

## ADDRESSING REGIONAL DECLINES IN PURPLE MARTIN POPULATIONS

J. TAUTIN,<sup>1,6</sup> B. COUSENS,<sup>2</sup> K. KOSTKA,<sup>3</sup> S. KOTSKA,<sup>4</sup> AND D. A. AIROLA<sup>5</sup>

<sup>1</sup>Purple Martin Conservation Association, Erie, Pennsylvania, USA;

<sup>2</sup>British Columbia Purple Martin Stewardship & Recovery Program, Nanaimo, British Columbia, Canada;

<sup>3</sup>Purple Martin Preservation Alliance, Export, Pennsylvania, USA;

<sup>4</sup>Western Purple Martin Working Group, Arlington, Washington, USA; and

<sup>5</sup>Airola Environmental Consulting, Sacramento, California, USA

*Abstract.* The Purple Martin (*Progne subis*) is one of the best known and most popular migratory birds in North America. Breeding Bird Survey results indicate that the range-wide breeding population of Purple Martins has been stable over the last 40 years, a testament to the dedication of thousands of Purple Martin "landlords" who provide housing for nesting martins. Regionally, however, some martin populations are in decline, most notably in the Great Lakes states and provinces, New England and the Maritime Provinces (where some states and provinces are close to losing martins entirely), and in California. We document these declines, report on successful efforts to restore previously declining martin populations in the Pacific Northwest, report on a unique effort to increase martins in southwestern Pennsylvania, and suggest additional, regional efforts to conserve Purple Martin populations.

*Key Words:* management, populations, *Progne subis*, Purple Martin.

### ABORDANDO EL DESCENSO REGIONAL DE LAS POBLACIONES DE MARTINES AZULES

*Resumen.* El Martín Azul (*Progne subis*) es una de las aves migratorias más conocidas y populares de América del Norte. Los resultados del Sondeo de Reproducción de Aves (Breeding Bird Survey), indican que la población reproductora de Martines Azules, en todo su rango de distribución, ha permanecido estable durante los últimos 40 años, en testimonio a la dedicación de miles de "dueños" que proporcionan hogar a los Martines Azules para su anidación. Regionalmente sin embargo, algunas poblaciones de martines van en descenso. Esto se hace más notable en los estados y provincias de los Grandes Lagos, así como en Nueva Inglaterra, California y las Provincias Marítimas -donde algunos estados y provincias están próximos a perder enteramente sus poblaciones de martines. Aquí documentamos dichos descensos, informamos sobre el éxito en los esfuerzos por restaurar poblaciones de martines anteriormente decrecientes en la zona del Pacífico Noroeste, informamos sobre un singular esfuerzo para aumentar la cantidad de martines en el sudoeste de Pennsylvania y sugerimos esfuerzos regionales adicionales, para conservar poblaciones de Martín Azul.

### INTRODUCTION

The Purple Martin (*Progne subis*) is North America's largest swallow and one of the best known and most popular migratory birds in North America. It is a secondary cavity nester that exhibits colonial nesting tendencies. Three subspecies are recognized. *P. s. hesperia* nests in the southwestern US, typically in woodpecker cavities in Saguaro cacti (*Cereus giganteus*). *P. s. arboricola* occurs in the intermountain and coastal regions of the western U.S., and in British

Columbia. It also nests in natural cavities, typically woodpecker holes in live and dead trees, but increasingly is taking to human-supplied artificial housing. *P. s. subis* occurs east of the Rocky Mountains in the US and Canada, and is by far the most numerous and widespread subspecies. *P. s. subis* nests almost entirely in housing provided by people, so much so that finding one nesting outside of artificial housing is noteworthy (Simpson 1993).

The Purple Martin's near exclusive use of human-provided housing east of the Rockies

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<sup>6</sup> E-mail: jtautin@purplemartin.org

makes it arguably the most intensively managed migratory bird in North America. Also unique in avian conservation is the fact that this management is done almost entirely by lay persons, the so called Purple Martin “landlords”, who provide the martins’ housing. Landlords receive some support, primarily management information, from Purple Martin organizations ranging from the continental Purple Martin Conservation Association (PMCA) through the smaller regional martin organizations and local clubs.

Some institutionally sponsored scientific research is done on Purple Martins, and they are monitored passively by science-based, agency-managed surveys such as the Breeding Bird Survey and breeding bird atlas projects. Mostly, however, wildlife and land management agencies, nongovernmental organizations, and universities do not actively manage martins or otherwise work purposefully to conserve them, leaving it mostly to the lay community to care for the species.

