

Species Habitat Suitability Model – Yellow-breasted Chat

Model Approach. BDCP Species Habitat Suitability Models are formulated primarily using vegetation data from existing GIS data sources (described below). Habitat suitability for each species is determined on the basis of whether or not a vegetation type or association is likely to be occupied based on the species' habitat requirements as described in the species account. The models are not formulated on the basis of species occurrence data, which is incomplete for most Covered Species in the Planning Area. Instead, species occurrence data are used to verify the habitat models and as necessary revise the vegetation input data.

By its nature, this type of model tends to provide conservative results with respect to the extent of suitable habitat. The tendency is to overestimate suitable habitat by attempting to be as inclusive as possible in the absence of site-specific data on vegetation structure, species composition, hydrology, occurrence of or proximity to other habitat elements and other variables that would provide more certainty with respect to habitat quality and the potential for occurrence.

However, due to minimum mapping unit limitations, it is possible to underestimate as well as overestimate the extent of suitable habitat. For example, suitable habitat areas that are below the minimum mapping unit size (1 acre) may not be identified. This may be important for species that can use small isolated habitats, such as individual trees or small groups of trees. Still, the more likely scenario is that an overestimate occurs as small acreages of unsuitable habitat are absorbed into larger suitable habitat polygons. Nonetheless, it is also important to note that while the models portray a reasonable distribution of habitat suitability for each Covered Species, they do not necessarily indicate with certainty that Covered Species would not occur in all areas identified as non-habitat; but instead indicate that non-habitat areas have a much lowered probability of species occurrence compared with areas identified as suitable habitat.

Where applicable, habitat suitability is also identified according to the life requisite of the species, such as breeding, foraging, or movement/dispersal habitat, and in some cases according to minimum habitat area requirements using home range or territory size data. Where appropriate, habitat suitability is also defined qualitatively (e.g., high, medium, and low value) based on broad suitability categories (e.g., grassland, pastureland, cultivated land) or through a general examination of species associations within vegetation types (e.g., species and range of percent cover of understory shrub layer) such as that provided in Hickson and Keeler-Wolf 2007. Finally, other input variables are used to address specific conditions that are not accounted for in the vegetation data bases but that can be generated through GIS analysis. These include incorporating buffers, connectivity between habitat types, and specific land use types, such as levee slopes.

For each model, the mapping data sets are identified and each vegetation type or association is identified along with its life requisite association. Finally, the assumptions used in the formulation of the model are described and if and how the model is expected to over- or under-estimate the extent of habitat in the planning area.

GIS model data sources. The yellow-breasted chat model uses vegetation types and associations from the following data sets: BDCP composite vegetation layer (Vaghti and Keeler-Wolf 2003 [Suisun Marsh]; Hickson and Keeler-Wolf 2007 [Delta]; TAIC 2008 [Yolo Basin]; USDA 2005 aerial photography; and DWR 2007 land use survey of the Delta and Suisun Marsh area-version 3. Using these data sets, the model maps the distribution of suitable yellow-breasted chat nesting and migratory habitat in the Planning Area using two qualitative parameters, primary habitat and secondary habitat. Vegetation types were assigned based on the species requirements as described above and the assumptions described below.

Nesting and Migratory Habitat: Nesting and migratory habitat in the Delta includes the following valley riparian types from the BDCP composite vegetation layer:

Primary Habitat

- White alder (*Alnus rhombifolia*)
- *Alnus rhombifolia/Salix exigua (Rosa californica)*
- *Acer negundo-Salix gooddingii*
- Hinds walnut (*Juglans hindsii*)
- Black willow (*Salix gooddingii*)
- *Quercus lobata-Salix exigua-Rubus discolor*
- *Salix gooddingii/rubus discolor*
- Coast live oak (*Quercus agrifolia*)
- *Quercus lobata/Rosa californica (Rubus discolor-Salix lasiolepis/Carex spp.)*
- *Quercus lobata – Acer negundo*
- *Quercus lobata – Alnus rhombifolia (Salix lasiolepis-Populus fremontii-Quercus agrifolia)*
- *Quercus lobata – Fraxinus latifolia*
- *Salix lasiolepis – Mixed brambles (Rosa californica-Vitis californica-Rubus discolor)*
- *Salix Exigua – (Salix lasiolepis – Rubus discolor – Rosa californica)*

