

Bird Records from the Southwestern Virginia Roanoke Sewage Treatment Plant

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ABSTRACT

The Roanoke Sewage Treatment Plant serves as a principal stopover site in southwestern Virginia for migrating birds, especially shorebirds, ducks, and long-legged waders. An annotated list of 242 species of transient and resident birds that have been documented at the facility is provided.

Key words: birds, sewage treatment plant, shorebirds, Virginia.

INTRODUCTION

The Roanoke Water Pollution Control Plant, or Sewage Treatment Plant (STP), is a modern advanced waste treatment facility that serves the town of Vinton, the cities of Roanoke and Salem, and Botetourt and Roanoke counties in southwestern Virginia. This facility was built in 1951 and occupies a 24 ha tract of land, with diverse habitat composed of forest edge, grassy hillsides, access roads, and two large, open, 22 and 30 million gallon capacity concrete basins, or holding ponds, for the city's rainwater. These basins periodically fill with water, serving as an attractant to numerous ducks, swallows, and gulls. Additionally, there are five sludge lagoons with pools of liquid and semi-liquid effluent forming extensive sludge-flats, similar to coastal mud flats and tidal pools. Elevated dikes serve as roads around the lagoons, providing excellent, unobstructed viewing platforms across the lagoons and above the Roanoke River. Adjacent off-site residential housing, a recreational ball field, and several gravel parking lots contribute additional habitat diversity to the area. The Roanoke River forms a boundary to the north at the confluence of Tinker Creek. The wooded riparian edge is dominated by Boxelder (*Acer negundo*), Silver Maple (*Acer saccharinum*), Siberian Elm (*Ulmus pumila*), Pawpaw (*Asimina triloba*), and Sycamore (*Plantanus occidentalis*). This facility offers birdwatchers unrestricted access to a major part of the property.

Since its installation, STP has served as a principal

stopover site for migrating birds, especially shorebirds, ducks, and long-legged waders. These species are usually associated with more tidal and estuarine habitats found along the Atlantic coast, 320 km eastward. During a mid-1970s Christmas Bird Count, a member of the Roanoke Bird Club discovered STP as a refuge for birds. Since then, STP, with its ease of access and excellent vantage points, has served as a popular destination for birdwatchers.

Nationally, sewage treatment facilities are well known in the birding community as important bird habitats, particularly as feeding and staging sites for migratory species. DeCecco & Cooper (1996) studied shorebird migration at a Mississippi River wastewater treatment plant over a 13-year period. Keller (1992) quantified the various species of shorebirds that visit an Indianapolis sewage disposal plant. The research of Fuller & Glue (1980) in Great Britain shows that modern sewage treatment facilities vary greatly in their potential value as bird habitats, and bird communities within these facilities differ not only between various treatment methods, but also between components that make up sewage treatment systems. As is true of Roanoke's STP, these treatment facilities have proven that they are used by a variety of breeding, migrant, and wintering species.

Middleton's (1982) paper entitled "Fame Comes to Roanoke's "STP" as Stopover for Transients" gives an overview of Roanoke's sewage treatment facility and a number of bird species that were documented there until the early 1980s. This work includes an annotated

list of only 27 species of shorebirds documented to that point. The purpose of this paper is to document the entire known avifauna of the Roanoke Sewage Treatment Plant. Unlike other branches of natural history such as botany, entomology, geology, and herpetology, where specimens are collected or vouchered to substantiate occurrences for a site, bird observations, rare or otherwise, are generally accepted from reputable and skilled observers. This annotated list is the result of reports from numerous birdwatchers of the Roanoke, Botetourt, Lynchburg, and Blacksburg areas that document the seasonal occurrences of these birds. Birds were identified, often with the aid of binoculars and spotting scopes, on the basis of characteristic field marks and behaviors as described in standard references, including Robbins et al. (1966) and Peterson (1980). No bird capture methods (e.g., mist nets) were used to aid in identification. These sightings are the result of intense searches and incidental findings spanning the past quarter century.

SPECIES ACCOUNTS

Bird life at STP is diverse; 62% of the avian species documented for Virginia have been observed at the site, including a number of rare species. The following annotated list includes records for 242 species of birds that have been documented at STP. Within the STP property, the riparian habitat, brushy thickets, and a stand of mixed hardwoods and conifers offers nesting habitat for at least 65 species of birds; however, no study of the nesting birds has been conducted. Species documented as breeding at STP are denoted with an asterisk (*). For the purposes of this report, breeding evidence is defined as birds observed in copulation, eggs or young in nest, and adults carrying nest material, food, or fecal sacs. Undocumented but suspected breeders are denoted with a plus sign (+). The list also includes four non-native species, Rock Pigeon (*Columba livia*), European Starling (*Sturnus vulgaris*), House Sparrow (*Passer domesticus*), and House Finch (*Carpodacus mexicanus*), that have established reproducing populations in Virginia. Several additional exotic or escaped cage bird species that have been documented at STP are included at the end of the annotation. The list follows AOU (2003) scientific and English nomenclature and species sequence. Most of the peak count dates cited are taken from Kinzie (1985) and Kain (1987). Values in parentheses refer to the number of individuals observed on a particular date. All records are given for rare species and only selected dates for more regular or common species.

ANNOTATED CHECKLIST

Dendrocygna bicolor (Fulvous Whistling-Duck)

One record: 29 May - 2 July 1979 (1) (Kinzie, 1985).

Chen caerulescens (Snow Goose)

One record: 1 April 1993 (2).

* *Branta canadensis* (Canada Goose)

Common permanent resident. Records include 31 March 1982 (2), 25-27 November 1987 (1), 5 March 1992 (1), and 25 May 2001 (2 adults, 4 young). Peak count: 44 (28 December 1990).

Cygnus columbianus (Tundra Swan)

Three records: 25 March 1984 (1), 18 March 1992 (1), and 13 November 1997 (1).

* *Aix sponsa* (Wood Duck)

Records include 17 March 1987 (5), 26 May 1983 (1 adult, 14 young), 27 February 1991 (2), and 14 October 1995 (6).

Anas strepera (Gadwall)

Records include 28 February 1980 (1), 10 November 1990 (1), and 11 November 1995 (2).

