WATERFOWL PRODUCTION SURVEY ON THE YUKON FLATS NATIONAL WILDLIFE REFUGE 1985

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INTRODUCTION

The Yukon Flats is recognized as a major North American Waterfowl production area. An extensive effort was initiated in the early 1950's and mid 1960's to collect waterfowl population and production information in response to the proposed development of the Ramparts Canyon Dam and Reservoir Project (USDI 1964, Lensink 1965). Over twenty years have lapsed since this significant waterfowl research/inventory was conducted.

Brood count surveys have been conducted annually on 34 waterbodies on the Yukon Flats for the preceeding five years and eleven years prior beginning in 1963 (Conant and King, 1983). The small sample size of 34 ponds and lakes has contributed to a high degree of variability from year to year and to a possible misrepresentation of actual trends in waterfowl production on the Yukon Flats. This trend along with an annual aerial breeding pair survey has provided the bulk of the waterfowl data for management decision making.

Two Congressional Acts have defined land ownership patterns on the Yukon Flats which complicate wildlife resource management. ANCSA 1972 allowed Native groups to select land units around villages totaling about 2.7 million acres (1.093 million hectares) within the Refuge Boundary. ANLCA 1980 set aside the 8.6 million acre (3.48 million hectares) Yukon Flats NWR. The 2.7 million acres encompasses about 75% of the Yukon Flats high density/production waterfowl areas. Fourteen of twenty 4-square mile (10.34 sq km) plots established by Lensink (1965) are located on these private lands and five of the seven plots or 23 of the 34 lakes/ponds are on private lands.

It became apparent during the first years after the refuge was established that (1) sample size of production surveys should be increased and (2) these surveys should be representative of refuge lands. Also existing data requires updating and expansion to reflect a better understanding of habitat.

The objectives of this survey are:

1. Establish and maintain an annual survey for monitoring waterfowl production trends;
2. Identify important waterfowl production areas; and
3. Establish a data baseline to aid in analysis of habitat characteristics relating to waterfowl productivity.

The task of data collection could not have been accomplished without the efforts of FWS personnel, summer temporary biologist and volunteers. These folks include James Clark, USFWS employee; Howard Golden, Steven Harrington, Jeff Mackay and Lori Nordstrom, Seasonal Biologists; and Patricia Heglund and Jack Holloway, University of Missouri.

METHODS AND MATERIALS

Eleven, four (4) square mile (10.36 sq. km) plots were established on the refuge in 1984 (Figure 1). Plots were (1) randomly selected to sample stratified waterfowl breeding pair densities established by Lensink (1965), illustrated in USDI (1964), USDI (1974); (2) determined by location or proximity to at least on a large lake 1/2 mile or greater in length to land an aircraft on floats; and (3) designed to be surveyed on an annual basis with a minimum of cost and time. Plots were located on 1:63,360 scale USGS squads. Plots were also mapped from 4 inch : mile scale NASA Color IR photographs. Waterbodies were enumerated and measured for surface area. Waterbodies with 50% or more of its area inside the plot boundary were surveyed; those with less than 50% were excluded from the plot.

The brood count survey was conducted on the Yukon Flats NWR in accordance to techniques used by Spindler and Kessel (1977) and briefly described by Conant (1984).

The survey was conducted in two parts; an early survey beginning on June 28 through July 9 and the second survey beginning on August 5 through August 21. The survey was delayed for five days compared to 1984. The delay was in response to late spring and snowmelt conditions.

Three field crews of two observers each surveyed designated plots. Crew members were able to identify female waterfowl by species and classify broods into plumage classes described by Blankenship, et al. (1953). Lakes/ponds were surveyed by the two observers walking in opposite directions around the perimeter or paddling small canoes in opposite directions. All birds observed by the crew upon first arrival were recorded to prevent later double-counting. All birds seen or flushed from the water or surrounding wetlands were counted. Unless a flying bird was foraging or had landed within the surveyed marsh, pond or lake, it was not counted. Once a brood was observed, it was recorded as to species, number of young, age class, and lake and plot number. Species identification was accomplished by identifying the female.

For recording purposes in the field, all broods and "broody" hens (hens flushed without a visible brood but making a distraction display were considered "broody") were counted. For tabulation purposes, all broods observed during the first survey were tabulated according to plumage class. "Broody" hens were arbitrarily given an average class I brood size according to Bellrose (1976). For the second survey, all broods were recorded by plumage class. Only those broods that could not have been a brood recorded on that particular waterbody during the first count were tabulated.

For broods observed without a hen, a best guess was utilized to identify it. Factors used were (1) duckling identification, (2) other species of ducks occurring on the water-body, or (3) marked as unidentified. These broods were tabulated. When combined broods were encountered (for the purpose of this procedure a combined brood consisted of 13 or more young), they were tabulated as two or more broods, arbitrarily splitting the number into equal sized groups. The number of females present with a large group were considered as brood number indicators.

Comparison of trend data between 1984 and 1985 for the refuge brood survey indicates an overall increase in broods and number of young produced for both dabblers and divers (Tables 2 and 3). Comparisons were made only for the same 171 waterbodies that were surveyed in 1984. Overall, the trend indicates an increase in numbers for both dabbler and diver broods and numbers of young produced. Increases are noted for wigeon, pintail, lesser scaup, bufflehead and scoter, no change for blue-winged teal and declines for mallard, green-winged teal, shoveler, and canvasback.

