



Feature Articles

Satellite and Conventional Telemetry Study of American White Pelicans in Northern Nevada

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Large-bodied soaring birds pose a serious threat to aircraft and human life when birds and planes collide, as demonstrated by the 1998 loss of an Iowa Air National Guard F-16 to a flock of American White Pelicans (*Pelecanus erythrorhynchos*) south of Ainsworth, Nebraska. Accordingly, the Raptor Research Center (RRC) at Boise State University and the Center for Conservation Research and Technology at the University of Maryland-Baltimore County (CCRT) have been developing a model to predict soaring bird flight patterns for the Department of Defense's Legacy Environmental Program. Fallon Naval Air Station in Nevada's Lahontan Valley is the U.S. Navy's premier naval air training facility. From April through September, thousands of American White Pelicans forage in the extensive Lahontan Valley wetlands within the Air Station's military operating area. In 1996-97 we outfitted 17 pelicans with satellite received transmitters, which also incorporated altitude sensors and conventional telemetry technology. These birds were tracked by auto and light aircraft as they made cross-country soaring flights between a large pelican colony at Pyramid Lake, Stillwater National Wildlife Refuge and other wetland foraging sites. Altitude data were recorded continuously during these flights and integrated with detailed meteorological observations. As a result of this study we are producing a working model that uses weather forecasts to predict flight altitudes of pelicans in and around the Lahontan Valley 36 hours in advance.

Previous research has shown that: 1) American White Pelican populations are broadly divisible into two groups (Western and Prairie) with distinct breeding distributions and migratory pathways on either side of the Continental Divide, and little interchange between groups; 2) in fall the Western population migrates in a broad front to the southern half of California and western Mexico, usually wintering where minimum January temperatures stay above 4° C (39.2° F); 3) in spring first arrivals on breeding grounds range from late February in Nevada to late April in northern Alberta; and 4) band recoveries of the Nevada population come primarily from California and Mexico. Our study enabled us to garner significant new information on the movements of American White Pelicans.

Telemetry methods

In May and June of 1996 we captured seven pelicans in foraging areas at Stillwater NWR. Captures were accomplished at night by hand net, net gun, and rocket net. In May of 1997 we captured five pelicans by hand at night in the nesting colony at Anaho Island, Pyramid Lake. In June we captured an additional five birds at Stillwater, again using rocket nets at night. Transmitter packages weighing 110 g (3.88 oz.) were attached to pelicans using individually fitted backpacks constructed of teflon ribbon. Packages included both a conventional transmitter at 216 MHz and a Platform Transmitter Terminal (PTT) at 401.65 MHz. The latter signal, when received by Argos satellite, is used by Service Argos to calculate and report the unit's position. Pressure sensors were also integrated for acquisition of altitude data. In 1996 PTT's were active for 14 of each 26 hours for the first three months, then changed to a more intermittent schedule. In 1997 the units became active continuously during early June to early July, then changed to a more intermittent schedule. Positions were downloaded from Argos at four-day intervals and analyzed.

Individual Movements

A brief summary of each bird's movements follows. Some PTT identity numbers were duplicated in 1996 and 1997, but all 17 pelicans were different individuals. PTT batteries lasted varying lengths of time, but the 1997 units were programmed to last longer. Five of the 1997 units continued to transmit until the subjects returned to Northern Nevada in 1998. All dates refer to the year in which a transmitter was attached unless otherwise noted.

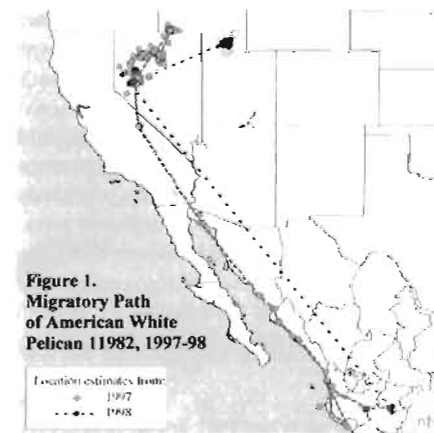
- 5716 (1996) remained in the study area for one month after capture. It briefly used Malheur NWR, Oregon during its relocation to the Payette, Idaho area. Leaving that area in mid September, it stopped briefly near the Great Salt Lake, Utah on its way to the Salton Sea in southern California. In mid October it migrated down the west coast of mainland Mexico, arriving on the coast of Colima state by December 2.
- 5717 (1996) used the study area for almost seven weeks before an unusual weather pattern assisted it in a swift relocation to the area of Logan, Utah. In early September it left that area and traveled to the Salton Sea where it remained until at least October 11.
- 5718 (1996) stayed in the area, and remained at Stillwater NWR on October 23, just prior to PTT battery failure.
- 5719 (1996) quickly relocated to California's Central Valley. A location on September 28 placed it near Milpitas, California, at the southern end of San Francisco Bay.
- 11982 (1996) used the study area for eight days after capture before making the first of seven round trips to the Central Valley. Absences from the area varied from two to eight days, and this was the only 1996 individual to return to the Lahontan

Valley after leaving. On August 21 it left Northern Nevada for the central Oregon/California border. A location on September 23 placed this individual near Tule Lake NWR, California.

