FINAL REPORT

March 27, 1984

PHASE 1
Wildlife Impact Assessment and Summary of Previous Mitigation Related to Hydroelectric Projects in Montana

VOLUME TWO(a) CLARK FORK PROJECTS: THOMPSON FALLS DAM
OPERATOR: MONTANA POWER COMPANY

Prepared by

Montana Department of Fish, Wildlife and Parks
Marilyn Wood - Wildlife Biologist
and
Arnold Olsen - Special Projects Supervisor

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PREFACE

This document, the first phase of a two part project, was compiled to determine the impacts of hydroelectric development on wildlife and wildlife habitat along the lower Clark Fork River and to determine any previous mitigation efforts which have been initiated. In the initial draft of this report, all three projects were considered as one analytical unit based on their occurrence within one ecological system (the Clark Fork River valley) and their similar impacts to wildlife species and habitats. This document was prepared in order to more clearly define the impacts due to the Thompson Falls project. This approach will be valuable in developing mitigation goals and determining mitigation responsibilities, since this project is operated by a private utility company separate from the operator of the other two hydroelectric projects.

In order to develop and guide mitigation efforts, it was necessary to estimate wildlife and wildlife habitat losses or gains attributable to the construction and operation of the project. The purpose of this report was to document best available information concerning wildlife species impacted and the degree of the impact. A target species list was developed for which mitigation efforts will be directed. Many wildlife species not listed will be benefited by the adopted mitigation measures.

The estimates represent losses considered to have occurred during one point in time, except where noted otherwise. When possible, quantitative loss estimates were developed based on historical information from the area or on data from similar areas. These loss estimates will assist in determining the level of mitigation necessary.

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I. INTRODUCTION

The Thompson Falls Dam is a run-of-the-river project located on the Clark Fork River 69 miles upstream from Lake Pend Oreille. The project inundated six miles of wildlife habitat. The loss of riparian habitat was especially critical to wildlife populations, as these areas often support the highest productivity, species diversity, and species densities (Carothers 1977 and Thomas et al. 1980). The inundation of riparian 'habitat and adjacent upland habitats by the construction of the dam and formation of the reservoir on the lower Clark Fork River resulted in adverse impacts to the diverse wildlife communities inhabiting the area.

A. INITIAL WILDLIFE CONCERNS

Based on the lack of wildlife impact information related to the construction of Thompson Falls Dam, this issue was apparently not previously addressed. However, a U.S. Fish and Wildlife Service report (US. Dep. Inter. 1959) on the entire Clark Fork River Basin included a section that describes potential impacts to wildlife populations in relation to proposed federal water development projects. Expected impacts included: loss of essential big-game habitat, creation of a water barrier at deer crossing sites, hazardous ice conditions, loss of upland bird habitat, elimination of beaver and muskrat populations on the impoundment area, and loss of river islands used by nesting waterfowl. It was assumed that similar impacts would have occurred at the Thompson Falls project.

B. HYDROELECTRIC PROJECT - DESCRIPTION AND OPERATION

Thompson Falls Dam near Thompon Falls, Montana is situated 69 miles upstream from Lake Pend Oreille located in Idaho. Construction on the power generation project began in 1913. The project consists of a 1,016 foot long and 54 foot high concrete main dam and a 449 foot long and 45 foot high concrete auxiliary dam. A 12 mile long reservoir with a surface area of 1,446 acres was formed. Montana Power Company acquired the project from the Thompson Falls Power Company in 1929 and continues to operate the dam. Prior to installation of taintor gates in 1983, a seasonal drawdown of 14 feet occurred in spring. Current operation of the project is run-of-the-river, with fluctuations due to the variations in the flow of the river.

C. PROJECT AREA DESCRIPTION

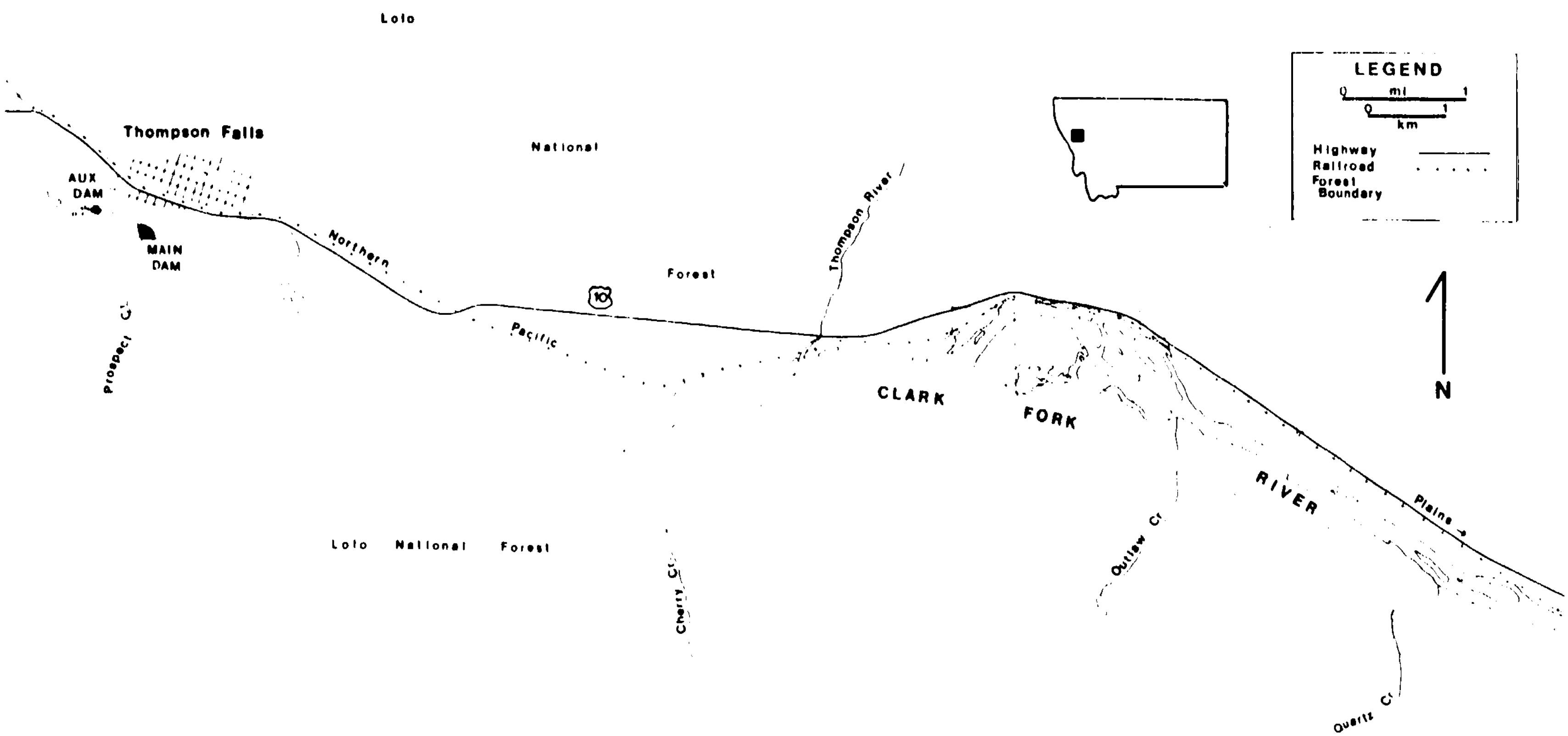
The lower Clark Fork River flows in a northwestern direction to Lake Pend Oreille, Idaho. The topography was greatly influenced by the massive glacial Lake Missoula (Tilton 1977) as evidenced by the typically narrow, U-shaped river valley. Tine valley floor at 2,400 feet is bounded by steep mountains rising to over 5,900 feet. The Cabinet Mountains border on the north and the Coeur d'Alene Mountains lie to the south of the river. Chief tributaries are the Thompson, Vermillion and Bull rivers.

The floristic composition reflects the mild Pacific maritime climate influence. Red cedar (Thuja plicata) and hemlock (Tsuga heterophylla) dominate the western most section of the lower Clark Fork River area as well as the stream bottoms. Dense forests of douglas fir (Pseudotsuga menziesii), lodgepole pine (Pinus contorta), western larch (Larix occidentalis), and ponderosa pine (Pinus ponderosa) occupy the benches and slopes above the river. Broadleaf trees and shrubs are found as narrow strips along the river and stream bottoms. A mosaic of conifers and hardwoods lie in between. Cultivated areas of small grains and hay are scattered throughout the valley floor.

Abundant and diverse wildlife populations inhabit the area. Big game species such as elk (Cervis elaphus), white-tailed deer (Odocoileus virginianus) and mule deer (O. hemionus) are common in the timbered mountains and bottomlands. Bald eagles (Haliaeetus leucocephalus) and osprey (Pandion haliaetus) are found along the waterways. Other big game species, upland game birds, waterfowl, furbearers and raptors occupy the area.

For the purpose of this report, the reservoir will be defined to include the impoundment area between the Thompson Falls Dam and the mouth of the Thompson River, a distance of six river miles (Figure 1). Although the Federal Energy Regulatory Commission licensing document describes the reservoir boundary as occurring 12 miles upstream from the dam, it was agreed by entities participating in the development of this report that little or no impact can be attributable to the reservoir within the upper six miles.

Figure 1. The Thompson Falls project area - 12 as defined by the relicensing application. Six miles was considered the major impact area.



II. METHODS

A. LITERATURE REVIEW AND INTERVIEWS

An extensive review was conducted of the files maintained by the Montana Department of Fish, Wildlife and Parks (MDFWP) and the US. Forest Service, Lolo and Kootenai National Forests, in order to obtain all the records containing wildlife information pertinent to the lower Clark Fork River project area.

Persons knowledgeable of the area were interviewed. These contacts included current area biologists, retired MDFWP personnel, and long-time residents of the area. Notes of the interviews are on file.

B. HABITAT TYPING

To determine the acreage of wildlife habitat inundated by the Thompson Falls Reservoir, a river profile survey map completed in 1911 (US. Dep. Inter. 1914) was used to delineate the river onto current topographic maps. Estimated acres inundated were determined by planimeter. Photos taken prior to construction of the Thompson Falls Dam were used to verify the presence of vegetation species. Lacking information on the specific habitat types present at the time of construction of Thompson Falls Dam, it was decided to use the habitat information available from the Cabinet Gorge and Noxon Rapids dams report (see Vol. Two (b)). A range of acres inundated by specific generic habitat types was determined by calculating the percentage of those types occurring at both the Cabinet Gorge and Noxon Rapids dams. It was assumed that similar types and similar percentages would have occurred at the area affected by the Thompson Falls Reservoir.

Description of the generic habitat types which likely occurred in the project area follows:

1) Aquatic

This habitat mapping unit (HMU) included all the open water areas, associated rivers, streams, ponds, sloughs, and marshes located in the project area. All the emergent vegetation zones identified within or along the edges of the open water were included. When possible, the following subtypes were identified: a) rivers and streams, and b) ponds, sloughs and marshes.

2) Gravel Bars

These were unstable areas containing sparse vegetation associated with islands and streambanks. These areas were usually covered with water during periods of high flows which inhibited the establishment of grasses and grass-like plants.

3) Grasslands/Hay Meadows

This HMU included those areas dominated by a variety of grasses, sedges (Carex spp.) and rushes (Juncus spp.) influenced by the presence of an elevated water table. Agricultural hay bottoms and grain fields were included within this type and composed the majority of the areas identified as grasslands/hay meadows. A variety of trees and/or shrubs were sometimes present within this type: however, they composed less than an estimated 10 percent of the total canopy coverage.