Clark (1985) collected production data on 34 waterbodies that have provided annual production trend information for a 16 year period. The data collected from 33 of 34 waterbodies indicates a decline in brood numbers for all species (Table 4). Declines in production for this survey are not understood. Comparison of results from the survey to that of the refuge survey do not show comparable trend data. However, the high degree of varibility associated with the small sample size may be of some importance.

Table 2.

Comparative Brood Counts, Yukon Flats NWR
1984-1985 (Refuge - 171 waterbodies)

	Number of Broods			% Change	% Change
	1984	1985	Average	from 1984	from Average
Dabblers:					
Mallard	26	11	18.5	-58	-41
American Wigeon	70	93	81.5	+33	+14
Green-winged Teal	38	37	37.5	-3	-1
Blue-winged Teal	1	1	1.0	0	0
Northern Shoveler	26	21	23.5	-19	-11
Pintail	20	21	20.5	+5	+2
Subtotal	181	184	182.5	+2	+1
Divers:					
Redhead	1	-	.5	-	-
Canvasback	32	24	28.0	-25	-14
Lesser Scaup	113	154	133.5	+36	+15
Bufflehead	6	10	8.0	+67	+25
Common Goldeneye	-	-	-	-	-
Subtotal	152	188	170.0	+24	+11
Miscellaneous:					
Scoter spp.	16	37	26.5	+131	+40
Unidentified	16	1	8.5	-94	-88
Subtotal	32	38	35.0	+19	+9
TOTAL	365	410	387.5	+12	+6

During the production survey, a trend in species abundance was noted to be similar to the pattern established from the refuge breeding pair survey conducted earlier in the season. A correlation analysis was performed using the trends of percentage change by species between 1984-1985 for the breeding pair and brood surveys. A correlation coefficient of .15 was calculated indicating little correlation between the results of the two surveys. However Figure 2 displays the pattern of trend for both surveys for all species. With a couple of notable exceptions the pattern of increases and decreases is similar. This pattern would tend to varify the general trend results of both surveys as both were completed independently and by different investigatiors.

Additional data collection describing habitat characteristics is necessary to analyze various factors influenciing and/or supporting the waterfowl production on the Yukon Flats. A two year graduate study was initiated in 1984 which will describe and measure various habitat attributes associated with waterfowl production. The study will be conducted by Patricia Heglund, from the University of Missouri. The refuge will continue to collect brood information to establish trends. Data will also be collected to describe habitat characteristics of the pond/lake systems within the plots. These data include water chemistry, area, water depth, and vegetation composition.

The following presentation of data represents an initial effort to associate habitat factors with duck production on the various plots. Habitat descriptors, classification and categorization will follow after completion of the existing contracted project being conducted by Patricia Heglund, University of Missouri. Data analysis presented here are preliminary and incomplete.

All water bodies surveyed were evaluated in association with duck production. Table 5 displays broods per acre and provides a first indication for ranking. Ranking was attempted to help identify habitats which can be classified into production density stratum. Each plot was ranked by column from 1 to 11 assuming 1 being relatively more important in numbers of broods, waterbodies, average broods per waterbody, averge broods per acre, and smaller average waterbody size. Each rank per column is totaled by plot with the lowest total sum signifying a high density production area. Waterfowl production trends analyzed annually in this manner may help in identification of habitats and habitat factors important to various species of waterfowl.

Plot M was ranked as number 1 because it had the highest broods present, highest number of waterbodies, a high number of broods per waterbody, the highest number of broods waterbody surface acre, and a low average water body size. Plot M also had one large lake surrounded by numerous smaller waterbodies and is characterized by small ephemeral streams. Plot E was ranked the lowest for the opposite factors. Plot E had the largest lake of any plot; was connected by a perennial stream, and had few small waterbodies present. Future reports will further describe habitat factors important to waterfowl.

Table 5.

Plot	Waterbody Area (Acres)	Number of Waterbodies	Broods	Average Waterbody Size (Acres)	Broods Per Waterbody	Broods Per Acre	Rank Sum	Total Rank
A	281	9	30	31.2	3.33	.11	33	7
B	294	29	70	10.1	2.41	.24	12	2
C	510	25	54	20.4	2.16	.11	27	5
D	572	32	34	17.9	1.06	.06	33	6
E	566	11	10	51.5	.91	.02	54	11
F	270	20	29	13.5	1.45	.11	34	8
G	256	16	17	16.0	1.06	.07	42	9
H	181	17	32	10.7	1.88	.18	24	4
J	445	12	19	37.9	1.58	.04	46	10
L	415	37	63	11.2	1.70	.15	19	3
M	427	59	133	7.2	2.25	.31	7	1
TOTAL	4217	267	491	15.8	1.85	.12		

A comparison of broods by waterbody size was determined for each plot. Waterbody surface area was measured with Planix 7 digital planimeter on 4 inch to the mile color IR photographs. Waterbodies were divided into seven preliminary size classes and streams by plot (Table 6). The number of broods observed by waterbody was recorded. Each size class represented in Table 6 displays the number of waterbodies surveyed, the number of waterbodies with broods and the number of broods for each plot.

Broods were present on all waterbodies over 50 acres in size. The number of broods generally increased with waterbody size while the smaller and more numerous waterbodies had the smallest percentage of broods observed. It appears that large waterbodies surrounded by or in proximity to smaller waterbodies potentially attract duck broods for rearing. Data is preliminary and incomplete. Many other habitat factors including nesting information is not presently available.

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