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THE STATUS OF THE BULL TROUT IN NEVADA

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Abstract

Bull trout, identified as Dolly Varden until 1978, are not known to have held more than a limited presence in the Jarbidge River system of Nevada. Their current status is not unlike that which might be inferred from the first recorded surveys in the 1950's, low fish densities with a disjunct distribution. Currently, best densities of bull trout are found in six headwater locations above 7200 feet elevation where they are often the only species present despite the absence of fish migration barriers. Coincident to finding more than one bull trout within a sample area were stream temperatures of < 51°F, and streamflows > 1.0 cfs. One or both of these stream characteristics was absent at 10 other electrofished sites in the drainage located above 7200 feet that were found to have wild rainbow/redband trout but no bull trout. General aquatic habitat conditions in the drainage are good due to the inherent stability of the streams, with the exception of those streams within the Buck Creek drainage and two other streams that are tributary to the Jarbidge River in Idaho, even though they originate on the Humboldt National Forest. As the majority of the bull trout habitat in Nevada is located within the Jarbidge Wilderness Area, the streams should remain in good habitat condition.

Introduction

Until 1978, bull trout were considered by fish taxonomists to be Dolly Varden (*Salvelinus malma*). In 1978, it was recognized that Dolly Varden and bull trout are separate and distinct species.[1] The fish species found in Nevada is bull trout (*Salvelinus confluentus*), even though historic records in Nevada most often refer to the fish as Dolly Varden. All historical accounts of bull trout in Nevada have come from the Jarbidge River

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[1]Cavender, T. 1978. California Fish and Game 64(3): 139.

drainage waters. They were first collected in Dave Creek (EFJRD) in 1934 (Miller, 1952)[2].

The most current compendium of knowledge of the bull trout in Nevada as well as the proposed future management of the species is contained in the Bull Trout Species Management Plan (hereafter referred to as the SMP), which was drafted in December, 1990. The plan has not been finalized nor formally adopted. Since development of the SMP, however, Division of Wildlife program emphasis has been directed by it. Prescribed programs include stream habitat and fish population surveys within the Jarbidge River drainage basin.

Historical Distribution

Bull trout were first collected by employees of the precursor to the Nevada Division of Wildlife, on July 5, 1951, when three specimens were obtained from the East Fork Jarbidge River. With the advent of the Dingell-Johnson Federal Aid Program, the Nevada Fish and Game Commission conducted the initial survey of many of Nevada's fishable waters during the 1950's. Two bull trout were electroshocked at the uppermost of five sample stations on the West Fork of the Jarbidge River on August 15, 1954. Similarly, four sample stations were electroshocked on the East Fork Jarbidge River on August 26 and 28, 1958. One bull trout was caught at each of the two highest elevation sample stations. The dominant wild game fish in both the West Fork and East Fork was rainbow trout followed by mountain whitefish and bull trout. In addition, the West Fork catch data indicated the presence of hatchery brook trout and cutthroat trout that together comprised 45.3% of the total catch. Excluding the hatchery trout in the West Fork samples, bull trout comprised about 7.0% of the game fish catch in both streams. Estimated minimum numbers of bull trout present in Nevada at the time of the original surveys of both the West Fork and East Fork of the Jarbidge River are presented below:

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[2] Miller, R. R. 1952. First record of the Dolly Varden, Salvelinus malma from Nevada. Copeia Vol. 3:207-208.

Jarbidge River
Initial Bull Trout Abundance Estimates
1958

Stream	Miles	Number/Mile	Total Number
West Fork	1.3	105.60	137
East Fork	9.4	34.32	323

The West Fork was extensively electrofished on several other occasions from which inferences to the abundance of bull trout can be drawn as is indicated below:

West Fork Jarbidge River
Fish Population Survey Results
1961 through 1979

Date	Sample Total	Sites w/BT	Mean BT/Mile	Occupied Miles	Estimated Total No.
10/61	7	1	580.80	1.6	929
08/72	4	1	35.20	2.0	70
11/74	6	0	--	--	--
09/75	7	0	--	--	--
10/79	10	2	5.75	5.9	34

The bull trout electrofished in 1961 were collected at what was later determined to be the upper distribution of bull trout in the West Fork. This location was about one-half mile upstream of the 1954 collection site. The 1979 fish population sampling was conducted within and immediately above recently channelized river segments located between Mahoney Ranger Station and Pine Creek Campground, hence, sampling was not conducted near the 1954 or 1961

collection sites. Neither did the surveys conducted in the early to mid 1970's include sampling within the upper one-mile of salmonid distribution in the West Fork. As a result, the estimates of total bull trout numbers during those years that the headwater reach was not sampled would have to be considered low and thus not good for trend analysis.