Anas americana (American Wigeon)

Records include 3 January 1985 (1), 17 March 1987 (3), 2 May 1990 (2), and 10 November 1991 (1).

Anas rubripes (American Black Duck)

Records include 17 March 1991 (4), 15 November 1995 (10), and 16 December 2000 (1). Peak count: 16 (5 January 1991).

* *Anas platyrhynchos* (Mallard)

Records include 25 November 1979 (1), 2 May 1983 (1 adult, 11 young), and 1 February 1997 (8). Peak count: 21 (16 December 2000).

Anas discors (Blue-winged Teal)

Records include 14 August 1991 (2), 29 March 1984 (16), and 5 October 1995 (2). Peak count: 41 (8 April 1987). A pair observed on 6 July 1979 indicates possible breeding activity.

Anas clypeata (Northern Shoveler)

Records include 9 March 1980 (1), 4 April 1982 (1), 6 April 1987 (2), 22 September 1992 (1), and 21 April 1993 (1). Peak count: 6 (5 April 1980).

Anas acuta (Northern Pintail)

Records include 7 September 1981 (1), 21 April 1987

(1), 21 February 1992 (1), and 17 May 1993 (2). One summer record: 15-17 July 1980 (2).

Anas crecca (Green-winged Teal)

Records include 20 March 1982 (1) and 3 January 1992 (4). Peak count: 6 (3 November 1995).

Aythya valisineria (Canvasback)

One record: 28 November 1982 (2).

Aythya americana (Redhead)

One record: 10 November 1991 (1).

Aythya collaris (Ring-necked Duck)

Records include 6 March 1983 (1), 6 April 1987 (3), and 18 March 1991 (1). Peak count: 10 (14 March 1991).

Aythya marila (Greater Scaup)

Records include 11 November 1981 (1) and 23 November 1992 (1). Peak count: 50 (1 March 1985).

Aythya affinis (Lesser Scaup)

Records include 4 April 1984 (13), 24 May 1985 (1), 17 March 1987 (12), and 3 November 1995 (1). Peak count: 64 (21 March 1982).

Melanitta fusca (White-winged Scoter)

Three records: 21-31 October 1987 (1), 7 November 1987 (1), and 8 January 1991 (1).

Clangula hyemalis (Long-tailed Duck)

One record: 29 March 1984 (2).

Bucephala albeola (Bufflehead)

Records include 3 January 1992 (2) and 17 March 1991 (1). Peak count: 8 (4 January 1988).

Bucephala clangula (Common Goldeneye)

Records include 21 November 1982 (1), 22 January 1986 (2), and 16-17 January 1991 (1).

Lophodytes cucullatus (Hooded Merganser)

Records include 28 May 1991 (1), 9 November 1990 (6), and 5 April 1992 (5). Peak count: 30 (11 January 1981). On 3 June 1983, two immatures were observed, suggesting a local breeding population.

Mergus serrator (Red-breasted Merganser)

Records include 24 April 1981 (1), 20 April 1992 (4), and 28 March 1993 (4). Peak count: 13 (29 March 1990).

Oxyura jamaicensis (Ruddy Duck)

Records include 21 March 1983 (5), 6 April 1986 (7), 8 October 1988 (1), 24 May 1986 (1), and 3 November 1995 (6). Peak count: 30 (11 January 1981; Kinzie, 1995).

+ *Bonasa umbellus* (Ruffed Grouse)

Only one record of one bird (23 May 1982), although this species probably breeds on STP.

+ *Meleagris gallopavo* (Wild Turkey)

Common permanent resident. Records include 30 November 1983 (4), 30 November 1987 (6), 26 March 1988 (4), and 16 December 2000 (3). Peak count: 7 (12 April 1993).

Colinus virginianus (Northern Bobwhite)

Only two records: 15 February 1983 (1) and 5 April 1988 (2). All three birds were observed across the Roanoke River.

Gavia immer (Common Loon)

Two records: 17 April 1987 (1) and 28 March 1993 (1).

Podilymbus podiceps (Pied-billed Grebe)

Records include 15 October 1995 (2) and 13 April 1996 (1). Peak count: 9 (15 November 1995).

Podiceps auritus (Horned Grebe)

Records include 20 March 1982 (1), 16 April 1983 (2), 10 November 1991 (1), and 10 April 1993 (2). Peak count: 11 (28 November 1982).

Phalacrocorax auritus (Double-crested Cormorant)

Records include 26 May 1985 (1), 17 April 1989 (1), 7 April 1990 (3), 9 April 1992 (2), and 16 September 1995 (1).

Botaurus lentiginosus (American Bittern)

Two records: 17-22 October 1982 (1) and 17-25 April 1986 (1).

Ixobrychus exilis (Least Bittern)

Two records: 2 October 1984 (1) and 3 May 1993 (1).

Ardea herodias (Great Blue Heron)

Records include 25 June 1987 (1 immature), 8 August 1991 (1), and 19 July 1992 (1). Peak count: 10 (5 November 1984).

Ardea alba (Great Egret)

Records include 13 April 1984 (2), 20 October 1987 (2), and 12 August 1995 (1). Peak count: 2 (20 October 1987).

Egretta thula (Snowy Egret)

Four records: 18 May 1985 (1), 17 April 1987 (1), 8 May 1988 (1), and 4 June 1992 (1).

Egretta caerulea (Little Blue Heron)

Three records: 24 July 1981 (1), 5 April 1983 (1), and 27 July 1991 (1).

Egretta tricolor (Tricolored Heron)

One record: 30 July 1989 (1).

Bubulcus ibis (Cattle Egret)

Records include 10 October 1982 (1), 14 September 1983 (1), 26 May 1987 (1), and 30 October 1987 (4). Peak count: 5 (1 November 1984).

* *Butorides virescens* (Green Heron)

Records include 14 April 1980 (2), 17 January 1987 (1), 19 July 1992 (2), 29 August 1992 (2 immature), and 4 November 1995 (1).

Nycticorax nycticorax (Black-crowned Night-Heron)

Records include 5 April 1983 (1), 16 April 1985 (2), 9 May 1987 (1 immature), 29 March 1989 (1), and 23 July 1991 (1).

