

# Central Valley Winter Raptor Survey (2007-2010): Red-shouldered Hawk Habitat Associations

Zachary Smith, 812 1/2 11th St., Davis, CA 95616

Edward R. Pandolfino, 5530 Delrose Court, Carmichael, CA 95608

Red-shouldered Hawks (*Buteo lineatus*) are one of the most common raptors in riparian, oak woodland, and rural/suburban habitats throughout the Central Valley (CV). In winter they frequently occur along habitat edges including roadsides adjacent to streams, canals, and the wooded borders of wetland areas (pers. obs., Dykstra et al. 2008). The species is a year-round resident in the CV, with most birds likely dispersing only short distances from breeding and natal areas (Dykstra et al. 2008). Since breeding and wintering ranges overlap, it is difficult to determine which birds are resident and which are migrants. Very little information exists on movements of Red-shouldered Hawks in California, but it is likely that some individuals undertake seasonal movements. Bloom et al. (2011) reported banded birds dispersing as far as northeastern Nevada from nests in southern California, so birds in the CV may potentially move similar distances.

Data from the Breeding Bird Survey for California (Sauer et al. 2011) and Christmas Bird Counts from the CV (Pandolfino 2006, 2008) indicate that the Red-shouldered Hawk population has increased over the last few decades. The species' adaptability to suburban and rural areas bodes well for its continued stability, even as natural habitats (i.e. riparian corridors) are reduced. While some research has been done on habitat-use during the breeding season (Rottenborn 2000, Bloom and McCrary 1996), winter habitat associations of Red-shouldered Hawks in California have never been rigorously examined.

## STUDY AREA AND METHODS

Survey methods are described in the accompanying overview and methods paper (Pandolfino and Smith 2011a). We determined habitat associations by comparing the average density of Red-shouldered Hawks (birds per 40 ha block) in each habitat type to the average density over all blocks. For each habitat type we determined the 95% confidence interval around the average density using the Data Analysis Package of Microsoft Excel. Habitats in which the average density was significantly higher than the average density across all habitats, were considered preferred. Habitats in which the average density was significantly below the overall average were considered to be avoided.

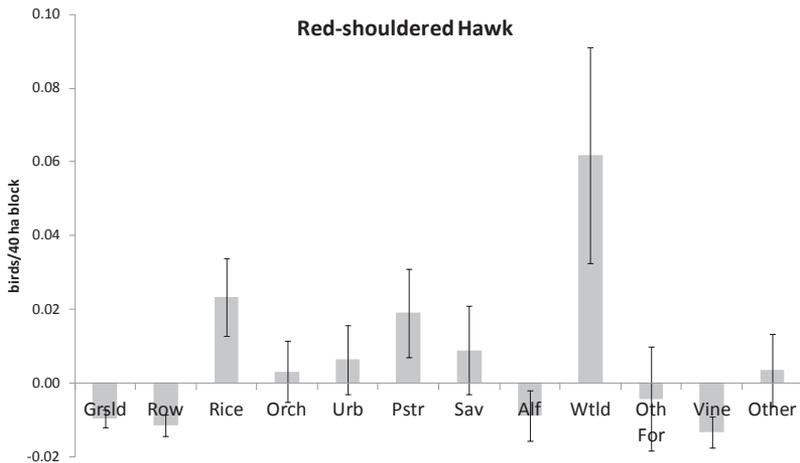


Figure 1. Differences between the densities of Red-shouldered Hawks (birds per 40 ha block) in individual habitat types compared to the average density across all habitat types. Error bars represent 95% confidence intervals. (Grsld = grassland, Row = row crop, Orch = orchard, Urb = urbanized, Pstr = irrigated pasture, Sav = savannah, Alf = alfalfa, Wtld = wetland, Oth For = other forage, Vine = vineyard).

## RESULTS AND DISCUSSION

Red-shouldered Hawks preferred rice, irrigated pasture, and wetland and avoided grassland, row crop, alfalfa, and vineyards (Figure 1). In addition, the species showed a strong association with habitat blocks where a riparian component was dominant or present (see Pandolfino and Smith 2011b), consistent with other habitat studies of this species (Dykstra et al. 2008). Rice and wetland blocks in the Sacramento Valley accounted for the highest Red-shouldered Hawk densities (Smith 2011). Both natural and planted trees occur close to most of the rice and wetland areas along our routes, which provide cover and hunting perches. Our data illustrate how attractive this situation is for Red-shouldered Hawks – more than 60 % of perched Red-shouldered Hawks were observed in trees (see Pandolfino and Smith 2011c). These habitats also harbor relatively high densities of songbirds and small mammals during winter (Sterling and Buttner 2009).

We also found positive, though non-significant, associations with the urbanized habitats, consistent with what is known about the species' adaptability to human activity (Bloom et al. 1993, Bloom and McCrary 1996, Rottenborn 2000, Dykstra et al 2008) and in contrast to what was observed for nearly every other raptor we studied (Pandolfino et al. 2011). Irrigated pasture may attract Red-shouldered Hawks because of blackbird and starling flocks frequently found in this habitat.

The observed avoidance of grassland is likely due to the minimal tree cover in and around these areas, which makes this habitat less attractive for

Red-shouldered Hawks. Row crops and vineyards also were largely avoided by most other surveyed raptors (Pandolfino et al. 2011) due to presumed low prey densities and/or the difficulty of locating and capturing prey in these habitats. Alfalfa can have relatively high densities of small mammals, birds and lizards but the competition with other raptors (i.e. Red-tailed Hawks) and lack of suitable tree cover where most alfalfa is grown are likely the primary factors responsible for the observed avoidance by Red-shouldered Hawks.

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