



Waterfowl relationships to Greenfields Lake, Teton County, Montana
by Leroy J Ellig

A THESIS Submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree
of Master of Science in Fish and Wildlife Management

Montana State University

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Abstract:

A study of waterfowl relationships to Greenfields Lake, Teton County, Montana, was conducted May 9 to November 30, 1951 and May 28 to September 20, 1952. Information on spring migration was obtained during week-ends in March, April, and May, 1952. Territorial pairs and lone males were censused to determine breeding population. A nesting study was conducted both years. An experiment on the effect of skunk control upon success of nests was carried out in 1952. Brood observations were made in 1951 and 1952. Information on hunter utilization and success was secured during the 1951 hunting season.

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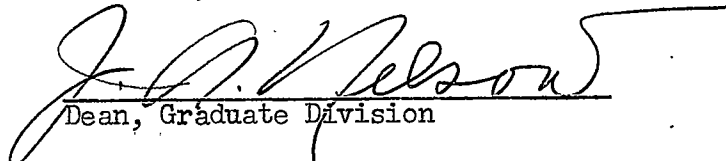
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Montana State College

Approved:


Head, Major Department


Chairman, Examining Committee


Dean, Graduate Division

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ABSTRACT

A study of waterfowl relationships to Greenfields Lake, Teton County, Montana, was conducted May 9 to November 30, 1951 and May 28 to September 20, 1952. Information on spring migration was obtained during week-ends in March, April, and May, 1952. Territorial pairs and lone males were censused to determine breeding population. A nesting study was conducted both years. An experiment on the effect of skunk control upon success of nests was carried out in 1952. Brood observations were made in 1951 and 1952. Information on hunter utilization and success was secured during the 1951 hunting season.

INTRODUCTION

The constantly diminishing number of suitable water areas is one of the major concerns of waterfowl management throughout the United States (Day, 1950). Thus the proposed draining of Greenfields Lake (also known as Freezeout Lake) in Teton County, north-central Montana, by local groups to alleviate inundating of agricultural lands and waterfowl crop deprecations caused considerable concern to the Montana Fish and Game Department. A study to determine waterfowl relationships to the area was conducted May 9 to November 30, 1951 and May 28 to September 20, 1952. Information on spring migration was secured during week-ends in March, April, and May, 1952.

The writer is grateful to the Montana Fish and Game Department for financing the study; to waterfowl biologists Wynn Freeman for supervision and Gerald Salinas for encouragement and assistance in field work; to other personnel and students of Montana State College who assisted in nest searches; to Dr. W. E. Booth, Montana State College, for verifying identification of plants; sincere appreciation is extended to Dr. Don C. Quimby, Montana State College, for advice and supervision during the study and preparation of the manuscript.

DESCRIPTION OF AREA

Greenfields Lake is located on the western edge of the Greenfields Division, Sun River Irrigation Project, approximately 2 miles northwest of Fairfield, Montana. It occupies the lower portion of a glacial lake bed, base elevation 3,654 feet, with no natural outlet. Long, sloping

plateaus, with elevations of approximately 4,000 feet, encompass the basin (Gieseke, 1937).

The lake was not a permanent body of water prior to irrigation of surrounding areas, initiated in 1919 (DeYoung, 1927), and increased to a maximum of 68,547 acres by 1945 (Bur. Rec., 1951). Residents report that previously the spring runoff generally dried up during the summer, but in "wet years" some water was retained. Nineteen-twenty was the last year the lake was dry. In 1941 it covered 1,900 acres, by 1952 it had increased to 4,100 acres with a maximum depth of 9.6 feet and a shoreline of 21.88 miles. The increase in size apparently resulted from waste and seepage waters flowing into the lake via 10 ditches from adjacent irrigated lands and/or above average precipitation during 1939 to 1951 (see below).

The lake supports abundant growths of submerged vegetation, mostly sago pondweed (Potamogeton pectinatus) and wigeongrass (Ruppia maritima): others include horned poolmat (Zannichellia palustris), muskgrass (Chara spp.), and water milfoil (Myriophyllum exalbescens). Alkali bulrush (Scirpus paludosus) is the only emergent species occurring in quantities, but softstem bulrush (S. validus), American bulrush (S. americanus), spike rush (Eleocharis macrostachya), wire rush (Juncus balticus), and cattail (Typha latifolia) are also found.