+ *Nyctanassa violacea* (Yellow-crowned Night-Heron)

Records include 8 April 1984 (1), 30 May 1986 (1), 26 May 1987 (1), 30 July 1992 (2 immature), and 19 August 1992 (1). Peak count: 4 (31 July 1989).

Eudocimus albus (White Ibis)

One record: 29 July 1980 (2).

Plegadis falcinellus (Glossy Ibis)

One record: 3-5 November 1986 (1).

Coragyps atratus (Black Vulture)

Uncommon permanent resident. Peak count: 4 (23 January 1988).

Cathartes aura (Turkey Vulture)

Common permanent resident. Peak count: 5 (1 January 1984).

Pandion haliaetus (Osprey)

Records include 12 April 1980 (1), 29 August 1992 (1), and 6 September 1993 (1), always 1-2 birds.

Haliaeetus leucocephalus (Bald Eagle)

Two records: 27 February 1988 (1) and 3 January 1992 (1).

Circus cyaneus (Northern Harrier)

Records include 4 September 1990 (1 immature), 7 September 1991 (1), and 26 October 1999 (1), always 1-2 birds.

Accipiter striatus (Sharp-shinned Hawk)

Records include 5 February 1982 (1) and 10 January 1992 (1), always 1-2 birds.

Accipiter cooperii (Cooper's Hawk)

Records include 8 March 1980 (1), 6 April 1991 (1 immature), 8 February 1994 (1), and 5 November 1995 (1).

Buteo lineatus (Red-shouldered Hawk)

Records include 20 February 1983 (1) and 20 May 1992 (1).

* *Buteo platypterus* (Broad-winged Hawk)

Records include 17 April 1983 (1), 10 April 1993 (1), and 18 April 1996 (4). Peak count: 5 (18 April 1992).

+ *Buteo jamaicensis* (Red-tailed Hawk)

Common permanent resident.

* *Falco sparverius* (American Kestrel)

Records include 1 January 1985 (1), 18 April 1993 (1), and 7 August 1994 (1).

Falco columbarius (Merlin)

Records include 16 October 1986 (1), 18 April 1992 (1), and 3 March 1994 (1).

Falco peregrinus (Peregrine Falcon)

Records include 26 October 1982 (1), 1 September 1991 (1), 25 March 1992 (1), 28 August 1992 (1), 22 September 1992 (1), 27 October 1992 (1), and 25 September 1994 (1).

Porzana carolina (Sora)

Records include 13-18 September 1983 (1) and 29 April 1987 (1). Never more than one bird observed per date.

Fulica americana (American Coot)

Records include 4 November 1982 (1), 24 October 1993 (1), and 7 May 1995 (1). Peak count: 2 (6 April 1983).

Pluvialis squatarola (Black-bellied Plover)

Records include 11 November 1979 (1), 14 May 1980 (2), 18 May 1981 (1), 18 August 1985 (1), 10 July 1986 (1), and 23 September 1995 (1). Never more than two birds observed per date.

Pluvialis dominica (American Golden-Plover)

Records include 21 September 1981 (2), 10-11 October 1983 (1), 6 September 1988 (2), 19-30 September 1990 (2), 15 November 1992 (1), and 23 September 1995 (1).

Charadrius semipalmatus (Semipalmated Plover)

Records include 22 April 1992 (1), 12 May 1981 (1), 17 October 1988 (1), and 17 September 1993 (1). Peak count: 72 (18 May 1981; Kinzie, 1985).

Charadrius melodus (Piping Plover)

Four records: 17 August 1978 (1), 29 July-5 August 1979 (1), 2-3 August 1981 (1), and 23-24 June 1990 (1).

* *Charadrius vociferus* (Killdeer)

Common permanent resident. 11 April 1993 (1 adult with 2 eggs). Peak count: 204 (30 July 1983).

Recurvirostra americana (American Avocet)

Five records: 11 October 1975 (1), 25-28 October 1984 (2, with one remaining until 2 November), 5 July 1985 (1), 8 August 1985 (4), and 1 September 1997 (1).

Tringa melanoleuca (Greater Yellowlegs)

Records include 19 March 1991 (1), 8 July 1981 (1), 25 April 1987 (1), and 13 October 1995 (1). Peak count: 5 (4 May 1997).

Tringa flavipes (Lesser Yellowlegs)

Records include 25 February 1985 (1) and 30 August 1995 (1). Peak count: 77 (28 July 1980; Kinzie, 1985).

Tringa solitaria (Solitary Sandpiper)

Records include 8 July 1983 (1), 3 April 1986 (1), 2 July 1987 (1), and 9 October 1992 (1). Peak count: 52 (27 April 1982; Kinzie, 1985).

Catoptrophorus semipalmatus (Willet)

Records include 18 May 1987 (1), 2 August 1978 (1), 10 July 1979 (2), and 29 August 1992 (1). Peak count: 15 (11 May 1981; Kinzie, 1985).

+ *Actitis macularia* (Spotted Sandpiper)

Records include 15 April 1991 (2), 23 July 1992 (1), and 5 October 1995 (1). Peak count: 101 (19 May 1981).

Numenius phaeopus (Whimbrel)

One record: 14 September 1983 (1).

Arenaria interpres (Ruddy Turnstone)

Records include 19 May 1981 (1), 27 July 1985 (1), 3-6 September 1987 (1), 3 June 1988 (1), 23 August 1990

(1), and 4 September 1993 (2).

Calidris canutus (Red Knot)

One record: 28-30 July 1980 (1).

Calidrus alba (Sanderling)

Records include 20 August 1980 (1), 29-31 May 1983 (1), 14-21 September 1983 (1), 6 August 1988 (2), and 2 October 1991 (3). Peak count: 8 (20 August 1987).

Calidris pusilla (Semipalmated Sandpiper)

Records include 8 May 1981 (1), 29 October 1991 (3), and 13 August 1995 (2). Peak count: 259 (3 June 1979; Kain, 1987).

Calidris mauri (Western Sandpiper)

Records include 5 September 1992 (1), 2 June 1994 (1), and 12-19 August 1995 (1). Peak count: 5 (24 July 1979).

