

Performance Report

State: District of Columbia
Grant: T-1-4
Grant Type: State Wildlife Grant
Grant Period: October 1, 2010 – September 30, 2012
Report Period: October 1, 2010 – September 30, 2011
Project Title: District of Columbia Bird Survey

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Kingman marshes in the shadow of RFK Stadium

Job 1: Breeding Bird Survey

Abstract

The extensive National Park system, riparian corridors, city parks, athletic fields, and private lands of the District provide a variety of habitats suitable for use by breeding bird species. Seventy-nine species were recorded using one or more of the 17 areas surveyed. Fifty-nine of those species were designated as possible breeders. Nine of those species are designated as Species of Greatest Conservation Need (SGCN) by the District's Wildlife Action Plan (WAP).

Introduction

Urban environments are not commonly thought of as suitable habitat for breeding birds.

Fragmentation, habitat loss, and invasive species are just a few factors in a complex dynamic which can impact breeding status and success of avian species. Over-browsing (Horsley, 2003), degradation of understory (Newell, 2007) and even competition with the sounds of the city (Slabblekoorn, 2007) can stress bird populations and increase reproductive failure.

In 2008, a woodland and shrubland breeding bird survey conducted by the District Department of the Environment, Fisheries and Wildlife Division (DDOE) identified 40 species as possible breeding birds in the District (State Wildlife Grant Report 2008). A more comprehensive survey was conducted during the breeding season of 2010, which included 90 survey sites and identified 62 possible breeding species in the District (State Wildlife Grant Report 2010). More surveys were required to evaluate the importance of key breeding habitats to focus future monitoring and research efforts.

Objective

The objective of this survey is to document the presence, abundance, and breeding status of bird species that utilize habitats identified in the 2010 State Wildlife Grant Report as the most valuable avian breeding areas in the District. Collected data will be used to focus future breeding bird research efforts.

Location

The study area is comprised of various habitat types within the boundaries of the District of Columbia that were deemed as most valuable breeding habitat by the 2010 Breeding Bird Survey (Figure 1.1).

Fifteen survey sites were selected from the 90 surveyed based on number of possible breeding species and number of possible breeding SGCN. They include Rock Creek National Park, Glover-Archbold Park, Chesapeake & Ohio Canal National Historic Park, Fort Dupont Park, River Terrace, Anacostia Park,

Kenilworth Park and Aquatic Gardens, Fort Circle Parks, and Catholic University of America. An additional forest point at Catholic University of America was surveyed. Fort Totten was also added to the 2011 survey since the park itself was not surveyed in 2010.

Methods

Bird Survey Procedures

Bird counts were conducted at 17 points during the summer breeding season between May 10 and July 22, 2011. The survey points were located in various habitats, including deciduous forest, mixed forest, marsh, managed meadows, scrub, forest edge, riparian corridors, wooded wetlands, and disturbed fields. Each point was visited six times, and ten-minute point counts were conducted to record all birds seen or heard during this interval within a 50 meter radius plot. All counts were conducted within four hours of sunrise.

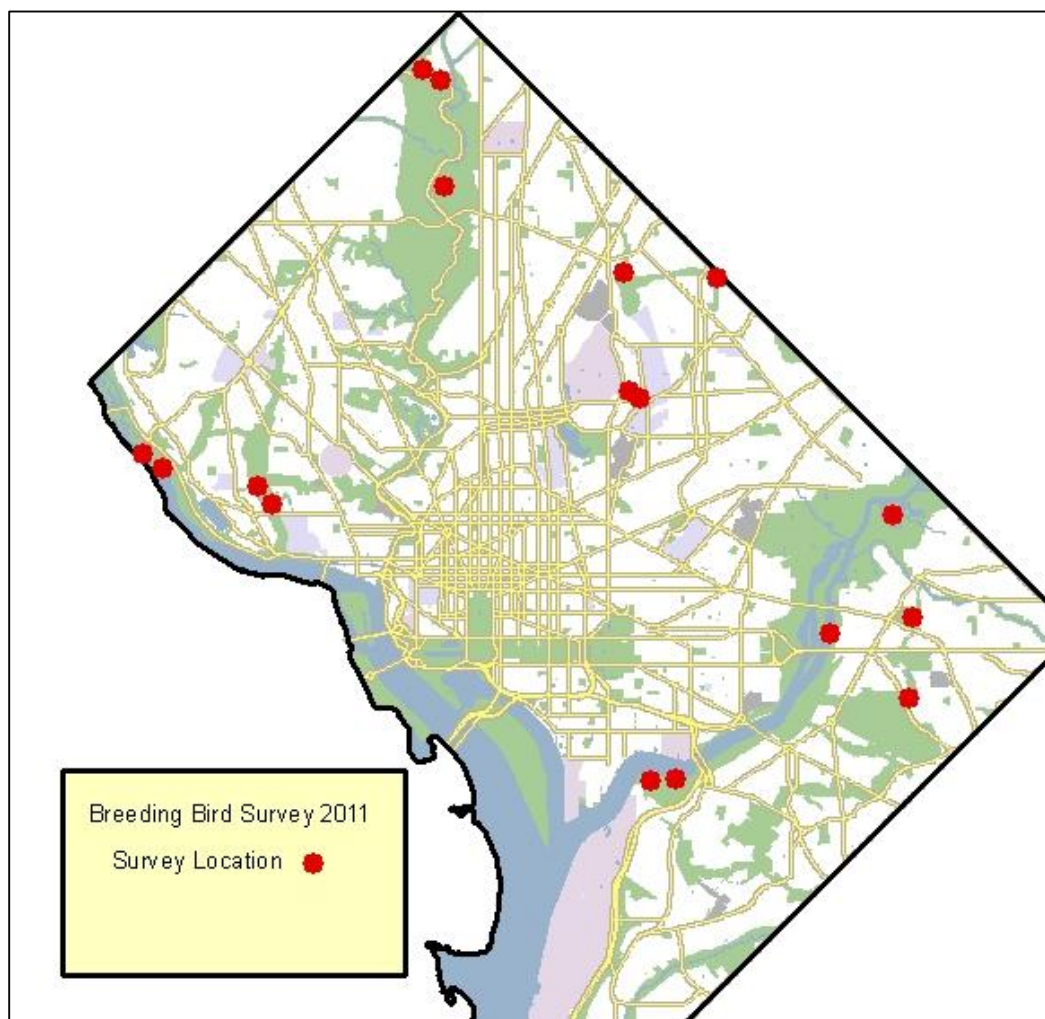


Figure 1.1 Breeding Bird Survey 2011 Locations

Data Analyses

Total Species Richness

The total number of species recorded within the survey plot was used to evaluate individual and total species richness. In addition, the numbers of SGCN were computed for each site as well.

Site Avian Abundance

The number of species recorded at each site was used to calculate the avian abundance by comparing the number of species detected per visit by the number of visits to each site.

Breeding Activity

The number and type of breeding species were determined by observing and recording possible indicative behaviors such as territorial song, reproductive display, copulation, nest building, food carry, fledgling feeding, sighted pairs, nest initiation, and the presence of juveniles. Additionally, the same was done for SGCN to assess the suitability of available habitat for species of concern.

Species Relative Abundance and Detection Frequencies

The relative abundance for possible breeding species was determined by comparing the total number of a species detected against the total number of birds recorded during the survey. Species detection frequencies were determined by comparing the number of sites at which a species was detected against the total number of sites visited during the survey.

Results

Total Species Richness

A total of 79 species were observed during the course of this survey. Nine species recorded were SGCN (Table 1.1).

Site Avian Abundance

Catholic University of America's fenced west campus meadow and forest edge had the highest avian abundance and number of species detected for all surveyed sites, with 12.33 species detected per visit and 31 species recorded during the survey. Of those 31 species, 24 were possible breeding species,

including four SGCN. Fort Mahan had the second highest avian abundance with 12.17 species per visit and 27 species detected over all surveys. Of the 27 observed species, 18 were possibly breeding and two were SGCN. Other sites with high avian abundance include; National Capitol Parks-East, the restored meadow of the Circle Parks, and Kenilworth Aquatic Gardens (Tables 1.2).

Breeding Activity

Based on behavioral data, it was determined that 59 species are possible breeding birds in the District. Of those, nine were designated SGCN. (Table 1.1)

Species Relative Abundance and Detection Frequencies

Relative abundance for possible breeding birds was calculated for each species by comparing the number of that species detected during all surveys by the total number of individual birds recorded (1,818). Four SGCN were among the 20 species with the highest relative abundance (Table 1.3).

Detection frequencies for all species were also determined by comparing the number of sites at which a species was recorded by the total number of sites surveyed. Four SGCN were among the 21 species with the highest detection frequencies (Table 1.4).



Blue-gray gnatcatcher (*Poliioptila caerulea*) incubating in nest – Kenilworth Aquatic Gardens



Orchard oriole (*Icterus spuius*) with nest building material – Kenilworth Aquatic Gardens



Northern flicker (*Colaptes auratus*) nestling in cavity – Catholic University of America



Eastern towhee (*Pipilo erythrophthalmus*) singing territorial song - Catholic University of America



Eastern kingbird (*Tyrannus tyrannus*) monitoring area near nest – Poplar Point



Wood thrush (*Hylocichla mustelina*) singing and foraging – Rock Creek Park

Discussion

Urbanization dominates the District of Columbia and as such continuous pressure is placed on existing forests, fields, and various other open spaces. Land use change and land cover alterations have been linked to declining bird populations in both temperate and tropical zones (Ludwig, 2009). Urban expansion is one of the key types of such change, and has resulted in the loss of meadows, forests, and wetlands on a massive scale. Urban development also contributes to the replacement of native species by non-native flora and fauna, and opens new territory to competitive species. Avian species are responding to habitat changes, and negative breeding trends may serve as an early warning sign for declining environmental conditions (Rich, 2004). Habitat loss, fragmentation, and degradation have led to regional and local declines in populations of some forest nesting species as well as of other avifauna. Quantifying the District's breeding bird populations and distributions is a critical component to determining the effects of climate change, land-use planning, and the development of conservation measures in accordance with the District's Wildlife Action Plan (WAP).

Site 1, the meadow/forest edge section of Catholic University of America, west of Harewood Road, NE had the highest number of species recorded and possible breeding species all survey sites for 2011. Site 1 had the second highest avian abundance (12.33). This survey location was also tied for the highest number of SGCN recorded (five) and possible breeding species (five).

Site 4, Poplar Point, had the highest avian abundance (13.00) of all sites, as well as the second highest number of species recorded (29) and observed SGCN (four).

Brown-headed cowbirds (*Molothrus ater*) are brood parasites and were detected at 58.82% of survey locations. This is more than twice the percentage of sites during the 2010 surveys. This may be partly due to the high number of sites surveyed in 2011 that have edge habitat, which brown-headed cowbirds utilize. Urbanization, trail creation, and other disturbance activities may be creating new brown-headed cowbird habitat and contributing to the decline or absence of woodland species such as worm-eating and hooded warblers. It is disturbing that almost 60% of the most productive bird habitat in the District is vulnerable to nest parasitism.

