



**Fall Creek Salmonid Passage Study, Downstream of the Fish Ladder and
Water Diversion, Santa Cruz County – Spring 2016**



**Critical Riffle at the Mouth of Fall Creek with San Lorenzo River Streamflow at 512 cfs at
the Big Trees Gage– March 2016**

**D.W. ALLEY & Associates, Aquatic Biology
Donald Alley and Chad Steiner, Fishery Biologists**

Prepared For the

**San Lorenzo Valley Water District
13060 Highway 9, Boulder Creek, CA 95006**

October 2018

Project # 238-03

Table of Contents

METHODS	3
<i>Study Design</i>	<i>3</i>
<i>Alternative Depth Criteria for Adult Salmonids in Lower Fall Creek</i>	<i>6</i>
<i>Alternative Depth Criteria for Juvenile Salmonids in Lower Fall Creek</i>	<i>9</i>
RESULTS	15
<i>Channel Width and Depth Measuring Details at Transects in Critical Riffles</i>	<i>15</i>
<i>Depth Versus Streamflow Results for Critical Riffles</i>	<i>17</i>
<i>Potential Impact of the Fall Creek Diversion on Salmonid Fish Passage.....</i>	<i>19</i>
REFERENCES.....	28
FIGURES.....	31
Appendix A. Photos.....	90
Appendix B1. Data Tables for Transect 1 (Critical Riffle 1) and Channel Width Calculations at Various Depth Criteria.	135
Appendix B2. Data Tables for Transect 2 (Critical Riffle 2) and Channel Width Calculations at Various Depth Criteria.	180
Appendix B3. Data Tables for Transect 3 (Critical Riffle 3) and Channel Width Calculations at Various Depth Criteria.	225
Appendix B4. Data Tables for Transect 5 (Critical Riffle 3) and Channel Width Calculations at Various Depth Criteria.	273
Appendix C. Riffle measurements taken during 23 February 2016 survey of lower Fall Creek to locate critical passage riffles.	304
Appendix D. Shallow riffle depths (often less than 0.2 feet deep) where YOY and yearling steelhead were captured in Central Coast streams.	306

METHODS

Study Design

On 23 February 2016, Fall Creek was surveyed for critical riffles from the mouth to the fish ladder, a distance of approximately ½ mile. Surveyors included Jen Michelsen, Environmental Programs Manager for the San Lorenzo Valley Water District (SLVWD), Jonathan Jankovitz, fishery biologist with the California Department of Fish and Wildlife (CDFW) and Donald Alley, local fishery biologist from D.W. ALLEY & Associates. The staff gage at the weir at the beginning of the fish ladder was read to estimate streamflow on the day of the survey. On a later date, Michelsen and Darren Howe (fishery biologist with NOAA Fisheries) surveyed the reach between the creekmouth and the fish ladder.

Alley measured riffle lengths and thalweg conditions of width and depth at shallow cross-sections (**Appendix C**). A hip-chain was used for length measurement and cross-section locations. Stream widths and depths were measured at shallow cross-sections with a stadia rod. In addition, average and maximum riffle depths were measured in 10 riffles with a graduated staff commonly used by Alley during habitat typing data collection. It was decided that at least 2 transects would be established at the creekmouth riffle to capture the shallowest cross-section as flows in Fall Creek and the San Lorenzo River (SLR) fluctuated, as well as at two other critical riffle cross-sections between the creekmouth and the fish ladder (0.5 miles). Especially shallow cross-sections were flagged during the survey.

The shallowest critical riffle (CR) above the creekmouth was identified as CR-1 and was furthest upstream. Critical riffles were numbered in a downstream direction. The second shallowest critical riffle above the creekmouth was identified as CR-2. Transects T-1 and T-2 were established across CR-1 and CR-2, respectively, with head and tail pins that remained throughout the study. Depth and width data were collected across the same transect cross-sections at CR-1 and CR-2 throughout the study. The CDFW method was used to collect depth and width data (**CDFW Instream Flow Group 2013**). T-1 and T-2 went straight across the stream channel and were located 2,267 and 808 feet from the creekmouth, respectively. Their respective GPS coordinates were N37.05413; W122.07918 and N37.05760; W122.07911. T-1 was at the widest riffle upstream of the creekmouth (23–28 feet wide during the study at varying flows). T-2 had a more typical stream width of 17–18 feet during the study. Refer to **Appendix A** for photos of the critical riffles and transects.

The creekmouth critical riffle was the shallowest and labeled CR-3. Its GPS coordinates were N37.05930; W122.07835. Conditions at CR-3 were more complex than at CR-1 and CR-2, with riffle depth dependent upon Fall Creek streamflow in combination with San Lorenzo River (SLR) streamflow. The riffle length was approximately 25–35 feet long, depending on the

streamflow in the SLR. *The shallowest cross-section was established with head and tail pins for each visit to the creekmouth's CR-3 to measure depths at equal intervals across.* At Fall Creek calibration flows when the SLR flows were above 500 cfs at the Big Trees Gage, two different transects were established for data collection (T-3 and T-4 (above T-3)). At SLR flows below 500 cfs at the Big Trees gage, data were collected at T-3 and the lowermost T-5 (below T-3). Transect T-4, the uppermost transect, went straight across at the highest flow monitored, with a width of 19.4 ft. Transect T-3 had one dog-leg across the stream channel and was 27.9 – 30.7 feet wide during the study. T-3 had several dry verticals at lower streamflows. Transect T-5, which came into play as SLR streamflow declined, had 2 dog-legs across the channel at the lowermost cross-section and was 35.1 – 35.8 feet wide during the study. T-5 had several dry verticals at lower streamflows. When SLR flows were above 500 cfs at the Big Trees gage, T-3 was the shallowest cross-section. When SLR flows were less than 500 cfs, T-5 was the shallowest cross-section. Refer to **Appendix A** for photos of the critical riffle and transects.

Calibration streamflows were measured at transects within 150 meters upstream of the critical riffle transects. Streamflow cross-sections were chosen to minimize turbulence and changes in water depth and to prevent backwaters along their margins. Streamflow for CR- 1 was measured at a transect with 26-29 verticals. Streamflow for CR- 2 was measured at a transect with 31-36 verticals. Streamflow for CR-3 was measured at a transect with 27-31 verticals. It was located downstream of the unnamed tributary which confluent with Fall Creek, approximately 175 meters upstream of the creekmouth and immediately upstream of the Highway 9 bridge overpass. This unnamed tributary augmented streamflow at CR-3.

Using EXCEL spreadsheets provided by CDFW (**DFG-IFP-001; updated 2013**), percent of the greatest contiguous (continuous) width and percent of the total transect width (at the highest calibration flow) were calculated for each calibration streamflow at specified depth criteria. Results were calculated at depth criteria between 0.2 and 0.7 feet at 0.1 foot increments (**Appendices B1–B4**). Then EXCEL was used to generate best-fit linear regression lines and equations for streamflow versus percent width (contiguous and total) at each depth criteria. Using the linear equations, the minimum streamflow was calculated which satisfied 10% of contiguous transect width and 25% of the total transect width at each specified depth criteria as acceptable widths established by Thompson (1972) for upstream migration. When a calibration streamflow provided zero width to meet the depth criteria, its width data were excluded in development of line graphs and equations. Including zeros as percent width would destroy any linear relationship that might exist. When the regression line from multiple calibration flows provided an unrealistic negative streamflow to meet the more shallow depth criteria (especially at the 0.1 and 0.2 ft depths), then only data points from the lowest 2 calibration flows were regressed visually on the EXCEL graphs with a straight edge between the points to obtain streamflow estimates that would satisfy the depth criteria.

The CDFW publication (**DFG-IFP-001; updated 2013**) provided proposed minimum depth requirements for adult and juvenile salmonids at critical riffles. They are included in **Table 1**. These salmonid requirements were presumably developed for upstream movement only.

Table 1. CDFW proposed minimum depth requirements for adult and juvenile salmonid passage to be used in critical riffle analysis.

Species	Minimum Depth (ft)
Steelhead (adult)	0.7
Coho salmon (adult)	0.7
Chinook salmon (adult)	0.9
Trout (adult, including 1-2+ juvenile steelhead)	0.4
Salmonid (young-of-the-year juvenile)	0.3

R2 Resource Consultants, Inc. (**2007**) stated that ideal criterion should enable passage of all possible sizes of individual fish and that there should be sufficient clearance underneath the fish so that contact with the streambed and abrasion are minimized, which they assumed to be approximately 0.1 ft. Based on these considerations, R2 Consultants, Inc. (**2008**) established minimum depth passage criteria for upstream migrating adult steelhead at 0.7 feet and for adult coho at 0.6 feet. Coho salmon are smaller, on average than steelhead. We could not find the basis for the CDFW criteria for juvenile steelhead or other YOY salmonids in Table 1. Thompson (**1972**) recommended the depth criteria for adult steelhead and coho salmon to be 0.6 feet for a 10% continuous portion of the critical riffle transect and 25% of the total width, with a maximum water velocity of 8 ft/sec. He cautioned that “the relationship between flow conditions on the transect and the relative ability of fish to pass has not been evaluated.” He did not provide depth or width recommendations for juvenile fish. In previous steelhead passage studies performed by Alley (**1992; 1993**) on Central Coast San Simeon and Santa Rosa creeks in San Luis Obispo County, he used the Thompson (**1972**) criteria of 0.6 feet depth for adult steelhead spawners. These criteria were acceptable to the California Department of Fish and Game (**Karen Worcester and Keith Anderson, CDFG biologists pers. comm.**) and the State Water Resources Control Board (**Steve Herrera, SWRCB staff, pers. comm.**). Alley added a minimum width criteria of 5 continuous feet of width for adult fish in the thalweg (deepest portion of the transect). Widths of critical riffle transects in San Simeon and Santa Rosa creeks were much wider than in lower Fall Creek. Ranges in widths for 4 critical riffles in lower Santa Rosa Creek were 63-64 ft, 30-37 ft, 53-78 ft and 42-76 ft, respectively, making the 25% total width depth criteria and minimum of 5 ft continuous width more relevant there than in lower Fall Creek. Alley established a depth criteria for spent kelts to be 0.4 feet across a minimum 4 feet width. Alley established depth criteria for smolts to be 0.3 feet. Depth criteria established for

yearling steelhead and older juveniles prior to smolting was 0.2 feet over a minimum of 5 feet continuous widths. Juvenile smolts in Santa Rosa Creek would be larger than those in Fall Creek, based on the large, fast-growing yearlings captured in sunny mainstem reaches of the lower valley on Santa Rosa Creek (Avg. length of yearlings at 2 random pools = 127 mm SL (139 mm calculated Fork Length; 5.5 inches) (n=55)) (**Alley 2004**). Depth criteria in Santa Rosa Creek for kelts, smolts and 1+ and older juveniles were based on 1) observations of migrating steelhead in central California coastal streams made by local fishery biologists Jerry Smith, David Dettman and Donald Alley, 2) discussions between Don Alley and the other two local biologists, 3) physical conditions in San Simeon and Santa Rosa creeks and professional judgment. Kelts have been observed moving downstream at shallower than 0.4 ft depth. In fact, small adult steelhead kelts have been observed moving down over short riffles at depths of only 0.2 feet in Waddell Creek (**Jerry Smith pers. comm.**). More stranded kelts have been observed in Santa Cruz Mountain watersheds after drier winters than wetter ones (**D. Alley, pers. observation**).

Alternative Depth Criteria for Adult Salmonids in Lower Fall Creek

In contrast to minimum depth criteria in **Table 1**, we judge that successful passage for adult and juvenile steelhead and coho salmon between the creekmouth and the fish ladder (0.5 miles) will occur at shallower minimum depths than the CDFW proposed minimum depth requirements. Shallower minimum depth requirements are warranted, based on considerations of 1) short distance of travel to the mainstem River, 2) other riffles in the reach are deeper than the 4 most critical riffles identified, 3) steelhead body height (depth), 4) personal observation of adult and juvenile movements, and 5) depths at which juvenile steelhead have been found to rear during our juvenile sampling in small California Central Coast streams. Smolts in Fall Creek would traverse up to 12 miles of stream channel to reach the ocean, 95% of which would be in the mainstem River.

Adult steelhead have been observed passing upstream through stream cross-sections that were 0.4 to 0.5 feet deep on several occasions (**D. Alley pers. observations**). Powers and Orsborn (**1985**) stated that flow depth needed to be greater than body depth (height) in passage designs for the fish to make full use of its propulsive power. They noted that the general length to height ratio equaled 5 for fish. For older adult steelhead that reached a mean length of approximately 32 inches in Waddell Creek (**Shapovalov and Taft 1954**), this equates to a design body height of 0.53 ft. Younger adult fish with a length averaging approximately 22 inches in the Shapovalov and Taft study would have a design body height of approximately 0.36 ft. The longest adult steelhead captured at the Felton trap at the top of the fishladder on the SLR over the 2008-2009 spawning season (a drier year in which a high proportion of the fish used the fish ladder) processed by the Monterey Bay Salmon and Trout Project was 36 inches (0.6 ft calculated height). The average adult steelhead length that spawning season was 24.5 inches (0.41 ft calculated height; n = 152). In the year with the largest returning 3-year old coho salmon

occurred in Waddell Creek (1939-40; **Shapovalov and Taft 1954**), males averaged 26.7 inches and females averaged 26 inches. Two-year old returning males averaged 16.5 inches. Average coho salmon length of those returning to Scott Creek in winter 2014-2015 was 57.6 cm (23 inches) Fork Length (n=78) (**data from J. Kiernan, NOAA Fisheries Biologist**), making the computed average body height of 4.5 inches (0.4 ft). Maximum fork length of adult coho in 2014-2015 was 72 cm (28.3 inches; body height 5.7 inches (0.5 ft)).

In the narrow, confined channel of lower Fall Creek from the mainstem River to the fish ladder, we expect adult spawners to easily follow the thalweg up the channel, making the metric of 25 % of total channel width depth criteria of limited relevance. It is the depth across 10% of contiguous thalweg that is important and will be focused on to establish minimum passage flows for steelhead and coho salmon in Fall Creek below the fish ladder. The initial 23 February 2016 survey of Fall Creek indicated that thalweg depths at T-1 and T-2 in CR-1 and CR-2 were 0.1 ft deeper than at T-5 in CR-3, and that thalweg depths at other shallow riffles were 0.15 to 0.45 feet deeper than at T-5 (**Appendix C**). Most riffles had average depths of 0.25 – 0.45 ft deeper than the thalweg at T-5. So, adult spawners would experience generally deeper conditions throughout the reach except at 3-4 more critical locations that may make passage more difficult when the depth criteria are not satisfied but not prevent it.

We judge that younger (smaller) adult steelhead (and adult coho salmon if present) would have successfully entered the Fall Creek creekmouth CR-3 in 2016 through the thalweg at depths in the range of 0.4 – 0.5 feet at T-5 and successfully migrated to the fish ladder. This is based on considerations of adult steelhead body height and relative depths of thalwegs (deepest portion of the channel cross-section) at critical riffles compared to thalwegs at other cross sections and average riffle depths. When the thalweg depth at T-5 for 10% contiguous width was 0.5 feet, thalweg depths at T-1 and T-2 in CR-1 and CR-2 would be similar or slightly deeper, and minimum thalweg depths in other riffles would be in the range of approximately 0.6 – 0.7 feet and deeper.

We judge that older (larger) adult steelhead would have successfully passed the creekmouth riffle in 2016 at T-5 with the thalweg depth in the range of 0.5 – 0.6 feet and made their way to the fish ladder. With these conclusions, we propose alternative minimum depth requirements for adult salmonid passage to be used in critical riffle analysis for Fall Creek (**Table 2**). An additional factor to consider at CR-3 is streamflow in the SLR. When it exceeded 500 cfs, T-5 became inundated by the River. At a streamflow between approximately 500 and 700 cfs in the SLR, T-3 became the shallowest cross-section in 2016. From previous calculations, bankfull at the Big Trees gage was between 2,800 and 4,300 cfs, corresponding to the 1.3 and 1.5 year recurrence intervals, respectively (**Alley 1999**). The influence of SLR streamflow upon CR-3 passability will

vary each year. We detected soft sand deposited in the SLR at the mouth of Fall Creek in March after significant stormflow. Much of the sediment moved downstream as the spring progressed.

Table 2. Alternative recommended minimum depth requirements for adult and juvenile salmonid passage at critical riffles to be used in analyses for lower Fall Creek between the fish ladder and the San Lorenzo River (0.5 miles). (Developed by D.W. ALLEY & Associates.)

Species	Minimum Depth (ft) at Critical Riffles	Timing of Movement
Steelhead (adult spawning)	0.4 (Younger Adults) – 0.6 (Older Adults)	Mid-December – Mid-April
Coho salmon (adult spawning)	0.4 (2-year old males) – 0.6 (3-year old adults)	Mid-December – End of February
Steelhead (adult spent kelts; down-migrants)	0.3 – 0.4	January – April
1+2+ juvenile steelhead, pre-smolts and smolts (down-migrant)	0.2	Mid-March – End of June
1+ juvenile coho pre-smolts and smolts (down-migrant)	0.2	Mid-March – Mid-June
YOY steelhead and juvenile coho salmon (downstream)	Maintain hydraulic continuity and 0.1 ft	April – July (Small numbers may move downstream through October)

The spawning season for adult steelhead may be expected to begin with the first opening of the SLR sandbar (usually November) and may extend to the end of May (**Shapovalov and Taft 1954**). The bulk of adult steelhead movement on Waddell Creek during the 9 year study in the 1933-1942 study on Waddell Creek occurred from mid-December to mid-April (**Shapovalov and Taft 1954**). The spawning season for adult coho salmon may be expected to begin with the first opening of the SLR sandbar (usually in November) and may extend to the end of March (**Shapovalov and Taft 1954**). The bulk of adult coho salmon movement on Waddell Creek during the 9 year study in the 1933-1942 study on Waddell Creek occurred from mid-December to the end of February (**Shapovalov and Taft 1954**).

We judge that minimum thalweg depths (10% contiguous width) of 0.3–0.4 would allow successful downstream movement of steelhead kelts in Fall Creek. The bulk of spent kelts migrated downstream from mid-March to the end of May in mainstem Waddell Creek, which has good pool development and cover for spent kelts (**Shapovalov and Taft 1954**). In Fall Creek we would expect kelts to exit soon after spawning because pool habitat is shallow and very limited. We would expect the bulk of kelt downstream movement to be in February and March in Fall Creek. They would require less depth than upstream migrants, their being propelled by the stream current.

Alternative Depth Criteria for Juvenile Salmonids in Lower Fall Creek

A basic assumption in relating juvenile densities to habitat conditions where they are captured has been that during the growing season, juveniles do not move substantially from where they are captured. Once juveniles choose their rearing habitat early in the growing season, most stay put for the entire season. This is a reasonable assumption because salmonids are territorial and at sites in close proximity, such as adjacent sites in the larger mainstem and smaller tributaries nearby, there are consistent differences in fish size between the sites. Juveniles are consistently larger in the mainstem sites where streamflow is greater and there is more food. They are consistently smaller in nearby lower reaches of tributaries where streamflow and food are reduced (Zayante Reach 13a compared to SLR below Zayante confluence; **Alley 2002**). In adjacent reaches of the same tributary, there are differences in juvenile steelhead size between sunny productive habitats with more streamflow and shady habitats with less streamflow where food is scarce (Zayante Reach 13c compared to Zayante Reach 13d; **Alley 2015**). This indicates a lack of movement between sites after yearling choosing rearing habitat and YOY distribution downstream after emergence in the spring. In addition, Davis (**1995**), during a study of growth rates in various habitat types, marked juvenile steelhead in June in Waddell Creek and recaptured the same fish in September in the same (or immediately adjacent) habitats where they had been marked. During the Sogard et al. (**2009**) work on Soquel Creek, many juveniles that had been PIT tagged early in the growing season were recaptured in the same habitats later in the fall, and Alley detected very few of her tagged fish in other downstream sites through the years of tagging, with most being captured by Alley in close proximity to where they were originally tagged.

Shapovalov and Taft (**1954**), after 9 consecutive years of effective fish trapping on Waddell Creek, detected very limited upstream juvenile steelhead movements; most of the upstream movement occurred in winter (wet season) near the lagoon/ estuary. Presumably, the sandbar at the creekmouth had broken from early stormflow, causing the lagoon to evacuate and reduce juvenile habitat, requiring juveniles to either enter the ocean or move upstream where habitat was available.

Hayes et al. (2011) detected juvenile upstream movement from the lagoon of Scott Creek in late fall 2008 after sandbar breaching and prior to sandbar breaching when water quality declined due to tidal overwash that typically occurs in late fall from storms at sea. During the study (2002–2008) the mean bar breach date due to stormflow in Scott Creek was December 7, with a range from November 14 to December 20. Some juveniles were detected just over 6 miles upstream of the creekmouth in that relatively small watershed. Relating these observations to the San Lorenzo River, the Fall Creek confluence is beyond river mile 10, and between it and the lagoon is the higher gradient gorge with multiple boulder cascades and the wide Rincon riffle. The Felton Diversion Dam abutment is also downstream. These impediments would be very difficult to negotiate at dry season baseflows. The fish ladder is nonfunctional at the Felton Diversion Dam in summer, creating a barrier to upstream steelhead movement into the upper mainstem or its tributaries (including Fall Creek) when the inflatable dam is not working in the summer and fall. Even so, juvenile steelhead PIT-tagged by J. Hagar in the San Lorenzo River lagoon/estuary in June 2016 were detected at the Felton Diversion Dam later in summer, and some of those PIT-tagged in September were also detected in Felton (Hagar 2017). Of the total 392 juvenile steelhead tagged in the lagoon in June 2016, 94 (24%) were recorded at Felton as of January 17, 2017. Of the 114 fish tagged in the lagoon in September, 34 (30%) were recorded at Felton by January 17. The first June tagged fish was recorded at Felton on June 29, 16 days after being tagged and the first September tagged fish was recorded at Felton on November 1, 36 days after being tagged in the lagoon. No mention was made of lagoon conditions that may have initiated these upstream movements. The San Lorenzo River lagoon is subject to periodic artificial summer breaching in which much of the lagoon volume and habitat is evacuated and water quality conditions may deteriorate. Under these conditions, steelhead may choose to move upstream to stream habitat. Another relevant observation from summer 2015 in Scott Creek was the bidirectional redistribution of PIT tagged YOY coho prior to the drying of stream reaches and isolation of pool habitats in late summer. This was small scale movement (generally <250 m), but movement nonetheless, when loss of hydraulic continuity was pending (J. Kiernan, NOAA Fisheries biologist, pers. comm.).

