

MT. MASSIVE LAKES, INC.

Annual Report

May 1, 2015 to April 30, 2016

INTRODUCTION

The 2015 summer water flows were adequate for the second straight year, allowing us to utilize our maximum eight (8) CFS water right from June 12th – August 16th. This maximum flow gave us the opportunity to run the entire water system, allowing us to utilize all our rearing ponds, raceways, and lakes. We experienced less mortality and minimal fish disease throughout the summer due to adequate water flows and cooler water temperatures. The flows allowed us to keep all our lakes full for the second straight year since the 2012 drought. The 2015 whirling disease resistant Hofer rainbows were the first fish since 2012 not effected by a drought. However, these fish experienced significant mortality due to spawning throughout the winter. This failed Hofer experiment drastically lowered the catchable rainbow trout stocked in the summer of 2015. We had a total of 60% unaccounted mortality of Hofers from ice on in the fall until we stocked out each rearing pond by July 6th. Unaccounted mortality is fish leaving the rearing pond that we don't observe and therefore are not counted as lost. This occurs due to predators such as coyotes and eagles, or escaping through outlets. Our normal winter mortality is 10%. The 2016 catchable rainbow class should have a normal winter mortality rate.

FISHERIES MANAGEMENT

Fishing pressure increased 504 hours to 12,445 hours in 2015 (Table 1) even though we stocked 5,976 fewer catchables than our goal of 14,865. This low stocking number is attributed to high mortality of the Hofers, which spawned beneath the ice throughout the winter, causing stress and wounds, which made them more susceptible to disease and predators.

Although the number of catchable rainbows stocked was low, the average rainbow trout size (23.9 oz) increased from 22.5 oz in 2014. However, we only stocked 6,889 catchables which were produced at Mount Massive Lakes (MML). We purchased 2,000 rainbow trout which weighed 2 pounds, and stocked them in June, July, and August to make up for the Hofers we lost in the winter.

Lower stocking numbers contributed to a lower CPMH of 1.76, (Table 1) and the fewest fish ever caught in a season. The combination of fewer catchable rainbow trout produced plus the cost of buying fish caused the average cost/pound of fish produced to skyrocket for the second consecutive year to \$12.63 (Table 2).

MANAGEMENT PROGRAMS:

Put and Take: Catchable rainbow trout size increased 1.4 ounces to 23.9 ounces (Table 2). This size remained significantly lower than our target size of 28 ounces, which was last attained in 2012. Smaller size was primarily due to the 2015 Hofer rainbows which did not perform as expected and were smaller than average. The 2016 triploid rainbows average size is 26.2 ounces as of October of 2015 and should approach our target stocking size. Triploid rainbows offer many benefits to the put and take program.

Triploids have better growth to larger sizes as all energy is transferred to growth rather than reproduction after these fish mature.

We also produced a year class of cutbows the same age as the triploids, however they are smaller weighing 17.6 ounces. The cutbows will be stocked last so we can utilize warm water during the summer months to get them to a normal stocking size. We should be able to produce a 28 ounce catchable in the summer of 2016. With the addition of the cutbows to our inventory we will be able to restart the super catchable program in 2017.

Unique: Unique populations include brook trout in Lakes #2, #3, #4, #13, #20 and #21 and cutthroats in Lakes #3, #4, #5, #12, #15, #20. All of these lakes contain healthy populations of brook trout (>12") or cutthroat trout (>12").

In the summer of 2014, we stocked 750 cutbows at 3" into Lake #3. These fish were 13.1"-14.2" in the 2015 summer gillnet samples. They will provide unique catchable opportunities this summer.

Summer and winter lake data showed that Johnson (#13), Spring (#15), and Kara (#21) have many brook trout greater than 12" in length. Johnson (#13) had a maximum size of 15.1". Spring (#15) data showed that 71% of brook trout sampled were over 13" with a weight greater than 18 ounces. The maximum brook trout size was 14.8" and 21 ounces. Kara (#21) data showed that 73% of brook trout sampled were greater than 12" in length with weights exceeding 12 ounces, including the biggest fish that was 14.4" weighing 16 ounces.

