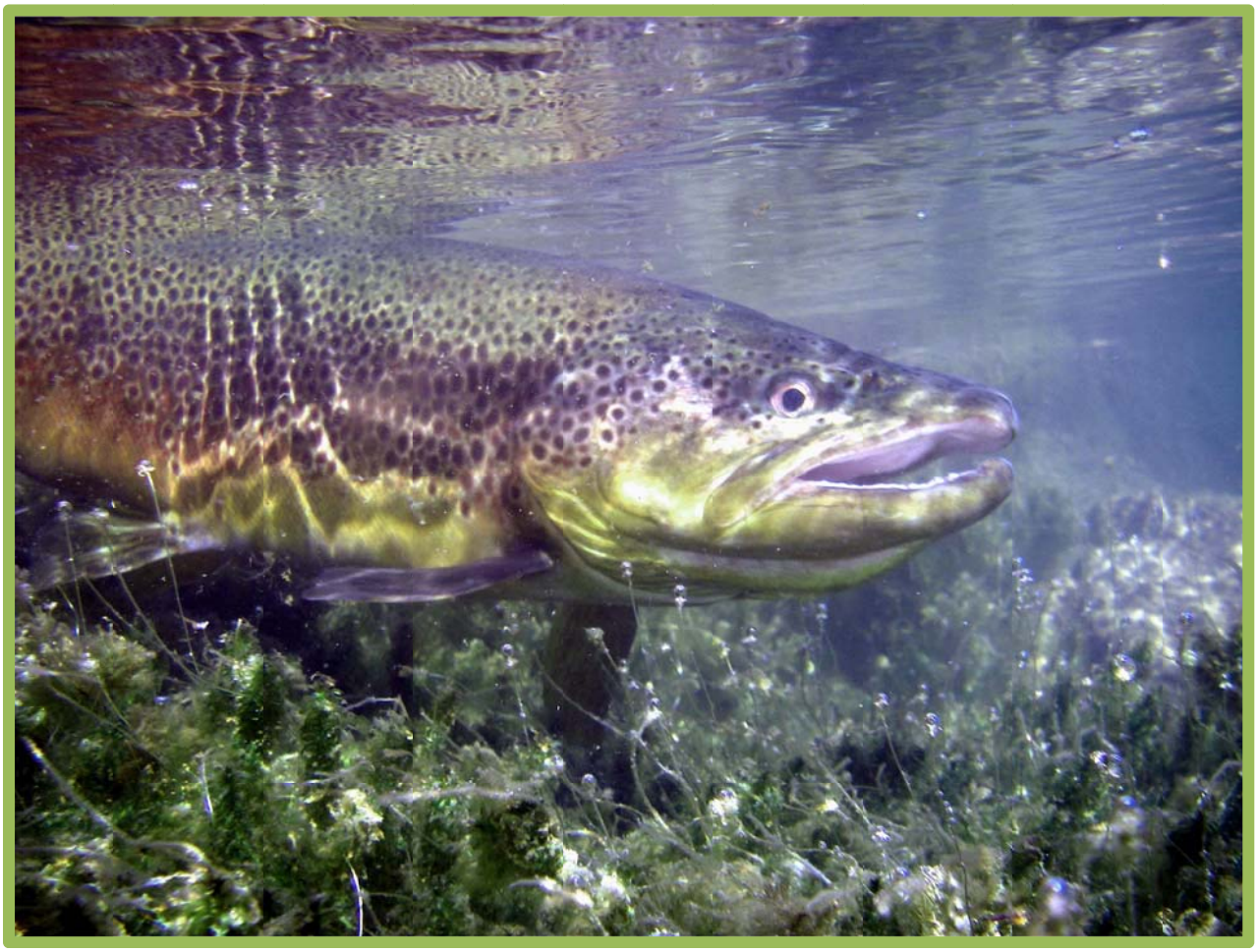
Section 3

Fisheries Monitoring Report for Rush, Lee Vining, Parker, and Walker Creeks 2012-13

Mono Basin Fisheries Monitoring Report
Rush, Lee Vining, and Walker Creeks
2012



Los Angeles Department of Water and Power

May 10, 2013

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Executive Summary

This report presents results of the sixteenth year of trout population monitoring in the Mono Basin in Rush, Lee Vining, and Walker Creeks pursuant to State Water Resources Control Board's (SWRCB) Water Right Decision 1631 (D1631) and the fourteenth year following SWRCB Orders #98-05 and #98-07. This report provides trout population data collected between September 7 and September 18, 2012 mandated by the Orders and the Settlement Agreement.

The 2012 runoff-year was a "dry" runoff year type based on the May 1 forecast with 55% of average runoff predicted. Annual electro-fishing mark-recapture monitoring was conducted at four reaches along Rush Creek and the Lee Vining main channel. Depletion fisheries monitoring was conducted on Walker Creek and the Lee Vining side channel. This monitoring was used to generate population estimates, density estimates, standing crop estimates, condition factors, and relative stock densities.

Age-0 brown trout estimated densities (numbers per hectare) increased for all sections in 2012 except Upper Rush when compared to 2011 estimates. The Bottomlands and County Road estimated densities increase by 18% and 29% respectively in 2012. Meanwhile, Walker Creek and the Lee Vining main channel and side channel experienced a 507%, 627%, 138% increase, respectively. Age-0 rainbow trout estimated densities in Lee Vining main channel increased from 7 trout/ha in 2011 to 2,393 trout/ha in 2012.

Age-1 and older brown trout estimated densities also increased for all sections in 2012 except Upper Rush when compared to 2011 estimates. The Bottomlands and County Road estimated densities increase by 51% and 50%, respectively in 2012. The Lee Vining main channel age-1 and older brown trout estimated densities increased from 2011 estimates by 131% and the side channel increased by 80% in 2012. Age-1 and older rainbow trout estimated densities in Lee Vining main channel increased 25% in 2012.

Relative condition factors of brown trout 150 to 250 mm in length in 2012 decreased in all sections from 2011 values. The Lee Vining main channel and Walker Creek sections were average (1.00) or above. All other sections in 2012 had condition factors that were below average. The Lee Vining side channel condition factor dipped below 1.00 for the first time in 2012 with a value of 0.83.

Standing crop estimates (kg/ha) in 2012 increased from 2011 estimates in all sampled section except for Upper Rush. Upper Rush's estimate in 2012 of 178 kg/ha was a 21% decrease from the 2011 estimate. The Bottomlands, County Road and MGORD experienced increases in standing crop estimates of 14%, 24%, and 55%, respectively. Lee Vining's main and side channel combined had an increase of 138% from 2011 to 2012. When looked at individually, the main channel increased by 193% while the side

channel increased by 15%. Walker Creek's 2012 standing crop estimate of 156 kg/ha was a 20% increase from the 2011 estimate.

Relative stock density (RSD)-225 values in 2012 for brown trout in the three sections of Rush Creek continued to decrease from 2011 and 2010 values. RSD-300 values in Upper Rush did not change from 2011's value of one. Both the Bottomlands and County Road sections decreased from 2011's value of one in 2012. In the MGORD RSD-225 values drop to 75 in 2012 from 83 in 2011, but RSD-300 and 375 stayed the same at 29 and 4 respectively. Lee Vining Creek combined main and side channel RSD-225 values decreased from 41 in 2011 to 32 in 2012

Rush Creek sampling sections in 2012, failed to meet four of the five proposed termination criteria for any of the three, three-year running averages. Upper Rush met two of five for three of the three-year running averages. Bottomlands and County Road met one of five for three of the three-year running averages. The MGORD in 2012 only met one of the three proposed termination criteria (RSD-225) for three of the three year running averages. Lee Vining Creek in 2012 met two of the four proposed termination criteria (condition factor and RSD-225) for the 2010-2012 and 2009-2011 averages. The 2008-2010 average in Lee Vining Creek only met one of four (condition factor).

Introduction

This report presents results of the sixteenth year of trout population monitoring for Rush, Lee Vining, and Walker Creeks pursuant to State Water Resources Control Board's (SWRCB) Water Right Decision 1631 (D1631) and the fourteenth year following SWRCB Orders #98-05 and #98-07.

D1631 states that prior to water diversions on Rush Creek, brown trout (*Salmo trutta*) averaging thirteen to fourteen inches were regularly observed and fairly consistently produced brown trout that weighted three-quarters to two pounds. With regard to Lee Vining Creek, it sustained catchable brown trout averaging eight to ten inches in length and some trout reached thirteen to fifteen inches.

A Settlement Agreement signed in 1997 (Settlement Agreement) called for establishment of size and structure of trout populations criteria for determining when stream restoration will be considered complete, i.e. terminated.

Order 98-05 approved the general termination criteria (TC) agreed to in the Settlement Agreement. The general description of the termination criteria described in Order 98-05 includes:

1. Whether trout are in good condition. This includes self-sustaining populations of brown trout similar to those that existed prior to the diversion of water by Los Angeles and which can be harvested in moderate numbers.

2. Whether the stream restoration and recovery process has resulted in a functional and self-sustaining stream system with healthy riparian ecosystem components for which no extensive physical manipulation is required on an ongoing basis.

Order 98-05 states that "*the stream restoration program may be terminated upon approval of the State Water Resources Control Board following public notice and opportunity for public comment (SWRCB 1998)" and* the SWRCB will base its determination upon consideration of the two above termination criteria. Order 98-07 also states the monitoring team will develop and implement a means for counting or evaluating the number, weights, lengths and ages of trout present in various reaches of Rush Creek, Lee Vining Creek, Parker Creek and Walker Creek. No specific termination criteria were set forth for Parker and Walker Creeks.

In 2006, the Fisheries Stream Scientist proposed new termination criteria in an attempt to make the calculation and interpretation of the fisheries termination criteria more quantifiable (Hunter 2007). The proposed termination criteria included biomass, density, condition factor, and relative stock density because these are generally accepted by fishery professionals as repeatable and quantifiable measurements of stream-dwelling trout populations. While the termination criteria were proposed, they were never formally adopted by the SWRCB, but have been used by the Stream Scientists in their annual reports.

This report provides trout population data collected in 2012 that are mandated by the Orders and the Settlement Agreement.

Study Area

Between September 7 and September 18, 2012, Los Angeles Department of Water and Power (LADWP) staff and Ross Taylor, the SWRCB fisheries scientist, conducted the annual fisheries monitoring in seven reaches along Rush, Lee Vining, and Walker Creeks in the Mono Lake Basin. These reaches were similar in length to those which have been sampled between 2009 and 2011(Figure 1). One exception was the Lee Vining Creek side channel section which was shorter in length due to the streamflow going sub-surface towards the downstream end of the reach. Aerial photographs of the 2012 sampling reaches can be found in Appendix B.

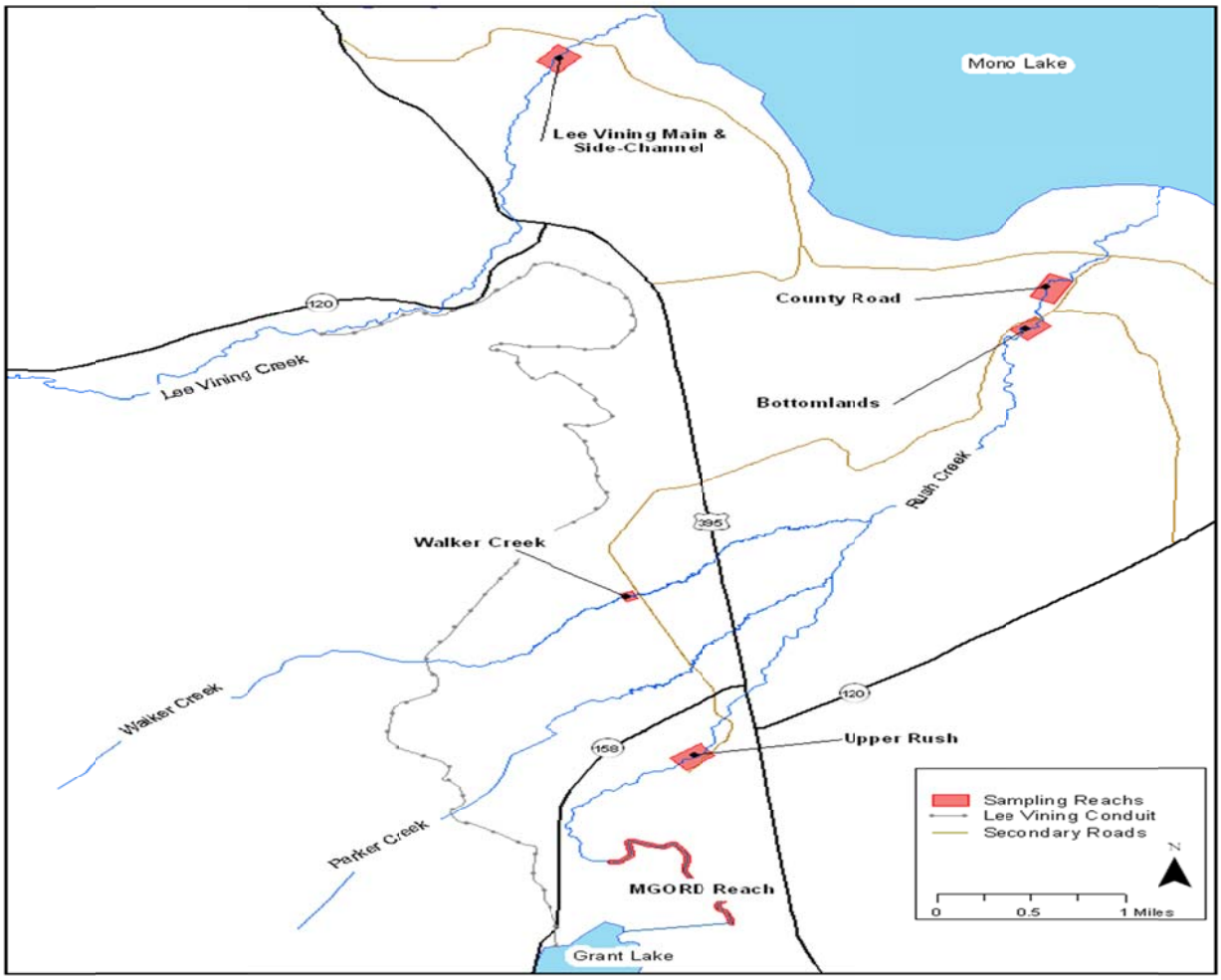

Figure 1. 2012 annual fisheries sampling sites within Mono Basin study area.

Hydrology

The 2012 runoff-year (April 1 – March 31) was a "dry" runoff year type based on the May 1 forecast. The forecasted Mono Basin runoff was 67,400 AF, which was 55% of the long term average runoff. In comparison, the 2011 runoff-year was a "wet" runoff year type with a runoff of 154,800 AF which was 149% of the average. Under Order 98-05 Stream Restoration Flow (SRF) "dry" year flow conditions, no peak flows were required for any of the four tributaries. Summer baseflows for Rush and Lee Vining Creeks were 31 cfs and 37 cfs, respectively.

Due to the concern of Grant Lake Reservoir spilling during the winter of 2011-2012, Rush Creek releases down the MGORD were increased from 50 to 350 cfs in October, 2011 (Figure 2). The winter baseflow following this release remained above 60 cfs until January 30, 2012. This resulted in the baseflow at Rush Creek below the Narrows

remaining above 65 cfs throughout the winter until the end of January. For RY2012, MGORD releases were maintained at 31 cfs from April through September and at 36 cfs for October through December.

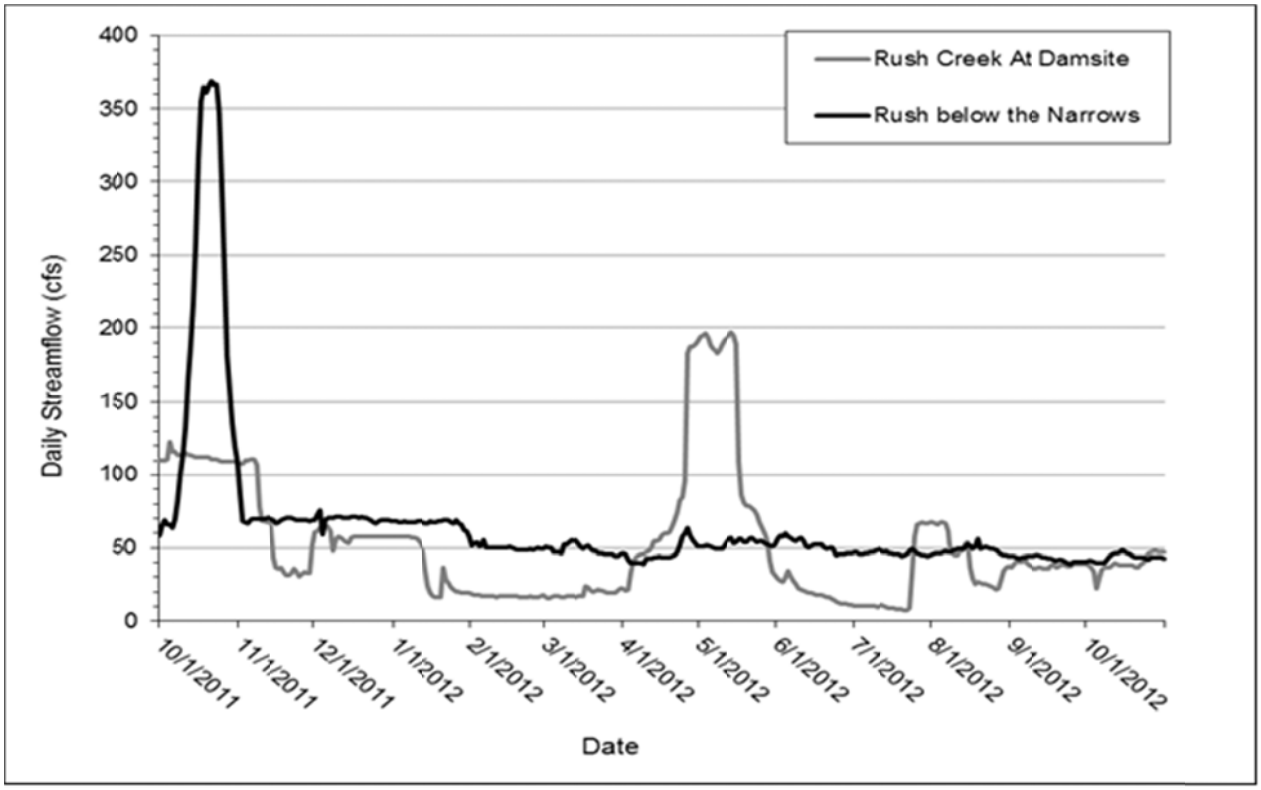

Figure 2. Rush Creek Hydrographs between October 1, 2011, and October 31, 2012.

Winter baseflow for Lee Vining Creek dropped below 20 cfs on December 20, 2011, and remained below 20 cfs until April, 2012 (Figure 3). Due to exports off Lee Vining Creek, the peak flow below Intake was 59 cfs on April 22, 2012. The summer baseflow remained above 37 cfs until the flow above Intake dropped below 37 cfs on July 17.

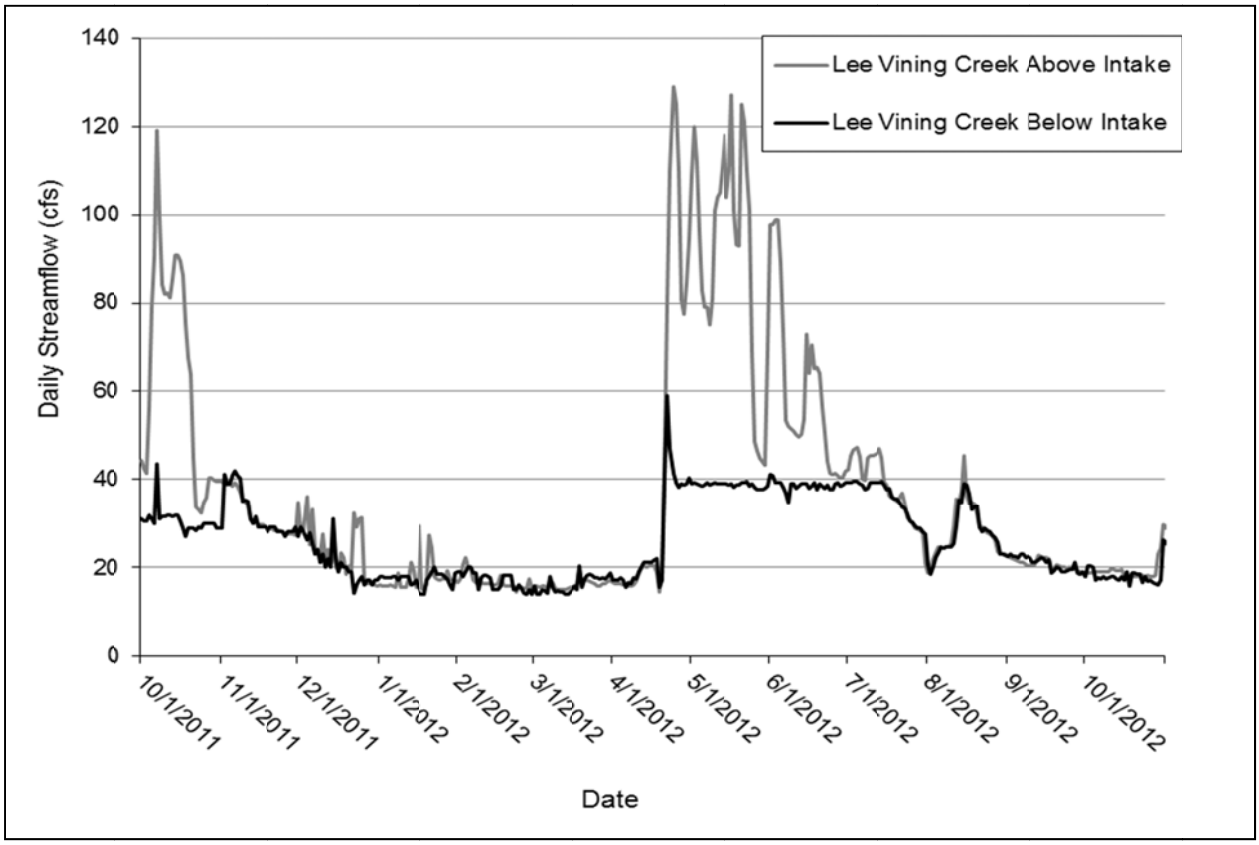

Figure 3. Lee Vining Creek Hydrographs between October 1, 2011, and October 31, 2012.

Grant Lake Reservoir

Grant Lake Reservoir (GLR) was close to spill level (7,128.6 ft) before the October 2011 release (Figure 4). Due to the pulse flow and higher winter baseflow, GLR's elevation dropped throughout the winter, reaching at the lowest level of 7,118.8 ft on April 1, 2012 before the snowmelt runoff. GLR's elevation reached a maximum elevation of 7,127.6 ft on May 25, 2012 (2.4 ft below the spill elevation of 7,130 ft). GLR remained above 7,125 ft until October 10, 2012, and dropped to the minimum elevation of 7,118.6 ft on November 28, 2012 and again on December 31, 2012. Since October 1, 2011, the GLR elevation had remained above the "*low*" GLR level (<25,000 AF storage or 7,108 ft elevation)[1]

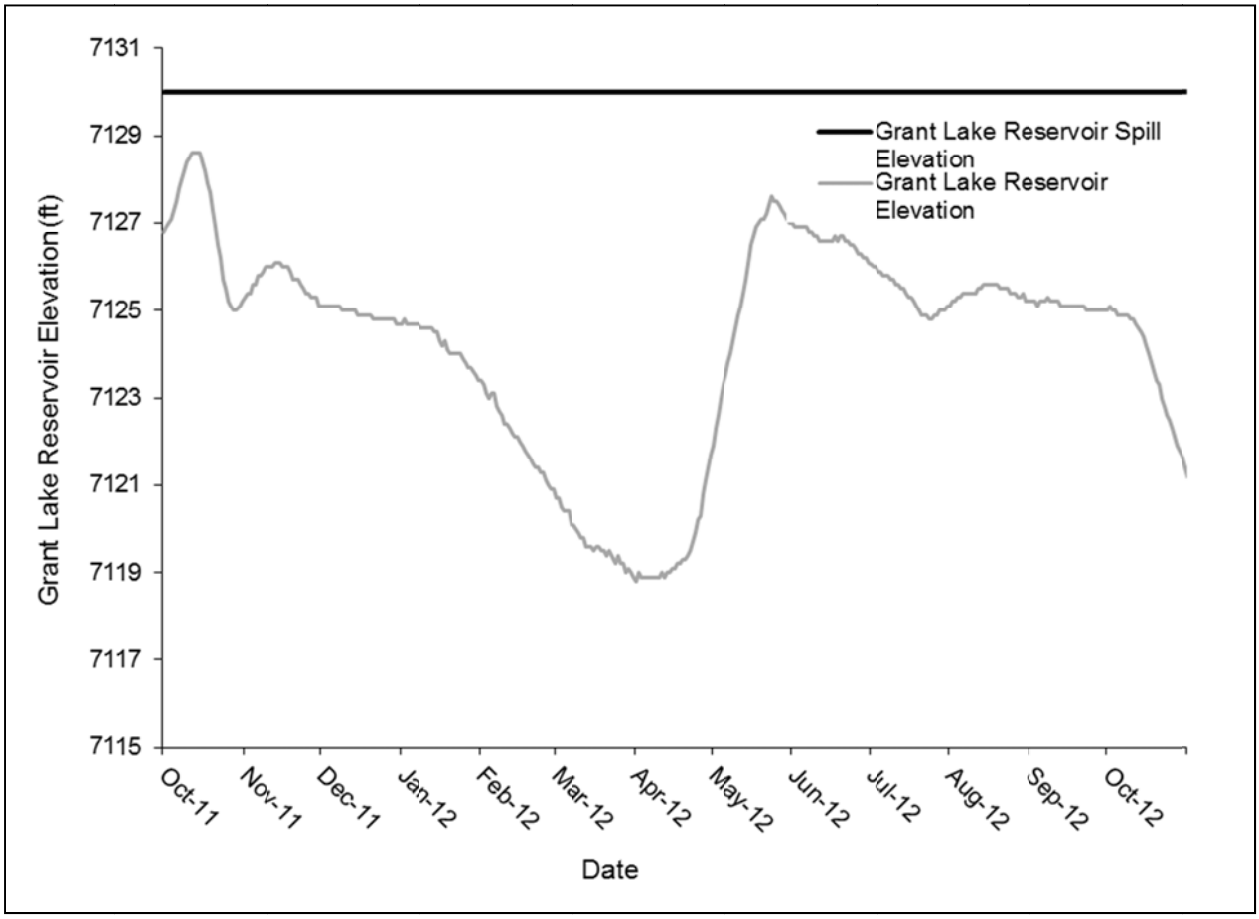

Figure 4. Grant Lake Reservoir Elevation between October, 2011, and December, 2012.

[1] The Stream Scientists have defined the "low" GLR level as the storage level below 25,000 AF in the Synthesis Report.

Water Temperature

Water temperatures from July 1 to September 30 were continuously recorded, at 15 minute intervals, at multiple sites (site locations can be found in Table 3 of Section 4), on both Rush and Lee Vining Creeks in 2012. This range of dates approximately corresponds to summer base-flow conditions.

On Rush Creek all sections below the MGORD exceeded the temperature threshold of 70°F for some portion of the summer. In particular, the County Road section exceeded this threshold for 47 days, or over half the summer, while the other sites exceeded it from 10 to 41% of the time. With respect to mean daily-temperatures, they were similar throughout Rush Creek and can be attributed largely because of the lower daily minimum-temperatures downstream of the MGORD offsetting higher maximum daily-temperatures (58.6°F at MGORD Top compared to 50.9°F at County Road). This similar trend is also reflected in the maximum-diurnal changes, which increased in the downstream direction and occurred primarily in late July.

No days exceeded 70°F on Lee Vining Creek in 2012 and there were little differences in temperatures between the monitoring sites, with exception to the slightly lower daily minimum at County Road (Table 1).

Table 1. Summary of water temperature data during the summer 2012 (July 1 to September 30). Temperature data is in °F.

	Summer Water Temperature					
Location	Daily Mean	Daily Max	Daily Min	No. Days > 70 °F	Max Diurnal Temp Flux	Date of Occurrence
Rush Creek at MGORD TOP	63.3	66.9	58.6	0	4.7	Jul 16, 2012
Rush Creek at MGORD BOTTOM	63.5	69.6	57.3	0	8.3	Jul 25, 2012
Rush Creek at Old Hwy 395	63.1	72.1	55.4	36	13.9	Jul 2, 2012
Rush Creek above Parker Confluence	62.3	71.0	54.5	9	13.7	Jul 31, 2012
Rush Creek below the Narrows	61.8	72.6	52.7	36	16.8	Jul 30, 2012
Rush Creek below 10 Channel Fall	61.9	73.0	51.9	38	17.5	Jul 30, 2012
Rush Creek at County Road	62.1	74.8	50.9	47	19.5	Jul 30, 2012
Lee Vining below Intake	54.0	63.3	52.8	0	13.3	Jul 25, 2012
Lee Vining at County Road	56.2	64.9	46.6	0	11.4	Jul 20, 2012

Methods

The annual fisheries monitoring was conducted between September 7 and 18, 2012. Closed population mark-recapture and depletion methods were utilized in order to estimate trout abundance. The mark-recapture method was used on all Rush Creek sections and the Lee Vining Creek main channel section. The depletion method was used on the Lee Vining Creek side channel and Walker Creek sections.

For the mark-recapture method to meet the assumption of a closed population, semi-permanent block fences were installed at the upper and lower ends of each section. The semi-permanent fences, were 48 inches tall, constructed with ½ inch-mesh hard wire cloth, t-posts, and rope. Hard wire cloth was stretched across the entire width of the creek and t-post were then driven at roughly three feet intervals through the cloth on the upstream side approximately one foot from the edge. Rocks were placed on the one foot piece to keep trout from swimming under the fence. Rope was secured across the top of the t-post and tied to both banks upstream of the fence. Cloth downstream of the t-post was raised and secured to the rope with bailing wire. Fences were raised the morning of the mark run and left in place for seven days until the recapture run was finished. To prevent failure, all fences were cleaned of leaves, twigs, and checked for mortalities morning and evening.

Depletion estimates only required temporary fencing to stop trout movement in and out of the study area while conducting the survey. Temporary fencing was erected at the upper and lower ends of the study areas with 3/16" nylon mesh seines installed across the channel. Rocks were placed on the lead line to prevent trout from swimming under the seine. Sticks were used to keep the top of the seine above the water line. Both ends of the seine were then tied to bank vegetation to hold it in place.

Equipment used to conduct mark-recapture electro-fishing on Rush Creek included a six foot plastic barge that contained the Smith-Root 2.5 GPP electro-fishing system, an insulated cooler, and battery powered aerators. The Smith-Root 2.5 GPP electro-fishing system includes a 5.5 horse power Honda generator which powers the 2.5 GPP control box. Electricity from the 2.5 GPP control box is introduced into the water via two anodes. The electrical circuit is completed by the metal plate cathode attached to the bottom of the barge. Due to the steep-gradient and relatively narrow width of Lee Vining Creek, two Smith-Root LR-24 backpack units were used for the mark-recapture runs.

Mark-recapture runs on Rush Creek consisted of a single downstream pass starting at the upper block fence and ending at the lower block fence. In 2012 the field crew consisted of a barge operator, two anode operators, and four netters, two for each anode. The barge operator's job consisted of carefully maneuvering the barge down the creek, and ensuring overall safety of the entire crew. The anode operator's job was to safely shock and hold trout until they were netted. The netters' job was to net and transport trout to the insulated cooler and monitor trout for signs of stress. Once the cooler was full, electro-fishing was temporarily stopped to process the trout. The trout were then transferred from the cooler to live cars and placed back in the creek. The trout were then processed in small batches and then returned to a recover live car in the creek. Once all the trout were processed the crew resumed electro-fishing until the cooler was once again full.

Mark-recapture runs on Lee Vining Creek consisted of an upstream pass starting at the lower block fence and ending at the upper block fence followed shortly by a downstream pass back to the lower block fence. The electro-fishing crew consisted of two crew members running the LR-24 backpack electro-fishers, three dip netters, and one bucket

carrier who transported the trout to the awaiting live cars in the creek. Once the two passes were finished the crew then processed the trout.

Due to the depth of the MGORD all electro-fishing and netting was done from inside a drift boat. The drift boat was held perpendicular to the flow by two crew members who walked it down the channel. The electro-fishing barge was tied off to the upstream side of the drift boat and a single throw anode was used. A single netter used a long handled dip net to net the stunned trout, which were then placed in an insulated cooler equipped with aerators. A safety officer sat at the stern of the drift boat whose job was to monitor the trout in the cooler, electro-fishing equipment, the electro-fishing crew and shut off the power should the need arise. Once the cooler was full, the trout were moved to a live car and placed back in the creek for the shore crew to process before continuing.

Walker Creek and the Lee Vining Creek side channel (B-1 side channel) depletions were both two-pass depletions. A single pass was considered an upstream pass from the lower fence to the upper fence followed by a downstream pass back to the lower fence. One member of the electro-fishing crew operated the LR-24 electro-fisher, another member was the primary netter and a third member was the backup netter and bucket carrier. The other members of the crew processed the trout from the first pass while the electro-fishing crew was working on the second pass. Once the electro-fishing crew was finished with the second pass, those trout were then processed.

To process trout during the mark run, small batches of trout from the live car were transferred to a five gallon bucket equipped with aerators. Trout were then anesthetized, identified, measured to the nearest millimeter (total length), and weighed to the nearest gram on an electronic balance. Trout were then “marked” with a small (< 3 mm) fin clip for identification during the recapture run. Trout captured in the MGORD, Rush Bottomlands and the main channel of Lee Vining Creek received an anal fin clip. Trout captured in the Upper Rush and County Road sections of Rush Creek received a lower caudal clip. Before placing trout into the recovery bucket, they were examined for a missing adipose fin. Trout missing their adipose fin were then scanned for their Passive Integrated Transponder (PIT) tag number. Trout missing their adipose fin and failed to produce a tag number when scanned were retagged. Partially regenerated adipose fins were reclipped for future identification.

Processing trout during the recapture run was similar to the mark run. Trout were transferred in small batches to a five gallon bucket. They were then anesthetized, identified, and examined for the “mark” fin clip. Trout that were fin clipped were only measured to the nearest millimeter and placed in the recovery bucket. Trout that were not clipped during the “mark” run (i.e. new trout) were measured to the nearest millimeter “total length,” weighed to the nearest gram, and examined for missing adipose fins. Trout missing adipose fins were then scanned for their PIT tag number then placed into recovery. Again, trout that failed to produce a tag number were retagged and partially regenerated adipose fins were reclipped.

Beginning in 2009, PIT tags were implanted in all young-of-the-year trout in Rush and Lee Vining Creeks and all trout in the MGORD. In 2012, only trout in Upper Rush and

Bottomlands sections of Rush Creek, Walker Creek and the Lee Vining Creek's main channel received PIT tags because of a limited number of tags. Trout that were missing their adipose fin during the mark and recapture runs and failed to produce a tag number were retagged. The remaining tags were divided among the above reaches and young of the year trout ≥ 70 mm were tagged on the recapture run. All trout that received a PIT tag also received an adipose fin clip for future identification.

All data collected in the field, were written on data sheets and entered into Excel spreadsheets using a Trimble Yuma GPS. Data sheets were then used to proof the Excel spreadsheets back at the office.

Mortalities

Accounting for all trout that died during the sampling process is important for accurate mark-recapture estimates. How these trout are accounted for depends on when these trout died and whether or not they were marked during the mark run.

All trout that died (morts) during the mark-run were removed from the population and were therefore not able to be sampled during the recapture run. These morts were removed from the mark run data prior to computing the mark recapture estimate, and then were added back for a total estimate.

While cleaning block fences during the seven-day period between the mark run and the recapture run, fences were scanned for additional morts. If morts were found their species, length, and whether or not they were marked was noted. Trout that were marked with a fin clip needed to be marked as a mort on the mark run data sheets. Using the length of the deceased trout, mark run data sheets were then scanned of trout of the same species and length. When a match was found, it was recorded as a fence mort so it could be removed from the mark run data prior to computing the estimate. Because of fin deterioration on some morts, exact lengths were not always available. Fortunately, it is not critical to match the exact length when assigning these marked fence morts to trout from the mark-run, but it is important that the fence morts are placed within the proper "size classes" for which estimates were computed. As with trout that died during the mark-run, these marked fence morts were added back into the total estimate after the mark-recapture estimate was computed.

Unmarked fence morts (trout not caught and clipped during the mark-run) were measured and tallied by the three size classes for which estimates were computed. These trout were then added to the total number of morts (for each size class), which were then added back into the mark-recapture estimates to provide unbiased total estimates for each of the three length groups.

Calculations

To calculate the area of each sample section, channel lengths and wetted widths were measured in the sample reaches. Wetted widths were measured at 10-meter intervals

in each reach. Average widths were used in area calculations which were then used to calculate each section's estimates of trout biomass and density.

Mark-recapture population estimates were derived from the Chapman modification of the Petersen equation (Ricker 1975 as cited in Taylor and Knudson. 2011). Depletions estimates and condition factors were derived from MicroFish 3.0 software program.

Length-Weight Relationships

Length-weight regressions (Cone 1989 as cited in Taylor and Knudson. 2011) were calculated for all brown trout greater than 100 mm in all section of Rush Creek. Regressions using Log10 transformed data were used to compare length-weight relationships by year and by section.

Fulton-type relative condition factors were computed in MicroFish using methods previously reported in (Taylor and Knudson 2011) for brown trout 150 to 250mm. A trout condition factor of 1.00 is considered average (Reimers 1963; Blackwell et al. 2000).

Relative Stock Density (RSD) Calculations

Relative stock density (RSD) is a numerical descriptor of length frequency data (Hunter et al. 2007).

RSD values are the proportions (percentage x 100) of the total number of brown trout ≥150 mm in length that are also ≥225 mm or (RSD-225), ≥300 mm (RSD-300) and ≥375 mm or (RSD-375). These three RSD values are calculated by the following equations:

RSD-225 = [(# of brown trout ≥225 mm) ÷ (# of brown trout ≥150 mm)] x 100
RSD-300 = [(# of brown trout ≥300 mm) ÷ (# of brown trout ≥150 mm)] x 100
RSD-375 = [(# of brown trout ≥375 mm) ÷ (# of brown trout ≥150 mm)] x 100

Termination Criteria Calculations and Analyses

Information regarding the proposed termination criteria, calculations, and analyses was conducted as described in Taylor and Knudson 2011(Appendix A).

