

Turkey Point Fall Migration Count: 2021 Season Report

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Abstract: Each year, millions of birds migrate through the eastern United States between breeding grounds in North America and wintering grounds in Central and South America. Bird migration is perhaps the clearest and most readily observable window into environmental and regional biodiversity health. Migratory birds are affected by environmental changes and by specific challenges at each stage of their migrations. To document bird populations on their southbound migration through the state, the Maryland Biodiversity Project conducted a fall morning flight bird count at Turkey Point, the southernmost point of the Elk Neck Peninsula in Cecil County, Maryland. The count was held from 1 August to 15 November 2021, using the same dates and protocols as the Cape May Bird Observatory morning flight count. The Turkey Point count was the first inland morning flight count for the Mid-Atlantic and the first morning flight count for Maryland and the Chesapeake Bay. The count provides valuable baseline data offering insights into regional bird movement and the nature of their migrations (e.g., relative abundance, timing, local daily weather impacts). The value is compounded when compared to the results of the Cape May Bird Observatory count highlighting differences in species diversity and abundance between inland and coastal locations. During the 2021 season, the Turkey Point Bird Count documented 199,317 individuals of 194 species in southbound migration.

Fall 2021 marked the first year of the Maryland Biodiversity Project (MBP) Turkey Point Fall Migration Count. This exciting new project aims to document the abundance, diversity, and migratory behavior of southbound migrants along the upper Chesapeake Bay. While the count's primary focus is the morning flight of land birds over Turkey Point, special efforts were made to count all species, including waterbirds, moving down the Bay.

Over the years Turkey Point has gained a reputation as one of the premier locations to witness fall migration in Maryland. During mornings with ideal conditions, it is not unusual to see over 70 bird species moving past the Point in the first few hours after sunrise. Historically, Turkey Point has been monitored on a semi-regular basis with most historical efforts focused on raptor migration. A volunteer hawk watch was established in 1994 by the Cecil County Bird Club and ran for roughly 15 years, but coverage was variable and focused on raptors. Northern Saw-whet Owl banding was also conducted periodically, including one

fall in 1995 and then from 2009 to 2015. In recent years, local birders have made an effort to cover Turkey Point in the fall during favorable winds to document the number of migrant passerines and came up with impressive results and several notable records (eBird 2022). Despite a history of birding coverage, consistent daily monitoring at Turkey Point has never taken place until now, especially from a morning flight perspective. Not only is this count a first of its kind for Maryland, but for the East Coast as well, considering its inland and Piedmont location and proximity to the Chesapeake Bay.

METHODS

Turkey Point sits at the southern end of the Elk Neck Peninsula in Cecil County, Maryland (Figure 1). Outlined by the Chesapeake Bay to the west and the Elk River to the east, it serves as a natural concentration point or “funnel” for southbound migrants (i.e., passerines and near-passerines during morning flight, and migrating diurnal raptors). Turkey Point itself is primarily wooded, aside from a small clearing at the tip, where the Turkey Point Lighthouse sits atop a 100-foot-high (30-meter-high) bluff overlooking the Chesapeake Bay. Other notable geographic features include the Chesapeake and Delaware Canal (C&D Canal) which juts off from the Elk River and runs east connecting it to the Delaware River; and the Susquehanna Flats, several miles north of Turkey Point, where the Susquehanna River feeds into the top of the Chesapeake Bay.

The count was conducted daily from the field atop the 100-foot-high bluff at the end of Turkey Point. The counter was positioned 100 ft (30 m) southwest of the lighthouse to maximize detections of migrants flying over the Point and down the Bay. The count ran from 1 August through 15 November. Each morning, the count began 15 minutes before sunrise and ran for a minimum of three hours after sunrise. On days with strong migratory movement, the count was extended past the three-hour mark until migration activity ceased. The count was ended early or suspended on days with continuous heavy rain that prevented flights. Migration data were collected and entered in the field using the Dutch software *Trektellen* (2022b), allowing the live stream of sightings to MBP’s count page (Maryland Biodiversity Project 2021) and to the *Trektellen* website. Birds were detected via both sight and flight call notes and recorded at species level as much as possible; when a species could not be determined, the detection was recorded at the genus or family level. Flight direction, time, and age and sex data (for species with dimorphic plumage) were also recorded with each entry into the database when possible. Daily reports were also filed with Cornell University’s eBird application (eBird 2022). In order to maintain coverage throughout the count period, qualified alternate counters covered eight mornings when the lead counter had days off. Qualified alternate counters each had decades of birding experience and were trained in count protocols by the lead counter.

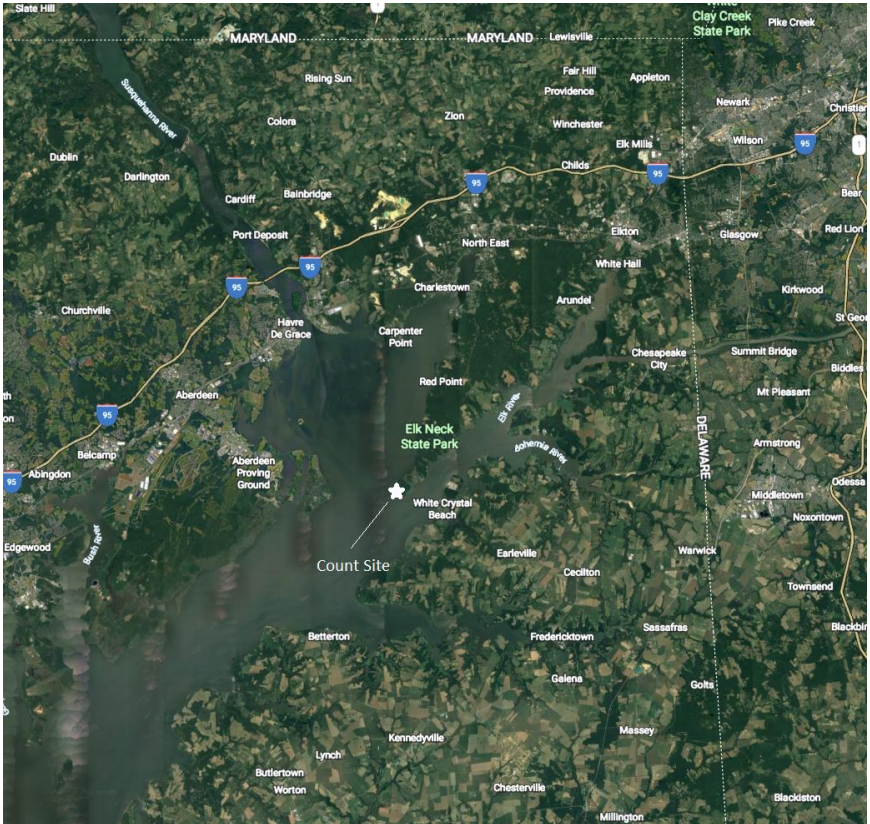


Figure 1. Elk Neck peninsula located in the Northeast corner of Maryland in the northern portion of the Chesapeake Bay. The count site is located on the southern end of the peninsula, or lower end of a funnel, concentrating birds during fall migration.

RESULTS

During the 2021 season 199,317 individuals of 194 species were recorded in active migration from the count site (Table 1). The count was conducted for 107 consecutive days totaling 434 observation hours. The total number of individuals and overall species diversity varied by month, ranging from a high of 119,150 individuals in November to a low in August with 11,699 individuals. September had the highest species diversity with 151 and November had the lowest species count with 103. All numbers in this report derive from totals of all species regardless of flight direction.

