Aquatic Inventory of Stockwater Reservoirs on Bureau of Land Management Lands in Carter County, Montana

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Introduction

The Bureau of Land Management (BLM) administers the unappropriated, unreserved residual lands of the United States. Lands under BLM jurisdiction comprise some 470 million acres, primarily in 11 western states and Alaska. The BLM is a multiple use manager striving to obtain the best possible mix of resource management practices.

The Miles City District of the BLM is responsible for administering 3,627,000 surface acres and 12,536,000 subsurface acres in Montana and South Dakota. The Box Elder Planning Unit comprising approximately 718,700 surface acres is the largest Planning Unit within the district. The BLM requires an intensive aquatic inventory of reservoirs within the Box Elder Planning Unit to fulfill its commitment to the most judicious use of the land and harmonious and coordinated management of the various resources.

The purpose of this project was to provide information to be used in evaluation of energy-related mineral exploration and development activities (oil, gas and uranium) in the planning unit. Additional benefits included determining impacts on aquatic resources from various resource management activities, and evaluating the existing fishery with possible expansion of the available fishing area and recreational opportunity.

Methods

The location of each reservoir was obtained from USGS topographic maps and BLM recreation access guide maps. A Reservoir Inventory Check List (RICL) was completed for each reservoir and photographs were taken. Problem areas, i.e., dam erosion, seepage and spillway washes were noted and photographed. These data were given to personnel of the BLM responsible for maintenance of the reservoirs.

Since many ponds are short lived due to heavy rates of siltation practical consideration was given to each reservoir to determine the extent of sampling required for adequate evaluation. The RICL was completed and photos taken for reservoirs lacking morphometric characteristics essential to a fishery. The remaining reservoirs were surveyed in the manner outlined in BLM manual "Lake and Reservoir Surveys 6672" and "Water Analysis for Fisheries 6674". Field notes were recorded on forms 6672-1 and 6674-3 and later transferred to Forms 6672-2 and 6674-4. Photographs were labeled with each ponds name, BLM project number and location. Depth was measured with a sounding line marked with .305m (1.0 ft.) graduations. The light penetration was measured with a standard 26.3 cm (8 in.) Secchi disc.

Analysis for dissolved oxygen, carbon dioxide, pH, phenolphthalein alkalinity, total alkalinity and total hardness were made with a Hach Water Ecology Kit. Temperature was measured with a standard field thermometer.

Fish populations were sampled by 38.1 m (125 ft.) x 1.5 m (5 ft.) monofilament gill sets. The nets were experimental, with meshes ranging

from 1.9 cm (3/4 in.) to 5.1 cm (2 in.). A dip net was used to sample populations of small fish.

Reservoirs that appeared to possess suitable habitat for game species were recommended for stocking.

The general criteria used to determine species to stock in a pond is as follows:

Rainbow trout: (*Salmo gairdneri*) Depth at least 3.66 m (12 ft.) over 50 percent of the pond area; low turbidity; temperatures less than 21°C (70°F); easily accessible, better than average pond.

Northern pike: (*Esox lucius*) Depth at least 3.05 m (10 ft.) over 50 percent of the area; temperatures less than 26.6°C (80°F); area greater than 5 surface acres; good vegetation to provide reproduction potential.

Walleye pike: (*Stizostedion vitreum*) Depth at least 3.05 m (10 ft.) over 50 percent of area; low turbidity; temperatures less than 26.6°C (80°F); rubble and/or gravel areas to provide reproductive potential; size no consideration.

Largemouth bass: (*Micropterus salmonides*) Depth greater than 2.135 m (7 ft.); temperatures less than 29.4°C (85°F); size, turbidity and vegetation no consideration.

RESULTS AND DISCUSSION

The 183 reservoirs studied were located in the southern half of Carter County, Montana. This relatively arid country is characterized by sagebrush-grassland vegetative type with large variations in the amount of ground cover. Natural rates of erosion are high in the area and may be accelerated by poor grazing practices. Continual inspection and evaluation of livestock use is necessary especially in areas around ponds used by waterfowl.

Four ponds were recommended for improvement of habitat for waterfowl. They are listed in Table 1. These ponds can be improved when routine maintenance is performed or when money is available specifically for such work.

Table 1. Ponds recommended for habitat improvement for waterfowl.

