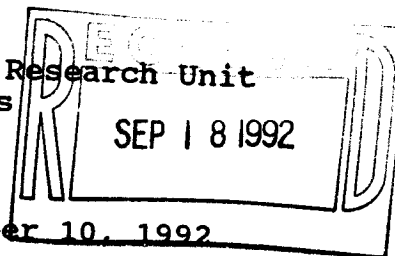




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United States Department of the Interior
FISH AND WILDLIFE SERVICE



Georgia Cooperative Fish and Wildlife Research Unit
School of Forest Resources
University of Georgia
Athens, GA 30602



MEMORANDUM

September 10, 1992

To: E. Frank Bowers (Refuges and Wildlife Region IV)
R. Jachowski (Migratory Birds, PWRC)
From: Michael J. Conroy, Georgia CFWRU *mjc*
Subject: Annual Report

*CC RF, NAT,
TN & CC*

12-2-92

DAILY MOVEMENTS, HABITAT USE, AND MORTALITY FACTORS OF AMERICAN
BLACK DUCKS WINTERING IN WESTERN TENNESSEE

Principal Investigators: Michael J. Conroy, GA CRWRU
Michael D. Samuel, NWHRC

Research Assistant: William H. Chipley, University of Georgia

American black ducks (Anas rubripes) wintering in the Mississippi Flyway comprise approximately 30% of the continental population. Winter surveys for this population have declined by 64 % between 1955 and 1985 (Rusch et al. 1989). Information similar to that obtained for Atlantic Flyway black ducks (Conroy et al. 1987, 1989) is needed for important populations of black ducks wintering in interior habitats of the Mississippi Flyway. This research project will provide data on daily movements, habitat preferences, non-hunting mortality rates, and causes of mortality for an important population of Mississippi Flyway black ducks. Specific research questions addressed in this project include: (1) Do black ducks show a preference for different habitat types throughout winter; (2) Are there daily shifts in habitat use in response to hunting pressure and/or changes in environmental conditions?; (3) Is there a relationship between habitat use and physical condition; (4) What are the sources and rates of mortality, and how are these different between adult and juvenile black ducks?

Preliminary answers to the above questions will be obtained in a 2-year study of black ducks wintering at Tennessee National Wildlife Refuge, Duck River Unit (TNWR).

1991-92 FIELD SEASON

Methods

Forty-eight (24 adults and 24 juveniles) female American black ducks (Anas rubripes) were captured, aged, banded, weighed and

body measurements taken, and equipped with radio transmitters in January 1992. A 5-cc blood sample and a tracheal swab were taken from each duck; subsequent analyses by NWHRC were to determine current disease infection, lead poisoning, and disease exposure. All ducks were monitored from release to 03/06/92 by foot, truck, boat, airplane and 15-m tower using standard telemetry methods. Habitat boundaries and telemetry location points are being digitized for analysis of home range, movement rates, and habitat use. Statistical tests of the relationship of age, condition, environmental factors to habitat use will be performed using categorical data models. Non-parametric estimates of survival have been obtained and tests will be conducted for age-specific differences, and relationship of survival to condition.

Preliminary Results

Twenty-two adults and nine juveniles were released from the Duck River Unit of Tennessee National Wildlife Refuge (TNWR) on 01/05/92. One adult and nine juveniles were released on 01/07/92. One adult and five juveniles were released on 01/12/92. And, one juvenile was released on 01/30/92. Location/observation periods were randomly allocated throughout the 24-hour period such that all time periods were sampled with equal regularity over the course of a week. Locations (normally using three intersecting bearings) and/or presence (using single bearings) of monitored birds were made on 56 days between 01/05/92 and 03/06/92. Two locations and/or presence of monitored birds were made on 35 (62%) of those days. Six aerial searches were conducted during this field season. The general weather conditions during this field season were moderate, although one hard freeze in mid-January resulted in 4-5 days of extensive ice cover in the refuge impoundments.