One bull trout was electrofished from a single 100 foot sample site in Jack Creek (WFJRD) on August 16, 1974. A 350 foot section of river on the East Fork at Robinson Hole was electrofished on October 16, 1984, revealing one 209 mm (FL) bull trout (15.09 BT/mile), five rainbow trout, one mountain whitefish, and 34 sculpin.

Angler Use

Both forks of the Jarbidge River are popular fishing waters for both resident and non-resident anglers. The Nevada Division of Wildlife tracks angler use by water fished through returns from an angler questionnaire that is mailed to 10% of the licensed resident anglers and 10% of the non-resident anglers. In the past 20+ years, angler use has generally decreased in the West Fork and increased in the East Fork (see below).

ANGLER USE TRENDS

	Average Number of Angler Days		
Jarbidge River	1970's	1980's	1990-1992
East Fork	643	1425	590
West Fork	3440	1666	2106

Annual catchable rainbow trout stocking in the West Fork averaged 4242 fish during the 1970's and 3287 fish in the 1980's. The West Fork has received 3000 catchable trout per year since 1986 except in 1991 when no trout were available for stocking. All trout stocked since 1960 have been hatchery reared rainbow trout. Angler use of tributary streams to both rivers has always remained minimal according to angler questionnaire return data.

Angler Harvest

Random angler creel checks on the East Fork during the 1970's and 1980's indicate that rainbow trout, bull trout and mountain whitefish comprised 94.7%, 3.5% and 1.8% of the fish harvested, respectively. Likewise, in the West Fork the creel was comprised of 96% rainbow trout, 2% bull trout, 1% mountain whitefish and 1% brook trout during the 1960's thru the 1980's. Hatchery stocking of rainbow trout and brook trout in the West Fork contributed to the creel which would tend to underestimate the contribution of bull trout. Angler caught bull trout were reported from the Humboldt National Forest portion of Dave Creek (EFJRD) in both 1975 and 1976, and from Jack Creek in 1976.

Current Bull Trout Status

West Fork Jarbidge River Drainage

The latest and most extensive fish population surveys in the Jarbidge River drainage were conducted in conjunction with stream habitat assessments. The West Fork Jarbidge River was surveyed in 1985 and the major tributaries on the Humboldt National Forest were surveyed in 1992. All fish population sampling consisted of one upstream pass with a backpack electroshocker. A downstream block net was usually put in place to prevent fish loss. The length of stream electrofished was usually 100 feet except in the West Fork where sample stations with fish varied between 90 and 235 feet and averaged 138 feet. A total length of 900 feet was sampled at the fishless uppermost sample site on the West Fork. Rainbow trout and sculpin were the most plentiful and widely distributed species found in the West Fork.

The highest density of bull trout in the West Fork was sampled near the upper limit of fish distribution. The average bull trout density within the 1.5 mile section of stream below the two headwater forks was 4.8 bull trout per 100 m^2. Bull trout and rainbow trout comprised 67% and 33% respectively of the catch at the uppermost sample site with fish. There were four year classes of bull trout represented in the West Fork of the Jarbidge River electrofished samples.

West Fork Jarbidge River
Fish Population Inventory
1985

Species*	Size (mm) Range	Size (mm) Mean	Occupied Miles	Fish per Mile Range	Fish per Mile Mean	Estimated Population
BT	73-266	132	5.5	0- 225	53	292
RBT	27-278	97	15.5	106-1877	978	15,156
MWF	90-315	208	10.5	0- 225	37	383
SU	37-199	112	6.5	0- 127	43	280
SC	20-119	62	14.5	158-6735	3188	46,219

* BT-Bull Trout; RBT-Rainbow Trout; MWF-Mountain Whitefish
SU-Sucker; SC-Sculpin

The bull trout captured in Jack Creek only represented 6% of the total trout captured at Sample Site R1S2. Rainbow trout represented 97.8% of the fish shocked and seen but miscaptured in all of Jack Creek. The one bull trout capture in Pine Creek represented only 2.6% of the total trout captured or seen but missed while electroshocking. Rainbow trout were the only other salmonid found in Pine Creek. The Forest portion of the Buck Creek drainage, Deer Creek, Bear Creek, Fox Creek and Sawmill Creek were all inhabited by only rainbow trout.

