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FROM

Refuge Biologist (RB)

OFFICE

Salt Lake City Area Office

DATE

02-09-82

SUBJECT

The attached report was written for the purpose of updating Area and Regional R&W personnel on the progress made in monitoring duck nesting and production on the Bear River Refuge. This study was implemented in 1981 as an integral part of the intensive waterfowl management program being implemented on the refuge.

cc: Jim Tisdale

WATERFOWL PRODUCTION ON THE BEAR RIVER MIGRATORY BIRD REFUGE - 1981

INTRODUCTION

A waterfowl production survey system, based upon nest searches in cover blocks, was implemented on the Bear River Migratory Bird Refuge in 1981. The survey was designed to proportionately sample all habitat on the refuge, thus providing a representative, statistically adequate, sample of duck nesting as a basis for estimating refuge duck production. The survey was also designed to provide information on nesting cover preferences, nest success, nest predation and related factors as a means of evaluating the effects of refuge management practices on duck production.

Nest searches have been conducted on the refuge since 1941, however the areas searched were not representative of the nesting habitat composition of the refuge. Thus, data collected in these surveys could not be used to estimate duck production nor to make valid inferences regarding nesting cover preferences, species composition of nesting hens, predation rates, etc. Most of the previously searched areas have been excluded from the new survey design. Also, methodologies for conducting the new survey have been improved greatly over the previously conducted nest searches.

METHODS

A detailed description of methods is presented in the document

entitled, "BEAR RIVER REFUGE - Instructions for Conducting the Waterfowl Production Survey Based on Cover Block Searches", which is on file at the refuge headquarters.

RESULTS AND DISCUSSION

A total of 285 duck nests were found during cover block searches in 1981. The estimated total number of duck nests on the refuge was $5,777 \pm 1042$ (95% confidence limits). Duck production to flight stage was estimated to be 13,571. Gadwall nests comprised 52% of the total, cinnamon teal 22%, redhead 12%, mallard 7%, pintail 4%, shoveler 2% and ruddy duck 1%. The hatching success of nests was 38% (i.e. an estimated 2,195 nests hatched successfully). Fifty-four percent of nests were destroyed by predators. Two percent of nests were flooded and six percent were abandoned. Of the destroyed nests, mammals destroyed 61% (skunk predation comprised 48% of this total) and avian predators destroyed 13% (magpie predation comprised 9% of this total). Twenty-six percent of destroyed nests were destroyed by unknown predators. Forty percent of nests on the dikes were destroyed by predators, as compared to fifty-seven percent destroyed in the same cover type off dikes. It is believed that the higher predation rate in the "off dike" cover reflects the more intense predator control efforts which have been conducted along the road dikes.

The percentages of nests destroyed by predators in the five vegetative cover types delineated on the refuge were as follows: 29% in alkali bulrush (n=7)*, 57% in saltgrass (n=23), 64% in mixed saltgrass and alkali bulrush (n=116), 46% in mixed saltgrass and other species (n=134) and 100% in greasewood (n=1). Alkali bulrush was the only cover type with appreciably less predation than other cover types. However, due to the small sample of nests (n=7) in alkali bulrush this lower level of predation should be viewed cautiously until more data are collected in this regard.

Robel pole reading ranges for each species, the number of nests which fall within each range and the corresponding percentages of nests are presented in Table 1. There was a preference for nesting cover in the 2.6-5.0 decimeter (10-20 inch) range by gadwall, cinnamon teal and mallards, whereas redheads showed a preference for cover in the 5.1-7.5 decimeter (20-30 inch) range. Sample sizes of nests of other duck species were low and no "pattern of selection" for any specific height/density of nesting cover was apparent.

Numbers of nests per acre located in the five vegetative cover types delineated on the refuge were as follows: 1.63 in alkali bulrush (n=7), .24 in saltgrass (n=23), .61 in mixed saltgrass and alkali bulrush (n=116), .97 in mixed saltgrass and other species (n=134), and .02 in greasewood (n=1). Alkali bulrush appears to have been the most favored nesting cover, although

*n=number of nests in the sample

the sample acreage searched was small, with saltgrass and mixed species associations the second most favored nesting cover. The plant species which appeared to be most dominant (i.e. observers believed that nesting hens "keyed in to" that species) within a 12-inch radius of nests, the number of nests represented and the percentage of nests in each "dominant type" are presented in Table 2. These data should be viewed in light of the fact that there is a predominance of some plant species relative to others. It is, therefore, not possible to quantitatively assess selection (if any) of certain plant species by nesting hens. However, some intuitive conclusions can be drawn from the data in Table 2. Hens showed a high degree of selection for wheatgrass as nesting cover. They also showed a high degree of selectivity for alkali bulrush, as well as the mixed forb communities which are typically found along road dikes and channel banks of the refuge. These communities are characterized by such species as thistle, nettle, sunflower, milkweed, sweetclover, foxtail barley and dock, with hard-stem bulrush on the "water side" and saltgrass on the "upland side".

RECOMMENDATIONS

The estimated 1981 duck production of 13,571, based upon the new survey system, remains substantially below historical production estimates for the Bear River Refuge. Previous years estimates ranged up to 79,000 ducks produced in 1964, with average production

for the 1953-80 period of 24,627. It is apparent that there is potential for increased duck production on the refuge above the current level.