Table 1. 2021 Turkey Point Fall Migration Count Results.

Species						Max. Count	First	Last
	AUG	SEP	OCT	NOV	Total	(Date)	Observed	Observed
Snow Goose	0	0	1	0	1	1 (7 Oct)	7 Oct	7 Oct
Cackling Goose	0	5	5	5	15	5 (29 Sep)	29 Sep	7 Nov
Canada Goose	0	271	2,342	454	3,067	299 (9 Oct)	3 Sep	15 Nov
Mute Swan	0	11	5	0	16	8 (29 Sep)	19 Sep	25 Oct
Tundra Swan	0	0	0	23	23	20 (2 Nov)	2 Nov	13 Nov
Trumpeter/Tundra Swan	0	0	0	2	2	2 (1 Nov)	1 Nov	1 Nov
Wood Duck	2	4	6	2	14	3 (14 Oct)	2 Aug	4 Nov
Blue-winged Teal	5	22	29	7	63	17 (30 Oct)	24 Aug	4 Nov
Northern Shoveler	0	21	32	1	54	10 (16 Oct)	6 Sep	15 Nov
Gadwall	0	6	26	23	55	12 (30 Oct)	26 Sep	13 Nov
American Wigeon	0	13	433	85	531	139 (19 Oct)	26 Sep	13 Nov
Mallard	1	53	219	177	450	71 (18 Oct)	28 Aug	15 Nov
American Black Duck	0	22	154	114	290	36 (19 Oct)	13 Sep	15 Nov
Northern Pintail	0	41	176	52	269	69 (30 Oct)	26 Sep	15 Nov
Green-winged Teal	0	42	188	5	235	73 (16 Oct)	1 Sep	2 Nov
dabbling duck sp.	0	0	18	0	18	13 (19 Oct)	18 Oct	19 Oct
Canvasback	0	0	0	9	9	9 (11 Nov)	11 Nov	11 Nov
Ring-necked Duck	0	0	93	169	262	54 (11 Nov)	18 Oct	14 Nov
Greater Scaup	0	0	15	17	32	17 (6 Nov)	19 Oct	6 Nov
Lesser Scaup	0	0	15	15	30	11 (23 Oct)	23 Oct	13 Nov
scaup sp.	0	0	20	10	30	12 (25 Oct)	24 Oct	7 Nov
<i>Aythya</i> sp.	0	0	38	47	85	24 (19 Oct)	9 Oct	15 Nov
Surf Scoter	0	0	5	0	5	5 (31 Oct)	31 Oct	31 Oct
White-winged Scoter	0	0	0	1	1	1 (2 Nov)	2 Nov	2 Nov
Surf/Black Scoter	0	0	1	0	1	1 (30 Oct)	30 Oct	30 Oct
Bufflehead	0	0	0	156	156	66 (13 Nov)	2 Nov	15 Nov
Common Goldeneye	0	0	0	7	7	3 (6 Nov)	6 Nov	14 Nov
Hooded Merganser	0	0	0	2	2	2 (5 Nov)	5 Nov	5 Nov
Ruddy Duck	0	0	14	0	14	12 (19 Oct)	18 Oct	30 Oct
duck sp.	0	0	28	2	30	16 (30 Oct)	2 Oct	4 Nov
Pied-billed Grebe	0	2	16	0	18	15 (30 Oct)	2 Sep	31 Oct
Rock Pigeon	0	3	2	3	8	2 (11 Nov)	4 Sep	11 Nov
Mourning Dove	44	16	14	5	79	5 (9 Aug)	1 Aug	15 Nov
Yellow-billed Cuckoo	0	2	0	0	2	1 (2 Sep)	2 Sep	29 Sep
Common Nighthawk	3	0	0	0	3	2 (28 Aug)	27 Aug	28 Aug
Chimney Swift	1,785	1,861	362	1	4,009	417 (10 Aug)	1 Aug	3 Nov
Ruby-throated Hummingbird	86	150	1	0	237	17 (12 Sep)	1 Aug	4 Oct
American Avocet	1	0	0	0	1	1 (23 Aug)	23 Aug	23 Aug
American Golden Plover	0	1	34	0	35	33 (9 Oct)	16 Sep	19 Oct
Black-bellied Plover	0	0	4	0	4	1 (5 Oct)	5 Oct	20 Oct
Killdeer	2	1	0	1	4	1 (4 Aug)	4 Aug	11 Nov
Semipalmated Plover	1	2	0	0	3	2 (27 Sep)	9 Aug	27 Sep
Sanderling	0	9	0	0	9	9 (27 Sep)	27 Sep	27 Sep
Dunlin	0	0	0	2	2	1 (2 Nov)	2 Nov	3 Nov
Least Sandpiper	3	1	0	0	4	2 (16 Aug)	16 Aug	2 Sep
Pectoral Sandpiper	1	0	0	0	1	1 (26 Aug)	26 Aug	26 Aug
Semipalmated Sandpiper	61	22	0	0	83	25 (13 Aug)	4 Aug	24 Sep
Short-billed Dowitcher	0	2	0	0	2	2 (9 Sep)	9 Sep	9 Sep
Wilson's Snipe	0	1	0	0	1	1 (1 Sep)	1 Sep	1 Sep
Spotted Sandpiper	1	0	0	0	1	1 (2 Aug)	2 Aug	2 Aug
Solitary Sandpiper	0	2	0	0	2	1 (10 Sep)	10 Sep	30 Sep
Lesser Yellowlegs	45	19	0	0	64	17 (26 Aug)	1 Aug	22 Sep
Greater Yellowlegs	0	1	1	1	3	1 (26 Sep)	26 Sep	1 Nov
shorebird sp.	0	0	7	0	7	6 (7 Oct)	7 Oct	11 Oct
small shorebird sp.	0	23	5	0	28	13 (1 Sep)	1 Sep	30 Oct
Black-legged Kittiwake	0	0	0	1	1	1 (3 Nov)	3 Nov	3 Nov