East Fork Jarbidge River Drainage

The entire Humboldt National Forest portion of the East Fork Jarbidge River drainage was surveyed in 1993. This survey found bull trout inhabiting the two uppermost sample sites on the river. Rainbow trout were the most plentiful and widely distributed species found in the East Fork of the Jarbidge River. Only bull trout were found at the uppermost Sample Site R3S3 whereas, downstream 0.8 miles at Sample Site R3S2, a single bull trout was collected along with three rainbow trout and seven sculpin. The river sample of four bull trout appeared to represent three different age classes, none of which were young-of-year fish.

East Fork Jarbidge River *
Fish Population Inventory
1993

Species**	Size (mm) Range	Size (mm) Mean	Occupied Miles	Fish per Mile Range	Fish per Mile Mean	Estimated Population
BT	115-165	155	1.7	53 - 317	185	314
RBT	32-220	122	13.3	105 - 792	317	4213
SC	21-114	74	12.5	53 -3221	1302	16280
DA	27- 70	48	1.8	264 - 739	502	903

* Humboldt National Forest portion only.
** BT-Bull Trout; RBT-Rainbow Trout; SC-Sculpin and DA-Dace

Contemporary surveys conducted on the East Fork tributaries found bull trout in upper Dave Creek and within the Slide Creek drainage. No evidence of bull trout was discovered in the Robinson Creek or Cougar Creek drainages, however, two adult trout observed in a deep pool at Sample Site 1 on Fall Creek were thought to be bull trout. Bull trout encountered in Slide Creek consisted of a single adult specimen at SS-3 and juvenile fish at the lowest elevation sample site in each of two unnamed tributary streams to Slide Creek. An estimated 361 bull trout inhabit the Slide Creek drainage. Bull trout in Dave Creek were collected at the two highest elevation sample sites but not at the Forest Boundary. An estimated 251 bull trout (132 bull trout per mile) inhabit 1.9 miles of Dave Creek on the National Forest. The uppermost Sample Site R1S3 catch was composed of 100% bull trout while about 0.5 mile downstream, R1S2 contained 50% bull trout and 50% rainbow trout. The five captured bull trout in Dave Creek ranged in length from 122 mm to 231 mm and averaged 167 mm (FL). Five collected rainbow trout averaged 125 mm (FL). Both rainbow trout and sculpin were sampled in Fall Creek and only rainbow trout were found inhabiting Cougar, Robinson and lower Jim Bob Creeks.

Stream Habitat Conditions

The most extensive stream habitat survey of the West Fork was completed in October, 1985. There were 17 sample sites located

throughout the Nevada portion of river from the stateline upstream to above the headwater forks. This stream habitat survey was conducted using a modification of the U.S. Forest Service transect method (Dunham and Collotzi, 1975). The tributaries of the West Fork and the entire East Fork drainage above the U.S. Forest Service Boundary were intensively surveyed in 1992 and 1993, respectively. These stream habitat surveys were conducted using the Level 3 Survey in the U.S. Forest Service - Region 4 Fisheries Habitat Surveys Handbook - FSH 2609.23 (March, 1989). Both survey methods consist of five cross-stream transects per station and thus, most stream attributes can be directly compared.

Both the West Fork and East Fork drainages lie within a basaltic flow geologic zone. Stable stream channels are characteristic of the drainage type as evidenced by "good" stream channel stability scores for both the West Fork and East Fork. A 1979 U.S. Forest Service stream channelization project straightened 3104 feet of the West Fork at seven areas ranging in length from less than 50 feet to 1621 feet located between Mahoney Ranger Station and Pine Creek Campground. Both river forks have a moderate stream gradient averaging under 3%. Stream bottom substrate composition in the forks is composed primarily of rubble sized particles.