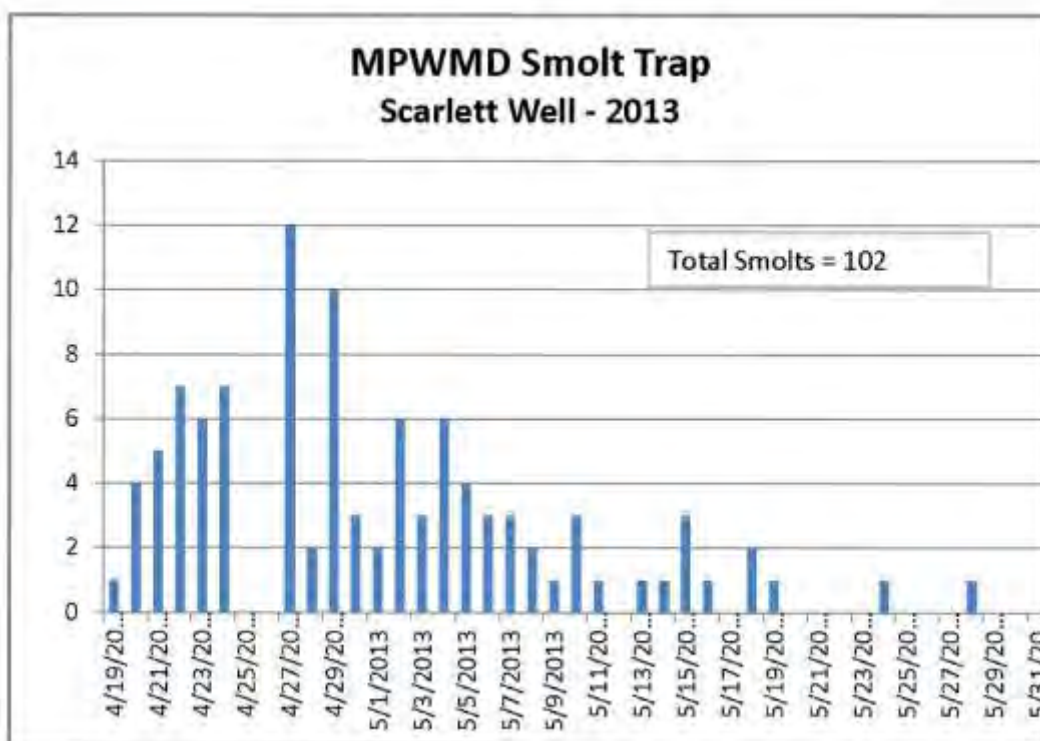
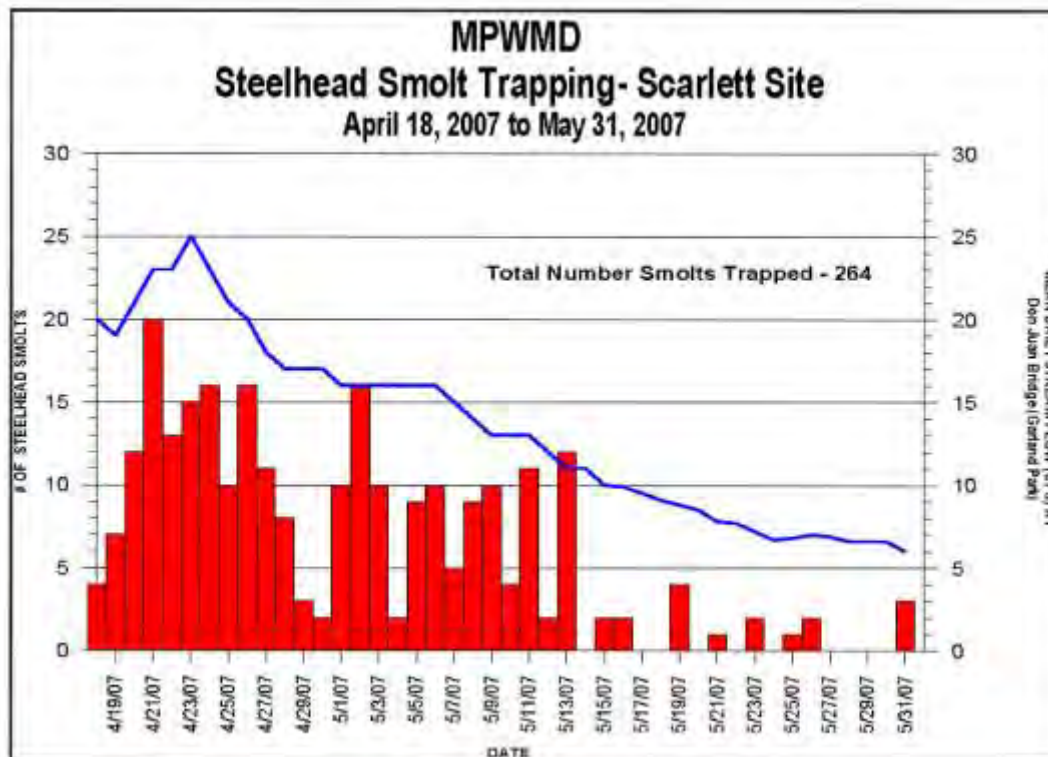
Despite these detected juvenile salmonid movements in the mainstem San Lorenzo and elsewhere, the ecological significance of upstream juvenile movements from the lagoon/estuary during the dry season is debatable. No lagoon tagged juvenile steelhead have been detected at fall sampling sites in the lower San Lorenzo River after multiple years of scanning except for one large yearling (363 mm FL) at the lowermost stream site just above the lagoon and below Highway 1 in 2018 (Alley 2016 and 2018 and pers. observations). No unusually large juvenile steelhead have been captured in Fall Creek or other tributaries in our annual fall sampling since 1994 that would indicate lagoon origin due to rapid growthrate there. However, larger juveniles are sometimes observed during snorkel censusing of mainstem pools in the fall.

We do not expect upstream movement of yearling and older juvenile steelhead within Fall Creek or into Fall Creek from the SLR except for possibly short distances in winter to seek overwintering cover from stormflows. The same may be said of juvenile coho salmon. We expect that the only ecologically significant movement of juvenile steelhead and coho salmon to be downstream through the thalweg of lower Fall Creek to smolt (primarily from March through

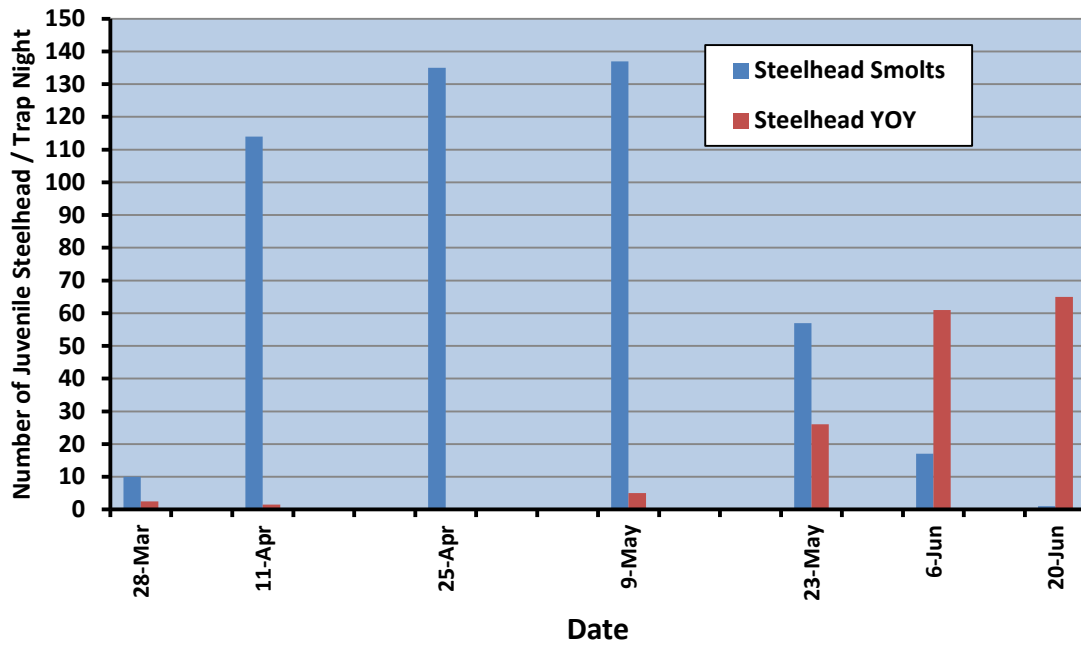
mid-June; **smolt trapping data in 1987 and 1988** in lower SLR available upon request) or to find better food availability after YOY fry emergence in spring and early summer (predominately May and June; smolt trapping data in 1987 and 1988 in lower SLR), but may extend through the summer to a much lesser degree (**Shapovalov and Taft 1954**). During the Shapovalov and Taft study on Waddell Creek (**1954**), the bulk of coho salmon pre-smolts and smolts moved downstream from mid-March to mid-June. The bulk of steelhead pre-smolts and smolts moved downstream from mid-March to the end of June in their Waddell Creek study (**Shapovalov and Taft 1954**). Downstream movements of juveniles will be possible at shallower depths and reduce the likelihood of abrasion compared to upstream movements. The distance from the diversion to the creekmouth is a relatively short 0.5 miles that had only 4 critically shallow riffles to minimize potential abrasion. Down migrants will easily follow the thalweg in Fall Creek.

During the growing season, we expect little upstream movement of YOY steelhead within Fall Creek or into Fall Creek from the SLR because of Fall Creek's highly shaded nature and slow juvenile growth rate, indicating food scarcity (**Alley 2015a**). More food is available in the SLR, as indicated by larger YOY sizes. Water temperatures in the SLR downstream of Fall Creek are well within steelhead temperature tolerances (**Alley 2015b**). It is conceivable that with coho recovery to the watershed, some juvenile coho salmon in the SLR may attempt to use Fall Creek as a cold water refuge in summer. However, naturally low Fall Creek baseflows would likely make access impossible in most years in July and August, and we have no evidence that this behavior may occur. There is a step caused by an artificial rock wall in lower Fall Creek (less than 300 ft from the creekmouth) that may be difficult for upstream passage of juvenile salmonids at flows less than 5 cfs and a drop of more than 1 foot (**Appendix A**).

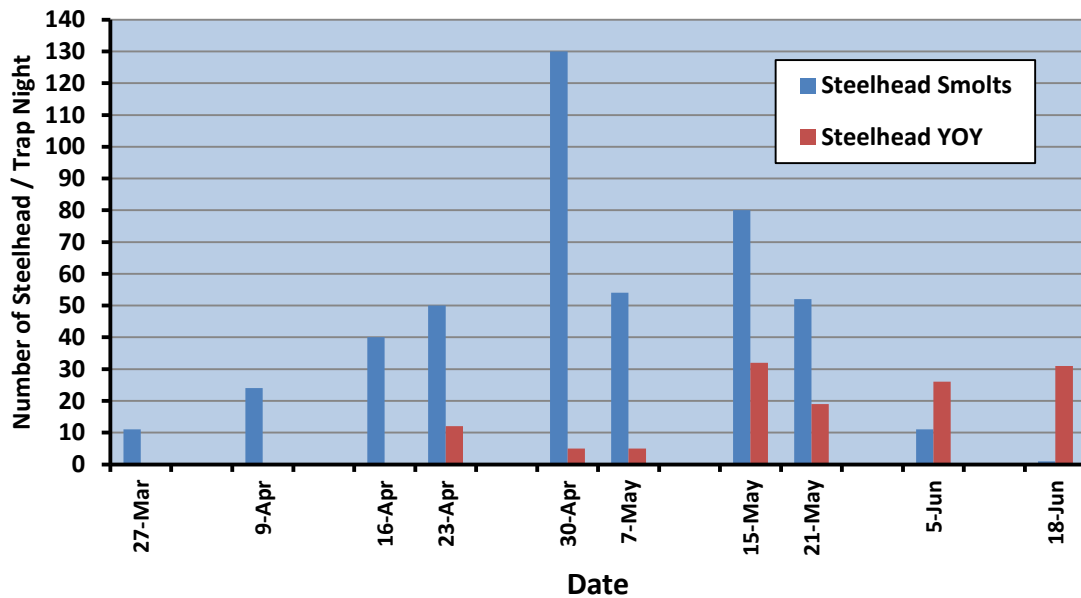
The smolt migration period for coho and steelhead is expected from mid-March through the end of June (**Shapovalov and Taft 1954**). The primary months of migration are April and May, based on data collected on the Carmel River by the Monterey Peninsula Water Management District and on the San Lorenzo River by Smith, Alley and Lehr (**see below**). Water Years 2007 and 2013 were critically dry on the Carmel River, leading to somewhat earlier smolt migration than wetter years because of higher water clarity, feeding efficiency and potentially faster growth rate in spring. The same may be said for timing of pre-smolt and smolt migration during the dry years of 1987 and 1988 on the San Lorenzo River (**see below**).



**San Lorenzo River Smolt Trapping Above Estuary, 1987, a Dry Year.
(Smith, Alley and Lehr Data)**



**San Lorenzo River Smolt Trapping Above Estuary, 1988, a Dry Year.
(Smith, Alley and Lehr Data)**



Average yearling or older juvenile steelhead length in fall 2010 in Fall Creek was 13.0 cm FL (5.1 in) (n=22). Calculated average body height would be approximately 1.02 inches (0.085 ft). Because growth rate is slow in heavily shaded Fall Creek, smolts are expected to be relatively small compared to those reared more sunny tributaries, mainstem reaches and larger coastal streams. These older juveniles may be expected to grow somewhat before smolting in spring. Even so, a minimum thalweg riffle depth of 0.2 ft for 9–10% contiguous width at critical riffles would be adequate for successful smolt down-migrant passage through lower Fall Creek past T-3 to T-5 in 2016. Therefore, 0.2 ft depth is specified as a minimum depth requirement across the thalweg in **Table 2**. This realistically assumes juvenile salmonids will squirt across the last 10 feet of CR-3 at 0.1 – 0.2 ft depth in the thalweg to reach the San Lorenzo River when it is flowing at less than 500 cfs.

Actual depth and width data collected at the lowest calibration flows at T-1 and T-2 were considered more accurate for the 0.2 ft depth criteria than predicted depth and width results generated by linear regression. Therefore, the actual depth measurements made at calibration flows were used to estimate minimum streamflow to satisfy the depth criteria at 0.2 ft. Across the 2.5 ft wide thalweg (8.9% contiguous width) at T-1 at the 8 cfs calibration flow, depths ranged from 0.2 to 0.34 ft. Across the 2.1 ft wide thalweg (11.7% contiguous width) at T-2 at the 7.1 cfs calibration flow, depths ranged from 0.25 to 0.36 ft. (Smolts would have negotiated an estimated 0.2–0.3 ft deep thalweg (2 ft wide) at 10 cfs for the last 10 feet of CR-3 through T-5 to reach the SLR in 2016.)

Average young-of-the-year (YOY) steelhead length in fall 2010 in Fall Creek was 6.6 cm FL (2.6 in) (n=44) (**Alley 2011**). Calculated average body height would be approximately 0.52 inches (0.043 ft) for YOY steelhead. These YOY were smaller in spring and early summer when they would have likely distributed downstream for the growing season. Further, YOY steelhead are often found rearing in shallow riffles of small Central Coast streams with average depths of 0.1 ft and maximum depths of 0.2 ft, with yearlings sometimes found there (**Appendix D**). We reason that if YOY juvenile steelhead rear in riffles that average 0.1 ft depth, they will have no trouble moving through them at that depth. Averaged mean and maximum riffle depth in the habitat typed lower Fall Creek half-mile in fall 2014 (drought conditions; 1.0 cfs) were 0.3 and 0.6 ft, respectively (**Alley 2015a**). We expect that as long as hydraulic continuity is maintained in Fall Creek, as it was during the extreme drought years of 2014 and 2015, YOY steelhead and YOY coho salmon will move unimpeded downstream in Fall Creek to the SLR, where food is more abundant (**Table 2**).

RESULTS

Channel Width and Depth Measuring Details at Transects in Critical Riffles

Based on the staff gage reading at the fish ladder, streamflow was approximately 2.7 cubic feet per second (cfs) on 23 February, the day of the initial survey when critical riffles were chosen. After reviewing field data regarding thalweg conditions across 10 shallow cross-sections, the shallowest transect cross-sections were chosen across 3 critical riffles, including the creekmouth riffle, as shallowest to be modeled at different streamflows. A total of 1,616 linear feet (62%) of 2,620 feet (0.5 miles) were riffle habitat from the creekmouth and the fish ladder.

Refer to **Table 3–5** and **Figures 1-6** for data details at transects across each critical riffle at various calibration flows. Refer to **Appendix A** for transect photos at various streamflows.

Table 3. Data collection details for Critical Riffle # 1.

Date	Critical Riffle #	Transect #	Calibration Streamflow (cubic ft/ sec)	Wetted Channel Width (ft)	# of Verticals between Water Edges	Vertical Interval (ft)	Avg. / Max. Vertical depth/ and Width (ft) Within Likely Fish Passageway
3-8-2016	1	1	22.8	27	53	0.5	0.45/ 0.58/ 4.5
3-14-2016	1	1	53.1	28.15	56	0.5	0.71/0.80/ 4.5
3-15-2016	1	1	44.1	28.0	56	0.5	0.64/ 0.72/ 4.5
3-26-2016	1	1	16.0	25.5	50	0.5	0.35/ 0.43/ 4.5
3-29-2016	1	1	15.1	25.2	48 wet/2 dry verticals)	0.5	0.30/ 0.40/ 4.5
4-4-2016	1	1	9.9	24.8	46 wet/3 dry verticals)	0.5	0.28/ 0.36/ 4.5
4-19-2016	1	1	8.0	23.0	38 wet/7 dry verticals	0.5	0.18/ 0.30/ 4.5

Table 4. Data collection details for Critical Riffle # 2.

Date	Critical Riffle #	Transect #	Calibration Streamflow (cubic ft/ sec)	Wetted Channel Width (ft)	# of Verticals between Water Edges	Vertical Interval (ft)	Avg. / Max. Vertical depth/ and Width (ft) Within Likely Fish Passageway
3-08-2016	2	2	27.5	17.5	49	0.35	0.65/ 0.71/ 4.2
3-14-2016	2	2	55.7	17.95	51	0.35	0.83/ 0.96/ 7.35
3-15-2016	2	2	45.3	17.9	51	0.35	0.72/ 0.92/ 7.35
3-26-2016	2	2	18.2	17.6	50	0.35	0.46/ 0.57/ 4.2
3-29-2016	2	2	15.9	17.6	45 wet/5 dry verticals)	0.35	0.40/ 0.50/ 4.2
4-4-2016	2	2	12.4	17.2	45 wet/5 dry verticals)	0.35	0.34/ .48/ 4.2
5-4-2016	2	2	7.1	17.15	37 wet/11 dry verticals)	0.35	0.26/ 0.36/ 3.5

Table 5. Data collection details for Critical Riffle # 3.

Date	Critical Riffle #	Transect #	Calibration Streamflow (cubic ft/ sec)	Wetted Channel Width Across Transect (ft)	# of Verticals between Water Edges	Vertical Interval (ft)	Avg. / Max. Vertical depth/ and Width (ft) Within Likely Fish Passageway	San Lorenzo River Streamflow @ Felton Big Trees Gage
3-08-2016	3	3	24.2	29.8	47	0.6	0.52/ 0.67/ 4.2	732
3-14-2016	3	4	58.2	19.4	27	0.7	1.61/ 2.30/ 16.8	2,040
3-15-2016	3	3	40.0	30.7	51	0.6	0.70/ 1.03/ 7.8	948
3-17-2016	3	5	30.3	35.8	43 wet (8 dry verticals)	0.7	0.19/ 0.26/ 4.2	512
3-26-2016	3	5	16.6	35.5	35 wet (15 dry verticals)	0.7	0.16/ 0.39/ 4.2	193
3-29-2016	3	5	14.9	35.4	30 wet (20 dry verticals)	0.7	0.14/ 0.35/ 4.2	158
4-4-2016	3	5	11.8	35.2	27 wet (24 dry verticals)	0.7	0.13/ 0.38/ 4.2	108
5-4-2016	3	5	6.2	35.1	15 wet (36 dry)	0.7	0.06/0.2/ 3.5	48

Refer to **Appendices B1–B4** for width and depth measurements at Transects 1–5 in Critical Riffles 1–3 and widths meeting depth criteria. Linear regression coordinates are also included.

Depth Versus Streamflow Results for Critical Riffles

Linear regression lines were generated for percent contiguous width and percent total width meeting various depth criteria as a function of streamflow for T-1 in CR-1 (**Figures 7–18**); for T-2 in CR-2 (**Figures 19–30**); and for CR-3, combining data from T-3, T-4 and T-5 and using the shallowest transect at varying Fall Creek and San Lorenzo River streamflows (**Figures 31a–42b**). Lines were derived with and without the March 8 calibration flow, when T-5 was inundated by the SLR and T-3 was the shallowest cross-section. Data from only T-3 were used to generate linear regression lines for percent contiguous width and percent total width at the 0.2 ft depth criteria, including the March 8 calibration flow (**Figures 43 and 44**). In addition, data from

only T-5 were used to generate linear regression lines for percent contiguous width and percent total width at the 0.2 ft depth criteria (**Figures 45 and 46**). Data from T-5 is more representative at this shallow depth. The linear regression model does not work to represent the 0.1 ft depth criteria. From measured data at the 6.2 cfs calibration flow, we measured 4% of the contiguous width at T-5 in the CR-3 was at least 0.1 ft deep and 12% of the total width was at least 0.1 ft deep. Unlike the CDFW proposed required 0.3 ft depth for juvenile smolt down migrants and juvenile upstream movement, we assume that juvenile salmonids will squirt downstream across the last 10–15 feet of CR-3 at 0.1 – 0.2 ft depth in the thalweg and between boulders in the creekmouth riffle to reach the San Lorenzo River when Fall Creek streamflow declines below about 6 cfs, as is typically the case in late spring. We assume that juveniles will not move upstream into Fall Creek from the mainstem River where there is more food and habitat.

Table 6. Fall Creek streamflows that meet depth criteria between 0.2 and 0.7 feet for 10% contiguous widths and 25% total width through critical riffles (CR), based on linear regression of data along transects (T) at all calibration flows (unless specified otherwise).

Depth Criteria (ft)	Streamflow (cfs) meeting 10% contiguous width (CW) requirement			Streamflow (cfs) meeting 25% total width requirement		
	CR-1	CR-2	CR-3	CR-1	CR-2	CR-3
0.7	36.0	38.6	32.1	37.2	32.2	35.8
0.6	26.8	27.2	28.1	29.5	25.9	31.2
0.5	23.8	17.7	22.8	24.2	19.3	26.4
0.4	17.6	14.0	19.7	16.6	16.0	22.4
0.3	9.6	8.2	18.8	5.3	8 cfs (regressing lowest 2 calib. flows)	19.4
0.2	9.2	7.7	17.3 @ T-3 calibration flows only 32.8 cfs @ T-5 calibration flows only	7.5 cfs (regressing lowest 2 calib. flows)	2.3 (regressing lowest 2 calib. flows)	1.0 @ T-3 calibration flows only (regressing lowest 2 calib. flows) 19.7 cfs @ T-5 calibration flows only



**Critical Riffle #3 at Creekmouth; Transect #5; Water flowing top to bottom; 6.2 cfs
4 May 2016**

Potential Impact of the Fall Creek Diversion on Salmonid Fish Passage

Thompson (1972) recommended that the streamflows that satisfied the chosen depth criteria for 10% contiguous width and 25% of the channel width for the species of concern at each critical riffle be averaged together to determine the minimum flow recommended for passage. This averaging was done for minimum flows at the 3 critical Fall Creek riffles that satisfied each depth criteria regarding a minimum of 10% contiguous width (**Table 7**). The minimum streamflow was estimated with linear regression results from data collection at calibration flows unless actual depths measured at calibration flows indicated lower streamflow that would satisfy the depth criteria. **An important observation made at the highest calibration flow was that at streamflows in the 53 to 58 cfs range, the reach of Fall Creek below the fish ladder became a torrent of continuous riffle.** This was due to the confined nature of the channel, shallow pool

development and gradient. At this range of flows, water velocity in the likely passage thalwegs across the streamflow measurement transects was 2.6–5.2 ft/sec for CR-1; 2.5–4.7 ft/sec for CR-2; and 1.9–4.5 ft/sec for CR-3. Water velocity likely exceeded 6 ft/sec in steeper riffles, and resting slackwater along the channel margin or behind instream wood was very limited. Adult steelhead have a sustained swimming speed (cruising speed) of 4.6 fps (3.4 fps for coho) (Powers and Orsborn 1985). This cruising speed is for normal functions without fatigue. Adult steelhead have a prolonged swimming speed of 13.7 fps (10.6 fps for coho). This prolonged speed includes activities lasting 15 seconds to 200 minutes, which results in fatigue.

Table 7. Minimum streamflow to satisfy our alternative minimum depth criteria averaged for the 3 critical riffles in lower Fall Creek for steelhead and coho salmon adults, kelts (steelhead only), smolts and YOY. (Assumes juvenile salmonids will squirt downstream across the last 10–15 feet of CR-3 at 0.1 – 0.2 ft depth in the thalweg and between boulders to reach the San Lorenzo River when Fall Creek is flowing at less than about 6 cfs.)

Life Stage (Minimum Depth criteria)	Averaged Streamflow (cfs) meeting 10% contiguous width (CW) requirement*	Streamflow (cfs) meeting 25% total width requirement	Primary Movement timing
Adult spawning Steelhead (0.4–0.6 ft depth)	17.1 – 27.4 cfs (35.6 cfs- 0.7 ft CDFW Criteria)	18.3 – 28.9 cfs (35.1 cfs- 0.7 ft CDFW Criteria)	Mid-December– Mid-April
Adult spawning Coho Salmon (0.4–0.6 ft depth)	17.1 – 27.4 cfs (35.6 cfs- 0.7 ft CDFW Criteria)	18.3 – 28.9 cfs (35.1 cfs- 0.7 ft CDFW Criteria)	Mid-December – End of February
Adult spent Steelhead Kelt (0.3–0.4 ft depth)	12.2 – 17.1 cfs (35.6 cfs- 0.7 ft CDFW Criteria)	12.4 – 18.3 cfs (35.1 cfs- 0.7 ft CDFW Criteria)	March – April
Steelhead pre- smolts, smolts and 1+2+ juveniles (0.2 ft depth)	7.1 cfs Avg. Calib. Flow T-3 (17.1 cfs- 0.4 ft CDFW Criteria)	Less than 7.1 cfs (18.3 cfs- 0.4 ft CDFW Criteria)	Mid-March – End of June
Coho Salmon pre- smolts and smolts (0.2 ft depth)	7.1 cfs Avg. Calib. Flow T-3 (17.1 cfs- 0.4 ft CDFW Criteria)	Less than 7.1 cfs (18.3 cfs- 0.4 ft CDFW Criteria)	Mid-March – Mid-June
Steelhead and Coho Salmon YOY (Hydraulic continuity; 0.1 ft depth)	1 – 2 cfs (Estimated at T-5) (12.2 cfs- 0.3 ft CDFW Criteria)	1 – 2 cfs (Estimated at T-5) (10.9 cfs- 0.3 ft CDFW Criteria)	April – July

*Streamflow meeting the 10% contiguous width requirement is most important.

The extent of adverse impact from water diversion just upstream of the fish ladder will depend on the rate and daily duration, as well as seasonality. According to SLVWD staff, water is diverted from Fall Creek at a fairly constant rate each day, with the rate changing from day to day depending on the demand. **Tables 8 and 9** provide daily Fall Creek diversion rates from January 2015 to May 2016, although the meter worked intermittently in March–May 2016. **Table 10** provides the range in pumping rate by month and the monthly average daily pumping rate. The Fall Creek pump typically runs for approximately 21 hours per day, with the diversion shut off from 0400 hr to 0700 hr for 75–80% of the year. During winter months, the 3-hour daily shutoff is closer to 100% due to reduced demand. By this time of the morning, the storage tanks are near full capacity, and diversions from Bull and Bennett springs are sufficient to meet demand. The max pumping capacity of the Fall Creek diversion is 700 gpm (1.6 cfs), though this has never been reached. At emergency times when the Fall Creek pump is shut down for maintenance or due to high turbidity during high stormflows and the springs cannot meet water demand, water is supplied to Felton through the intertie system. SLVWD staff stated that diversion rates are similar through the years, though output from Bull and Bennett springs was likely lower than usual due to drought, requiring greater reliance on the Fall Creek diversion in 2015. Thus, summer and early fall diversion rates may be less after more average and wetter winters.

