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# Survey For Least Bell's Vireo In Riparian Habitat On Vandenberg Air Force Base, Santa Barbara County, California

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March 1988

FOR REFERENCE

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David R. Breininger  
The Bionetics Corporation, John F. Kennedy Space Center, Florida

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## Abstract

The least bell's vireo (*Vireo bellii pusillus*) was listed in 1986 as an endangered species by the U.S. Fish and Wildlife Service. Because of the possibility of the species existing on Vandenberg Air Force Base (VAFB), this survey was conducted to determine if they exist, and if so to prepare a distribution map of the species on the base. Major riparian areas were surveyed on foot for 17 days in April, May, and July 1987.

No least bell's vireos were sighted in this study; based on past studies, it is unlikely that there is a significant population on VAFB. There are, however, at least 13 other species of special concern that inhabit VAFB riparian woodlands. Most of these species have declined along the south coast of Santa Barbara County, and many have declined in much of the southern half of California. Riparian areas on VAFB are an important environmental resource for the southern half of California; many of these areas, however, show signs of degradation.

## Acknowledgments

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## 1.0 Introduction

There are three subspecies of bell's vireo (*Vireo bellii*) that are all geographically isolated on their breeding ranges (Hamilton 1962). The least bell's vireo (*Vireo bellii pusillus*) is a subspecies designated as an endangered species due to a tremendous loss of habitat and reduced reproductive success, from nest parasitism by the brown-headed cowbird, within much of its remaining habitat (Smith 1986). Its breeding range once extended from interior northern California south to northwestern Baja California, Mexico. The species was once described as abundant or common (Baird et al. 1874, Cooper 1874, Belding 1878, Fisher 1893, Grinnel and Swarth 1913).

A noticeable decline in numbers was associated with the coincident increase of cowbirds (Grinnel and Miller 1944), and its survival soon became a concern (Mans and Chase 1963, McCaskie 1969, Gaines 1974). Cowbirds were rare in California prior to the 1900s but have undergone a tremendous range extension due to agriculture and animal husbandry (Garrett and Dunn 1981). Smith (1986) reviews studies (e.g., Salata 1981, 1983) of the parasitism rates of cowbirds on least bell's vireo, indicating that higher rates of parasitism can significantly reduce reproductive success. An active cowbird control program has been credited with increasing reproduction by the vireo (Salata 1983). The decline of the vireo parallels the increase in the cowbird although the evidence implicating the cowbird is not entirely conclusive (Goldwasser et al. 1980).

The loss of habitat for the species has been dramatic but there is seemingly suitable habitat that is not inhabited by the species (Goldwasser et al. 1980). Gray and Greaves (1984) suggest that the cowbird problem is a symptom of a more crucial problem that includes not only the loss but also the

degradation of habitat. Examples of degradation of habitat include alteration of stream flows and disturbance to surrounding habitat.

A few hundred pairs of the least bell's vireo are estimated to occur in California (U.S. Fish and Wildlife Service, unpublished data referenced by Smith 1986). Nesting habitat is primarily restricted to dense willow-dominated habitats that are generally in close proximity to water sources. The least bell's vireo now occurs primarily in only 46 of over 150 former localities; most of these are in southwestern California and northwestern Baja California, Mexico (Smith 1986). Three of these sites are in Santa Barbara County, one within the Santa Ynez Valley at Gibraltar Reservoir (Gray and Greaves 1984). The Santa Ynez River eventually drains into the Pacific Ocean on Vandenberg Air Force Base (VAFB), Santa Barbara County, California.

Much riparian habitat dominated by willows can be found on VAFB (Mahrtdt et al. 1976). Dial and Pisapia (1980) reported a sighting of the species in Barka Slough on VAFB, including a possible nest. Webster (1980) conducted a 15 day survey in several of the most likely areas for the vireo but did not find the species. Webster (1980) noted that the vireo traditionally has been associated with interior valleys where it is quite warm and suggested that the location of VAFB in a cool, coastal fog belt may explain the species absence. He reported that he could not cover every spot of potential habitat and suggested that if the species was to occur on VAFB, Barka Slough would be the most likely location. Webster (1980) noted that cowbirds were not numerous on VAFB and suggested the absence of the vireo could not be attributed to cowbirds. The least bell's vireo was not reported on VAFB in a basewide environmental study done by San Diego State University (Coulombe and Mahrtdt 1976, Coulombe and Cooper 1976). Other recognized ornithologists have briefly surveyed areas on VAFB without noting the presence

of the vireo (e.g., Paul Lehman, University of California, Santa Barbara [UCSB], pers. comm.).

