fly since well before nesting. For at least three, the injuries were old enough to have prevented migration that spring and probably the previous autumn. From the standpoint of avian physiology and behavior, it is noteworthy that the injured eiders fed, courted, nested, and survived without the ability to fly or migrate.

While feeding, the wings aid in diving but are not used while on the bottom (Palmer, Handbook of North American Birds, Vol. 3:49, Yale Univ. Press, New Haven, Connecticut, 1975). Foraging efficiency could then be reduced in crippled birds. However, the eiders we encountered had been able to deposit the large fat and protein stores needed for egg production and as an energy source throughout incubation (Korschgen 1977). During courtship the female has a rather passive role (Palmer 1975), thus, the loss of flight should not hinder pairing and mating. The inability to migrate would likely be little problem to Maine eiders, since suitable feeding areas, for all seasons, occur nearby the nesting islands. Furthermore, banding analysis of *S. m. dresseri* (Wakely, M.S. thesis, Univ. Maine, Orono, Maine, 1973) suggests a portion of Maine's breeding eider population is essentially non-migratory.

Our 1981 observations then indicate that eiders in Maine may be better adapted than other North American waterfowl to function in the wild, in a nearly normal manner, in spite of sustaining flight-impairing injuries. The many similarities between the eider and the two flightless species of South American Steamer Ducks (*Tachyeres pteneres* and *T. brachypterus*) add strength to this conclusion.

Possible sources of these injuries include gunshot wounds, encounters with predators, battering against ledges during severe storms, or collisions with branches or ledges while landing on or leaving nesting islands. During the handling of several thousand nesting eiders in Maine since 1964 injuries have been observed, although infrequently (Mendall and Hutchinson, unpubl.). For example, on Fisherman Island, of 833 nesting birds caught prior to 1981, only two had injuries precluding flight. We have no explanation, other than normal, random variation, as to why more injured birds were found in 1981.

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Distribution and phenology of nesting Forster's Terns in eastern Lake Huron and Lake St. Clair.—Forster's Terns (*Sterna forsteri*) are considered to be a prairie, East Coast (Erwin, Coastal Waterbird Colonies: Cape Elizabeth, Maine to Virginia, FWS/OBS–79/10, 1979) and Gulf Coast (Portnoy, Proc. Colonial Waterbird Group 1:38–43, 1977) nesting species. A concentration of more than 200 nests has been known from four sites in Lake Michigan near Brown and Oconto Counties, Green Bay, Wisconsin (Scharf et al., Nesting and Migration Areas of Birds of the U.S. Great Lakes, Fish and Wildlife Service, OBS–77/2, 1979). Kenaga (Jack-Pine Warbler 35:68–70, 1957) found at least two pairs of nesting Forster's Terns in the Saginaw Bay area of Michigan in 1956 and historically the species was considered to breed commonly at Lake St. Clair (Morden and Saunders, Canadian Sportsman and Naturalist, 1882:194). Several other accounts are given from the late 1800 to early 1900 period by Campbell and Trautman (Auk 53:213–214, 1936). Sightings of up to 25 nesting pairs of Forster's Terns have been noted on the Canadian portion of Lake St. Clair (James et al., An Annotated Checklist of the Birds of Ontario, Life Sci. Misc. Publ., Royal Ont.

TABLE 1

LOCATION AND NUMBER OF FORSTER'S TERN COLONIES 1980 AND 1982

	Colony name	Area	Lat., long.	No. nests	
				1980	1982
1.[a]	East Standish	Northern Saginaw Bay	43°58'N, 084°10'W	10	6
2.	Channel-Shelter Dike	Middle Saginaw Bay	43°40'N, 084°15'W	50	145
3.	Sebewaing	Southeastern Saginaw Bay	43°45'N, 083°35'W	0	240
4.	Clinton River S	Northern Lake St. Clair	42°34'N, 082°41'W	29	80
5.	Clinton River N	Northwestern Lake St. Clair	42°34'N, 082°41'W	4	50
6.	Baltimore Hwy. 1	Northwestern Lake St. Clair	42°36'N, 082°39'W	0	20
7.	Baltimore Hwy. 2	Northwestern Lake St. Clair	42°36'N, 082°39'W	0	50
8.	Baltimore Hwy. 3	Northwestern Lake St. Clair	42°36'N, 082°39'W	0	16
9.	Cresent	Northwestern Lake St. Clair	42°38'N, 082°39'W	0	210
10.	Round	Northwestern Lake St. Clair	42°39'N, 082°38'W	0	33
11.	L-shaped	Middle Lake St. Clair	42°37'N, 082°44'W	7	0
	Total			100	850

[a] Numbers indicate locations of colonies on Fig. 1.