**Table 8. Daily diversion rate measurement (gallons per minute) from Fall Creek in 2015.
(Typically 21 hours per day with shutoff during 0400 – 0700 hr.)**

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
	145	153	114	216	200	166	284	195	255	135	186	164
	118	0	142	204	143	125	184	197	234	184	0	162
	94	0	101	207	139	170	0	0	264	162	194	162
	0	121	129	204	120	124	154	216	225	155	0	200
	96.2	124	163	199	122	154	160	193	250	160	153	215
	96.7	0	167	174	142	170	197	173	234	158	163	166
	90.9	50	147	186	144	190	111	176	231	155	149	217
	103	102	149	140	122	190	175	172	298	182	165	207
	97	0	131	148	118	155	158	165	319	152	175	173
	98	0	121	146	130	157	124	205	316	171	151	160
	0	150	131	0	131	155	128	194	262	172	153	167
	0	144	141	123	136	155	0	163	185	181	169	160
	0	136	153	155	131	136	219	0	225	173	170	176
	115	0	0	123	151	147	165	185	253	191	149	160
	127	152	0	150	181	0	168	220	186	152	147	171
	130	105	159	137	179	100	171	233	173	145	153	164
	0	0	141	117	154	200	136	206	207	159	0	153
	124	153	141	154	142	171	123	195	170	136	156	157
	106	151	160	130	119	132	175	195	216	158	168	168
	0	111	159	205	172	172	156	139	214	156	165	168
	0	148	118	0	0	166	180	148	226	222	154	165
	0	148	148	117	179	208	178	185	0	170	153	0
	158	156	102	137	0	187	168	181	252	197	167	160
	170	153	149	142	171	174	131	162	258	196	156	165
	157	111	151	195	176	0	163	187	248	211	157	175
	151	174	196	0	114	118	220	187	246	210	0	148
	154	93.9	231	0	0	192	216	0	255	210	0	140
	0	122	217	165	160	301	152	0	247	183	172	133
	0		228	160	0	201	132	200	161	168	158	175
	167		212	0	139	0	153	177	167	168	173	163
	153		233		163		180	304		167		162
AVG-1*	86	98	146	135	128	151	157	166	226	172	135	163
AVG-2*	126	131	156	161	147	167	168	191	234	172	162	169

* AVG-1 includes days with zero pumping, and AVG-2 does not.

**Table 9. Daily diversion rate measurement (gallons per minute) from Fall Creek in 2016.
(Typically 21 hours per day with shutoff during 0400 – 0700 hr.)**

	Jan	Feb	Mar	Apr	May
	0	64	141	70 est.	75 est.
	159	80	90+	70 est.	100 est.
	184	0	90 +	70 est.	85 est.
	160	87	30+	70 est.	85 est.
	130	87	20+	70 est.	145
	90	101	20+	149	141
	90	98	0	70 est.	100 est.
	90	160	0	70 est.	66 est.
	0	140	0	70 est.	90 est.
	79	143	0	70 est.	75 est.
	80	143	0	70 est.	80 est.
	161	139	0	70 est.	80 est.
	148	0	0	70 est.	179
	145	140	100 est.	70 est.	153
	145	138	134	70 est.	105 est.
	138	139	0	70 est.	0
	140	118	78 est.	70 est.	111
	0	134	59 est.	80 est.	144
	0	151	80 est.	80 est.	105 est.
	0	145	80 est.	85 est.	183
	172	130	80 est.	81 est.	156
	110	144	70 est.	80 est.	116
	100	144	80 est.	75 est.	148
	80	146	80 est.	77 est.	153
	77	142	80 est.	73 est.	160
	95	156	70 est.	73 est.	120
	90	0	68 est.	75 est.	110
	95	146	66 est.	75 est.	110
	80	150	68 est.	70 est.	164
	72	116.03		75 est.	150
	0				153
AVG- 1*	94	116			
AVG- 2*	116	129			

* AVG-1 includes days with zero pumping, and AVG-2 does not.

Table 10. Range of daily water diversion rate by month from Fall Creek at the San Lorenzo Valley Water District surface diversion (January 2015 – February 2016), immediately upstream of the half-mile reach containing critical riffles.

Month	Range of Daily Diversion Rate by Month	Average Daily Diversion Rate by Month	Average Daily Diversion Rate by Month Without Days of Zero Pumping
January 2015	0 – 170 gpm (0 – 0.38 cfs)	86 gpm (0.19 cfs)	126 gpm (0.28 cfs)
February 2015	0 – 174 gpm (0 – 0.39 cfs)	98 gpm (0.22 cfs)	131 gpm (0.29 cfs)
March 2015	0 – 223 gpm (0 – 0.50 cfs)	146 gpm (0.33 cfs)	156 gpm (0.35 cfs)
April 2015	0 – 216 gpm (0 – 0.48 cfs)	135 gpm (0.30 cfs)	161 gpm (0.36 cfs)
May 2015	0 – 200 gpm (0 – 0.45 cfs)	128 gpm (0.29 cfs)	147 gpm (0.33 cfs)
June 2015	0 – 301 gpm (0 – 0.67 cfs)	151 gpm (0.34 cfs)	167 gpm (0.37 cfs)
July 2015	0 – 284 gpm (0 – 0.63 cfs)	157 gpm (0.35 cfs)	168 gpm (0.37 cfs)
August 2015	0 – 304 gpm (0 – 0.68 cfs)	166 gpm (0.37 cfs)	191 gpm (0.43 cfs)
September 2015	0 – 319 gpm (0 – 0.71 cfs)	226 gpm (0.50 cfs)	234 gpm (0.52 cfs)
October 2015	135 – 222 gpm (0.30 – 0.49 cfs)	172 gpm (0.38 cfs)	172 gpm (0.38 cfs)
November 2015	0 – 194 gpm (0 – 0.43 cfs)	135 gpm (0.30 cfs)	162 gpm (0.36 cfs)
December 2015	0 – 217 gpm (0 – 0.48 cfs)	163 gpm (0.36 cfs)	169 gpm (0.38 cfs)
January 2016	0 – 184 gpm (0 – 0.41 cfs)	97 gpm (0.22 cfs)	
February 2016	0 – 156 gpm (0 – 0.35 cfs)	116 gpm (0.26 cfs)	

Potential Water Diversion Impacts to Adult Steelhead and Coho Salmon

Water diversion may adversely impact adult steelhead and coho spawning migration when unimpaired streamflow in Fall Creek reaches approximately 17 cfs or greater after stormflow events from mid-December to mid-April, especially in the range of 17 – 30 cfs (providing 0.4–0.6 ft depth at critical riffles). For data provided in **Tables 8–10**, the maximum daily pumping rate varies between 0.38 cfs and 0.50 cfs during the adult spawning period. **In looking at the relationships between water depth and streamflow at the various critical riffle transects above 17 cfs (Figures 1, 3 and 5), it appears that a 0.50 cfs decline in streamflow due to water diversion would cause only a slight reduction in depth in the thalweg of transects in critical riffles and not significantly impede adult salmonid spawning migration.** At T-1 in CR-1, a decline in streamflow from 44 to 23 cfs (21 cfs decrease) caused only a 0.1 to 0.2 ft decline in depth at transect verticals, and a streamflow decline from 23 to 16 cfs (7 cfs decrease) caused only a 0.1 to 0.15 ft decline in thalweg depth at transect verticals. At T-2 in CR-2, a decline in streamflow from 45 to 27 cfs (18 cfs decrease) caused a 0.2 to 0.3 ft decline in thalweg depth at transect verticals, and a decline from 27 to 18 cfs caused a 0.1 to 0.3 ft decline at transect verticals in the thalweg. At T-3 in CR-3, a decline in streamflow from 40 to 30 cfs (10 cfs decrease) caused a 0.1 to 0.3 ft decline in depth at thalweg verticals, and a decline from 30 to 24 cfs (6 cfs decrease) caused only a 0.1 to 0.2 ft decline or less in depth at thalweg verticals. We would expect a decrease in depth from the diversion in the 17 to 40 cfs range to be less than 0.05 ft along thalweg verticals at the maximum pumpage rate and likely less than 0.03 ft decline at average monthly diversion rate. The decline would diminish as unimpaired streamflows increased within the range.

Potential Water Diversion Impacts to Steelhead Kelts

Water diversion may adversely compact adult steelhead kelts (spent) down migration when unimpaired streamflow in Fall Creek is in the 12 – 18 cfs cfs range (providing 0.3–0.4 ft depth at critical riffles) in January–April within approximately 2–3 weeks after a stormflow event. This would be periods between storm events and after the final one for the season. **However, in looking at Fall Creek relationships between water depth and streamflow at the critical riffle transects between 12 and 18 cfs (Figures 2, 4 and 6), it appears that a 0.50 cfs decline in streamflow due to water diversion during these months would cause only a slight reduction in depth at transect verticals in the thalweg and not significantly impede kelt out-migration.** At T-1 in CR-1, a decline in streamflow from 15 to 10 cfs caused only a 0.05 to 0.1 ft decline at transect verticals in the thalweg. At T-2 in CR-2, a decline in streamflow from 18 to 12 cfs caused only a 0.05 to 0.1 ft decline at transect verticals in the thalweg. At T-3 in CR-3, a decline in streamflow from 17 to 12 cfs caused a 0.1 to 0.15 ft decline at transect verticals in the thalweg. At maximum daily diversion rates in March and April of 2015, we would expect a decline of less than 0.025 ft decline caused by water diversion at 2015 rates in CR-1 and CR-2 at thalweg verticals and less

than 0.05 ft decline at thalweg verticals in the short CR-3 at the creekmouth in the streamflow range for kelt out-migration. On average, the decline would be less each month.

Potential Water Diversion Impacts to Steelhead and Coho Salmon Pre-smolts, Smolts and 1+/2+ Juvenile Steelhead

Water diversion may adversely impact steelhead and coho salmon pre-smolts and smolts and downstream moving 1+/2+ juvenile steelhead into the SLR when unimpaired streamflow in Fall Creek goes below 7 cfs from mid-March to the end of June. This would include periods between storm events. We have no calibration flows below 8 cfs at CR-1, 7.1 cfs at CR-2 or 6.2 cfs at CR-3. However, we may obtain a liberal indication of the rate of depth decline with streamflow at the lowest calibration flows that data were collected (**Figures 2, 4 and 6**). This rate would be liberal because at lower streamflows, water is typically funneled through the thalweg, maintaining its depth and more strongly directing smolts and yearling steelhead through it. This funneling of current was developing at the lowest calibration flow at T-1 and T-3 in early May 2016. At T-1 in CR-1, a decline in streamflow from 9.9 to 8 cfs (1.9 cfs decrease) caused a 0.1 to 0.15 ft decline at transect verticals in the thalweg. At T-2 in CR-2, a decline in streamflow from 12.4 to 7.1 cfs (5.3 cfs decrease) caused a 0.1 to 0.2 ft decline in transect verticals in the thalweg. At T-3 in CR-3, a decline in streamflow from 11.8 to 6.2 cfs (5.6 cfs decrease) caused a decline of 0.03 to 0.15 ft at transect verticals in the thalweg, with some cases of deepening. From these data we see that depth declined more quickly at T-1 than either T-2 or T-3. However, at lower flows, water was being directed to the right side (looking upstream) at T-1 such that the thalweg deepened at several verticals on that side despite declining streamflow. Data indicated that a potentially significant 0.05 to 0.10 ft further decline in thalweg depth was probable as unimpaired baseflow declined further from 7 cfs to 2 cfs and as potential maximum daily diversion rates of 0.45 to 0.67 cfs in 2015 (**Table 10**) from April through June occurred. Therefore, it would be beneficial to smolt migration to initiate periods of unimpaired flows during a portion of the night-time hours with diversion shutoff when baseflow goes below 7 cfs between March and the end of June. Nightly shut-off would be ideal during the peak migration in April and May. Considering water velocity across streamflow transects in run habitat in 2016 at 6–12 cfs stormflows and that approximately 1.6 miles of steelhead habitat exist in Fall Creek, a conservative rate of passive downstream migration of 0.5 ft/sec would require 5 hours of nighttime for pre-smolts and smolts to cover the distance, assuming they would begin moving once darkness ensued.

Potential Water Diversion Impacts to Young-of-the-Year Steelhead and Coho Salmon

Water diversion may adversely impact YOY steelhead and coho salmon moving downstream into the SLR at streamflows that will not maintain hydraulic continuity through the reach and a riffle thalweg depth of at least 0.1 ft. At a baseflow of 1.0 cfs and 0.32 cfs at the mouth of Fall Creek in 2014 and 2015, respectively, hydraulic continuity was maintained and YOY could have

moved downstream to the creekmouth riffle if they chose. Insufficient observations of the creekmouth riffle at these low flows prevent assessment of its passability at those flows. Juvenile steelhead reared in this reach successfully during these drought conditions under cool water conditions (Alley 2015b; 2016). Habitat typing of this reach in 2014 indicated that riffles averaged 0.3 ft average depth and 0.6 ft maximum depth at approximately 1 cfs (Alley 2015a). Riffle depths at repeated, average quality sampling sites in 2014 and 2015 averaged 0.25 ft depth with average maximum depth of 0.5 ft (n=4). These data indicated that ample depth of at least 0.1 ft and hydraulic continuity was available for YOY movement downstream in the fall to the creekmouth riffle despite drought. We judge that current Fall Creek diversion rates do not impede YOY steelhead or YOY coho salmon movements in summer to the creekmouth riffle, of which we anticipate little movement after June. We suspect that the creekmouth riffle becomes difficult to pass in summer under unimpaired streamflow in most years due to its high gradient, large boulders and width as it widens and spills into the SLR. More observations of this creekmouth riffle during summer months are warranted to assess its passability.

REFERENCES

- Alley, D.W. 1992.** Passage requirements for steelhead on San Simeon Creek, San Luis Obispo County, California, 1991.
- Alley, D.W. 1993.** Passage requirements for steelhead in Santa Rosa Creek, San Luis Obispo County, California, 1993.
- Alley, D.W. 1999.** Comparisons of Juvenile Steelhead Densities, Population Estimates and Habitat Conditions for the San Lorenzo River, Santa Cruz County, California, 1995-1998; with an Index of Adult Returns.
- Alley, D.W. 2002.** Comparison of Juvenile Steelhead Densities, 1997 through 2001, in the San Lorenzo River and Tributaries, Santa Cruz County, California; With an Estimate of Juvenile Population Size and an Index of Adult Returns.
- Alley, D.W. 2004.** Trends in juvenile steelhead production in 1994-2003 for San Simeon Creek, San Luis Obispo County, California, with habitat analysis and an index of adult returns. Prepared for Cambria Community Services District, P.O. Box 65, Cambria, CA 93428.
- Alley, D.W. 2004.** Trends in juvenile steelhead production in 1994-2003 for Santa Rosa Creek, San Luis Obispo County, California, with habitat analysis and an index of adult returns. Prepared for Cambria Community Services District, P.O. Box 65, Cambria, CA 93428.
- Alley, D.W., J. Dvorsky, J. Ricker, K. Schroeder and J.J. Smith. 2004.** San Lorenzo River Enhancement Plan. Prepared for Santa Cruz County by D.W. ALLEY & Associates and Swanson Hydrology and Geomorphology.
- Alley, D.W. 2007.** Trends in the Juvenile Steelhead population in 1994–2006 for Santa Rosa Creek, San Luis Obispo County, California, with Habitat Analysis and an Index of Adult Returns. Prepared for Cambria Community Services District, P.O. Box 65, Cambria, CA 93428.
- Alley, D.W. 2011b.** 2010 Juvenile Steelhead Densities in the San Lorenzo, Soquel, Aptos and Corralitos Watersheds, Santa Cruz County, California, with San Lorenzo and Soquel Trend Analysis. Available at Santa Cruz County Environmental Health Dept. website.
- Alley, D.W. 2014.** 2013 Juvenile Steelhead Densities in the San Lorenzo, Soquel, Aptos and Corralitos Watersheds, Santa Cruz County, California.
- Alley, D.W. 2015a.** 2014 Juvenile Steelhead Densities in the San Lorenzo, Soquel, Aptos and Corralitos Watersheds, Santa Cruz County, California. Available at Santa Cruz County Environmental Health Dept. website.
- Alley, D.W. 2015b.** Report to the San Lorenzo Valley Water District– Fishery Implications of Water Temperature Data Collected in June – September 2014.
- Alley, D.W. 2016.** 2015 Juvenile Steelhead Densities in the San Lorenzo, Soquel, Aptos and Corralitos Watersheds, Santa Cruz County, California. Available at Santa Cruz County Environmental Health Dept. website.

REFERENCES (continued)

Anderson, Keith. 1993. Personal Communication. California Department of Fish and Game. Monterey, CA. Retired. Last Phone No. 831-653-4330.

California Department of Fish and Wildlife. 2013. CDFW Instream Flow Group. Standard Operating Procedure for Critical Riffle Analysis for Fish Passage in California DFG-IFP-001 October 2012, updated February 2013

Davis, L. 1995. Age Determination of Steelhead Trout (*Oncorhynchus mykiss*) in Microhabitats of a Small Central California Coastal Stream, Using Otolith Microstructural Analysis. Master's Thesis. San Jose State University.

Dettman, David. 1991. Personal Communication. Monterey Peninsula Water Management District. P.O. Box 85, Monterey, CA 93940. Retired. Phone No. 831-336-8290.

Hagar, Jeff. 2017. Technical Memorandum: Santa Cruz Habitat Conservation Plan Lagoon Surveys 2016. Hagar Environmental Science.

Hayes, Sean A. , Morgan H. Bond, Chad V. Hanson, Andrew W. Jones, Arnold J. Ammann, Jeffrey A. Harding, Alison L. Collins, Jeffrey Perez, R. Bruce MacFarlane. 2011. Down, up, down and “smolting” twice? Seasonal movement patterns by juvenile steelhead (*Oncorhynchus mykiss*) in a coastal watershed with a bar closing estuary. Fisheries Ecology Division, NOAA National Marine Fisheries Service, Southwest Fisheries Science Center, 110 Shaffer Road, Santa Cruz, CA 95060, USA.

Herrera, Steve. 1991. Personal Communication. State Water Resources Control Board. Div. of Water Rights. 901 “P” Street, Sacramento, CA 95810. Retired. Previous Phone No. 916-324-5646.

Kiernan, Joseph. 2016. Personal Communication. NOAA Fisheries Biologist. Fisheries Ecology Division, NOAA National Marine Fisheries Service, Southwest Fisheries Science Center, 110 Shaffer Road, Santa Cruz, CA 95060, USA.

Powers, P.D. and J.F. Orsborn. 1985. Analysis of barriers to upstream fish migration. An investigation of the physical and biological conditions affecting fish passage success at culverts and waterfalls. Albrook Hydraulics Laboratory. Washington State Univ. Part of a Bonneville Power Administration Fisheries Project on the development of new concepts in fishladder design. Contract DE-A179-82BP36523.

R2 Resource Consultants, Inc. 2008. Appendix G. Approach for assessing effects of policy element alternatives on upstream passage and spawning habitat availability. March 14, 2008 Administrative Draft prepared for the California State Water Resources Control Board, Division of Water Rights as part of the North Coast instream flow policy; Scientific basis and development of alternatives protecting anadromous salmonids. Accessed from: http://www.swrcb.ca.gov/waterrights/water_issues/programs/instream_flows.

Shapovalov, L. and A. Taft. 1954. The Life Histories of Steelhead Rainbow Trout and Silver Salmon. Calif. Dept. Fish and Game. Fish Bulletin No. 98. 375 pp.

REFERENCES (continued)

Smith, Jerry J. 1991. Personal Communication. San Jose State University. San Jose, CA. Retired. Phone No. 831-923-3656.

Sogard, S.M., T.H. Williams and H. Fish. 2009. Seasonal Patterns of Abundance, Growth, and Site Fidelity of Juvenile Steelhead in a Small Coastal California Stream. Transactions of the American Fisheries Society 138:549–563.

Thompson, K.E. 1972. Determining streamflows for fish life. In Proceedings of the Instream Flow Requirement Workshop. Pp. 31-50. Pacific N.W. River Basin Commission. Portland, Oregon.

Worcester, Karen. 1991. Personal Communication. Calif. Dept Fish and Game. P.O. Box 1535, Morro Bay, CA 93443. Last Phone No. 805-772-4122.

FIGURES

Figure 1. Depth across Transect-1 in Critical Riffle-1 at the four highest calibration flows in Fall Creek, 2016.

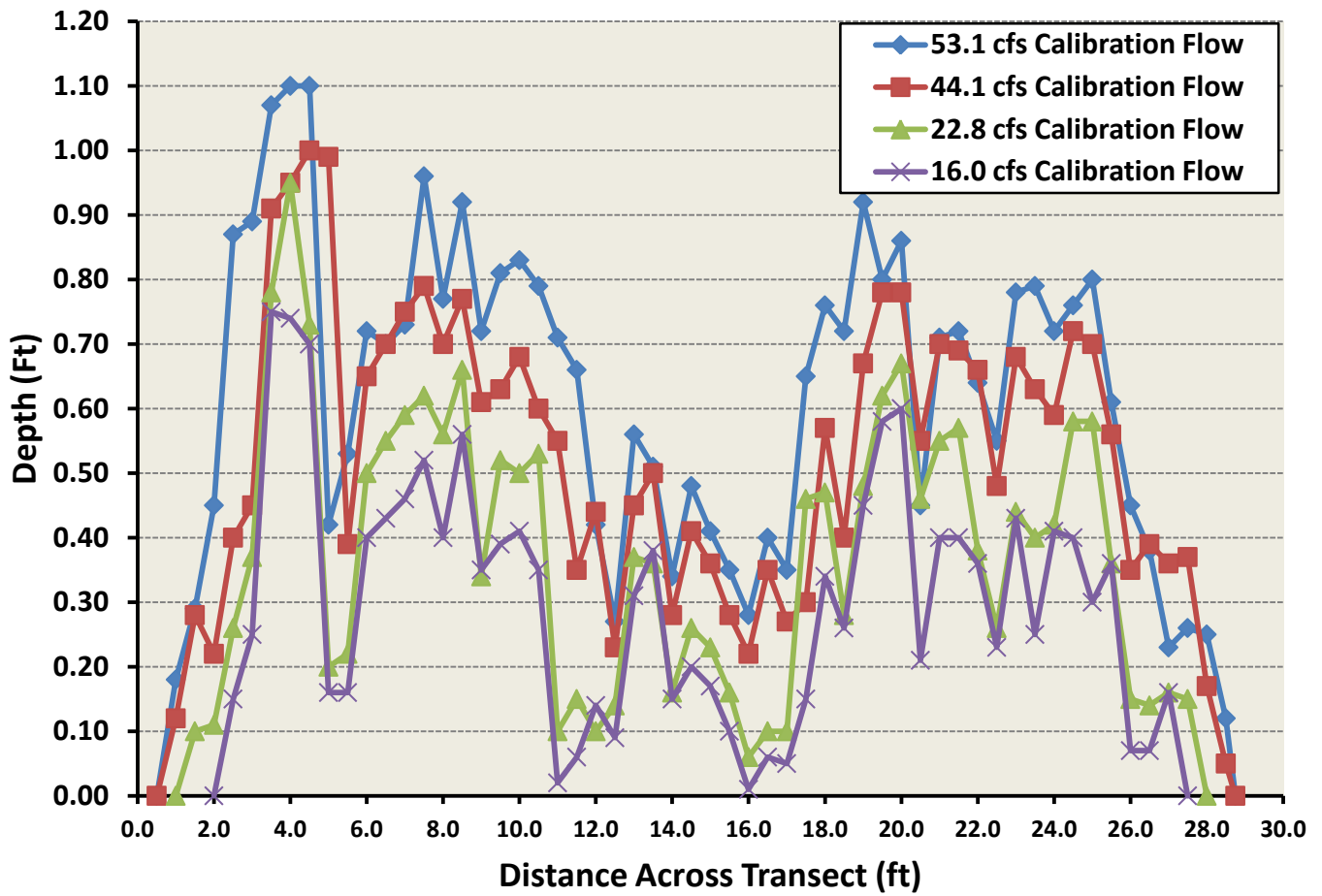


Figure 2. Depth across Transect-1 in Critical Riffle-1 at the three lowest calibration flows in Fall Creek, 2016.