The historic distribution map for the subspecies by Grinnel and Miller (1944) excluded VAFB from the subspecies range. The map includes southwestern California north along the coast until Point Conception where the northern part of the species range is interior of coastal areas.

Federal agencies are required to consult formally with the U.S. Fish and Wildlife Service if they propose to authorize, fund, or perform any activity that may affect an endangered species. Since least bell's vireo was believed to occur on VAFB (Dial and Pisapia 1980), and was officially listed as an endangered species in 1986, this survey was initiated to determine the likelihood of presence or absence on VAFB. The limited scope of this study excluded the collection of quantitative data on other riparian birds; however, an objective was a preliminary assessment of riparian bird habitat for development of a Biological Monitoring Program (BMP). This study was part of a first phase in a series of studies to develop a BMP; however, the first phase excluded the study of wildlife populations due to limited funding. Field experience gained in this survey was used to prepare recommendations towards the eventual development of a comprehensive BMP.

## 2.0 Methods

Initially, I listened to tapes of the least bells vireo's song and that of related vireos and then visited a known least bells vireo population at Gibraltar Reservoir (Gray and Greaves 1984), Santa Barbara County. The least bell's vireo is reported for its persistency of singing, even while on the nest, thereby being vociferous and easily detected during the nesting season (Bent 1950, Grinnel et al. 1930). Searches, beginning in early morning hours, were



conducted on VAFB, attempting to cover as much riparian habitat on VAFB as possible. Jim Greaves (environmental consultant, Santa Barbara) and/or Mike McElligott (base ecologist, VAFB), participated in many of the surveys. Some playback of the species song was used.

Least bell's vireos are reported to arrive on their breeding areas in late March and early April and leave these areas in late August or early September (Grinnel and Miller 1944). Studies of the population at Camp Pendleton Marine Corps Base in San Diego County (Salata 1981, 1983) also indicated this pattern. Most of the population at the Gibraltar study area arrives by the end of April (Gray and Greaves 1984). The first surveys for this study were conducted for 13 days beginning in the last week of April and ending in the second week of May 1987. This year there was a drought, the Gibraltar population never reached 100% of its former size, and the population in San Diego arrived late (Jim Greaves, pers. comm.). Because of this, riparian areas on VAFB were revisited for four days at the end of July 1987.

### 3.0 Description of Study Area

Visits were made to Barka Slough and other sections of San Antonio Creek, Santa Ynez River, Canada Honda Creek, Shuman Creek, Bear Creek, Spring Canyon, Pine Canyon, and Oak Canyon. Brief descriptions of the major drainages are provided below. Riparian woodlands on VAFB are comprised primarily of willows (*Salix* spp.), box elder, and cottonwoods (Mahrtdt et al. 1976, Schmalzer et al. in preparation) and are identified on the vegetation map (Provancha et al., draft) developed as part of the first phase of the BMP.

The largest amount of riparian habitat is associated with San Antonio Creek. This creek is approximately 45 km long, has a drainage area of 399 km<sup>2</sup>, and is intermittent except from Barka Slough to the Pacific Ocean (Mahrtdt

et al. 1976). Webster (1980) described Barka Slough as probably the finest riparian area along coastal southern California.

Barka Slough is a palustrine, emergent, and forested wetland dominated by willow and box elder woodland and some emergent marsh; it is approximately 220 ha in size (Dial and Pisapia 1980). The slough contains some of the largest emergent wetlands in Santa Barbara County, but much of these areas are drying or have dried out. Due to groundwater withdrawal particularly water use by VAFB and that associated with agriculture upstream, the continued existence of Barka Slough as a wetland is uncertain (Dial and Pisapia 1980). Hutchinson (1980) predicted a decrease in water levels due to pumping of the VAFB well field. The upstream section of the slough has a large open field possessing characteristics on an old salt marsh that has been drying out (Dial and Pisapia 1980). Our observations, described in greater detail by Schmalzer et al. (in preparation), suggest further deterioration of the north side of Barka Slough, particularly of the emergent areas, since the study by Dial and Pisapia (1980).