Species	AUG	SEP	OCT	NOV	Total	Max. Count (Date)	First Observed	Last Observed
Bonaparte's Gull	1	1	1	231	234	44 (11 Nov)	22 Aug	15 Nov
Laughing Gull	7	210	2,510	2,605	5,332	1040 (6 Nov)	28 Aug	15 Nov
Franklin's Gull	0	0	1	0	1	1 (17 Oct)	17 Oct	17 Oct
Ring-billed Gull	0	65	1,338	657	2,060	516 (29 Oct)	11 Sep	15 Nov
Herring Gull	0	14	220	207	441	139 (7 Nov)	11 Sep	15 Nov
Lesser Black-backed Gull	0	0	3	1	4	1 (6 Oct)	6 Oct	14 Nov
Great Black-backed Gull	14	5	23	14	56	8 (7 Nov)	15 Aug	15 Nov
Least Tern	9	0	0	0	9	3 (6 Aug)	6 Aug	13 Aug
Caspian Tern	4	17	21	1	43	4 (19 Sep)	1 Aug	3 Nov
Black Tern	8	11	0	0	19	4 (6 Sep)	10 Aug	10 Sep
Common Tern	1	2	0	0	3	1 (6 Aug)	6 Aug	16 Sep
Forster's Tern	28	107	2,072	457	2,664	323 (31 Oct)	6 Aug	15 Nov
Red-throated Loon	0	0	1	1	2	1 (30 Oct)	30 Oct	13 Nov
Common Loon	1	1	47	11	60	9 (11 Oct)	17 Aug	14 Nov
Double-crested Cormorant	94	127	5,135	3,572	8,928	2055 (29 Oct)	16 Aug	15 Nov
Great Blue Heron	11	6	8	2	27	3 (29 Oct)	4 Aug	13 Nov
Great Egret	41	10	1	1	53	12 (12 Aug)	4 Aug	1 Nov
Snowy Egret	1	1	0	0	2	1 (4 Aug)	4 Aug	7 Sep
Little Blue Heron	2	0	0	0	2	2 (16 Aug)	16 Aug	16 Aug
Cattle Egret	15	1	0	0	16	14 (16 Aug)	4 Aug	9 Sep
Green Heron	9	1	0	0	10	3 (27 Aug)	2 Aug	3 Sep
Black Vulture	0	3	21	15	39	15 (28 Oct)	29 Sep	6 Nov
Turkey Vulture	0	10	891	534	1,435	268 (21 Oct)	10 Sep	15 Nov
Osprey	23	60	16	0	99	15 (2 Sep)	6 Aug	30 Oct
Golden Eagle	0	0	2	2	4	1 (20 Oct)	20 Oct	6 Nov
Northern Harrier	0	1	39	9	49	8 (9 Oct)	27 Sep	15 Nov
Sharp-shinned Hawk	0	170	813	60	1,043	227 (9 Oct)	11 Sep	14 Nov
Cooper's Hawk	0	52	216	24	292	64 (9 Oct)	3 Sep	13 Nov
Bald Eagle	0	48	54	17	119	13 (26 Sep)	3 Sep	10 Nov
Red-shouldered Hawk	1	4	36	57	98	19 (28 Oct)	28 Aug	14 Nov
Broad-winged Hawk	1	150	38	1	190	101 (30 Sep)	6 Aug	5 Nov
Red-tailed Hawk	0	6	35	74	115	30 (4 Nov)	2 Sep	13 Nov
Belted Kingfisher	2	2	7	1	12	2 (28 Oct)	9 Aug	3 Nov
Red-headed Woodpecker	1	57	18	3	79	7 (25 Sep)	31 Aug	13 Nov
Red-bellied Woodpecker	0	30	75	21	126	8 (21 Oct)	24 Sep	15 Nov
Yellow-bellied Sapsucker	0	11	76	7	94	9 (1 Oct)	20 Sep	13 Nov
Downy Woodpecker	1	10	15	2	28	3 (11 Sep)	14 Aug	9 Nov
Hairy Woodpecker	1	16	13	0	30	4 (25 Sep)	25 Aug	23 Oct
Northern Flicker	5	250	286	52	593	50 (20 Sep)	5 Aug	14 Nov
Pileated Woodpecker	2	2	0	0	4	1 (8 Aug)	8 Aug	27 Sep
American Kestrel	6	54	119	0	179	35 (9 Oct)	6 Aug	29 Oct
Merlin	2	28	56	13	99	8 (18 Oct)	21 Aug	15 Nov
Peregrine Falcon	5	13	19	3	40	4 (29 Sep)	1 Aug	15 Nov
Great Crested Flycatcher	4	2	0	0	6	2 (14 Aug)	14 Aug	19 Sep
Western Kingbird	0	1	0	1	2	1 (29 Sep)	29 Sep	9 Nov
Eastern Kingbird	199	51	0	0	250	23 (21 Aug)	2 Aug	16 Sep
Olive-sided Flycatcher	1	1	0	0	2	1 (15 Aug)	15 Aug	11 Sep
Eastern Wood-Pewee	24	37	6	0	67	5 (3 Sep)	5 Aug	8 Oct
Traill's Flycatcher	14	3	0	0	17	4 (21 Aug)	10 Aug	25 Sep
Least Flycatcher	3	4	1	0	8	2 (7 Sep)	9 Aug	2 Oct
<i>Empidonax</i> sp.	7	4	0	0	11	2 (3 Sep)	2 Aug	11 Sep
Eastern Phoebe	1	21	27	2	51	7 (25 Sep)	5 Aug	7 Nov
Yellow-throated Vireo	0	4	0	0	4	1 (2 Sep)	2 Sep	13 Sep
Blue-headed Vireo	0	1	10	0	11	2 (19 Oct)	25 Sep	28 Oct
Philadelphia Vireo	0	2	0	0	2	1 (19 Sep)	19 Sep	20 Sep
Warbling Vireo	7	1	0	0	8	1 (3 Aug)	3 Aug	13 Sep
Philadelphia/Warbling Vireo	0	1	0	0	1	1 (7 Sep)	7 Sep	7 Sep
Red-eyed Vireo	37	111	5	0	153	11 (20 Sep)	5 Aug	28 Oct
Blue Jay	0	1,434	2,686	33	4,153	334 (26 Sep)	11 Sep	9 Nov
Common Raven	1	6	0	1	8	3 (26 Sep)	28 Aug	4 Nov