Calidris minutilla (Least Sandpiper)

Records include 27 March 1986 (1), 25 April 1987 (1), and 5 August 1994 (1). Peak count: 398 (12 May 1981; Kain, 1987).

Calidris fuscicollis (White-rumped Sandpiper)

Records include 19 May 1981 (5), 1-7 September 1981 (2), 14-21 October 1984 (1), 26 August 1989 (4), and 7-15 November 1990 (1). Peak count: 18 (26 May 1981; Kain, 1987).

Calidris bairdii (Baird's Sandpiper)

Records include 17 September 1979 (1), 13-16 September 1983 (1), 26 October 1987 (1), 22-28 August 1988 (1), and 5 September 1995 (1). Spring records include a single bird on 18 and 23 May 1980. Peak count: 5 (6-7 September 1979; Kain, 1987).

Calidris melanotos (Pectoral Sandpiper)

Records include 22 July 1980 (1), 11 February 1986 (1), 25 October 1987 (1), 23 October 1992 (2), 1 December 1993 (1), and 5 May 1995 (1). Peak count: 89 (2 October 1985).

Calidris alpina (Dunlin)

Records include 18 May 1981 (3), 3 April 1982 (2), 22 October 1982 (2), 4 September 1983 (2), and 5 November 1992 (1). Peak count: 59 (19 May 1991).

Calidris himantopus (Stilt Sandpiper)

Records include 28 July 1980 (3), 16 September 1981 (1), 7 August 1982 (1), 4 September 1983 (1), 25 July 1985 (5), 9 September 1988 (11), and 23 July 1992 (1). Peak count: 12 (29 July 1980; Kain, 1987).

Tryngites subruficollis (Buff-breasted Sandpiper)

Records include 12 September 1978 (1), 19-30 August 1981 (1), 8-9 September 1984 (1), 18 August 1985 (2), 9 August 1991 (1), and 2 September 1995 (1).

Limnodromus griseus (Short-billed Dowitcher)

Records include 1 September 1982 (1), 8 November 1982 (1), and 8 April 1995 (1). Peak count: 33 (18 May 1981).

Limnodromus scolopaceus (Long-billed Dowitcher)

Two records: 13-17 October 1983 (1) and 23 September 1984 (1).

Gallinago delicata (Wilson's Snipe)

Records include 13 March 1987 (3), 21 January 1991 (1), 6 May 1991 (1), 8 November 1991 (1), 18 April 1992 (4), and 12 September 1997 (1). Peak count: 8 (13 April 1996).

Scolopax minor (American Woodcock)

Two records: 7 March 1981 (1) and 11 November 1987 (1).

Phalaropus tricolor (Wilson's Phalarope)

Records include 25-27 August 1977 (1), 10-20 August 1978 (1), 23-25 May 1979 (1), 3 June 1979 (1), 23-29 July 1979 (1), 25 August 1985 (1), and 18 July 1986 (1). Most records list one or two birds, but three were seen on 22 August 1989.

Phalaropus lobatus (Red-necked Phalarope)

Records include 24 May-3 June 1979 (1), 18 May 1980 (1), 25 May 1986 (1), 26-28 May 1988 (1), and 16-28 May 1991 (1). Peak count: 18 (5 September 1979; Kain, 1987).

Phalaropus fulicarius (Red Phalarope)

One record: 23 November - 28 December 1984 (1) (Kain, 1987).

Larus atricilla (Laughing Gull)

Records include 11 April 1982 (5), 2 November 1986 (1), and 28 August 1992 (1). Peak count: 5 (11 April 1982).

Larus philadelphia (Bonaparte's Gull)

Records include 5 April 1980 (1), 16 May 1983 (1), 26 March 1983 (2), 29 December 1987 (6), 7 February 1989 (5), and 8 November 1991 (8). Peak count: 39 (21 March 1982).

Larus delawarensis (Ring-billed Gull)

Records include 15 January 1988 (210), 8 October 1988

(2), 13 October 1990 (1), 28 January 1996 (30), and 20 February 2001 (1). Peak count: 450 (8 March 1980).

Larus argentatus (Herring Gull)

Records include 28 February 1980 (1), 18 March 1987 (3), 15 January 1988 (2), 3 October 1989 (1), 31 January 1991 (1), and 16 December 1992 (2). Peak count: 10 (20 April 1992).

Larus fuscus (Lesser Black-backed Gull)

An adult observed on 4 April 1984 represents the only record for this species for the Mountain and Valley region of Virginia (Kain, 1987).

Sterna caspia (Caspian Tern)

Records include 4 September 1981 (1), 4 April 1992 (1), and 15 September 1992 (1). Peak count: 4 (22 April 1988).

Sterna hirundo (Common Tern)

Records include 11 November 1979 (1), 28 July 1980 (1), 9 September 1988 (1), and 4 September 1981 (2).

Sterna fosteri (Forster's Tern)

Three records: 5 October 1983 (6), 24 May 1985 (1), and 31 July 1985 (1).

Chlidonias niger (Black Tern)

Records include 28 July 1980 (3), 7 September 1981 (2), 2 September 1983 (1), 12 August 1986 (1), 16 August 1987 (1), 12 August 1988 (1), 9 September 1988 (4), 25 July 1985 (1), and 31 August 1987 (1).

* *Columba livia* (Rock Pigeon)

Common permanent resident; introduced species. Peak count: 20 (1 January 1983).

* *Zenaida macroura* (Mourning Dove)

Common permanent resident. Peak count: 23 (1 January 1988).

Coccyzus erythrophthalmus (Black-billed Cuckoo)

One record: 28 September 1991 (1).

* *Coccyzus americanus* (Yellow-billed Cuckoo)

Records include 24 May 1986 (1), 26 October 1989 (1), 30 April 1991 (1), and 6 August 1992 (1).

Tyto alba (Barn Owl)

Two records: 18 July 1982 (2) and 21 July 1983 (3).

+ *Megascops asio* (Eastern Screech-Owl)

Common permanent resident.

+ *Bubo virginianus* (Great Horned Owl)
Uncommon permanent resident.