## METHODS

We examined data from the Breeding Bird Survey (BBS) (Sauer, Hines and Fallon 2003) for population trends at state, regional and continental levels over the time period 1966–2006. For several reasons, we believe that the BBS is particularly well suited for monitoring trends in Purple Martin populations east of the Rockies where most individuals occur (Tautin 2007). The geographic area covered by the BBS corresponds closely to the breeding range of Purple Martins (Brown 1997). The BBS is a daytime survey employing point counts at regular intervals along roads. Purple Martins are diurnal, easily identified and readily observed in their open, roadside habitats. Their housing typically is located close to human habitation within sight of a road. Some may be detected as they forage over the countryside, but we believe that most would be sighted when observers key in on colonies seen from the road. For martin populations west of the Rocky Mountains, and other areas where their populations are low and sparsely distributed, we relied on scientific literature, state and provincial breeding bird atlases and our own ongoing studies.

## RESULTS

### THE RANGE-WIDE POPULATION TREND

Data from 1745 BBS routes were used in the range-wide analysis. Across North America, the overall Purple Martin population has been

stable over the years 1966–2006 ( $-0.1\% \text{ yr}^{-1}$ ,  $P = 0.73$ ). An estimated 4.51 birds route<sup>-1</sup> were observed, with little variation among years.

### REGIONAL DECLINES

#### *Upper Great Lakes*

While the overall Purple Martin population appears to have been stable over the 41 years of BBS coverage, and martin populations are increasing in some parts of the continent (Tautin 2007), three contiguous upper Great Lakes states, Michigan ( $-7.3\% \text{ yr}^{-1}$ ,  $P < 0.01$ ), Minnesota ( $-3.8\% \text{ yr}^{-1}$ ,  $P < 0.01$ ) and Wisconsin ( $-4.3\% \text{ yr}^{-1}$ ,  $P < 0.01$ ) have significant declines. These three states comprise a large portion of three regions of interest, U.S. Fish and Wildlife Service Region 3, Bird Conservation Region 23 (Prairie Hardwood Transition) and Bird Conservation Region 12 (Boreal Hardwood Transition), each of which shows a significant decline ( $-2.3\% \text{ yr}^{-1}$ ,  $P < 0.01$ ;  $-4.5\% \text{ yr}^{-1}$ ,  $P < 0.01$ ; and  $-4.8\% \text{ yr}^{-1}$ ,  $P < 0.01$ , respectively). Additionally, the Great Lakes states and provinces of Illinois ( $-1.4\% \text{ yr}^{-1}$ ,  $P = 0.13$ ), Indiana ( $-1.2\% \text{ yr}^{-1}$ ,  $P = 0.25$ ), Ontario ( $-2.6\% \text{ yr}^{-1}$ ,  $P = 0.17$ ) and Quebec ( $-3.7\% \text{ yr}^{-1}$ ,  $P = 0.08$ ) have nonsignificant decreasing trends, with  $P$  values low enough to suggest that the trends are more likely true than not.

#### *New England and the Maritimes*

BBS results for New England states and the Maritime Provinces are mixed and not significant. However, these estimates have wide confidence intervals and are based on observations along relatively few (2–7) routes where densities of martins are low (0.06–0.63 birds route<sup>-1</sup>).

Other sources of information indicate that martins in New England are in decline. Hunt’s (2005) comprehensive account on the status of Purple Martins in New Hampshire reports that as few as 10 colonies existed in 2003, and as of 2008 there may have been no more than 3 (Hunt 2008, personal communication). Picard (2008) reported a decline of martins in Rhode Island and believes that only 5 or 6 colonies remain in the state, down from a high of 32 recorded in 1974 (Picard 2008, personal communication).

In Massachusetts, during the late 1970s, martins were found in only 33 (3.4%) of 969 of blocks surveyed during the first (1974–79) Massachusetts Breeding Bird Atlas, and only 300 pairs were thought to exist in the state (Clapp 2003). During the first year (2007) of the second Massachusetts Breeding Bird Atlas, Purple Martins were recorded in only 2 (0.5%)

of 440 of blocks surveyed (US Geological Survey 2007). Clapp (2008, personal communication) reported that only 200 pairs of martins may remain in Massachusetts. McGrath and O'Hare (2007) provide a comprehensive historical account of the tenuous existence of Purple Martins in Massachusetts.

Purple Martins nesting in the adjoining Maritime Provinces have also declined. During the first (1986–1990) Maritimes Breeding Bird Atlas (Bird Studies Canada 2007), martins were recorded in 78 (6.6%) of 1189 blocks. Most were in New Brunswick, in a distribution closely matching the distribution of colonies reported by Hunter (1967) in his 1966 private survey of colonies. During the first two years (2006–2007) of the second Maritimes Breeding Bird Atlas, Purple Martins were recorded in only 5 (0.4%) of 1189 blocks. A. Chenier (2008 personal communication) believes that as few as 8 martin colonies are left in New Brunswick, and none remain in Nova Scotia where martins formerly nested.

