Survey and Management of Mountain Lakes in the Clearwater Basin

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Missoula, Montana
July 2020

Acknowledgments

Thanks to all the MFWP fisheries technicians, interns, and volunteers that assisted with our lake surveys in the Clearwater Basin, particularly Glenn Grandjean, Taylor Lipscomb, and Jared Preston.

The staff at the MFWP Washoe Park Trout Hatchery in Anaconda have produced and transport the Westslope Cutthroat Trout for the mountain lake stocking program for decades. Recent individuals involved with the program include: Angela Smith, Kerrie Berger, Jim Vojachoski, Paul Suek, and Taylor Lipscomb.

This study and report were funded with Montana hunter and angler license dollars and Federal Wallop-Breaux/Sport Fish Restoration Act funds.

Introduction

The Clearwater Basin in west-central Montana, considered the project area for this report and evaluation (Figure 1), contains more than 20 middle elevation and high elevation natural lakes (elevation range 4,268 - 7,030 ft) that generally lie around the perimeter of the watershed. These lakes range in size from 2 to 103 acres (Figure 2). Larger, lower elevation lakes located along the Clearwater River main stem and valley bottom (e.g., Rainy, Alva, Inez, Seely, Salmon and Placid Lakes) are not included in this report section.

Middle and high elevation lakes, hereafter referred to as 'Clearwater mountain lakes', are physically diverse, and include both fish-bearing and fishless waters (Figure 3). Fish assemblages are primarily comprised of introduced native and non-native trout, but native, non-game fishes and illegally introduced warmwater sportfish also occupy several lakes. Sport fisheries are primarily supported by trout species and most populations are self-sustaining. However, Westslope Cutthroat Trout (WCT, *Oncorhynchus clarkii lewisi*) are stocked by Montana Fish, Wildlife & Parks (MFWP) in selected waters to increase the consistency and quality of sport fisheries. No other fish species are stocked in Clearwater mountain lakes.

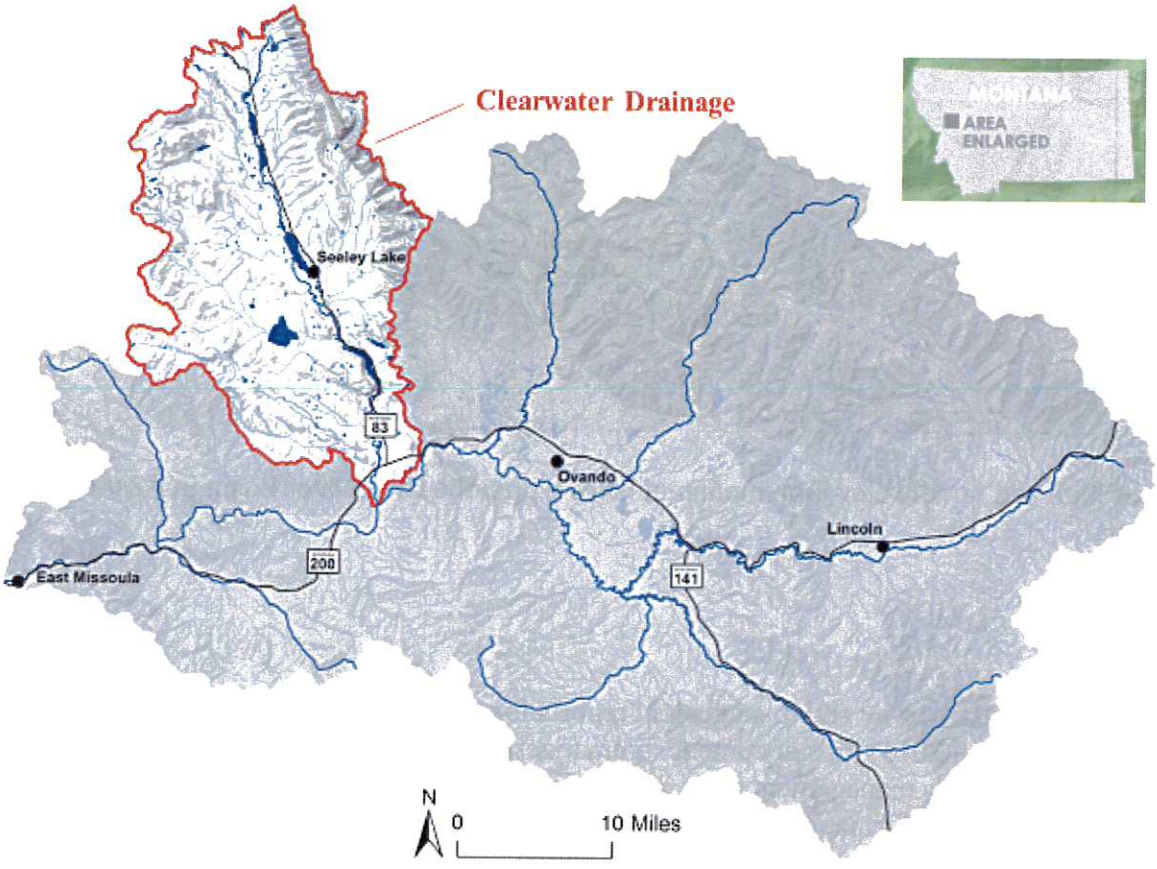


Figure 1. Location of the Clearwater Drainage within the Blackfoot watershed in western Montana.

Methods

Fish-bearing mountain lakes in the Clearwater Basin were visited by MFWP field crews in 2010-2018 (Figure 3). The objective of the surveys was to describe physical and biological lake attributes, as well as evaluate accessibility and relative levels of recreational use. Surveys included fish population assessments, amphibian searches, bathymetric mapping, water chemistry measurements, and a description of recreation sites and trail networks. In some cases, lakes were sampled more frequently to monitor concurrent research projects (e.g., WCT Diploid-Triploid trials on Clearwater, Spook and Hidden Lakes, see Appendix IV). Many of the fishless lakes in the project area were also visited and sampled (Figure 3), primarily to describe lake physical attributes, document amphibian populations, and verify that fish were absent.

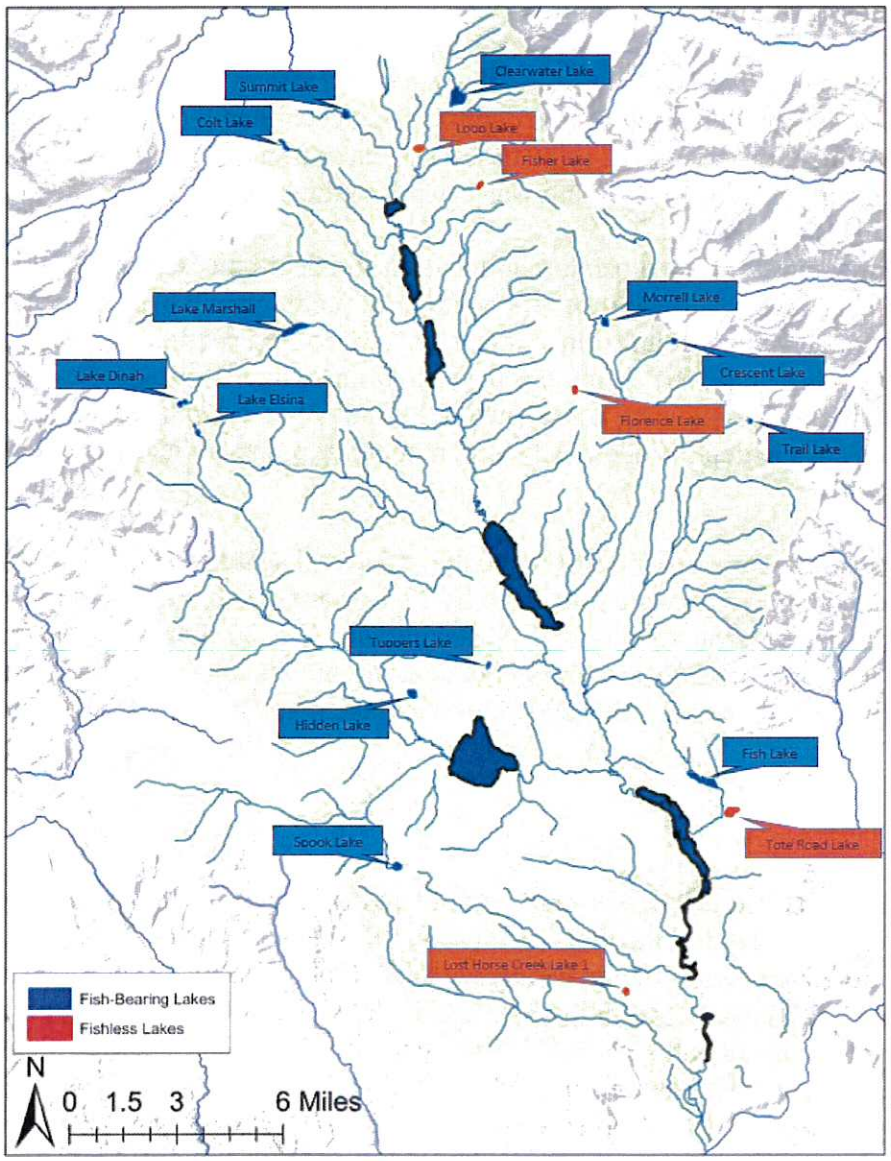


Figure 3. Fish-bearing and fishless mountain lakes in the Clearwater Basin of west-central Montana.

widely-spaced locations to help ensure an adequate, representative sample. For analysis, all gill net catch results were standardized by species as number of fish/net/hr.

Fish caught in gill nets were sacrificed and processed on shore. We weighed (g) and measured (TL, mm) each individual, assessed sex and maturity, and noted a qualitative description of major taxa in stomach contents (anecdotal). In many instances where *Oncorhynchus* spp. were present, we preserved 25 fin clips (caudal or anal fin) in individual vials filled with 95% ethanol. These samples were stored to allow future determination of the relative genetic contribution of WCT, Rainbow Trout (*Oncorhynchus mykiss*), and Yellowstone Cutthroat Trout (*Oncorhynchus clarki bouvieri*) comprising lake populations. In some instances, additional fish were collected to complete genetic or age/growth (otoliths and scale) samples. We typically angled from shore to supplement gill net catch, but did not include these samples in gill net catch summaries.

Relative Weight as an Index of Fish Condition

Indices of well-being or condition are used to describe length-weight relationships ("plumpness") in fish. Relative weight (Wr) is a common index where average fish of all species have a value of 100, regardless of the units of measure (Anderson and Neumann 1996). Relative weight for an individual fish is derived through the following equation:

$$Wr = W / Ws \times 100$$

Where W is the weight of an individual and Ws is a length-specific standard weight. Standard weight equations are of the form:

$$\log_{10} Ws = a' + b' (\log_{10} L)$$

where a' and b' account for the genetically determined shape characteristics of a species and L is the total length. Species-specific a' and b' values yield a Wr of 100 for fish that are well fed and have an average condition or "plumpness" that reflect "ecological and physiological optimality". Ws was calculated for Brook Trout (*Salvelinus fontinalis*), Cutthroat Trout *spp.* and Rainbow Trout using the following equations (Anderson and Neumann 1996):

Rainbow Trout	$\log Ws = -4.898 + 2.990 \log L$
Cutthroat Trout	$\log Ws = -5.192 + 3.086 \log L$
Brook Trout	$\log Ws = -5.085 + 3.043 \log L$

Relative weight was calculated for individual trout based on total length and weight measurements. Means and ranges were then computed to represent the condition or well-being of each lake population. Trout with high condition generally exhibit faster growth rates and may achieve larger sizes. High average condition for a population was considered an indication that fish densities were appropriate for the inherent carrying capacity of a lake and that natural reproduction and/or stocking levels were not excessive.

amphibians were identified to species and life stage. Relative abundance of each species and life stage was noted for each lake and is noted in Appendix I, Table 3.

Description of Recreational Use

Relative recreational use at each lake was estimated and described based on qualitative observations. Indicators including trail presence/absence and condition, number and condition of campsites/fire rings, amount of refuse, ease of access, etc., along with fishing pressure estimates from the MFWP state-wide mail surveys (MFWP, Unpublished Data) were used collectively to describe overall recreational use. Locations of trailheads, distances to lakes from access points, trail numbers, etc. were obtained from field observations, USGS topographic maps and current USFS maps.

Results & Summary

Mountain lakes in the Clearwater Bain support a number of quality trout fisheries distributed throughout the watershed (Figure 4). A summary of physical and biological information for each lake is found in Appendix I tables and in individual lake summaries (Appendix II). Trout populations are predominantly self-sustaining, although several WCT fisheries are supplemented with periodic stocking (described below). Lake access and relative levels of recreational use vary significantly and are also described at the end of this section and for individual waters in Appendix II.

In summary, quality WCT angling opportunities are available at Clearwater Lake, Colt Lake, Crescent Lake, Hidden Lake, and Spook Lake (Table 2). Cutthroat trout are also present in Lake Elsina, but the population is stunted. Lake Marshall predominantly supports stunted Brook Trout and Mountain Whitefish (*Prosopium williamsoni*), with limited numbers of WCT and Bull Trout (*Salvelinus confluentus*). Collectively, these fisheries represent a mix of self-sustaining populations and those supplemented with stocking.