Downstream from Barka Slough the drainage maintains a course of narrow riparian vegetation surrounded by agricultural areas until reaching the Lompoc/Casmalia Road. Between the Lompoc/Casmalia Road and El Rancho Road the drainage widens out and there is extensive riparian habitat bordered by coastal sage scrub along the northern side. Much of the river east and west of El Rancho Road has been diked. Here the riparian vegetation has a low foliage density (few leaves) from the ground to higher than 2 m except along the edges. Both sides of the stretch downstream of El Rancho Road are surrounded by coastal sage scrub. Barka Slough contrasts with these lower sections in that there are areas of large trees, areas of many snags, and often dense foliage at the ground layer. Barka Slough is also much more

heterogeneous; it is bordered by coastal sage scrub, previously grazed areas, and areas currently being grazed. Much of the interior of Barka Slough was not surveyed because it is extremely difficult to penetrate; this is due to a dense layer of standing and fallen trees and a nearly complete ground cover of poison oak and stinging nettle (often 2 m in height). We spent considerable time in the dense interior and surveyed along the entire edge including the upstream, large, open field. We also surveyed the interior at the upper end which was less dense and showed some scouring by the water course.

The Santa Ynez River is approximately 113 km long with a drainage area of 2331 km<sup>2</sup> and a flow that varies dramatically (Mahrtdt et al. 1976), although most or all of the river on VAFB appears perennial. The riparian habitat along this river on VAFB is approximately 169 ha (Mahrtdt et al. 1976). Past floods along this river are evident, as one can find areas showing the scouring effect of floods and numerous size classes of willows. Areas abound where foliage is close to the ground. Much of the upper stretches on VAFB are surrounded by agricultural fields. Downstream of the 13th Street bridge there is a very wide band of riparian vegetation alongside the creek bed. This does not show the variety of age classes, particularly younger classes, characteristic of areas closest to the main course. The understory is sometimes dense in this area, but not nearly as dense as Barka Slough, although like Barka Slough, there are few openings in the woodland.

Shuman Creek is approximately 14 km long with a drainage area of 54 km<sup>2</sup> and is mostly a narrow, shallow stream with 9 ha of riparian woodland (Mahrtdt et al. 1976). One side of the riparian woodlands of Shuman Creek is bordered by chaparral or coastal sage scrub; the other side is currently grazed, although cattle are fenced off from riparian areas.

Canada Honda Creek is approximately 14 km long with a drainage area of 31 km<sup>2</sup>, perennial flow, and 6 ha of riparian vegetation (Mahrdt et al. 1976). It is mostly surrounded by chaparral, although there is a stretch of previously grazed area bordering the riparian habitat. Pine Canyon has numerous man-made ponds and some riparian habitat along its length. Other riparian habitats visited include Oak Canyon, Spring Canyon, and Bear Creek; all of these have small amounts of riparian vegetation. Several other canyons with small amounts of riparian vegetation were visited.

#### 4.0 Results and Discussion

##### 4.1 Least Bell's Vireo

No least bell's vireo were seen or heard during the survey. This result is similar to that of Webster (1980), who doubted that the species ever has or ever will inhabit most of VAFB. Webster (1980) suggested that the species is characteristic of warm, interior valleys and not the cool, coastal fog belt of most of VAFB. He suggested if the species occurred anywhere on VAFB it would be Barka Slough.