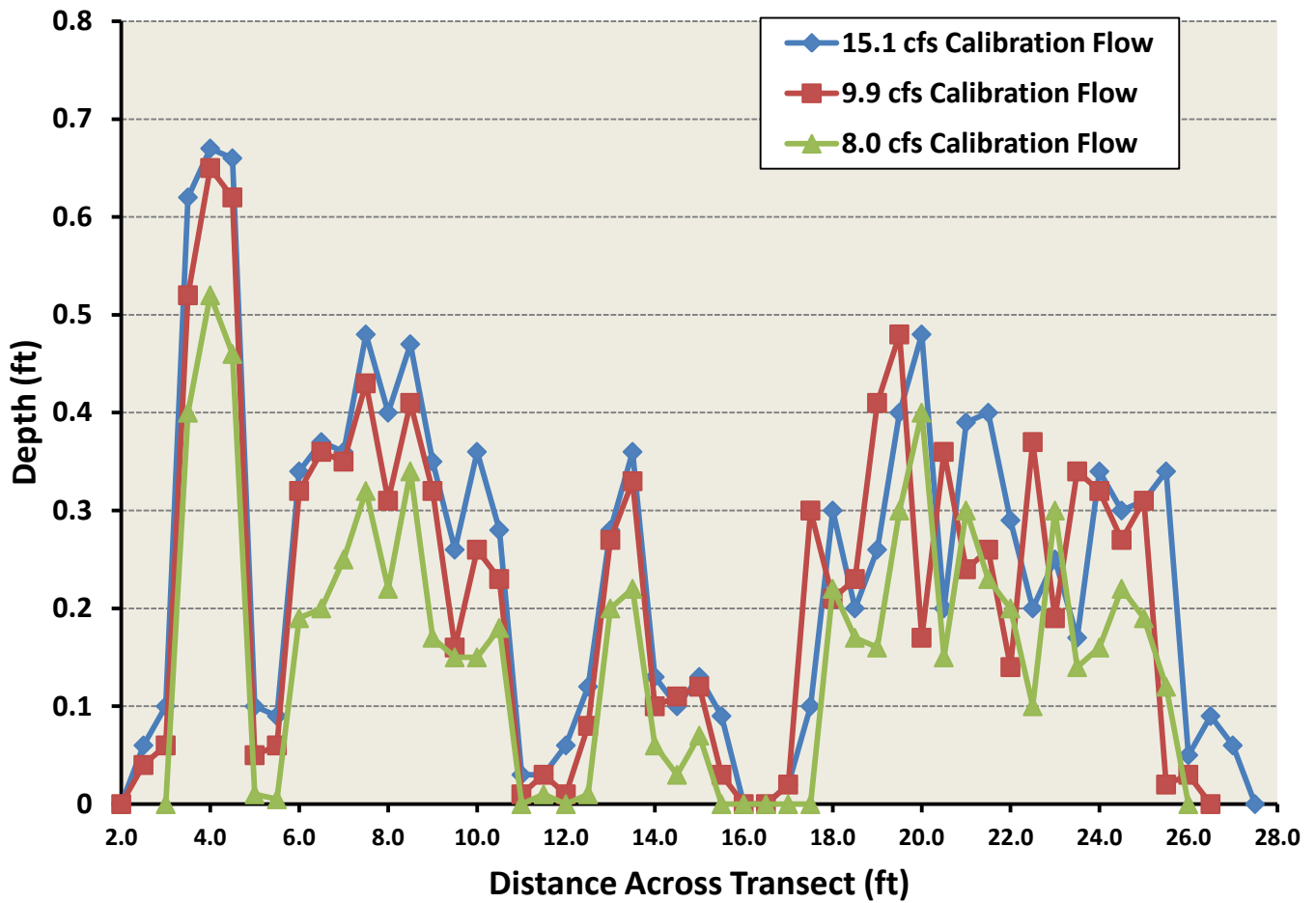


Figure 3. Depth across Transect-2 in Critical Riffle-2 at the four highest calibration flows in Fall Creek, 2016.

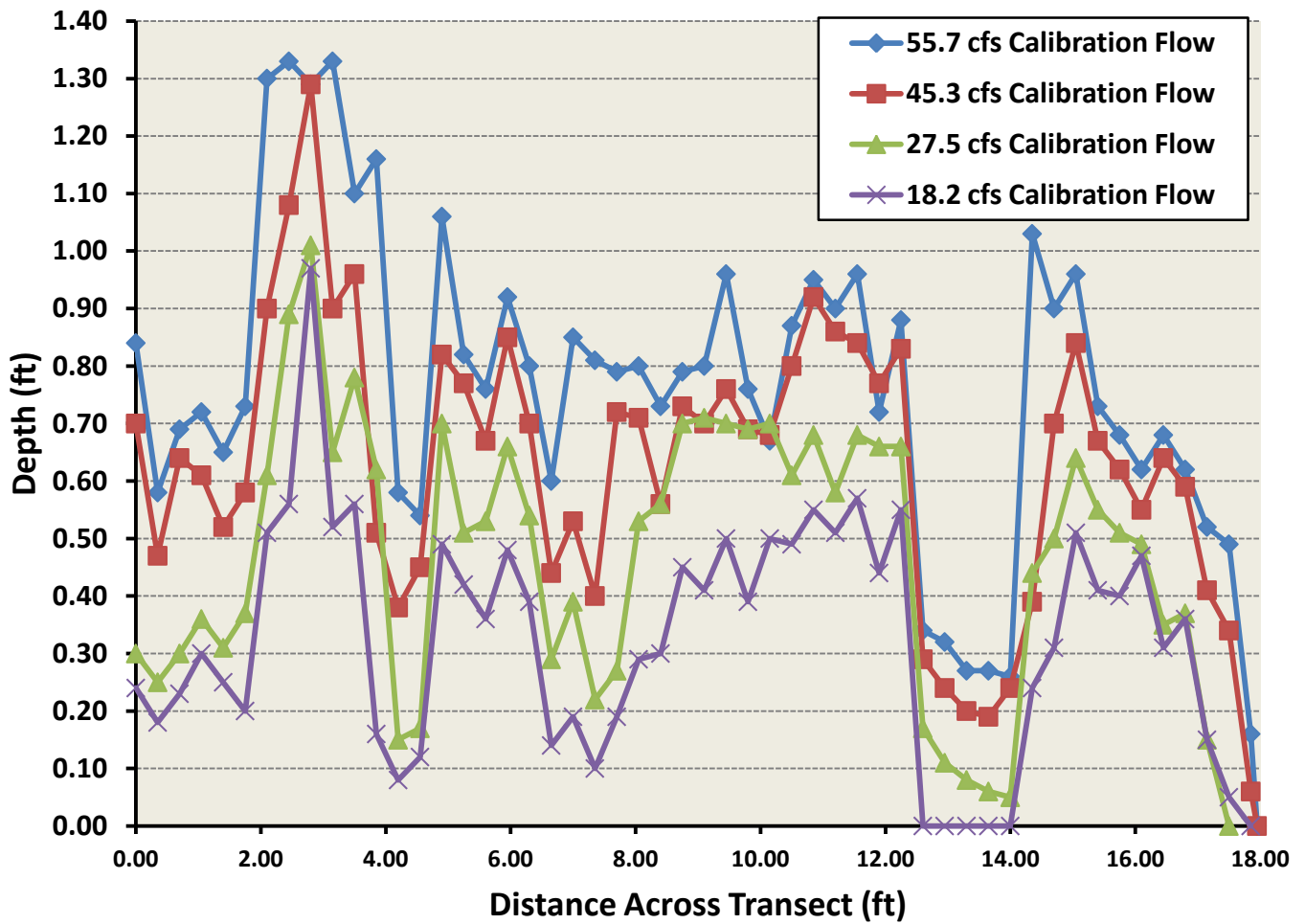


Figure 4. Depth across Transect-2 in Critical Riffle-2 at the four lowest calibration flows in Fall Creek, 2016.

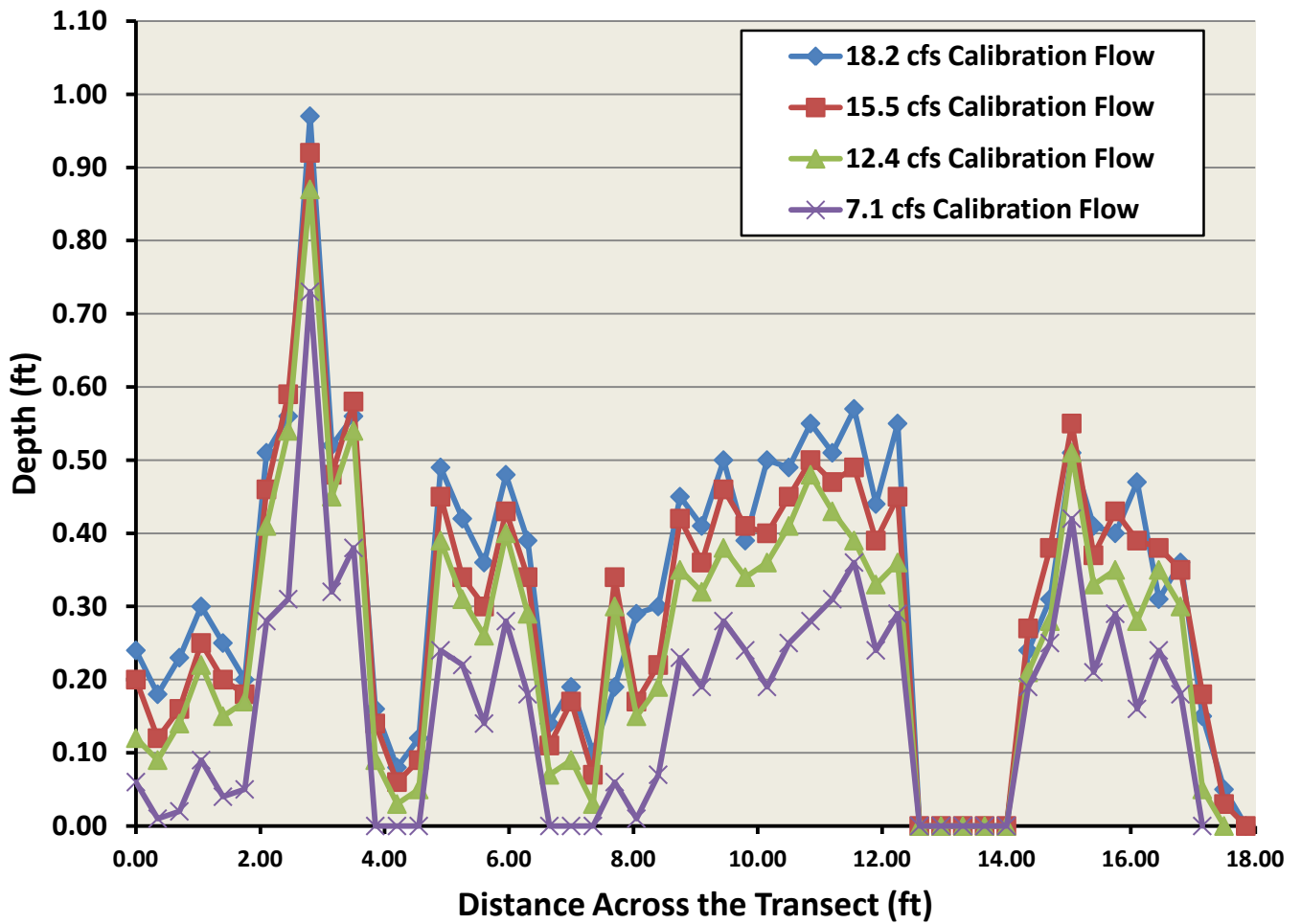


Figure 5. Depth across Transect-3 in Critical Riffle-3 at the three highest calibration flows in Fall Creek, 2016. (Too deep to measure at 58 cfs.)

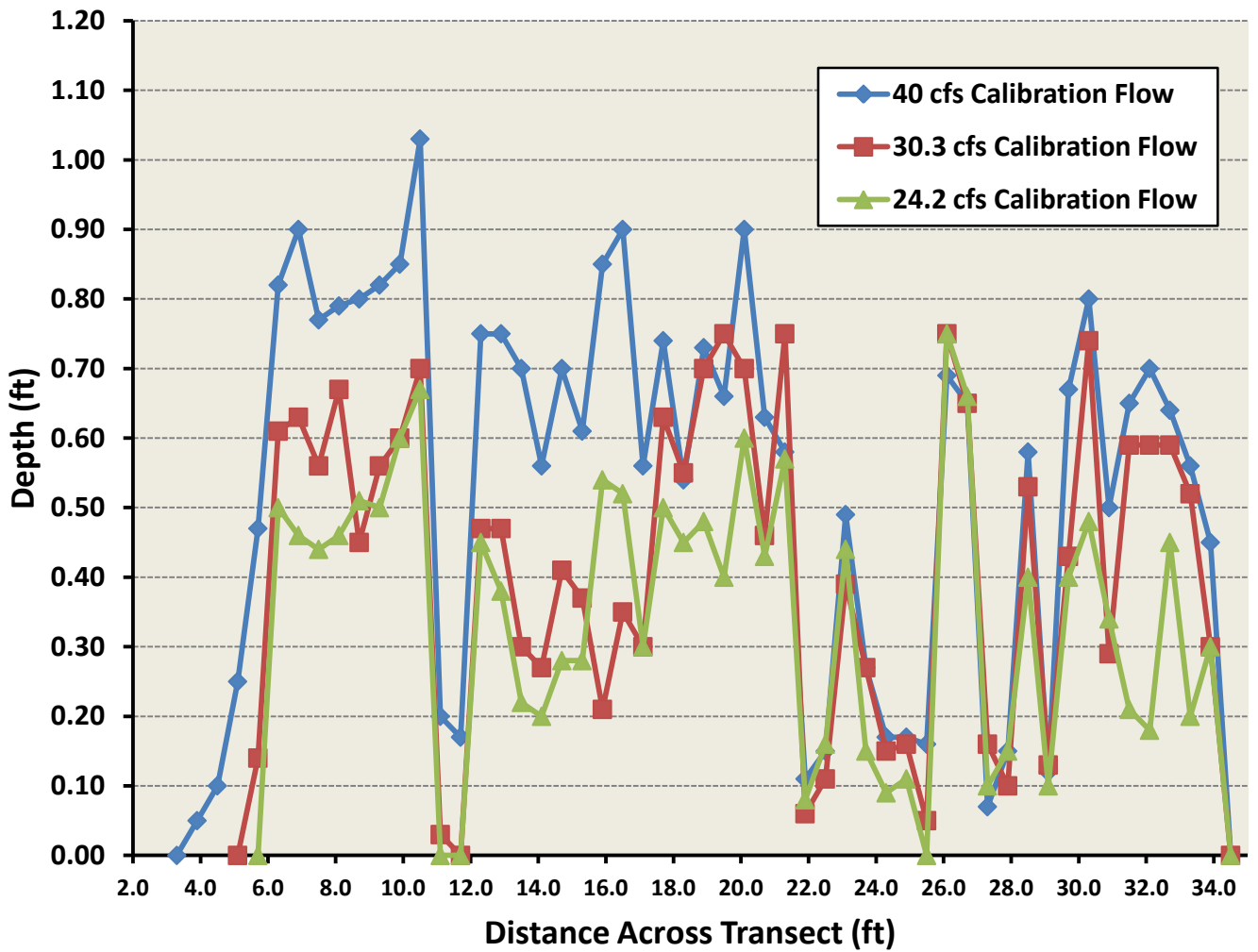


Figure 6. Depth across Transect-3 in Critical Riffle-3 at the four lowest calibration flows in Fall Creek, 2016.

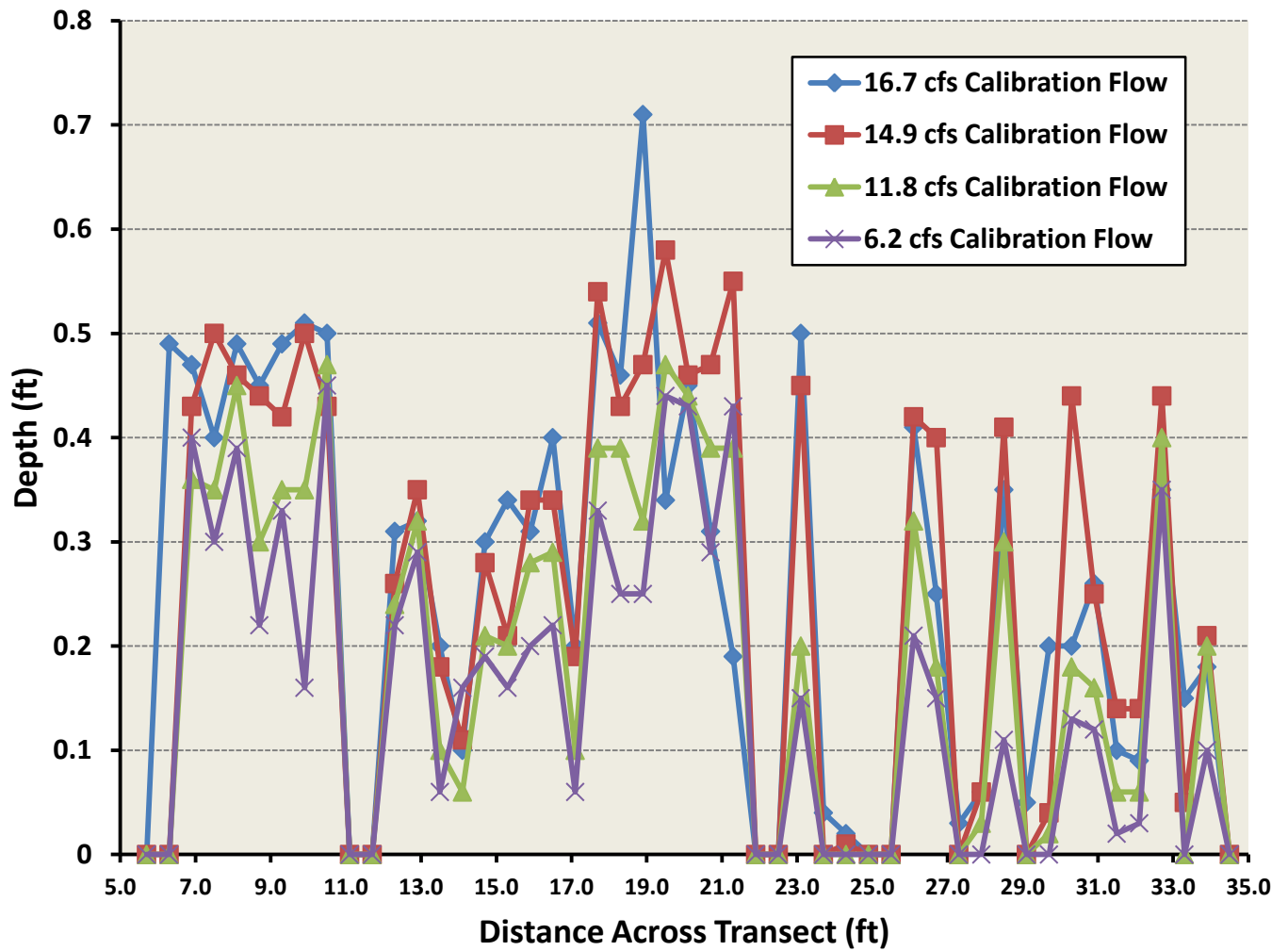


Figure 7. Critical Riffle #1 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width (0.7 ft Depth Criteria).

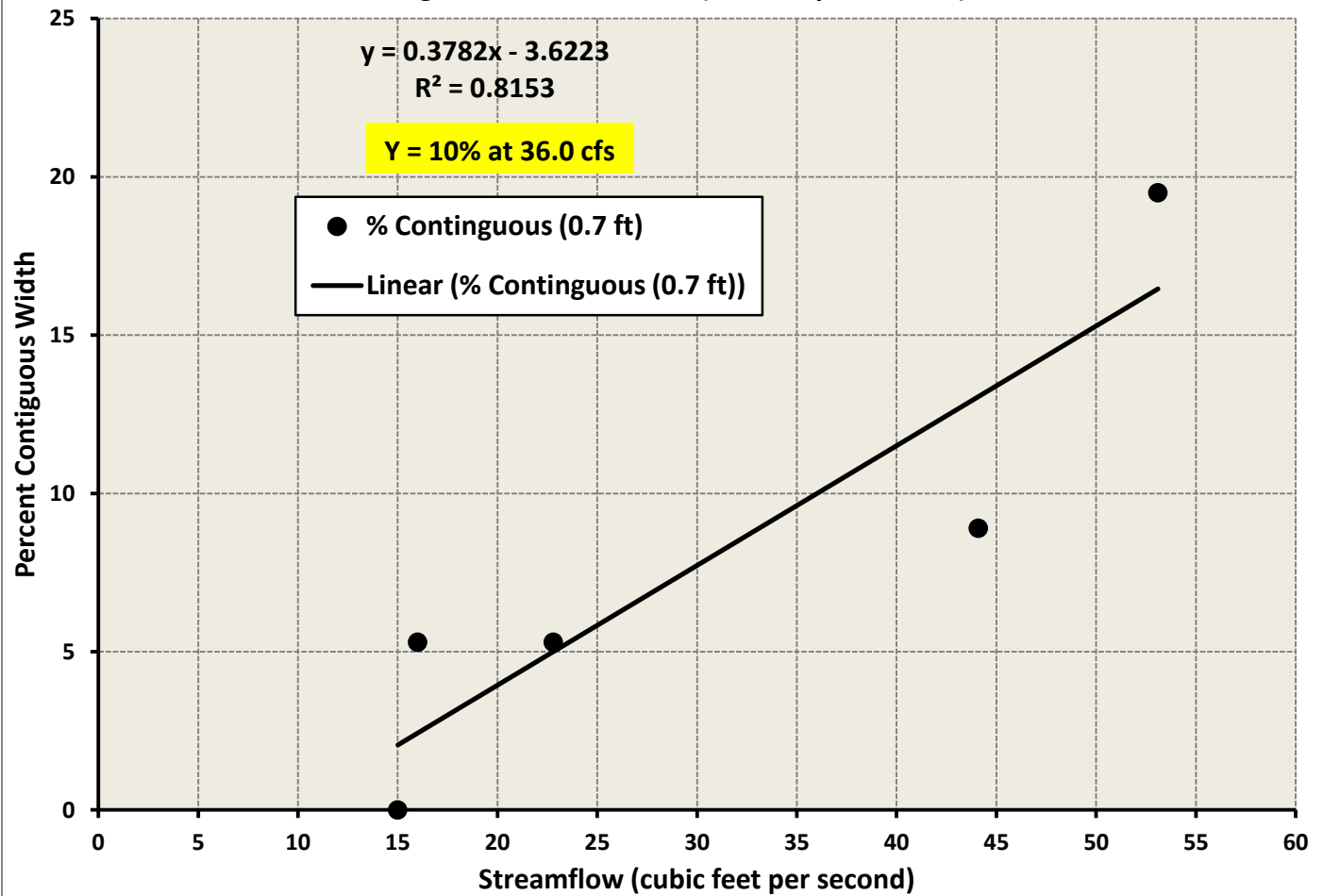


Figure 8. Critical Riffle #1 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width (0.7 feet Depth Criteria).

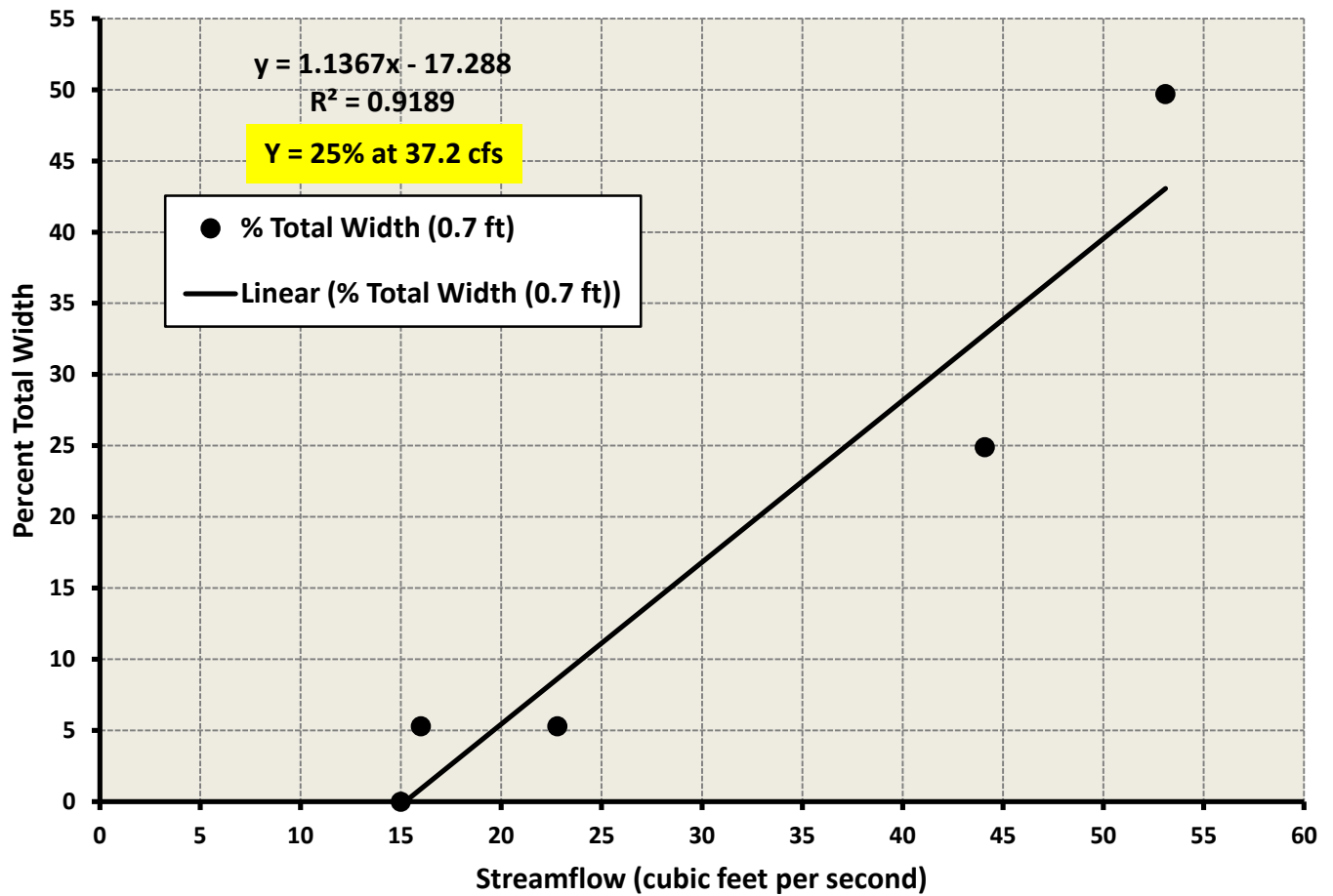


Figure 9. Critical Riffle #1 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width (0.6 ft Depth Criteria).