Deep (#14) and High (#20) had high numbers of brook trout less than 12", both in the summer and winter lake samples. Deep (#14) numbers decreased 29% in 2015 from 54% in 2014 of brook trout <12" in our samples. In High (#20) 100% of the sampled brook trout were <12" in 2015. Therefore, we used removal techniques including electrofishing, gillnetting, and traps to cull spawning brook trout in Deep (#14), Deep (#14) ditch, Spring (#15) ditch, High (#20), and High (#20) ditch in an effort to reduce the brook trout population and keep it becoming further stunted. Fewer fish will allow better growth and larger brook trout. We removed 114 spawning brook trout from Deep (#14), Deep (#14) ditch, and Spring (#15) ditch. We also removed 355 spawning brook trout from High (#20) and High (#20) ditch. All spawning brook trout removed were less than 12" in length.

We will follow up this summer with our gillnet samples to evaluate if our removal efforts were successful and if we need to continue to remove spawning brook trout again next fall. Data shows that we were successful in Deep (#14) by reducing the number of brook trout <12" by half. High (#20) ditch requires a more extensive removal of brook trout <12". Fishermen can help to keep brook trout populations healthy by harvesting brook trout <12".

Arctic char continue to show potential in Cokely (#8), Spring (#15), and High (#20). To take advantage of this species potential in these environments, arctic char are stocked annually as 3" fingerlings. To provide maximum survivability and growth, we are stocking 50 adult arctic char >12" into Cokely (#8) and Spring (#15) this summer. We will transplant these adults from High (#20). We will monitor the survival and growth of these stocked adult arctic char to determine if this is a viable program.

Tiger trout, our most unique fish, continue to thrive in Lower Granite (#10), Upper Granite (#11), Spring (#15), Kara (#21), and Jess (#26). This species is used to control brook trout numbers and to create both unique and trophy fisheries. Tiger trout are growing well in these lakes and also keeping brook trout populations low. The biggest tiger trout sampled this year was 21.3” and weighed 55 ounces (3.4 pounds). In Lower Granite (#10) tiger trout averaged 16.7” and weighed 31 ounces.

Table 1. Mount Massive Lakes creel census results 1983 through 2015.

Year	Hours Fished	CPMH	KPMH	RB Plants	Harvest	Total Harvest by Species			
						RB	BK	BN	CT
2015	12,445	1.76	0.41	8,889	5,099	4,652	343	101	27
2014	11,941	1.99	0.45	12,374	5,414	4,958	308	124	23
2013	12,772	2.47	0.58	15,646	7,354	7,081	232	31	12
2012	14,873	2.34	0.58	13,415	8,635	8,439	135	43	16
2011	15,473	2.65	0.55	16,473	8,571	8,289	216	48	21
2010	17,597	2.75	0.61	18,329	10,673	10,356	189	110	21
2009	18,323	2.73	0.53	17,699	9,705	9,300	289	97	30
2008	16,628	2.30	0.52	16,564	8,668	8,203	248	163	64
2007	18,754	2.52	0.59	17,757	11,059	10,503	352	114	90
2006	14,110	2.29	0.60	17,560	8,428	7,904	389	101	36
2005	13,908	2.29	0.54	15,989	7,542	7,099	295	127	28
2004	14,204	2.20	0.60	15,498	8,469	7,827	456	64	131
2003	14,735	2.37	0.53	15,771	7,836	7,330	425	60	23
2002	14,252	2.36	0.70	14,656	10,017	9,376	424	147	70
2001	15,576	2.44	0.70	15,883	10,872	9,896	733	129	115
2000	13,122	2.81	0.68	16,105	8,915	8,164	492	133	126
1999	15,078	2.60	0.68	16,450	10,289	9,683	355	126	125
1998	16,212	2.40	0.66	17,322	10,637	10,028	392	93	124
1997	17,637	2.47	0.76	18,030	13,322	12,333	696	101	192
1996	17,761	2.41	0.79	17,967	14,059	13,314	332	106	307
1995	16,084	2.64	0.79	16,447	12,641	11,926	287	88	340
1994	17,010	2.59	0.83	18,883	14,159	13,366	316	107	370
1993	13,912	2.77	0.91	19,964	12,610	11,941	289	99	281
1992	14,993	2.64	0.96	18,326	14,408	13,414	437	142	417
1991	16,044	2.53	1.08	22,845	17,286	16,047	417	159	40
1990	15,167	1.97	1.00	18,440	15,183	13,770	688	185	540
1989	16,614	1.60	0.97	16,200	16,135	14,409	852	364	510
1988	13,675	1.88	1.07	16,750	14,408	13,049	794	274	291
1987	16,347	1.73	1.12	17,486	18,355	16,617	636	355	747
1986	13,494	2.07	1.32	17,257	17,828	15,705	823	516	784
1985	15,351	N/A	1.40	18,774	21,524	18,660	1,353	407	1,104
1984	14,581	N/A	1.28	14,724	18,731	15,874	2,062	348	447
1983	13,209	N/A	1.42	17,250	18,775	14,146	3,877	580	172