Of the 48 monitored birds, locations and/or presence was known for 45 (94%) on 10 or more days, 36 (75%) on 20 or more days, 29 (60%) on 30 or more days, 22 (46%) on 40 or more days, and 8 (17%) on 50 or more days. Twenty-four (50%) of the study birds were known to have survived until 03/05/92 (one of these had left the study area but was later recovered during a spring hunt in Ontario). Six (25%) of those surviving until 03/05/92 had dispersed and relocated away from the main study area at Duck River: two NW of Duck River in the Obion River system, three north of Duck River in the Big Sandy River/Springville Bottoms area, and one NNE of Duck River in Dover Bottoms on the Cumberland River. Twenty (42%) of the original 48 study birds had unknown fates at the end of the study period (03/06/92). Using nine weeks as the approximate length of this field season, these 20 study birds were last located as follows: three (15%) during week two, one (5%) during week three, one (5%) during week four, one (5%) during week five, two (10%) during week six, seven (35%) during week seven, and five (25%) during week eight. Two (10%) of these 20 had known transmitter and/or battery failure and six (30%) had relocated away from the Duck River area: three in the Obion River system, one north of the study area in the Big Sandy Unit of TNWR, one in the Cumberland River along TVA's Land

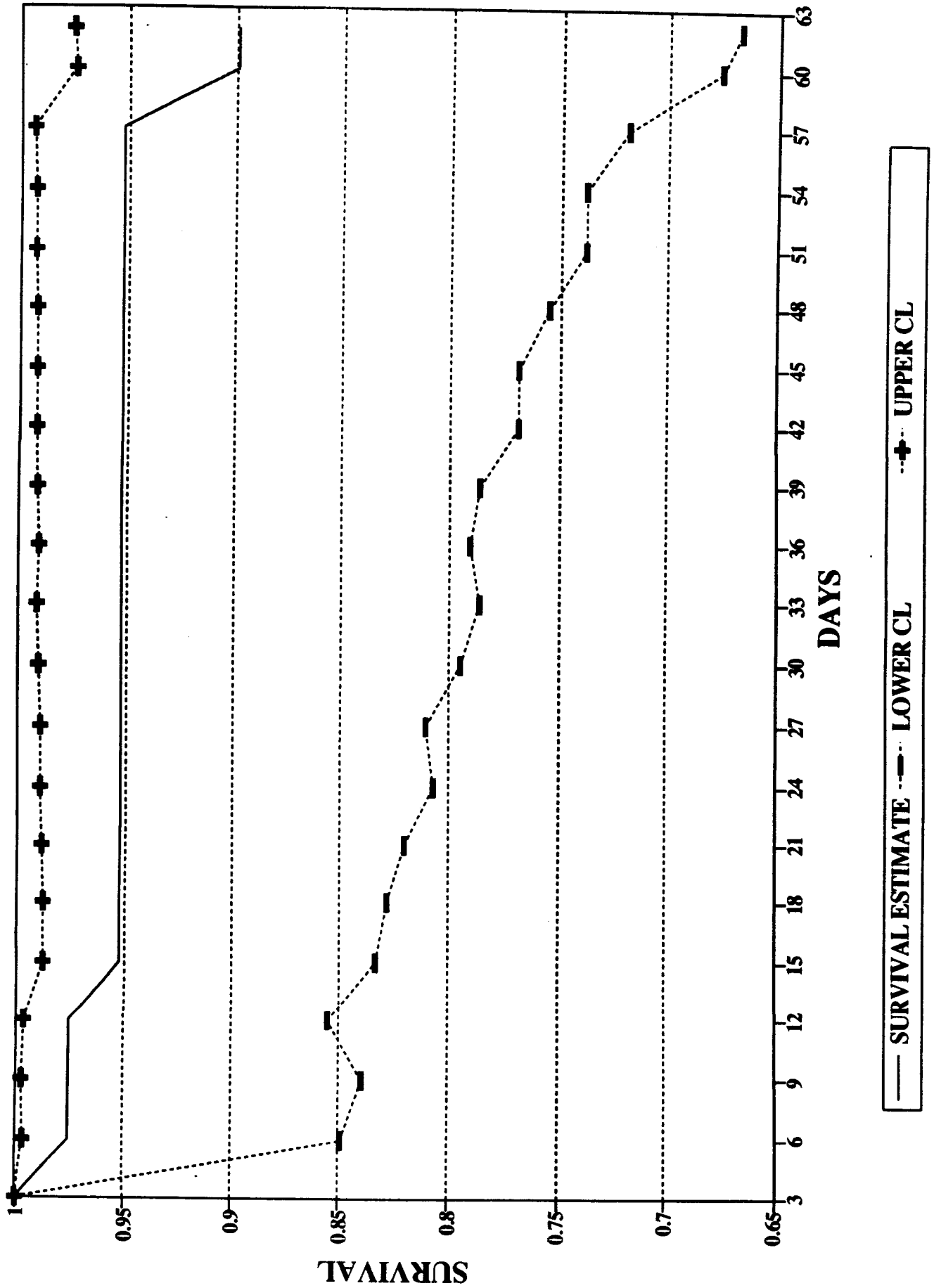
Between the Lakes, and one south of the study area in the Buffalo River near Lobelville, TN. Three (6%) study birds were killed by unknown predators (no carcasses found), although one loss is believed to have been caused by a large raptor after finding the radio transmitter 20 feet up in a tree. One (2%) study bird had its radio removed prior to the end of the field season.

