

FALL 2009 SONGBIRD BANDING  
KEENE STATE COLLEGE WILDLIFE MANAGEMENT AREA  
KEENE, NH



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## **Summary**

During the fall of 2009, graduate students from Antioch University New England partnered with staff and volunteers from Ashuelot Valley Environmental Observatory to operate a fall migration songbird banding station in Keene, NH for its third season. Up to 14 mist nets were opened each of 22 days of banding, for a total of 767.05 net hours. Over a three month period, 511 birds of 46 species were netted at a capture rate of 0.66 birds per net hour. Of these, 439 were newly banded, 62 were recaptures, and 10 were released unbanded. Gray Catbirds (*Dumetella carolinensis*) were the most frequently captured species, followed by Song Sparrows (*Melospiza melodia*), White-throated Sparrow (*Zonotrichia albicollis*), Black-capped Chickadees (*Poecile atricapillus*) and Myrtle (Yellow-rumped) Warblers (*Dencroica coronata*). Although initial efforts seem to indicate a difference in habitat use by migratory songbirds (between riparian habitat and utility right-of-way corridor) more study is needed to quantify this appreciable difference.

## **Introduction**

Since 2002, Antioch University New England (ANE) and Ashuelot Valley Environmental Observatory (AVEO) have collaboratively operated two bird banding stations in Keene, NH as part of the Monitoring Avian Productivity and Survivorship (MAPS) program, which focuses on breeding birds. Beginning in 2007, banding activities were expanded to include an exploratory fall migration banding project at the Keene State College (KSC) Wildlife Management Area. Adjacent to the KSC athletic complex, the study area spanned floodplain forest habitat and a utility right-of-way (ROW), providing an interesting mosaic of habitat types. Objectives of the study included: 1) to document fall songbird migration in Keene, NH, 2) to determine if a difference existed between the number and species of birds netted in riparian habitat and the utility ROW, and 3) to explore the ways in which birds were moving through the utility ROW by determining direction and height of flight. A pilot effort from August 21<sup>st</sup> to October 10<sup>th</sup> 2007 experimented with net lane placement in the utility ROW. The second year ran from August 10<sup>th</sup> to October 19<sup>th</sup> 2008, during which banding effort was greatly increased. The 2009 season was the most comprehensive to date, with banding session beginning on August 26<sup>th</sup> and concluding on November 21<sup>st</sup> when inclement weather became the norm. In this report, methods and results from the 2009 season are presented with limited comparison to the 2007-2008 seasons.

## Methods

Fourteen mist nets, 12 m in length and of 36 mm mesh size, were opened for two to four hours between 0630 hrs and 1200 hrs on 22 mornings from late August to late November 2009. Five nets were located in floodplain forest and the remainder were placed in a utility ROW. With the exception of rain dates, banding sessions were generally held twice per week. Duration of each banding session was tailored to early morning temperature and frost conditions, as well as inclement weather throughout the morning. Upon capture each bird was labeled with net, net pocket (indicating height of flight) and net side (indicating the direction in which the bird was moving prior to capture) in an attempt to document the particular movements of birds through the ROW and floodplain forest.

Data was collected following MAPS protocol. Each bird was fitted with a uniquely numbered aluminum band issued by the USGS. Birds were identified to species and then examined to determine age, sex, wing length (mm), mass (g), flight feather wear and molt, skull ossification, and body molt. Banding activities were authorized under Master Permit #09996 issued to Dr. Jon Atwood of Antioch University New England.

## Results

*Effort.*—In 22 banding sessions, the combined effort yielded 507 birds netted in just below 770 net hours for a total of 0.66 birds per net hour (Table 1). Net was not recorded for four individuals; these were excluded from effort analysis. Capture rate differed between the two habitat types, at 0.30 birds per net hour (mean 48.26 net hours) in the floodplain forest and 0.83 birds per net hour (mean 58.42 net hours) in the utility right-of-way.

Table 1. Netting effort and capture rate by habitat type for 2009 fall banding in Keene, NH.

Habitat	# Nets	# Net Hours	Mean Net Hours ( $\pm 2SE$ )	# Birds	Birds/Net Hour
Riparian	5	241.30	48.26 (28.28, 68.24)	434	0.30
Utility ROW	9	525.75	58.42 (41.16, 75.67)	73	0.83
Total	14	767.05	54.79 (43.02, 66.56)	507*	0.66

\* Net was not recorded for four individuals, accounting for the discrepancy between total birds included in effort analysis and the total number of birds (511) netted.

