

OBSERVATIONS OF SHOREBIRDS AT SELECTED NEW JERSEY SEWAGE LAGOONS

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A man-made habitat used by shorebirds: sewage lagoons. Sewage sludge is known to be an attraction to a wide variety of birds, and especially to species of Charadriiformes including both gulls and shorebirds. Typically birds concentrate to feed at sewer outlets or at the pools and flats of sludge lagoons. Field reports often describe such areas as "hot spots" of avian activity, particularly for migrant shorebirds (e.g. Kane and Buckley 1975, and Kelcey 1975) and for wintering gulls, including European species (e.g. Bull 1974). American reports from sewage locations seldom present systematic observations but British ornithologists have made several long-term studies including the bird ringing projects at Altrincham and Bletchley sewerage works (Bell 1962) and a three-year census of a 5 hectare sewerage farm (Glue and Bodenham 1974).

We recorded birds visiting sets of sewage sludge lagoons at Plainsboro, Middlesex County, and Trenton, Mercer County, New Jersey. The Plainsboro impoundments were primary-treatment sedimentation pools for the sewage of a large dairy herd (Walker-Gordon Farms). The three active pools and their soil bank borders were all contained within an area of less than one hectare. Pool depths of the liquid wastes varied greatly because of the pumping regime, but on any given day at least one pond had exposed mud flats. The Plainsboro site was visited on 42 dates from 31 July 1962 through 6 July 1972 (CL). The Trenton site (1.4 ha) included three sludge basins as secondary treatment lagoons for human wastes after aeration (Hamilton Township facilities). Observations were made at Trenton from 22 July-29 August 1975 (P.H.). At both locations the numbers of individuals of all species of shorebirds were recorded and notes were made of other birds frequenting the site. All the sludge basins have been operative for at least 15 years. Dominant vegetation at the edge of the pools included *Phytolacca americana* at Plainsboro and *Scirpus* sp. at Trenton. The Plainsboro ponds are built in sandy soil of the inner coastal plain while the Trenton pools lie at the edge of the rich-soiled Trenton Marshes (a tidal freshwater marsh).

The common shorebirds at both locations are presented in Table 1. Except for some of the Killdeers and Spotted Sandpipers at the Trenton site, all birds were fall migrants. Most species were usually present in small numbers but the Least Sandpiper and Semipalmated Sandpiper did occasionally appear in flocks of 10-34 individuals. These flocks would remain at the pools for only several days. From other census data of a series of consecutive days we believe that such short visits (<5 days) are probably typical of other migrant shorebirds as well. The noteworthy species at both locations was the Solitary Sandpiper which consistently appeared in small numbers with a fall daily maximum of seven.

This non-costal species is generally a scarce migrant but it is known to frequent *natural stagnant* pools (Stout 1967). We established a New Jersey State maximum with a spring count of 13 at Plainsboro (10 May 1968).

Uncommon shorebirds, not listed in Table 1, included two Greater Yellowlegs (*Tringa melanoleucus*) on 19 August 1975 and one Short-billed Dowitcher (*Limnodromus griseus*) on 29 August 1975, both at Trenton, and two Western Sandpipers (*Calidris mauri*) on 8 August 1974 at Plainsboro. The Wilson's Phalarope (*Steganopus tricolor*) has also been noted at the Plainsboro pools in earlier years (Charles H. Rogers, pers. com.). In fact, many other shorebird species are at least sometimes reported from larger sewage beds in the Northeast. For example, in the fall of 1974 the sewage filter ponds at Pittsfield, Massachusetts yielded *Tryngites subruficollis*, *Calidris fuscicollis*, *C. bairdii*, *Lobipes lobatus*, and *Capella gallinago* (Schwab 1974, 1975).

Why are the migrant shorebirds much more attracted to local sludge lagoons than inland ponds or mudflats? Apparently the lagoons simply provide the richest and most concentrated food sources, although the direct or indirect diet items have not been identified. At least some species will feed directly on sewage food particles, but it is suspected that much of the diets are indirect sources such as invertebrates of the flats. Of course these indirect items benefit themselves from the flooding of the nutrient rich sludge. At Trenton it is also important that the natural mudflats are often covered by tidewater while the sewage pools remain continually available for the migrants. Although the shorebirds were the most conspicuous visitors at the pools, other birds made regular appearances. At both study areas Mallards (*Anas platyrhynchos*) bred and Wood Ducks (*Aix sponsa*) appeared with young. European Coot (*Fulica atra*) and Common Teal (*Anas crecca*) were among the aquatic birds nesting on an English sewage farm (Glue and Bodenham 1974). Other birds common to the sludge pools of both areas included single Green Herons (*Butorides virescens*) and flocks of Starlings (*Sturnus vulgaris*). At Trenton hundreds of Starlings also regularly fed on the granite filter beds of the oxidization tanks. In the vegetation surrounding the pools Ring-necked Pheasants (*Phasianus colchicus*) and Song Sparrows (*Melospiza melodia*) were frequent.

In the future many more communities will probably utilize natural sewage treatment systems with secondary sludge cleansing and surface irrigation of effluents. If this occurs sewage mudflats will be more common and of greater importance for avian exploitation.

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LITERATURE CITED

- Bell, T. H. 1962. *Birds of Cheshire*, Altrincham, England, J. Sherratt.
- Bull, J. 1974. *Birds of New York State*. Garden City, New York, Doubleday.

- Glue, D. and D. Bodenham. 1974. Bird-life at a modern sewage farm. *Bird Study* 21:229-237.
- Kane, R. and P. A. Buckley. 1975. Hudson-St. Lawrence Region. *Amer. Birds* 29:31-32.
- Kelcey, J. G. 1975. Industrial development and wildlife conservation. *Envir. Conservation* 2: 99-108.
- Schwab, A. 1974 and 1975. Berkshire County Report. *Bird News of Western Massachusetts* 14: 66, 85, and 15:5.
- Stout, G. D. (ed.) 1967. *The shorebirds of North America*. New York, Viking Press.

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TABLE 1
COMMON SHOREBIRDS AT THE SEWAGE SLUDGE LAGOONS¹
TRENTON (18 DAYS) PLAINSBORO (42 DAYS)

	JUL	AUG	JUL	AUG	SEP	Total N
NO. DAYS	7	11	13	20	9	
Killdeer	25 (4)	56 (8)	5 (1)	11 (5)	3 (3)	100
<i>Charadrius vociferus</i>	7	11	5	4	1	
Spotted Sand.	25 (6)	61 (10)	19 (5)	16 (3)	—	121
<i>Actitis macularia</i>	7	11	10	9		
Solitary Sand.	8 (2)	40 (6)	39 (7)	40 (6)	7 (2)	134
<i>Tringa solitaria</i>	6	11	12	20	5	
Lesser Yellowlegs	15 (5)	22 (5)	2 (1)	8 (2)	—	47
<i>Tringa flavipes</i>	6	9	2	5	—	
Pectoral Sand.	2 (1)	—	3 (1)	12 (6)	—	17
<i>Calidris melanotos</i>	2		3	5		
Least Sand.	7 (5)	17 (5)	11 (3)	136 (26)	18 (40)	189
<i>Calidris minutilla</i>	4	8	7	10	7	
Semi-palmated Sandpiper	2 (1)	17 (14)	6 (6)	69 (34)	2 (1)	96
<i>Calidris pusillus</i>	2	4	1	5	2	

¹The numbers represent the monthly totals followed by the daily maximums in parentheses. The lower numerals indicate the number of days each species was observed.