Results

Channel Lengths and Widths

Differences in wetted widths between years can be due to factors such as, magnitude of spring peak flows, stream flows at time of measurements, and locations of where measurements were taken. The main factor causing the reduction in width in 2012 was going from a "wet" runoff year in 2011 to a "dry" runoff year in 2012. For Rush Creek, the SRF summer baseflows for a "dry" runoff year is 31 cfs compared to a "wet" runoff year with summer base flows of 68 cfs. Lee Vining Creek the "dry" year summer baseflow is 37 cfs while the "wet" year base flow was 54 cfs. In Lee Vining Creek the "dry" runoff year summer baseflow is 37 cfs while the "wet" runoff year baseflow was 54 cfs. Lengths, widths, and areas from all 2011 sections are provided for comparisons (Table 2).

Table 2. Total length, average wetted width, and total surface area of sample sections in Rush, Lee Vining, and Walker Creeks sampled between September 7-18, 2012. Values from 2011 are provided for comparisons.

Section	Length (m) 2011	Width (m) 2011	Area (m^2) 2011	Length (m) 2012	Width (m) 2012	Area (m^2) 2012
Rush – Upper	430	8.4	3,612.0	430	7.8	3,357
Rush - Bottomlands	437	8.1	3,539.7	437	7.4	3,222
Rush – Co. Road	329	8.4	2,763.6	329	7.5	2,470
Rush – MGORD	2,230	12.0	26,760.0	2,230	7.8	17,333
Lee Vining – Main	255	5.4	1,377.0	255	5.0	1,279
Lee Vining - Side	195	2.6	507.0	179	2.0	365
Walker Creek	194	2.5	485.0	193	2.3	450

Trout Population Abundance

Rush Creek

In 2012, a total of 1,816 brown trout ranging in size from 56 mm to 465 mm were captured in Upper Rush section (Figure 5). Age-0 brown trout comprised 68% of the total catch this year. Upper Rush supported an estimated 2,895 age-0 brown trout in 2012 compared to 3,794 trout in 2011. Standard error on age-0 brown trout was 5% of the estimate vs. 2011's 10% (Table 3).

Table 3. Rush Creek and Lee Vining Creek mark-recapture estimates for 2012 showing total number of trout marked (M), total number captured on the recapture run (C), total number recaptured on the recapture run (R), and total estimated number and its associated standard error (S.E.) by stream, section, date, species, and size class. Mortalities (Morts) were those trout that were captured during the mark run, but died prior to the recapture run. Mortalities were not included in mark-recapture estimates and were added to estimates for accurate total estimates. NP = estimate not possible.

Stream Section Species Date	Size Class (mm)	Mark - recapture estimate M	C	R	Morts	**Estimate**	S.E.
Rush Creek							
Upper Rush-BNT							
9/07/2012 & 9/14/12							
	0 - 124 mm	685	765	186	86	**2809**	152
	125 - 199 mm	164	214	73	14	**478**	33
	>200 mm	100	86	51	9	**168**	10
Upper Rush-RBT							
9/07/2012 & 9/14/2012							
	0 - 124 mm	60	68	15	17	**262**	48
	125 - 199 mm	18	11	7	0	**28**	4
	>200 mm	7	7	4	0	**NP***	NP
Bottomlands-BNT							
9/08/2012 & 9/15/2012							
	0 - 124 mm	256	247	71	17	**826**	68
	125 - 199 mm	265	266	154	3	**457**	15
	>200 mm	66	75	50	0	**99**	4
Bottomlands-RBT							
9/08/2012 & 9/15/2012							
	0 - 124 mm	4	10	1	0	**NP***	11
	125 - 199 mm	8	6	4	1	**NP***	2
	>200 mm	0	0	0	0	**NP**	NP
County Road-BNT							
9/09/2012 & 9/16/2012							
	0 - 124 mm	286	278	116	4	**683**	37
	125 - 199 mm	214	202	114	2	**379**	16
	>200 mm	36	24	12	0	**70**	11
County Road-RBT							
9/09/2012 & 09/16/2012							
	0 - 124 mm	2	8	0	0	**NP***	NP
	125 - 199 mm	11	12	7	0	**19**	2
	>200 mm	0	1	0	0	**NP***	NP

Stream Section Species Date	Size Class (mm)	Mark - recapture estimate M	C	R	Morts	**Estimate**	S.E.
MGORD-BNT							
9/10/2012 & 9/17/2012							
	0 - 124 mm	67	142	2	22	**NP***	NP
	125 - 199 mm	56	50	14	1	**193**	35
	>200 mm	430	335	165	2	**871**	38
MGORD-RBT							
9/10/2012 & 09/17/2012							
	0 - 124 mm	5	7	0	1	**NP***	NP
	125 - 199 mm	0	0	0	0	**NP***	NP
	>200 mm	22	9	4	0	**NP***	NP
Lee Vining Creek							
Main Channel-BNT							
9/11/2012 & 9/18/2012							
	0 - 124 mm	250	257	97	17	**660**	41
	125 - 199 mm	45	40	25	1	**72**	6
	>200 mm	34	32	23	0	**47**	3
Main Channel-RBT							
9/11/2012 & 9/18/2012							
	0 - 124 mm	144	138	67	11	**295**	19
	125 - 199 mm	3	3	2	0	**NP***	NP
	>200 mm	4	4	3	0	**NP***	NP

Brown trout 125-199 mm in length comprised 16% of the total catch in the Upper Rush section. This section supported an estimated 492 brown trout 125-199 mm in length in 2012 compared to 579 brown trout in 2011. Standard error for this size class was the same as 2011 at 7% of the estimate.

Brown trout 200 mm and greater comprised of seven percent of the total catch in 2012. Upper Rush supported an estimated 177 brown trout greater than 200 mm. Standard error for this size class was 6% of the estimate vs. 7% in 2011. In 2012, only four brown trout greater than 300 mm in length were captured in the Upper Rush section. Of these four trout, only two were greater than 350 mm in length.

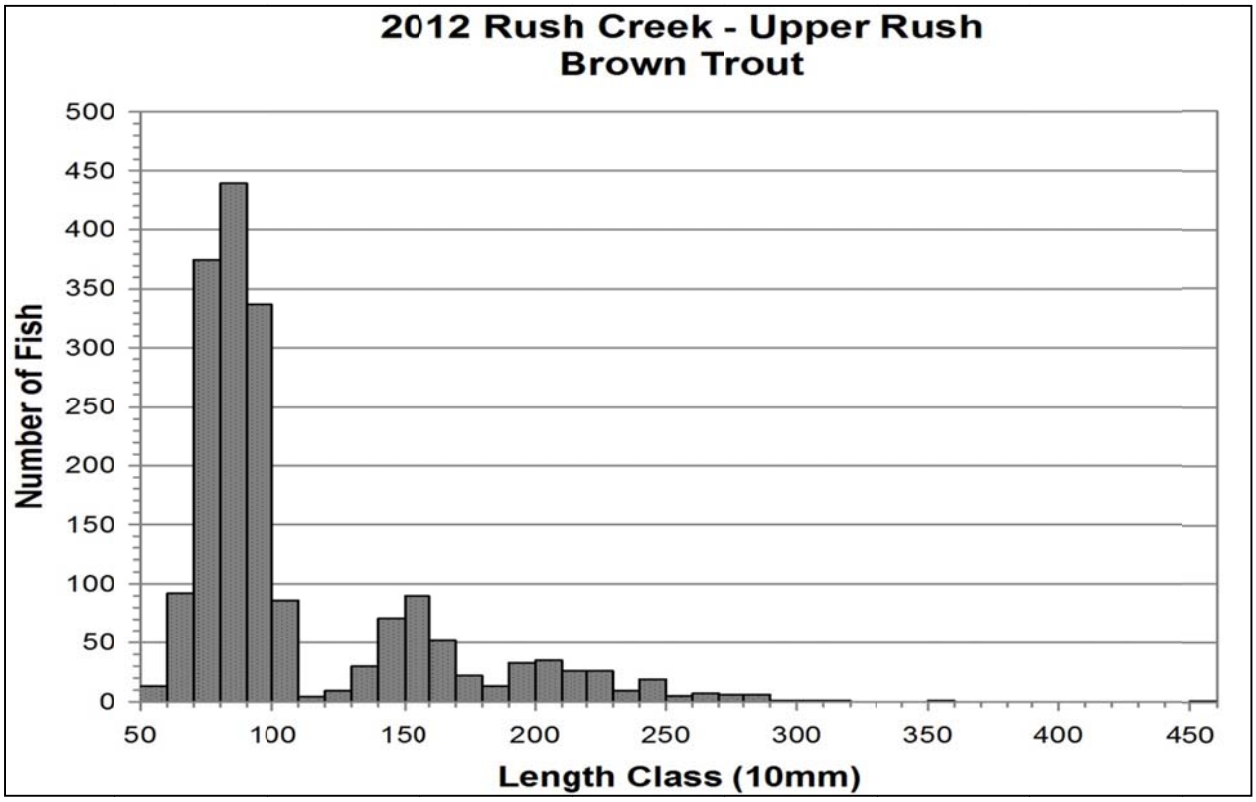

Figure 5. Length-frequency histogram for Upper Rush captured brown trout, September 7th and 14th, 2012.

A total of 162 rainbow trout (*Oncorhynchus mykiss*) were captured on the Upper Rush section making up 9% of the total catch in 2012 (Table 3). Of the 162 rainbow trout 130 were age-0. The 162 rainbow trout ranged in size from 52 mm to 308 mm (Figure 6). Age-0 estimates on Upper Rush were 279 trout, compared to 92 trout in 2011. Standard error was 17%, of the estimate vs. 16% in 2011. Rainbow trout 125-199 mm had an estimate of 28 trout and standard error was 14% of the estimate. In 2011, there were too few recaptures of trout 125-199 mm to generate an estimate. Rainbow trout greater than 200 mm in 2012 had insufficient numbers of recaptures to produce a valid estimate.

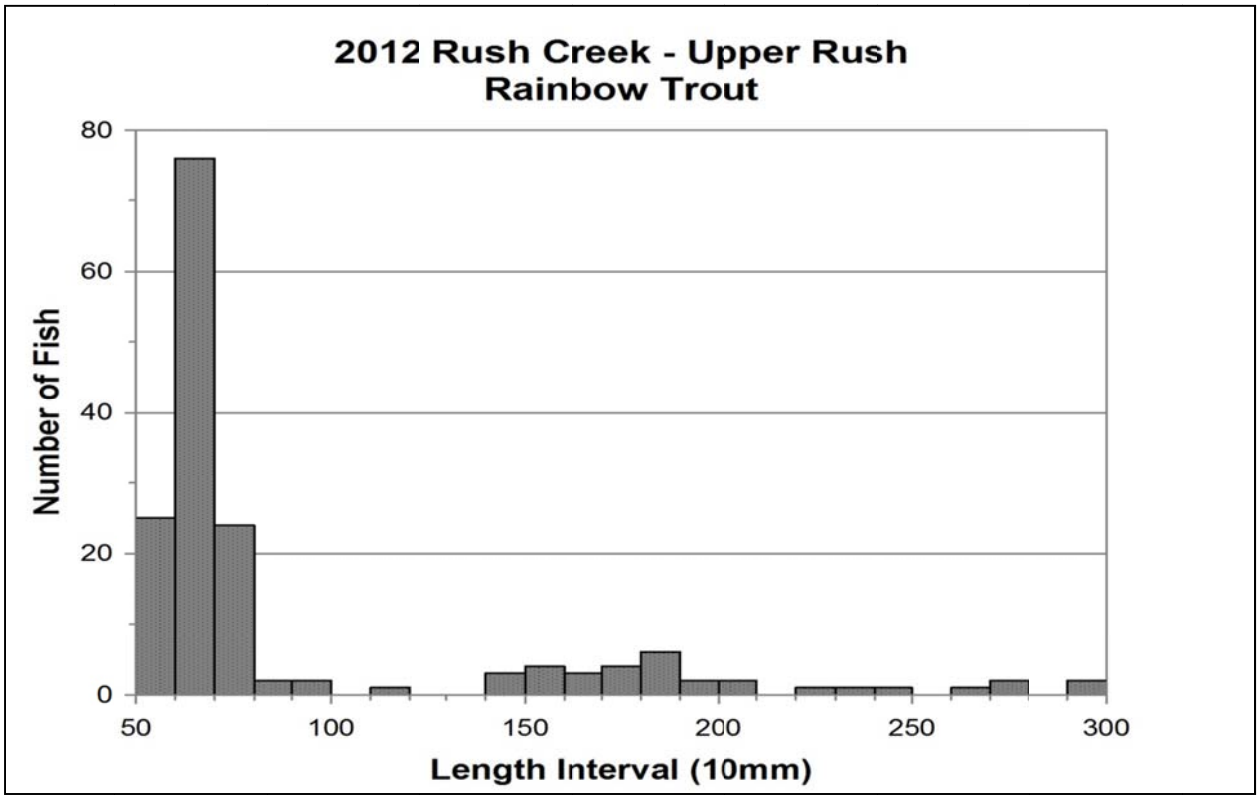

Figure 6. Length-frequency histogram for Upper Rush captured rainbow trout, September 7th and 14th, 2012.

Within the Bottomlands section of Rush Creek a total of 903 brown trout were captured (Table 3) which ranged in size from 60 mm to 306 mm in 2012 (Figure 7). Age-0 brown trout comprised 47% of the total catch this year. The Bottomlands supported an estimated 843 age-0 brown trout in 2012 while it supported 785 in 2011. Standard error on age-0 brown trout was 8% of the estimate vs. 11% in 2011.

Brown trout 125-199 mm in length comprised 41% of the total catch in the Bottomlands section. This section supported an estimated 460 brown trout 125-199 mm in length in 2012 compared to 304 brown trout in 2011. Standard error for this size class was 3% vs. 7% in 2011.

Brown trout 200 mm and greater comprised of 10% of the total catch in 2012 with the largest trout 306 mm in length. The Bottomlands supported an estimated 99 brown

trout greater than 200 mm in 2012 compared to 105 trout in 2011. Standard error for this size class was 4% vs. 6% in 2011.

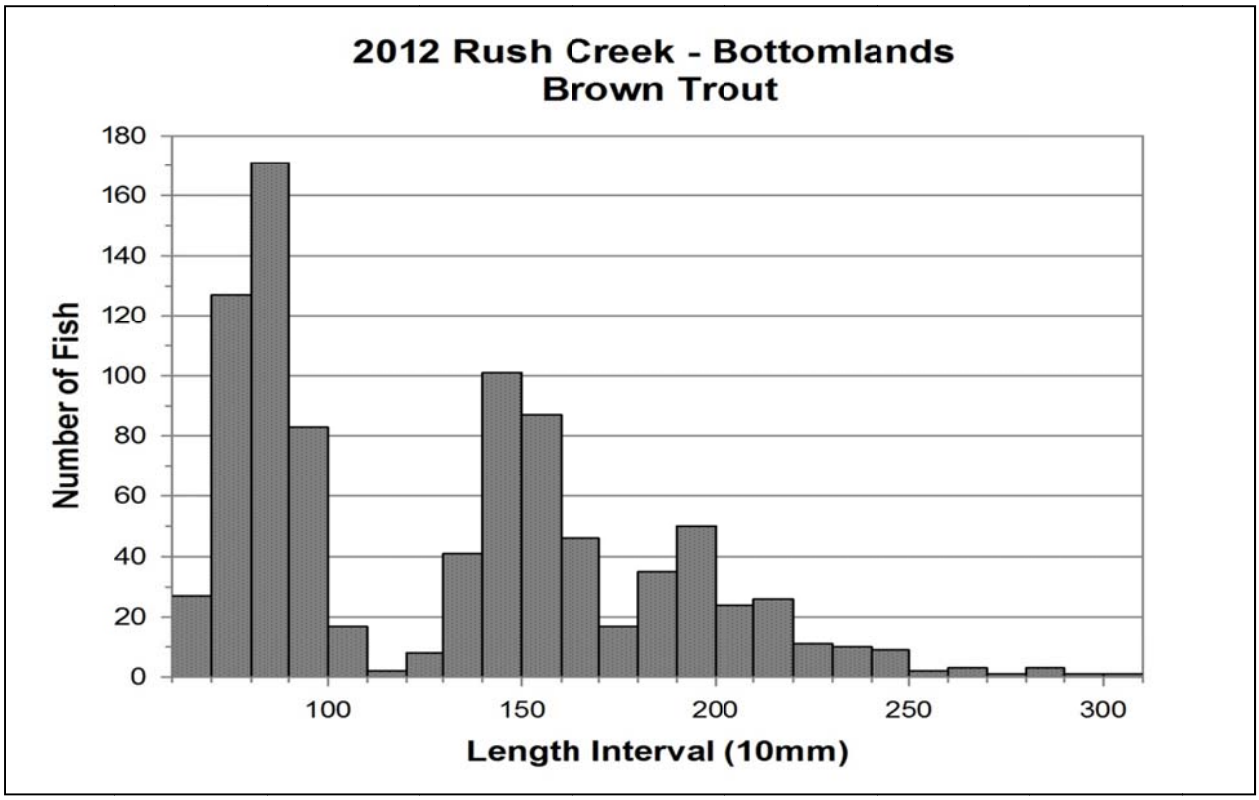

Figure 7. Length-frequency histogram of captured brown trout in the Bottomlands section of Rush Creek, September 8th and 15th, 2012.

A total of 24 rainbow trout ranging in size from 47 mm to 183 mm were captured on the Bottomlands section (Table 3), representing 2% of the total catch (Figure 8). Of the 24 rainbow trout caught, 13 were age-0. No population estimate was generated for rainbow trout for this section due to an insufficient number of recaptures.

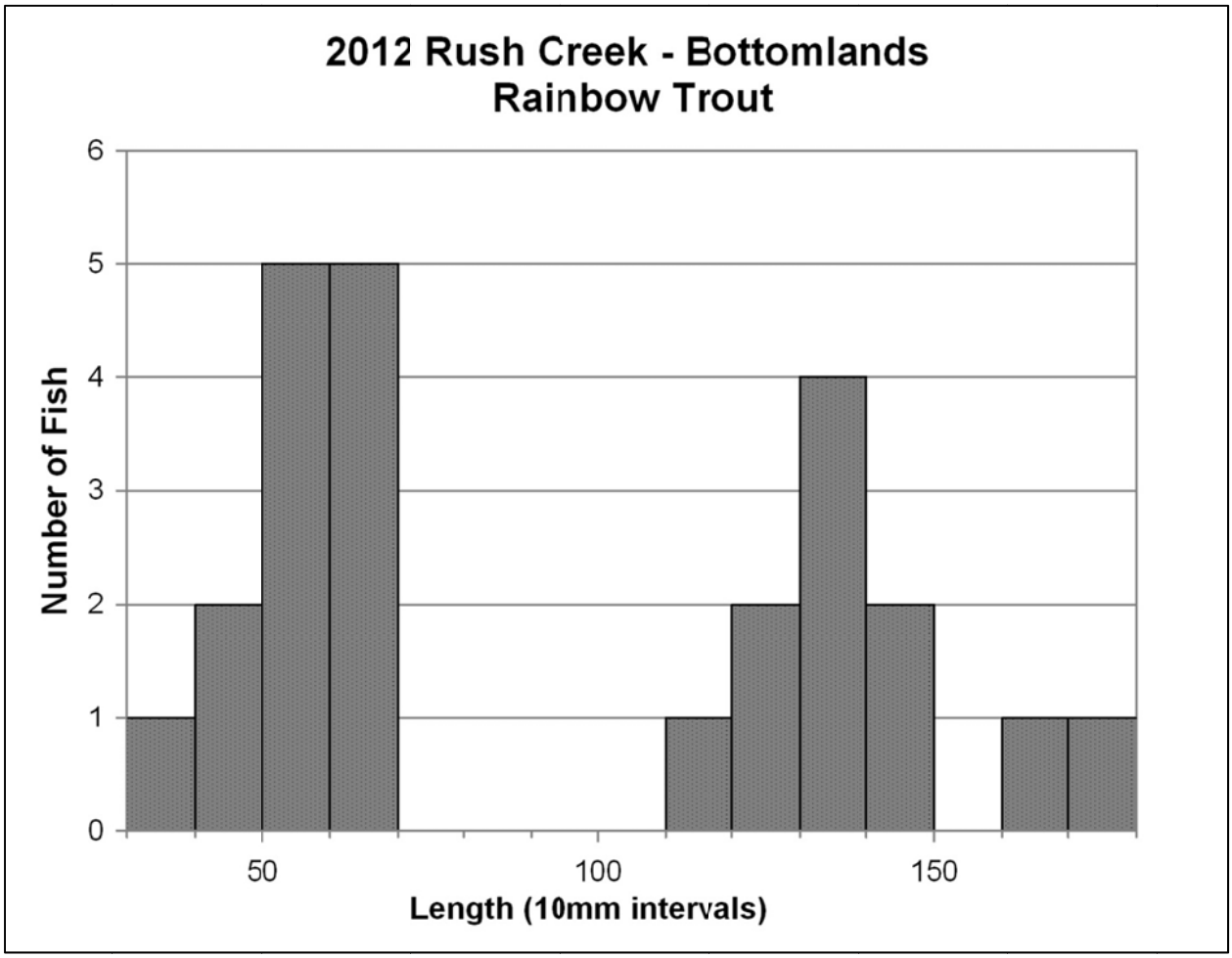

Figure 8. Length-frequency histogram of captured rainbow trout in the Bottomlands section of Rush Creek, September 8th and 15th, 2012.

Within the County Road section of Rush Creek a total of 804 brown trout were captured in 2012 (Table 3) ranging in size from 58 mm to 300 mm (Figure 9). Young of the year (age-0) brown trout comprised 54% of the total number of trout captured. County Road age-0 trout ranged in size from 58 mm to 123 mm and supported estimated 687 age-0 brown trout in 2012 compared to an estimated 597 age-0 brown trout in 2011. The standard error on the age-0 brown trout estimate was 5% in 2012 vs. 8% in 2011.

Brown trout 125-199 mm comprised 36% of the total catch in the County Road section. This section supported an estimated 381 brown trout 125-199 mm in 2012 compared to 267 trout in 2011. Standard error for this size class was 4% of the estimate in 2012 compared to 6% in 2011.

Brown trout 200 mm and greater only comprised of 6% of the total catch in 2012 with the largest trout reaching 300 mm. County Road supported an estimated 70 brown trout greater than 200 mm. Standard error for this size class was 16% of the estimate vs. 8% in 2011.

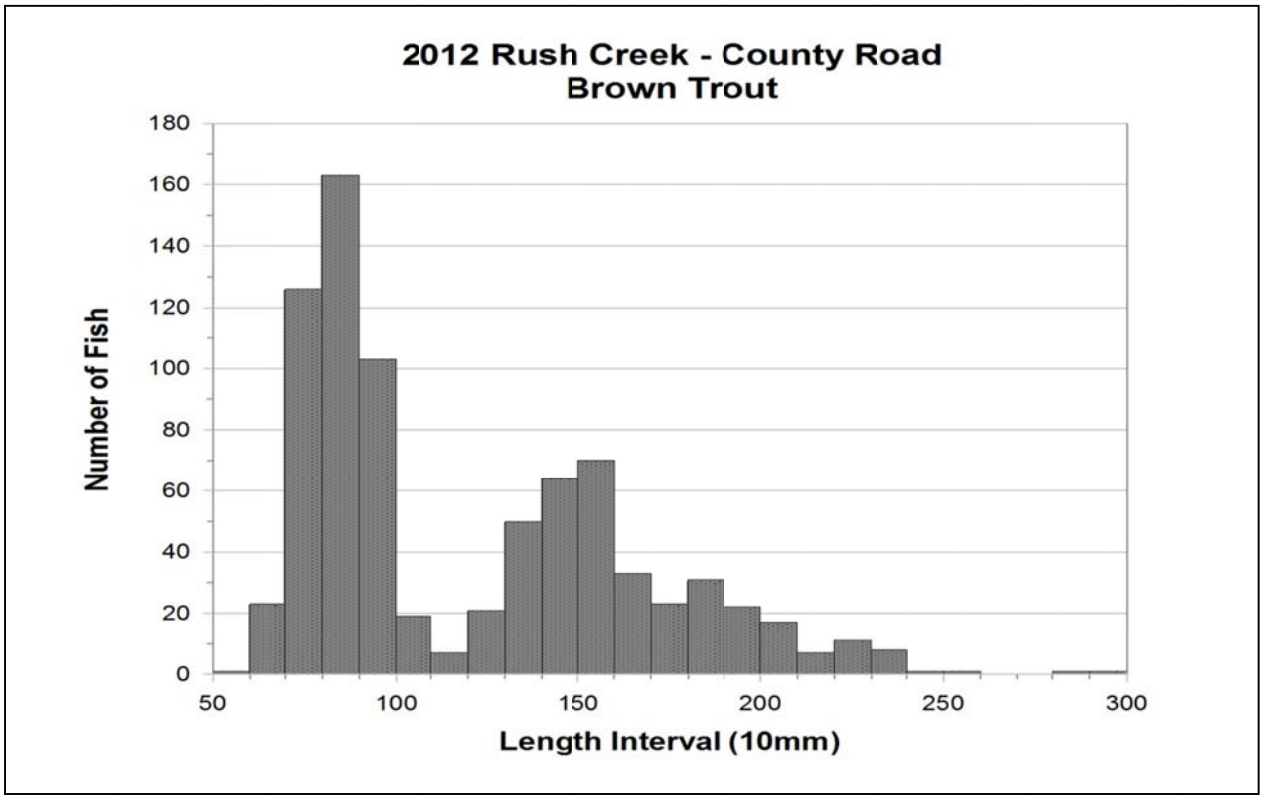

Figure 9. Length-frequency histogram of captured brown trout in the County Road section of Rush Creek, September 9th and 16th, 2012.

A total of 27 rainbow trout were caught in 2012 on the County Road section (Table 3) ranging in size from 46 mm to 175 mm accounting of only three percent of the total trout caught (Figure 10). This section supported an estimated 19 rainbow trout 125-199 mm in 2012. Standard error for this size class was 11% of the estimate. No population estimates were generated for rainbow trout in the 0-124 mm and 200+ mm size classes due to insufficient number of recaptures.

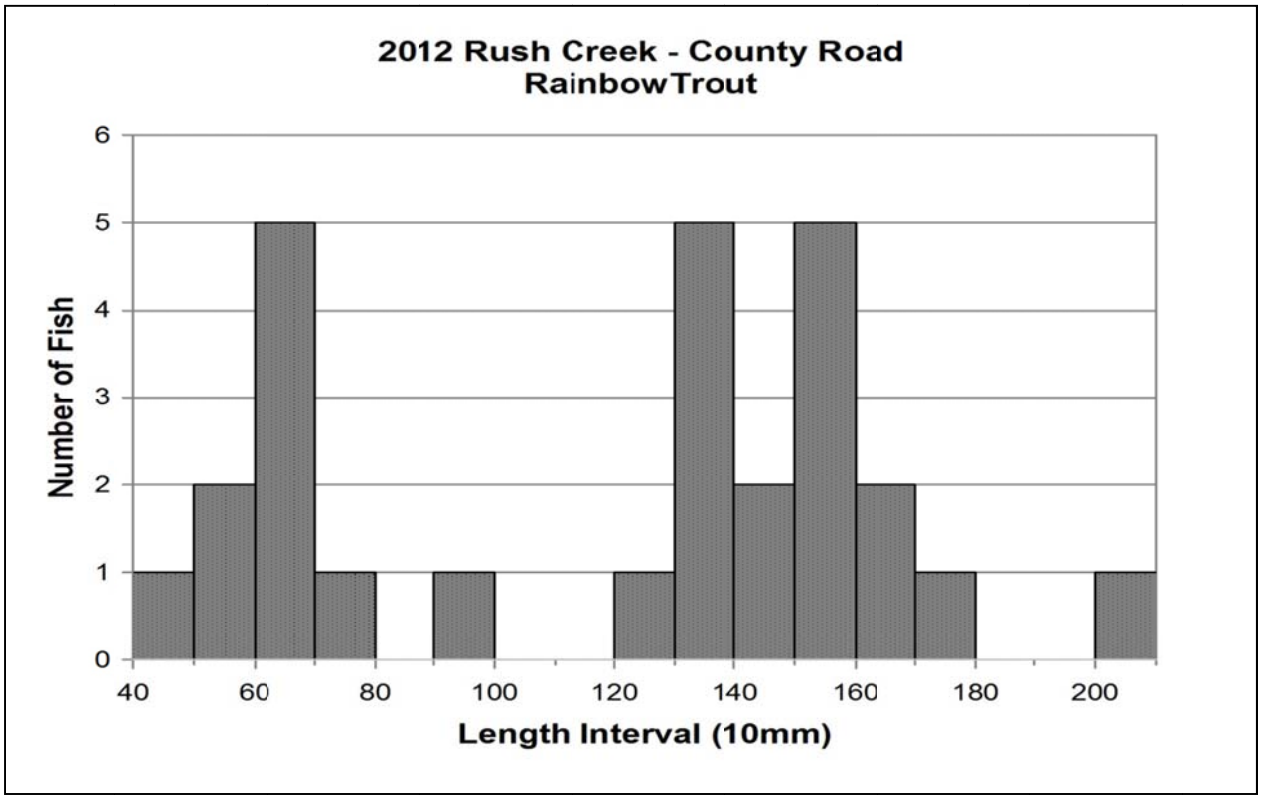

Figure 10. Length-frequency histogram of captured rainbow trout in the County Road section of Rush Creek, September 9th and 16th, 2012.

In 2012, a total of 924 brown trout were captured in the MGORD (Table 3) ranging in size from 56 to 468 mm (Figure 11). A total of 229 age-0 brown trout were captured in the MGORD which comprised 24% of the total catch. There were insufficient numbers of recaptures to generate a valid estimate of age-0 brown trout.

Brown trout 125-199 mm in length comprised 10% of the total catch on the MGORD in 2012. The MGORD supported an estimated 194 brown trout 125-199 mm in length. Standard error for this size class was 18% of the estimate.

Brown trout 200 mm and greater comprised 62% of the total catch on the MGORD in 2012. The MGORD supported an estimated 873 brown trout greater that 200 mm. Standard error for this size class was 4% of the estimate.

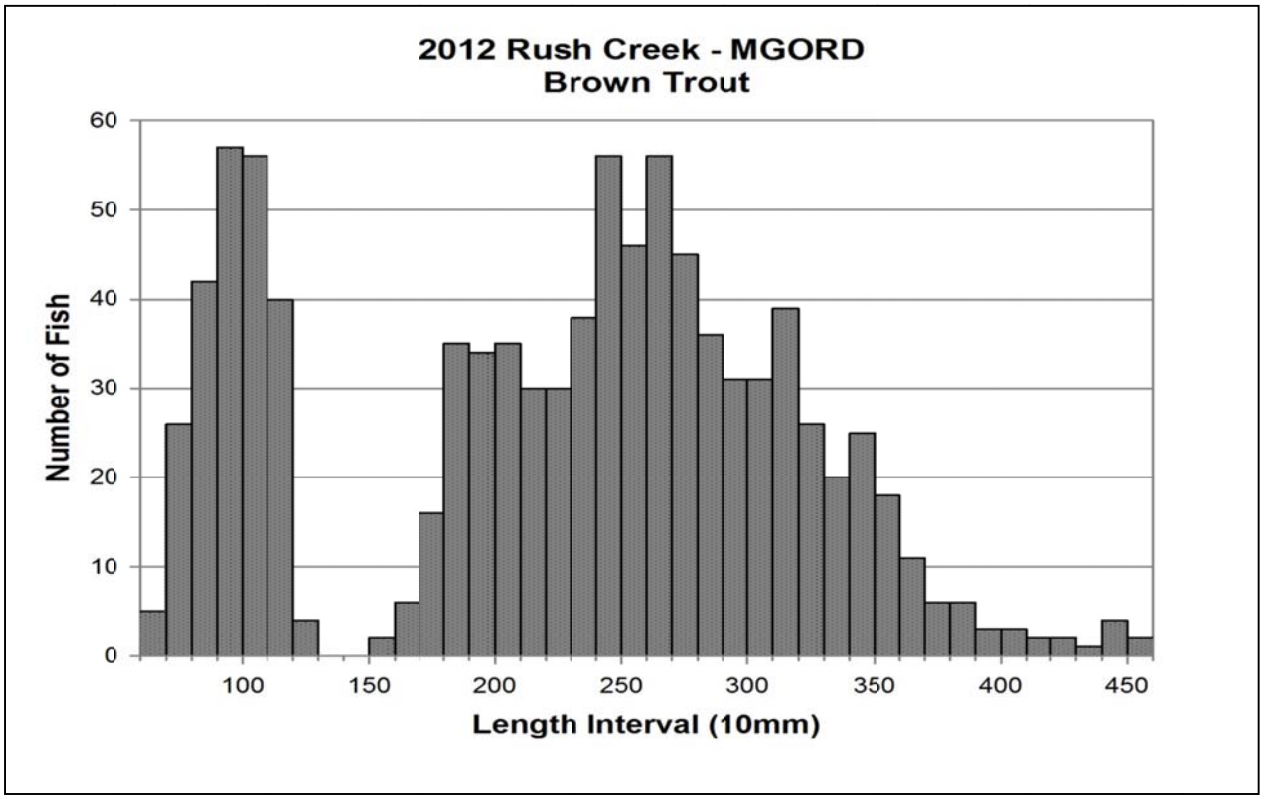

Figure 11. Length-frequency histogram of captured brown trout in the MGORD section of Rush Creek, September 10th and 17th, 2012.

A total of 40 rainbow trout were captured on the MGORD (Table 3). Of the 40 rainbow trout 13 were age-0. The 40 rainbow trout ranged in size from 70 mm to 319 mm (Figure 12). There were too few recaptures to generate estimates for any size class on the MGORD.

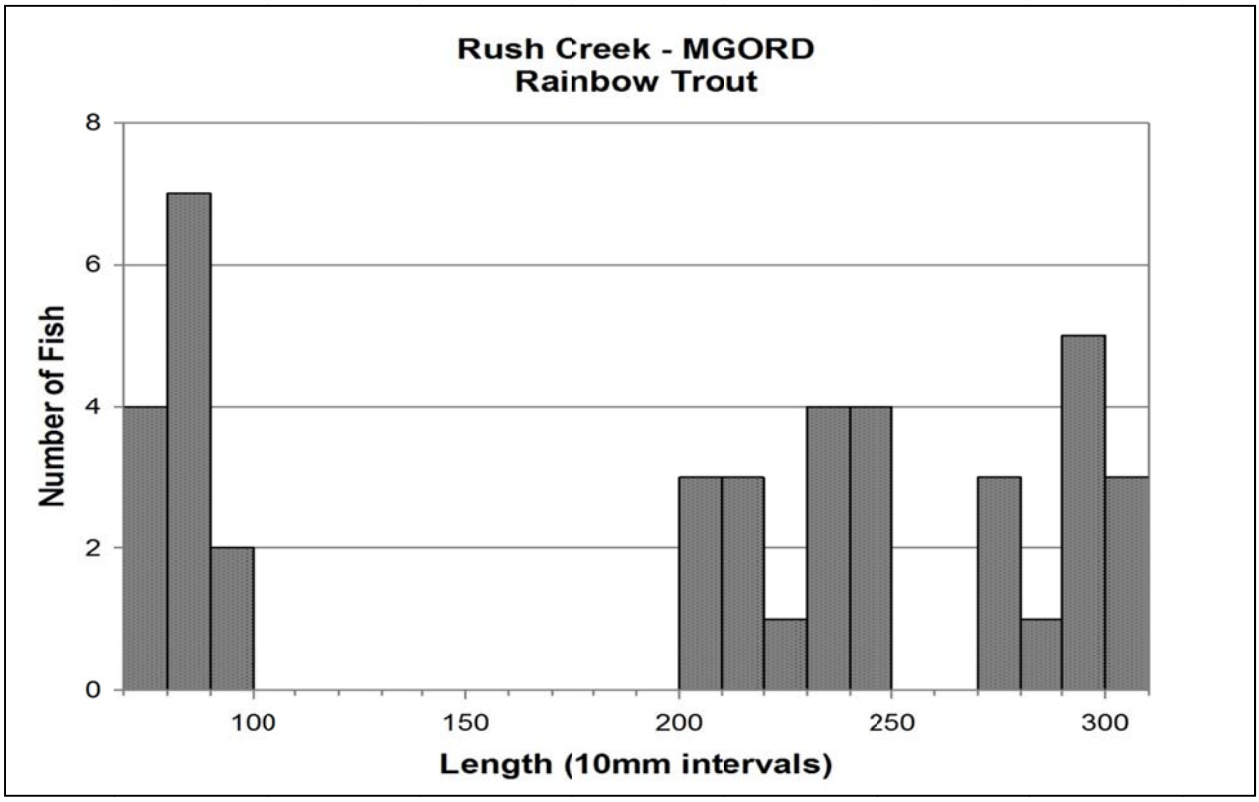

Figure 12. Length-frequency histogram of captured rainbow trout in the MGORD section of Rush Creek, September 10 and 17, 2012.

Lee Vining Creek

A total of 762 trout were captured in the Lee Vining Creek main channel section (Table 3). Of the 762 trout captured, 527 were brown trout making up 69% of the total trout captured. Brown trout ranged in size from 62 mm to 321 mm (Figure 13). Age-0 brown trout comprised 56% of the total catch this year. Lee Vining Creek's main channel section supported an estimated 677 age-0 brown trout in 2012 while it supported 92 trout in 2011. Standard error on age-0 brown trout was 6% of the estimate vs. 2011's 13%.

Brown trout 125-199 mm in length comprised 8% of the total catch in Lee Vining Creek's main channel section. This section supported an estimated 73 brown trout 125-199 mm in length in 2012 compared to 28 brown trout in 2011. Standard error for this size class was 8% of the estimate compared to 2011's 9%.

Brown trout 200 mm and greater comprised of 5% of the total catch in 2012. Lee Vining Creek's main channel supported an estimated 47 brown trout greater that 200 mm. Standard error for this size class was 6% of the estimate vs. 4% in 2011.

