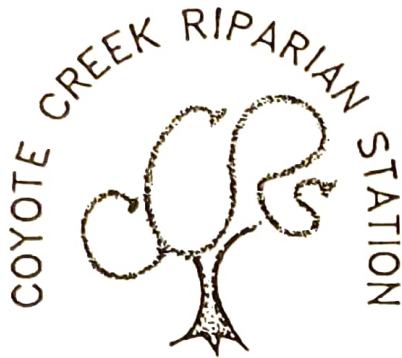


RipariaNews



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WHERE HAVE ALL THE SWAINSON'S THRUSHES GONE?

By Michael Rigney

I could have picked any number of species to substitute for "birds" in the title of John Terborgh's landmark book **Where Have All the Birds Gone?** So many birds seem to be in trouble. The Swainson's Thrush, however, epitomizes the plight of North American passerines who yearly traverse thousands of miles in their migratory journeys from tropical wintering grounds in Central and South America to northern temperate forests.

In the first chapter of his book, Terborgh shares with us his childhood memories of a Virginia farm and the nearby stream and pond, relatively undisturbed by encroaching suburbia. Prominent in those memories (and beautifully described in simple prose) are the sights and sounds of legions of croaking frogs, and singing birds - of being lulled to sleep on a summer evening by a "chorus of

Acadian Flycatchers and Whip-poor-wills". And, as all too often happens, suburban development and its attendant denizens begin to eliminate the woods (converted to houses and shopping malls), the pond (drained and filled to provide the foundation for a tennis court) and the path through the woods (now a major thoroughfare). The

agers that used to liven the woods along the stream. Like a good scientist he begins asking questions about the essential causes for declines in some species and gains in others. And like most questions in the field of ecology he reluctantly admits that the answers are complicated and far reaching. He concludes this reminiscence with the following warning:

All the answers are not yet in, and for that reason one might argue that my concern is premature. My reply is that things are going wrong with our environment, even the parts of it that are nominally protected. If we wait until all the answers are in, we may find ourselves in a much worse predicament than if we take notice of the problem earlier. By waiting, one risks being too late; on the other hand, there can be no such thing as being too early.

John Terborgh - "Where Have All the Birds Gone"

point that Terborgh makes so eloquently is that, although birds are still abundant in his beloved Virginia woods, they are not the birds of his childhood. Granted, there are still mockingbirds, catbirds, woodpeckers and chickadees. Gone, however, are the thrushes, warblers, vireos, cuckoos, flycatchers, and tan-

All the answers are not yet in, and for that reason one might argue that my concern is premature. My reply is that things are going wrong with our environment, even the parts of it that are nominally protected. If we wait until all the answers are in, we may find ourselves in a much worse predicament than if we take notice of the problem earlier. By waiting, one risks being too late; on the other hand, there can be no such thing as being too early."

We at CCRS, like many other individuals and organizations, have been quietly counting, banding and observing birds in our own woodlots and streamsidés. Collectively, we have all begun to formulate similar concerns. In symposia, in scientific journals, and in casual conversations, we have all been expressing the same concerns - some species are showing noticeable declines in recent years and we're not sure why.

Take the Swainson's Thrush for example (Figure 1). Widespread in the spring, summer and fall throughout forested regions of the U.S. and Canada, it winters in tropical forests from Central Mexico through Central America and portions of South America. There are several recognizable subspecies each with its own unique distribution. The "Olive-backed Swainson's Thrush", our western subspecies, breeds in coastal areas from southeastern Alaska through coastal British Columbia, western Washington, western Oregon to southern and western California west of the Cascades and Sierra Nevada. Ornithologists are not certain exactly where this subspecies winters but it apparently centers around southern Mexico extending as far south as El Salvador (1957, Checklist of North American Birds.)

At CCRS, this bird is primarily caught while migrating although some mid-summer records indicate that small numbers may be breeding nearby. We are apparently situated ideally to monitor its migratory movements. Each year, since 1986 when regular, systematic banding was instituted, we have banded 200-400 individuals. However, we recently noted that, when new captures of Swainson's Thrushes



Figure 1. Dick Mewaldt applies a U.S. Fish and Wildlife Service band to a migrant Swainson's Thrush. Photo by David Johnson.

were standardized according to the number of birds captured per unit of effort (100 net hours), capture rates appeared to be steadily declining. A quick glance at Figure 2 will illustrate this alarming trend. As you can see, captures of unbanded Swainson's Thrushes declined

steadily until 1988 when capture rates leveled off. These rates, though relatively steady, are still substantially below those in 1986 and 1987.