4) Riparian Tree-Shrubs/Shrub Steppe

This HMU contained deciduous trees, primarily black cotton wood (Populus trichocarpa) and a dense deciduous shrub understory associated with riverine systems. This type also included the shrubfield areas related to old fires or logged areas. Several shrub species were included: serviceberry (Amelanchier alnifolia), Rocky Mountain maple (Acer glabrum), and snowberry (Symphoricarpus spp.).

5) Mixed Deciduous/Conifer Forest

This HMU generally occupied the floodplain between the riparian vegetation and the dense conifer forests and represented a complex mosaic of conifer tree species and deciduous tree/shrubs. The canopy was generally dominated by conifer species such as douglas fir, ponderosa pine, and lodgepole pine. Deciduous tree species such as cottonwood and birch (Betula spp.) and a variety of deciduous shrub species were found in this type.

6) Developed Areas

These areas included towns, farm buildings, gravel pits and other disturbances that were associated with human development.

C. TARGET SPECIES LIST

A target species list was developed which addressed the primary wildlife species impacted by the project and of primary concern to MDFWP. This list did not address the abundance of nongame species which utilized the habitats associated with the project area. The loss of riparian areas, mountain shrublands and open conifer forests had a detrimental impact on the small mammals, raptors and other avifauna which were yearlong or seasonal residents of the area. Mitigation directed toward the target species will also benefit many of these species.

The following were considered for designation of target species:

a) Those species determined to have incurred the greatest impacts attributable to the reservoir,

b) Species previously targeted by the MDFWP as "species of special concern" (Flath 1981),

c) Species listed as threatened or endangered, and/or

d) A priority species designated by the MDFWP regional plan.

D. IMPACT ANALYSIS

A impact analysis was developed for each species or group of species identified on the draft target species list. The impact analyses were based on historical population and species distribution information and acres of disturbance. All available data were used in the analysis, and where possible, quantitative loss estimate ranges were developed. In some cases, the quantitative loss estimates reflect actual densities of animals capable of having been supported by the habitat inundated. When species density estimates were not possible to determine, the quantitative loss estimates reflect the loss of specific required habitat. For white-tailed deer and ruffed grouse it was agreed, during coordination meetings, that the habitat loss estimates would be calculated by subtracting the acres adjacent to the townsite (88), which likely did not support either species, from the total acres inundated (347), yielding a loss estimate of 259 acres. When a species (ie. mule deer and bear) was tied to specific habitat types, the habitat loss estimates were based on the percentage of those types inundated by Cabinet Gorge and Noxon Rapids reservoirs. Since this method produced a rough approximation of the habitats lost, it was considered to be appropriate to base the losses on percentages of the total acres inundated by the Thompson Falls reservoirs (347). For certain species, i.e., mountain lion and bobcat, it was difficult to quantify the losses based on either density estimates or acres of required habitat lost. The loss estimate for mountain lions was assessed in terms of prey species lost. No quantitative loss estimate for bobcats was determined.

E. CREATION OF WILDLIFE HABITAT

Recent color aerial photos were compared to old aerial photos and topographic maps to determine the extent of wildlife habitat created by the reservoir. The presence of "new" islands, ponds, marshes and riparian vegetation attributable to the formation of the reservoir was documented.

F PREVIOUS MITIGATION

Previous mitigation efforts were determined by contacting operator biologists and local conservationists and sportsmen. The current status of known wildlife mitigation projects occurring within the reservoir were reported.

III. TARGET SPECIES LIST

Numerous species of big game, furbearers, waterfowl, upland game birds, as well as the non-game species of small mammals, ratpors and other birds were impacted by the loss of riparian habitat. The primary purpose of the target species list is to focus the potential mitigation efforts toward those species which experienced the greatest impacts, and those which will receive the greatest benefit for a given mitigation effort. As mitigation projects are developed, they will be designed to benefit one or more of the target species. In addition, the projects will provide benefits to many non-target species.

The target species are:

- Whtie-tailed deer (Odocoileus virginianus)
- Mule deer (O. hemionus)
- Bear
  - Blackbear (Ursus americanus)
  - Grizzly bear (Ursus arctos horribilus)
- Mountain lion (Felis concolor)
- Bobcat (Lynx rufus)
- River otter (Lutra canadensis)
- Beaver (Castor; canadensis)
- Ruf fed grouse (Bonasa umbellus)
- Bald eagle (Halàeetus Ieucocephalus)
- Osprey (Pandion haliaetus)
- Waterfowl
  - Canada goose (Branta canadensis)
  - Mallard (Anas platyrhynchos)
  - American wigeon (Anas americana)
  - Gadwall (Anas strepera)
  - Common goldeneye (Bucephala clangula)
  - Ring-necked duck (Aythya collaris)
  - Common merganser (Mergus merganser)

IV. RESULTS

A. HABITAT

1) Habitat Loss Estimations

Estimates indicate approximately 347 acres of terrestrial wildlife habitat were inundated by Thompson Falls Reservoir (Figure 2). The majority of the impact occurred within three miles of the dam. One 14 acre island and approximately one half (five acres) of another island were inundated. The remainder of the reservoir broadened the existing river and inundated a narrow strip of riparian vegetation on either side of the river. Photos taken in 1909 (U.S. Forest Service files) show Douglas-fir, ponderosa pine and lodgepole pine were the dominant vegetation types. Deciduous trees and shrubs were also present. Lacking more detailed information on specific habitats inundated, it was assumed that habitat types lost were similar to those determined to be inundated by Noxon Rapids and Cabinet Gorge reservoirs. In order to determine acreages for the three generic vegetation types believed to be inundated by the Thompson Falls Reservoir, percent ages of those habitats lost due to the Cabinet Gorge and Noxon Rapids reservoirs were calculated. The Noxon Rapids reservoir inundated 1,100 acres of the grassland/hay meadow habitat type (18.3 percent of the total acreage lost). The Cabinet Gorge Reservoir inundated 320 acres of the grassland/hay meadow type (11.9 percent of the total acreage lost). These percentages combined with the total acres (347) inundated by Thompson Falls Reservoir provided a range of 41-64 acres of grassland/hay meadow habitat lost. The percentages of shrub habitat inundated by the Noxon Rapids and Cabinet Gorge were 12.2 and 15.7 percent (of the total acreage lost), respectively. These percentages combined with the 347 acres produced a range of 42-52 acres of the shrub type inundated by Thompson Falls Reservoir. It was assumed the mixed deciduous/conifer type comprised the remaining habitat inundated.

2) Wildlife Habitat Created by the Project

Based on recent color aerial photos and tophgraphic maps, no ponds or marshes were created by the reservoir. One island (7 acres) was created during periods of high water level and is separated from the mainland by a narrow, shallow water channel. Prior to 1983, during the spring drawdown of 14 feet, two mudflat areas were created.

It was estimated that less than 10 percent of the total wiidlife habitat lost was replaced by the creation of riparian vegetation. This 10 percent estimate includes vegetation found on the mudflats and deciduous shrub/forb communities found scattered along the reservoir shoreline. It is questionable whether these piparian communities were actually created by the reservoir or are remnant communities that occurred in the floodplain of the river. It

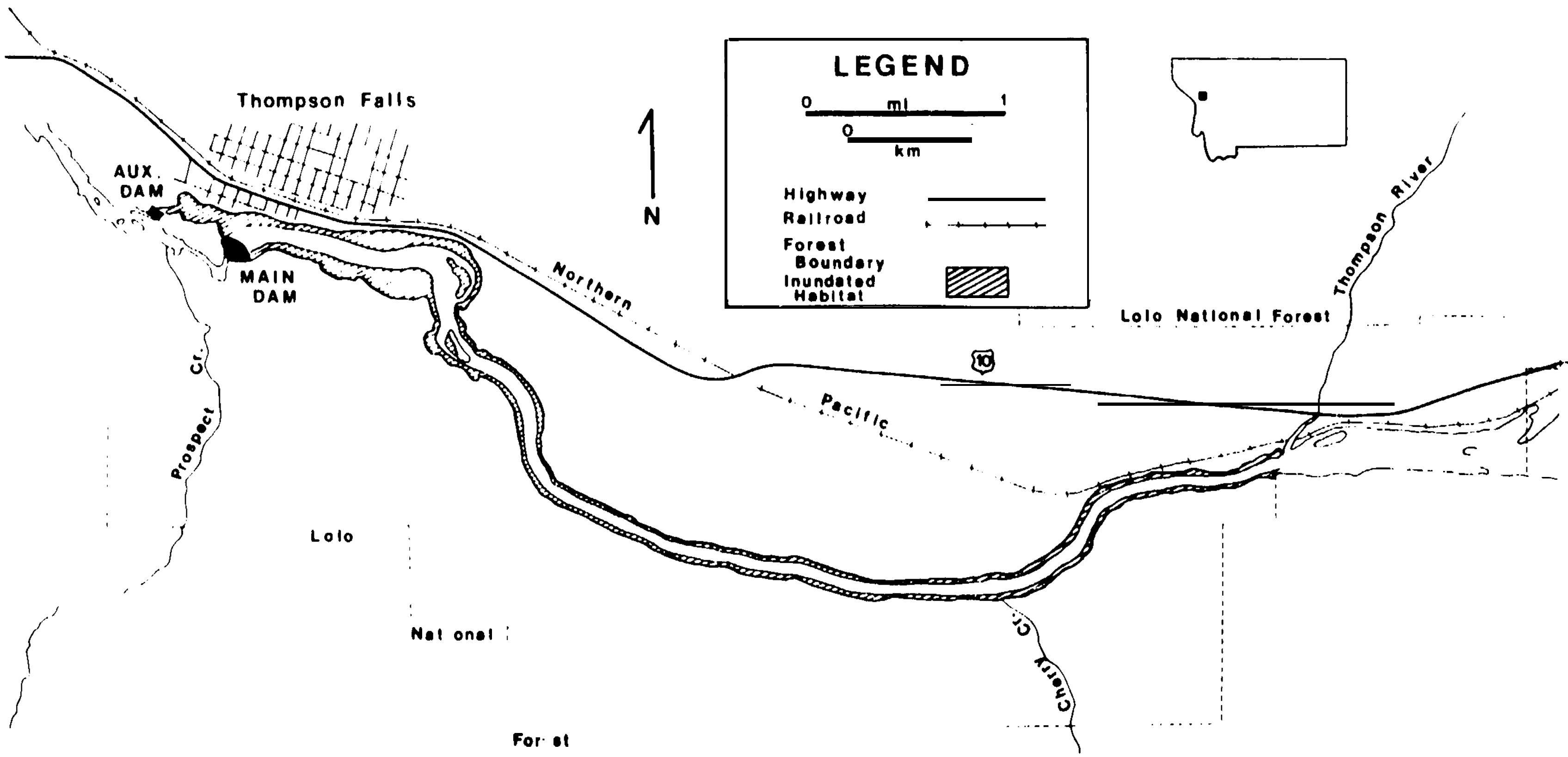


Figure 2 The estimated wildlife habitat acreage inundated (347 acres) within the 6 mile impact area of the Thompson Falls Reservoir.

should be noted that fluctuating water levels in run-of-the-river reservoirs are not conducive to supporting riparian vegetation: however, with the installment of the taintor gates in 1983 and the resultant stabilization of the reservoir, an increase in riparian vegetation may occur (Thompson 1983).