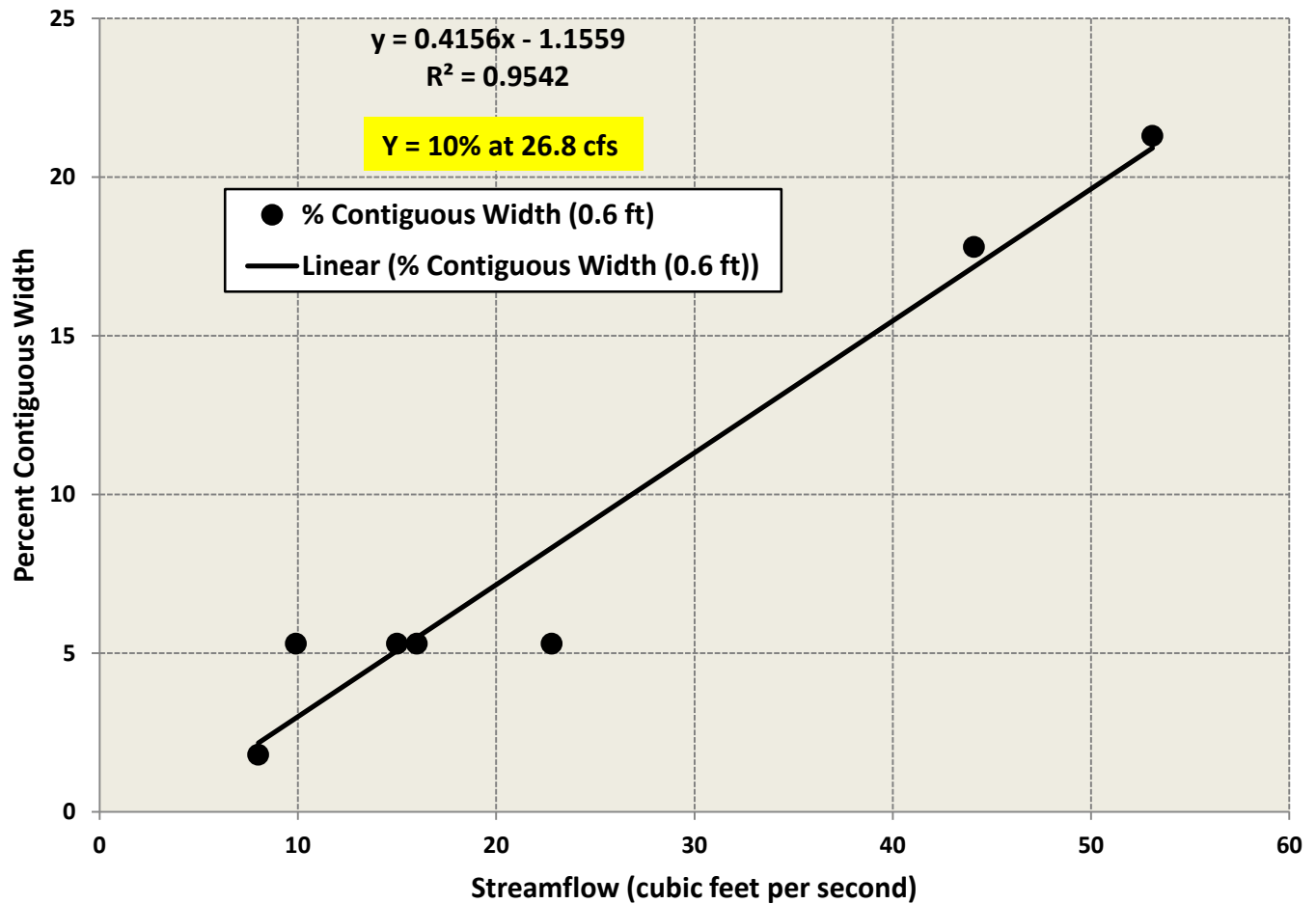


Figure 10. Critical Riffle #1 on Fall Creek Downstream of Fish Ladder– Percent Total Passable Width (0.6 ft Depth Criteria).

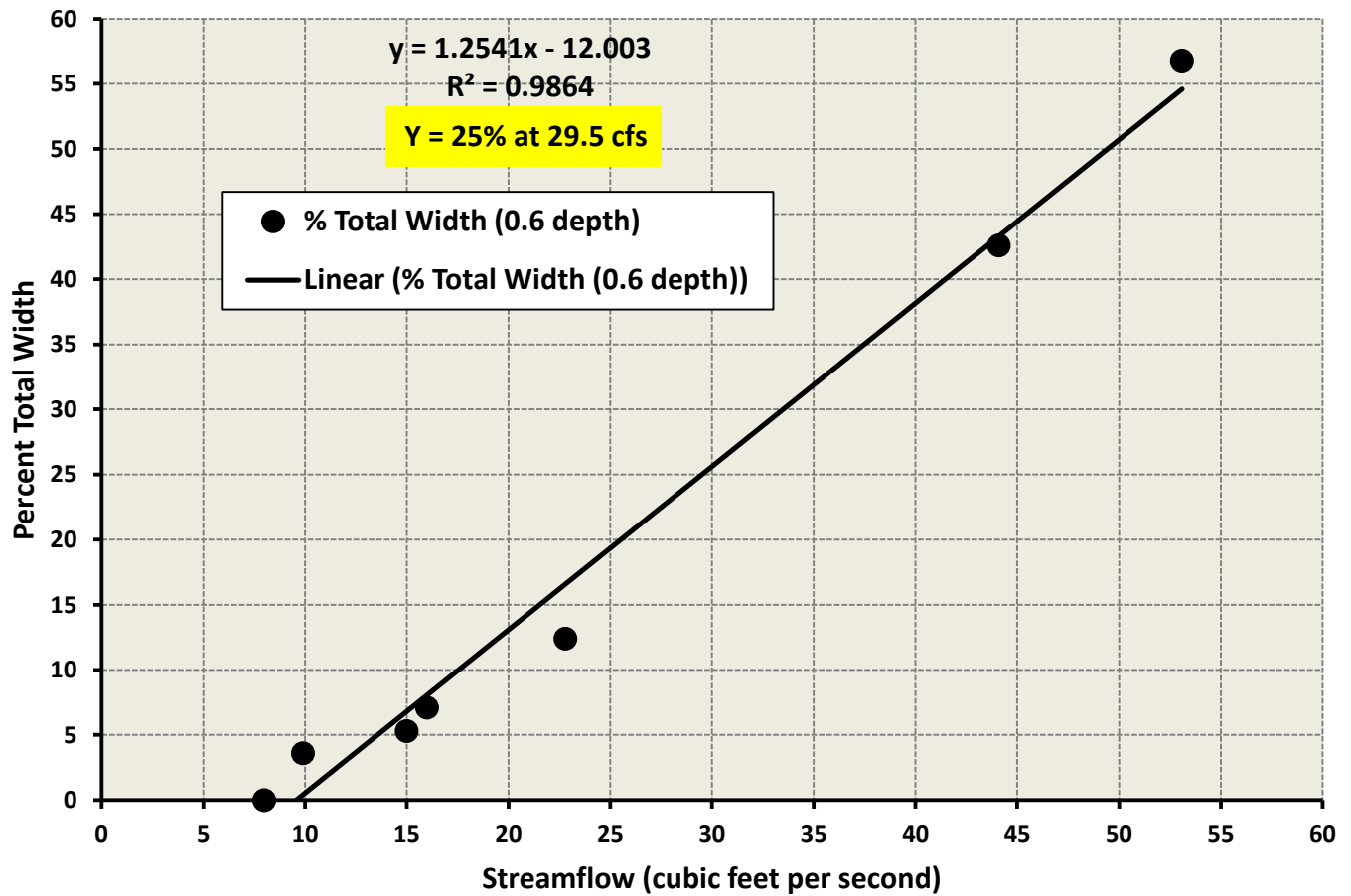


Figure 11. Critical Riffle #1 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width (0.5 ft Depth Criteria).

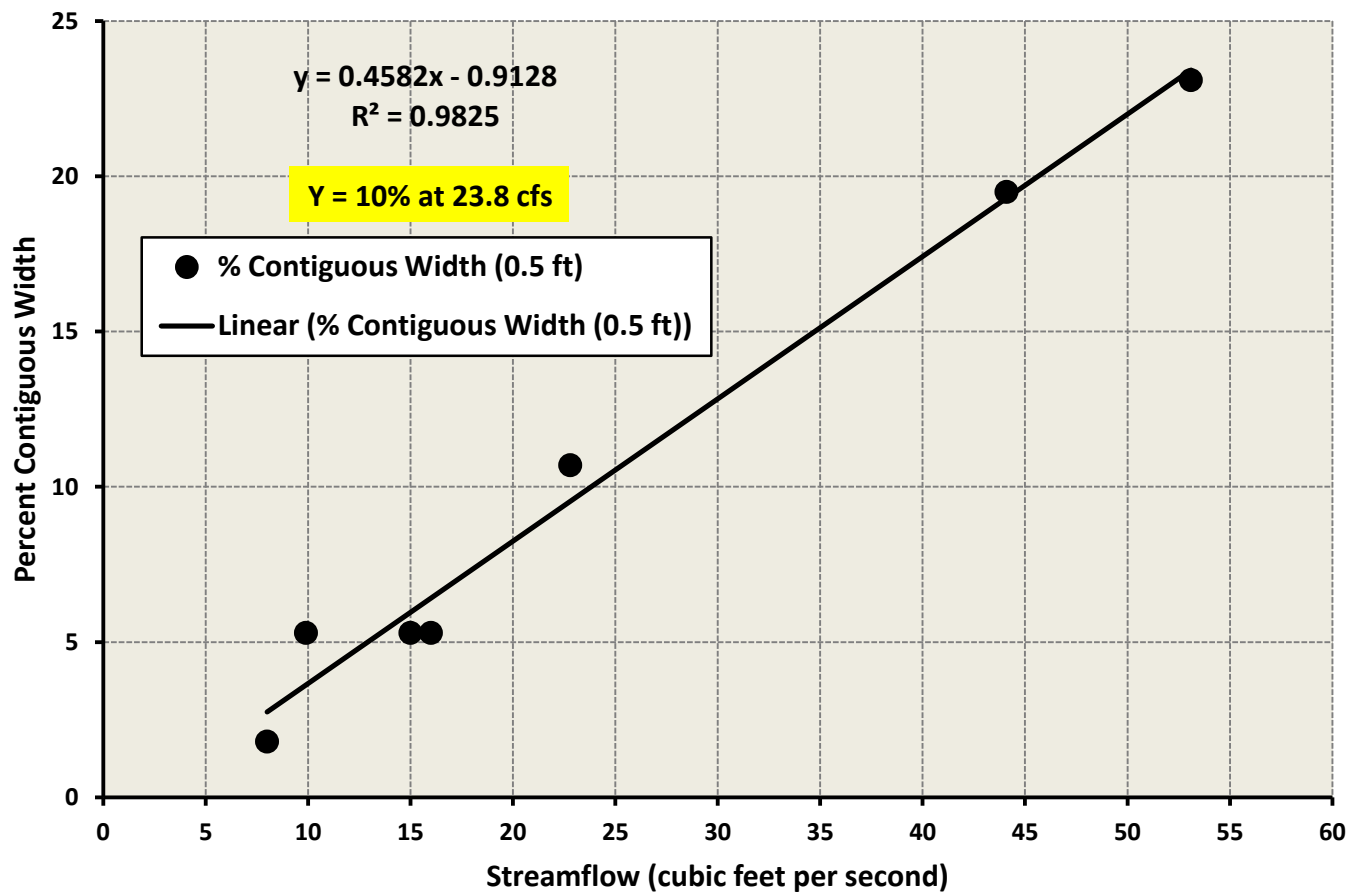


Figure 12. Critical Riffle #1 on Fall Creek Downstream of Fish Ladder– Percent Total Passable Width (0.5 ft Depth Criteria).

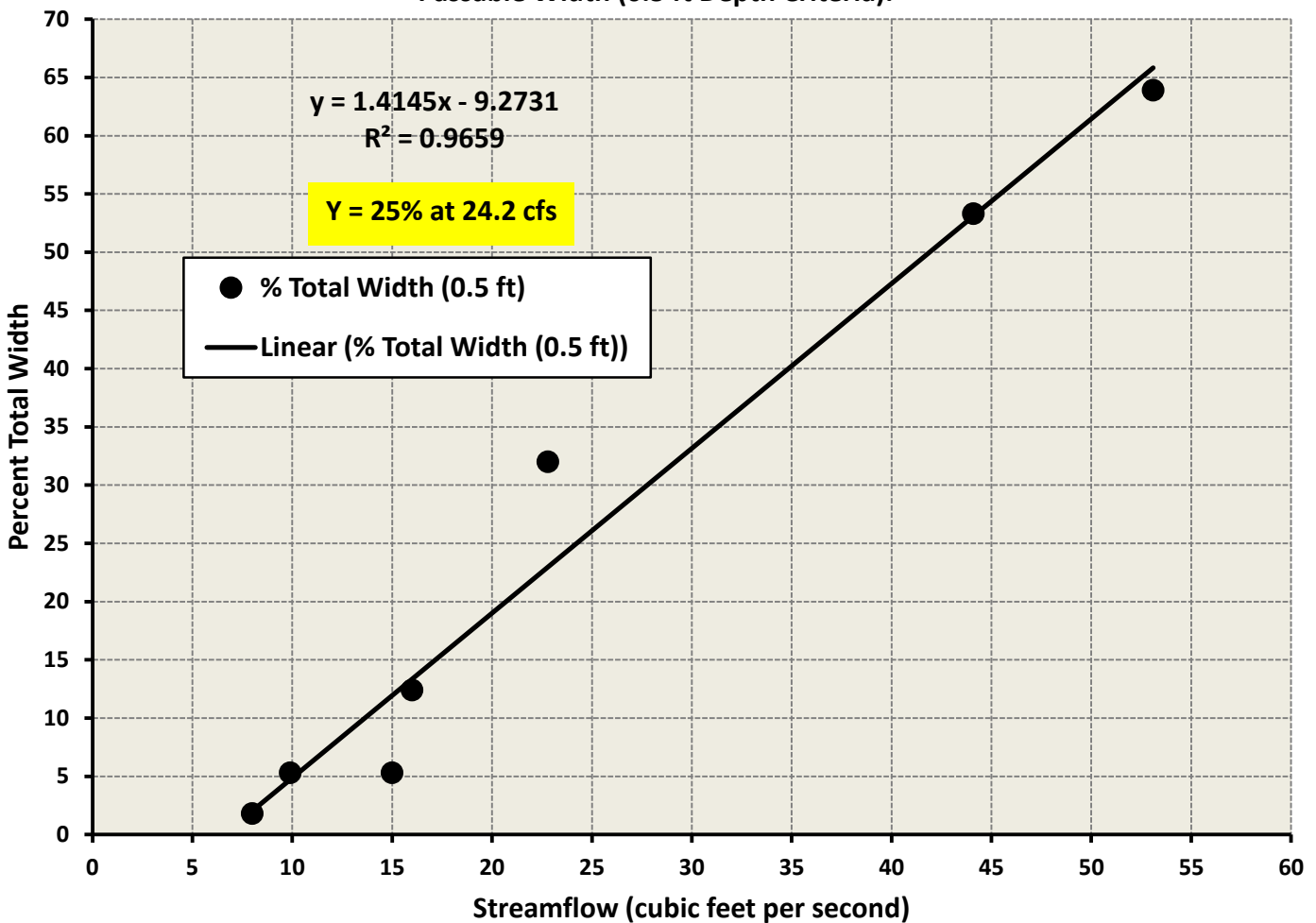


Figure 13. Critical Riffle #1 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width (0.4 ft Depth Criteria).

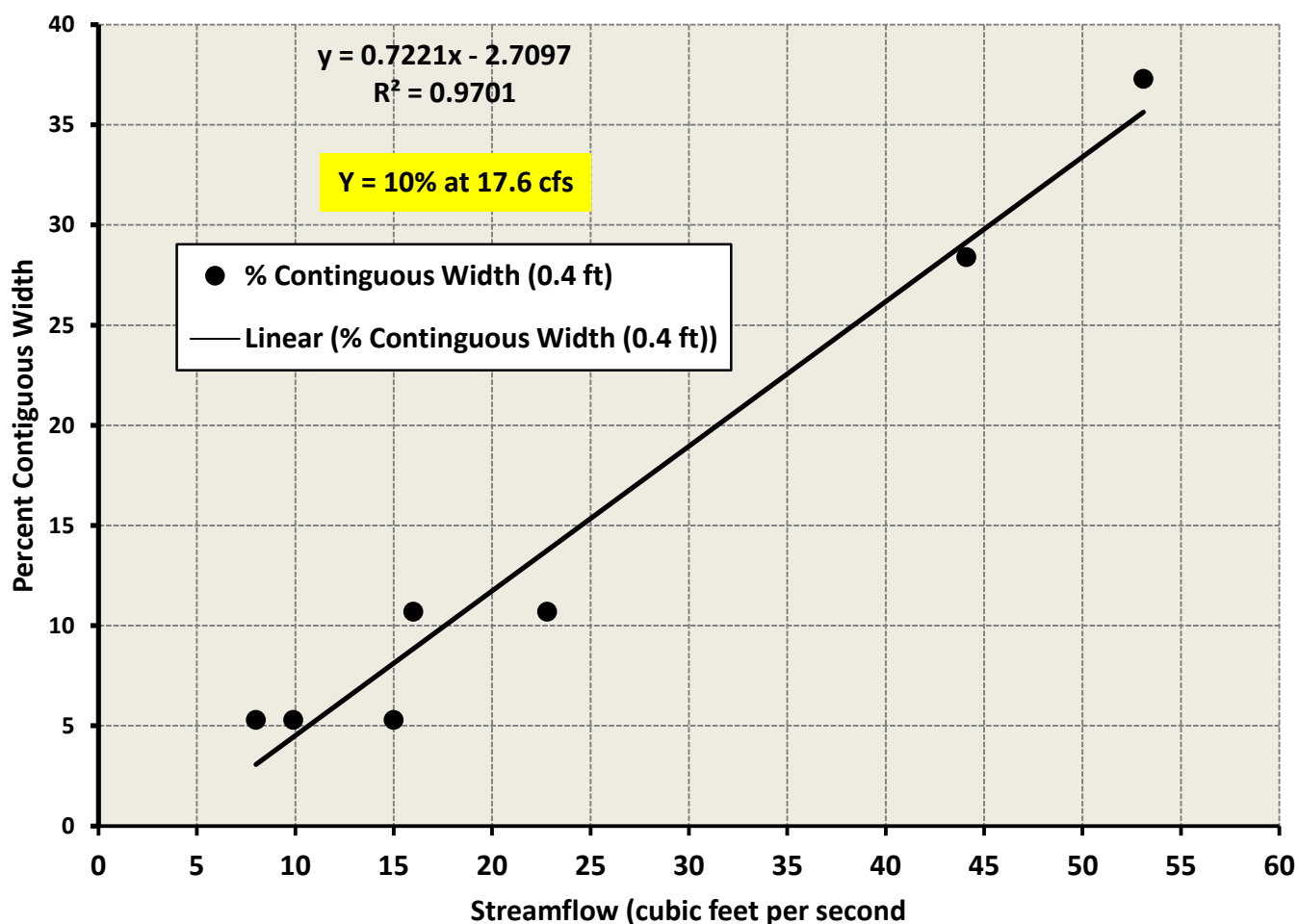


Figure 14. Critical Riffle #1 on Fall Creek Downstream of Fish Ladder– Percent Total Passable Width (0.4 ft Depth Criteria).

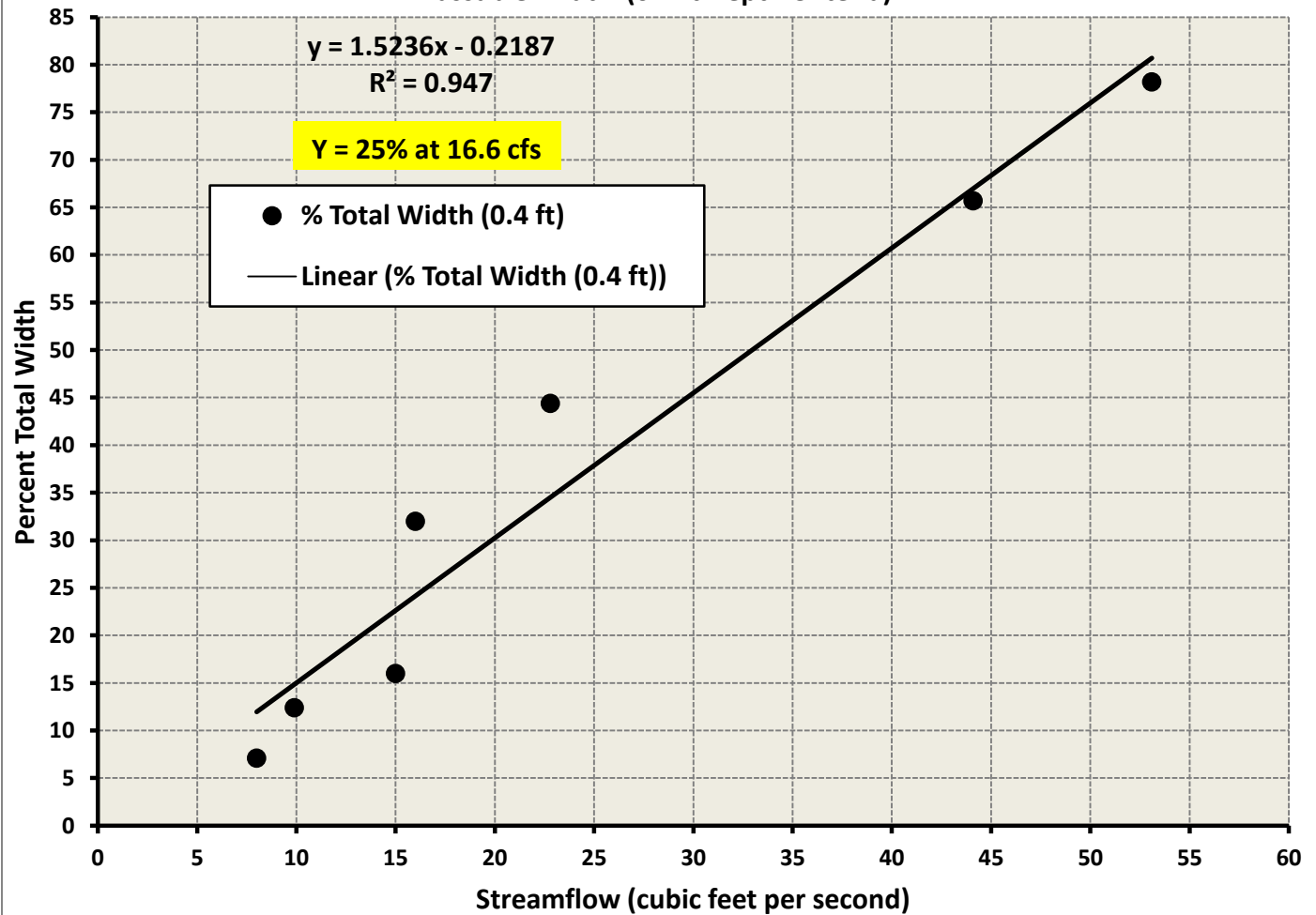


Figure 15. Critical Riffle #1 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width (0.3 ft Depth Criteria).