Many questions confront us as students of bird populations when dealing with data such as these. The

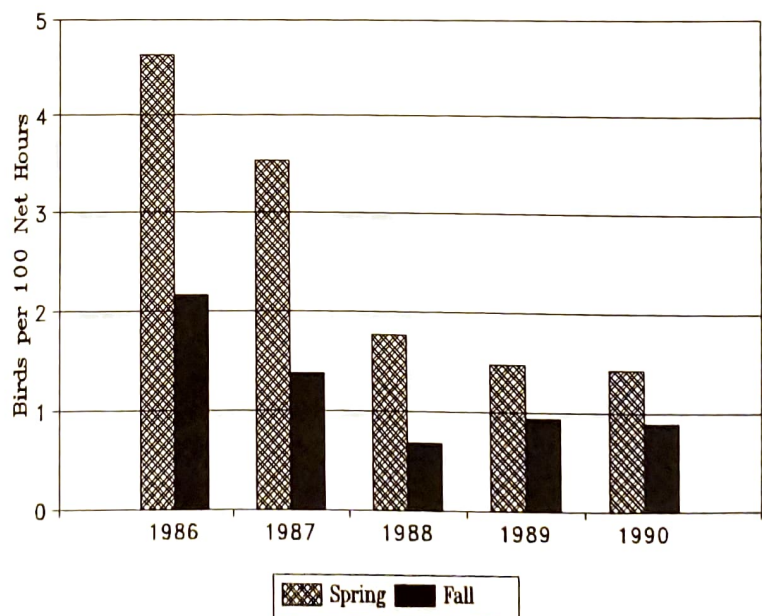


Figure 2. Swainson's Thrush captures (new bandings only) per 100 net hours from 1986 through 1990

most apparent question might be what possible relationship these declines might have with California's severe drought. Certainly, populations of the Swainson's Thrush which breed in northern California may well be suffering from decreased survivorship and low fledging success due to food shortages which are attributable to the drought. Since we only encounter migrants at the Station it is virtually impossible for us to determine if our decreased capture rate is due to habitat changes on the breeding grounds in California and points north, or whether these changes are due to habitat deterioration on the wintering grounds.

Could this presumed decline be merely a natural population fluctuation? Many species of birds and mammals have normal highs and lows when viewed from a perspective of 10, 15 or more years. Is five years of banding enough to speculate on the population trends of any species? Most authorities would agree that five years is enough to begin asking questions but not enough time to sound alarm bells.

So what are we to make of these data and what, more importantly, are we to do to answer some unresolved questions.

Obviously, CCRS will continue to band and gather data on Swainson's Thrush populations which use the riparian corridor for migration through central California. We are also working with the Point Reyes Bird Observatory, who with their Palomarin banding station and the Farallon Islands have gathered nearly 20 years of data on the Swainson's Thrush. We will be working closely with Geoff Geupel and his banding staff at Palomarin

to see if similar trends are evident in their data. We may also try to collaborate with other stations and individuals who band substantial numbers of this species.

One important obstacle stands in our way of gaining a complete picture of population trends in this and many other neotropical landbirds. Few people are banding in the breeding centers such as western Canada and western Alaska and fewer still are banding in the tropical forests where they spend the winter.

The key to our ability to understand and protect these fragile migrants lies in our understanding of their population dynamics on the breeding grounds, during migration and on their wintering grounds. This clearly requires a commitment of resources, by both government and non-government organizations, nationally and internationally.

This commitment cannot be a short-term commitment either.

Long-term banding projects such as those at various bird observatories and CCRS are few in number and usually far between. Funding for such long-term projects has been characteristically difficult to obtain due to short-term funding cycles and reduced annual budgets.

The information we are gathering on the Swainson's Thrush is a good example of the type of data needed to determine historical trends. Interest on both a national and international level is mounting for concentrated and coordinated studies of neotropical migrants. New banding stations are being established to begin collecting data.

After a recent visit to CCRS and Point Reyes Bird Observatory, a veteran Fish and Wildlife Service employee, Tom Pogson, quit his job in Alaska to start a bird observatory near Fairbanks. NOW THAT'S COMMITMENT!!

OFF THE WALL

THE 1990-91 WINTER SEASON

By Bill Bousman

The Station was in operation 21 days in December, 26 Days in January and 23 days in February which is pretty much typical for recent winters. The weather continued to dominate our thoughts with very little rain in any of the three months - January was almost bone dry. An arctic weather pattern moved in on 19 December and we had about 10 days of freezing night-

time temperatures including some nights with temperatures below 20° F. Many flowering plants were severely damaged including the tree tobacco bordering the creek. What happened to our hummingbirds and common wintering insectivores as a result of this abnormal weather?

In **Table 1** I compare the new capture data for the last four winters for Anna's Hummingbird, Ruby-crowned Kinglet, Yellow-rumped Warbler and Golden-crowned Spar-

row. I include the Golden-crowned Sparrow as a control since, as a seed-eater, its food resource should not have been effected by the cold weather. At best, new-capture data is very crude since it is not standardized according to level of effort (*Ed. Note: Net hours for 1991 were roughly equivalent to the other three years used in this comparison*) and, particularly when addressing mortality, we should be looking at recapture data not new capture data. Nonetheless, I would expect a dramatic increase in mortality for hummingbirds, kinglets and warblers to be evident - but it is not. What we see is substantial yearly variation in all species with no obvious effects of the winter freeze. A careful analysis of all of our data, however, may result in a different conclusion.

