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Recent Population Status of the American White Pelican: A Continental Perspective

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Abstract.—Breeding bird surveys were conducted at most American White Pelican (*Pelecanus erythrorhynchos*) colonies in North America from 1979-81 and the number of American White Pelicans was estimated at >109,000 breeding individuals in 55 colonies. Although many pelican colonies have not been surveyed since the early 1980s, we present the most current survey numbers available for North American colonies. Using available data (1998-2001) and the North American Continental Divide to delineate eastern from western metapopulations, 27 colonies and 48,240 nests in the East and 15 colonies and 18,790 nests in the West were documented, giving a total of about 134,000 breeding pelicans in North America. The nest numbers of 20 eastern and western colonies that were surveyed during 1979-81 and again in 1998-2001 were also compared to determine if pelican numbers are changing. The number of AWPE nests in those colonies has more than doubled since the 1979-81 surveys. Because current data for colonies in part of the United States and much of Canada are lacking and about 20 years have passed since more complete surveys were done, we propose that regular and coordinated North American pelican surveys should be initiated.

Key words.—American White Pelican, North America, *Pelecanus erythrorhynchos*, population status, surveys

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Independent nesting bird surveys were conducted at most of the American White Pelican (*Pelecanus erythrorhynchos*) colonies in North America from 1979-1981. Using these survey data, Sidle *et al.* (1985) estimated the total numbers of the American White Pelican (AWPE) at >109,000 breeding individuals in 55 colonies. Smith *et al.* (1984) and Paullin *et al.* (1988) noted a marked decrease in the number of colonies west of the North American Continental Divide from a historic high of 23-24 to 5-8 in 1984. During the same period, Sidle *et al.* (1985) reported that numbers were stable or increasing across the remainder of North America. No thorough, coordinated continental surveys have ever been conducted, and many breeding colonies have not been surveyed since the early 1980s (see notable exceptions in these proceedings: Madden and Restani 2005; Shuford 2005; Sovada *et al.* 2005; VanSpall *et al.* 2005). Because the status of many historic AWPE breeding colonies is not known, it is unclear if all are still active, if new breeding colonies have been established in other areas, or if numbers within these breeding colonies have increased or decreased.

Understanding the population status of the AWPE is necessary for developing effective management strategies to ensure healthy populations and to wisely manage human/pelican interactions. For example, there is a need to develop strategies to reduce AWPE impacts on aquaculture in the southeastern United States (King 1997, 2005) and to effectively manage water levels for conservation (Moreno-Matiella and Anderson 2005; Murphy and Tracy 2005). In this paper, we present the most current (1998-2001) survey numbers available for AWPE colonies in North America and, where feasible, compare breeding colony nest numbers and trends from 1979-1981 to 1998-2001.

METHODS

Similar to Sidle *et al.* (1985), our numbers and locations of breeding colonies and nests were derived from specific surveys conducted by many individuals from 1998-2001. The nest estimates were doubled to obtain a breeding bird estimate. State and federal managers and other biologists working with the AWPE were contacted to obtain the latest survey data available for their regions (Appendix 1). The North American Continental Divide was used to delineate eastern and western breeding colonies and metapopulations (Evans and Knopf

1993; Johnsgard 1993; Anderson and King 2005). The data were then compared with respect to eastern and western breeding colonies and in 1979-1981 and 1998-2001. Only data from the 20 breeding colonies surveyed during both periods were used in our comparisons of metapopulation trends. The use of only paired-data could represent a bias, because nearly all of the smaller western metapopulation was surveyed, whereas recent data for a portion of the eastern metapopulation could not be obtained. It is also important to note that the western metapopulation of the AWPE was already severely reduced from historical numbers (Smith *et al.* 1984; Paullin *et al.* 1988) prior to our recent comparisons. However, we were interested to determine if there were indications of a more recent increase or decline. Breeding colony locations and sizes were mapped using ArcView 3.2a (Environmental Systems Research Institute 2000). Breeding Bird Survey (BBS) data (Sauer *et al.* 2003) were also examined to obtain an independent evaluation of trends.