A marsh of 360 acres, connected to the lake by a $\frac{1}{2}$ mile drainage ditch (Fig. 1), provides the only substantial stand of emergent cover, mostly cattails (Fig. 2), on the area. Other emergent species include

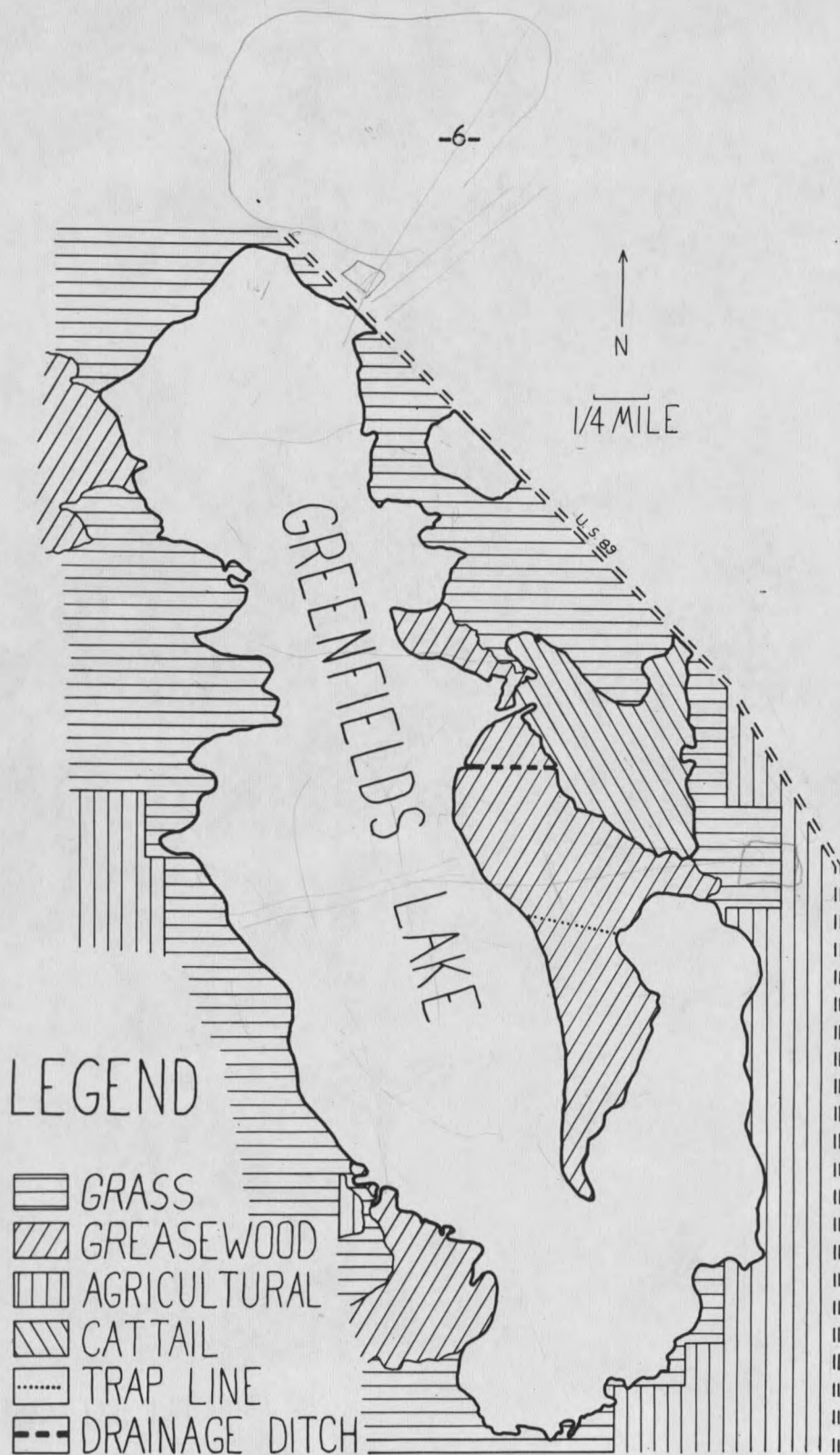


Fig. 1. Map of Greenfields Lake study area.



