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The Distribution of the Cutthroat Trout (Salmo clarki) in Montana 1/

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Introduction

The cutthroat trout (Salmo clarki) originally inhabited all the waters of Montana in and adjacent to the mountains except for a considerable number of small isolated virgin lakes. Other native game species which shared this range were the grayling (Thymallus arcticus) and the mountain whitefish (Prosopium williamsoni) on the eastern slopes of the Continental Divide with the dolly varden (Salvelinus alpinus) and the mountain whitefish on the western slopes. Other fishes were also present (Table 1).

Cutthroat trout were abundant in the upper Yellowstone River drainage as early as 1889(3) and attracted anglers in the upper waters of the Missouri River Basin (2). Although abundant it had begun to decline by 1894 as a result of fishing pressure and increased water and land use (2). Evermann reported an abundance of cutthroat trout on the western slopes of the Rocky Mountains (1). There is evidence to show that cutthroat trout were abundant in the mountainous areas of Montana, however, this species was probably no more abundant than grayling and mountain whitefish in many streams.

While exotic trout have been introduced into all the major drainages originally occupied by cutthroat trout, a few small tributaries still remain unmolested. Rainbow trout (Salmo gairdneri) was first introduced in 1891 and has been most extensively stocked since that time. Brown trout (Salmo trutta) was originally introduced in 1891 and has become the predominant species in the valley streams of the cutthroat trout range. Eastern brook trout (Salvelinus fontinalis) was introduced in 1894 and now occupies many of the small valley brooks and mountain headwater creeks as well as a considerable number of mountain lakes. These exotic species have gradually replaced the cutthroat trout in the lower parts of its original range. The native strains of cutthroat trout are now limited to a few remote areas of the State.

Hybrids between rainbow and cutthroat trout have appeared in practically all drainages where rainbow trout were introduced. These hybrids are numerous in most places which makes identification of the cutthroat trout and the determination of its present range extremely difficult. The effects of hybridization on the future of the cutthroat trout are not known.

The present study of cutthroat trout has two primary objectives as follows: to determine the distribution and relative abundance of pure cutthroat trout stocks; and to secure information on factors which influence their distribution and abundance. In addition, observations were made on taxonomic differences between the various native strains of cutthroat trout and on the prevalence of hybrids. This study should be useful in future management of this species.

Time did not permit the writer to determine the complete range of the cutthroat trout for the whole State. Investigations were concentrated east of the Continental Divide. However, all the available information on this species in Montana has been included. Field collections were made and surveys conducted during the summers of 1957 and 1958 (June to September).

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valuable field assistance; other Montana Fish and Game Department personnel aided in collecting specimens and furnished distribution data. Edward Nevala, Quenton Stober and James Calkins assisted in the stream surveys. The U. S. Forest Service supplied maps. The Montana Fish and Game Department financed the field work under Federal Aid to Fisheries Restoration Project F-5-R.

Table 1. List of the fishes associated with cutthroat trout (Salmo clarki) in Montana.

Species		Distribution 1/	Origin 2/
Game			
Grayling	Thymallus arcticus	E	N
Kokanee salmon	Onchorhynchus nerka	EW	I
Brown trout	Salmo trutta	EW	I
Rainbow trout	Salmo gairdneri	EW	I
Eastern brook trout	Salvelinus fontinalis	EW	I
Dolly varden trout	Salvelinus alpinus	W 3/	N
Pygmy whitefish	Prosopium coulteri	W	N
Mountain whitefish	Prosopium williamsoni	EW	N
Others			
White sucker	Catostomus commersoni	E	N
Eastern longnose sucker	Catostomus catostomus	E	N
Columbia largescaled sucker	Catostomus macrocheilus	W	N
Mountain sucker	Pantosteus platyrhynchus	E	N
Carp	Cyprinus carpio	EW	I
Longnose dace	Rhinichthys cataractae	EW	N
Columbia River chub	Mylocheilus caurinus	W	N
Squawfish	Ptychocheilus oregonense	W	N
Redside shiner	Gila balteata	W	N
Black bullhead	Ictalurus melas	E	I
Burbot	Lota lota	EW	N
Pumpkinseed	Lepomis gibbosus	W	I
Yellow perch	Perca flavescens	EW	I
Northern sculpin	Cottus bairdi	EW	N
Slimy sculpin	Cottus cognatus	W	N
Torrent sculpin	Cottus rhotheus	W	N

1/ E - east Continental Divide; W - west Continental Divide; EW - both sides of Divide.

2/ N - native; I - introduced.

3/ St. Mary Drainage, east Continental Divide.

Description of the Study Area

The present distribution of the cutthroat trout, east of the Continental Divide in Montana, is confined to parts of most major primary tributary drainages; in the Missouri River from Three Forks to the mouth of the Musselshell River, and in the Yellowstone River from the Wyoming boundary to the mouth of the Big Horn River. This species is rarely found in the main stem of the Missouri River, however, it does occur frequently in the Yellowstone River for a distance of about 90 miles down stream from Yellowstone National Park.

The major primary streams of these two large rivers have vast networks of secondary and tertiary tributaries draining the east slope of the Rocky Mountains in Montana. Remnants of pure cutthroat trout are mostly confined to the small headwater streams. These drain: steep mountain slopes, which are generally covered by coniferous forests; mountain valleys where grasses, sedges and willows predominate; valleys at low elevations characterized by sagebrush and bunchgrass.

These streams are 5 - 20 feet in width (av. about 9 feet) and have depths usually less than two feet. They originate at elevations from 6,000 to 8,000 feet above sea level. The lowest elevation at which cutthroat trout were collected in streams was 4,500 feet, however, a few specimens were taken in ponds and reservoirs at lower elevations. Estimated gradients of streams presently occupied by cutthroat trout were usually from 50 to 250 feet per mile, but there were extensive stretches of cascades and falls where gradients were higher. Summer stream velocities of 1 - 3 feet per second were characteristic of riffle areas. Velocities taken during early spring run-off in the more precipitous areas were approximately double those of summer. Beaver dams frequently occur on the streams and have a tempering effect on the velocities. In general, bottom materials (based on visual estimates) were composed of about 10 percent boulders, 15 percent rubble, 60 percent gravel and 15 percent sand and detritus. Exceptions to the general composition were in areas of beaver activity and mining dumps where silt became a major component.

Summer water temperatures (June 20 to Sept. 24) varied from 45 to 65° F. and the total alkalinity (methyl orange) range was 13.5 - 227 ppm. The principal stream bottom organisms were stoneflies (Plecoptera), caddisflies (Trichoptera) and mayflies (Ephemeroptera). Algae were common but vascular water plants were rare.

Mining, logging, and livestock are the major industries found in the area of cutthroat trout distribution. U. S. Forest Service and other access roads are present in some forest areas, however, about 75 percent of the cutthroat trout streams are still inaccessible by road.

Field Survey Methods

The lack of roads along mountain streams made the use of an electric fish shocker impractical. Most collections were made by angling or by using cresol, however, other fish toxicants and dynamite were employed to a limited extent.

An attempt was made to test the effectiveness of sampling by angling. Six miles of a stream were selected which had an approximate average width of nine feet, an average depth of eight inches and an average velocity of two feet per second. The stream was then divided into six 1-mile sections. A 300 foot portion of each mile section, selected in favorable trout habitat, was shocked (110 volt A.C.). The fish recovered were counted and returned to the area in which they were taken. Each one mile section was then fished using flies (wet and dry). A distance of one mile was covered in approximately two hours of fishing. While the number of fish taken by angling was considerably less than by shocking, angling appeared adequate to show the range and relative abundance of trout (Table 2).

In actual practice the length of streams fished ranged from 3 - 8 miles. Usually two fishermen sampled alternate parts of a stream from lower to higher elevations. Success was generally good, possibly because of low fishing pressures in these areas. Angling was considered sufficiently successful to determine the range and relative abundance of trout in 80 of the 100 streams surveyed. Relative abundance estimates were probably more accurate on small streams where fishing was more intense.

Table 2. Angling and shocking success on test stream.

Sections	Species of trout	Shocking per 300 feet	Angling per mile
		No. Fish	No. Fish
1	Cutthroat trout	48	22
2	Cutthroat trout	36	14
3 1/	Eastern brook trout	98	24
	Cutthroat trout	36	6
	Rainbow trout	1	0
4	Eastern brook trout	53	17
	Cutthroat trout	4	2
	Rainbow trout	2	0
5	Rainbow trout	26	11
	Eastern brook trout	6	8
6	Eastern brook trout	44 2/	18
	Rainbow trout	8	5
	Cutthroat trout	1	0

1/ Rainbow x cutthroat hybrids were present, but not identified as such.
2/ Twenty-nine of these were less than 3 inches in length.

Cresol was used where angling success was low. An estimate of the stream volume was made by using a velocity head rod. Cresol was applied at the rate of one gallon per four cfs for each 100 yards of the stream (6). Cresol was spread over the upper half of the sample area when velocities were less than one foot per second. When velocities were greater, it was applied in a narrow band across the stream, usually at the head of a pool. Incapacitation of trout and sculpins in the faster streams was almost immediate after application and the effect was only momentary. In the slower streams the incapacitation time varied from 5 - 8 minutes and recovery from 5 - 20 minutes. All sizes of fishes were affected by the treatment. A small amount of mortality occurred as a result of fish thrashing about and becoming beached.

Field Survey Results

Field surveys were made on 100 streams east of the Continental Divide, 73 of which contained cutthroat trout. Fifty-five (75 percent) of these had only populations of cutthroat trout above barriers; nine had exotic trout planted above fish barriers; two had cutthroat trout planted into existing exotic trout populations; five had cutthroat populations which were seriously effected by pollution or dewatering; two had populations of cutthroat and exotic trout with no barriers separating them.

Forty-six (84 percent) of the barriers which had only cutthroat trout above them were either natural falls, high gradient areas or beaver dams. Natural falls (Fig. 1) varied in height from 4 - 30 feet and no exotic trout were found above them in most instances. High gradient areas (gradient 500 - 1,500 feet per mile) varied in length from 330 - 1,320 feet (Fig. 2). The bottom materials in these areas were predominantly large boulders and rubble with numerous dead falls and other debris. Beaver dams formed barriers either singly or in series. Single dams were usually old and ranged from 6 - 12 feet in height. Even low beaver dams were barriers if a large enough number occurred in a series(Fig. 3). The stream in such places was often diverted into numerous channels which covered the entire flood plain. In a few instances beaver dams occurred in conjunction with irrigation diversion dams

Fig. 1. Natural falls fish barrier (Hellroaring Creek, Beaverhead River Drainage).

Fig. 2. High gradient area fish barrier (David Creek, Big Hole River Drainage).