Self-sustaining Rainbow Trout populations in Trail and Dinah Lakes are consistently abundant and include some quality fish, but trout body condition is typically low. Fishing opportunity is limited at Summit Lake and Tuppers Lake as trout populations are sparse or absent. In general, recreational opportunities associated with lakes and lake fisheries are abundant and diverse in the basin. Specific attributes and descriptions of fisheries are presented below for each water body, along with discussion of access and various recreation components.

Table 2. Comparison of trout size, condition and relative abundance among publicly accessible middle and high elevation lakes in the Clearwater Basin based on MFWP's most recent sampling.

Lake	Fish Species^	Max Length (mm)	Avg Condition Wr (Range)	Catch Rate (sinking gill nets)
Clearwater L.	WCT	**416**	**97** (87-115)	**0.9** trout/net/hour
	EBT	**433**	**113** (99-134)	**0.9** trout/net/hour
Colt L.	WCT	**436**	**98** (79-120)	**0.9** trout/net/hour
Crescent L.	WCT**	-	-	-
L. Dinah	RBT	**441**	**82** (69-99)	**0.6** trout/net/hour
L. Elsina	WCT	**308**	**94** (77-107)	**1.9** trout/net/hour
Hidden L.	WCT	**384**	**116** (85-143)	**1.7** trout/net/hour
L. Marshall*	WCT	**390**	**93** (86-100)	**< 0.1** trout/net/hour
	EBT	**258**	**103** (94-109)	**0.2** trout/net/hour
Morrell L.*	WCT	**401**	**96** (85-111)	**1.7** trout/net/hour
Spook L.	WCT	**462**	**104** (84-139)	**2.0** trout/net/hour
Summit L.	WCT	**189**	**87** (86-87)	**0.1** trout/net/hour
Trail L.	RBT	**440**	**86** (77-93)	**1.1** trout/net/hour
Tuppers L.	WCT**	-	-	-

^ WCT = Westslope Cutthroat Trout, RBT =Rainbow Trout, EBT = Brook Trout

* Bull Trout were also captured at Marshall and Morrell Lakes, but not included as angling for them is illegal

**No fish were captured in Crescent or Tuppers Lakes in most recent sampling events, but both historically supported WCT

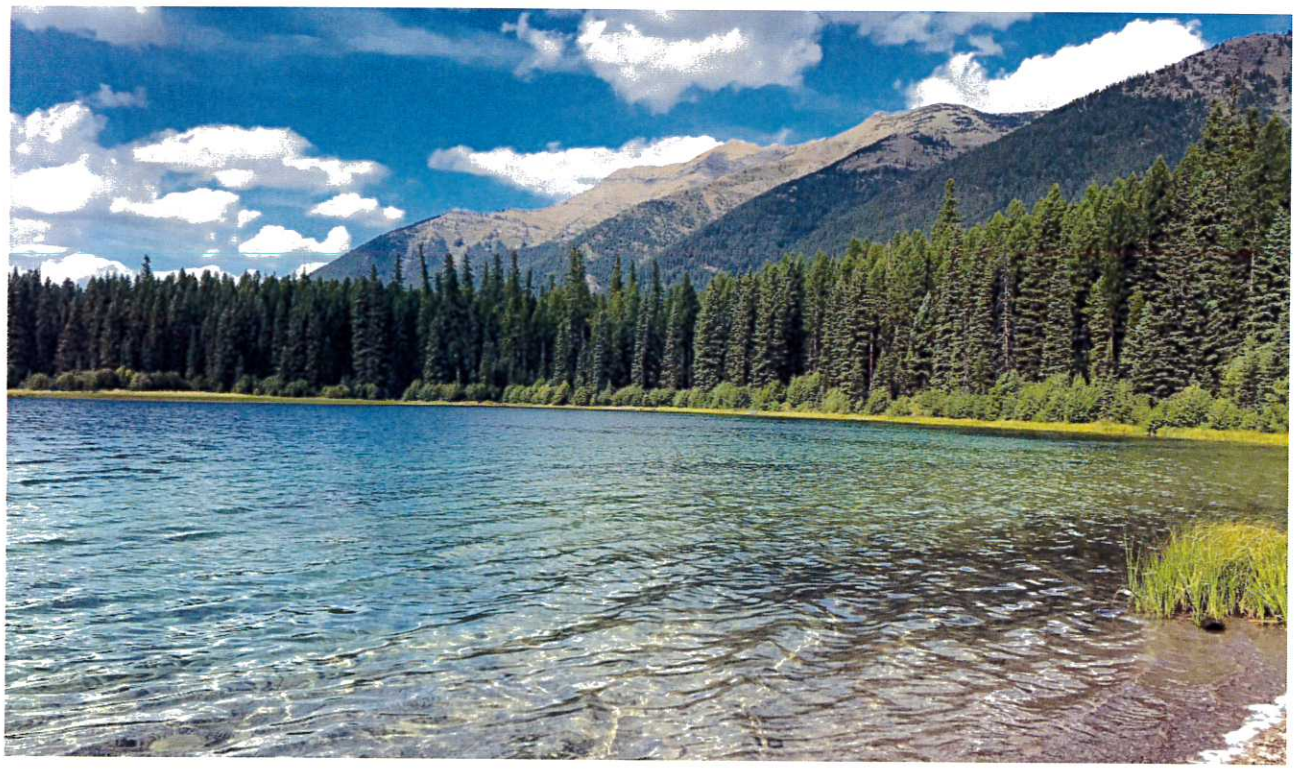


Figure 5. The unique setting provided by Clearwater Lake and the Swan Crest in late summer.

a common destination for hiking, wildlife viewing, and camping. The nonmotorized trail system that originates 0.5 miles from the lake and encircles the entire shoreline is heavily used, as are several disbursed campsites along the lake perimeter. Recreationists and anglers also frequently access the lake in winter via snowmobile.

Colt Lake

Colt Lake and Crescent Lake (below) also offer quality, semi-remote WCT angling opportunities. The Colt Lake WCT fishery has been completely self-sustaining and relatively stable for decades. Size structure information from sampling in 2005, 2011, 2015 and 2018 indicate that natural reproduction is moderate, but consistent, producing a reliable high quality fishery (MFWP, unpublished data). Gill net sampling over this period produced median sizes of ~ 355 mm (14 in), with good overall body condition (e.g., mean Wr = 98) and adult WCT regularly exceeding 430 mm (17 in). No other fish species have been detected in Colt Lake. This lack of interspecific competition likely contributes to the stability and quality of this fishery.

Figure 7. Typical size range for three consecutive Westslope Cutthroat Trout year classes captured in gill nets at Colt Lake.

Colt Lake is easily to access via a ~0.25 mile, low gradient trail off of the maintained USFS road system (see Appendix II). Despite easy walk-in access and consistent fishery quality, fishing pressure and overall use remain relatively low (< 200 angler days per year) based on biannual state-wide angler use surveys (MFWP, unpublished data). Much of the lake perimeter is steep and heavily vegetated, but easy shoreline access and established campsites are evident where the trail converges with the lake.

Lake Dinah

Lake Dinah and Trail Lake (below) support introduced, self-sustaining rainbow trout populations that have not been actively managed or stocked in recent decades. Fish in Lake Dinah exhibit slow growth rates and very low body condition (mean Wr = 82), presumably related to relatively low lake productivity, high elevation (6,476 ft msl), and consistent natural reproduction. Slow growth and poor condition of Rainbow Trout is typical of other high mountain lake populations in western Montana (Knotek & Thabes 2008; Knotek et al. 2013). However, Lake Dinah does support some larger fish over 17 inches (>440 mm).

Because Lake Dinah actually lies within the upper Marshall Creek Basin, some outmigrant rainbow trout undoubtedly occupy the outlet stream and ultimately emigrate downstream to Lake Marshall. Lake rehabilitation and potentially re-stocking with WCT would likely improve fishery quality at Lake Dinah, as well as help to alleviate hybridization and fishery quality issues at Lake Marshall.

Lake Dinah offers a semi-remote and scenic alpine setting for camping and angling. The lake is easily accessed via a ~ 2 mile hike from the Lake Elsina trailhead (USFS Trail 12T). Several established camp sites and excellent shoreline angling locations are evident along the lake perimeter, particularly on the peninsula that extends from the northeast shoreline.

Lake Elsina

Figure 9. Early summer conditions at Lake Elsina.

Hidden Lake is directly accessible by vehicle and there are many suitable camping locations, as most of the west shoreline is managed as a USFS dispersed camping area. However, shoreline angling opportunity is limited by topography and lake bathymetry. Most angling occurs from personal, non-motorized watercraft because of motor restrictions and the quality of the primitive launch (essentially carry-in).

Lake Marshall

Lake Marshall is a large (85 ac), relatively sterile mid-elevation (4,751ft msl) lake that formed in a glacial trough on the west side of the Clearwater Valley above Lake Inez. Historically, the lake likely supported endemic species including WCT, Bull Trout, Mountain Whitefish, and Largescale Suckers (*Catostomus macrocheilus*), but Brook Trout and Rainbow Trout (RBT) were introduced in the mid-1900s and remain self-sustaining. The fishery is currently defined by stunted Brook Trout, but stocked WCT and WCT x RBT hybrids are also available to anglers. Bull Trout that originate in the inlet stream are common, but angling for them is not legal.

Marshall Lake lies entirely within the Marshall Creek Wildlife Management Area (WMA) managed by MFWP and the lake is directly accessible by vehicle via USFS Road #463. However, camping and carry-in boat access are only reasonably available on the east (outlet) portion of the lake. This lake and surrounding Mission Mountains are known for their scenic beauty and wildlife.

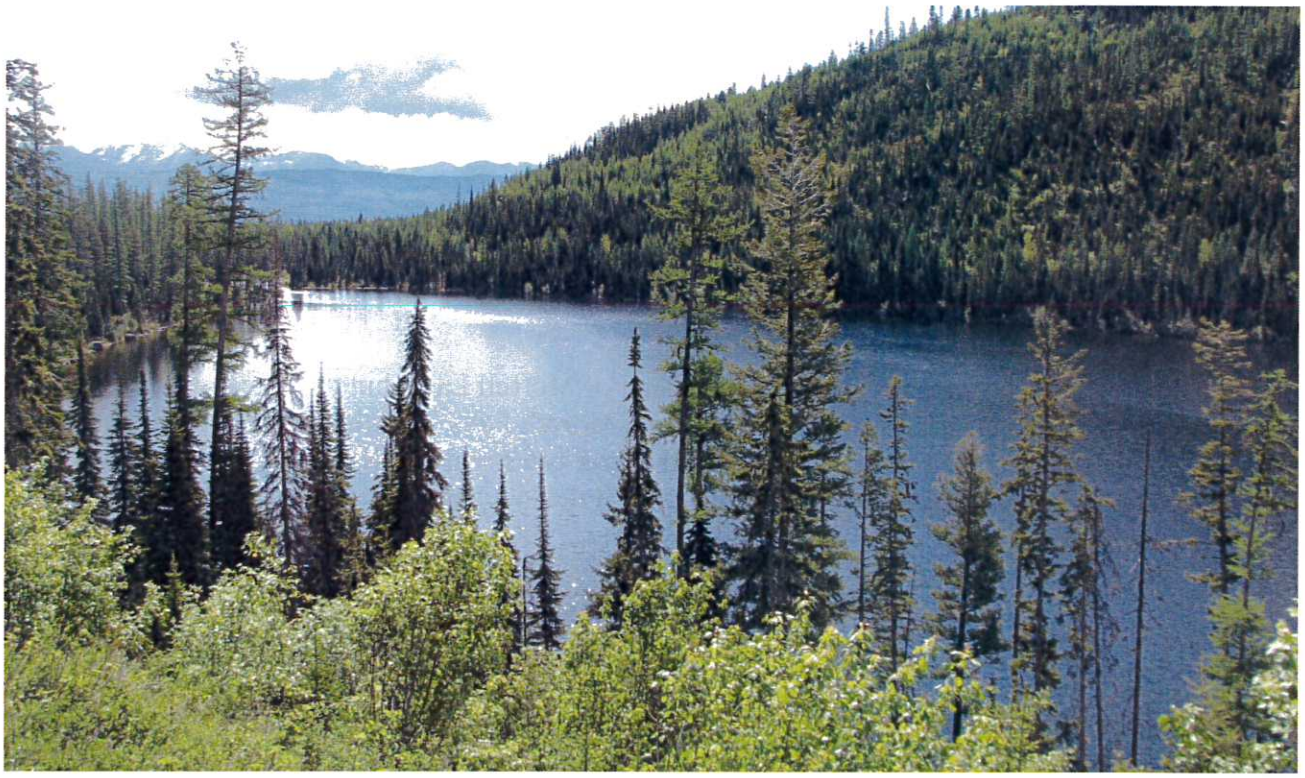


Figure 11. Lake Marshall is the largest mountain lake in the Clearwater Basin.

consistently exceed 400 mm (16 in). However, fishing pressure and harvest are higher than most comparable lake fisheries in the basin, so abundance of large fish is generally low.

