

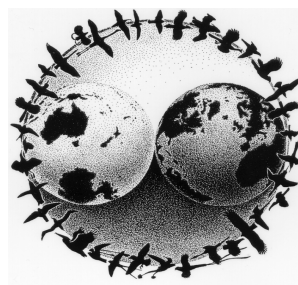
**Modeling Overwintering Survival of Declining Landbirds:
Monitoring Results from the
January, February, and March Pulses for the 2005-06
Monitoring Avian Winter Survival (MAWS) Program
on DOD Installations in Southeastern United States**

**Technical Report
to the Legacy Resources Management Program
for DoD Legacy Project Number 05-186**

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Report on Monitoring Results from the January, February, and March 2006 Pulses

I am pleased to report that as of March 31, 2006, we completed the 2005-06 field season of the Monitoring Avian Winter Survival (MAWS) project on four military installations in the southeastern United States; Fort Chaffee and Camp Joseph Robinson in Arkansas, Fort Bragg in North Carolina, and Fort Benning in Georgia. In particular, we completed (1) the January, February, and March banding pulses, (2) extensive resighting efforts for color-banded birds, (3) residency status lists, and (4) detailed vegetation descriptions and maps for each of the installations. We provide a brief summary of these activities and preliminary results here.

We completed the January, February, and March pulses on schedule at each of the six stations on each of the four installations. We captured 32 species at Fort Chaffee, 29 species at Camp Robinson, 37 species at Fort Bragg, and 32 at Fort Benning during these late season (January-March) pulses. Tables 1a-d present a summary of mist-netting effort and a preliminary summary of the numbers of birds newly banded, released unbanded, and recaptured with bands during the January, February, and March pulses for each winter season that the MAWS project has been in operation. We present data for 18 commonly-captured target species (as in previous reports), as well as for all species pooled.

Late-season mist-netting efforts at Forts Chaffee and Bragg were similar to that recorded in the previous (2004-05) field season. A similar level of effort was logged at Fort Benning, although this total was down slightly from the previous season. Our goal of attaining at least 60% of the maximum possible effort (3110 net-hours, based on 16 nets operated for 6 hrs/d on 3 d per pulse at each station) was exceeded at all three of these installations (Table 1). Effort was slightly lower at Fort Robinson, where severe weather – mainly in the form of persistent strong winds – prevented attainment of the 60% goal (56% of the maximum possible effort was recorded there). At the four locations combined, however, we achieved nearly 61% of the maximum-attainable effort (12,780 net-hours), thus meeting our overall effort goal.

Overall, captures were slightly higher in the January-March pulses in 2006 than in 2005 at the Arkansas installations, although capture rates were still quite low compared to captures during these months in the first MAWS season (2003-04). The relatively low capture rates observed during the early-season 2005-06 (Nov-Dec 2005) pulses on Forts Benning and Bragg continued during January-March. Late-season capture rates (including both newly-banded birds and recaptures) were down 45% and 58% at Forts Benning and Bragg, respectively. Low capture rates on these two installations could reflect real population declines; however, they could also reflect an overall mild winter in the region. Mild winter weather could have resulted in low capture rates due to larger-than-normal numbers of birds wintering farther north (or at higher altitudes) or to relatively low activity levels of birds that did overwinter at these sites (activity levels tend to increase at lower temperatures). Additional years of monitoring should shed light on whether observed capture declines reflect climate variation or real population declines.

The success of resighting efforts varied tremendously among locations. The experience of the crews, habitats present, and the time that was able to be devoted to resighting all contributed to this variation. Effort (for the entire 2005-06 season) varied from a low of 14 person-hrs at Ft. Benning to a high of 135 person-hrs at Fort Chaffee. The amount of effort devoted to resighting

varied inversely with mist-netting effort. (Thus, while the number of net-hours was a little shy of our target for Chaffee during the late season pulses, this effort was diverted to resighting birds.) The number of resightings was low at Forts Benning and Bragg (8 resightings combined) where little resighting effort was expended (40 person-hrs combined) and high at Fort Chaffee and Camp Robinson (172 resightings) where considerable effort was devoted to resighting (303 person-hrs combined). A multiple regression model that included 'installation' (which incorporates both habitat and crew effects) and 'effort' (no. person-hours spent looking for birds) effects explained 86% of the variation in the number of birds resighted among location-pulses (each pulse at each location was considered an independent observation). Both 'installation' and 'effort' effects were highly significant ($P < 0.02$ and $P < 0.001$ respectively). There was no indication that the effort effect levels off within the range of effort values that were expended here, suggesting that as much effort should be devoted to resighting as is possible. It must be stressed, however, that this analysis *treats all resightings equally* (i.e., an individual resighted n times is counted n times); it is possible that the numbers of *unique between-pulse resightings* (i.e., resightings that contribute survival information) level off at some effort level well-within the range we considered. Furthermore, our analysis does not indicate the amount of information that is duplicated by recapture data. It could very well be (as there was some indication of last year) that these resightings contribute relatively little useful new information for survival analyses. We leave further consideration of this matter to the survival analyses that will be presented in the annual report.

