DIE-OFF OF BROWN PELICANS IN PUERTO RICO AND THE UNITED STATES VIRGIN ISLANDS

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IN LATE JANUARY 1989, BROWN Pelicans (*Pelecanus occidentalis*) began dying in La Parguera, Puerto Rico, near the marine laboratories of the University of Puerto Rico. We notified local and international biologists, natural history agencies, and sent requests for information to newsletters and journals (Williams, 1989). Through these efforts, we learned of similar mortalities in other areas of southwestern and western Puerto Rico, and St. Croix and St. Thomas in the United States Virgin Islands (Table 1).

No field investigations or active efforts were made to monitor deaths and no cause was determined for the pelican die-off. However, we feel that the limited information received about this event is important to document. The number of pelicans that died may be much larger than the number of dead birds recovered. Most observers who reported dead pelicans commented that they had not seen this many dead birds before. Too often such disturbances go unreported and are quickly forgotten (Williams, Williams and Bunkley 1986; Williams and Williams 1987). Similar mortalities may occur again or this event may be related to recent marine major ecological disturbances (Williams and Bunkley-Williams 1990a, b) in the greater Caribbean region.

Raffaele (1983) remarked on the unusual deaths of pelicans presumably caused by their clumsiness in becoming hung in tree branches. Pelican deaths are primarily associated with lack or loss of feeding skills during some stage of their life (*e.g.*., juvenile *vs* adult age classes; Collazo 1985). Food-stressed individuals of any age class are usually found hung at roosting or nesting sites as pelicans try to maintain balance or become airborne (Collazo 1985). The few pelicans found hanging on trees or fences in the present event were placed there by fishermen after their deaths. A few pelicans in the Virgin Islands have died in the past by breaking their necks diving into shallow waters (R. Boulon, Div. Fish and Wildlife, U. S. Virgin Islands, pers. comm.). Apparently these were older birds impaired by cataracts. None of the birds examined in the present event had either broken necks or cataracts. A mortality of Brown Pelicans occurred in Florida, at about the same time as this event. It was more localized, and was apparently caused by contamination with a toxin (M. Spalding, Dept. Infectious Diseases, Univ. Florida, pers. comm.).

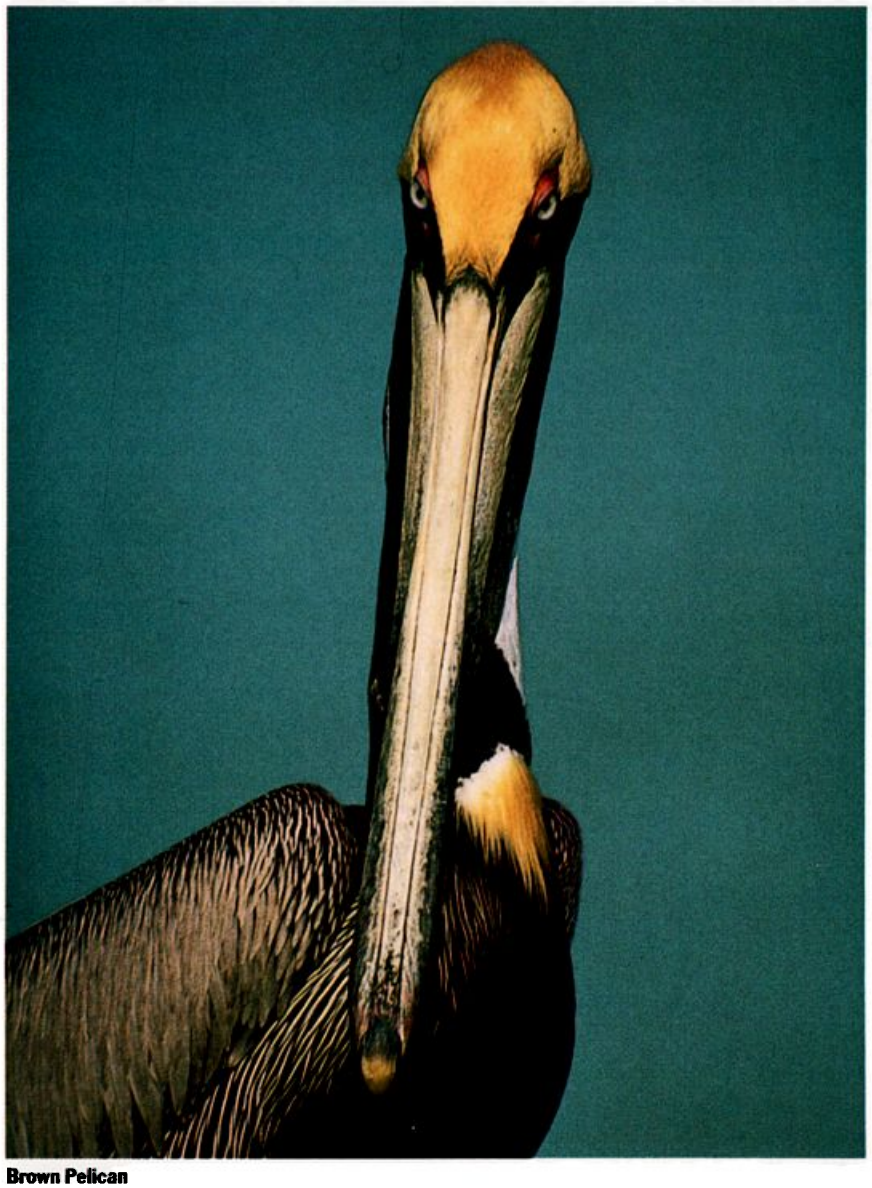
A mortality of adult and young Brown Pelicans occurred from at least Cartagena to Santa Marta, Colombia, in August 1989. More than 50 dead birds were noted. The deaths were at first thought to be caused by a chemical spill, but the wider geographic range of this disturbance make this explanation unlikely. Analysis of blood samples from these animals has not been completed. The possibility of a viral disease has been suggested, but this is simply speculation (C. Bohorquez, Centro de Investigaciones de Educacion y Recreación, Cartegena, Colombia, pers. comm.). We cannot be certain that these mortalities are related to the die-off in the northern Caribbean. We are attempting to obtain more details about the disturbance in Colombia.

