NEVADA DEPARTMENT OF WILDLIFE
STATEWIDE FISHERIES MANAGEMENT

FEDERAL AID JOB PROGRESS REPORTS

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2016

Lake Tahoe Rainbow Trout Study
WESTERN REGION

NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL PROGRESS REPORT

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NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL PROGRESS REPORT

State: *Nevada*
Project Title: *Statewide Fisheries Program*
Job Title: *Lake Tahoe Rainbow Trout Study*
Period Covered: *January 1, 2016 through December 31, 2016*

SUMMARY

In the second year of the Lake Tahoe Rainbow Trout Study, a decline was seen in the number of adfluvial rainbow trout attempting to spawn in Third Creek from what was observed in the first year of the study. A total of 30 rainbow trout were captured at the management barrier from April 5 to May 24. Of these, 16 were hand spawned for egg production. This effort produced 13,844 Incline strain rainbow trout eggs.

A combined 4,200-tagged Incline and Tahoe strain rainbow trout reared at Mason Valley Hatchery were stocked into Boulder Reservoir (1,200), Marlette Lake (2,000), and Lake Tahoe (1,000) during the 2016 season. These fish will be monitored for longevity, performance, and fecundity.

BACKGROUND

Lake Tahoe is located in the eastern portion of the Sierra Nevada's at an elevation of approximately 6,224 ft. Situated along the California border, approximately 30% of the lake lies within Nevada. It is 22 mi long, 12 mi wide, and has 123,300 surface acres. The lake holds 122,160,280 acre-ft of water and has a maximum depth of 1,645 ft. Average depth is 989 ft. A natural rim occurs at 6,223.0 ft above mean sea level (MSL), but a permanent concrete dam built in 1913 extends the lake elevation to 6,229.1 ft above MSL. The lake is fed predominantly by snowmelt from 63 streams, but the Truckee River is the only natural outlet from Lake Tahoe.

Lake Tahoe was discovered in the 1840's and supported robust populations of Lahontan cutthroat trout, mountain whitefish, and a number of other native non-game species. A number of factors including habitat disturbance, competition and/or predation from introduced fish species, loss of spawning habitat, and commercial harvest led to the extirpation of LCT by the 1940's.

Lake Tahoe supports self-sustaining, wild populations of lake trout, rainbow trout, brown trout, and kokanee salmon, which represent the bulk of the current sport fish community. Densities of introduced, non-native fish species such as largemouth bass, bluegill, and crappie have shown marked increases in recent years. These populations are generally associated with shallow, warm portions of the lake such as the Tahoe Keys Marina. Lake Tahoe also contains populations of native non-game fish including speckled dace, Lahontan redsides, tui chub, Tahoe suckers, and Lahontan mountain suckers. Tributary streams provide permanent spawning and rearing habitat for species such as brook trout, brown trout, rainbow trout, and kokanee salmon. Hatchery reared

rainbow trout are stocked each year to augment wild populations and enhance sport fishing opportunities.

Several of Nevada's tributaries are crucial to lacustrine rainbow trout, which are collected, artificially spawned, and released back into the tributaries. Eggs collected are hatched and reared at Mason Valley Hatchery. The progeny from these artificial spawning efforts are subsequently used to enhance the genetic diversity of the broodstock in Marlette Lake.

OBJECTIVES

- Hand spawn all available adfluvial rainbow trout captured at the Third Creek barrier for propagation in the Mason Valley fish hatchery.
- Concurrent with the spawning operation at Third and Incline creeks and other creeks in the basin, measure length, weigh, check for Floy tags and Floy tag all spawning rainbow trout.
- Tag approximately 3,600 Incline strain rainbow trout and 1,600 Tahoe strain rainbow trout to be released in Marlette Lake, Boulder Lake, and Lake Tahoe.
- Assess angler catch rate and harvest or catch location of tagged rainbow trout in all waters along with growth rate through opportunistic angler contacts and return of angler drop-box data.
- Conduct surveys for adfluvial spawning rainbow trout on Wood Creek, Slaughterhouse Creek, Glenbrook Creek, Marlette Creek, Secret Harbor Creek, and Logan House Creek as time permits.
- Finalize data from initial stocking of Incline strain rainbow trout from 2009 to the present and write final report.