Another explanation for there being no significant population of the least bell's vireo on VAFB is that the habitat may not be suitable within most of the warmer, interior area. Many riparian areas of VAFB are comprised of mature willows having low foliage densities near the ground. Salata (1983) reviewed reports that emphasized the need for a dense shrubby layer near the ground surface for nesting of the least bell's vireo. Mean nest heights reported have been 0.87 m (Wilbur 1980), 0.64 m (Gray and Greaves 1984), and 1.0 m (Salata 1983). Least bell's vireos usually nest in willows which are generally very abundant in vireo habitat; the species will use a variety of other vegetation as nest sites (Wilbur 1980, Goldwasser 1981, Gray and Greaves 1984, Salata

1981, 1983). The species will nest in herbaceous vegetation such as clover (*Melilotus*) and mugwort (*Artemisia douglasiana*) (Gray and Greaves 1984). Salata (1983) found that most feeding activity occurs within 0 to 4 m of the ground surface; this is similar to observations of Gray and Greaves (1984) who reported most activity at and/or below mid canopy level. The scouring action of periodic floods has been described as important to provide the younger growths of vegetation and is a normal component of riparian habitat used by the vireo (Smith 1986). Such scouring is not characteristic of most riparian areas on VAFB except along the Santa Ynez River which has a large drainage area.

Salata (1981) noted that the presence of canopy trees in combination with a dense shrub layer appeared an important feature to occur in least bell's vireo territories. He reported no vireos within extensive stands of dense, low-growing willows lacking canopy trees at Camp Pendleton, but he indicated more studies were needed to clarify the relationship. Canopy trees are generally lacking in the Santa Ynez close to the river bed. Large trees are usually only high along the banks of the riparian edge or in the large area located to the north of the river and west of the 13th Street bridge. Both of these areas do not show the scouring effects of floods.

A dense understory at ground level occurred at Barka Slough, but it was primarily comprised of stinging nettle. The suitability of stinging nettle as nest sites is not known, although one Wilson's warbler nest was observed within the nettles during this survey. Most of Barka Slough, the expanded lower portions of San Antonio Creek and Santa Ynez River all lack openings in the canopy. Gray and Greaves (1984) reported that most nests were placed near or at edges of thickets, edges of woods, open fields, or washes. They suggested that high contrast (light and shadow across nest) seemed to have contributed more to reproductive success than several other vegetational measures. This

contrast was believed to be important for concealment from predators (Jim Greaves, pers. comm.). This may be particularly important, since the vireo nests are so close to the ground that nests are very accessible to predators of eggs or young (Salata 1981, 1983).

Adjacent habitat may have important influences on the habitat suitability of an area for the species. Salata (1983) found that most of the subspecies activity was confined within riparian habitat but noted that oak woodland and chaparral communities bordering riparian woodland were utilized. Gray and Greaves (1984) reported that the subspecies often traveled several hundred yards into chaparral to obtain food for nestlings. Not only might adjacent habitat be important for foraging by the vireo, but it may also influence accessibility of vireo nests to cowbirds. Some of the Santa Ynez habitat near the river appears suitable, but it is adjacent to agriculture.

The least bell's vireo may be absent from most of VAFB riparian areas due to unsuitable vegetation characteristics, but given the diversity of habitat, one would expect a few areas to be suitable. The species may also not be at VAFB due to coastal fog (Webster 1980). Both the above explanations may be responsible for there not being enough suitable habitat to maintain a sustainable population. The species shows considerable site tenacity with respect to nest site location (Gray and Greaves 1984, Salata 1983), so that enough individuals to sustain a population may have never dispersed to VAFB. Local extinctions are a frequent occurrence in small populations (Whitcomb et al. 1976, Fritz 1979) which may be, in part, dependent upon immigration for population replacement. Coastal fog may not only reduce the suitability of an area but could discourage immigration.

Webster (1980) stated that most past reports of the least bell's vireo occurring on VAFB are highly questionable, especially those by people who

see but do not hear the vociferous bird since it can visually be confused with birds such as a young Hutton's vireo. Webster (1980) did believe Dial and Pisapia's (1980) report was worthy of consideration but could not find the bird in the location described by Dial. This year's survey did occur during a drought, and the large nearby Gibraltar population never reached 100% of its former size (Jim Greaves, pers. comm.). Results of this year's survey is in agreement with Webster (1980) who concluded that if the least bell's vireo occurs at VAFB, there are only a few of them. Salata (1983) found a case in his study area where an individual from another distant study dispersed to Camp Pendleton and became a resident breeder. One cannot entirely discount the possibility that the species will occur at VAFB since the two other subspecies have been reported to undergo range expansion in Arizona (Brown et al. 1983) and North Dakota (Hibbard and Kline 1971).

