

BIODIVERSITY MANAGEMENT PLAN
for
MARIN MUNICIPAL WATER DISTRICT
LANDS

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23 January 2009

EXECUTIVE SUMMARY

This Biodiversity Management Plan (BMP) has been prepared to provide background information for the Marin Municipal Water District's 2009 update of its Vegetation Management Plan (VMP). The Biodiversity Management Plan addresses management goals and actions for all of the lands managed by the Marin Municipal Water District (MMWD), including lands within the Mt. Tamalpais watershed, the Nicasio Reservoir watershed, and the Soulagule Reservoir watershed, which total approximately 20,000 acres.

High levels of biological diversity characterize the lands managed by the Marin Municipal Water District, and the District is committed to protecting this biological diversity at all levels. District lands contain a large array of plant and animal species that occupy many different habitats, vegetation types and ecosystems. The total number of species found within District lands is unknown, but it includes more than 900 species of vascular plants and at least 400 species of vertebrate animals. Many more species of fungi (mushrooms) and invertebrates such as insects and other arthropods undoubtedly occur within District lands. Of the species that are known or likely to occur, there are 43 plant species of special significance, including seven that are federally or state listed as rare, threatened or endangered; and 34 vertebrate animal species of special significance, including two fish, two amphibians, one reptile, 21 birds and eight mammals with designated conservation status. Within the vegetation of the Mt. Tamalpais watershed, at least 59 alliances and habitats, and 88 associations have been identified. This diversity, found within a large-scale landscape that has protected status, resulted in the inclusion of MMWD lands within the Golden Gate Biosphere Reserve created by UNESCO in 1988 (UNESCO 2008).

Threats to biological diversity on MMWD lands include the effects of: non-native invasive plants and animals, wildfire, Sudden Oak Death and other forest pathogens, and global climate change. These threats can result in the loss and degradation of habitats, vegetation types, and ecosystems; and the reduction in size, range, and reproductive capacity of special-status plants and animals.

To address these threats and fulfill the goals and objectives of the 2009 update of the Vegetation Management Plan, the District will use a strategy that includes planning, direct actions, monitoring, adaptive management, and support for research. This multi-faceted approach requires the District to: 1) maintain an up-to-date inventory of its biological resources, and current maps that display the distribution patterns of native and non-native species, vegetation, and wildlife habitats; 2) monitor the outcome of projects and actions conducted for management of biological resources; 3) monitor the condition of these resources over time in order to detect changes and take appropriate management actions; 4) take actions to preserve and protect resources that are currently

in good condition; 5) take actions to restore resources that exist in degraded condition or suboptimal numbers; and 6) manage resources over the long term through a process that incorporates monitoring results into the decision-making process, which means to use *adaptive management*.

In Section 6, this Plan describes a variety of projects and actions that the District will implement to protect and enhance biological diversity within its lands. These include: six projects to address mapping and inventory needs, four monitoring projects and programs, four projects to protect existing resources, three projects to restore degraded habitats, including weed control projects at 25 or more specific sites, and 11 projects and actions that will implement adaptive management, develop long-term solutions, and foster research.

In Section 7, this Plan includes a variety of recommended methods to address weed control needs. Recommended control methods are organized by weed species, and by the type of control activity to be undertaken (e.g., control seedlings, remove adult plants, etc.). Methods using no herbicides are listed separately from those using herbicides. The feasibility and effectiveness is given for each control method, including specific information for different infestation sizes.

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High levels of biological diversity characterize the lands managed by the Marin Municipal Water District, especially those within the Mt. Tamalpais watershed. MMWD manages approximately 20,000 acres of land, including a significant portion of the Mt. Tamalpais watershed. At the District-sponsored Mt. Tamalpais Watershed Symposium in February 2008, more than 20 scientists described the watershed's biodiversity and its management to the 350 attendees. Presentations from this symposium are an important source of information for this BMP.

Within District lands is found a large array of plant and animal species that occupy many different habitats, vegetation types and ecosystems. The total number of species found within District lands is unknown, but it includes more than 900 species of vascular plants and at least 400 species of vertebrate animals. Many more species of fungi (mushrooms) and invertebrates such as insects and other arthropods undoubtedly occur within District lands. Of the species that are known or likely to occur, there are 43 plant species of special significance, including seven that are federally or state listed as rare, threatened or endangered; and 34 vertebrate animal species of special significance, including two fish, one amphibian, one reptile, 21 birds and eight mammals with designated conservation status. Within the vegetation of the Mt. Tamalpais watershed, at least 59 alliances and habitats, and 88 associations have been identified. This diversity, found within a large-scale landscape that has protected status, resulted in the inclusion of MMWD lands within the Golden Gate Biosphere Reserve created by UNESCO in 1988 (UNESCO 2008).

The values of biodiversity on a global scale are limitless. Core biodiversity values of the lands managed by MMWD include: providing a high quality water supply for homes,