PROCEDURES

Hand spawn all available adfluvial rainbow trout captured at the Third Creek barrier for propagation in the Mason Valley fish hatchery. A temporary barrier was installed approximately 600 ft (182.88 m) upstream of the Third Creek confluence with Lake Tahoe on March 16. This barrier stopped the upstream migration of adfluvial rainbow trout and resulted in congregations of fish immediately downstream. These fish were captured, measured to fork length, weighed, sexed, checked for ripeness, and given individual Floy and PIT tags. Fish that were deemed suitable were then anesthetized and hand spawned. Disinfected eggs were taken to Mason Valley Fish Hatchery to be reared. All fish caught were released unharmed back to Third Creek below the barrier.

Concurrent with the spawning operation at Third and Incline creeks and other streams in the basin, measure length, weigh, check for Floy tags, and Floy tag all spawning rainbow trout. Beginning on March 16, 2016, Third and Incline creeks were monitored for adfluvial rainbow trout ascending the tributaries. A backpack electroshocker was used to capture fish. Once captured, fish were measured to fork

length, weighed, sexed, checked for ripeness, and given individual Floy and PIT tags. All fish were released unharmed.

Tag approximately 3,600 Incline strain rainbow trout and 1,600 Tahoe strain rainbow trout to be released in Marlette Lake, Boulder Lake, and Lake Tahoe. On three occasions during the 2016 field season, Incline and Tahoe strain rainbow trout that were being reared at Mason Valley Fish Hatchery to be stocked into Marlette Lake, Boulder Lake, and Lake Tahoe were Floy tagged. A total of 5,200 fish were anesthetized in holding tanks prior to tagging. Once sedated the fish were measured to fork length, weighed, and tagged in front of the dorsal fin with colored and individually numbered FD-94 anchor tags. The fish were then allowed to recover in holding pens within hatchery raceways. Fish were held for two days after tagging for observation and then stocked into the appropriate body of water.

Assess angler catch rates and harvest or catch location of tagged rainbow trout through opportunistic angler contacts and return of angler drop-box surveys. All fish captured during the spawning operation and fish surveys were given individually coded Floy and PIT tags. One tagged fish was reported by an angler fishing Lake Tahoe throughout the course of the year.

Conduct surveys for adfluvial spawning rainbow trout on Wood Creek, Slaughterhouse Creek, Glenbrook Creek, Marlette Creek, Secret Harbor Creek, and Logan House Creek as time permits. On March 9 and 10, Wood Creek, Slaughterhouse Creek, Glenbrook Creek, Marlette Creek, Secret Harbor Creek, and Logan House Creek were all visually monitored for spawning or staging rainbow trout near their respective confluences with Lake Tahoe. No fish were observed at any of the tributaries in 2016.

Finalize data from initial stocking of Incline strain rainbow in 2009 through present and write final report. A completion report has been developed and is available in the stand-alone “Marlette Lake Rainbow Trout Study Completion Report.”