B. WHITE-TAILED DEER

1) Introduction

Historical records documented the presence of deer in the lower Clark Fork River valley as early as 1809 when David Thompson established the Salish House, a trading post, near Thompson Falls. Deer were apparently relatively common as records indicated Thompson and his crew survived on 145 deer during the first winter. No species distinction was made but the deer were described as generally small and of slight stature (White 1950). Ross Cox of the Northwest Fur Company survived on deer killed along the Clark Fork River near Thompson Falls during the winter of 1812 (Koch 1941). In the 1840's, W. A. Ferris during one winter killed 46 deer (Ferris 1873). Toward the end of the century, deer were still common as indicated in a letter dated January 19, 1890 written by D. V. Herriott, an early Thompson Falls resident, "There is an abundance of all kinds of game here. Deer, prairie chickens, grouse, ducks, mountain sheep, mountain goats, elk and in fact every kind of game in abundance" (Dufresne 1976).

In 1910, approximately 60 percent of the Cabinet National Forest, which surrounds the lower Clark Fork River, was burned by a forest fire. This may have affected distribution and survival of white-tailed deer due to a decreased availability of preferred habitat. The construction of Thompson Falls Dam likely compounded this problem.

With the establishment of the Cabinet National Forest in the early 1900's came the first detailed records of game species. Although just estimates, these early records gave useful perspectives on population trends. The Forest Service attempted to estimate deer populations as early as 1919. White-tailed deer were not classified separately until the mid 1930's when reports suggested dramatic increases in their numbers. By the late 1950's, white-tailed deer populations were believed to be at record highs.

2) Seasonal Habitat Preference

Various studies have described the distribution and habitat use of white-tailed deer in northwestern Montana. In the Swan River Valley, researchers identified important summer range as mesic sites in association with a diversity of habitat types including dense coniferous forests (Mackie et al. 1980). Winter range was described by Mundinger (1982) as riparian habitat with variable use of timbered upland habitat. River bottomlands were identified as primary winter range for white-tailed deer in the Fisher River and Kootenai River drainages (Blair 1955). Mixed riparian hardwoods and open ponderosa pine stands found on south and west slopes were two general forest types identified on these winter ranges. During average winter conditions, deer were distributed throughout the two types Under severe winter conditions, deer were restricted to the riparian lands and lower benches (Zajanc 1948, Blair 1955).

White-tailed deer found along the lower Clark Fork River show similar habitat preferences. During the mid to late 1930's, the Cabinet National Forest initiated "winter game studies" that identified 22 important deer winter ranges (original maps are on file Region One headquarters, MDFWP, Kalispell). All but six of the areas were located along the Clark Fork River bottom and the mouths of several important drainages (Duvendack 1935).

Meadows (1937) indicated that with deep snow conditions deer utilized Douglas fir thickets feeding on cedar and fir needles, mountain maple, serviceberry, lichens, and ceanothus (Ceonothus spp) depending on availability. Cedar furnished about 90 percent of the forage to the deer on the Dead Horse and Bull River units during late winters. Roemer (1938) observed white-tailed deer in the upper Thompson River area concentrated in the Douglas fir-larch stands.

White-tailed deer were reported as the most numerous big game species west of Thompson Falls (Rognrud 1950a). The deer wintered along the Clark Fork River and near the mouths of the lesser drainages. The map included in Rognrud's 1950 report combined all the winter range areas identified by the Forest Service in the 1930s and delineated the entire Clark Fork River bottom as important winter range.

3) Population Status

The earliest estimates of deer populations were made by the Cabinet National Forest. Numbers of deer estimated for the entire Forest are available from 1919 to 1939 (Appendix A). These early figures represent estimates of the district managers based on daily sightings and are not based on systematic surveys. These estimates are useful primarily for determining historic trends of increases or declines in the deer populations. These estimates document the increasing trend in deer populations during the early 1900's.

Estimates made during the period 1934-1938 were likely more accurate since the Forest Service hired personnel to make estimates of deer populations based on browse surveys and specific counts. Estimates for each winter range area were combined for each year to give a total estimate for the lower Clark Fork River (Table 1). An average figure of 1,707 deer was calculated from the three years data.

Population estimates of big game species were made by Montana Department Fish and Game (MDFG) during the early 1950's (Couey 1951, 1952, 1953, 1955). The estimates for the Clark Fork Management Unit (including the lower sections of the Flathead River and the St. Regis River) indicated a sharp increase in white-tailed

Table 1. Population estimates of deer found on winter range along the Clark Fork River from winter game studies.

Year	Numbr of deer for the Cabinet National Forest	Number estimated along Clark Fork
1934-1935	8,342	1,525
1935-1936[2]	10,300	1,875
1936-1937[3]	9,997	1,721

[1] Duvendack (1935)
[2] Roemer (1936)
[3] Meadows (1937)

deer numbers by the mid-1950s (Appendix B).

Winter range surveys conducted by MDFG personnel during the winters of 1949 and 1950 give the best estimates of white-tailed deer populations. McDowell (1949) estimated 2,200 white-tailed deer in the area from Eddy Creek (east of Thompson Falls) to Beaver Creek (west of Thompson Falls) along both sides of the Clark Fork River. Rognrud (1950a) surveyed the area from Beaver Creek to the Idaho line and estimated 1,375 white-tailed deer in the bottom along the Clark Fork River and the mouths of the lesser drainages. Of that total, 700 white-tailed deer were found strictly along the Clark Fork River.

4) Assessment of Impacts

The major negative impact on the white-tailed deer population due to the creation of the Thompson Falls Reservoir has been the loss of important winter range by inundation. Approximately 259 acres of white-tailed deer winter range were inundated. The importance of the habitat was likely emphasized by the 1910 fire, as the remaining unburned bottomland vegetation became critical islands of habitat (J. Peek 1983, pers. commun.)

The second impact has been the loss of deer by drownings in the ice-covered reservoir. The hazards to deer attempting to cross impounded areas were recognized by the U.S. Fish and Wildlife Service (U. S. Dep. Inter. 1959). The Thompson Falls Reservoir freezes over nearly every year during the winter months (H. Crawford 1984, per-s. commun.). A. H.Cheney (1983,pers. commun.) and Tuffy Smith (1983, pers. commun.) both recalled an incident of 35 white-tailed deer drowning just east of Thompson Falls. Faye Couey (1983, pers. commun.) and Merle Rognrud (1983, pers. commun.), both retired MDFG biologists, also recalled reports of deer drowning. The current MDFWP game warden, Chester Lamoreux receives many reports of drownings during severe winters. Mr. Lamoreux (1983, pers. commun.) recalled one incident of 13 deer found in Vermillion Bay. All persons interviewed believed the losses were more significant during severe winters. When considered over the lifetime of the reservoirs, the total losses can contribute to a sizeable loss of deer.

5) Estimated Losses Due to the Project

-Quantitative loss estimate for the Thompson Falls Reservoir:

-Number of acres of habitat inundated - 259

-Range of white-tailed deer numbers negatively affected - 21-47

-No quantitative loss estimates were determined due to drownings or other losses attributable to hazardous ice-covered reservoir conditions,

6) Derivation of Loss Estimates

Several assumptions have been made in order to estimate white-tailed deer losses.

1) The most significant impact to white-tailed deer populations occurred because of the loss of important winter range. It is assumed that adjacent winter range was at carrying capacity.

2) The deer are evenly distributed throughout the winter range. This is a simplified statement of complex habitat use, but necessary in order to calculate deer numbers per acre with available information.

3) Deer densities are similar throughout the lower Clark Fork River.

4) Density estimates from other areas in northwestern Montana are comparable to the lower Clark Fork River area. Areas used for comparison were selected based on location (all occurred in northwestern Montana) and similar habitat.

5) Early population estimtes made by the Forest Service are useful only in determining range of figures.

These assumptions were necessary in order to make reasonable estimates based on available information.

Density estimates from deer studies in northwestern Montana were used to define the loss estimates. Using strip count methods, McDowell (1950) reported density figures of 0.13 deer/acre in 1949 and 0.18 deer/acre in 1950 for an average of 0.155 deer/acre for white-tailed deer wintering in the Thompson River drainage. Yde and Olsen (1983, see Volume I) used the density figure of 0.155 deer/acre in their loss estimates along the Kootenai River. After five years of research on white-tailed deer in the Swan River Valley, Mundinger (1983, pers. commun.) believes a density of 100 deer per square mile (0.156 deer/acre) is a realistic estimate for winter range. Janke (1977) and Slott (1979) studies from the Clearwater River area also likely reflect conditions found in the Thompson Falls vicinity. They reported density estimates of 0.08 and 0.12 deer/acre on winter range. Lacking pre-impoundment, site specific deer density estimates, it was felt that a region-wide density range would give the best estimates for the lower Clark Fork River area. The low and high density estimates were used to set the bounds of the loss estimate range. Therefore, based on the density range of 0.08 and 0.18 (deer/acre) and the estimated loss of winter range acreage (259 acres), a range of 21-47 white-tailed deer were estimated to be lost.

C. MULE DEER

1) Introduction

The early historical records on deer reported in the previous section on white-tailed deer undoubtedly included a percentage of mule deer. Mule deer were native to the Clark Fork River area and were present during the construction of all three projects. Mule deer were not mentioned separately as a species until the U. S. Forest Service records of 1937 (Weckwerth 1959).

2) Seasonal Habitat Preference

The early Forest Service winter game studies indicated important deer winter range occurring along the Clark Fork River and the lesser drainages. Mule deer wintered at the higher elevations within these ranges above the white-tailed deer concentrations (Roemer 1936). The deer started to concentrate on winter ranges by December 15 seeking south slopes. As snow became deeper, deer concentrations on the lower slopes became greater and were heaviest during late winter (Duvendack 1935). Rognrud (1950a) also reported finding mule deer at the higher elevations of known winter ranges in his surveys of the Noxon area. A more recent document, Mackie et al. (1976), reported mule deer wintering in each of several creeks of the Clark Fork drainage. Typically mule deer occurred at mid to upper slopes and in close association with old burns. The timbered areas were dominated by ponderosa pine and Douglas fir.

Little information exists on other seasonal habitat use by mule deer in the lower Clark Fork River area. However, Meadows (1937) reported that during spring deer concentrated on the bottoms along the river and at low elevations where green grass had begun to appear in abundance. A percentage of these deer were probably mule deer as evidenced by a more recent study. Henderson (1983, pers. commun.) radio-collared mule deer in the 20-Odd Mountain area and tracked their use of the river bottoms from the end of March to the end of May. A few of the deer remained on the lower bottoms throughout the summer.

These spring "green-up" areas provided nutritious forage necessary to ensure good physical condition prior to parturition and lactation. The importance of high quality spring range and increased productivity in deer has been documented (Cheatum and Severinghaus 1950).

3) Population Status

McDowell (1949) was able to estimate 1,600 mule deer for the Thompson Falls area (excluding the Cherry Creek game preserve). MDFG estimates for mule deer in the entire Clark Fork Management Unit are reported in Appendix B.

4) <u>Assessment of Impacts</u>

Available data did not indicate loss of any known mule deer winter range due to inundation.

The loss of important spring habitat was a major impact on the mule deer population. A detrimental impact to the mule deer population was assessed due to reduced productivity with loss of important spring range. Mautz (1978) summarized the importance of high quality seasonal range and the effects on fawn size and fawn survival.

