

Microhabitat Use by Songbirds on Erie Landfill during the 2008-2010 Fall Migration Seasons

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Introduction

- Habitat loss and degradation have been identified as two of the leading causes for the decline of many migrant songbird species (Robbins et al. 1989; Walk & Warner 2000; Holmes 2007; Rodewald & Brittingham 2007).
- Although capped landfills are common features in contemporary landscapes, few researchers have examined whether songbirds use landfills as stopover sites during migration (Robinson and Handel 1993).
- A useful approach for understanding migrant songbird activity on capped landfills could be to assess how different bird species use different types of vegetation commonly found on these sites.
- This study surveyed the songbird community on one capped landfill in the New Jersey Meadowlands over three Fall migration seasons. Bird activity was compared among three microhabitats: a) common mugwort (*Artemisia vulgaris*) shrub habitat; b) an Eastern cottonwood (*Populus deltoides*) tree patch; c) a black locust (*Robinia pseudoacacia*) tree patch.

Objectives

- document overall activity by songbirds during the 2008, 2009, and 2010 Fall migration seasons.
- examine trends across the different microhabitats for the most common bird species.

microhabitats

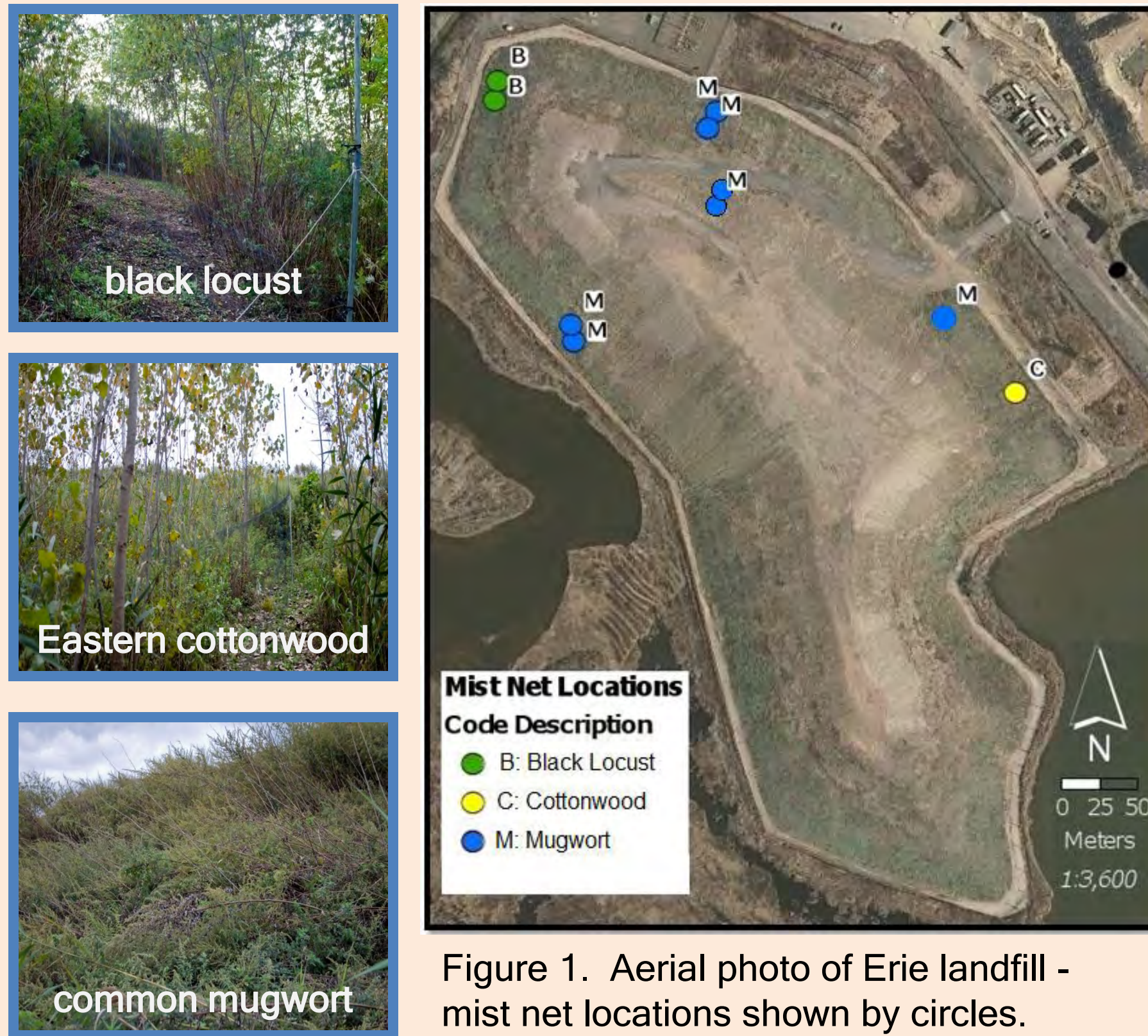


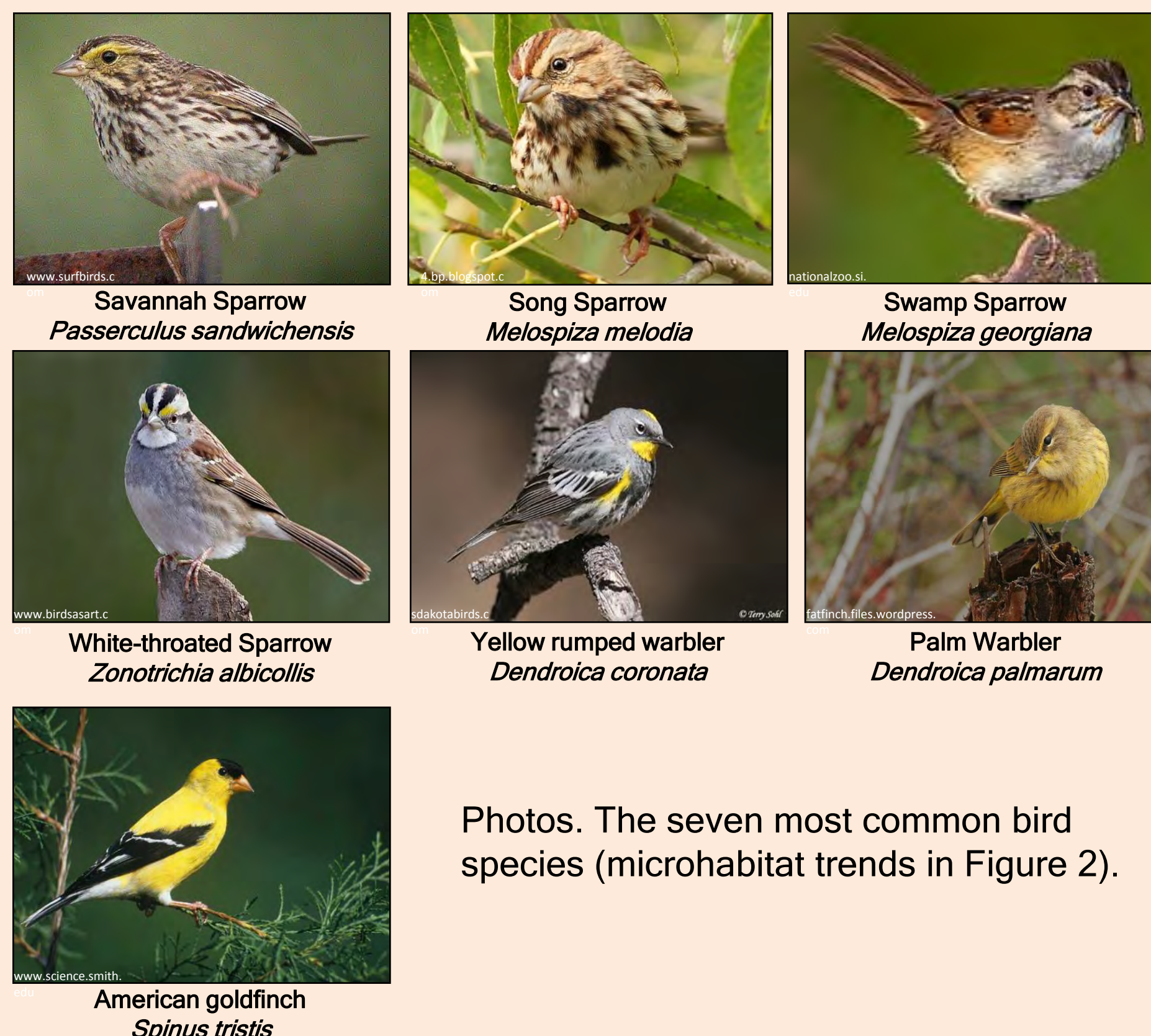
Figure 1. Aerial photo of Erie landfill - mist net locations shown by circles.

