

Project Name: Wildlife Corridors for Flood Escape on the Yolo Bypass Wildlife Area

Applicant Name: Yolo County Resource Conservation District

Best Available Science

(Excerpted from grant application, page 31, Scientific Basis for Project)

The Yolo County Resource Conservation District (RCD) pioneered native plant hedgerow planting on the edges of agricultural land in Yolo County in the mid-1990's (Robins et al. 2001). Since then, many other organizations and agencies throughout the state have taken up the practice under a variety of names (pollinator strips, habitat strips, wildlife corridors, etc.) and in a variety of cultivated and wildland settings. Research to understand effectiveness has occurred and continues, but many aspects of these corridors are still not well studied or understood.

Documentation of habitat fragmentation, species isolation, the importance of patch size, and the impacts on reduced genetic diversity go back several decades (Wilcox 1985, Wilcove 1986). Studies of wildlife corridors and their benefits began in the early 1990's and have continued (Beier 1992, Harrison 1992, Fahrig 2003). More recent studies emphasize the importance of re-connecting separated habitat areas and providing safe, diverse corridors for wildlife movement to allow response to changing weather, climate, food, population and other life-history needs (Harrison 1992, Fischer 1999, Bond 2003,). There are documented benefits to improved native plant movement with the establishment of wildlife corridors (Brudvig 2009). The USDA Natural Resources Conservation Service produced a publication dealing specifically with wildlife corridor planning and management and highlights the environmental, social and economic benefits (Johnson 1999). The 2012 Wilderness Society publication, Designating Wildlife Corridors on the Public Lands (Protection through the Bureau of Land Management's Land Use Planning Process), describes how crucial wildlife populations are to quality of life, developing a framework to define and preserve wildlife movement patterns through habitat-connecting corridors.

There are multiple studies on beneficial insect use of native plant hedgerows from the last decade. They document the use and dispersal from hedgerows by crop pest-predators and various pollinator species, including lacewings, lady bugs, assassin bugs, honey bees, native bees, wasps, syrphid flies and butterflies (Long and Anderson 2010; Morandin et al. 2011; Morandin and Kremen 2013). Morandin and Kremen studied pollinators along edges of agricultural fields for benefits to biodiversity and ecosystem services such as pollination (Morandin and Kremen 2013). They found that native bees and syrphid flies were more abundant, species-rich, and diverse in these hedgerows than in weedy, unmanaged edges. In particular, uncommon species of native bees were 7 times more abundant on native plant flowers than on flowers in weedy edges, and that these pollinators dispersed readily from the native plant borders into areas where pollination services could be provided. In the report, Hedgerows enhance beneficial insects on farms in California's Central Valley, Morandin and Long (2011) documented that California native plant field borders attract far more beneficial than pest insects.

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Controlled studies on bird use of hedgerows, particularly in California, are harder to find. Hinsley and Bellamy's (2000) review of published articles in 2000 found evidential support for substantial use of hedge-type corridors by migratory and resident songbirds. K. Velas (Velas et al. 2014) of Audubon California, in an as yet unpublished technical report, conducted a statistically analyzed survey comparing bird use of planted hedgerows vs unplanted areas, finding that hedgerows increase bird species richness (significantly more taxa) and average abundance.

Johnson and Beck (1988) confirmed that shelterbelts provide wildlife wind and weather protection, escape cover, food and foraging sites, reproductive habitat and travel corridors. They found at least 108 species of birds and 28 species of mammals use shelterbelts, extending the ranges of several bird and small mammal species. The authors recommend enhancing benefits by designing for the needs of the most desired wildlife with attention to complexity. They also note that shelterbelts may provide economic, educational, recreational and aesthetic benefits.

There is a paucity of research on the benefits of wildlife corridors during flood events. It follows that wildlife corridors would provide shelter and cover during escape from rising flood waters. Wildlife monitoring is notoriously difficult and/or costly. Our proposal to use game trail cameras during strategic times of the year, and during any flood events that occur during the contract period, will serve as pilot documentation of this type of benefit, to inform future similar work and will keep costs low. The University of California Davis Road Ecology Center's research program in-progress is tracking wildlife movement and connectivity effects (<http://roadecology.ucdavis.edu/research/programs/wildlife-movement-connectivity>). We will use those program principles and practices as a model for our wildlife corridor use observations. We bring the experience of 20 years of hedgerow installation in a variety of working landscape and wildland conditions, to installing the proposed wildlife corridors, using methods that demonstrate greatest plant survival and selecting species that survive and thrive under the potential extremes of drought, heat and flood. Pre-plant weed control and site preparation begins well in advance of planting. Native grasses will be seeded and plants installed in late fall/winter. Maintenance begins during the following spring. The start of irrigation is dictated by weather conditions and could continue into fall. Specific nuances within each of these steps are catered to specific site conditions and needs.

Yolo Bypass Wildlife Area staff have observed wildlife mortality during flooding for a number of years and see this project as an opportunity to address that problem and restore habitat and ecosystem function on the Wildlife Area. Plans to restore habitat within the Sacramento San-Joaquin Bay Delta include large acreages within the Yolo Bypass. The Yolo County HCP/NCCP (Habitat Conservation Plan/Natural Communities Conservation Plan), scheduled to be completed by the end of 2017, will inform these activities. RCD staff have participated in the HCP/NCCP planning process for more than 10 years and Yolo Habitat Conservancy staff confirm

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that this project will complement the HCP/NCCP, enhancing habitat for two species addressed in the Plan – giant gartersnake and western pond turtle. Significant portions of the Bypass acreage are under agricultural operation (grazing or cultivation). This is a critical opportunity to gain experience establishing flood-adapted, floodway-sanctioned, agriculture-friendly habitat corridors and patches to help fulfill the goals of the Bay Delta Conservation Plan. NRCS's appropriate science-based practice specifications, consultation with California Department of Fish and Wildlife's staff, peer-reviewed and scientific publications and other local restoration expertise will support the RCD's long experience with native plant corridor installation, extensive knowledge of native plant habitat and cultivation and our unique ability to work with farmers and ranchers to make this an opportune conjunction of community will, project timeliness, implementer expertise and opportunity. We can begin working towards restoration goals in this important floodway, agricultural and habitat landscape, using the best available science for plant selection, corridor design and adaptive management techniques to ensure a successful project that supports and enhances Bypass ecological, agricultural and recreational functions.

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