#### 4.2 Other Noteworthy Species

Sightings of other riparian birds and comparisons with previous studies are provided in Table 1. The hermit thrush, yellow-rumped warbler, and western kingbird were all listed as fairly common and as breeders by Dial and Pisapia (1980), but based on Webster (1980), Lehman (1982), and this study it is very unlikely that they are breeders on VAFB. The willow flycatchers and northern raven were listed as expected breeders and fairly common by Dial and Pisapia (1980), but they probably are also not breeders in riparian habitat on VAFB. The ruby-crowned kinglet, tricolored blackbird, rufous hummingbird, and fox sparrow are also included in Table 1, since they were described as possible breeders by Dial and Pisapia (1980), but they should probably not be considered potential breeders on VAFB. Nineteen other species are listed as potential breeders in Table 1 because there are few or no records of their

Table 1. Potential breeding birds<sup>1</sup> of riparian woodlands and associated wetlands<sup>2</sup> on Vandenberg Air Force Base, California.

Species	Coulombe and Cooper 1976 <sup>3</sup>	Dial and Pisapia 1980 <sup>4</sup>	Webster 1980	Breiningger 1987	Summary of breeding status <sup>5</sup>
Pied-billed grebe	L	L		R	P(H)
Great blue heron		L*	L*	O	B(H)
Black-crowned night heron			L*	R*	P(H)
Green-backed heron		L	L	R*	P(H)
Mallard	L	L	L*	O*	B(H)
Northern pintail		L	L	O	P(H)
American wigeon			L		P(H)
Wood duck			L		P(H)
Cinnamon teal	L	L	L*	O	P(H)
Ruddy duck	L			O	B(H)
Gadwall			L*	R	P(H)
Turkey vulture	L	L	L*	C	P(H)
White-tailed kite	L	L	L*	C	B(H)
Cooper's hawk	L	L	L*	R	P
Red-tailed hawk	L	L	L	C*	B
Red-shouldered hawk	L	L	L*	C*	B
Northern harrier	L	L	L*	C*	B(H)
American kestrel			L	R	P
California quail	L	L	L	C*	B
Virginia rail		L	L	R	B(H)
Sora	L	L			P(H)
American coot	L	L	L	C*	B(H)
Killdeer	L	L	L	C*	B(H)
Spotted sandpiper			L*		B(H)
Band-tailed pigeon		L	L		P(H)
Rock dove		L		R*	B(H)
Mourning dove	L	L	L	C*	B
Spotted dove		L			P
Roadrunner		L	L	R	B(H)
Yellow-billed cuckoo				R <sup>6</sup>	P(H)
Barn owl		L	L	R	B(H)
Great horned owl	L	L	L	C*	B
Long-eared owl		L	L	R	P(H)
Poor-will		L		R	
White-throated swift		L	L	R*	B(H)
Black-chinned hummingbird		L	L	O*	B
Costa's hummingbird			L	O	B
Anna's hummingbird	L	L	L	C*	AB
Rufous hummingbird		L <sup>8</sup>			U
Allen's hummingbird	L		L	C*	AB
<i>Selasphorus</i> spp.			L		
Belted kingfisher	L	L	L*	R	P(H)
Common flicker	L	L	L	O	B
Hairy woodpecker		L	L	O	B
Downy woodpecker	L	L	L	C*	AB
Nuttall's woodpecker	L	L	L	C	AB
Black phoebe	L	L	L	C*	AB(H)
Westernwood pewee	L			R	P
Say's phoebe		L			P
Western kingbird		L			U



Table 1. (Continued).