Methods

- Study Site: Erie Landfill, Lyndhurst, New Jersey - located along the Atlantic flyway
- Summary of survey effort (9/1 - 11/3 each year):

microhabitat	net hours		
	2008	2009	2010
black locust	437	378	429
Eastern cottonwood	194	193	227
common mugwort	935	960	1375

Table 1. Mist net survey hours per microhabitat across 38, 35 and 37 field days for 2008, 2009 and 2010, respectively.



Photos. The seven most common bird species (microhabitat trends in Figure 2).

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species	2008		2009		2010	
	captures	relative density	captures	relative density	captures	relative density
savannah sparrow	514	25.0 %	700	25.7 %	387	18.0 %
song sparrow	404	19.6 %	470	17.3 %	396	18.4 %
swamp sparrow*	113	5.5 %	412	15.1 %	217	10.1 %
palm warbler	156	7.6 %	306	11.3 %	168	7.8 %
yellow-rumped warbler***	292	14.2 %	116	4.3 %	69	3.2 %
American goldfinch***	17	0.8 %	150	5.5 %	262	12.2 %
white-throated sparrow	91	4.4 %	47	1.7 %	116	5.4 %

Table 2. Most abundant species caught during Fall 2008, Fall 2009 and Fall 2010. Relative density = $n_{\text{species } i} / n_{\text{all species}}$; Significant differences between 2008, 2009, and 2010 relative densities (Chi-square analysis): * = $p < 0.1$; ** = $p < 0.05$; *** = $p < 0.01$.

bunting, indigo	junco, dark-eyed	sparrow, field	warbler, blackpoll
catbird, grey	kinglet, ruby-crowned	sparrow, Lincoln's	warbler, yellow
flycatcher, Traill's	robin, American	sparrow, white-crowned	yellowthroat, common

Table 3. The next 12 most abundant species captured during the study (relative densities > 1.0 %).

bobolink	kestrel, American	Swainson's thrush	warbler, Canada
cardinal, northern	kinglet, golden crowned	swallow, barn	warbler, Cape May
chat, yellow-breasted	mockingbird, northern	thrasher, brown	warbler, magnolia
chickadee, black-capped	ovenbird	thrush, grey-cheeked	warbler, mourning
creep, brown	parula, northern	thrush, hermit	warbler, Nashville
cuckoo, yellow-billed	phoebe, Eastern	titmouse, tufted	warbler, pine
dove, mourning	redstart, American	towhee, Eastern	warbler, prairie
finch, house	red-winged blackbird	veery	warbler, Tennessee
flicker, yellow-shafted	sapsucker, yellow-bellied	vireo, blue-headed	warbler, Wilson's
flycatcher, least	sparrow, chipping	vireo, red-eyed	waterthrush, northern
flycatcher, Willow	sparrow, fox	vireo, warbling	woodpecker, downy
grosbeak, blue	sparrow, grasshopper	vireo, white-eyed	wren, Carolina
grosbeak, rose-breasted	sparrow, saltmarsh sharp tailed	warbler, Connecticut	wren, house
hummingbird, ruby-throated	sparrow, vesper	warbler, black and white	wren, winter
jay, blue	starling, European	warbler, black-throated blue	

Table 4. The 59 less common bird species captured during the study (relative densities < 1.0 %).