5) <u>Estimated Losses Due to the Project</u>

- Quantitative loss estimates for mule deer were based on the loss of important spring range:

  - Total number of acres inundated by the reservoir - 347 acres

  - Acres of grassland/hay meadow lost (determined from percentages occurring at the Noxon Rapids and Cabinet Gorge reservoirs) - 41-64 acres

6) <u>Derivation of Loss Estimates</u>

To determine the range of acres of important spring range inundated by the Thompson Falls Reservoir, the total number of acres inundated (347) was multiplied by the percentage of spring range found prior to construction of the Noxon Rapids and Cabinet Gorge reservoirs (18.3 and 11.9 percent, respectively):

Spring range (grassland/hay meadows)

Noxon Rapids .183 x 347 acres = 64
Cabinet Gorge .119 x 347 acres = 41

D. ELK

1) Introduction

Elk were uncommon in the lower Clark Fork River valley during the early 1800s David Thompson made no mention of the elk during his second winter near Thompson Falls White 1950). The elk populations apparently increased by the late 1800's, as one Thompson Falls resident wrote that elk were abundant (Dufresne 1976).

In 1912, thirty-eight elk from Yellowstone National Park were released a few miles east of Thompson Falls to augment the native herd. In 1933 the Cherry Creek Came Preserve was created to provide sanctuary for the growing elk herd and by 1949 the herd had nearly doubled in size and severe overuse of winter range was noted. The preserve was abandoned in 1950 (Rognrud 1950b), and the elk dispersed westward. Introductions of 75 elk near the Vermillion River in 1951 and 28 elk near McKay Creek in 1960 further increased the herd. A large population currently occupies areas on the north and south side of the lower Clark Fork River.

2) Seasonal Habitat Preference

Habitat use during winter was described in several reports. South slopes at mid elevations were selected during normal winters. Elk concentrated on lower slopes as snow became deeper during late winter (Duvendack 1935). During periods of severe winter conditions elk moved into the creek bottoms and flats along the Clark Fork River when deep, crusted snow made foraging impossible on the lower slopes (McDowell 1949). The use of bottomlands by elk during severe winter conditions and the potential for interspecific competition with white-tailed deer has been noted on other northwestern Montana elk herds (Blair 1955).

Elk disperse from their winter concentrations on to spring range including the sites of early "green-up". Diverse scattered habitats were utilized through fall.

3) Population Status

Early U. S. Forest Service records document the estimates of elk populations (Appendix A). The Cabinet National Forest records indicated a sharp increase in numbers following the establishment of the Cherry Creek Game Preserve in 1933 (Appendix C). Montana Department of Fish and Game estimates for the Clark Fork Management Unit indicated increased numbers of elk from 1950 (2830) to 1954 (4170) (Appendix B).

4! Assessment of Impacts

Due to the low population numbers present at the time of consttruction of the Thompson Falls Dam, a negligible impact was assessed due to inundation of spring and winter range. No quantified loss estimate was determined.

E. BEAR

1) Introduction

Black bears were historically common in the lower Clark Fork River area. The earliest attempt to estimate their population was made by the US. Forest Service in 1921 (Appendix A). Reports of increasing black bears coincide with the extensive domestic sheep grazing on Forest Service lands following the 1910 fire. Paul Harlowe (1983, pers. commun.), a local rancher, recalled black bears "were common along the bottomlands and we always had trouble with our sheep bands". Apparently a number of bears, both black and grizzly were shot during this period, but no records of actual numbers were kept. Sheep grazing on Forest Service lands continued through the 1940's.

Grizzly bears, currently a threatened species in Montana, have historically inhabited the Clark Fork River drainage. Halvorson (1974) mapped approximate locations of 89 historical observations. All locations were north of the river at higher elevations: however, one grizzly bear kill was recorded at Trout Creek in 1953 (Rognrud 1954). Later observations in the 1970's record grizzly bears in the lesser drainages on the south side of the river. A known grizzly bear population currently occupies the Cabinet Mountain Range (W. Kasworm 1983, per-s. commun.).

2) Seasonal Habitat Preference

No detailed study of habitat use by black bears in the lower Clark Fork River area was available. Only broad generalizations were reported in existing big game references, i.e. "black bears are common throughout the Thompson Falls district" (Weckwerth 1959).

Studies of black bears in other areas of northwestern Montana revealed that permanent home ranges were found in forested low elevation areas. These forested habitats were sites of old burns in various seral stages. Stream bottoms and meadows were seasonally used in early and mid-summer (Jonkel and Cowan 1971). These riparian areas were particularly important as sites of high nutritional forage, influencing reproductive potentials of black bears. Rogers (1974) suggested a relationship between nutritional inadequacy and reduced reproductivity due to smaller litters, reduced frequency of litters and a raising of the minimum breeding age.

The riparian areas also provide important denning sites for black bears. The base of a hollow tree was the site most often used in denning (Jonkel and Cowan 1971). The majority of black bear dens were found at the base of hollow cottonwoods in the Fisher River bottomlands (Gillespie 1977).

Specific habitat use by grizzly bears in the Clark Fork drainage is unknown. A current research project in the Cabinet Mountains will determine habitat preference. Generally, grizzly bears prefer relatively open areas with early successional sites being prime grizzly habitat (Erickson 1976). Riparian areas are "key" habitat for grizzly bears during spring (C. Jonkel 1983, pers. commun.), while early successional shrubfields provide important forage areas in late summer and fall.

3) Population Status

U.S. Forest Service estimates of black bears found in the entire Cabinet National Forest were available for the years 1921-1939 (Appendix A). These estimates suggest a trend of increasing numbers of black bears by the late 1930's following a population decline in 1931. Estimates made by MDFG for the Clark Fork Management Unit suggest a decline in black bear numbers from 1950 (1,325) to 1954 (925) (Appendix B).

Population estimates from U.S. Forest Service records dated 1922-1939 (Appendix A) indicate a small population of grizzly bears within the Cabinet National Forest. A general decline in numbers was noted after 1930. Between five and 25 grizzly bears were estimated by the Trout Creek and Noxon ranger districts during the construction periods for the Cabinet Gorge and Noxon Rapids dams (Weckwerth 1959). Montana Department of Fish and Game estimates of grizzly bears in the Clark Fork unit were as follows: 1951 - 18; 1952 - 25; 1953 - 40; and 1954 - 20 (Appendix B).

4) Assessment of Impacts

The inundation of riparian and upland shrub habitat resulted in the loss of key foraging sites during spring and late summer for both species of bears. Additionally, black bear denning sites were likely lost. The presence of grizzly bears on both sides of the Clark Fork River suggests that possible travel corridors have been interrupted 'by the creation of the reservoirs (C. Jonkel 1983, pers. commun.).

5) Estimated Losses Due to the Project

-Quantitative loss estimate for bears is based on the loss of important foraging areas:

	Cabinet Gorge	Noxon	Thompson Falls	
	(% total)	(% total)	Inundated acres	Acres lost
Grassland/hay meadows	.119	.183	x347	4164
Shrub steppe	.157	.122		42-54

6) **Derivation of Losses**

The negative impacts associated with loss of denning sites and disruption of travel corridors was unquantifiable. To determine losses attributable to inundation of important forage sites, the number of acres of grassland/hay meadows (41-64) and shrubfields (42-54) was calculated based on percentages from the Cabinet Gorge (.119 and .157) and Noxon Rapids (.183 and .122) projects.

F. MOUNTAIN LION

1) Introduction

The Clark Fork area has always been good mountain lion habitat (M. Hornocker 1983, pers. commun.). The historical presence of mountain lions in the Clark Fork drainage system has been documented. Albert Sales is reported to have killed over 500 mountain lions in the Thompson River area during his 40 year trapping career (Roemer 1936). Mountain lion sign was noted during surveys of winter ranges (Duvendack 1935, Meadows 1937, Roemer 1936, 19381. The use of river bottomlands by mountain lions in northwestern Montana was documented by Hornocker (1983, pers. commun.). Mountain lions probably utilized the areas impacted by the Thompson Falls project The concentrations of big game animals present on winter range within the inundated areas provided an abundant food source. No population estimates were available.

2) Assessment of Impacts

The loss of habitat capable of sustaining the prey base (deer) would have a detrimental effect on the mountain lion population (M. Hornocker 1983, pers. commun.). Additionally, the disruption of mountain lion territories would have a negative impact on the population. It is believed the disruption of mountain lion territories by the loss of habitat or prey base (ie. inundation of habitat by a reservoir) would displace individuals and have an adverse effect on lions occupying adjacent territories. The overall disruption of the territorial behavior would have a negative impact to the mountain lion population (M. Hornocker 1983, pars. commun.).

3) Estimated Losses Due to the Project

-No quantitative loss estimate for mountain lions was developed.

-Quantitative loss estimate for prey species:

White-tailed deer - 21-47
Yule deer spring range - 4164 acres.

4) Derivation of Loss Estimates

It was not possible to determine losses of actual numbers of mountain lions: however, because of the dependence of this species on ungulate prey species, it was agreed to express mountain lion losses in terms of the deer losses which occurred. The derivation of the loss estimates for white-tailed deer (21-47) and mule deer (41-64 acres spring range) were reported in previous sections.

G. BOBCAT

1) Introduction

Bobcats probably utilized the habitats flooded by the project. The abundant small mammal and bird populations associated with riparian habitats provided a prey base for resident bobcats. No current information is available to describe bobcat use of the remaining habitat: however, a current graduate student project in the area may define specific habitat requirements.

2) Population Status

No population estimates were available; however, Cooley (1957) reported that bobcats were increasing and were killed in considerable numbers by local residents along the lower Clark Fork River in 1956.

3) Assessment of Impacts

The flooding of the riparian areas and adjacent upland habitats, and the subsequent loss of the prey base supported by this habitat likely resulted in a detrimental impact on the resident bobcats (H.Hash 1983,pers. commun.).

4) Estimated Losses Due to the Projects

- No quantitative loss estimates were determined, although it was recognized that negative impacts occurred (loss of prey base). It was agreed, during coordination meetings, that adequacy of mitigation for bobcats will be assessed by interagency review during Phase 2. It is likely that mitigation aimed at other target species will include habitat manipulations which may result in an increased prey base adequate to offset negative impacts to bobcats.

H. RIVER OTTER

1) Introduction

Historical records document the presence of river Otter in the lower Clark Fork River drainage (Ferris 1873, US. Dep. Agric. 1919-1941). A longtime trapper of the 1920-1960 period, Carl Holmes, apparently trapped a number of river otter in the lower Clark Fork River (R Browne 1983, pers. commun.). Currently, one river otter has been sighted in the Martin Bay area of Noxon Reservoir (R Woodworth 1983, pers. commun.). Adjacent areas are known to support otters. U.S. Forest Service biologist Jerry Deibert (1983, pers. commun.) reports otters are found in the river reach near Plains (upstream from Thompson Falls). Three otter were trapped in the Thompson River during the past two years (S. Riley 1983,pers;.commun.).

2) Seasonal Habitat Preference

From studies of otters in Idaho, Melquist and Hornocker (1983) found that otters preferred valley to mountain habitats, and stream-associated habitats to lakes, reservoirs and ponds. Fish were the most important prey species. Kokanee salmon, largescale suckers, and mountain whitefish were the three major fish species occurring in their diets.

Seasonal habitat use was described by Melquist and Hornocker (1983). Open marshes, swamps and backwater sloughs found along rivers were used most often during summer. Unobstructed forest streams were used during winter. Activity centers were often located at log jams especially during the fall.