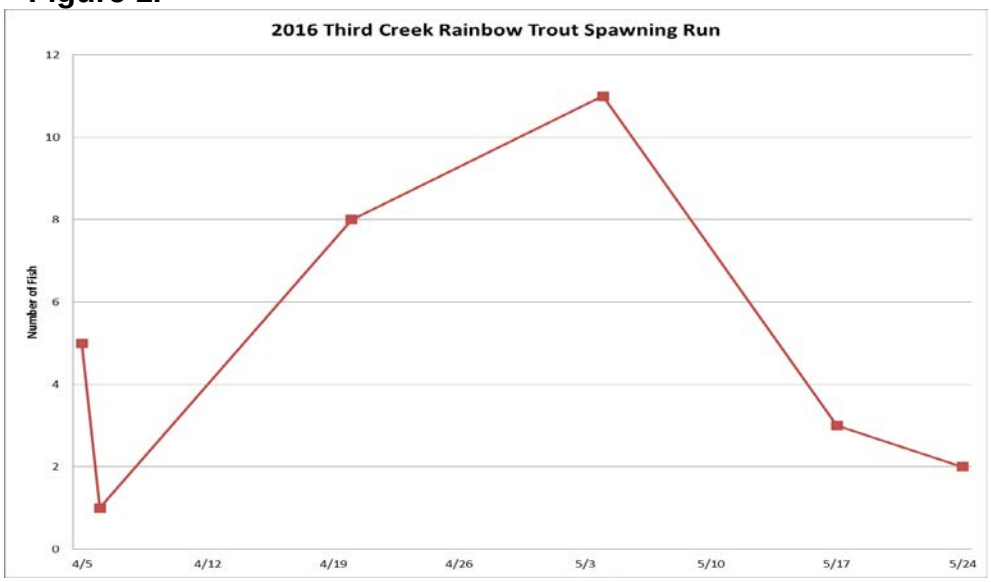
FINDINGS

Hand spawn all available adfluvial rainbow trout captured at the Third Creek barrier for propagation in the Mason Valley fish hatchery. Beginning on March 16, Third and Incline creeks were monitored for the presence of adfluvial rainbow trout. The installation of a temporary barrier on Third Creek allowed for an adequate assessment of rainbow trout attempting to ascend the tributary while, at the same time, it enabled easy capture of fish for spawning and egg collection. Thirty rainbow trout were captured at the barrier from April 5 to May 24 and of these, 16 were hand spawned. This effort produced 13,844 Incline strain rainbow trout eggs. Figure 1 illustrates the extent of the spawning run in Third Creek in 2016.

The timing of the 2016-spawning run was roughly two weeks later than in 2015. Flow conditions were more indicative of the long-term average, with several high flow

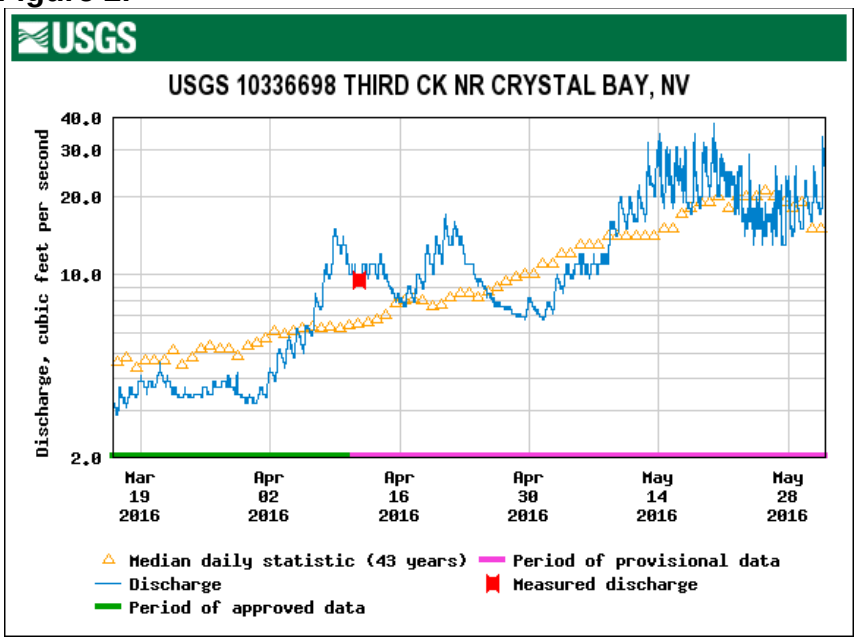
events following rain on snow. These flushes of water were thought to have negatively affected the ability of adfluvial rainbow trout to navigate and hold in the stream for the time allowed for their capture. Figure 2 illustrates flow rates during 2016.

Figure 1.



Incline Creek was monitored daily from the confluence with Lake Tahoe upstream to the Lakeshore Blvd Bridge. Because there was no barrier on Incline Creek, fish were free to move upstream as far as necessary. Because of this, only visual monitoring with limited electroshocking occurred, however, six fish were captured during the duration of the project, four of which were hand spawned.

Figure 2.



Concurrent with the spawning operation at Third and Incline creeks and other streams in the basin, measure length, weigh, check for Floy tags, and Floy tag all spawning rainbow trout. A total of 36 fish were caught (Table 1), 30 from Third Creek and six from Incline Creek. Six fish were previously caught and tagged in 2015 (Table 2) and the remaining fish were given individually coded Floy and PIT tags.

Table 1. Third and Incline Creek 2016 Rainbow Trout Spawning Run Data.

