

Regional Open Space



MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

R-08-75
Meeting 08-12
May 14, 2008

AGENDA ITEM 1

AGENDA ITEM

Study Session to Review Draft Habitat Connectivity Policy

GENERAL MANAGER'S RECOMMENDATION

Review, discuss and comment on the attached Draft Habitat Connectivity Policy.

DISCUSSION

The Board of Directors prioritized the development of resource management policies during a workshop held on October 25, 2004. At this workshop, the Board determined that among the priorities for revision should be the District's approach to wildlife corridors and habitat connectivity, which is now presented as a new chapter to be added to the draft Resource Management Policies. The Board had previously adopted a set of policy statements addressing related aspects of natural systems, wildlife, and vegetation management (Resource Management Policies, 1994, Policy 10). The draft Habitat Connectivity policy addresses closely related but distinct issues, building on these earlier chapters.

Management of the District's extensive habitats is an important part of the District's mission to protect and restore the natural environment. Habitat fragmentation and land use conversion pose significant challenges to the viability of the Santa Cruz Mountains ecosystem and to the District as an active party in the preservation of natural places. As a result, cooperation with agencies and organizations in this arena is essential if important rare habitats and ecosystems that span jurisdictional boundaries are to be protected.

The District encompasses much of the northern portion of the Santa Cruz Mountains, a region that has experienced significant habitat fragmentation, threatening the long term preservation of biodiversity within the District's lands. Fragmentation also affects populations of plants and animals on District lands on a larger scale through the geographic isolation of the Santa Cruz Mountains bioregion from other habitats in the state. This isolation threatens wide-ranging species, such as mountain lions, as habitat connections to the Santa Cruz Mountains become more and more tenuous. Isolated populations of both plant and animal species are highly susceptible to stressors in their environment; such populations face a long-term loss of genetic diversity, called inbreeding depression, which results in a reduced resilience to natural disasters, environmental change, disease, and other factors that can weaken them and result in extinction.

Staff recommends the addition of habitat connectivity policies to the existing resource management policies to refine the scope of the District's commitments and introduce a critical subject area. Additionally, these revisions incorporate policies and implementation measures

that address the issues specific to managing the District's habitats and biogeography. The draft Habitat Connectivity policy text is attached to this agenda report (Attachment A).

Structurally, the policy text follows the same organization as the original Resource Management Policy, which is described in the preface to the 1994 document:

“The Resource Management Policies are organized into chapters by subject and resource category. The chapter format generally consists of an introduction, goal, policies, and implementation measures. Each introduction provides background and rationale for the goal and policies that follow. The goal is phrased as a broad, general statement describing the desired state or condition to be achieved. The policies state what steps the District will take in order to attain that goal.

Each policy includes one or more recommended implementation measures, highlighted by bullets (●). These implementation measures are intended to reflect current knowledge and practices regarding resource conservation, but are not necessarily comprehensive. They further define the policy by specifying the actions needed to carry it out.”

As with the revision of the earlier resource management policies, staff recommends that minor revisions pertaining to the existing policies be addressed at a later meeting, to be held at the conclusion of all the specific policy workshops.

CEQA COMPLIANCE

The study session will not result in any action by the Board of Directors subject to CEQA compliance.

NEXT STEPS

Following the Board's initial review of the Draft Habitat Connectivity Policy, staff will solicit additional input from environmental agencies and organizations. Staff will then return to the Board for review and tentative adoption of the policy. Following the conclusion of all the specific policy workshops, staff will present the Board with the revisions to the complete Resource Management Policy document, including the recommended changes necessary to ensure the document is internally consistent. The environmental review of the updated policy document per CEQA will be presented for the Board's certification at the time of final adoption.

Prepared by:
Stella Cousins, Open Space Planner I

Contact Staff:
Kirk Lenington, Senior Resource Planner
Stella Cousins, Open Space Planner I

Attachment A

9 HABITAT CONNECTIVITY

Habitats are the conditions and locations in which plants and animals live and reproduce, and are a critical component of a naturally functioning ecosystem. Habitats come in many forms, but are traditionally thought of as the particular communities of plants and animals that together comprise the ideal conditions for one focal species or for a broad assembly of particular plants and animals. District open space lands are made up of a wide variety of habitats, including freshwater streams, redwood forests, oak woodlands, coastal grasslands, chaparral, and many others. In areas surrounding District Preserves, one finds many of these same communities. Connections that link otherwise isolated habitats are known as corridors, and effectively extend the range of a species from one location to many locations in accessible areas. Wildlife corridors may be extensive contiguous natural areas suitable for a wide-ranging organism, a stream with a continuous wide buffer of riparian vegetation, or even a tunnel or culvert beneath a highway that allows passage of animals.

