



Figure 1. Wilson's Warbler is one of the common neotropical migrant bird species caught in mist-nets during the breeding season from 1993 through 1997 in an alder-dominated riparian habitat in Redwood National and State Parks

REDWOOD NATIONAL AND STATE PARKS' NEOTROPICAL MIGRATORY SONGBIRD PROGRAM:

Monitoring for Avian Productivity and Survivorship (MAPS)

By HOWARD F. SAKAI

REDWOOD NATIONAL AND State Parks, a world heritage site and biosphere reserve, are recognized for their magnificent groves of relict old-growth coastal redwoods (*Sequoia sempervirens*). Concomitant with old-growth redwoods, the California parks' 42,719 hectares (approx. 106,000 acres) contain a mosaic of habitat types including coastal dunes/scrub/mixed-conifer forest, second-growth redwood/mixed conifers, riparian red alder-dominated (*Alnus rubra*) corridors, Douglas fir/mixed conifer/hardwood, coastal grasslands, and oak-woodlands. A diverse bird species richness of 404 species, as noted in the parks' bird checklist, illustrates the influence of this diverse mix of habitats. Neotropical migrants, defined as species for which the majority of the population winters south of the U.S.-Mexico border, make up about 27% of the total species occurring within the parks. Only recently has the demise of migratory songbirds on their breeding and wintering grounds been given national and international recognition. This threat has been acknowledged through ongoing research and monitoring efforts by public, private, and

philanthropic agencies involving international cooperation. For this article, I will describe an ongoing monitoring program Redwood is conducting on neotropical migratory songbirds, discuss some of the study results, and briefly provide an assessment of the program.

MAPS

Our constant-effort mist netting study (Monitoring for Avian Productivity and Survivorship or MAPS), initiated in the summer of 1993, provides baseline information and is one of several ongoing park bird projects contributing to the understanding of neotropical migratory songbirds on their breeding grounds. Our MAPS program provides critical long-term data to a broader regional study conducted by Dr. David DeSante of the Institute for Bird Populations at Point Reyes Station, California. Dr. DeSante's study is attempting to compare the productivity and survival of migratory songbird species throughout their breeding range.

The park MAPS study area is located within a 6-ha (14.8-acre) riparian corridor dominated by mature red alder. Our constant-effort mist-netting station fol-

lowed Dr. DeSante's MAPS protocol for maintaining standardization amongst all participating MAPS cooperators. Ten mist-nets spaced 150-200 m apart within the study area were operated for six hours per day, starting within 15 minutes of sunrise, every 10 days between mid-May and mid-August. All captured birds, except hummingbirds, game birds, and raptors, were marked with a U.S. Fish and Wildlife Service sequentially numbered aluminum leg band. All newly captured birds were processed for a variety of morphological and physiological measurements. Recaptured birds were also processed again and identified by their band numbers.

COSTS AND OTHER CONSIDERATIONS

The cost of operating a MAPS station is dependent upon initial equipment investment (in 1993 about \$750, which included 24 electrical conduit poles and rib bars, 15 mist-nets, and 100 feet of 1/8" nylon rope); replacement mist-nets every second or third year (five nets at current price of \$250); personnel costs, which vary with type of personnel (volunteer or paid staff) and grade level for 80 hours per sala-

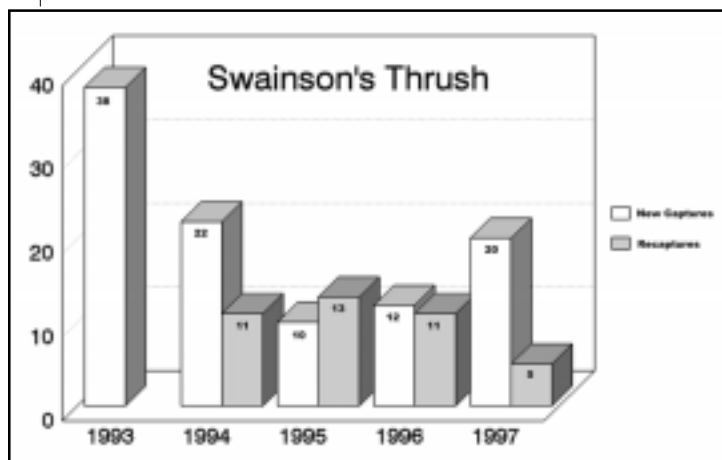


Figure 2. Captures and recaptures of Swainson's Thrush, 1993-'97

ried individual per breeding season; and number of personnel needed to operate a MAPS station (dependent upon participant level of expertise). Safety of netted birds should always be the primary concern for any program manager operating a mist-netting station. Accordingly, two trained bird banders are highly recommended in operating a MAPS station; however, an experienced bird bander with several years of experience could independently operate a station while still maintaining bird safety. At our parks, an experienced bird bander with a *master* bird banding permit supervised either one or two inexperienced staff members the first three field seasons for the purpose of providing training. For the 1996 field season, the experienced bird bander ran the MAPS station alone for an extended period, which contributed to lower program cost. However, a program manager should never use less staff to simply lower operation cost without *always* first considering the safety of netted birds.