Spook Lake is directly accessible via 4-wheel drive vehicles and shoreline camp sites are numerous. However, shoreline topography and lake bathymetry make fishing from most shoreline locations difficult. Therefore, small boats or personal nonmotorized watercraft are recommended for angling.

Summit Lake

Contrary to its name, Summit Lake is actually a shallow pothole surrounded by bog and wetlands located at the head of the Clearwater Valley near the Clearwater-Swan drainage divide. The lake lies a short distance below a road-side pull-out adjacent to Montana Highway 83 and is primarily known as a viewing area for common loons and other wildlife.

Although Summit Lake supports low densities of WCT, Longnose Sucker (*Catostomus Catostomus*) and illegally introduced Pumpkinseed sunfish (*Lepomis gibbosus*), the fishery is marginal and is seldom utilized. The lake has not been stocked in recent decades and the sparse WCT population is likely sustained by the small inlet stream known as Bertha Creek.

Trail Lake

Figure 12. View of Trail Lake from Pyramid Pass trail.

Trail Lake lies in a glacial cirque at 6,900 ft elevation just below Pyramid Pass along the Swan Mountain Crest. This small (2.2 acre), scenic lake contains self-sustaining Rainbow Trout that were stocked in the mid-1900s. Similar to Lake Dinah and other sterile lakes at high elevation, Rainbow

REFERENCES

Anderson, R.O. and R.M. Neumann. 1996. Length, Weight, and Associated Structural Indices. *In* Fisheries Techniques; B.R. Murphy and D.W. Willis, eds. American Fisheries Society, Bethesda, Maryland. pp 447-482.

Bahls, P. 1992. The status of fish populations and management of high mountain lakes in the western United States. Northwest Science 66(3):183-193.

Bjornn, T.C. and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. Pages 83-138 *in* Influences of Forest and Rangeland Management on Salmonid Fishes and their Habitats, W.R. Meehan, ed. American Fisheries Society Special Publication 19, Bethesda, Maryland.

Knotek, W.L. and J. Thabes. 2008. Mountain Lake Surveys and Management Plan – Middle Clark Fork Region of the Bitterroot Mountains. Montana Fish, Wildlife & Parks, Missoula, Montana. 73 pp.

Knotek, W.L., W.J. Schreck, R.A. Rashap, and J.C. Thabes. 2013. Mountain lake surveys and fisheries management recommendations for Rattlesnake Wilderness Lakes. Montana Fish, Wildlife & Parks, Missoula, Montana. 90 pp.

Maxell, B.A. 2002. Amphibian and aquatic reptile inventories in watersheds in the South and Middle Forks of the Flathead River drainage that contains lakes being considered for application of piscicides and subsequent stocking of westslope cutthroat trout. Report to the Region 1 Office of the U.S. Forest Service and Montana Fish, Wildlife and parks. Montana Cooperative Wildlife Research Unit and Wildlife Biology Program, University of Montana, Missoula, MT. 62 pp.

MFWP. 1999-2019. Montana statewide angling pressure summaries. Montana Fish, Wildlife & Parks, Helena, Montana.

Stiff, R.K. 2000. Protocols for sampling alpine lakes. Montana Fish, Wildlife and Parks, Billings, Montana

APPENDIX I. Tables Summarizing Physical and Biological Data for Middle and High Elevation Lakes in the Clearwater River Basin

Table 1. Summary information for middle and high elevation natural lakes in the Clearwater River Basin.

Lake	Water Code	Date Last Surveyed	Stream Drainage	Location (T, R, S)	GPS Location Latitude	GPS Location Longitude	Lake Type
Clearwater L.	04-6300	8/30/2016	East Fork Clearwater	19N,15W,19C	N 47.3859	W -113.5596	Glacial Depression/Trough
Colt L.	04-6320	6/28/2018	Colt Creek	19N,16W,32A	N 47.3621	W -113.6620	Glacial Depression/Trough
Crescent L.	None	7/15/2015	Morrell Creek	18N,14W,30A	N 47.2977	W -113.4648	Glacial Cirque
L. Dinah	04-6450	9/8/2010	Marshall Creek	17N,17W,1C	N 47.2559	W -113.7161	Glacial Depression/Trough
L. Elsina	04-6540	9/7/2010	N Fork Placid Creek	17N,17W,12A	N 47.2441	W -113.7043	Glacial Depression/Trough
Fish L.*	None	-	Fish Cr (Salmon Lake)	16N,14W,28/29	N 47.1138	W -113.3900	Glacial Pothole/Depression
Hidden L.	04-6705	8/31/2016	Placid Creek	16N,16W,13AB	N 47.1433	W -113.5682	Glacial Pothole/Depression
L. Marshall	04-6930	8/31/2017	Marshall Creek	18N,16W,28B	N 47.2882	W -113.6509	Glacial Depression/Trough
Morrell L.	04-6990	7/31/2018	Morrell Creek	18N,15W,23D	N 47.2978	W -113.4647	Glacial Depression/Trough
Spook L.	04-7350	8/30/2016	Boles Creek	15N,16W,12B	N 47.0731	W -113.5720	Glacial Pothole/Depression
Summit L.	04-7380	6/9/2011	Bertha Creek	19N,16W,27B	N 47.3764	W -113.6276	Glacial Pothole/Depression
Trail L.	None	8/22/2018	Trail Creek	17N,14W,3B	N 47.2604	W -113.3748	Glacial Cirque
Tuppers L.	04-7410	5/25/2016	Placid L Tributary	16N,15W,08CD	N 47.1568	W -113.5237	Glacial Pothole/Depression

** Not accessible to public*

Table 2. Physical attributes of middle and high elevation natural lakes in the Clearwater River Basin.

Lake	Approx. Elevation	Surface Acres (ha)	Max Depth ft (m)	Lake Volume (acre-ft)	Secchi Depth ft (m)	PH	Lake Aspect	History of Winter Kill?
Clearwater L.	4,786 ft	103 (41.7)	42 (12.8)	2,087	-	8.9	SW	No
Colt L.	4,835 ft	24.5 (9.9)	45 (13.7)	405	14 (4.3)	7.4	SE	No
Crescent L.	7,030 ft	3.7 (1.5)	19 (5.8)	29	>19 (5.8)	-	SW	Yes
L. Dinah	6,476 ft	22 (8.9)	21 (6.4)	156	18 (5.5)	7.2	NE	No
L. Elsina	6,309 ft	12 (4.9)	18 (5.5)	55	-	7.6	SE	No
Hidden L.	4,268 ft	33.5 (13.6)	61 (18.6)	998	20 (6.1)	-	S	Possible
L. Marshall	4,751 ft	85 (34.4)	57 (17.4)	2,700	-	-	NE	No
Morrell L.	4,825 ft	9.1 (3.7)	4 (1.3)	65	-	-	SW	Possible
Spook L.	5,620 ft	15.8 (6.4)	31 (9.5)	235	-	7.6	SE	No
Summit L.	4,176 ft	28.4 (11.5)	8 (2.4)	123	>8 (2.4)	8.1	S	Possible
Trail L.	6,900 ft	2.2 (0.9)	15 (4.5)	90	12 (3.6)	8.4	W	No
Tuppers L.	4,330 ft	16.9 (6.8)	30 (9.2)	230	8 (2.4)	-	S	Yes

APPENDIX II. Individual Lake Summaries

Clearwater Lake

Description: Clearwater Lake is a large (103 acres), mid-elevation (4,786 ft) mountain lake located at the head end of the Clearwater Valley near the Clearwater-Swan drainage divide ~14 miles north of Seeley Lake. Clearwater Lake is known both for its outstanding scenery and trout fishery.

Location: T19N, R15W, Section 19; Latitude N47.3855°, Longitude W113.5589°
Nearest Town: Seeley Lake, MT. Surrounding land ownership: Lolo National Forest (Seeley Lake Ranger District).

Access: Clearwater Lake is accessed from a well-marked trailhead (USFS Trail 18T) off of the Clearwater Loop road. To reach the lake, turn east off of U.S. Highway 83 either 0.5 or 1.3 miles north of Rainy Lake onto USFS Road #4370/4353. The trailhead is located ~ 7 miles from either end of the loop road's junction with Hwy 83. The lake lies ~ 0.5 miles straight west of the trailhead on a well used foot trail that is closed to motorized use.

Campsites and Use: There are two primary camping areas adjacent to Clearwater Lake. The primary site lies where USFS Trail 18T intersects the lake. The second site lies ~0.25 miles to the northwest along the lake shoreline along the trail which encircles the lake. Clearwater Lake receives consistent use during open water months from May-October and inconsistent use by ice-fisherman during winter.

Angling Opportunity: Clearwater Lake has historically been considered one of the finest westslope cutthroat trout fisheries in Montana. Fishery quality has subsided somewhat in the last 15 years since brook trout were illegally introduced. However, it still provides a quality fishery with reasonable shoreline access around most of the lake perimeter. Motorized watercraft are prohibited on the lake, with the exception of those powered by electric motors.

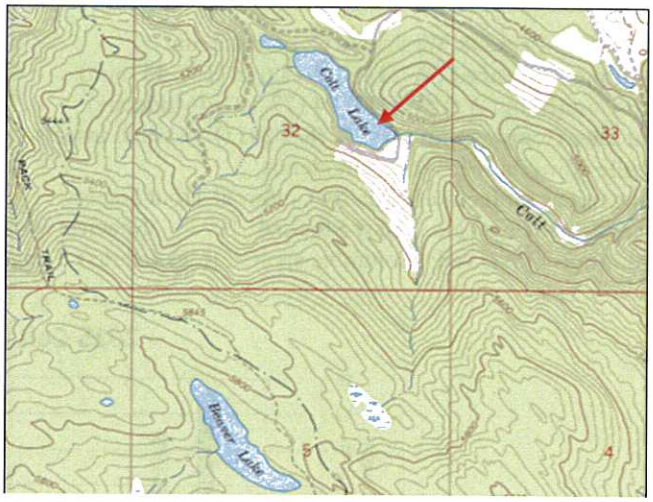
Stocking History: Clearwater Lake has been stocked regularly with fingerling westslope cutthroat trout for more than two decades. There is evidence of some natural reproduction by cutthroat trout. However, brook trout spawn successfully each year and high densities have compromised the lake's trophy fishery.

Angling Pressure: Clearwater lake is a popular fishery that receives high angling pressure relative to other mid-elevation lakes in western Montana. Estimated angling pressure from Montana state-wide mail surveys indicate that the lake has supported > 2,000 angler-days per year since 2009.

Other Nearby Lakes: Lakes in the vicinity of Clearwater Lake include Summit Lake (3 miles to west), Rainy Lake (3.5 miles southwest), Colt Lake (4.5 miles west), Pierce Lake (3 miles west) , and Holland Lake (4 miles north). Please see Lolo National Forest (Seeley Ranger District) map for routes.

Montana Fish, Wildlife & Parks

Colt Lake



Description: Colt Lake a moderately sized (24.5 acres), glacial trough lake located within the Lolo National Forest boundary about 10 miles north of Seeley Lake, MT near the Clearwater-Swan drainage divide. This mid-elevation lake is located within 0.25 miles of an open USFS road and is completely surrounded by forested terrain at 4,835 ft elevation.

Location: T19N, R16W, Section 32; Latitude N47.36234°, Longitude W113.66202°
Nearest town: Seeley Lake, MT. Surrounding land ownership: Lolo National Forest (Seeley Lake Ranger District)

Access: Colt Lake is most easily accessed via Montana Hwy 83 near the Clearwater-Swan Drainage divide. To reach the lake, turn west off of Hwy 83 on Beaver Creek Road (USFS Rd #906) located ~ 17 miles north of Seeley Lake. After ~1.7 miles, turn left and travel south on USFS Rd #646 for ~2.6 miles. At the next junction, turn right (east) on Colt Lake Road (USFS Rd #4356). Follow Colt Lake Road for ~0.75 miles to the closed gate at the Colt Lake trail access point. The lake is found along the closed road ~0.25 miles past the USFS gate and parking area. Note: The former access route via W. Fork Clearwater Road from the south is no longer viable.

Campsites and Use: Colt Lake is relatively accessible, but receives light recreational use. There are two dispersed campsites near the access point and an established trail to the lake. 'Leave no trace' camping and recreating is encouraged in this area.

Angling Opportunity: Colt Lake supports a westslope cutthroat trout population with moderate natural reproduction. Shoreline topography and thick forest canopy make shoreline angling difficult in most locations. Motorized watercraft are prohibited on Colt Lake, with the exception of those powered by electric motors.

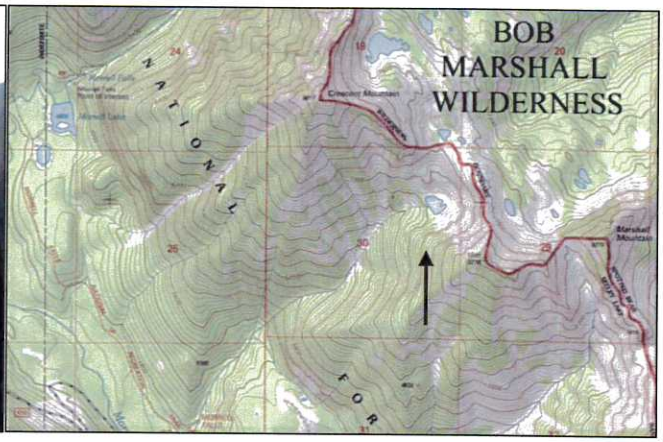
Stocking History: Colt Lake was stocked with westslope cutthroat trout on four occasions from 1966 to 1977. No subsequent stocking has occurred or is planned as the population is self-sustaining.