Chordeiles minor (Common Nighthawk)
Records include 11 October 1982 (2), 3 May 1983 (4),
17 October 1988 (1), and 21 May 1993 (1).

Caprimulgus vociferus (Whip-poor-will)
The one record is of one individual heard calling on 31
March 1982.

Chaetura pelagica (Chimney Swift)
Records include 12 April 1980 (1), 17 April 1987 (15),
16 April 1983 (38), and 14 April 1991 (3). Peak count:
300 (26 September 1995).

+ *Archilochus colubris* (Ruby-throated Hummingbird)
Records include 26 April 1984 (1), 30 April 1985 (1),
25 April 1987 (1), and 26 July 1992 (1).

* *Ceryle alcyon* (Belted Kingfisher)
Common permanent resident.

+ *Melanerpes carolinus* (Red-bellied Woodpecker)
Common permanent resident.

Sphyrapicus varius (Yellow-bellied Sapsucker)
No summer records. Records include 28 February 1981
(1), 9 January 1985 (1), and 16 December 2000 (1).

* *Picoides pubescens* (Downy Woodpecker)
Common permanent resident. 5 June 1983 (1 adult on
nest).

Picoides villosus (Hairy Woodpecker)
Records include 14 November 1982 (1), 8 January 1988
(1), and 16 December 2000 (3).

* *Colaptes auratus* (Northern Flicker)
Common permanent resident.

+ *Dryocopus pileatus* (Pileated Woodpecker)
Common permanent resident.

* *Contopus virens* (Eastern Wood-Pewee)
Common summer resident. Records include 7 May
1983 (2) and 29 May 2000 (1).

* *Empidonax virens* (Acadian Flycatcher)
Common summer resident. Records include 2 May
1983 (1), 30 May 1983 (1), and 22 May 1987 (2).

* *Empidonax traillii* (Willow Flycatcher)
Records include 30 May 1981 (1), 23 May 1982 (2), 15

May 1989 (1), 18 June 1991 (1), and 19 April 1992 (2).

Empidonax minimus (Least Flycatcher)
Two records: 18 September 1983 (1) and 6 June 1989
(1).

* *Sayornis phoebe* (Eastern Phoebe)
Records include 6 March 1983 (1), 14 January 1984
(1), 3 April 1994 (1), 6 October 1995 (1), and 2
December 1999 (1).

* *Myiarchus crinitus* (Great Crested Flycatcher)
Common summer resident. Records include 1 May
1983 (1), 25 April 1992 (1), and 7 August 1992 (1).

Tyrannus verticalis (Western Kingbird)
One record: 6 October 1985 (1).

* *Tyrannus tyrannus* (Eastern Kingbird)
Summer resident. Records include 26 April 1984 (2)
and 1 May 1987 (1). Peak count: 17 (8 September
1971; Kinzie, 1985).

Tyrannus forficatus (Scissor-tailed Flycatcher)
One record: 27 September 1987 (1).

* *Lanius ludovicianus* (Loggerhead Shrike)
Records include 12 February 1984 (1), 1 January 1986
(1), 5 July 1987 (2 adult, 1 immature), 29 August 1988
(1), 12 September 1989 (2), 9 November 1990 (1), and
15-20 March 1992 (1). There are no records of this
declining, state threatened species since 1992.

Vireo griseus (White-eyed Vireo)
Records include 28 April 1984 (1), 26 October 1986
(1), 28 April 1991 (2), 18 April 1992 (1), and 16 April
1994 (1).

Vireo flavifrons (Yellow-throated Vireo)
Records include 31 May 1983 (1) and 28 October 1989
(1).

Vireo solitarius (Blue-headed Vireo)
Records include 22 October 1982 (1) and 6 April 1991
(1).

Vireo gilvus (Warbling Vireo)
Records include 19 May 1985 (1) and 6 April 1991 (2).

Vireo philadelphicus (Philadelphia Vireo)
Three records: 29 September 1984 (1), 20 October 1987
(1), and 22 September 1990 (1).

**Vireo olivaceus* (Red-eyed Vireo)

Common summer resident. Records include 5 April 1982 (1), 28 April 1984 (1), and 21 August 1989 (1).

* *Cyanocitta cristata* (Blue Jay)

Common permanent resident.

* *Corvus brachyrhynchos* (American Crow)

Common permanent resident.

Corvus corax (Common Raven)

Uncommon permanent resident. Peak count: 6 (10 October 1982; Kinzie, 1985).

+ *Progne subis* (Purple Martin)

Records include 7 April 1982 (8), 23 March 1991 (3), and 20 March 1992 (2). Peak count: 15 (21 March 1992).

* *Tachycineta bicolor* (Tree Swallow)

Records include 22 June 1983 (5 eggs in bluebird box), 20 October 1983 (4), 20 March 1992 (1), and 11 April 1996 (1). Peak count: 68 (4 October 1987).

* *Stelgidopteryx serripennis* (Northern Rough-winged Swallow)

Records include 4 April 1980 (1), 28 March 1981 (3), 25 March 1987 (1), 23 March 1991 (4), and 4 November 1995 (1). Peak count: 8 (7 April 1990).

Riparia riparia (Bank Swallow)

Records include 20 April 1982 (1), 23 April 1984 (1), 21 April 1987 (6), 19 April 1992 (4), and 5 May 1992 (5).

Petrochelidon pyrrhonta (Cliff Swallow)

Records include 3 May 1984 (1), 26 September 1989 (10), 19 April 1991 (5), and 5 October 1995 (1). Peak count: 50 (24 May 1985; Kinzie, 1985).

* *Hirundo rustica* (Barn Swallow)

Common summer resident. Records include 2 April 1980 (1), 25 March 1987 (2), 20 March 1992 (3), and 5 October 1995 (1). Peak count: 12 (12 April 1980).

* *Poecile carolinensis* (Carolina Chickadee)

Common permanent resident.

Poecile atricapillus (Black-capped Chickadee)

The few records include 10 November 1983 (1) and 15 November 1990 (1).

* *Baeolophus bicolor* (Tufted Titmouse)

Common permanent resident.

Sitta canadensis (Red-breasted Nuthatch)

One record: 14 December 2000 (1).