Seventeen birds surviving the study period remained in the Duck River vicinity. Thirteen (76%) of these birds made use of areas away from Duck River. Eight (47%) of those 17 study birds were routinely located a short distance NW of Duck River in the state-managed Camden WMA. Five (29%) of these surviving study birds were located an equally short distance east of Duck River on private property managed as a hunt club. All of these birds were located on 03/05/92. A final aerial search on 03/06/92 revealed the locations of the six study birds who relocated away from Duck River. No other location efforts were made after that date.

Kaplan/Meier survival estimates were made for all study birds, adults, and juveniles using three-day intervals from 01/05/92 until 03/06/92. Estimates for study birds to survive the entire period were 0.8995, 0.8199, 0.9444, respectively. Further analyses of survival and habitat use relationships will be completed during Fall Quarter 1992, and a thesis completed during Winter Quarter 1993 or earlier.

[NOTE: Two hunter recoveries of 1990-91 study birds were made in the late fall and early winter of 1991: one bird was recovered in Michigan on 10/20/91 and the other from Camden WMA on 12/22/91.]

1991-92 BLACK DUCK STUDY (ALL BIRDS) KAPLAN MEIER SURVIVAL ESTIMATES



1991-92 BLACK DUCK STUDY (KAPLAN/MEIER SURVIVAL ESTIMATES) ALL BIRDS

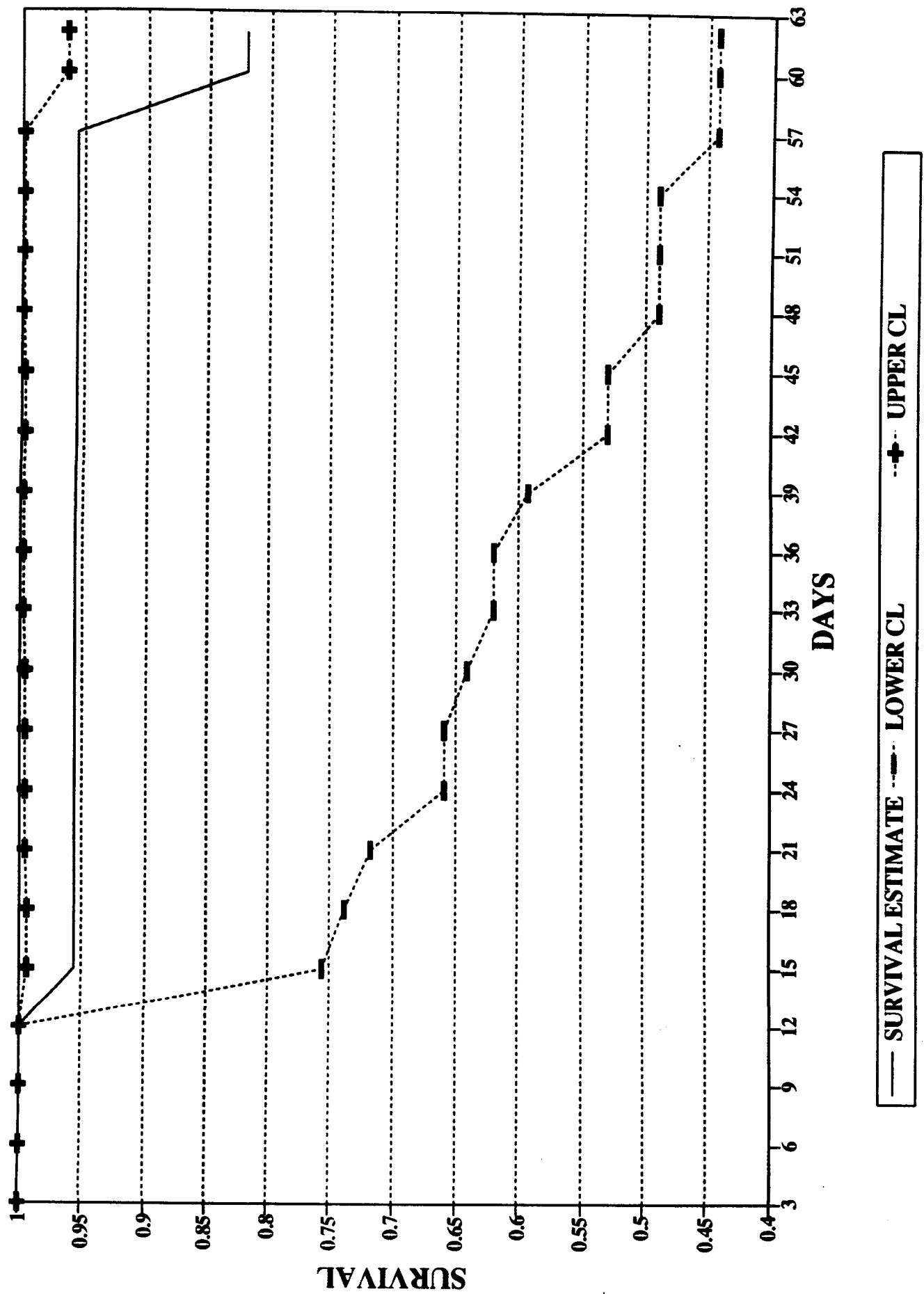
ALL BIRDS (1991-92)

