to other regional HCPs, the MSCP can serve as a national model by providing insight into the possibility for successes and the risk of encountering impediments to those attempting similar efforts.

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