

ESSENTIAL HABITAT OF THE BROWN PELICAN IN FLORIDA

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Endangered species' "Critical Habitat" has been defined as "The specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species . . ." (The Endangered Species Act Amendments of 1978). The Recovery Team for the Eastern Brown Pelican (*Pelecanus occidentalis carolinensis*) (1980) chose not to so designate any habitat area other than nesting colonies. As part of an 8-year study (Schreiber 1980) we gathered data on the Brown Pelican's use of various islands and areas. These data allow us to identify aspects of the total habitat that are essential to the survival of the Brown Pelican in Florida.

METHODS

Between 1971 and 1976 we made essentially weekly surveys of Boca Ciega Bay (Fig. 1), Pinellas County, Florida west coast. Using plumage classifications determined as part of this study (Schreiber and Schreiber, in prep.) we determined the age of all pelicans seen and recorded their location (Schreiber and Schreiber, in press).

RESULTS AND DISCUSSION

HABITAT USE BY THE TOTAL POPULATION

Seasonal variation occurs in the use of the various islands by the pelican population in Boca Ciega Bay (Table 1, Fig. 2). The majority of birds used Tarpon (including Whale) Key, especially during the nesting season, when adults spent all their non-foraging time on the island. Adults leave nestlings alone at the nest after they are 3-5 weeks old and spend their time away from the actual nesting areas but on the same island. All birds abandoned the actual nesting locations on the island after nestlings fledged and spent time roosting (night) and loafing (day) in other areas of the island. Annual differences in timing of nesting (Schreiber 1980) are apparent (Table 1). In 1972, 1975, and 1976, nesting on Tarpon Key began earlier (in January-February) than in 1969-1971, and 1973-1974 (in March).

Nearly all Brown Pelicans used specific sites but use of these sites varied seasonally. Pelicans used Bird Key, a small (0.4 hectare) island, for roosting and loafing in all months, but primarily in fall

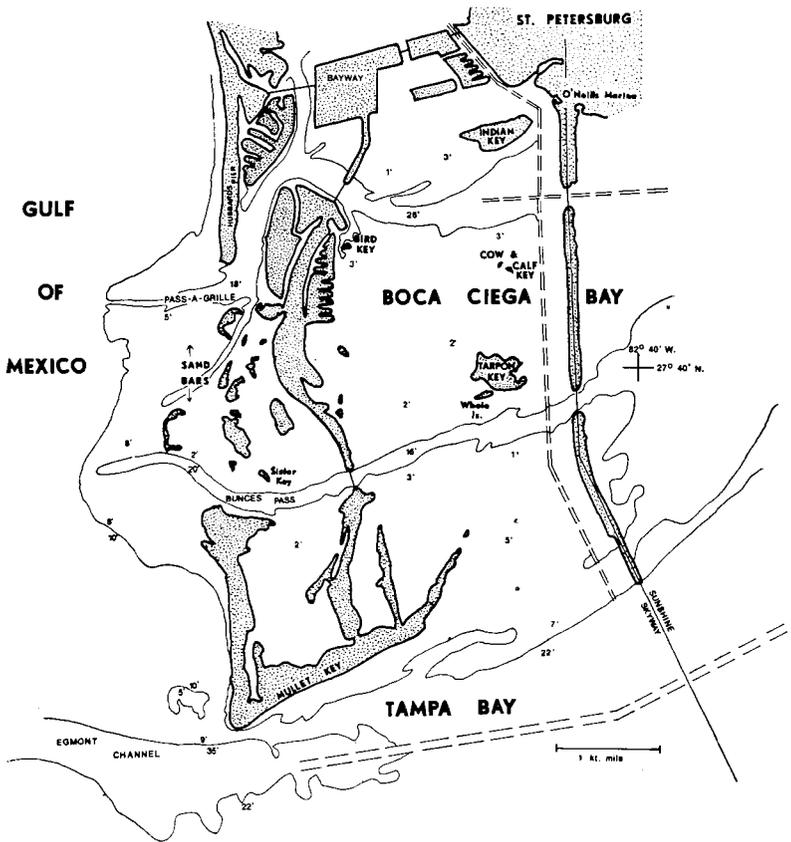


Fig. 1. Boca Ciega Bay, Pinellas County, Florida west coast, study region for the Brown Pelican population 1969-1976.

and winter, with few present during the height of the nesting season. In 1973 and 1975, two pairs nested on this island as well.

A few pelicans used Indian Key, a larger (10 h) island with a sand spit on the west tip that is exposed at low tides, from late summer through early winter. After young fledged, adults first were seen away from the nesting colony on Cow and Calf keys, tiny (50 m²) mangrove islets about 500 m north of Tarpon Key.