During an intensive study of Brown Pelicans from September 1980 to July 1983 in Puerto Rico and the United States and British Virgin Islands, Collazo (1985) noted two series of mortalities of these birds. One hundred twenty-seven pelicans died from February to August 1982, apparently from organophosphates in the Dorado Lagoon. Twenty-five died apparently from botulism in Santa Teresa Lagoon, Humacao, November to December 1982. These mortalities were isolated, unrelated and non-recurring. They do not seem related to the present event.

Lethargic, dazed or injured pelicans were noted in Mayagüez (Sadovy,

pers. comm.; see Table 1) and La Parguera. Birds with broken wings were seen in St. Croix (W. Knowles, pers. comm.; see Table 1) and La Parguera. Some dead birds were reported to be emaciated or starved, while others appeared normal. Fishermen in St. Croix reported pelicans fishing at night and that suggested the fishes on which they feed might be more scarce than normal. The number of pelicans in the Virgin Islands may be much lower after this disturbance. Also fewer nests have been recorded at Buck Island, St. Croix, this year (J. Pierce, Sea Bird Surveys, Div. Fish and Wildlife, U. S. Virgin Islands, pers. comm.). Dogs, cats, and most tourists are barred from Isla Magueyes (Marine Laboratories site), in an attempt to protect a population of Cuban Iguanas (*Cyclura nubila*). This has created an unintentional refuge for injured birds. Usually these consist of a few Cattle Egrets (*Bubulcus ibis)*, and occasionally other ardeids. During the pelican mortalities, two injured Brown Pelicans joined this gathering of injured birds.

Two birds were given to the Fish and Wildlife Service, Boquerón, Puerto Rico, for examination. One adult, dead for one or two days, was collected January 22, and one moribund (almost dead) adult was collected March 28 (C. Guzman, pers. comm.; see Table 1), both from La Parguera. These specimens were frozen and shipped to the National Health Research Center, U. S. Fish and Wildlife Service, Madison, Wisconsin, where they were examined (F. Lopez, U. S. Fish and Wildlife Service, Boquerón, pers. comm.). The first specimen was probably too deteriorated to be very useful in a diagnosis. The second was collected one month after most all of the affected birds had died (Table 1). Its condition may not have been related to the original outbreak. Fresh material taken during the height of an event is the most desirable for accurate disease diagnosis. Any delay makes the investigation more difficult. Freezing can eliminate many disease agents.



Brown Pelican

Ninety percent of the pelicans were reported dead during a one-month period (January 22–February 21, 1989). The reported losses were arranged in three groups. Six birds during three days (January 22, 23, 25), followed by nine days without reports, six birds over a six-day period (February 4, 7, 10), a five-day period without reports, and five birds over a four-day period (February 16–20). The apparently cyclic nature of the reports is interesting, but too little information is available to confirm this pattern. The following month only two deaths were noted and could represent a period of recovery.