Den and resting sites were selected based on the protection and seclusion they provided. Natural formations and man-made structures were used. Active and abandoned beaver bank dens and lodges were used more often than any other kind of den or resting site. Dense riparian vegetation was also a preferred resting site.

3) Population Status

The Cabinet National Forest estimated five otters per year from 1938-1941 for the entire forest (U.S. Dep. Agric. 1919-1941). Montana Department of Fish and Came harvest records for the years 1956-1964 ranked District 1 (northwest Montana) second in total harvest. The annual harvest ranged from 14-25 otters with an average of 17.4 otters (Rongrud 1964).

Melquist and Hornocker's (1983) study in west central Idaho provides the only density estimates for river otter in the northern Rocky Mountains Based on their studies of the Payette River drainage, they reported a density range of 2.7 km and 5.8 km per otter for ail 'habitats considered (including streams, lakes, ponds, and reservoirs?.

4) Assessment of Impacts

The transformation of a river habitat to a reservoir habitat has resulted in the following impacts: 1) during clearing of the impoundment areas, riparian vegetation and natural obstructions such as log jams were removed; 2) reservoir fluctuations, prior to installation of taintor gates in 1983, exposed bare banks and mudflats offering little escape cover; 3) reduced beaver populations limited the number of bank dens and lodges available for otter den sites: and 4) flooding of marshes, swamps and sloughs removed summer foraging areas. The combined effect of these impacts has been detrimental to the river otter population. Reservoirs in the Idaho study were virtually unused by otters because there was insufficient escape cover and resting sites along the shoreline (W. Melquist 1983, pers. commun.).

5) Estimated Losses Due to the Project

-Quantitative loss estimates: (This indicates a loss of the ability of the habitat to support these individuals):

-Number of river otter lost due to inundation of habitat - 2-4

6) Derivation of Loss Estimates

The range of loss estimates was determined by combining the density estimates (2.7 km - 5.8 km per otter) from the Melquist and Hornocker study (1983) with the known length of waterway for the reservoir. The two density figures from the Melquist and Hornocker (1983) study represent the high and low estimates and were used to determine the loss estimate bounds:

9.6 km/5.8 (km/otter) = 1.6
9.6 km/2.7 (km/otter) = 3.5
Range = 2-4 river otters lost

The loss estimates assumed that all river otter were lost due to the construction of the Thompson Falls project.

I. BEAVER

1) Introduction

Early records document the presence of beaver on the lower Clark Fork River area (Ferris 1873, White 1950). By the late 1940's beaver were common and found all along the Clark Fork River and the lower sections of the side drainages (Cooley 1957, A. Cheney 1983, pers. commun). The first general beaver season occurred in the winter of 1953-1954. Population trends were monitored by aerial surveys and harvest information (Hawley 1957, 1958, Rognrud 1964).

2) Seasonal Habitat Preference

Beavers are known to occupy large rivers (Martin 1977) as well as small mountain streams. Due to the large volume of flow and the impossibility of construction of dams and lodges most beaver reside in bank dens, although lodges and dams have been found in side channels and backwater areas.

Willow and young cottonwoods are the primary food source on western Montana rivers (Townsend 1953). Winter food supplies are stored in caches in deep water near den sites.

3) Population Status

Beaver populations in the Cabinet National Forest were estimated for the years 1939-1941. An increasing trend from 1,550 to 2,300 beavers was noted (U.S.Dep.Agric.1939-1941).

Density estimates were available for the 1950's and are reported in Table 2. Montana Department of Fish and Game records indicated reduced beaver populations during 1956 in area 15, the lower Clark Fork River. Much of the stream surveyed fell within the Noxon Dam impoundment area and Fish and Game personnel reported that, "the deterioration of the habitat in the impoundment area, through brush clearing operations, has been coincident with the decrease in number of colonies counted" (Hawley 1958). A decline in numbers of beaver harvested occurred during the construction years of Noxon Rapids Dam (Table 3) and may reflect reduced beaver numbers; however, other variables such as current fur prices and normal population fluctuations may have also been responsible for reduced harvest figures.

Current MDFWP beaver cache surveys have focused on the area from Dixon to Thompson Falls and included the reservoir. The surveys do not distinguish caches found in the river versus the reservoir; however, the area biologist could not recall ever finding a cache within the main pool of the Thompson Falls reservoir (R Henderson 1984, pers. commun.). Evidence of current beaver activity within the reservoir has been reported by the MPC biolo-

Table. 2. Aerial colony counts of beaver trapping areas for Region 1, Montana Department of Fish, Wildlife and Parks. Area 15 is the same as the lower Clark Fork River area.[1]

Area	Colonies per Mile				
	1953	1954	1955	1956	1957
11a	.67	1.11	–	.45	.53
12a	.83	.67			.83
13	--	--	--	--	.71
15	.67	.42		.11	.36
16a	.45	.63	--	.11	.52
17	.71	.45	--	.42	1.25

[1] Hawley 1958.

Table 3. Numbers of beavers harvested in Region 1 (northwestern Montana).[1]

Year	Nunber
1954-55	2,000
1955-56	1,700
1956-57	1,100
1957-58	1,100
1958-59	1,100
1959-60	1,100
1960-61	2,100
1961-62	2,300

[1] Rognrud 1964.

gist (T. O'Neil 1984, pers. commun.). A current study in eastern Montana, supported by MPC, may further clarify the use of impounded areas by beavers. Based on limited data from one field season, beavers were found to occupy several reservoirs but in lower densities than adjacent free-flowing rivers (R Bown 1984, pers. commun.).

4) Assessment off Impacts

Data indicates an initial reduction in beaver numbers during construction of Noxon Rapids dam. It is assumed that a similar reduction occurred during construction of the Thompson Falls dam. Beavers currently occupy the reservoir but likely at lower densities than reported for the upstream free-flowing river. The ioss of cottonwood and willows, and the effect of reservoir fluctuations on dens and food caches offer sub-optimal. beaver habitat and is likely responsible for the reduced densities.

The indirect impacts have the potential to be more detrimental to the beaver population than the initial direct loss of resident beavers, as suggested by Martin (1977). Due to the operation of most reservoirs, regulated rivers do not exhibit peak flows, the primary influence responsible for the formation of new islands and gravel bars. Loss of islands and gravel bars in turn results in loss of the associated early seral species, willows and cottonwoods the primary food for beavers. Additionally, fluctuations of reservoir levels can expose bank dens, thereby increasing beaver losses by predation. Food caches may be washed away or frozen to the river bed, depending on the flow regime in winter (Martin 1977:. Prior to 1983, Thompson Falls Reservoir, a run-of-the-river project, exhibited seasonal drawdowns and probably impacted the beaver population similar to other reservoir projects. Since 1983 and the installation of the taintor gates, the seasonal drawdowns have been eliminated and the stabilized water levels probably do not have as severe of an impact to the beaver population.

5) Estimated Losses Due to the Projects

-Quantitative loss estimates: (Losses indicate an inability of the habitat to support these numbers due to dam construction and operation)

-Miles of river impacted	6
-Beaver colonies lost	l-3

5) Derivation of Loss Estimates

Pre-construction population indices of .30 and .63 colonies per mile for 1953 and 1954, respectively (Newby 1955), found on the Clark Fork River between Thompson Falls and Noxon, were used to determine the loss estimate ranae for the Thompson Falls project. These indices were combined with the miles of river impacted (6) to estimate beaver beaver colonies lost (2-4). This method assumes the area impacted by the Thomspon Falls Dam was similar to conditions for the Noxon Rapids Dam. It was agreed during the coordination meetings (January 30 and February 1, 1984) that the current presence of one beaver colony on the Thompson Falls reservoir (T. O'Neil 1983, pers. commun.) would be subtracted from the loss estimate (2-4 colonies) to develop the net loss of 1-3 beaver colonies.

J. BALD EAGLE

1) Introduction

No records were avaiiable to document bald eagle use of the lower Clark Fork River prior to the construction of the Thompson Falls dam. However, both Craighead (1983, pers. commun.) and Flath (1983, pers. commun.) believe the lower Clark Fork River supported wintering populations of 'bald eagles and probably a few nesting pairs. Adjacent areas, the Bull River and Lake Pend Oreille have historically (as well as currently) supported bald eagle populations (D. Flath 1983, pers. commun.).

Recent observations document bald eagle use of the lower Clark Fork River during winter (US. Dep. Inter. mid-winter bald eagle counts). Craighead and Craighead (1979) reported use of the ice-free areas of the lower Clark Fork during January. No nest sites are known.

2) Seasonal Habitat Preference

Food habits and habitat preference have been described by Craighead and Craighead (1979) for bald eagles on the Kootenai River. Riparian habitat was utilized for perching, hunting, and roosting. Generally trees of all species were used for hunting and nesting while cottonwoods were preferred for roosting. Gravel bars and shorelines were used for resting and foraging. During winters, bald eagles used open water areas for foraging.

A variety of food items were utilized. Mountain whitefish (*Prosopium williamsoni*) were a primary food source during fall spawning runs. Big game carrion was utilized during winter. Turbine damaged fish were utilized year-round. Migrating waterfowl and resident upland birds were also utilized as food.

3) Population Status

Current surveys of mid-winter bald eagle use of the lower Clark Fork River area have been conducted by the U.S. Forest Service for the U.S. Dep. Inter. mid-winter count. Mapping of the bald eagle sightings indicate the Thompson Falls reservoir was not used during ice-covered periods during the recent surveys (R. Krepps 1984, pers. commun.).

4) Assessment of Impacts

The main impact associated with the formation of the Thompson Falls reservoir has been the loss of wintering habitat for bald eagles. During periods of ice cover the availability of the food resource (fish) is reduced and limits the forage flexibility of the eagles during a time when the food resource may be a limiting factor. Additionally, the inundation of conifer and deciduous forests removed perching, hunting and nesting sites. Foraging and resting areas such as gravel bears were also lost. The clearing of the impoundment areas likely removed suitable nest sites for bald eagles.

5) Estimated Losses Due to the Project

-Quantitative loss estimate of 2-3 wintering bald eagles due to ice-covered conditions and reduced food availability was assessed

6) Derivation of Loss Estimate

The best available site specific information was used to develop the loss estimate bounds. It was assumed that density estimates for bald eagles found on impounded, open water reaches of the Clark Fork River would adequately reflect the number of eagles impacted by the loss of this habitat. Mid-winter counts for 1983 conducted by the U.S. Forest Service reported 14 eagles within 28 miles of river between the mouths of the Flathead and the Thompson rivers for a density of one eagle per 2.0 miles (R. Krepps 1984, pers. commun.). In 1979, Craighead and Craighead reported a density of one eagle per 2.7 miles for the open water reaches of the Clark Fork River. Combining these densities with the length of river affected by the Thompson Falls reservoir (6 miles), a loss estimate of 2-3 bald eagles was calculated.

K. OSPREY

1) Introduction

No records were available that document the osprey populations present prior to the construction of the Thompson Falls project.

2) Seasonal Habitat Preference

Ospreys require riparian areas for nesting sites and their primary food source - fish. Several studies document the presence of osprey on rivers, lakes and reservoirs in Montana (Grover 1983, Hinz 1977, MacCarter and MacCarter 1979, Swenson 1981). Nesting occurs along the shorelines and small islands. Preferred sites include live or dead conifer trees, cottonwood snags, and power poles (MacCarter and MacCarter 1979).