Jarbidge River
Stream Bottom Substrate Composition
1985, 1992 and 1993 Surveys

	Substrate Percent Composition						Percent
Stream	Bedrock	Boulder	Rubble	Gravel	Sand/Silt	Other	Embededness
West Fork	1	20	50	16	7	7	12.5
East Fork	3	21	51	21	4	Trace	16.0

Each stream bottom was evaluated as being moderately packed with some overlapping. Mean substrate embeddedness ratings were considered "light" (gravel, rubble, and boulder particles have less than 25 percent of their surface surrounded by fine sediment) in both streams.

A comparison of the East Fork and West Fork stream habitat condition index (HCI) using the average of the five parameters of pool measure (PM), pool structure (PS), streambottom (SB), bank cover (BC), and streambank soil stability (BSS) is presented below:

Jarbidge River
Stream Habitat Characteristics
1985, 1992 and 1993 Surveys

Stream	Percent of Optimum PM	PS	SB	BC	BSS	HCI
East Fork	80.6	40.8	72.0	73.6	91.0	71.6
West Fork	47.2	49.5	65.0	70.0	78.0	61.9

The major habitat differences between the two streams was the paucity of pools in the West Fork and somewhat less stable streambanks in the West Fork. The dominant pool forming features in both streams was boulder and/or rubble substrate. Features including logs, limbs, root wads, and overhanging banks accounted for 15% of the noted pool features in the East Fork and and 16% in the West Fork. Deep water as a pool feature was present 13% of the time in the West Fork but only 1% of the time in the East Fork.

Stream discharge on the National Forest portion of the West Fork and East Fork was similar at the time each river was surveyed.

Jarbidge River
Stream Discharge
1985, 1992 and 1993 Surveys

Stream	Stream Discharge (cfs) Range	Mean
West Fork	1.7 - 8.8	5.7
East Fork	1.3 - 10.2	5.5

The mean water depth at ten West Fork survey sites located on the National Forest was 0.48 feet compared to 0.35 feet on the East Fork. Likewise, the mean water width on the Forest portion of the West Fork and East Fork was 15.9 feet and 19.9 feet, respectively. It would appear that the West Fork is somewhat narrower and deeper than the East Fork under low to medium flow regimens despite a similar channel width that averaged 39.2 feet on the West Fork and 39.9 feet on the East Fork. The fact that a road parallels much of the West Fork and that stream channelization has occurred in several areas could help explain the narrower and hence, deeper West Fork.

Tributary Stream Conditions

The National Forest portion of the tributaries entering the East and West Forks of the Jarbidge River within Nevada are above 5850 feet and are primarily first or second order, Rosgen A2 type stream channels. Tributaries on the Forest that eventually drain into Idaho from the Double Diamond Desert are steep to moderate gradient, gravel-rubble or gravel-fines, Rosgen B type stream channels. Streams of like character include East Fork Jarbidge River tributaries, West Fork Jarbidge River tributaries within Nevada, and streams originating on National Forest in Nevada and ending in the Idaho portion of the West Fork or Jarbidge River proper. Stream flows present during the East Fork Jarbidge River drainage surveys in 1993 were 98% of average in the Snake River drainage, whereas, West Fork tributary streamflows were only about 30% of normal in 1992.

The East Fork and West Fork tributary streams being of similar character, greatest differences were associated with stream discharge and its affect on formation of pool habitat and pool quality. Habitat parameters of bank soil stability and bank vegetative stability were rated good to excellent in both the East Fork and West Fork tributaries. The Buck Creek drainage and headwaters of Columbet and Dorsey Creeks were collectively only moderately stable however. Stream bottom composition was good in the East Fork and West Fork tributaries. Less than desirable substrates (silt and sand) prevented attainment of even a fair stream bottom rating in the Buck Creek Area where stream bottom embeddedness rated 49% and ungulate streambank damage was rated moderate at 42%. Both stream bottom embeddedness and ungulate

damage ratings were acceptable in the tributaries of the East Fork and West Fork.