The high detection frequencies for four SGCN are encouraging. The Acadian flycatcher (*Empidonax virescens*) and eastern towhee (*Pipilo erythrophthalmus*) were detected at 52.94% of sites and chimney

swift (*Chaetura pelagic*) and wood thrush (*Hylocichla mustelina*) were detected at 47.06% of sites. These are all increases from 2010 surveys.

The 2011 surveys demonstrate the importance of various habitats and high reproductive value of the surveyed areas for breeding birds. Many bird species are specialists and require certain parameters to breed in an area, such as canopy density, water access, perches for feeding sorties, viable food sources, and available nest cavities. The seventeen sites surveyed in 2011 accounted for almost the same amount of breeding species as the ninety sites from the 2010 breeding bird project.

Future studies on breeding birds in the District of Columbia will focus further on the key properties surveyed in the 2011 breeding bird survey. These studies will be more intensive and include a species focus, with emphasis on species of conservation priority.

Table 1.1 **Possible Breeding Birds from 2011 Survey Sites**

Common Name	*=SGCN	Possible Breeder	Behavior Observed
Cormorants			
Double-crested Cormorant			
Herons and Egrets			
Black-crowned Night-Heron*			
Great Egret			
Great Blue Heron			
Ducks and Geese			
Canada Goose		Y	Nest, incubating adult, fledged young
Wood Duck*		Y	Fledged young
Mallard		Y	Fledged young
Vultures			
Turkey Vulture			
Hawks and Eagles			
Osprey		Y	Territorial behavior, food carry
Bald Eagle*			
Red-shouldered Hawk*		Y	Territorial pair
Red-tailed Hawk			
Gulls and Terns			
Laughing Gull			
Ring-billed Gull			
Doves			
Rock Dove			
Mourning Dove		Y	
Cuckoos			
Yellow-billed Cuckoo		Y	Territorial song
Owls			
Barred Owl		Y	Fledgling, feeding young
Swifts			
Chimney Swift*			
Kingfishers			
Belted Kingfisher			
Woodpeckers			
Red-bellied Woodpecker		Y	Territorial song
Northern Flicker		Y	Territorial song, young in nest cavity
Downy Woodpecker		Y	Territorial song
Hairy Woodpecker		Y	Territorial song, young in nest cavity
Pileated Woodpecker		Y	Territorial song

Flycatchers

Eastern Wood-pewee	Y	Territorial song
Acadian Flycatcher*	Y	Territorial song
Willow Flycatcher	Y	Territorial song
Eastern Phoebe	Y	Territorial song
Great Crested Flycatcher	Y	Territorial song, fledged young
Eastern Kingbird	Y	Territorial song, fledged young

Vireos

Red-eyed Vireo	Y	Territorial song
Warbling Vireo	Y	Territorial song

Jays and Crows

Blue Jay	Y	Territorial song
American Crow	Y	Active nest
Fish Crow		

Swallows

Tree Swallow	Y	Fledged young, food carry
Barn Swallow	Y	Fledged young

Chickadees and Titmice

Tufted Titmouse	Y	Territorial song, adults feeding fledged young
Carolina Chickadee	Y	Territorial song, adults feeding fledged young

Nuthatches

White-breasted Nuthatch	Y	Territorial song
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Wrens

House Wren	Y	Territorial song
Carolina Wren	Y	Territorial song, feeding fledglings

Gnatcatchers

Blue-gray Gnatcatcher	Y	Territorial song, active nest, incubating adult
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Thrushes

Eastern Bluebird		
Wood Thrush*	Y	Territorial song, active nest
Veery	Y	Territorial song
American Robin	Y	Complete nest, fledged young, adults feeding fledged young

Mockingbirds and Thrashers

Gray Catbird	Y	Territorial song, fledged young
Northern Mockingbird	Y	Territorial song, fledged young
Brown Thrasher*	Y	Territorial song, food carry

Starlings

European Starling	Y	Fledged young
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Waxwings

Cedar Waxwing		
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Warblers

Prothonotary Warbler*	Y	Territorial song
Northern Parula	Y	Territorial song

Yellow-rumped Warbler		
Black-throated Blue Warbler		
Blackpoll Warbler		
Yellow Warbler	Y	Territorial song
Ovenbird*	Y	Territorial song
Louisiana Waterthrush*		
Common Yellowthroat	Y	Territorial song
Yellow-breasted Chat		
American Redstart		
Tanagers		
Scarlet Tanager*	Y	Territorial song
Towhees		
Eastern Towhee*	Y	Territorial song, fledged young
Sparrows		
Song Sparrow	Y	Territorial song, fledged young
Cardinals, Grosbeaks and Buntings		
Northern Cardinal	Y	Territorial song, fledged young
Blue Grosbeak	Y	Territorial song
Indigo Bunting	Y	Territorial song, fledged young
Blackbirds and Orioles		
Red-winged Blackbird	Y	Territorial song, fledged young, courtship display
Common Grackle	Y	Territorial song, fledged young
Brown-headed Cowbird	Y	Territorial song, fledged young
Orchard Oriole	Y	Territorial song, nest building
Baltimore Oriole	Y	Territorial song, territorial behavior
Finches		
House Finch	Y	Territorial song
American Goldfinch	Y	Territorial song, fledged young
Old World Sparrows		
House Sparrow	Y	Adults feeding young, fledged young

Table 1.2 Breeding Bird Site*

Site	Location	SSR	#SGCN	ABUN	#PBS	#PBSGCN	Primary Habitat Type	Secondary Habitat Type
1	Catholic University of Amer.	31	5	12.33	24	4	Early-succession/edge	Grassland/managed meadow
2	Catholic University of Amer.	18	3	8.17	16	2	Hardwood forest	Hardwood forest
3	Fort Mahan	27	4	12.17	18	2	Grassland/managed meadow	Early-succession/edge
4	Poplar Point	29	4	13.00	18	1	Forested wetland	Early-succession/edge
5	National Capitol Parks – East	27	2	11.67	14	1	Riparian woodlands	Grassland/managed meadow
6	River Terrace	22	1	8.67	15	0	Emergent tidal wetlands	Riparian woodlands
7	Fort Dupont	22	2	8.33	14	2	Hardwood forest	Riparian woodlands
8	Kenilworth Aquatic Gardens	26	4	10.17	20	3	Tidal mudflats	Forested wetlands
9	Glover-Archbold Park – N	20	3	9.17	19	3	Hardwood forest	Riparian wetlands
10	Glover-Archbold Park - S	18	4	9.50	17	4	Hardwood forest	Riparian wetlands
11	C&O Canal – Fletcher’s Cove	24	5	9.00	20	4	Forested wetlands	Riparian woodlands
12	C&O Canal – Potomac River	29	4	9.33	22	3	Riparian woodlands	Forested wetlands
13	Fort Totten	20	2	7.83	19	1	Hardwood forest	Early-succession/edge
14	Circle Parks Restored Meadow	26	3	10.67	23	2	Grassland/managed meadow	Early-succession/edge
15	Rock Creek Park – North	22	4	9.33	18	3	Hardwood forest	Riparian woodlands
16	Rock Creek Park – South	19	3	8.83	17	3	Hardwood forest	Riparian woodlands
17	Rock Creek Park – Golf Course	22	4	9.67	20	4	Hardwood forest	Early-succession/edge

*SSR = Site Species Richness

#SGCN = Number of SGCN recorded at site

ABUN= Site Avian Abundance

#PBS = Number of possible breeding species

#PBSGCN= Number of possible breeding SGCN

Table 1.3***=SCGN**

20 Species with Highest Relative Abundance of Possible Breeding Species Over All Surveyed Sites

	Common Name	Scientific Name	No. Detected	Relative Abundance
1	American Robin	<i>Turdus migratorius</i>	217	11.936
2	Gray Catbird	<i>Dumetella carolinensis</i>	161	8.856
3	European Starling	<i>Sturnus vulgaris</i>	152	8.361
4	Northern Cardinal	<i>Cardinalis cardinalis</i>	97	5.336
5	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	67	3.685
6	Chimney Swift*	<i>Chaetura pelagica</i>	66	3.630
7	Carolina Wren	<i>Thryothorus ludovicianus</i>	55	3.025
8	Acadian Flycatcher*	<i>Empidonax virescens</i>	50	2.750
9	Eastern Towhee*	<i>Pipilo erythrophthalmus</i>	46	2.530
10	Cedar Waxwing	<i>Bombycilla cedrorum</i>	45	2.475
11	Brown-headed Cowbird	<i>Molothrus ater</i>	44	2.420
12	Song Sparrow	<i>Melospiza melodia</i>	43	2.365
13	American Goldfinch	<i>Carduelis tristis</i>	40	2.200
14	Carolina Chickadee	<i>Poecile carolinensis</i>	38	2.090
15	Common Grackle	<i>Quiscalus quiscula</i>	35	1.925
16	Wood Thrush*	<i>Hylocichla mustelina</i>	35	1.925
17	Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	32	1.760
18	Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	27	1.485
19	Mallard	<i>Anas platyrhynchos</i>	25	1.375
20	House Sparrow	<i>Passer domesticus</i>	24	1.320

Table 1.4***=SGCN**

21 Species with Highest Detection Frequencies of Possible Breeding Species Over All Surveyed Sites

	Common Name	Scientific Name	No. of Sites Detected	Detection Frequency
1	American Robin	<i>Turdus migratorius</i>	17	100.00
2	Northern Cardinal	<i>Cardinalis cardinalis</i>	16	94.12
3	Carolina Wren	<i>Thryothorus ludovicianus</i>	15	88.24
4	Gray Catbird	<i>Dumetella carolinensis</i>	13	76.47
5	Downy Woodpecker	<i>Picoides pubescens</i>	12	70.59
6	American Goldfinch	<i>Carduelis tristis</i>	12	70.59
7	Brown-headed Cowbird	<i>Molothrus ater</i>	10	58.82
8	Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	10	58.82
9	Tufted Titmouse	<i>Baeolophus bicolor</i>	10	58.82
10	Blackpoll Warbler	<i>Dendroica striata</i>	10	58.82
11	Eastern Towhee*	<i>Pipilo erythrophthalmus</i>	9	52.94
12	European Starling	<i>Sturnus vulgaris</i>	9	52.94
13	Acadian Flycatcher*	<i>Empidonax virescens</i>	9	52.94
14	Carolina Chickadee	<i>Poecile carolinensis</i>	9	52.94
15	Pileated Woodpecker	<i>Dryocopus pileatus</i>	9	52.94
16	Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	9	52.94
17	Chimney Swift*	<i>Chaetura pelagica</i>	8	47.06
18	Mallard	<i>Anas platyrhynchos</i>	8	47.06
19	Common Grackle	<i>Quiscalus quiscula</i>	8	47.06
20	Red-eyed Vireo	<i>Vireo olivaceus</i>	8	47.06
21	Wood Thrush*	<i>Hylocichla mustelina</i>	8	47.06

Job 2: Nesting Assistance

Abstract

Nest boxes were placed along the Chesapeake and Ohio National Historic Park corridor to increase nesting opportunities for secondary cavity nesting species. Fifteen prothonotary warbler and ten brown creeper boxes were placed before the 2011 breeding season. Of the 25 nest boxes, only one was utilized. A prothonotary warbler constructed a nest and sang next to PW11. No initiation was observed and the nest was abandoned.