Fig. 2. Cattail marsh showing extensive emergent cover.



Fig. 3. Small islands resulting from inundation of greasewood type shoreline.

those above.

Inundation has produced numerous small islands in two bays of the lake (Fig. 3). Dominant vegetation is generally greas^ewood (Sarcobatus vermiculatus).

The lake shore vegetation is mainly grass with greasewood dominant on alkali impregnated areas (Fig. 4). The greasewood type has a hummocky appearance, the result of soil erosion between plants (DeYoung, 1927). This type occupies 39.0 per cent (8.54 miles) of the shoreline (Fig. 1). Twenty-two 900 foot line intercepts (Canfield, 1942), each taken perpendicular to the shoreline, gave an average greasewood canopy cover of 14.1 per cent (2.0-34.4). Twenty-four 300 point transects (Coupland, 1950) were taken perpendicular to the shoreline to measure ground cover excluding greasewood. A board with 10 nails spaced 10 centimeters apart was placed on the ground at 12 step intervals starting at the shoreline. Vegetation touching the tip of each nail was recorded. Average density for 7,200 points was 23.6 per cent (7.0-53.0). Plants present and their percentage of ground cover were: foxtail barley (Hordeum jubatum), 22.6 per cent; saltgrass (Distichlis stricta), 19.3; western wheatgrass (Agropyron smithii), 11.7; Sandberg bluegrass (Poa secunda), 11.7; Nuttall saltbrush (Atriplex nuttallii), 9.7; bluegrass (Poa spp.), 9.1; alkali dropseed (Sporobolus airoides), 6.6; blue gramma (Bouteloua gracilis), 2.6; ^hMyssopleaf ^eEchinopsilon (Echinopsilon hyssopifolium), 2.2; seepweed (Suaeda depressa), 1.8; pepperwort (Lepidium virginicum), 1.5; Nuttall alkali-grass (Puccinellia nuttalliana) and junegrass (Koeleria cristata),

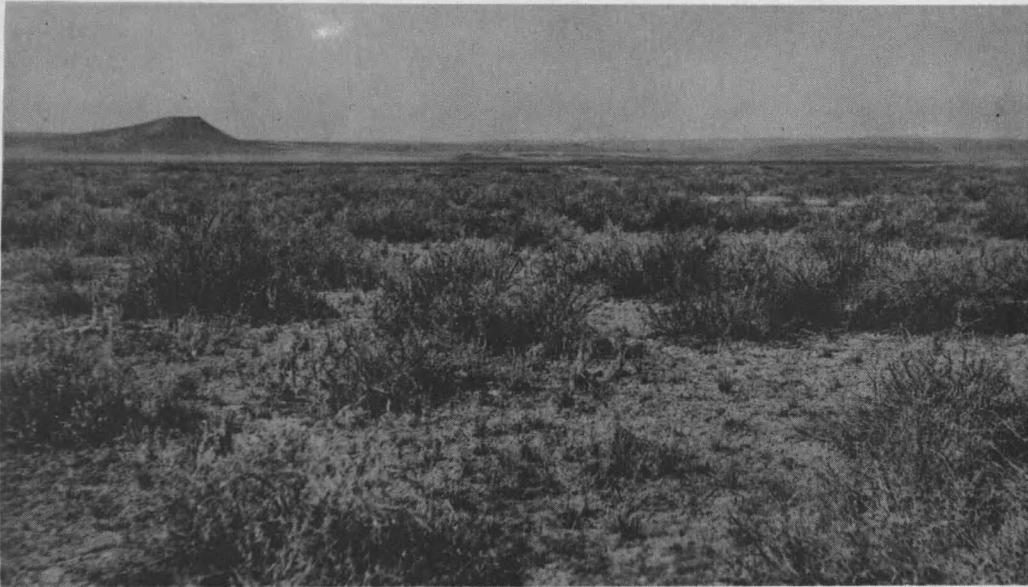


Fig. 4. Typical greasewood cover which constitutes 39 per cent of the shore line.