- 11983 (1996) stayed in the study area for 3.5 weeks, then moved south some 50 miles from Fallon to the Walker Lake area. After foraging in that vicinity for about 5 weeks, it relocated to the Central Valley. On August 26 this individual was placed west of Merced, California.
- 11984 (1996) used the Fallon area for five weeks after capture, then relocated to the Central Valley. On November 27 it was to the east of Riverside, California.
- 5710 (1997) relocated to the Central Valley in mid-September. By September 21 it had reached the Salton Sea, where it lingered for almost a month before reaching the Colorado River Delta. It continued to wander southward into Mexico, visiting the Baja Peninsula, Sonora state, Chihuahua state, and arriving on November 17 at the border of Nayarit and Sinaloa states. By January 11, 1998 it was on the border of Guanajuato and Michoacán states, and its last good position came from coastal Nayarit state on February 23, 1998.
- 5716 (1997) left the study area after about six weeks for the Central Valley. Arriving at the Salton Sea by October 20, it had moved to coastal Sinaloa by November 1. A northward movement placed it in Sonora on February 23, 1998. Some four weeks later it was northeast of Barstow, California, and was positioned on April 1, 1998 to the east of Palmdale. Six days later it arrived in Northern Nevada via the Sacramento area.
- 5717 (1997) stayed in northern Nevada for 2.5 months after capture, then moved north to Burns, Oregon, probably visiting Malheur NWR. It was positioned at Parma, then Buhl, Idaho before arriving at Bear River NWR, Utah by August 28. On September 21 this pelican was near Greybull, Wyoming, and a month later arrived at the Salton Sea. Although in January, 1998 we still intermittently received transmissions, our last good fix was November 9 on the coast of Sinaloa state.
- 5718 (1997) began the first of three round trips between Pyramid Lake and the Central Valley on May 29. Our final reception verified its return from the last trip on June 8.
- 5719 (1997) wandered relentlessly and we were often unable to get good positions from its PTT. Initially this bird covered much ground around Northern Nevada before relocating to the Central Valley on June 18. On September 3 it appeared briefly 30 miles south of Hawthorne, Nevada, but was back in the Central Valley two days later. Our next accurate fix was from Jalisco state in Mexico on January 8, 1998. By April 8, 1998 it had returned to Fallon.
- 5720 (1997) stayed in Northern Nevada until its appearance at the Salton Sea on October 1. On November 6 it was at the Colorado River Delta, and by January 10, 1998 it had returned to the Salton Sea.

- 5722 (1997) relocated to the Central Valley about 10 days after capture, and reached the Salton Sea by October 15. Four days later it was at the Colorado River Delta, and four days after that on western coastal Baja California Sur state. By March 11, 1998 it had moved farther north in Baja, and was east of the Salton Sea two days later. We confirmed its presence in Fallon on April 5, 1998.

- 11982 (1997-98) stayed in northern Nevada for 1.5 months after capture, then moved northeast to the Duck Valley Indian Reservation on the Idaho border (see Figure 1). Returning briefly to the study area at the end of September, this bird moved south around October 5. By October 8 it had crossed the Mexican border and later spent the winter near the border of Guanajuato and Michoacán states. We confirmed its return to Northern Nevada on April 30, 1998. It moved to the Great Salt Lake by July 17, 1998, and remained there at the end of September.



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- 11983 (1997) moved to the Central Valley five days after capture, but returned after another five days. Four days later it returned to the Central Valley, visiting Grizzly Bay and lower San Francisco Bay. In early November it moved to the Salton Sea. On March 10, 1998 it was west of Bishop, California, and we confirmed its return to Pyramid Lake on March 14, 1998.
- 11984 (1997) crossed the Sierra Nevada mountains eight days after capture and died in the western foothills near Lone, California. We located the scavenged remains July 31 on a wooded hillside in rolling blue oak savanna habitat. The harness was intact as fitted, and could not have interfered with flight mechanics. Evidence suggested gunshot or Golden Eagle depredation as cause of death.

Behavior

Typically, pelicans made local movements in groups of a few to several hundred birds. We found no evidence that pelicans fitted with transmitters behaved differently from other birds and assume that our data are applicable to the general American White Pelican population.