Trophy: Fish 19”plus (16”+ for brook trout) are considered trophy in our management programs. The best opportunities to catch fish of this size are Muskrat (#7), Cokely (#8), Lower Granite (#10), Upper Granite (#11), Deep (#14), Spring (#15) and Jess (#26). A

variety of species grow this large in these lakes. These include brown trout in Lakes #7, #8, #10, #11; brook trout in Lakes #14 and #15; cutthroat trout in Lake #8; arctic char in Lakes #8 and #15; and tiger trout in Lakes #10 and #26.

Muskrat (#7) produced a 20" brown trout in our summer gillnet sample. Cokely (#8) produced three brown trout between the lengths of 22.1"-23.0" weighing 46-64 ounces. Lower Granite (#10) and Upper Granite (#11) produced large sizes of brown trout during our winter lake samples, ranging from 19.2" weighing 42 ounces to 20.1" weighing 47 ounces. The 19.2" brown trout from Upper Granite (#11) is the largest fish ever to have been sampled from that lake.

Tiger trout are providing many trophy opportunities. We sampled trophy tiger trout from Lower Granite (#10) ranging from 21.3"-21.5" weighing 47-55 ounces (2.9-3.4 pounds) during both our summer and winter lake samples. Jess (#26) also produced trophy size tiger trout ranging from 19.6"-19.8" weighing 50-53 ounces (3.1-3.3 pounds). The tiger trout sampled in Lower Granite (#10), Upper Granite (#11), Spring (#15), Kara (#21), and Jess (#26), averaged 19" in length and weighed 45 ounces (2.8 pounds).

Table 2. Mount Massive Lakes economic summary 1986 through 2015.

Year	Fish Caught (kept & released)	Total Lbs. Caught	Operating Expenses	Cost/Lb. Caught	CPMH	Avg. Size ozs./fish
2015	21,946	32,782	\$413,930	\$12.63	1.76	23.9
2014	23,762	33,452	\$394,078	\$11.78	1.99	22.5
2013	31,495	49,896	\$380,507	\$7.62	2.47	25.3
2012	34,803	71,836	\$359,004	\$5.00	2.34	33.3
2011	40,941	79,499	\$372,569	\$4.69	2.65	30.8
2010	48,323	91,363	\$365,367	\$4.00	2.75	30.3
2009	50,224	79,193	\$337,923	\$4.26	2.73	25.4
2008	38,184	58,392	\$342,983	\$5.87	2.30	24.2
2007	47,260	90,591	\$321,645	\$3.55	2.52	30.8
2006	32,415	69,575	\$297,374	\$4.27	2.29	34.4
2005	31,993	51,934	\$289,802	\$5.58	2.29	25.9
2004	31,249	43,114	\$283,771	\$6.58	2.20	22.2
2003	34,946	56,577	\$282,168	\$4.98	2.37	26.1
2002	33,666	67,898	\$275,854	\$4.06	2.36	32.3
2001	38,005	74,874	\$267,991	\$3.58	2.44	31.6
2000	36,808	69,285	\$260,085	\$3.75	2.81	30.1
1999	39,144	64,489	\$231,830	\$3.53	2.60	26.4
1998	38,909	63,929	\$207,275	\$3.24	2.40	26.7
1997	43,533	79,505	\$193,168	\$2.42	2.47	29.2
1996	42,798	83,354	\$189,950	\$2.28	2.41	31.2
1995	42,438	82,292	\$178,381	\$2.17	2.64	31.0
1994	44,056	74,192	\$183,350	\$2.47	2.59	26.2
1993	38,573	55,486	\$166,919	\$3.00	2.77	23.2
1992	39,612	60,781	\$168,369	\$2.77	2.64	24.6
1991	40,652	48,438	\$168,661	\$3.48	2.53	19.3
1990	29,895	47,084	\$154,431	\$3.28	1.97	25.2
1989	26,582	42,181	\$150,150	\$3.56	1.60	25.4
1988	25,661	39,700	\$152,980	\$3.85	1.88	24.6
1987	28,278	38,706	\$128,884	\$3.33	1.73	21.9
1986	27,932	32,296	\$122,838	\$3.80	2.07	18.5