Species	AUG	SEP	OCT	NOV	Total	Max. Count (Date)	First Observed	Last Observed
Tufted Titmouse	0	5	3	0	8	5 (27 Sep)	27 Sep	19 Oct
Horned Lark	0	0	8	26	34	21 (11 Nov)	4 Oct	14 Nov
Bank Swallow	922	245	1	0	1,168	135 (17 Aug)	1 Aug	11 Oct
Tree Swallow	48	969	1,866	141	3,024	272 (1 Sep)	2 Aug	13 Nov
N. Rough-winged Swallow	33	39	75	4	151	14 (19 Oct)	3 Aug	10 Nov
Purple Martin	790	386	0	0	1,176	121 (1 Sep)	1 Aug	22 Sep
Barn Swallow	794	395	1	0	1,190	119 (27 Aug)	1 Aug	1 Oct
Cliff Swallow	4	4	0	0	8	2 (10 Sep)	3 Aug	15 Sep
Ruby-crowned Kinglet	0	1	74	29	104	10 (28 Oct)	29 Sep	13 Nov
Golden-crowned Kinglet	0	6	115	34	155	13 (6 Oct)	20 Sep	10 Nov
Cedar Waxwing	1120	1393	1,483	5,525	9,521	1022 (6 Nov)	1 Aug	15 Nov
Red-breasted Nuthatch	0	23	29	24	76	9 (13 Nov)	14 Sep	13 Nov
White-breasted Nuthatch	4	0	5	1	10	3 (8 Aug)	8 Aug	4 Nov
Brown Creeper	0	1	10	12	23	3 (20 Oct)	29 Sep	13 Nov
Blue-gray Gnatcatcher	963	601	7	0	1,571	98 (18 Aug)	1 Aug	6 Oct
House Wren	0	0	2	0	2	1 (12 Oct)	12 Oct	21 Oct
Winter Wren	0	0	3	1	4	1 (14 Oct)	14 Oct	6 Nov
Gray Catbird	1	2	1	0	4	2 (20 Sep)	5 Aug	15 Oct
Brown Thrasher	0	0	1	0	1	1 (8 Oct)	8 Oct	8 Oct
Northern Mockingbird	17	7	0	0	24	6 (26 Aug)	5 Aug	27 Sep
European Starling	91	133	544	653	1,421	132 (9 Nov)	2 Aug	14 Nov
Eastern Bluebird	34	3	268	485	790	104 (11 Nov)	4 Aug	15 Nov
Veery	0	3	0	0	3	2 (14 Sep)	14 Sep	20 Sep
Swainson's Thrush	0	5	1	0	6	2 (19 Sep)	19 Sep	2 Oct
Hermit Thrush	0	0	2	2	4	1 (13 Oct)	13 Oct	5 Nov
<i>Catharus</i> sp.	0	3	0	0	3	3 (11 Sep)	11 Sep	11 Sep
Wood Thrush	0	1	0	0	1	1 (11 Sep)	11 Sep	11 Sep
American Robin	64	17	3,137	36,433	39,651	13229 (6 Nov)	1 Aug	15 Nov
House Sparrow	78	69	102	28	277	17 (8 Aug)	2 Aug	13 Nov
American Pipit	0	4	28	77	109	14 (2 Nov)	30 Sep	14 Nov
House Finch	35	32	467	288	822	52 (21 Oct)	2 Aug	13 Nov
Purple Finch	0	0	79	284	363	50 (13 Nov)	19 Oct	15 Nov
Pine Siskin	0	0	0	5	5	1 (4 Nov)	4 Nov	10 Nov
American Goldfinch	16	18	89	241	364	37 (13 Nov)	4 Aug	15 Nov
Chipping Sparrow	13	13	140	69	235	27 (15 Oct)	1 Aug	13 Nov
Field Sparrow	1	1	8	3	13	2 (15 Oct)	25 Aug	7 Nov
Dark-eyed Junco	0	0	53	38	91	28 (28 Oct)	8 Oct	13 Nov
White-crowned Sparrow	0	0	1	0	1	1 (14 Oct)	14 Oct	14 Oct
White-crowned Sparrow (Gambel's)	0	0	1	0	1	1 (14 Oct)	14 Oct	14 Oct
White-throated Sparrow	0	0	32	7	39	11 (14 Oct)	1 Oct	13 Nov
Savannah Sparrow	0	9	15	8	32	3 (30 Sep)	11 Sep	15 Nov
Song Sparrow	0	0	28	5	33	5 (24 Oct)	11 Oct	13 Nov
Lincoln's Sparrow	0	1	0	0	1	1 (29 Sep)	29 Sep	29 Sep
Swamp Sparrow	0	0	3	0	3	2 (19 Oct)	14 Oct	19 Oct
Eastern Towhee	0	0	7	0	7	2 (8 Oct)	8 Oct	28 Oct
Yellow-breasted Chat	1	2	0	0	3	1 (30 Aug)	30 Aug	25 Sep
Bobolink	357	1,137	7	0	1,501	462 (4 Sep)	3 Aug	13 Oct
Eastern Meadowlark	0	1	79	25	105	17 (20 Oct)	6 Sep	13 Nov
Orchard Oriole	425	16	0	0	441	28 (24 Aug)	1 Aug	10 Sep
Baltimore Oriole	96	11	3	1	111	11 (21 Aug)	3 Aug	5 Nov
Red-winged Blackbird	1,893	1,010	4,010	10,297	17,210	1865 (11 Nov)	1 Aug	15 Nov
Brown-headed Cowbird	22	19	1160	317	1518	187 (7 Oct)	1 Aug	15 Nov
Rusty Blackbird	0	0	239	449	688	99 (11 Nov)	9 Oct	14 Nov
Common Grackle	212	2	10,028	52,645	62,887	9318 (4 Nov)	2 Aug	15 Nov
Ovenbird	2	6	2	0	10	2 (1 Oct)	5 Aug	1 Oct
Worm-eating Warbler	16	1	0	0	17	3 (27 Aug)	4 Aug	8 Sep
Louisiana Waterthrush	4	0	0	0	4	1 (5 Aug)	5 Aug	12 Aug
Northern Waterthrush	93	69	0	0	162	13 (26 Aug)	2 Aug	30 Sep
Louisiana/Northern Waterthrush	10	0	0	0	10	2 (3 Aug)	3 Aug	28 Aug
Golden-winged Warbler	0	1	0	0	1	1 (8 Sep)	8 Sep	8 Sep

Species	AUG	SEP	OCT	NOV	Total	Max. Count (Date)	First Observed	Last Observed
Blue-winged Warbler	5	0	0	0	5	2 (17 Aug)	16 Aug	26 Aug
Black-and-white Warbler	54	47	1	0	102	9 (14 Sep)	4 Aug	9 Oct
Prothonotary Warbler	4	0	0	0	4	1 (3 Aug)	3 Aug	27 Aug
Tennessee Warbler	17	130	55	7	209	27 (29 Sep)	5 Aug	13 Nov
Nashville Warbler	0	26	33	1	60	10 (29 Sep)	3 Sep	3 Nov
Connecticut Warbler	0	1	0	0	1	1 (7 Sep)	7 Sep	7 Sep
Common Yellowthroat	2	7	0	0	9	2 (7 Sep)	28 Aug	20 Sep
American Redstart	219	309	4	0	532	69 (3 Sep)	1 Aug	8 Oct
Cape May Warbler	102	878	169	2	1,151	273 (10 Sep)	13 Aug	9 Nov
Northern Parula	46	590	29	0	665	68 (20 Sep)	6 Aug	20 Oct
Magnolia Warbler	9	59	7	0	75	10 (7 Sep)	21 Aug	10 Oct
Bay-breasted Warbler	0	56	1	0	57	13 (3 Sep)	3 Sep	8 Oct
Bay-breasted/Blackpoll Warbler	1	43	2	0	46	10 (14 Sep)	31 Aug	1 Oct
Blackburnian Warbler	40	84	2	0	126	28 (3 Sep)	13 Aug	7 Oct
Yellow Warbler	168	33	0	0	201	17 (10 Aug)	1 Aug	21 Sep
Chestnut-sided Warbler	18	27	1	0	46	6 (3 Sep)	15 Aug	9 Oct
Blackpoll Warbler	1	490	905	10	1,406	110 (30 Sep)	31 Aug	11 Nov
Black-throated Blue Warbler	10	43	20	0	73	10 (10 Sep)	24 Aug	21 Oct
Palm Warbler	0	103	496	16	615	48 (22 Oct)	7 Sep	11 Nov
Pine Warbler	3	18	62	4	87	10 (9 Oct)	8 Aug	13 Nov
Yellow-rumped Warbler	3	151	3,976	859	4,989	428 (29 Oct)	24 Aug	15 Nov
Yellow-throated Warbler	2	2	0	0	4	1 (6 Aug)	6 Aug	12 Sep
Prairie Warbler	17	14	0	0	31	3 (26 Aug)	4 Aug	27 Sep
Black-throated Green Warbler	6	79	25	0	110	17 (30 Sep)	24 Aug	25 Oct
Canada Warbler	1	1	0	0	2	1 (25 Aug)	25 Aug	11 Sep
Wilson's Warbler	0	2	0	0	2	1 (1 Sep)	1 Sep	3 Sep
warbler sp.	125	627	497	2	1,251	85 (2 Oct)	3 Aug	13 Nov
Summer Tanager	0	1	0	0	1	1 (8 Sep)	8 Sep	8 Sep
Scarlet Tanager	10	60	11	0	81	8 (25 Sep)	11 Aug	25 Oct
Rose-breasted Grosbeak	0	44	7	0	51	9 (11 Sep)	3 Sep	8 Oct
Blue Grosbeak	15	33	2	0	50	9 (11 Sep)	9 Aug	1 Oct
Indigo Bunting	22	97	42	0	161	12 (30 Sep)	6 Aug	19 Oct
Dickcissel	5	6	7	1	19	2 (1 Oct)	9 Aug	6 Nov
passerine sp.	0	33	0	0	33	33 (18 Sep)	18 Sep	18 Sep

MONTHLY SUMMARIES

August

During August, 11,699 individuals of 107 species were counted. The first quarter of August started out relatively cool with light winds primarily from the north and east. The season kicked off on 1 AUG with a slow day of unfavorable winds and rain. This trend did not last long as winds switched northwest bringing the season's first sprinkle of migrants on 2 AUG including 19 Orchard Orioles, 2 Northern Waterthrushes, and 6 Yellow Warblers. Noteworthy on 3 AUG were the season's first Prothonotary Warblers, a Cliff Swallow, a Warbling Vireo, 13 Yellow Warblers, and the season's first American Redstart. A slight cold front on the 4 AUG set up a nice diverse flight the next morning; 169 individuals of 34 species were tallied, including an early Tennessee Warbler and the season's first Louisiana Waterthrush. Featured on 6 AUG were a Yellow-throated Warbler and a Common Tern, which are quite scarce in the upper Bay. Light east winds on 9 AUG brought the first Dickcissel of the season

and a mix of other passerines including Least Flycatcher and a noticeable uptick of 42 Blue-gray Gnatcatchers. Light south winds on 10 AUG proved noteworthy with 3 Black Terns flying down the Bay and a nice push of 417 Chimney Swifts.