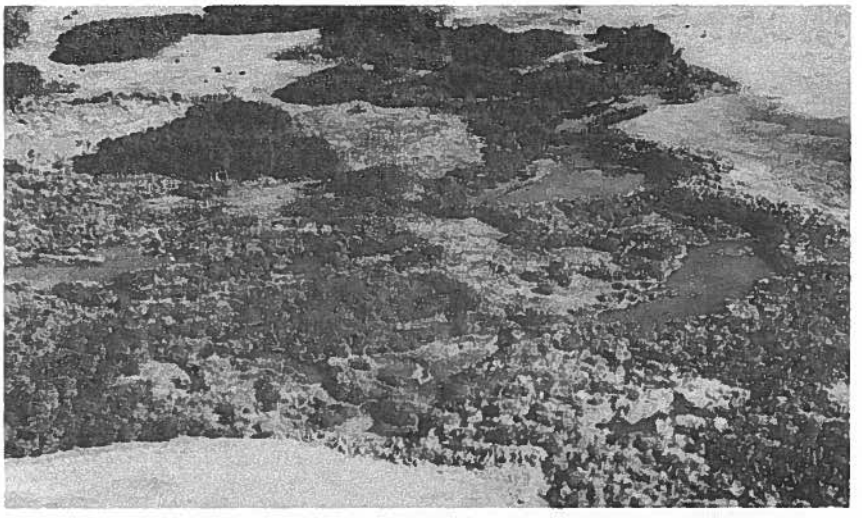

Fig. 3. Low beaver dams form fish barrier (Deep Creek, Missouri River Drainage).

to form fish barriers.

Exotic trout when planted above barriers were invariably predominant. An example of this was found in Tenderfoot Creek (tributary of Smith River) which had a pure cutthroat population above a 30 foot natural falls prior to stocking with rainbow trout in 1955. This rainbow trout plant was made in the immediate area above the falls. In 1958 a preponderance of rainbow trout occurred for three miles above the falls, followed by a two mile section where cutthroat, rainbow, and hybrid trout (rainbow X cutthroat) were present in approximately equal numbers. Only cutthroat trout were found above this section. Wherever cutthroat and rainbow trout were found together in a stream, hybrids were present. Another example was found in Highwood Creek (tributary of Missouri River) which had eastern brook trout planted in 1938 above a series of beaver dams and a natural falls. When surveyed eastern brook trout were predominant and cutthroat trout were rare in the entire stream.

The West Gallatin River did not have a barrier separating cutthroat from exotic trout. Below the mouth of Speciman Creek, brown, rainbow, cutthroat and hybrid (rainbow X cutthroat) were found. Approximately one mile above Speciman Creek hybrids and cutthroat trout were present. The main river above this area as well as one tributary in Montana and three in Wyoming had cutthroat trout only.

Cutthroat trout are presently restricted to the headwaters of streams which originally were entirely inhabited by them. The major factors limiting cutthroat trout distribution are; stream habitat changes, competition with exotic species and hybridization with rainbow trout. Practically all presently existing pure cutthroat trout populations in streams are above barriers.

Taxonomic Considerations

The widespread introduction of rainbow trout into cutthroat trout waters, as well as the indiscriminate stocking of various cutthroat trout strains, along with the fact that these species readily hybridize, has created serious taxonomic difficulties.

Taxonomic considerations are based upon the examination of 345 cutthroat trout (126 from streams that had never been stocked with rainbow trout), 54 rainbow trout and 88 rainbow X cutthroat trout. The taxonomic characteristics used (Table 3, Figs. 4-7), with minor exceptions, are those described by Miller (5).

No single characteristic was found to be adequate for identification but when used in combination satisfactory separation of fish over 4.0 inches total length was achieved. Lateral line scale counts are often used to separate cutthroat and rainbow trout, but in the specimens studied there was much overlapping and this characteristic was not used.

Cutthroat Trout Distribution

The distribution of cutthroat trout (Figs. 8-13) was determined from: 1 - field surveys made by the writer; 2 - collections at Montana State College; 3 - records of fisheries biologists and creel census, Montana Fish and Game Department. The distribution of cutthroat trout is listed along with that of other game fishes and the presence of barriers (Tables 4-8). In creel census records the identification of cutthroat, rainbow and hybrids may not be accurate in some instances since many reports were by untrained personnel.

The streams and lakes are arranged by drainages beginning at the mouth and going up stream. In the tabular data, the major tributary streams of the Missouri, Yellowstone, Flathead, Kootenai, and Clark Fork of the Columbia Rivers are underlined. The primary, secondary, and tertiary tributaries of these drainages are indented to show their relationship to one another. Streams in parentheses have no records of cutthroat trout and are listed only to show the relationship of other streams or lakes which do have cutthroat trout.

Area No. 1 (Figs. 8, 9). This area is in the extreme northwestern part of Montana. On the eastern slopes of the Continental Divide it includes the headwaters of the St. Mary, Milk, Marias and Sun Rivers and on the western slopes it includes the primary drainages of the Flathead and Kootenai Rivers and the Clark Fork of the Columbia River below the mouth of the Flathead River.

Cutthroat trout were recorded from 218 streams and 93 lakes but were predominant (only game fish present or ranked first in relation to any other game fish) in only 112 streams and 62 lakes. Cutthroat trout records from the lower Milk River (Bear Paw Mountains) drainage were included in this area. They were not native but were planted in 1879 (4) by soldiers of a nearby army fort who secured fish from the Sun River, west of Great Falls.

Area No. 2 (Figs. 8, 10). This area is in west central Montana, entirely west of the Continental Divide. The primary drainages are the Blackfoot and Bitterroot Rivers and that portion of the Clark Fork above the mouth of the Flathead River.

Cutthroat trout were recorded from 194 streams and 48 lakes but were predominant in only 76 streams and 27 lakes.

Area No. 3 (Figs. 8, 11). This area is in central Montana, east of the Continental Divide. It includes the Missouri River and its tributaries from Three Forks to the mouth of the Dearborn River and the headwater streams of certain primary tributaries of the Missouri River from the mouth of the Dearborn River to the mouth of the Musselshell River.

Table 3. Characteristics of cutthroat, rainbow and rainbow X cutthroat trout.

Diagnostic Characteristics	Cutthroat trout	Rainbow X Cutthroat trout	Rainbow trout
Dentary mark	Always present; orange to blood-red; weaker on juveniles	Usually present; often lighter than on cutthroat trout	Usually absent; rarely indistinct yellow
Hyoid teeth	Usually present	Present or absent	Absent
Ventral border of anal fin	Dark; may have flesh color on first two rays	Usually milky-white	Conspicuously milky-white
Maxillary length	Range 1.3 - 2.3 (usually 1.6 - 1.9); maxillary extends beyond eye	Range 1.6 - 2.1 (usually 1.8 - 2.0)	Range 1.8 - 2.1 (usually 2.0 - 2.1); maxillary not extending beyond eye
Scale distinction	Scales deeply embedded; hardly visible without magnification	Scales usually more exposed; visible without magnification	Scales exposed; visible without magnification
Spot distribution	Usually concentrated above lateral line and on caudal peduncle	Usually concentrated along lateral line	Usually spotted over entire body
Spot size and shape	Usually large; margins regular	Usually large; margins irregular and contiguous	Usually small; margins irregular
Shape of head	Long, pointed and conical	Similar to either cutthroat or rainbow	Short, blunt and rounded
Shape of body	Usually slender and compressed	Similar to either cutthroat or rainbow	Usually deep and robust

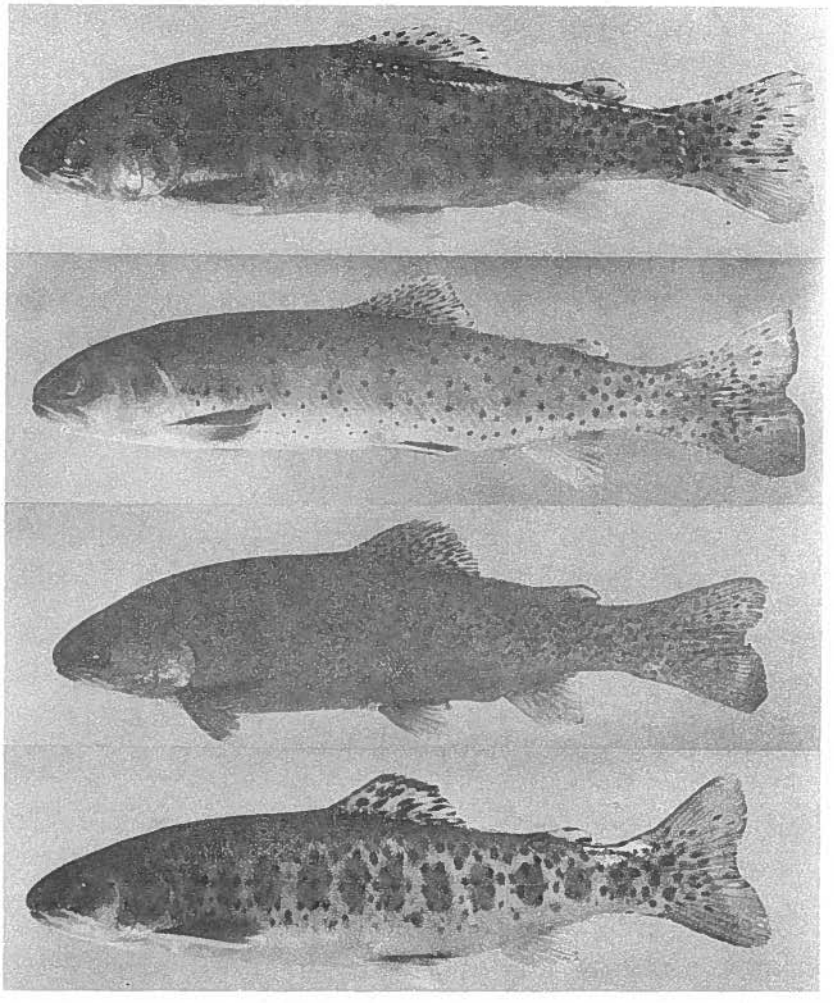

Fig. 4. Cutthroat trout from Missouri River Drainage.
Fig. 5. Cutthroat trout from Yellowstone River Drainage.
Fig. 6. Rainbow trout from Missouri River Drainage.
Fig. 7. Rainbow X cutthroat trout from Missouri River Drainage.