#	DAY	MONTH	DAT	TOTAL	NO.RISK	NO.DEATHS	SURVIVAL	NO.CENSOR	NO.ADDED
3	JAN	92	7	41	41	0	1.0000	0	0
6	JAN		10	41	41	1	0.9756	0	0
9	JAN		13	47	38	0	0.9756	2	6
12	JAN		16	46	43	0	0.9756	1	2
15	JAN		19	45	42	1	0.9524	3	0
18	JAN		22	45	40	0	0.9524	4	0
21	JAN		25	44	37	0	0.9524	7	0
24	JAN		28	44	33	0	0.9524	10	1
27	JAN		31	45	34	0	0.9524	6	5
30	FEB		3	45	30	0	0.9524	15	0
33	FEB		6	45	28	0	0.9524	16	1
36	FEB		9	45	29	0	0.9524	7	9
39	FEB		12	45	28	0	0.9524	17	0
42	FEB		15	45	25	0	0.9524	18	2
45	FEB		18	45	25	0	0.9524	15	5
48	FEB		21	45	23	0	0.9524	13	9
51	FEB		24	45	21	0	0.9524	23	1
54	FEB		27	45	21	0	0.9524	22	2
57	MAR		1	45	19	0	0.9524	26	0
60	MAR		4	45	18	1	0.8995	26	1
62	MAR		6	45	17	0	0.8995	21	6