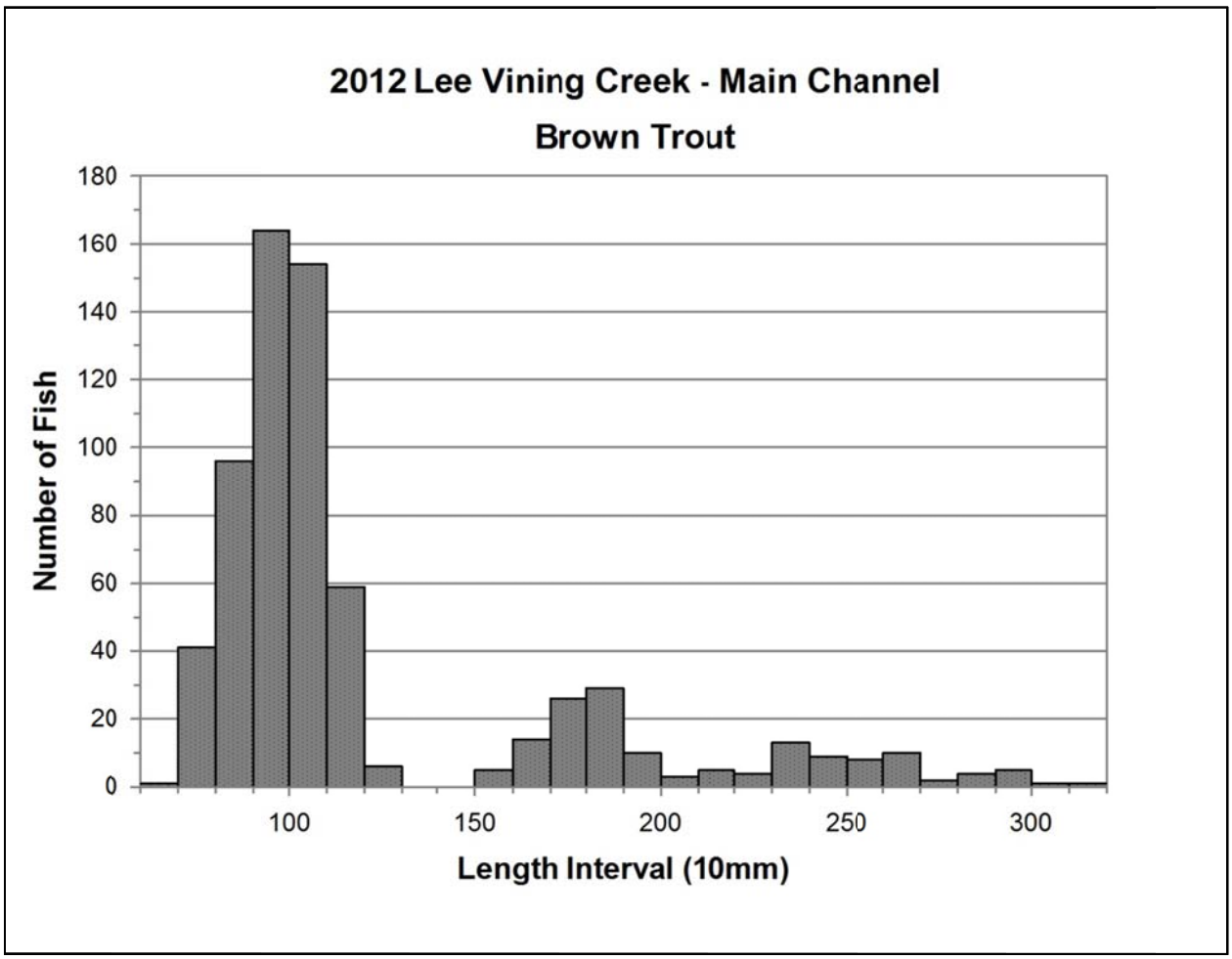

Figure 13. Length-frequency histogram of captured brown trout in the main channel section of Lee Vining Creek, September 11th and 18th, 2012.

A total of 235 rainbow trout were captured in Lee Vining's main channel making up approximately 31% of the total catch in 2012 (Table 3). Rainbow trout ranged in size from 51 mm to 250 mm (Figure 14). Of the 235 rainbow trout captured 226 were age-0. The age-0 estimate in the main channel was 306 rainbow trout and standard error was 6% of the estimate.

Rainbow trout 125-199 mm in length made up <1% of the total catch in 2012. There were insufficient numbers of recaptures to calculate a population estimate for this size class.

Rainbow trout in Lee Vining Creek's main channel, >200 mm made up <1% of the total catch in 2012. There were insufficient numbers of recaptures to produce a population estimate for this size class.

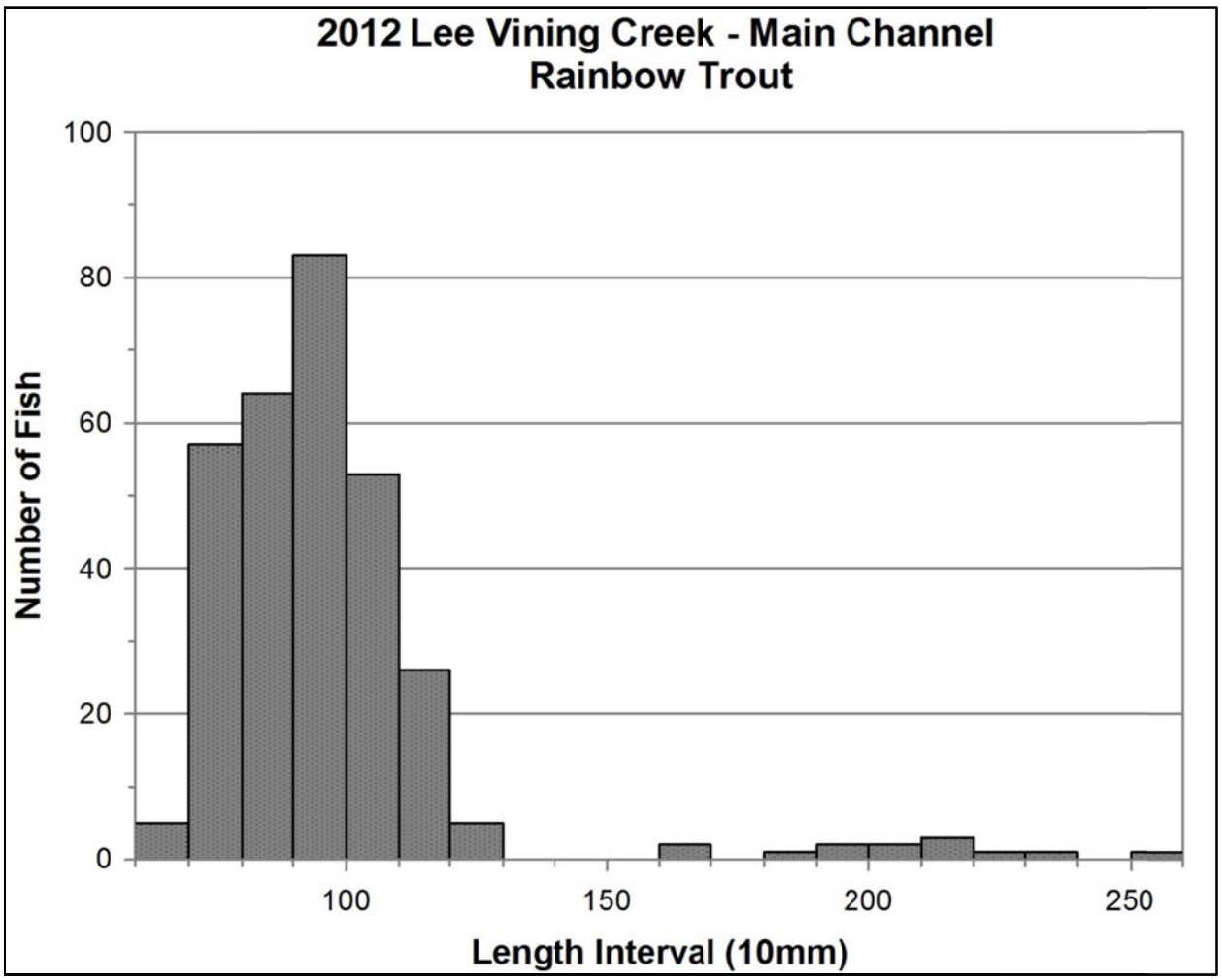

Figure 14. Length-frequency histogram of captured rainbow trout in the main channel section of Lee Vining Creek, September 11th and 18th, 2012.

In the Lee Vining Creek side channel 45 brown trout were captured in two electro-fishing passes (Table 3). Of the 45 trout captured, 23 or 51% were age-0 trout that ranged in size from 55 mm to 123 mm (Figure 15). The age-0 estimate was 24 brown trout and standard error was 8% of the estimate.

Brown trout 125-199 mm in length made up 36% of the total catch in 2012. The estimate for this size class was 16 brown trout and standard error was 4% of the estimate (Table 3).

A total of six brown trout 200 mm and greater were captured in the first passes and ranged in size from 201 mm to 281 mm (Figure 15). The population of brown trout 200 mm and greater was six brown trout.

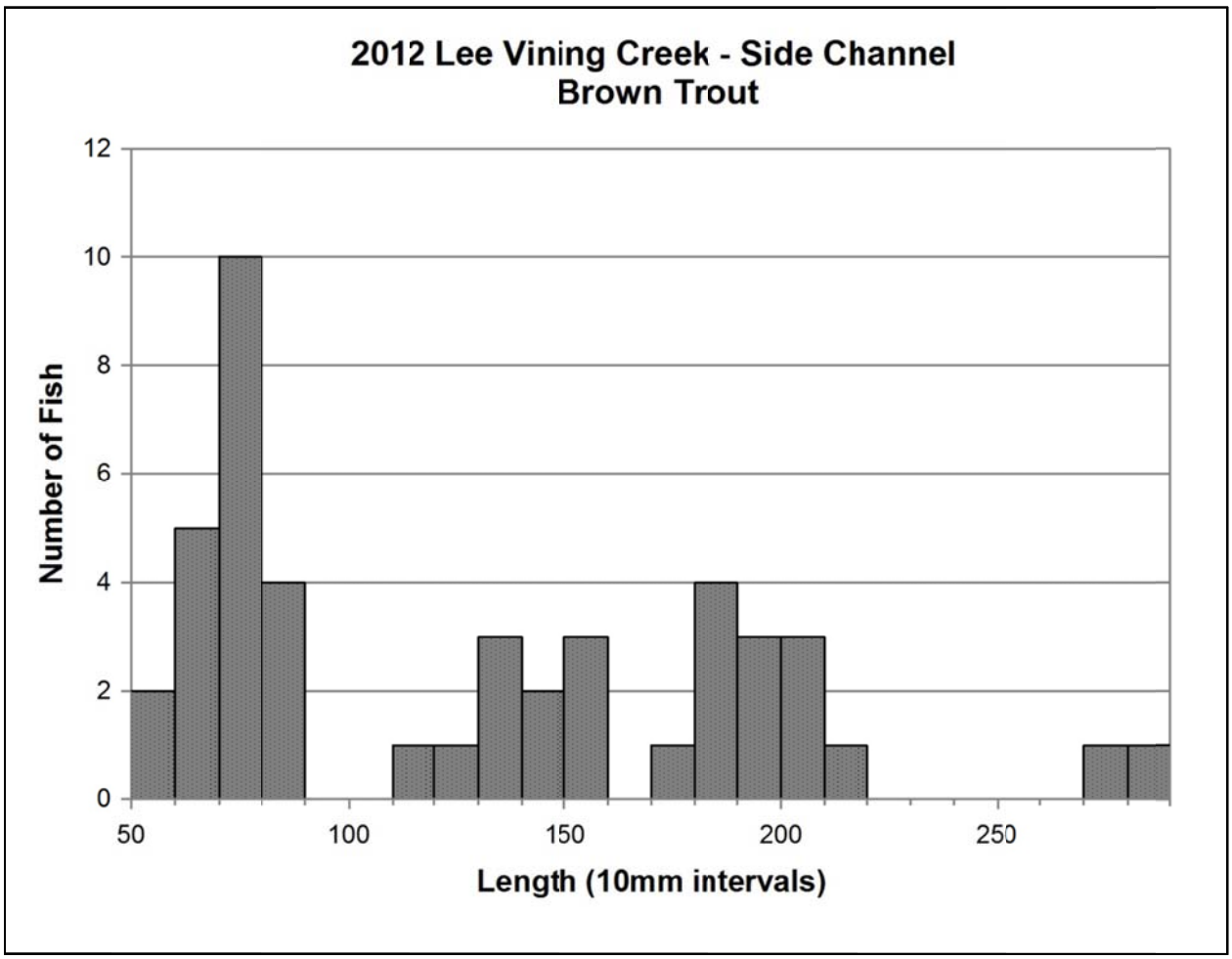

Figure 15. Length-frequency histogram of captured brown trout in the side channel section of Lee Vining Creek, September 11th, 2012.

No rainbow trout were captured in the Lee Vining Creek side channel in 2012 (Table 4). This was the fourth consecutive year that no age-0 rainbow trout were captured in the Lee Vining Creek side channel.

Walker Creek

A total of 296 brown trout were captured in two electro-fishing passes on the Walker Creek section (Table 4). Of the 296 brown trout, 225 trout or 76% were age-0 ranging in size from 61 mm to 111 mm (Figure 16). The age-0 brown trout estimate for Walker Creek was 231 trout with a standard error of 2% of the estimate.

Brown trout 125-199 mm accounted for 15% of the total catch in 2012. The population estimate for brown trout 125-199 mm was 43 trout with a standard error of <1% of the estimate.

Brown trout greater than 200 mm accounted for 9% of the total catch. The population estimate for this size class was 28 brown trout with a standard error of 1% of the

estimate. The largest brown trout captured on Walker Creek in 2012 was 262 mm in length (Figure 16).

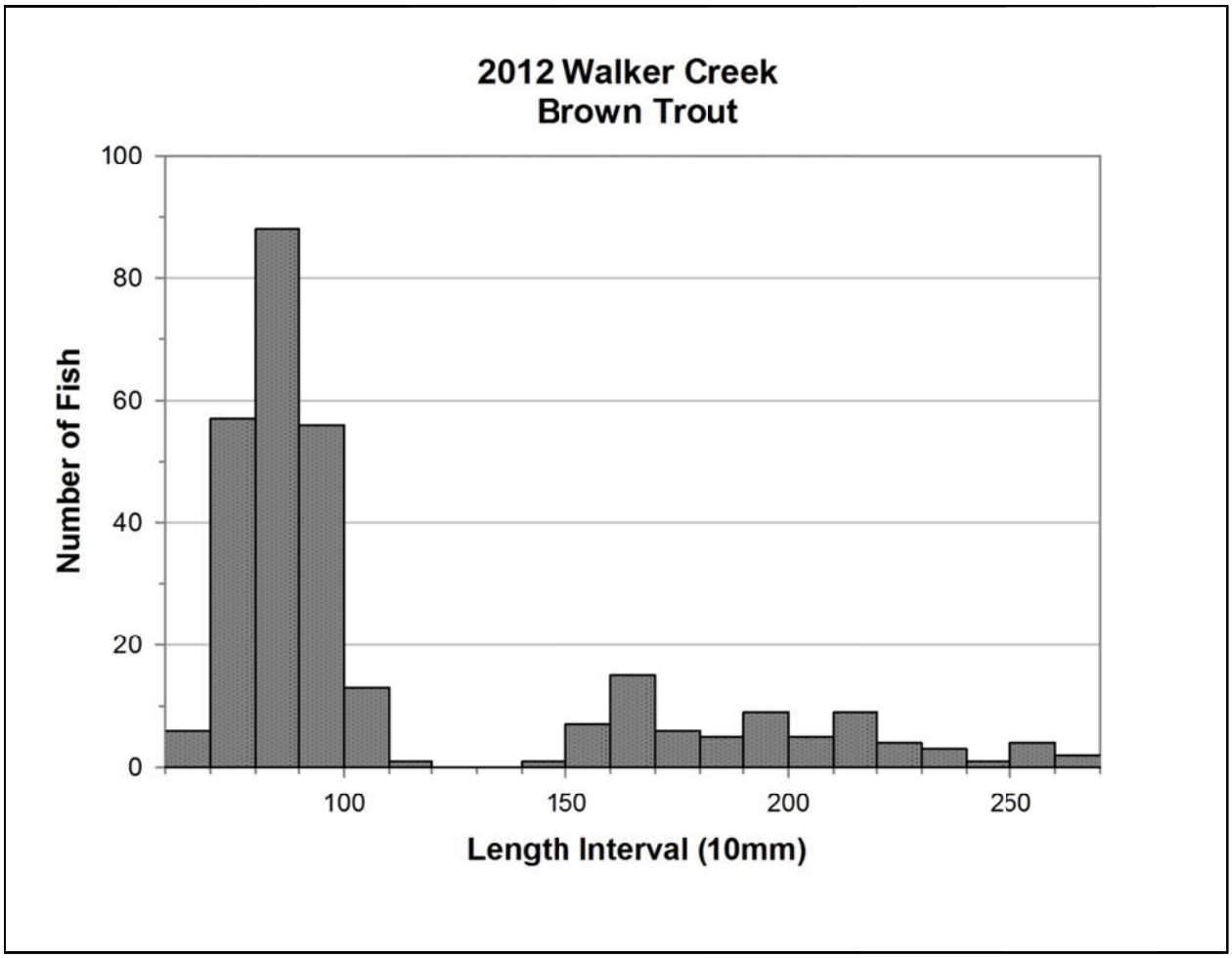

Figure 16. Length-frequency histogram of captured brown trout in Walker Creek, September 12th, 2012.

Table 4. Depletion estimates made in the Lower side channel section of Lee Vining Creek and Walker Creek during September 2012 showing number of trout captured in each pass, estimated number, probability of capture (P.C.) by species and size class.

Stream - Section Date **Species**	Size Class (mm)	Removals	Removal Pattern	**Estimate**	P.C.
Lee Vining Creek- Side Channel-9/11/2012					
Brown Trout					
	0 - 124 mm	2	18 5	**24**	0.77
	125 - 199 mm	2	14 2	**16**	0.90
	200 + mm	2	6 0	**6**	1.00
Rainbow Trout					
	0 - 124 mm	2	0 0	**0**	0.0
	125 - 199 mm	2	0 0	**0**	0.0
	200 + mm	2	0 0	**0**	0.0
Walker Creek - above old Hwy 395 - 9/12/2012					
Brown Trout					
	0 - 124 mm	2	192 33	**231**	0.83
	125 - 199 mm	2	42 1	**43**	0.97
	200 + mm	2	27 1	**28**	0.96

Catch of Rainbow Trout in Rush and Lee Vining Creeks

Beginning with the 2008 annual report rainbow trout numbers have only been reported for Rush Creek This decision was made because rainbow trout usually accounted for <5% of the total catch in Rush Creek. In 2011 GLR spilled carrying rainbow trout out of the reservoir resulting in rainbow trout accounting for 8% of the total catch in 2011, the highest ever sampled in Rush Creek. In 2012, rainbow trout once again accounted for 5% of the total catch in Rush Creek. Although there were only 10 fewer rainbow trout captured in 2012 compared to 2011 the total number of trout in Rush Creek captured increased from 3,352 trout in 2011 to 4,697 in 2012 thus driving down the catch of rainbow trout.

Rainbow trout numbers in Lee Vining Creek have been variable over the last 13 years. Sufficient numbers of age-0 rainbow trout were captured in the main channel to generate population estimates for six of the 12 years sampled (Table 5). Adequate numbers of age-1 and older rainbow trout were captured in the main channel to generate population estimates four of the 12 years sampled (Table 6). The side

channel produced enough numbers of age-0 and age-1 and older rainbow trout to generate population estimates for eight of the 13 years sampled (Tables 7-8).

Due to rainbow trout encompassing a large portion of the Lee Vining Creek fishery, an effort has been made to generate density and biomass values using all data available. In years when adequate numbers of rainbows have been captured statistically valid density and biomass estimates have been generated. In year when less than adequate numbers of rainbow trout have been captured, catch numbers have been used to generate density and biomass estimates. While catch numbers are not statistically valid they are consistently lower than statistically valid estimates and allow for comparison between years (Tables 5-8).

Table 5. Numbers of age-0 rainbow trout caught in Lee Vining Creek main channel section, 2000-2012.

Sample Year	Area of Sample Section (Ha)	Number of Trout on Marking Run	Number of Trout on Capture Run	Number of Recap Trout	Pop Estimate	Estimated Number of Trout per Hectare	Number of Trout Caught (Catch)	Catch per Hectare
2012	**0.1279**	**144**	**138**	**67**	**306**	**2,393**	**226**	**1,773**
2011	0.1428	1	0	0	NP	NP	1	7
2010	0.1505	0	0	0	0	0	0	0
2009	0.1505	4	4	0	NP	NP	8	53
2008	0.1377	17	31	9	57	414	39	283
2007	0.0884	42	56	22	106	1,199	76	860
2006	NS*	--	--	--	--	--	--	--
2005	0.0744	0	0	0	0	0	0	0
2004	0.0744	1	0	0	NP	NP	1	13
2003	0.0744	0	0	0	0	0	0	0
2002	0.0744	0	1	0	NP	NP	1	13
2001	0.0898	3	5	1	NP	NP	7	78
2000	0.0898	0	1	0	NP	NP	1	22

*NS stands for not sampled due to high flows

Table 6. Numbers of age-1 and older rainbow trout caught in Lee Vining Creek main channel section, 2000-2012.

Sample Year	Area of Sample Section (Ha)	Number of Trout on Marking Run	Number of Trout on Capture Run	Number of Recap Trout	Pop Estimate	Estimated Number of Trout per Hectare	Number of Trout Caught (Catch)	Catch per Hectare
2012	**0.1279**	**7**	**7**	**5**	**NP**	**NP**	**9**	**71**
2011	0.1428	5	8	5	NP	NP	8	56
2010	0.1505	12	9	7	15	100	14	93
2009	0.1505	39	32	12	98	651	59	392
2008	0.1377	71	64	37	129	936	98	712
2007	0.0884	3	5	1	NP	NP	7	79
2006	NS*	--	--	--	--	--	--	--
2005	0.0744	3	3	0	NP	NP	6	81
2004	0.0744	2	2	2	NP	NP	2	27
2003	0.0744	5	6	5	NP	NP	6	81
2002	0.0744	10	10	7	14	188	13	175
2001	0.0898	9	8	4	NP	NP	13	145
2000	0.0898	1	3	0	NP	NP	4	45

*NS stands for not sampled due to high flows

Table 7. Numbers of age-0 rainbow trout caught in Lee Vining Creek side channel section, 2000-2012.

Sample Year	Area of Sample Section (Ha)	Number of Trout Caught on Pass #1	Number of Trout Caught on Pass #2	Number of Trout Caught on Pass #3	Pop Estimate	Estimated Number of Trout per Hectare	Number of Trout Caught (Catch)	Catch per Hectare
2012	**0.0365**	**0**	**0**	**--**	**0**	**0**	**0**	**0**
2011	0.0507	0	0	--	0	0	0	0
2010	0.0507	0	0	--	0	0	0	0
2009	0.0488	0	0	--	0	0	0	0
2008	0.0488	5	2	--	7	143	7	143
2007	0.0488	4	0	--	NP	NP	4	82
2006	0.0761	46	26	--	100	1,314	72	946
2005	0.0936	0	0	--	0	0	0	0
2004	0.0936	82	30	--	127	1,357	112	1,197
2003	0.0936	0	0	--	0	0	0	0
2002	0.0936	28	17	--	64	684	45	481
2001	0.1310	69	23	--	102	779	92	702
2000	0.0945	32	15	--	57	603	47	497

Table 8. Numbers of age-1 and older rainbow trout caught in Lee Vining Creek side channel section, 2000-2012.

Sample Year	Area of Sample Section (Ha)	Number of Trout Caught on Pass #1	Number of Trout Caught on Pass #2	Number of Trout Caught on Pass #3	Pop Estimate	Estimated Number of Trout per Hectare	Number of Trout Caught (Catch)	Catch per Hectare
2012	**0.0365**	**0**	**0**	**--**	**0**	**0**	**0**	**0**
2011	0.0507	0	0	--	0	0	0	0
2010	0.0507	1	0	--	1	20	1	20
2009	0.0488	15	0	--	15	307	15	307
2008	0.0488	3	1	--	4	82	4	82
2007	0.0488	6	0	--	NP	NP	6	123
2006	0.0761	5	0	--	NP	NP	5	66
2005	0.0936	7	2	--	9	96	9	96
2004	0.0936	5	0	--	NP	NP	5	53
2003	0.0936	13	0	--	NP	NP	13	139
2002	0.0936	29	4	--	33	353	33	353
2001	0.1310	38	3	--	41	313	41	313
2000	0.0945	9	0	--	NP	NP	9	95

Relative Condition of Brown Trout

After Log_{10} transformations were performed on the lengths and weights of captured brown trout ≥ 100 mm, a simple linear regression analysis was then preformed. All sections had r^2 values 0.98 or greater, indicating that length was strongly correlated with weight (Table 9).

Table 9. Regression statistics for log_{10} transformed length (L) to weight (WT) for brown trout 100 mm and longer captured in Rush Creek by sample section and year. The 2012 regression equations are in bold type.

Section	Year	N	Equation	r^2	P
County Road	**2012**	**388**	**$Log_{10}(WT) = 2.8297*Log_{10}(L) – 4.6518$**	**0.98**	**<0.01**
	2011	298	$Log_{10}(WT) = 2.950*Log_{10}(L) – 4.9137$	0.99	<0.01
	2010	375	$Log_{10}(WT) = 3.014*Log_{10}(L) – 5.044$	0.99	<0.01
	2009	456	$Log_{10}(WT) = 2.994*Log_{10}(L) – 4.898$	0.99	<0.01
	2008	398	$Log_{10}(WT) = 2.794*Log_{10}(L) – 4.585$	0.99	<0.01
	2007	912	$Log_{10}(WT) = 2.789*Log_{10}(L) – 4.565$	0.98	<0.01
	2006	373	$Log_{10}(WT) = 3.00*Log_{10}(L) – 5.00$	0.99	<0.01
	2005	257	$Log_{10}(WT) = 2.97*Log_{10}(L) – 4.90$	0.98	<0.01
	2004	655	$Log_{10}(WT) = 2.97*Log_{10}(L) – 4.94$	0.99	<0.01
	2003	933	$Log_{10}(WT) = 3.00*Log_{10}(L) – 5.01$	0.99	<0.01
	2002	476	$Log_{10}(WT) = 2.95*Log_{10}(L) – 4.88$	0.99	< 0.01
	2001	552	$Log_{10}(WT) = 2.91*Log_{10}(L) – 4.81$	0.98	< 0.01
	2000	412	$Log_{10}(WT) = 2.94*Log_{10}(L) – 4.83$	0.99	< 0.01
Bottomlands	**2012**	**495**	**$Log_{10}(WT) = 2.8149*Log_{10}(L) – 4.6206$**	**0.98**	**<0.01**
	2011	361	$Log_{10}(WT) = 2.926*Log_{10}(L) – 4.858$	0.99	<0.01
	2010	425	$Log_{10}(WT) = 2.999*Log_{10}(L) – 5.005$	0.99	<0.01
	2009	511	$Log_{10}(WT) = 2.920*Log_{10}(L) – 4.821$	0.99	<0.01
	2008	611	$Log_{10}(WT) = 2.773*Log_{10}(L) – 4.524$	0.99	<0.01
Upper Rush	**2012**	**554**	**$Log_{10}(WT) = 2.8693*Log_{10}(L) – 4.721$**	**0.99**	**<0.01**
	2011	547	$Log_{10}(WT) = 3.006*Log_{10}(L) – 5.014$	0.99	<0.01
	2010	420	$Log_{10}(WT) = 2.995*Log_{10}(L) – 4.994$	0.99	<0.01
	2009	612	$Log_{10}(WT) = 2.941*Log_{10}(L) – 4.855$	0.99	<0.01
	2008	594	$Log_{10}(WT) = 2.967*Log_{10}(L) – 4.937$	0.99	<0.01
	2007	436	$Log_{10}(WT) = 2.867*Log_{10}(L) – 4.715$	0.99	<0.01

Table 9 (continued).

Section	Year	N	Equation	R^2	P
	2006	485	$Log_{10}(WT) = 2.99*Log_{10}(L) – 4.98$	0.99	<0.01
	2005	261	$Log_{10}(WT) = 3.02*Log_{10}(L) – 5.02$	0.99	<0.01
	2004	400	$Log_{10}(WT) = 2.97*Log_{10}(L) – 4.94$	0.99	<0.01
	2003	569	$Log_{10}(WT) = 2.96*Log_{10}(L) – 4.89$	0.99	<0.01
	2002	373	$Log_{10}(WT) = 2.94*Log_{10}(L) – 4.86$	0.99	< 0.01
	2001	335	$Log_{10}(WT) = 2.99*Log_{10}(L) – 4.96$	0.99	< 0.01
	2000	309	$Log_{10}(WT) = 3.00*Log_{10}(L) – 4.96$	0.98	< 0.01
	1999	317	$Log_{10}(WT) = 2.93*Log_{10}(L) – 4.84$	0.98	< 0.01
MGORD	**2012**	**795**	**$Log_{10}(WT) = 2..9048*Log_{10}(L) – 4.808$**	**0.99**	**<0.01**
	2011	218	$Log_{10}(WT) = 2.917*Log_{10}(L) – 4.823$	0.98	<0.01
	2010	694	$Log_{10}(WT) = 2.892*Log_{10}(L) – 4.756$	0.98	<0.01
	2009	689	$Log_{10}(WT) = 2.974*Log_{10}(L) – 4.933$	0.99	<0.01
	2008	862	$Log_{10}(WT) = 2.827*Log_{10}(L) – 4.602$	0.98	<0.01
	2007	643	$Log_{10}(WT) = 2.914*Log_{10}(L) – 4.825$	0.98	<0.01
	2006	593	$Log_{10}(WT) = 2.956*Log_{10}(L) – 4.872$	0.98	<0.01
	2004	449	$Log_{10}(WT) = 2.984*Log_{10}(L) – 4.973$	0.99	<0.01
	2001	769	$Log_{10}(WT) = 2.873*Log_{10}(L) – 4.719$	0.99	<0.01
	2000	82	$Log_{10}(WT) = 2.909*Log_{10}(L) – 4.733$	0.98	<0.01

Relative condition factors of brown trout 150 to 250 mm in length decreased in all sections from 2011 (Figure 17).

The Upper Rush section had a condition factor of 0.98 in 2012, a decrease from 1.00 in 2011. The lowest condition factor value in the sampling history was in 2007 at 0.96 followed by a condition factor value of 0.98 which also occurred in 2008, 2010.

In 2012, the Bottomlands section had a condition factor of 0.92 which tied 2008 for the lowest condition factor. Like the County Road section, 2012 was the third straight decrease in condition factor on the Bottomlands section since 2009's value of 0.99.

Relative condition factor in the County Road section in 2012 was 0.93. The 2012 value was the third lowest condition factor behind years 2007 and 2008. It was also the third straight decrease in condition factor since 2009's value of 1.00.

The MGORD's 2012 value of 0.96 was the lowest condition value in the sampling history and the third straight decrease from 2009's 1.02.

In 2012, Lee Vining Creek's main channel had the lowest condition factor in sampling history at 1.00. Although 2012's condition factor was the lowest in sampling history, a value of 1.00 is still considered average. Rainbow trout 150 to 250 mm in length in the main channel had a condition factor of 1.12 and are considered to be above average (Figure 17). Rainbow trout in 2012 once again had a better condition factor than the brown trout in the main channel of Lee Vining Creek (Figure 18).

In 2012, brown trout in Lee Vining Creek's side channel had the lowest condition factor in sampling history at 0.83. This was the first year in the 13 years of sampling the side channel that the condition factor has dropped below 1.00. For the fourth year in a row, no rainbow trout were captured in the side channel.

Walker Creek brown trout had a condition factor of 1.01 in 2012 a slight decrease from 2011's 1.05. In the 14 years of sampling Walker Creek condition factor for brown trout 150 mm to 250 mm dropped below 1.00 only four years.

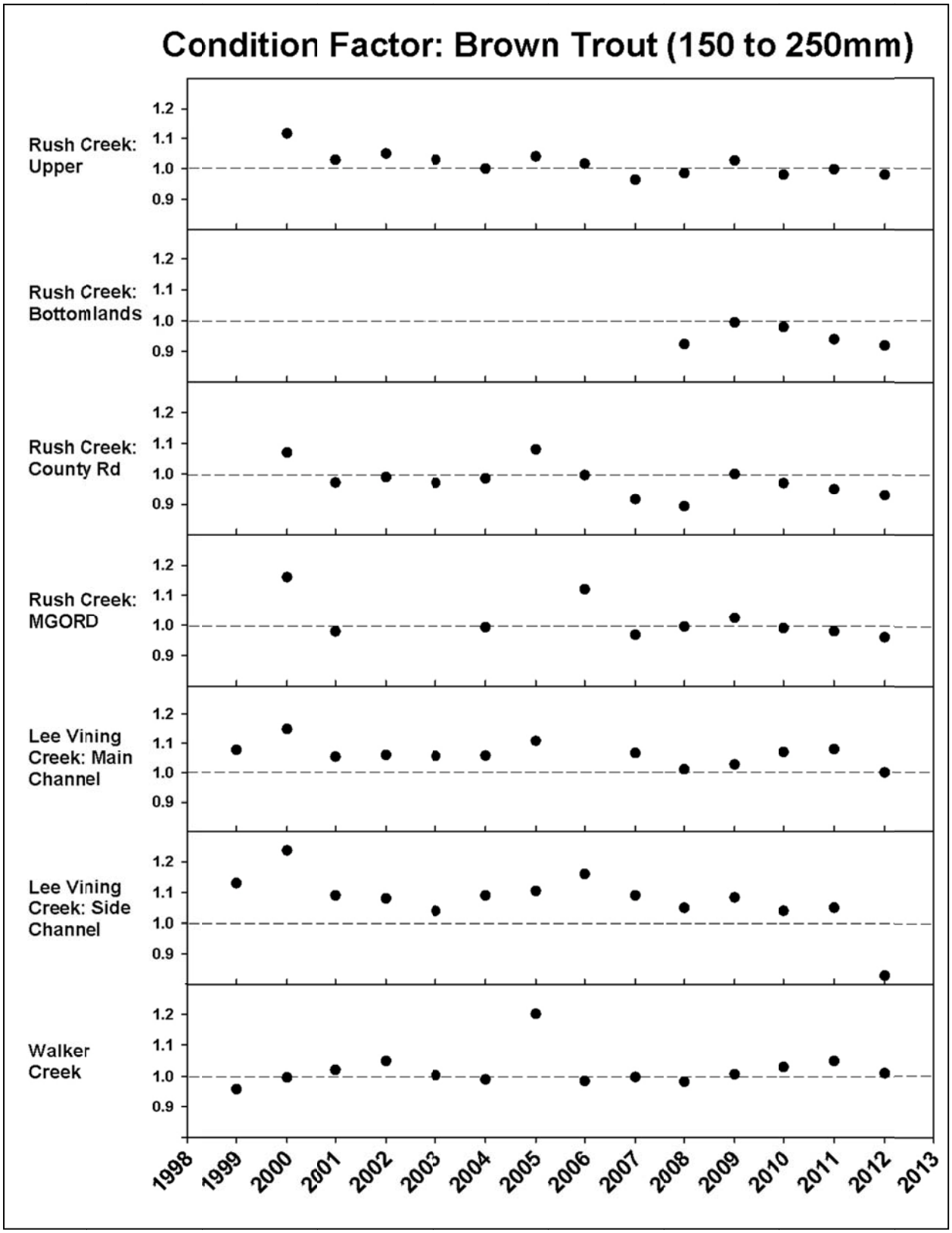

Figure 17. Condition factors for brown trout 150 to 250 mm long in sample sections of Rush, Lee Vining, and Walker Creeks from 1999 to 2012.

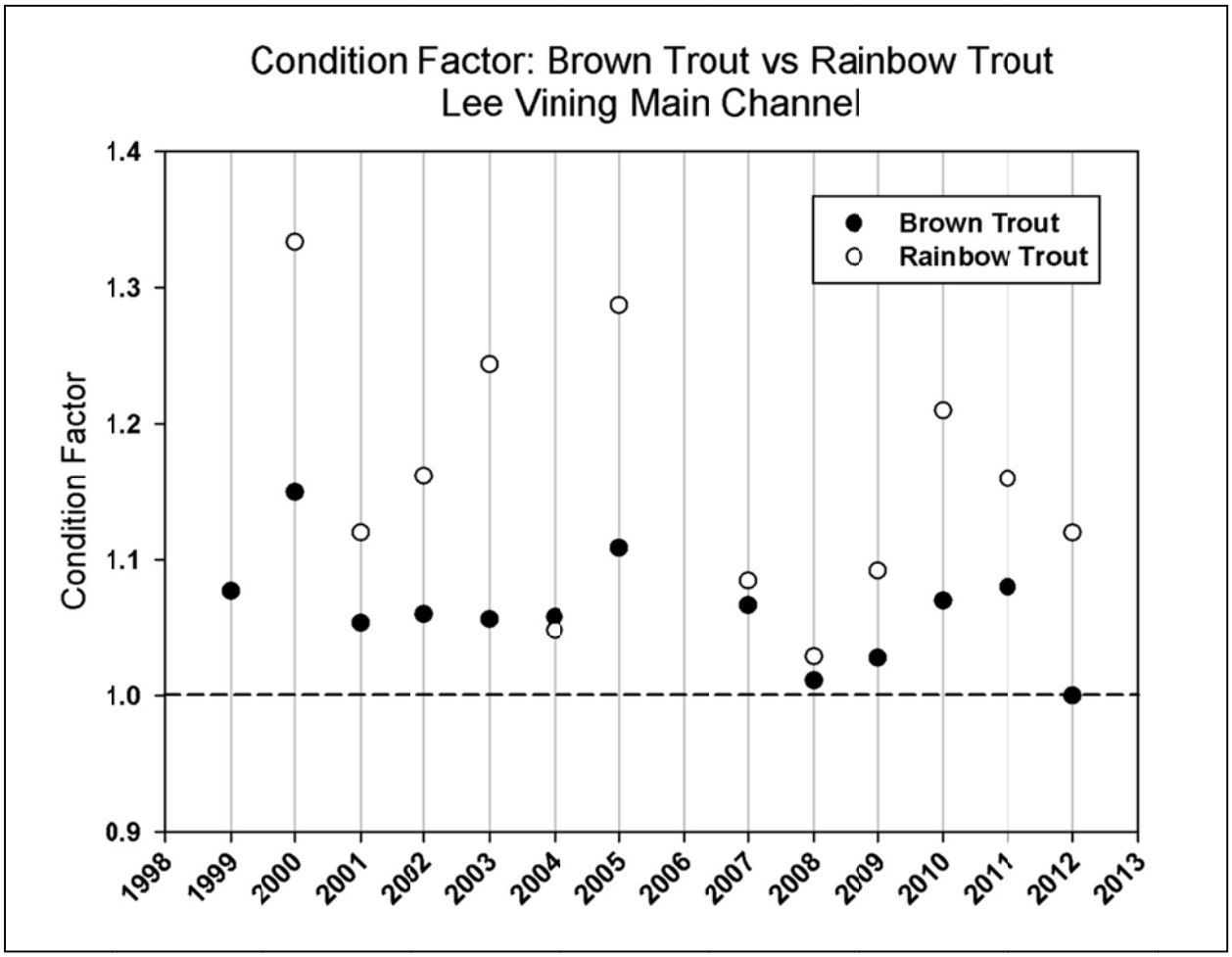

Figure 18. Comparison of condition factors for rainbow trout and brown trout 150 to 250 mm long in main channel sample section of Lee Vining Creek from 2000 to 2012. Main channel was not sampled in 2006 due to high flows.