+ *Sitta carolinensis* (White-breasted Nuthatch)

Common permanent resident.

Certhia americana (Brown Creeper)

Winter resident. Records include 21 November 1982 (1), 3 April 1983 (1) and 17 February 1996 (1). Peak count: 2 (3 February 1983).

* *Thryothorus ludovicianus* (Carolina Wren)

Common permanent resident.

* *Troglodytes aedon* (House Wren)

Records include 13 October 1981 (1), 20 April 1982 (1), 22 April 1989 (1), and 26 April 1993 (1).

Troglodytes troglodytes (Winter Wren)

Winter resident. Records include 20 December 1981 (1), 18 February 1984 (2), 27 October 1992 (1), and 29 November 1993 (3).

Cistothorus palustris (Marsh Wren)

Records include 7 May 1987 (1), 29 September 1992 (1), and 24 October 1993 (1).

Regulus satrapa (Golden-crowned Kinglet)

Winter resident. Records include 1 January 1983 (1), 4 November 1995 (4), and 21 February 1999 (1).

Regulus calendula (Ruby-crowned Kinglet)

Records include 4 April 1982 (2), 16 October 1983 (1), 1 January 1985 (3), and 2 December 1999 (5).

* *Poliophtila caerulea* (Blue-gray Gnatcatcher)

Common summer resident. Records include 13 April 1984 (1), 30 March 1991 (1), 13 October 1992 (1), and 8 April 1995 (1).

* *Sialia sialis* (Eastern Bluebird)

Common permanent resident.

Catharus fuscescens (Veery)

Two records: 25 May 1987 (1) and 5 May 1992 (1).

Catharus minimus (Gray-cheeked Thrush)

One record: 29 September 1990 (1).

Catharus ustulatus (Swainson's Thrush)

Uncommon migrant. Records include 29 April 1983 (1), 20 May 1987 (1), 29 September 1990 (1), and 30 September 1991 (1).

Catharus guttatus (Hermit Thrush)

Common winter resident and migrant. Records include 3 April 1983 (2), 13 April 1985 (1), 7 April 1991 (1), and 11 April 1992 (1).

* *Hylocichla mustelina* (Wood Thrush)

Common summer resident. Records include 29 April 1983 (1), 26 April 1984 (2), and 2 August 1993 (1).

* *Turdus migratorius* (American Robin)

Common permanent resident. Records include 5 April 1985 (1) and 2 December 1999 (1).

+ *Dumetella carolinensis* (Gray Catbird)

Probable summer resident. Records include 27 April 1982 (1) and 25 April 1992 (1). No winter records.

* *Mimus polyglottos* (Northern Mockingbird)

Common permanent resident.

* *Toxostoma rufum* (Brown Thrasher)

Records include 14 April 1984 (2), 7 March 1987 (1), and 10 August 1992 (2).

* *Sturnus vulgaris* (European Starling)

Common permanent resident; introduced species. Peak count: 15 (1 January 1988).

Anthus rubescens (American Pipit)

Records include 1 January 1982 (1), 30 October 1983 (7), 28 October 1989 (6), 4 April 1993 (1), 1 December 1993 (3), and 5 November 1995 (2). Peak count: 10 (2 October 1993).

* *Bombcilla cedrorum* (Cedar Waxwing)

Common permanent resident. Peak count: 5 (20 August 1990).

Vermivora pinus (Blue-winged Warbler)

Records include 25 August 1990 (1), 29 April 1991 (1), and 27 July 1991 (1).

Vermivora peregrina (Tennessee Warbler)

Records include 2 October 1983 (1), 4 May 1984 (1), 9 October 1989 (1), and 14 September 1990 (1). Peak count: 5 (16 September 1981).

Vermivora celata (Orange-crowned Warbler)

Records include 28 October 1984 (1), 12 October 1987 (1), and 14 September 1990 (1). No spring records.

Vermivora ruficapilla (Nashville Warbler)

Records include 20 September 1981 (1), 11 September 1983 (1), 14 September 1990 (1), 6 October 1993 (1),

and 8 November 1983 (1). Peak count: 2 (20 September 1981).

Parula americana (Northern Parula)

Records include 20 September 1981 (1), 13 April 1985 (1), and 26 April 1993 (1).

* *Dendroica petechia* (Yellow Warbler)

Common summer resident. Records include 29 April 1983 (3), 8 August 1992 (4), and 26 April 1993 (1).

Dendroica pensylvanica (Chestnut-sided Warbler)

Records include 7 May 1984 (1), 3 May 1983 (1), 30 April 1991 (1), and 18 May 1992 (2). No summer records.

Dendroica magnolia (Magnolia Warbler)

Records include 11 October 1981 (1), 15 September 1983 (1), 18 May 1992 (1), and 16 September 1995 (2).

Dendroica tigrina (Cape May Warbler)

Records include 20 September 1990 (4), 8 August 1991 (1), 3 May 1992 (1), and 16 September 1995 (1).

Dendroica caerulescens (Black-throated Blue Warbler)

Records include 9 May 1984 (1), 29 April 1991 (1), 4 May 1992 (1), and 30 April 1993 (1). No summer records.

Dendroica coronata (Yellow-rumped Warbler)

Common winter resident. Records include 5 January 1982 (1) and 12 December 2000 (13).

Dendroica virens (Black-throated Green Warbler)

Records include 15 September 1983 (1) and 10 April 1992 (1).

Dendroica fusca (Blackburnian Warbler)

Records include 7 May 1984 (1) and 14 September 1990 (1).

Dendroica dominica (Yellow-throated Warbler)

Records include 26 May 1984 (1), 23 April 1987 (2), 7 May 1991 (1), and 11 April 1992 (1).

* *Dendroica pinus* (Pine Warbler)

Two records: 12 October 1987 (1) and 29 July 1988 (2). A pair observed on the latter date indicates possible breeding activity.

+ *Dendroica discolor* (Prairie Warbler)

The few records include 29 September 1984 (1), 23 April 1989 (2), and 17 April 1991 (1).

Dendroica palmarum (Palm Warbler)

Records include 22 September 1983 (1), 24 November 1991 (2), and 19 April 1992 (2). Peak count: 35 (2 October 1993; Kinzie, 1985).