Angling Pressure: Estimated angling pressure from Montana state-wide mail surveys has been moderate and averaged 113 angler-days per year (range: 28-169).

Other Nearby Lakes: There are several other lakes in the vicinity of Colt Lake. The closest lakes are Beaver Lake, Summit Lake, Rainy Lake, and Clearwater Lake. All are located within five miles of Colt Lake, but are accessed via different U.S. Forest Service roads and trails (see USFS Seeley Ranger District map). Larger lakes along the Clearwater chain of lakes (e.g., Lakes Alva and Inez) are also found in close proximity.

Montana Fish, Wildlife & Parks

Crescent Lake



Description: Crescent Lake is a classic subalpine lake that lies within a small glacial cirque (3.7 acres) at the headwaters of an unnamed tributary of Morrell Creek at an elevation of 7,050 ft. The lake is located directly above Seeley Lake near Crescent Peak, just west of the Bob Marshall Wilderness boundary. Crescent lake supports a re-established westslope cutthroat trout fishery in a beautiful mountain lake setting.

Location: T18N, R14W, Section 30; Latitude N47.29185°, Longitude W113.42262°
Nearest Town: Seeley Lake, MT. Surrounding land ownership: Lolo National Forest (Seeley Lake Ranger District)

Access: Access to the lake requires non-motorized travel, typically via a user-established trail that is not part of the official U.S. Forest Service trail network. The trail begins at an unmarked turnout near the Pyramid Pass trailhead near Seeley Lake and proceeds for approximately 2 miles up the ridge to the south end of the lake. The trail then drops into the cirque basin to the north, follows the lake perimeter, and continues over the Swan Mountain Range Divide into Marshall Creek in the Bob Marshall Wilderness.

Campsites and Use: Crescent Lake supports frequent use as it is a common stop and camping location for local outfitters and recreationists. There are two established camp sites along the lake perimeter: one large camp site on the southwest shoreline (near the outlet) and another smaller site on the north shoreline. There is also a trail along most of the lake perimeter.

Angling Opportunity: Crescent Lake was fishless at the time of our survey, but now supports westslope cutthroat trout that were re-stocked in fall 2015. A complete winter kill apparently occurred in 2014. However, the lake has historically provided a quality, self-sustaining trout fishery. Gentle topography and trail access facilitate shoreline angling along most of the lake perimeter.

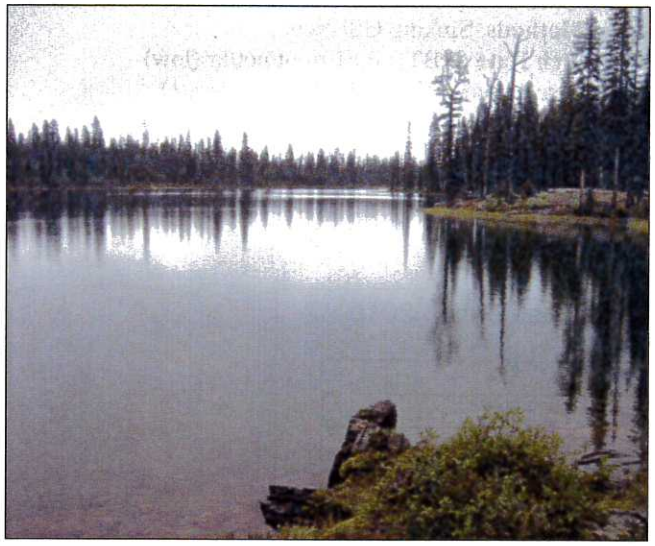
Angling Pressure: No fishing pressure estimates are available for Crescent Lake. However, given the lake's remote location, overall fishing pressure is low (assumed < 200 angler-days per year).

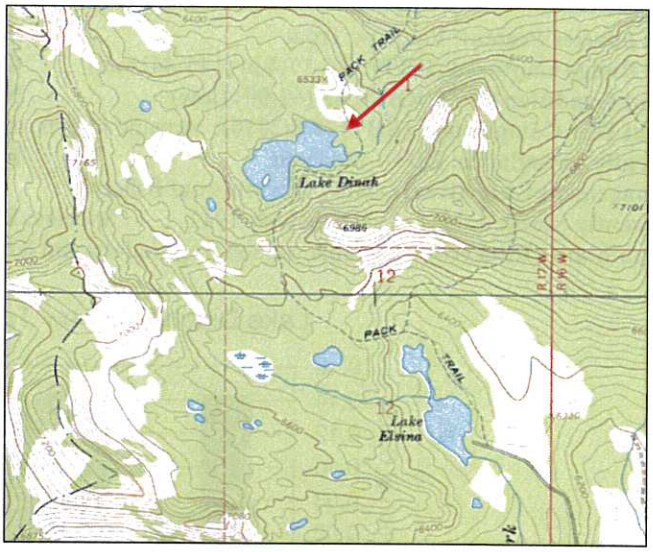
Stocking History: Prior to 2014, Crescent Lake supported a self-sustaining westslope cutthroat trout population that was introduced in the 1980s. The lake presumably winter-killed in 2014 and genetically pure westslope cutthroat trout were re-introduced in fall 2015. No additional stocking is planned unless trout are unable to reproduce successfully or the population becomes extinct again.

Other nearby Lakes: There are no lakes in the immediate vicinity of Crescent Lake. However, several other high elevation lakes occur along the Swan Mountain Divide within the Bob Marshall Wilderness boundary. These include Pyramid Lake (~ 2.5 miles SE), Trail Lake (~ 3 miles SE) and several other mountain lakes in the headwaters of Youngs and Marshall Creek Basins within two miles to the east and north of Crescent Lake.

Montana Fish, Wildlife & Parks

Lake Dinah





Description: Lake Dinah is a moderately sized alpine lake (22.0 acres) that formed in a glacial trough in the headwaters of the Marshall Creek drainage at an elevation of 6,476 ft. This lake lies within the Lolo National Forest on the Seeley Lake Ranger District and supports a quality, self-sustaining rainbow trout fishery.

Location: T17N, R17W, Section 1; Latitude N47.25598°, Longitude W113.71519°
Nearest Town: Seeley Lake, MT. Surrounding land ownership: Lolo National Forest (Seeley Lake Ranger District)

Access: Lake Dinah is most easily accessed from U.S. Highway 83 north of Seeley Lake, Montana. Follow Boy Scout Road (USFS Road #77) west to USFS Road #4349. After ~ 3.5 miles, take USFS Road #465 west to Lake Elsina. From Lake Elsina, hike USFS Trail #12T approximately 2 miles to Lake Dinah. The last 0.5 miles above the lake is steep and rocky, requiring some extra caution.

Campsites and Use: Lake Dinah lies in a semi-remote location that receives moderate use by anglers and hikers. There are several campsites and fire rings present adjacent to the lake (see map), with a user-created trail around most of the lake perimeter. Boating regulations prohibit all motorized watercraft on Lake Dinah.

Angling Opportunity: Lake Dinah supports a self-sustaining rainbow trout population with a moderate rate of natural reproduction. Shoreline topography lends well to shoreline angling along most of the lake perimeter.

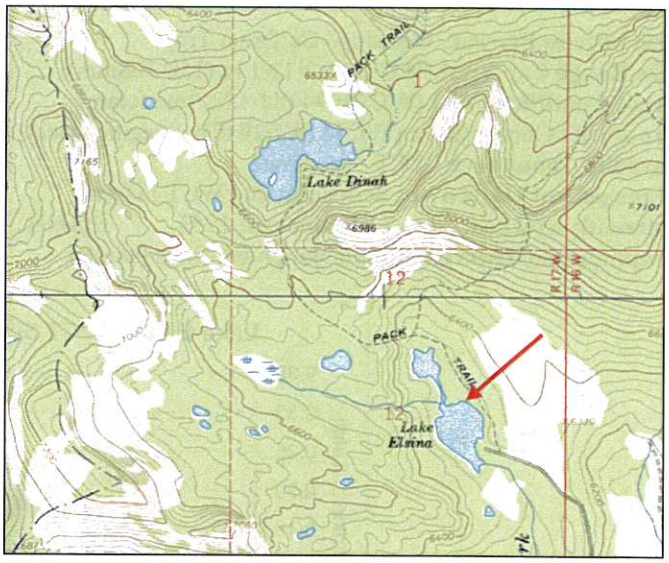
Angling Pressure: Estimated angling pressure from Montana state-wide mail surveys in 2003-2011 is moderate with an average 91 angler-days per year (range: 41-177).

Stocking History: Lake Dinah was stocked in 1941 with approximately ten thousand rainbow trout. No other stocking has been reported and no future stocking is planned as the population is self-sustaining.

Other Nearby Lakes: Lake Elsina is located approximately one mile to the southeast adjacent to the USFS Trail 12T trailhead typically used to access Lake Dinah. Lake Marshall lies below Lake Dinah, approximately 3.5 miles to the northeast, but is most easily accessed via the road system to the east on the Marshall Creek Wildlife Management Area.

Montana Fish, Wildlife & Parks

Lake Elsina



Description: Lake Elsina is a small (12.0 acres), shallow lake formed in a valley depression at the head of the Placid Creek drainage at an elevation of 6,309 ft. This lake lies near Lake Dinah on the Lolo National Forest (Seeley Lake Ranger District) and supports a self-sustaining westslope cutthroat trout population.

Location: T17N, R17W, Section 12; Latitude N47.24445°, Longitude W113.70450°
Nearest Town: Seeley Lake, MT. Surrounding land ownership: Lolo National Forest (Seeley Lake Ranger District).

Access: Lake Elsina is most easily accessed from U.S. Highway 83 north of Seeley Lake. Follow Boy Scout Road (USFS Road # 77) west to USFS Road #4349. After ~ 3.5 miles, take USFS Road #465 west for approximately 8 miles to Lake Elsina. The road runs directly to the small parking area adjacent to the lake.

Campsites and Use: Lake Elsina receives moderate use due to its accessibility. There is a small parking area and several campsites near the lake, as well as a trail along most of the shoreline. Lake Elsina is closed to motorized watercraft, with the exception of those powered by electric motors.

Angling Opportunity: Lake Elsina supports a self-sustaining westslope cutthroat population with consistent natural reproduction. Shoreline topography and trail access lend well to shoreline angling.

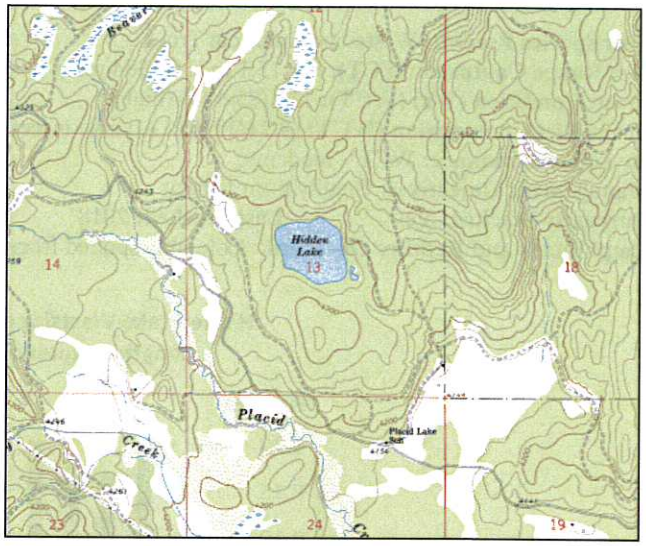
Stocking History: Stocking records indicate that rainbow trout and westslope cutthroat trout were stocked in Lake Elsina until 1953. No subsequent stocking has occurred or is planned as the population is self-sustaining.

Angling Pressure: Estimated angling pressure from Montana state-wide mail surveys in 2007-2013 is moderate with an average 68 angler-days per year (range: 38-111).

Other Nearby Lakes: Lake Dinah is located approximately one mile to the northwest of Lake Elsina and can be reached via USFS Trail # 12T. The parking area near Lake Elsina serves as the trailhead for USFS Trail # 12T. Lake Marshall lies below Lake Dinah (~ 3.5 miles to the northeast), but is most easily accessed via the open road system on the Marshall Creek Wildlife Management Area.

Montana Fish, Wildlife & Parks

Hidden Lake



Description: Hidden Lake is a moderately sized (33.5 acres) kettle lake located on the edge of the Clearwater Valley near Placid Lake at 4,268 ft elevation. Hidden Lake is surrounded by U.S. Forest Service ownership (Lolo National Forest - Seeley Lake Ranger District) and supports a popular stocked westslope cutthroat trout fishery.