*Birds netted.*—In all, 511 individuals of 46 species were netted, and of these 439 were newly banded, 62 were recaptures and 10 were released unbanded. Gray Catbirds (*Dumetella carolinensis*) were the most frequently captured species (0.16 birds/net hr, n=122), followed by Song Sparrows (*Melospiza melodia*; 0.08 birds/net hr, n=64), White-throated Sparrows (*Zonotrichia albicollis*; 0.07 birds/net hr, n=52), Black-capped Chickadees (*Poecile atricapillus*; 0.06 birds/net hr, n=47), and Myrtle (Yellow-rumped) Warblers (*Dencroica coronata*; 0.05 birds/net hr, n=37). For the remaining species, capture rate was below 0.03 birds/net hr, which equates to less than 20 individuals (Figure 1).

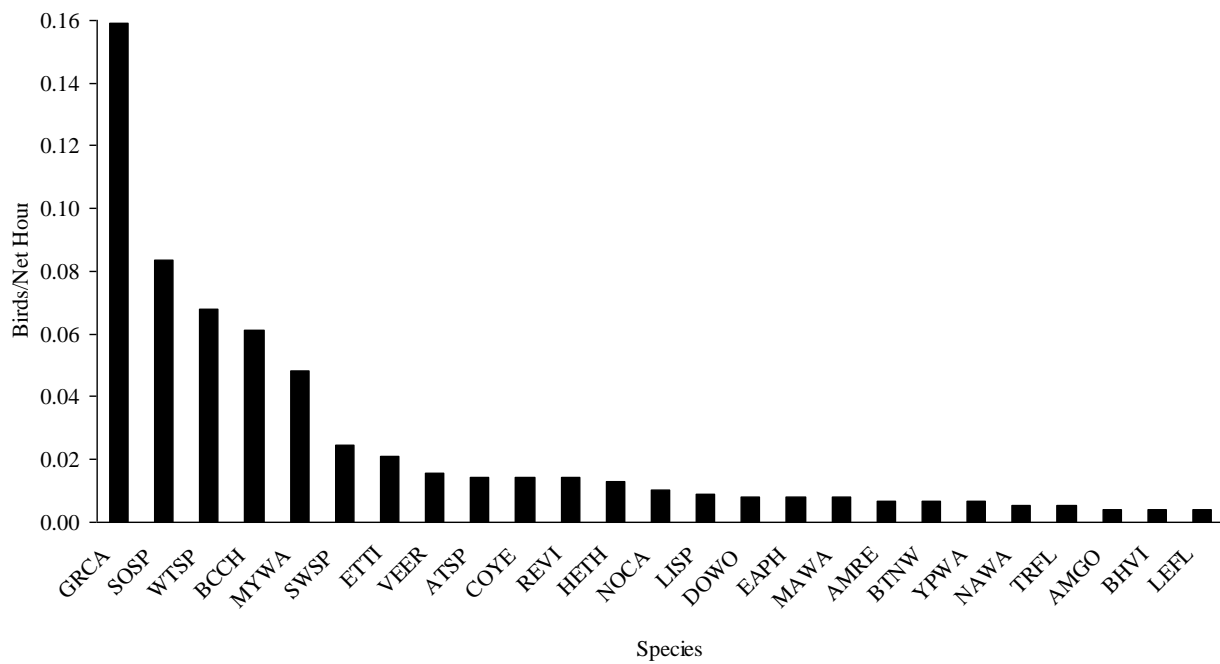


Figure 1. Capture rate (birds per net hour) of the 25 most frequently captured species during fall 2009 songbird banding in Keene, NH. For species codes, refer to Table A-3.

*Capture height and direction.*—Height of capture and direction of flight (prior to capture) were noted for 436 of the 511 birds netted. Of these 117 were netted between 0m and 0.5 m, 144 between 0.5m and 1m, 127 between 1m and 1.5m and 48 between 1.5 and 2m. Of 433 birds with direction noted, 184 were netted from the West side of the net, 152 from the East, 50 from the South and 47 from the North.