Species	Coulombe and Cooper 1976 <sup>3</sup>	Dial and Pisapia 1980 <sup>4</sup>	Webster 1980	Breining 1987	Summary of breeding status <sup>5</sup>
Cassin's kingbird		L	L	R	B(H)
Ash-throated flycatcher		L	L	C	B(H)
Willow flycatcher		L			U
Western flycatcher	L	L	L	C	AB
Violet-green swallow		L	L	O	B(H)
Tree swallow	L	L	L	C*	AB(H)
Rough-winged swallow	L	L	L	R	P(H)
Cliff swallow	L	L	L	C*	AB(H)
Scrub jay		L	L	C	AB(H)
Yellow-billed magpie		L			P(H)
American crow	L	L	L	C*	AB
Northern raven		L			U(H)
Chestnut-backed chickadee		L	L	C	AB(H)
Plain titmouse		L	L	O	B
Common bushtit	L	L	L	C*	AB
White-breasted nuthatch			L	R	P(H)
Wrentit	L	L	L	C*	AB
House-wren	L	L	L	R	B
Long-billed marsh wren	L		L	C*	AB(H)
Bewick's wren	L	L	L	C*	AB
Northern mockingbird	L	L	L	R	B(H)
California thrasher	L	L	L	C	AB
Hermit thrush	L <sup>8</sup>	L <sup>8</sup>			U(H)
Swainson's thrush	L	L	L	C*	AB
Western bluebird		L	L	R	B(H)
Blue-grey gnatcatcher	L <sup>8</sup>			R <sup>8</sup>	P
Ruby-crowned kinglet	L <sup>8</sup>	L <sup>8</sup>			U(H)
Starling	L		R	B(H)	
Loggerhead shrike	L	L	L	O*	B(H)
Hutton's vireo	L	L	L	C	B
Bell's vireo		L			P(H)
Warbling vireo		L	L	O	B
Solitary vireo				R <sup>6</sup>	
Orange-crowned warbler	L	L	L	C	AB
Yellow warbler	L	L	L	C*	AB(H)
Yellow-rumped warbler	L <sup>8</sup>	L <sup>8</sup>			U(H)
Common yellowthroat	L	L	L	C*	AB(H)
Yellow-breasted chat		L	L	O	B
Wilson's warbler	L	L	L	C*	AB
House sparrow		L		R	B(H)
Yellow headed blackbird			L	R	U(H)
Western meadowlark		L	L	O	B(H)
Red-winged blackbird	L	L	L	C*	AB(H)
Tricolored blackbird		L <sup>8</sup>			U(H)
Northern oriole		L <sup>8</sup>	L <sup>8</sup>	R	U
Brewer's blackbird		L	L	O	B
Brown-headed cowbird		L	L	O*	B(H)
Western tanager		L <sup>8</sup>			U(H)
Black-headed grosbeak	L		L	C	B
Blue grosbeak		L	L	R	B(H)

Table 1. (Continued).

Species	Coulombe and Cooper 1976 <sup>3</sup>	Dial and Pisapia 1980 <sup>4</sup>	Webster 1980	Breining 1987	Summary of breeding status <sup>5</sup>
Lazuli bunting		L	L	R	P
Purple finch		L	L	C	AB
House finch	L	L	L	C	AB
American goldfinch		L	L	C*	AB
Lesser goldfinch	L	L	L	C*	AB
Lawrence's goldfinch		L	L	O	B
Rufous-sided towhee	L	L	L	C*	AB(H)
Brown towhee	L	L	L	C	AB(H)
Lark sparrow		L	L	O	B(H)
Northern junco	L	L	L		P(H)
White-crowned sparrow		L	L	C	B(H)
Fox sparrow		L			U(H)
Song sparrow	L	L	L	C*	AB(H)

<sup>1</sup> Refers to birds that may breed on VAFB and utilize riparian woodlands but not necessarily for nesting.

<sup>2</sup> Includes open water, emergent, and open areas within riparian woodland, excludes estuary at river mouths.

<sup>3</sup> Includes species sighted during fall, winter, and spring that are suspected breeders based on literature cited in this report.

<sup>4</sup> Includes species listed as breeders, expected breeders, and potential breeders in Barka Slough only.

<sup>5</sup> Based on observations from this survey and Webster (1980) that suggest nesting and based on breeding status summarized by Lehman (1982).

<sup>6</sup> Questionable sightings.

<sup>7</sup> Webster's designation, includes his sightings of Allen's and rufous hummingbirds.

<sup>8</sup> Probably nonbreeding birds.