Table 1. January/February New Capture Data

Species	1988	1989	1990	1991
Anna's Hummingbird	6	14	10	11
Ruby-crowned Kinglet	13	13	2	16
Yellow-rumped Warbler	29	33	38	24

The winter season is a good time to look back at some of the capture patterns we see and try to understand what they tell us about the species' biology. In past columns I have used the hummingbird new-capture data to show the difference between resident (Anna's), and summering (Allen's) species. Some birds don't show such clear patterns. I will discuss two of these species here and let the reader draw his/her own conclusions.

In **Figure 1** I show the new-capture data for House Wren. This species is not captured often along the

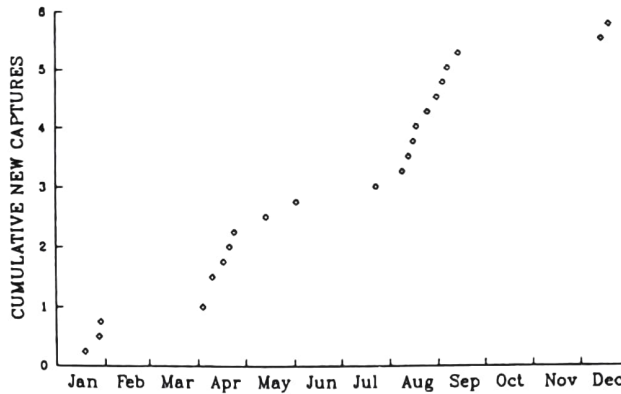


Figure 1. House Wren New Capture Data - All Years

creek despite it being a common resident further upstream. On average, we capture only 5 or 6 birds per year. However, the data from the last 4 years suggest that most of the birds we encounter are migrants.

There appears to be a clear spring migration in April and a slightly longer fall migration that begins in the second week in August and extends through the second week in September. A few locally dispersing birds are seen during the summer, but

we also find them occasionally in the winter (two of four). The House Wren's winter range centers in western Mexico, but smaller numbers are found in Southern California. We are essentially on the extreme edge of its wintering range. Perhaps in milder winters more birds

stay north and, if healthy as spring approaches, get first choice of prime territories.

Figure 2

shows new-capture data for the Common Yellowthroat. Unlike the House Wren, we capture good numbers of this species every year. The

averages shown here

are for 1987-1989. My guess is that there is a strong resident component with a mix of migrants. It looks to me like there is a period of migration in early April and again in mid-August almost to the end of September. Yet in some years, such as 1987, there is no sign of migration. From early October through December almost no yellowthroats are captured until we start picking up a few in January and February. If you are a fan of winter high tides then you have seen that the Common Yellowthroat is nearly as abundant in the Palo Alto marshes as the Song Sparrow. Yet almost none are along the creek. (*Ed. Note: Bill has just described the*

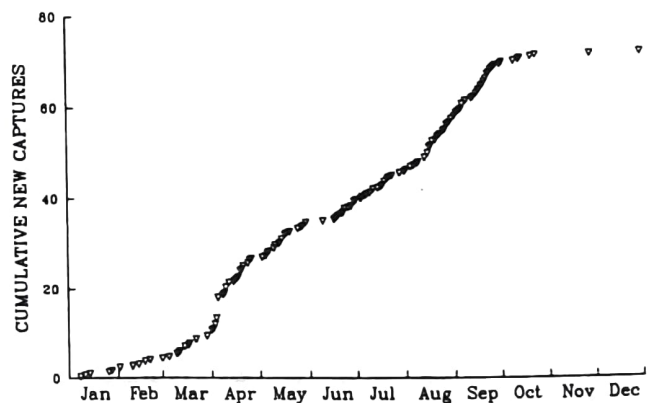


Figure 2. Common Yellowthroat New Capture Data - All Years.

differential habitat selection of the endemic Saltmarsh Yellowthroat, *Geothlypis trichas sinuosa*. For additional information on this important and potentially threatened subspecies see a related article in this issue).

Winter always comes to an end and for banding records the harbinger of spring is the Allen's Hummingbird. The first arrival this year was 17 February, slightly later than during the last two years. Spring is here!

SANTA CLARA COUNTY BREEDING BIRD ATLAS

1987-1990

by Bill Bousman

We have now completed three out of the five years of field work that is required to "atlas" the birds breeding in Santa Clara County (Figure 1).

This atlas is an intensive effort to determine the breeding status of all species that nest in the county. The approach and protocol is essentially the same as is used throughout California and the rest of North America.