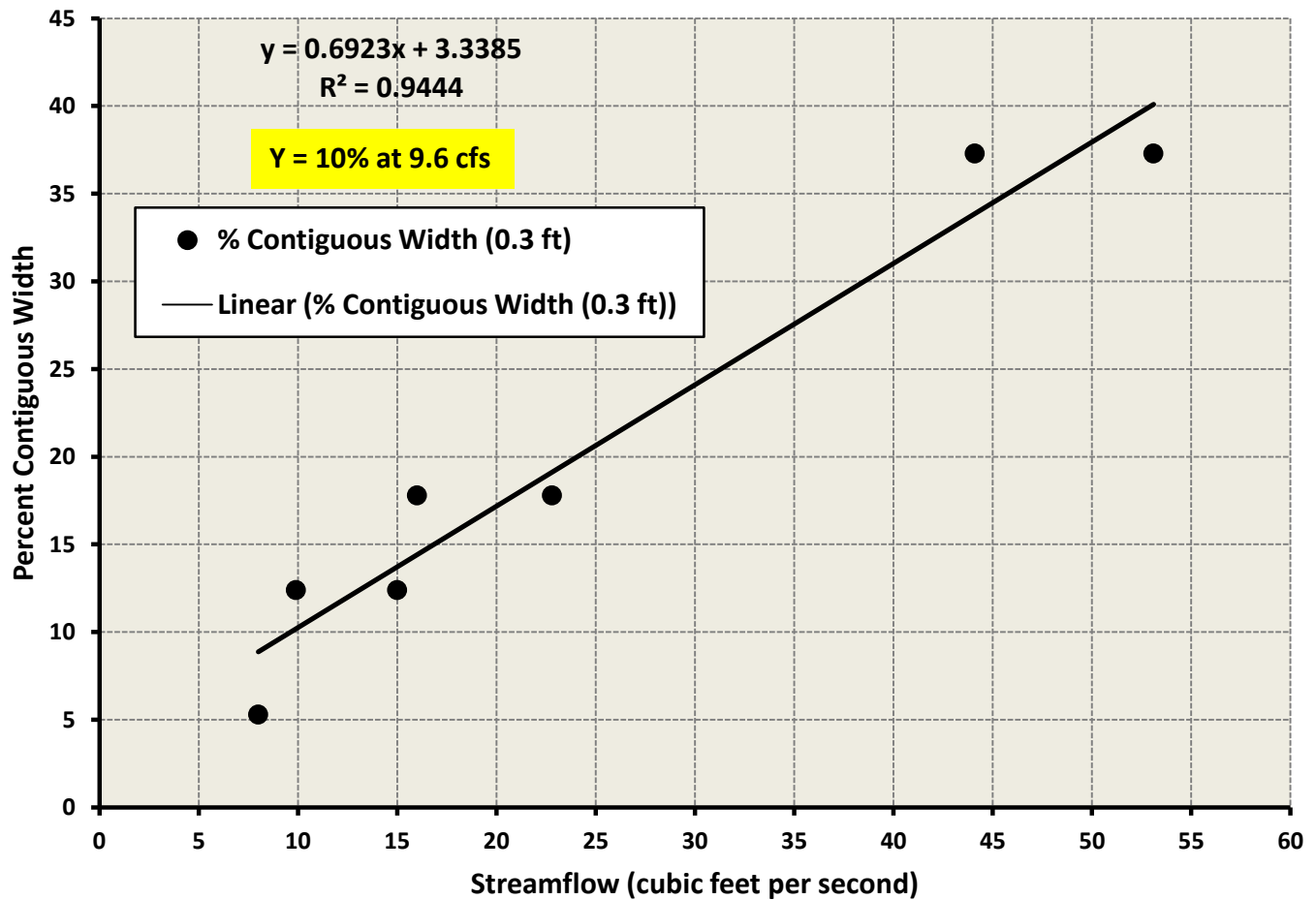


Figure 16. Critical Riffle #1 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width (0.3 feet Depth Criteria).

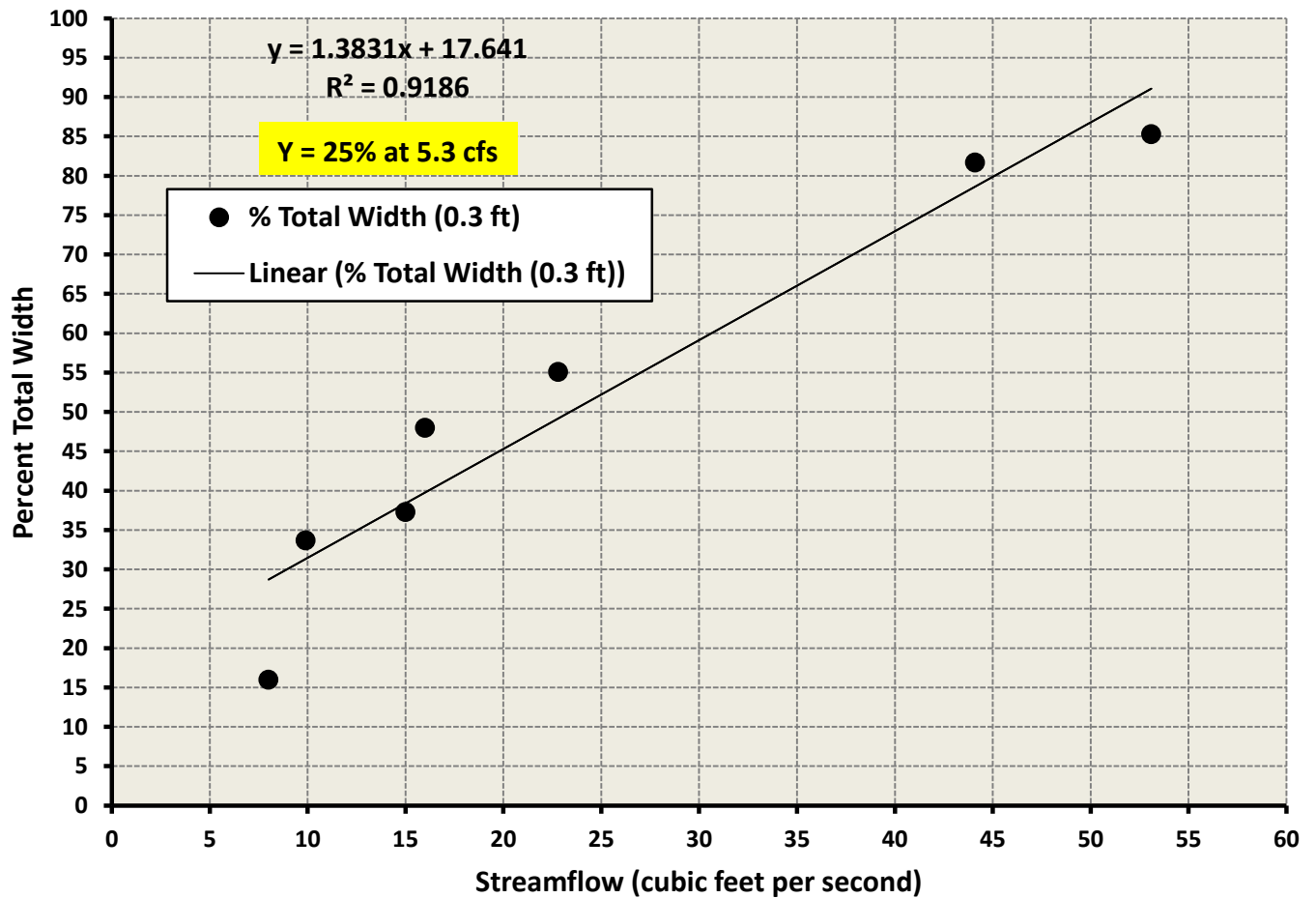


Figure 17. Critical Riffle #1 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width (0.2 ft Depth Criteria).

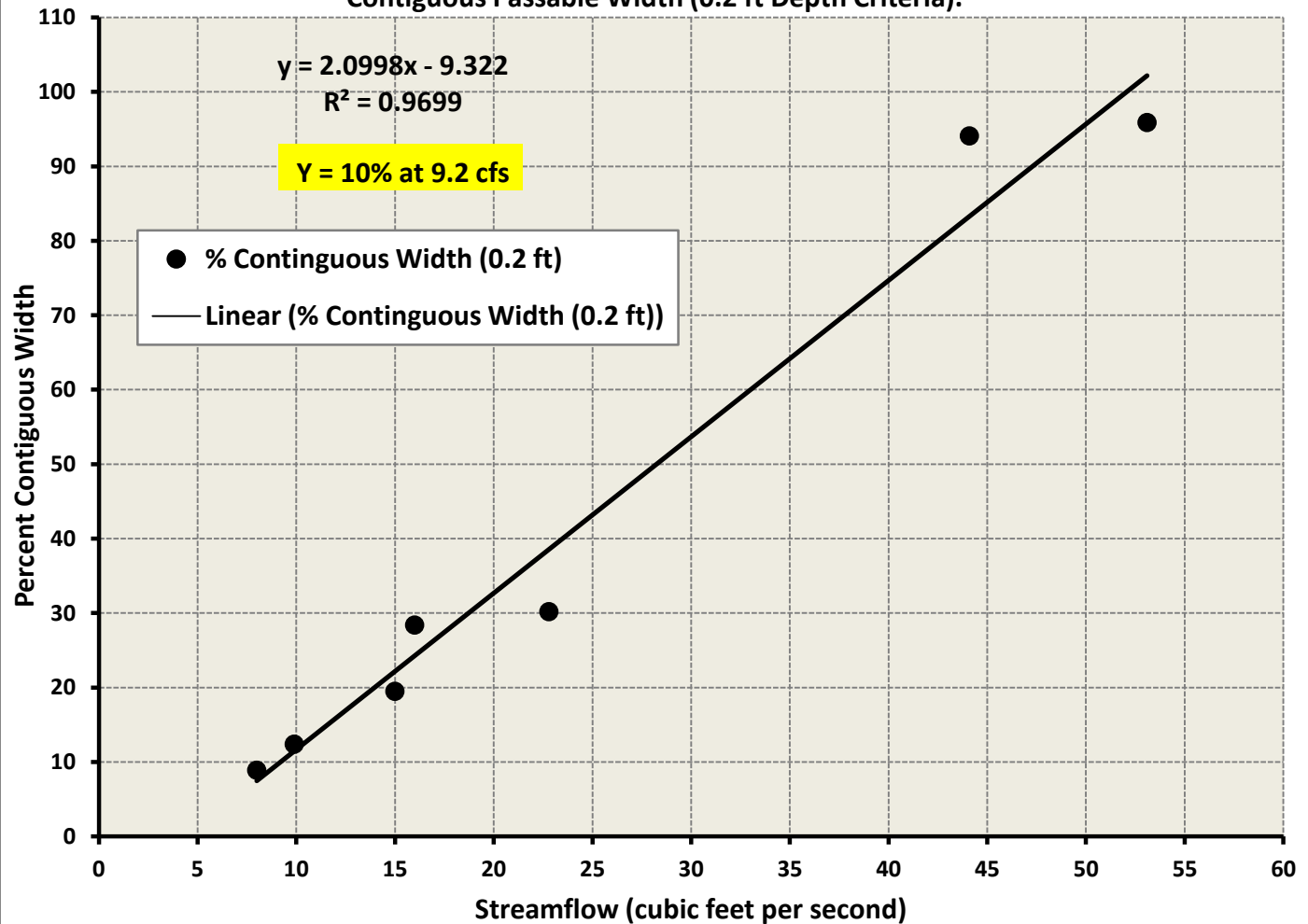


Figure 18. Critical Riffle #1 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width for (0.2 feet Depth Criteria).

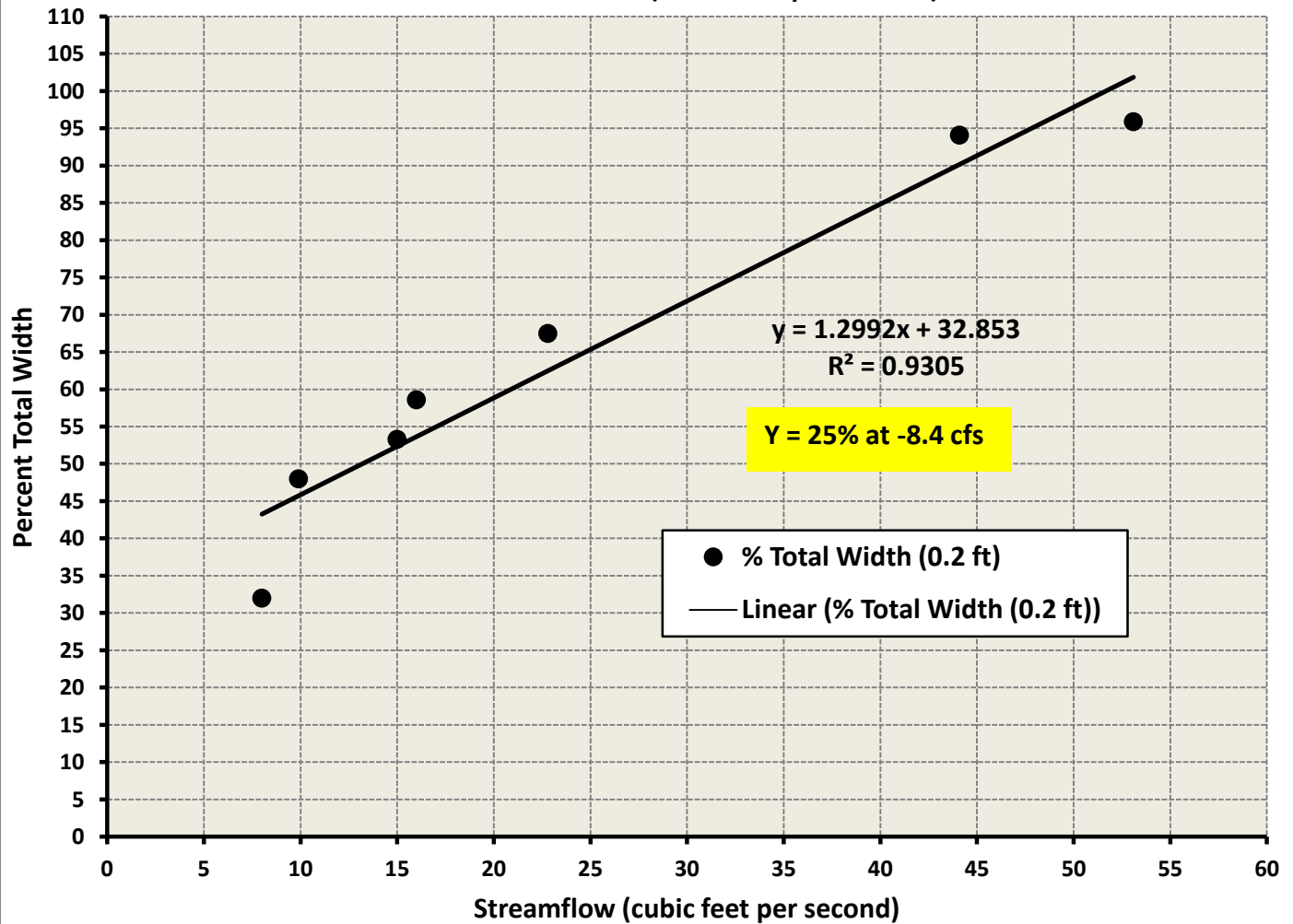


Figure 19. Critical Riffle #2 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width (0.7 ft Depth Criteria).

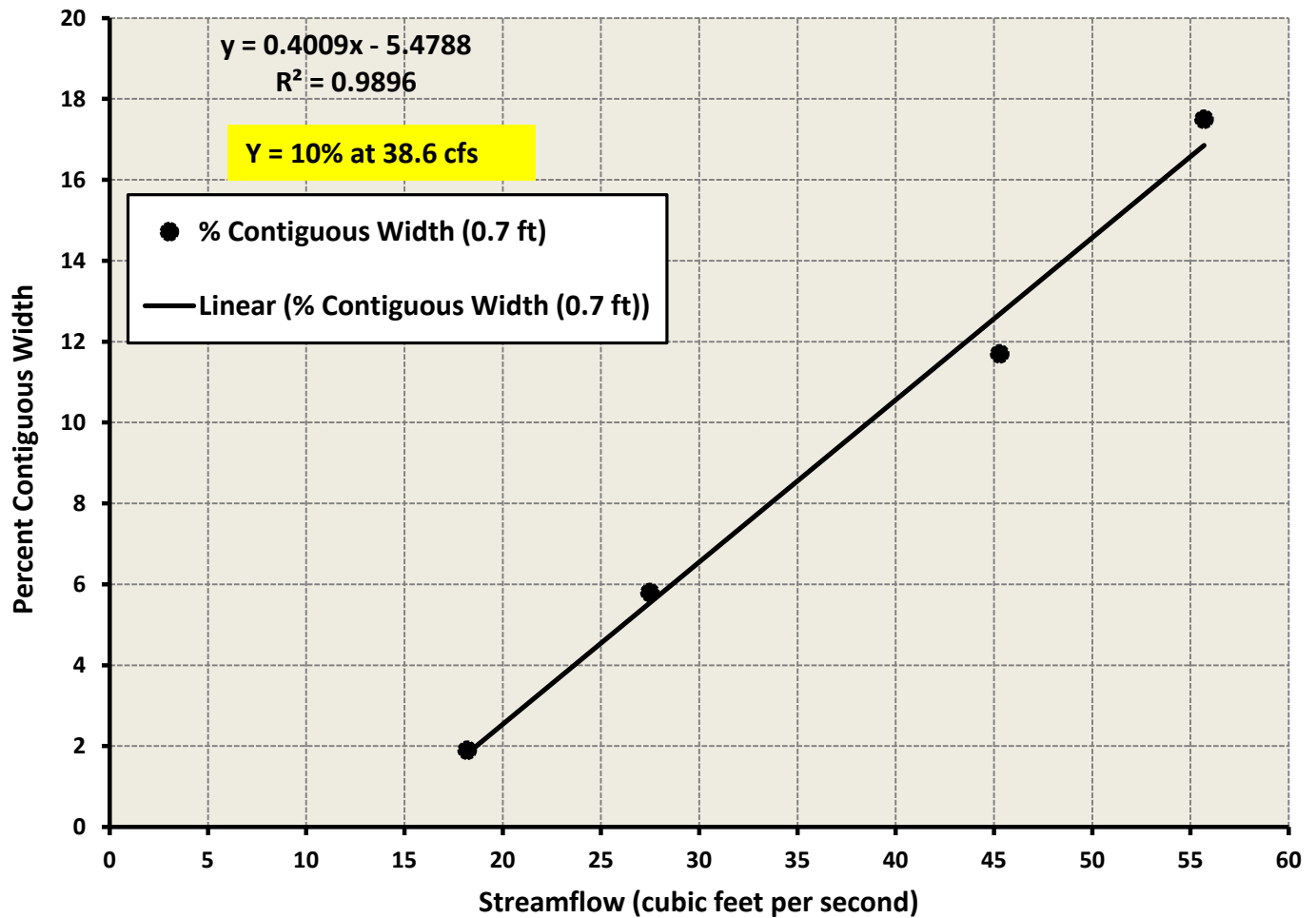


Figure 20. Critical Riffle #2 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width (0.7 feet Depth Criteria).

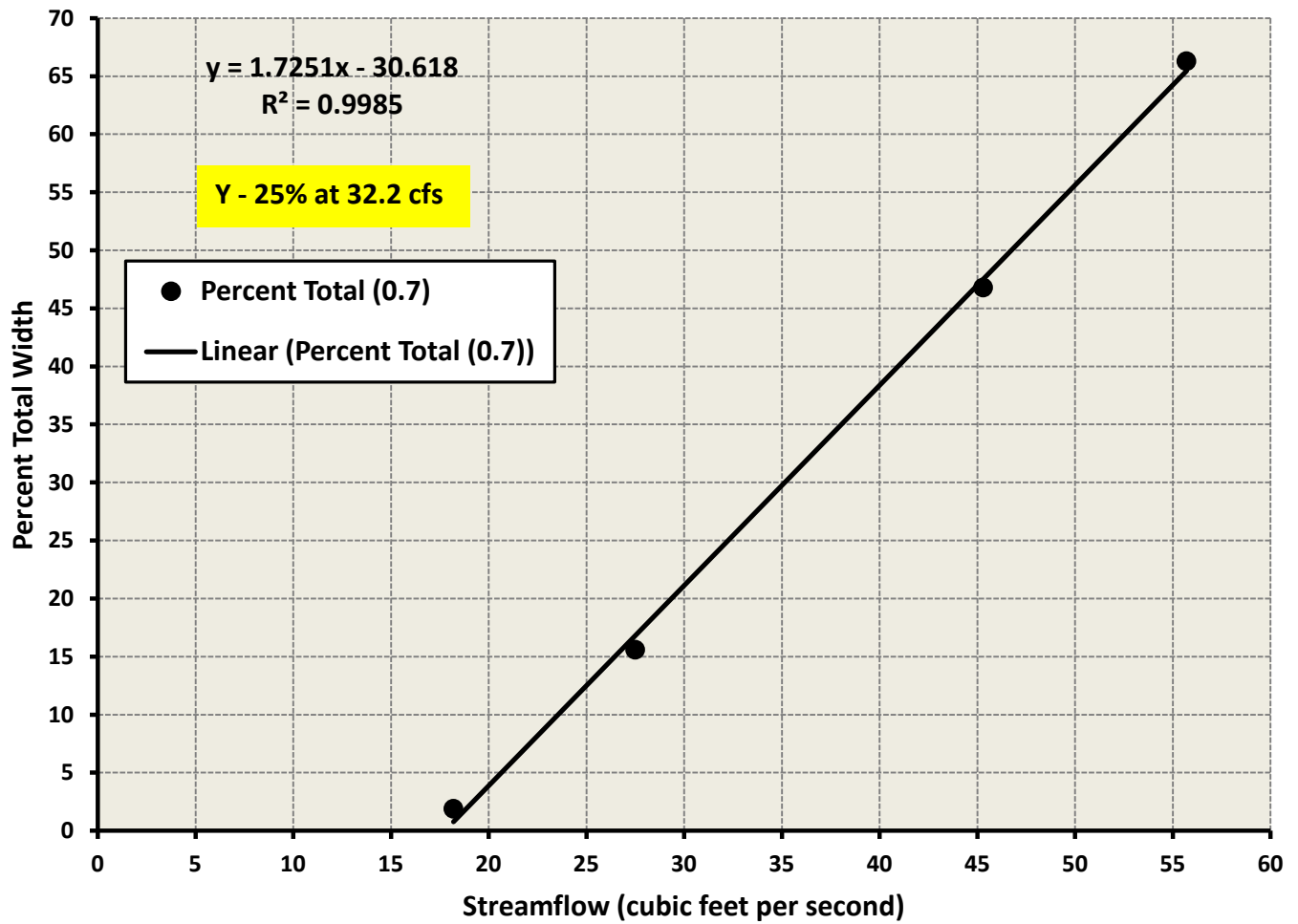


Figure 21. Critical Riffle #2 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width (0.6 ft Depth Criteria).

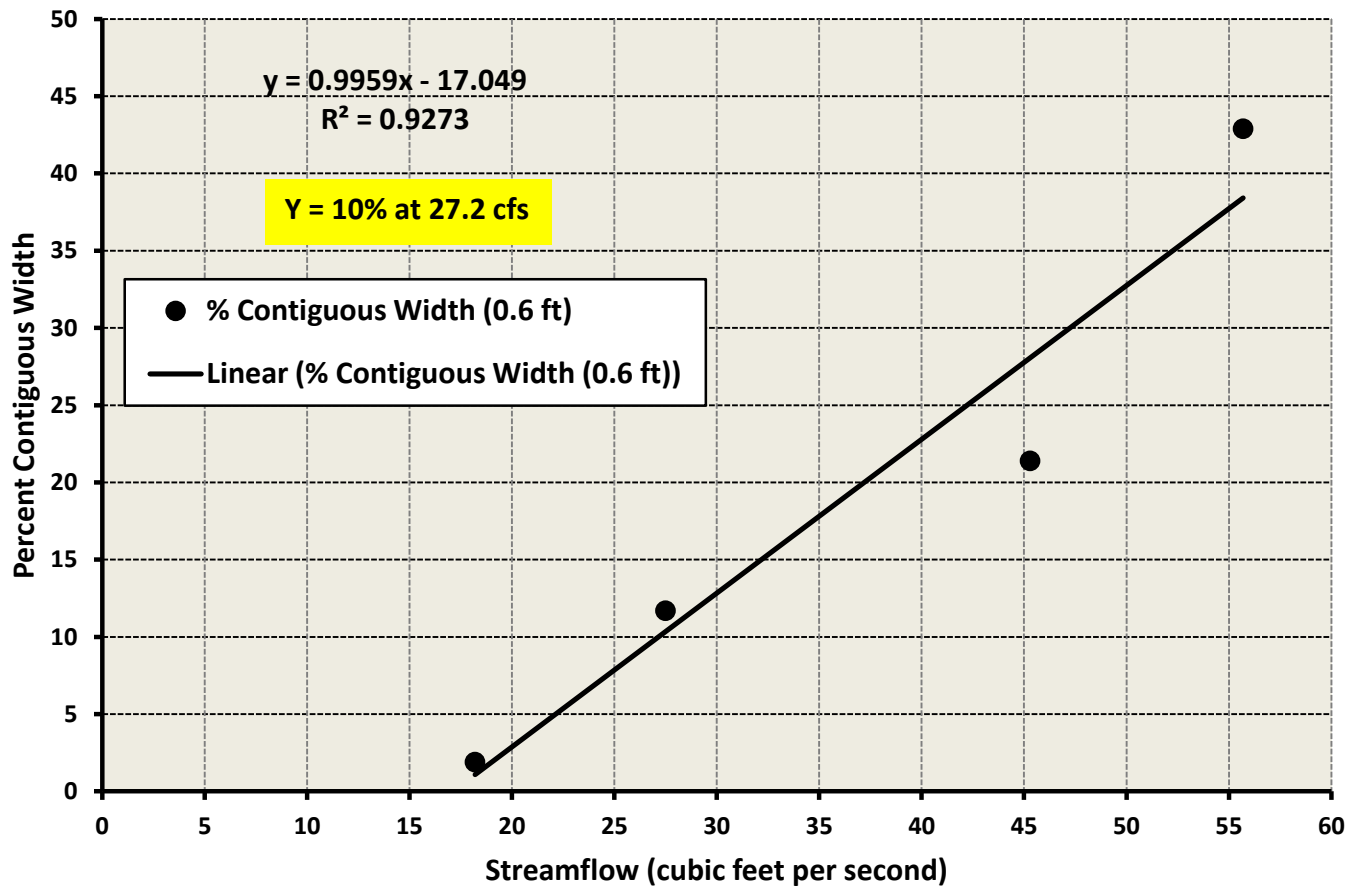


Figure 22. Critical Riffle #2 on Fall Creek Downstream of Fish Ladder– Percent Total Passable Width (0.6 ft Depth Criteria).