Sand bars exposed to the Gulf of Mexico were the most important non-nesting habitat within this region. They were used for roosting and loafing throughout the year, but especially during the non-nesting season, when up to 61% of the area population used them.

Feeding areas are undoubtedly "critical habitat" but during this study we were unable to obtain good data on where the large pelican population fed. Little natural feeding occurred within our whole study area. Few birds were seen feeding and then generally not more than 5-10 widely scattered individuals. We have observed large feeding flocks of pelicans (50-100 birds) on fewer than 15 occasions over 8 years, usually in the channel of Bunces Pass south of Tarpon Key or in the Pass-a-grille Channel. Humans feed pelicans at the marinas of the region. Hubbard's Pier on Pass-a-grille and O'Neills Marina on U. S. Highway 19 were used throughout the year by pelicans, somewhat more in the fall through early spring (Herbert and Schreiber 1975). The location of feeding areas by the pelicans remains to be determined. Relevant data will only be obtained through use of radio transmitters.

HABITAT USE BY AGE CLASS

Adults and subadults.—Adults concentrated on Tarpon Key from February through September, and on sand bars and non-colony mangrove islands in October-December. Subadults showed a similar pattern but concentrated less on Tarpon Key in the spring and more on the sand bars in the fall and winter than did adults. Subadults moved onto Tarpon Key later than adults and used the edges of the nesting areas without first spending time on the outside edge of the island as adults did. Subadult use of the sand bars was more consistent throughout the year. More subadults used the marinas than adults and their large increase in use in June is unexplained.

Immatures.—Following fledging, immatures abandoned the colony itself but stayed in the immediate vicinity later into the fall and winter than adults. Sand bars and non-colony mangrove islands were used consistently throughout the year. Marinas received heavy use by these young birds, especially during winter and spring. Immatures did not show up at fishing piers, marinas or non-colony mangrove areas immediately post-fledging. A lag of a few weeks occurred while these young birds learned that food is available at piers, and became coordinated sufficiently to land and perch on branches.

CRITICAL HABITAT

The recovery plan for the Eastern Brown Pelican (1980; see A.O.U. 1977) only specifies current nesting sites as "critical

TABLE 1. Percent locality use by month during 1971-1976 for the total population of Brown Pelicans within Boca Ciega Bay study area, Florida west coast.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1971 n=39												
Marinas	4	5	5	1	1	1	0	1	0	0	0	1
Indian Key	0	0	0	0	0	0	0	0	10	5	0	0
Bird Key	45	90	4	3	1	1	7	8	13	20	25	28
Sand bars	51	5	1	0	1	2	25	29	13	35	24	42
Cow and Calf keys	0	0	0	0	0	0	8	7	0	2	0	0
Tarpon & Whale keys	0	0	90	96	97	94	60	55	64	38	49	30
1972 n=39												
Marinas	1	1	1	1	1	5	5	1	2	1	1	13
Indian Key	0	0	0	0	0	0	0	10	14	11	8	1
Bird Key	1	5	0	0	0	6	5	15	25	24	26	58
Sand bars	35	8	0	3	10	5	4	15	25	38	43	27
Cow and Calf keys	0	0	0	0	0	0	6	8	1	1	3	0
Tarpon & Whale keys	63	86	99	96	89	84	80	51	33	25	19	2
1973 n=89												
Marinas	11	14	5	4	2	2	1	1	1	—	1	2
Indian Key	1	0	0	0	0	0	2	2	3	—	6	4
Bird Key	44	36	6	7	2	4	7	23	16	—	23	42
Sand bars	40	40	33	4	2	14	15	4	1	—	38	20
Cow and Calf keys	0	0	0	0	0	0	0	2	8	—	0	0
Tarpon & Whale keys	4	10	56	85	94	80	54	68	71	—	32	32

TABLE I. (Continued)

1974 n=40												
Marinas	40	8	0	1	4	6	1	1	0	4	4	8
Indian Key	3	1	0	0	0	0	1	1	3	5	5	1
Bird Key	28	1	0	0	0	0	1	17	16	20	15	30
Sand bars	21	56	0	1	0	15	57	17	28	15	42	33
Cow and Calf keys	0	0	0	0	0	0	0	9	9	15	10	0
Tarpon & Whale keys	8	34	100	98	96	79	40	55	44	41	27	28
1975 n=46												
Marinas	4	1	1	1	1	2	2	2	2	2	7	7
Indian Key	4	0	0	0	0	3	3	4	8	4	5	3
Bird Key	4	0	1	0	1	1	1	4	11	12	16	22
Sand bars	55	16	12	1	3	2	14	29	23	36	38	19
Cow and Calf keys	0	0	0	0	2	3	7	9	7	9	6	2
Tarpon & Whale keys	33	83	86	98	93	89	73	52	60	37	28	47
1976 n=34												
Marinas	9	10	3	3	3	2	2	1	1	3	5	6
Indian Key	0	0	0	0	1	0	1	1	10	6	13	1
Bird Key	35	2	1	0	0	1	3	5	8	5	4	5
Sand bars	15	22	4	8	18	24	31	30	40	30	61	55
Cow and Calf keys	0	0	0	0	4	4	6	4	9	7	0	0
Tarpon & Whale keys	41	64	92	89	74	69	57	59	32	49	17	33