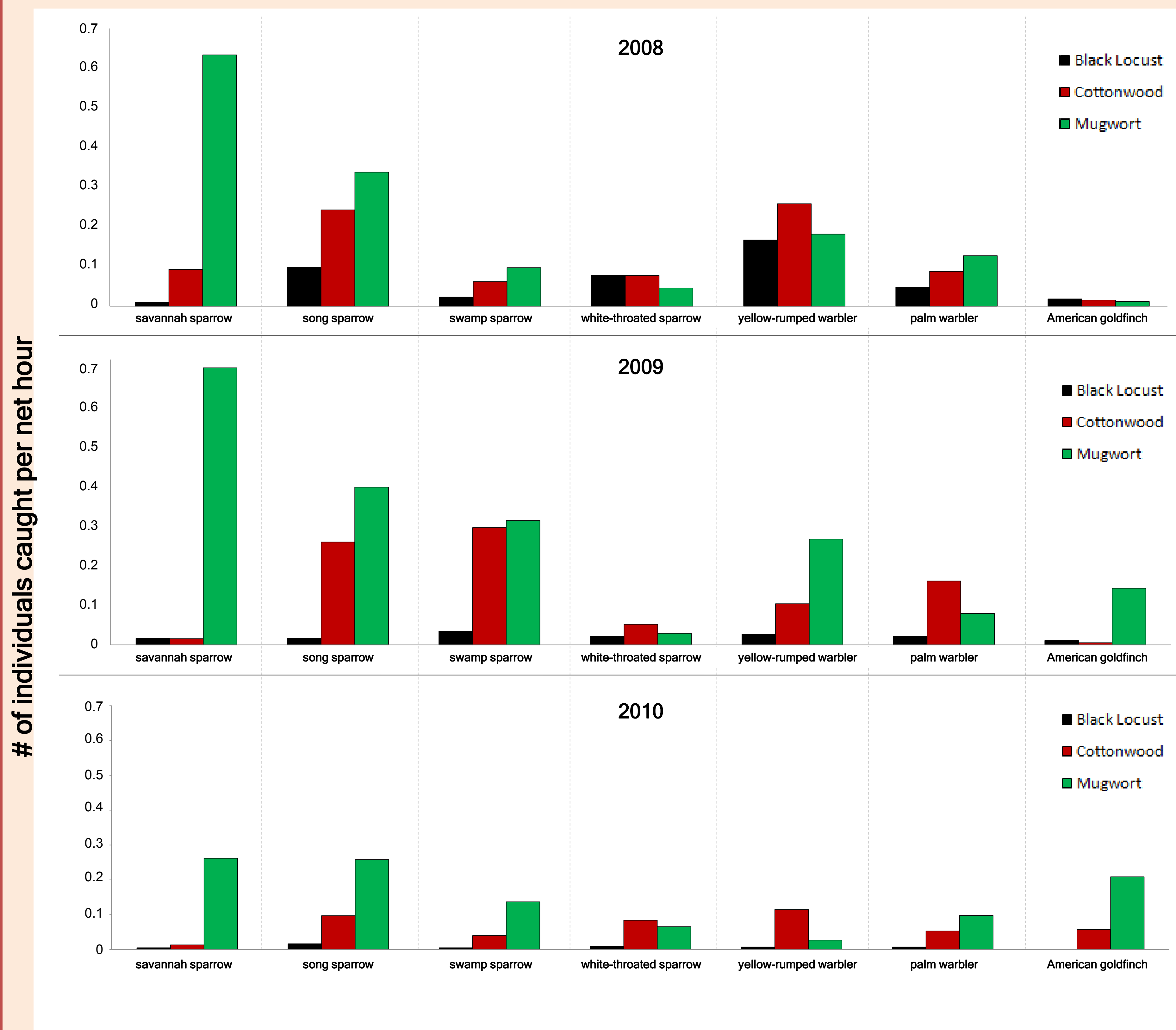


Figure 2. Capture data across the three microhabitats for the seven most common bird species.



Photos: mist net surveys.

Results

- Erie landfill is used by a wide variety of migrating songbird species (Tables 2, 3, 4, 5).
- Sparrow species accounted for 56.2 %, 62.3 %, and 53.4% of the captures respectively for 2008, 2009 and 2010 (species listed in Tables 2, 3, 4).
- Relative densities of some species differed significantly among the study years (Table 2).
- Overall bird activity was highest in the common mugwort habitat, intermediate in the Eastern cottonwood tree patch, and lowest in the black locust tree patch (Table 6).
- All of the common bird species were captured in all three microhabitats. The savannah sparrow was the only species that appeared to be an overwhelming habitat specialist (Figure 2).
- Activity patterns among the microhabitats shifted from year to year for many bird species (Figure 2).

	2008	2009	2010
# of captures	2,058	2,721	2,153
# of species	70	62	69

Table 5. Total numbers of birds and species captured.

Microhabitat	captures per net hour		
	2008	2009	2010
black locust	0.80	0.41	0.19
Eastern cottonwood	1.22	1.37	0.95
common mugwort	1.57	2.40	1.35

Table 6. Capture rates within the different microhabitats.

Implications

- Capped landfills in the New Jersey Meadowlands may serve as important stopover sites for songbirds along the Atlantic flyway.
- The complex trends of microhabitat usage among different songbird species and across different years suggest that microhabitat diversity will best serve restoration efforts that aim to improve habitat for songbirds that use capped landfills as stopover sites during Fall migration.



Erie Landfill

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