Residency status lists completed during 2005-06 are enabling a more complete description of the avian communities at each installation. In addition, these lists are contributing to advancing knowledge about winter distributions of many species. For example, Henslow's Sparrows were observed at a Fort Chaffee MAWS station ('Spizella') in February. The northern range limit of this secretive species in winter is not well known; however, Fort Chaffee is generally considered to be well to the north of its typical winter range. In addition to residency status lists, we completed our second season of detailed vegetation mapping and vegetation structure assessments for each of the 24 MAWS stations. As was the case last year, the field biologists and field biologist interns reported that they believed that the vegetation structure assessments that they completed provided an accurate assessment of the vegetation composition and structure at each station. We look forward to inputting these data into the computer and including aspects of these data as covariates in mark-recapture models of overwintering apparent survival of the various target species.

All of us here at IBP are grateful for the funding and opportunity to conduct this important research in conjunction with the Legacy Resources Management Program. The data being generated by the MAWS project on these four southeastern U. S. military installations is contributing greatly to our general knowledge of the winter ecology of these bird species (including several species of declining sparrows), and is providing important baseline data on the population status and demography of these birds on these military installations. We are very pleased with the progress of the project to date, and look forward to constructing survival-habitat models that will help the Department of Defense manage lands both for healthy bird populations and for improved Military Readiness and Range Sustainment. Thank you very much.

Table 1a. Comparison of Jan-Mar captures per 100 net hours between 2004, 2005 and 2006 at MAWS stations on Fort Chaffee, Arkansas. N= number of newly banded birds, U = number of birds released unbanded, R= number of recaptures. Numbers in parentheses represent total number of captures in each category.

Species	Jan-Mar 2004			Jan-Mar 2005			Jan-Mar 2006		
	N	U	R	N	U	R	N	U	R
Carolina chickadee	1.19 (39)	0.27 (9)	0.73 (24)	0.53 (20)	0.05 (2)	1.20 (45)	0.65 (23)	0.03 (1)	0.56 (20)
Tufted titmouse	1.19 (39)	0.12 (4)	0.70 (23)	0.35 (13)	0.00 (0)	0.59 (22)	0.62 (22)	0.00 (0)	0.48 (17)
Carolina wren	0.21 (7)	0.00 (0)	0.27 (9)	0.05 (2)	0.03 (1)	0.24 (9)	0.11 (4)	0.06 (2)	0.11 (4)
Ruby-crowned kinglet	0.52 (17)	0.21 (7)	0.27 (9)	0.69 (26)	0.08 (3)	0.82 (31)	0.36 (13)	0.03 (1)	0.48 (17)
Hermit thrush	0.52 (17)	0.06 (2)	1.25 (41)	0.43 (16)	0.03 (1)	0.96 (36)	0.62 (22)	0.00 (0)	1.66 (59)
Northern mockingbird	0.24 (8)	0.00 (0)	0.15 (5)	0.05 (2)	0.03 (1)	0.21 (8)	0.14 (5)	0.00 (0)	0.06 (2)
Brown thrasher	0.27 (9)	0.00 (0)	0.18 (6)	0.29 (11)	0.03 (1)	0.21 (8)	0.51 (18)	0.03 (1)	0.42 (15)
Yellow-rumped warbl.	0.98 (32)	0.73 (24)	0.00 (0)	0.11 (4)	0.00 (0)	0.00 (0)	0.39 (14)	0.00 (0)	0.06 (2)
Common yellowthroat	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Chipping sparrow	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Field sparrow	3.41 (112)	0.00 (0)	1.22 (40)	0.27 (10)	0.00 (0)	0.19 (7)	0.81 (29)	0.00 (0)	0.73 (26)
Savannah sparrow	0.18 (6)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Fox sparrow	1.16 (38)	0.03 (1)	0.46 (15)	0.90 (34)	0.03 (1)	0.27 (10)	0.25 (9)	0.00 (0)	0.31 (11)
Song sparrow	2.10 (69)	0.21 (7)	0.73 (24)	0.19 (7)	0.05 (2)	0.61 (23)	0.39 (14)	0.03 (1)	1.12 (40)
Swamp sparrow	0.43 (14)	0.00 (0)	0.12 (4)	0.16 (6)	0.00 (0)	0.27 (10)	0.17 (6)	0.00 (0)	0.03 (1)
White-throated sparrow	5.09 (167)	0.09 (3)	1.83 (60)	2.13 (80)	0.03 (1)	1.94 (73)	2.22 (79)	0.06 (2)	2.47 (88)
Dark-eyed junco	4.45 (146)	0.15 (5)	0.82 (27)	0.51 (19)	0.00 (0)	0.53 (20)	2.58 (92)	0.14 (5)	2.02 (72)
Northern cardinal	2.01 (66)	0.09 (3)	0.67 (22)	0.64 (24)	0.03 (1)	0.66 (25)	1.07 (38)	0.00 (0)	0.65 (23)
All captures	28.41 (932)	2.35 (77)	9.48 (311)	9.04 (340)	0.40 (15)	8.99 (338)	12.07 (430)	0.51 (18)	11.37 (405)
Total net hours	3280			3760			3563		

