

# **Overview of Biological Invasions in California Riparian Areas and Wetlands**

**Tom Dudley,  
Dept. of Integrative Biology,  
UC Berkeley, CA 94720**

California has more threatened or endangered species of plants and animals than any other continental state, with over half of protected animal species and possibly a similar number of plants associated with aquatic or riparian habitats. Such wetland ecosystems are focal habitats in the majority of areas designated for protection of natural resources, including wilderness areas, national forests, state and national parks, private or institutional ecological reserves. Efforts to protect these ecosystems are jeopardized by invasion of non-indigenous species, yet there has been no comprehensive analysis of what species are involved and where.

We conducted a survey of over 50 protected 'natural areas' in 6 biogeographical provinces of California to determine what species were considered problems by resource managers and what was being done to combat these invaders. Over 77 plant taxa and 70 animal taxa were identified from interviews, and tabulated with respect to their current distributions and the degree of threat they pose to native species and/or ecosystems processes. Costs of damage and control were exceedingly difficult to assess, but are certainly in the tens of millions of dollars statewide, with lack of management funds being a critical concern in all areas. This compilation is available to managers and other interested people to assist in developing strategies to protect wetland ecosystems and to generate concern before problems expand further.

To better represent the nature and extent of problem invasions into wetlands, I describe several relationships that may determine susceptibility of habitats to invasion, including elevation and climate, modification of natural disturbance regimes. Characteristics of problem invaders and 'invasion complexes' (suites of interacting invading species), and important research directions, are also discussed.