Mid-August was warmer with primarily south and east winds but that did not stop migrants from funneling into Turkey Point, which can be surprisingly productive on light southerlies. A classic example was 13 AUG, as warm temperatures and light winds brought the season's first Cape May and Blackburnian Warblers to the Point. A small cold front moved through on 14 AUG, setting up a nice flight the following morning. There were notable influxes of 19 Eastern Kingbirds, 27 American Redstarts, and 16 Yellow Warblers. Other highlights of the morning included Olive-sided Flycatcher, Dickcissel, and the first Chestnut-sided Warbler of the fall. Another diverse flight from light east/southeast winds occurred on 16 AUG. We counted 564 individuals of 40 species, ten of which were warblers. Some highlights from the morning included six Cape May Warblers, three Blackburnian Warblers, and the first Blue-winged Warbler of the fall. Bank Swallows peaked on 17 AUG with 135 tallied while 18 AUG brought another notable passerine flight on light southeast winds featuring the season's highest count of 98 Blue-gray Gnatcatchers.

The last quarter of the month started out slowly but ended with some notable flights and plenty of new arrivals. Temperatures were warm, but winds were mostly from the north and northeast. Passerine movement on 22 and 23 AUG was slow with the rain, but an early Bonaparte's Gull and an American Avocet were observed. Skies cleared for 24 AUG with a light north breeze, making for a diverse flight. The season's first Black-throated Blue and Black-throated Green Warblers were counted along with the seasonal peak of 28 Orchard Orioles. Two Yellow-rumped Warblers were the highlight of the day as they were the first of the fall. (While 24 AUG is early for Yellow-rumped, a few molting adults start moving through in mid- to late August [pers. observ.]). The following morning was equally productive featuring 937 individuals of 53 species, 15 of which were warblers. The season's first Canada Warbler was observed along with 12 Cape May Warblers. Light northeast winds on 28 AUG provided a nice flight that notably consisted of 12 Blackburnian Warblers and a Cliff Swallow. On 31 AUG, the month wrapped up on light northwest winds that brought several new arrivals. The season's first Red-headed Woodpecker flew over, along with the first Blackpoll Warbler, possibly signaling the beginning of what was just around the corner in September.

September

The count tallied 16,762 individuals of 151 species during September. The first quarter of the month started off cool with winds primarily north and northwest. Rain and strong winds leading a cold front had not yet cleared on 1 SEP. This

limited migration, but some noteworthy sightings including a Wilson's Warbler and an early Wilson's Snipe. Light northerlies and temperatures in the mid-50s °F on 3 SEP brought one of strongest early season flights of the fall. We counted 1,147 individuals of 63 species, including a noticeable influx of warblers; 25 Tennessee Warblers, 73 Cape May Warblers, 13 Bay-breasted Warblers, and 28 Blackburnian Warblers were noteworthy counts for the morning. Light northwest winds on 7 SEP set up a diverse flight featuring the season's only Connecticut Warbler, a Yellow-throated Vireo, and the max flight of 10 Magnolia Warblers. A light southerly breeze brought an interesting flight on 8 SEP that showcased the season's only Golden-winged Warbler and Summer Tanager. A strong cold front with northwest winds blew through on 9 SEP, timed with a remarkable flight on 10 SEP. The highlight of the morning was an impressive flight of 273 Cape May Warblers, while 10 Black-throated Blue Warblers marked their peak flight of the fall.

Mid-September had prevailing winds from the north and east with rather cool temperatures. There was a nice follow-up flight on 11 SEP featuring the season's second Olive-sided Flycatcher and 45 Cape May Warblers. Fairly strong south/southwest winds on 12 SEP did not result in many migrants past the Point besides the season's high of 17 Ruby-throated Hummingbirds. Ruby-throateds seemed to prefer a headwind and departed straight south out over the Bay without hesitation. Light variable winds occurring on 15 SEP brought a moderately diverse flight. There was another notable pulse with 67 Cape May Warblers, an uptick of 34 Northern Parulas, and the season's first Red-breasted Nuthatch. Although 16 SEP was slow with dreary conditions and east/northeast winds, it showcased an American Golden-Plover flying over the Bay. After several days of wet foggy weather and unfavorable winds, a cold front passed on 18 SEP bringing clear skies, north winds, and cooler temperatures. Benefits of the front passage were evident on 19 SEP with a diverse flight of 530 individuals and 71 species. The first Philadelphia Vireo of the fall flew by the Point along with a noticeable arrival of 13 Blackpoll Warblers and 23 Northern Flickers. There was also a slight uptick of raptors with 7 Sharp-shinned Hawks and 13 Broad-winged Hawks.

Late September brought cooler temperatures and winds primarily from the northwest with several remarkable flights in the last few days of the month. A cold snap on 20 SEP resulted in a season high of 68 Northern Parulas, the first Golden-crowned Kinglet and Yellow-bellied Sapsucker of the fall, and the season high of 50 Northern Flickers. Winds turned to the south and temperatures rose into the 70s °F over the following three days appearing to halt observations, but winds shifted back north on 25 SEP with a noticeable cold front. Most notable on 25 SEP was the first push of 262 Blue Jays. Northwest winds on 26 SEP brought a diverse flight that featured 68 species of 857 individuals; 85 Blackpoll Warblers, 57 Northern Parulas, and 29 Cape May Warblers were

tallied while the first influx of waterfowl took place over the Bay. Eight Northern Shovelers, 6 Gadwall, and 12 American Wigeon were all new arrivals for the fall. There were similar numbers of warblers on 27 SEP with west/southwest winds but the highlight of the morning was a flock of 9 Sanderlings flying down the Bay. A major cold front swept through on 28 SEP and brought one of the season's most diverse flights the following morning. On 29 SEP, 1,237 individuals of 76 species were showcased with the highlight being a Western Kingbird that moved around the Point with the swirling flocks of Blue Jays. Notable counts from the morning included 27 Tennessee Warblers, 10 Nashville Warblers, 106 Blackpoll Warblers, and the first influx of Yellow-rumped Warblers with 78. The first southbound flight of 112 Canada Geese was noted as well, along with an early flock of 5 Cackling Geese. Continued northwest winds resulted in 30 SEP being equally productive with 1,411 individuals of 78 species. Seasonal peaks occurred for Blackpoll Warblers with 110 and 17 Black-throated Green Warblers while a notable raptor movement took place that included 106 Sharp-shinned Hawks, 29 Cooper's Hawks and 101 Broad-winged Hawks.