The amount of field work that

has been accomplished in the 168 atlas blocks (an atlas block is a 5 kilometer square) is truly amazing. In some blocks atlasers have put in more than 100 hours to determine the status of our breeding species. We are close to completing all of our blocks in the western portion of the county. This includes the Santa Cruz Mountains, the bay side habitats, and the urban areas north of

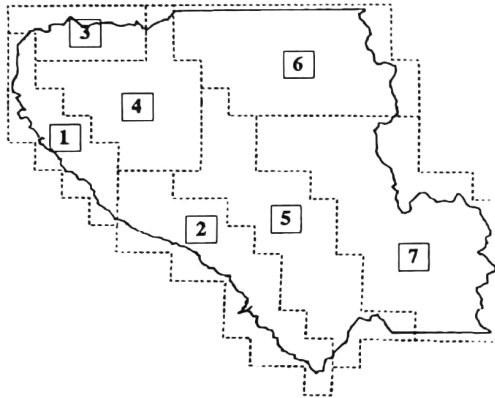


Figure 1. Santa Clara County with Atlas Regions.

the Coyote Valley. Where we are behind is the Diablo Range and the south county - this is where we will focus our work in the remaining two years. Access to private land is our

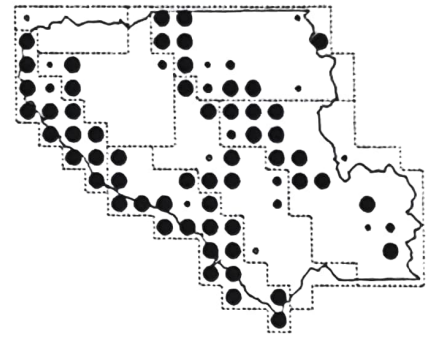
greatest problem. It may be impossible to atlas those blocks where landowners are unwilling to let us onto their property.

At this stage of the atlas project, our results provide a fascinating perspective on the breeding birds of the local area. The

atlas provides very fine detail for these species and raises many interesting questions. I am including some examples with this article that show some of the insights we have gained even though the atlas is not complete.

In Figure 2 I compare the atlas maps for Steller's and Scrub jays. The large solid circle represents breeding confirmation. This could

Steller's Jay



Scrub Jay

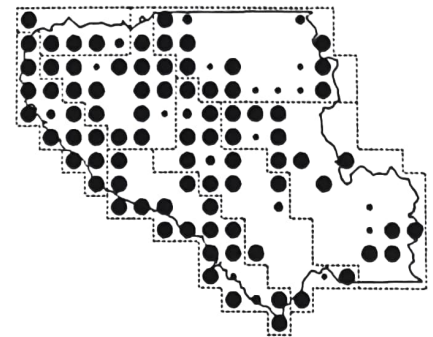


Figure 2. Breeding ranges of the Steller's Jay (top) and Scrub Jay (bottom).

be an observation of nest building, eggs or young in the nest, feeding of young, or recently fledged young. The medium-sized circle represents probable breeding, such as copulation or territorial displays. The small circle is evidence of possible breeding. This is usually an observation of a species in appropriate habitat. The dotted lines on these maps show the regions. Regions One and Two are the northern and southern Santa Cruz Mountains respectively, and lie along the left edge of the map. Region Three and Four comprise the urban area. Each of these regions has been well covered so the absence of breeding evidence means that the species is not using the habitats in these blocks. This is

not the case in the south valley and the Diablo Range where many blocks have not been atlased and the blank spots, more likely than not, represent a lack of atlasing activity.

What I notice first about our two jays is that both Steller's and Scrub are found throughout the Santa Cruz Mountains and the Diablo Range where we have atlased, but only the Scrub is found on the valley floor and in the urban habitats. The Steller's Jay is almost never found outside of the coniferous or mixed-evergreen forests. These forests also, generally have a closed canopy. On the other hand, the Scrub Jay is a bird of the open-canopied oak woodlands and chaparral. Where these two communities are intermixed it is almost like there is an invisible wall set up at the boundaries - the Steller's gives its last raucous laugh as you leave the shadows of the closed-canopied forest and the Scrub Jay welcomes you to his sunny land, peering from the top of a shrub, and giving its dry rattle or hearty shriek. In the urban area, along creeks, and in parks, the Scrub Jay has adapted very well and is one of our most common birds. Not so with the Steller's, who will never be satisfied with our streets, parks, and gardens.

In the second set of maps (Figure 3) I compare the range of the Plain Titmouse and the Yellow Warbler. The Plain Titmouse is an abundant bird in the oak woodlands and savannahs that cover so much of the eastern portion of the county. It is likely the most common species east of the Santa Clara Valley. Yet it is almost completely absent from our urban habitats. The Yellow Warbler, on the other hand, is much less