*Comparison to 2007 and 2008.*—The number of birds netted in each of the three fall migration seasons, 2007-2009, was compared for the ten species with the highest capture rate. In 2008 and

2009, Catbirds and Song Sparrows were netted most often, while in 2007 White-throated Sparrows were more prevalent than these two species (Figure 2). Capture rate for 2007 and 2008 could not be determined due to lack of data, and the smaller number of birds netted in 2007 likely stems from lower effort rather than an actual disparity in the number of birds netted.

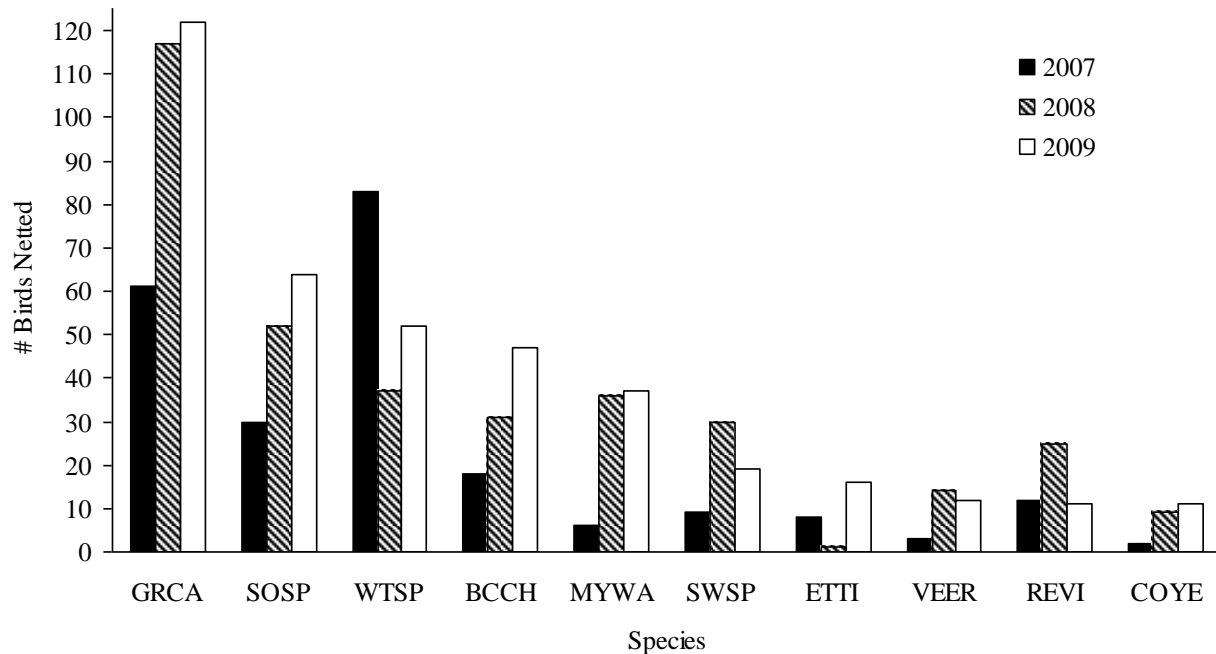


Figure 2. Comparison of the number of birds netted during fall migration banding efforts in 2007, 2008 and 2009 for the top ten most frequently netted species.

### Discussion

Each year, the fall migration banding project has expanded in terms of effort, number of species netted, and total number of birds netted. Over three years, casual observations continue to indicate that more birds are using utility ROWs than riparian habitat during fall migration, and banding data seems to support that finding. The banding project has continued to build on the exploratory effort in 2007 in order to provide a strong dataset to allow future analysis of this issue, and to explore potential factors driving songbirds’ disparate use of the two habitat types during fall migration.