FISH CULTURE

Egg taking operations produced all eggs (except triploid rainbow trout) required for MML management programs (Table 3). This year we discontinued trading brook trout and brown trout eggs with Colorado Parks and Wildlife (CPW). Brown trout eggs from CPW were added to the existing MML brown trout population in 2013 and 2014. This was done to enhance brown trout genetics. Without this addition of new genetics into the MML brown trout population, they would have become inbred which causes slow growth, poor survival, and poor egg production in future generations.

After the 2012 drought, we stocked 3” fingerling cutthroat trout into Alley (#5) and Rainbow (#12) to provide additional lakes for egg taking operations and provide more cutthroat fishing opportunities. These fish have performed well. We expect to take eggs from these two additional lakes, along with Cokely (#8) and Spring (#15) this spring. We will be stocking two year classes of cutthroat trout into Muskrat (#7) this spring to provide more cutthroat trout fishing opportunities and also to create another broodstock.

The production goal of 30,000 pounds was not achieved for the fourth consecutive year (Graph 1). Fish production dramatically decreased 9,965 pounds to 8,624 pounds (Table 4). This decrease was due to mortality in the Hofer rainbow trout experiment and a gill lice epizootic. The diploid Hofers began to spawn beneath the ice last winter, causing very high mortality. Gill lice cause significant physical trauma to the gill filaments, causing deformities that affect respiration and efficient uptake of oxygen and release of carbon dioxide, ammonia, and other metabolites. Gill lice infestations have become problematic throughout Colorado. Beginning this spring, MML will be participating in an INAD (Investigational New Animal Drug) which will help control and prevent gill lice throughout our fishery. We will be working alongside with the US Fish and Wildlife Service and Colorado Parks and Wildlife to begin this program. For more information about gill lice and the INAD program, please visit the MML website and click on the Managers Corner section.

Beginning in 2016 rainbow catchable and super catchable year classes will consist of triploids. Triploids have better growth to larger sizes as all their energy is transferred to growth rather than reproduction. They also experience less winter mortality because they do not spawn.

The 2016 year classes of triploid rainbows and cutbows will approach 28 ounces in size. If they attain this weight, the total production of for 2016 will approach the 30,000 pound production goal. In addition, about 2,500 cutbows will be held an additional year to restart our super catchable program in 2017. These fish are smaller than the super catchables in the past because cutbows grow slower than triploids. The 2018 super catchables will be triploid rainbows and will attain a greater size than the cutbows.

Table 3. Mount Massive Lakes egg production, 2015.

<u>Species</u>	<u>Source</u>	<u>Spawn</u>	<u>Egg Take</u>	<u>Egg Hatch</u>	<u>% Hatch</u>
Brown	Feral	September	6,101	5,469	90
Cutthroat	Feral	June	6,156	4,348	69
Rainbow	Purchased	October	35,044	34,893	99
Tiger	Feral	September	13,202	5,462	41

- Feral TG – 7,562 dumped because of poor egg take, fish began to absorb eggs.

Whirling Disease Management Plan (WDMP):

- Transplanted Tubifex worms exhibiting immunity to Whirling Disease (WD) from New Pond to Lake #10. Continue this project until all MML waters have been inoculated with immune worms.
- Required maintenance on all WD renovated rearing facilities.
- Disinfect both hatchery springs on a bi-annual basis.
- Remove rainbow trout from Muskrat Lake (#7) and Lower Granite (#10).
- Continue to keep current on the following, WD management research which might enhance our ability to better manage WD spore production:
 - Tubifex worms

Graph 1. Mount Massive Lakes hatchery production, in pounds of fish, 1982-2015.