Secondary Habitat

- *Alnus rhombifolia/Cornus sericea*
- Oregon Ash (*Fraxinus latifolia*)
- Box elder (*Acer negundo*)
- Fremont cottonwood (*Populus fremontii*)
- *Salix gooddingii/wetland herbs*

- *Salix goodingii* – *Quercus lobata*/wetland herbs
- Coyotebush (*Baccharis pilularis*)
- Blackberry (*Rubus discolor*)
- California wild rose (*Rosa californica*)
- Mexican elderberry (*Sambucus mexicana*)
- California dogwood (*Cornus sericea*)
- *Cornus sericea* – *Salix exigua*
- *Cornus sericea* – *Salix lasiolepis*/(*Phragmites australis*)
- Arroyo Willow (*Salix lasiolepis*)
- *Salix lasiolepis* – *Cornus sericea*/*Scirpus* spp – complex unit
- Shining willow (*Salix exigua*)
- Narrow-leaf willow (*Salix exigua*)

Nesting and migratory habitat in the Suisun Marsh and Yolo Basin includes the following valley riparian types from the BDCP composite vegetation layer:

- *Fraxinus latifolia*
- Fremont Cottonwood-Valley Oak-Willow Riparian Forest
- Mixed Fremont Cottonwood – Willow
- Mixed Willow Super Alliance
- *Quercus agrifolia*
- *Rosa californica*
- *Rosa/Baccharis*
- *Rubus discolor*
- *Salix laevigata*/*S. lasiolepis*
- *Salix lasiolepis/Quercus agrifolia*
- Valley Oak Alliance – Riparian
- Willow Trees

Yellow-breasted chat nesting and migratory habitat includes all valley riparian types with a shrub component that includes blackberry, California wild rose, dogwood, coyotebush, willow and other shrub species, and an overstory component that includes valley oak, coast live oak, Fremont cottonwood, white alder, box elder, Oregon ash, willow, or walnut. Distinguishing primary from secondary habitat was based on a qualitative assessment of the suitability of the understory and overstory layers within each type. Types that are classified as primary habitat support a greater extent cover of a suitable shrub layer, particularly blackberry and California wild rose, and that also included a moderately-dense overstory canopy. Determining whether a riparian habitat was considered primary or secondary habitat was done through a review of the species associations and ranges of percent cover from Hickson and Keeler-Wolf 2007. Vegetation types designated as species habitat in this model correspond to the mapped vegetation associations in the BDCP GIS vegetation data layer.

Assumptions: Yellow-breasted chats nest and forage in dense riparian thickets of willows, vines, and brush associated with streams and other wetland habitats (Small 1994). Population density is directly related to shrub density (Crawford et al. 1981), with a preference for blackberry noted in several studies (Kroodsma 1982, Burnett and DeStaebler 2003), although a variety of other shrubs and thickets are considered suitable including wildlife grape, willows, and California wild rose (Ricketts and Kus 2000, Melhop and Lynch 1986, Annand and Thompson 1997, Comrack 2008). Some taller overstory trees are also required for song perches (Dunn and Garrett 1997), but the mature and dense overstory canopies are apparently avoided (Kroodsma 1982, Melhop and Lynch 1986, Annand and Thompson 1997, Comrack 2008).

While breeding has not yet been confirmed, late spring and summer occurrences of yellow-breasted chats have been confirmed. This suggests a reasonable possibility of this species breeding within the Planning Area. Chats are known to migrate through the Planning Area. Vegetation types that are listed as primary habitat are considered to have a higher probability of breeding activity, and while chats generally use similar habitat during the breeding and non-breeding seasons, both the primary and secondary types are considered suitable migratory habitat.

The model does not distinguish suitability on the basis of riparian width or patch size. Zeiner et al. 1990) reports chat territory sizes from 0.3 to 3.2 acres. Because the minimum mapping unit (1 acre) is above the minimum territory size, the model is not restricted on the basis of patch size, but may in fact underestimate the extent of suitable habitat. (Note however, that Gaines (1974) reported a breeding density from the Sacramento Valley of one chat per 10 ac., which would suggest a possible overestimate of suitable habitat.) Riparian width may be an important factor related to yellow-breasted chat occurrence. Narrow widths may make chats more susceptible to brown-headed cowbird parasitism (Gaines 1974, Ricketts and Kus 2000) and predation (Green 2005). The model may also overestimate suitable habitat for chats by not restricting the distribution of suitable habitat based on riparian width.