PIT Tag Recaptures

In 2009, a total of 1,596 trout received PIT tags and adipose fin clips in Rush, Lee Vining, and Walker Creeks. Of the 1,596 trout tagged, 711 were age-0 and 861 were age-1+ brown trout, 19 were age-0, and five were age-1 and older rainbow trout. In 2008, age-0 trout received adipose fin clips to help track growth rates of that cohort of trout into the future. Knowing that this cohort of trout was age-1 in 2009, 224 trout with adipose fin clips were tagged in 2009. All trout in the MGORD were tagged and accounted for 54 of the age-0 brown trout and 642 of the age-1 and older brown trout. No rainbow trout were captured in the MGORD. Most of these trout in the MGORD were older than age-1 (Table 10).

A total of 1,274 trout received PIT tags and adipose fin clips in Rush, Lee Vining, and Walker Creeks in 2010. Of the 1,274 trout, 855 were age-0 and 43 were age-1 and older brown trout. Four age-0 and one age-1 and older rainbow trout received PIT tags and adipose fin clips. Again all trout in the MGORD (371 trout) were tagged and given

an adipose fin clip. Of the 371 trout, 359 were age-1 and older brown trout and 12 were age-1 rainbow trout. Like 2009, most of the trout tagged in the MGORD were older than age-1 (Table 11).

In 2011, a total of 1,065 trout received adipose fin clips and PIT tags in Rush, Lee Vining, and Walker Creeks. Of these 1,065 trout, 851 were age-0 brown trout and 19 were age-1 and older brown trout. Fifty age-0 rainbow trout received PIT tags and adipose fin clips. All age-1 and older trout in the MGORD (145 trout) were tagged and given adipose fin clips. Of the 145 trout 142 were age-1 and older (mostly older) brown trout and three were age-1 and older rainbow trout (Table 12).

A total of 496 trout received PIT tags and adipose fin clips in Rush, Lee Vining, and Walker Creeks in 2012. Of the 496 trout tagged, 412 were age-0 and 4 were age-1 and older brown trout. For rainbow trout, only age-0 trout were tagged in 2012 which totaled 80 trout. No new tags were implanted in trout in the County Road section, but trout with missing adipose fins and did not produce a tag number when scanned were retagged. No trout in the MGORD in 2012 were tagged or retagged due to a limited number of PIT tags (Table 13).

In the following text, growth rate between 2011 and 2012 will be referred as a 2012 growth rate. A 2012 trout refers to a trout which is recaptured in 2012. An age of a PIT tagged trout reflects the age during the sampling year. For instance, an age-1 trout in 2012 indicates that a trout had been tagged in 2011 as age-0 and its length and weight were measured in 2012 when it was recaptured. Individual PIT tag growth data recaptured 2010-2012 are provided in Appendix C.

Table 10. Total numbers of trout implanted with PIT tags during the 2009 sampling season, by stream, sample section, age-class and species.

Stream	Sample Section	Number of Age-0 Brown Trout	Number of Age-1 Brown Trout	Number of Age-0 Rainbow Trout	Number of Age-1 Rainbow Trout	Reach Totals
Rush Creek	Upper Rush	256	26	15	1	**298 Trout**
	Bottomlands	164	68	0	0	**232 Trout**
	County Road	108	29	0	0	**137 Trout**
	MGORD	54	642*	0	0	**696 Trout**
Lee Vining Creek	Main Channel	10	45	4	3	**62 Trout**
	Side Channel	5	0	0	1	**6 Trout**
Walker Creek	Above old 395	114	51	0	0	**165 Trout**
Totals:		**711**	**861**	**19**	**5**	**Total Trout: 1,596**

*Many of these MGORD trout were >age-1.

Table 11. Total numbers of trout implanted with PIT tags during the 2010 sampling season, by stream, sample section, age-class and species.

Stream	Sample Section	Number of Age-0 Brown Trout (<125 mm)	Number of Age-1 and older Brown Trout	Number of Age-0 Rainbow Trout (<125 mm)	Number of Age-1 and older Rainbow Trout	Reach Totals
Rush Creek	Upper Rush	242	11	4	0	**257 Trout**
	Bottomlands	284	3	0	0	**287 Trout**
	County Road	210	7	0	0	**217 Trout**
	MGORD	1	359*	0	12	**372 Trout**
Lee Vining Creek	Main Channel	24	8	0	1	**33 Trout**
	Side Channel	13	0	0	0	**13 Trout**
Walker Creek	Above old 395	81	14	0	0	**95 Trout**
Totals:		**855**	**402**	**4**	**13**	**Total Trout: 1,274**

*Many of these MGORD trout were >age-1.

Table 12. Total numbers of trout implanted with PIT tags during the 2011 sampling season, by stream, sample section, age-class and species.

Stream	Sample Section	Number of Age-0 Brown Trout (<125 mm)	Number of Age-1 and older Brown Trout	Number of Age-0 Rainbow Trout (<125 mm)	Number of Age-1 and older Rainbow Trout	Reach Totals
Rush Creek	Upper Rush	393	3	30	0	**426 Trout**
	Bottomlands	178	1	11	0	**190 Trout**
	County Road	196	1	6	0	**203 Trout**
	MGORD	8	142*	3	3	**156 Trout**
Lee Vining Creek	Main Channel	24	0	0	0	**24 Trout**
	Side Channel	11	14	0	0	**25 Trout**
Walker Creek	Above old 395	41	0	0	0	**41 Trout**
Totals:		**851**	**161**	**50**	**3**	**Total Trout: 1,065**

*Many of these MGORD trout were >age-1.

Table 13. Total numbers of trout implanted with PIT tags during the 2012 sampling season, by stream, sample section, age-class and species.

Stream	Sample Section	Number of Age-0 Brown Trout (<125 mm)	Number of Age-1 and older Brown Trout	Number of Age-0 Rainbow Trout (<125 mm)	Number of Age-1 and older Rainbow Trout	Reach Totals
Rush Creek	Upper Rush	117	1	2	0	**120 Trout**
	Bottomlands	110	1	6	0	**117 Trout**
	County Road	0	2	0	0	**2 Trout**
	MGORD	0	0	0	0	**0 Trout**
Lee Vining Creek	Main Channel	125	0	72	0	**197 Trout**
	Side Channel	0	0	0	0	**0 Trout**
Walker Creek	Above old 395	60	0	0	0	**60 Trout**
Totals:		**412**	**4**	**80**	**0**	**Total Trout: 496**

Growth of Age-1 Brown Trout between 2011 and 2012

In 2012, a total of 127 age-1 brown trout were recaptured that were tagged as age-0 in 2011, for a recapture rate of 5.2% (Table 14). All sections except the Lee Vining Creek main channel had a decrease in the average growth rates (length) of age-1 brown trout when compared to 2011 age-1 brown trout (Table15). The Lee Vining Creek main channel and Walker Creek were the only two sections that had increases in weight gain, whereas recaptured trout from all other sections had decreased weight gains when comparing 2011 and 2012 growth of age-1 trout (Table 15).

Average 2012 growth of 24 age-1 PIT tagged brown trout was 72 mm and 33 g for the Upper Rush section. When compared to 2011 and 2010 brown trout of the same age, the average growth rates 11 and 9 mm shorter and 15 and 17g lighter respectively. When compared to 2009 brown trout growth rates (the highest sampled) they were 17 mm shorter and 18 grams lighter.

The forty-four age-1 PIT tagged brown trout were recaptured in 2012 and the average growth rates were 58 mm and gained 25 g in the Bottomlands section. Compared to 2011 PIT tagged brown trout, the 2012 trout were 13 mm and 10 g lighter. Compared to 2010 trout the 2012 trout were 19mm and 15 g lighter. When compared to the 2009 growth rates (the highest average annual growth rate), the 2012 trout were 26mm shorter and 18 grams lighter.

The County Road section had an average growth rate of 57 mm and 24 grams for the 33 age-1 brown trout recaptured in 2012. Compared to 2011 brown trout, the 2012

brown trout were 11mm shorter and 9 grams lighter. The 2012 trout were also 16 mm shorter and 12 g lighter than 2010 trout and 21 mm shorter and 17 grams lighter than 2009 brown trout.

The MGORD failed to produce any age-1 recaptures in 2012, thus there were no growth rates for age-1 brown trout in the MGORD.

Eleven age-1 brown trout in the Lee Vining Creek main channel had an average growth rate of 99 mm and 52 g in 2012. Compared to brown trout the same age in 2011, the 2012 brown trout gained 27 mm and 15 g more. Compared to the one age-1 brown trout which was tagged in 2009 and recaptured in 2010, the 2012 brown trout were 19 mm longer and 10 g heavier. The Lee Vining main channel failed to produce any adipose clipped age-1 recaptures in 2009.

The Lee Vining Creek side channel produced three age-1 brown trout in 2012. These three brown trout had an average annual growth rate of 70 mm and 24 g. When compared to the 2011 brown trout, three 2012 trout were 18 mm shorter and 30 g lighter. No trout were recaptured in 2010 on the side channel to give an average growth rate.

Twelve age-1 brown trout on the Walker Creek section had an annual growth rate of 68 mm and 36 g in 2012. The 2012 age-1 trout grew 3 mm less, but gained two grams more compared to the 2011 trout, were 17 mm longer and 16 g heavier compared to the 2010 trout, and were the same length, but 9 g heavier compared to 2010 trout.

Table 14. Number of brown trout recaptured in 2012, implanted with PIT tags in 2009 through 2011, by stream reach, sample section, and of known age.

Creek	Sample Section	Number of Age-1 Brown Trout	Number of Age-2 Brown Trout	Number of Age-3 Brown Trout	Number of Age-4 Brown Trout	Reach Totals
Rush Creek	Upper Rush	24	6	5	0	**35 Trout**
	Bottomlands	44	10	3	2	**59 Trout**
	County Road	33	7	1	0	**41 Trout**
	MGORD	*	*	*	*	*** Trout**
Lee Vining Creek	Main Channel	11	2	0	1	**14 Trout**
	Side Channel	3	2	0	0	**5 Trout**
Walker Creek	Above old 395	12	3	2	2	**19 Trout**
Totals:		**127**	**30**	**11**	**5**	**Total Trout: 256**

* MGORD brown trout ages are unknown and are presented by size class not age.

Table 15. Average length and weight of all brown trout recaptured from 2009 through 2012 by age.

Stream	Stream Reach	Cohort	Average Annual Growth Length (mm)				Average Annual Growth Weight (g)			
			2008-2009**	2009-2010	2010-2011	2011-2012	2008-2009**	2009-2010	2010-2011	2011-2012
Rush Creek	Upper Rush	Age 1	89	81	83	72	51	50	48	33
		Age 2		58	54	43		70	73	42
		Age 3				14				29
		Age 4								
	Bottomlands	Age 1	84	77	71	58	43	40	35	25
		Age 2		50	35	30		54	32	28
		Age 3			13	17			14	16
		Age 4				4				-11
	County Rd	Age 1	78	73	68	57	41	36	33	24
		Age 2		55	37	26		56	46	19
		Age 3			24	11*			44	10*
		Age 4								
Lee Vining Creek	Main Channel	Age 1		80*	72	99		42*	37	52
		Age 2		66		77		95		110
		Age 3			34				92	
		Age 4				21*				41*
	Side Channel	Age 1			88	70			54	24
		Age 2				22				6
		Age 3								
		Age 4								
Walker Creek	Walker	Age 1	68	51	71	68	27	20	34	36
		Age 2		31	60	40		26	56	33
		Age 3			28	18			44	12
		Age 4				7				2

* Only one trout recaptured
** Average growth rates were calculated using average weights and lengths of age-0 adipose clipped trout in 2008 and average weights and lengths of clipped age-1 trout PIT tagged in 2009.

Growth of Age-2 Brown Trout between 2011 and 2012

A total of three different age-2 cohorts are possible in 2012 using adipose clips and PIT tag data from 2008 through 2012 (Table 15). In 2012, a total of 30 known age-2 brown trout were recaptured that were tagged as age-0 in 2010, and recaptured as age-1 in 2011 for a recapture rate of 3.5% (Table 14). All sections except the Lee Vining main channel had a decrease in the average growth rates (length) of age-2 brown trout when compared to 2011 age-2 brown trout. The Lee Vining main channel did not have any age-2 recaptures in 2011. All sections show smaller weight gain in 2012 compared to average weight gain in 2011.

The Upper Rush section had an average growth rate of 43 mm and 42 grams for the six age-2 brown trout recaptured in 2012. Compared to 2011 age-2 brown trout, the 2012 brown trout were 11mm shorter and 31 grams lighter. The 2012 brown trout were also 15 mm shorter and 28 g lighter than 2010 brown trout.

Ten age-2 brown trout on the Bottomlands section had an average growth rate of 30 mm and 28 g in 2012. Compared to 2011 age-2 brown trout, the 2012 brown trout were 5 mm shorter and 4 grams lighter. The 2012 brown trout were also 15 mm shorter and 26 g lighter than 2010 brown trout.

The County Road section had an average growth rate of 26 mm and 19 g for the 7 age-2 brown trout recaptured in 2012. Compared to the age-2 brown trout recaptured in 2011, the 2012 brown trout were 11mm shorter and 9 grams lighter. The 2012 trout were also 16 mm shorter and 12 g lighter than 2010 trout and 21 mm shorter and 17 grams lighter than the 2009 brown trout.

The Lee Vining Creek main channel had two age-2 brown trout recaptured in 2012. The average growth rate of these trout was 77 mm and 110 g. No age-2 brown trout were recapture in 2011, thus no growth rates are available. Comparing the growth rates of age-2 brown trout recaptured in 2010 to brown trout recaptured in 2012, the 2012 brown trout were 11 mm longer and 15 g heavier.

The Lee Vining side channel had two recaptures of age-2 brown trout in 2012, which had an average growth rate of 22 mm and 6 g. No other known age-2 brown trout have been recaptured in the past in the side channel.

Walker Creek had three age-2 brown trout recaptures in 2012. Average growth rate of the three age-2 trout in 2012 was 40 mm and 33 g. Compared to the growth rate of 2011 age-2 trout, the 2012 trout were 20 mm shorter and 23 g lighter. Compared to 2010 growth rates, the 2012 trout were 9 mm longer and 7 g heavier.

Growth of Age-3 Brown Trout between 2011 and 2012

A total of two different age-3 cohorts are possible in 2012 using adipose clips and PIT tag data from 2008 through 2012 (Table 15). In 2012, a total of 11 known age-3 brown trout were recaptured that were tagged as age-0 in 2009, and recaptured as age-1 in 2011 and age-2 in 2012 for a recapture rate of 1.5% (Table 14). Only the Bottomlands and County Road sections and the Walker Creek section were able to produce two different age-3 cohorts.

The Upper Rush section had five recapture of known age-3 brown trout in 2012. These five brown trout had an average growth rate of 14 mm and 29 g.

The Bottomlands section had three recaptures of known age-3 brown trout in 2012. These three trout had an average growth rate of 30 mm and 28 g. The 2012 age-3 trout

were 4 mm longer and two grams heavier compared to the average growth rate of age-3 brown trout captured in 2011.

The County Road section only produced one recapture of a known age-3 brown trout in 2012 with an average growth rate of 11 mm and 10 g. Compared to the two known age-3 recaptures in 2011, the 2012 trout was 13 mm shorter and 34 g lighter.

Neither the main or side channel sections of Lee Vining Creek produce any known age-3 brown trout in 2012.

Walker Creek had two known age-3 brown trout recaptured in 2012. These two trout had a growth rate of 18 mm and 12 g. Compared to the growth rate of the recaptured brown trout in 2011, the 2012 trout were 10 mm shorter and 32 g lighter.

Growth of Age-4 Brown Trout between 2011 and 2012

For the first time, known age-4 growth rates are available using adipose clips and PIT tag data from 2008 through 2012 (Table 15). A total of five known age-4 brown trout were recaptured in 2012 that were tagged as age-1 in 2009 and recaptured in 2011 and again in 2012 for a recapture rate of 0.5% (Table 14). Only the Rush Creek Bottomlands, Lee Vining Creek's main channel and Walker Creek sections produced known age-4 brown trout in 2012.

Two known age-4 recaptures in the Bottomlands section in 2012 had an average growth rate of 4 mm. Both trout lost weight with one losing one gram and the other losing 21 grams for an average weight loss of 11 g.

The main channel of Lee Vining Creek had one recapture of a known age-4 brown trout whose growth rate was 21 mm and 41 g.

Walker Creek had two known age-4 recaptures in 2012 with an average growth rate of 7 mm and 2 g.

Growth of Rush Creek MGORD brown trout by size class between 2011 and 2012

Because there were no recaptures of age-1 brown trout in the MGORD, determination of actual age of recaptured trout was not possible. Growth rate comparisons for the MGORD were based on size classes not by age classes. Due to the majority of the brown trout in the MGORD being >225 mm, size classes were based on the proposed RSD values for the MGORD.

None of the eight age-0 brown trout tagged in 2011 were recaptured in the MGORD in 2012 (Table 16).

There were 10 brown trout that were tagged in the MGORD in 2011 at 125-225 mm then recaptured in 2012 (Table 17). These 10 trout had an average growth rate of 63 mm and 78 g in 2012. Compared to the two previous years, average growth rates for this size class in 2012 was the highest for length but the lowest for weight on record (Table 16).

There were 28 brown trout 226-300 mm in length that were recaptured in 2012, that were implanted with PIT tags in 2009 through 2011 in the MGORD (Table 17). These 28 brown trout had an average growth rate of 22 mm and 34 g. The 2012 average growth rates for this size class were the lowest in the three years sampled (Table 16).

Twenty-three brown trout ranging between 301 and 375 mm in length were recaptured in 2012 that were implanted with PIT tags in 2009 through 2011 in the MGORD (Table 17). The average growth rates for these 23 trout were 9 mm and 5 g. Again the 2012 average growth rates were the lowest of the three years sampled.

Three brown trout whose lengths were greater than 375 mm were recaptured in 2012 that were implanted with PIT tags in 2009 through 2011 in the MGORD (Table 17). These three brown trout had average growth rates of 1 mm and 47 g in 2012. The 2012 average growth rates were again the lowest of the three years sampled, 19 mm shorter and 181 g lighter than 2011 >375mm brown trout (Table 16).

Table 16. Average length and weight of all brown trout recaptured from 2009 through 2012 by size class.

Stream	Stream Reach	Size Class (mm)	Average Annual Growth Length (mm)			Average Annual Growth Weight (g)		
			2009-2010	2010-2011	2011-2012	2009-2010	2010-2011	2011-2012
Rush Creek	Upper Rush	0-124	81	83	72	50	48	33
		125-199	61	54	43	74	73	42
		200+	38	24	10	61	49	7
	Bottomlands	0-124	77	71	58	40	35	25
		125-199	50	37	30	54	33	28
		200+		13	12		14	5
	County Rd	0-124	73	68	57	36	33	24
		125-199	55	37	25	56	43	20
		200+		28			51	
	MGORD	0-124	121			91		
		125-225	55	59	63	85	90	78
		226-300	32	39	22	53	81	34
		301-375	20	17	9	23	54	-5
		376+	13	18	-1	-10	134	-47
Lee Vining Creek	Main Channel	0-124	80*	72	99	42*	37	52
		125-199	66		77	95		110
		200+		41	19		100	26
	Side Channel	0-124		88	70		54	24
		125-199			16			2
		200+			16*			1*
Walker Creek	Walker	0-124	51	71	68	20	34	36
		125-199	31	39	35	26	47	28
		200+	-4*	6*	10	-18*	15*	4

* Growth rate represented by one trout.

Table 17. Number of brown trout recaptured in 2012, implanted with PIT tags in 2009 through 2011, by stream reach, sample section, and size class.

Creek	Sample Section	Number of Brown Trout 0-124 (mm)	Number of Brown Trout 125-225 (mm)	Number of Brown Trout 226-300 (mm)	Number of Brown Trout 301-375 (mm)	Number of Brown Trout 375+ (mm)	Reach Totals
Rush Creek	MGORD	0	10	28	23	3	**64 Trout**

Apparent one-year survivals of PIT tagged brown trout

Apparent one-year survivals of trout between age-0 and age-1 (2011 to 2012) were based on the number of age-0 brown trout originally PIT tagged with an assumption that any trout not recaptured the following year had died (apparent mortality) unless those trout were recaptured in another section. Any PIT tagged trout recaptured in a different

section were counted in the apparent survival calculation for the section where they were originally tagged. Apparent one-year survivals for brown trout in Rush Creek in 2012 was 6% for the Upper Rush section, 25% for the Bottomlands section, 17% for the County Road section and zero percent for the MGORD. Lee Vining Creek had apparent one-year survivals of 46% on the main channel and 27% on the side channel. Walker Creek's apparent one-year survival was 29% in 2012. Overall, the three creeks had apparent one-year survivals of 15% for all PIT tagged brown trout.

Average Growth Rate of Rainbow Trout

Due to the lack of rainbow trout recaptures and thus the lack of PIT tag data discernible trends cannot be made (Table 18).

Table 18. Average length and weight of all rainbow trout recaptured from 2009 through 2012 by size class.

Stream	Stream Reach	Size Class	Average Annual Growth (Length mm)			Average Annual Growth (Weight g)		
			2009-2010	2010-2011	2011-2012	2009-2010	2010-2011	2011-2012
Rush Creek	Upper Rush	0-124	103		91*	62		44*
		125-199						
	Bottomlands	0-124			81*			28*
		125-199						
	MGORD	0-124						
		125-225						
		226-300	56*		12*	93*		7*
Lee Vining	Lee Vining: Main	0-124	107*			62*		
		125-199						

* Growth rate represented by one trout.

Movement of PIT Tagged Trout between Sections

From 2009 to 2012 a total of 4,071 PIT tags were surgically implanted in brown and rainbow trout in the following stream reaches: Upper Rush, County Road, Bottomlands, MGORD, and Walker Creek. During this time period only 23 trout, all brown trout, were ever recaptured in a stream reach other than where they were initially tagged (Appendix C). The majority of movement between sections has been from the Upper Rush section to the MGORD. There has also been some movement between the Bottomlands and County Road sections (Table19). No other movement between sections has been recorded.

Prior to making growth rate calculations trout were separated into two categories; trout that left one section and were recaptured the following year(s) in another section and trout that remained within the section they were initially tagged in. This was done for

two reasons: 1) to accurately calculate the average growth rate of trout that remained within a particular section for one or more years, and 2) to determine if the trip between sections and or final destination of the trout after movement had any effect on the average growth rate of those trout.

In 2012 a total of nine trout were recaptured in the MGORD that had moved upstream from the Upper Rush section. Of these nine trout, six were initially tagged in 2009, two were initially tagged in 2010, and one was initially tagged in 2011. Also in 2012, a total of two trout had moved downstream from the Bottomlands section to the County Road section. Both of these trout were initially tagged in 2011.

The annual growth of the single trout in the <125mm size class that moved from Upper Rush in 2011 to the MGORD in 2012 was 91mm and 48g (Table 19). The annual growth of the single trout in the 125mm -199mm size class that moved from the Upper Rush in 2011 to the MGORD in 2012 was 76mm and 130g. The average growth rate of the six trout recaptured in the <125mm size class that moved from Upper Rush between 2009 and 2012 to the MGORD was 187mm and 217g (Table 20). The average growth rate for these trout over the three year period was 62mm and 72g per year. The average growth rate of the two trout recaptured in the <125mm size class that moved from Upper Rush between 2010 and 2012 to the MGORD was 166mm and 161g. The growth rate for these trout over the two year period was 83mm and 81mm per year. The average growth rate of the two trout recaptured in the <12mmsize class that moved from the Bottomlands reach in 2011 to the County Rd reach in 2012 was 64mm and 31g.

The single trout in the <124mm size class that moved from Upper Rush in 2011 to the MGORD in 2012 was 19mm longer and 15g heavier than the average growth rate of the same size trout that remained within the Upper Rush reach during the same time period (Tables 16 and 19). No trout were recaptured in the MGORD in 2012 that were tagged in the <125mm size class in 2011. Therefore no comparisons can be made. The single trout in the 125mm -199mm size class that moved from Upper Rush in 2011 to the MGORD in 2012 was 33mm longer and 88g heavier than the average growth rate of the same size trout that remained within the Upper Rush reach during the same time period. This trout was also 13mm longer and 52g heavier than the average growth rate of trout in the 125mm -225mm size class that remained within the MGORD during the same time period. This trend was also observed in 2010 and only slightly in 2011.

The average growth rate of two trout recaptured in the <125 size class that moved from the Bottomlands section in 2011 to the County Road section in 2012 was 6mm longer and 6g heavier than the average growth rate of the same size trout that remained within the Bottomlands section during the same time period (Tables 16 and 19). The average growth rate of these trout was also 7mm longer and 7g heavier than the average growth rate of same size trout that remained within the County Road section during the same time period. Due to the lack of trout that have been observed moving between these two sections no other comparisons can be made at this time.

Movement between sections has only been between Upper Rush and the MGORD and between County Road and the Bottomlands. Movement beyond this extent has yet to

be observed. The trout that have moved between sections that have been recaptured seem to have higher growth rates than the cohorts that remained in either of the two sections. It is important to note that this is strictly an observation and to show any significance a much larger sample size will be required.

Table 19. Average length and weight of all brown trout recaptured from 2009 through 2012 by size class that moved the same year they were PIT tagged.

Stream	Stream Reach	Size Class	Average Annual Growth (Length mm)			Average Annual Growth (Weight g)		
			2009-2010	2010-2011	2011-2012	2009-2010	2010-2011	2011-2012
Rush Creek	Upper Rush To MGORD	0-124	106	63*	91*	79	25*	48*
		125-199	91		76*	124		130*
	Bottomlands to County Rd	0-124			64			31
		125-199						
	County Rd to Bottomlands	0-124		84*			37*	
		125-199						

* Growth rate represented by one trout.

Table 20. Average length and weight of all brown trout from 2009 through 2012 by size that were recaptured either two or three years after they were PIT tagged.

Stream	Stream Reach	Size Class	Average Annual Growth (Length mm)			Average Annual Growth (Weight g)		
			2 Year 2009-2011	2 Year 2010-2012	3 Year 2009-2012	2 Year 2009-2011	2 Year 2010-2012	3 Year 2009-2012
Rush Creek	Upper Rush To MGORD	0-124	154	166	187	168	161	217
		125-199						

Shed Rate of PIT Tags between 2009 and 2012

In 2012, a total of 13 brown trout with adipose fin clips were recaptured and failed to produce a PIT tag number when scanned with the tag reader. Assuming that all 13 trout in 2012, all eight trout in 2011, and all 45 trout in 2010 were previously PIT tagged, the calculated shed rate was 1.6%. This rate was lower than rates reported by other PIT tagging studies (Ombredane et al. 1998; Bateman and Gresswell 2006 as cited in Taylor and Knudson. 2011).

Population Estimates and Densities, by age-class, during September 2012

During 2012, four age-classes of PIT-tagged brown trout were recaptured within six fisheries monitoring sections. Along with providing age-specific growth information, these trout also helped develop the "most probable" length ranges for each study section (Table 21).

The age-classes length ranges for the County Road and Bottomlands sections were very similar in 2012 up to about age-3 (Table 21). The difference between the smallest age-3 trout in the County Road and Bottomlands sections was 9 mm while the difference between the largest age-3 trout was 20 mm. The smallest age-4 had a difference of 48 mm between two sections, but largest trout captured on two sections were very similar in size. Similar proportions of densities (numbers/ha and numbers/ km) based age classes were similar between two sections. However, actual densities were slightly higher at the County Road section for all age classes except the age-3 class.

The size classes for brown trout age-0 to age-3 in the Upper Rush were slightly larger than those in the lower two sections, but the largest trout in each size class was consistently larger in Upper Rush (Table 21). This is mainly due to a higher average growth rate in the Upper Rush for all length groups than those in the lower two sections (Table 15).

For age-3 and older brown trout, the trend in densities observed in 2011 was reversed in 2012 as more age-3+ brown trout were captured at the Upper Rush section (178 trout/ha) than two lower sections (160 trout/ha at the Bottomlands section and 63 trout/ha at the County Road section).

In the main channel of Lee Vining Creek all age classes, except age-4, were larger than those of the same age class in Rush Creek (Table 21). For instance, the age-2 size class in the main channel was similar to the size classes of age-3 trout in Rush Creek. The average growth rate for all size classes in Lee Vining Creek's main channel was the highest of all sampled sections (Table 15). In 2012, the densities of all brown trout age classes were lower than those observed in 2011 (Table 21). In 2012, only five age-4+ brown trout were captured including one with complete PIT tag data set. These findings appeared to support the earlier conclusion by the Stream Scientist that very few brown trout reach age-4 on this stream regardless of the flow regime due to a lack of holding habitat.

On the Walker Creek section, the older brown trout were relatively small, with age-3 trout ranging from 206-220 mm (Table 21). This size class was much smaller than the size classes for age-3 brown trout at other sections. However, this size class was consistent with the size classes obtained in 2011 (206-219mm). The largest two brown trout recaptured in 2012 were 262 mm, which were most likely age-5 or older. In the other sections these two brown trout would have been in the age-3 size class at that length. Average growth rates for Walker Creek were comparable to other sections for all size classes (Table 15).

Table 21. Population estimates, densities and PIT tag return rates, by age class for brown trout populations at five electro-fishing sections on Rush, Lee Vining, and Walker Creeks.

Creek	Section	Cohort	Size Class (mm)	Range (mm)	Population Estimate	Number per Hectare	Number per Kilometer	% of total Population Estimate
Rush Creek	Upper Rush	Age-0	56-116	60	2891	8612	6723	82%
		Age-1	122-189	67	431	1285	1003	12%
		Age-2	190-230	40	160	478	373	5%
		Age-3	231-265	34	41	121	95	1%
		Age-4+	266-465	199	19	57	44	1%
		Sum			3542	10553	8238	
	Bottomlands	Age-0	60-114	54	834	2587	1908	60%
		Age-1	120-172	52	355	1103	813	25%
		Age-2	173-213	40	156	485	357	11%
		Age-3	214-232	18	26	81	59	2%
		Age-4	233-244	11	13	41	30	1%
		Age-5+	245-307	62	14	45	33	1%
		Sum			1399	4342	3201	
	County Road	Age-0	58-113	55	684	2770	2079	60%
		Age-1	115-175	60	317	1285	965	28%
		Age-2	176-222	46	111	448	336	10%
		Age-3	223-252	29	18	73	55	2%
		Age-4+	281-300	58	3	12	9	0%
		Sum			1133	4588	3444	
Lee Vining	Main Channel	Age-0	62-129	67	671	5248	2632	85%
		Age-1	153-197	44	72	561	281	9%
		Age-2	202-271	69	35	273	137	4%
		Age-3	275-290	15	5	39	20	1%
		Age-4+	292-321	29	5	39	20	1%
		Sum			788	6160	3090	
Walker Creek	Above old 395	Age-0	61-111	50	231	4813	1197	76%
		Age-1	146-180	34	30	625	155	10%
		Age-2	184-205	21	15	313	78	5%
		Age-3	206-220	14	13	271	67	4%
		Age-4+	223-262	39	13	271	67	4%
		Sum			302	6292	1565	

Estimated Trout Densities

Age-0 Brown Trout

The Upper Rush section had an estimated density of 8,624 age-0 brown trout/ha in 2012, a decrease of 20% from 2011's second highest estimate of 10,829 trout/ha (Figure 19). The 2012 density value on the Upper Rush section was the fourth highest

in the 14 year sampling period and was 26% higher than the 14 year average of 6,828 trout/ha.

The Bottomlands section of Rush Creek had a density estimate of 2,616 age-0 brown trout/ha in 2012. This estimate was an increase of 18% in the number of trout/ha when compared to the 2011 estimate of 2,218 trout/ha. The 2012 estimate was the third highest age-0 estimate since the start of sampling in 2008. When compared to the five-year average of 2,592 trout/ha, 2012's estimate was one percent higher (Figure 19).

The density estimate of age-0 brown trout in the County Road section of Rush Creek in 2012 was 2,781 trout/ha. The 2012 estimate was a 29% increase from the 2011 estimate of 2,160 trout/ha. This year's density estimate is the fourth highest estimate of all years sampled and was five percent higher compared to the 13-year average of 2,651 trout/ha (Figure 19).

Due to insufficient number of age-0 brown trout recaptures in the MGORD, density estimates of age-0 and older brown trout were not able to be performed.

The 2012 Walker Creek density estimate of 5,133 age-0 brown trout/ha was a 507% increase over the 2011 estimate and was the fourth highest in the 14-year sampling period. The 2012 density estimate of 5,133 trout/ha was 48% higher than the 14-year average of 3,458 trout/ha (Figure 19).

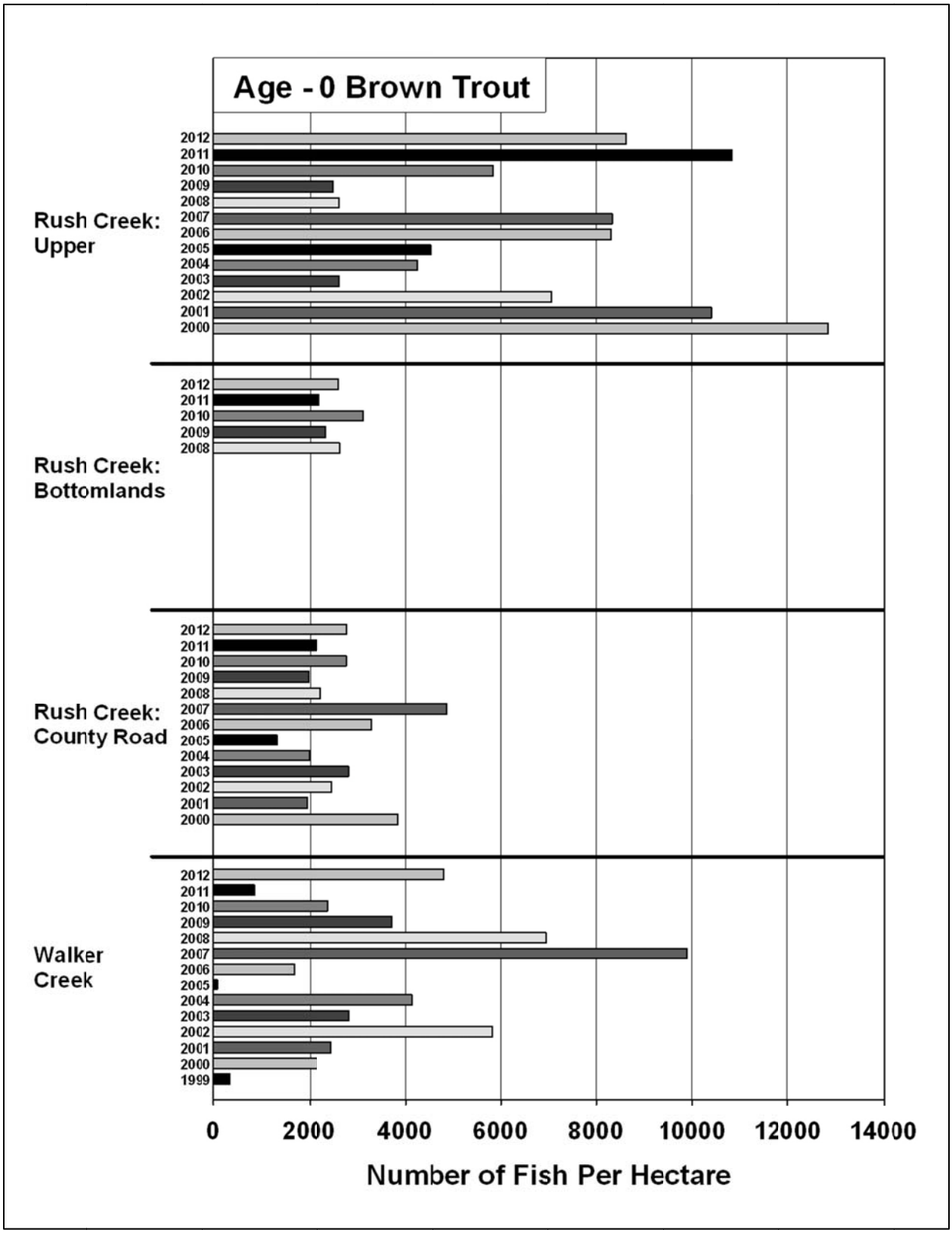

Figure 19. Estimated number of age-0 brown trout per hectare in Rush Creek and Walker Creek from 2000 to 2012.

In 2012, the age-0 brown trout density estimate on the main channel of Lee Vining Creek was the highest ever sampled at 5,293 trout/ha which was a 627% increase from the 2011 density estimate of 728 trout/ha (Figure 20). The 2012 estimate was 249% higher than the 13 year average of 1,518 trout /ha.

The 2012 density estimate of age-0 brown trout on the Lee Vining Creek side channel was 658 trout/ha, a 138% increase from the 2011 estimate of 276 trout/ha. Compared to the 14 year average of 433 trout/ha, 2012 was 51% higher (Figure 20).