RESULTS

The locations and numbers of nests for 42 breeding colonies surveyed in North America from 1998-2001 (Fig. 1) were obtained. We were not able to obtain recent breeding colony data from Manitoba (except for Lake Winnipegosis), Saskatchewan, or Tamaulipas, Mexico. Twenty-eight (66%) breeding colonies had ≤ 750 nests. Chase Lake, North Dakota had the highest number of nests (14,900) and was the largest single breeding colony in North America (Table 1; see also Sovada *et al.* 2005). Chase Lake was followed in abundance by Gunnison Island, Utah with 8,000 nests. Using 1998-2001 survey data, 67,000 AWPE nests were recorded in North America. If there are 134,000 breeding individuals and the assumption is made that 15% of the total numbers are non-breeding birds (Lies and Behle 1966; Evans and Knopf 1993), we estimate the total numbers of the AWPE at over 157,000 individuals. Because the current status of many colonies surveyed during 1979-81 is not known and several other colonies were not surveyed during 1998-2001, our estimate is conservative for the time-period covered.

Using available data (1998-2001) and the North American Continental Divide to delineate eastern from western breeding colonies, 27 eastern breeding colonies with 48,240 nests and 15 western breeding colonies with 18,790 nests were identified (Fig. 2). The western metapopulation represent-

ed 28% and the eastern metapopulation 72% of the numbers of breeding AWPE surveyed. The number of nests in the 20 breeding colonies surveyed in the eastern and western regions during 1979-81 and again in 1998-2001 have doubled since the 1979-81 surveys (Fig. 3).

U.S. Department of Interior Breeding Bird Survey data trends (Sauer *et al.* 2003) indicated that, overall, the total numbers of AWPE have increased by $4.8\% \text{ yr}^{-1}$ (or about doubled) between 1980 and 2002, but it was not possible to precisely separate the two metapopulations. Looking specifically at the totals from our surveys using only our paired-data samples, the number of nests in the 20 colonies surveyed in the eastern and western regions at least doubled (+106%) since the earlier surveys (Fig. 3), similar to the trend observed by Sauer *et al.* (2003).

DISCUSSION

Making meaningful comparisons between 1979-1981 and 1998-2001 data are difficult because several colonies surveyed during 1979-1981 have not been surveyed in recent years. Although recent data for all of the breeding colonies in North America were not acquired, the data presented indicate an increase in AWPE numbers throughout the areas surveyed, during the period that was examined. Similarly, the North American Breeding Bird Survey data show AWPE numbers increasing (Sauer *et al.* 2003).

The increase in the numbers of nesting birds in surveyed breeding colonies may have resulted from a number of factors. For example, the expansion of the aquaculture industry in the southeastern United States may have enhanced eastern metapopulation pelican winter-survivability by providing an abundant, readily available food source (King 1997, 2005; King and Grewe 2001). A possible link between aquaculture and the western AWPE metapopulation status remains untested, although aquaculture in western Mexico is known to be one of the fastest expanding industries in that region (Anderson *et al.* 2003), and the Salton Sea, with huge populations of introduced fish,