1991-92 BLACK DUCK STUDY (KAPLAN/MEIER SURVIVAL ESTIMATES) ALL BIRDS

ALL BIRDS (1991-92)				TRANSFORMED		BACKTRA		
# DAY	SURVIVAL	VAR	SE(VAR)	Y	LOWERCL	UPPERCL	LOWERCL	UPPERCL
3	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000
6	0.9756	0.0006	1.0000	3.6889	1.7289	5.6489	0.8493	0.9965
9	0.9756	0.0006	1.0387	3.6889	1.6530	5.7248	0.8393	0.9967
12	0.9756	0.0005	0.9765	3.6889	1.7750	5.6028	0.8551	0.9963
15	0.9524	0.0010	0.7071	2.9957	1.6098	4.3817	0.8334	0.9876
18	0.9524	0.0011	0.7246	2.9957	1.5756	4.4159	0.8286	0.9881
21	0.9524	0.0012	0.7534	2.9957	1.5191	4.4723	0.8204	0.9887
24	0.9524	0.0013	0.7977	2.9957	1.4322	4.5593	0.8072	0.9896
27	0.9524	0.0013	0.7859	2.9957	1.4554	4.5361	0.8108	0.9894
30	0.9524	0.0014	0.8367	2.9957	1.3559	4.6356	0.7951	0.9904
33	0.9524	0.0015	0.8660	2.9957	1.2983	4.6931	0.7856	0.9909
36	0.9524	0.0015	0.8510	2.9957	1.3278	4.6636	0.7905	0.9907
39	0.9524	0.0015	0.8660	2.9957	1.2983	4.6931	0.7856	0.9909
42	0.9524	0.0017	0.9165	2.9957	1.1994	4.7921	0.7684	0.9918
45	0.9524	0.0017	0.9165	2.9957	1.1994	4.7921	0.7684	0.9918
48	0.9524	0.0019	0.9555	2.9957	1.1229	4.8686	0.7545	0.9924
51	0.9524	0.0021	1.0000	2.9957	1.0357	4.9557	0.7380	0.9930
54	0.9524	0.0021	1.0000	2.9957	1.0357	4.9557	0.7380	0.9930
57	0.9524	0.0023	1.0513	2.9957	0.9352	5.0563	0.7181	0.9937
60	0.8995	0.0045	0.7434	2.1914	0.7343	3.6484	0.6758	0.9746
62	0.8995	0.0048	0.7649	2.1914	0.6921	3.6906	0.6664	0.9757