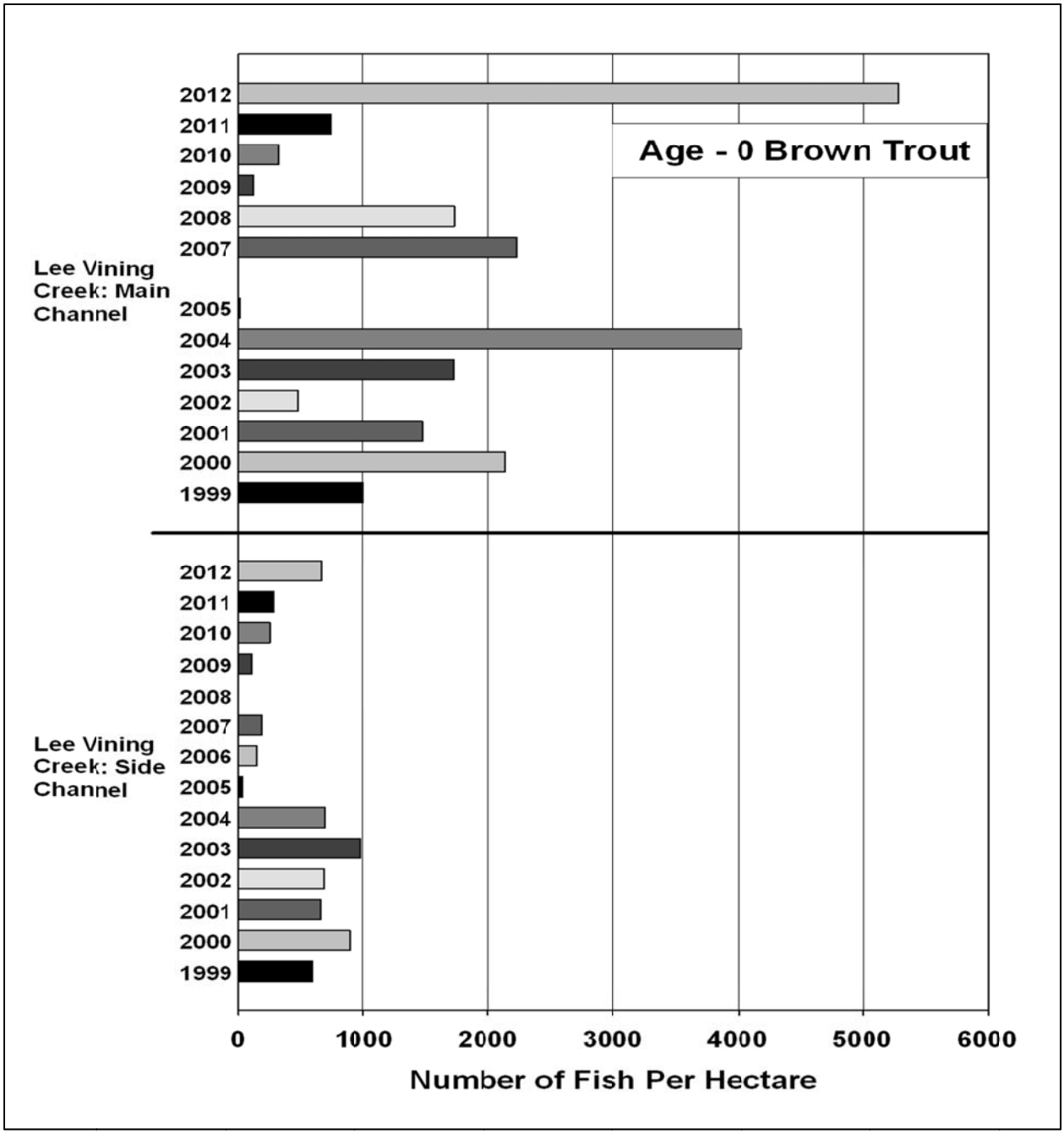

Figure 20. Estimated number of age-0 brown trout per hectare in Lee Vining Creek from 1999 to 2012.

Age-0 Rainbow Trout

The Lee Vining Creek main channel, estimated density of age-0 rainbow trout was the highest ever sampled in the 13 year history at 2,393 trout/ha up from 7 trout/ha in 2011 (Figure 21). The thirteen year average in the main channel for age-0 rainbow trout was 356 trout/ha.

For the fourth year in a row no age-0 rainbow trout were captured in the Lee Vining Creek side channel (Figure 21).

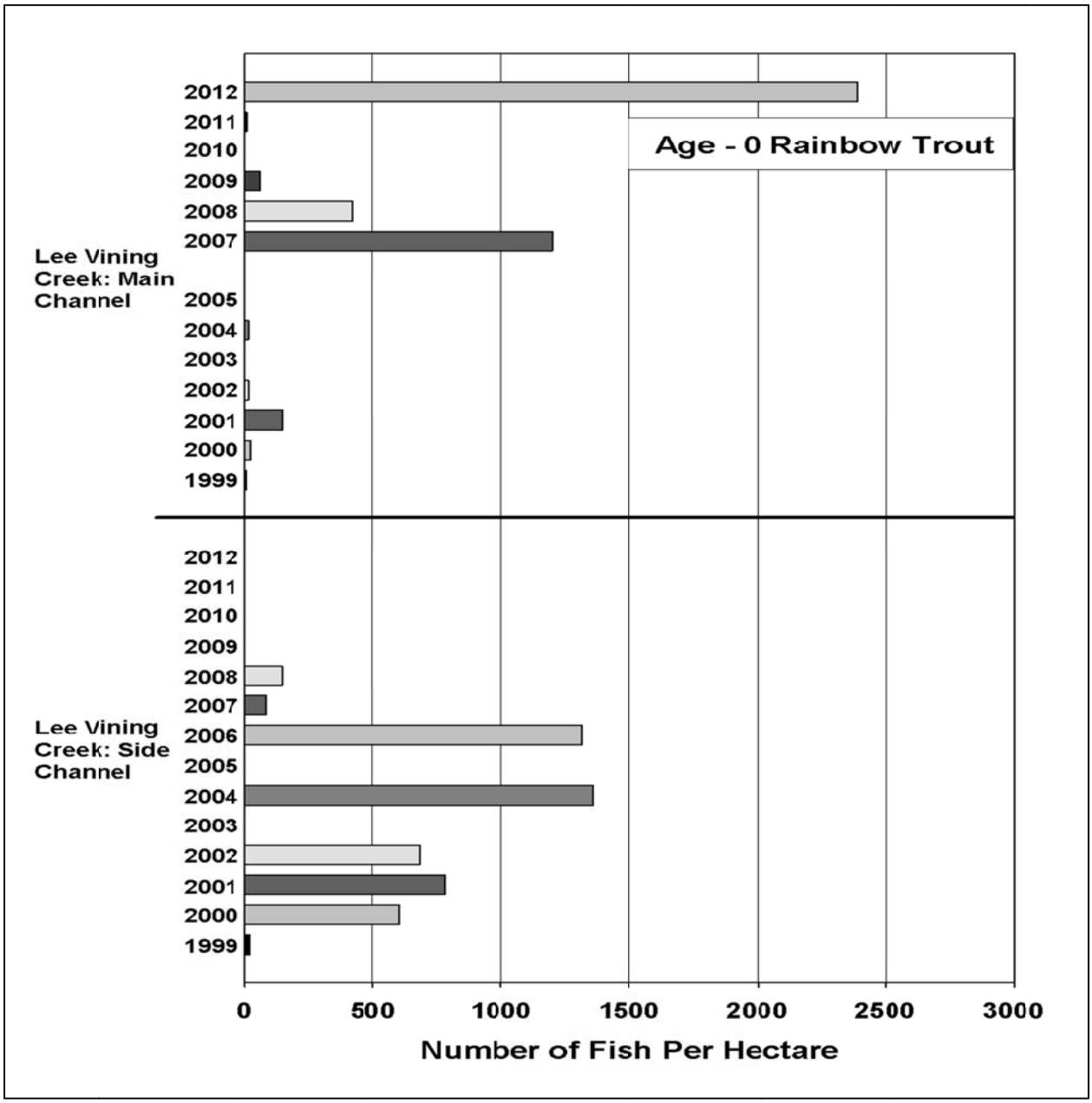

Figure 21. Estimated number of age-0 rainbow trout per hectare in Lee Vining Creek from 1999 to 2012.

Age-1+ Brown Trout

The Upper Rush section had an estimated density (number per hectare) of 1,993 age-1+ trout/ha in 2012, a decrease of 10% from 2011's highest ever estimate of 2,208 trout/ha (Figure 22). The 2012 density value was the third highest in the 14-year sampling period and was 41% higher than the 14-year average of 1,418 trout/ha.

Brown trout age-1+ on the Bottomlands section produced a density estimate of 1,735 trout/ha in 2012. This estimate was 51% higher when compared to the 2011 estimate of 1,147 trout/ha. The 2012 estimate was second highest since the start of sampling in 2008, only 5% less than 2008's high of 1,834 trout/ha, and 17% higher than the five year average of 1,488 trout/ha (Figure 22).

A density estimate of age-1+ brown trout for the County Road section in 2012 was 1,826 trout/ha. The 2012 estimate was a 50% increase from the 2011 estimate of 1,216 trout/ha. This year's density estimate was the third highest estimate of all years sampled and was only 16% lower than the highest density estimate of 2,177 trout/ha in 2009 (Figure 22). The 2012's estimate was 45% higher compared to the 13 year average of 1,260 trout/ha.

A MGORD density estimate of age-1+ brown trout was 616 trout/ha in 2012. When compared to the 2010 density estimate (the last density estimate generated for the MGORD), the 2012 estimate was 50% higher and the second highest in the six years sampled. When compared to the highest estimate of 660 trout/ha in 2006, the 2012 estimate was only 7% lower (Figure 22). The 2012 was 22% higher than the six year average of 503 trout/ha.

A 2012 density estimate for age-1+ brown trout for the Walker Creek section was 1,578 trout/ha which was 5% higher than the 2011 estimate. The density of age-1 and older brown trout has decreased by 21% over a two-year period since the record high value was set in 2009, but was 8% higher than the 14 year average and 147% higher than the lowest estimate of 638 trout/ha set in 2006 (Figure 22).

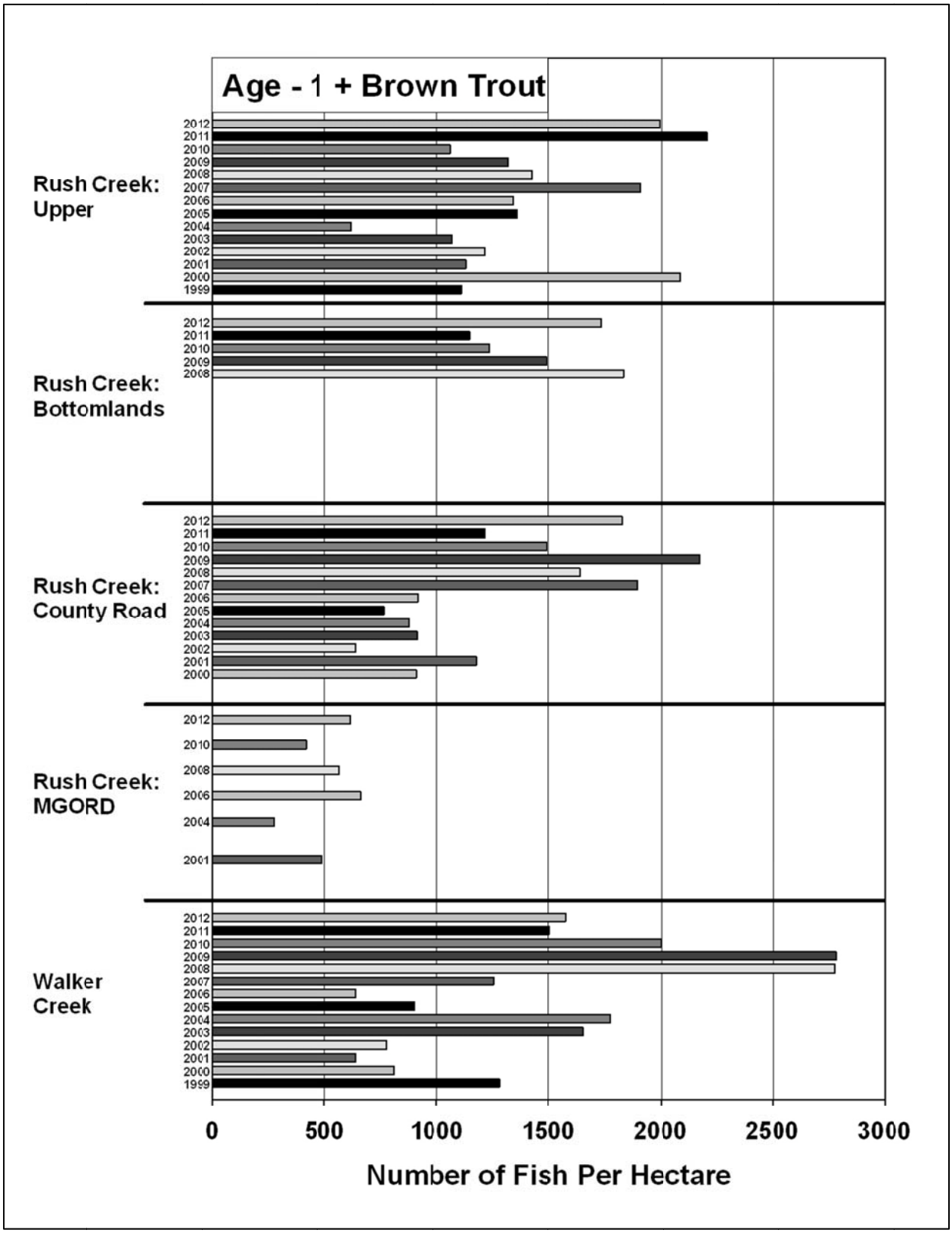

Figure 22. Estimated number of age-1 and older brown trout per hectare in sections of Rush and Walker Creeks from 1999 to 2012.

An estimated density for age-1+ brown trout for the Lee Vining main channel section was 938 trout/ha. The density increased by 131% from the 406 trout/ha in 2011. The 2012 estimate was 11% higher than the 13 year average density estimate of 842 trout/ha (2006 was not sampled due to high flows) (Figure 23).

In 2012, the side channel of Lee Vining Creek produced an estimated density of 603 age-1 and older brown trout/ha which was the highest ever estimate for this section. The 2012 estimate was also 45% higher than the next highest estimate of 417 trout/ha set in 2002. The 2012 estimate was 80% higher than last year's 335 trout/ha and was 160% higher than the 14-year average (Figure 23).

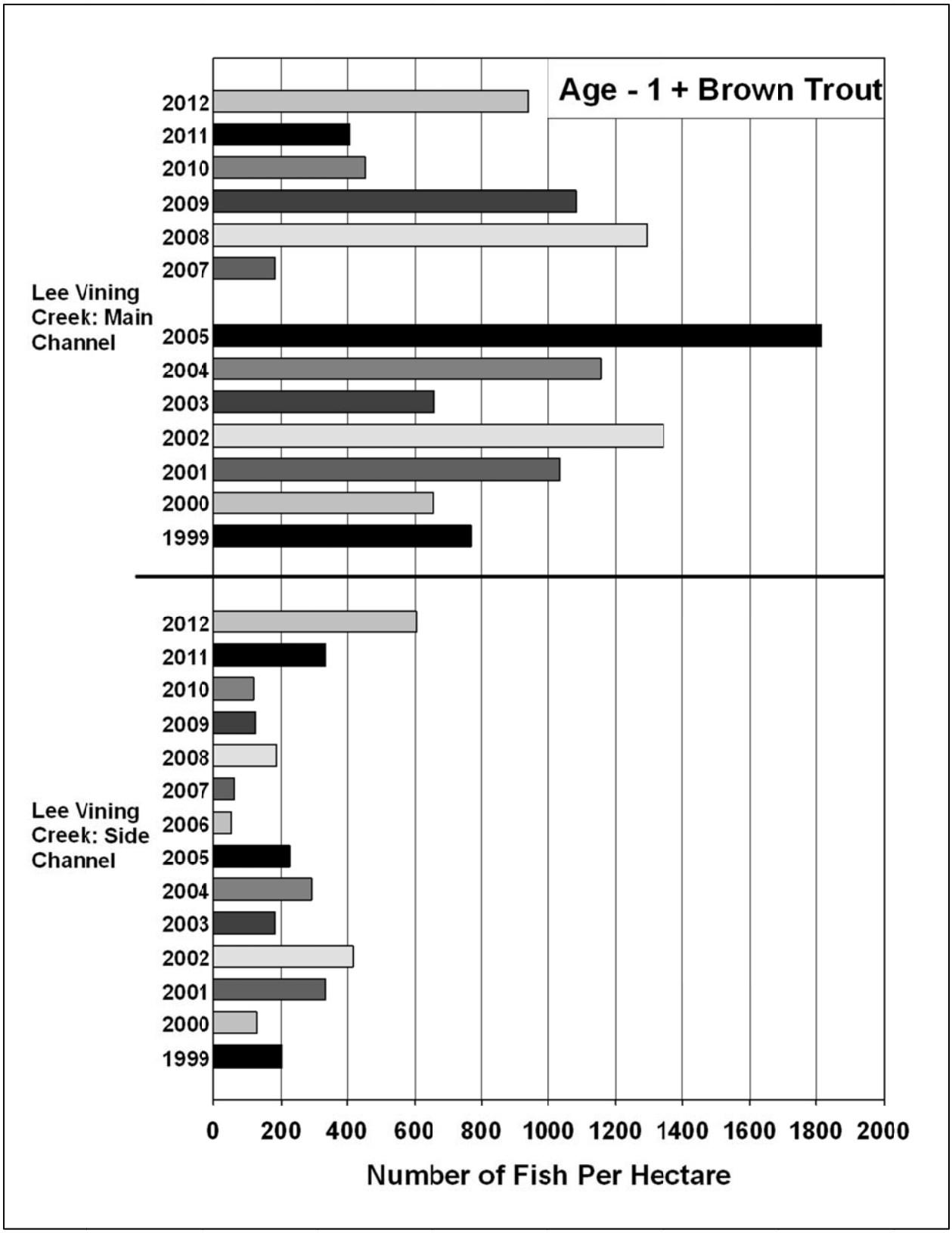

Figure 23. Estimated number of age-1 and older brown trout per hectare in sections of Lee Vining Creek from 1999 to 2012.

Age-1+ Rainbow Trout

For the second year in a row no age-1 and older rainbow trout were captured in the Lee Vining Creek side channel.

For the Lee Vining Creek main channel, the estimated densities of age-1 and older rainbow trout increased by 25% from 56 trout/ha in 2011 to 70 trout/ha in 2012. Although, when compared to the 13 year average (2006 was not sampled due to high flows) of 181 trout/ha, 2012 was below the average by 61% (Figure 24). Sampling years (1999-2001, 2003-2005, 2007 and 2011) produced insufficient numbers of age-1 and older rainbow trout to generate population estimates, thus these density estimates were derived from catch data.

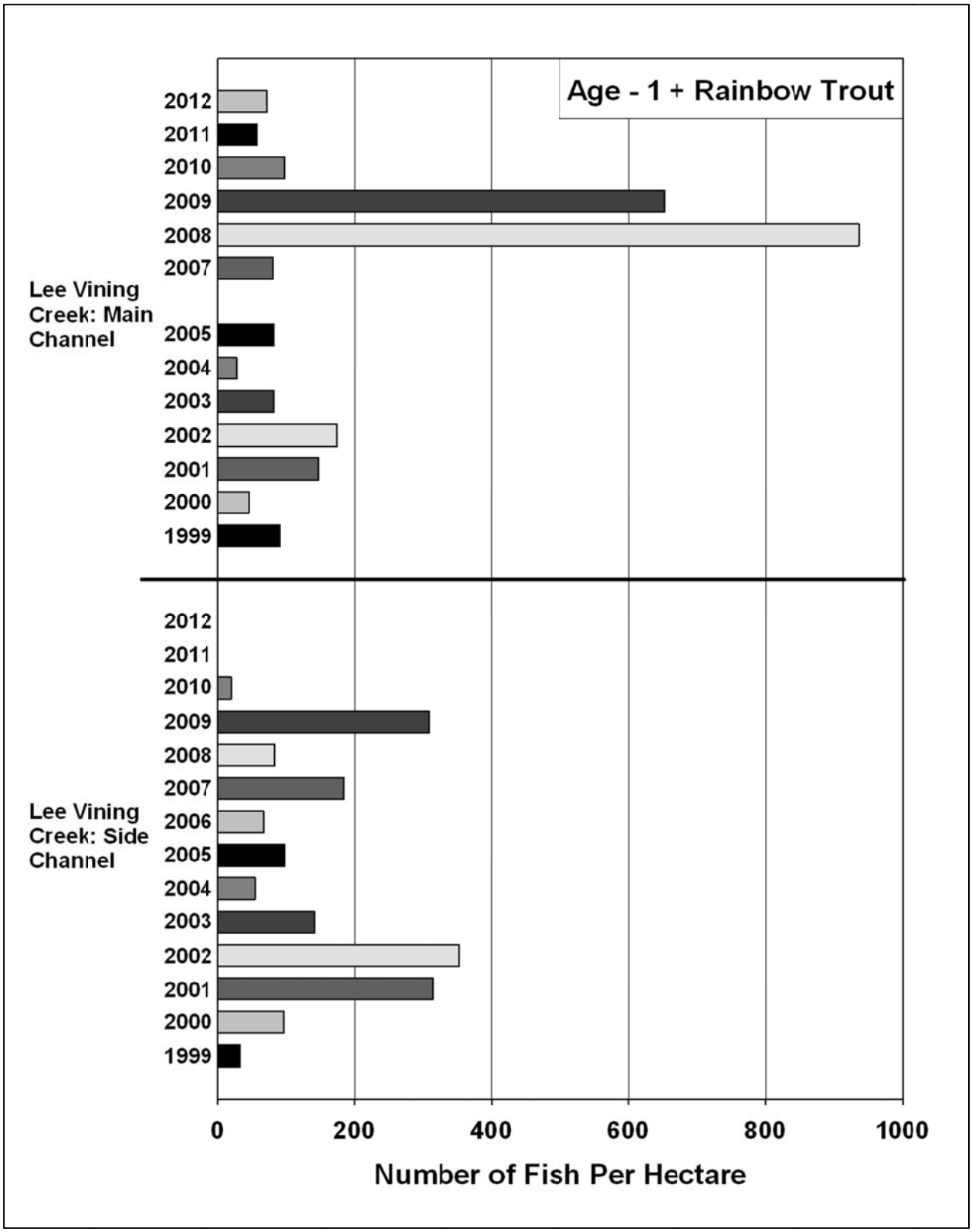

Figure 24. Estimated number of age-1 and older rainbow trout per hectare in sections of Lee Vining Creek from 1999 to 2012.

Estimated Trout Densities Expressed in Numbers per Unit Length

The Upper Rush section produced a total of 8,288 brown trout per kilometer in 2012 which was 23% lower than 2011's estimate of 10,821brown trout/km (Table 22). When looking at the 12-year sampling history of Upper Rush, sample year 2000 produced the highest estimate (11,054 trout/km) followed by 2011 (10,821 trout/km). The 2012 estimate was the fifth highest in the 12 years since 2000, and 25% higher than the 13-year average of 6,605 total brown trout/km. The estimated age-1+ brown tout density in 2012 was 1,556 brown trout/km which was 15% lower than the 2011 estimate.

The Bottomlands section in 2012 produced a total estimated 3,208 brown trout/km which was 18% higher than the 2011 estimate of 2,725 (Table 22). The estimated density of age-1+ brown trout in 2012 was 1,279 brown trout/km, a 38% increase from 2011. When compared to the five year average of 3,176 total brown trout/km, 2012 was only 1% higher.

The County Road section in 2012 had a total estimate of 3,459 brown trout/km, which was 22% higher than the 2011, 2,836 brown trout /km (Table 22). Age-1 and older brown trout also increased by 34% from the 2011 estimate of 1,021 brown trout/km to the 2012 estimate of 1,371 brown trout/km. When compared to the 13-year average of 3,034 total brown trout/km, 2012 was 14 percent higher.

The Lee Vining Creek main channel produced an estimate of 4,361 rainbow and brown trout/km in 2012 (Table 23). The 2012 estimate was 499% higher the 2011 estimate of 727 rainbow and brown trout/km. Catch numbers were used for two size classes for rainbow trout (125-199 mm and for 200 mm+) due to insufficient numbers of recaptures for those size classes. For age-1+ rainbow and brown trout, an estimated density was 506 trout/km in 2012 which was a 96% increase from 2011.

The Lee Vining side channel produced a total estimate of 257 brown trout/km in 2012, a 65% increase from 2011 (Table 23). Age-1 and older brown produced an estimate of 123 brown trout/km in 2012 which was a 41% increase from 2011's estimate.

The Lee Vining main channel and the side channel densities were added in order to compare to the proposed termination criteria as discussed in the 2011 annual report (Taylor 2011). When combined, the two channels produced a total estimate of 2,668 rainbow and brown trout/km in 2012 which was a 502% increase compared to the 2011 estimate of 443 rainbow and brown trout/km. The 2012 total estimate was 178% higher than the 12 year average of 958 rainbow and brown trout/km (Table 23). Age-1 and older trout in these two channels produced an estimate of 348 rainbow and brown trout/km in 2012, a 101% increase from 2011's estimate. The 2012 estimate for age-1 and older brown and rainbow trout was 8% higher than the 12 year average of 321.

Table 22. Total number of brown trout per kilometer of stream channel for Rush Creek sample sections from 2000 to 2012. The value within (#) denotes the number of age-1 and older trout per kilometer.

Collection Location	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average Total #
Rush Creek, Upper Rush	11,054 (1,547)	8,535 (837)	6,137 (900)	2,740 (791)	3,881 (495)	5,032 (1,167)	7,905 (1,100)	8,698 (1,621)	3,607 (1,267)	3,444 (1,186)	5,726 (881)	10,821 (1,833)	8,288 (1,556)	6,605
Rush Creek, Bottom-land	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3,579 (1,467)	2,961 (1,146)	3,405 (963)	2,725 (929)	3,208 (1,279)	3,176
Rush Creek, County Road	3,832 (725)	2,530 (942)	2,618 (536)	3,136 (764)	2,095 (641)	1,737 (641)	3,242 (702)	5,011 (1,402)	3,186 (1,346)	3,064 (1,611)	3,498 (1,222)	2,836 (1,021)	3,459 (1,371)	3,034

Table 23. Total number of brown and rainbow trout per kilometer of stream channel for Lee Vining Creek sample sections from 2000 to 2012. The value within ( ) denotes the number of age-1 and older trout per kilometer.

Collection Location	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average Total #
Lee Vining, Main Channel	674 (337)	1,333 (567)	883 (729)	1,181 (355)	936 (568)	917 (910)	Not Sampled due to high flow	2,103 (148)	2,357 (1,204)	1,192 (1,023)	518 (326)	727 (258)	4,361 (506)	1,430
Lee Vining, Side Channel	853 (112)	623 (287)	731 (369)	626 (154)	1,144 (165)	169 (154)	618 (48)	129 (62)	103 (67)	133 (108)	103 (36)	159 (87)	257 (123)	434
LV Main + LV Side Additive Approach	764 (225)	978 (427)	807 (549)	904 (255)	1,040 (367)	543 (532)	Not Averaged In 2006	1,116 (105)	1,230 (636)	663 (566)	311 (181)	443 (173)	2,668 (348)	958

Estimated Trout Standing Crop Comparisons

The estimated standing crop for brown trout in the Upper Rush section was 178 kg/ha in 2012 which was a 21% decrease from the 2011 estimate of 224 kg/ha (Table 24). When compared to the 14 year average of 156 kg/ha, the 2012 standing crop estimate was 10% higher (Figure 25)

Bottomlands' brown trout in 2012 produced a standing crop estimate of 103 kg/ha (Figure 25). This estimate was a 14% increase from the 2011 estimate of 90 kg/ha (Table 24). The five sampling years produced an average of 107 kg/ha, which was 4% higher than the 2012 estimate.

The County Road section produced a standing crop estimate for brown trout of 104 kg/ha in 2012 which was the fifth highest in sampling history. This estimate was a 24% increase from the 2011 estimate of 84 kg/ha (Table 24). The 13-year average for County Road was 95 kg/ha which was that lowest for all Rush Creek sections and 9% lower than the 2012 estimate.

Although there are no standing crop termination criteria for the MGORD, standing crop for the MGORD was estimated. The standing crop estimate was 119 kg/ha in 2012, the second highest following the 2006 estimate of 208 kg/ha. Due to an insufficient number of age-0 brown trout recaptured, a population estimate based on a catch numbers for age-0 brown trout was used to estimate a standing crop. When compared to the 2010 estimate of 77 kg/ha, 2012 was 55% higher. The six year average for the MGORD was 100 kg/ha which was 19% less than the 2012 estimate.

Like the MGORD, the Walker Creek section does not have any proposed termination criteria for standing crop. Walker Creek produced an estimate of 156 kg/ha in 2012, a 20% increase from the 2011 estimate of 130 kg/ha (Table 24). The 14-year average standing crop is 120 kg/ha, and this average is higher than all Rush Creek sections except for Upper Rush.

The Lee Vining main channel in 2012 produced a standing crop of 173 kg/ha for both rainbow and brown trout. The 2012 estimate was a 193% increase from the 2011 estimate of 59 kg/ha. Brown trout made up 145 kg/ha of the total and rainbow trout made up the rest at 28 kg/ha. Catch numbers were again used for two size classes for rainbow trout (125-199 mm and for 200+) due to insufficient number of recaptures for those size classes. Brown trout in 2012 increased from the 2011 estimate by 102% and rainbow trout increased by 133%.

The Lee Vining side channel produced a standing crop estimate of 39 kg/ha in 2012 which was a 15% increase compared to the 2011 estimate of 34 kg/ha. No rainbow trout were captured in the side channel in 2012.

When standing crop estimates between the main channel and the side channel were added, a total standing crop estimate was 143 kg/ha, a 138% increase from 2011

(Table 25). Compared to the six year average since 2007, the 2012 total sanding crop estimate was 58% higher.

Table 24. Comparison of brown trout standing crop (kg/ha) estimates between 2011 and 2012 for Rush Creek sections.

Collection Location	2011 Total Standing Crop (kg/ha)	2012 Total Standing Crop (kg/ha)	Percent Change Between 2011 and 2012
Rush Creek – Upper	224	178	-21%
Rush Creek - Bottomlands	90	103	+14%
Rush Creek - County Road	84	104	+24%
Rush Creek - MGORD	77*	119	+55%
Walker Creek	130	156	+20%

* 2010 Total Standing Crop Value.

Table 25. Comparison of total (brown and rainbow trout) standing crop (kg/ha) estimates between 2011 and 2012 for the Lee Vining Creek sections.

Collection Location	2011 Total Standing Crop (kg/ha)	2012 Total Standing Crop (kg/ha)	Percent Change Between 2011 and 2012
Lee Vining Creek - Main Channel	59	173	+193%
Lee Vining Creek - Side Channel	34	39	+15%
Lee Vining Creek – Main and Side Channel Combined	60	143	+138%

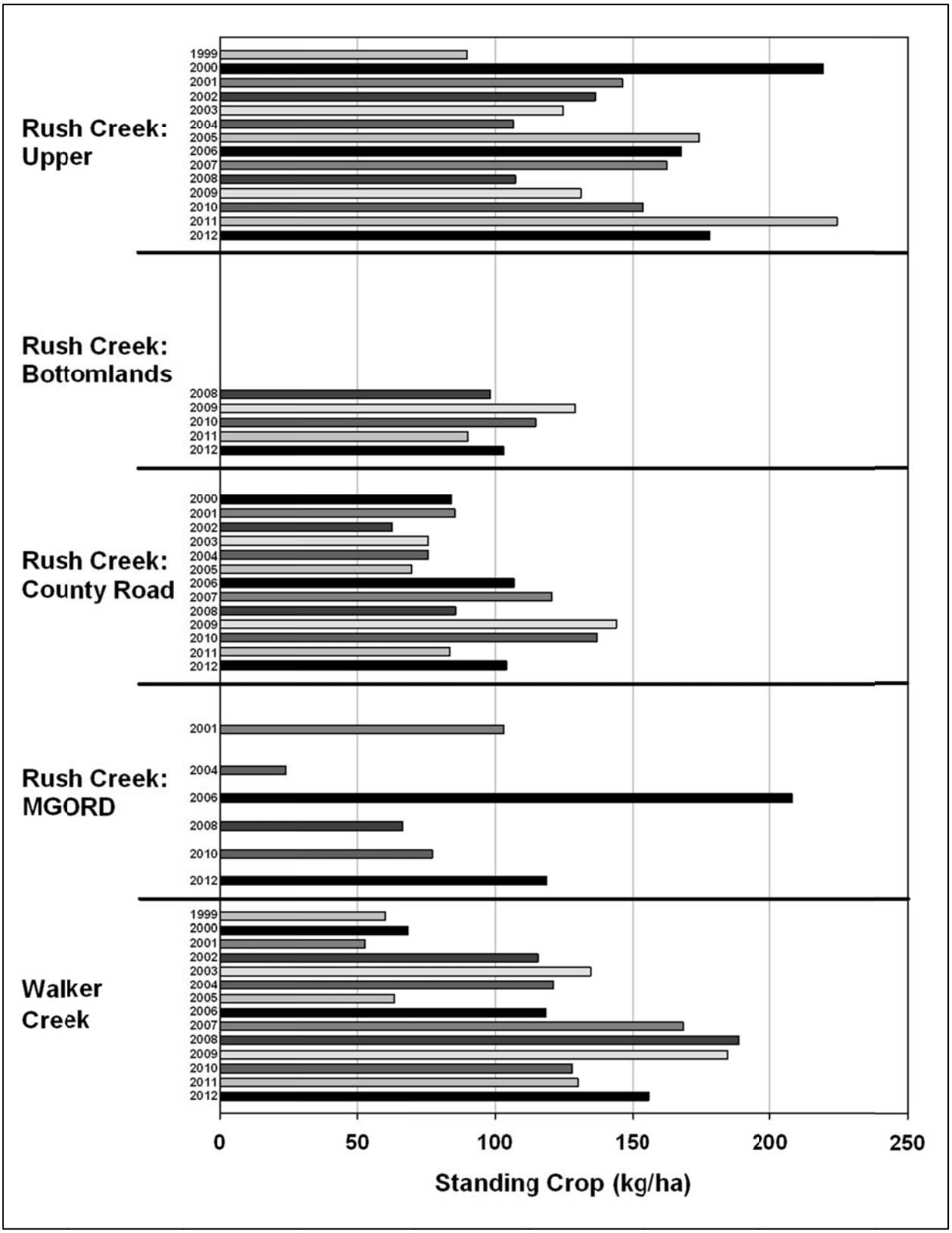

Figure 25. Estimated total standing crop (kilograms per hectare) of brown trout in all sample sections within Rush Creek from 1999 to 2012.

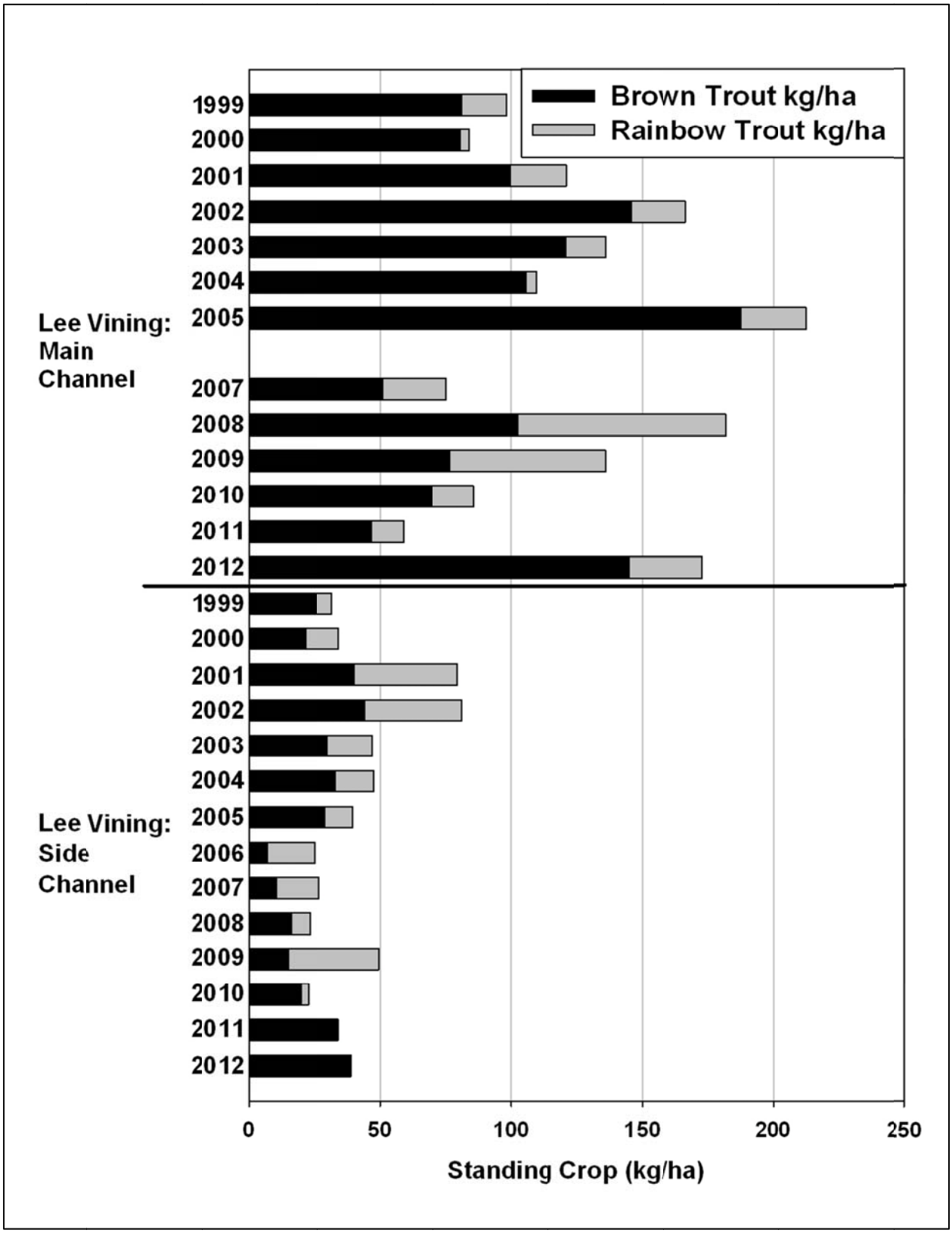

Figure 26. Estimated total standing crop (kilograms per hectare) of brown trout and rainbow trout in all sample sections within the Lee Vining Creek drainage from 1999 to 2012.