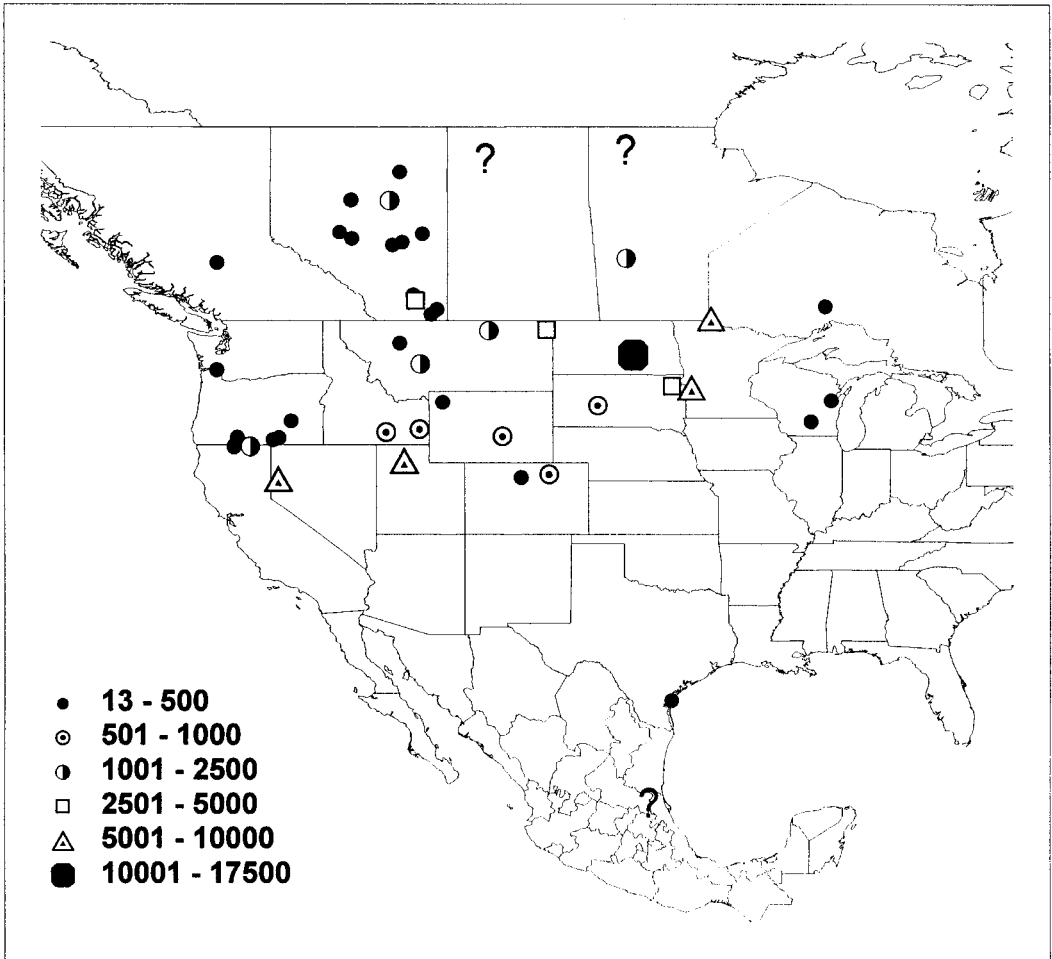


Figure 1. Locations of American White Pelican breeding colonies and their relative sizes, 1998-2001. Provinces and states with historic AWPE colonies but lacking recent data are identified with "?".

has become an important wintering and migratory-passage area for AWPE (Shuford and Molina 2004). Also, climate changes such as drought to wet periods may have positively affected AWPE numbers (Sovada *et al.* 2005).

The AWPE appears to be expanding its breeding range eastward with the recent establishment of new breeding colonies in Wisconsin (S. Matteson, pers. comm.). Because many historic AWPE breeding colonies have not been surveyed since the early 1980s, it is unclear if these new breeding colonies were established as numbers increased or if some un-surveyed historic breeding colony sites became unsuitable for breeding AWPE resulting in colony relocation. Dynamic water

levels throughout much of the AWPE breeding range may have caused the abandonment of some historic breeding colony sites leading to the establishment of new breeding efforts in areas with more viable resources. Although AWPE numbers were increasing in many parts of Canada and the United States into the early 1980s (Sidle *et al.* 1985), and still appear to be increasing in areas that were recently surveyed, the lack of current, continent-wide breeding colony and nesting numbers frustrates our efforts to reliably determine the current status of the AWPE throughout its breeding range. Additionally, information on the numbers of non-breeding and immature AWPE is lacking except

Table 1. American White Pelican breeding colony locations, number of nests and year of survey in North America, 1998-2001.