The District's Geographic Setting

The District's jurisdiction, spanning the San Francisco Peninsula from the Pacific Ocean in San Mateo County to the baylands in San Mateo and Santa Clara Counties, is drawn along both natural and political boundaries. The District encompasses much of the northern portion of the Santa Cruz Mountains, numerous foothills and ridges of that mountain system, and more than 50 miles of coastline, both on the Pacific Ocean and the San Francisco Bay. The Santa Cruz Mountains are a local spur of the Coast Range, and are physically separated from the larger system by the Golden Gate to the north, the Santa Clara Valley to the east and south, and the Pajaro Valley to the south. The closest adjacent mountains and foothills with a similar suite of resident species are the Gabilan Range and the Hamilton Range, and it is with these regions that biological exchange is both most likely and most critical.

Habitats in the Santa Cruz mountains are both connected to and isolated from comparable habitats in nearby areas. This means that interaction between local and neighboring plant and animal populations is governed by their need and ability to move across areas that are inhospitable or even hazardous to survival of the population. These barriers can take many forms, and have differing effects on various species. Furthermore, as humans modify the natural environment, pre-existing boundaries to plant and animal movement can change dramatically. Modified habitat connectivity may result from new roads or houses, changing vegetation, or even from the effects of climatic changes on habitat distribution. Habitat features are just one aspect of a functioning interdependent ecosystem; thus, the permeability of geographic barriers is a complex and ever-changing relationship. It is a function not only of the species' capacity for crossing barriers, but also of the obstacles themselves.

Basic Habitat Ecology

An ecosystem's many habitats form a complex mosaic on the landscape. They may gradually transform from one to another, or change suddenly at a natural or a man made boundary. Two or more habitats may coexist or form a relationship, as when a stream, a linear habitat for fish, insects, and riparian plants, flows through an oak woodland, which is found only where specific kinds of soil type, water availability, and weather conditions occur. Habitats may also be partially or completely interrupted, as when a broad river bisects a grassy plain, a highway passes through the redwoods, or a meadow forms in the woods.

Both the relative size and extent of a habitat's connectivity to other habitats are key factors in its ability to support the plants and animals that depend on it, and in the variety of species, or biodiversity, it can support. Typically, the most resilient and diverse habitats are large areas connected by corridors along which wide-ranging animals can travel, plants can propagate, genetic interchange can occur, populations can move in response to environmental changes and natural disasters, and species at risk can be replenished from other areas. For habitats in the District, migratory and genetic linkage with neighboring mountain ranges, where many of the same plant and animals live and reproduce, is

Although the Santa Cruz Mountains are geographically separate from the nearby mountain ranges, they share many of the same species, and are interconnected through routes of migration and dispersal. These paths, often referred to as "wildlife corridors," commonly follow watercourses into and out of the foothills and valleys. In the San Francisco Bay region and elsewhere, wildlife corridors are frequently intersected by roads and highways.

Preserving contiguous natural habitats is key to preserving biodiversity in a changing world. When a species is reduced to a few isolated populations due to fragmentation of its habitat, a natural stressor such as a fire or drought can wipe out a significant portion of the remnant population, bringing it closer to extinction. Connected habitats protect species from changes in their environment.

important for overall population health. Species living in small, isolated patches of habitat are more vulnerable to disease, population pressures, predation, and other stresses. Such isolation can also lead to inbreeding, which compromises genetic diversity and contributes to instability of species populations. This need for habitat connectivity is particularly true of wide-ranging animals such as mountain lions, eagles, or salmon, but is also applicable at smaller scales. For example, movement across a small road can be critical for the newt that must locate a valuable food source or find a mate.

To support a viable population over the long term, a given species needs an uninterrupted patch of suitable habitat of a particular size. The needed size varies, but always greatly exceeds the range of one individual. This core habitat is bordered by edges that can fill some of an organism's needs, but do not support stable populations. The largest patches have a high proportion of core habitats, but also provide edge zones. Barriers to movement such as roads, homes, or walls cause habitat fragmentation, in which multiple smaller edge habitats are formed. Habitat fragmentation can greatly diminish the viability of the ecosystem. As habitats become fragmented, the amount of core habitat decreases while edge habitat increases. This can greatly reduce habitat viability for species with unique requirements such as nesting owls or murrelets, or increase predation by edge-adapted predators such as cats or raccoons.