Table 1b. Comparison of Jan-Mar captures per 100 net hours between 2004, 2005 and 2006 at MAWS stations on Camp Robinson, Arkansas. N= number of newly banded birds, U = number of birds released unbanded, R= number of recaptures. Numbers in parentheses represent total number of captures in each category.

Species	Jan-Mar 2004			Jan-Mar 2005			Jan-Mar 2006		
	N	U	R	N	U	R	N	U	R
Carolina chickadee	3.30 (43)	0.15 (2)	0.69 (9)	0.89 (32)	0.08 (3)	0.67 (24)	0.28 (8)	0.00 (0)	1.15 (33)
Tufted titmouse	2.91 (38)	0.00 (0)	0.69 (9)	1.48 (53)	0.06 (2)	2.51 (90)	0.45 (13)	0.00 (0)	0.73 (21)
Carolina wren	1.15 (15)	0.31 (4)	0.46 (6)	0.34 (12)	0.03 (1)	0.59 (21)	0.42 (12)	0.00 (0)	0.62 (18)
Ruby-crowned kinglet	1.69 (22)	0.31 (4)	1.23 (16)	0.45 (16)	0.03 (1)	0.64 (23)	0.42 (12)	0.00 (0)	0.62 (18)
Hermit thrush	2.68 (35)	0.00 (0)	0.77 (10)	0.56 (20)	0.00 (0)	2.32 (83)	0.94 (27)	0.00 (0)	1.70 (49)
Northern mockingbird	0.15 (2)	0.00 (0)	0.00 (0)	0.03 (1)	0.03 (1)	0.17 (6)	0.00 (0)	0.00 (0)	0.00 (0)
Brown thrasher	1.61 (21)	0.08 (1)	1.00 (13)	0.39 (14)	0.06 (2)	0.34 (12)	0.38 (11)	0.00 (0)	0.52 (15)
Yellow-rumped warbl.	1.00 (13)	0.00 (0)	0.08 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.56 (16)	0.00 (0)	0.14 (4)
Common yellowthroat	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Chipping sparrow	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Field sparrow	1.76 (23)	0.23 (3)	0.38 (5)	0.28 (10)	0.00 (0)	0.36 (13)	0.31 (9)	0.00 (0)	0.28 (8)
Savannah sparrow	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Fox sparrow	0.23 (3)	0.00 (0)	0.08 (1)	0.11 (4)	0.00 (0)	0.03 (1)	0.35 (10)	0.00 (0)	0.17 (5)
Song sparrow	5.75 (75)	0.23 (3)	0.69 (9)	0.59 (21)	0.00 (0)	0.31 (11)	0.42 (12)	0.00 (0)	0.31 (9)
Swamp sparrow	1.23 (16)	0.08 (1)	0.23 (3)	0.20 (7)	0.00 (0)	0.17 (6)	0.00 (0)	0.03 (1)	0.07 (2)
White-throated sparrow	17.16 (224)	0.77 (10)	3.98 (52)	2.12 (76)	0.00 (0)	2.23 (80)	5.28 (152)	0.42 (12)	4.79 (138)
Dark-eyed junco	1.61 (21)	0.69 (9)	0.23 (3)	0.08 (3)	0.00 (0)	0.06 (2)	0.31 (9)	0.00 (0)	0.21 (6)
Northern cardinal	3.91 (51)	0.08 (1)	0.77 (10)	0.53 (19)	0.03 (1)	0.45 (16)	1.25 (36)	0.00 (0)	0.83 (24)
All captures	51.88 (677)	3.37 (44)	12.03 (157)	10.39 (372)	0.45 (16)	11.39 (408)	13.92 (401)	0.69 (20)	13.05 (376)
Total net hours	1305			3581			2881		