Although the 2009 season represented the most thorough effort yet, there are several opportunities to improve and expand methodology in order to obtain statistically significant data in support of current and additional study objectives. First, future seasons should minimize the difference in effort between the two habitats included in the study area. In part, the discrepancy

in capture effort stemmed from site conditions (e.g. flooding) that restricted access to net lanes. At a minimum, the number of nets in the riparian habitat should be increased to distribute effort equally between the two habitat types. Second, further study could elucidate differences in the way that migratory songbirds are using the two habitats by continuing to collect data on direction and height of flight. Third, a detailed comparison of vegetation structure, food resources, and other factors may help to explain the observation of more birds using the utility ROW rather than the adjacent riparian habitat. Here, it may be worth exploring the current vegetation management (mowing regime) practiced annually in this ROW. Finally, several short-term trends have emerged in the dataset, including the increase in Song Sparrow capture, and the change in the number of White-throated Sparrows across the three years of study. Although short-term trends are difficult to interpret, it may be worth exploring capture rate of these species in the future. In addressing these, and other, research ideas, we can continue to contribute to the understanding of songbird migration, and, more specifically, to songbird use of these two intriguing habitats.

### **Acknowledgements**

Fall banding would not have been possible without the contributions of Master Permit holder Dr. Jon Atwood of Antioch University New England and David Moon, Executive Director of Ashuelot Valley Environmental Observatory. Banding was coordinated and by AVEO Program Director Kate Yard and by ANE Research Assistants Meghan Powell and Maggie Vinson. Volunteers including Maki Briggs, Phillip Howard, Ken Klapper, Tyler Maikath, Byard Miller, Polly Pattison, Ernesto Ruelas, Mike Sharon, Sally Sims, Gabe Stalberg, Matt Walter, Tom Warren and Elise White brought their time, energy and enthusiasm for banding and were not deterred by early morning start times, stinging yellow jackets, persistent mosquitoes, persnickety weather, and flooded net lanes. Thank you!

## Appendix A: Supporting Data

Table A-1. Distribution of netting effort over the 14 nets used in fall 2009 songbird banding in Keene, NH. Note that four birds did not have a net recorded, and were excluded from analysis.

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<b>Net</b>	<b>Hours Open</b>	<b># Birds</b>	<b>Birds/Net hour</b>
1	58.90	27	0.46
2	58.90	7	0.12
3	41.20	21	0.51
4	23.00	9	0.39
5	59.30	9	0.15
11	36.00	23	0.64
12	72.25	59	0.82
13	69.00	66	0.96
14	74.70	66	0.88
15	74.20	59	0.80
16	74.20	84	1.13
17	27.70	30	1.08
19	74.70	44	0.59
20	23.00	3	0.13
<b>Total</b>	<b>767.05</b>	<b>507</b>	<b>0.66</b>

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Table A-2. List of species observed and/or banded at the KSC Wildlife Management Area, Keene, NH in fall 2009.

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Alder Flycatcher *	Eastern Phoebe *	Red-winged Blackbird
American Crow	Eastern Tufted Titmouse *	Rose-breasted Grosbeak
American Goldfinch *	Eastern Wood Pewee	Ruby-crowned Kinglet *
American Redstart *	European Starling	Ruby-throated Hummingbird*
American Robin	Evening Grosbeak	Savannah Sparrow *
American Tree Sparrow *	Fox Sparrow *	Scarlet Tanager
American Woodcock	Golden-crowned Kinglet *	Sharp-shinned Hawk
Baltimore Oriole	Gray Catbird*	Slate-colored Junco
Belted Kingfisher	Great Blue Heron	Solitary Sandpiper
Black-and-white Warbler *	Hairy Woodpecker	Song Sparrow*
Black-billed Cuckoo *	Hermit Thrush *	Swainson's Thrush*
Black-capped Chickadee *	Killdeer	Swamp Sparrow *
Blackpoll Warbler *	Least Flycatcher *	Trail's Flycatcher*
Black-throated Green Warbler *	Lincoln's Sparrow *	Turkey Vulture
Blue Jay *	Magnolia Warbler	Unknown Accipiter
Blue-headed Vireo *	Mallard	Unknown Sparrow *
Bobolink	Merlin	Veery*
Broad-winged Hawk	Mourning Dove	Warbling Vireo
Brown Creeper	Myrtle Warbler *	White-breasted Nuthatch *
Canada Goose	Nashville Warbler *	White-throated Sparrow*
Cape May Warbler	Northern Cardinal *	Willow Flycatcher*
Cedar Waxwing *	Northern Parula *	Wilson's Warbler *
Chestnut-sided Warbler *	Northern Waterthrush *	Wood Duck
Chipping Sparrow	Osprey	Wood Thrush *
Common Grackle	Ovenbird *	Yellow Palm Warbler *
Common Raven	Philadelphia Vireo *	Yellow-bellied Flycatcher *
Common Yellowthroat *	Pileated Woodpecker	Yellow-bellied Sapsucker
Cooper's Hawk	Red-breasted Nuthatch	Yellow-breasted Chat
Downy Woodpecker *	Red-eyed Vireo *	Yellow-shafted Flicker
Eastern Bluebird	Red-tailed Hawk	

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\* indicates that one or more individuals of that species was netted.



