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## Food Habits of Nesting Great Blue Herons at Heyburn State Park, Idaho

### Abstracts

The food habits of nesting great blue herons (*Ardea herodias*) were studied in 1977 and 1978 at Heyburn State Park. Brown bullheads (*Ictalurus nebulosus*) and tench (*Tinca tinca*) provided the main nutritional needs in this heronry, comprising 75 percent and 60 percent of the total sampled biomass in 1977 and 1978, respectively. The meadow vole (*Microtus pennsylvanicus*) was also an important diet component, representing 25 percent in 1977 and 40 percent in 1978 of the sampled biomass.

### Introduction

Various aspects of the feeding ecology of great blue herons have been studied throughout the United States and Canada (Kirpatrick 1940, Meyerriecks 1960, Dennis 1971, Krebs 1974, Kushlan 1976, Willard 1977, Hoffman 1978, Quinney and Smith 1980, Black and Collopy 1982, and others). In northern Idaho, however, food habits of great blue herons have not been documented. In this region, the species is the most abundant representative of the ardeids and breeding colonies are widely distributed (Larrison 1981).

Collazo (1981) described the breeding biology of great blue herons nesting at Heyburn State Park in Benewah County. This paper documents the food habits of herons at this heronry based on food samples collected during two breeding seasons.

### Methods

Between March and August in 1977 and 1978, regurgitated pellets (castings), boluses, and fish remains were collected at 2-day intervals from the ground beneath nest trees. At weekly intervals, food items were collected from 12 nests that were accessible by climbing. Samples were dated, and stored in plastic bags for later analysis in the laboratory.

Prey items that were collected intact were measured (total length) and weighed (wet weight in grams). Weights of fish that were partially digested, or dry, were determined from a length-weight table (Carlander 1969, 1977).

Air-dried castings were made up almost entirely of normal hair, primarily that of meadow voles. In order to estimate how many voles were in a casting, an average weight of dried skins ( $n=20$ ) was calculated to compare it to the dry weights of castings.

Fish bones, most of which were identified, were collected from the ground. Although these skeletal counts were not included in the frequency of occurrence data presented in this work, they were useful in determining the relative importance of game fish in the diet of herons.

## Results and Discussion

Brown bullheads and tench represented 15 percent and 12 percent of the sampled prey items for 1977, and 16 percent and 7 percent for 1978, respectively (Table 1). Other species of fish comprised 10 percent in 1977, and 7 percent in 1978, of the total food items collected.

TABLE 1. Frequency of occurrence and biomass (g) of food items collected at a nesting colony of Great Blue Herons, Benewah County, Idaho.

| Prey Species                             | Year | Frequency/month |     |    |    |    | %  | Biomass<br>X(±)SE | Total   |    |
|--|------|-----------------|-----|----|----|----|----|-------------------|---------|----|
|  |      | M               | A   | M  | J  | J  |    |                   | Biomass | %  |
| <i>Ictalurus</i><br><i>nebulosus</i>     | 1977 | 4               | 12  | 11 | 38 | 32 | 15 | 170±21            | 16,490  | 30 |
|  | 1978 | 3               | 7   | 43 | 32 | 27 | 16 | 127±21            | 14,224  | 35 |
| <i>Tinea fina</i>                        | 1977 | 0               | 1   | 4  | 44 | 25 | 12 | 298±26            | 22,052  | 40 |
|  | 1978 | 0               | 1   | 6  | 20 | 22 | 7  | 177±31            | 9,027   | 21 |
| <i>Perca</i><br><i>flavescens</i>        | 1977 | 0               | 0   | 1  | 18 | 17 | 5  | 36±12             | 1,296   | 2  |
|  | 1978 | 0               | 0   | 1  | 12 | 5  | 3  | 29±6              | 522     | 1  |
| <i>Lepomis</i><br><i>gibbosus</i>        | 1977 | 0               | 0   | 1  | 17 | 11 | 5  | 57±5              | 1,653   | 3  |
|  | 1978 | 0               | 0   | 0  | 13 | 11 | 4  | 48±5              | 1,152   | 3  |
| <i>Microtus</i><br><i>pennsylvanicus</i> | 1977 | 82              | 128 | 66 | 81 | 40 | 62 | 35±3              | 13,895  | 25 |
|  | 1978 | 155             | 123 | 64 | 88 | 35 | 67 | 35±3              | 16,275  | 40 |
| Other                                    | 1977 | 0               | 2   | 1  | 3  | 4  | 1  | —                 | —       | —  |
|  | 1978 | 0               | 2   | 6  | 10 | 5  | 3  | —                 | —       | —  |

Estimated numbers of voles occurring per month represented 62 percent in 1977, and 67 percent in 1978, of all food items (Table 1). I assumed that all hair found in castings was that of meadow voles because of the high frequency of bones and skulls of this species. Single skulls of the long-tailed weasel (*Mustela frenata*) and a muskrat (*Ondatra zibethicus*) were also found in castings.

Various other species occurred in low frequencies in the analyses. These amounted to 1 percent in 1977 and 3 percent in 1978 (Table 1). Species in this category and their frequency of occurrence for both seasons were 1 frog (*Rana* spp.), 1 sculpin (*Cottus* spp.), 3 painted turtles (*Chrysemys picta*), 2 northern squawfish (*Ptychocheilus oregonensis*), 10 black crappie (*Pomoxis nigromaculatus*), 1 cutthroat trout (*Salmo clarki*), 1 largemouth bass (*Micropterus salmoides*), 1 northern pocket gopher (*Thomomys talpoides*), 1 crayfish (*Cambarus* spp.), 8 giant water bugs (*Belostomatidae*), and 2 muskrats.

Only small fragments of invertebrates, mainly aquatic arthropods, were recovered. Invertebrates, however, should not be disregarded as an important component in the diet of herons (e.g., Kushlan 1978). Their rarity among these samples may be due to their relatively high digestibility (Hibbert-Ware 1940, Kushlan 1978).

Brown bullheads and tench provided the main nutritional needs in this heronry (Table 1). Fish species comprised 75 percent and 60 percent of the total sampled biomass in 1977 and 1978, respectively. The frequency of fish in the samples began to increase in May for both years. This increase coincided with the hatching of young in mid-April and their subsequent demand for food (Collazo 1981). Also, brown bullheads, tench, yellow perch (*Perca flavescens*), and pumpkinseeds (*Lepomis gibbosus*) become more vulnerable during the nestling period as these fish spawn in May, June, and July in shallow, weedy areas (Simpson and Wallace 1978).

Although fish consumption increased during the breeding season, the frequency of game fish in the samples was low. Of 140 skeletons identified (paired bones), only 1 percent was that of game fish. Thus great blue herons are not believed detrimental to game fish populations at Heyburn State Park and nearby tributaries. In fact, herons probably have a beneficial effect in preying chiefly on what many fishermen and fisheries biologists (Simpson and Wallace 1978) consider nuisance species in Idaho.

Mammals were also an important diet component in this heronry particularly in the early part of the nesting season (Table 1). Mammals, especially voles, are abundant along grassy and moist areas at Heyburn State Park and thus vulnerable to predation (Larrison and Johnson 1981). Early in the season, lakes and nearby tributaries were partially frozen and perhaps mammals were relatively more available to herons than fish.

More information is needed to determine whether food remains beneath nest trees represent the true prey species composition and its relative importance in the diet of great blue herons. This could be investigated by comparing food remains to their prey species preference and seasonality as determined by analyses of boluses and digestive tract contents.

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