Table 1c. Comparison of Jan-Mar captures per 100 net hours between 2004, 2005 and 2006 at MAWS stations on Fort Benning, Georgia. N= number of newly banded birds, U = number of birds released unbanded, R= number of recaptures. Numbers in parentheses represent total number of captures in each category.

Species	Jan-Mar 2004			Jan-Mar 2005			Jan-Mar 2006		
	N	U	R	N	U	R	N	U	R
Carolina chickadee	0.81 (16)	0.00 (0)	0.05 (1)	0.38 (16)	0.00 (0)	0.41 (17)	0.19 (7)	0.00 (0)	0.54 (20)
Tufted titmouse	0.66 (13)	0.05 (1)	0.15 (3)	0.31 (13)	0.00 (0)	0.00 (0)	0.19 (7)	0.00 (0)	0.19 (7)
Carolina wren	0.41 (8)	0.00 (0)	0.56 (11)	0.29 (12)	0.00 (0)	0.58 (24)	0.24 (9)	0.03 (1)	0.35 (13)
Ruby-crowned kinglet	0.46 (9)	0.00 (0)	0.15 (3)	0.43 (18)	0.02 (1)	0.89 (37)	0.56 (21)	0.00 (0)	0.83 (31)
Hermit thrush	0.30 (6)	0.00 (0)	0.05 (1)	0.17 (7)	0.00 (0)	0.19 (8)	0.05 (2)	0.00 (0)	0.05 (2)
Northern mockingbird	0.25 (5)	0.00 (0)	0.15 (3)	0.07 (3)	0.00 (0)	0.12 (5)	0.05 (2)	0.03 (1)	0.03 (1)
Brown thrasher	0.05 (1)	0.00 (0)	0.00 (0)	0.07 (3)	0.00 (0)	0.12 (5)	0.05 (2)	0.00 (0)	0.03 (1)
Yellow-rumped warbl.	1.68 (33)	0.00 (0)	0.05 (1)	1.06 (44)	0.00 (0)	0.48 (20)	1.16 (43)	0.00 (0)	0.22 (8)
Common yellowthroat	0.71 (14)	0.00 (0)	0.51 (10)	0.36 (15)	0.00 (0)	0.55 (23)	0.32 (12)	0.03 (1)	0.46 (17)
Chipping sparrow	5.18 (102)	0.10 (2)	0.05 (1)	1.56 (65)	0.02 (1)	0.07 (3)	0.08 (3)	0.00 (0)	0.00 (0)
Field sparrow	3.10 (61)	0.00 (0)	1.42 (28)	1.40 (58)	0.02 (1)	2.00 (83)	0.73 (27)	0.03 (1)	0.51 (19)
Savannah sparrow	1.02 (20)	0.00 (0)	0.46 (9)	1.40 (58)	0.00 (0)	0.82 (34)	0.11 (4)	0.00 (0)	0.00 (0)
Fox sparrow	0.36 (7)	0.00 (0)	0.00 (0)	0.36 (15)	0.00 (0)	0.05 (2)	0.11 (4)	0.00 (0)	0.00 (0)
Song sparrow	1.83 (36)	0.05 (1)	1.12 (22)	0.91 (38)	0.02 (1)	0.99 (41)	0.40 (15)	0.00 (0)	0.51 (19)
Swamp sparrow	2.03 (40)	0.05 (1)	1.17 (23)	1.18 (49)	0.00 (0)	2.19 (91)	0.59 (22)	0.05 (2)	0.91 (34)
White-throated sparrow	1.78 (35)	0.00 (0)	0.36 (7)	2.98 (124)	0.00 (0)	2.07 (86)	0.83 (31)	0.08 (3)	0.67 (25)
Dark-eyed junco	0.86 (17)	0.05 (1)	0.10 (2)	0.51 (21)	0.00 (0)	0.07 (3)	0.00 (0)	0.00 (0)	0.00 (0)
Northern cardinal	0.81 (16)	0.00 (0)	0.05 (1)	0.84 (35)	0.00 (0)	0.31 (13)	0.78 (29)	0.03 (1)	0.24 (9)
All captures	25.05 (493)	0.46 (9)	6.61 (130)	18.57 (772)	0.22 (9)	12.68 (527)	8.23 (306)	0.46 (17)	5.97 (222)
Total net hours	1968			4157			3719		