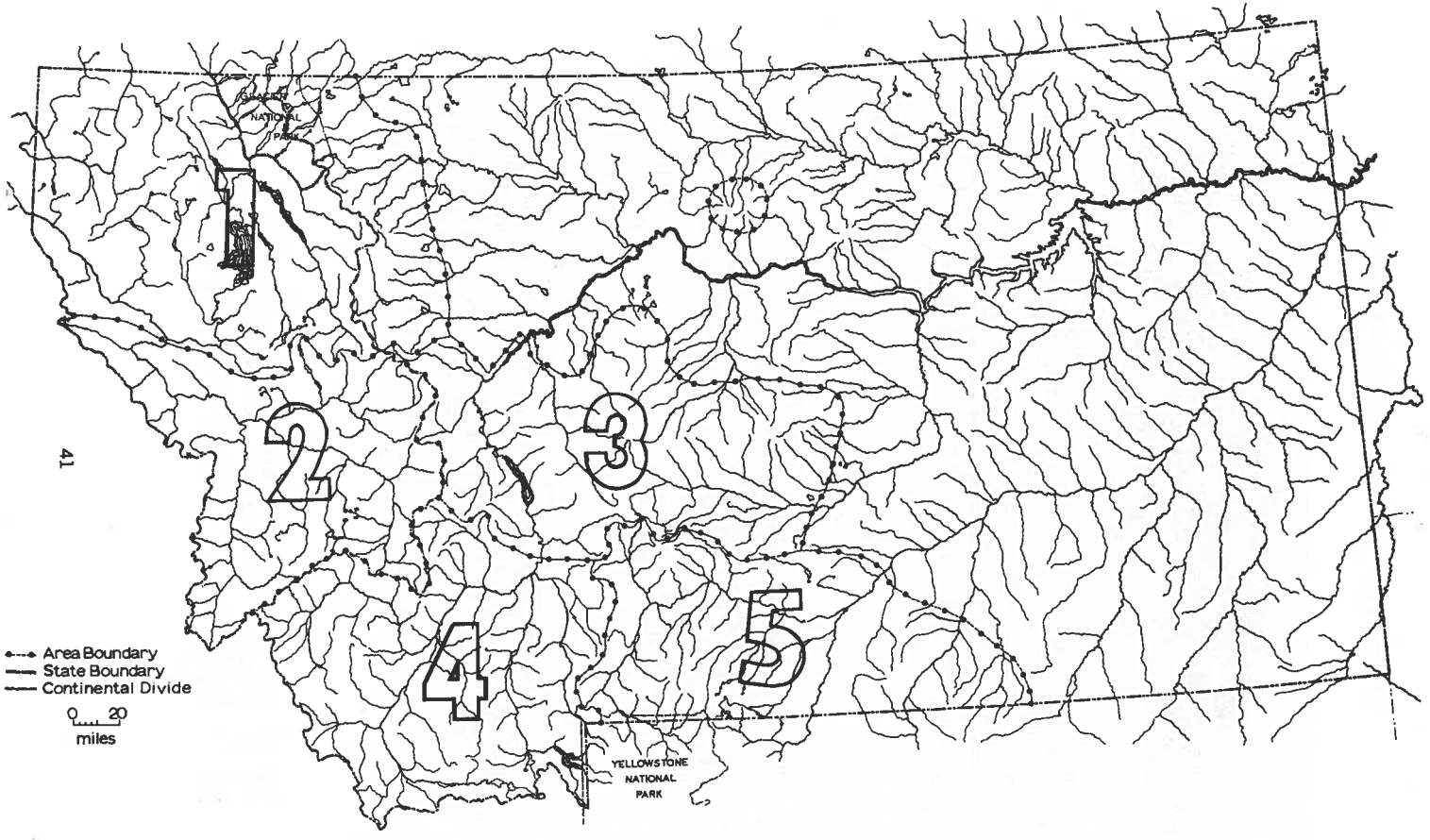

Fig. 8. Cutthroat trout range and designated areas in Montana.

Cutthroat trout were recorded from 94 streams and 21 lakes but were predominant in only 23 streams and 13 lakes.

Area No. 4 (Figs. 8, 12). This area is in southwestern Montana, east of the Continental Divide, and includes the drainage of the Missouri River above Three Forks. The Jefferson, Madison and Gallatin Rivers are the primary tributaries.

Cutthroat trout were recorded from 100 streams and 47 lakes but were predominant in only 19 streams and 28 lakes.

Area No. 5 (Figs. 8, 13). This area is in southern Montana, east of the Continental Divide and includes the Yellowstone River drainage from the Wyoming boundary to Billings. The headwaters of the Bighorn River are also included in this area. The primary tributaries of the Yellowstone River are the Shields, Boulder, Stillwater and Clark Fork Rivers.

Cutthroat trout were recorded from 63 streams and 25 lakes but were predominant in only 23 streams and 12 lakes.

Several farm ponds on the lower Yellowstone River (not included in this area) have had cutthroat trout planted in them. These records were not included.

Including all of Montana, cutthroat trout were recorded from 669 streams and 244 lakes but were predominant in only 253 (38 percent) streams and 142 (58 percent) lakes. Cutthroat trout records, west of the Continental Divide, include 378 streams and 133 lakes with cutthroat predominating in 182 streams and 83 lakes. Records east of the Continental Divide include 291 streams and 111 lakes with cutthroat predominating in 71 streams and 59 lakes.

A series of symbols devised for expressing tabular information follows under appropriate headings:

Cutthroat relation to other game fish. The categories below are estimates of abundance only in relation to other game fish. No information was secured on the actual abundance of cutthroat trout in the streams and lakes considered. e.g. The actual number of cutthroat trout in a d-stream might well be greater than that of an a-, b-, or c-stream.

- a- cutthroat trout only game fish present, or when used with barrier, cutthroat trout only game fish above
- b- cutthroat trout more abundant than any other game fish
- c- cutthroat trout second in abundance to any other game fish
- d- cutthroat trout present, but third or less in abundance to any other game fish
- e- cutthroat trout collection record only

Other game fish. Symbols used for other game fishes.

R- rainbow trout	D- dolly varden
E- eastern brook trout	G- grayling
B- brown trout	K- kokanee salmon
L- lake trout	W- mountain whitefish

Barriers. Symbols used for fish barriers.

BD- beaver dam
ID- irrigation diversion dam
NF- natural falls or high gradient areas

Information source. Symbols used for sources of information and year of the latest record.

C- creel census records
S- field survey records
D- biologist records of Montana Fisheries Division
M- collection records, Montana State College
53, etc.,- year of last collection.

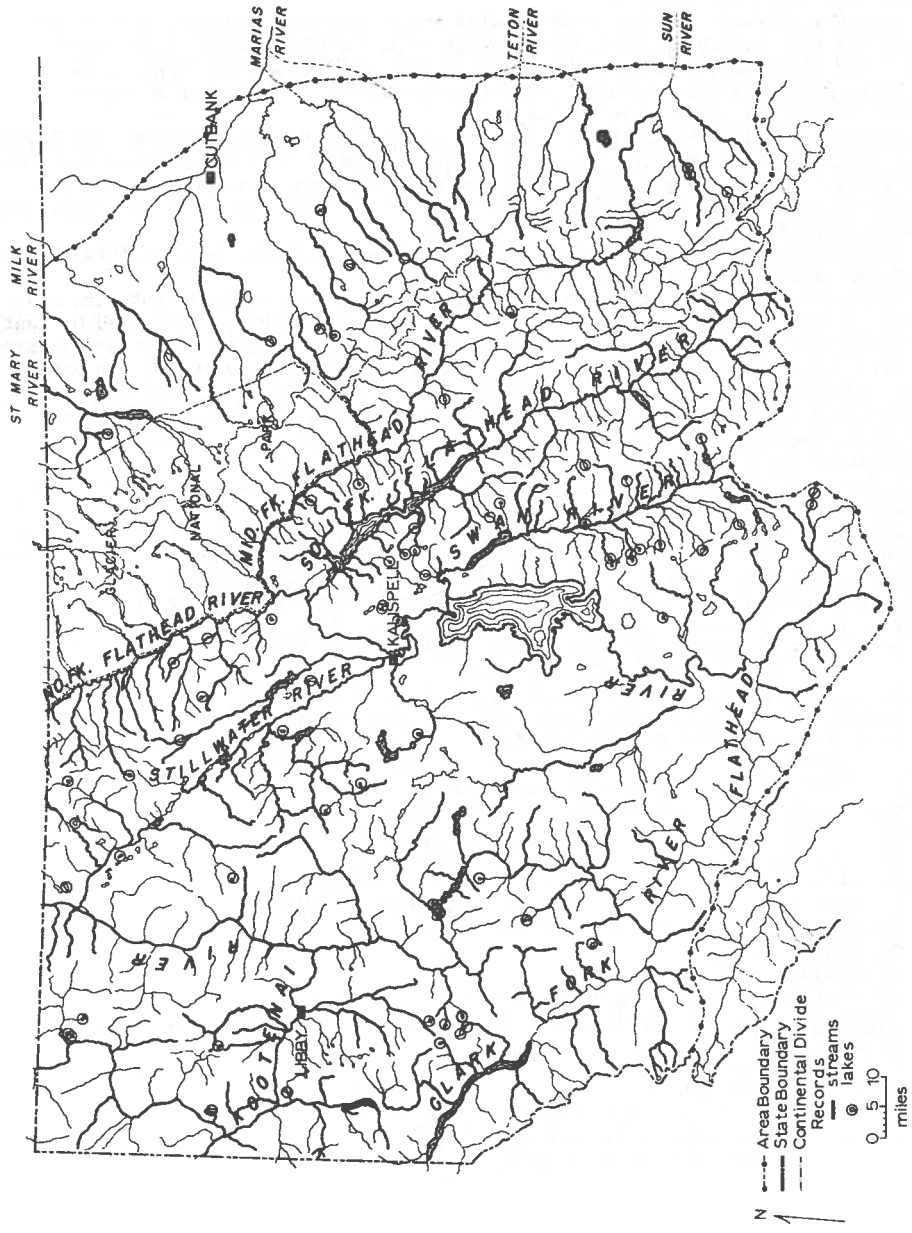

Fig. 9. Cutthroat trout distribution (heavy lines) in Area No. 1; Table 4.

Table 4. Cutthroat trout records in Area No. 1 (Fig. 9).

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
ST. MARY RIVER	c	RWD	NF	S57,C58
Kennedy Cr.	a	-		C57
So. Fk. Kennedy Cr.	c	RD		C55
Beaver Cr.	b	R	BD-a	S57
Beaver L.	a	-		S57,C58
Duck L.	c	R		C57
Lower St. Mary L.	d	RWL		C58
MILK RIVER				
Clear Cr. (Wind Cr.)	d	RE		C54
Ross Reservoir	d	RE		C58
Beaver Cr.	e	-		M57
So. Fk. Milk R.	d	RE		C57,S57
Mid. Fk. Milk R.	d	RE		C58
Livermore Cr.	c	RE		C53
No. Fk. Milk R.	d	REW		C57
MARIAS RIVER Sec. 1 (Teton R.)	c	R		C57
No. Fk. Teton R. (Muddy Cr.) (No. Fk. Muddy Cr.)	d	REW		C58
Cow Cr.	c	RE	BD-a	C56,S57
Deep Cr.	b	RE		C54
Mid. Fk. Teton R.	c	E		C56
W. Fk. Teton R.	c	E		D52
Tiber Reservoir	c	RE		C57
Cut Bank Cr. Sec. 1	d	REW		C54
Cut Bank Cr. Sec. 2	d	RE		C54
Lower Mission L.	c	R		C58
Willow Cr.	a	-		C55
Ray L. (Two Medicine R.)	a	-		C56
Birch Cr.	c	RE	ID	D54,C58
Dupuyer Cr.	d	RE		C56
No. Fk. Dupuyer Cr.	b	E	NF-a	C55,S57
So. Fk. Dupuyer Cr.	b	E	ID-a	S57
Blacktail Cr.	d	RE		D54
Swift Reservoir	d	RK		C58
Mid. Fk. Birch Cr.	c	R		C58
Big Badger Cr.	d	RE	ID	D54,C55
Four Horn L. (Limestone Cr.)	d	REB		C54
Cooper L. (Two Medicine Cr.)	a	-		C55
Little Badger Cr.	c	E		C58
Kiyo L.	a	-		C57
So. Fk. Two Medicine Cr. (Deep Cr.)	c	RE	NF-a	S57,C58
Dog Gone L.	c	E		C56