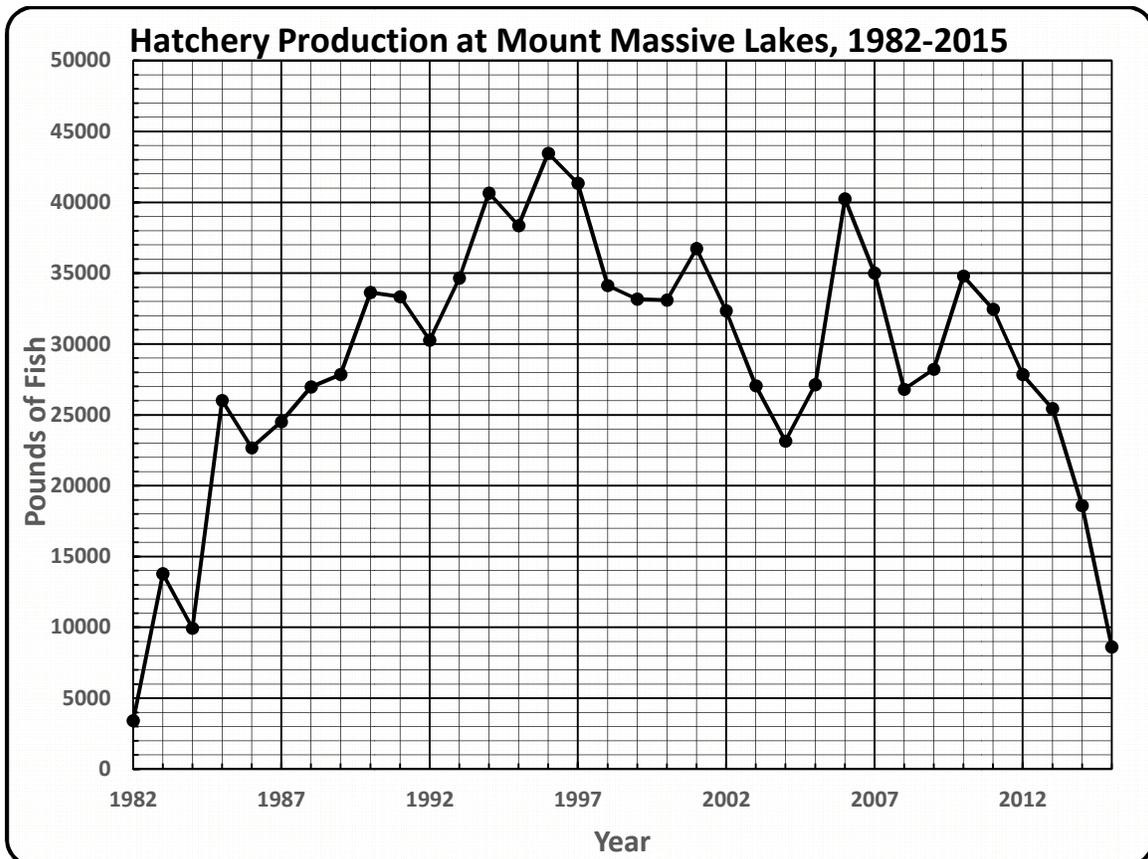


Table 4. Mount Massive Lakes hatchery production, in pounds of fish, 2004-2015.

Species	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
Rainbow	8,496	18,506	25,269	27,781	32,368	34,744	28,061	26,737	34,930	40,190	26,948	22,359
Brown	22	39	55	18	40	22	44	12	26	31	24	656
Cutthroat	39	8	89	30	22	19	104	40	37	9	157	12
Tiger	53	10	19	8	16	7	11	12	14	3	1	9
Splake	0	0	0	0	0	0	0	0	0	0	2	50
Cutbow	0	8	0	0	0	0	0	0	0	10	3	0
Arctic Char	14	18	12	0	21	7	0	0	0	0	0	59
Totals	8,624	18,589	25,444	27,847	32,466	34,799	28,220	26,801	35,007	40,243	27,135	23,145