Table 1d. Comparison of Jan-Mar captures per 100 net hours between 2004, 2005 and 2006 at MAWS stations on Fort Bragg, North Carolina. N= number of newly banded birds, U = number of birds released unbanded, R= number of recaptures. Numbers in parentheses represent total number of captures in each category.

Species	Jan-Mar 2004			Jan-Mar 2005			Jan-Mar 2006		
	N	U	R	N	U	R	N	U	R
Carolina chickadee	0.37 (5)	0.07 (1)	0.52 (7)	0.53 (17)	0.00 (0)	0.56 (18)	0.65 (21)	0.00 (0)	0.50 (16)
Tufted titmouse	0.45 (6)	0.00 (0)	0.00 (0)	0.56 (18)	0.00 (0)	0.41 (13)	0.47 (15)	0.00 (0)	0.19 (6)
Carolina wren	0.60 (8)	0.00 (0)	0.45 (6)	0.22 (7)	0.00 (0)	0.47 (15)	0.19 (6)	0.06 (2)	0.37 (12)
Ruby-crowned kinglet	2.40 (32)	0.00 (0)	2.99 (40)	2.16 (69)	0.22 (7)	2.82 (90)	0.68 (22)	0.06 (2)	1.40 (45)
Hermit thrush	0.60 (8)	0.00 (0)	1.05 (14)	0.50 (16)	0.00 (0)	1.19 (38)	0.22 (7)	0.00 (0)	0.78 (25)
Northern mockingbird	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (2)	0.06 (2)	0.00 (0)	0.06 (2)
Brown thrasher	0.07 (1)	0.00 (0)	0.15 (2)	0.22 (7)	0.00 (0)	0.06 (2)	0.09 (3)	0.00 (0)	0.03 (1)
Yellow-rumped warbl.	0.60 (8)	0.30 (4)	0.30 (4)	0.03 (1)	0.00 (0)	0.00 (0)	0.84 (27)	0.00 (0)	0.03 (1)
Common yellowthroat	0.07 (1)	0.00 (0)	0.07 (1)	0.03 (1)	0.00 (0)	0.06 (2)	0.09 (3)	0.00 (0)	0.00 (0)
Chipping sparrow	5.31 (71)	0.00 (0)	0.52 (7)	4.17 (133)	0.16 (5)	0.53 (17)	1.77 (57)	0.03 (1)	0.22 (7)
Field sparrow	4.34 (58)	0.00 (0)	1.42 (19)	2.60 (83)	0.03 (1)	1.38 (44)	1.62 (52)	0.06 (2)	1.24 (40)
Savannah sparrow	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (1)	0.00 (0)	0.00 (0)
Fox sparrow	0.15 (2)	0.00 (0)	0.00 (0)	0.03 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Song sparrow	1.95 (26)	0.07 (1)	1.05 (14)	1.79 (57)	0.00 (0)	1.19 (38)	0.56 (18)	0.06 (2)	0.65 (21)
Swamp sparrow	1.27 (17)	0.00 (0)	0.67 (9)	1.04 (33)	0.09 (3)	1.10 (35)	0.56 (18)	0.03 (1)	1.09 (35)
White-throated sparrow	1.87 (25)	0.07 (1)	1.42 (19)	0.75 (24)	0.03 (1)	1.19 (38)	0.59 (19)	0.03 (1)	0.50 (16)
Dark-eyed junco	5.16 (69)	0.00 (0)	1.12 (15)	2.95 (94)	0.03 (1)	1.19 (38)	0.84 (27)	0.03 (1)	0.22 (7)
Northern cardinal	0.97 (13)	0.07 (1)	0.90 (12)	0.41 (13)	0.13 (4)	0.22 (7)	0.22 (7)	0.00 (0)	0.22 (7)
All captures	31.29 (418)	1.35 (18)	13.32 (178)	21.86 (697)	0.72 (23)	14.05 (448)	12.15 (391)	0.50 (16)	8.58 (276)
Total net hours	1336			3188			3217		