Introduction

Biologists commonly agree that habitat loss may lead to species declines. Species declines as a result of habitat loss are exacerbated with respect to birds that nest or reproduce in existing cavities. Commonly called secondary cavity-nesters, these birds have a more difficult time locating suitable nesting areas than do canopy or ground nesting birds because cavity nesters generally lack the ability to create the hollow spaces needed to nest. Nest boxes were placed in appropriate areas in accordance with species and nesting data collected in the 2010 survey. Target species included prothonotary warbler (*Protonotaria citrea*) and brown creeper (*Certhia americana*), and secondary species included white-breasted nuthatch, tufted titmouse, Carolina chickadee, and eastern bluebird.

Cavity-nesting birds require dead or deteriorating trees, natural cavities, or a tree that can be excavated. Cavity excavating species have been declining for years as a result of habitat destruction, forest management practices, and a lower density of potential nesting trees. As a result, secondary cavity nester populations such as the prothonotary warbler, an SGCN, have been declining over much of their breeding range. Standing dead trees, or snags, have long been considered a problem by forest and park managers and are often removed due their appearance, safety hazard to pedestrians and property, fire suppression, or as a possible harbor for pests. Removal of snags is known to reduce cavity-nesting populations; for example, the removal of snags in a ponderosa pine forest in Arizona resulted in a 50 percent decline in cavity nesting species (Scott, 1997). Additionally, lower densities of cavity-nesting

birds in suburban areas appears to be the result of urban growth rates and the conversion of forest to houses, stores, and other built areas that contain few trees and even fewer snags (Blewett, 2005).

Need

The District of Columbia's resident population is growing at 4.8 percent a year, and it surpassed 600,000 in 2010 (United States Census Bureau). This growth will increase pressure for additional housing and the supporting economic and transportation infrastructure. The prothonotary warbler and brown creeper are secondary cavity-nesting SGCN that have been experiencing declines up to 1.5 percent annually (Sauer, 1999).

Objective

The objective of this project is to provide nesting opportunities for secondary cavity-nesting birds, particularly, species of greatest conservation need.

Approach

Fifteen prothonotary warbler nest boxes (Picture 2.1) and ten brown creeper boxes (Picture 2.2) were placed in riparian zones and forested wetlands along the Chesapeake and Ohio Canal National Historic Park in the District of Columbia. Nest boxes were checked for breeding or nesting activity from March 9 until August 11, 2011. Species present and breeding behaviors were recorded.

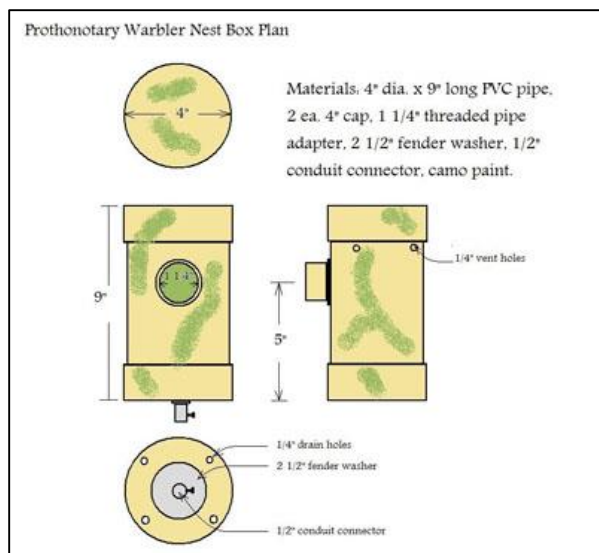
The prothonotary warbler boxes were made from a four inch, thin walled PVC drain pipe adapted by Wisconsin Department of Natural Resources wildlife biologist Mike Foy, from a design used for Eastern bluebird boxes (Picture 2.3).



Picture 2.1 Prothonotary warbler nest box.



Picture 2.2 Brown creeper nest box.



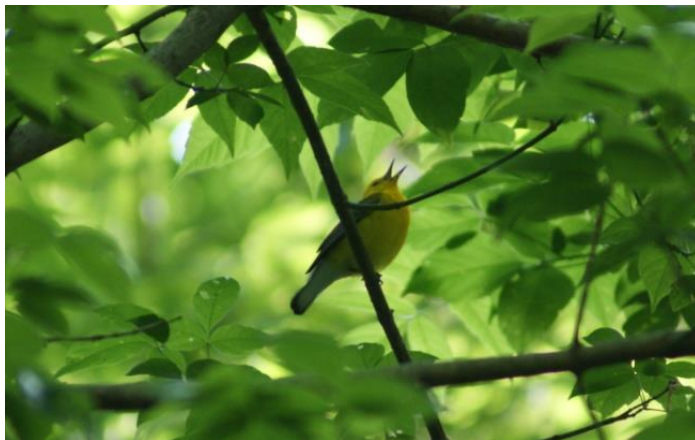
Picture 2.3 –Prothonotary nest box plans.

Results

After placement, many nest boxes were lost or damaged by storm water runoff swelling the Potomac River to flood stages and an increased amount of debris associated with bank overflows. Nine of the fifteen prothonotary warbler boxes were lost or damaged due to high waters and debris. PW4 and PW10 were knocked down, but recovered and reset. Brown creeper box 8 was lost.

Only one of the six remaining prothonotary boxes had breeding activity in its vicinity during surveys. PW11, near Fletcher's Cove, was used by a prothonotary warbler between March 12 and May 8. Activity was observed on three of seven visits, including territorial singing, adults leaving the nest box, alert calls, and food carrying. Adults were no longer present at the nest box on or after June 17. The box was examined and a nest was present, but apparently abandoned. Adults were not observed in the vicinity on subsequent visits.

The nine remaining brown creeper nest boxes were not used as nesting locations by any avian species.



Prothonotary warbler (*Protonotaria citrea*) singing near nest box.

Discussion

The prothonotary warbler nest in PW11 was most likely an incomplete or “dummy” nest built by the male (Bull, 1964). Partial nests may demonstrate to the female that the male has chosen a territory with multiple nesting opportunities. “Dummy” nests may also inform other cavity

nesters that the area is full. Male prothonotary warblers have been observed using incomplete nests as night roosting sites.

The large number of destroyed and damaged nest boxes is a testament to the hazards and difficulties secondary cavity nesters face in floodplain forests and riparian zones. Snowmelt, storm water runoff, and heavy rains may cause flood conditions that carry large amounts of debris down river and force decaying trees and snags from potential breeding areas. Large pieces of debris can destroy snags and nest boxes, while other suitable nesting locations are removed by the force of high waters.

The remaining prothonotary warbler and brown creeper nest boxes will be cleaned and secured, and will remain to provide wintering habitat.

Job 3: Winter Waterbird Survey

Abstract

The open water of the Anacostia and Potomac Rivers, municipal reservoirs, ponds and adjacent wetlands of the District provide year- round habitat for waterbirds. These water features are important breeding areas and migration corridors. Wintering waterbirds rely on these resources to survive the winter. The District surveyed the Anacostia and Potomac Rivers, reservoirs, tidal wetlands, mudflats, and ponds on a bi-monthly basis from November 15, 2010 to March 15, 2011. Five species of greatest conservation need were recorded: Black-crowned night heron, bald eagle, red-shouldered hawk, American black duck, and wood duck. Canada geese, ring-billed gulls, mallards, and American crows were the most common species seen on the Anacostia and Potomac River watersheds.

Introduction

The District contains approximately 3,120 hectares (7,745 acres) of suitable waterbird habitat, including but not exclusively, rivers, wetlands, and reservoirs. These habitats are essential and enable waterbirds to survive the winter months and prepare for spring migrations and breeding seasons. The habitats also provide resources such as loafing space and forage for gulls, terns, geese, dabbling ducks, diving ducks, wading birds, and raptors. Waterbirds can act as barometers of these habitats in terms of water quality, submerged aquatic vegetation levels, and the general health of the ecosystems they are utilizing.

Waterbirds can be highly visible representatives of aquatic and wetland habitats. Their large congregations draw birdwatchers, game hunters, and other outdoor enthusiasts. Since waterbirds are also important indicators of environmental health and quality, their conservation and management contributes to the overall preservation of aquatic ecosystems. Waterbirds face numerous pressures throughout their breeding habitats, migration routes and wintering habitats, in both inland and coastal areas. The destruction of wetlands, adverse impacts of invasive plant and animal species, decreasing water quality, loss of sub-aquatic vegetation, and human disturbance are just a few of the waterbird conservation issues that wildlife managers address. Minimizing these pressures in waterbirds' wintering habitats may help to increase their survivability during migration and productivity during the breeding season.

A vast majority of research on urban avifauna has focused on passerine species in terrestrial habitats. Even when studies have focused on waterbirds, they have generally done so in non-urban settings (Bolduc and Afton, 2004). Very little information exists on habitat needs outside of the breeding season for many bird species. Along with other types of non-breeding habitats, wintering areas are critical to

the overall conservation needs of avian species. Since the use of such areas by waterbirds is relatively poorly understood, and given their importance for the long-term health of waterbird populations, there is need for long-term monitoring of such habitat.

Open water habitat is listed as a highly critical habitat in the DC Wildlife Action Plan (WAP). Sixty-two SGCN species use open water habitat, wetlands and mudflats along the Potomac and Anacostia Rivers. The District is also a part of the Atlantic migratory flyway and is far enough south that many birds that nest in the far north may overwinter here, depending on weather conditions. To establish diversity and abundance data of waterbirds that use these critical habitats, surveys were conducted on the Anacostia and Potomac rivers during the winter of 2010-2011.

Like most urban water bodies in the nation, the Anacostia River faces ecological threats from myriad sources. Its watershed is one of the most densely populated areas within the Chesapeake Bay drainage. As a result, urban and suburban development exerts constant and ever-increasing pressures on the ecosystem of this tidal river. Stormwater runoff, sedimentation, toxic pollution from a variety of non-point sources, and illegal dumping of trash are examples of major stressors.

Objectives

The DDOE began monitoring wintering waterbirds in 2002 on the tidal sections of the Anacostia and Potomac rivers as well as on large water bodies within the District. This remains an ongoing study, with the following specific objectives:

- 1) To compile an inventory of wintering waterbird species along the District's main water bodies.
- 2) To evaluate spatial patterns of utilization by wintering waterbirds of the District's rivers and reservoirs.
- 3) To assess the frequency and abundance of wintering waterbirds within the District and how these population parameters vary between years.

Results obtained from such analyses will be used to establish a database to implement best management practices (BMP) for priority waterbird species.

Methods

The Winter Waterbird Survey (WWS) study area includes the tidal sections of the Anacostia and Potomac Rivers within the boundary of the District of Columbia. Data were also collected on reservoirs

and ponds associated with the river systems. For the Anacostia River, this included MacMillan Reservoir. For the Potomac River, this included the Georgetown Reservoir, DaleCarlia Reservoir, and Constitution Gardens on the National Mall.