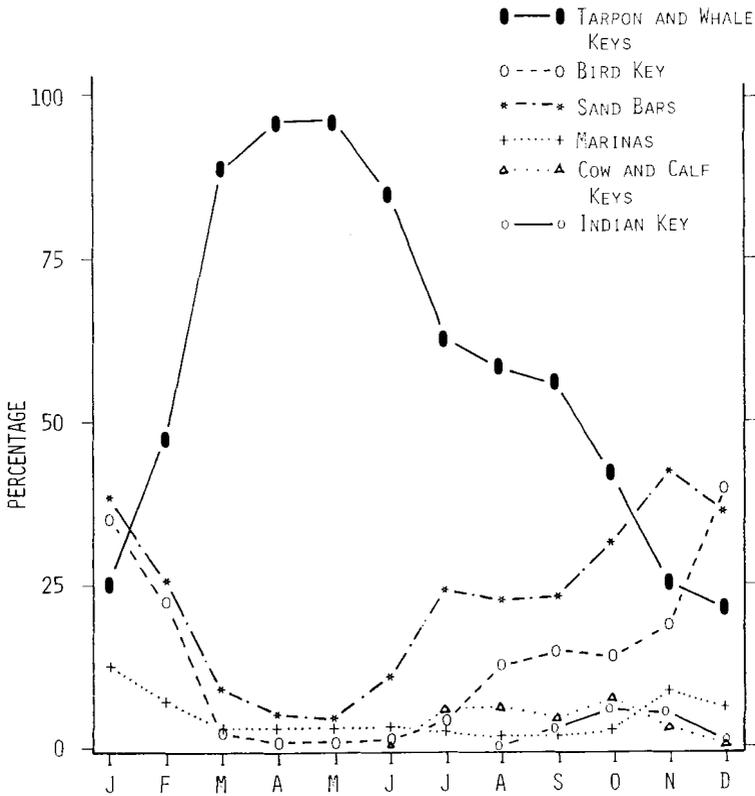


Fig. 2. Percentage use of specific locations by the total Brown Pelican population of Boca Ciega Bay study region in 1971-1976.

habitat.” The plan states that no detriment to the species can be shown from degradation of or disturbance to roosting/loafing sites. We believe this is a serious misconception.

We watched the formation of three colonies on the west coast of Florida between 1969 and 1979 (at Placida, in North Charlotte Harbor, and at John’s Pass). In each case the use of the island progressed from a loafing area during the non-nesting season, to roosting and loafing throughout the year, to colony formation. Through this process the birds learn where they can rest undisturbed and then gradually “feel comfortable” enough to begin nesting. At times nesting sites are destroyed by tidal and wave action or the birds’ nesting activities degrade the mangrove to such an extent that it cannot support nests. Thus, the population must find other islands for nesting. Additionally, during the past

11 years we know of two colonies that were made unusable for the birds by human disturbance (at John's Pass and Robert's Bay, Sarasota). Pelicans also move abruptly, for unknown reasons, as in Florida Bay (R. T. Paul, pers. comm.). Without the availability of undisturbed mangrove sites, presently unused by birds, new colonies will never form.

Adults do not spend appreciable time away from the nesting islands during the breeding season except to feed. At the end of the season they leave the immediate vicinity of the colony (in most cases) and spread out through the region. It is probably more efficient energetically to loaf and roost near a location where food is readily found, especially if no reason exists to return to the nesting island. In some locations (Pelican Island on the east coast, and in Charlotte Harbor, for instance) the birds do use the colony islands throughout the year. The differences between islands in this use pattern needs to be examined, especially in relation to vegetation growth on the islands and in feeding areas and patterns. The Brown Pelican would be an excellent species in which to document the "sphere of influence" of colony sites on the population distribution (Nelson 1978) and the "information center hypothesis" in relation to feeding and roosting (Zahavi 1971).

Although many roosting/loafing sites do not become colonies, these sites remain important as the pelicans must have undisturbed, dry sites to rest, to sleep, and to perform maintenance activities. Sand bars are especially important to immature birds just after fledging since they are not sufficiently coordinated to land in trees. Marinas are used as loafing areas by birds during the day but not at night. Pelicans are unable to remain on the water for more than an hour without becoming waterlogged (Schreiber, unpubl. data). Therefore dry roosts are essential.