Table 4, continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
No. Fk. Two Medicine Cr.	d	REW	NF	S57
Railroad Cr.	d	REW	NF	C53,S57
SUN RIVER Sec. 1	d	RBGW		C54
No. Fk. Sun R.	d	REWB		C58
Willow Cr.	d	RE		C54
Nilan Reservoir	c	RE		D52,C58
Cobbs L.	d	RE		C58
Pishkun Reservoir	d	RG		C54
Gibson Reservoir	d	REK		C58
Big George Cr. (Open Cr.)	c	R		C54
Lake Levale	a	-		C57
So. Fk. Sun R. (Smith Cr.)	d	RBGW		C54
Wood L.	b	R		C58
CLARK FORK COLUMBIA RIVER				
Cabinet Gorge Reservoir	d	REBW		C55,D57
Bull R.	d	REKD		C58
E. Fk. Bull R.	b	D		C58
Rock Cr.	b	E		C58
E. Fk. Rock Cr.	b	R		C58
Rock Cr. L.	a	-		C56
Noxon Rapids Reservoir	d	REBW		D58
Swamp Cr.	b	E		C57
Buck L.	a	-		C58
Wanless L.	a	-		C58
Martin Cr.	b	W		D57,C58
So Fk. Martin Cr.	a	-		C58
Vermillion R.	b	RED		C58
Cataract Cr.	a	-		C55
Sims Cr.	b	D		C58
Willow Cr.	a	-		C56
Beaver Cr.	b	R		C57
White Pine Cr.	b	RE		C53
Big Beaver Cr.	c	E		C58
Deep Cr.	a	-		C55
Graves Cr.	a	-		C57
Prospect Cr.	b	RED		C58
Dry Cr.	b	EB		C57
E. Fk. Dry Cr.	a	-		C54
Knox Cr.	a	-		C54
Cooper Gulch	a	-		C53
Evans Gulch	a	-		C53
Glidden Gulch	a	-		C55
Cherry Cr.	a	-		C54
Thompson R. Sec. 1	d	REDW		C58
Thompson R. Sec. 2	c	E		C57
W. Fk. Thompson R. (Four Lakes Cr.)	b	E		C57
Cabin L.	b	R		C56

Table 4, continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
Fishtrap Cr.	c	RED		C57
Beatrice Cr.	b	D		C58
(Mantrap Fk. Fishtrap Cr.)				
(Radio Cr.)				
Fishtrap L.	c	E		C57
Little Thompson R.	d	REDW		C58,M58
Little Rock Cr.	a	-		C56
Big Rock Cr.	b	ED		C57,M58
(Twin Lakes Cr.)				
Twin L.	a	-		C56
McGregor Cr.	a	-		C54
McGregor L.	d	REL		C58
Lower Thompson L.	d	EDW		M52,C56,D57
Boiling Spring Cr.	a	-		M52,D57
Mid. Thompson L.	d	EDKW		C57,D57
Slimmer Cr.	b	E	BD	M52,D57
Davis Cr.	e	-		D56
Upper Thompson L.	b	KW		C56
Buffalo Bill Cr.	b	E		C55
FLATHEAD RIVER Sec. 1	d	RDW		C57
Flathead R. Sec. 2	d	RDKW		D57,C58
Revais Cr.	b	E		C55
Jocko R.	d	RE		D57,C58
(Valley Cr.)				
Hewolf Cr.	c	E		C55
Finley Cr.	c	RE		C58
Mid. Fk. Jocko R.	a	-		C53
Lower Jocko L.	e	-		D56
Upper Jocko L.	d	RW		D56,C58
Post Cr.	b	RE		C57
Mission Cr.	c	D		C55
Crow Cr.	b	E		C53
(Mud Cr.)				
Lake on Mud Cr.	d	RE		C55
No. Fk. Crow Cr.	b	E		C56
Little Bitterroot R.	d	RE	ID	D57,C58
(Warm Springs Cr.)				
(Dry Fork Cr.)				
Dry Fork Reservoir	a	-		C54
Briggs Cr.	c	E		C58
Flathead L.	d	RDKW		D57,C58
Lake Mary Ronan	d	RE		C53
Dayton Cr.	a	-		C56
Swan River Sec. 1	d	REDW		D57,C57
Swan R. Sec. 2	c	RED		C58
(Mud Cr.)				
Mud L.	a	-		C53
(Birch Cr.)				
Birch L.	b	R		C53

Table 4. continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
Bear Cr.	d	ED		D57
Swan L.	d	RDK		C57
(Hall Cr.)				
Hall L.	b	R		C55
(Bond Cr.)				
Trinkus L.	a	-		C56
Lost Cr.	b	ED		C56
So. Fk. Lost Cr.	b	D		C53
No. Fk. Lost Cr.	b	R		C53
Cilly Cr.	c	E		C55
(Cedar Cr.)				
Shay L.	a	-		C54
Fatty Cr.	e	-		D56
Fatty Cr. Reservoir	a	-		C54,D57
Rainbow L.	a	-		D57
(No. Fk. Cedar Cr.)				
Lower Fish L.	a	-		D57,C58
Upper Fish L.	a	-		C58
Goat Cr.	b	E		C56
Lion Cr.	d	EDW		C55,D57
Piper Cr.	b	RE		D57
Piper L.	a	-		D57
Mid. Piper L.	a	-		D57
(Jim Cr.)				
Jim L.	a	-		C55
(Pony Cr.)				
Pony L.	a	-		C56
Dog Cr.	e	-		M58
(Condon Cr.)				
Smith Cr.	c	E		D57
(Cold Cr.)				
(No. Fk. Cold Cr.)				
Cold L.	a	-		C57
(Elk Cr.)				
(So. Fk. Elk Cr.)				
Elk L.	a	-		C55
(Glacier Cr.)				
Glacier L.	a	-		C58
Rumble Cr.	c	E		D57
Holland Cr.	d	RE		C55
Holland L.	d	RED		C57
Upper Holland L.	d	RB		C58
Beaver Cr.	b	E		C57
Lindbergh L.	d	RDK		C55
Crystal L.	b	K		C57
(Therriaults Cr.)				
Bunyan L.	a	-		C56
Jessup Mill Pond	a	-		C56
Creston L.	b	RE		C55
Ashley Cr.	d	RE		D57

Table 4, continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
(Truman Cr.)				
Wild Bill Cr.	b	E		C56
Lake Monroe	e	-		D56
Lone L.	b	G		D57
Ashley L.	c	RKW		D57,C58
Stillwater River	d	REDW	ID	D57,C58
Whitefish R.	d	RDKW	ID	D57
Haskill Cr.	d	E		C56
Whitefish L.	b	LK		C55
Lazy Cr.	c	E		C53
Whitefish Cr.	a	-		C55
E. Fk. Whitefish Cr.	a	-		C56
Upper Whitefish L.	d	RD		C56,D57
W. Fk. Whitefish Cr.	c	D		C55
Spencer L.	b	R		C58
Logan Cr.	c	REW		C58
Good Cr.	a	-		C58
Plume Cr.	a	-		C58
Cedar L.	b	R		C56,D57
Talley L.	d	RE		C58
Sheppard Cr.	c	E		C56
Dunsire Cr.	a	-		C58
Griffin Cr.	c	E		C58
Sylvia L.	b	G		C56
Lupine L.	a	-		C58
Meadow Cr.	e	-		D56
Martin Cr.	a	-		C56
Upper Stillwater L.	d	RD		C58
Lebeau Cr.	a	-		C56
Sunday Cr.	e	-		D56
South Fork Flathead River	b	RDW		D57,C58
Hungry Horse Reservoir	b	RDGW		D57,C58
Emery Cr.	b	RE		C58
Hungry Horse Cr.	e	-		D56
Margaret Cr.	a	-		C54
Doris Cr.	e	-		D56
Lost Johnny Cr.	a	-		C58
Wounded Buck Cr. (Wildcat Cr.)	a	-		D56,C58
Wildcat L.	a	-		D57,C58
Ryle Cr.	e	-		D56
Riverside Cr.	e	-		D56
Murray Cr.	c	E		D57
Clayton Cr.	e	-		D56
Harris Cr.	a	-		C54
Felix Cr.	b	DW		C54
Graves Cr.	c	REDG		C57,M58
Aeneas Cr.	e	-		D56
Handkerchief L.	b	G		C58
Black L.	a	-		C58

Table 4, continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
Logan Cr.	b	E	NF	D57
Devils Corkscrew Cr.	e	-		D56
Baptiste Cr.	e	-		D56
Sullivan Cr.	b	E		D57
Quintonkon Cr.	e	-		D56
Soldier Cr.	e	-		D56
Lower Twin Cr.	e	-		D56
Twin Cr.	a	-		D56,C58
Spotted Bear R.	a	-		C57
Bunker Cr. (Gorge Cr.)	c	D		C53
Sunburst L.	a	-		C55
Big Salmon R.	a	-		C58
Big Salmon L.	a	-		M51,C58
White R.	a	-		C54
Youngs Cr.	a	-		C56
Hahn Cr.	a	-		C54
Danaher Cr.	a	-		C58
Camp Cr.	b	D		C53
Basin Cr.	a	-		C58
Limestone Cr.	a	-		C53
North Fork Flathead River	c	RDKW		D57,C58
Spoon L.	c	E		C54
Canyon Cr.	a	-		C54,D57
Big Cr.	c	DW		D57
Langford Cr.	e	-		D56
Mud L.	a	-		C56
Hallowat Cr. (Kletomus Cr.)	e	-		D56
Moose L.	a	-		C58
Coal Cr.	e	-		D56
Cyclone Cr.	a	-		D57
Cyclone L.	b	D		C57,D57
Quartz Cr.	e	-		D56
Moran Cr.	b	DW		D57
Hay Cr.	b	DW		D57,C58
Bowman Cr.	e	-		D56
Red Meadow Cr.	c	D		C53,D57
Red Meadow L.	a	-		D55
Hawk Cr.	a	-		D57
Moose Cr.	a	-	BD	D57
Whale Cr.	b	D		D57
Yakinikak Cr.	d	DW		D57
Tuchuck Cr.	a	-		C54
Colts Cr.	a	-		D57
Middle Fork Flathead River	d	REDK		D57,C58
Crystal Cr.	c	E		C53
Stanton Cr.	a	-		C58
Stanton L.	b	W		C58
Tunnel Cr.	a	-		C56

Table 4, continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
(Essex Cr.)				
(Marion Cr.)				
Marion L.	a	-		C56
Bear Cr.	d	EDW		D57,C57
(Lake Cr.)				
Flotilla L.	e	-		D56
Bowl Cr.	c	D		C58
KOOTENAI RIVER	d	REDW		C58
Yaak R. Sec. 1	d	RE		C57
Yaak R. Sec. 2	d	RED	NF	D57,C58
Kilbrennan Cr.	c	RE		C55
Kilbrennan L.	d	RE		C56
Spread Cr.	a	-		C54
So. Fk. Yaak R.	a	-		C57
Vinal L.	a	-		D57,C58
Huskin L.	b	R		C57,D57
W. Fk. Yaak R.	a	-		C57
(E. Fk. Yaak R.)				
(Windy Cr.)				
Fish Lakes	a	-		C58
Star Cr.	a	-		C58
Lake Cr.	c	REDW		C58
(Falls Cr.)				
Savage L.	a	-		C58
Keeler Cr.	b	RE		C58
W. Fk. Keeler Cr.	a	-		C58
Halverson Cr.	a	-		C55
Benning Cr.	b	E		C56
Camp Cr.	b	RE		C58
Bull L.	d	DKW		D57
Stanley Cr.	b	E		C58
Ross Cr.	c	E		C56
O'Brien Cr.	c	REDW		C58
Quartz Cr.	a	-		C58
Bobtail Cr.	c	E		C57
Pipe Cr.	b	RED		D57,C58
Tom Pole L.	a	-		C55
E. Fk. Pipe Cr.	b	E		C55
Libby Cr.	d	REDW		C58
Big Cherry Cr.	a	-		C56
Deep Cr.	a	-		C58
Swamp Cr.	d	RE		C54
(Howard Cr.)				
Howard L.	c	R		C58
Fisher R.	d	REDW		C58
Wolf Cr.	a	-		D57,C58
W. Fisher R.	c	R		D57,C58
(Trail Cr.)				
Bear L.	a	-		C56