Data were collected from fixed points offering high visibility along the rivers. Ten points were on the Anacostia River and twelve were on the Potomac River (Figure 3.1).

Field counts for the winter waterbird survey of 2011 were conducted from mid-November to mid-March. Waterbird counts were conducted on each river system on a bi-weekly basis.

Visible waterbirds were recorded from each survey point using binoculars and a spotting scope. Efforts were made to identify and count every waterbird visible on the water, loafing near the shore, or flying over the point. Care was taken to exclude individuals previously counted at another point. Other species were recorded due to their ecology being associated with water ecosystems, wetland habitats, or use of water systems during winter. Additionally, weather and tide were recorded at the beginning of each survey.

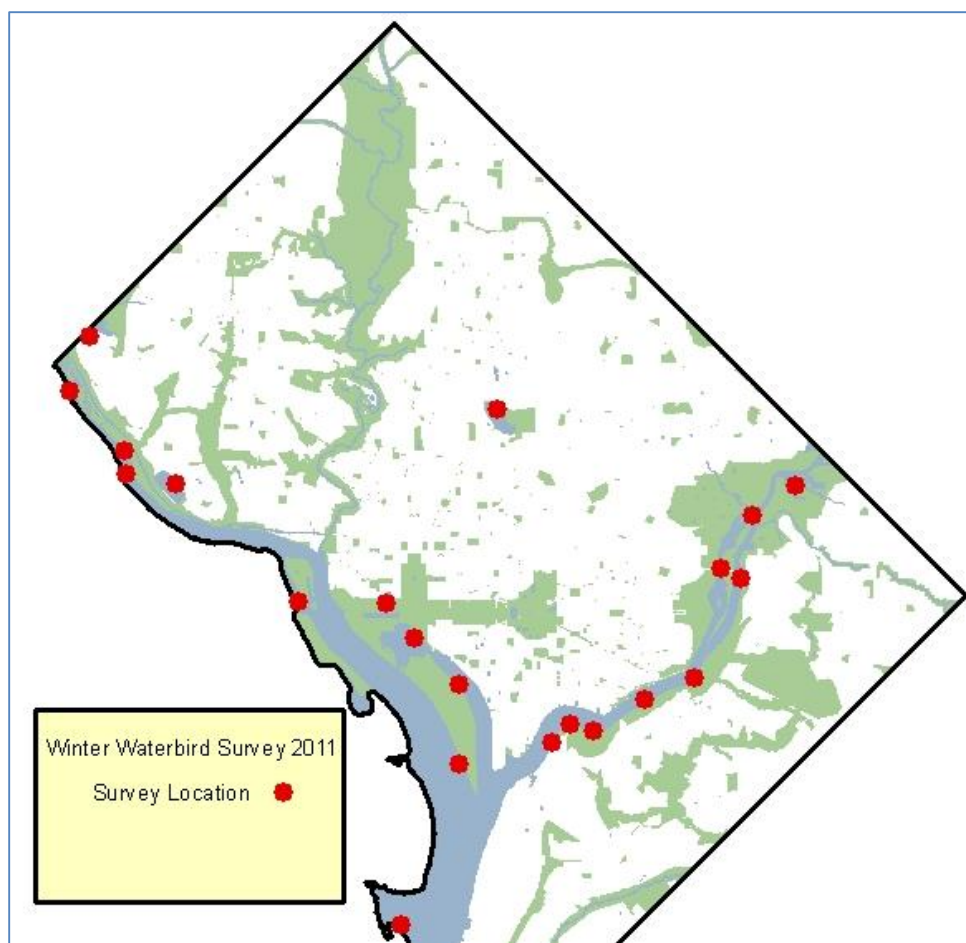


Figure 3.1 Winter Waterbird Survey 2011 Locations

Results

Summary

A total of 42 species were observed and recorded during the WWS of 2011. Five Species of Greatest Conservation Need (SGCN) were recorded during these surveys: Black-crowned night heron, American black duck, bald eagle, red-shouldered hawk, and wood duck. Four waterbird species were recorded only once on all surveys: Common loon, cackling goose, solitary sandpiper, and glaucous gull (Table 2.1).

Data Analysis

Data were summarized for each river system to provide estimates of species richness, relative abundance, and detection frequency. The total number of individuals of each species sighted during the course of the study was used to calculate a percentage for relative abundance. The total number of days

a given species was observed was used to calculate the frequency of detection for that species. Data were analyzed in this manner for each river system.

Anacostia River System

A total of 32 species of waterbirds were observed on the Anacostia River, representing 76 percent of the total species diversity recorded. Twenty-three species were recorded in 2007, nineteen in 2008, sixteen in 2009, and twenty-five in 2010.

Four SGCN seen during these surveys were recorded on the Anacostia River.

Three sites on the Anacostia River were tied with the highest overall diversity of eighteen species: Kenilworth Aquatic Gardens, Langston Golf Course-North, and MacMillan Reservoir. The next highest site for species diversity was the Navy Yard, with 16 species. Langston Golf Course- South had the lowest diversity of only seven species. A summary of the Anacostia River system data appears in Table 2.2.

One type of grebe, cormorant, and heron were recorded on the Anacostia River. The double-crested cormorant was the most frequently observed of these species with 2.01% relative abundance and 66% detection on field days.

Four species of dabbling ducks or geese were observed. The Canada goose was the most common with 51.07% relative abundance and 100% detection on field days. Mallards also had a 100% detection frequency, but had a lower relative abundance of 3.17%. American black duck and wood duck are both SGCN species and had relative abundances of less than 1%.

Seven species of diving ducks were recorded in the Anacostia River system. Canvasback, ring-necked duck, lesser scaup, bufflehead, common mergansers, hooded mergansers, and ruddy ducks were seen in low numbers, less than 1% relative abundance, with the ring-necked duck being observed most often, on 77% of field days.

Six species of raptors were sighted during Anacostia surveys, with the red-tailed hawk being the most common and seen on 67% of field days. Two SGCN, bald eagle and red-shouldered hawk, were recorded on 44% of survey days. Other raptors were seen on only 16% of field days. The peregrine falcon was not seen during 2011 surveys.

The American coot was not seen on the Anacostia River during 2010 surveys, but was recorded on 67% of field days in 2011, with a relative abundance of less than 1%.

The killdeer was the only plover sighted, with 36 individuals being recorded on six field days.

A lone solitary sandpiper was seen on one survey day during low tide near the Aquatic Resources Education Center.

Six gull species were observed during surveys. Ring-billed gulls were the most common with 28.35% relative abundance and 100% detection on field days. Herring gulls and great black-backed gulls were also detected on 100% of field days, but with much lower relative abundances, 1.66% and 1.70% respectively. Laughing gulls were observed on one field day, which included a large flock of 300 individuals. Four lesser black-backed gulls and one glaucous gull were also recorded on surveys.

The belted kingfisher was sighted on 78% of field days. Red-winged blackbirds were seen on 44% of field days.

Two corvid species were recorded on the Anacostia River system. American crows and fish crows were both seen on 100% of field days and with varying abundances, 4.82% and 0.63% respectively. Ninety-six other individual crows were also recorded but not identified, due to lack of vocalizations.

Potomac River System

A total of thirty-eight waterbird species were observed and recorded on the Potomac River, representing 90% of the total species diversity recorded. Twenty-one species were recorded in 2007, twenty in 2008, twenty-five in 2009, and thirty-four in 2010. Eight species were sighted exclusively during surveys of the Potomac River system: common loon, horned grebe, black-crowned night heron, cackling goose, gadwall, American wigeon, northern shoveler, and redhead.

Five SGCN seen during these surveys were recorded on the Potomac River.

The Potomac River site with the highest overall diversity was Washington Channel, with seventeen species recorded. The sites with the next highest diversity were Georgetown Reservoir, Constitution Gardens, and Daingerfield Island/ Belle Haven Marina, all with fifteen species. Fletcher's Cove and DaleCarlia Reservoir had the lowest diversity with only seven species recorded at each site. A summary of the Potomac River system data appears in Table 2.3.

One type of loon and two types of grebes were sighted during surveys on the Potomac River system. A common loon was recorded once in Washington Channel. Pied-billed grebes were seen on 67% of field

days, with a low relative abundance of 0.11%. Horned grebes were recorded on four survey days. Double-crested cormorants were recorded on 100% of field days, with 2.01% relative abundance.

Two types of herons were recorded. The great blue heron was sighted on 89% of field days, but with less than 1% relative abundance. Black-crowned night herons were recorded for the first time since 2009. Thirty-four individuals were recorded on four survey days roosting off Washington Channel.

Eight species of dabbling ducks and geese were observed during surveys. The Canada goose had the highest relative abundance of all species on the Potomac River system, 42.16%, and was detected on 100% of field days. A cackling goose was sighted with Canada geese on Washington Channel. Mallards were sighted in 100% of field days with 10.48% relative abundance. American black duck and wood duck, both SGCN, had less than 1% relative abundance. Other recorded dabbling ducks included gadwall, American wigeon, and northern shoveler.

Eight species of diving ducks were recorded. Lesser scaup were detected on 67% of field days, but not in large rafts as in previous years. Ring-necked ducks were detected on 89% of field days, with a 1.14 relative abundance. The canvasback, redhead, bufflehead, common merganser, hooded merganser, and ruddy duck also had relative abundances of less than 1%. Red-breasted mergansers and greater scaup were not observed in 2011.

Five raptor species were observed on the Potomac River system. The red-tailed hawk was the most common, with eight individuals observed on six field days. Four bald eagles and three red-shouldered hawks, both SGCN, were recorded. An American kestrel and osprey were each sighted once.

American coot sightings were less than in the previous four years, with only eight individuals and 67% detection on field days.

Four gull species accounted for 37.49% of avian relative abundance on the Potomac River. Ring-billed gulls were most common with 33.96% of relative abundance and 100% detection on field days. Great black-backed gulls and herring gulls also had 100% detection frequency, but lower relative abundance, 1.69% and 1.82% respectively. Three lesser black-backed gulls were also recorded during surveys. Laughing gulls and Bonaparte's gulls were not observed on the Potomac during 2011 surveys.

The belted kingfisher was sighted on 67% of field days. Red-winged blackbirds were seen on one field day.

Two corvid species were recorded on the Potomac River system. Fish crows were seen on 67% of field days with similar a 0.14% relative abundance. American crows were seen on 78% of survey days with a 0.71% relative abundance.