3) Population Status

No population estimates were available to determine the status of the osprey prior to construction of the Thompson Falls dam. A marked decline in osprey populations was documented in the eastern United States during the 1950's and 1960's (MacCarter and MacCarter 1979). A similar decline likely occurred in the western half as well, and may have been reflected in low numbers of osprey occupying the lower Clark Fork River areas.

Currently two osprey nests are found near the Thompson Falls reservoir (T. O'Neil 1984, pers. commun.). One nest, known to be active, is located near the mouth of Prospect Creek. The second nest, found on a platform on a power line tower adjacent to the reservoir, is not currently active and is in a state of disrepair. It is assumed that this site was active at one time although no records to document this were found.

4) Assessment of Imacts

Increased use of reservoirs by osprey has been documented elsewhere in Montana (Grover 1983, Swenson 1981). It is assumed that increased use by osprey also occurred on the Thompson Falls reservoir.

5) Estimated Losses/Gains Due to the Proiect

- A quantitative estimate of a net gain of 1-2 osprey nests was assessed for the Thompson Falls reservoir.

6) Derivation of Gain Estimates

The impact estimate was determined by comparing the number of nests currently present (2) to the probable number present before the reservoir. It was assumed that unimpounded river areas would reflect pre-dam conditions. MPC supplied data that indicated a density of 0.12 nests per mile along the Flathead River (T. O'Neil 1984, pers. commun.). Combining this density (0.12 nests per mile for unimpounded rivers) with the number of river miles inundated by the Thompson Falls reservoir (6 miles), it was determined that 1 nest would be expected to have occurred prior to construction of the dam. To calculate the net effect, the pre-construction estimate of 1 nest was subtracted from the current nest number (2) to derive the net impact of a gain of 1 nest. A range of 1-2 nests gained was established in order to allow for flexibility in determining mitigation goals. It should be noted that credit was given for 2 active nest sites, even though only 1 nest site is documented to be active.

l. RUFFED GROUSE

1) Introduction

Ruffed grouse were probably the most common upland game bird inhabiting the impact area prior to inundation. The mixture of deciduous and conifer habitat types are typically utilized by ruffed grouse for yearlong habitat (Hungerford 1951). It was assumed that nesting and brood rearing habitat was provided by the deciduous habitat type found within the mixed conifer/deciduous habitat.

2) Assessment of Impacts

Approximately 347 acres of habitat was inundated when the project was completed. Ruffed grouse occupied a majority of the impact area. The loss of yearlong habitat capable of sustaining resident grouse populations had a negative impact on the grouse population.

3) Estimated Losses Due to the Project

-The quantitative loss estimate for ruffed grouse due to the loss of yearlong habitat: 28-54 ruffed grouse.

4) Derivation of Loss Estimates

Density estimates from various studies (Landry 1980) were reviewed to determine a reasonable estimate for western Montana. The density estimates summarized by Landry (1980) ranged from 0.07 - 0.55. It was assumed that the density range reported for northern Idaho (0.11-0.21; Hungerford 1951) would most adequately reflect populations in western Montana. It was agreed to combine this density range with the acreage of ruffed grouse habitat lost to determine numbers of ruffed grouse lost. The number of acres of ruffed grouse habitat was determined by taking the original 347 acres inundated by the reservoir and subtracting 88 acres that occurred adjacent to the town and likely did not support grouse populations. The resultant acreage figure (259) was combined with the density range (0.11-0.21) to calculate the loss of 28-54 ruffed grouse.

M. WATERFOWL

1) Introduction

No breeding or winter surveys of waterfowl were available prior to construction of the dam. Historical records document the presence of geese, ducks and swans on the lower Clark Fork River (White 1950, Dufresne 1976). Cavity nesting species such as the common merganser and the common goldeneye were probably present (J. Ball 1983, pers. commun.). Mallards, upland nesters, were probably also found on the lower Clark Fork River. Canada geese were common on the Clark Fork River above Plains during the 1950's and probably nested on islands on the reach of river below Plains as well (J. Craighead 1983, pers. commun.).

Recent winter surveys reported the following species along the lower Clark Fork River: Canada geese, mallard, American wigeon common goldeneye, gadwall and the ring-necked duck (MDFWP unpublished data).

2) Population Status

Population estimates were not available for the years prior to or immediately after construction of the dam. It is assumed waterfowl densities were highest during spring and fall migrations. An unknown density of geese and ducks were residents in the winters and nested along the Clark Fork River. Canada goose breeding pair surveys conducted by U.S. Fish and Wildlife Service from 1976 to 1983 indicate an average of one nesting pair per mile less occurring on the Noxon Reservoir than on the free-flowing river (Table 4).

3) Assessment of Impacts

Waterfowl production was negatively affected by the formation of the Thompson Falls reservoir. Cavity nesting sites utilized by some ducks were likely removed during clearing of the impoundment area. At least one island and numerous gravel bars, preferred nesting and loafing sites Bellrose 1976) were inundated. Important brood rearing areas were lost with the inundation of grassland habitats adjacent to the river. The negative impact to canada goose production as a result of construction of hydroelectric projects has been documented. Bowhay (1972) reported a 67 percent reduction in the goose production the first year following construction of hydroelectric projects in Washington. The reduction of productivity was attributed to loss of nesting sites (islands) and reduced brood size.

Food resources preferred by waterfowl species were likely negatively affected by the formation of the reservoir. The loss of sloughs and marshes reduced the aquatic vegetation food resource. The importance of macroinvertebrates as a food resource has been documented (Sugden 1973). Changes in the species composition of

Table 4. U.S. Fish and Wildlife Service surveys of Canada geese nesting pairs found on the lower Clark Fork River.[1]

Year	Thompson Falls to Noxon		Plains to Thompson Falls	
	Total pairs	Pair/mile	Total pairs	Pair/mile
1976	34	.83	65	2.32
1977	48	1.17	75	2.68
1978	43	1.05	50	1.79
1979	57	1.40	94	3.36
1980	53	1.30	65	2.32
1981	53	1.29	62	2.21
1982	35	.85	31	1.10
1983	75	1.83	60	2.14
$\bar{x}$=	49.75	1.22	62.75	2.24

· U.S. Departmetn of Interior, Fish and Wildlife Service, unpublished data.

macroinvertebrates due to impoundment of rivers has also been documented (Bonde and Bush 1982, McMullin 1979).

The formation of reservoirs may have had a positive impact in providing stop-over areas for migrating waterfowl. The large open water attracts geese (J. Craighead 1873, pers. commun.). The apparent increase in geese believed to occupy the reservoirs (R Henderson 1983, pers. commun., H. Knowlton 1983, pers. commun.) may reflect the general trend of increasing numbers of geese throughout the Pacific Northwest (J. Ball 1983, pers. commun.). Intensive management efforts on the Ninepipes Wildlife Refuge, Flathead Lake and the Flathead River may be responsible for the apparent increase (R Weckwerth 1983, pers. commun.).

A second positive impact can be attributed to the creation of Thompson Falls reservoir. Prior to 1983, the annual spring draw-down resulted in the creation of at least two mudflat areas within the main pool of the reservoir. These areas were preferred by goose broods and are believed to have resulted in increased number of broods in the area (R. Henderson 1983, pers. commun.). Survey flights by U.S. Fish and Wildlife Service indicated brood concentration areas within Thompson Falls reservoir (on the lawn of the Forest Products office) and the big islands upstream from the Thompson River as well as, several sites near Plains and Paradise (H. Null 1984, pers. commun.). Since the installment of the taintor gates in 1983 and the resultant stabilizing of the reservoir, a 50 percent decrease of brood production in the Thompson Falls area was noted (T. O'Neil 1983, pers. commun.). Montana Power Company is managing a five acre parcel near an island used by nesting geese as potential brood-rearing habitat. Surveys during the next several years will determine if the current mitigation efforts will offset the inundation of the mudflats.

4) Estimated Losses/Gains Due to the Project

It was agreed by the participating entities that the net impact to waterfowl attributed to the Thompson Falls project would be "no effect" based on the balance of the negative and positive effects.

N. PREVIOUS MITIGATION

No projects have been undertaken at the Thompson Falls reservoir in order to mitigate the impacts to wildlife due to the construction of the original dam. However, in the current relicensing application for proposed expansion of the generation capacity, a temporary impact to nesting geese was indicated. To compensate for this potential impact, Montana Power Company constructed six rock-pillar type nesting structures on the mudflat within the main pool area. Although none of the nests were used by geese during the spring of 1983, Montana Power Company will maintain these structures and monitor their use.

With the installment of the taintor gates in 1983 and the subsequent stabilization of the reservoir, the mudflats used as brooding habitat were inundated. A 50 percent decrease in goslings reared occurred in the spring of 1983. To mitigate for this loss of brood habitat, Montana Power Company cleared nearly 5 acres of land adjacent to the reservoir and has planted the site with grass and legume species.

Sportsmen groups placed two wood duck nests on Rainbow Island within the main pool during spring, 1982. These nests were not monitored in 1983.

V. SUMMARY

The Thompson Falls dam inundated approximately 347 acres of wildlife habitat that likely included conifer forests, deciduous bottoms, mixed conifer-deciduous forests and grassland/hay meadows. Additionally, at least one island, and several gravel bars were inundated when the river was transformed into a reservoir. The loss of riparian and riverine habitat adversely affected the diverse wildlife community inhabiting the lower Clark Fork River area. Quantitative loss estimates were determined for selected target species (Table 5) based on best available information.

The loss estimates were based on inundation of the habitat capable of supporting the target species. Whenever possible, loss estimates bounds were developed by determining ranges of impacts based on density estimates and/or acreage loss estimates.

Of the twelve target species or species groups, nine were assessed as having net negative impacts. Based on the inundation of 259 acres of winter range, an estimated 21-47 white-tailed deer were lost from the population. Region-wide density estimates for winter range were used to calculated the estimate bounds. The estimated loss of 4164 acres of grassland/hay meadows, important spring range for mule deer, was assessed. This habitat also provided important foraging sites for both black bears and grizzly bears. Additionally, a negative impact to bears was assessed due to the loss of shrub areas (42-54 acres), important forage areas for bears during late summer. It was not possible to quantify mountain lion losses; however, the major impact was the loss of prey species and this impact was estimated. The loss of 21-47 white-tailed deer and 41-64 acres of spring range capable of supporting mule deer reduced the prey availability for mountain lions. A negative impact to bobcats was assessed due to loss of prey species supported by the habitats inundated. This loss was not quantifiable, however the bobcat losses will be addressed in the mitigation phase of this report.

An estimated 2-4 river otter were lost due to the tranformation of riverine habitat to reservoir habitat and the resultant loss of foraging, denning and resting sites. One to three beaver colonies were estimated to have been lost due to the sub-optimal conditions created by the reservoir. As a result of the reservoir becoming ice-covered during winter, food resources (fish) were unavailable for wintering eagles. An estimated 2-3 bald eagles were lost. Important yearlong habitat for ruffed grouse was inundated and an estimated 28-54 birds were lost from the population based on density ranges.

Negligible losses were assessed for elk due to the low population present at the time of construction of Thompson Falls dam. Only one species, osprey, was assessed a net positive impact. It was estimated that an increase of l-2 nests was attributable to the creation of the reservoir. A net effect of "no impact" was assess-

Table 5. Impact assessments for selected target species - the Thompson Falls dam.