1991-92 BLACK DUCK STUDY (ADULTS) KAPLAN MEIER SURVIVAL ESTIMATES



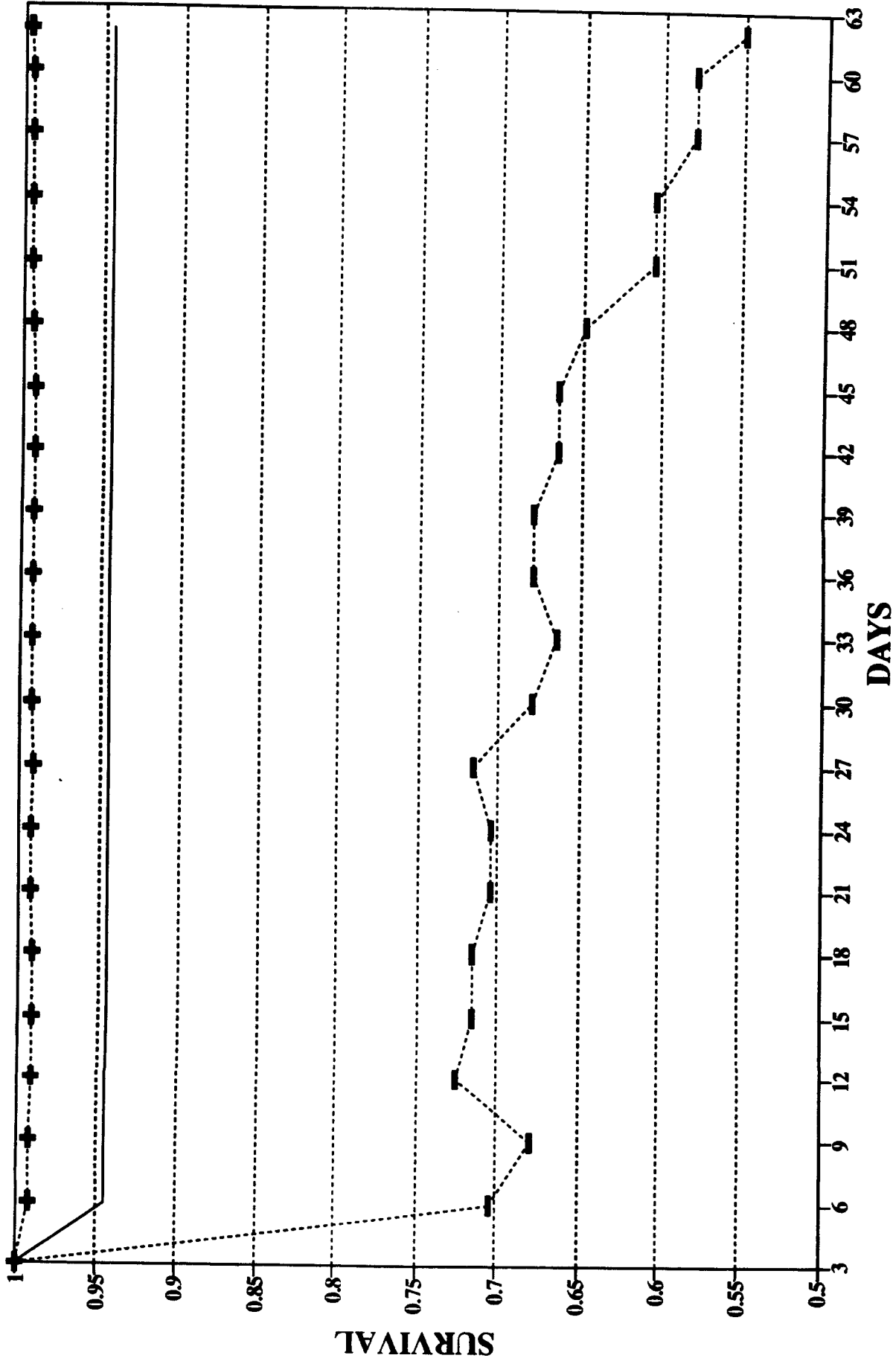
1991-92 BLACK DUCK STUDY (KAPLAN/MEIER SURVIVAL ESTIMATES) ADULTS

						ADULTS (1991-92)			
# DAY	MONTH	DAY	TOTAL	NO.RISK	NO.DEATHS	SURVIVAL	NO.CENSOR	NO.ADDED	
3	JAN	92	7	23	23	0	1.0000	0	
6	JAN		10	23	23	0	1.0000	0	
9	JAN		13	24	22	0	1.0000	1	
12	JAN		16	24	23	0	1.0000	0	
15	JAN		19	24	23	1	0.9565	1	
18	JAN		22	24	21	0	0.9565	2	
21	JAN		25	23	19	0	0.9565	4	
24	JAN		28	23	15	0	0.9565	7	
27	JAN		31	23	15	0	0.9565	4	
30	FEB		3	23	14	0	0.9565	9	
33	FEB		6	23	13	0	0.9565	10	
36	FEB		9	23	13	0	0.9565	5	
39	FEB		12	23	12	0	0.9565	11	
42	FEB		15	23	10	0	0.9565	12	
45	FEB		18	23	10	0	0.9565	10	
48	FEB		21	23	9	0	0.9565	8	
51	FEB		24	23	9	0	0.9565	14	
54	FEB		27	23	9	0	0.9565	13	
57	MAR		1	23	8	0	0.9565	15	
60	MAR		4	23	7	1	0.8199	15	
62	MAR		6	23	7	0	0.8199	10	

1991-92 BLACK DUCK STUDY (KAPLAN/MEIER SURVIVAL ESTIMATES) ADULTS

ADULTS (1991-92)				TRANSFORMED		BACKTRA	
# DAY SURVIVAL	VAR	SE(VAR)	Y	LOWERCL	UPPERCL	LOWERCL	UPPERCL
3	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000
6	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000
9	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000
12	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000
15	0.9565	0.0017	1.0000	3.0910	1.1310	0.7560	0.9936
18	0.9565	0.0019	1.0465	3.0910	1.0398	0.7388	0.9942
21	0.9565	0.0021	1.1002	3.0910	0.9346	0.7180	0.9948
24	0.9565	0.0027	1.2383	3.0910	0.6640	0.6602	0.9960
27	0.9565	0.0027	1.2383	3.0910	0.6640	0.6602	0.9960
30	0.9565	0.0028	1.2817	3.0910	0.5788	0.6408	0.9963
33	0.9565	0.0031	1.3301	3.0910	0.4840	0.6187	0.9967
36	0.9565	0.0031	1.3301	3.0910	0.4840	0.6187	0.9967
39	0.9565	0.0033	1.3844	3.0910	0.3775	0.5933	0.9970
42	0.9565	0.0040	1.5166	3.0910	0.1186	0.5296	0.9977
45	0.9565	0.0040	1.5166	3.0910	0.1186	0.5296	0.9977
48	0.9565	0.0044	1.5986	3.0910	-0.0422	0.4894	0.9980
51	0.9565	0.0044	1.5986	3.0910	-0.0422	0.4894	0.9980
54	0.9565	0.0044	1.5986	3.0910	-0.0422	0.4894	0.9980
57	0.9565	0.0050	1.6956	3.0910	-0.2323	0.4422	0.9984
60	0.8199	0.0173	0.8906	1.5155	-0.2300	0.4428	0.9631
62	0.8199	0.0173	0.8906	1.5155	-0.2300	0.4428	0.9631