Table 4, concluded

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
(Lake Cr.)				
Geiger L.	a	-		C55
Standard Cr.	c	E		D57
Pleasant Valley Fisher R.	d	RE		C55
Leon L.	c	KW		C56
Horseshoe L.	c	E		D57
Bootjack L.	c	R		C55
E. Fisher R.	b	RE	NF	C53,D57
Silver Butte Fisher R.	b	RE		C56,D57
Jackson Cr.	a	-		D57
Fivemile Cr.	d	RE		D57
Sullivan Cr.	b	E		D57
Tobacco R.	c	RE		C58,M58
St. Clair Cr.	a	-	ID	D57,C58
Lost L.	e	-		D56
(Giffin Cr.)				
Therriault Cr.	b	RE		D56,C58
Fortine Cr.	a	-		C58
(Lake Cr.)				
Lake on Lake Cr.	b	E		C57
Grave Cr.	c	RED	NF	C57,D57
Dickey L.	c	K		C58
Dodge Cr.	c	E		D57
Carpenter L.	a	-		C58
Young Cr.	e	-		D56
Wigwam Cr.	a	-		C53
(Bluebird Cr.)				
Therriault L.	b	RKW		C58
(Weasel Cr.)				
Weasel L.	b	D		C56

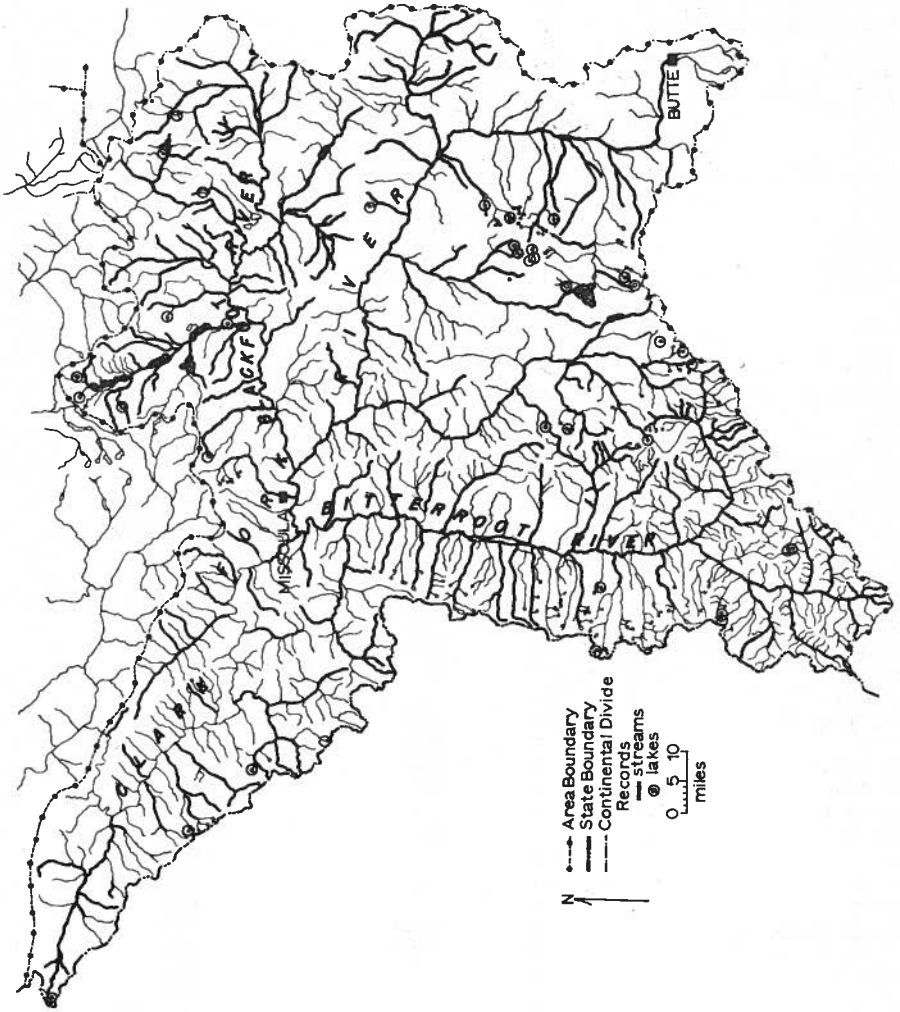

Fig. 10. Cutthroat trout distribution (heavy lines) in Area No. 2; Table 5.

Table 5. Cutthroat trout records in Area No. 2 (Fig. 10)

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
CLARK FORK COLUMBIA RIVER				
Clark Fk. Columbia R. Sec. 1	d	RDW		C56,D57
Clark Fk. Columbia R. Sec. 2	d	RBDW		C58
Clark Fk. Columbia R. Sec. 3	d	RB		C58
Siegel Cr.	a	-		C53
St. Regis R.	c	REDB		C58
Little St. Joe Cr. (Ward Cr.)	a	-		C58
Cedar Cr.	b	E		C54
Twelvemile Cr.	c	REW		C58
Deer Cr.	a	-		C58
Big Cr.	b	E		C58
Silver Cr.	b	E		C58
Randolph Cr.	c	E		C57
St. Regis L.	b	E		C58
Dry Cr.	b	EDB		D57,C58
Pardee Cr.	a	-		C55
Cedar Cr. (Lost Cr.)	c	RDBW		D57,C58
Oregon Gulch	b	R		C58
Lost L.	a	-		C58
Trout Cr.	b	DBW		D57,C58
No. Fk. Trout Cr. (Nemote Cr.)	e	-		D56
Miller Cr.	a	-		C58
Fish Cr.	d	REDW		D57,C58
W. Fk. Fish Cr. (Cedar Log Cr.)	a	-		C58
Cedar Log L.	b	B		C58
No. Fk. Fish Cr.	e	-		D56
Straight Cr. (French Cr.)	c	RD		C57
French L.	a	-		C57
So. Fk. Fish Cr.	b	RED		C58
Petty Cr.	c	RED		C58
Ninemile Cr.	c	REBD		C58
Butler Cr.	c	RE		C54
McCormick Cr.	a	-		C54
Sixmile Cr.	c	E		C57
Mill Cr.	a	-		C56
Albert Cr.	a	-		C55
Okeefe Cr.	a	-		C57
Bitterroot River Sec. 1	d	REBW		C58
Bitterroot R. Sec. 2	d	REDB		C58
O'Brien Cr.	a	-		C56
Miller Cr.	a	-		C53
Lolo Cr.	d	REDW		D54,C58
Mill Cr.	e	-		D55
Graves Cr.	a	-		C57
W. Fk. Lolo Cr.	e	-		D54

Table 5, continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
Howard Cr.	c	ED		C58
E. Fk. Lolo Cr.	b	D		C56
One Horse Cr.	a	-		C57
Eightmile Cr. (Threemile Cr.)	a	-		M54,D55,C58
Ambrose Cr.	a	-		C56
Bass Cr.	b	RED	ID	D55,C58
Burnt Fk. Bitterroot R.	c	REBD		C58
Kootenai Cr.	b	RE		C58
Big Cr.	c	E		C58
Bear Cr.	b	RE		D55,C57
Fred Burr Cr.	d	RE		C58
Willow Cr.	a	-		C54
Mill Cr.	c	RE		C56
Roaring Lion Cr.	a	-		C56
Skalkaho Cr.	c	RED		D54,C58
Newton Gulch	e	-		D54
Bear Gulch	e	-		D54
Tenderfoot Gulch	e	-		D54
Daly Cr.	d	RD		C58
Railroad Cr.	e	-		D54
Hog Trough Cr.	e	-		D54
Weasel Cr.	e	-		D54
So. Fk. Skalkaho Cr.	b	D		D54
Sleeping Child Cr. (Camas Cr.)	d	RED		C58
Camas L.	a	-		C56
Lost Horse Cr.	c	ED		C58
Twin L. 2nd	c	R		C58
Tin Cup Cr.	a	-		C57
Rye Cr.	c	RE		C56
E. Fk. Bitterroot R.	d	REDW		M52,C58
Warm Spring Cr.	b	RED		C58
Cameron Cr.	c	RED		C58
Meadow Cr.	b	D		D54
Swift Cr.	e	-		D54
Dense Cr.	e	-		D54
Bugle Cr.	e	-		D54
Moose Cr.	c	D		D54
Lick Cr.	e	-		D54
Reynolds Cr.	e	-		D54
Sign Cr.	e	-		D54
Cuba Cr.	e	-		D54
Ripple L.	e	-		D54
W. Fk. Bitterroot R. (Piquett Cr.)	c	REDW		D54,C58
Shelf L.	a	-		D55
Piquett L.	a	-		D55

Table 5, continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
(Boulder Cr.)				
Dollar L.	a	-		C58
Boulder L.	a	-		C58
Nezperce Fk. Bitterroot R.	d	ED		C58
Watch Tower Cr.	a	-		C57
Blue Joint Cr.	d	RED		C53
Overwhich Cr.	a	-		C58
Hughes Cr.	e	-		D54
Burrell Cr.	e	-		D54
Lake Cr.	e	-		D54
Emmett Cr.	e	-		D54
Woods Cr.	e	-		D54
Salt Cr.	e	-		D54
Johnson Cr.	e	-		D54
Sheep Cr.	e	-		D54
Rattlesnake Cr.	d	REW		M55,C58
Blackfoot River Sec. 1	d	REDB		C58
Blackfoot R. Sec. 2	d	REDB		C58
Blackfoot R. Sec. 3	d	REDB		C58
Gold Cr.	c	RED		C56
Boulder L.	a	-		C54
Belmont Cr.	d	RD		D56
Elk Cr.	b	REBD	ID	D56,C58
Clearwater R.	d	REDW		C58
Blanchard Cr.	c	REW		D54,C58
No. Fk. Blanchard Cr.	c	E		C57
Harper L.	b	G		D56,C58
Salmon L.	d	RKW		C58
Owl Cr.	c	RED		C58
Placid L.	b	DK		C58
Finley Cr.	b	RE		C54
Drew Cr.	e	-		D56
Morrell Cr.	d	RE		C58
Trail Cr.	e	-		D56
Seeley L.	d	DK		D57,C58
Deer Cr.	c	E		C55
Fawn Cr.	a	-		C56
Sawyer Cr.	e	-		D56
W. Fk. Clearwater R.	b	ED		C56,D56
Marshall Cr.	e	-		D56
Marshall L.	a	-		C55,D56
Lake Inez	d	DKW		C58
Lake Alva	c	REDK		C58
Rainy L.	d	DKW		C58
Clearwater L. (Bertha Cr.)	e	-		D56
Summit L.	e	-		D56
Cottonwood Cr.	b	RE		C57
Cottonwood L.	c	R		C55