Types of Movement and Barriers to Movement

The District's boundaries encompass many of the remaining undeveloped habitats within the San Francisco Peninsula. The main connection for the plants and animals inhabiting District habitats is through relatively narrow corridors at the southern end of the Santa Cruz Mountain Range and across the Santa Clara Valley. Smaller thoroughfares, residential construction, and some natural features are hindrances to the movement of smaller animals and distribution of plants.

Movement of plant and animal species occurs at every scale, from the small matter of crossing a trail to the significant task of climbing a mountain. Furthermore, movement of species can be described not only as locomotion, or movement of individuals, but also as dispersal of eggs, seeds, or larvae. Although the challenges to a single individual can be seen as an effective model for their whole species, habitat networks are more specifically relevant to populations than to individuals. Various species use these corridors frequently, seasonally, or only on rare occasions. Again, the large and wide-ranging animals utilize regional scale habitat networks most heavily, while smaller scale networks may occur between one pond and a woodland for frogs or among interconnected grasslands for a population of deer.

The goal of the District's habitat connectivity policies is to protect ecosystem integrity by maximizing habitat connectivity both within and surrounding the District. This goal will be attained through adherence to six Policy statements:

- 9.1 Identify and include habitat connectivity from a local to regional scale in strategic land acquisition planning.
- 9.2 Identify and protect existing habitat corridors to prevent further compromise to ecosystem integrity.
- 9.3 Collaborate with neighboring land holders and resource agencies to support regional efforts to establish and maintain habitat networks.
- 9.4 Restore, maintain or enhance local habitat networks formed within or incorporating Preserves and other protected lands.
- 9.5 Preserve and enhance riparian/stream habitats locally and at a watershed level (Refer also to Water Resources Policy)

9 Habitat Connectivity

Goal: Protect ecosystem integrity by maximizing habitat connectivity.

Policies and Implementation Measures

9.1 Identify and include habitat connectivity from a local and regional scale in strategic land acquisition planning.

- Maximize habitat connectivity for priority plant and wildlife species in new property purchases.
- Cooperate with regional and local land preservation groups and resource agencies to develop strategic goals for protecting or purchasing critical habitat areas and/or movement corridors.
- Emphasize protection of extensive and interconnected and open space habitats.

9.2 Identify and protect existing habitat networks to prevent further compromise to ecosystem integrity.

- Evaluate existing facilities and land uses that impact habitat connectivity and riparian corridors and prepare plans for protection or restoration, as appropriate.
- Identify wildlife movement patterns and high value habitat features and formulate site-specific habitat management goals.
- Encourage field research activities including collecting, trapping, and tracking in support of studies that can inform District management of natural resources and ecosystems.
- Incorporate construction practices that avoid the creation of additional unnecessary barriers to habitat connectivity. Where feasible, utilize removable fencing, wildlife friendly silt trapping devices, and other design features that allow passage of plants and animals during and after project implementation
- Evaluate the existing habitat values of man-made structures prior to removal.
- Where isolated natural areas exist, strive to connect them through movement corridors to facilitate connection across barrier.
- Identify unique or legally rare habitat types and target for protection. Strive to maximize habitat connectivity for locally rare habitats such as serpentine grassland, valley oak woodlands, coastal terrace prairie, etc.

Wildlife corridors, or the paths of movement between patches of an animal's distribution, are only one component of an effectively connected habitat. As the science of biogeography and population dynamics develops, wildlife corridors have come to mean structures or narrow reserves set aside for crossing highways at pinch points or along established migration routes. Habitat networks are a more resilient and extensive linkage of suitable environments that support dynamic and mobile populations of plants and animals.

9.3 Collaborate with neighboring land holders and resource agencies to support regional efforts to establish and maintain habitat networks.

- Advocate for land use plans and policies that preserve the District's biogeographic connectivity with the greater Santa Cruz Mountains and with the neighboring Gabilan and Hamilton Ranges.
- Review and comment on land use decisions that impact habitat connectivity within

the District's jurisdiction and bioregion, including construction or modification of roads and proposals for large scale developments.

- Reduce barriers to wildlife movement on a regional basis.