October

The count tallied 51,830 individuals of 134 species during October. The first quarter of October was warm with winds primarily from the south and east. The month got off to a good start on 1 OCT with another strong flight of 95 Blackpoll Warblers and a nice uptick in Palm Warblers with 33. The following four days were relatively slow with primarily south and east winds and little movement, although there were several highlights including the season's first Horned Larks with 3 on 4 OCT, a single Black-bellied Plover on 5 OCT, a juvenile Lesser Black-backed Gull on 6 OCT, and the season's only Snow Goose on 7 OCT. A light cold front finally moved through late on 7 OCT, dropping temperatures which was correlated with a diverse flight on 8 OCT. We tallied 1,150 individuals of 67 species, including a notable increase in Yellow-rumped Warblers with 149 and another push of Blackpoll Warblers with 92. Fairly strong east/northeast winds on 9 OCT resulted in the season's first Rusty Blackbirds that flew over while there was also a strong raptor flight that included the seasonal high for Sharp-shinned Hawks. The highlight of the morning was a flock of 33 American Golden-Plovers and a Black-bellied Plover flying down the Bay.

Mid-October started off slowly with warm temperatures, light northeasterly winds, lacking any significant decreases in temperatures. However, towards the end of the period, a major front moved through, sinking temperatures into the high 40s °F. Light north winds set up a nice flight on 12 OCT that featured 1,619 individuals of 55 species. There was an uptick of Yellow-rumped Warblers with 375 along with the first noticeable increase in Common Grackles with 375. Light west/northwest winds on 14 OCT brought diverse movement.

Most notable was an influx of sparrows that included 11 White-throated Sparrows moving through the bushes around the Point and two White-crowned Sparrows, one of which was a western “Gambel’s” type. On 15 OCT, light and variable winds provided a notable flight of 27 Chipping Sparrows and a push of 39 Palm Warblers. Finally, a long-anticipated major cold front with strong westerly winds blew through the afternoon of 16 OCT. The front did not provide much in the way of passerines on 17 OCT since the west winds were likely too strong or blew migrants to the coast, but there was a nice flight of 297 Yellow-rumped Warblers. The highlight of the day was a Franklin’s Gull moving south over the Point with small groups of Laughing Gulls late in the morning. The strong west/northwest winds had died down by 19 OCT bringing the season’s first Purple Finch and an American Golden-Plover. Light west winds on 20 OCT showcased a noteworthy raptor flight that included 75 Sharp-shinned Hawks, 20 Cooper’s Hawks, and the first Golden Eagle of the fall. A seasonal high of 17 Eastern Meadowlarks was also noted.

Late October brought cooler temps and winds mostly from the northwest and south. Things kicked off on 21 OCT with another strong raptor flight that featured a second Golden Eagle and a major movement of 268 Turkey Vultures, their peak flight of the fall. There was also a nice influx of 23 Rusty Blackbirds. Strong northwest winds on 27 OCT brought a push of 427 Red-winged Blackbirds along with the last noticeable movement of 14 Northern Rough-winged Swallows, tying 19 OCT as the high count for the fall. Cooler temperatures and northeast winds on 28 OCT brought in the first noteworthy late fall migration. We counted 10,007 individuals of 61 species, including the first large Common Grackle flight of the fall with 6,232, a nice showing of 37 Rusty Blackbirds, and an uptick in Cedar Waxwings with 156. There was also a nice raptor flight that included 168 Turkey Vultures, the season high of 15 Black Vultures, and 19 Red-shouldered Hawks. The following day brought 20 mph (32 km/h) easterly winds and drizzle, which made for an interesting morning that included the peak flight of 2,055 Double-crested Cormorants. The season’s high of 428 Yellow-rumped Warblers was also noted along with an impressive flight of 516 Ring-billed Gulls exiting the Elk River. Stiff south winds and low cloud cover appeared to produce a good waterbird flight on 30 OCT that included a Red-throated Loon and notable numbers of puddle ducks. There was also a strange movement of 15 Pied-billed Grebes flying down the Bay, a species rarely seen in active migration. This event could have been in response to the heavy rain and flooding the previous day that washed out the grass beds on the Susquehanna Flats where Pied-billed Grebes gather in large numbers during migration. This waterbird movement continued on 31 OCT with 5 Surf Scoters flying down the Bay and the peak flight of 323 Forster’s Terns.

November

The count tallied 119,150 individuals of 103 species during November. Early November brought cooler temperatures and winds primarily from the northwest. On 2 NOV, light northwest winds resulted from a cold front the day before. The first 20 Tundra Swans of the season were counted along with the season's only White-winged Scoter which was noted flying down the Bay. There was also a notable passerine flight that included a season high of 14 American Pipits and influxes of 41 Eastern Bluebirds, 21 Purple Finches, and 1,162 Red-winged Blackbirds. The following morning was equally productive on light northwest winds. A juvenile Black-legged Kittiwake moving down the Bay was the highlight of the morning, although an unseasonable Chimney Swift was noteworthy as well. A strong flight occurred on 4 NOV featuring 16,327 individuals of 58 species. There was a major flight of 9,318 Common Grackles, making it the peak flight for the species while an influx of 3,302 American Robins and 244 Cedar Waxwings signaled what was to come in the days ahead. Light north winds with a slight, high cloud-cover brought a remarkable late season flight on 5 NOV. Record numbers of 13,229 American Robins and 1,022 Cedar Waxwings flew by marking seasonal peaks for both species. A late Dickcissel, Golden Eagle, and three Common Goldeneyes flying down the Bay were also noteworthy. Slightly warmer temperatures and light northwest winds on 9 NOV made for an interesting flight. A late Cape May Warbler was counted while the highlight was a second Western Kingbird for the fall, which dropped in at the Point late in the morning.

Moving into the final five days of the count, temperatures were warmer with winds mostly from the west and northeast. Fairly strong northeast winds on 11 NOV brought another impressive movement of over 9,000 Common Grackles but also the peak of 99 Rusty Blackbirds and 104 Eastern Bluebirds. An interesting movement of 21 Horned Larks also took place with several small flocks departing south over the Point but also one group flying south over the middle of the Bay. A nice cold front on 13 NOV brought in a final push of late season specialties. Seasonal peaks of 50 Purple Finches and 9 Red-breasted Nuthatches were noted while 2 late Tennessee Warblers and the second Red-throated Loon of the fall rounded out the morning. The count concluded on 15 NOV with strong westerly winds making for a slower flight that morning, but 600 individuals of 30 species were still tallied.

Species Accounts - The Season's Notable Five

Blue-gray Gnatcatcher

Turkey Point is an excellent location to see large concentrations of Blue-gray Gnatcatchers in the early fall. Predictions when the count started were that the numbers tallied at the Point would be impressive. Since 2021 was the first season of daily monitoring at Turkey Point, we didn't know how this season's

total would compare to others, but it seems notable enough in its own right to mention here. The first Blue-gray Gnatcatchers were counted on 1 AUG and the last was noted on 6 OCT. The peak flight for the species occurred on 18 AUG when 98 were tallied (Figure 2). Monthly totals were 963 in August, 601 in September, 7 in October, and none in November with a season total of 1,571. Gnatcatchers were present on 64 of the 107 days of monitoring.