RESULTS AND DISCUSSION

Results of our four-year mist-netting effort during the breeding season provided baseline information for 15 migrant and resident species. The most commonly caught migrants were Swainson's Thrush (*Catharus ustulatus*), Wilson's Warbler (*Wilsonia pusilla* [fig. 1]), and Pacific-slope Flycatcher (*Empidonax difficilis*). Winter Wren (*Troglodytes troglodytes*) and Varied

Thrush (*Ixoreus naevius*) were the most common resident species. The constant-effort mist-netting technique provides a means for monitoring species movement within the study area, especially for lower to mid-canopy species, and verifies for the un-

Recovery of marked individuals from previous banding efforts documented site fidelity for the common migrant and resident species. Yearly recaptures of migrant Swainson's Thrush (fig. 2) and Wilson's Warbler (fig. 3) individuals have been documented since the inception of the banding program in 1993. Recaptures of migrant Pacific-slope Flycatcher (fig. 4) individuals were documented for one summer. Of the common migrant individuals recaptured for two or more consecutive summers, the male to female

Swainson's Thrush (n=20) and Wilson's Warbler (n=19) recapture ratio was 70%:30% and 68%:32%, respectively. A similar comparison for Pacific-slope Flycatcher recaptures by sex was impossible as males and females could not be distinguished by plumage or anatomical (i.e., cloacal protuberance) differences, and none of the captured individuals possessed a brood patch. Analysis by mist-net capture locations

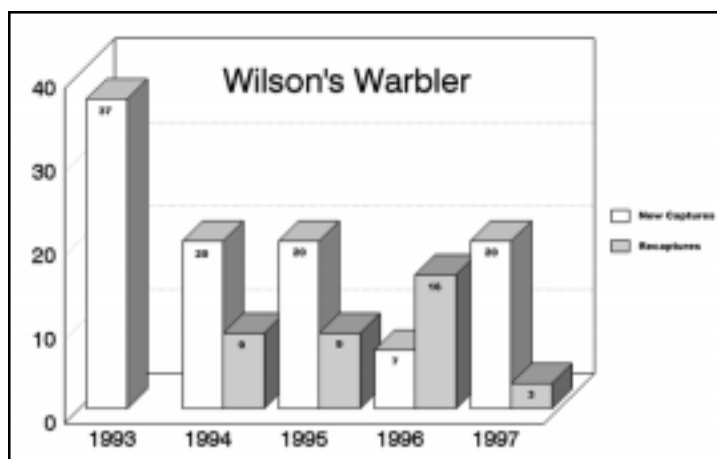


Figure 3. Captures and recaptures of Wilson's Warbler, 1993-'97

common species their presence or rarity. For example, an unexpected mist-net capture in July 1996 of an Ovenbird (*Seiurus aurocapillus*), a species common to the east coast and ranging as far west as Colorado, documents its presence within the parks despite being outside of its normal range. A similar unexpected capture of a Brown-headed Cowbird (*Molothrus ater*) in our forested riparian study area documents its rare presence, as this species is normally not common in interior forested habitat. However, the Brown-headed Cowbird does occur locally in agricultural fields about 1½ miles from our study area. This capture could be a precursor to the cowbird's potential threat to this interior riparian habitat.

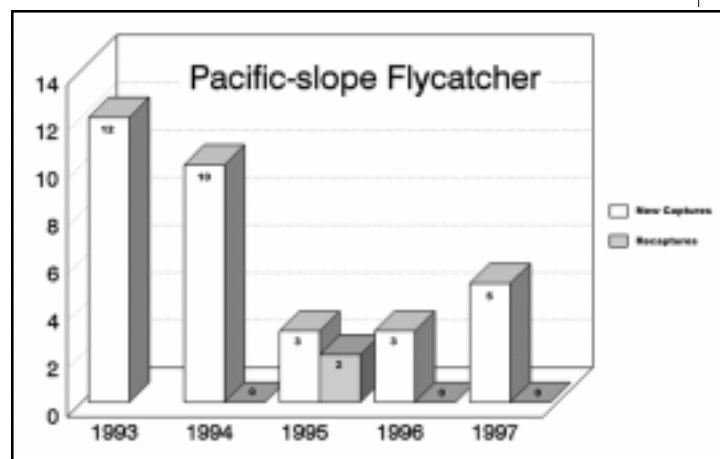


Figure 4. Captures and recaptures of Pacific-slope Flycatcher, 1993-'97

showed that 15 of the 20 returning Swainson's Thrushes, 11 of the 18 Wilson's Warblers, and 1 of 2 Pacific-slope Flycatchers were caught within a 300-m or less radius of their initial capture location. It is simply amazing that these tiny migrant songbirds survive the perils of migration, over several consecutive years, to return to the same breeding location from

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their wintering grounds located many thousands of miles away (i.e., Mexico, Belize, and Guatemala for Wilson's Warbler and Pacific-slope Flycatcher; northern South America for Swainson's Thrush)!

CONCLUSION

The Redwood MAPS station validates the importance of this riparian corridor for these three neotropical migrants. However, more constant-effort mist-netting stations are needed to verify our results for similar riparian habitats throughout the park complex or within the species' breeding range. Although our findings are limited to our study area, our parks' contribution of data to the Institute for Bird Populations is very useful for the regionwide analysis in comparing productivity and survivorship of these species within a portion of their breeding range.

There are obvious beneficial uses of MAPS data, but there are limitations, as well. For example, inferences may be made for a banding site only and may not be extrapolated to broader areas. Regardless of this limitation, the low overhead cost for materials (\$750) invested in establishing the MAPS station is worth the expense. Such easily and inexpensively collected data also clearly illustrate the importance of each habitat in a broader ecosystem context. Redwood can monitor a vital sign related to its resources that is pertinent on a local and regional scale. Because of the stability of parks, these protected areas are particularly critical for the survival and maintenance of these long-distance migrants. Parks have a responsibility to participate as much as possible in this way given the broad context of ecosystem management and maintenance of biodiversity.

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