Table 5, continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
Chamberlain Cr.	a	-		C55,D56
Pearson Cr.	a	-		D56
Monture Cr.	d	REDW		D56,C58
McCabe Cr.	b	EW		C57
Dick Cr.	c	RE		C57
Dunham Cr.	a	-		C56
Falls Cr.	a	-		C56
Warren Cr.	b	RE		C56,M57
No. Fk. Blackfoot R.	c	REDW		D56, C58
Rock Cr.	e	-		D56
Coopers L.	a	-		D57
Spring Cr.	a	-		D53
E. Fk. No. Fk. Blackfoot R.	b	R		D55
Meadow Cr.	b	R		C56
Parker L.	a	-		C58
Webb L.	a	-		C56
Wales Cr.	c	RK	ID	D56
Yourname Cr.	a	-	ID	D56
Nevada Cr. Sec. 1	d	REDW	ID	D56,C58
Nevada Cr. Sec. 2	b	EDW		D56
Douglas Cr.	b	REDW	ID	D56,C57
Cottonwood Cr.	d	EB	ID	C53,M54,D56
Chimney Cr.	c	E		C55,D56
Mud Cr.	d	EB		C53,D56
Murray Cr.	e	-		D56
Bear Cr.	e	-		D56
Sturgeon Cr.	e	-		D56
Nevada Cr. L.	c	RK		D56,C58
Arrastra Cr.	c	ED		C57
Stonewall Cr.	c	EB		C58
Beaver Cr.	b	E		C57
Liverpool Cr.	c	E		C58
Blue Diamond Cr.	c	E		C54
Poorman Cr.	c	RED		C56
Humbug Cr.	c	RE		C56
Landers Fork	e	-		D56
Copper Cr.	b	RD		C58
Heart L. (Hogan Cr.)	b	G		C58
Keep Cool Cr.	c	REB		C58
Alice Cr.	c	RED		C58
Wallace Cr.	c	E		C57
Schwartz Cr.	a	-		C58
Rock Cr. Sec. 1	d	REDB		C58
Rock Cr. Sec. 2	d	REDB		C58
Ranch Cr.	c	RED		D56,C57,M58
Stony Cr.	a	-		C57
Stony L.	b	K		D56

Table 5, continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
No. Fk. Rock Cr.	e	-		D56
Ross Fk. Rock Cr.	b	REDW		C57
Helm Cr. (Condon Cr.)	e	-		D56
Medicine Cr.	a	-		C57
Beaver Cr.	b	E		C57
W. Fk. Rock Cr.	b	REDW		D56,C57
Mud L.	e	-		M53
Lake Abundance	a	-		C58
E. Fk. Rock Cr.	c	REDW		C58
E. Fk. Reservoir	e	-		D56
Copper Cr.	c	ED		C57
Mid. Fk. Rock Cr. (Carp Cr.)	b	REDW		C57
Carp L.	e	-		M56
Phyllis L.	e	-		D56
Cramer Cr.	d	RE		C58
Harvey Cr.	b	REBD		C58
Flint Cr. Sec. 1	d	REB		C58
Flint Cr. Sec. 2	c	E		C56
Lower Willow Cr.	c	EB		C58
Douglas Cr.	b	E		C53
Boulder Cr.	b	RED		C58
So. Fk. Boulder Cr. (Copper Cr.)	e	-		D55
Dora Thorn L.	e	-		D55
Boulder L.	a	-		C55
Trout Cr.	b	E		C54
Georgetown L. (No. Fk. Flint Cr.)	b	REKG		C58
Echo L.	c	REB		C55,D56
Hoover Cr.	c	RE		C56
Millers Cr. L.	c	RE		C56
Warm Springs Cr.	c	REBD		C56
Little Blackfoot R. Sec. 1	d	REDB		C58
Little Blackfoot R. Sec. 2	c	REDB		C58
Spotted Dog Cr.	b	B		M54,C57
Trout Cr. (Carpenter Cr.)	b	E		C54
Snowshoe Cr.	d	EB		C58
Ophir Cr.	b	EB		C58
Dog Cr.	b	REB		C58
Hope Cr.	b	EB		C58
Mike Renig Gulch	b	RE		C53, M54
Telegraph Cr.	c	RE		C57
Bryan Cr.	a	-		C56
Slate Cr.	a	-		C56
Laribee Gulch	c	E		C57

Table 5, concluded

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
Willow Cr.	c	E		C58
Rock Cr.	d	REB		C57
(Rock Cr. L.)				
Dolus L.	b	B		C56
Meadow L. 2nd	a	-		C58
Racetrack Cr.	b	RE		M54,C58
Pozega L.	a	-		C58
Meadow L. 2nd	a	-		C58
Fisher L.	a	-		C57
Little Racetrack Cr.	e	-		C55
Little Racetrack L.	e	-		D55
Racetrack L.	e	-		D55
Lost Cr.	c	REB		C56
Modesty Cr.	a	-		C54
Dutchman Cr.	c	RE		C53
(Warm Springs Cr.)				
Foster Cr.	c	RED		C56
(Twin Lakes Cr.)				
Fourmile Basin L.	b	RE		C53
Storm Lake Cr.	a	-		C53
Storm L.	c	R		C55
Mill Cr.	c	RE		C57
Clear Cr.	a	-		C56
Beefstraight Cr.	b	E		C56

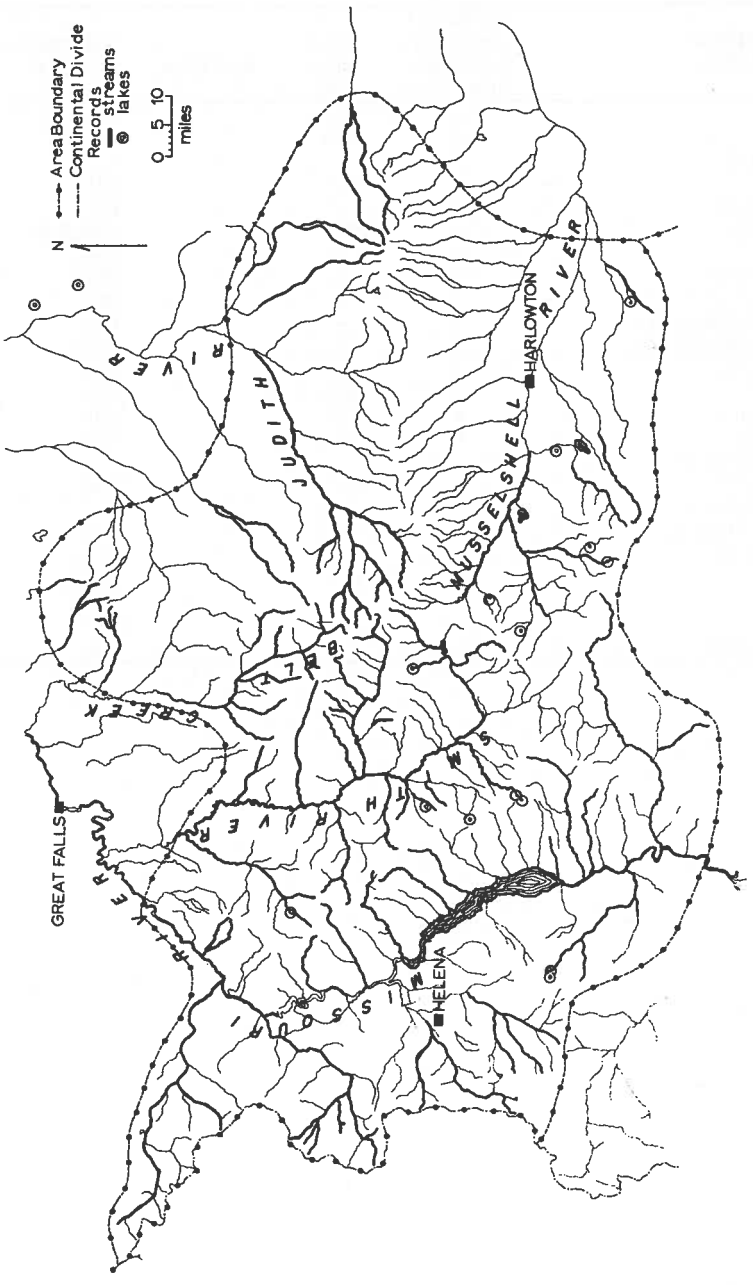

Fig. 11. Cutthroat trout distribution (heavy lines) in Area No. 3; Table 6.

Table 6. Cutthroat trout records in Area No. 3 (Fig. 11).

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
MISSOURI RIVER Sec. 1	d	RBW		C53
Missouri R. Sec. 2	d	RB		C53
Missouri R. Sec. 9	d	RB		C54
Missouri R. Sec. 12	d	RBW		C58
Musselshell River Sec. 1	d	REBW		C53
(Flatwillow Cr.)				
No. Fk. Flatwillow Cr.	d	REB		C53
So. Fk. Flatwillow Cr.	d	REB		D57
(Fish Cr.)				
Rock Cr.	c	REW		C56
Carters Pond	a	-		C58
American Fk. Cr.	d	REB		C53
(Lebo Cr.)				
Lebo L.	d	REB		C53
Big Elk Cr.	c	E		D52
Elk Cr. Reservoir	d	RE		C58
Martinsdale L.	d	RB		C53
So. Fk. Musselshell R.	d	REB		C57
Cottonwood Cr.	d	RE	NF-a	D54,C58
Mid. Fk. Cottonwood Cr.	b	RE		C56
(Loco Cr.)				
Sandero Pond	d	RE		D53
Forest L.	a	-		D54
(Alabaugh Cr.)				
Castle L.	a	-		C57
(No. Fk. Musselshell R.)				
(Flagstaff Cr.)				
Holiday L.	d	RE		C58,S58
Judith River Sec. 1	d	RE		C54,D57
Judith R. Sec. 2	c	RE		C56,D57
(Arrow Cr.)				
Holgate Reservoir	a	-		C56
Kingsbury L.	a	-		C57
Dry Wolf Cr.	d	REB		C58
Running Wolf Cr.	d	RE		C58
Spring Cr.	d	REBW		C54
Cottonwood Cr.	c	RE		C58
E. Fk. Spring Cr.	b	RE		C53
Yogo Cr.	c	RE		C55
So. Fk. Judith R.	d	RE	NF-a	C57,S58
Mid. Fk. Judith R.	d	REK	NF	C58,S58
Lost Fk. Mid. Fk. Judith R.	c	RE	BD-a	C53,S58
W. Fk. Lost Fk.	a	-		S58
Harrison Cr.	c	RE	BD-a	C53,S58
Weatherwax Cr.	a	-	BD-a	D57,S58
Cleveland Cr.	c	RE	NF-a	S58
Hell Cr.	a	-	NF-a	S58
Shonkin Cr.	d	RE	NF	C55,D56