#### *Western states and provinces*

Purple Martins in the West (subspecies *P. s. arboricola* and *P. s. hesperia*) also are not covered well by the BBS due to their limited distributions and numbers. Other information on the status of *P. s. arboricola* is available, however. Gillihan and Levad (2002) estimated only 500–1000 birds in western Colorado where they nest primarily in cavities in Quaking Aspen (*Populus tremuloides*) trees. In California and the Pacific Northwest, members of the Western Purple Martin Working Group have monitored the status of certain martin populations for many years. Martin populations in much of the region declined following the 1960s to 1980s arrival of the non-native European Starling (*Sturnus vulgaris*), an aggressive competitor for nesting cavities (Brown 1981).

The existence of a Purple Martin pre-migratory roost containing 7000–12 000 birds in the mid-1940s at Seattle, WA, (Higman 1944, Larrison 1945) where none is known currently in the entire West illustrates the magnitude of the decline. These 1940s numbers would equate to an estimated 40–60% of the entire West Coast annual post-breeding season population today. Recently, some West Coast populations have made comebacks in response to nest box programs, notably in British Columbia and Washington (Cousens et al. 2005).

In California, in response to effects of starling competition and habitat changes, martins have declined dramatically to a recent statewide population estimate of 950 to 1350 nesting pairs

(Airola and Williams 2008). Martins are now absent from extensive areas of formerly occupied lowland habitat in Southern California and are all but eliminated from the vast interior Central Valley (Airola and Williams 2008) where they were once apparently abundant (Ridgeway 1877). Today, the few martins that remain in the Central Valley nest precariously in concrete bridges in urbanized Sacramento, where starling competition is apparently minimized (Airola and Grantham 2003, Airola et al. 2008).

Remaining populations in the state are threatened by development and other habitat changes that increase local starling populations (Williams 2002). While post-fire management of burned forests has reduced martin habitat value in the past (Airola and Williams 2008), recent extensive wildfires offer opportunities for altered management by federal and state agencies to maintain the resulting enhanced habitat to encourage martin populations. Finally, an incipient nest box program has begun (Kostka et al. 2008).

#### *Alabama and Florida*

Although not usually thought of as constituting a region, the contiguous states of Alabama ( $-1.0\% \text{ yr}^{-1}$ ,  $P = 0.05$ ) and Florida ( $-3.5\% \text{ yr}^{-1}$ ,  $P < 0.01$ ) have significantly declining populations of Purple Martins. Martins remain common, though, and little note of these declines has been made.

#### DISCUSSION

The BBS provides a good means for monitoring the population status of Purple Martins over most of its breeding range east of the Rocky Mountains. BBS results indicate that the overall continental population of Purple Martins has been stable over the 41-year survey period 1966–2006. Understandably, this apparent stability of the continental population does not give agencies and larger nongovernmental organizations cause for concern. Thus, one does not find the Purple Martin on national and international lists of species of concern, for example, the U.S. Fish and Wildlife Service's Birds of Conservation Concern list (U.S. Fish and Wildlife Service 2007), the joint Audubon/American Bird Conservancy's 2007 Watchlist (Butcher et al. 2007), or Partners In Flight Species of Importance lists (Rich et al. 2004). With the exception of the U.S. Forest Service's Rocky Mountain Region 2 listing of the Purple Martin as a "Sensitive" species (Wiggins 2005), the Purple Martin does not appear on regional lists of species of concern.

It is not until one gets down to the state and provincial level that one sees some official designations like “special concern” or “threatened,” that suggest concern for the population status of Purple Martins. A dozen states and provinces concentrated in the Northeast and along the Pacific Coast have applied such designations to Purple Martins.

Despite the overall satisfactory picture for the eastern continental population of Purple Martins, declines in regional populations in the Upper Great Lakes, and in New England and the Maritimes are cause for concern. In these regions, some states and provinces note the decline of the Purple Martin, for example, by listing it as having Greatest Conservation Need in State Wildlife Action Plans. However, although agencies and larger nongovernmental organizations participate in the science that informs us of the status of Purple Martin populations, few of them have taken action to address the declines where noted. By default, the management of Purple Martins has remained largely up to layperson landlords and their supporting martin organizations. This long-standing gap between science and management has not been problematic where martin populations have been stable or increasing, but the gap limits conservation actions where they are in decline.

#### PURPLE MARTIN WORKING GROUPS—BRIDGING THE GAP BETWEEN SCIENCE AND MANAGEMENT

We suggest the formation and continuation of Purple Martin working groups to bridge the science-management gap and address regional declines in Purple Martin populations. Working groups foster collaborative conservation through planning, sharing knowledge, and leveraging resources. In this case, we envision that members of the broader conservation community, for example, Audubon chapters, bird observatories, non-profit conservation organizations, wildlife agencies, and educational institutions, would collaborate with Purple Martin landlords to maintain or restore martin populations. Working groups are needed urgently in Michigan, Minnesota, and Wisconsin which have lost 75% or more of their martin populations since the 1966 beginning of the BBS, and in New England and the Maritimes where some states and provinces are on the verge of losing Purple Martins as breeding birds.