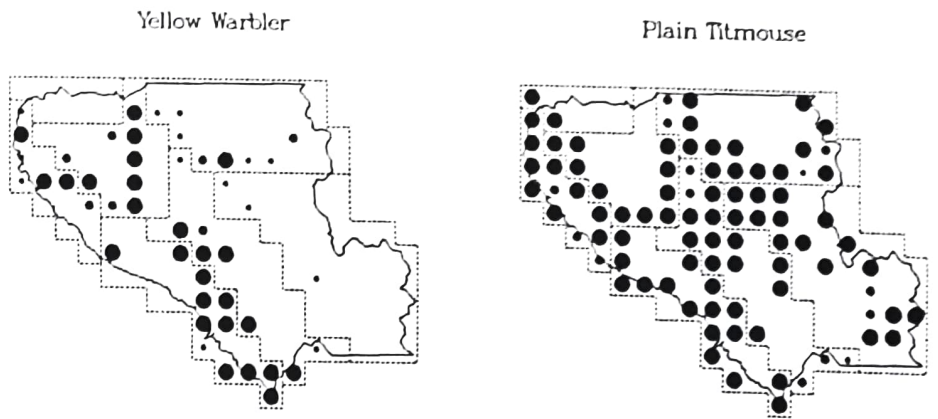


Figure 3. Breeding distribution of the Yellow Warbler and Plain Titmouse.

common, yet it occurs along our urban streams and creeks as well as those in the remote areas of the Santa Cruz Mountains and the Diablo Range. Why should this be? Perhaps the Yellow Warbler, with its requirement for riparian woodlands, is quite use to a habitat that is long and narrow with unsuitable edges. In such a situation, houses and light industry are no better or worse than grassland or open woodlands. But the titmouse appears to require an open expanse of oak woodlands and savannah. The occasional urban oak and vacant lot is apparently not suitable for titmice when the majority of the area is bounded by houses and parks.

The last pair of maps I show (Figure 4) depicts the breeding extent of two raptors. These birds are at the top of the food chain and are susceptible to many problems. The Black-shouldered Kite is found nesting in grasslands near the bay along the valley edge. As long as it has a mixture of open grasslands and oak savannah for foraging it seems to prosper. Along the Bay the habitat is different, but there is probably still sufficient prey resources. However, it normally nests only where there is

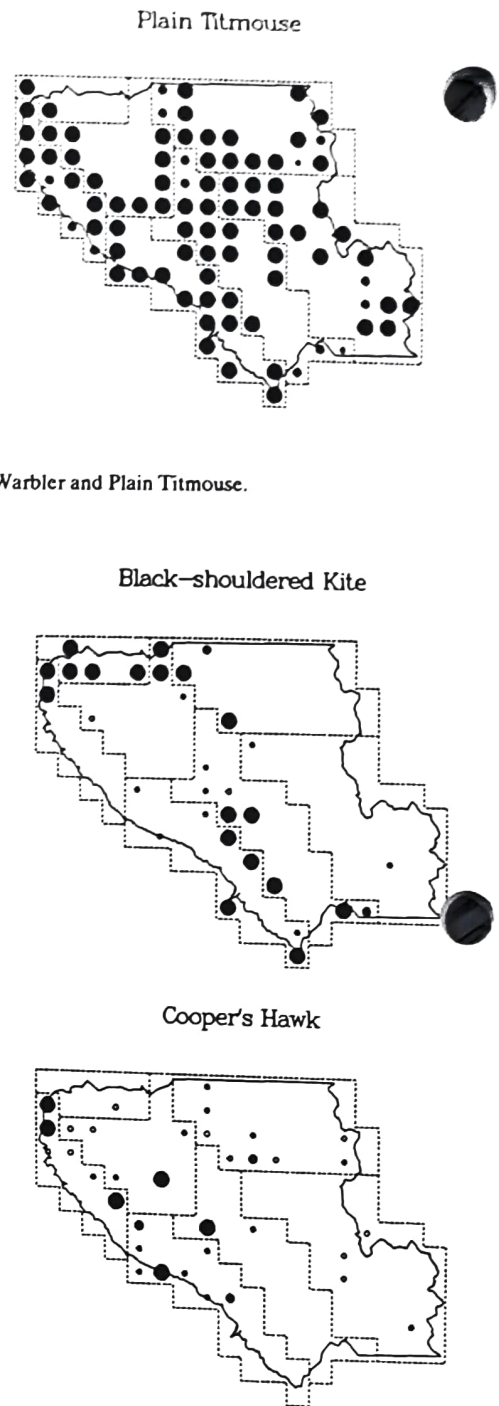


Figure 4. Breeding distribution of the Black-shouldered Kite and Cooper's Hawk.

low disturbance. As our recreational use of this habitat becomes more intense, kite breeding may suffer. The Cooper's Hawk feeds on other birds and appears to tolerate life in the big

city as long as there are birds to eat and suitable trees to nest in. A pair is again nesting in the Willow Glen area of San Jose, having successfully raised young there last year. Other birds of prey will have differing responses to urban areas and the atlas will give us a means of assessing these species' needs and the will, I hope to reduce the pressure of our population on their food chains.

The last species map I show is for the Song Sparrow (**Figure 5**).