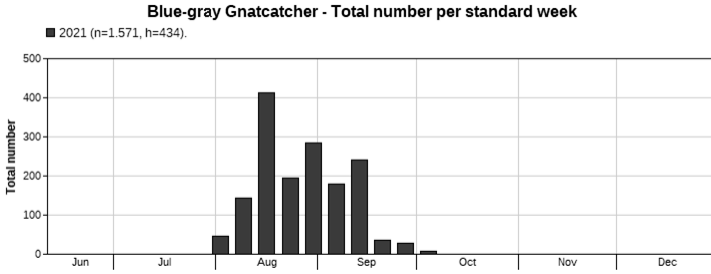


Figure 2. Timing of Blue-gray Gnatcatcher fall movement in 2021 over Turkey Point, Cecil County, Maryland.

American Robin

In early November in the eastern United States, American Robins can be seen migrating in massive loose flocks that sometimes cover the sky. They are a late season staple in most East Coast morning flight counts and typically make up a large amount of the season’s total (Trekellen 2022a). The vast majority passed through the area in late October and early November and the few counted In August and September appeared to be young dispersing birds in juvenile plumage. The first American Robins were counted on 1 AUG and the last were counted on 15 NOV. While the 15 NOV was the end of our monitoring period at Turkey Point, these birds certainly continue to move through late November. The peak flight occurred on 6 NOV when 13,229 were counted (Figure 3). Monthly totals were 64 in August, 17 in September, 3,137 in October, and 36,433 in November with a season total of 39,651. American Robins were present on 64 of the 107 days of monitoring.

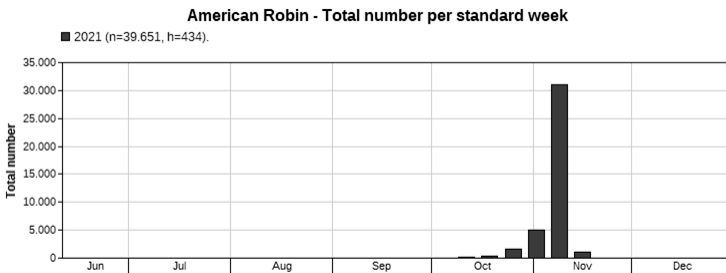


Figure 3. Timing of American Robin fall movement in 2021 over Turkey Point, Cecil County, Maryland.

Cape May Warbler

From mid-August until early November, we documented what was likely a banner year for Cape May Warblers, making them one of the most notable species of the fall. Cape May Warbler populations fluctuate greatly during the breeding season, largely driven by the severity of Spruce Budworm, *Archips fumiferana* Clemens (Lepidoptera: Tortricidae), outbreaks, which can correspond to higher-than-average number of birds observed in the fall (Drever et al. 2018). Starting in early July, banding stations in northern Canada and counts along the Great Lakes were observing high numbers of Cape May Warblers (Giroux 2021, Trektellen 2022c). It was not long until they spilled over into the United States, arriving earlier than usual, and continuing to trickle through much later than usual. The first Cape May Warbler was noted at Turkey Point on 13 AUG and the last came through on 9 NOV. The peak flight of the season occurred on 10 SEP when 273 were counted in a morning (Figure 4). Monthly totals were 102 in August, 878 in September, 169 in October, and 2 in November, making for a season total of 1,151. Cape May Warblers were present for 76 of the 107 days of monitoring.

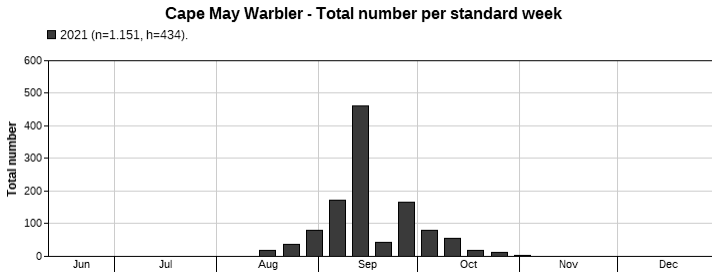


Figure 4. Timing of Cape May Warbler fall movement in 2021 over Turkey Point, Cecil County, Maryland.

Blackpoll Warbler

Blackpolls were the second most abundant warbler at Turkey Point this fall, edged out only by Yellow-rumped Warbler, and followed closely by Cape May Warbler. In late September and throughout October, Blackpolls played a key role in most flights with several mornings totaling over 100 individuals. The first Blackpoll Warbler of the season was noted on 31 AUG and the last moved through on 11 NOV. The peak flight for the species occurred on 30 SEP when 110 were counted (Figure 5). Monthly totals were 1 in August, 490 in September, 905 in October, and 10 in November with a season total of 1,406. Blackpoll Warblers were present on 57 of the 107 days of monitoring.

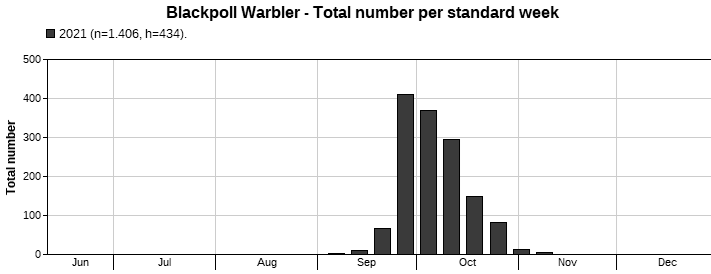


Figure 5. Timing of Blackpoll Warbler fall movement in 2021 over Turkey Point, Cecil County, Maryland.

Rusty Blackbird

A late season specialty from the north woods, Rusty Blackbirds moved past Turkey Point in impressive numbers. This location has always been known as a hotspot to see Rusty Blackbird migration in Maryland (eBird 2022), but daily counts were never conducted to see how many moved through during a full season. On days with the right conditions in early November, it was not uncommon to see flocks of 10–15 birds and tally over 50 in a morning. The first Rusty Blackbird flew over Turkey Point on 9 OCT and the last was noted on 14 NOV, though they certainly continued to move through the end of November. The peak flight occurred on 11 NOV when 99 were tallied in a morning (Figure 6). Monthly totals were 0 in August and September, 239 in October, and 449 in November, making for a season total of 688.

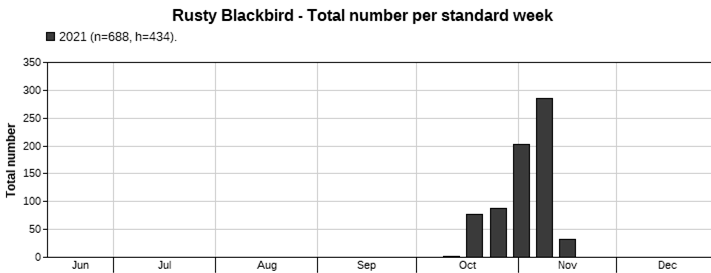


Figure 6. Timing of Rusty Blackbird fall movement in 2021 over Turkey Point, Cecil County, Maryland.

The count data are publicly available via Trektellen at the Maryland Biodiversity Project - Turkey Pt. morning flight page (Trektellen 2022b), eBird (2022), and Avian Knowledge Network (2022). Highlights and photos of the 2021 morning flight count can be found at the MBP special project page (Maryland Biodiversity Project 2021) and MBP blog (Maryland Biodiversity Project 2022).

DISCUSSION

Due to the count location at the tip of Turkey Point, migrant behavior changed drastically day-to-day correlated with changes in the weather, primarily wind direction, and varied a lot across species. Each taxonomic group (in some cases individual species) behaved differently at the Point and used certain flight paths; going over all of those individually would make for an extremely long report, but a few main groups are covered below. Overall, it was a difficult location to get a grasp of what was going on, especially on mornings with light/variable winds when birds were going every which way with many high and circling. However, there were some consistent patterns.