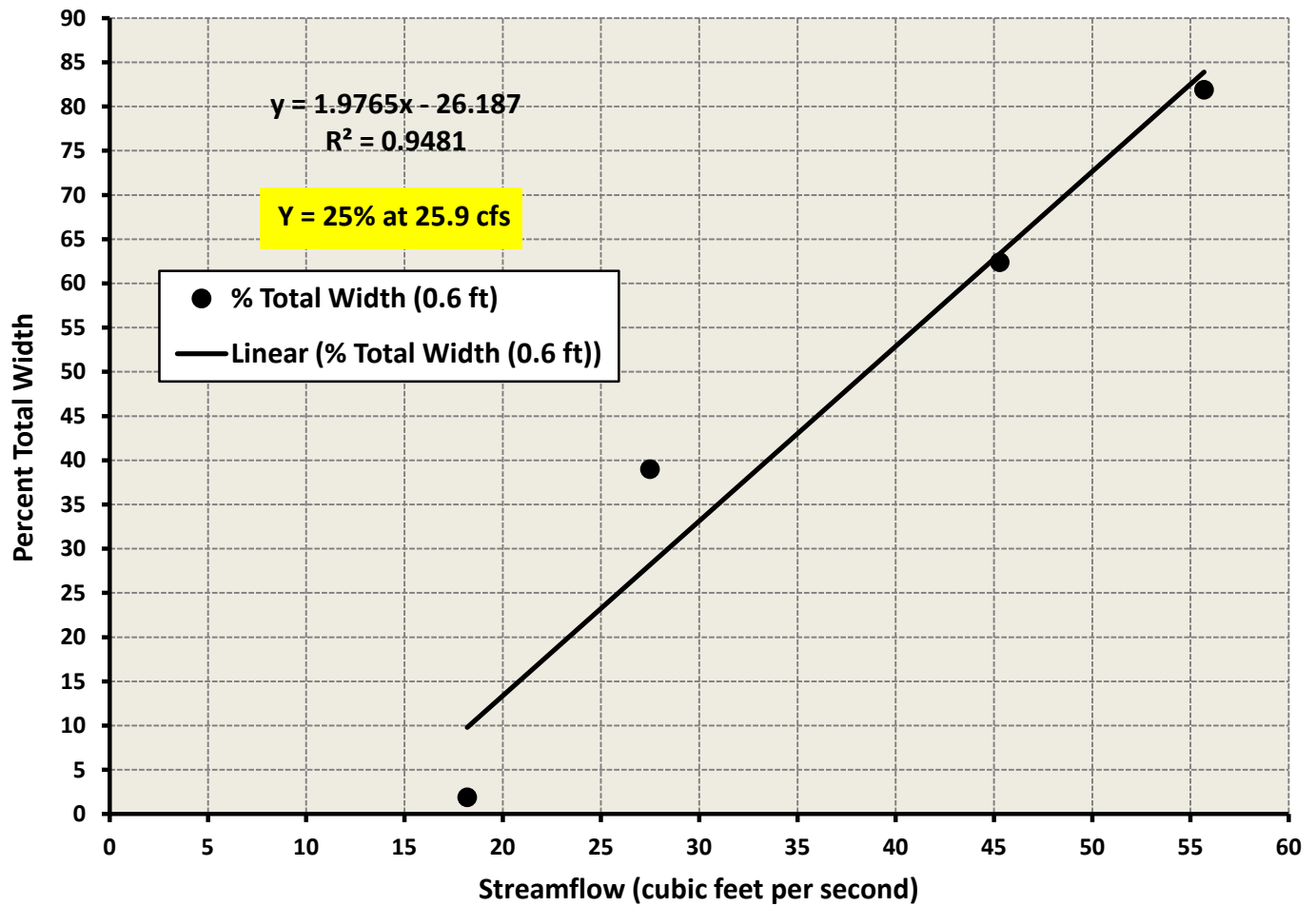


Figure 23. Critical Riffle #2 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width (0.5 ft Depth Criteria).

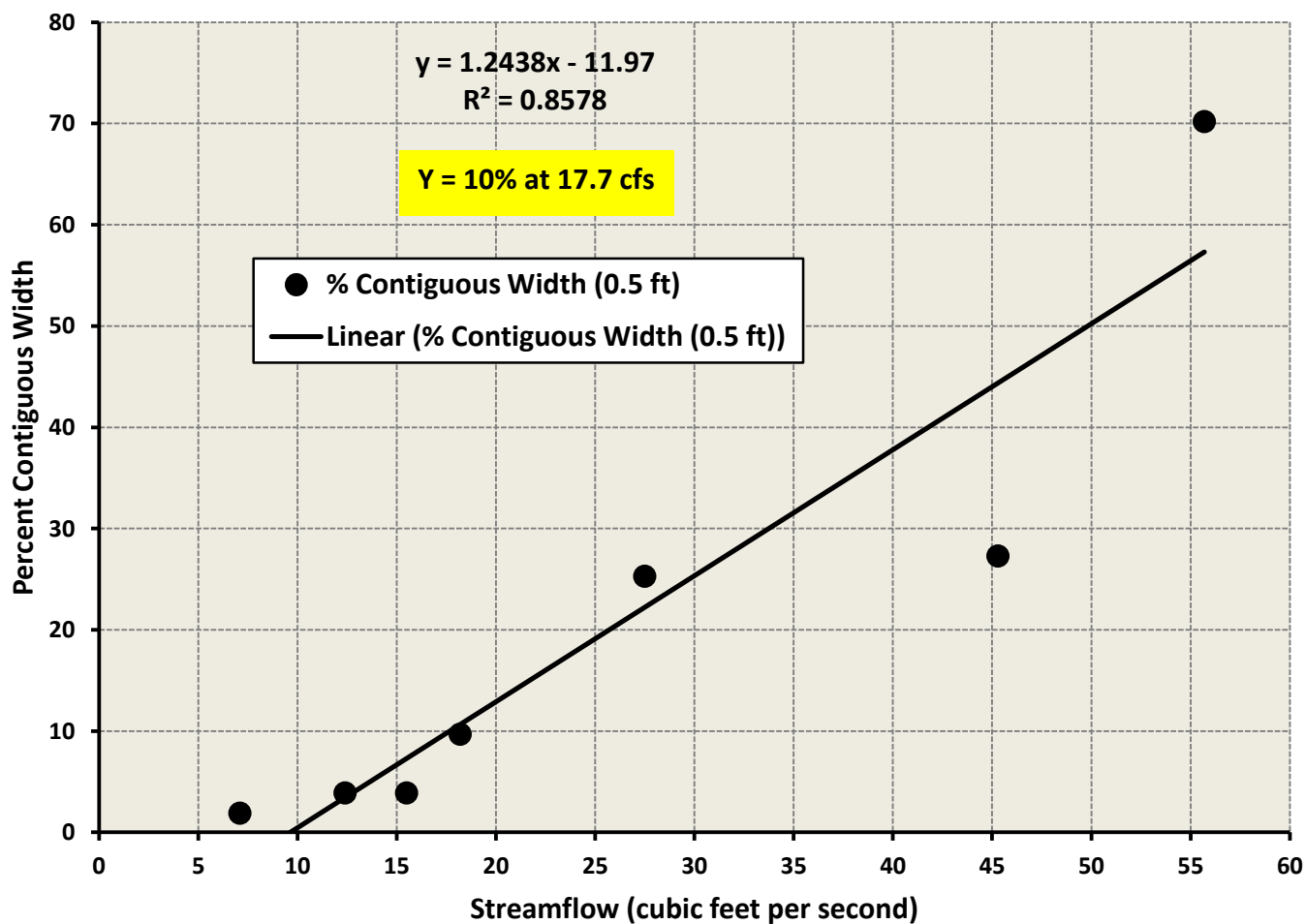


Figure 24. Critical Riffle #2 on Fall Creek Downstream of Fish Ladder– Percent Total Passable Width (0.5 ft Depth Criteria).

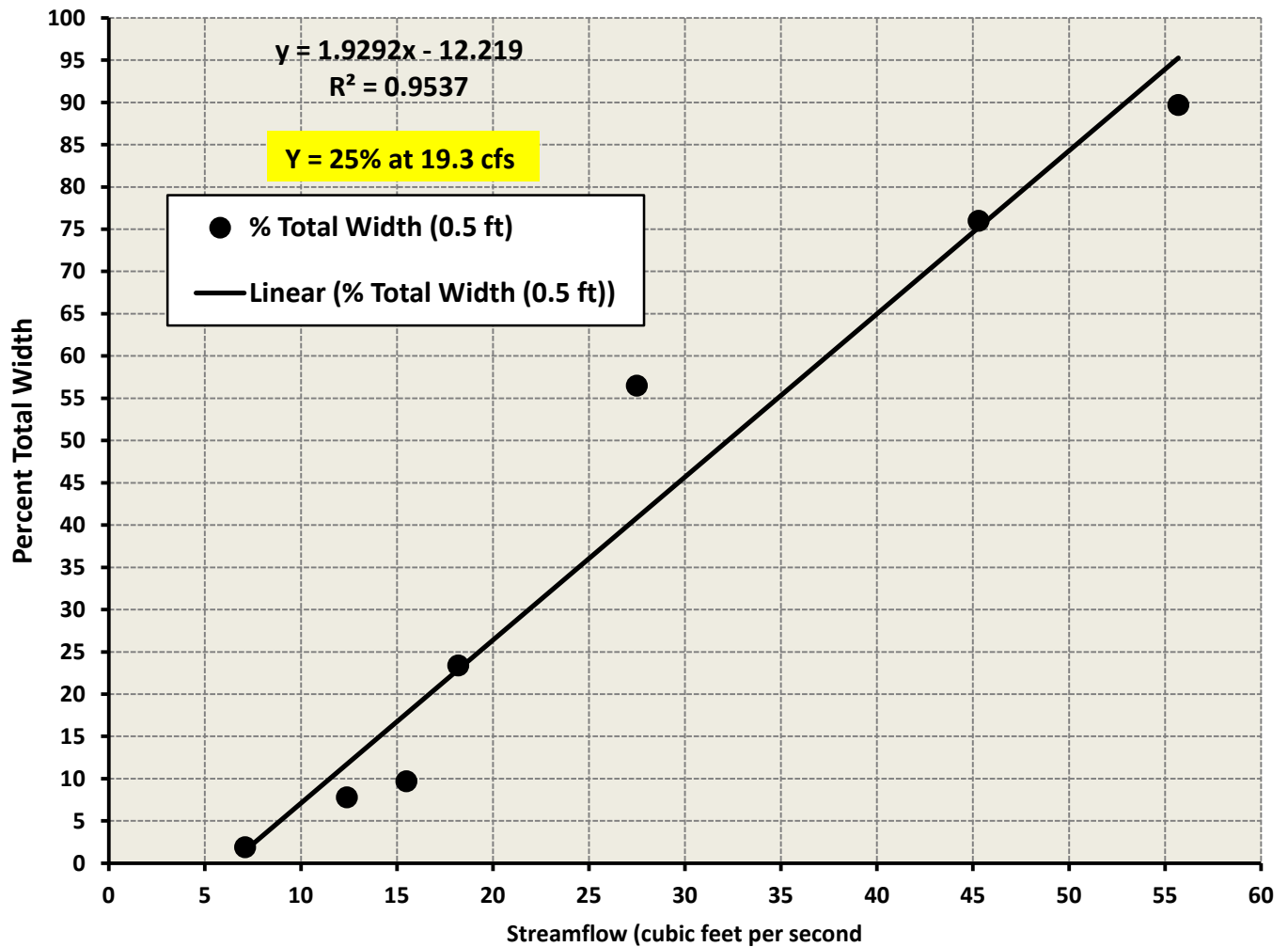


Figure 25. Critical Riffle #2 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width (0.4 ft Depth Criteria).

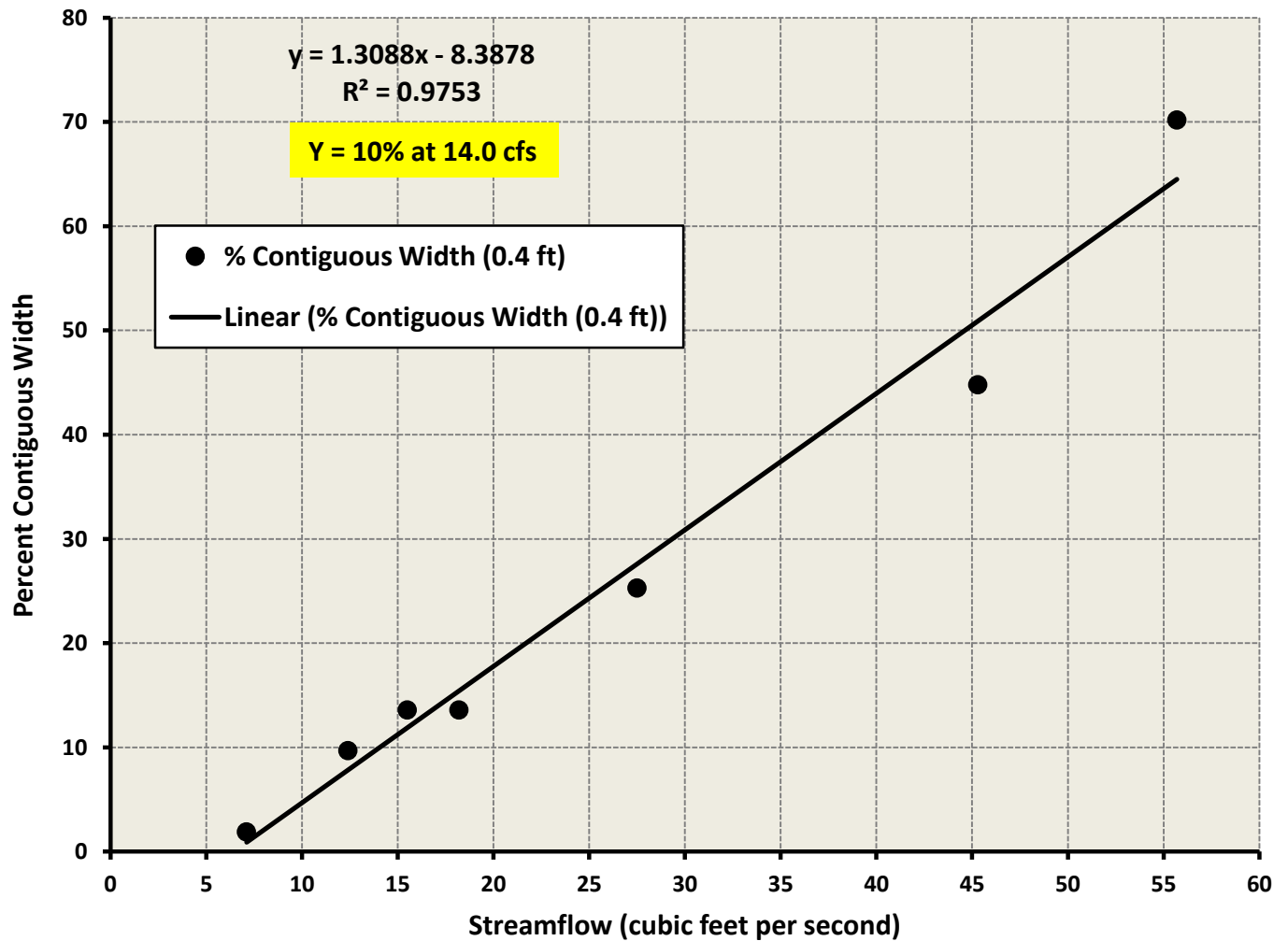


Figure 26. Critical Riffle #2 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width (0.4 feet Depth Criteria).

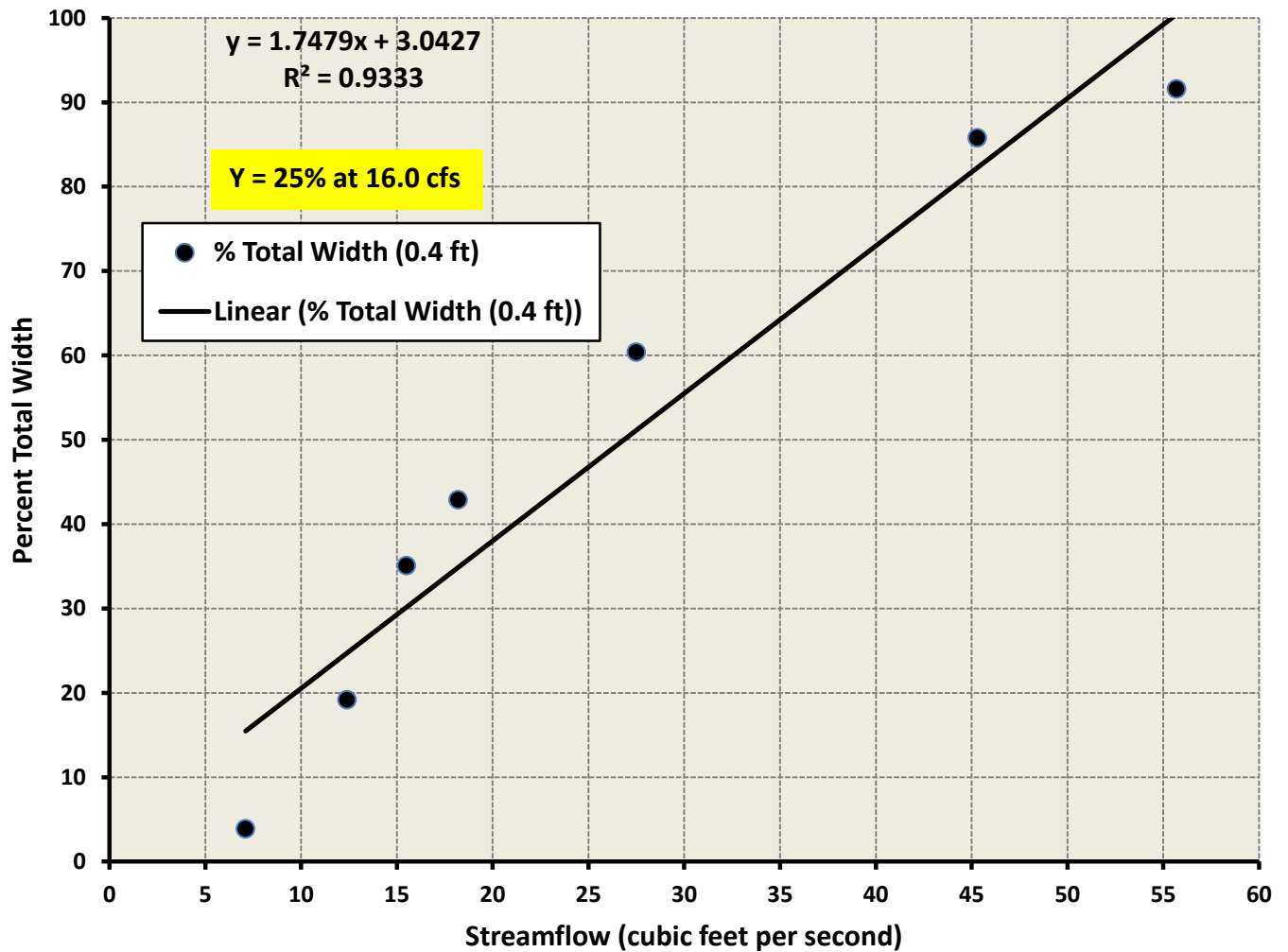


Figure 27. Critical Riffle #2 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width for YOY Juvenile Salmonids (0.3 ft Depth Criteria).

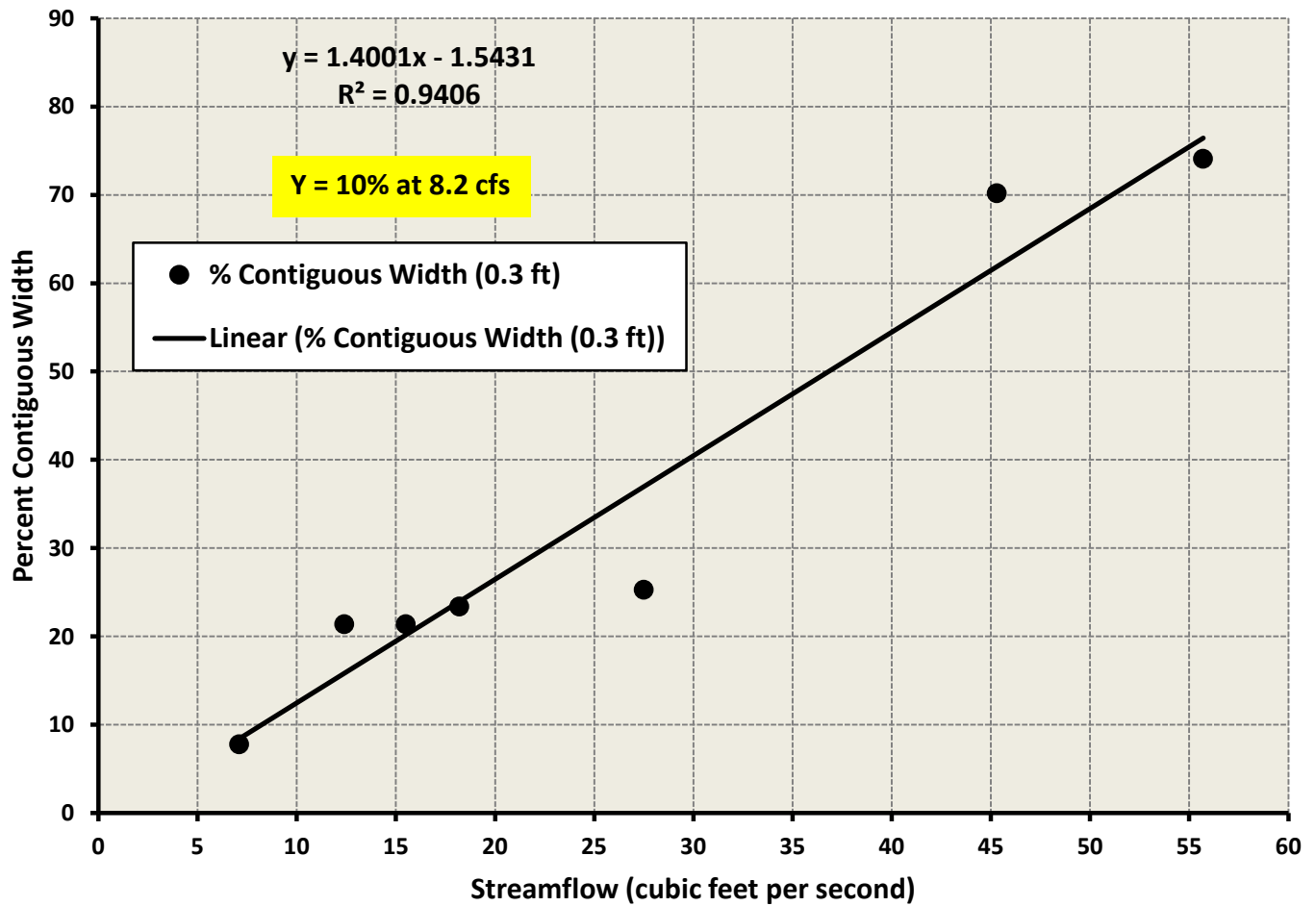


Figure 28. Critical Riffle #2 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width (0.3 feet Depth Criteria).