Location: T16N, R16W, Section 13; Latitude N47.14331°, Longitude W113.56792°
Nearest Town: Seeley Lake, MT. Surrounding land ownership: Lolo National Forest (Seeley Lake Ranger District)

Access: Hidden Lake is easily accessible by motorized vehicles from a maintained gravel road. To reach the lake, take USFS Road 349 west off of U.S. Highway 83 (turnoff is 3.5 miles south of Seeley Lake). Travel for approximately 9 miles around Placid Lake on USFS Road 349 to the unmarked Hidden Lake access road on the right. The turnoff is located ~ 4 miles past Placid Lake and is easiest to find while consulting a U.S. Forest Service – Seeley Lake Ranger District map.

Campsites and Use: Hidden Lake receives moderate use due to its accessibility and quality fishery. There are multiple campsites and fire rings and a trail along the entire shoreline of the lake. There is a vault toilet and boat ramp at the west U.S. Forest Service access site.

Angling Opportunity: Hidden Lake supports a stocked westslope cutthroat population. Shoreline topography generally lends well to shoreline angling and the primitive boat ramp provides access for smaller watercraft. Regulations on the lake prohibit motorized watercraft, with the exception of those powered by electric motors.

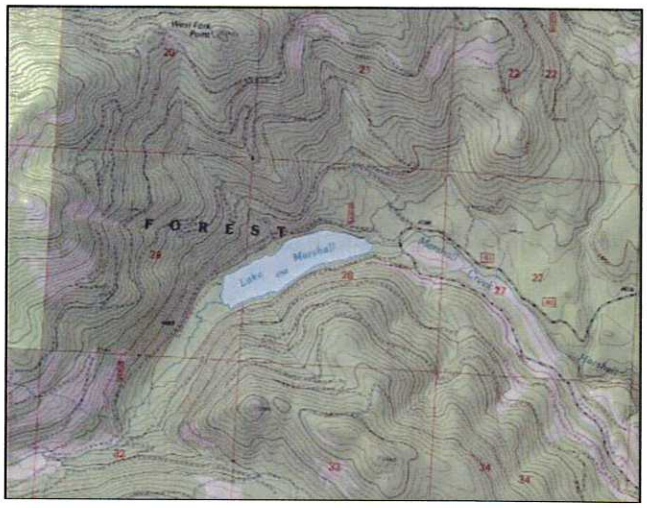
Stocking History: Hidden Lake is stocked annually with approximately 1000 fingerling westslope cutthroat trout. This has been the stocking prescription for more than two decades and no other trout species are present.

Angling Pressure: Estimated angling pressure from Montana state-wide mail surveys is moderate with an average 296 angler-days per year (range: 288-304).

Other Nearby Lakes: Placid Lake lies approximately three miles to the southeast and Tuppers Lake is located approximately three miles to the northeast. Both of these lakes, as well as the other nearby lakes in the Clearwater Chain of Lakes, are easily accessible by motorized vehicles.

Montana Fish, Wildlife & Parks

Lake Marshall



Description: Lake Marshall is a large (85 acres), glacial trough lake located entirely within the Marshall Creek Wildlife Management Area near Seeley Lake, Montana at 4,751ft elevation. Although the lake is currently stocked with westslope cutthroat trout and supports wild populations of brook trout, bull trout and rainbow trout x cutthroat trout hybrids, it continues to provide a marginal fishery.

Location: T18N, R16W, Section 28; Latitude N47.28826°, Longitude W113.64991°
Nearest Town: Seeley Lake, MT. Surrounding land ownership: Montana Fish, Wildlife & Parks (Marshall Creek Wildlife Management Area).

Access: Lake Marshall can be reached by road from MT Highway 83 north of Seeley Lake. From Highway 83 turn left (west) on Boy Scout Road (USFS Road #77), then right on USFS Road # 4349. At the four-way intersection, turn right on Lake Marshall Road (USFS # 463) and travel approximately 6 miles to the lake.

Campsites and Use: Lake Marshall is accessible by vehicle and receives moderate recreational use. Several dispersed campsites are located on the east end of the lake adjacent to the outlet. There is also a short carry-in launch near these sites, which provides access for manual or electric powered boats (motorized boats prohibited).

Angling Opportunity: Lake Marshall supports low densities of self sustaining brook trout and westslope cutthroat trout x rainbow trout hybrids, as well as stocked westslope cutthroat trout. Despite its size, available spawning habitat and multiple sport species, the lake provides marginal fishing opportunity. In addition, shoreline access is difficult around most of the lake perimeter so fishing from small watercraft is recommended. The best shoreline angling opportunity lies near the outlet, adjacent to established campsites.

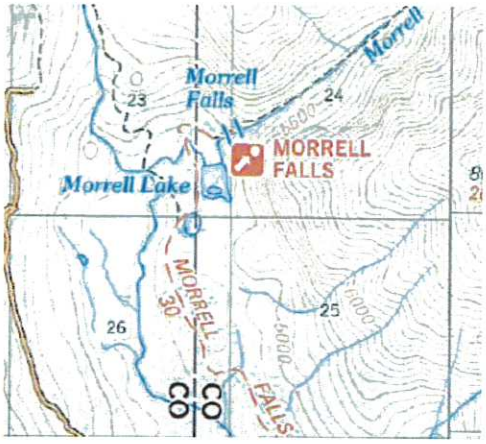
Stocking History: Stocking records indicate Lake Marshall has been stocked with rainbow trout, brook trout and westslope cutthroat trout. Westslope cutthroat trout have been the only species stocked since 1971. Cutthroat trout stocking has recently been discontinued due to lack of growth and survival.

Angling Pressure: Despite outstanding scenery and easy public access, estimated angling pressure is low on Lake Marshall (<100 angler-days per year) according to MFWP state-wide mail surveys.

Other nearby Lakes: Lake Dinah and Lake Elsina are the closest high elevation lakes (geographically) to Lake Marshall and lie approximately 3 miles to the southwest. However, these lakes are most easily accessed from the Placid Creek drainage via USFS Road # 465, which leads directly to Lake Elsina and the Lake Dinah trailhead.

Montana Fish, Wildlife & Parks

Morrell Lake



Description: Morrell Lake is a small (~ 9.1 acres), shallow (< 5 ft), instream glacial depression located just below Morrell Falls on Morrell Creek. The lake is located about 8 miles north of Seeley Lake, MT along the popular USFS National Recreation Trail (USFS Trail #30) to Morrell Falls. This mid-elevation lake is relatively easy to access and is surrounded by forested terrain on the Lolo Natural Forest at 4,825 ft elevation.

Location: T18N, R15W, Section 23; Latitude N47.29778°, Longitude W113.46452°
Nearest Town: Seeley Lake, MT; Surrounding land ownership: Lolo National Forest (Seeley Ranger District)

Access: Morrell Lake is relatively easy to access, but requires non-motorized travel on the Morrell Falls National Recreation Trail (USFS Trail #30). To reach the lake, turn east off MT Highway 83 onto Morrell Creek Rd (USFS Rd #4353) just north of the city of Seeley Lake. Follow Morrell Creek Rd for 6.8 miles, then turn right (east) on Upper Trail Creek Rd (USFS Road #4381). Stay on Upper Trail Creek Rd for 0.2 miles, then turn left (north) on Trailhead Rd (USFS Road #4364) for 0.6 miles to arrive at Morrell Falls Trailhead. Take Morrell Falls National Recreation Trail #30 for 2.1 miles and Morrell Lake lies on the southeast (right) side of the trail.

Campsites and Use: Morrell lake is relatively accessible, but recreational use is limited. There are no established campsites at the lake, but dispersed camping is allowed in the area. Motorized boats are prohibited on Morrell Lake and 'leave no trace' camping and recreating is encouraged along the shoreline.

Angling Opportunity: Morrell Lake is inhabited by wild westslope cutthroat trout and bull trout – fish species that naturally inhabit Morrell Creek. Given the shallow lake depth and stream influence, fish abundance likely varies seasonally. Shoreline topography and access allow for shoreline angling along most of the lake perimeter.

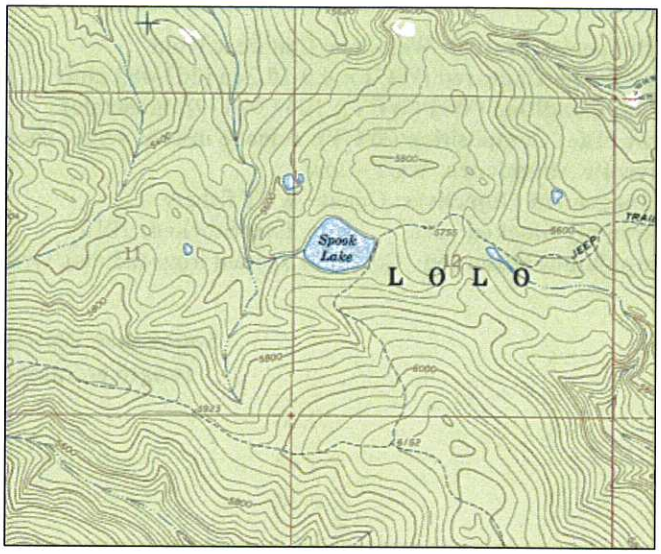
Stocking History: Stocking records indicate that Morrell Lake has been stocked several times with westslope cutthroat trout (1939-1951), and once with rainbow trout (1939). No stocking has occurred in recent decades or is planned in the future as Morrell Creek supports important, abundant native trout populations.

Angling Pressure: Given its shallow depth and location, estimated angling pressure is low on Morrell Lake. No records or actual angling pressure estimates are available through MFWP state-wide mail surveys.

Other Nearby Lakes: There is one small, unnamed fishless lake in the immediate vicinity of Morrell Lake located ~ 0.1 miles to the southwest. Nearby fish-bearing lakes include high elevation cirque lakes (e.g., Crescent and Trail Creek Lakes) along the ridge line above and large, main stem Clearwater Valley waters including Seeley, Salmon, and Inez Lakes.

Montana Fish, Wildlife & Parks

Spook Lake



Description: Spook Lake is a small (15.8 acres), isolated water body that formed in a glacial pothole or trough. The lake is located above Placid Lake, to the southwest, at 5,620 ft elevation. Spook Lake has traditionally supported a quality westslope cutthroat trout fishery that is supported by regular stocking from MFWP hatcheries.

Location: T15N, R16W, Section 12; Latitude N47.07333°, Longitude W113.57166°
Nearest Town: Seeley Lake, MT; Surrounding land ownership: Lolo National Forest (Seeley Lake Ranger District)

Access: Spook Lake can be directly accessed with motorized vehicles (4-wheel drive recommended). The easiest route is to take Placid Lake Road (USFS Road #349) from MT Highway 83 (~ 4 miles south of Seeley Lake). Before reaching Placid Lake, take USFS Road #4337 and travel for approximately 6.8 miles to reach the lake.

Campsites and Use: Spook Lake receives moderate to heavy use due to its accessibility and quality fishery. There are four established campsites and a trail along the entire shoreline of the lake. Motorized watercraft are prohibited on the lake, with the exception of those powered by electric motors.

Angling Opportunity: Spook Lake supports an abundant westslope cutthroat population that is sustained through biennial stocking. Shoreline topography and thick forest canopy make shoreline angling difficult in many areas; carry-in boats or inflatable watercraft are recommended.

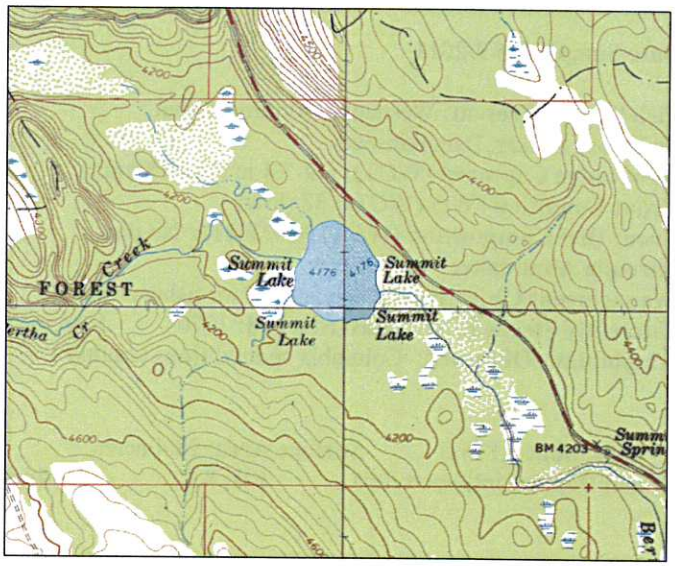
Stocking History: Stocking records indicate Spook Lake has been consistently stocked with westslope cutthroat trout since 1968. Spook Lake is currently stocked every other year (odd years) with approximately 1,000 fingerling westslope cutthroat trout.

Angling Pressure: Estimated angling pressure from Montana state-wide mail surveys in 2007-2015 is high for a small alpine lake, with an average of 427 angler-days per year (range: 275-540).

Other Nearby Lakes: Other fish-bearing lakes in the area include Hidden and Tuppers Lakes, which lie 5-6 miles to the north on the open road network. Larger valley lakes in the vicinity include Placid and Salmon Lakes, which are both within 8 miles of Spook Lake.