Song Sparrow

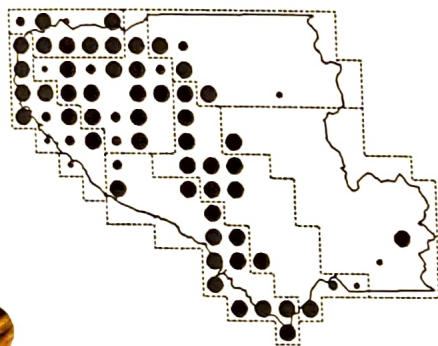


Figure 5. Breeding distribution of the Song Sparrow.

There are two subspecies resident in the county, one in the salt marshes along the Bay (*Melospiza melodia pusillula*) and the other (*Melospiza melodia gouldii*) in upland in other riparian and marsh habitats. This is not an urban bird but, like the Yellow Warbler, resides within the stream corridors which still pass through our residential areas. Because it requires some degree of dampness and a thick understory, it is largely absent from the dry Diablo Range. But note how in the southern Diablo Range it is found breeding along Pacheco Creek and in the northern Diablo is possibly breeding in stock ponds in the Arroyo Bayo drainage. The 5-km resolution that is inherent in our atlas maps does

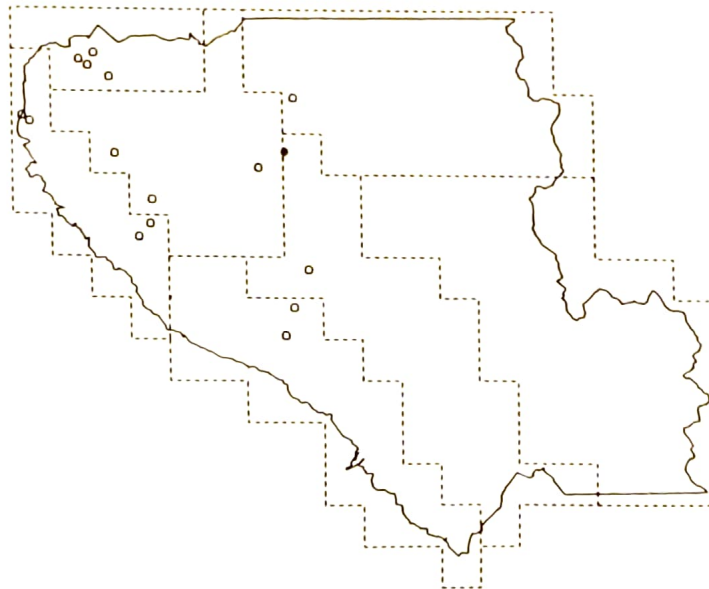


Figure 6. Nest locations of Song Sparrows.

not allow us to clearly delineate patterns in species like the Song Sparrow that have fairly specific habitat requirements. In particular, the map does not clearly indicate the boundary that occurs between our two subspecies along the edge of the Bay. Many atlasers are now adding coordinates that are accurate to 50 meters when they confirm breeding. The effect of this hundredfold increase in resolution is suggested in the second map (**Figure 6**) I show for Song Sparrow. The solid symbol represents an actual nest location (hard to find in the field) while the open symbols represent other breeding evidence (carrying nest material, carrying food for young, feeding young or recently fledged young). This latter information is nearly as exact as a nest location for a sedentary bird like the Song Sparrow. We hope to be able to chart more accurately the breeding requirements of this species using the atlas data base.

Although our focus in the last two years is shifting increasingly toward the Diablo Range, we still appreciate any information that directly relates to breeding in the

county. If you find a nest then please provide us with the date, the breeding evidence you observed, and the nest location. Most records are phoned directly to Roy Cameron (408-867-6632) who has a set of topographic maps and can place your observation on the UTM grid we use for the data base. Alternatively, if you can locate a nest on a topographic map, then just mail us a copy of the map with your name, the date you observed the nest, and the breeding evidence. Your help would be greatly appreciated.



SALTMARSH YELLOWTHROAT - A BIRD IN LIMBO

By Michael Rigney

In 1901 eminent ornithologist Joseph Grinnell described a small race of the Common Yellowthroat. This subspecies was somewhat smaller and darker than the other two western subspecies and was restricted to the marshes surrounding

and freshwater marshes were still quite extensive and few people were concerned about a bird with so limited a range and dependent upon so defined a habitat.

As we are all too painfully aware, in the subsequent years thousands of acres of salt and freshwater

such as the California Clapper Rail, salt marsh harvest mouse and the small, colorful Saltmarsh Yellowthroat declined along with the habitat which supported them. By some accounts salt marshes have decreased 80% since the turn of the century (Jones and Stokes 1979; U.S. Fish and Wildlife Service 1984). Thousands of acres of freshwater marsh existed in Grinnell's day while only 600 acres within the greater San Francisco Bay area remained by the mid-1980's (Wakeman 1982; Larry Walker and Assoc. 1983).