Third Creek	n	FL (mm)	Weight (g)
M	16	374	693
F	14	476	1310
Incline Creek			
M	2	440	1025
F	4	446	1137

Table 2. Third and Incline Creek Recapture Rainbow Trout

Capture	Creek	Recapture	Creek	Sex	Length (mm)	Growth (mm)	Weight (g)	Growth (g)	K Value
4/21/2015	Third	4/20/2016	Third	F	580	50	1860	520	1.0
4/21/2015	Third	4/20/2016	Third	F	465	55	1430	600	1.4
4/21/2015	Third	5/4/2016	Third	F	482	3	1440	100	1.3
4/30/2015	Third	5/4/2016	Third	F	403	38	860	300	1.3
5/6/2015	Third	5/4/2016	Incline	F	473	73	1440	810	1.4
5/6/2015	Incline	5/17/2016	Incline	F	480	10	n/a	n/a	n/a
				Average	**480.5**	**38**	**1406**	**466**	**1.3**

Tag approximately 3,600 Incline strain rainbow trout and 1,600 Tahoe strain rainbow trout to be released in Marlette Lake, Boulder Lake, and Lake Tahoe. A total of 5,200 rainbow trout (3,600 Incline strain and 1,600 Tahoe strain) were tagged during the 2016 field season and released into one of three waters where growth and performance will be monitored. Comparisons between the Tahoe and Incline strains of fish will help assess which is better suited for the recreational fishery program.

Table 3. Tagged Rainbow Trout Stocking By Water - 2016

Water	Strain	Number	FL (mm)	Weight (g)	K-Factor	Color
Boulder	Tahoe	600	240.25	202.50	1.28	Red
	Incline	600	239.18	204.94	1.35	Yellow
Marlette	Incline	1000	200.39	128.50	1.37	Red
	Tahoe	1000	209.32	120.69	1.24	Yellow
Tahoe	Incline	2000	245.84	189.05	1.23	Red/Yellow

Assess angler catch rates and harvest or catch location of tagged rainbow trout through opportunistic angler contacts and return of angler drop-box surveys. One angler fishing Lake Tahoe reported catching and harvesting rainbow trout that was tagged in Third Creek. The fish was caught approximately 200 ft off shore, directly in front of the intersection of Lakeshore Blvd and Highway 28 on July 19 (Attachment 1).

Conduct surveys for adfluvial spawning rainbow trout on Wood Creek, Slaughterhouse Creek, Glenbrook Creek, Marlette Creek, Secret Harbor Creek, and Logan House Creek as time permits. On March 9 and 10, Wood Creek, Slaughterhouse Creek, Glenbrook Creek, Marlette Creek, Secret Harbor Creek, and Logan House Creek were visually monitored for spawning or staging rainbow trout near their confluences with Lake Tahoe. No fish were observed at any of the tributaries.

Several years of lower than average snowpack and runoff on the Nevada side of Lake Tahoe led to large deltas forming at the mouth of most tributaries. These deltas are extremely difficult or, in some cases, impossible for adfluvial rainbow trout to navigate in order to reach suitable spawning habitat. These deltas were considered a main factor in the absence of adfluvial fish found during the time of the survey.

Finalize data from initial stocking of Incline strain rainbow in 2009 through present and write final report. A completion report has been developed and is available in the stand-alone “Marlette Lake Rainbow Trout Study Completion Report.”

STUDY REVIEW

The 2016 field season on Third and Incline Creek provided new insight into the wild population of rainbow trout that exist in Lake Tahoe. Once again, a fair number of adfluvial fish arrived in Third creek during the spring to spawn and they were utilized for egg production. Increased flow rates experienced in 2016 appeared to have had a negative effect on the ability of fish to reach spawning habitats successfully. Further, research is needed to understand the relationship between flow rate and spawning in Third and Incline creeks. The recapture of six fish in 2016 that were initially tagged in 2015 shows some degree of site fidelity and is something that will be monitored.

Another aspect of this study is the long-term performance of hatchery-reared rainbow trout that are progeny of wild fish utilizing Third and Incline creeks. With 3,600 Incline strain rainbow trout being stocked into Boulder Reservoir (600), Lake Tahoe (2,000), and Marlette Lake (1,000) during 2016, valuable data will be obtained in the coming years.

RECOMMENDATIONS

- Hand spawn all available adfluvial rainbow trout captured at the Third Creek barrier for propagation in the Mason Valley fish hatchery.

- Concurrent with the spawning operation at Third and Incline creeks and other creeks in the basin, measure length, weigh, check for Floy tags and Floy tag all spawning rainbow trout.
- Tag approximately 3,600 Incline strain rainbow trout and 1,600 Tahoe strain rainbow trout to be released in Marlette Lake, Boulder Lake, and Lake Tahoe.
- Assess angler catch rate and harvest or catch location of tagged rainbow trout in all waters along with growth rate through opportunistic angler contacts and return of angler drop-box data.
- Set gill nets for one net-night in the fall to assess growth rates of tagged Incline and Tahoe strain rainbow trout.
- Conduct surveys for adfluvial spawning rainbow trout on Wood Creek, Slaughterhouse Creek, Glenbrook Creek, Marlette Creek, Secret Harbor Creek, and Logan House Creek as time permits.