Table A-3. Comparison of the number of individuals netted, by species, during fall migration banding from 2007-2009 at the KSC Wildlife Management Area, Keene, NH.

<b>Species</b>	<b>Code</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
Alder Flycatcher	ALFL	0	0	1
American Goldfinch	AMGO	4	3	3
American Redstart	AMRE	2	4	5
American Robin	AMRO	0	1	0
American Tree Sparrow	ATSP	0	0	11
Black-and-white Warbler	BAWW	1	3	1
Black-billed Cuckoo	BBCU	0	0	1
Black-capped Chickadee	BCCH	18	31	47
Blackpoll Warbler	BLPW	2	1	1
Black-throated Blue Warbler	BTBW	1	4	0
Black-throated Green Warbler	BTNW	0	2	5
Blue Jay	BLJA	0	0	2
Blue-headed Vireo	BHVI	1	0	3
Brown Thrasher	BRTH	0	2	0
Cedar Waxwing	CEDW	0	1	1
Chestnut-sided Warbler	CSWA	3	1	2
Chipping Sparrow	CHSP	0	4	0
Common Yellowthroat	COYE	2	9	11
Connecticut Warbler	CONW	1	0	0
Downy Woodpecker	DOWO	1	0	6
Eastern Phoebe	EAPH	2	6	6
Eastern Towhee	EATO	0	1	0
Eastern Tufted Titmouse	ETTI	8	1	16
Fox Sparrow	FOSP	0	0	1
Golden-crowned Kinglet	GCKI	0	0	1
Gray Catbird	GRCA	61	117	122
Hairy Woodpecker	HAWO	1	1	0
Hermit Thrush	HETH	0	4	10
Indigo Bunting	INBU	2	1	0
Least Flycatcher	LEFL	2	2	3
Lincoln's Sparrow	LISP	2	4	7
Magnolia Warbler	MAWA	0	2	6
Myrtle Warbler	MYWA	6	36	37
Nashville Warbler	NAWA	1	0	4
Northern Cardinal	NOCA	0	1	8
Northern Parula	NOPA	0	2	2
Northern Waterthrush	NOWA	1	0	2
Ovenbird	OVEN	0	3	2
Philadelphia Vireo	PHVI	1	0	1
Purple Finch	PUFI	11	0	0
Red-eyed Vireo	REVI	12	25	11
Rose-breasted Grosbeak	RBGR	0	1	0

<b>Species</b>	<b>Code</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
Ruby-crowned Kinglet	RCKI	0	0	2
Ruby-throated Hummingbird	RTHU	0	2	1
Savannah Sparrow	SAVS	0	0	2
Scarlet Tanager	SCTA	2	0	0
Song Sparrow	SOSP	30	52	64
Swainson's Thrush	SWTH	0	2	2
Swamp Sparrow	SWSP	9	30	19
Tennessee Warbler	TEWA	0	1	0
Trail's Flycatcher	TRFL	3	4	4
Unknown Sparrow	UNSP	0	0	1
Veery	VEER	3	14	12
Warbling Vireo	WAVI	1	1	0
White-breasted Nuthatch	WBNU	0	0	1
White-crowned Sparrow	WCSP	4	2	0
White-throated Sparrow	WTSP	83	37	52
Willow Flycatcher	WIFL	2	2	1
Wilson's Warbler	WIWA	1	1	2
Wood Thrush	WOTH	0	0	3
Yellow Palm Warbler	YPWA	4	2	5
Yellow Warbler	YWAR	0	1	0
Yellow-bellied Flycatcher	YBFL	0	0	1
Yellow-bellied Sapsucker	YBSA	0	1	0
<b>TOTAL</b>		<b>288</b>	<b>425</b>	<b>511</b>

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