9.4 Restore, maintain or enhance local habitat networks formed within or incorporating Preserves and other protected lands.

Restoration and enhancement are terms that are sometimes used interchangeably when discussing habitat improvement projects. Restoration refers to the process of returning land that has been degraded and disturbed into functional habitat. Enhancement refers to the process of altering a habitat to provide specific ecosystem functions that may be missing; typically to provide habitat for endangered species.

- Review and comment on land use decisions that impact habitats contiguous to those located on District Preserves. Recommend and support measures to maintain connected and undegraded habitats where possible.
- Protect and restore known habitats of rare, endangered, or special concern species, taking into consideration the legal protection, distribution and abundance, and risk to specific resources involved.
- Designate sensitive habitat areas and, if necessary, restrict or exclude public access to these areas for resource protection.
- Evaluate impacts on wildlife movement and habitat connectivity when planning trails and other facilities.
- Minimize roads, fences, and other barriers to wildlife movement within preserves.
- Identify and protect established wildlife crossings to allow movement across existing roads. Where appropriate, modify established crossings to improve habitat features.
- Collaborate with resource agencies to restore and enhance the habitats of protected and special status species known to utilize preserve areas.

9.5 Preserve and enhance riparian/stream habitats locally and at a watershed level.

Streams can be thought of as linear habitat corridors, particularly for fish that migrate from land to sea. Anadromous fish, such as steelhead trout, return from the open ocean as adults to freshwater streams to breed. Human activities have greatly altered and degraded many of the streams in the Bay Area primarily through barriers to fish passage, such as road culverts and dams and through degradation of spawning habitats by excessive sedimentation of spawning gravels.

- Inventory and assess stream reaches accessible to anadromous fisheries to identify impediments to fish passage and opportunities for habitat enhancement. Remove artificial barriers to fish passage where removal would enhance spawning and rearing habitats.
- Enhance spawning and rearing habitats for native fisheries through restoration. Prioritize restoration and enhancement of areas providing habitat to sensitive species.
- Restore hydrologic processes altered by human activity by installing erosion control materials and structures, and removing culverts and drainage diversions where appropriate, and using improved drainage structures that minimize alteration of hydrology.
- Participate in regional watershed management planning and restoration activities.

Glossary of Terms

Barrier – an impediment to migration, genetic exchange, dispersal, or other essential movement of an organism. May be of natural or man-made origin.

Biodiversity – “The full range of variety and variability within and among living organisms, and the ecological complexes in which they occur, and encompass ecosystem or community diversity, species diversity and genetic diversity.” (U.S. Congressional Biodiversity Act, 1990 HR1268)

Boundary – The area of border between habitat patches or vegetation types; a zone comprised of edges of adjacent ecosystems or land types.

Core – the portion of an ecosystem or habitat where effects of the surrounding area are limited.

Edge – the portion of an ecosystem or habitat near its perimeter, where influences of the surroundings prevent development of interior/core-area environmental conditions.

Enhance - to increase or improve a habitat in value or quality.

Habitat – the combination of living and non-living factors that surround and potentially influence an organism; a particular organism or species' typical environment.

Habitat Fragmentation – the breaking up of a previously continuous habitat (or ecosystem) into spatially separated and smaller pieces.

Patch – a relatively homogenous type of habitat that is spatially separated from other similar habitat and differs from its surroundings.

Restore - to bring back to or put back into a former or original state.

Watercourse - a natural or artificial channel through which water flows.

Wildlife corridors – avenues along which wide-ranging animals can travel, plants can propagate, genetic interchange can occur, populations can move in response to environmental changes and natural disasters, and threatened species can be replenished from other areas.

Selected References

Jensen, D.B., Torn, M.S., and Harte, J. *In Our Own Hands: A Strategy for Conserving California's Biodiversity*. University of California Press, 1993.

Dramstad, W.E., Olson, J.D, and Forman, R.T.T. *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning*. Harvard University Graduate School of Design, Island Press, and the American Society of Landscape Architects, 1996

Peck, S. *Planning For Biodiversity: Issues and Examples*. Island Press, 1998.

Townsend, C.R., Harper, J.L., and Begon, M. *Essentials of Ecology*. Blackwell Science, 2000

Real, L.A. and Brown, J.H. *Foundations of Ecology: Classic Papers with Commentaries*. University of Chicago Press and Ecological Society of America, 1991.

Conservation Thresholds for Land Use Planners. Environmental Law Institute, 2003.