Montana Fish, Wildlife & Parks

Summit Lake



Description: Summit Lake is a small (28.4 acres), shallow (< 8 ft max depth) glacial pothole lake located ~ 15 miles north of Seeley Lake at 4,176 ft elevation near the Clearwater-Swan drainage divide. The lake supports wild fish populations, but does not offer substantial fishery value. The lake is a popular location for wildlife viewing and often supports nesting common loons.

Location: T19N, R16W, Section 27; Latitude N47.37617°, Longitude W113.62665°
Nearest Town: Seeley Lake, MT. Surrounding land ownership: Lolo National Forest (Seeley Lake Ranger District)

Access: Summit Lake can be accessed via a short non-motorized foot trail that leads directly from a pull-out (Summit Lake Overlook) on MT Highway 83 located ~0.5 mile south of the Clearwater-Swan Drainage divide.

Campsites and Use: Summit Lake receives minimal use despite its accessibility from the highway. There are two informal campsites near the lake, but no trail has been established around the lake perimeter. Motorized watercraft are prohibited on the lake, with the exception of those powered by electric motors.

Angling Opportunity: Summit Lake supports a sparse westslope cutthroat population that likely receives natural recruitment from Bertha Creek. Longnose suckers and pumpkinseed sunfish are also present, but overall fishing opportunity is limited.

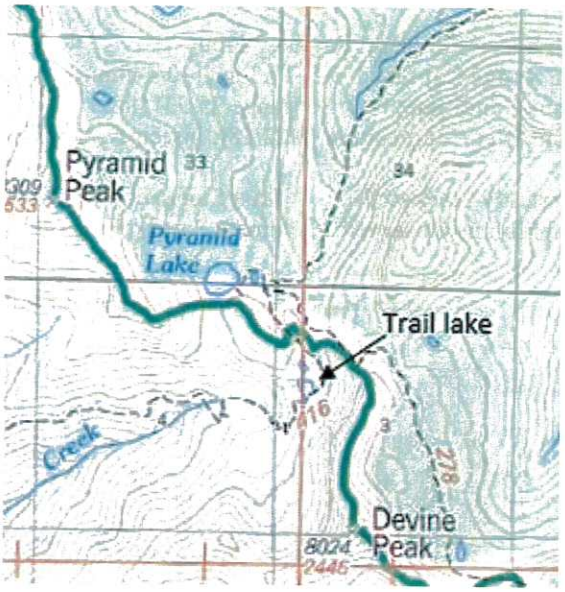
Stocking History: Stocking records indicate Summit Lake was stocked with kokanee, westslope cutthroat trout and arctic grayling in the period between 1939 and 1970. No subsequent stocking has occurred or is planned due to limited past success.

Angling Pressure: No angling pressure estimates are available for Summit Lake. Although the lake is a popular destination for wildlife viewing, angler use is assumed very light based on anecdotal observations and low fishery quality.

Other Nearby Lakes: Summit Lake is located approximately 2 miles north of Rainy Lake and 3 miles west of Clearwater Lake. Colt, Pierce, and Alva Lakes are also located nearby (within 4 miles) and are readily accessible.

Montana Fish, Wildlife & Parks

Trail Lake



Description: Trail Lake is a small (~ 2.2 acres), high elevation (6,900 ft), glacial cirque lake located within the Lolo National Forest boundary about 7.5 miles northeast of Seeley Lake, MT. This subalpine lake is moderately difficult to access, but lies immediately adjacent to a maintained USFS trail that is a primary access route for the Bob Marshall Wilderness Complex via Pyramid Pass.

Location: T17N, R14W, Section 3; Latitude N47.2606°, Longitude W113.3738°
Nearest Town: Seeley Lake, MT; Surrounding land ownership: Lolo National Forest (Seeley Ranger District)

Access: Trail Lake is located 0.25 miles south of Pyramid Pass and the Bob Marshall Wilderness boundary along Pyramid Pass Trail (USFS Trail #416). The lake is moderately difficult to access and does require non-motorized travel from the trailhead to Pyramid Pass. To reach the trailhead, turn east off MT Highway 83 onto Morrell Creek Rd (USFS Road #4353). Take Morrell Creek Road for 6.8 miles, then turn right (east) on Upper Trail Creek Rd (USFS Rd #4381). Stay on Upper Trail Creek Road for 3.1 miles to reach the Pyramid Pass Trailhead. Take Pyramid Pass trail for 4.2 miles and Trail Lake lies on the north side of the trail.

Campsites and Use: Trail lake is difficult to access and recreation appears light. There is one dispersed campsite on the north side of the lake, but many recreationists traveling along the trail likely stop and fish the lake. 'Leave no trace' camping and recreating is encouraged in this area.

Angling Opportunity: Trail Lake supports a quality, wild rainbow trout population that appears to reproduce consistently. Shoreline topography and access allow for shoreline angling along most of the lake perimeter.

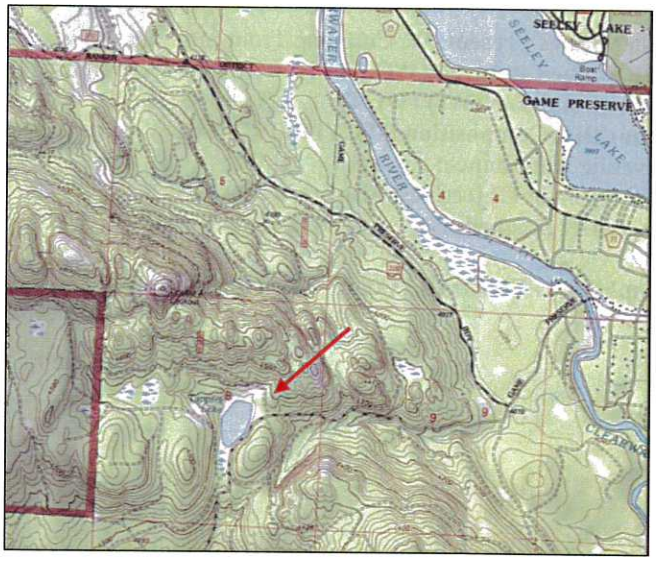
Stocking History: There are no documented stocking records for Trail Lake. The lake was likely stocked with rainbow trout by private outfitters in the 1960s or 1970s. No future stocking is planned as the rainbow trout population is self-sustaining.

Angling Pressure: Estimated angling pressure is low, with no estimate of user days available in previous Montana state-wide mail surveys.

Other Nearby Lakes: There is a small, unnamed fishless lake located just north of Trail Lake. Pyramid Lake lies ~0.6 miles to the northwest within the Wilderness boundary near USFS Trail # 416.

Montana Fish, Wildlife & Parks

Tuppers Lake



Description: Tuppers Lake is a small (16.9 acres), glacial kettle lake located approximately two miles southwest of Seeley Lake at 4,330 ft elevation. Although fishless in recent history, experimental stocking with westslope cutthroat trout began in 2013. Subsequent sampling indicated that lake conditions will not consistently support trout survival.

Location: T16N, R15W, Section 8; Latitude N47.15644°, Longitude W113.52368°
Nearest Town: Seeley Lake, MT. Surrounding land ownership: Montana Department of Natural Resource Conservation (DNRC) and The Nature Conservancy.

Access: Tuppers Lake can be accessed from Riverview Drive near the town of Seeley Lake. From U.S. Highway 83 just south of Seeley Lake, travel west on Riverview Drive. After crossing a bridge over the Clearwater River, stay left at the next two intersections and follow the road for approximately two miles to Tuppers Lake. The lake can also be reached from the south via Placid Lake Road.

Campsites and Use: Despite its accessibility by road, Tuppers Lake receives light use. There is a small campground on the north end of the lake and easy carry-in boat access. Although no shoreline trail is evident along the lake perimeter, The Nature Conservancy has developed a nearby non-motorized trail system.

Angling Opportunity: Tuppers Lake recently supported stocked westslope cutthroat trout, but subsequent sampling in 2016 indicated no survival of stocked fish and no viable fishery. Future stocking is uncertain.

Stocking History: Stocking records indicate eastern brook trout and rainbow trout were stocked in Tuppers Lake until 1949, but a lake surveys in 2012 failed to detect fish. The lake was subsequently stocked with westslope cutthroat trout in 2013 and 2015; initial growth rates and survival were excellent, but no fish survived to spring 2016.

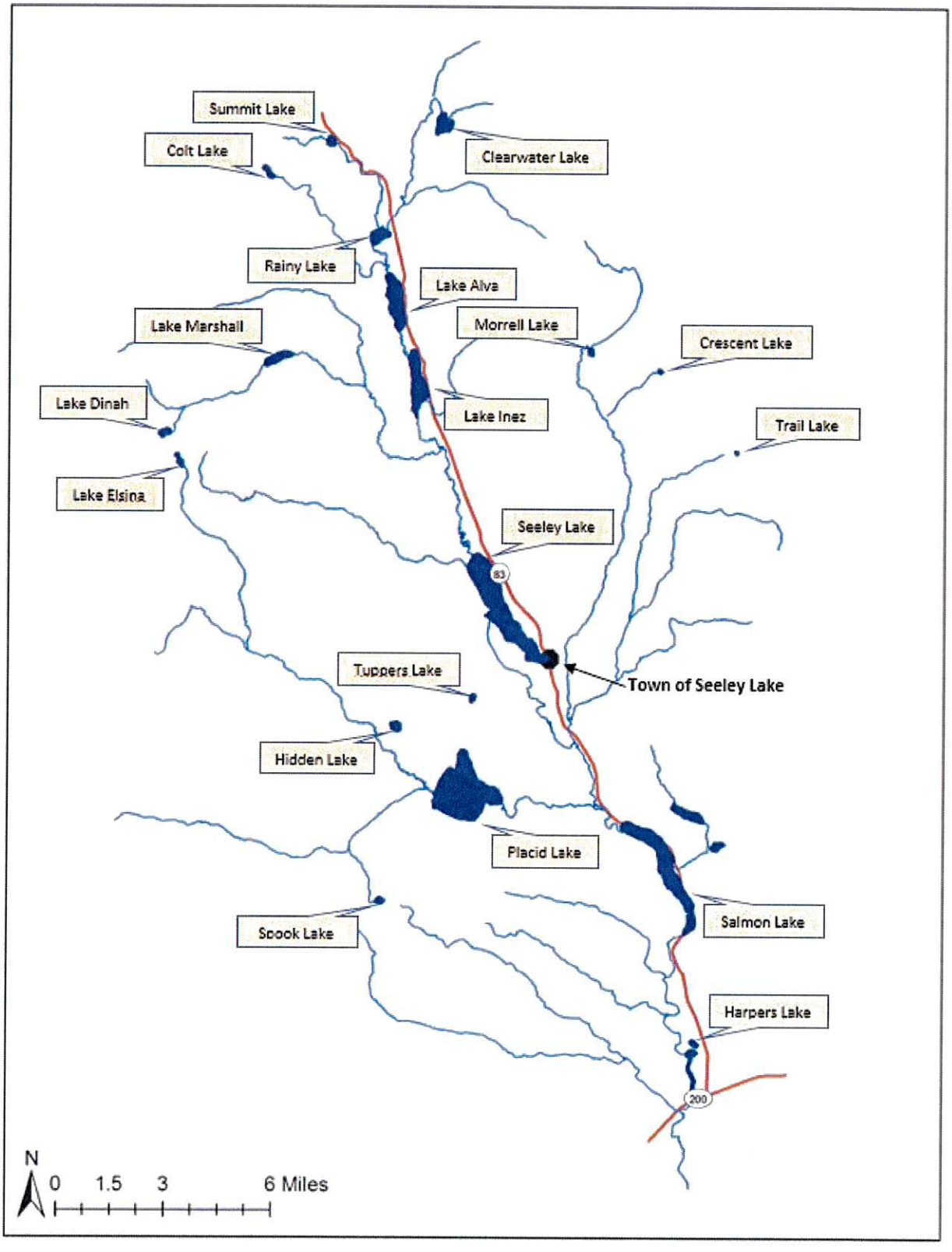
Angling Pressure: No angler use was reported in Montana state-wide mail surveys in 2007-2013, presumably because the lake was fishless. Sporadic angling was reported in 2013-2014 after westslope cutthroat trout were re-introduced, but future angling opportunity is uncertain given poor stocking success.

Other Nearby Lakes: Hidden Lake is located 2 miles to the southwest of Tuppers Lake and can also be reached by motorized travel. Other nearby lakes include Seeley, Salmon and Placid Lakes, all of which are greater than 600 acres and support heavy recreational use.

APPENDIX III. Summary of Lake Fishing Opportunities in the Clearwater Basin

Lake Fishing Opportunities

Clearwater Basin



Hidden Lake:

Hidden Lake is a moderately sized (33.5 acres) kettle lake located on the edge of the Clearwater Valley near Placid Lake. The lake is surrounded by USFS property and supports a high quality westslope cutthroat trout population that is stocked annually by FWP. Hidden Lake has direct road access, with several established dispersed campsites, a vault toilet, and a primitive shoreline launch location. Trailered boat access is not recommended and 'no wake' boating regulations are in place. Shoreline topography is variable, but lends well to shoreline angling in some locations.