L=listed

C=commonly sighted (several birds/hour effort)

O=occasional (several birds/day)

R=rare (not seen every day)

\*=nests or juveniles sighted

AB=abundant breeder

B=characteristic breeder on VAFB

P=potential breeder on VAFB, not necessarily every year

U=unlikely breeder

(H)=these species (and probably others) have specific habitat requirements not met in all riparian areas on VAFB

nesting on VAFB, but they may sometimes nest on VAFB or sections of VAFB (Coulombe and Mahrtdt 1976, Webster 1980, Lehman 1982). There are at least 66 avian species that nest on VAFB and use riparian habitat. This species richness indicates that riparian woodlands are a very important environmental resource. It is estimated that 70% to 90% of all natural riparian habitat in the U.S. has been lost or has undergone extensive alteration (Hirsch and Segelquist 1978). Riparian woodlands across the southwestern U.S. are extremely important to bird populations (Carothers et al. 1974, Laymon 1985, Szaro and Jakle 1985); they have a higher species richness and density than surrounding habitat and contribute substantially to the total bird density and species richness of surrounding habitat (Laymon 1985, Szaro and Jakle 1985). Riparian woodland is the plant formation of California that has the greatest number of breeding bird species and the most species that are only found in it or prefer it over other formations (Miller 1951).

Several other nonbreeding species were sighted in this survey; they include: the snowy egret, great egret, cedar waxwing, and Townsend's warbler. Not only are riparian areas on VAFB important to local breeders, but they are probably important to many migratory species such as ruby-crowned kinglets, yellow-rumped warblers, and Lincoln's sparrows.

Several other observations were made that were noteworthy. On two different occasions possible calls of the yellow-billed cuckoo were heard, once in Barka Slough and once along the Santa Ynez River. Neither involved visual confirmation, and both calls were a considerable distance away. The author is familiar with their calls and did hear most of the -ka-ka-ka-kow-kow-kowlp-kowlp-kowlp call, but due to the distance the author was not absolutely sure the call was a cuckoo. No crows or coots which could have been confused with the cuckoo were in the vicinity at the time of the Barka Slough observation. The

species can easily be overlooked, because it is often quiet and shy. Yellow-billed cuckoos are a summer visitor in California from May to September; they once were common to fairly common in riparian areas within California (Grinnel and Miller 1944). The cuckoos' dramatic decline in southwestern California is attributed to habitat destruction (Gaines and Laymon 1984). Fluctuations in breeding densities take place from year to year due to cycles in the abundance of caterpillars, cicadas, and other large insects (Clay 1929, Forbush 1927, Nolan and Thompson 1975). A nomadic phase prior to breeding has also been postulated where cuckoos appraise food resources prior to territory establishment (Hamilton and Hamilton 1965).

Lehman (1982) reported only five records of the yellow-headed blackbird in 20 years for Santa Barbara County. Approximately 20 juvenile males were seen during April along 13th Street near the south gate and one singing adult male was seen along the Santa Ynez River. Lehman (1982) reported Barka Slough to have the only significant population of the house wren for the Santa Barbara north coast. Singing house wrens were abundant during a visit to Barka Slough in March, but only one singing male was detected during this survey. Only a few cowbirds were seen during the April/May survey, but a couple of cowbirds were seen almost every day during the July survey. They appeared particularly abundant along the Santa Ynez River at and upstream from the 13th Street bridge.

There are several species in riparian habitat on VAFB (Table 2) that have been extirpated or have undergone dramatic reductions along the south coast of Santa Barbara County and much of southern California (Remsen 1978, Lehman 1982). At least five of these species are abundant enough on VAFB so that they very likely represent self-sustaining populations over long periods of time. Protection of riparian areas on VAFB along with other remaining riparian

Table 2. Avian species of special concern in riparian habitat on Vandenberg Air Force Base, California.

Species	Status
Turkey vulture	Probably several to 20 nesting pairs
White-tailed kite	Several nesting pairs, concentrations in roosts during nonbreeding season
Cooper's hawk	Rare, maybe a couple nesting pairs
Northern harrier	At least one nesting pair, several wintering birds
Virginia rail	At least several nesting pairs, larger wintering population
Yellow-billed cuckoo	Status unclear, probably rare
Long-eared owl	Nesting status unclear, casual winter visitor
Willow flycatcher	Probably only a transient and extirpated as breeder in the county
Tree swallow	At least 50 nesting pairs
Swainson's thrush	At least 50 nesting pairs
Warbling vireo	Probably more than 30 nesting pairs
Bell's vireo	Few if any nesting pairs
Yellow warbler	At least 50 nesting pairs
Wilson's warbler	At least 50 nesting pairs
Yellow-breasted chat	Probably at least 5 nesting pairs
Blue grosbeak	At least a couple of nesting pairs

areas in California will be necessary to prevent extinction of many of these species within most of the southern half of California.