We are attempting to follow three marine major ecological disturbances (MMED's) in the Caribbean and/or worldwide and are aware of a number of other MMED's (Williams and Bunkley-Williams, 1990a). The possibility of shared causes or interrelationships between MMED's is of particular interest. The pelican mortalities in Puerto Rico and the United States Virgin Islands occurred at the same time as a widespread coral-reef bleaching bout of low intensity in Puerto Rico, the United States Virgin Islands, and Mona Island (Williams and Bunkley-Williams, 1990a); and mass mortalities of herrings (*Harengula* spp.) in St. Vincent and Barbados (Williams and Bunkley-Williams, 1990b). These herrings also form an important part of the diet of the

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Brown Pelican in Puerto Rico and the United States Virgin Islands (Collazo 1985). We are not aware of any mortalities of local herrings during the time the pelicans were dying. However, these potential linkages with two other marine major ecological disturbances must be thoroughly explored.

This event was large enough in geographic range and occurred over a sufficient time span to be considered a marine major ecological disturbance (Williams and Bunkley-Williams, 1990a). The full significance of the event will have to await a recount of the pelican population of the region and time to learn if this disturbance continues. More information is needed about this event. Reports of additional mortalities during the event, reports from adjacent areas, reports of previous mortalities, and moribund birds from any future events, are necessary to understand patterns, significance, and causes of these mortalities. We are particularly concerned that this event may be part of a recent series of marine major ecological disturbances.

NESTING NOTES

Raffaele (1983) noted periodic nesting of Brown Pelicans in La Parguera, and Collazo (1985) documented nesting there during the 1981–82, 1982–83 and 1984–85 seasons. We have observed nesting there for the last few years and found pelican nests in the Marine Sanctuary at Jobos Bay (southeastern Puerto Rico), an area neither Raffaele (1983) nor Collazo (1985) mentioned as a nesting site.

Through 1983, the American Oystercatcher *(Haematopus palliatus)* was found to rarely occur around the main Puerto Rican Island (Raffaele 1983). Up to 11 birds have been observed on many of the cays off La Parguera for the last three years. In July 1981, a pair nested (2 eggs) on the Cay of Turrumote I Reef, off La Parguera (López-Irizarry, unpub. data). The single chick was removed from the nest by a local tourist.

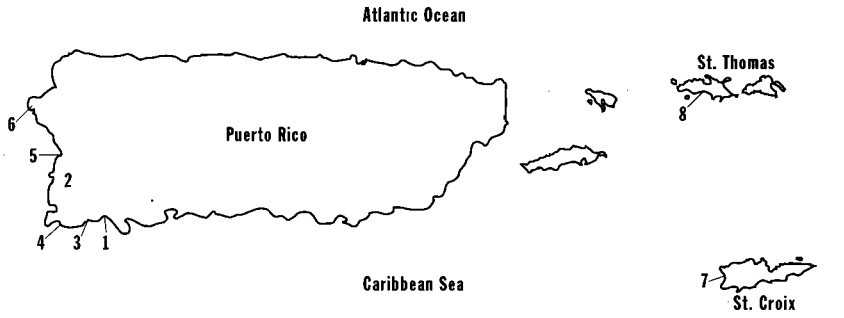

Table 1. Brown Pelican Mortalities Reported from Puerto Rico and the U. S. Virgin Islands

Date(1989)	Location	Map No.	Birds	Source[1]
22 January	Parguera, PR	1	1	López
23 January	Parguera	1	1	Williams
23 January	Lajas, PR	2	2	Rosado[2]
25 January	Parguera	1	2	López
4 February	Parguera	1	1	Williams
early February	St. Croix	7	3	Knowles
10 February	Mayagüez, PR	5	2	Sadovy
16 February	Is. Cueva, PR	3	2	Rosado
16 February	Guayacan, PR	4	2	Rosado
21 February	St. Thomas	8	1	Peters
3 March	Rincon, PR	6	1	Williams[3]
28 March	Parguera	1	1	Guzman
Reports=12	**Locations=8**		**Dead Birds=19**	**Observers=8**

1. Personal Communications were received from: C. Guzman, Dept. Natural Resources, Parguera; W. Knowles, Div. Fish and Wildlife, U.S. Virgin Islands; N. Peters, Sea Grant, U. S. Virgin Islands; W. Rosado, Dept. Marine Sciences, University of Puerto Rico; E. Sadovy, Fisheries Research Lab., Mayagüez. "López" or "Williams" in the table refers to the authors.
2. Freshwater ponds.
3. Date estimated from the condition of a bird found on the beach and from the position of the remains 67% up drift lines towards the former high water mark.

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