Lake Inez:

Lake Inez is a moderately sized (288 acres) natural lake located along MT Highway 83 and the main-stem Clearwater River chain 8 miles north of the town of Seeley Lake. Easy boat access is available via a launch at the north end of the lake at the USFS Lake Inez campground. The northeast shoreline also has numerous USFS public camping and shoreline access locations. Westslope cutthroat trout and kokanee salmon are stocked on an annual basis and supplement those produced naturally. The populations are abundant, but fish size is generally small. Other sport fish species include brown trout, mountain whitefish, northern pike, pumpkinseed, and yellow perch, which vary in size and abundance. Lake Inez also supports an important population of migratory bull trout, which must be released immediately.

Lake Marshall:

Lake Marshall is a large (85 acres), mid-elevation (4,751 ft) glacial trough lake located entirely within the Marshall Creek Wildlife Management Area west of Seeley Lake. The lake supports low densities of self-sustaining, stunted brook trout and westslope cutthroat trout, as well as migratory bull trout. Lake Marshall provides outstanding scenery, relatively easy direct vehicle access, and good camping, but marginal fishing opportunity. In addition, shoreline access is difficult around most of the lake perimeter, so fishing from small watercraft is recommended. Easy carry-in boat access is available adjacent to established camp sites at the lake outlet (east end). Motorized boats are not allowed on the lake.

Morrell Lake:

Morrell Lake is essentially a small (~ 9.1 acres), shallow (< 5 ft), instream pond located just below Morrell Falls on upper Morrell Creek (5,021 ft elevation). The lake is located about 8 miles north of Seeley Lake, along the popular USFS National Recreation Trail (USFS Trail #30) that leads to Morrell Falls. Morrell Lake is inhabited by wild westslope cutthroat trout and bull trout – fish species that naturally inhabit Morrell Creek. Given the shallow lake depth and stream influence, fish abundance and fishing opportunity for cutthroat trout vary seasonally. Shoreline topography and trail access provide shoreline angling along most of the lake perimeter. Please release bull trout immediately if captured.

Placid Lake:

Placid Lake is a large (1,212 acres), glacial lake located 8.5 miles west of Seeley Lake. Although private cabins circle most of the shoreline, the lake is publicly accessible at two Placid Lake State Park locations. Placid Lake is typically fished from a boat, but does have limited shoreline access at public sites and near the outlet. Westslope cutthroat trout and kokanee salmon are stocked annually and provide consistent fishing opportunity. Placid Lake also provides quality largemouth bass and trophy brown trout fishing. Other species, such as yellow perch, mountain whitefish, and pumpkinseed sunfish are abundant, but quality is inconsistent. Much of the fish biomass in Placid Lake is comprised of non-sport species such as peamouth, suckers, and northern pikeminnow. The lake also supports an important population of migratory bull trout, which must be released immediately if caught. Fishing pressure is relatively high throughout the year and the lake is a popular destination for recreational boating during the summer.

Rainy Lake:

Rainy Lake is the smallest (82 acres) of the valley chain of lakes along the Clearwater River, located 13 miles north of Seeley Lake. Rainy Lake is relatively easy to access through Rainy Lake campground along the south shoreline and the entire area is in public ownership. There is a developed trail system along the shoreline and a carry-in watercraft launch adjacent to the campground. The best way to fish Rainy Lake is either along the south shoreline or via carry-in non-motorized watercraft. Westslope cutthroat trout are stocked on an annual basis and provide good fishing opportunity. Yellow perch, brook trout, and pumpkinseed sunfish are also present, but fishing is inconsistent. Rainy Lake also supports an important population of migratory bull trout, which should be released immediately if caught.

APPENDIX IV. Relative Performance and Catchability of Stocked Diploid and Triploid Westslope Cutthroat Trout in Small Clearwater Basin Lakes

RELATIVE PERFORMANCE AND CATCHABILITY OF STOCKED DIPLOID AND TRIPLOID WESTSLOPE CUTTHROAT TROUT IN SMALL CLEARWATER BASIN LAKES

W.L. Knotek and W. Schreck, Montana Fish, Wildlife & Parks
A. Smith and T. Lipscomb, Washoe Park State Fish Hatchery

Background

Westslope cutthroat trout (WCT, *Oncorhynchus clarki lewisi*) are currently the most important sport species stocked in high and middle elevation lakes in western Montana. Montana Fish, Wildlife, & Parks (MFWP) stocks hundreds of lakes with this species using the agency's M012 strain, which was developed using a range of wild stocks confirmed to be genetically diverse and compatible with other regional non-introgressed populations. Despite high suitability for stocking, MFWP staff are still hesitant to stock or recommend stocking of viable (diploid) WCT in some situations because of potential changes to the genetic composition of adjacent, hydrologically connected native populations. The same concern applies to stocking private fish ponds that are linked or adjacent to waters supporting wild, non-introgressed cutthroat trout.

Use of sterile (triploid) fish is one option for stocking in sensitive areas where impacts to the genetic integrity of wild populations is a concern. However, some evidence suggests that triploid trout may exhibit reduced performance relative to diploid individuals from the same source. For instance, growth and survival of diploid and triploid WCT reared in the hatchery were assessed by Boyer et al. (2012) using paired trials. These evaluations indicated a performance advantage for early life stages of diploid WCT in hatchery rearing facilities. Similarly, Koenig and Meyer (2011) observed reduced survival rates and return to anglers for triploid catchable rainbow trout (*Oncorhynchus mykiss*) relative to concurrently planted diploid stocks in several Idaho lakes and reservoirs.

This study is an extension of similar published assessments, where we evaluated the relative performance of triploid (3N) and diploid (2N) WCT in side-by-side field trials at several natural lakes. After several year classes of hatchery reared fingerlings were planted in lakes occurring over a range of elevations, we directly compared growth, survival, and susceptibility to angling for sterile and viable fish to help inform management decisions regarding WCT stocking in western Montana.

Study Area and Methods

Four lakes (16-103 acres) in the Clearwater Basin of Western Montana were selected as study sites for our paired trials: Rainy Lake, Hidden Lake, Clearwater Lake, and Spook Lake (Figure 1). These lakes were chosen because they vary in elevation, already supported WCT populations and WCT natural reproduction was believed to be minimal.

Fish species composition varies somewhat among lakes. Hidden and Spook Lakes support only WCT, but Clearwater Lake also contains illegally introduced brook trout (*Salvelinus fontinalis*)

Cutthroat Trout Production, Marking, and Stocking

Sterile and viable WCT used in this study were progeny of existing M012 brood stock at the Washoe Park State Fish Hatchery. Immediately after spawning, egg lots were split and triploid WCT were produced using pressure treatments on fertilized eggs (Angela Smith, Washoe Park State Fish Hatchery Manager, personal communication). Diploid and triploid cutthroat trout were then propagated for ~ 12 months under identical conditions and at similar densities in adjacent hatchery rearing tanks and raceways (Figure 2).

Prior to stocking, all fish were marked using feed with an oxytetracycline (OTC) supplement that allowed us to distinguish stocked fish from wild (naturally produced) individuals in study lakes. In addition, adipose fins were removed from all triploid (sterile) WCT to distinguish them from diploid individuals (Figure 2).

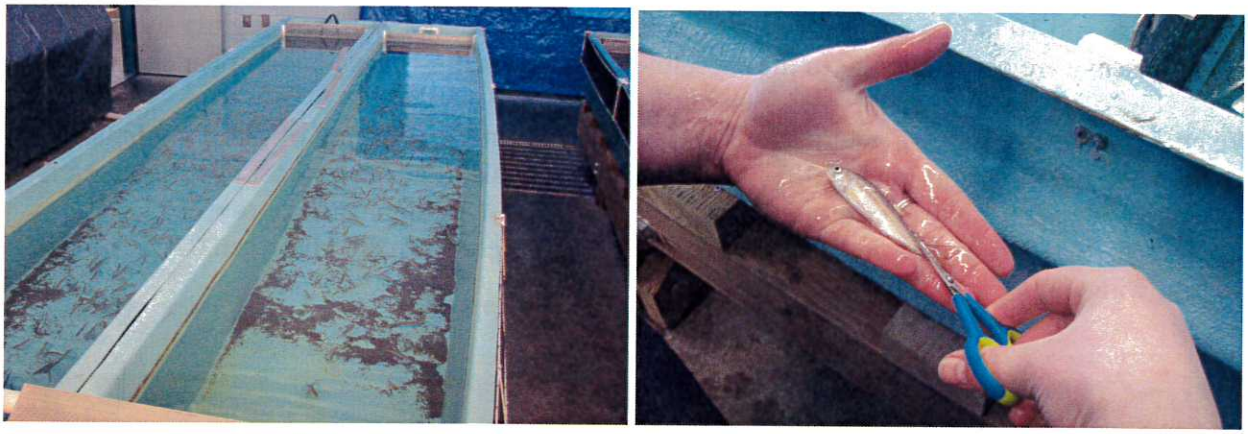


Figure 2. Hatchery raceways with diploid and triploid westslope cutthroat trout (left). Adipose fins were clipped on triploid individuals for easy identification (right).

WCT planted as part of the study were hand sorted so that size distributions of the two treatment groups were as similar as possible (see Appendix A). Equal numbers of both groups were transported in aerated tanker trucks and stocked concurrently by hand at all four lakes in June or July when fish were one year old and averaged 90-120 mm TL. Lake physical attributes and stocking information are summarized in Table 1 below.

Table 1. Stocking schedule and rates for westslope cutthroat trout planted in Clearwater Basin lakes during the study period.

			Number Stocked		*Year Stocked (X)*				
Lake	**Elevation (ft)**	**Acres**	**# Diploid**	**# Triploid**	**2011**	**2012**	**2013**	**2014**	**2015**
Rainy	4,786	103	1,000	1,000	-	X	X	X	X
Hidden	4,094	81	750	750	X	X	X	X	X
Clearwater	4,268	34	500	500	X	X	X	X	X
Spook	5,620	16	500	500	X	-	X	-	X

Comparison of Catchability for Diploid and Triploid WCT

We evaluated the relative catchability of diploid and triploid WCT at Spook Lake, which was selected because no natural WCT reproduction was evident, stocked WCT were abundant, and the lake is easily accessible. We angled for cutthroat trout on three separate occasions in summer and fall of 2016 (June, July, September).

Individual anglers captured fish using flies, bait and hardware from shore and various watercraft on the three dates noted above. Upon capture, WCT were measured and adipose fins were examined. Individuals with a clipped adipose fin were identified as triploid (sterile), while those with no clip were assumed to be stocked diploid fish. Metadata and information for all fish was recorded on a datasheet by each angler. All data were later tabulated for each fishing date, along with total time angled, to calculate cumulative catch rates.

Results and Discussion

All four study lakes were sampled in late summer of 2015 to evaluate the performance of previously stocked diploid and triploid WCT. All WCT netted in Hidden and Spook Lakes were marked and the lakes appeared to conform to our assumption of insignificant natural reproduction (Figure 4). As expected based on prior sampling, some of the WCT netted in Clearwater Lake (~30%) were unmarked, naturally produced fish that were eliminated from our paired comparisons.

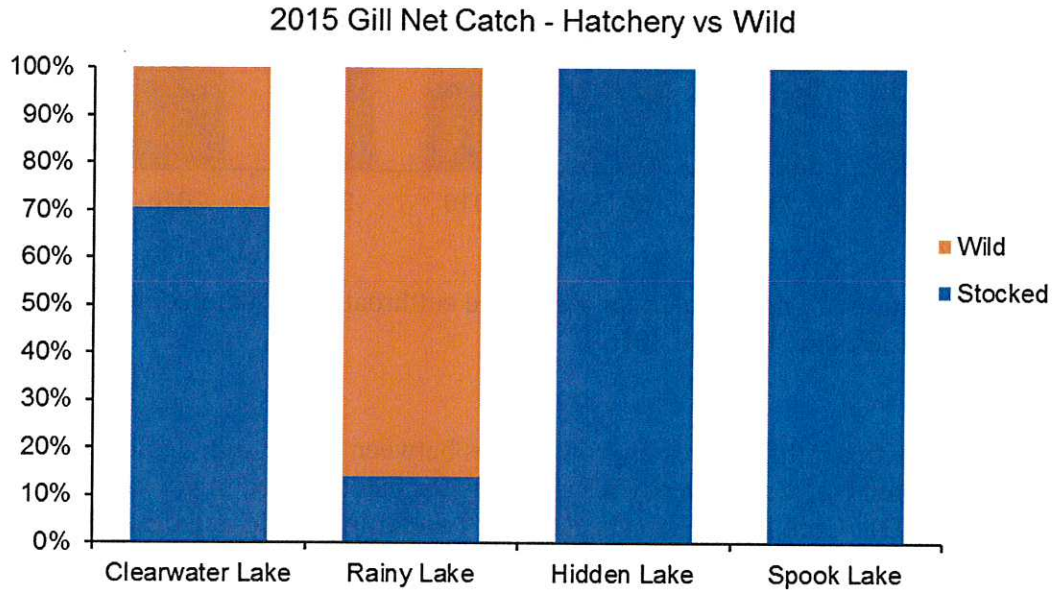


Figure 4. Relative proportion of wild and stocked (hatchery) westslope cutthroat trout captured in gill net surveys conducted at study lakes in 2015.