It was apparent during the survey and to Webster (1980) that not all riparian birds are associated with all riparian habitat of VAFB. Some species such as the scrub jay, brown towhee, rufous-sided towhee, and song sparrow are characteristic of shrubby areas or riparian edge but not within the interior of dense, continuous riparian forest. Other species may require enough woodland to be present for nesting. Few yellow-billed cuckoos have been found where suitable vegetation cover is less than 10 ha in surface area (Gaines 1974). Stauffer and Best (1980) found that bird species richness increased with the width of riparian areas. Neighboring habitats may influence riparian birds by having species that competitively restrict riparian birds (Carothers et al. 1974). Some riparian species (e.g., Swainson's thrush) used small, narrow canyons, but these areas were also occupied by scrub jays that might exert a predatory influence. Most riparian species found on VAFB can be parasitized by cowbirds (Payne 1973, Gaines 1974, 1977, Smith and Atkins 1979, Clark and Robertson 1981, Smith 1981, Folkers and Lowther 1985). Twelve species that declined or disappeared in the Sacramento Valley were all species victimized by cowbirds (Gaines 1974). Not only might the size of riparian habitat be a factor, but the condition of nearby habitats may be important to consider in management.

White-tailed kites restrict their hunting to open areas, especially grasslands or marsh areas, feeding primarily on small mammals, particularly the California meadow mouse *Microtus californicus* (Waian and Stendall 1970, Pruett-Jones et al. 1980). The status of the kite may be very dependent on its principle prey item which probably depends on moisture (Warner and Rudd 1975). The distribution of some avian species may be limited by the availability of water; this may be an important resource for a variety of avian species in

mesic areas that experience seasonal drought characteristic of coastal central California (Williams and Koenig 1980). Some species such as chestnut-backed chickadees, western bluebirds, and tree swallows require snags. Some raptors require trees large enough to support their nests. Wilson's warbler nests near the ground and appeared to be most common in areas that had high foliage density at ground level. Other species such as the ash-throated flycatcher appear to only use areas of VAFB away from the coastal influence.

## 5.0 Recommendations

1. Riparian habitat on VAFB is used for nesting and feeding by many avian species of special concern in California and should be preserved since it is an important environmental resource for the southern half of California.

2. Barka Slough shows signs of further deterioration due to less water; this should be assessed. A long-term monitoring program is recommended for riparian areas on VAFB (Breininger, in preparation).

3. Riparian areas on VAFB show differences with respect to avian use; this should be investigated by a monitoring program to provide information for land use planning and habitat management (Breininger, in preparation).

4. The use of habitat adjacent to riparian habitat should be evaluated and regulated. For example, Gaines and Laymon (1984) recommended that precautions should be taken to prevent pesticides from being sprayed on adjacent agricultural lands that will affect vegetation and the food sources of species such as the yellow-billed cuckoo.

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# Report Documentation Page

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16. Abstract <p>The least bell's vireo (<u>Vireo bellii pusillus</u>) was listed in 1986 as an endangered species by the U.S. Fish and Wildlife Service. Because of the possibility of the species existing on Vandenberg Air Force Base (VAFB), this survey was conducted to determine if they exist, and if so to prepare a distribution map of the species on the base. Major riparian areas were surveyed on foot for 17 days in April, May, and July 1987.</p> <p>No least bell's vireos were sighted in this study; based on past studies, it is unlikely that there is a significant population on VAFB. There are, however, at least 13 other species of special concern that inhabit VAFB riparian woodlands. Most of these species have declined along the south coast of Santa Barbara County, and many have declined in much of the southern half of California. Riparian areas on VAFB are an important environmental resource for the southern half of California; many of these areas, however, show signs of degradation.</p>			
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