SPECIAL PROJECTS/RENOVATIONS

2015 PROJECTS:

1. Continued construction of HP-P1 pipeline.
 - This pipeline will mitigate ice problems and conserve water.
2. Completed construction of the new rearing tank system (Haydon-Rogers Tanks).
 - This system will mitigate the effects of future droughts on our fish production system.
3. Rainbow Pond Renovation.
 - Relocated the spillway, cut bigger holes in outlet pipe, secured solar house and walkway to the concrete pond bottom.
 - These improvements will mitigate ice problems.
4. Purchased a new fire pump.
 - This is used for cleaning ponds and emergency fire situations.
5. Planted grass on the Haydon-Rogers Tanks (HRT) pipeline.
 - This will improve aesthetics and control erosion.
6. Installed pipeline in ditch behind lumber barns.
 - This will prevent water loss from leaks in the ditch and conserve water.
7. Repaired ditch blow out between Lake 6 and Lake 7.
 - This will stabilize the ditch bank and prevent water loss.
8. Installed one 20 foot pipe at the Main Diversion.
 - This will prevent excess spring runoff water from entering our ditch.
9. Built a new solar house in High Lake ditch.
 - This will mitigate ice problems.
10. Repaired Lake 14 ditch.
 - This will mitigate ice problems.
11. Dug out New Diversion (ND) ditch.
 - This will mitigate ice problems.
12. Installed winter aeration to Rainbow Pond (RBP).
 - This will mitigate ice problems.
13. Built new spawning flume for Spring Lake (#15).

2016 PROPOSED PROJECTS:

1. Continue construction of HP-P1 pipeline.
2. Continue construction of RBP pipeline.
 - This system will mitigate the effects of future drought on our fish production system and also mitigate ice problems.
3. Build a predator control fence around one designated rearing pond.

- This fence will prevent fish loss and mortality due to predators such as coyotes.
4. Re-seed Haydon-Rogers Tanks pipeline with mesh and hydro seeding.
 5. Evaluate the Good well from their existing cabin site located north of Lake 5 inlet.
 - This could increase hatchery water flows up to five gallons per minute of spring water.
 6. Replace shop doors.
 7. Install new spawning flume in Spring Lake (#15).
 8. Repair hatchery effluent and pipe system.
 9. Renovate Lake 3 inlet ditch.
 10. Renovate Lake 4 inlet ditch.

The Special Projects Program (SPP) is set up each year according to the needs and improvements which can be implemented to the club in order to make it a better fishery and improve the quality of MML. Rather than raise dues (during the year through a special assessment) we use the SPP fund for emergencies that come up. This pushes other projects back, but priorities which are related to the fishery and fish production are completed first.

WATER RIGHTS

1. Stipulated out of Climax case 12CW124.
2. Monitor new water right proposals in the Arkansas River basin monthly.
3. Developed and implemented a water lease agreement for Sylvan Lakes with our excess water rights.
4. Continue monitoring objection to Lake County case 98CW73. Court date set for January 9-13, 2017.

RESEARCH AND DEVELOPMENT

1. Implement and monitor new arctic char program.
2. Monitor brown trout genetic program.
3. Monitor Lake 5 and Lake 12 for cutthroat broodstock.
4. Research building a new rearing pond on the main water chain.

CONCLUSION

2015 "Healing Waters" fishing project, with recovering active duty warriors, was a great success for its fifth season. Thanks to all the members who help to make this a memorable event for our heroes. MML will continue this project in 2016. The sixth season activities will commence June 3, 2016 and be announced in the upcoming Troutlines.

Exceptional water flows the past three seasons has allowed MML to build fish production toward expected levels. Adequate water flows in 2016 will allow us to take an intermediate step toward full production in 2017.

Appendix A: “Adopt-A-Lake” program 2016.

<u>LAKE</u>	<u>NAME</u>	<u>Member</u>
2	Shelley	Tooth
3	Cutthroat	Cannon, Seeman
5	Alley	Modder
6	Jake	Perry
7	Muskrat	Watson
8	Cokely	Tims
12	Rainbow	Carnahan, Flanigan
15	Spring	Mulligan
16	Home	Poline
18	Kelsey	Green
19	Herendine	Lanier
20	High	Bruce, Jones

Please contact Brent for sign up and the details on areas that require clean up.