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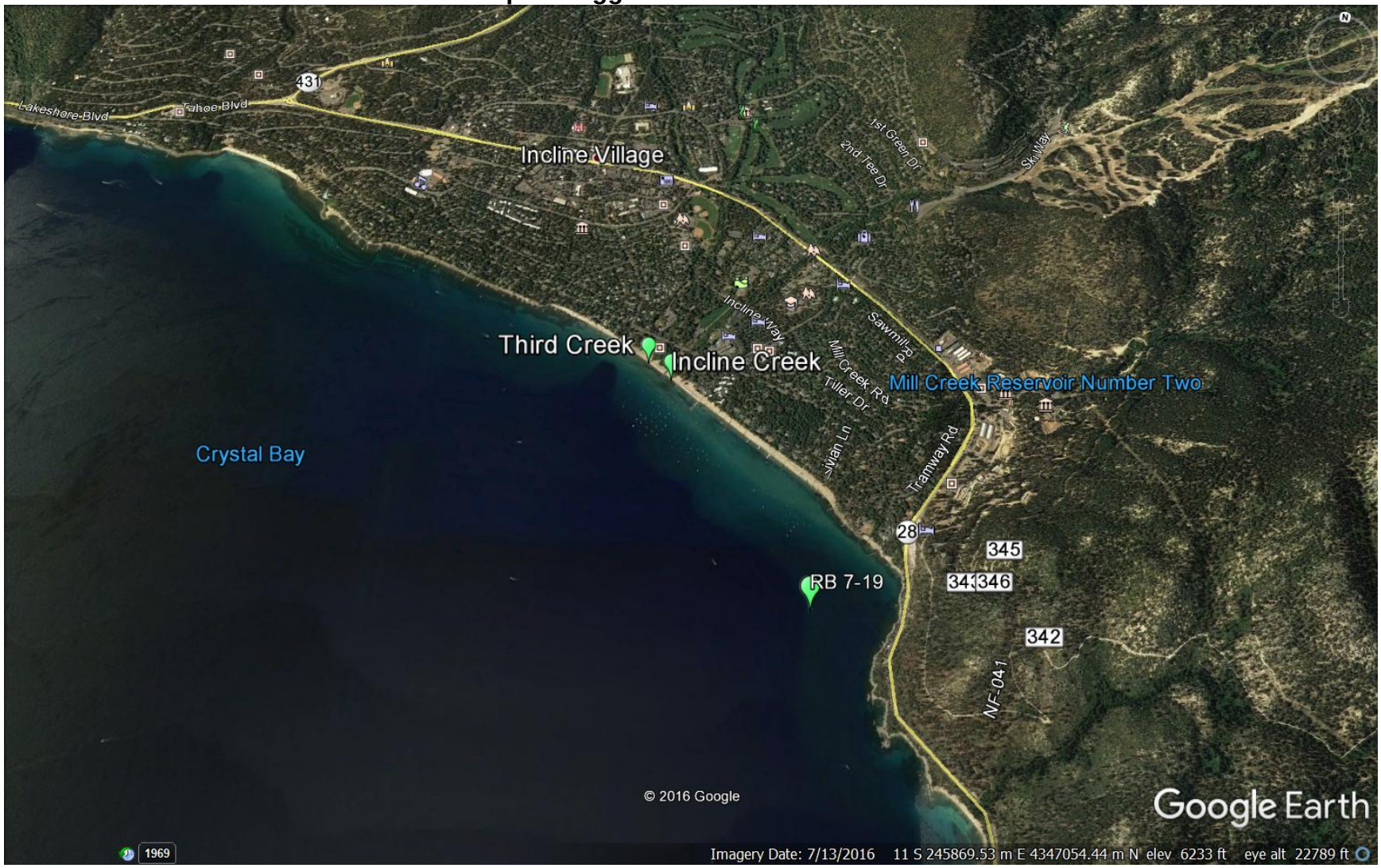
Date: December 14, 2016

Attachment 1

Catch Report Tagged Third Creek Rainbow Trout