State/Province	Name	No. Nests ^b	Year	1979-81 ^d
A. Eastern: ^a				
Alberta	Beaver Hill Lake	150	1998	41
	Buffalo Lake	300	1998	
	Chip Lake	20	1998	
	Joseph Lake	500	1998	
	Lake Newell	20	1998	
	Lower Therien Lake	50	1998	
	Namur Lake	300	1998	
	Pakowki Lake	50	1998	
	Pelican Lake	1,050	1998	
	Hays Reservoir	3,850	1998	
	St. Mary Reservoir	80	1998	
	Utikuma Lake	150	1998	
Colorado	Antero Reservoir	? ^c		165
	Arapaho NWR ³	150	2001	
	Riverside Reservoir	750	2001	
Manitoba	Lake Winnipegosis	2,500	1999	1,718
	Other areas	? ^c		
Minnesota	Marsh Lake WMA ^c	6,000	2001	961
	Lake of the Woods	6,400	2001	
Montana	Bowdoin NWR	1,650	2000	1,192
	Medicine Lake NWR	4,250	2001	
North Dakota	Chase Lake NWR	14,900	2001	6,142
Ontario	Lake Nipigon	300	2001	
South Dakota	Bitter Lake	3,000	2001	1,900
	LaCreek NWR	750	2001	
Saskatchewan		? ^c		
Tamaulipas	Laguna Madre	? ^c		
Texas	Laguna Madre	200	2001	
Wisconsin	Cat Island	200	1999	
	Horicon Marsh NWR	20	1999	
Wyoming	Pathfinder Reservoir	650	2001	
B. Western: ^a				
British Columbia	Stum Lake	350	2001	120
California	Clear Lake NWR	1,600	2001	1,571
	Lower Klamath NWR	30	2001	
Idaho	Blackfoot Reservoir	800	2001	750
	Minidoka NWR	550	2001	
Montana	Arod Lake	300	2001	
	Canyon Ferry	1,800	2000	
Nevada	Anaho Island NWR	3,950	2001	2,880
Oregon	Crump Lake	200	2001	250
	Malheur NWR	300	1998	
	Upper Klamath NWR	260	2001	
	Pelican Lake	200	2001	
Utah	Gunnison Is. NWR	8,000	2001	3,023
Washington	Columbia River	150	1999	
Wyoming	Yellowstone Lake	300	2001	285
Subtotal East		48,240		
Subtotal West		18,790		
Total		67,030		

^aSeparation of Eastern and Western metapopulations is described in the text and based on Anderson and King (2005).

^bNumbers reported to us by cooperators (Appendix 1) were rounded to the nearest 50 in all cases except for colonies reported as <100, which were rounded to the nearest 10.

^cAbbreviations: NWR = National Wildlife Refuge; WMA = a wildlife management area; Is. = Island; ? = no survey data.

^dNest numbers reported in Sidle *et al.* 1985 used for comparison of population trend.

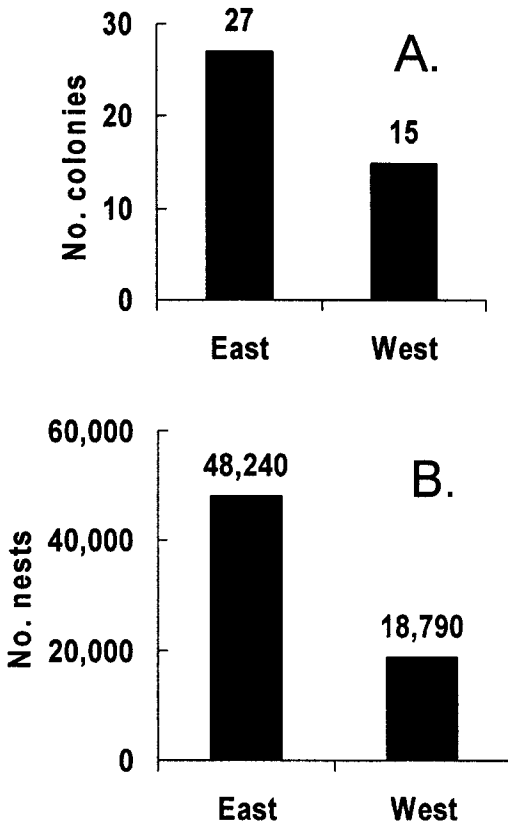


Figure 2. Numbers of American White Pelican breeding colonies and nests east and west of the North American Continental Divide, 1998-2001. Colonies without recent data were excluded.

