ABSTRACT: Monitoring canaries in coal mines, and other bird populations, can uncover limits in habitat management. Over 14 years, a breeding bird assemblage showed substantial decreases in a suburban wetland park in central California. Of the seventy bird species observed here, fifty-four were classified as riparian focal species for conservation. Species richness, diversity, and species evenness showed little variability among years, however total individuals of all species territories combined showed statistically significant declines. Breeding bird censuses conducted from 1994 to 2008 showed substantial declines in eleven out of twenty-five species, those of notable conservation interest include common yellowthroat (Geothlypis trichas), Wilson’s warbler (Wilsonia pusilla), and song sparrow (Melospiza melodia). These changes were not related to any measurable alteration in vegetation that may be related to changes in habitat surrounding the site, or precipitation/climate. To our knowledge, this is the first long-term breeding bird census of a riparian habitat along the eastern shoreline of San Francisco Bay, California. Management recommendations to benefit the avifauna include adaptive management during monitoring, and expansion of the park’s riparian habitat by enhancing plants in surrounding area restorations.

METHODS: In 1994, we established a Breeding Bird Census (BBC) plot in the park. A team of two or three individuals conducted the census following standard BBC procedures (Van Velsen 1972), recording all birds seen and heard. All counts were made in the early morning, starting at 05:30 hr before sunrise and ending 2.5-3.5 hr later, and were conducted on days with heavy rain or strong wind. The first breeding season was recorded during March to mid-June, and recorded all birds seen and heard, giving a total of 96 BBC censuses during this study. Territory boundaries were determined based on repeated behavioral occurrences (male singing and/or displays) and simultaneous singing. In addition, detection of nests, the carrying of nest material, and/or the feeding of offspring was used as evidence to confirm and support the number of territory boundary. The number of bird territories provides a measure of breeding population density. Standardized methodology of BBC allows density estimates to be compared among different sites and among different years at the same site. Gaps in the research years are due to lack of time and funds, making annual censuses of the plot impossible. As a result, the study included two distinct blocks of data to compare, a decade apart.

- In western United States, 77 breeding bird species are identified as obligate or riparian dependent, and their occurrence serves as the standard to which to which other riparian species are measured.
- California’s riparian habitat provides important breeding and overwintering grounds, migratory stopover areas and corridors for dispersal (Cossigwell, 1962; Ganes, 1977; Ralph, 1998; Humphre and Guepil, 2002, Flannery et al. 2004).

Differences in population densities between 1994–1998 and 2004–2008 as expressed were seen as a result of percentage change (after Canfield and Blockstein, 2007). The Mann-Whitney U statistical test was used to compare the degree of individual species change at the 90% (marginally significant) and 95% (statistically significant) confidence levels.

RESULTS: Bird community – Seventy-five bird species were observed during this 14-year study period, of which forty-six species are known to nest within Coyote Hills and twenty-five species attempted to breed on the site (Table 1). Based on relative population densities, the six most common species on the plot were, in decreasing order of abundance: song sparrow (Melospiza melodia), averaging 12 territories/8.5 ha, marsh wren (Cistothorus palustris) averaging 6 territories/8.5 ha, common yellowthroat (Geothlypis trichas) averaging 6 territories/8.5 ha, Bewick’s wren (Thryomanes bewickii) averaging 3 territories/8.5 ha, and chipping sparrow (Spizella passerina) averaging 1 territories/8.5 ha (Table 2). The entire breeding bird assemblages showed a markedly decrease in population density during this 14-year study period (Figure 1), in addition, three out of four of the highly important, Riparian Focal Species (Figure 2) showed significant (0.05%) and marginally significant (0.10%) territory density declines. Throughout this study, the song sparrow remained the predominant species. The four variables describing the structure of the avian community in all six years (Table 3) showed little variability among years with the exception of individual species’ territories, which showed a significant decline.

MANAGEMENT IMPLICATIONS: Our study achieved some noteworthy goals: data collected established baseline information on the riparian breeding bird community that may serve as a basis for evaluating future findings, and our study demonstrated the value of a cooperative effort to engage planning, staff support, and trained volunteers. Ongoing long-term surveys can be an integral part of a resource stewardship program. This study provides the first statistically sound, comprehensive assessment of the East Bay Regional Park District’s riparian bird community at Coyote Hills Regional Park and will serve as a basis for developing future park district surveys to assist in the conservation of non-game birds. Effective management of riparian vegetation and wildlife in the area can only occur through long-term monitoring to clearly understand physical factors that may be involved in causing the declines we observed.