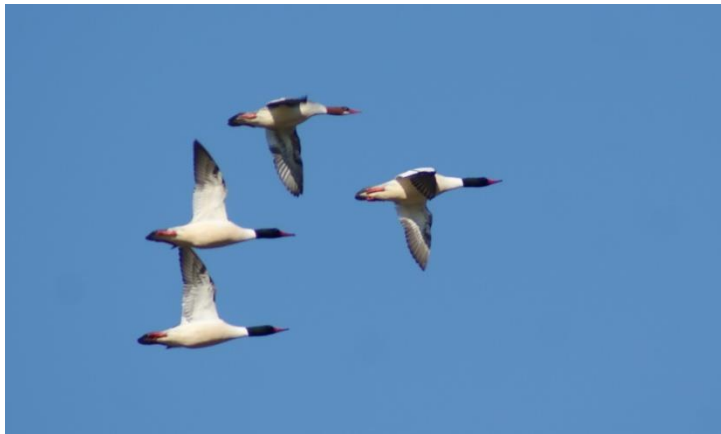
Ring-billed gulls (*Larus delawarensis*) turned into the wind. – Hains Point



Bald eagle (*Haliaeetus leucocephalus*) consuming a ring-billed gull. – MacMillan Reservoir



Merlin (*Falco columbarius*) – Hains Point



Common mergansers (*Mergus merganser*) – Kingman Island

Discussion

Although the Anacostia River system supports fewer numbers of species during the winter than the Potomac River system, mean site species richness and avian abundance continues to be higher along the Anacostia during the Winter Waterbird Survey of 2011 (Table 2.4) as it was in 2010.

Four SGCN were recorded on each river: Bald eagle, red-shouldered hawk, American black duck, and wood duck. Black-crowned night herons were also recorded on the Potomac River.

The Canada goose, ring-billed gull, mallard, American crow, and double-crested cormorant were the most abundant waterbird species to winter in District waters.

Several species that have wintered in District waters previously were not detected on the 2011 WWS, including green-winged teal, blue-winged teal, northern pintail, greater scaup and red-breasted mergansers. A few species that were not recorded in 2010 were observed in 2011, including common loon, black-crowned night heron, cackling goose, gadwall, redhead, northern shoveler, osprey, merlin, and glaucous gull.

Waterbirds are subjected to multiple stressors that may affect wintering populations and distributions. Land use changes in breeding habitat, migration shifts due to climate change, water contamination, invertebrate population declines, and submerged aquatic vegetation are just few factors that may impact winter waterbird surveys. Temperature, snow and ice cover, and human disturbance also may be factors in winter waterbird distribution in the District.

Little information exists on the influence of weather and weather events on waterfowl abundance during wintering months. Cumulative weather severity measurements that reflect current and cumulative temperatures, snow cover, river and wetland icing, and food availability may be the best tool for explaining changes in winter waterbird populations (Schummer, 2010). In 2010, severe cold temperatures and record-breaking snowfall may have altered avian distribution and rendered some areas temporarily unsuitable waterbird habitat. Even though December 2010 was relatively cold, with temperatures below average on 23 of 31 days, the rest of the winter was milder and dry. Snowfall was limited to less than 2 inches in December, 7.3 inches in January, and only 0.5 inches in February. The metropolitan region had four days in February 2011 where the temperature reached at least 70F (National Weather Service).

This is in great contrast to record snowfalls and long term icing of wetlands and rivers in January and February of 2010. A milder winter may account for the increased number of species recorded on both rivers and the nearly 20% increase in the numbers of individuals sighted on surveys. More foraging opportunities lead to a higher threshold of individuals and number of species able to utilize habitats.

In order to provide a more complete survey of waterbird distribution in the District, MacMillan and DaleCarlia reservoirs were included. MacMillan was surveyed on the Anacostia River route, while DaleCarlia was added to the Potomac River route. Constitution Gardens and the Georgetown Reservoir were surveyed in previous years. The artificial ponds yielded different results in terms of species recorded, avian abundance, and total number of individuals (Table 2.5).

MacMillan and Georgetown reservoirs are of similar size, 15.4 and 17 hectares respectively. DaleCarlia is larger in total size, but only 5.7 hectares of water is within the District (Washington Aqueduct). Constitution Gardens is much smaller with only 3.5 hectares, including Signer Island. Unlike the other reservoirs, Constitution Gardens is shallow, less than one meter deep.

MacMillan and Constitution Gardens had the highest number of individuals throughout the survey, 2546 (165/ha) and 2294 (574/ha) respectively. The other reservoirs had much lower individual counts, 780 (46/ha) for Georgetown and 70 (20/ha) for DaleCarlia.

Observed waterbirds were divided into four guilds; surface plant feeders, surface fish feeders, diving invertebrate feeders, and diving fish feeders (Brigger, 1997).

Constitution Gardens contained eleven species and was utilized primarily by surface plant feeders. Fifty percent of species types and 89% of the individuals were surface plant feeders. This coincides with the limited depth and lack of sustainable fish species. Surface fish feeders, such as the ring-billed gull were primarily loafing on the surrounding grass surfaces and scavenging.

DaleCarlia Reservoir was completely devoid of waterbirds on 44% of survey visits. Two species of diving fish feeders were recorded, while only one species of the other three guilds was observed during the survey season.

Georgetown Reservoir contained fourteen species, divided among the four guilds. Sixty percent of the individuals recorded were ring-billed gulls. Five species of diving invertebrate feeders, redhead, canvasback, ring-necked, bufflehead, and ruddy ducks, were observed utilizing Georgetown Reservoir. Some sections of the reservoir were drained during the course of the study.

MacMillan Reservoir provided wintering habitat for fifteen species during the survey. Ring-billed gulls made up the largest percentage of individuals (46.6%), followed by Canada geese (42.5%). The most represented guild was surface fish feeders, with seven species, including an adult bald eagle preying on ring-billed gulls.

The survey results are in some cases what would be expected. For example, the prevalence of surface plant feeders at Constitution Gardens coincides with the shallow water depth. A high variety of diving invertebrate feeders at Georgetown and MacMillan would be expected due to deeper, larger areas of open water.

In other aspects, results are more puzzling, and raise more questions. Even though Georgetown and MacMillan are similar in size, MacMillan had more than three times the density of birds per hectare. This may be partly explained by occasional draw downs of the two northern sections in Georgetown, or the floating booms on MacMillan that provide loafing opportunities, but most of the birds were counted on the water. The underutilization by different species and low individual numbers at DaleCarlia is not easily explained. DaleCarlia is wooded on much of its shoreline and is more remote in terms of pedestrian and vehicular traffic compared to the other artificial water bodies. Only five species utilized DaleCarlia, and the 39 recorded Canada Geese were loafing on the shoreline. The presence of diving and surface fish feeders over multiple survey dates at other reservoirs may indicate introduced fish species to sustain a wintering bird population.

In order to fully investigate differences between reservoirs that may affect bird usage, more information is needed, including: turbidity, dissolved oxygen, conductivity, pH, temperature, and the presence of macrophytes and macroinvertebrates. Further studies would also be needed to determine the diet of fish feeding guilds.

The Washington Aqueduct is a division of the Baltimore District, U.S. Army Corps of Engineers and provides drinking water for more than one million residents in the greater metropolitan area by producing over 180 million gallons of water daily. The system was not created to provide wildlife habitat of any type, but has become wintering habitat for a number of bird species. It is a windfall that so many species are able to use the reservoirs as auxiliary winter habitat. It is paramount that the Washington Aqueduct continues to fulfill its primary objective and wildlife conflicts with operation be minimized. Although the District's reservoirs and artificial ponds are utilized by more than 5,600 wintering birds, they should not be altered to increase wintering habitat and avian use.

Conclusion

A handful of species dominates the District's open water during the winter. The combination of weather events and human disturbance may have contributed to the number, species, and distribution of waterbirds in the District in 2011. Increasing submerged aquatic vegetation beds and improving water quality may increase the number of species and biomass of waterbirds utilizing District waters during the winter. The DDOE will continue to monitor waterbirds to establish long-term trends, recommend best management practices for emerging development, and strive to conserve and improve wintering opportunities for waterbirds in the District.

Table 2.1 Species of greatest conservation need (SGCN) and species with only one sighting recorded during the 2010-2011 winter waterbird survey for each river.

	Anacostia	Potomac
SGCN	Bald eagle	Bald Eagle
	Red-shouldered hawk	Red-shouldered hawk
	American black duck	American black duck
	Wood duck	Wood duck
		Black-crowned night heron
One Record	Glaucous gull	Common loon
	Bufflehead	Cackling goose
	Solitary sandpiper	American kestrel
	Osprey	Osprey
	Cooper's hawk	
	American kestrel	
	Merlin	

Table 2.2 Winter Waterbird Survey summary data for the Anacostia River system 2010-2011

Species	2010			2011		
	No. Seen	Rel. Abun.	Det. Freq.	No. Seen	Rel. Abun.	Det. Freq.
Pied-billed grebe	16	0.13	3	18	0.14	7
Double-crested cormorant	269	2.21	9	264	2.01	6
Great blue heron	26	0.21	8	32	0.24	9
Canada goose	5485	45.23	10	6693	51.07	9
Wood duck	8	0.06	2	18	0.14	2
Mallard	357	2.94	10	415	3.17	9
American black duck	29	0.23	4	25	0.19	5
Canvasback	0	0	0	3	0.02	2
Ring-necked duck	0	0	0	101	0.77	7
Lesser scaup	5	0.04	2	13	0.10	3
Bufflehead	0	0	0	1	0.01	1
Common merganser	13	0.10	2	19	0.14	3
Hooded merganser	28	0.23	5	23	0.18	3
Ruddy duck	0	0	0	6	0.05	4
Osprey	0	0	0	1	0.01	1
Bald eagle	1	0.01	1	4	0.03	4
Cooper's hawk	3	0.02	2	1	0.01	1
Red-shouldered hawk	15	0.12	8	9	0.07	4
Red-tailed hawk	3	0.02	2	7	0.05	6
American kestrel	2	0.01	1	1	0.01	1
Peregrine falcon	2	0.01	2	0	0	0
American coot	0	0	0	10	0.08	5
Killdeer	25	0.20	2	36	0.27	6
Solitary sandpiper	0	0	0	1	0.01	1
Laughing gull	145	1.19	2	384	2.93	1
Ring-billed gull	4468	36.84	10	3716	28.35	9
Herring gull	237	1.95	10	217	1.66	9
Glaucous gull	0	0	0	1	0.01	1
Lesser black-backed gull	0	0	0	4	0.03	2
Great black-backed gull	475	3.91	10	223	1.70	9
Belted kingfisher	7	0.05	5	8	0.06	7
American crow	286	2.35	9	632	4.82	9
Fish crow	196	1.61	9	82	0.63	9
Red-winged blackbird	21	0.17	3	42	0.32	4

Table 2.3 Winter Waterbird Survey summary data for the Potomac River system 2010-2011