Relative Stock Density (RSD) Results for Rush and Lee Vining Creeks

RSD-225 values for brown trout in the three sections of Rush Creek continued to decrease from the 2010 values (Table 26).

On the Upper Rush section, the RSD-225 value decreased from the 2011 value of 23 to the 2012 value of 20. The RSD-225 in 2012 was also lower than the 13 year average of 24 mainly due to the larger number of trout ≥150 mm in 2012 which offset the slightly higher number of trout ≥250 mm. The RSD-300 value was one in 2012, which did not change from the 2011 value. A combination of the increase of trout ≥150 mm and the low number of trout ≥300 mm most likely contributed to the reduce RSD-300 value in 2012.

The RSD-225 value for the Bottomlands section decreased from 2011's value of 18 to 2012's value of 11. This was mainly due to a combination of the increase in trout ≥150mm and the decrease in trout 225-299 mm. The average number of trout 225-299 mm over the sampling history is 47 trout, and the number was only 34 trout for that size class in 2012. No trout larger than 300 mm was captured in 2012; thus, no RSD-300 value was obtained for 2012.

The County Road section had a RSD-225 value of 8 in 2012 which was less than the 2011's value of 17. As the case in the Bottomlands section, the total number of trout ≥150 increased while the number of trout 225-229 mm decreased compared to 2011. This combination resulted in the lower RSD-225 in 2012. In 2012, this section only produced 17 trout in this size class compared to the 13 year average of trout for this size class (45 trout). The RSD-300 value for 2012 was zero down from 1 in 2011. No trout ≥ 300 mm was captured on the County Road section in 2012.

The RSD-225 value for the MGORD in 2012 was 75, a drop from the 2011 value of 83. The RSD-300 value was the same as 2011 at 29 and the RSD-375 value was also the same at 4. The number of trout ≥ 150 mm in 2012 was the third highest in sampling history. In 2012 the MGORD produced 695 trout compared to the average number of trout ≥ 150mm (610 trout).

In the past RSD values on Lee Vining Creek were generated using just the main channel. In 2012, RSD values were recalculated using both the main and side channel sections since 2008 (Table 27). The addition of the side channel resulted in the reduction of all previous RSD-225 values (Tables 27-28). The 2012 RSD-225 value was 32, a decrease from 2011's value of 41. The main and side channels combined produce a RSD-300 value of 2 in 2012, a decrease from 2011's value of 8 (Table 27).

Table 26. RSD values for brown trout in Rush Creek sections from 2000 to 2012.

Sampling Location Rush Creek	Sample Year	Number of Trout ≥150 mm	Number of Trout ≥150-224 mm	Number of Trout 225-299 mm	Number of Trout 300-374 mm	Number of Trout ≥375 mm	RSD-225	RSD-300	RSD-375
Upper Rush	**2012**	**354**	**284**	**66**	**3**	**1**	**20**	**1**	
Upper Rush	2011	498	381	110	6	1	23	1	
Upper Rush	2010	308	202	97	7	2	34	3	1
Upper Rush	2009	372	322	43	5	2	13	2	1
Upper Rush	2008	227	189	31	6	1	17	3	
Upper Rush	2007	282	210	61	9	2	26	4	1
Upper Rush	2006	233	154	69	10	0	34	4	
Upper Rush	2005	202	139	56	5	2	31	3	
Upper Rush	2004	179	112	64	2	1	37	2	
Upper Rush	2003	264	216	45	2	1	18	1	
Upper Rush	2002	220	181	35	1	2	18	2	1
Upper Rush	2001	223	190	27	6	0	15	3	
Upper Rush	2000	182	158	22	2	0	13	1	
Bottomlands	**2012**	**325**	**290**	**34**	**1**	**0**	**11**	**0**	
Bottomlands	2011	267	218	46	3	0	18	1	
Bottomlands	2010	307	225	81	1	0	27	0	
Bottomlands	2009	379	321	56	1	1	15	1	
Bottomlands	2008	160	141	19	0	0	12	0	
County Rd	**2012**	**227**	**209**	**17**	**1**	**0**	**8**	**0**	
County Rd	2011	205	170	33	2	0	17	1	
County Rd	2010	302	228	71	2	1	25	1	
County Rd	2009	356	331	25	0	0	7	0	
County Rd	2008*	97	88	9	0	0	9	0	
County Rd	2007	591	518	73	0	0	12	0	
County Rd	2006	265	187	78	0	0	29	0	
County Rd	2005	209	162	47	0	0	22	0	
County Rd	2004	409	355	54	0	0	13	0	
County Rd	2003	449	384	64	1	0	14	0	
County Rd	2002	303	262	40	1	0	14	0	
County Rd	2001	418	378	37	3	0	10	1	
County Rd	2000	320	277	43	0	0	13	0	

Table 26 (continued).

Sampling Location Rush Creek	Sample Year	Number of Trout ≥150 mm	Number of Trout ≥150-224 mm	Number of Trout 225-299 mm	Number of Trout 300-374 mm	Number of Trout ≥375 mm	RSD-225	RSD-300	RSD-375
MGORD	**2012**	**694**	**176**	**319**	**173**	**26**	**75**	**29**	**4**
MGORD	2011	216	36	117	55	8	83	29	4
MGORD	2010	694	252	292	115	35	64	22	5
MGORD	2009	643	156	338	123	26	76	23	4
MGORD	2008	856	415	301	118	22	52	16	3
MGORD	2007	621	144	191	259	27	77	46	4
MGORD	2006	567	60	200	280	27	89	54	5
MGORD	2004	424	130	197	64	33	69	23	8
MGORD	2001	774	330	217	119	108	57	29	14

*The relatively low number of trout captured ≥150 mm in 2008 is due to the shortening of the County Road section.

Table 27. RSD values for brown and rainbow trout in the Lee Vining Creek main channel and side channel sections from 2008 to 2012. RSD values for brown and rainbow trout in the Lee Vining Creek main channel section from 2000 to 2012. NS = not sampled due to high flow.

Sampling Location Lee Vining Creek	Sample Year	Number of Trout ≥150 mm	Number of Trout ≥150-224 mm	Number of Trout 225-299 mm	Number of Trout 300-374 mm	Number of Trout ≥375 mm	RSD-225	RSD-300
Main & Side Channel	**2012**	**128**	**87**	**39**	**2**	**0**	**32**	**2**
Main & Side Channel	2011	78	46	26	5	1	41	8
Main & Side Channel	2010	68	31	35	2	0	54	3
Main & Side Channel	2009	192	159	32	1	0	17	1
Main & Side Channel	2008	252	242	19	0	0	4	0
Main Channel	2007	29	24	5	0	0	17	0
Main Channel	2006	NS	NS	NS	NS	NS	-	-
Main Channel	2005	60	37	20	2	1	38	5
Main Channel	2004	70	60	8	2	0	14	3
Main Channel	2003	52	27	23	2	0	48	4
Main Channel	2002	100	74	23	3	0	26	3
Main Channel	2001	90	71	16	3	0	21	3
Main Channel	2000	51	32	18	1	0	37	2

Table 28. RSD values for brown and rainbow trout in just the Lee Vining Creek main channel from 2008 to 2012.

Sampling Location Lee Vining Creek	Sample Year	Number of Trout ≥150 mm	Number of Trout ≥150-224 mm	Number of Trout 225-299 mm	Number of Trout 300-374 mm	Number of Trout ≥375 mm	RSD-225	RSD-300
Main Channel	**2012**	**111**	**72**	**37**	**2**	**0**	**35**	**2**
Main Channel	2011	60	31	23	5	1	48	10
Main Channel	2010	62	28	32	2	0	55	3
Main Channel	2009	137	106	30	1	0	23	1
Main Channel	2008	149	138	11	0	0	7	0

Termination Criteria Results

Rush Creek sampling sections in 2012, failed to meet four of the five proposed termination criteria for any of the three, three-year running averages.

Upper Rush met the density criterion for all three of the three year running averages. It also met the biomass criterion for years 2010 through 2012 and condition factor for years 2009 through 2011 and 2008 through 2010 (Table 29). The Bottomlands section met the density criterion for all three, three-year averages, but none of the other criteria (Table 30). The County Road section like the two above sections only met the density criterion for all three of the three-year averages (Table 31).

Table 29. Termination criteria analyses for the Upper Rush section of Rush Creek. Bold values indicate that an estimated value met the termination criterion.

Termination Criteria	**2010 – 2012 Average**	**2009 – 2011 Average**	**2008 – 2010 Average**
Biomass (≥175 kg/ha)	**185**	169	130
Density (≥3,000 trout/km)	**8,278**	**6,663**	**4,259**
Condition Factor (≥1.00)	0.99	**1.00**	**1.00**
RSD-225 (≥35)	26	23	21
RSD-300 (≥5)	2	2	3
Conclusion	**Met two of five TC**	**Met two of five TC**	**Met two of five TC**

Table 30. Termination criteria analyses for the Bottomlands of Rush Creek. Bold values indicate that an estimated value met the termination criterion.

Termination Criteria	2010 – 2012 Average	2009 – 2011 Average	2008 – 2010 Average
Biomass (≥175 kg/ha)	103	111	114
Density (≥3,000 trout/km)	**3,113**	**3,030**	**3,315**
Condition Factor (≥1.00)	0.94	0.97	0.96
RSD-225 (≥35)	19	20	18
RSD-300 (≥5)	0	1	0
Conclusion	**Met one of five TC**	**Met one of five TC**	**Met one of five TC**

Table 31. Termination criteria analyses for the County Road section of Rush Creek. Bold values indicate that an estimated value met the termination criterion.

Termination Criteria	2010 – 2012 Average	2009 – 2011 Average	2008 – 2010 Average
Biomass (≥175 kg/ha)	108	122	122
Density (≥3,000 trout/km)	**3,265**	**3,133**	**3,250**
Condition Factor (≥1.00)	0.95	0.97	0.95
RSD-225 (≥35)	17	16	14
RSD-300 (≥5)	0	1	0
Conclusion	**Met one of five TC**	**Met one of five TC**	**Met one of five TC**

The MGORD only met the RSD-225 termination criterion for all the of the three-year running averages. The MGORD was within one value for RSD-375 for all three, three-year running averages (Table 32).

Table 32. Termination criteria analyses for the MGORD section of Rush Creek. Bold values indicate that an estimated value met the termination criterion.

Termination Criteria	2010 – 2012 Average	2009 - 2011 Average	2008 - 2010 Average
RSD-225 (≥60)	**74**	**74**	**64**
RSD-300 (≥30)	27	25	20
RSD-375 (≥5)	4	4	4
Conclusion	**Met TC one of three RSD values**	**Met TC one of three RSD values**	**Met TC one of three RSD values**

The main and side channel of Lee Vining Creek together met the condition factor criterion, for all three of the three-year running averages. The two channels also met the RSD-225 termination criterion for years 2010-2012 and 2009-2011(Table 33).

Table 33. Termination criteria analyses for the Lee Vining Creek sample sections. Bold values indicate that an estimated value met the termination criterion.

Termination Criteria	2010 - 2012 Average	2009 - 2011 Average	2008 - 2010 Average
Biomass (≥150 kg/ha)	106	77	103
Density (≥1,400 trout/km)	1,151	483	745
Condition Factor (≥1.00)	**1.04**	**1.07**	**1.05**
RSD-225 (≥30)	**42**	**37**	25
Conclusion	**Met two of four TC**	**Met two of four TC**	**Met one of four TC**

Discussion

The 2012 sampling year was the fourteenth consecutive year in which trout population data were collected and the fourth year of the PIT tagging study on Rush, Lee Vining, and Walker Creeks. Methods were derived from two years of pilot studies conducted in 1997 and 1998. The 2012 runoff year was 55% of normal and considered a “dry” runoff year type. Under SRFs, no peak flows were required and winter baseflows were 36 and 25 cfs for Rush and Lee Vining Creeks, respectively. Summer baseflows for Rush and Lee Vining Creeks were 31 and 37 cfs, respectively.

In 2010, the Stream Scientists released their Synthesis Report in which they recommended new Stream Ecosystem Flows (SEF) for Rush and Lee Vining Creeks. Besides addressing geomorphic and riparian needs, the new SEF regimes were developed to improve the growth and survival of the trout in these creeks by; 1) lowering winter baseflows in both Rush and Lee Vining creeks to increase preferred trout winter holding habitat, 2) to increase storage and maintain higher storage levels in GLR to improve summer thermal conditions in Rush Creek, and 3) modifying the receding limb of the Rush Creeks’ hydrograph to improve summer thermal conditions (M&T and RTA 2010).

Winter baseflows in Rush and Lee Vining Creeks have been consistent with SEFs since the winter of 2007-2008. Lee Vining Creek has had five consecutive winters with SEF type winter baseflows. Rush Creek had four consecutive winters with SEF type winter baseflows until the winter of 2011-2012.

SRF baseflows returned in the winter of 2011-2012. Since the 2011 runoff year was considered a “wet” runoff year GLR began the year at full capacity and spilled from March 28, 2011 through August 16, 2011 until exports were increased.

In early August of 2011, GLR continued spilling about 150 cfs while inflow into GLR remained above 200 cfs. The combined flow from Parker and Walker Creek was 48 cfs which increased lower Rush flows to approximately 200 cfs. Annual fisheries monitoring scheduled for September required flows to be less than 40 cfs for safety reasons. Therefore Lee Vining Creek flows were lowered by diverted Lee Vining water to GLR via the Lee Vining Conduit. Flows from Parker and Walker creeks were also diverted to reduce Rush Creek flows. In order to prevent GLR from spilling and reduce Rush Creek flows LADWP exports were increased first to 90 cfs and then 120 cfs to lower GLR.

With continuous high inflow into GLR well into September of 2011, it was apparent that a mid-winter spill was possible. To prevent this possibility which would have likely resulted in the loss of age-0 brown trout, the California Department of Fish and Wildlife (formerly, the California Department of Fish and Game) suggested that a controlled flow be released from the MGORD in October to lower the GLR level, prior to the late-fall spawning period of brown trout. On October 6, 2011, the SWRCB sent an approval letter for the controlled flow as long as it was done before the existing variance ended.

On October 7, 2011, LADWP started ramping Rush Creek release from 48 cfs to 350 cfs at a 20 percent daily ramping-rate. Approximately 350 cfs was released for seven days and ramped down back to SRF baseflows of 55 cfs by October 31, 2011. This release had the effect of avoiding a mid-winter spill and thus preserved the survival of age-0 brown trout.

Proposed Rush Creek SEF winter baseflows may increase the frequency of GLR spilling mid-winter and reducing the following year's recruitment. The frequency of this occurrence is highly dependent on the GLR level, hydrology, and SCE's releases during the transition period (while Mono Lake is below 6,392 ft and LADWP's annual exports are capped at 16,000 acre-feet). If feasible another means to prevent fall to mid-winter spills during the transition period may be for LADWP to extend the duration of SEF peak releases during the spring-summer run-off period. Once Mono Lake has reached an elevation 6,392 ft (post-transition), LADWP's average annual exports will increase, thus reducing the probability of mid-winter spills from GLR.

Brown Trout Responses to Winter Baseflows

Runoff year 2011 increased the period in which winter baseflows were within the ranges recommended by the Stream Scientists, thus providing an opportunity to examine the potential effects of lowered winter baseflows on the fishery. Beginning in 2012, baseflows were reverted back to SRFs.

Density

To examine responses of brown trout to the different winter baseflow regimes, average density for the SRF (2000-2007 and 2012) and SEF (2008-2010) was calculated for Upper Rush and County Road sections. Density data from the Bottomlands section were not utilized because this section was not established until 2008.

Average densities were lower for age-0 brown trout and higher for age-1 and older brown trout in both Upper Rush and County Road (Table 34 and 35) under SEF conditions. Indicating that SEF winter baseflows conditions, may result in populations shifting towards a greater number of larger and older trout rather than a population dominated by smaller and younger as observed under SRF conditions.

Relative Stocking Densities

RSD values do not respond in a similar manner as values are essentially identical under either winter baseflow scenario. RSD-225 values for Upper Rush were slightly lower under SEFs than under SRFs conditions. There was no change for RSD-300 between the different flow scenarios (Table 34). County Road experienced no differences in RSD-225 values under the different winter baseflows and moderately increased RSD-300 (0.5 versus 0.1) under SEF conditions versus SRF flows (Table 35).

Table 34. Average condition factor, density, RSD value, flow, and temperature for the SRF (2000-2007 and 2012) and SEF (2008-2011) winter baseflows for Upper Rush.

Upper Rush									Water Temperature			Air Temperature			
Year	Condition Factor	Density (#/ha)		RSD		Flow			Daily Maximum			Daily Mean	Daily Maximum		
		Age 0	Age 1+	225	300	Winter (Nov-Feb)	Summer (Jul-Sep)	Peak Daily	Summer (Jul-Sep)	Summer (Max)	No. Days >70°F	Summer (Jul-Sep)	Summer (Jul-Sep)	Summer Max	No. Days >70°F
2000	1.12	12847	2090	13	1	46	62	203				59.3	80.8	92	5
2001	1.03	10402	1131	15	3	44	50	159				61.2	83.1	93	8
2002	1.05	7077	1216	18	2	45	49	166				61.4	83.2	99	19
2003	1.03	2634	1069	18	1	47	48	203				61.8	83.6	96	8
2004	1.00	4238	620	37	2	43	43	345				59.9	81.8	95	4
2005	1.04	4516	1357	31	3	43	108	408	62.0	66.1	0	61.3	83.0	98	15
2006	1.02	8298	1341	34	4	44	169	473	61.3	66.7	0	61.5	84.1	97	19
2007	0.96	8326	1907	26	4	53	32	38	68.2	72.2	38	62.7	85.8	99	35
2008	0.98	2629	1424	17	3	28	44	354	70.5	75.7	58	63.7	86.4	97	26
2009	1.03	2509	1318	13	2	33	40	59	67.4	71.3	5	62.9	85.3	94	19
2010	0.98	5836	1062	34	3	33	126	434	64.1	68.4	0	62.1	85.0	98	16
2011	1.00	10829	2208	23	1	32	167	446	62.4	66.1	0	62.4	85.0	95	10
2012	0.98	9637	1927	20	1	56	34	43	69.6	72.1	36	64.9	87.0	96	22
Ave. SRF 00-07, and 12	1.02	7553	1407	24	2.3	47	66	227	65	69	19	62	84	96	15
Ave. SEF 08-11	1	5451	1503	22	2.3	31	94	323	66	70	16	63	85	96	18

Table 35. Average condition factor, density, RSD value, flow, and temperature for the SRF (2000-2007 and 2012) and SEF (2008-2010) winter baseflows for County Road.

County Road									Water Temperature			Air Temperature			
Year	Condition Factor	Density (#/ha)		RSD		Flow			Daily Maximum			Daily Mean	Daily Maximum		
		Age 0	Age 1+	225	300	Winter (Nov-Feb)	Summer (Jul-Sep)	Peak Daily	Summer (Jul-Sep)	Summer (Max)	No. Days >70°F	Summer (Jul-Sep)	Summer (Jul-Sep)	Summer Max	No. Days >70°F
2000	1.07	3839	906	13	0	54	84	255	67.3	71.5	16	59.3	80.8	92	5
2001	0.97	1934	1178	10	1	51	67	201	67.0	71.2	6	61.2	83.1	93	8
2002	0.99	2478	638	14	0	53	65	223	68.1	74.6	37	61.4	83.2	99	19
2003	0.97	2823	909	14	0	54	68	284	**69.1**	**73.9**	**19**	61.8	83.6	96	8
2004	0.99	1981	873	13	0	49	58	374	69.2	75.2	47	59.9	81.8	95	4
2005	1.08	1305	763	22	0	50	157	472				61.3	83.0	98	15
2006	1.00	3299	912	29	0	54	211	580	66.8	70.1	2	61.5	84.1	97	19
2007	0.92	4877	1895	12	0	61	45	62	69.0	74.9	51	**62.7**	**85.8**	**99**	**35**
2008	0.89	2243	1641	9	0	33	60	395	70.6	75.6	58	63.7	86.4	97	26
2009	1.00	1963	2177	7	0	39	59	117				62.9	85.3	94	19
2010	0.97	2776	1490	25	1	39	156	493	66.0	71.6	6	62.1	85.0	98	16
2011	0.95	2160	1216	17	1	43	215	565	64.3	67.8	0	62.4	85.0	95	10
2012	0.93	2822	1838	8	0	64	47	66	70.3	74.8	47	64.9	87.0	96	22
Ave. SRF 00-07, and 12	0.99	2817	1101	15	0.1	54	89	280	68	73	28	62	84	96	15
Ave. SEF 08-11	0.95	2286	1631	15	0.5	38	122	393	67	72	21	63	85	96	18

Annual densities of brown trout >255 mm

The principal objective of the winter baseflow recommendation was to increase the amount of winter holding habitat for brown trout, which may ultimately increase the survival of older and thus larger trout in lower Rush Creek (Taylor and Knudson 2011). To evaluate this hypothesis these comparisons were made;

- annual densities of brown trout >255 mm in 2012
- minimum length of age-4 trout at the County Road and Bottomlands sections in 2011as determined by PIT tag return data.
- length-frequency histograms to see if there were any trends in the densities of these older and larger trout in lower Rush Creek from September 2000-2012.

Bottomlands

Following the implementation of SEF winter baseflows in 2008-09 there was an increase in the densities of older and larger brown trout. The first year the Bottomlands section was sampled (2008) no trout > 255 mm were captured. For both 2009 and 2010 there were increases of brown trout 39 and 73 trout/ha respectively. In 2011, the densities dropped to 65 trout/ha and in 2012, the densities dropped to 31 trout/ha after winter baseflows were returned to SRFs (Table 36).

County Road

In 2008, the first year flows were consistent with SEF type winter baseflows County Road had a density of 15 trout /ha followed by a drop of almost half to 8 trout/ha in 2009 (Table 36). In 2010, the highest density yet to be recorded (93 trout/ha) was followed by a drop of more than half in 2011 to 43 trout/ha. In 2012 after the SRFs were reimplemented density estimates dropped further to 12 trout/ha, the fourth lowest in this section's 13-year history.

To further evaluate winter flow recommendations, mean density estimates for brown trout >255 mm were compared under both flow scenarios. Comparing averages, it is evident that SEF's produced twice as many trout as SRF's (Table 36). The SRF's had an average of 18 trout/ha and 14 trout/km compared to the SEF's of 40 trout/ha and 33 trout/km (Table 36). Based on the data collected to date, it does appear that lower winter baseflow is one factor of many that produces older and larger trout.

Table 36. Total catch, population estimates, and densities for brown trout >255 mm in length in the Bottomlands and County Road sections of Rush Creek during September 2000–2012. Catch numbers were used for density estimate calculations whenever there were less than seven recaptures.

Bottomlands								
Year of Sampling	Area (ha)	Length (km)	Population Estimate	Number per hectare	Number per kilometer	Average Winter Baseflow	Average Summer Baseflow	Daily Peak Flow
2008	0.3496	0.437	0	0	0	33	60	395
2009	0.3365	0.437	13	39	30	39	59	117
2010	0.3409	0.437	25	73	57	39	156	493
2011	0.354	0.437	23	65	53	43	215	565
2012	0.322	0.437	N/P	31	23	64	47	66
2008-2011 Mean				44	35	38	122	393
County Road								
Year of Sampling	Area (ha)	Length (km)	Population Estimate	Number per hectare	Number per kilometer	Average Winter Baseflow	Average Summer Baseflow	Daily Peak Flow
2000	0.4878	0.813	N/P	6	4	54	84	255
2001	0.4878	0.813	10	21	12	51	67	201
2002	0.6504	0.813	10	15	12	53	65	223
2003	0.3829	0.813	12	18	15	54	68	284
2004	0.5935	0.813	16	27	20	49	58	374
2005	0.6829	0.813	N/P	10	9	50	157	472
2006	0.626	0.813	N/P	37	28	54	211	580
2007	0.6016	0.813	12	20	15	61	45	62
2008	0.1943	0.237	N/P	15	13	33	60	395
2009	0.2435	0.329	N/P	8	6	39	59	117
2010	0.2698	0.329	25	93	76	39	156	493
2011	0.2764	0.329	12	43	36	43	215	565
2012	0.2468	0.329	N/P	12	9	64	47	66
2000-2007, and 2012 Mean				18	14	54	89	280
2008-2011 Mean				40	33	38	122	393

Lee Vining Main Channel

A failure of Lee Vining Creek to consistently produce larger and older trout has been attributed to the lack of suitable and low-velocity holding habitat. Overall densities of age-1+ trout tend to be lower during years with high-peak flows (Table 37). For example, runoff-years 2010 and 2011 had the highest peak flow since 2000 (511 cfs and 532 cfs, respectively) and these two years also produced two lowest age-1+ densities since 2000. It appears that many of age-1+ trout do not survive higher peak flow conditions. As a result, runoff years 2010 and 2011 produced two of the highest RSD-225 values and 2011 produced the highest RSD-300 value due to the overall reduction of trout >150 mm in length. Consequently, the last two three-year running averages of RSD-225 were two of the highest since 2000 (37 and 42 for 2009-2011 and 2010-2012, respectively.

Table 37. Condition factors, densities, RSD values, flows, and temperatures for Lee Vining Creek 2000-2012.

Lee Vining									Air Temperature			
Year	Condition Factor	Density (#/km)		RSD		Flow			Daily Mean	Daily Maximum		
		Age 0	Age 1+	225	300	Winter (Nov-Feb)	Summer (Jul-Sep)	Peak Daily	Summer (Jul-Sep)	Summer (Jul-Sep)	Summer Max	No. Days >70°F
2000	1.15	337	337	37	2	30	48	264	59.3	80.8	92	5
2001	1.05	766	567	21	3	26	33	215	61.2	83.1	93	8
2002	1.06	154	729	26	3	25	42	238	61.4	83.2	99	19
2003	1.06	826	355	48	4	24	42	332	61.8	83.6	96	8
2004	1.06	368	568	14	3	29	38	152	59.9	81.8	95	4
2005	1.11	7	910	38	5	27	112	374	61.3	83.0	98	15
2006	na	na	na	na	na	39	128	457	61.5	84.1	97	19
2007	1.07	1955	148	17	0	33	26	127	62.7	85.8	99	35
2008	1.01	1153	1204	4	0	17	34	222	63.7	86.4	97	26
2009	1.03	169	1023	17	1	21	42	232	62.9	85.3	94	19
2010	1.07	253	326	54	3	16	48	511	62.1	85.0	98	16
2011	1.08	469	258	41	8	20	158	532	62.4	85.0	95	10
2012	1.00	3824	521	32	2	18	28	59	64.9	87.0	96	22

Trout Growth between 2011 and 2012

In the County Road and Bottomlands sections the average growth rates of age-0 to age-1 trout for the year between 2011 and 2012 were 24g/year and 25g/year, respectively, which were 11g and 9g, lower than rates from the previous year (Table 38). In Upper Rush, the average growth of age-0 to age-1 trout between 2011 and 2012 was 15g lower than the average from 2010 and 2011. Upper Rush and County Road sections in 2011-2012 had almost identical average growth rate to 2006 and 2007.

Growth rates for age-1 to age-2 brown trout, between 2011 and 2012 were lower than the two previous periods (Table 38). The largest decline in average growth rate was Upper Rush (73 g/year to 44 g/year, respectively) followed closely by the County Road

section (46 g/year to 19 g/year, respectively). The growth rate between 2011 and 2012 in the Bottomlands section remained relatively similar to what was observed in 2010-2011.

Across all five years, the average growth rates of brown trout in Rush Creek between age-0 and age-1 have consistently decreased in the downstream direction even though differences between lower two sections have been small. Except for the slight increase in growth in 2010-2011 this trend is also true for average growth rates between age-1 and age-2 brown trout (Table 38).

Table 38. Growth rate (g) comparisons of Rush Creek age-0 to age-1 and age-1 to age-2 brown trout by years.

		Upper Rush	Bottomlands	County Road	Fin Clip or PIT Tag
Age 0 to 1	2006-2007	32	na	25	Adipose Fin Clip
	2008-2009	51	43	41	Adipose Fin Clip
	2009-2010	48	40	36	PIT Tag
	2010-2011	48	36	33	PIT Tag
	2011-2012	33	25	24	PIT Tag
Age 1 to 2	2008-2009	NA	NA	NA	NA
	2009-2010	70	54	56	PIT Tag
	2010-2011	73	32	46	PIT Tag
	2011-2012	42	28	19	PIT Tag

Four potential reasons were presented in the 2011 Annual Report that attempted to explain this spatial trend in growth rates. These reasons are: (1) increased organic and nutrient loading along Upper Reach because of its proximity to GLR, (2) more favorable DO and thermal conditions along the upper reaches, (3) the difference in timing of fry emergence between the upper and lower sections and (4) genetic differences between sections, such that trout along the upper sections maybe progeny of larger MGORD trout. Thermal and DO gradients would seem the most plausible in explaining the difference in growth gradients between the upper and lower sections. The longitudinal water-temperature pattern reveals that relative to the upstream sections, less than 50% of the days between June 1 and September 30, 2012 (57 days out of 122 days) (Table 1) did water temperatures increase in the downstream sections. Consequently, water temperatures in the Bottomlands section were no worse than that of the Upper Rush. However, when looking at diurnal fluctuations on Rush Creek, upper sections experienced max diurnal fluctuations of 8.3 to 13.9 °F while lower Rush Creek sections experienced max diurnal fluctuations of 17.5 to 19.5 °F. It appears that diurnal fluctuations and not DO and thermal gradients are the cause for the reduced growth rates in the lower sections of Rush Creek.

The decreasing trend of growth rates for age-3+ trout was observed again in 2012. Two age-4 brown trout caught at the Bottomlands showed 4mm of growth and lost 11 grams between 2011 and 2012. The age-4 size class in the Bottomlands ranged between 233 and 244 mm. No Pit-tagged age-4 trout were captured in the County Road section; thus, more precise determination of the size class for age-4+ trout was not possible.

But the close examination of the length-frequency histogram revealed that the size class between 281-300mm may belong to age-5 trout. As mentioned in the previous fisheries report, a trout must survive at least five years in order to exceed 300mm in length. The proportion of trout with >300mm in the lower Rush Creek's brown trout remains below 5% in 2012 (one brown trout >300mm in length at the Bottomlands, but none at the County Road).

PIT tag data from the MGORD continues to show excellent brown trout growth for younger trout, but tapers off as trout exceed 300 mm in length. As the case in 2010, more than half of trout captured that were >300 mm in length, lost weight between 2011 and 2012. If not for one trout which gained 156g, the average growth rate for trout between 301 and 375mm in length would have been -13g. Three trout that were >300mm lost more than 100g between 2011 and 2012. Even though the water temperature conditions at MGORD were better than downstream sections, a combined factor of lower flows and higher daily maximum water temperatures may have resulted in lower growth rates for large trout. The effect of senescence among larger trout may have also contributed to lower growth rates. The inconsistent pattern of growth rates for large trout was pointed out in the previous fisheries report. This inconsistency was also found in 2012 as some trout were able to gain weight (e.g. 156g by tag #23449530 and 91g by tag #7025643) while a majority of trout showed a little or negative weigh gain. Competition among large trout for better foraging habitat may be playing a role in MGORD because of the high density of large trout.

Methods Evaluation

In 2012, mark-recapture and depletion estimates were again used to produce population estimates on Rush Lee Vining and Walker Creeks. Block fences were cleaned twice a day, and each section met the assumption of a closed population with no block fence failures.

While there were no major changes to the channels due to peak flows, there was a decrease in average widths on all sections and a decrease in length of the Lee Vining Creek side channel due to the lower flows of 2012. In 2012, the majority of the side channel was dry. Water emerged from the rocks at the top of the annual electro-fishing section and flowed for about three-quarters of the length of the section where it again went sub-surface. Flow in the side channel during the September sampling was approximately a tenth of a cfs. The trout in the side channel were trapped and concentrated in the few pools that were left. Condition factor for these trout was 0.83, the lowest value in the 14 year history and the first time dropping below 1.04. In the future, if the side channel does not have continuous flow, the data should not be used due to the fact that its low densities and condition factors are skewing the data and is not a true representation of the fishery. It is recommended that channel length and width be re-measured annually.

In last year's report, the Stream Scientist stated that because rainbow trout only make up a small portion (<2%) of the Rush Creek trout population only numbers would be

reported and no attempt would be made to make density or biomass estimates. Because of the potential for interspecific competition these rainbow trout should be included in the estimates. These rainbow trout compete with the brown trout for the same resources such as food and habitat and if a particular resource is limiting one or both species will be negatively impacted. Therefore, rainbow trout in Rush Creek should be treated like the rainbow trout in Lee Vining creek and be added to the brown trout estimates. When there are adequate numbers estimates should be used, but when there are insufficient numbers to generate an estimate catch data should be used.

Size classes (0-124, 125-199, and 200+ mm) developed and discussed during the 2008 annual report should continue to be used in the future (Hunter et al. 2008). Using these size classes provides for long term consistency as well as year to year consistency. Annually adjusting size classes would require PIT tagging indefinitely, would be quite costly and will still not be 100% accurate.

Since 2009 the use of PIT tags has allowed the survival, growth, and movement of individuals up to age-4 to be tracked.

In past annual reports all trout with adipose fin clips that failed to produce a PIT tag number when scanned with the tag reader were assumed to have lost their tag. While some trout had visible scars on their bellies from past tagging, not all trout had visible scars. Trout lacking visible scars either had no scar from past tagging or were trout that were clipped as age-0 in 2008 or 2006 and never received a PIT tag as age-1 in 2009. Therefore past calculated shed rates are probably lower than what has been presented in the past.

To ensure that electro-fishing sampling can be conducted safely and efficiently, flows in Rush and Lee Vining creeks not exceed 40 cfs (± 5 cfs) during the annual sampling period.

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Appendices

Appendix A. Termination Criteria

The termination criteria provided in this report are based on the suite of termination criteria proposed by the Fisheries Stream Scientist in an attempt to make the calculation and interpretation of the fisheries termination criteria a more quantifiable exercise. The rationale for replacing the original termination criteria was to evaluate brown trout populations with metrics derived from quantifiable methodologies that are generally accepted as standards by fisheries professionals. As stated in previous annual reports no data were available that provided a scientifically quantitative picture of trout populations that these streams supported on a self-sustaining basis prior to 1941 (Hunter et al. 2000–2008 and Taylor et al. 2009-2011).

Four repeatable and quantifiable metrics are now employed as termination criteria to evaluate the brown trout populations in the Upper, Bottomlands, and County sections of Rush Creek – biomass, density, condition and relative stock density (RSD) of catchable trout (≥225 mm or ≥9”) in the populations. The same four criteria are applied to all trout (brown and rainbow combined) in the Lee Vining Creek sample section. A fifth metric of RSD-300 for brown trout (percentage of brown trout ≥300 mm or ≥12”) is also applied to only Rush Creek sample sections. The values for these fisheries metrics, as discussed below, represent realistic recovery goals for the streams.

Finally, three termination criteria RSD metrics are now applied to the MGORD portion of Rush Creek – the RSD of brown trout ≥225 mm (RSD-225), ≥300 mm (RSD-300) and ≥375 mm (RSD-375).

Rush Creek Termination Criteria for Upper, Bottomlands and County Road Sections

Termination Criterion #1 – Biomass: Total brown trout standing crop estimates based on kilograms per hectare of biomass. Total standing crop estimates will also be calculated to reflect contribution by two age-classes (age-0 and ≥age-1). The termination criterion for biomass estimate is **≥ 175 kg/ha**. Trends in brown trout standing crop data are assessed with three-year moving averages by computing the average of the three most-current years of data. That average should meet the termination criteria of at least **175 kg/ha**.

Termination Criterion #2 – Density: Total number of brown trout per unit length (km) of stream channel. The termination criterion for total number of trout per kilometer is **≥3,000 trout/km**. Trends in total number of trout per kilometer are assessed with three-year moving averages by computing the average of the three most-current years of data. That average should meet the termination criteria of at least **3,000 trout/km**.

Termination Criterion #3 – Condition: Condition factor of brown trout ≥age-1+ is computed and should not drop below **1.00**. Values below 1.00 should be of concern to managers. When standing crop values drop, fishery would be considered in "good condition" if condition factors remain stable or increase. It is possible that higher densities (# of fish/ha) will result in lower condition factors for individual groups of trout due to density dependent competition. Trends in condition factor are assessed with three-year moving averages by computing the average of three most-current years of data. That average should meet the termination criteria of condition factor **≥1.00**.

Termination Criterion #4 – RSD-225: RSD-225 values of brown trout are computed for all sections of Rush Creek and should not drop below **35**. Trends in RSD-225 are assessed with three-year moving averages by computing the average of the three most-current years of data. That average should meet the termination criteria RSD-225 value of at least **35**.

Termination Criterion #5 – RSD-300: RSD-300 values of brown trout are computed for all sections of Rush Creek and should not drop below **5**. Trends in RSD-300 are assessed with three-year moving averages by computing the average of the three most-current years of data. That average should meet the termination criteria RSD-300 value of at least **5**.

Lee Vining Creek Termination Criteria

Termination Criterion #1 – Biomass: Total trout (brown and wild rainbow combined) standing crop estimates based on kilograms per hectare of biomass. Total standing crop estimates will also be calculated to reflect contribution by two age-classes (age-0 and ≥age-1). The termination criterion for biomass estimate is **≥ 150 kg/ha**. Trends in total trout standing crop data are assessed with three-year moving averages by computing the average of the three most-current years of data. That average should meet the termination criteria of at least **150 kg/ha**.

Termination Criterion #2 – Density: Total number of trout per unit length (km) of stream channel. The termination criterion for total number of trout per kilometer is **≥1,400 trout/km**. Trends in total number of trout per kilometer are assessed with three-year moving averages by computing the average of the three most-current years of data. That average should meet the termination criteria of at least **1,400 trout/km**.

Termination Criterion #3 – Condition: Condition factor of trout ≥age-1+ is computed and should not drop below **1.00**. Trends in condition factor are assessed with three-year moving averages by computing the average of three most-current years of data. That average should meet the termination criteria of condition factor **≥1.00**.

Termination Criterion #4 – RSD-225: RSD-225 values of all trout (brown and wild rainbow) are computed for both Lee Vining Creek study sections and should not drop below **30**. Trends in RSD-225 are assessed with three-year moving averages by

computing the average of the three most-current years of data. That average should meet the termination criteria RSD-225 value of at least **30**.