In recent years, human visitation, building construction, and pleasure boat traffic have increased greatly and changed pelican use of islands and sand bars in our study area. Bird Key, a mangrove island that was an important roosting/loafing area in 1969-1975, began to be abandoned in 1976 and through 1981 has received little use by birds as boat traffic increased nearby. In response to harbor dredging during 1976 in Egmont Channel, 5 km south of our study area, a new sand bar, inaccessible to boats, emerged on the north side of Pass-a-grille. Pelicans immediately began using this bar in large numbers. Such bars along the Gulf of Mexico are preferred roosting/loafing sites for non-breeders and during the non-nesting season. Primary use is before and after feeding and the

bars used are those with a clear view out into the Gulf. When the pelicans must roost and loaf inland, they may be forced to travel farther to find fish and cannot use sightings of other feeding birds as guides to fish availability. In recent years we commonly counted as many as 50-60 boats, and no pelicans, on previously used sand bars. We noted that when all sand bars in the region had humans on them the birds were found inland in larger than "usual" numbers on mangrove islands and at marinas. Weekends appeared to be especially "bad" for the birds because of the increased use of the bars for recreation by humans.

Thus, critical habitat necessary for pelicans to maintain a healthy population in a region includes not only mangrove nesting colony sites, but also sand bars and islets where the birds can roost and loaf without being disturbed by human activity. We believe that roosting and loafing areas should be protected from disturbance as vigorously as are nesting colony sites in order to insure the continued survival of the Brown Pelican in Florida, and elsewhere in its range.

AGE AT FIRST BREEDING

Brown Pelicans have bred in "subadult" plumages, although less successfully than adults, in South Carolina (Blus and Keahey 1978), Louisiana (Williams and Joanen 1974), and in captivity (Nesbitt et al., in press). Few "subadults" nest in established colonies in our study areas. However, the colonies we have watched becoming established were all started by "subadult" plumaged individuals, and in fact, juveniles first used these islands as loafing and roosting sites. In South Carolina, the total population was apparently low in years when "subadults" nested and thus perhaps fewer adults were present. In Louisiana, adults were totally absent (Blus et al. 1979) and nestlings transported from Florida and released in Louisiana began nesting as "subadults." Perhaps deferred maturity in this species is in some manner related to the presence of and interaction with adult pelicans, rather than just to the time to learn to feed efficiently (Orians 1969, Schreiber, unpubl. data).

SUMMARY

We have determined what types of habitats and what areas are important to pelicans in Boca Ciega Bay, Florida. Our less detailed

observations elsewhere indicate the importance of similar habitat throughout the species range. We have monitored the human encroachment into these habitats that have caused pelicans to abandon many islands and sand bars. This disturbance, we predict, will eventually result in decreased nesting by pelicans in this region, unless other areas, in addition to nesting islands, are protected.

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LITERATURE CITED

- AMERICAN ORNITHOLOGISTS' UNION. 1977. Report of the American Ornithologists' Union Committee on Conservation 1976-1977. *Auk* 84 (Suppl. 4): 1DD-19DD.
- BLUS, L. J., AND J. A. KEAHEY. 1978. Variation in reproductivity with age in the Brown Pelican. *Auk* 95: 128-134.
- BLUS, L. J., E. CROMARTIE, L. MCNEASE, AND T. JOANEN. 1979. Brown Pelican: population status, reproductive success, and organochlorine residues in Louisiana, 1971-1976. *Bull. Environ. Contam. Toxic.* 22: 128-135.
- HERBERT, N. G., AND R. W. SCHREIBER. 1975. Diurnal activity of Brown Pelicans at a marina. *Fla. Field Nat.* 3: 11-12.
- NELSON, J. B. 1978. The Sulidae gannets and boobies. New York, Oxford University Press.
- ORIAN, G. H. 1969. Age and hunting success in the Brown Pelican (*Pelecanus occidentalis*). *Anim. Behav.* 17: 316-319.
- RECOVERY TEAM FOR THE EASTERN BROWN PELICAN. 1980. Recovery plan for the Eastern Brown Pelican. U.S. Fish Wildl. Serv., Dept. Interior, Wash., D.C.
- SCHREIBER, R. W. 1980. Nesting chronology of the eastern Brown Pelican *Auk* 97: 491-508.
- THE ENDANGERED SPECIES ACT AMENDMENTS OF 1978. Public Law 95-632. November 10, 1978. Washington, D.C.
- WILLIAMS, L. E., JR., AND T. JOANEN. 1974. Age of first breeding in the Brown Pelican. *Wilson Bull.* 86: 279-280.
- ZAHAVI, A. 1971. The function of pre-roost gatherings and communal roosts. *Ibis* 113: 106-109.
- Natural History Museum, Los Angeles County, Los Angeles, California 90007.*