Species	2010			2011		
	No. Seen	Rel. Abun.	Det. Freq.	No. Seen	Rel. Abun.	Det. Freq.
Common loon	0	0	0	1	0.01	1
Horned grebe	1	0.01	1	7	0.05	4
Pied-billed grebe	25	0.23	9	16	0.11	6
Double-crested cormorant	359	3.33	10	553	2.01	9
Black-crowned night heron	0	0	0	34	0.24	4
Great blue heron	20	0.18	8	33	0.23	8
Canada goose	4151	38.59	9	6077	42.16	9
Cackling goose	0	0	0	1	0.01	1
Wood duck	3	0.02	1	12	0.08	1
Mallard	1328	12.34	10	1511	10.48	9
American black duck	5	0.01	2	5	0.03	3
Gadwall	0	0	0	2	0.01	2
American wigeon	2	0.01	1	10	0.07	5
Northern shoveler	0	0	0	2	0.01	1
Canvasback	1	0.01	1	6	0.04	2
Redhead	0	0	0	9	0.06	4
Ring-necked duck	69	0.64	7	165	1.14	8
Greater scaup	1	0.01	1	0	0	0
Lesser scaup	822	7.64	5	243	1.69	6
Bufflehead	14	0.13	4	40	0.28	5
Common merganser	21	0.19	4	46	0.32	6
Red-breasted merganser	2	0.01	1	0	0	0
Hooded merganser	3	0.02	2	5	0.03	3
Ruddy duck	6	0.55	2	55	0.38	5
Osprey	0	0	0	1	0.01	1
Bald eagle	3	0.02	3	4	0.03	3
Cooper's hawk	1	0.01	1	0	0	0
Red-shouldered hawk	2	0.01	2	3	0.02	2
Red-tailed hawk	2	0.01	2	8	0.06	6
American kestrel	0	0	0	1	0.01	1
American coot	16	0.14	6	8	0.06	6
Laughing gull	1	0.01	1	0	0	0
Bonaparte gull	2	0.01	1	0	0	0
Ring-billed gull	3269	30.39	10	4895	33.96	9
Herring gull	109	1.01	10	262	1.82	9
Lesser black-backed gull	4	0.03	2	3	0.02	3
Great black-backed gull	359	3.33	10	243	1.69	9
Belted kingfisher	7	0.06	6	6	0.04	6
American crow	11	0.10	4	103	0.71	7
Fish crow	116	1.07	5	20	0.14	6
Red-winged blackbird	18	0.16	2	32	0.22	1

Table 2.4 Winter Waterbird Survey – Data summary for Anacostia River and Potomac River systems from 2010-2011.

Site	Location	Species Richness	Avian Abundance	#SGCN	Total #	Ave/Visit
Anacostia	River Mouth/Bolling AFB	12	4.3	0	1030	114.4
	Pumphouse	11	4.3	1	482	53.6
	Navy Yard	16	4.6	1	584	64.9
	Marinas	11	4.9	0	2014	223.8
	AREC	10	3.7	0	1516	168.4
	River Terrace	12	5.1	1	1163	129.2
	Langston South	7	2.5	0	1253	156.6
	Langston North	18	6.4	3	1059	132.4
	MacMillan Reservoir	18	8.4	1	2688	298.7
	Kenilworth Aquatic Gardens	18	8.1	4	1416	157.3
	Mean =	13.30	5.23	1.1	1320.5	149.93
	StanDev=	3.92	1.88	1.37	652.00	71.91
Potomac	T.R Channel	8	3.0	1	274	30.4
	VA side overlooks across from Fletcher's	11	2.7	0	185	20.6
	Chain Bridge	12	3.0	2	69	7.8
	Fletcher's Cove	7	2.6	1	168	18.7
	DaleCarlia Reservoir	7	1.1	1	75	8.3
	Georgetown Reservoir	15	4.2	0	1009	112.1
	Ohio Drive/East Potomac Park	11	4.4	0	895	99.4
	Washington Channel	17	7.9	2	4491	499.0
	Tidal Basin	12	4.3	0	2061	229.0
	Constitution Gardens	15	5.9	0	2311	256.8
	Daingerfield Sail Marina	15	5.2	2	871	96.8
	Alexandria Waterfront	9	4.7	0	2020	224.4
	Mean =	11.58	4.08	0.75	1202.42	133.60
	StanDev=	3.39	1.78	0.87	1321.64	146.85

Table 2.5 Winter waterbirds on District Reservoirs by Guild

Reservoirs	Dale	Carlia	Georgetown	MacMillan	Constitution Gardens
(Number of Individuals/Percent of Individuals at Water body)					
Guild					
<i>Surface Plant Feeders</i>					
Canada goose	39/55.7	192/24.6	1084/42.5	1239/54.0	
Mallard		32/4.1	39/1.5	784/34.2	
Gadwall				2/0.1	
American wigeon				10/0.4	
American coot			10/0.4	3/0.1	
<i>Surface Fish Feeders</i>					
Great blue heron				1/0.1	
Ring-billed gull		466/60.0	1189/46.6	100/4.4	
Great black-backed gull		1/0.1	82/3.2		
Lesser black-backed gull			4/0.2		
Herring gull		3/0.4	123/4.8		
Glaucous gull			1/0.1		
Bald eagle	1/1.4		1/0.1		
Fish crow		7/0.9	4/0.2		
<i>Diving Invertebrate Feeders</i>					
Redhead		6/0.8		3/0.1	
Canvasback		1/0.1	3/0.1		
Ring-necked duck	7/10.0	10/1.3	101/4.0	148/6.5	
Bufflehead		13/1.7	1/0.1	3/0.1	
Ruddy duck		46/5.9			
<i>Diving Fish Feeders</i>					
Pied-billed grebe			16/0.6		
Horned grebe		1/0.1			
Double-crested cormorant			1/0.1	1/0.1	
Hooded merganser	2/2.9	1/0.1			
Common merganser	21/30.0	1/0.1			
Total Number of Individuals	70	780	2546	2294	
Total Number of Species	5	14	15	11	

Job 4: Lower Kingman and Heritage Islands Survey

Abstract

Lower Kingman Island and Heritage Island were surveyed weekly for one year to inventory the number of bird species utilizing the islands' habitats. One hundred and eight species were recorded during the survey, including thirteen Species of Greatest Conservation Need.

Introduction

Lower Kingman Island (LKI) and Heritage Island (HI) are both man-made islands in the Anacostia River (Figure 4.1). They were created from dredged materials from the Anacostia River and completed in 1916. After nearly a century of proposed land uses, legal challenges, and financial struggles, in 2005 Mayor Anthony Williams proposed turning the islands into a formal wildlife refuge. The National Park Service and USGS enhanced the islands, restoring marshlands on the western side of HI and eastern side of LKI. The islands are currently a park and educational area under the stewardship of Living Classrooms of the National Capitol Region.

The islands are largely undeveloped, with a network of footpaths and two bridges linking them to shore. Throughout 2010 and the first half of 2011, major construction projects took place on the islands. Three forested areas were cleared and landscaped with native plants for outdoor classrooms. The main trail on Kingman Island was widened from twelve feet to more than twenty-five feet in some areas. This process removed a large strip of canopy down the center of KI. The scrub field along Benning Road was also altered. It was replanted with native trees, shrubs, and wildflowers, a small pavilion built with a view of the river, and trails designed to wind through the new gardens. Two access areas were cut from the main trail to the water's edge to allow for expanded views of the River Terrace section of the Anacostia River. Due to their unique creation and continued alteration, the islands are composed of native and invasive plant communities of varying levels of age and disturbance. This urban habitat provides a diversity of resources for resident birds that utilize the area year-round as well as for species that make use of the islands on a seasonal basis.

As part of the Atlantic flyway, both islands are components of an important corridor for neotropical migratory birds. In addition, the river and its surrounding wetlands are important for wintering waterbirds, migratory shorebirds, and waterfowl species.

The DDOE began jointly monitoring birds with research staff of the Patuxent Wildlife Research Center (PWRC) on these islands in the summer of 2003. Although the PWRC terminated its involvement in the survey in 2004, the DDOE has continued the study to date.

Objectives

The objectives of this survey are to inventory and monitor the birds of LKI and HI, study seasonal changes in diversity and abundance, document avian species richness and abundance during the construction of the wildlife refuge with educational classrooms and to compare post-development with pre-development data.

Location

The study area included LKI and HI, as well as Kingman Lake, the water channels between both islands and the shorelines, and their marshlands viewed from either the connecting bridges or island shorelines.

Construction began on both park entrances and the new outdoor classrooms in September 2010. Several areas were cleared of trees and undergrowth, while trails were widened and heavy equipment was operated in many areas of the park. This is the first phase of enhancements to include outdoor classrooms and a new trail system. Boardwalks, butterfly gardens, education stations, and a bird observation post will be included in later phases.



Construction of outdoor classrooms on Kingman Island

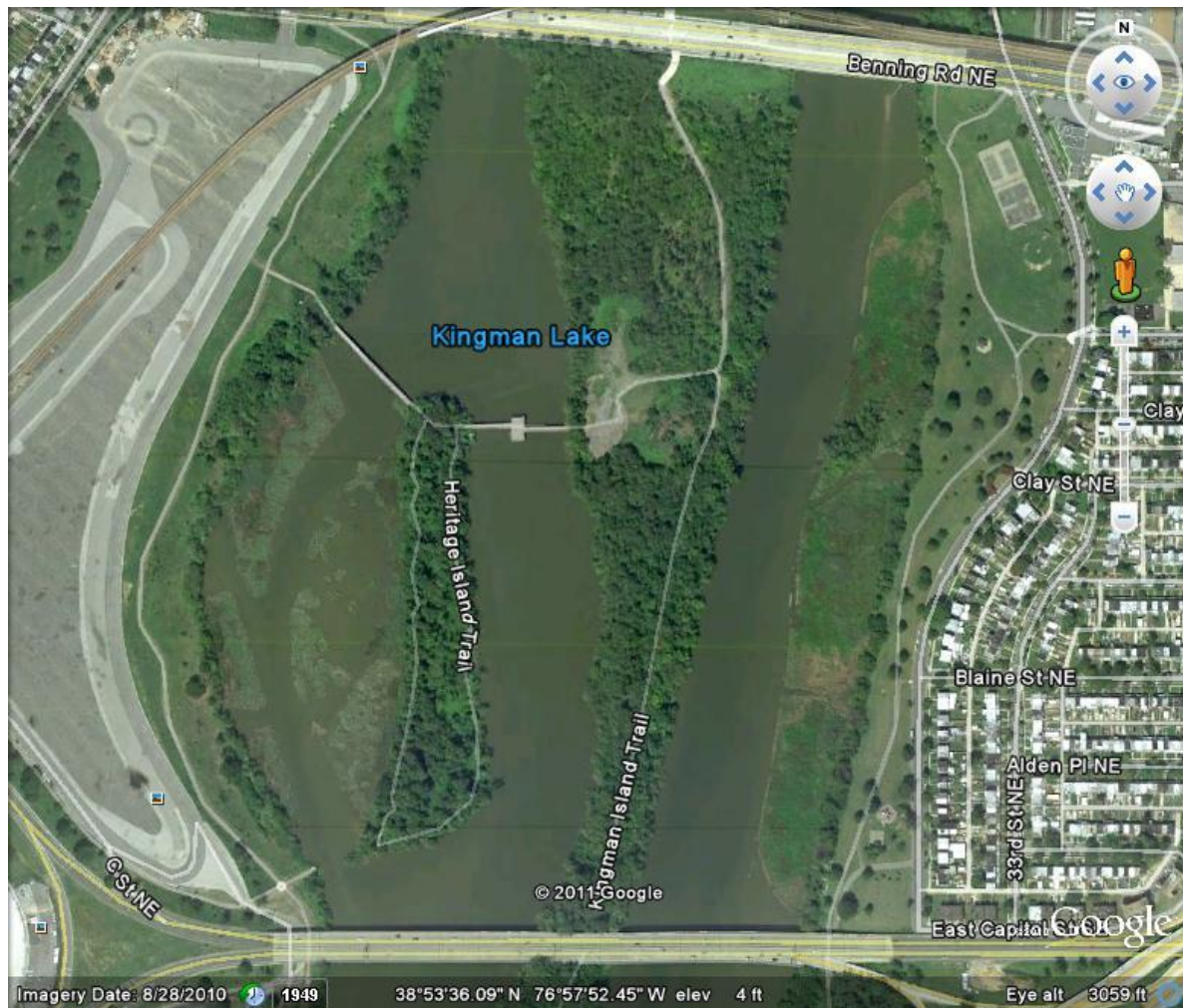


Figure 4.1 Kingman and Heritage Islands

Methods

Bird Survey Procedures

Five- minutes bird counts were conducted on a weekly basis. The point counts were conducted at 14 pre-determined locations. Six points were located on LKI and six were on HI. The remaining two points were positioned on wooden bridges that spanned the eastern and western shores of HI to specifically

document shorebirds and waterbirds. All birds seen or heard during the five-minute count were recorded.