Rush Creek Termination Criteria for the MGORD Section

For the Rush Creek MGORD study section three termination criteria metrics of RSD are utilized – the RSD of brown trout ≥225 mm (≥9”), ≥300 mm (≥12”) and ≥375 mm (≥15”).

RSD-225 value in the MGORD is computed and should not drop below **60**.
RSD-300 value in the MGORD is computed and should not drop below **30**.
RSD-375 value in the MGORD is computed and should not drop below **5**.

Trends in RSD-225, RSD-300 and RSD-375 were assessed with three-year moving averages by computing the average of the three most-current years of data. The averages should meet the termination criteria of **60**, **30** and **5**, respectively.

The rationale for assessing these “large trout” metrics specifically for the MGORD is that this human-constructed section below Grant Lake Reservoir has unique spring creek-like characteristics that support the growth of large brown trout similar to the pre-1941 productivity of the human-influenced springs below the Rush Creek Narrows. Two years of movement study data demonstrated that approximately 40 to 50% of the large (>300 mm) radio-tagged brown trout migrated between the MGORD and downstream reaches of Rush Creek, especially during autumn and winter. To most accurately evaluate the status of large brown trout in the Rush Creek system immediately downstream of Grant Lake Reservoir, data for computing RSD values of MGORD brown trout should be collected in September, prior to the onset of the fall spawning season when migrations occur.

How to use the Quantifiable Termination Criteria

1. With the most-current data set, calculate the biomass, density, condition factor and RSD-225 values for each section of Rush Creek and Lee Vining Creek. Calculate the RSD-300 values for Rush Creek sections only.

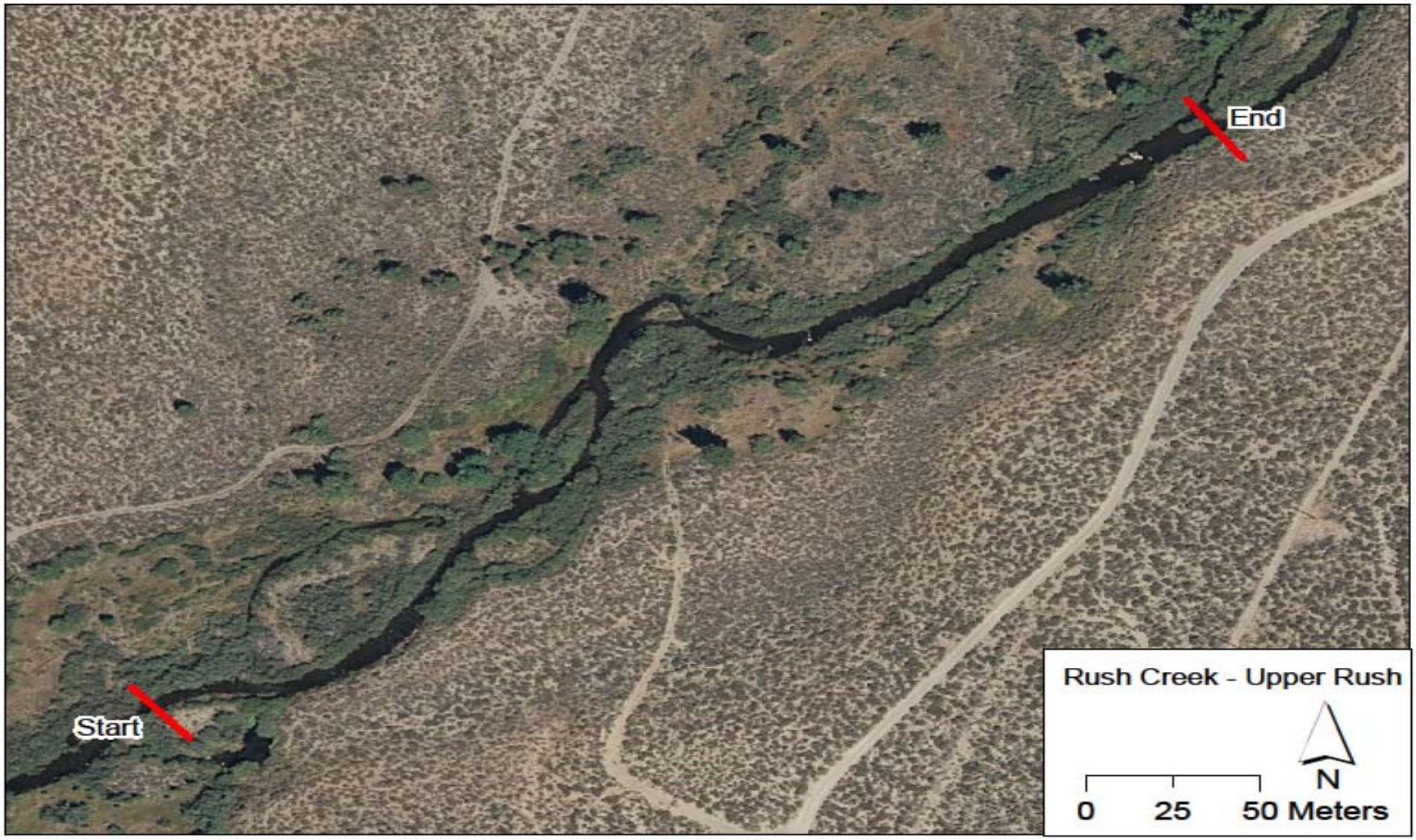
2. For Lee Vining Creek, the biomass estimates from the main and side (if watered) channels were combined for a total value. For densities and condition factors, the values from the main and side (if watered) channels were averaged.

3. For the current year and the two previous years, calculate the three-year running averages of biomass, density, condition factor and RSD-225 for each section of Rush Creek and Lee Vining Creek. Calculate the three-year running averages of RSD-300 for Rush Creek sections only. *Five years of data are necessary to compute a complete set of three, three-year running averages.*

4. For the Upper, Bottomlands and County Road sections of Rush Creek, a section would be considered “recovered” if it met four of the five termination criteria for three consecutive years that the three-year running averages were calculated. The rationale is that in years of high young-of-year (age-0) recruitment, densities will be high with fairly low biomass estimates. Conversely, in years of low age-0 recruitment densities will probably drop, but biomass of older trout should increase. Years of high densities may also exhibit lower condition factors due to density-dependent competition for available food and/or habitat.

5. For Lee Vining Creek, the sample section would be considered “recovered” if it met three of the four termination criteria for three consecutive years that the three-year running averages were calculated.

Appendix B: Aerial Photographs of Long-term Monitoring Sections.




End
Start
Rush Creek - Bottomlands
N
0
25
50 Meters


End
Start
Rush Creek - County Road
N
0
25
50 Meters


End
Start
Rush Creek - MGORD
N
0
100
200 Meters


End
End
B-1 Side Channel
Main Channel
Start
Start
Lee Vining Creek- Main and B-1 Side Channels
0
20
40 Meters
N


End
Start
Walker Creek
N
0
12.5
25 Meters

Appendix C: PIT Tag Recaptures Data from 2009 through 2012.

Rush Creek: Upper (Annual Growth 2009-2012 by Size Class)

2009-2010						
Rush Creek: Upper	Length (mm)			Weight (g)		
Fish ID BNT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020941792	83	151	68	6	32	26
985121020113318	91	173	82	7	49	42
985121020115182	91	174	83	8	51	43
985121020114282	91	175	84	7	52	45
985121020936745	92	161	69	8	43	35
985121020128509	96	175	79	10	53	43
985121020939006	98	177	79	10	57	47
985121020114049	99	182	83	10	61	51
985121020913468	100	160	60	10	42	32
985121020117810	100	188	88	10	61	51
985121020114149	100	189	89	11	67	56
985121020935610	102	190	88	12	69	57
985121020109142	103	180	77	12	55	43
985121020110718	107	183	76	13	60	47
985121020118914	107	189	82	13	69	56
985121020113231	107	209	102	12	84	72
985121020932673	109	177	68	14	55	41
985121020910463	110	195	85	15	76	61
985121020910766	110	196	86	14	74	60
985121020903354	110	200	90	13	76	63
985121020912366	112	179	67	15	62	47
985121020938134	112	184	72	14	57	43
985121020933639	112	210	98	14	88	74
985121020128338	117	197	80	17	85	68
Average Growth < 124			**81**			**50**
985121020927961	168	239	71	45	129	84
985121020941237	173	224	51	53	116	63
Average Growth 125-199			**61**			**74**
985121020938419	183	235	52	64	128	64
985121020922419	284	307	23	220	277	57
Average Growth 200+			**38**			**61**
2010-2011						
Rush Creek: Upper	Length (mm)			Weight (g)		
Fish ID BNT	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121023551476	81	190	109	5	69	64
985121020112648	86	158	72	7	38	31
985121023632407	87	172	85	7	52	45

985121020913208	87	173	86	7	46	39
985121020914925	90	162	72	7	42	35
985121023602882	92	153	61	8	36	28
985121020935580	92	168	76	8	46	38
985121020120728	93	167	74	8	48	40
985121023599374	93	173	80	8	52	44
985121023614869	93	178	85	8	57	49
985121023598743	93	188	95	8	68	60
985121020938584	95	194	99	10	75	65
985121023612287	96	184	88	8	61	53
985121023617856	96	189	93	9	62	53
985121020935415	97	176	79	9	51	42
985121020098344	97	185	88	9	66	57
985121023628901	98	177	79	10	50	40
985121023585942	99	154	55	10	34	24
985121023569572	99	178	79	9	59	50
985121023645082	100	178	78	10	55	45
985121020114900	100	182	82	9	56	47
985121020943166	101	175	74	10	50	40
985121020944106	101	177	76	10	54	44
985121023641398	101	178	77	11	56	45
985121023592497	101	192	91	10	63	53
985121023617115	101	213	112	10	89	79
985121020928722	104	195	91	10	74	64
985121023579597	107	203	96	12	83	71
985121020944247	118	196	78	18	69	51
Average Growth < 124			**83**			**48**
985121020936745	161	222	61	43	112	69
985121020935502	165	221	56	44	110	66
985121020932673	177	219	42	55	106	51
985121020109142	180	245	65	55	157	102
985121020117810	188	238	50	61	127	66
985121020935610	190	234	44	69	135	66
985121020910463	195	256	61	76	165	89
Average Growth 125-199			**54**			**73**
985121020905890	214	238	24	106	142	36
985121020941173	234	268	34	115	181	66
985121020922419	307	321	14	277	321	44
Average Growth 200+			**24**			**49**

2011-2012						
Rush Creek: Upper	Length (mm)			Weight (g)		
Fish ID BNT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121023455312	71	137	66	3	25	22
985121021889764	76	127	51	5	19	14

985121021911473	76	156	80	4	38	34
985121021867208	81	149	68	5	32	27
985121027933342	81	156	75	6	33	27
985121023465025	81	158	77	6	38	32
985121023447821	83	155	72	6	38	32
985121028082877	84	154	70	5	34	29
985121021891010	85	153	68	6	33	27
985121028061839	86	155	69	7	33	26
985121028086687	88	145	57	7	30	23
985121028076559	88	158	70	8	36	28
985121023475691	89	149	60	7	36	29
985121021887468	89	167	78	7	45	38
985121027899369	90	172	82	7	46	39
985121028082878	91	171	80	8	48	40
985121027923979	92	160	68	9	41	32
985121028068766	92	170	78	8	46	38
985121027909813	93	176	83	7	53	46
985121027903179	94	165	71	8	47	39
985121028059294	94	184	90	9	64	55
985121028069578	96	157	61	9	35	26
985121027922616	98	186	88	11	62	51
985121027923943	100	169	69	10	44	34
Average Growth < 124			**72**			**33**
985121023602882	153	208	55	36	90	54
985121023585942	154	190	36	34	66	32
985121020120728	167	229	62	48	112	64
985121020935580	168	208	40	46	85	39
985121020944106	177	204	27	54	86	32
985121020928722	195	230	35	74	107	33
Average Growth 125-199			**43**			**42**
985121020935502	221	237	16	110	128	18
985121020936745	222	227	5	112	111	-1
985121020943825	225	246	21	112	216	104
985121020905890	238	244	6	142	125	-17
985121020117810	238	247	9	127	140	13
985121020109142	245	265	20	157	168	11
985121020941173	268	268	0	181	152	-29
985121021890723	286	287	1	217	171	-46
Average Growth 200+			**10**			**7**

Rush Creek: Bottomlands (Annual Growth 2009-2012 by Size Class)

2009-2010						
Rush Creek: Bottomlands	Length (mm)			Weight (g)		
Fish ID BNT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020921945	80	148	68	5	31	26
985121020114006	80	161	81	5	39	34
985121020123570	82	155	73	6	35	29
985121020935605	82	166	84	5	51	46
985121020920952	83	146	63	6	30	24
985121020936101	83	146	63	6	30	24
985121020910138	85	155	70	6	37	31
985121020118024	85	157	72	6	34	28
985121020904493	85	168	83	6	47	41
985121020942106	86	166	80	7	42	35
985121020112302	86	167	81	7	45	38
985121020932848	87	154	67	7	33	26
985121020937007	88	161	73	7	44	37
985121020920003	88	172	84	8	57	49
985121020110423	90	160	70	8	39	31
985121020912832	91	157	66	7	38	31
985121020111924	91	174	83	7	49	42
985121020933770	91	176	85	7	49	42
985121020926589	95	178	83	8	50	42
985121020114060	96	174	78	8	48	40
985121020932689	97	176	79	11	56	45
985121020935592	97	180	83	10	53	43
985121020924797	97	183	86	11	69	58
985121020121350	98	168	70	10	42	32
985121020110490	98	178	80	9	50	41
985121020940699	99	167	68	9	42	33
985121020925265	100	189	89	10	56	46
985121020920914	101	169	68	12	45	33
985121020119416	101	183	82	11	58	47
985121020112154	102	186	84	11	64	53
985121020944545	104	200	96	12	84	72
985121020924172	105	169	64	13	48	35
985121020100993	105	180	75	12	54	42
985121020110827	105	186	81	12	65	53
985121020925648	106	187	81	12	64	52
985121020114073	114	196	82	16	74	58
Average Growth < 124			**77**			**40**
985121020943071	157	201	44	38	77	39
985121020100755	161	209	48	42	90	48
985121020103525	163	210	47	42	95	53

985121020906224	163	221	58	40	99	59
985121020905245	165	212	47	47	103	56
985121020908422	165	224	59	44	104	60
985121020921335	171	212	41	56	106	50
985121020924548	176	238	62	53	120	67
985121020904696	186	234	48	65	123	58
Average Growth 125-199			**50**			**54**
2010-2011						
Rush Creek: Bottomlands	Length (mm)			Weight (g)		
Fish ID BNT	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121023641917	81	146	65	6	29	23
985121023572514	82	147	65	5	28	23
985121023619450	84	138	54	6	27	21
985121023586150	84	150	66	6	29	23
985121023646006	85	166	81	5	38	33
985121023569735	86	147	61	6	31	25
985121023578653	86	151	65	6	33	27
985121023622964	87	154	67	8	36	28
985121023532735	91	161	70	6	40	34
985121023569606	92	149	57	7	33	26
985121023616072	93	141	48	8	29	21
985121023569596	93	180	87	8	52	44
985121023592570	94	169	75	8	47	39
985121023575475	94	171	77	7	39	32
985121023589583	95	163	68	8	41	33
985121023645965	95	178	83	10	51	41
985121023582326	97	169	72	10	47	37
985121023631082	97	175	78	8	50	42
985121023601610	97	176	79	10	51	41
985121023569647	98	207	109	9	78	69
985121023615106	100	164	64	10	44	34
985121023621167	106	158	52	11	35	24
985121023585509	106	176	70	11	51	40
985121023646339	107	181	74	11	58	47
985121023552878	108	170	62	11	48	37
985121023612849	108	176	68	11	51	40
985121023633510	112	196	84	14	65	51
985121023582961	117	194	77	16	65	49
Average Growth < 124			**71**			**35**
985121020123570	155	209	54	35	78	43
985121020121350	168	205	37	42	73	31
985121020111924	174	213	39	49	83	34
985121020924797	183	215	32	69	104	35
985121020112154	186	209	23	64	88	24

Average Growth 125-199			**37**			**33**
985121020103525	210	219	9	95	100	5
985121020921335	212	229	17	106	117	11
985121020904696	234	241	7	123	143	20
985121020924548	238	257	19	120	141	21
Average Growth 200+			**13**			**14**

2011-2012						
Rush Creek: Bottomlands	Length (mm)			Weight (g)		
Fish ID BNT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121028058925	77	165	88	5	41	36
985121028062433	80	156	76	5	35	30
985121023622536	81	132	51	5	20	15
985121023572805	81	146	65	6	30	24
985121023575088	82	131	49	7	24	17
985121023636986	82	149	67	6	32	26
985121023545533	83	132	49	5	25	20
985121023592492	84	138	54	5	25	20
985121023575322	85	143	58	6	27	21
985121028121438	85	145	60	6	30	24
985121023700284	86	141	55	7	28	21
985121023582334	86	142	56	7	25	18
985121028101754	87	134	47	6	22	16
985121023629923	88	146	58	7	31	24
985121027906393	89	145	56	6	27	21
985121023582957	89	154	65	8	35	27
985121023609176	89	159	70	7	36	29
985121021907097	90	165	75	7	44	37
985121023550620	91	142	51	7	27	20
985121023645581	91	142	51	8	28	20
985121027928959	92	143	51	7	30	23
985121028091438	92	148	56	9	31	22
985121028056095	92	151	59	7	32	25
985121023609583	93	163	70	8	36	28
985121023642821	94	154	60	8	32	24
985121023624232	95	150	55	8	34	26
985121027906329	95	161	66	7	37	30
985121023588963	96	157	61	8	39	31
985121028061844	97	156	59	8	38	30
985121023396717	98	157	59	10	37	27
985121023612474	99	146	47	10	30	20
985121023530875	100	161	61	9	39	30
985121028062373	100	163	63	9	40	31
985121028082962	101	149	48	10	34	24
985121023575223	102	163	61	10	39	29

985121023540824	102	165	63	10	43	33
985121027898729	104	155	51	11	38	27
985121023572153	106	150	44	13	34	21
985121027930495	107	166	59	11	42	31
985121023601166	108	163	55	12	40	28
985121027901727	108	172	64	14	44	30
985121023537280	111	164	53	13	42	29
985121023549003	112	168	56	14	45	31
985121023572547	117	163	46	16	39	23
Average Growth < 124			**58**			**25**
985121023619450	138	173	35	27	55	28
985121023569735	147	182	35	31	59	28
985121023578653	151	188	37	33	64	31
985121023622964	154	190	36	36	63	27
985121023621167	158	197	39	35	77	42
985121023646006	166	181	15	38	63	25
985121023616634	167	192	25	42	67	25
985121023582326	169	205	36	47	83	36
985121023575475	171	203	32	39	67	28
985121023631082	175	209	34	50	81	31
985121023585509	176	199	23	51	70	19
985121023582961	194	210	16	65	85	20
Average Growth 125-199			**30**			**28**
985121020121350	205	232	27	73	104	31
985121020111924	213	229	16	83	92	9
985121020924797	215	224	9	104	111	7
985121020921335	229	233	4	117	116	-1
985121020904696	241	244	3	143	122	-21
Average Growth 200+			**12**			**5**

Rush Creek: County Rd(Annual Growth 2009-2012by Size Class)

2009-2010						
Rush Creek: County Rd	Length (mm)			Weight (g)		
Fish ID BNT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020931470	82	163	81	5	39	34
985121020939478	83	140	57	5	25	20
985121020939217	83	151	68	6	31	25
985121020118520	84	153	69	6	37	31
985121020943506	86	169	83	6	42	36
985121020110095	89	145	56	6	28	22
985121020917695	91	164	73	7	44	37
985121020114684	91	166	75	7	42	35
985121020932415	91	172	81	8	44	36
985121020933762	92	156	64	7	35	28
985121020939986	92	164	72	8	42	34
985121020908605	92	166	74	8	45	37
985121020936299	93	160	67	9	39	30
985121020940642	93	177	84	8	52	44
985121020110505	96	168	72	10	46	36
985121020918063	97	157	60	8	35	27
985121020110997	101	168	67	10	44	34
985121020109973	102	170	68	12	44	32
985121020910924	102	195	93	10	71	61
985121020938535	103	208	105	11	84	73
Average Growth < 124			**73**			**36**
985121020106769	134	208	74	22	79	57
985121020931106	142	210	68	29	86	57
985121020917329	152	202	50	34	88	54
985121020933486	154	211	57	38	101	63
985121020904480	161	211	50	39	86	47
985121020938028	168	209	41	51	102	51
985121020906504	168	229	61	51	113	62
985121020100865	173	227	54	52	127	75
985121020908804	174	210	36	55	94	39
Average Growth 125-199			**55**			**56**
2010-2011						
Rush Creek: County Rd	Length (mm)			Weight (g)		
Fish ID BNT	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121023446738	82	140	58	6	26	20
985121023589363	83	148	65	5	33	28
985121023585957	85	155	70	5	34	29
985121021878824	86	164	78	6	40	34
985121021887589	89	145	56	7	30	23

985121023632875	89	162	73	7	40	33
985121021901983	90	155	65	7	34	27
985121023589071	90	159	69	7	40	33
985121023476298	91	153	62	7	33	26
985121021902812	91	157	66	8	40	32
985121023446715	91	161	70	8	41	33
985121023589005	94	162	68	8	42	34
985121023443810	95	154	59	6	33	27
985121021911475	95	156	61	8	36	28
985121023469837	96	158	62	8	37	29
985121021901863	96	168	72	8	45	37
985121021890892	96	174	78	9	48	39
985121023542660	97	167	70	8	46	38
985121021900918	97	179	82	9	57	48
985121021923735	99	156	57	8	36	28
985121023476088	99	156	57	10	39	29
985121023472792	100	168	68	11	46	35
985121023448961	101	166	65	9	44	35
985121023619089	101	181	80	10	54	44
985121023582685	107	177	70	12	52	40
985121021900605	108	179	71	13	53	40
985121021909023	112	183	71	13	55	42
Average Growth < 124			**68**			**33**
985121020110997	168	209	41	44	80	36
985121020109973	170	213	43	44	96	52
985121020910924	195	221	26	71	113	42
Average Growth 125-199			**37**			**43**
985121020106769	208	230	22	79	117	38
985121020938535	208	244	36	84	149	65
985121020906504	229	255	26	113	162	49
Average Growth 200+			**28**			**51**

2011-2012						
Rush Creek: County Rd	Length (mm)			Weight (g)		
Fish ID BNT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121028065196	71	120	49	4	17	13
985121028069554	77	139	62	5	25	20
985121027900691	78	143	65	4	26	22
985121028062265	79	131	52	5	24	19
985121027913979	80	148	68	5	31	26
985121028056182	82	131	49	5	21	16
985121028088979	83	139	56	5	27	22
985121028122984	86	127	41	6	20	14
985121028120029	86	130	44	5	19	14
985121027935109	87	137	50	6	25	19

985121028072250	87	152	65	7	36	29
985121027933102	87	172	85	5	47	42
985121028069453	89	126	37	7	22	15
985121028080029	89	142	53	7	27	20
985121027900381	91	144	53	8	29	21
985121028065680	92	141	49	6	26	20
985121028065390	92	165	73	7	40	33
985121028083599	93	148	55	7	28	21
985121027903326	93	150	57	8	32	24
985121028058738	94	144	50	8	30	22
985121027899671	94	152	58	8	37	29
985121028089085	94	154	60	8	37	29
985121028079487	94	160	66	8	41	33
985121028065739	96	159	63	8	32	24
985121027915316	97	139	42	9	23	14
985121027920360	97	155	58	9	38	29
985121028086239	97	164	67	10	38	28
985121027897419	101	162	61	10	40	30
985121028086481	102	156	54	12	38	26
985121027900334	105	165	60	11	41	30
985121027933723	105	175	70	11	50	39
985121027934388	106	155	49	11	34	23
985121028091426	108	167	59	12	42	30
Average Growth < 124			**57**			**24**
985121023589071	159	185	26	40	57	17
985121023446715	161	195	34	41	72	31
985121023589005	162	183	21	42	52	10
985121021878824	164	194	30	40	67	27
985121021890892	174	222	48	48	96	48
985121023582685	177	200	23	52	72	20
985121021900605	179	196	17	53	55	2
985121023619089	181	210	29	54	82	28
985121023390468	185	194	9	57	59	2
985121020936692	190	201	11	64	74	10
Average Growth 125-199			**25**			**20**

Rush Creek: MGORD (Annual Growth 2009-2012 by Size Class)

2009-2010						
Rush Creek: MGORD	Length (mm)			Weight (g)		
Fish ID BNT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020903668	89	213	124	6	91	85
985121020100405	110	228	118	12	109	97
Average Growth < 124			**121**			**91**
985121020907528	125	231	106	22	125	103
985121020917583	176	256	80	55	163	108
985121020905686	188	235	47	69	144	75
985121020936552	201	243	42	77	131	54
985121020917971	201	256	55	83	148	65
985121020905354	204	258	54	89	171	82
985121020903370	207	266	59	91	167	76
985121020098013	213	259	46	95	163	68
985121020117247	214	251	37	90	168	78
985121020920349	214	275	61	104	191	87
985121020121144	214	277	63	89	199	110
985121020101394	215	253	38	93	174	81
985121020919192	215	271	56	102	175	73
985121020909295	217	280	63	104	214	110
985121020903631	220	238	18	117	133	16
985121020907600	221	280	59	104	222	118
985121020920208	222	261	39	104	159	55
985121020918696	222	293	71	116	237	121
985121020923184	223	277	54	113	216	103
985121020904177	223	278	55	109	218	109
Average Growth 125-225			**55**			**85**
985121020101281	226	256	30	127	181	54
985121020922135	227	244	17	141	141	0
985121020925533	228	277	49	108	211	103
985121020098970	228	284	56	120	190	70
985121017017377	233	296	63	134	226	92
985121017028428	236	281	45	151	202	51
985121017018633	237	286	49	147	220	73
985121017025957	238	271	33	146	205	59
985121017022723	238	285	47	139	238	99
985121017020136	240	271	31	127	195	68
985121020920582	240	334	94	123	332	209
985121017024202	244	257	13	147	157	10
985121017024289	246	281	35	162	204	42
985121017030661	247	266	19	140	168	28
985121020917468	247	266	19	248	177	-71

985121017022273	248	295	47	153	239	86
985121017020458	251	295	44	153	233	80
985121017018125	253	274	21	186	223	37
985121017031354	257	289	32	169	237	68
985121017027325	257	307	50	182	303	121
985121017033595	259	279	20	190	218	28
985121020105263	260	291	31	183	252	69
985121017020448	261	283	22	168	221	53
985121020922329	262	276	14	174	202	28
985121017017896	262	288	26	198	261	63
985121017024257	265	300	35	212	264	52
985121017027024	266	280	14	195	232	37
985121017020820	267	290	23	203	223	20
985121017026584	274	287	13	202	229	27
985121017029311	275	326	51	221	360	139
985121017021482	276	293	17	246	255	9
985121017025893	276	307	31	217	250	33
985121017023924	282	306	24	219	265	46
985121017034074	282	313	31	218	255	37
985121017033593	283	302	19	229	254	25
985121017030963	284	298	14	241	232	-9
985121017028807	286	294	8	263	239	-24
985121017017901	287	298	11	257	239	-18
985121017029606	287	312	25	241	277	36
985121017032348	287	320	33	268	287	19
985121017020439	292	310	18	253	244	-9
985121017029289	292	325	33	228	318	90
985121017022012	293	320	27	266	304	38
985121020934293	294	354	60	226	422	196
985121017031436	296	319	23	266	347	81
985121017025643	296	334	38	252	352	100
Average Growth 226-300			**32**			**53**
985121017031045	302	310	8	301	276	-25
985121017018665	303	336	33	285	352	67
985121020925059	303	338	35	238	331	93
985121017028329	308	351	43	275	370	95
985121017026970	311	348	37	294	379	85
985121017029175	312	318	6	305	247	-58
985121017024094	313	319	6	350	257	-93
985121017032768	313	327	14	351	316	-35
985121017031683	313	393	80	285	632	347
985121017033190	317	318	1	330	296	-34
985121017024541	317	333	16	319	333	14

985121017017161	318	313	-5	313	267	-46
985121017029566	321	356	35	311	386	75
985121017024168	326	331	5	328	291	-37
985121017022992	326	340	14	355	373	18
985121017033200	326	370	44	311	470	159
985121017029853	328	348	20	403	420	17
985121017025228	338	340	2	357	313	-44
985121020105641	338	364	26	364	419	55
985121017033259	342	352	10	389	423	34
985121017033111	353	351	-2	490	303	-187
985121017022674	358	369	11	483	427	-56
985121017021391	358	388	30	463	540	77
Average Growth 301-375			**20**			**23**
985121017026522	382	397	15	564	527	-37
985121020925491	390	386	-4	454	484	30
985121020917818	395	450	55	507	790	283
985121017030978	403	412	9	642	703	61
985121017016532	426	458	32	924	1024	100
985121017024191	433	428	-5	907	713	-194
985121017031332	435	434	-1	763	695	-68
985121017019380	462	464	2	1056	805	-251
Average Growth 375+			**13**			**-10**

2010-2011						
Rush Creek: MGORD	Length (mm)			Weight (g)		
Fish ID BNT	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121023622485	186	233	47	67	105	38
985121021888784	187	250	63	65	139	74
985121021898184	189	266	77	65	157	92
985121021875639	190	251	61	70	157	87
985121021890827	200	250	50	79	140	61
985121023558100	203	246	43	84	168	84
985121020943520	203	263	60	71	167	96
985121023586008	206	278	72	88	204	116
985121023623039	207	270	63	83	166	83
985121023644730	208	262	54	90	179	89
985121023468069	208	264	56	76	163	87
985121023470544	210	272	62	104	191	87
985121023380781	210	278	68	94	202	108
985121023458934	212	266	54	88	166	78
985121021888674	213	276	63	86	173	87
985121021900738	215	266	51	90	175	85
985121021900578	219	257	38	92	163	71
985121023458530	219	300	81	104	246	142

985121021889565	223	292	69	99	234	135
985121021903275	224	281	57	109	199	90
Average Growth 125-225			**59**			**90**
985121021889002	226	272	46	110	177	67
985121023450995	231	274	43	116	185	69
985121023579285	232	298	66	107	241	134
985121023373191	233	340	107	322	378	56
985121021915826	238	280	42	117	203	86
985121023365010	239	305	66	126	244	118
985121023460436	239	312	73	126	263	137
985121021900411	240	265	25	125	156	31
985121020936552	243	334	91	131	345	214
985121020922135	244	252	8	141	162	21
985121021891828	250	315	65	142	370	228
985121023623111	254	281	27	140	173	33
985121023475668	257	303	46	170	275	105
985121020920208	261	280	19	159	190	31
985121021895944	262	288	26	170	234	64
985121023398099	264	298	34	171	254	83
985121023455513	266	302	36	193	271	78
985121020940687	271	305	34	185	289	104
985121020904177	278	332	54	218	349	131
985121017028428	281	315	34	202	270	68
985121023464872	284	311	27	198	266	68
985121023621073	285	321	36	193	289	96
985121023473565	286	289	3	224	213	-11
985121021873781	288	298	10	245	240	-5
985121023625078	288	300	12	203	242	39
985121017017896	288	320	32	261	348	87
985121017020820	290	315	25	223	307	84
985121023636489	299	322	23	260	304	44
985121017024257	300	332	32	264	355	91
Average Growth 226-300			**39**			**81**
985121023451063	301	347	46	272	432	160
985121017033593	302	314	12	254	267	13
985121023467655	304	328	24	279	350	71
985121023600852	307	310	3	298	310	12
985121017032348	320	334	14	287	383	96
985121023369646	330	362	32	329	437	108
985121017024541	333	348	15	333	392	59
985121017025643	334	363	29	352	400	48
985121017022992	340	345	5	373	368	-5
985121020928543	340	345	5	363	385	22

985121017025228	340	361	21	313	380	67
985121021895370	343	337	-6	363	311	-52
985121023449297	351	376	25	377	455	78
985121017022674	369	385	16	427	511	84
Average Growth 301-375			**17**			**54**
985121023572971	380	375	-5	300	331	31
985121023454442	384	436	52	575	823	248
985121017021391	388	414	26	540	601	61
985121023454166	407	415	8	609	697	88
985121021880110	414	450	36	697	988	291
985121017019380	464	456	-8	805	891	86
Average Growth 375+			**18**			**134**

2011-2012						
Rush Creek: MGORD	Length (mm)			Weight (g)		
Fish ID BNT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121021886683	165	226	61	44	99	55
985121021886902	169	222	53	44	111	67
985121021898421	176	255	79	57	142	85
985121021865877	182	235	53	64	133	69
985121021894206	183	256	73	58	159	101
985121023455881	187	252	65	57	144	87
985121021891838	190	260	70	64	152	88
985121023476933	198	259	61	74	155	81
985121021865033	200	262	62	78	157	79
985121023448182	209	262	53	84	150	66
Average Growth 125-225			**63**			**78**
985121021895587	235	259	24	124	163	39
985121021880858	235	262	27	121	168	47
985121021885751	236	258	22	153	177	24
985121021878865	240	275	35	148	177	29
985121023448280	254	300	46	135	212	77
985121023468307	255	280	25	145	191	46
985121023444330	257	272	15	158	175	17
985121023449463	257	280	23	169	205	36
985121021873798	257	300	43	159	243	84
985121021902621	258	282	24	163	205	42
985121023476785	262	291	29	169	222	53
985121020943520	263	269	6	167	178	11
985121021903342	265	272	7	162	166	4
985121023458934	266	285	19	166	212	46
985121021902490	267	295	28	193	238	45
985121023450995	274	301	27	185	217	32
985121023460392	277	300	23	186	226	40
985121023390635	278	275	-3	223	192	-31

985121023380781	278	295	17	202	203	1
985121023362348	281	291	10	215	248	33
985121021903275	281	321	40	199	293	94
985121021902104	282	334	52	216	309	93
985121021895944	288	285	-3	234	205	-29
985121021889565	292	310	18	234	234	0
985121021897442	292	312	20	207	281	74
985121023446237	297	324	27	235	275	40
985121021873781	298	303	5	240	248	8
985121023398099	298	304	6	254	249	-5
Average Growth 226-300			**22**			**34**
985121023455513	302	317	15	271	278	7
985121020940687	305	303	-2	289	178	-111
985121021895606	309	316	7	285	216	-69
985121023380096	309	329	20	289	311	22
985121023475072	313	322	9	291	267	-24
985121017033593	314	313	-1	267	247	-20
985121020098051	314	321	7	304	292	-12
985121023384411	318	329	11	331	336	5
985121017017896	320	340	20	348	371	23
985121023621073	321	323	2	289	271	-18
985121021878152	321	339	18	334	351	17
985121023636489	322	322	0	304	268	-36
985121023467655	328	340	12	350	366	16
985121020936552	334	344	10	345	300	-45
985121021895370	337	369	32	311	390	79
985121023373191	340	350	10	378	368	-10
985121021900424	344	344	0	400	320	-80
985121020928543	345	350	5	385	359	-26
985121017022992	345	351	6	368	380	12
985121021867358	348	351	3	410	480	70
985121023468057	354	345	-9	399	307	-92
985121023449530	355	390	35	408	564	156
985121023468311	356	354	-2	363	375	12
Average Growth 301-375			**9**			**-5**
985121017025643	363	361	-2	400	494	94
985121023454442	436	435	-1	823	715	-108
985121017019380	456	455	-1	891	764	-127
Average Growth 375+			**-1**			**-47**

Lee Vining Creek: Main (Annual Growth 2009-2012 by Size Class)

2009-2010						
Lee Vining Creek: Main	Length (mm)			Weight (g)		
Fish ID BNT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020926612	85	165	80	6	48	42
Average Growth < 124			**80**			**42**
985121020925996	164	222	58	44	110	66
985121020096917	168	235	67	52	145	93
985121020920076	169	229	60	50	136	86
985121020109582	174	249	75	54	148	94
985121020943740	177	243	66	54	153	99
985121020927890	182	249	67	57	172	115
985121020119523	186	254	68	67	180	113
Average Growth 125-199			**66**			**95**
2010-2011						
Lee Vining Creek: Main	Length (mm)			Weight (g)		
Fish ID BNT	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121023445971	84	142	58	4	28	24
985121020924979	84	155	71	5	38	33
985121020119422	85	163	78	6	45	39
985121023444826	87	151	64	7	36	29
985121020913586	91	174	83	9	60	51
985121023473421	94	171	77	9	57	48
Average Growth < 124			**72**			**37**
985121020914307	227	271	44	126	213	87
985121020911274	228	281	53	123	254	131
985121020096917	235	281	46	145	261	116
985121020927890	249	271	22	172	239	67
Average Growth 200+			**41**			**100**
2011-2012						
Lee Vining Creek: Main	Length (mm)			Weight (g)		
Fish ID BNT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121027916787	70	153	83	3	39	36
985121028086331	72	161	89	4	40	36
985121028069475	74	181	107	5	63	58
985121027916847	77	181	104	5	64	59
985121028058550	77	181	104	5	56	51
985121028112653	78	177	99	5	58	53
985121027896969	80	180	100	6	56	50
985121028072758	80	180	100	6	55	49
985121027906337	82	174	92	6	58	52
985121028059114	85	193	108	6	70	64
985121027920308	88	195	107	7	71	64

Average Growth < 124			**99**			**52**
985121020119422	163	236	73	45	126	81
985121020913586	174	255	81	60	199	139
Average Growth 125-199			**77**			**110**
985121020914307	271	288	17	213	224	11
985121020927890	271	292	21	239	280	41
Average Growth 200+			**19**			**26**

Lee Vining Creek: Side (Annual Growth 2009-2012 by Size Class)

2010-2011						
Lee Vining Creek: Side	Length (mm)			Weight (g)		
Fish ID BNT	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121020116643	82	155	73	5	40	35
985121020942143	93	186	93	9	73	64
985121020117063	93	190	97	9	72	63
Average Growth < 124			**88**			**54**
2011-2012						
Lee Vining Creek: Side	Length (mm)			Weight (g)		
Fish ID BNT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121023464229	70	133	63	3	21	18
985121021879060	73	149	76	4	32	28
985121023371928	83	154	71	6	33	27
Average Growth < 124			**70**			**24**
985121020116643	155	181	26	40	48	8
985121023469633	163	172	9	42	37	-5
985121023378988	168	187	19	47	60	13
985121023472726	170	182	12	54	48	-6
985121023462146	173	189	16	49	54	5
985121021877700	178	196	18	53	58	5
985121021878663	183	193	10	57	55	-2
985121020942143	186	204	18	73	77	4
985121021869957	187	201	14	78	76	-2
Average Growth 125-199			**16**			**2**
985121023373237	265	281	16	206	207	1
Average Growth 200+			**16**			**1**