1991-92 BLACK DUCK STUDY (JUVENILES) KAPLAN MEIER SURVIVAL ESTIMATES



— SURVIVAL ESTIMATE - - - - - LOWER CL ····+··· UPPER CL

1991-92 BLACK DUCK STUDY (KAPLAN/MEIER SURVIVAL ESTIMATES) JUVENILES

JUVENILES (1991-92)									
#	DAY	MONTH	DAY	TOTAL	NO.RISK	NO.DEATHS	SURVIVAL	NO.CENSOR	NO.ADDED
3	JAN	92	7	18	18	0	1.0000	0	0
6	JAN		10	18	18	1	0.9444	0	0
9	JAN		13	23	16	0	0.9444	1	5
12	JAN		16	22	20	0	0.9444	1	1
15	JAN		19	21	19	0	0.9444	2	0
18	JAN		22	21	19	0	0.9444	2	0
21	JAN		25	21	18	0	0.9444	3	0
24	JAN		28	21	18	0	0.9444	3	0
27	JAN		31	22	19	0	0.9444	2	1
30	FEB		3	22	16	0	0.9444	6	0
33	FEB		6	22	15	0	0.9444	6	1
36	FEB		9	22	16	0	0.9444	2	4
39	FEB		12	22	16	0	0.9444	6	0
42	FEB		15	22	15	0	0.9444	6	1
45	FEB		18	22	15	0	0.9444	5	2
48	FEB		21	22	14	0	0.9444	5	3
51	FEB		24	22	12	0	0.9444	9	1
54	FEB		27	22	12	0	0.9444	9	1
57	MAR		1	22	11	0	0.9444	11	0
60	MAR		4	22	11	0	0.9444	11	0
62	MAR		6	22	10	0	0.9444	11	1

1991-92 BLACK DUCK STUDY (KAPLAN/MEIER SURVIVAL ESTIMATES) JUVENILES

# DAY	JUVENILES (1991-92)			Y	TRANSFORMED		BACKTRA	
	SURVIVAL	VAR	SE(VAR)		LOWERCL	UPPERCL	LOWERCL	UPPERCL
3	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000
6	0.9444	0.0028	1.0000	2.8332	0.8732	4.7932	0.7054	0.9918
9	0.9444	0.0031	1.0607	2.8332	0.7543	4.9121	0.6801	0.9927
12	0.9444	0.0025	0.9487	2.8332	0.9738	4.6926	0.7259	0.9909
15	0.9444	0.0026	0.9733	2.8332	0.9255	4.7409	0.7162	0.9913
18	0.9444	0.0026	0.9733	2.8332	0.9255	4.7409	0.7162	0.9913
21	0.9444	0.0028	1.0000	2.8332	0.8732	4.7932	0.7054	0.9918
24	0.9444	0.0028	1.0000	2.8332	0.8732	4.7932	0.7054	0.9918
27	0.9444	0.0026	0.9733	2.8332	0.9255	4.7409	0.7162	0.9913
30	0.9444	0.0031	1.0607	2.8332	0.7543	4.9121	0.6801	0.9927
33	0.9444	0.0033	1.0954	2.8332	0.6861	4.9803	0.6651	0.9932
36	0.9444	0.0031	1.0607	2.8332	0.7543	4.9121	0.6801	0.9927
39	0.9444	0.0031	1.0607	2.8332	0.7543	4.9121	0.6801	0.9927
42	0.9444	0.0033	1.0954	2.8332	0.6861	4.9803	0.6651	0.9932
45	0.9444	0.0033	1.0954	2.8332	0.6861	4.9803	0.6651	0.9932
48	0.9444	0.0035	1.1339	2.8332	0.6108	5.0556	0.6481	0.9937
51	0.9444	0.0041	1.2247	2.8332	0.4327	5.2337	0.6065	0.9947
54	0.9444	0.0041	1.2247	2.8332	0.4327	5.2337	0.6065	0.9947
57	0.9444	0.0045	1.2792	2.8332	0.3260	5.3405	0.5808	0.9952
60	0.9444	0.0045	1.2792	2.8332	0.3260	5.3405	0.5808	0.9952
62	0.9444	0.0050	1.3416	2.8332	0.2036	5.4628	0.5507	0.9958