Pond	Township	Range	Section
Dead Cottonwood #501	9S	57E	28
Glenn Walker Dam	7S	59E	NWSW 11
N&S Butte Water Spreader #599	7S	60E	SWSW 24
Bonnie Reservoir #2274	9S	57E	NWSE 34

A summary of physical and chemical parameters is presented in Table 2. These measurements were taken under many varied conditions and should be interpreted in a general manner. Since most reservoirs did not have morphometric characteristics essential to a fishery chemical analysis was performed on only 57 reservoirs. The field season commenced prior to receiving some chemical reagents, therefore, complete analysis was not possible during the first trip. Reservoirs containing populations of fish are shown in Table 3. Four reservoirs had existing populations of fathead minnows. This species is a forage species for game fish; however, their presence alone does not indicate potential for game species. This minnow is often found in habitats devoid of game species and can tolerate low oxygen conditions, high turbidities and a wide range of temperatures and alkalinity (Brown 1971). Sidney Reservoir #23 contained rainbow trout and should be restocked periodically. Access to this reservoir should be improved by installation of a culvert where the trail crosses the creek above the reservoir.

Several reservoirs were found to have potential for developing a fishery and are presented in Table 4. Sidehill Reservoir #6108 and Tysk Silt Check #3501 are recommended for stocking largemouth bass. Access to these reservoirs is good, and their proximity to each other increases the

incentive for anglers to use them if a fishery were developed. Establishing a fishery in these reservoirs would provide recreational opportunity for the residents of Alzada and the mineral exploration crews in the area.

Photographs, Reservoir Inventory Check Lists and Forms 6672-2, 6674-4 and Miscellanerous Observations are included in separate binders.

LITERATURE CITED

Brown, C.J.D. 1971. Fishes of Montana. Big Sky Book. Montana State University. 207 pp.

Lind, O.T. 1974. Handbook of Common Methods in Limnology. The C.V. Mosby Company. 154 pp.

Table 2. Array of physical and chemical parameters for stock water ponds in Carter County, Montana 1979.

Percent of Capacity	Number	Percent	Max. Depth (Meters)	Number	Percent	Light Penetration (meters)	Number	Percent
Dry	11	6	.1 - 1.0	5	8.8	0 - 1.0	19	33.3
1≤10%	34	18.6	1.1 - 2.0	23	40.4	1.1 - 2.0	22	38.6
11≤25%	18	9.8	2.1 - 3.0	21	36.8	2.1 - 3.0	11	19.3
26≤50%	42	23.0	3.1 - +	8	14.0	3.1 - +	5	8.8
TOTAL	105	57.4		57	100.0		57	100.0

Dissolved Oxygen mg/l	Number	Percent	CO_2 mg/l	Number	Percent	pH	Number	Percent
0.0 - 7.5	12	21.4	0	20	48.8	0.0 - 7.0	5	8.8
7.6 - 8.5	4	7.1	1 - 5	6	14.6	7.1 - 7.5	18	31.6
8.6 - 9.5	12	21.4	6 - 10	9	22.0	7.6 - 8.0	21	36.8
9.6 - 10.5	12	21.4	11 - 15	3	7.3	8.1 - 8.5	13	22.8
10.6 - +	16	28.6	16 - +	3	7.3	8.6 - +	0	0.0
TOTAL	56	99.9		41	100.0		57	100.0

Alkalinity	Number	Percent	Alkalinity Relationships[1]	Hardness mg/l	Number	Percent
P = 0	21	51.2	HCO_3 Only	0 - 100	5	12.2
P < ½T	15	36.6	CO_3 = 2P; HCO_3 = T-2P	101 - 200	9	21.9
P = ½T	5	12.2	CO_3 = 2P; HCO_3 = 0	201 - 300	10	24.4
P > ½T	0		OH = 2P-T CO_3 = 2 (T-P)	301 - 400	2	4.9
P = T	0		OH = T	401 - 500	4	9.8
				500 - +	11	26.8
TOTAL	41	100.0			41	100.0

[1] from Lind (1974).

Table 3. Stockwater reservoirs surveyed in Carter County, 1979 which contained populations of fish.

Reservoir	T	R	Sec.	Max. Depth (M)	Species
Sidney Reservoir #23	5S	59E	SWNW 29	3.66	Rainbow trout
Glenn Walker Dam #230	7S	59E	NWSW 11	1.37	Fathead minnows
Giacometto #118	9S	56E	NWNW 35	1.83	Fathead minnows
Newland 1	8S	62E	33	1.37	Fathead minnows
Lambert CCC	5S	56E	NWSW 32	2.44	Fathead minnows

Table 4. Reservoirs recommended for stocking in Carter County, Montana.

Reservoir	T	R	Sec.	Species
Sidney Reservoir #23	5S	59E	SWNW 29	Rainbow trout
Sidehill #6108	9S	57E	34	Largemouth bass
Tysk Silt Check #3501	9S	57E	SWSE 4	Largemouth bass
Lambert CCC	5S	56E	NWSW 32	Largemouth bass