Mus., Toronto, Canada, 1976; Goodwin, Am. Birds 30:950, 1976; 31:1131–1135, 1977; 32:1154, 1978; 33:858–860, 1979; 35:935, 1981). Nesting of 12–50 pairs is also recorded in Ontario at Long Point (Goodwin, Am. Birds 30:950, 1976) and at Point Pelee (Goodwin 1977). However, Campbell (Birds of the Toledo Area, The Blade, Toledo, Ohio, 1968) notes that no evidence of breeding has been found in the nearby and apparently suitable habitat of western Lake Erie. This also agrees with our surveys of the Lake Erie area (Scharf, Colonial Birds Nesting on Man-Made and Natural Sites in the U.S. Great Lakes, Tech. Rept. D–78–10 Waterways Exper. Stat., Vicksburg, Mississippi, 1978; Scharf et al. 1979; Shugart and Scharf, J. Field Orn. 54:160–169, 1983). In this note, we describe increasing numbers and colonies of nesting Forster's Terns in eastern Lake Huron's Saginaw Bay and Lake St. Clair, habitat preferences, and nesting cycle.

Methods.—Forster's Tern colonies were located from a Cessna 180 floatplane at an altitude of 100–150 m above lake level during May, June, and July of 1980 and 1982. We searched the entire Michigan Great Lakes in 1980, and in 1982 searched the area designated Ludwig Survey Area by Shugart and Scharf (1983) in conjunction with a survey of breeding Common Terns (*S. hirundo*). Upon locating a colony we landed and waded in mud and water up to

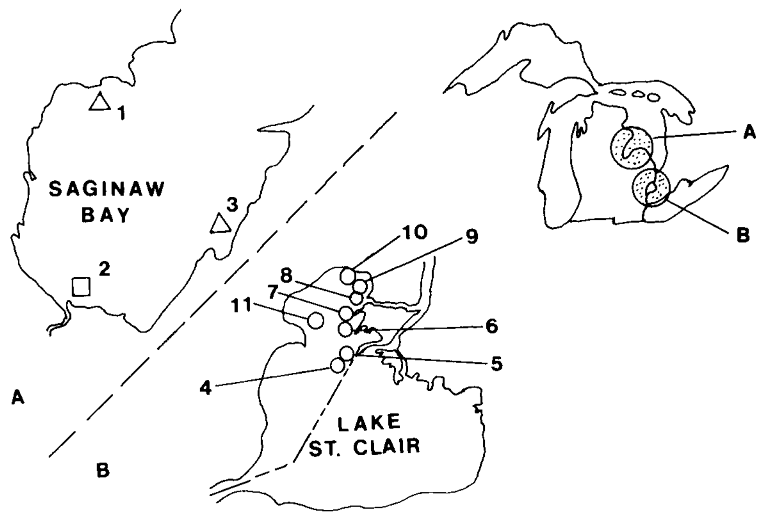

FIG. 1. Map of Forster's Tern colony sites. Numbers correspond to Table 1. Circles are colonies in *Phragmites,* triangles are colonies in *Typha,* and the square represents dredged disposal covered with *Polygonum.*

1.3 m deep to make most nest counts. The Channel-Shelter Diked Disposal (CSDD) was an exception where we walked over quaking dredged material to the nests. A few nest counts represent aerial counts of sitting (i.e., incubating) terns.

Vegetation type (reedgrass [*Phragmites communis*], cattail [*Typha* sp.]) was identified during visits to colonies. We recorded colony-sites on 1:40,000 scale navigation maps, photographed sites, nests and young, and banded young where possible.

Results.—We located five colonies and 100 nests in 1980, and 10 colonies and 850 nests in 1982 (Table 1). All colonies were in marsh habitat in Saginaw Bay and Lake St. Clair (Fig. 1). Only one of the 1980 sites was unused in 1982; the remainder had increased in numbers of pairs in the interim. Since the same area was searched in both years, the totals represent a substantial increase in the number of colonies and nesting pairs for this area.