The results presented in the previous section of this report suggest the following waterfowl management measures which should be implemented to enhance waterfowl production on the Bear River Refuge.

- 1) Continue an intensive predator control program aimed at skunks and magpies as the primary target species. This effort should be conducted annually during the late winter and throughout the duck nesting season. Attempts should be made to reduce nest losses resulting from predation to at least 30 percent.
- 2) Efforts should be aimed at establishing additional blocks of alkali bulrush on the refuge. This species provides a favored, relatively "predator resistant" nesting cover for waterfowl and several other species such as white-faced ibis, snowy egrets, Franklin's gulls and western grebes. Contour furrowing combined with "sheet irrigation" appears to have been the most effective means of establishing this cover type in the past.
- 3) Efforts should be aimed at establishing additional blocks of tall wheatgrass on the refuge. This species

provides a highly favored nesting cover for ducks and a winter food source for pheasants and passerine species. The county agricultural agent has suggested that this cover type be planted with a standard grain drill in the fall, prior to heavy snows. He also suggested that it be planted only in areas with soil salinity levels less than 31.5 millimhos/cm. Such areas would likely occur most frequently along road dikes or other elevated areas where salts have been leached out of the soils.

Table 1. Robel pole readings (ranges) for duck nests located on the Bear River Refuge, 1981.

| Species | Robel Range (decimeters) | No. Nests | % | Robel Range (decimeters) | No. Nests | % | Robel Range (decimeters) | No. Nests | % | Robel Range (decimeters) | No. Nests | % | Robel Range (decimeters) | No. Nests | % |
|----------|-----------------------------|--------------|-----------|-----------------------------|--------------|-----------|-----------------------------|--------------|-----------|-----------------------------|--------------|----|-----------------------------|--------------|------------|
| Gadwall | 0.0 - 2.5 | 12 | 8 | 2.6 - 5.0 | 82 | <u>55</u> | 5.1 - 7.5 | 34 | 23 | 7.6 - 10.0 | 12 | 8 | 10.1 + | 8 | 5 |
| C. teal | 0.0 - 2.5 | 22 | 34 | 2.6 - 5.0 | 39 | <u>61</u> | 5.1 - 7.5 | 1 | 2 | 7.6 - 10.0 | 1 | 2 | 10.1 + | 1 | 2 |
| Mallard | 0.0 - 2.5 | 5 | 25 | 2.6 - 5.0 | 10 | <u>50</u> | 5.1 - 7.5 | 3 | 15 | 7.6 - 10.0 | 2 | 10 | 10.1 + | 0 | 0 |
| Pintail | 0.0 - 2.5 | 4 | <u>36</u> | 2.6 - 5.0 | 4 | <u>36</u> | 5.1 - 7.5 | 3 | 27 | 7.6 - 10.0 | 0 | 0 | 10.1 + | 0 | 0 |
| Shoveler | 0.0 - 2.5 | 4 | <u>80</u> | 2.6 - 5.0 | 1 | 20 | 5.1 - 7.5 | 0 | 0 | 7.6 - 10.0 | 0 | 0 | 10.1 + | 0 | 0 |
| Redhead | 0.0 - 2.5 | 4 | 11 | 2.6 - 5.0 | 8 | 23 | 5.1 - 7.5 | 14 | <u>40</u> | 7.6 - 10.0 | 6 | 17 | 10.1 + | 3 | 9 |
| Ruddy | 0.0 - 2.5 | 0 | 0 | 2.6 - 5.0 | 0 | 0 | 5.1 - 7.5 | 0 | 0 | 7.6 - 10.0 | 0 | 0 | 10.1 + | 1 | <u>100</u> |
| Other | 0.0 - 2.5 | 1 | <u>50</u> | 2.6 - 5.0 | 1 | <u>50</u> | 5.1 - 7.5 | 0 | 0 | 7.6 - 10.0 | 0 | 0 | 10.1 + | 0 | 0 |

Note: Highest percentages for each species are underlined.

Table 2. Dominant plant species within a 12-inch radius of duck nests located on the Bear River Refuge, 1981.

| Dominant Plant | Number Nests Located | Percent |
|------------------|----------------------|---------|
| Saltgrass | 87 | 30.5 |
| Hardstem bulrush | 38 | 13.3 |
| Wheatgrass | 30 | 10.5 |
| Alkali bulrush | 23 | 8.1 |
| Foxtail barley | 18 | 6.3 |
| Canada thistle | 17 | 6.0 |
| Stinging nettle | 14 | 4.9 |
| Small sunflower | 13 | 4.6 |
| Unknown | 9 | 3.2 |
| Showy milkweed | 6 | 2.1 |
| Cattail | 5 | 1.8 |
| Sweetclover | 5 | 1.8 |
| Ragweed | 3 | 1.1 |
| Cheatgrass | 3 | 1.1 |
| Curly-leaf dock | 3 | 1.1 |
| Spikerush | 2 | 0.7 |
| Rose | 2 | 0.7 |
| Mint | 2 | 0.7 |
| Water hemlock | 1 | 0.4 |
| Baltic rush | 1 | 0.4 |
| Smartweed | 1 | 0.4 |
| Salt cedar | 1 | 0.4 |
| Pigeon grass | 1 | 0.4 |
| TOTAL | 285 | 100.1 |