Dendroica castanea (Bay-breasted Warbler)

Two records: 22 September 1990 (1) and 17 September 1988 (1).

Dendroica striata (Blackpoll Warbler)

Records include 17 May 1981 (1), 15 October 1990 (1), and 18 May 1992 (2).

Dendroica cerulea (Cerulean Warbler)

Records include 18 May 1982 (1), 11 May 1982 (1), and 15 May 1989 (1).

* *Mniotilta varia* (Black-and-white Warbler)

Uncommon summer resident. Records include 11 October 1981 (1), 13 April 1982 (1), 9 April 1991 (2), and 24 June 1994 (1).

* *Setophaga ruticilla* (American Redstart)

Common summer resident. Records include 20 September 1981 (1), 25 April 1987 (1), 29 July 1988 (1), and 20 April 1991 (1).

* *Protonotaria citrea* (Prothonotary Warbler)

Uncommon summer resident. Records include 2 May 1982 (2), 4 May 1984 (1), 7 May 1984 (1 adult on nest), 18 April 1993 (1), and 14 May 1994 (2).

* *Helmitheros vermivorus* (Worm-eating Warbler)

Common summer resident. Records include 3 April 1983 (1), 16 August 1983 (1), and 12 May 1990 (1).

* *Seiurus aurocapilla* (Ovenbird)

Common summer resident. Records include 29 April 1983 (1) and 30 September 1983 (1).

Seiurus noveboracensis (Northern Waterthrush)

Records include 8 May 1988 (1), 30 April 1991 (2), 20 April 1992 (1), and 5 May 1992 (1). Peak count: 2 (11 May 1980).

* *Seiurus motacilla* (Louisiana Waterthrush)

Records include 8 April 1984 (2) and 20 April 1992 (1).

Oporornis formosus (Kentucky Warbler)

Records include 30 April 1983 (1) and 3 May 1992 (1)

Oporornis philadelphia (Mourning Warbler)

Two records: 29 May 1984 (1) and 21 May 1987 (1).

* *Geothlypis trichas* (Common Yellowthroat)

Uncommon summer resident. Records include 20 September 1981 (1), 19 May 1983 (1), 15 April 1983 (1), 29 July 1988 (1), and 6 October 1993 (1).

Wilsonia citrina (Hooded Warbler)

One record: 29 April 1991 (1).

Wilsonia pusilla (Wilson's Warbler)

Records include 20 September 1981 (1), 23 May 1982 (1), 23 September 1987 (1), and 20 September 1991 (1). Peak count: 3 (11 September 1983; Kinzie, 1985).

Wilsonia canadensis (Canada Warbler)

Records include 11 May 1981 (1), 15 September 1983 (1), 20 May 1987 (1), and 16 May 1992 (1). Peak count: 2 (16 May 1992).

* *Icteria virens* (Yellow-breasted Chat)

Uncommon summer resident. Records include 15 May 1982 (3), 2 May 1984 (1), and 30 April 1990 (1). Peak count: 3 (15 May 1982).

* *Piranga olivacea* (Scarlet Tanager)

Common summer resident. Records include 2 May 1983 (1) and 29 July 1988 (1).

* *Pipilo erythrophthalmus* (Eastern Towhee)

Common summer resident, uncommon winter resident. Records include 1 January 1983 (1) and 29 August 1995 (1).

* *Spizella passerina* (Chipping Sparrow)

Common summer resident. Records include 29 March 1981 (6), 29 July 1988 (2), and 15 August 1996 (1).

* *Spizella pusilla* (Field Sparrow)

Common permanent resident.

Pooecetes gramineus (Vesper Sparrow)

Records include 13 April 1982 (2), 21 April 1987 (1), 30 March 1991 (1), 15 September 1993 (1), and 15 October 1994 (1).

Chondestes grammacus (Lark Sparrow)

Records include 13 April 1982 (2), 8 and 20 August 1991 (2).

Passerculus sandwichensis (Savannah Sparrow)

Records include 21 March 1981 (3), 3 April 1989 (3), 24 April 1993 (2), and 17 September 1993 (3).

Ammodramus savannarum (Grasshopper Sparrow)
Records include 10 October 1987 (1) and 25 April 1992 (2).

Ammodramus henslowii (Henslow's Sparrow)
Two records: 30 May 1991 (1) and 15 May 1991 (1).
No recent STP records of this state threatened bird.

Ammodramus leconteii (Le Conte's Sparrow)
One record: 4 September 1990 (1).

Passerella iliaca (Fox Sparrow)
Uncommon winter resident. Records include 14 November 1982 (1), 12 March 1983 (2), 2 April 1994 (1), and 21 October 1995 (1).

* *Melospiza melodia* (Song Sparrow)
Common permanent resident.

Melospiza lincolni (Lincoln's Sparrow)
Records include 27 September 1984 (1), 12 October 1987 (1), and 16 October 1994 (1). Peak count: 4 (11 October 1981).

Melospiza georgiana (Swamp Sparrow)
Records include 11 October 1981 (1), 8 April 1984 (1), 5 May 1992 (1), and 11 April 1993 (1).

Zonotrichia albicollis (White-throated Sparrow)
Common winter resident. Records include 27 September 1984 (1) and 27 November 1999 (3). Peak count: 15 (11 October 1981).

Zonotrichia leucophrys (White-crowned Sparrow)
Uncommon winter resident. Records include 11 and 13 October 1981 (2). Peak count: 20 (1 January 1991).

Junco hyemalis (Dark-eyed Junco)
Common winter resident. Records include 2 February 1984 (1) and 5 December 1990 (3). Peak count: 17 (5 March 1997).

* *Cardinalis cardinalis* (Northern Cardinal)
Common permanent resident.

Pheucticus ludovicianus (Rose-breasted Grosbeak)
Records include 20 September 1981 (1), 3 May 1982 (2), and 6 October 1993 (1). Peak count: 10 (2 May 1983).

* *Passerina caerulea* (Blue Grosbeak)
Uncommon summer resident. Records include 2 May 1982 (1), 20 May 1987 (2), 3 May 1983 (3), and 26 September 1995 (1).

