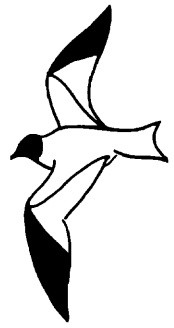


# WESTERN BIRDS



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## **SEABIRDS CARRIED INLAND BY TROPICAL STORM NORA**

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Every year about 15 cyclones form off the southwest coast of Mexico or regenerate there from Caribbean storms that have crossed Central America; about half of these become hurricanes. Prior to the 1970s, these storms were thought to have no effect on weather in the United States. Court (1980) brought a new perspective to eastern Pacific cyclones when he showed that 40 storms occurring between 1904 and 1980 had affected the western United States.

It should surprise no one then that with so few tropical storms reaching North America from the Pacific much is left to be learned about their effects on birds and the potential for unusual displacements, especially of coastal and pelagic species inland. In 1976, Tropical Storm Kathleen gave ornithologists a glimpse of such effects when it stranded hundreds of seabirds in the desert southwest, primarily at the Salton Sea (Kaufman 1977, McCaskie 1977). Tropical Storm Nora provided another opportunity for study with an unprecedented number of seabirds found in Arizona along the Colorado River and, to a lesser degree, at the Salton Sea.

### TROPICAL STORM NORA

Nora formed late on 15 September 1997, roughly 480 km southwest of Acapulco in a large area of disturbed weather that was likely related to a tropical wave (a disturbance or trough of low pressure that moves from east to west through the tropics, generally creating only a shift in winds and rain but often associated with the development of cyclones) that crossed from Africa into the Atlantic hurricane basin in late August. The southern part of this wave crossed the Caribbean Sea and northern South America, arriving in the eastern Pacific 12 September. Nora reached tropical storm status on 16 September and became a hurricane with a large ill-defined eye on 18 September. Traveling parallel to the west coast of Mexico, the hurricane passed over the Revillagigedo Islands with a very broad eye (92 km

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wide) on 22 September. Moving west of Baja California, Nora came under the effects of a low-pressure trough to the northwest, which steered it northward. Nora made a direct hit on Punta Eugenia, Baja California Sur, 24 September and brought floodwaters to its second landfall about 95 km south of San Fernando, forcing 350 to 400 people from their homes (Rappaport 1997).

Accelerating overland, Nora crossed the Baja California peninsula, skirted the western shoreline of the Gulf of California and entered the United States, as a tropical storm, along the Arizona-California border. Further weakening ensued, and by 1700 on 25 September Nora was a tropical depression near Rice Valley, California, with winds of 48 km/hr. Yuma received a peak wind gust of 75 km/hr and 8.9 cm of rain. The storm dissipated over the next two days while moving northeastward through Arizona, Utah, Colorado, Idaho, and Wyoming (Rappaport 1997).

For birders, the timing of the storm as it hit the Lower Colorado River valley was rather unfortunate, allowing only a few hours for looking for birds before darkness fell. Interestingly, though, during the height of the wind (56 to 72 km/hr) gulls and terns at Lake Havasu were unfazed. They were actively feeding over the water, fighting and chasing each other vigorously for food that had either welled up from lower depths or was swept down with the runoff from higher ground.

Following the storm on the morning of 26 September birders were out in force; Arizona and southern California were well covered, and, once word got out of the storm-petrels at Lake Havasu and the Salton Sea, people continued reporting for weeks. Observers as far away from the storm track as Willcox and Picacho Reservoir in eastern and central Arizona reported their sightings; they had anticipated the possibility of unusual birds. This level of reporting contributed greater detail on the activities of storm-driven birds than was provided in the early days after Kathleen, which flooded and washed out many access roads.