Stream temperatures taken at the time of the stream surveys within the Forest portion of the Jarbidge River system were characteristic of summertime conditions. The highest temperatures recorded were from the Buck Creek Area where the mean high temperature for the six streams was 67.5°F. The eight other West Fork tributaries had a mean recorded high temperature of 58.6°F. The lower reach of Pine Creek had a recorded high of 66°F, however, the recorded high in the upper reach where the bull trout was found was 59°F. The bull trout captured in Jack Creek was in 53°F water in the evening. The mean high temperature in the East Fork tributaries was only 50.7°F. The highest recorded temperature in the East Fork tributaries was taken at SS-7 in Robinson Creek, 59°F.

Bull Trout Habitat Characteristics

There were six electrofished sites having a minimum of two bull trout present (105.6 fish/mile) and all were located at the uppermost trout inhabited area of the stream in which they were found. These sites could be considered Focal Habitat[3] or the last remaining strongholds for bull trout. All six sample sites were located in the fir-aspen-mountain brush upland vegetation zone at stream elevations above 7200 feet. The associated riparian zone at all sites consisted of a composite of aspen, fir, grass and forbs, and willow and/or alder. All the sites were representative of a Rosgen A2 type stream channel. Consistent conditions across all six sample sites included the following: (1) clear, cold water(40°-51°F); (2) an elevation above 7200 feet; and (3) a base discharge of at least 1 cfs. There were ten other sampled sites located in the Jarbidge River drainage in Nevada above 7200 feet that were inhabited by only rainbow/redband trout. Based on the aforementioned stream characteristics present in occupied bull trout habitat, none of the ten sites is potential bull trout habitat; either stream temperature and/or minimum discharge

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[3]Terminology as used in the Draft, Bull Trout Conservation Agreement - State of Idaho (including Nevada). April 4, 1994.

criteria were not met during the time each of the ten sites was sampled. If the two trout seen but not shocked at Station 1 in Fall Creek were indeed bull trout as thought, they were at a location with a discharge of 14.66 cfs, a water temperature of 53°F and at an elevation of 6450 feet. Because the two trout were resting on the bottom of a deep, quality pool, the temperature where they were may have actually been cooler than the recorded temperature taken just beneath the stream surface.

The current and past distribution of bull trout should be considered Focal Habitat. This includes the headwaters of the East Fork and West Fork of the Jarbidge River, the headwaters of Dave Creek, the headwaters of Pine Creek, and all of Fall Creek, Jack Creek and Slide Creek. The majority of the East Fork and West Fork of the Jarbidge River can also be considered Nodal Habitat[4], or those habitats adjacent to focal areas which support trout during periods of high population and distribution. Critical Contributing Areas[5] that could conceivably be used at times by bull trout or, at a minimum, provide clear, cold water to the river system include the following areas: Sawmill Creek, Fox Creek, Bear Creek, and Deer Creek in the West Fork Jarbidge River; and Cougar Creek and Robinson Creek in the East Fork Jarbidge River drainage. Due to current habitat problems and direct link to West Fork Nodal Habitat, the Buck Creek drainage could be considered an Adjunct Habitat[6] (adjacent habitats unsuitable for sustained occupancy).

Conclusion

Based on the first stream survey records for the Jarbidge River drainage system and the most current survey results, bull trout continue to maintain a limited presence in the same locations. Given the present habitat condition of focal habitats, the current land management practices, negligible exploitation, and wilderness land status, bull trout are expected to persist.