Most birders assumed that all birds crossed south over the Elk River once reaching Turkey Point. However, that is not the case, on most mornings a large majority of migrants were observed circling back north on either side of the peninsula depending on the wind direction that morning. There were a few exceptions, however. Raptors, hummingbirds, swallows, and Common Grackles often crossed without much hesitation. American Robins, Cedar Waxwings, Bobolinks, and blackbirds crossed on a regular basis as well but only in certain conditions (often a light headwind or light winds in general) and with some hesitation after circling and gaining altitude. Woodpeckers were never observed crossing even though many started to cross and flew out distantly over the river/bay but never committed and circled back to the Point. Warblers and other small passerines rarely crossed. Among small passerines, it was primarily the strong flyers such as Northern Waterthrush, Blackpoll Warbler, and Yellow-rumped Warbler that crossed most frequently. Crossing in this group occurred mainly on clear days with light winds, especially light headwinds and only after circling and becoming very high to the limit of visibility. It is also possible that more birds crossed at this height and were not visible to the counter.

During mornings with northwest winds, small passerines were observed moving west around the Point, coming from the east side, while mornings with northeast winds small passerines moved east around the Point, starting out from the west (Figure 7). As a rule, small passerines moved around the Point heading into any westerly component or into any easterly component in the wind. Flight direction on straight north winds was still primarily west, but slightly more mixed, while on straight south winds flight direction was primarily east. On mornings with slack winds, birds moved either direction around the Point, but in many situations most passerines still moved west. Flight direction was influenced by even the slightest west breeze, for example, making for a primarily westbound flight. These flight patterns seem logical as winds should concentrate migrants along the edge of Turkey Point opposite of where the wind is coming from. Once birds reached the Point they wrapped around into the wind and continued back north. What happened after birds circled back north at Turkey Point is unknown and not addressed through observations on morning flight behavior.

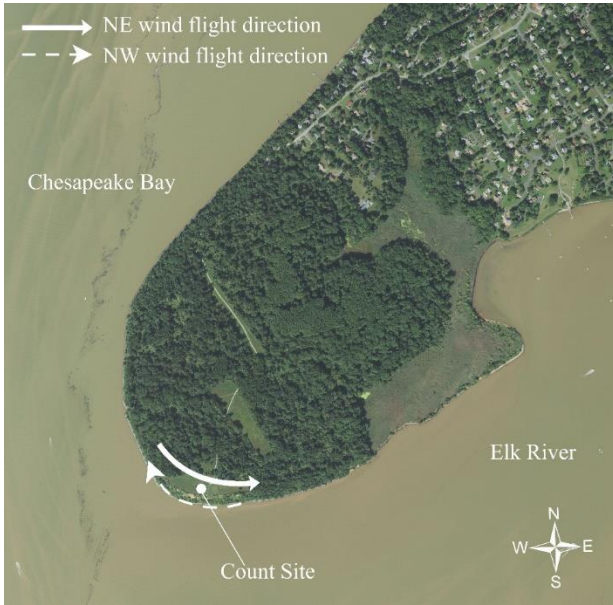


Figure 7. Primary flight directions of small passerines influenced by wind direction at Turkey Point, Cecil County, Maryland.



Figure 8. Flight paths of raptors over Turkey Point, Cecil County, Maryland.

There are three likely outcomes for birds reaching the tip at Turkey Point and circling back north. The first possibility is that birds continue north until crossing the Elk River at a narrower point then move south again. While this might be the case on some days, it is inconsistent with observations on mornings with northwest winds when birds appeared to move north along the west side of Turkey Point and would have had to cut back east across the peninsula to cross the river. The second possibility is birds continue north without a particular target location, feeding and moving through the trees until afternoon when activity slows or until each species finds a desired/suitable habitat to feed for the day. This could happen since in late afternoon, even after a big push in the morning, the tip of Turkey Point was often very quiet with little migrant activity while the woods 1 mi (1.6 km) north of the Point near the parking lot held many migrants. The third possibility is that birds continue a short distance north before circling back south and making several laps around Turkey Point over the course of a morning and eventually spend the day nearby or spread out north. While this outcome would affect the relative abundance estimates for the count, there are a few reasons to believe this occurs regularly. On several occasions with species that tend to flock, it appeared that the same group flew by several times over the morning. Also, there were cases where a particular individual flew past the Point several times in a morning and even several times over the course of a few days.

Another interesting behavior observed at Turkey Point is that many small passerines moved around the Point in loose groups of mixed species, similar to the makeup in daytime feeding flocks. This behavior is most likely attributed to birds simply feeding and moving quickly south in the morning as a type of refueling before continuing migration. When a group of birds come to an opening or end in the habitat like the clearing at the end of Turkey Point, they often fly out apparently looking for more habitat and notice they have reached the end of the land and are hesitant to cross, therefore they circle back north. This behavior was also evident as birds would build up in the southeast corner for example, where the woods ended at the field before flying out around the Point into a northwest wind. There were times when small passerines would fly high above the tree line, but that was mostly first thing in the morning or when winds were light. Most birds flew around the Point at tree-height appearing to fly out from the woods.

Waterbirds used simpler flight paths past Turkey Point compared to passerines. Most birds moved south down the Chesapeake Bay while occasional flights occurred over the Elk River. There were several days with notable gull flights over the Elk River, primarily on cloudy or rainy days with northeast or east winds. Notable numbers of Ring-billed Gulls moved down the river in the late season (over 500 one day), while small flocks of Herring Gulls and several Great Black-backed and Lesser Black-backed Gulls followed the river south as

well. Many of these birds likely follow the C&D Canal west from the Delaware River and end up in the Elk River then follow it out to the Chesapeake Bay. Flocks of migrant Double-crested Cormorants also used an interesting flight path. Their movements peaked at Turkey Point on days with strong east or northeast winds, presumably blowing birds inland from the coast. Most flocks flew south over the Elk River or directly over Turkey Point then angled down the Bay, but groups would also cross the Elk Neck Peninsula north of Turkey Point then move south over the Bay.

Raptors used three primary flight paths at Turkey Point. Most streamed over departing straight south across the mouth of the Elk River without hesitation and continued along the Bay's edge. Some smaller, more wind-dependent birds like Sharp-shinned Hawks would often circle and gain altitude or hesitate if winds were light. Two alternative flight paths were off the northeast and northwest corners of Turkey Point (Figure 8). Birds using these paths could be hard to detect from the Point since they depart before reaching the tip. These two alternate paths were used primarily by Turkey Vultures, but also by small numbers of accipiters and buteos. Birds departing off the northeast corner crossed the Elk River more perpendicular and angled toward the southeast while birds departing off the northwest corner angled southwest crossing the Bay and heading for Aberdeen Proving Ground in Harford County.

Based on this first year of count data, it is evident that migration past Turkey Point is highly variable with weather patterns affecting flight paths on a daily basis; and that songbirds, raptors, and waterbirds use different strategies when moving south in the fall. There is a lot to learn, for example, why do most individuals choose not to cross the water south of Turkey Point when land is clearly visible 1.5 mi (2.4 km) to the southeast or why birds prefer to fly into a light head wind when moving around the Point. This inaugural season established baseline data for bird movement down Maryland's Coastal Plain allowing for future comparisons of total individual and species relative abundance, but also how weather affects movement of species groups throughout the migratory season. Answers to these observations and questions after multiple seasons counting migrating birds on Turkey Point will not only contribute to the growing research and understanding of bird migration as a whole, but also hopefully provide another standardized way of tracking movements of bird populations.

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