* *Passerina cyanea* (Indigo Bunting)
Common summer resident. Records include 26 April 1992 (5) and 1 May 1993 (1). Peak count: 24 (11 May 1980).

Dolichonyx oryzivorus (Bobolink)
Records include 10 October 1982 (1), 17 September 1983 (1), 20 August 1991 (1), and 12 May 1995 (1).
Peak count: 3 (17 September 1993).

* *Agelaius phoeniceus* (Red-winged Blackbird)
Common summer resident. Records include 9 October 1981 (21) and 15 November 1995 (5).

Sturnella magna (Eastern Meadowlark)
Permanent resident. Records include 3 January 1987 (8) and 17 September 1983 (1). Peak count: 14 (14 January 1984).

Xanthocephalus xanthocephalus (Yellow-headed Blackbird)
One record: 2-4 September 1978 (1).

Euphagus carolinus (Rusty Blackbird)
Records include 3 April 1983 (3), 11 November 1987 (4), 15 April 1991 (1), and 26 November 1993 (1).
Peak count: 50 (26 October 1982).

* *Quiscalus quiscula* (Common Grackle)
Common summer resident. Records include 9 December 1996 (1) and 23 May 1999 (1). Peak count: 50 (24 February 1983).

* *Molothrus ater* (Brown-headed Cowbird)
Common summer resident. Records include 20 March 1981 (1), 30 March 1989 (2), and 16 April 1990 (1).

Icterus spurius (Orchard Oriole)
One record: 28 April 1982 (1).

* *Icterus galbula* (Baltimore Oriole)
Uncommon summer resident. Records include 4 May 1982 (1), 4 May 1982 (1), and 29 July 1988 (1).

Carpodacus purpureus (Purple Finch)
Records include 20 October 1981 (1), 30 April 1983 (1), 23 November 1989 (1), and 16 December 1990 (1).
Peak count: 2 (17 April 1988).

* *Carpodacus mexicanus* (House Finch)
Permanent resident; introduced species. Peak count: 65 (16 December 2000).

Carduelis pinus (Pine Siskin)
One record: 26 April 1986 (1).

* *Carduelis tristis* (American Goldfinch)
Common permanent resident.

Coccothraustes vespertinus (Evening Grosbeak)
One record: 13 November 1983 (8).

* *Passer domesticus* (House Sparrow)
Common permanent resident; introduced species.

Exotic Species

Anser cygnoides (Chinese Goose)
One record: 21 March 1993 (2).

Aix galericulata (Mandarin Duck)
One record: 14 September 1997 (1).

Tadorna ferruginea (Ruddy Shelduck)
One record: 3 April 1988 (1).

Cairina moschata (Muscovy)
Permanent resident; introduced species.
Records include 28-29 August 1992 (1).

Aratinga finschi (Crimson-fronted Parakeet)
One record: 4-5 July 1991 (1).

Streptopelia risoria (Ringed Turtle-Dove)
Two records: 19 July 1985 (2) and 22 May 1991 (1).

Nandayus nenday (Black-hooded Parakeet)
One record: 22 July 1989 (2).

DISCUSSION

For almost thirty years, local birdwatchers have made astute observations of 242 species of transient and resident birds at STP. Observers have concentrated their searches for migrant waders at STP and as a result have recorded 32 species of shorebirds visiting the site, with the Killdeer (*Charadrius vociferus*) being the only documented breeding species. The rich diversity of shorebirds that visit this inland site varies according to water levels of the impoundments, time of day, and time of year. Major weather patterns, such as the remnants of tropical storms, play an important role in the number and variety of birds that stop here. Although usually not extremely destructive locally, the tropical depressions that pass through the area often create significant fluctuations in water levels within the

Table 1. Summary of shorebirds observed at Roanoke Regional Airport (RA) and Roanoke Sewage Treatment Plant (STP) on 18 August 1985.

	RA	STP
Black-bellied Plover (<i>Pluvialis squatarola</i>)	101	3
American Golden Plover (<i>Pluvialis dominica</i>)	1	-
Semipalmated Plover (<i>Charadrius semipalmatus</i>)	2	1
Killdeer (<i>Charadrius vociferus</i>)	8	7
Greater Yellowlegs (<i>Tringa melanoleuca</i>)	2	1
Lesser Yellowlegs (<i>Tringa flavipes</i>)	20	5
Solitary Sandpiper (<i>Tringa solitaria</i>)	-	3
Willet (<i>Catoptrophorus semipalmatus</i>)	1	-
Upland Sandpiper (<i>Bartramia longicauda</i>)	4	-
Hudsonian Godwit (<i>Limosa haemastica</i>)	8	-
Ruddy Turnstone (<i>Arenaria interpres</i>)	13	-
Red Knot (<i>Calidris canutus</i>)	2	-
Sanderling (<i>Calidris alba</i>)	7	2
Semipalmated Sandpiper (<i>Calidris pusilla</i>)	20	3
Least Sandpiper (<i>Calidris minutilla</i>)	2	5
Pectoral Sandpiper (<i>Calidris melanotos</i>)	30	11
Stilt Sandpiper (<i>Calidris himantopus</i>)	1	-
Buff-breasted Sandpiper (<i>Tryngites subruficollis</i>)	3	1
Short-billed Dowitcher (<i>Limnodromus griseus</i>)	53	3
Total species	18	12
Total shorebirds	278	45

sludge lagoons and basins which the birds tend to use. Typical of sludge farms nationwide, these open-air lagoons produce millions of insects and provide a relatively safe haven for many of these birds that have been forced down to weather the storms, or as a stopover on their seasonal migrations. On 18 August 1985, Hurricane Danny passed over Roanoke leaving a wake of shorebirds that has never been equaled. The bulk of the shorebird fallout, which included eighteen species, was found at the Roanoke Regional Airport, specifically the General Aviation Field, but a number of shorebird species was also located at STP (Table 1). Most notable at STP from that event were Black-bellied Plover (*Pluvialis squatarola*), and Buff-breasted Sandpiper (*Tryngites subruficollis*) (Donahue, pers. obs.). With continued interest in bird watching, future observations at STP will likely confirm suspected breeding species and also add to the existing list of bird species.

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