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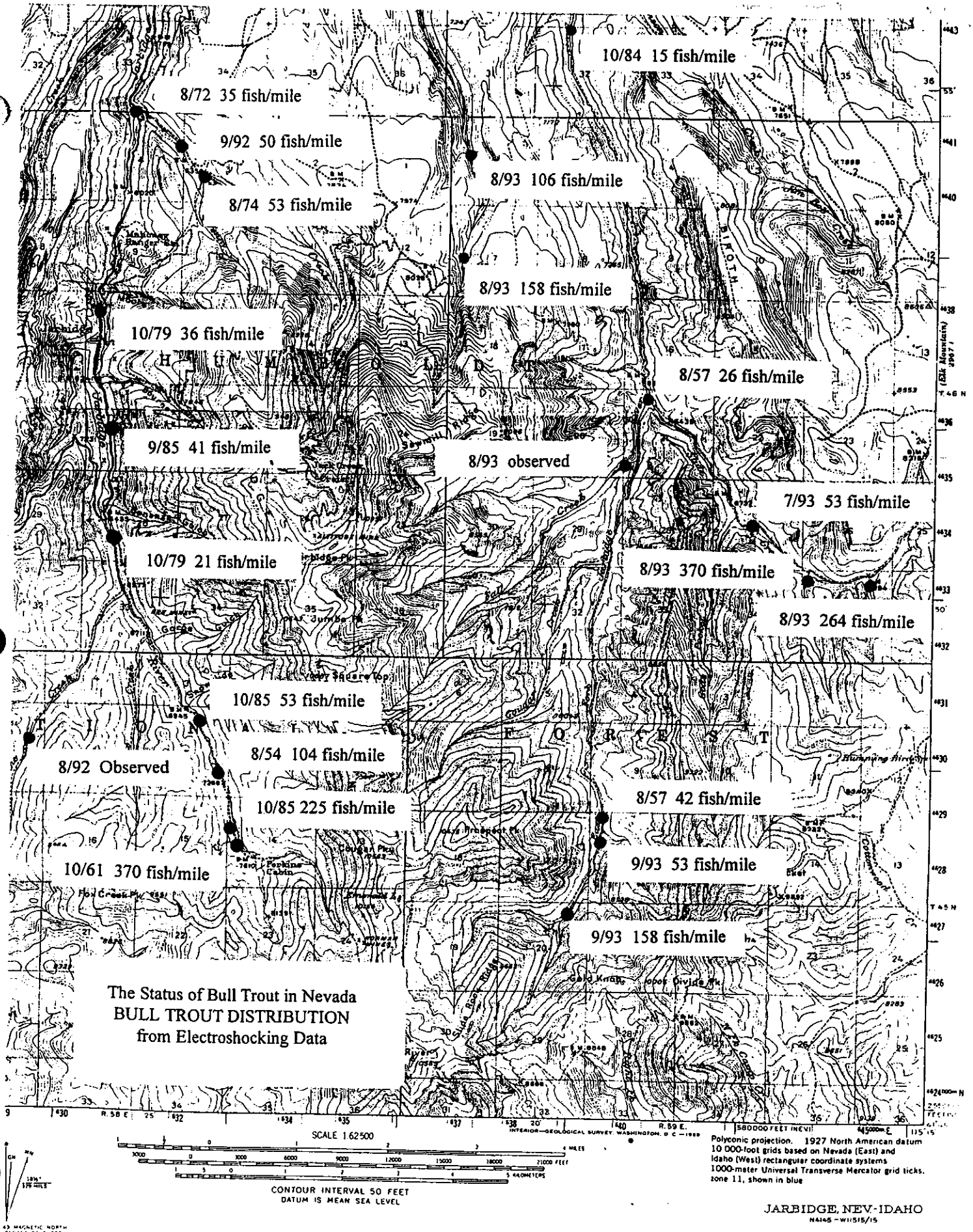
[4] ibid

[5] ibid

[6] ibid


10/84 15 fish/mile
8/72 35 fish/mile
9/92 50 fish/mile
8/93 106 fish/mile
8/74 53 fish/mile
8/93 158 fish/mile
10/79 36 fish/mile
8/57 26 fish/mile
9/85 41 fish/mile
8/93 observed
7/93 53 fish/mile
10/79 21 fish/mile
8/93 370 fish/mile
8/93 264 fish/mile
10/85 53 fish/mile
8/54 104 fish/mile
8/92 Observed
10/85 225 fish/mile
8/57 42 fish/mile
10/61 370 fish/mile
9/93 53 fish/mile
9/93 158 fish/mile
The Status of Bull Trout in Nevada
BULL TROUT DISTRIBUTION
from Electroshocking Data
SCALE 1:62500
CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL
Polyconic projection. 1927 North American datum
10 000-foot grids based on Nevada (East) and Idaho (West) rectangular coordinate systems
1000-meter Universal Transverse Mercator grid ticks, zone 11, shown in blue
JARBIDGE, NEV-IDAHO
1943
AMS 2967 IV-SERIES V736