Data Analyses

Summarized data provide estimates of species richness, detection frequency, and abundance. Each species sighted during counts was collated into a list that was used to compute the species richness for the two islands. Detection frequencies were calculated for each species by summing the number of days a given species was detected in a given season and dividing that figure by the total number of field days for that season. Relative abundance was calculated by summing all individuals of a given species recorded for a given season and dividing that figure by the total number of birds of all species observed during the same duration.

Results

A total of 108 species were seen at the Lower Kingman and Heritage Islands during the course of the study (see Table 3.1). This represents approximately 58% of the species reported to the Maryland Ornithological Society's "Annual Bird Sightings in the District of Columbia" compilation for the year 2006. Thirteen of these are considered Species of Greatest Conservation Need in the DC Wildlife Action Plan.

Table 3. 1 Percent detection frequencies and relative abundance of bird species at Lower Kingman-Heritage Islands during four seasons of 2010-2011.

The seasonal time periods have been delineated as follows:

Spring = March-May; summer = June-August; fall = September-November; winter = December-February.

%DF = Detection Frequency %RA= Relative Abundance

(* = **SGCN** Species of Greatest Conservation Need)

Common Name	Spring %DF	Spring %RA	Summer %DF	Summer %RA	Fall %DF	Fall %RA	Winter %DF	Winter %RA
SGCN = *								
Grebes								
Pied-billed Grebe	8	0.07						
Cormorants								
Double-crested Cormorant	69	3.89	57	1.34	100	6.55	8	0.04
Hérons and Egrets								
Black-crowned Night-Heron*			7	0.07				
Green Heron	8	0.07						
Little Blue Heron	8	0.13						
Great Egret			57	3.38	77	2.8		
Great Blue Heron	77	1.45	100	3.38	100	1.2	92	1.66
Snowy Egret					8	0.04		
Ducks and Geese								
Canada Goose	77	6.13	64	10.84	85	5.2	77	7.27
Wood Duck*	46	0.73	50	2.25	46	1.2		
Mallard	92	7.84	86	3.1	92	4.23	77	4.07
American Black Duck*							7	0.07
Common Merganser	8	0.46					46	1.48
Hooded Merganser	8	0.2					85	1.69
Vultures								
Turkey Vulture	8	0.13	7	0.07	23	0.18		
Black Vulture					8	0.04		
Hawks and Eagles								
Osprey	54	0.66	86	1.06	8	0.04		
Bald Eagle*	31	0.4			23	0.11		
Sharp-shinned Hawk							7	0.04
Cooper's Hawk					23	0.18	38	0.22
Red-shouldered Hawk	46	0.46	14	0.14	46	0.22	54	0.29
Red-tailed Hawk	23	0.26					62	0.4
Peregrine Falcon	8	0.07						
Plovers								
Killdeer	31	0.13	14	0.14	15	0.07	15	0.14
Sandpipers								
Solitary Sandpiper	8	0.07						
Spotted Sandpiper	23	0.33	7	0.07				
Gulls and Terns								

Spring	Spring	Summer	Summer	Fall	Fall	Winter	Winter
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Common Name	%DF	%RA	%DF	%RA	%DF	%RA	%DF	%RA
SGCN=*								
Laughing Gull			36	5.77	23	1.35		
Ring-billed Gull	69	7.58	29	0.42	100	11.49	100	37.11
Herring Gull	8	0.1			15	0.11	31	0.4
Great Black-backed Gull	15	0.13			15	0.07	38	0.36
Caspian Tern	15	0.2			15	0.11		
Doves								
Rock Dove					15	0.18		
Mourning Dove	23	0.33	50	0.7	23	0.15		
Cuckoos								
Yellow-billed Cuckoo			7	0.07				
Swifts								
Chimney Swift*	8	0.79	64	0.99	8	0.62		
Hummingbirds								
Ruby-throated Hummingbird	8	0.07						
Kingfishers								
Belted Kingfisher	38	0.46	36	0.35	46	0.25	23	0.11
Woodpeckers								
Red-bellied Woodpecker	62	0.59			15	0.07	54	0.29
Northern Flicker	69	1.05	43	0.42	69	0.65	77	0.76
Yellow-bellied Sapsucker					15	0.07	23	0.11
Downy Woodpecker	62	0.99	86	1.13	92	1.24	92	0.86
Hairy Woodpecker	15	0.13	7	0.14	31	0.15	54	0.36
Flycatchers								
Eastern Phoebe	38	0.46	21	0.28	15	0.18		
Great Crested Flycatcher	15	0.13	21	0.56				
Eastern Kingbird	23	0.2	50	0.63				
Vireos								
Warbling Vireo			29	0.35				
Blue-headed Vireo					8	0.04		
Red-eyed Vireo	38	0.33	43	0.63	8	0.22		
Yellow-throated vireo*					8	0.04		
Jays and Crows								
Blue Jay	8	0.07			38	0.25		
American Crow	69	2.18	21	0.42	62	0.76	100	7.27
Fish								
Crow	77	0.99	14	0.14	31	0.33	85	0.72
UNID Crow Species	46	0.86	36	0.77	38	2.8	31	2.05
Swallows								
Tree Swallow	77	3.3	50	1.34				
Barn Swallow	46	0.79	71	2.18				
Chickadees and Titmice								
Tufted Titmouse			36	0.49				
Black-capped Chickadee	15	0.13					8	0.04
Carolina Chickadee	69	1.38	79	1.41	85	1.16	77	0.86

Common Name	Spring %DF	Spring %RA	Summer %DF	Summer %RA	Fall %DF	Fall %RA	Winter %DF	Winter %RA
SGCN=*								
Creepers								
Brown creeper*	8	0.07			8	0.04		
Wrens								
House Wren					15	0.07		
Winter Wren	8	0.07					15	0.07
Carolina Wren	100	3.03	100	4.57	85	1.2	100	1.01
Kinglets								
Golden-crowned Kinglet	15	0.13			15	0.18	54	0.36
Ruby-crowned Kinglet	31	0.53			46	0.25	38	0.4
Gnatcatchers								
Blue-gray Gnatcatcher	54	2.31	86	4.08	8	0.11		
Thrushes								
Hermit Thrush	15	0.13			8	0.04	8	0.04
American Robin	69	2.18	100	16.54	85	20.95	46	2.28
Mockingbirds and Thrashers								
Gray Catbird	38	2.77	71	2.04	69	1.45		
Northern Mockingbird	8	0.07	14	0.21	8	0.04	38	18
Brown Thrasher*	23	0.33	14	0.21				
Starlings								
European Starling	46	0.46	50	7.46	31	7.53	46	0.86
Waxwings								
Cedar Waxwing	15	1.71			46	3.35	38	4.82
Warblers								
Orange-crowned warbler					8	0.04		
Northern Parula	8	0.07	14	0.14	15	0.11		
Magnolia Warbler					15	0.07		
Yellow-rumped Warbler	54	1.52			46	1.71		
Black-and-white Warbler					23	0.14		
Black-throated Blue Warbler					8	0.04		
Black-throated green Warbler					8	0.04		
Wilson's Warbler					8	0.04		
Common Yellowthroat	38	0.4	14	0.14	23	0.14		
Yellow-throated Warbler	15	0.13						
Prairie warbler					8	0.04		
Blackpoll Warbler	31	1.32			8	0.04		
Palm Warbler	15	0.4			23	0.15		
Yellow Warbler					8	0.07		
Ovenbird*	15	0.13			8	0.04		
Louisiana Waterthrush*	15	0.13			15	0.07		
American Redstart					15	0.15		
Yellow-breasted Chat			7	0.07				
Towhees								
Eastern Towhee*	31	0.33	7	0.14	8	0.04		
	Spring	Spring	Summer	Summer	Fall	Fall	Winter	Winter

Common Name	%DF	%RA	%DF	%RA	%DF	%RA	%DF	%RA
SGCN=*								
Sparrows								
Chipping Sparrow					8	0.04		
Fox Sparrow	8	0.07						
Savannah Sparrow							8	0.04
Song Sparrow	54	3.03	50	0.99	69	2.55	100	3.2
Swamp Sparrow	23	0.2						
White-throated Sparrow	85	16.74			69	7.67	100	14.25
White-crowned Sparrow							8	0.04
Dark-eyed Junco	8	0.2			23	0.76		
Cardinals, Grosbeaks and Buntings								
Northern Cardinal	92	5.47	100	5.14	100	2.58	92	2.09
Blue Grosbeak			14	0.14	15	0.18		
Indigo Bunting	31	0.66	100	3.73	8	0.16		
Blackbirds and Orioles								
Red-winged Blackbird	100	4.81	93	4.57	69	2.29	23	0.68
Common Grackle	54	1.25	100	6.26	15	0.07	8	0.22
Brown-headed Cowbird	31	0.33	7	0.07				
Orchard Oriole			43	0.63				
Baltimore Oriole			7	0.07				
Finches								
House Finch			7	0.07	31	0.33		
American Goldfinch	62	1.25	100	1.76	85	1.45	15	0.32
Old World Sparrows								
House Sparrow	8	0.2	21	0.35				

Seasonal Dynamics

Spring

A total of 76 species were recorded during spring. This constitutes approximately 70% of species recorded over the annual cycle. Eight of these species are considered SGCN.

The nine most commonly observed species during the spring of 2011 are depicted in Table 3.2.

Table 3.2 Most frequently detected species over all spring season counts	
Species	% Relative Detection Frequency
Carolina Wren	100
Red-winged Blackbird	100
Mallard	92
Northern Cardinal	92
White-throated Sparrow	85
Great Blue Heron	77
Canada Goose	77
Fish Crow	77
Tree Swallow	77

The ten most relatively abundant species recorded over the spring counts are shown in Table 3.3.