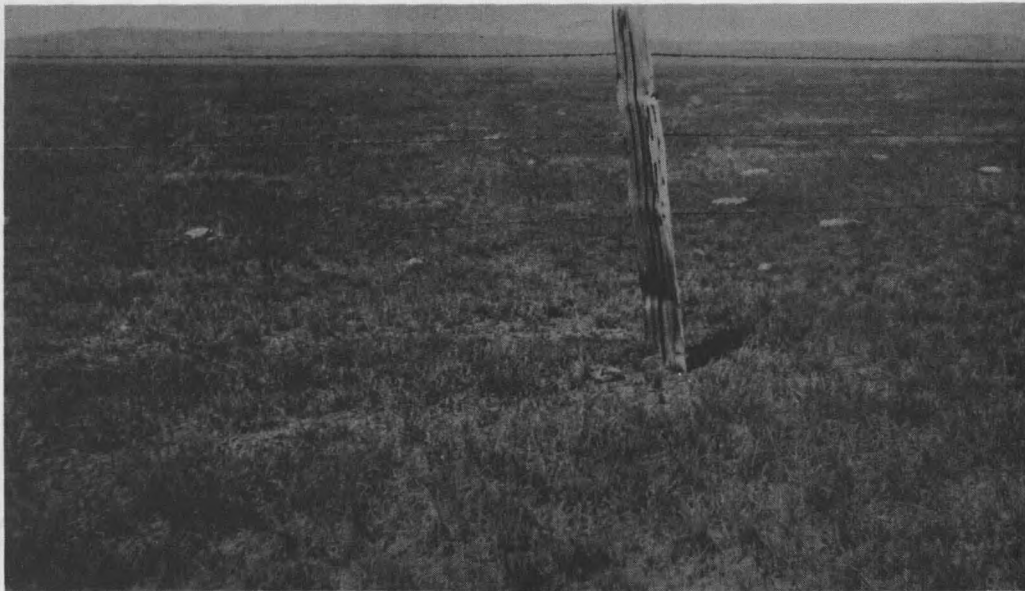


Fig. 5. Typical grass cover which constitutes 52.4 per cent of the shore line.

1.1.

Grass cover (Fig. 5) occupies 52.4 per cent (11.46 miles) of the shoreline (Fig. 1). The average density of 6,600 points was 47.3 per cent (27.0-72.3). Plants present and their percentage of ground cover were: blue gramma, 53.8 per cent; western wheatgrass, 21.4; needlegrass (Stipa comata), 8.6; saltgrass, 5.8; foxtail barley, 3.0; fringed sage (Artemisia frigida), 2.0; alkali dropseed, 1.2; junegrass, 1.0; gumweed (Grindelia squarrosa), seepweed, hyssopleaf echinopsilon, Nuttall alkali-grass, rabbit brush (Chrysothamnus nauseosus), Sandberg bluegrass, snake-weed (Gutierrezia sarothrae), Nuttall saltbrush, and unidentified plants, 3.0. Grazing pressure was considered heavy in grass and greas^ewood types. Monocot nomenclature follows Booth's (1950) Flora of Montana, Part I. Dicots follow Booth and Wright's (1953) Flora of Montana, Part II.

Irrigated farm lands of alfalfa, small grains, and summer fallow (Fig. 6) form 8.6 per cent (1.88 miles) of the shoreline (Fig. 1). The land is cultivated to a distance of 60 to 170 feet from the lake shore, depending on moisture conditions.

The climate is semi-arid; average annual precipitation at Fairfield during 1906-1938 was 11.53 inches (Maughan, 1941), for 1939-1951, 12.49 inches (U. S. Dept. of Commerce). The months of April, May, June, and July receive 56.9 per cent of the precipitation. The average temperature for January is 21.6° F., July, 65° F. The average last killing frost is May 19, the first September 20 (Maughan, 1941).