## BIRDS ASSOCIATED WITH NORA

At the north end of Lake Havasu, Mohave Co., Steve Ganley, Charles Babbitt, and I observed an apparent Black-vented Shearwater (*Puffinus opisthomelas*) on 26 September. Jim Burns and Bud Johnson saw two following a boat the next day at the same location. The original written descriptions are on file with the Arizona Bird Committee at the University of Arizona bird collection (no photograph was taken nor specimen collected). Only one shearwater had been seen in Arizona prior to Nora, a Sooty Shearwater (*Puffinus griseus*) found dead near Wellton, Yuma Co., on 6 June 1971 (Quigley 1973, Univ. Ariz. 10316). Inland southern California records include a Wedge-tailed Shearwater (*Puffinus pacificus*) at the Salton Sea, Riverside Co., 31 July 1988 (McCaskie and Webster 1990) and a Buller's Shearwater (*Puffinus bulleri*) at the same location on 6 August 1966 (Audubon Field Notes 20:599, specimen in the San Bernardino County Museum). There have also been eight records of the Sooty Shearwater from Imperial and Riverside counties, all between April and August (Patten and Minnich 1997). None of the region's previous records are

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thought to be storm related (Patten and Minnich 1997). The Black-vented and Sooty are the most common shearwaters of the northern gulf, and it seems reasonable to infer that the Lake Havasu birds came from there. However remote the chance that a bird could survive in the eye long enough to make a trip from Revillagigedo Islands, it may be difficult to rule out Townsend's Shearwater (*Puffinus auricularis auricularis*) entirely.

Two birds reported as Leach's Storm-Petrels (*Oceanodroma leucorhoa*), one dark-rumped and one white-rumped, were briefly observed by Bill Howe at the north end of Lake Havasu on 26 September. The original written description is on file at the University of Arizona. There are no accepted records for Arizona. In southern California, Kathleen was responsible for a dark-rumped individual at the Salton Sea on 15 September 1976 (McCaskie 1977), and a white-rumped individual was at the mouth of the Whitewater River 30 June–21 July 1984 (McCaskie 1984).

Approximately 40 Black Storm-Petrels (*Oceanodroma melania*) were seen and photographed at Lake Havasu on 26 and 27 September (Figure 1). Reports were from the mouth of Bill Williams delta, Takeoff Point, Cattail Cove, the north end, and from the California side in San Bernardino Co. (many observers). The last report was of eight birds on 30 September by E. A. Cardiff and Dori Myers. At the south end of the Salton Sea, J. Coatsworth reported three or four birds on 27 September. The number there fluctuated with a high of 17 on 11 October (M. A. Patten). The last report was on 9 November (H. King). There were no previous records for Arizona. Inland records in southern California are from the north end of the Salton Sea, Riverside Co., 21 September 1986 (McCaskie 1987) and King's Canyon National Park, Tulare Co., 5 October 1994 (Yee et al. 1995). Although the



Figure 1. Black Storm-Petrels, Lake Havasu, 26 September 1997.

Photo by William Grossi

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bird at the Salton Sea was not storm related, the one at King's Canyon was thought to be associated with a nontropical Pacific storm.

Between 100 and 200 Least Storm-Petrels (*Oceanodroma microsoma*) were seen and photographed at Lake Havasu on 26 September (many observers). The number went down to 40 to 60 the next day, and from 28 September to 1 October only one to six birds were reported. The birds were seen at the mouth of the Bill Williams delta, Takeoff Point, Cattail Cove, the north end, and from San Bernardino Co. in California. Two dead Least Storm-Petrels were picked up at Lake Havasu, one 26 September (C. Tomoff, Univ. Ariz. 17724; Figure 2), the other 3 October (D. Stejskal, Univ. Ariz. 17817). At the south end of the Salton Sea three birds were found 27 September (D. K. Adams), with one still present 20 October (G. McCaskie). Kathleen brought three individuals to Arizona, two at Lake Mohave, Mohave Co., 12 September 1976 and one at Davies Dam, Mohave Co., 17 September 1976 (Monson and Phillips 1981). The only other Arizona record, related to the remnants of Hurricane Lester, is of a bird at Patagonia Lake, Santa Cruz Co., 24 August–5 September 1992 (Rosenberg and Stejskal 1993). In California, Kathleen brought 500–1000 birds to the Salton Sea (McCaskie 1977). Another was found at the Whitewater River delta 10 July 1993, the only interior California record not associated with Kathleen or Nora (Patten and Minnich 1997).