Concern over the loss of bay wetlands prompted by studies conducted by ecologists H. Thomas Harvey and Kent Dedrick and mammalogist Howard H. Shellhammer culminated in a number of studies on endemic species. In 1973, CCRS founder, and then professor of zoology at San Jose State University, L. Richard Mewaldt and Howard Shellhammer proposed that the Saltmarsh Yellowthroat be considered for protection under the newly established Endangered Species Act. Shortly afterward the U.S. Fish and Wildlife Service granted "Candidate" status to *G. t. sinuosa* suggesting that further studies were necessary to determine its exact range and current abundance. In 1975, funds were made available to Margaret Foster, a graduate student of Drs. Mewaldt and Shellhammer, to determine yellowthroat distribution and abundance and to assess the quality and extent of its remaining habitat. Her three year study found that numbers of breeding yellowthroats were drastically reduced from historical levels and that the remaining habitat was fragmented and subject to increased degradation (Foster 1977). Her

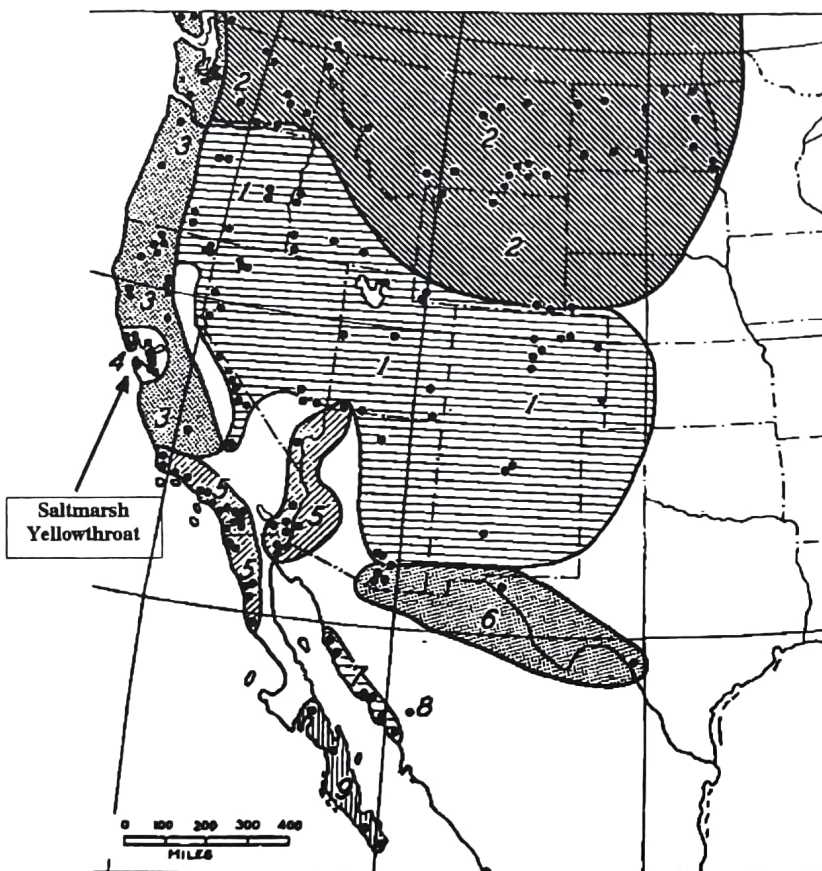


Figure 1. Breeding ranges of the yellowthroats of western North America (after Behle 1950). 1. *G.t. occidentalis*; 2. *G.t. campicola*; 3. *G.t. arizela*; 4. *G.t. sinuosa*; 5. *G.t. scirpicola*; 6. *G.t. chrysolea*; 7. *G.t. modesta*; 8. *G.t. riparia*; 9. *G. beldingi*.

San Francisco Bay (see Figure 1). He named this bird the Saltmarsh Yellowthroat and assigned it the scientific name of *Geothlypis trichas sinuosa*. In Grinnell's time the salt

marshes were either drained and filled for development or were diked off and converted into salt evaporation ponds. And all species dependent upon this dwindling habitat

study also recommended classification as a threatened or endangered species. Unfortunately, California was in the midst of a severe drought which had had a significant impact on wetlands, and as a consequence, population projections might not have been representative of normal conditions. The Saltmarsh Yellowthroat retained its candidate status.

In 1985 the San Francisco Bay Bird Observatory conducted a follow-up study of breeding yellowthroats at numerous locations throughout the historical range of the subspecies. Important conclusions derived from their study indicated that in many areas where suitable habitat was found, breeding yellowthroats were absent. This suggested to the authors that other limiting factors may be effecting breeding populations (Hobson, et al. 1986). In addition, measurements of banded yellowthroats in the Suisun Bay marshes were consistent with those of presumed Saltmarsh Yellowthroats. It had been presumed prior to this study that the eastern extent of the saltmarsh race was the Carquinez Straits. With the exact range of the Saltmarsh Yellowthroat still in question the status of this subspecies has remained unchanged; now for nearly 20 years.