Species/ Species group	Major Impacts	Quantitative Estimate
White-tailed deer	Loss of winter range	21-47 white-tailed deer
Mule deer	Loss of spring rang2	41-64 acres
Elk	Negligible losses	No quantitative estimate determined
Bear	Loss of spring and summer forage areas	41-64 acres grass/hay meadows
		42-54 acres shrub steppe
Mountain lion	Loss of prey species	21-47 white-tailed deer
		41-64 acres of spring rang2 for mule deer
Bobcat	Loss of prey species	not quantifiable
River otter	Loss of foraging, denning and vesting sites	2-4 otters
Beaver	Loss of optimal habitat	l-3 colonies
Bald eagle	Loss of winter food resource	2-3 eagles
Osprey	Increase in nesting	l-2 active nest sites
Ruffed grouse	Loss of yearlong habitat	28-54 ruffed grouse
Waterfowl	Loss of nesting and and brood-rearing sites; creation of brood-rearing sites and increased open water areas	Negative impacts balanced by positive impacts and mitigation efforts

ed for waterfowl based on the balancing of the negative impacts (loss of nesting and brood-rearing sites) and the positive impacts (creation of brood and stopover areas) as well as current mitigation efforts.

VI. REFERENCES CITED

Ball, I. J. 1983. Wildlife professor, U.S. Fish and Wildlife Service, Montana Cooperative Wildlife Research Unit, phone conversation, July 6, October 7 and personal interview, January 11, 1984.

Bellrose F. C. 1976. Ducks, geese, and swans of North America. Stackpole Books, Harrisburg, Pa. 543 pp.

Blair, R. M. 1955. Lincoln County deer management study. Montana Dept. Fish and Game, Quarterly Rept., April-June, 1955. Proj. W-36-R-5, Vol. VI, No. 2, Job No. VIII-A.

Bonde, T. J. H., and R. M. Bush. 1982. Limnological investigations: Lake Koocanusa, Montana. Part 1: Pre-impoundment study, 1967-1972. U.S. Army Corps of Engineers, Spec. Rept. 82-21. 184 pp.

Bowhay, E. L. 1972. Canada geese management on the Columbia and Snake rivers in Washington. Proc. Conf. West. Assoc. Fish and Game Comm. 52:360-373.

Bown, 1984. Graduate student, University of Montana, Missoula, phone conversation, January 23.

Browne, R. 1984. Trappar, Thompson Falls resident, personal interview, January 24.

Carothers, S. W. 1977. Importance, preservation, and management of riparian habitats: an overview. In: Importance, preservation and management of riparian habitat: A Symposium. R. Roy Johnson and Dale A. Jones (tech. coordinators). U.S.D.A. For. Serv. Gen. Tech. Rep. RM-43:2-4. Rocky Mtn. For. and Range Exp. Sta., Ft. Collins. Cola.

Cheatum E. L. and C. W. Severinghaus. 1950. Variations on fertility of white-tailed deer related to range conditions. Trans. N. Amer. Wildl. Conf. 15:170-190.

Cneney, A. H. 1983. Longtime resident of Thompson Falls and retired Montana Dept. Fish and Game game warden, personal interview, August 3.

Couey, F. M. 1951. State-wide cumulative record of big game data. Montana Fish and Game Comm. Quarterly Rept., April-June 1951.

__________. 1952. State-wide cululative record of big game data. Montana Fish and Game Corm., Quarterly Rept. April-June, 1952

__________. 1953. State-wide cumulative record of big game data. Montana Fish and Game Comm., Quarterly Rept., January-March 1953.

_____ 1955. State-wide culuative record of big game data. Montana Fish and Game Comm., Quarterly Rept., April-June 1955.

___________. 1983. Retired Montana Dept. Fish and Game wildlife biologist, personal interview, June 28.

Craighead, J. 1983. Wildlife biologist, Wildlands Research Institute, Missoula, phone conversation, October 4.

____________. and L. Craighead. 1979. An assessment of the ecological impacts of the Libby Additional Units and Reregulating Dam (LAURD) project and Libby Dam on the American bald eagle. Final Report, in cooperation with U.S. Army Corps of Engineers. Contract No. DACW67-78-C-0190

Crawford, H. 1984. Superintendent, Thompson Falls Dam, Thompson Falls, Montana, phone conversation, January 27.

Deibert, G. 1983. Wildlife biologist, Lolo National Forest, personal interview, August, 23.

Dufresne, L. 1976. A heritage remembered. Early and later days in the history of western Sanders County. Sanders County Ledger, Thompson Falls, Mt. 203pp.

Duvendack, G. H. 1935. Winter game studies, 1934-1935. U.S.D.A., Forest Service, Cabinet National Forest Rept.

Erickson, A. W. 1976. Grizzly bear management in the Thompson Falls area and adjacent environs. U.S.D.A., Loo National Forest Rept. 58pp.

Ferris, W. A. 1873. Life in the Rocky Mountains. A diary. Special collection, Univ. Mont. Library, Missoula.

Flath, D. 1983. Wildlife biologist, Montana Dept. Fish, Wildlife and Parks, phone conversation, July 8.

Gillespie, D. 1977. The ecology of a black bear denning area, March 30, 1977 - September 14, 1977. Unpubl. Senior Thesis - progress rept., Univ. of Mont., Missoula. 36pp.

Grover, K. 1983. The ecology of osprey on the upper Missouri River, Montana Unpubl. Master's Thesis, Montana State University, Bozeman. 58 pp.

Hlavorson, G. 1974. Historical grizzly bear imformation - Tnompson Falls Ranger District and selected areas of the Plains and Cabinet (Trout Creek) Ranger District. U.S.D.A., Forest Service, Lolo National Forest.

Harlowe, P. 1983. Longtime resident of Thomspon Falls, personal interview, October 1.

Hash, H. 1983. Wildlife biologist, Montana Dept. Fish, Wildlife and Parks, personal interview, September 6.

Hawley, V. D. 1957. Beaver population and distribution trends - aerial survey. Montana Dept. Fish and Game, Job Completion Rept. No. W-49-R-6.

___________. 1958. Beaver population and distribution trends - aerial survey. Montana Dept. Fish and Game, Job Completion Rept., Project No. W-49-R-7.

Henderson, R. 1983. Wildlife biologist, Montana Dept. Fish, Wildlife and Parks, personal interview, August 17 and phone conversation January 6, 1984.

Hinz, T. 1977. The effects of altered streamflow on migratory birds of the Yellowstone River Basin, Montana. Technical Rept. No. 7. Water Resources Div., Montana Dept. Nat. Resources and Conserv. 107pp.

Hornocker, M. 1983. Wildlife professor, Univ. of Idaho, Moscow, phone conversation, September 29.

Hungerford, K. E. 1951. Ruffed grouse populations and cover use in northern Idaho. Trans. N. Amer. Wildl. Conf. 16:216-224.

Janke, D. 1977. White-tailed deer population characteristics, movements, and winter site selection in western Montana. Dept. Fish, Wildlife and Parks, Job Final Report, Proj. No. W-120-R-7,8,9. 92 pp.

Jonkel, C. J. 1983. Wildlife professor, Univ. of Montana, phone conversation, September 8.

___________. and I. McT. Cowan. 1971. The black bear in the spruce-fir forest. Wildl. Monogr. No. 27. 57pp.

Kasworm, W. 1983. Wildlife biologist, Montana Dept. Fish, Wildlife and Parks, personal interview, September 1.

Knowlton, H. 1983. Longtime resident of Noxon, personal interview, August 16.

Koch, F. 1941. Big game in Montana from early historical records. J. Wildl. Manage. 5(4):357-370.

Krepps, R. 1984. Resource planner, U.S. Forest Service, Lolo National Forest, Plains, personal interview, January 10 and phone conversation January 27.

Lomoreux, C. 1983. Game warden, MontaM Dept. Fish, Wildlife and Parks, Thompson Falls, July 26.

Landry, J. L. 1980. Ecology and management of the ruffed grouse. Utah Coop. Wildl. Res. Unit, U.S.D.A. Forest Service Rept. 25 pp.

MacCarter, D. L. and D. S. MacCarter, 1979. Ten-year nesting status of osprey at Flathead Lake, Montana. The Murrelet 60: 42-49.

Mackie, R. J., K. L. Hamlin, H. E. Jorgensen, J. G. Mundinger, and D. F. Pac. 1980. Montana deer studies. Montana Dept. Fish, Wildlife and Parks. Job Prcg. Rept. Proj. W-120-R-11, Study No. BG-1.00, Job Nos. 1, 2, 3, 4.

____________________________ C. J. Knowles, and J. G. Mundinger. 1976. Statewide deer research. Montana Dept. Fish and Game, Job Prog. Rept. Proj. W-120-R-7.

Martin, P. 1977. The effect of altered streamflow on furbearing mammals of the Yellowstone River Basin, Montana. Tech. Rept. No. 6. Water Resources Division, Montana. Dept. Nat. Resources and Conserv. 79pp.

Mautz, W. W. 1978. Nutrition and carrying capacity. In: Big Game of Northe America, Ecology nd Management, eds. J. L. Schmidt and D. L. Gilbert, pp. 321-348. Stackpole Books, Harrisburg, Pa. 494 pp.

McCormick, J. R. 1978. An initiative for preservation and management of wetland habitat. U.S.D.I., Off. of Biological Serv., U.S. Fish and Wildl. Ser. 27 pp.

McDowell, L. 1949. Bitterroot - Clark Fork units: big game survey and investigation, winter 1948-1949. Montana Dept. Fish and Game, Quarterly Rept., January-March 1949. Project No. 1-R.

McDowell, L. 1950. White-tailed deer strip census in the Thompson River. Montana Dept. Fish and Game, Quarterly Rept., January-March 1950.

McMullin, S. L. 1979. The food habits and distribution of rainbow and cutthroat trout in Lake Koocanusa, Montana. M.S. Thesis, Univ. Idaho, Moscow. 80 pp.

Meadows, R. 1937. Winter game studies 1936-1937. U.S.D.A., Forest Service, Cabinet National Forest Rept.

Melquist, W. E. and M . G. Hornocker, 1983. Ecology of river otters in west central Idaho. Wild. Monog. Mo. 83. 60pp.

______________. 1983. Wildlife 'biologist, Univ. Idaho, Moscow, phone converstion August 12 and January 27.

Mundinger, J. 1982. Biology of the white-tailed deer in coniferous forests of northwestern Montana In: T. Itenky (Ed.) Fish and Wildlife relationships in old-growth forests. Proc. of the Northwest Section the Wildlife Society Symp., April 14-16, 1982. Juneau, Ak. (in press).

Newby, F. E. 1955. Beaver population and distribution trends-aerial survey. Montana Dept. Fish and Game, Quarterly Rept., April-June.1955.

Null, H. 1983. Wildlife biologist, U.S. Fish and Wildlife Service, National Bison Range, phone conversation December 20, and personal interview January 11, 1984.

O'Neil, T. 1984. Wildlife biologist, Montana Power Company, Butte, coordination meeting, December 21.

Peek, J. 1983. Wildlife professor, Univ. Idaho, Moscow, phone conversation, October 3.

Riley, S. 1983. Wildlife biologist, Montana Dept. Fish, Wildlife and Parks, personal interview, September 27.

Roemer, A. 1936. Winter game studies, 1935-1936. U.S.D.A., Forest Service, Cabinet National Forest Rept.