The Forster's Tern colonies we located were in three distinct habitats: (1) cattail and mud islands; (2) reedgrass islands which were rooted in water and mud up to 1.5 m deep; and (3) near the standing water-emergent smartweed (*Polygonum* sp.) interface in the interior of a partially filled dredge-material disposal and containment site (CSDD).

At the cattail and mud islands nests were placed in floating broken stems of vegetation, bare mud, and on muskrat (*Ondatra zibethica*) houses. The *Phragmites* island sites were most common (7/10 sites) in 1982. In these, nests were placed on floating mats of dead vegetation, primarily *Phragmites,* and flotsam which had accumulated around an erect central core of the previous year's growth. These mats apparently were formed by ice and wave action. The mats and the birds were not visible from water level because of a concentric zone of new growth on the outside of the mats. A similar zonation of nests was evident in the *Polygonum*-water interface at CSDD. At this site water receded, leaving the once floating nests on mud.

Common Terns nested within 100 m of the Forster's Terns at two sites (CCDS, Clinton

River) on drier and less vegetated substrate. We saw no Black Terns (*Chlidonias niger*) near the Forster's Tern sites in contrast to Bergman et al. (Wilson Bull. 82:435–444, 1970). Only two Forster's Tern nests were placed on muskrat houses, although muskrats and their houses were common. This infrequent use of muskrat houses contrasts with 53–98% of the nests on muskrat houses in Iowa (Bergman et al. 1970; Weller and Spatcher, Spec. Rept. 43, Iowa St. Univ., Ames, Iowa, 1965). From the third week of May to the first week of June 1982, 67% of nests at which clutch-size was recorded, had three eggs. In 1980, sites checked in the first 2 weeks of June had nests under construction and incomplete clutches which suggests a prolonged nesting cycle or renesting. These observations of nesting chronology are consistent with the Iowa data of Bergman et al. (1970).

Discussion.—Based on published information, Forster's Terns, during most of this century, were uncommon and scattered nesters in southern Lake Huron and Lake St. Clair, and the lower Great Lakes. This is no longer true. This species must be considered common in our survey area. The increase we describe represents a substantial shift from the discontinuous breeding range usually described for this species, and shows a concentration of breeding colonies from southeastern Michigan through southwestern Ontario. Perhaps the recent increase represents a return to former numbers and distribution. Or, the rapid increase may be a response to greater food and nesting site availability coupled with the loss of competition from a closely related species, the Common Tern. The latter species has recently lost habitat (Shugart and Scharf 1983) due to high water levels. Forster's Terns, in this study area, are less vulnerable to flooding with their floating nests, and seem to have a longer period of nest initiation than Common Terns.

We assume that such a large increase in such a short time of 1976–77 to 1982 signals an ecological change of unknown magnitude. At this time we have no basis for further speculation.

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Post-fledging departure from colonies by juvenile Least Terns in Texas: implications for estimating production.—Least Terns (*Sterna antillarum*) have been classified as endangered in California since 1973 (Bureau of Sport Fisheries and Wildlife, Resour. Publ. No. 114, 1973), and decline in numbers has been suggested for much of its range in North America and for the similar Little Tern (*Sterna albifrons*) in Europe (Nisbet, Bird-Banding 44:27–55, 1973; Fisk, Am. Birds 29:15–16, 1975; Lloyd et al., Br. Birds 68:221–237, 1975; Arbib, Am. Birds 33:830–835, 1979; Tate and Tate, Am. Birds 36:126–135, 1982). Despite a generally accepted decline, quantitative evaluations of reproductive parameters are few, aside from estimates of fledging success or fledgling : adult ratios presented by Massey (Proc. Linnaean Soc. N. Y. No. 72:1–24, 1974), Blus and Prouty (Wilson Bull. 91:62–71, 1979), and Massey and Atwood (Auk 98:596–605, 1981).

Earlier reports on Least Tern breeding biology often referred to counts of juveniles at colonies as a direct measure of annual productivity, and these counts were acknowledged as the usual method to estimate survival to fledging (Massey 1974). Massey and Atwood