#### *An Example of a Successful Purple Martin Working Group*

Working groups for Purple Martins are not new. The Western Purple Martin Working

Group was formed in 1998 by ornithologist and bird conservation activist J. Cam Finlay to address declines in subspecies *P. s. arboricola*. The Group’s first meeting in September, 1998 at Victoria, British Columbia brought together people and programs that had been working with Purple Martins in the Pacific Northwest. The Group expanded to include diverse representatives from state and federal agencies, universities and conservation organizations, as well as unaffiliated individuals interested in Purple Martins. The Group meets annually, and over the years has developed recovery plans; conducted research on distribution, population status and systematics; educated people; and most importantly, provided housing (Cousens et al. 2005).

Much work remains, but members of the Western Purple Martin Working Group have had impressive success. For example, due to the efforts of the British Columbia Purple Martin Stewardship and Recovery Program and other dedicated volunteers, the number of Purple Martin pairs breeding in British Columbia grew from 5 known in 1985 to 600 in 2006 (Lee et al. 2007), and in Washington from a few known pairs in the 1970s to approximately 700 pairs in 2004 (Cousens et al. 2005).

#### *Forming More Purple Martin Working Groups*

As the Western Purple Martin Working Group illustrates, much can be accomplished when dedicated individuals and organizations cooperate and combine energy and resources to address a common conservation need. At our urging, and following the Western example, two new Purple Martin working groups have formed.

The Minnesota Purple Martin Working Group formed in January 2008. Initial members include the Mille Lacs Band of Ojibwe, Audubon Minnesota, Bird Conservation Minnesota, the Minnesota Department of Natural Resources, the U.S. Fish and Wildlife Service, the PMCA, and two smaller martin organizations, Minnesota Purple Martins, and the East Central Minnesota Purple Martin Recovery. The group has met regularly and is formulating plans, including conducting martin workshops, expanding the annual Minnesota Martifest, assessing martin banding in Minnesota, forming “colony assessment teams” to assist landlords, and developing a catalog of Purple Martin colonies in Minnesota. The last effort involves incorporating a special Purple Martin colony survey into the upcoming Minnesota state breeding bird atlas.

The New England Purple Martin Working Group formed in March 2008 in conjunction with

the meeting of the Northeast Coordinated Bird Monitoring Partnership at Hadley, MA. Initial members include the PMCA, the Connecticut Department of Environmental Protection, Connecticut Audubon Society, New Hampshire Audubon, and unaffiliated Purple Martin landlords and advocates. The New England group will affiliate with the Partners in Flight Northeast Working Group and the Northeast Coordinated Bird Monitoring Partnership.

The New England Purple Martin Working Group faces challenges. Unlike the situation in Minnesota where martin colonies are still relatively common, few colonies are left in New England and the Maritimes. Consequently, few landlords are left to aid in martin population recovery. Success of the New England effort will depend largely on the willingness of wildlife agencies and nongovernmental organizations to get involved with remaining landlords to bolster existing colonies and start new ones. The initial objectives of the New England group are to: raise awareness and expand group representation; survey existing and historic colonies; improve management at existing colonies; identify funding sources for conservation actions; and identify factors that may be limiting martins in New England.

#### DOING MORE FOR DECLINING MARTIN POPULATIONS

While the success of the Western Purple Martin Working Group and the recent formation of the Minnesota and New England groups are gratifying and promising, more remains to be done where Purple Martin populations have declined significantly, particularly in the big martin states of Alabama and Florida, and in two upper Great Lakes states, Michigan and Wisconsin. Densities of martins in Alabama and Florida remain relatively high compared to northern populations, so the immediate formation of formal working groups may not be necessary in these states. However, the conservation community should be concerned about maintaining, if not increasing, the martins that remain in Alabama and Florida. In Wisconsin and Michigan, the situation is more urgent, and the formation of a working group or groups is likely necessary to halt the declines of martin populations.

More research on martin populations would be helpful, particularly on population dynamics, causes of regional declines, dispersal of martins from established colonies, recruitment to new colonies, wintering locations, and survival during migration and wintering. Additionally, new management techniques may be needed to restore martin populations. The innovative work

of the Purple Martin Preservation Alliance in southwestern Pennsylvania is a good example. Formed in 2002, the Alliance has been working to restore a regional population of martins that declined greatly following Hurricane Agnes in 1972. Currently, the Alliance is conducting research on transplanting Purple Martins, and in 2007 successfully moved a family 5 km to a new location (Purple Martin Preservation Alliance 2008). This research will continue in 2008. A workable transplant technique could prove invaluable to the restoration of Purple Martin populations.

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