Black and Least storm-petrels are common in both the northern gulf and along the northern end of Nora's track in the Pacific, making their origin



Figure 2. Least Storm-Petrel, Lake Havasu, 26 September 1997.

Photo by Troy Corman

difficult to assess. The mountains of Baja California, however, should have blocked the arrival of a large number of birds at Lake Havasu from the Pacific. It seems more plausible that the majority of Nora's storm-petrels (including Leach's) were swept into the storm from the gulf. Some of the storm-petrel reports from the Salton Sea were probably of birds from Lake Havasu that had found their way to this inland sea rather than to the gulf (McCaskie 1998). Some storm-petrels at Lake Havasu on 26 September were reported as weak and tired while many others appeared to be fine. One observer commented that some probably did not survive for too long after they were seen.

An adult Red-billed Tropicbird (*Phaethon aethereus*) was found by Pamela Beare in Imperial County, California, on 27 September. The bird was picked up on Highway 78 between Palo Verde and Midway Well and taken to Sea World, where it died later that day (San Diego Natural History Museum 49913). A Kathleen-related bird in Morongo Valley on 11 September 1976 (McCaskie 1977, San Bernardino County Museum) provides the only other inland record for southern California. Arizona has six tropicbird records; only one, the state's lone White-tailed Tropicbird (*Phaethon lepturus*), was storm related. It was picked up in Scottsdale, Maricopa Co., 22 August 1980 (Monson and Phillips 1981, Smithsonian) and was thought to be associated with a tropical depression that moved into the state from the Gulf of Mexico.

Lin Piest saw 21 frigatebirds ahead of the storm at Telegraph Pass east of Yuma, Yuma Co., on 25 September. It is very likely these birds were all Magnificent Frigatebirds (*Fregata magnificens*), common in the northern Gulf of California. With no physical documentation, however, ruling out the Great Frigatebird (*Fregata minor*) entirely may be difficult. Aside from a flock of 22 at the north end of the Salton Sea in 1979, those at Telegraph Pass represent the largest flock for the interior southwest (Patten 1998, Mlodinow 1998) and by far the highest number ever for Arizona.

An immature Blue-footed Booby (*Sula nebouxii*) at the north end of the Salton Sea 28 September–6 October may have been storm related, but this species wanders north from the gulf sporadically at this time of the year (McCaskie 1970, Garrett and Dunn 1981). In Arizona, there are 12 accepted records (Monson and Phillips 1981, Rosenberg and Witzeman 1998) from the central and western parts of the state, all of birds that wandered from the gulf in fall.

Two Least Terns (*Sterna antillarum*) were seen on 26 September, one at Lake Havasu (W. Grossi), the other at the Ajo sewage ponds, Maricopa Co. (D. Tiller). This species has been seen in Arizona in increasing frequency the past several years, primarily as a late spring or early summer visitor (Rosenberg and Witzeman 1998). At the Salton Sea, it is regular in small numbers from late April through mid-July. The late date of those seen 26 September 1997 seems to support their association with Nora.

A Black Skimmer (*Rynchops niger*) was seen at Lake Havasu on 26 and 28 September (B. Raulston, J. Burns). There are fewer than 10 Arizona records (Rosenberg and Witzeman 1998). At the Salton Sea hundreds of pairs nest annually. Because Nora's track probably would have blocked a bird from wandering to Lake Havasu from the Salton Sea, it is likely this bird was driven from the gulf.