_________. 1938. Winter game studies, 1937-1938. U.S.D.A., Forest Service, Cabinet National Forest Rept.

Rognrud, M. 1950a. A prelimimry investigation of big game in the Noxon area. Montana Dept. Fish and Game, Quarterly Rept., January-March 1950. Project No. 1-R.

__________. 1950b. Census and distribution of elk in the Cherry Creek game preserve. Montana Dept. Fish and Game, Quarterly Report, July-September 1950. Proj. No. 1-R.

__________. 1954. Grizzly bear investigations and rechecks. Montana Dept. Fish and Game, Quarterly Rept., April-June. Project No. W-60-R-1.

__________. 1964. Fur resources survey - harvest data. Montana Dept. Fish and Game, Job Completion Rept., Proj. No. W-71-R-9.

__________. 1983. Retired Montana Dept. Fish and Game wildlife biologist, personal interview, July 5.

Siott, B. J. 1979. Population ecology and habitat relationships of white-tailed deer in coniferous forest habitats of northwestern Montana. Monana Dept. Fish, Wildlife and Parks, Job Final Rept, Proj. No. W-120-R-9,10,11. 62 pp.

Smith, T. 1983. Longtime resident and outfitter of Thomspon Falls, personal interview, September 8.

Sugden, L. G. 1973. Feeding ecology of pintail, gadwall, American wigeon and lesser scaup ducklings. Can. Wild. Serv. Rept. Ser. No. 24.

Swenson, J. E. 1981. Status of the osprey in southwestern Montana before and after the construction of reservoirs. Western Birds 12:47-51.

Thomas, J. W., C. Maser and J. E. Rodiek. 1980. Wildlife habitats in managed rangelands - the great basin of southeastern Oregon - riparian zones. U.S.D.A. For. Serv. Pacific NW For. and Range Exp. Sta. Gen. Tech. Rep. PNW-8

Thompson, L. S. 1983. Shoreline vegetation in relation to water level at Toston Reservoir, Braodwater County, Montana. Proc. Mont. Acad. Sci. 42:7-16.

Tilton, M. E. 1977. Habitat selection and use by bighorn sheep (Oris canadensis) on a northwestern Montana winter range. Unpubl. Master's thesis, Univ. Mont., Missoula. 121pp.

Townsend, J. 1953. Beaver ecology in western Montana with special reference to movements. J. Mamnn. 34(4):459-479.

U.S. Department of Agriculture. 1919-1941. Annual Wildlife Reports, Cabinet National Forest. U.S.D.A. Forest Service Rept.

US. Department of Interior. 1914. Profile surveys in the basin of Clark Fork of Columbia River prepared under the direction of R. B. Marshall, Chief Geographer. U.S.D.I. Geo. Survey Water Supply Paper 346.

U.S. Department of Interior. 1959. A preliminary survey of fish and wildlife resources of the Clark Fork River Basin, Montana, in relation to federal water development projects. U.S.D.I., Fish and Wildl. Ser., Portland, Oregon. 93 PP.

Weckwerth, R. 1959. Hunting district 12, a compilation of U.S. Forest Service and Montana Fish and Game records, notebook. MDFWP, Kalispell.

____________. 1961. District big game survey and investigations. Montana Dept. Fish and Game, Job Completion Rept., May 1960-April 1961.

Weckwerth, R. 1983. Regional game manager, Montana Dept. Fish, Wildlife and Parks, Kalispell, personal interview, September 16.

White, M. C. 1950. Editor. David Thompson's journals relating to Montana and adjacent regions 1808-1812. Mont. State Univ. Press. 345pp.

Woodworth R. 1983. Wildlife biologist, Washington Water Power Company, Spokane, phone conversation, November 17.

Yde, C. and A. Olsen. 1983. Wildlife loss estimates and summary of previous mitigation related to hydroelectric projects in Montana. Vol. 1 - Libby Dam project. Draft report, Montana Dept. Fish, Wildlife and Parks. 76 pp + appendices.

Zajanc, A. 1948. Lincoln County game study, 1947-1948. Montana Dept. Fish and Game, Quarterly Rept., April-June 1948.

Appendix A. Cabinet National Forest estimates of big game animals, 1919-1939.'

Year	Deer	Elk	Black bear	Grizzly bear
191	4,600	260		
1920	4,550	310		
1921	5,oco	369	510	19
1922	4,800	244	590	24
1923	5,260	288	610	41
1924	6,550	233	745	56
1925	8,250	298	835	51
1926	9,000	328	870	46
1927	9,240	300	910	37
1928	9,550	290	840	49
1929	9,400	300	750	57
1930	9,400	340	750	42
1931	5,000	290	520	20
1932	4,700	450	600	25
1933	4,200	500	600	25
1934	4,000	525	575	20
1935	8,500	500	550	20
1936	10,300	600	590	20
1937	11,000	700	600	20
1938	10,700	620	650	20
1939	10,600	650	670	25

· Department of Agriculture, 1919-1939.

Appendix Population estimates of big game in the Clark Fork Management Unit (MDFG)[1].

Year	Mule deer	White-tailed deer	Elk	Black bear	Grizzly bear
1950-51	9,250	6,050	2,830	1,325	18
1951-52	9,450	7,350	3,015	900	25
1952-53	9,000	6,400	2,755	890	40
1954-55	12,180	11,300	4,170	825	20

[1] Couey, F. 1951, 1952, 1953, and 1955.

Appendix C. Population estimates of elk in the Thompson Falls Ranger District-Cabinet Natinal Forest.[1]

Year	Estimate	Year	Estimate
1931	150	1946	500
1932	300	1947	400
1933	350	1948	400
1934	375	1949	1500
1935	400	1951	700
1936	525	1952	700
1937	525	1953	700
1943	500	1954	600
1944	600	1355	600
1945	650	1957	700

1 U.S. Department of Agriculture, Forest Service, 1931-1957.

REQUESTS FOR FORMAL REVIEW - THOMPSON FALLS PROJECT

Mr.. Paul Schmechel, President — no comments received
Montana Power Company
40 East Eroadway
Butte, Montana 59701

Mr. John Wood, Field Supervisor
U. S. Fish and Wildlife Service
Ecological Services
Federal Euilding, Room 3035
316 North 26th Street
Eillings, Montana 59101

Mr. Paul Erouha — no comments received
U. S. Forest Service
P. 0. Eox 7669
Missoula, Montana 59807

Mr. James Paro
The Confederated Salish and Kootenai
Tribes of the Flathead Reservation
P. 0. Box 98
Pablo, Montana 59855

Mr. James Flynn, Director
Attention: Dr. Arnold Olsen
Montana Department of Fish, Wildlife and Parks
1420 East Sixth Avenue
Helena, Montana 59620

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Ecological Services
Federal Building, Room 3035
316 North 26th Street
Billings, Montana 59101-1396

MAY 18 1984

Received MAY 18 1984

IN REPLY REFER TO:
ES

May 11, 1984

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

Dear Sirs:

As you requested, we have reviewed the document. "Final Report (March 27, 1984), Phase I Wildlife Impact Assessment and Summary of Previous Mitigation Related to Hydroelectric Projects in Montana, Volume Two(a) - Clark Fork Projects: Thompson Falls Dam, Operator: Montana Power Company," prepared by Montana Department of Fish, Wildlife, and Parks (MDFWP). In addition to reviewing the final document, we have met with the MDFWP and Montana Power Company on several occasions to discuss earlier versions of this document.

The subject document adequately describes the impacts to wildlife resources caused by construction and operation of the Thompson Falls Dams. It also appears that agreements reached during previous discussions between MDFWP, MPC, and FWS have been incorporated into this "Final Report."

We will attend the upcoming (May 24, 1984) coordination meeting to discuss any technical issues that may arise.

Sincerely,

John G. Wood
Field Supervisor
Ecological Services

cc: Field Supervisor, USFWS, Helena, MT (SE)
ARD, USFWS, Denver, CO (HR)
Director, Montana Department of Fish, Wildlife, and Parks, Helena, MT

JUN 14 1984

THE CONFEDERATED SALISH AND KOOTENAI TRIBES OF THE FLATHEAD RESERVATION

NATURAL RESOURCES DEPARTMENT
Box 98
PABLO, MONTANA 59855
(406) 675-4600

FLATHEAD NATION

June 6, 1984

Mr. James Meyer, Wildlife Biologist
Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208

Dear Mr. Meyer:

Thank you for the opportunity to review the Department of Fish, Wildlife and Park's Project Reports entitled, "Wildlife Impact Assessment and Summary of Previous Mitigation Related to Hydroelectric Projects in Montana: Volume two (a) Clark Fork Projects - Thompson Falls Dam and Volume three - Hungry Horse Project."

In general, we agree with the approach they utilized to assess impacts on wildlife due to inundation by these hydropower developments. In the final analysis there can always be discussion on actual values and numbers lost, but their statements on assumptions and criteria utilized, clarify procedures adequately.

Specifically, on Thompson Falls Project we offer these comments:
1- page 31; J.3) the mid-winter bald eagle count is coordinated by the National Wildlife Federation;
2- pages 33-34; K.6) Montana Power Company data indicating osprey nest density of 0.12 nests per mile along the Flathead River should reference Klaver et. al. 1982. Osprey Surveys in the Flathead Valley, Montana, 1977 to 1980. The Murrelet 63:40-45.

Specifically, on Hungry Horse Project, we offer these comments:
1- page 10 - we suggest they add goshawk to the raptor list of species with impacted habitat;
2- page 15-16 B.2) - "Within bottomland areas, mature timber provided thermal cover...." we suggest a discussion on the value of snow interception from these habitat areas be added as well.
3- page 48 K.1) - last paragraph - mid-winter survey data for

Flathead Lake in January, 1984 was 34 eagles and in January, 1982 was 26 eagles.
4- page 52 L.4) - we suggest reference to Klaver et. al. mentioned above for density figures on Flathead River and lake for additional baseline data.

Again, thank you for the opportunity to review these reports and feel free to contact us regarding these comments.

Sincerely,

James E. Paro, Director
Natural Resources Dept.

JEP/dch

Enclosure

Montana Department of Fish, Wildlife & Parks

Helena, MT 59620
July 9, 1984

Mr. Jim Meyer
Bonneville Power Adm. - PJS
P.O Box 3621
Portland, OF 37208

Dear Mr. Meyer:

This impact assessment presents a thorough and concise analysis of the impacts to the wildlife and wildlife habitat resulting from the construction of the Thompson Falls hydroelectric project. This assessment, based on a thorough review of the available site-specific information and pertinent literature, was developed by key professinals within the Montana Department of Fish, Wildlife and Parks. It incorporates comments received from the operator, Montana Power Company, and the various agencies involved in the management of the wildlife resource or habitat. The thorough review of the available information and the extensive coordination which has been completed has allowed for the development of a comprehensive assessment. It is an adequate documentation of the impacts to the wildlife population and wildlife habitat resulting from the construction of the hydroelectric project and represents good faith negotiations between Montana Power Company and the other participating agencies.

The assessments for the other hydroelectric developments corrently under consideration by the department include cualitative, as well as, quantitative impact assessments for the target species.

Qualitative loss estimates were deieted in the process of finalizing this impact assessment. They are, however, available and should be used as guidelines for determining levels of mitigation implemented.

Coordination between the operator, Montana Power Company, and the various agencies in the manaement of the wildlife resource during the development of mitigation alternatives wi 11 ensure mitigation of the impacts to the wildlife resources will be achieved.

Sincerely,

James W. Flynn
Directcr