Table 6, continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
Highwood Cr.	d	RE		C58
No. Fk. Highwood Cr.	c	E	BD	S57
So. Fk. Highwood Cr.	c	E		C53
Pohlod Cr.	c	E		S57
Belt Creek	d	REBW		C55
Little Belt Cr.	d	RE	NF-a	S57,C58
Main Cr.	a	-		S57
No. Fk. Little Belt Cr.	a	-		S57
So. Fk. Little Belt Cr.	a	-		S57
Logging Cr.	d	RE	NF-a	C56,S57
Pilgrim Cr.	b	RE	NF-a	C54,S57
Tillinghast Cr.	d	RE	NF-a	S57
Dry Fk. Belt Cr.	d	RE		S57,C58
So. Fk. Dry Fk. Belt Cr.	c	RE	NF-a	S58
Hoover Cr.	c	RE	BD-a	S57
Harley Cr.	c	RE	NF-a	S57
Jefferson Cr.	d	RE	NF-a	S57
Smith River Sec. 1	d	REBW		C53
Smith River Sec. 2	d	REBW		D54
Hound Cr.	d	REBW		C58
E. Fk. Hound Cr.	d	RE		C54
Mid. Fk. Hound Cr.	c	E	ID-a	S57
Mid. Fk. Reservoir	a	-		S57
Dry Fk. Smith R.	c	REB	NF-a	D53
Tenderfoot Cr.	b	REW	NF	C58,S58
Rock Cr.	c	REB	BD-a	C57,S58
No. Fk. Rock Cr.	a	-	BD-a	S58
So. Fk. Rock Cr.	a	-	BD-a	S58
Eagle Cr.	d	RE	BD-a	S58
Sheep Cr. (Black Cr.)	d	REW	BD	M51,D57
Butte Cr.	a	-		C53
Calf Cr.	b	RE	BD-a	C53,S58
Little Calf Cr.	a	-		S58
Moose Cr.	c	RE	BD-a	S58
Deadmans Cr.	e	-		D54
Beaver Cr. (Camas Cr.) (Thomas Cr.)	a	-	C53	
Benton Gulch	a	-		C57
Keep Cool Cr.	a	-		C57
Keep Cool Reservoir	b	REBW		C57
Elk Cr.	c	E		C57
Camas L.	b	R		C57
Big Birch Cr.	c	RE		C57
Edith L.	b	RG		D55,C57
Gypsy L.	b	E		C57

Table 6, concluded

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
No. Fk. Smith R.	d	REK		D56
Fourmile Cr.	b	E		C53
Lake Cr.	c	E	NF-a	S58
Boundary L.	a	-		S58
Sutherland Reservoir	d	REKW		C58
Sheep Cr.	d	REBW		C58
Dearborn R.	c	REBW		C58
Mid.Fk. Dearborn R.	d	RE		C55
Prickly Pear Cr.	d	REB		D54,C58
Canyon Cr.	d	REB		D55,C58
Cottonwood Cr.	a	-		C54
Virginia Cr.	a	-		C55
Trout Cr.	b	RE		C53
Little Prickly Pear Cr.	c	RE		C57
Deadman Cr.	d	RE		C56
Lost Horse Cr.	a	-		C57
Elk Horn Cr.	c	E	NF-a	S57
Beaver Cr.	d	RED		C57
(Lake Helena)				
Prickly Pear Cr.	d	RE		C56
Lump Gulch	b	RE		C52
Clancy Cr.	c	E		C56
Tenmile Cr.	c	RE		C57
Sevenmile Cr.	c	E		C57
Trout Cr.	d	RB		C53
Hauser L.	d	RB		C57
Canyon Ferry Reservoir	d	RBW		C56
Avalanche Cr.	a	-		C54
White Gulch	c	E		C53
Wilson Cr.	c	E		C55
Deep Cr.	d	REBW		C53
Greyson Cr.	c	RE		C57
Crow Cr.	d	REB		C56
So. Fk. Crow Cr.	d	RE		C53
(No. Fk. Crow Cr.)				
No. Fk. Crow Cr. L.	a	-		C53
Tizer L.	c	E		C55
Sixteenmile Cr.	d	REBW		C58
So. Fk. Sixteenmile Cr.	d	RE		C56

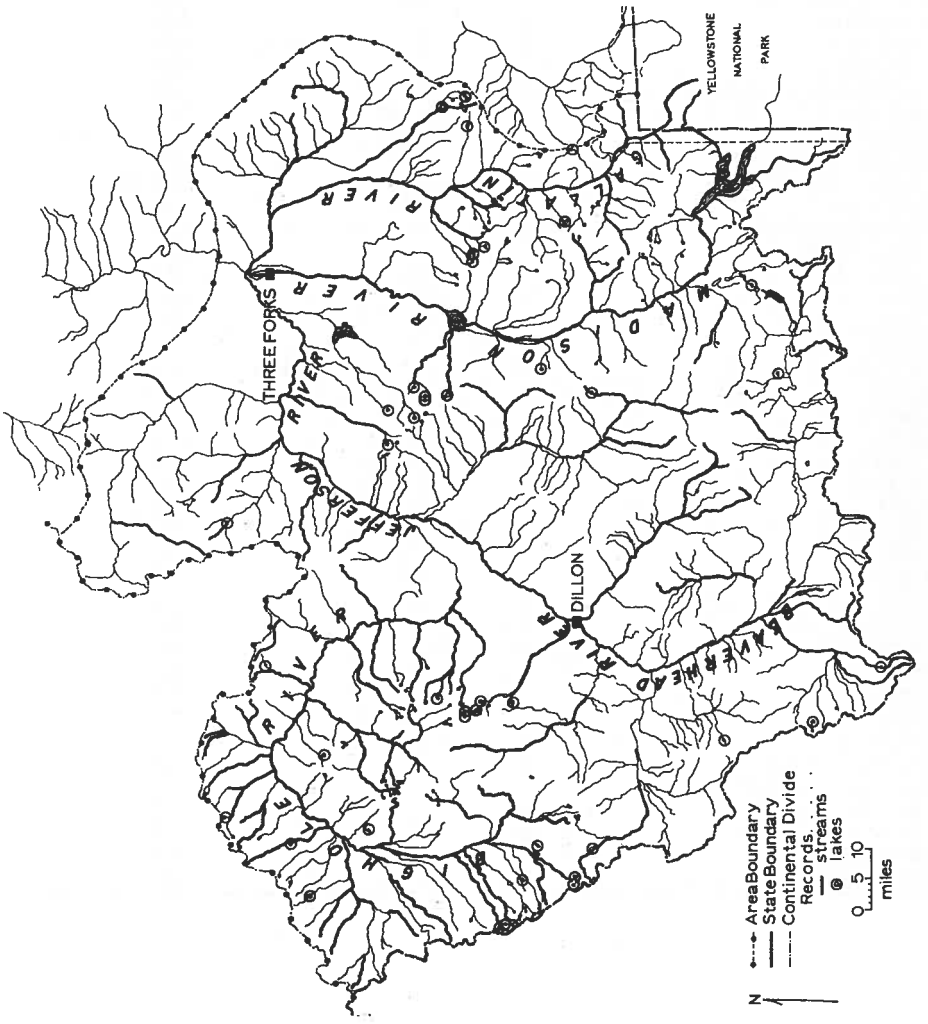

Fig. 12. Cutthroat trout distribution (heavy lines) in Area No. 4; Table 7.

Table 7. Cutthroat trout records in Area No. 4 (Fig. 12).

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
Jefferson River	d	RBW		C55
(Willow Cr.)				
Willow Cr. Reservoir	d	REB		C58
(So. Willow Cr.)				
Bell L.	b	R		C56
(No. Willow Cr.)				
Hollow Top L.	c	R		C58
So. Boulder R.	c	RE		C56
Sailor L.	d	EB		C53
(Boulder R.)				
Bison Cr.	d	REW		C58
Boulder Cr.	d	REB		C57
Whitetail Cr.	b	EB		C55
(Big Pipestone Cr.)				
Delmoe L.	b	REB		C54
Haney Cr.	c	R		C57
Fish Cr.	b	RE		C58
Hell Canyon Cr.	b	R		C55
Big Hole River Sec. 1	d	REBG		C56
Big Hole R. Sec. 2	d	REBG		C58
Big Hole R. Sec. 3	d	REBG		C58
Birch Cr.	c	E		C57
Pear L.	d	RB		C55
Tub L.	a	-		C57
Willow Cr.	d	RE		C53
Bond Cr.	c	E		C53
Dubois Cr.	a	-		C53
Cherry L.	a	-		C53
Rock Cr.	c	RE		C53
Trapper Cr.	b	E		C53,D56
Camp Cr.	c	E		C56
Canyon Cr.	c	RE		C53,D56
(Divide Cr.)				
No. Fk. Divide Cr.	d	RE		C55
Jerry Cr.	c	REB		C56,D57
(Tom Cr.)				
Hamby L.	c	E		C58
Wise R.	d	REGW		C58
Pattengail Cr.	d	REG		C58
Elk Cr.	c	E		C54
Lacy Cr.	c	EG	BD-a	C58,S58
Bobcat Cr.	c	E	BD-a	C57,S58
Mono Cr.	a	-	NF-a	C56,S58
David Cr.	b	RE	NF-a	S58
(Alder Cr.)				
Johanna L.	a	-		C56
(Deep Cr.)				
French Gulch	c	E		C56
American Cr.	a	-		C56

Table 7, continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
(Sevenmile Cr.)				
Twelve Mile Cr.	e	-		D57
Ten Mile Cr.	e	-		D57
Seymour Cr.	c	E		C56
Lamarche Cr.	c	RE		C56
(W. Fk. Lamarche Cr.)				
Warren L.	a	-		C53
Fishtrap Cr.	c	E		C56
Mid. Fk. Fishtrap Cr.	c	E	BD-a	S58
Pintlar Cr.	d	RE		C56
Pintlar L.	d	RE		C56
(Plimpton Cr.)				
Thompson L.	d	REGW		C53
No. Fk. Big Hole R.	d	REG		C54
(Mussigbrod Cr.)				
Mussigbrod L.	e	-		D56
Johnson Cr.	d	RE		C56
Tie Cr.	c	E		C57
(Ruby Cr.)				
Big Moose Horn Cr.	c	E		C56
(Trail Cr.)				
Joseph Cr.	c	E	BD	D57,S58
(McVay Cr.)				
Boot L.	d	RBW		C57
(Swamp Cr.)				
Moose Cr.	b	RE		C58,D58
Steel Cr.	d	REG		C58
Big Swamp Cr.	c	E		C58
(Slag-a-melt Cr.)				
Slag-a-melt L.	a	-		C57
Ajax L.	a	-		C55
Little Lake Cr.	c	E		C58
(Hamby Cr.)				
(Englejard Cr.)				
Englejard L.	a	-		C58
Warm Spring Cr.	d	REGW		C58,S58
Governor Cr.	d	EG		C58
Berry Cr.	c	EG		C58
Jahnke Cr.	c	E		C56
Van Houten L.	d	RE		C57
Jahnke L.	a	-		C57
(Dark Horse Cr.)				
Dark Horse L.	c	R		C56
Bull Cr.	c	E		C58
Beaverhead River	d	RBW		C56
Ruby R. Sec. 1	d	REB	ID	M52,C56
Alder Gulch	d	RE		C58
Granite Cr.	a	-		C56
Ledford Cr.	c	RE		C56

Table 7, continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
Warm Spring Cr.	e	-		M57
Romey L.	a	-		C58
Rattlesnake Cr.	c	RE	NF	C57,S58
Estler Cr.	c	R		C56
Estler L.	c	R		C56
Tent L.	a	-		C58
Minneopa L.	a	-		C54
Blacktail Cr.	c	REW		C54
E. Fk. Blacktail Cr.	d	REB		C58
Indian Cr.	c	E		C57
W. Fk. Blacktail Cr.	c	RE		C56
Grasshopper Cr. (Horse Prairie Cr.) (Medicine Lodge Cr.) (Dad Cr.)	d	REB		C56
Dad L.	a	-		C54
Bloody Dick Cr.	c	R		C56
Reservoir L. (Red Rock R.)	c	E		C55
Sage Cr.	c	RE		C53
Sheep Cr.	c	RBW		C57
Deadman Cr.	c	R	BD	S58
Deadman L.	a	-		C58
Nicholia Cr. (Cabin Cr.) (Indian Cr.)	b	R	BD-a	C56,S57
Morrison L.	c	K		C56
Little Sheep Cr.	c	E		C56
E. Fk. Little Sheep Cr.	c	R		C56
W. Fk. Little Sheep Cr. (Willow Cr.)	c	E		C56
Birch Cr.	a	-		C55
Long Cr.	b	G	BD	S58
Schultz Pond (Lower Red Rock L.)	a	-		M52,C56
Odell Cr. (Upper Red Rock L.)	b	RE	NF-a	S58
Elk Springs Cr.	b	RE		C58
Elk L.	b	GL		C58
Red Rock Cr.	d	REG		S58,D58
Hell Roaring Cr.	b	E	NF-a	S58
Madison River Sec. 1	d	RBGW		C58
Madison R. Sec. 2	d	REBG		C57
Madison R. Sec. 3	d	REBG		C54
Madison R. Sec. 4	d	RBGW		C53
Ennis L. (Meadow Cr.)	d	RBG		C56
No. Meadow Cr.	d	REB		C54
Sureshot L.	b	E		C56