New efforts are underway to examine, using some rather technologically sophisticated techniques, and put to rest the remaining questions concerning the Saltmarsh Yellowthroat's distribution and degree of genetic difference.

Karen Rabey, working with Dr. Luis Baptista and the San Francisco Bay Bird Observatory is investigating song patterns in breeding yellowthroats to determine if there are populational differences. Her work

is now in its second season.

At CCRS we are focusing our efforts on studying morphological and color characteristics. This breeding season we are also conducting a pilot study using a technique called DNA fingerprinting. Working in cooperation with Dr. Will Gergits and new CCRS Board member Dr. Scott Terrill, we will harmlessly extract small amounts of blood (less than 100 microliters) from birds belonging to the *sinuosa* race and from birds of the more upland *arizela* race. Dr. Gergits will use sophisticated chromatographic techniques and specific DNA probes to determine if there are genetic "markers" which will allow separation of the two races. If the pilot study is successful we will then apply this technique to individuals captured near the presumed zones of population overlap. Hopefully we will be able to determine the exact range and degree of genetic difference which will, at long last, free this important subspecies from "listing limbo" and afford it and its habitat full protection under the Endangered Species Act. Initial funding for this project was supplied by Chevron Corporation. We will keep you posted on the progress of this crucial work.

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MEWADLT LIBRARY ESTABLISHED

By Michael Rigney

Thanks to the generosity of Francis Mewaldt, most of Dick Mewaldt's extensive ornithological library has been donated to CCRS. Included in this donation are runs of

journals such as the *Auk*, *Condor* (back to Volume 1 Number 1, 1899), *Wilson's Bulletin*, *American Birds*, *Journal of Field Ornithology*, *Bird-Banding*, *North American Bird Bander*, *Western Birds*, and several more. Important non-periodical re-

sources include, Palmer's Handbook of North American Birds, a nearly complete set of Bent's Life Histories of North American Birds, and Dawson's four volume set on Birds of California.

In all, nearly 300 books, serials, and occasional papers will reside in the library. These resources will be invaluable to our volunteers and staff as they carry on the research begun by Dick at CCRS over 10 years ago. Additional bookcases were purchased from a memorial fund established in the name of Inez Rigney.

With Dick's comprehensive library providing the foundation for our continuing commitment to maintain a useful resource, we are looking for member support. We would like those of you who strongly support our research efforts, to underwrite subscriptions to current journals. These subscriptions would be in your name and you would receive full benefits of membership in the organization you chose; the journals would be delivered to CCRS. To the extent allowed by law, your subscription would be tax deductible and you would, of course, have the option of cancelling at any time. Your name would be added to the inside cover of the issues and to the library cases which will hold completed volumes. The journals were are most in need of are listed below:

The Auk (American Ornithologists' Union).....\$35/year

The Condor (Cooper Ornithological Society).....\$23/year

The Wilson's Bulletin (Wilson Ornith. Soc.).....\$23/year

Journal of Field Ornithology (Assoc. of Field Ornith.) \$21/year

MEMBERSHIPS IN CCRS

Member	\$20 annually
Senior or Student	15 annually
Family	25 annually
Supporting	35 annually
Sustaining	90 annually
Corporate	100 + annually *
Life	500 single pay. *
Patron	5000 single pay. *

Life Membership payments and 10% of all other membership payments and general contributions go into the CCRS Endowment Fund now earning about \$175 per month. CCRS is a non-profit corporation with U. S. and California tax exempt status. Five dollars from the dues of each joint CCRS-SCCBB Atlas Member goes to the Atlas program. We acknowledge Memorial contributions in **RipariaNews**. We welcome bequests, including those of real property.

* Or in 4 or 5 installments

NEW MEMBERS

We welcome the following new members who joined CCRS within the last four months:

Elizabeth S. Brown	Member
Harry J. Cornbleet	Member
Al DeMartini	Member
William K. Groll	Member
Margaret Limberatos	Member
Dr. Scott B. Terrill	Active Member
Charles Wilson	Member
Dr. William Lofthouse	Member

We would like to thank **Michael Mammoser** who became our latest Life Member. Mike is very active in the Breeding Bird Atlas and the CCRS census program.

COYOTE CREEK RIPARIAN STATION

Coyote Creek Riparian Station is a non-profit California membership corporation with United States and California tax exempt status. CCRS is dedicated to research on, and to the restoration and management of, riparian and wetland habitats.

Coyote Creek Riparian Station operates in cooperation with the Santa Clara Valley Water District, San Jose/Santa Clara Water Pollution Control Plant, U. S. Fish and Wildlife Service, San Francisco Bay National Wildlife Refuge, and the California Department of Fish and Game.

RipariaNews is published quarterly for the information of our CCRS membership, the personnel of the several cooperating federal, state, and local agencies, and for other organizations and individuals concerned with the flora and fauna of riparian and wetland habitats.

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