Walker Creek (Annual Growth 2009-2012 by Size Class)

2009-2010						
Walker Creek	Length (mm)			Weight (g)		
Fish ID BNT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020944309	81	139	58	5	29	24
985121020100436	82	125	43	8	18	10
985121020107405	85	144	59	6	31	25
985121020111159	86	146	60	7	33	26
985121020929632	89	140	51	8	28	20
985121020934081	90	126	36	9	19	10
985121020117459	90	145	55	8	33	25
985121020925388	90	148	58	7	29	22
985121020905768	95	138	43	9	28	19
Average Growth < 124			**51**			**20**
985121020940051	128	156	28	18	33	15
985121020908415	130	160	30	22	44	22
985121020939403	136	174	38	26	50	24
985121020914927	139	169	30	29	48	19
985121020105197	144	174	30	30	52	22
985121020919053	145	178	33	28	57	29
985121020926127	146	183	37	29	64	35
985121020905968	151	179	28	39	60	21
985121020103130	151	181	30	36	59	23
985121020110816	152	184	32	38	68	30
985121020112608	153	176	23	36	62	26
985121020904160	154	189	35	35	69	34
985121020936228	156	193	37	38	74	36
985121020904753	163	196	33	43	82	39
985121020935465	164	183	19	49	58	9
Average Growth 125-199			**31**			**26**
985121020932018	232	228	-4	115	97	-18
Average Growth 200+			**-4**			**-18**
2010-2011						
Walker Creek	Length (mm)			Weight (g)		
Fish ID BNT	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121020122109	82	147	65	6	28	22
985121020935879	82	152	70	6	34	28
985121020943145	84	176	92	6	54	48
985121020943810	88	154	66	6	39	33
985121020936121	88	165	77	8	40	32
985121020120400	90	152	62	7	38	31
985121020911377	119	183	64	16	58	42
Average Growth < 124			**71**			**34**
985121020934081	126	189	63	19	81	62

985121020905768	138	204	66	28	82	54
985121020107405	144	196	52	31	83	52
985121020914927	169	202	33	48	96	48
985121020929212	173	206	33	55	101	46
985121020105197	174	208	34	52	93	41
985121020109599	183	208	25	64	99	35
985121020936228	193	217	24	74	121	47
985121020904753	196	218	22	82	121	39
Average Growth 125-199			**39**			**47**
985121020111671	229	235	6	110	125	15
Average Growth 200+			**6**			**15**
2011-2012						
Walker Creek	Length (mm)			Weight (g)		
Fish ID BNT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121023448256	86	155	69	9	40	31
985121021901953	88	153	65	6	33	27
985121023444252	91	155	64	7	37	30
985121023456812	91	163	72	7	45	38
985121023396689	92	157	65	8	35	27
985121023467904	93	157	64	9	41	32
985121021894319	97	180	83	9	58	49
985121021869301	99	171	72	11	54	43
985121021865724	102	175	73	12	54	42
985121023446927	106	161	55	11	39	28
985121021909257	106	162	56	12	41	29
985121023448952	106	179	73	12	62	50
Average Growth < 124			**68**			**36**
985121020122109	147	185	38	28	56	28
985121020935879	152	194	42	34	70	36
985121020943810	154	194	40	39	74	35
985121020107405	196	216	20	83	97	14
Average Growth 125-199			**35**			**28**
985121020905768	204	220	16	82	92	10
985121020929212	206	217	11	101	102	1
985121020105197	208	217	9	93	104	11
985121020904753	218	223	5	121	114	-7
Average Growth 200+			**10**			**4**

Growth of Rainbow Trout All Sections (2009-2012)

2009-2010						
Rush Creek: Upper	Length (mm)			Weight (g)		
Fish ID RBT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020113414	80	208	128	6	85	79
985121020114187	86	168	82	7	49	42
985121020927628	88	186	98	8	72	64
Average Growth < 124			**103**			**62**
2011-2012						
Rush Creek: Upper	Length (mm)			Weight (g)		
Fish ID RBT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121028072128	72	163	91	4	48	44
Average Growth < 124			**91**			**44**
2011-2012						
Rush Creek: Bottomlands	Length (mm)			Weight (g)		
Fish ID RBT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121028075723	72	153	81	4	32	28
Average Growth < 124			**81**			**28**
2009-2010						
Rush Creek: MGORD	Length (mm)			Weight (g)		
Fish ID RBT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020933893	211	267	56	90	183	93
Average Growth 226-300			**56**			**93**
2011-2012						
Rush Creek: MGORD	Length (mm)			Weight (g)		
Fish ID RBT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121023314314	265	277	12	194	201	7
Average Growth 226-300			**12**			**7**
2009-2010						
Lee Vining Creek: Main	Length (mm)			Weight (g)		
Fish ID RBT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020943434	75	182	107	5	67	62
Average Growth < 124			**107**			**62**

Growth of Brown Trout That Moved Between Sections (2009-2012)

2009-2010						
Upper Rush To MGORD	Length (mm)			Weight (g)		
Fish ID (BNT)	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020113591	93	190	97	9	78	69
985121020113849	94	208	114	10	98	88
985121020940196	99	206	107	11	91	80
985121020942876	103	225	122	12	99	87
985121020929332	106	213	107	14	104	90
985121020938512	107	206	99	14	91	77
985121020943520	107	203	96	13	71	58
985121020915715	108	219	111	14	102	88
985121020942129	111	214	103	14	91	77
Average Growth < 124			**106**			**79**
985121020921539	185	265	80	62	173	111
985121020113311	187	288	101	64	201	137
Average Growth 125-199			**91**			**124**
2010-2011						
Upper Rush To MGORD	Length (mm)			Weight (g)		
Fish ID (BNT)	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121020922879	83	146	63	6	31	25
Average Growth < 124			**63**			**25**
2011-2012						
Upper Rush To MGORD	Length (mm)			Weight (g)		
Fish ID (BNT)	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121021875637	78	169	91	4	52	48
Average Growth < 124			**91**			**48**
985121020938584	194	270	76	75	205	130
Average Growth 125-199			**76**			**130**
2009-2011						
Upper Rush To MGORD	Length (mm)			Weight (g)		
Fish ID (BNT)	2009	2011	2 Years Growth (mm)	2009	2011	2 Years Growth (g)
985121020121766	107	249	142	13	167	154
985121020943520	107	263	156	13	167	154
985121020112881	112	277	165	15	211	196
Average Growth < 124			**154**			**168**
2010-2012						
Upper Rush To MGORD	Length (mm)			Weight (g)		
Fish ID (BNT)	2010	2012	2 Years Growth (mm)	2010	2012	2 Years Growth (g)
985121020915553	83	240	157	7	133	126
985121020938584	95	270	175	10	205	195

Average Growth < 124			**166**			**161**
2009-2012						
Upper Rush To MGORD	Length (mm)			Weight (g)		
Fish ID (BNT)	2009	2012	3 Years Growth (mm)	2009	2012	3 Years Growth (g)
985121020113787	83	275	192	6	207	201
985121020929332	106	291	185	14	205	191
985121020943520	107	269	162	13	178	165
985121020940493	110	310	200	14	278	264
985121020942129	111	292	181	14	224	210
985121020912644	118	320	202	17	288	271
Average Growth < 124			**187**			**217**
2010-2011						
County Rd to Bottomlands	Length (mm)			Weight (g)		
Fish ID (BNT)	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121023616634	81	165	84	5	42	37
Average Growth < 124			**84**			**37**
2011-2012						
Bottomlands to County Rd	Length (mm)			Weight (g)		
Fish ID (BNT)	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121027900609	97	170	73	9	46	37
985121027929119	99	154	55	8	33	25
Average Growth < 124			**64**			**31**

Annual Growth (2009-2010) of 1 Year Old Brown Trout: All Sections

2009-2010						
Rush Creek: Upper	Length (mm)			Weight (g)		
Fish ID BNT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020941792	83	151	68	6	32	26
985121020113318	91	173	82	7	49	42
985121020115182	91	174	83	8	51	43
985121020114282	91	175	84	7	52	45
985121020936745	92	161	69	8	43	35
985121020128509	96	175	79	10	53	43
985121020939006	98	177	79	10	57	47
985121020114049	99	182	83	10	61	51
985121020913468	100	160	60	10	42	32
985121020117810	100	188	88	10	61	51
985121020114149	100	189	89	11	67	56
985121020935610	102	190	88	12	69	57
985121020109142	103	180	77	12	55	43
985121020110718	107	183	76	13	60	47
985121020118914	107	189	82	13	69	56
985121020113231	107	209	102	12	84	72
985121020932673	109	177	68	14	55	41
985121020910463	110	195	85	15	76	61
985121020910766	110	196	86	14	74	60
985121020903354	110	200	90	13	76	63
985121020912366	112	179	67	15	62	47
985121020938134	112	184	72	14	57	43
985121020933639	112	210	98	14	88	74
985121020128338	117	197	80	17	85	68
Average Growth Age 1			**81**			**50**

2009-2010						
Rush Creek: Bottomlands	Length (mm)			Weight (g)		
Fish ID BNT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020921945	80	148	68	5	31	26
985121020114006	80	161	81	5	39	34
985121020123570	82	155	73	6	35	29
985121020935605	82	166	84	5	51	46
985121020920952	83	146	63	6	30	24
985121020936101	83	146	63	6	30	24
985121020910138	85	155	70	6	37	31
985121020118024	85	157	72	6	34	28
985121020904493	85	168	83	6	47	41
985121020942106	86	166	80	7	42	35
985121020112302	86	167	81	7	45	38

985121020932848	87	154	67	7	33	26
985121020937007	88	161	73	7	44	37
985121020920003	88	172	84	8	57	49
985121020110423	90	160	70	8	39	31
985121020912832	91	157	66	7	38	31
985121020111924	91	174	83	7	49	42
985121020933770	91	176	85	7	49	42
985121020926589	95	178	83	8	50	42
985121020114060	96	174	78	8	48	40
985121020932689	97	176	79	11	56	45
985121020935592	97	180	83	10	53	43
985121020924797	97	183	86	11	69	58
985121020121350	98	168	70	10	42	32
985121020110490	98	178	80	9	50	41
985121020940699	99	167	68	9	42	33
985121020925265	100	189	89	10	56	46
985121020920914	101	169	68	12	45	33
985121020119416	101	183	82	11	58	47
985121020112154	102	186	84	11	64	53
985121020944545	104	200	96	12	84	72
985121020924172	105	169	64	13	48	35
985121020100993	105	180	75	12	54	42
985121020110827	105	186	81	12	65	53
985121020925648	106	187	81	12	64	52
985121020114073	114	196	82	16	74	58
Average Growth Age 1			**77**			**40**

2009-2010						
Rush Creek: County Rd	Length (mm)			Weight (g)		
Fish ID BNT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020931470	82	163	81	5	39	34
985121020939478	83	140	57	5	25	20
985121020939217	83	151	68	6	31	25
985121020118520	84	153	69	6	37	31
985121020943506	86	169	83	6	42	36
985121020110095	89	145	56	6	28	22
985121020917695	91	164	73	7	44	37
985121020114684	91	166	75	7	42	35
985121020932415	91	172	81	8	44	36
985121020933762	92	156	64	7	35	28
985121020939986	92	164	72	8	42	34
985121020908605	92	166	74	8	45	37
985121020936299	93	160	67	9	39	30
985121020940642	93	177	84	8	52	44
985121020110505	96	168	72	10	46	36

985121020918063	97	157	60	8	35	27
985121020110997	101	168	67	10	44	34
985121020109973	102	170	68	12	44	32
985121020910924	102	195	93	10	71	61
985121020938535	103	208	105	11	84	73
Average Growth Age 1			**73**			**36**
2009-2010						
Rush Creek: MGORD	Length (mm)			Weight (g)		
Fish ID BNT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020903668	89	213	124	6	91	85
985121020100405	110	228	118	12	109	97
Average Growth Age 1			**121**			**91**
2009-2010						
Lee Vining Creek: Main	Length (mm)			Weight (g)		
Fish ID BNT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020926612	85	165	80	6	48	42
Average Growth Age 1			**80**			**42**
2009-2010						
Walker Creek	Length (mm)			Weight (g)		
Fish ID BNT	2009	2010	Annual Growth (mm)	2009	2010	Annual Growth (g)
985121020944309	81	139	58	5	29	24
985121020100436	82	125	43	8	18	10
985121020107405	85	144	59	6	31	25
985121020111159	86	146	60	7	33	26
985121020929632	89	140	51	8	28	20
985121020934081	90	126	36	9	19	10
985121020117459	90	145	55	8	33	25
985121020925388	90	148	58	7	29	22
985121020905768	95	138	43	9	28	19
Average Growth Age 1			**51**			**20**

Annual Growth (2010-2011) of 1 Year Old Brown Trout: All Sections

2010-2011						
Rush Creek: Upper	Length (mm)			Weight (g)		
Fish ID BNT	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121023551476	81	190	109	5	69	64
985121020112648	86	158	72	7	38	31
985121023632407	87	172	85	7	52	45
985121020913208	87	173	86	7	46	39
985121020914925	90	162	72	7	42	35
985121023602882	92	153	61	8	36	28
985121020935580	92	168	76	8	46	38
985121020120728	93	167	74	8	48	40
985121023599374	93	173	80	8	52	44
985121023614869	93	178	85	8	57	49
985121023598743	93	188	95	8	68	60
985121020938584	95	194	99	10	75	65
985121023612287	96	184	88	8	61	53
985121023617856	96	189	93	9	62	53
985121020935415	97	176	79	9	51	42
985121020098344	97	185	88	9	66	57
985121023628901	98	177	79	10	50	40
985121023585942	99	154	55	10	34	24
985121023569572	99	178	79	9	59	50
985121023645082	100	178	78	10	55	45
985121020114900	100	182	82	9	56	47
985121020943166	101	175	74	10	50	40
985121020944106	101	177	76	10	54	44
985121023641398	101	178	77	11	56	45
985121023592497	101	192	91	10	63	53
985121023617115	101	213	112	10	89	79
985121020928722	104	195	91	10	74	64
985121023579597	107	203	96	12	83	71
985121020944247	118	196	78	18	69	51
Average Growth Age 1			**83**			**48**

2010-2011						
Rush Creek: Bottomlands	Length (mm)			Weight (g)		
Fish ID BNT	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121023641917	81	146	65	6	29	23
985121023572514	82	147	65	5	28	23
985121023619450	84	138	54	6	27	21
985121023586150	84	150	66	6	29	23
985121023646006	85	166	81	5	38	33
985121023569735	86	147	61	6	31	25

985121023578653	86	151	65	6	33	27
985121023622964	87	154	67	8	36	28
985121023532735	91	161	70	6	40	34
985121023569606	92	149	57	7	33	26
985121023616072	93	141	48	8	29	21
985121023569596	93	180	87	8	52	44
985121023592570	94	169	75	8	47	39
985121023575475	94	171	77	7	39	32
985121023589583	95	163	68	8	41	33
985121023645965	95	178	83	10	51	41
985121023582326	97	169	72	10	47	37
985121023631082	97	175	78	8	50	42
985121023601610	97	176	79	10	51	41
985121023569647	98	207	109	9	78	69
985121023615106	100	164	64	10	44	34
985121023621167	106	158	52	11	35	24
985121023585509	106	176	70	11	51	40
985121023646339	107	181	74	11	58	47
985121023552878	108	170	62	11	48	37
985121023612849	108	176	68	11	51	40
985121023633510	112	196	84	14	65	51
985121023582961	117	194	77	16	65	49
Average Growth Age 1			**71**			**35**

2010-2011

Rush Creek: County Rd	Length (mm)			Weight (g)		
Fish ID BNT	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121023446738	82	140	58	6	26	20
985121023589363	83	148	65	5	33	28
985121023585957	85	155	70	5	34	29
985121021878824	86	164	78	6	40	34
985121021887589	89	145	56	7	30	23
985121023632875	89	162	73	7	40	33
985121021901983	90	155	65	7	34	27
985121023589071	90	159	69	7	40	33
985121023476298	91	153	62	7	33	26
985121021902812	91	157	66	8	40	32
985121023446715	91	161	70	8	41	33
985121023589005	94	162	68	8	42	34
985121023443810	95	154	59	6	33	27
985121021911475	95	156	61	8	36	28
985121023469837	96	158	62	8	37	29
985121021901863	96	168	72	8	45	37
985121021890892	96	174	78	9	48	39
985121023542660	97	167	70	8	46	38

985121021900918	97	179	82	9	57	48
985121021923735	99	156	57	8	36	28
985121023476088	99	156	57	10	39	29
985121023472792	100	168	68	11	46	35
985121023448961	101	166	65	9	44	35
985121023619089	101	181	80	10	54	44
985121023582685	107	177	70	12	52	40
985121021900605	108	179	71	13	53	40
985121021909023	112	183	71	13	55	42
Average Growth Age 1			**68**			**33**
2010-2011						
Lee Vining Creek: Main	Length (mm)			Weight (g)		
Fish ID BNT	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121023445971	84	142	58	4	28	24
985121020924979	84	155	71	5	38	33
985121020119422	85	163	78	6	45	39
985121023444826	87	151	64	7	36	29
985121020913586	91	174	83	9	60	51
985121023473421	94	171	77	9	57	48
Average Growth Age 1			**72**			**37**
2010-2011						
Lee Vining Creek: Side	Length (mm)			Weight (g)		
Fish ID BNT	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121020116643	82	155	73	5	40	35
985121020942143	93	186	93	9	73	64
985121020117063	93	190	97	9	72	63
Average Growth Age 1			**88**			**54**
2010-2011						
Walker Creek	Length (mm)			Weight (g)		
Fish ID BNT	2010	2011	Annual Growth (mm)	2010	2011	Annual Growth (g)
985121020122109	82	147	65	6	28	22
985121020935879	82	152	70	6	34	28
985121020943145	84	176	92	6	54	48
985121020943810	88	154	66	6	39	33
985121020936121	88	165	77	8	40	32
985121020120400	90	152	62	7	38	31
985121020911377	119	183	64	16	58	42
Average Growth Age 1			**71**			**34**

Annual Growth (2011-2012) of 1 Year Old Brown Trout: All Sections

2011-2012						
Rush Creek: Upper	Length (mm)			Weight (g)		
Fish ID BNT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121023455312	71	137	66	3	25	22
985121021889764	76	127	51	5	19	14
985121021911473	76	156	80	4	38	34
985121021867208	81	149	68	5	32	27
985121027933342	81	156	75	6	33	27
985121023465025	81	158	77	6	38	32
985121023447821	83	155	72	6	38	32
985121028082877	84	154	70	5	34	29
985121021891010	85	153	68	6	33	27
985121028061839	86	155	69	7	33	26
985121028086687	88	145	57	7	30	23
985121028076559	88	158	70	8	36	28
985121023475691	89	149	60	7	36	29
985121021887468	89	167	78	7	45	38
985121027899369	90	172	82	7	46	39
985121028082878	91	171	80	8	48	40
985121027923979	92	160	68	9	41	32
985121028068766	92	170	78	8	46	38
985121027909813	93	176	83	7	53	46
985121027903179	94	165	71	8	47	39
985121028059294	94	184	90	9	64	55
985121028069578	96	157	61	9	35	26
985121027922616	98	186	88	11	62	51
985121027923943	100	169	69	10	44	34
Average Growth Age 1			**72**			**33**

2011-2012						
Rush Creek: Bottomlands	Length (mm)			Weight (g)		
Fish ID BNT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121028058925	77	165	88	5	41	36
985121028062433	80	156	76	5	35	30
985121023622536	81	132	51	5	20	15
985121023572805	81	146	65	6	30	24
985121023575088	82	131	49	7	24	17
985121023636986	82	149	67	6	32	26
985121023545533	83	132	49	5	25	20
985121023592492	84	138	54	5	25	20
985121023575322	85	143	58	6	27	21
985121028121438	85	145	60	6	30	24
985121023700284	86	141	55	7	28	21

985121023582334	86	142	56	7	25	18
985121028101754	87	134	47	6	22	16
985121023629923	88	146	58	7	31	24
985121027906393	89	145	56	6	27	21
985121023582957	89	154	65	8	35	27
985121023609176	89	159	70	7	36	29
985121021907097	90	165	75	7	44	37
985121023550620	91	142	51	7	27	20
985121023645581	91	142	51	8	28	20
985121027928959	92	143	51	7	30	23
985121028091438	92	148	56	9	31	22
985121028056095	92	151	59	7	32	25
985121023609583	93	163	70	8	36	28
985121023642821	94	154	60	8	32	24
985121023624232	95	150	55	8	34	26
985121027906329	95	161	66	7	37	30
985121023588963	96	157	61	8	39	31
985121028061844	97	156	59	8	38	30
985121023396717	98	157	59	10	37	27
985121023612474	99	146	47	10	30	20
985121023530875	100	161	61	9	39	30
985121028062373	100	163	63	9	40	31
985121028082962	101	149	48	10	34	24
985121023575223	102	163	61	10	39	29
985121023540824	102	165	63	10	43	33
985121027898729	104	155	51	11	38	27
985121023572153	106	150	44	13	34	21
985121027930495	107	166	59	11	42	31
985121023601166	108	163	55	12	40	28
985121027901727	108	172	64	14	44	30
985121023537280	111	164	53	13	42	29
985121023549003	112	168	56	14	45	31
985121023572547	117	163	46	16	39	23
Average Growth Age 1			**58**			**25**

2011-2012						
Rush Creek: County Rd	Length (mm)			Weight (g)		
Fish ID BNT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121028065196	71	120	49	4	17	13
985121028069554	77	139	62	5	25	20
985121027900691	78	143	65	4	26	22
985121028062265	79	131	52	5	24	19
985121027913979	80	148	68	5	31	26
985121028056182	82	131	49	5	21	16
985121028088979	83	139	56	5	27	22

985121028122984	86	127	41	6	20	14
985121028120029	86	130	44	5	19	14
985121027935109	87	137	50	6	25	19
985121028072250	87	152	65	7	36	29
985121027933102	87	172	85	5	47	42
985121028069453	89	126	37	7	22	15
985121028080029	89	142	53	7	27	20
985121027900381	91	144	53	8	29	21
985121028065680	92	141	49	6	26	20
985121028065390	92	165	73	7	40	33
985121028083599	93	148	55	7	28	21
985121027903326	93	150	57	8	32	24
985121028058738	94	144	50	8	30	22
985121027899671	94	152	58	8	37	29
985121028089085	94	154	60	8	37	29
985121028079487	94	160	66	8	41	33
985121028065739	96	159	63	8	32	24
985121027915316	97	139	42	9	23	14
985121027920360	97	155	58	9	38	29
985121028086239	97	164	67	10	38	28
985121027897419	101	162	61	10	40	30
985121028086481	102	156	54	12	38	26
985121027900334	105	165	60	11	41	30
985121027933723	105	175	70	11	50	39
985121027934388	106	155	49	11	34	23
985121028091426	108	167	59	12	42	30
Average Growth Age 1			**57**			**24**

2011-2012						
Lee Vining Creek: Main	Length (mm)			Weight (g)		
Fish ID BNT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121027916787	70	153	83	3	39	36
985121028086331	72	161	89	4	40	36
985121028069475	74	181	107	5	63	58
985121027916847	77	181	104	5	64	59
985121028058550	77	181	104	5	56	51
985121028112653	78	177	99	5	58	53
985121027896969	80	180	100	6	56	50
985121028072758	80	180	100	6	55	49
985121027906337	82	174	92	6	58	52
985121028059114	85	193	108	6	70	64
985121027920308	88	195	107	7	71	64
Average Growth Age 1			**99**			**52**

2011-2012						
Lee Vining Creek: Side	Length (mm)			Weight (g)		

Fish ID BNT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121023464229	70	133	63	3	21	18
985121021879060	73	149	76	4	32	28
985121023371928	83	154	71	6	33	27
Average Growth Age 1			**70**			**24**

2011-2012						
Walker Creek	Length (mm)			Weight (g)		
Fish ID BNT	2011	2012	Annual Growth (mm)	2011	2012	Annual Growth (g)
985121023448256	86	155	69	9	40	31
985121021901953	88	153	65	6	33	27
985121023444252	91	155	64	7	37	30
985121023456812	91	163	72	7	45	38
985121023396689	92	157	65	8	35	27
985121023467904	93	157	64	9	41	32
985121021894319	97	180	83	9	58	49
985121021869301	99	171	72	11	54	43
985121021865724	102	175	73	12	54	42
985121023446927	106	161	55	11	39	28
985121021909257	106	162	56	12	41	29
985121023448952	106	179	73	12	62	50
Average Growth Age 1			**68**			**36**

Annual Growth (2009-2010) of 2 Year Old Brown Trout: All Sections

2009a-2010						
Rush Creek: Upper	Length (mm)			Weight (g)		
Fish ID BNT	2009a	2010	Annual Growth 2009-2010 (mm)	2009a	2010	Annual Growth 2009-2010 (g)
985121020927961	168	239	71	45	129	84
985121020941237	173	224	51	53	116	63
985121020938419	183	235	52	64	128	64
Average Growth Age 2			**58**			**70**

2009a-2010						
Rush Creek: Bottomlands	Length (mm)			Weight (g)		
Fish ID BNT	2009a	2010	Annual Growth 2009-2010 (mm)	2009a	2010	Annual Growth 2009-2010 (g)
985121020943071	157	201	44	38	77	39
985121020100755	161	209	48	42	90	48
985121020103525	163	210	47	42	95	53
985121020906224	163	221	58	40	99	59
985121020905245	165	212	47	47	103	56
985121020908422	165	224	59	44	104	60
985121020921335	171	212	41	56	106	50
985121020924548	176	238	62	53	120	67
985121020904696	186	234	48	65	123	58
Average Growth Age 2			**50**			**54**

2009a-2010						
Rush Creek: County Rd	Length (mm)			Weight (g)		
Fish ID BNT	2009a	2010	Annual Growth 2009-2010 (mm)	2009a	2010	Annual Growth 2009-2010 (g)
985121020106769	134	208	74	22	79	57
985121020931106	142	210	68	29	86	57
985121020917329	152	202	50	34	88	54
985121020933486	154	211	57	38	101	63
985121020904480	161	211	50	39	86	47
985121020906504	168	229	61	51	113	62
985121020938028	168	209	41	51	102	51
985121020100865	173	227	54	52	127	75
985121020908804	174	210	36	55	94	39
Average Growth Age 2			**55**			**56**

2009a-2010						
Lee Vining Creek: Main	Length (mm)			Weight (g)		
Fish ID BNT	2009a	2010	Annual Growth 2009-2010 (mm)	2009a	2010	Annual Growth 2009-2010 (g)
985121020925996	164	222	58	44	110	66
985121020096917	168	235	67	52	145	93

985121020920076	169	229	60	50	136	86
985121020109582	174	249	75	54	148	94
985121020943740	177	243	66	54	153	99
985121020927890	182	249	67	57	172	115
985121020119523	186	254	68	67	180	113
Average Growth Age 2			**66**			**95**

2009a-2010						
Walker Creek	Length (mm)			Weight (g)		
Fish ID BNT	2009a	2010	Annual Growth 2009-2010 (mm)	2009a	2010	Annual Growth 2009-2010 (g)
985121020940051	128	156	28	18	33	15
985121020908415	130	160	30	22	44	22
985121020939403	136	174	38	26	50	24
985121020914927	139	169	30	29	48	19
985121020105197	144	174	30	30	52	22
985121020919053	145	178	33	28	57	29
985121020926127	146	183	37	29	64	35
985121020103130	151	181	30	36	59	23
985121020905968	151	179	28	39	60	21
985121020110816	152	184	32	38	68	30
985121020112608	153	176	23	36	62	26
985121020904160	154	189	35	35	69	34
985121020936228	156	193	37	38	74	36
985121020904753	163	196	33	43	82	39
985121020935465	164	183	19	49	58	9
Average Growth Age 2			**31**			**26**

Annual Growth (2010-2011) of 2 Year Old Brown Trout: All Sections

2009-2011								
Rush Creek: Upper	Length (mm)				Weight (g)			
Fish ID BNT	2009	2010	2011	Annual Growth 2010-2011 (mm)	2009	2010	2011	Annual Growth 2010-2011 (g)
985121020935502	90	165	221	56	8	44	110	66
985121020936745	92	161	222	61	8	43	112	69
985121020117810	100	188	238	50	10	61	127	66
985121020935610	102	190	234	44	12	69	135	66
985121020109142	103	180	245	65	12	55	157	102
985121020932673	109	177	219	42	14	55	106	51
985121020910463	110	195	256	61	15	76	165	89
Average Growth Age 2				**54**				**73**
2009-2011								
Rush Creek: Bottomlands	Length (mm)				Weight (g)			
Fish ID BNT	2009	2010	2011	Annual Growth 2010-2011 (mm)	2009	2010	2011	Annual Growth 2010-2011 (g)
985121020123570	82	155	209	54	6	35	78	43
985121020937007	88	161	186	25	7	44	66	22
985121020111924	91	174	213	39	7	49	83	34
985121020924797	97	183	215	32	11	69	104	35
985121020121350	98	168	205	37	10	42	73	31
985121020112154	102	186	209	23	11	64	88	24
Average Growth Age 2				**35**				**32**
2009-2011								
Rush Creek: County Rd	Length (mm)				Weight (g)			
Fish ID BNT	2009	2010	2011	Annual Growth 2010-2011 (mm)	2009	2010	2011	Annual Growth 2010-2011 (g)
985121020936299	93	160	197	37	9	39	75	36
985121020110997	101	168	209	41	10	44	80	36
985121020109973	102	170	213	43	12	44	96	52
985121020910924	102	195	221	26	10	71	113	42
985121020938535	103	208	244	36	11	84	149	65
Average Growth Age 2				**37**				**46**
2009-2011								
Walker Creek	Length (mm)				Weight (g)			
Fish ID BNT	2009	2010	2011	Annual Growth 2010-2011 (mm)	2009	2010	2011	Annual Growth 2010-2011 (g)
985121020107405	85	144	196	52	6	31	83	52
985121020905768	95	138	204	66	9	28	82	54
985121020934081	90	126	189	63	9	19	81	62
Average Growth Age 2				**60**				**56**

Annual Growth (2011-2012) of 2 Year Old Brown Trout: All

Sections

2010-2012								
Rush Creek: Upper	Length (mm)				Weight (g)			
Fish ID BNT	2010	2011	2012	Annual Growth 2011-2012 (mm)	2010	2011	2012	Annual Growth 2011-2012 (g)
985121023602882	92	153	208	55	8	36	90	54
985121020935580	92	168	208	40	8	46	85	39
985121020120728	93	167	229	62	8	48	112	64
985121023585942	99	154	190	36	10	34	66	32
985121020944106	101	177	204	27	10	54	86	32
985121020928722	104	195	230	35	10	74	107	33
Average Growth Age 2				**43**				**42**
2010-2012								
Rush Creek: Bottomlands	Length (mm)				Weight (g)			
Fish ID BNT	2010	2011	2012	Annual Growth 2011-2012 (mm)	2010	2011	2012	Annual Growth 2011-2012 (g)
985121023619450	84	138	173	35	6	27	55	28
985121023646006	85	166	181	15	5	38	63	25
985121023569735	86	147	182	35	6	31	59	28
985121023578653	86	151	188	37	6	33	64	31
985121023622964	87	154	190	36	8	36	63	27
985121023575475	94	171	203	32	7	39	67	28
985121023631082	97	175	209	34	8	50	81	31
985121023621167	106	158	197	39	11	35	77	42
985121023585509	106	176	199	23	11	51	70	19
985121023582961	117	194	210	16	16	65	85	20
Average Growth Age 2				**30**				**28**
2010-2012								
Rush Creek: County Rd	Length (mm)				Weight (g)			
Fish ID BNT	2010	2011	2012	Annual Growth 2011-2012 (mm)	2010	2011	2012	Annual Growth 2011-2012 (g)
985121021878824	86	164	194	30	6	40	67	27
985121023589071	90	159	185	26	7	40	57	17
985121023446715	91	161	195	34	8	41	72	31
985121023589005	94	162	183	21	8	42	52	10
985121023619089	101	181	210	29	10	54	82	28
985121023582685	107	177	200	23	12	52	72	20
985121021900605	108	179	196	17	13	53	55	2
Average Growth Age 2				**26**				**19**
2010-2012								
Lee Vining Creek: Main	Length (mm)				Weight (g)			

Fish ID BNT	2010	2011	2012	Annual Growth 2011-2012 (mm)	2010	2011	2012	Annual Growth 2011-2012 (g)
985121020119422	85	163	236	73	6	45	126	81
985121020913586	91	174	255	81	9	60	199	139
Average Growth Age 2				**77**				**110**
2010-2012								
Lee Vining Creek: Side	Length (mm)				Weight (g)			
Fish ID BNT	2010	2011	2012	Annual Growth 2011-2012 (mm)	2010	2011	2012	Annual Growth 2011-2012 (g)
985121020116643	82	155	181	26	5	40	48	8
985121020942143	93	186	204	18	9	73	77	4
Average Growth Age 2				**22**				**6**
2010-2012								
Walker Creek	Length (mm)				Weight (g)			
Fish ID BNT	2010	2011	2012	Annual Growth 2011-2012 (mm)	2010	2011	2012	Annual Growth 2011-2012 (g)
985121020122109	82	147	185	38	6	28	56	28
985121020935879	82	152	194	42	6	34	70	36
985121020943810	88	154	194	40	6	39	74	35
Average Growth Age 2				**40**				**33**

Annual Growth(2010-2011)of 3 Year Old Brown Trout: All Sections

2009a-2011								
Rush Creek: Bottomlands	Length (mm)				Weight (g)			
Fish ID BNT	2009a	2010	2011	Annual Growth 2010-2011 (mm)	2009a	2010	2011	Annual Growth 2010-2011 (g)
985121020103525	163	210	219	9	42	95	100	5
985121020904696	186	234	241	7	65	123	143	20
985121020921335	171	212	229	17	56	106	117	11
985121020924548	176	238	257	19	53	120	141	21
Average Growth Age 3				**13**				**14**
2009a-2011								
Rush Creek: County Rd	Length (mm)				Weight (g)			
Fish ID BNT	2009a	2010	2011	Annual Growth 2010-2011 (mm)	2009a	2010	2011	Annual Growth 2010-2011 (g)
985121020106769	134	208	230	22	22	79	117	38
985121020906504	168	229	255	26	51	113	162	49
Average Growth Age 3				**24**				**44**
2009a-2011								
Lee Vining Creek: Main	Length (mm)				Weight (g)			
Fish ID BNT	2009a	2010	2011	Annual Growth 2010-2011 (mm)	2009a	2010	2011	Annual Growth 2010-2011 (g)
985121020096917	168	235	281	46	52	145	261	116
985121020927890	182	249	271	22	57	172	239	67
Average Growth Age 3				**34**				**92**
2009a-2011								
Walker Creek	Length (mm)				Weight (g)			
Fish ID BNT	2009a	2010	2011	Annual Growth 2010-2011 (mm)	2009a	2010	2011	Annual Growth 2010-2011 (g)
985121020914927	139	169	202	33	29	48	96	48
985121020105197	144	174	208	34	30	52	93	41
985121020936228	156	193	217	24	38	74	121	47
985121020904753	163	196	218	22	43	82	121	39
Average Growth Age 3				**28**				**44**

Annual Growth(2011-2012)of 4 Year Old Brown Trout: All Sections

2009a-2012								
Rush Creek: Bottomlands	Length (mm)				Weight (g)			
Fish ID BNT	2009a	2011	2012	Annual Growth 2011-2012 (mm)	2009a	2011	2012	Annual Growth 2011-2012 (g)
985121020921335	171	229	233	4	56	117	116	-1
985121020904696	186	241	244	3	65	143	122	-21
Average Growth Age 4				**4**				**-11**
2009a-2012								
Lee Vining Creek: Main	Length (mm)				Weight (g)			
Fish ID BNT	2009a	2011	2012	Annual Growth 2011-2012 (mm)	2009a	2011	2012	Annual Growth 2011-2012 (g)
985121020927890	182	271	292	21	57	239	280	41
Average Growth Age 4				**21**				**41**
2009a-2012								
Walker Creek	Length (mm)				Weight (g)			
Fish ID BNT	2009a	2011	2012	Annual Growth 2011-2012 (mm)	2009a	2011	2012	Annual Growth 2011-2012 (g)
985121020105197	144	208	217	9	30	93	104	11
985121020904753	163	218	223	5	43	121	114	-7
Average Growth Age 4				**7**				**2**

Rush Creek: Upper 2008-2012

Age	Length Range (mm)	Number of Tagged/Recaptured Fish
0	70-125*	1058 Tagged
1	127-213	77 Recaptured
2	190-270	21 Recaptured
3	227-265	6 Recaptured
4+	240+	1 recaptured

Rush Creek: Bottomlands 2008-2012

Age	Length Range (mm)	Number of Tagged/Recaptured Fish
0	68-120	753 Tagged
1	131-207	108 Recaptured
2	172-234	27 Recaptured
3	215-232	4 Recaptured
4	233-234	2 Recaptured
5+	234+	0 recaptured

Rush Creek: County Road 2008-2012

Age	Length Range (mm)	Number of Tagged/Recaptured Fish
0	71-124	520 Tagged
1	120-208	80 Recaptured
2	150-244	22 Recaptured
3+	201+	1 Recaptured

Lee Vining Creek: Main 2008-2012

Age	Length Range (mm)	Number of Tagged/Recaptured Fish
0	67-125*	259 tagged
1	142-195	18 Recaptured
2	226-271	4 Recaptured
3	266-310	4 Recaptured
4+	292+	1 recaptured

Lee Vining Creek: Side 2008-2012

Age	Length Range (mm)	Number of Tagged/Recaptured Fish
0	68-105	29 Tagged
1	132-190	6 Recaptured
2	181-204	2 Recaptured
3+	204+	0 Recaptured

Walker Creek 2008-2012

Age	Length Range (mm)	Number of Tagged/Recaptured Fish
0	76-124	303 Tagged
1	125-180	27 recaptured
2	185-205	7 Recaptured
3	216-220	2 Recaptured
4	217-223	2 Recaptured
5+	223+	0 Recaptured