Table 7, concluded

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
Twin L.	b	R		C54
McKelvey L.	a	-		C57
So. Meadow Cr.	a	-		C58
So. Meadow Cr. L. (Blain Spring Cr.)	b	R		C57
Axolotl L.	c	R		C56
Indian Cr.	c	R	NF-a	S58
So. Fk. Indian Cr. (W. Fk. Madison R.) (Cliff L.)	a	-	NF-a	C58,S58
Goose L.	a	-		C54
Elk R.	c	RB		C56
Hebgen L.	d	RBW		C58
Grayling Cr.	b	RB		C55
So. Fk. Madison R.	d	RB		C53
Gallatin River	d	RBW		C58
E. Gallatin R.	d	RBW		C58
Ross Cr.	c	R		C54
Hyalite Cr.	d	RE		C58
Hyalite Reservoir	b	REBG		S57,C58
Emerald L.	c	RG		C54
Bridger Cr.	d	REB		C56
W. Gallatin R. Sec. 1	d	RBW		C54
W. Gallatin R. Sec. 2	d	RBW		M51,C58,S58
Beck and Border Canal	e	-		M51
Spain Ferris Irr. Ditch	e	-		M52
Highline Canal	e	-		M51
Kleinschmidt Canal	e	-		M51
Spanish Cr.	c	E		C58
So. Fk. Spanish Cr.	c	RE	BD	S58
Spanish Lakes	a	-		C58
Lake Solitude (No. Fk. Spanish Cr.)	a	-		C58
Chiquita L.	a	-		C58
Hell Roaring Cr. (Squaw Cr.)	c	R	NF-a	S58
Rat L. (Beaver Cr.)	c	R		C58
Beaver Cr. L. (Buffalo Cr.)	a	-		C57
Ramshorn L.	a	-		C58
Taylor Fk. Gallatin R.	c	R		C55
Speciman Cr.	c	R	BD-a	S58
Bacon Rind Cr.	a	-		C57,S58

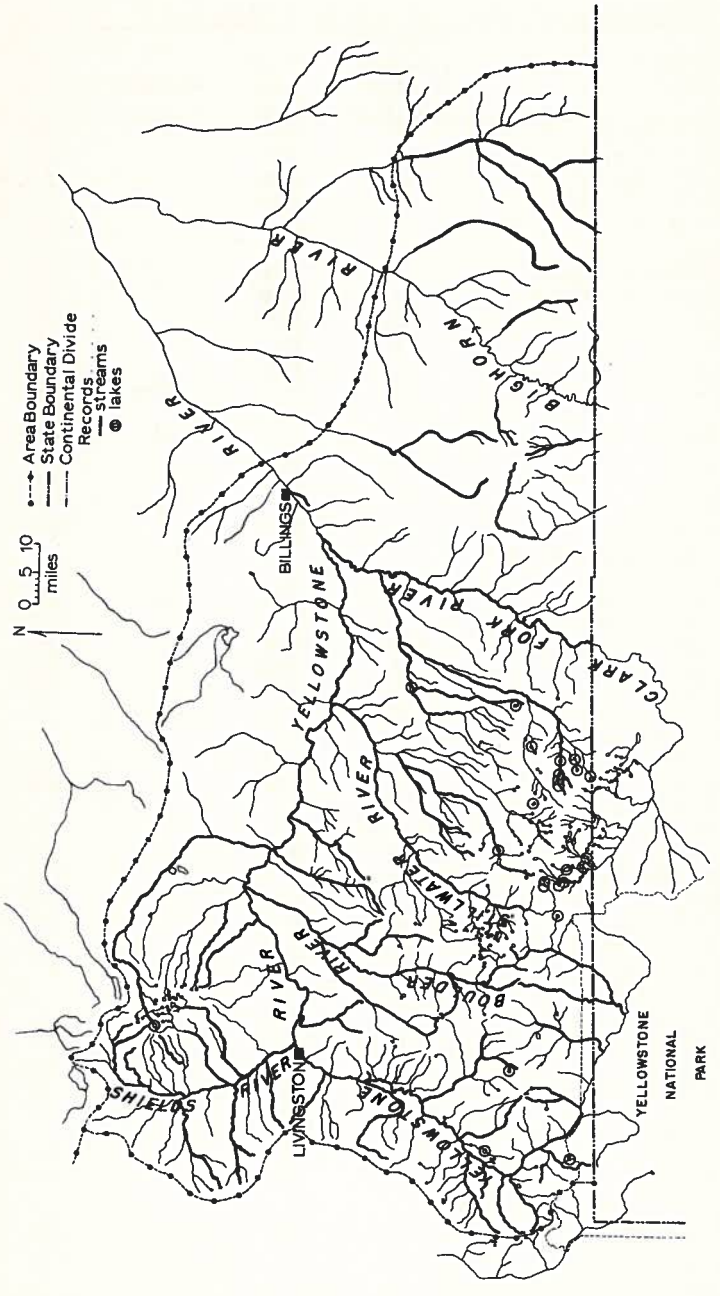

Fig. 13. Cutthroat trout distribution (heavy lines) in Area No. 5; Table 8.

Table 8. Cutthroat trout records in Area No. 5 (Fig. 13).

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
YELLOWSTONE RIVER Sec. 5	d	RBW		C58
Yellowstone R. Sec. 6	d	RBW		C56
Yellowstone R. Sec. 7	d	REBW		C58,M58
Yellowstone R. Sec. 8	d	REBW		C58
Yellowstone R. Sec. 9	c	RBW		C58
Bighorn River				
Little Bighorn R. Sec. 1	d	REBW		C54
Little Bighorn R. Sec. 2	d	REBW		C56
Lodge Grass Cr.	d	REBW		C56
Elbow Cr.	b	RB		C58
Rottengrass Cr.	c	REB		C58
Black Canyon Cr.	d	REB	BD-a	S58
Dry Head Cr.	d	B		D57
Crooked Cr.	b	E	NF	C58,S58
Sage Cr.	d	RE		C58,S58
Pryor Cr.	d	RE		S58
E. Fk. Pryor Cr.	c	R	BD-a	C55,M57,S58
Broadwater Drain	c	E		C54
Clark Fk. Yellowstone River				
Clark Fk. R. Sec. 1	c	RE		C53
Clark Fk. R. Sec. 2	d	RBW	ID	C55,D57
Clark Fk. R. Sec. 3	c	E		C55
Rock Cr. Sec. 1	d	RBW		C55
Rock Cr. Sec. 2	d	REBW		C54
Rock Cr. Sec. 3	d	REBW		C54
Red Lodge Cr.	d	RE		C56
Cooney Reservoir	c	R		C57
Willow Cr.	c	REBW		C56
Willow Cr. L.	d	RBW		C54
(W. Fk. Rock Cr.)				
(Basin Cr.)				
Basin Cr. L.	b	E		C55
Falls Fk. Rock Cr.	b	E		C58
Broadwater L.	c	E		C54
Keyser Brown L.	c	E		C58
First Rock Cr. L.	b	E		C58
Second Rock Cr. L.	b	E		C57
(Hellroaring Cr.)				
Hellroaring L.	c	E		C53
Sliderock L.	a	-		C54
Glacier L.	b	E		C58
Rock Island L.	c	E		C53
Margaret L.	a	-		C58
(Broadwater R.)				
Kersey L.	c	RE		C57
Broadwater L.	c	E		C55
Lady of the Lake Cr.	c	E		C53
Lady of the Lake	c	RE		C55
Ovis L.	a	-		C58
Corner L.	a	-		C58

Table 8, continued

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
Stillwater River Sec. 1	d	RBW		C55
Stillwater R. Sec. 2	d	RBW		C58
Stillwater R. Sec. 3	d	REBW		M38,C54
W. Rosebud Cr.	d	REBW		C58
Fishtail Cr.	d	REB		C56
Fiddler Cr.	d	REB		C54
Mystic L.	c	R		C58
(E. Rosebud Cr.)				
Thunder L.	c	R		C54
(Goose Cr.)				
Goose L.	a	-		C54
Bridger Cr.	c	E		C56
Lower Deer Cr.	b	B		C56
Sweetgrass Cr.	d	RB		C58
Campfire L.	c	R		C56
Boulder River Sec. 1	d	REBW		C58
Boulder R. Sec. 2	d	RE	NF	C58,M58,D58
Boulder R. Sec. 3	d	REBW		C57
W. Boulder R.	d	RBW		C58
E. Boulder R.	d	RBW		C53
Elk Cr.	c	R	NF	D58,M58
Fourmile Cr.	c	R		C58
E. Fk. Boulder R.	c	REB		C53
(Big Timber Cr.)				
Swamp Cr.	a	-		C53
Little Timber Cr.	a	-		C56
Mission Cr.	c	RB		C53
Little Mission Cr.	a	-		C56
Shields River Sec. 1	c	REB	BD	C58
Shields R. Sec. 2	d	RB		C58
Shields R. Sec. 3	d	EBW		S57,C58
Willow Cr.	a	-		C58
Rock Cr.	c	REB	BD	C58,S58
Brackett Cr.	c	REB		C58
Skunk Cr.	b	B		C57
Cottonwood Cr.	c	REB	BD-a	C58,S58
(Horsefly Cr.)				
Horse Cr.	a	-		C57
(Cottonwood Cr.)				
Flathead Cr.	b	REBW		S57,C58
Porcupine Cr.	b	EB		C57
So. Fk. Shields R.	a	-		C57
Mill Cr.	c	E		C57
Fleshman Cr.	c	E		C57
Trail Cr.	d	RE		D57,C58
Spring Cr.	d	rbw		C58
Mill Cr.	c	R		C58,S58
Passage Cr.	a	-		C56
Carpenter L.	a	-		C56

Table 8, concluded

PRIMARY DRAINAGE and Tributaries	Cutthroat relation to other game fish	Other game fish	Barriers	Information source
Sixmile Cr.	b	E		C53
Dailey L.	d	RK		C58
Big Cr.	d	REB		C58
Donahue Cr.	a	-		C55
Rock Cr.	a	-		C53
Tom Miner Cr.	c	RE	BD-a	C58,S58
Mol Heron Cr. (Cinnabar Cr.)	a	-		C57
Mill Cr.	b	R		C57
Mol Heron L.	a	-		C57
Bear Cr.	b	R		C57
Billman Cr.	b	E		C57
Hellroaring Cr.	a	-		C55
Slough Cr.	b	R	NF-a	C57,S58
Buffalo Fork (Lake Abundance Cr.)	c	R	NF-a	C53,S58
Lake Abundance	a	-		C58

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