Table 3.3 Most abundant species over all spring season counts	
Species	% Relative Abundance
White-throated Sparrow	16.74
Mallard	7.84
Ring-billed Gull	7.58
Canada Goose	6.13
Northern Cardinal	5.47
Red-winged Blackbird	4.81
Double-crested cormorant	3.89
Carolina Wren	3.03
Song Sparrow	3.03
Gray Catbird	2.77

Summer

A total of 59 species were recorded during summer. This constitutes approximately 55% of species recorded over the annual cycle. Five species are considered SGCN.

The twelve most commonly observed species during the summer are depicted in Table 3.4.

Table 3.4. Twelve most frequently detected species over all summer season counts	
Species	% Relative Detection Frequency
Great Blue Heron	100
Carolina Wren	100
American Robin	100
Northern Cardinal	100
Indigo Bunting	100
Common Grackle	100
American Goldfinch	100
Red-winged Blackbird	93
Mallard	86
Osprey	86
Downy Woodpecker	86
Blue-gray Gnatcatcher	86

The ten most relatively abundant summer species summer are shown in Table 3.5.

Table 3.5 Most abundant species over all summer season counts	
Species	% Relative Abundance
American Robin	16.54
Canada Goose	10.84
European Starling	7.46
Common Grackle	6.26
Laughing Gull	5.77
Northern Cardinal	5.14
Carolina Wren	4.57
Red-winged Blackbird	4.57
Blue-gray Gnatcatcher	4.08
Indigo Bunting	3.73

Fall

A total of 77 species were recorded during the fall. This constitutes approximately 71% of species recorded over the annual cycle. Nine species are considered SGCN.

The ten most regularly observed species during the fall are shown in Table 3.6.

Table 3.6 Most frequently detected species over all fall season counts	
Species	% Relative Detection Frequency
Double-crested Cormorant	100
Great Blue Heron	100
Ring-billed Gull	100
Northern Cardinal	100
Downy Woodpecker	92
Mallard	92
Canada Goose	85
Carolina Chickadee	85
American Robin	85
American Goldfinch	85

The ten most abundant species recorded during fall counts are shown in Table 3.7.

Table 3.7 Most abundant species over all fall season counts	
Species	% Relative Abundance
American Robin	20.95
Ring-billed Gull	11.49
White-throated Sparrow	7.67
European Starling	7.35
Double-crested Cormorant	6.55
Mallard	4.23
Cedar Waxwing	3.35
Great Egret	2.80
Northern Cardinal	2.58
Song Sparrow	2.55

Winter

A total of 43 species were recorded during the winter. This constitutes approximately 40% of species recorded over the annual cycle. Two species are considered SGCN.

The ten most frequently detected species in the winter are depicted in Table 3.8.

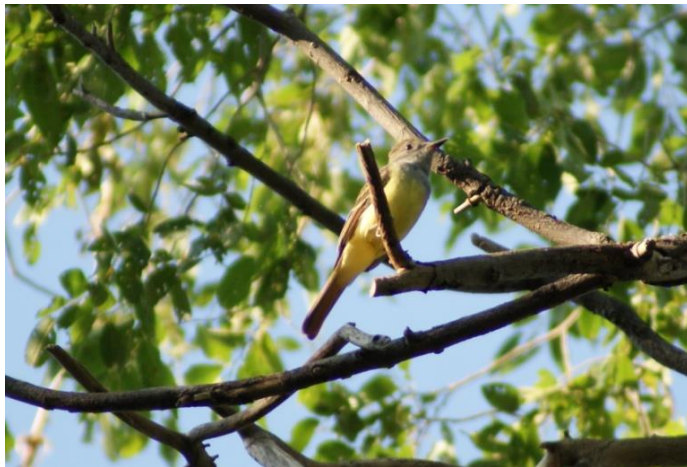
Table 3.8 Ten most frequently detected species over all winter season counts	
Species	% Relative Detection Frequency
Ring-billed Gull	100
American Crow	100
Carolina Wren	100
Song Sparrow	100
White-throated Sparrow	100
Downy Woodpecker	92
Great Blue Heron	92
Northern Cardinal	92
Hooded Merganser	85
Fish Crow	85

The ten most abundant species recorded during winter counts are shown in Table 3.9.

Table 3.9 Ten most abundant species over all winter season counts	
Species	% Relative Abundance
Ring-billed Gull	37.11
White-throated Sparrow	14.25
Canada Goose	7.27
American Crow	7.27
Cedar Waxwing	4.82
Mallard	4.07
Song Sparrow	3.20
American Robin	2.28
Northern Cardinal	2.09
Hooded Merganser	1.69



Yellow -throated warbler (*Dendroica dominica*) on Kingman Island.



Great crested flycatcher (*Myiarchus crinitus*) on Heritage Island.



Great blue heron (*Ardea herodias*) waiting for low tide on Heritage Island.

Discussion

The continuing value of Lower Kingman and Heritage Islands is apparent through the high species richness and the number of avian SGCN (13 of 34) recorded during the survey. The results are impressive for an urban area of approximately 50 acres. The tidal mudflats, river, marsh, scrub, and forest habitats allow for a variety of uses such as a migration corridor, wintering ground, or breeding habitat, even though the islands are surrounded by parking lots, high density housing, and highways.

There were several changes in relative frequency and abundance, as well as changes in species detected between 2010 and 2011.

Spring:

The Spring of 2011 was marked by increased construction activity, operation of large machines along trail areas, and the clearing of woods for water access. There were increases in the detection frequency for great blue heron, fish crow, and tree swallow, all species that rely more on wetland habitat than forest. The frequency of detection for song sparrow, American robin, ring-billed gull, Canada goose, and Carolina chickadee decreased. Blackpoll warbler relative abundance decreased from 5.84 in 2010 to 1.32 in 2011. The number of migratory warbler species dropped from 12 to eight. This may be connected to the loss of canopy on Lower Kingman Island and construction noise and activity acting as a deterrent for migratory visitors.

Summer:

The number of species recorded during the summers of 2010 and 2011 were the same, 59. The relative detection frequency for American goldfinch and indigo bunting increased to 100%. Indigo bunting males were observed singing breeding songs and defending territories. Bunting fledglings were recorded on both islands. The increase in goldfinch detection would suggest breeding on the islands or in close vicinity. The relative abundance for the Carolina wren increased from 1.83 to 4.57 and for the laughing Gull 2.39 to 5.77.

Fall:

Species frequency of detection and relative abundance for the fall of 2010 and 2011 were similar. Island reconstruction was limited to open area clean ups and clearing shrub, and redesigning the park entrances near Robert F. Kennedy Stadium and Benning Road.

Winter:

Construction activity was delayed for much of the winter due to low temperatures. There was a slight increase in the number of recorded species, 37 species in 2010 to 43 in 2011, but relative frequencies and abundance for individual species were comparable. Hooded mergansers had a higher frequency of detection, 85%, and relative abundance, 1.69, than in 2010. This is most likely due to a small group that wintered at the north end of Kingman Lake.

Further monitoring is needed to assess the impacts of construction projects and improvements to the islands.

Job 5: Osprey and Bald Eagle Nesting Platforms

Abstract

We were unable to implement this job during FOY 2011. Plans for construction and placement of the nesting platforms were not approved by the District of Columbia Historic Preservation Office until September, 2011.

Introduction

Nesting platforms have been proven to be effective in providing nesting opportunities and increasing populations in osprey and bald eagles. Both ospreys and bald eagles have been seen foraging and patrolling the area around Kingman and Heritage Islands in the District. Ospreys are nesting on the Anacostia River, to the north and south of Kingman Island. Unfortunately, these nests are not in trees, but on artificial structures. These nests frequently conflict with human activities and fail when the structure is not able to support the nest. In 2011, osprey nested on a construction crane, which delayed a bridge for the Anacostia Riverwalk Trail; pylons on the north and south sides of the Frederick Douglas Bridge; and in light towers in Anacostia Park. Only one of the light tower nests fledged. The other tower nest near the Aquatic Center collapsed due to lack of a support base underneath.

In order to provide both nesting habitat and reduce human conflicts, two nesting platforms will be installed on Kingman and Heritage Islands. One will be on the north east side of Kingman Lake, while the other will be on the southeastern end of Heritage Island. Both of these platforms will be large enough

to support both bald eagle and osprey nests. The platforms will also be viewable from the boardwalk between the islands.

Summary of Activity

We were unable to implement this job during 2011. Plans for construction and placement of the nesting platforms were approved by the District of Columbia Historic Preservation Office in September, 2011.



Osprey (*Pandion haliaetus*) nest on top of construction crane in Anacostia Park.



Osprey (*Pandion haliaetus*) nest on north pylons of the Frederick Douglas Bridge.



Osprey (*Pandion haliaetus*) nest in stadium lighting tower near Kenilworth Aquatic Gardens.



Bald eagle (*Haliaeetus leucocephalus*) on Heritage Island.

Job 6: Nightjar Surveys

Abstract

A nightjar survey was conducted in the District as part of a nationwide project coordinated by the William and Mary College Center for Conservation Biology. The survey was conducted on June 5, 2011 in accordance with data collection protocols. No species of nightjar were detected.

Introduction

Nightjars are one of the most reclusive and enigmatic group of birds. Very little is known about nightjar biology, behavior, migration, breeding, habitat, or population status.

When comparing historical accounts with current anecdotal observations, there is a general consensus that nightjar populations are declining. Information on range, status, and habitat needs to be gathered to access current status and long term monitoring strategies.

Surveys have been conducted in 38 states. 2011 was the first year of participation for the District of Columbia.

Methods

Project methodology was designed and coordinated by the Center for Conservation Biology, Williamsburg, VA.

There were two time periods for completing surveys, May 10-24 2011 and June 9-23, 2011. These periods coincided with nights of brightest moonlight and highest nightjar calling frequency. Surveys begin at least 30 minutes after sunset and end no later than fifteen minutes before sunrise. The moon must be above the horizon and not obscured by clouds. Surveys should be concluded before moonset. The route is only to be surveys once annually.

Point counts were conducted in wooded corridors, with approximately one mile between survey locations. Eight points were in Rock Creek Park and two were along the Chesapeake and Ohio Canal Historic Park.

Results

No nightjar species were detected during the survey. One screech owl was recorded at the first point, near Boundary Channel in Rock Creek Park.

Conclusion

Nightjars are present in the District of Columbia. The DDOE bird biologist has observed common nighthawks (*Chordeiles minor*) feeding on summer evenings in the Northeast quadrant of the city. He also has seen common nighthawks migrating through the metropolitan area this Fall. The fact that

nightjars were not detected during surveys is not surprising. While listening at survey sites, ambient noise ranged from slight to excessive, with some major roads running through wooded areas. Automobile traffic brings noise and light pollution, which inhibits detection and may scare off a number of species, including nightjars and owls.

Rock Creek Park and the Chesapeake and Ohio Canal Historic Park were chosen as study sites for their long stretches of unbroken forest, which would provide for a more connected survey route. The nightjar survey should be conducted in 2012 in other areas of the District with less traffic, such as Kenilworth Aquatic Gardens, Fort Dupont, Fort Mahan, Anacostia Park, and the National Arboretum.

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