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I saw two Sabine's Gulls (*Xema sabini*) during the storm from Kiwanis Park at Lake Havasu on 25 September and counted eight at the north end of Lake Havasu the following day, the largest concentration ever reported in Arizona. Sabine's Gulls were reported through 28 September. At both the Salton Sea and in Arizona, this species is found in very small numbers during fall migration. Therefore, the high number of individuals involved makes it more likely the birds were carried north from the gulf rather than slowed on their southward migration.

Charles Babbitt, Steve Ganley, and I noted two Parasitic Jaegers (*Stercorarius parasiticus*), one immature and one adult, at the north end of Lake Havasu on 26 September. There are five accepted records for Arizona (Rosenberg and Witzeman 1998). These birds could have been carried north from the gulf, where they are probably common at this time of year, or they may have been moving southward during their normal migration.

### DISCUSSION

Most of what is known about bird movements and tropical storms has been learned from cyclones in the Atlantic, Caribbean, and Gulf of Mexico. The most powerful of these storms has stranded birds more than 1600 km from their normal range and as far north as Nova Scotia and Newfoundland. These storms are also notorious for transporting otherwise strictly pelagic species great distances inland, sometimes over obstacles like the Appalachian Mountains. With satellite imagery and advanced warning systems, birders in the eastern U.S. are able to anticipate with surprising accuracy the times and places where one might find birds following such storms (Kaufman 1977, Elkins 1988, Brinkley 1997, 1999).

When pelagic birds were carried inland by Kathleen the question was whether they were brought ashore from the Pacific by the relative calm in the eye or from the gulf by the winds contained in the outer bands of the storm, rotating counterclockwise (Kaufman 1977). With birders providing early post-storm reports from many locations in Arizona, some ideas of how Nora brought seabirds ashore can be formed. Because the low-pressure center passed just west and north of Lake Havasu, where the largest concentration was found, the birds were likely brought ashore in the eye. If the outer winds had been more important birds would be expected all over western Arizona where the winds were the strongest and not in a single location so close to the storm track. Places like Painted Rock Reservoir to the south and lakes Mohave and Mead to the north were checked but no storm-driven birds were found. Another point is the relatively moderate wind speed of the storm once it entered the U.S. (56 to 72 km/hr). It seems unlikely that these winds alone were powerful enough to force a large number of birds such a distance inland.

The final fate of these birds is open to debate. Many people feel that they perished over land, at Lake Havasu, or at the Salton Sea, unable to find their way to the gulf. The two dead storm-petrels at Lake Havasu, the tropicbird in California, and reports of weak and tired birds after the storm support this hypothesis. It is possible, though, that many of these birds survived. In 1968, Hurricane Gladys transported tens of thousands of Laughing Gulls and Black

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Skimmers some 1900 km from their normal range; it was thought that the majority of these birds returned south (Elkins 1988). Nora transported birds roughly 300 km. At Lake Havasu the seabirds dispersed within days. The number of Least Storm-Petrels in particular went down more than 50% after the first day, and within three days the number of all storm-petrels was less than 10% of what it was immediately after the storm. This rapid departure would give the birds the best chance of finding their way to the gulf. If some of the birds at the Salton Sea found their way from Lake Havasu then clearly they could find their way across the desert. In addition, the small number of dead storm-petrels found seems low for any mass die-off, especially when the number of birders in the field after the storm is considered.

### SUMMARY

Tropical Storm Nora gave ornithologists the opportunity to study the effects that Pacific cyclones have on seabirds and their movements. This storm brought hundreds of storm-petrels and other pelagic species inland to Arizona and California. It can safely be assumed that cyclones from the eastern Pacific or the Gulf of California will transport pelagic species inland, sometimes great distances. Birders can add significantly to our knowledge of the effects these storms have on birds by visiting bodies of water along the path of the storm's center as quickly as possible after the storm's passage and reporting their discoveries immediately.

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