Significant movements were usually facilitated by rising in one thermal updraft and gliding to another in repetition. During these glides airspeeds of over 113 kmph (70 mph) were attained. It was not unusual on days of deep thermal formation for pelicans to be

greater than 3.2 km (2 miles) above the ground during these movements. Wherever an individual went, it usually had a choice of different flocks heading in the same direction. These flocks were dynamic in nature, with individuals intermittently leaving and joining. Often our subjects would join several different flocks during the course of a cross-country movement. Round trips exceeding 322 km (200 miles) were a common occurrence. It was also noted that on days of inclement weather with little or no thermal activity, birds were capable of making these trips under their own power. Fewer birds made such movements on those days, however, and we suspect the demands of feeding young provided the impetus for those involved.

While we observed fairly consistent numbers of American White Pelicans in Lahontan Valley during our core study period, our research suggests they were not always the same individuals. There is apparently a previously unsuspected degree of interchange among American White Pelicans in different parts of the inter-mountain west. Non-breeding adults, which are not tied to an area by nesting demands, might stay in one place for only the briefest of periods. The movements of 11982 (Figure 1), by all indications a non-breeder in 1997 and 1998 during the spring and summer months of both years, demonstrate that even a single individual may have no set pattern to its wanderings from year to year.

American White Pelicans were observed to engage in significant travels for reasons that were not apparent. One non-breeder joined a flock leaving Carson Lake for Pyramid Lake and then returned to its point of departure with another flock, never having landed. This bird might have made the 161 km (100 mile) round trip because it was drawn to the behavior of the flock, or to gather information for future foraging or breeding activities.

In 1997 six of the eight subjects with transmitters active into the late fall used the Salton Sea for varying periods. In 1996 transmitters did not last long into the fall, but at least two of the six birds used the Salton Sea. During August-November 1996, over 8500 American White Pelicans (estimated at 10% of the western population) died during a major outbreak of botulism at the Sea. Of 161 banded birds recovered during the die-off, 87 (54%) had been banded at Pyramid Lake. Our data further illustrate the connection between these two areas and the vulnerability of Nevada's breeding population to the ongoing problems in the Salton Sea ecosystem.

Our results have given us information on movement capabilities and inclinations of this species, and the sometimes dramatic influences of weather. On August 5, 1996 Nevada experienced an unusual summertime upper-level trough, with winds aloft occasionally reaching over 64 kph (40 mph) from the southwest and west-southwest. Number 5717 left the Fallon area sometime after 0919, and was to the north of the Great Salt Lake within ten hours. Over the final 2.5 hours of the journey it averaged almost 113 kph (70 mph), obviously aided by a significant tailwind. In 1996 number 11982 made seven round trips to California's Central Valley, each of which involved two crossings of the Sierra Nevada range. In 1997 number 5718, a breeder, had already made three such round trips when its transmitter inexplicably went off the air after one month.

In summary, we found the American White Pelican to be a highly mobile species.

capable of and inclined to travel at altitudes and speeds that belie its cumbersome and deliberate stereotype.

Acknowledgments

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Status of the Northern Goshawk in the Great Basin

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Introduction

The Northern Goshawk (*Accipiter gentilis*) is the largest of the accipitrine hawks and is closely associated with riparian, forested habitats. The name is derived from the Old World name of "grouse-hawk," shortened centuries ago to goshawk. The goshawk is circumpolar in distribution with nesting activity in North America restricted primarily to the western and northern United States, Canada and Alaska. Wintering birds can be found as far south as northern Mexico. Because of the hawk's secretive nature and the relatively secluded forested areas that it inhabits, it was initially classified as a very rare nesting species in Nevada by many ornithologists. However, over two decades of surveys since 1974 have resulted in locating over 250 nesting territories that were occupied by adults. In 1985 the Division of Wildlife estimated that there were approximately 300 nesting pairs present in the State. That estimate appears to have been conservative.

A typical goshawk nest site in Nevada is located in an aspen stringer at least 600 feet long and from 75 to 300 feet wide. Almost without exception there is never more than one goshawk nesting territory located in a single drainage. The distance between drainages containing suitable nesting habitat may vary from one-half mile to over 10 miles. The majority of nesting occurs near small perennial streams at approximately 7400 - 7800 feet in elevation. Over 90 percent of documented nests are located in aspen. Since most surveys have been conducted in aspen communities, conifer nest sites are undoubtedly under represented in the survey data.

A typical nest is over 30 inches in diameter and is constructed in a mature tree (35-50 feet tall) and positioned in an upper crotch near the trunk, below the canopy top. There are usually numerous nests that were constructed in previous years within a