The WCT composition in Rainy Lake was much different than we expected. Only ~15% of the WCT we sampled in 2015 were stocked fish considered part of the trial, despite four consecutive years of stocking and the highest total numbers of WCT planted in any lake (Figure 4). These

particularly under stressful environmental conditions (e.g., high water temperature), likely contribute to observed differences in body condition (Ojolick et al. 1995; Simon et al. 2011).

Table 2. Comparison of condition (Wr) for stocked diploid and triploid westslope cutthroat trout captured in Spook Lake and Clearwater Lake.

	Diploid				Triploid			
	Mean (W_r)	SD	Length Range (mm)	n	Mean (W_r)	SD	Length Range (mm)	n
Spook Lake 2015	**100.4***	11.8	284-411	25	**93.5***	8.4	270-406	22
Spook Lake 2016	**107.8***	9.3	276-462	57	**99.8***	6.5	276-449	22
Clearwater Lake 2015	**99**	5.3	267-332	9	**98**	7.3	280-353	9
Clearwater Lake 2016	**102.5**	8.1	293-416	17	**99.7**	5	291-398	12

* Difference in condition (W_r) values is statistically significant ($p<0.05$)

Comparison of Catchability by Anglers

The relativel catchability of diploid and triploid WCT was evaluated at Spook Lake in 2016. Experienced volunteer anglers used a variety of gear types to catch a total of 139 WCT (~ 150-425 mm) while fishing on three different days in summer and early fall. Pooled catch rates ranged from 1.1 to 2.2 WCT per hour for anglers fishing on each date.

Figure 6. Volunteer anglers on Spook Lake comparing catchability of stocked diploid and triploid westslope cutthraot trout.

The cumulative angler catch for triploid WCT was slightly higher than the proportion of diploid WCT (Figure 7, right chart). This was surprising, given that approximately 2/3 (63%) of the remaining WCT in the lake were diploid based on random gill net sets (Figure 7, left chart). These results could suggest that either diploid WCT are more susceptible to gill nets (unlikely)

References

Boyer, M.C., G. Michael, M. Schnee, L. Fried, K. Tempel, and S. Relyea. 2012. Hungry Horse Mitigation Program 2011 Annual Report. BPA Project Number 199101903. Montana Fish, Wildlife & Parks, Kalispell, Montana.

Koenig, M.K., J.R. Kozfkay, K.A. Meyer, and D.J. Schill. 2011. Performance of Diploid and Triploid Rainbow Trout Stocked in Idaho Alpine Lakes. North American Journal of Fisheries Management 31:124-133.

Koenig, M.K. and K.A. Meyer. 2011. Relative Performance of Diploid and Triploid Catchable Rainbow Trout Stocked in Idaho Lakes and Reservoirs. North American Journal of Fisheries Management 31:605-613.

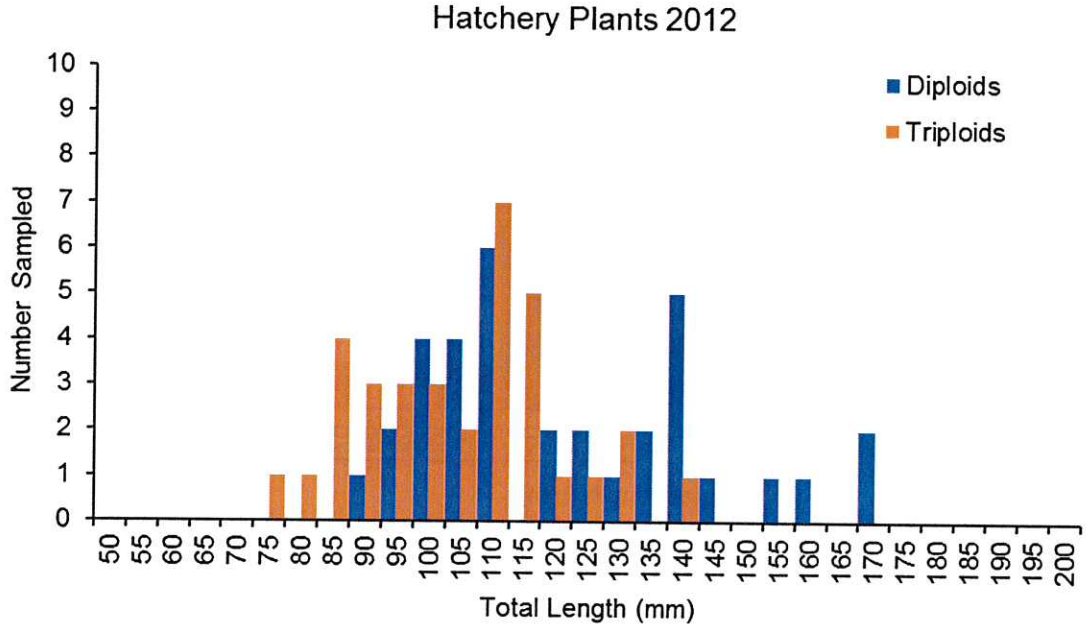
Kozfkay, J.R. J.C. Dillon, and D.J. Schill. 2011. Routine Use of Sterile Fish in Salmonid Sport Fisheries: Are We There Yet? Fisheries 31:392-401.

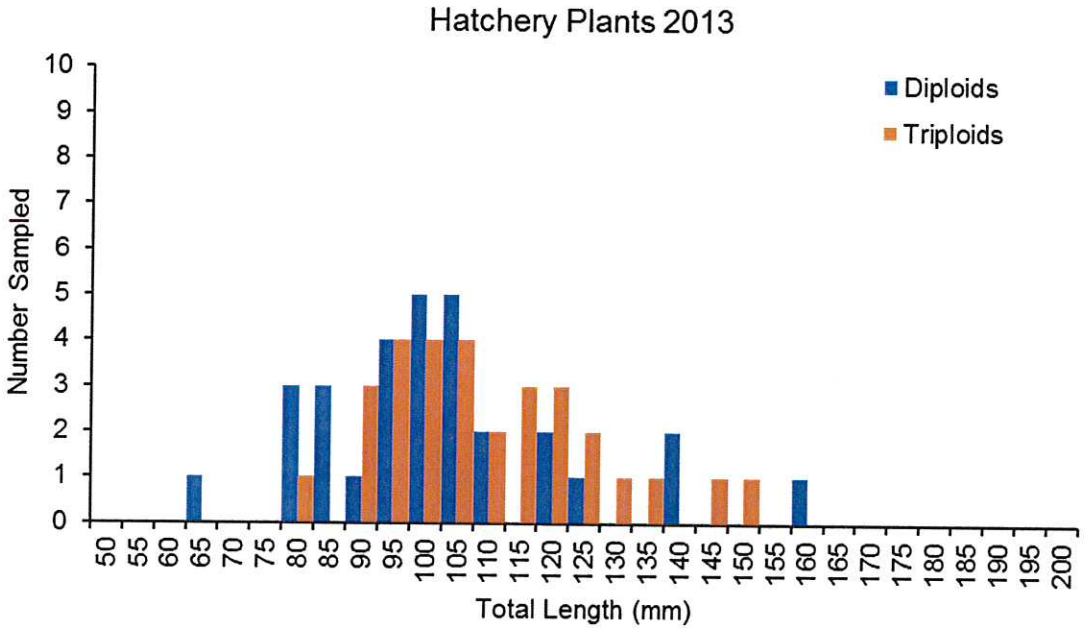
Ojolick, E.J. R. Cusack, T. Benfrey, and S.R. Kerr. 1995. Survial and Growth of All-Female Diploid and Triploid Rainbow Trout (Oncorhynchus mykiss). Aquaculture 131(3-4):177-187.

Simon, D.C., C.G. Scalet, and J.C. Dillon. 2011. Field Performance of Triploid and Diploid Rainbow Trout in South Dakota Ponds. North American Journal of Fisheries Management 13:134-140.

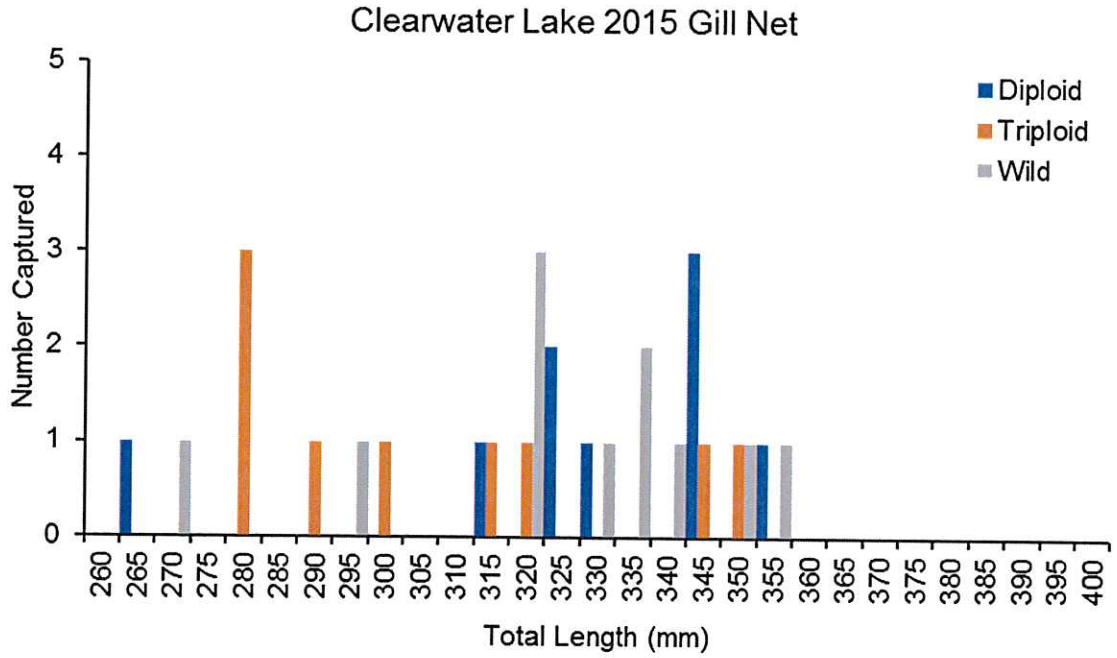
Teuscher, D.M., D.J. Schill, D.J. Megargle and J.C. Dillon. 2003. Relative Survival and Growth of Triploid and Diploid Rainbow Trout in Two Idaho Reservoirs. North American Journal of Fisheries Management 23:983-988.

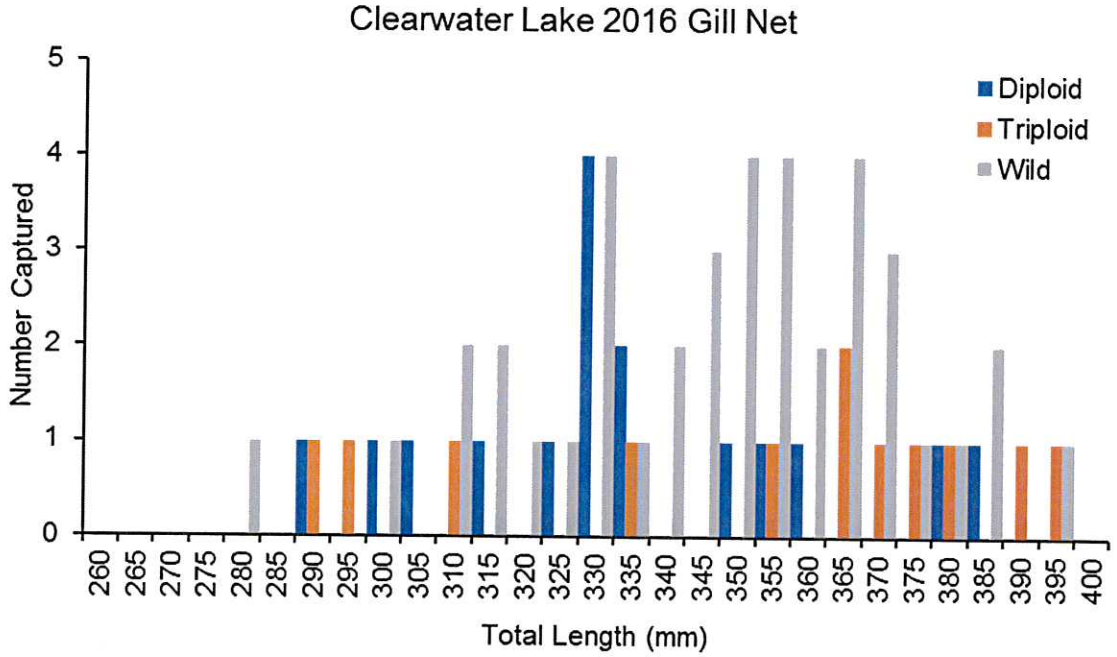
Appendix A. Size distributions of diploid and triploid WCT at time of stocking in Clearwater Basin lakes in 2012-2015.





Appendix B. Size distribution and strain composition of westslope cutthroat trout sampled in Clearwater Lake in 2015 (top) and 2016 (bottom).





Appendix D. Size distribution and strain composition of westslope cutthroat trout sampled in Spook Lake in 2015 (top) and 2016 (bottom).