for irregular observations of birds in typical wintering habitats during the summer months. Insufficient survey data for many breeding colonies and regions precludes development of a suitable breeding AWPE index and underscores the need for coordinated surveys to be initiated in the near future. These data may be combined with information on population dynamics, abundance, distribution and habits of non-breeding individuals, as part of an AWPE monitoring program. Sidle *et al.* (1985) recommended the establishment of a continental monitoring program for AWPE nearly 20 years ago. We echo their recommendation and urge all interested parties to work toward the establishment of a continental monitoring program. Further, we recommend a survey of all breeding colonies every

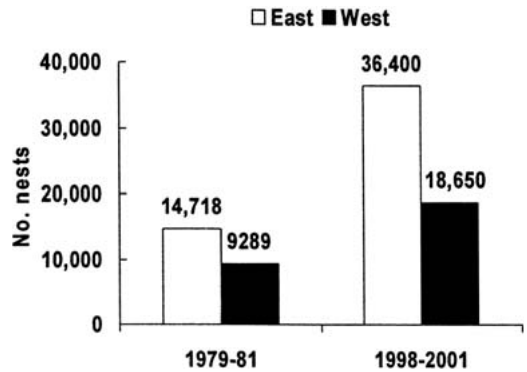


Figure 3. Comparison of American White Pelican nest numbers for 1979-81 vs. 1998-2001 and East vs. West of the North American Continental Divide. Only data from colonies surveyed during 1979-1981 and 1998-2001 were used (N = 20).

10 years and we encourage managers to continue or establish annual breeding colony monitoring where feasible.

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Appendix 1. American White Pelican survey co-operators' names and affiliations.

Janice Anderson	Ministry of Water, Land and Air Protection, British Columbia
Mike Artman	LaCreek NWR ¹ , Martin, South Dakota
John Beckstrand	Upper Klamath NWR, California
Styron Bell	Anaho Island NWR, Nevada
Gene Blaylock	Corpus Christi, Texas
Steve Bouffard	Minidoka NWR, Idaho
Howard Browers	Umatilla NWR, Washington
Andrea Cerovski	Department of Game and Fish, Wyoming
L. H. Dewey	Division of Wildlife Resources, Utah
Jeff DiMateo	Department of Natural Resources, Minnesota
Mick Erickson	Chase Lake NWR, Woodworth, North Dakota
Paul Hendricks	Montana Natural Heritage Program, Missoula, Montana
Gary Ivey	Malheur NWR, Oregon
Gerry Kemp	Edmonton, Alberta
Rolf Kraft	LaCreek NWR, Martin, South Dakota
Bill Koonz	Dept. Natural Resources, Manitoba
Doug Leschisin	Waubay NWR, South Dakota
Rich Levad	Rocky Mountain Bird Observatory, Colorado
Beth Madden	Medicine Lake NWR, Montana
Scott Lockhart	Ministry of Natural Resources, Ontario
Val Macins	Ministry of Natural Resources, Ontario
A. E. Manning	Division of Wildlife Resources, Utah
Summner Matteson	Department of Natural Resources, Wisconsin
Dave Mauser	Upper Klamath NWR, California
Wayne Nelson	Sustainable Resource Development, Alberta
Kit Novick	Department of Fish and Game, California
Don Paul	Division of Wildlife Resources, Utah
Diane Penttila	Horicon Marsh NWR, Wisconsin
Kory Richardson	USFWS Valley City Wetland Mgmt. District, North Dakota
Keith Roney	Royal Museum, Regina, Saskatchewan
Ron Ryder	Colorado State University, Colorado
Bill Shultz	Sand Lake NWR, South Dakota
Julie Steciw	Ministry of Water, Land and Air Protection, British Columbia
Martin St. Louis	Dept. of Fish and Game, Oregon
Rob Swanison	Ministry of Natural Resources, Ontario
Katharine VanSpall	Ministry of Water, Land and Air Protection, British Columbia
Martha Wackenhut	Department of Fish and Game, Idaho
Donna Withers	Anaho Island NWR, Nevada

¹NWR = National Wildlife Refuge.