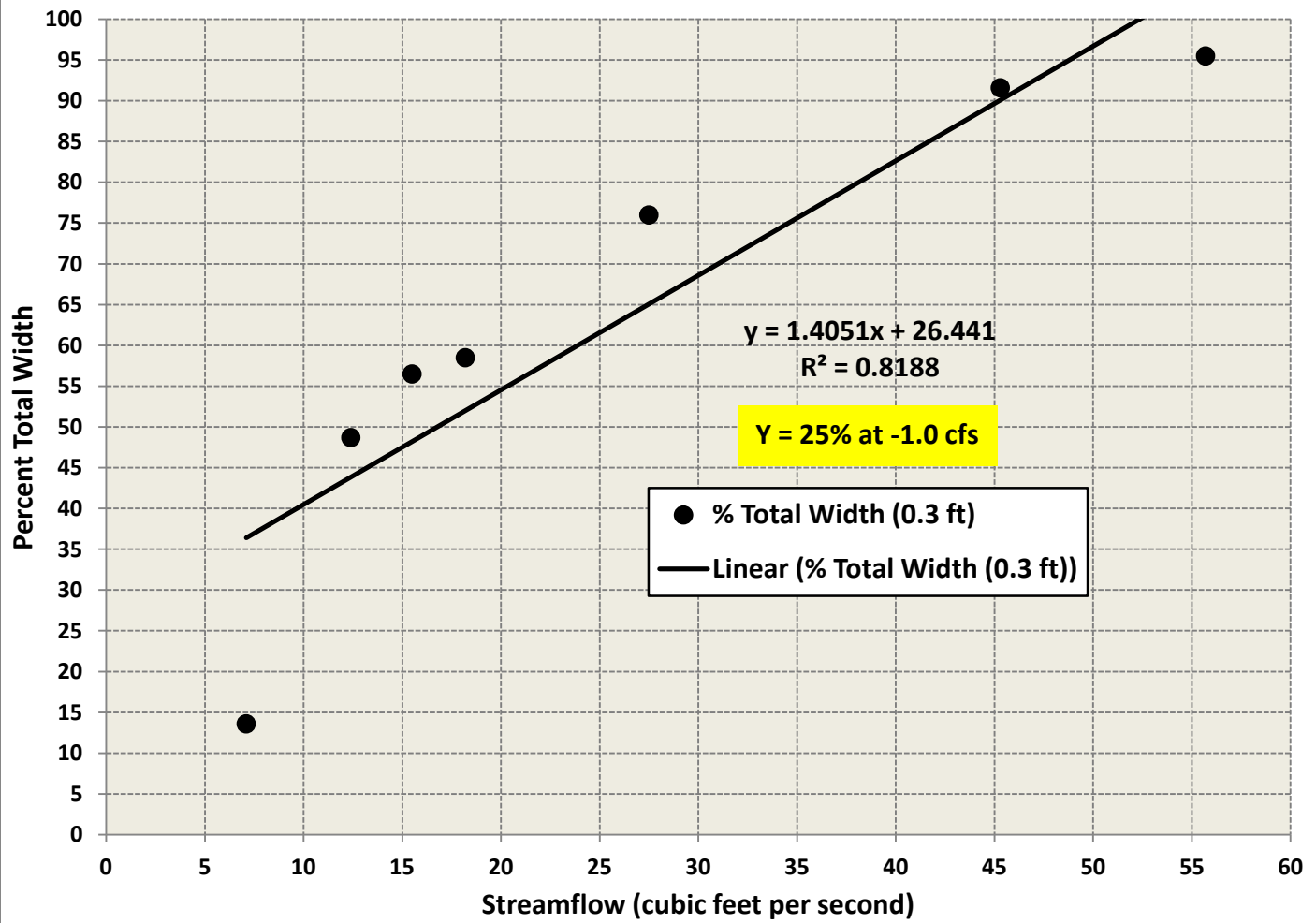


Figure 29. Critical Riffle #2 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width (0.2 ft Depth Criteria).

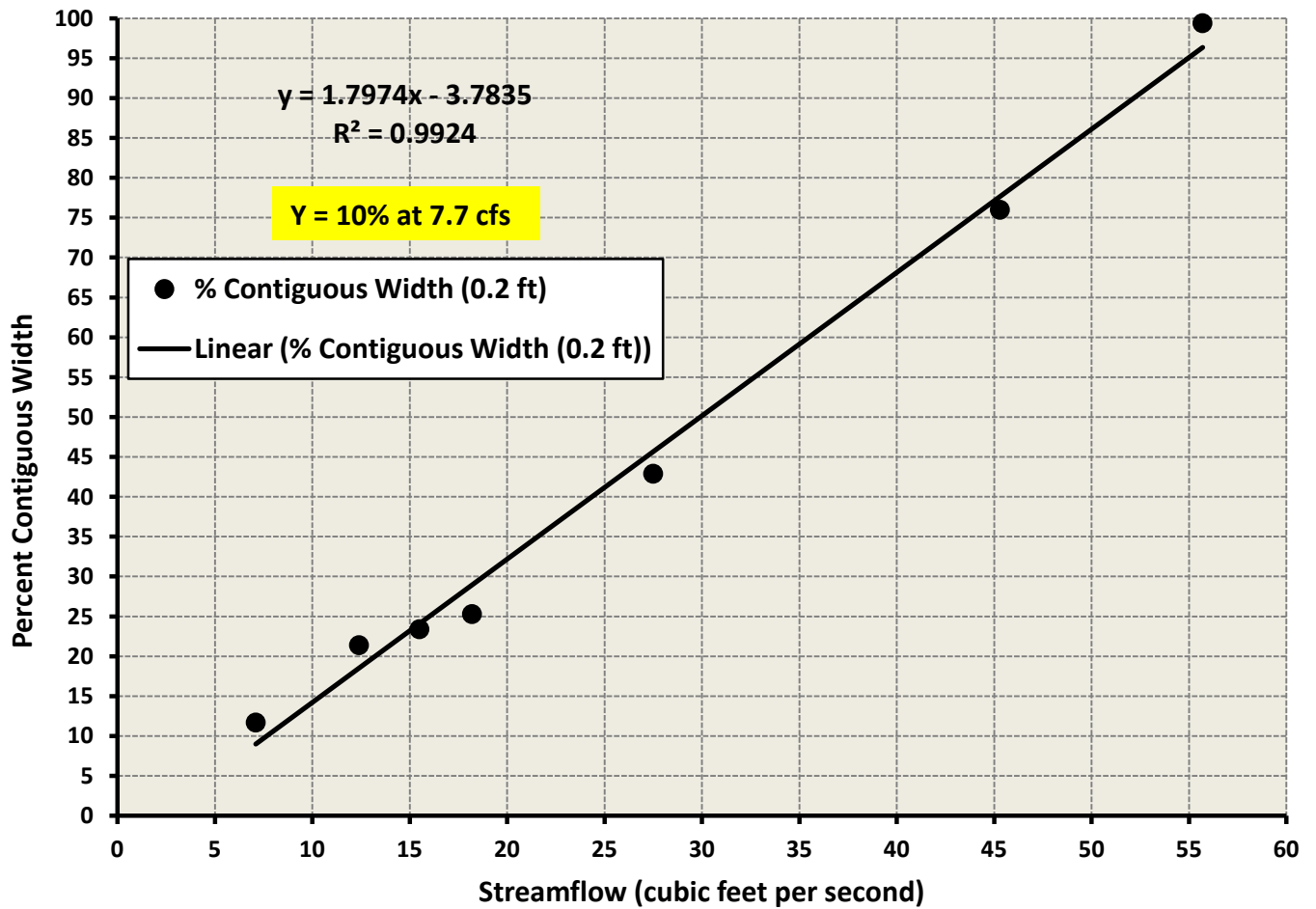


Figure 30. Critical Riffle #2 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width (0.2 feet Depth Criteria).

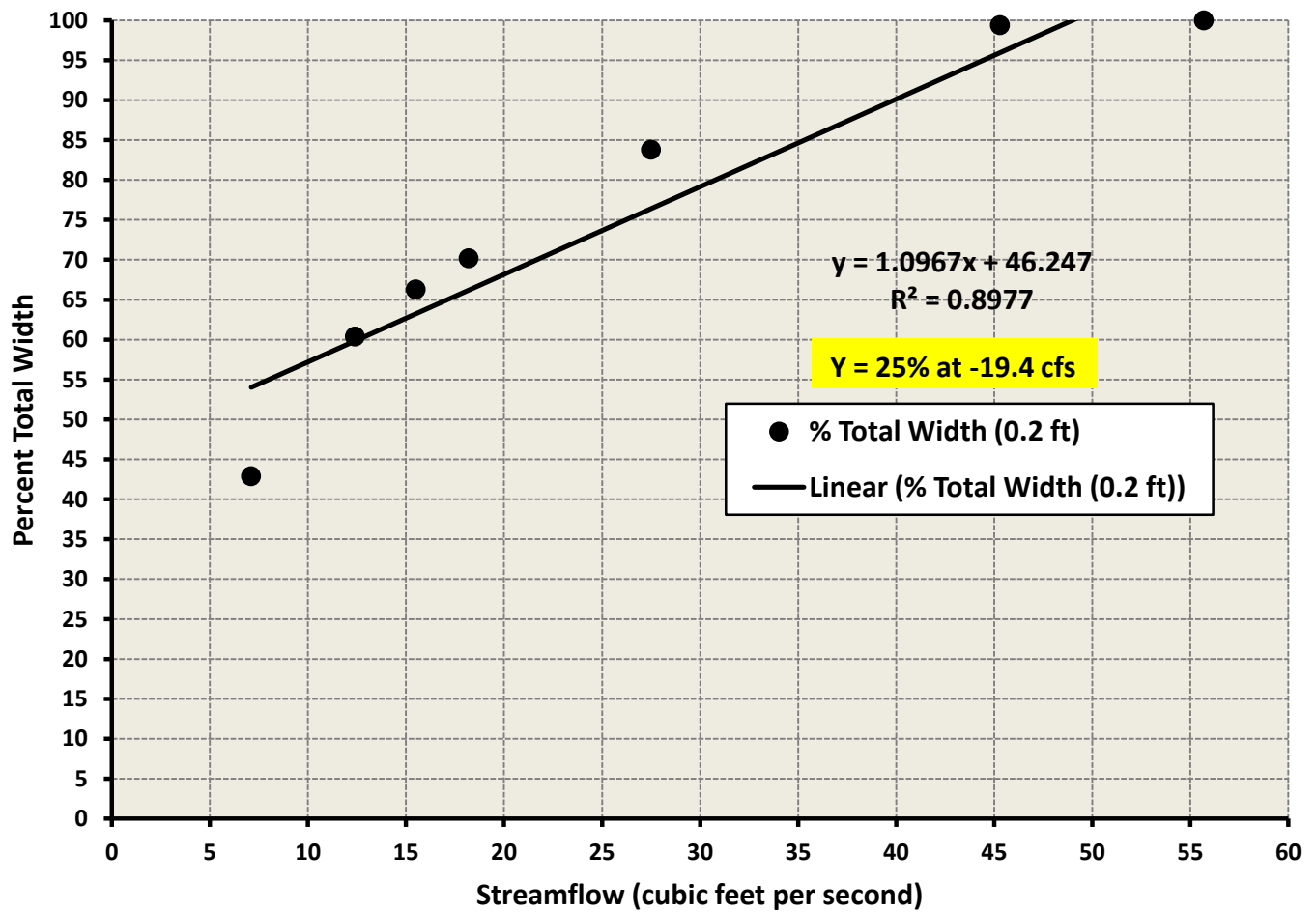


Figure 31a. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width Using 3 Transects (0.7 ft Depth Criteria; Includes March 8 data).

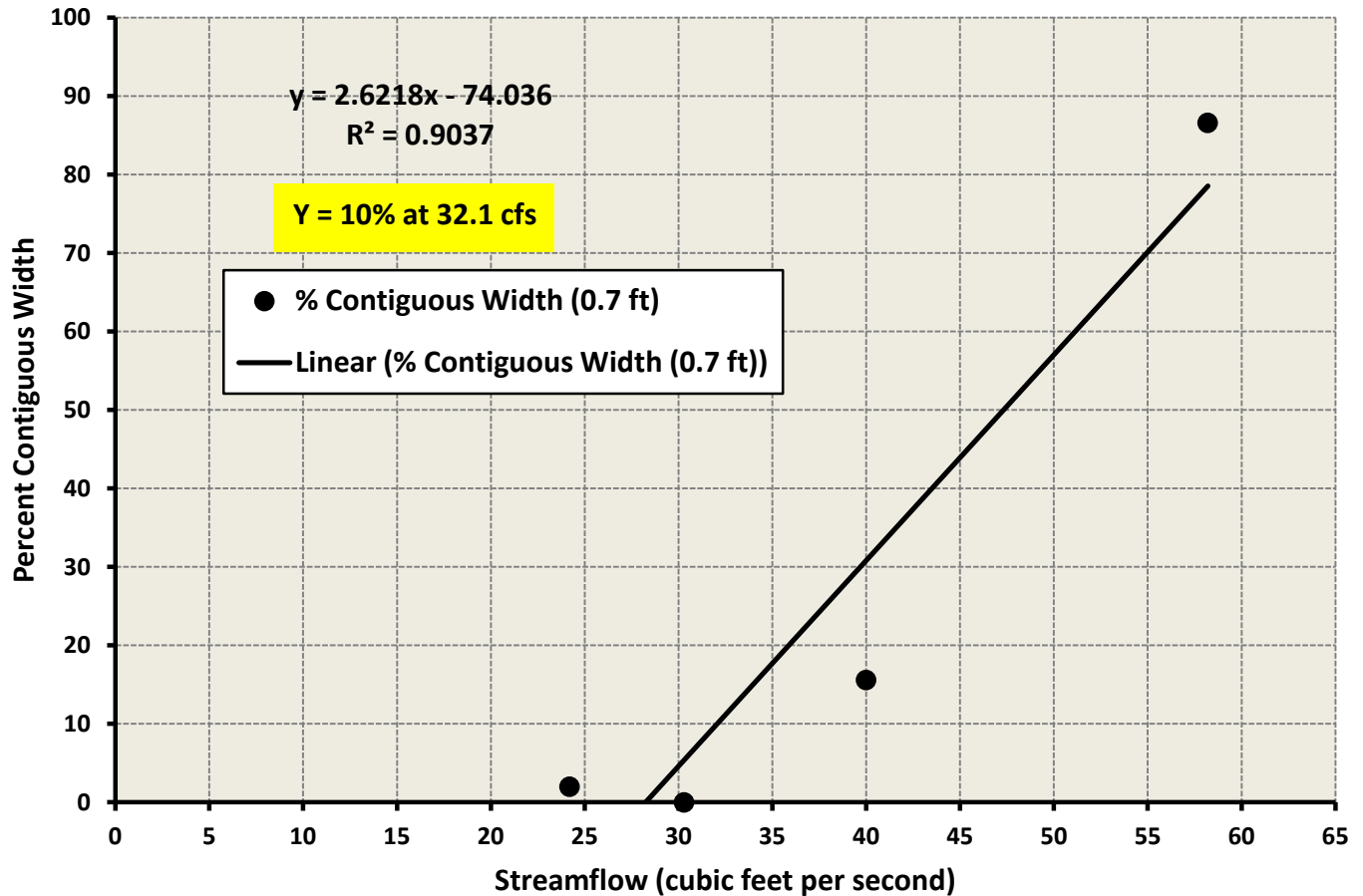


Figure 31b. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width Using 3 Transects (0.7 ft Depth Criteria; Without March 8 Data).

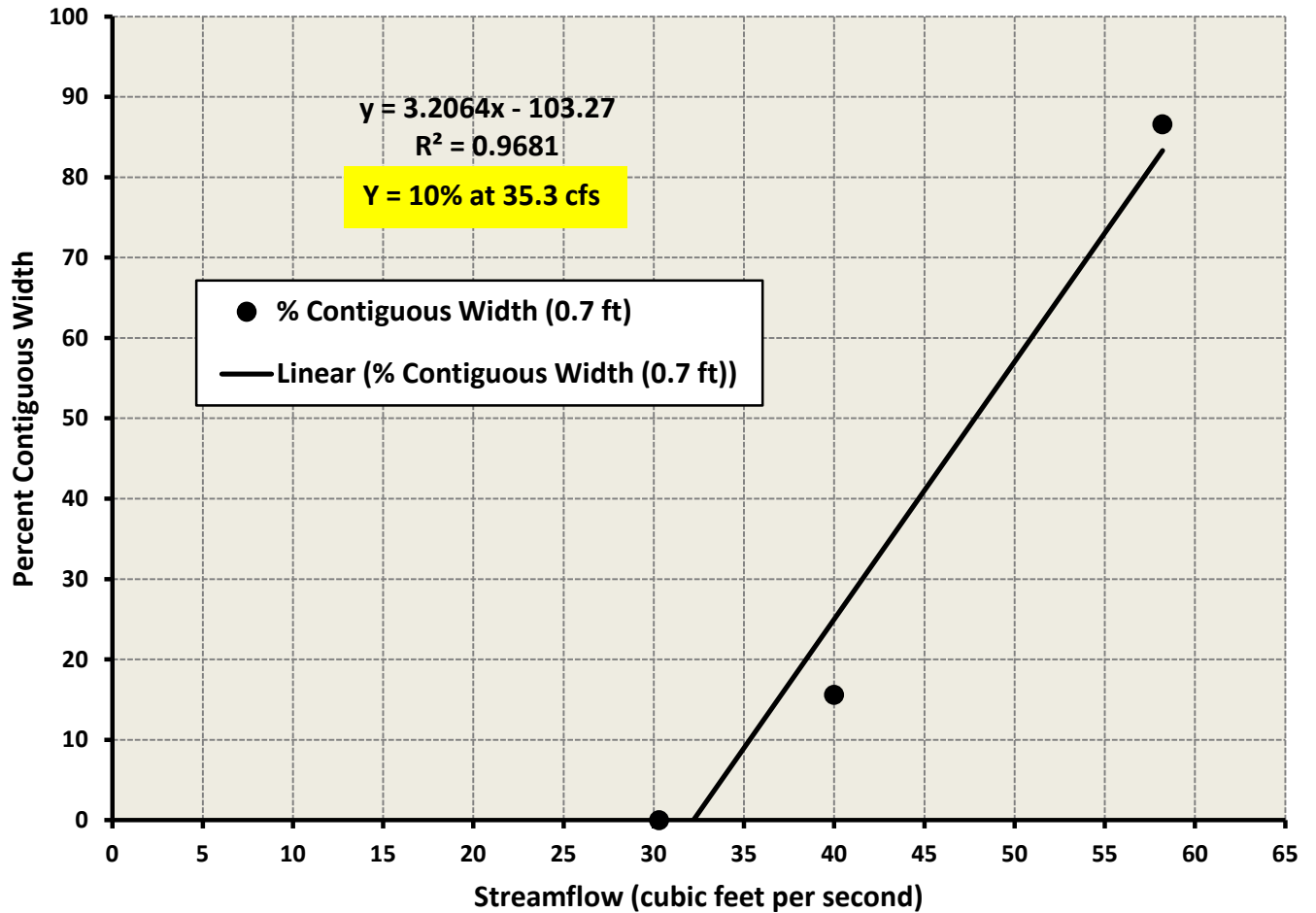


Figure 32a. Critical Riffle #3 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width Using 3 Transects (0.7 feet Depth Criteria; Includes March 8 data).

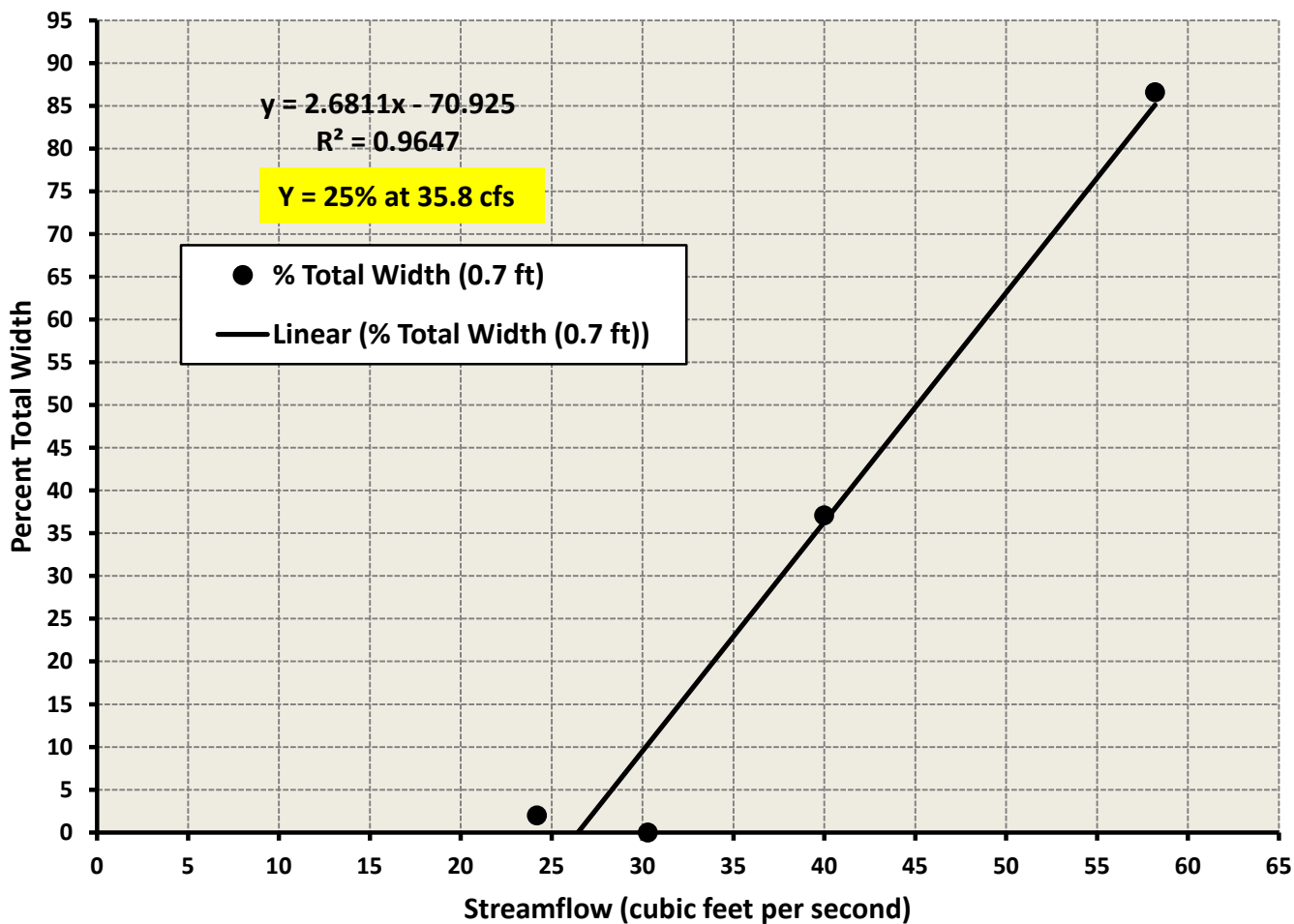


Figure 32b. Critical Riffle #3 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width Using 3 Transects (0.7 feet Depth Criteria; Without March 8 data).

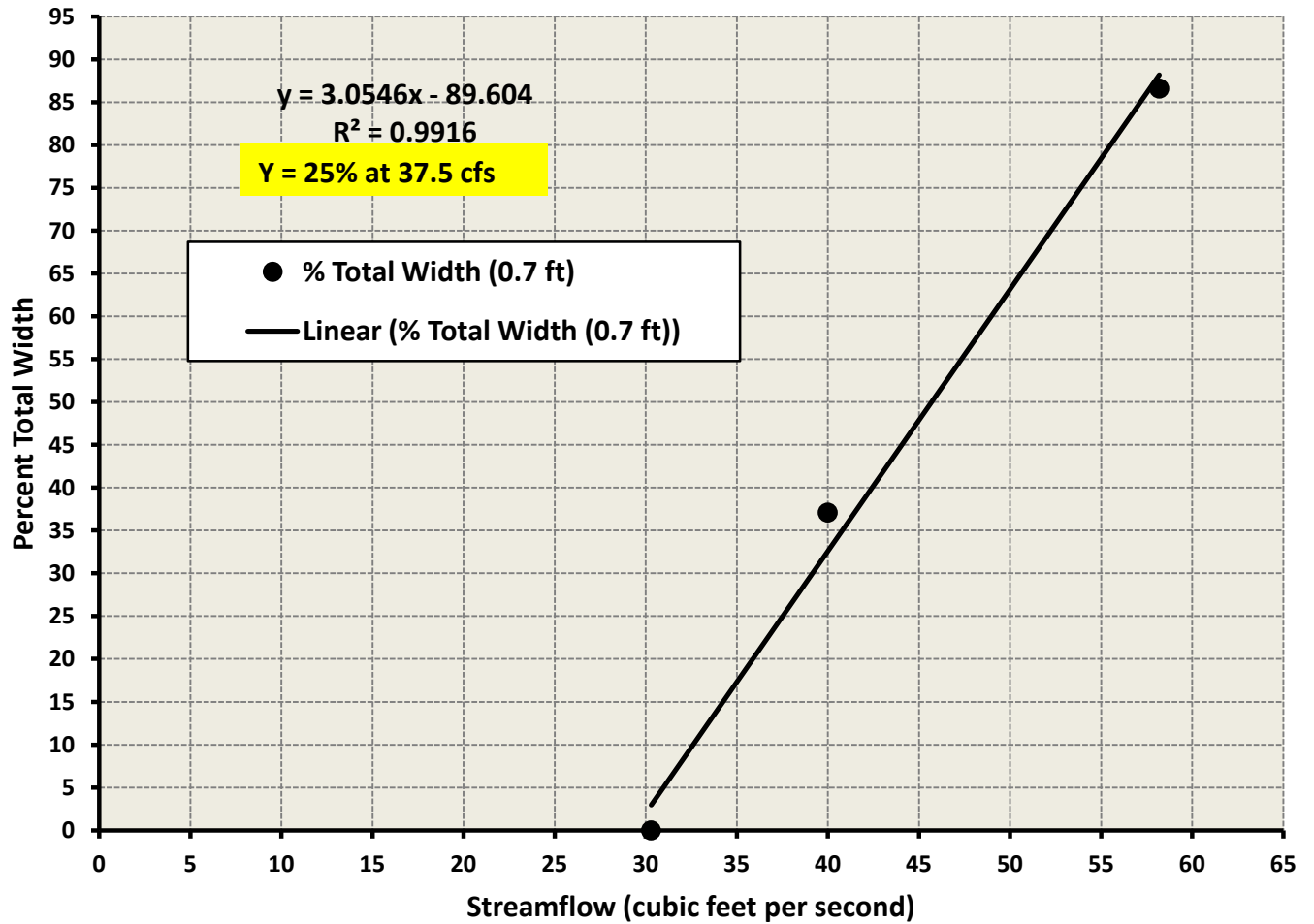


Figure 33a. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width Using 3 Transects (0.6 ft Depth Criteria; Includes March 8 data).

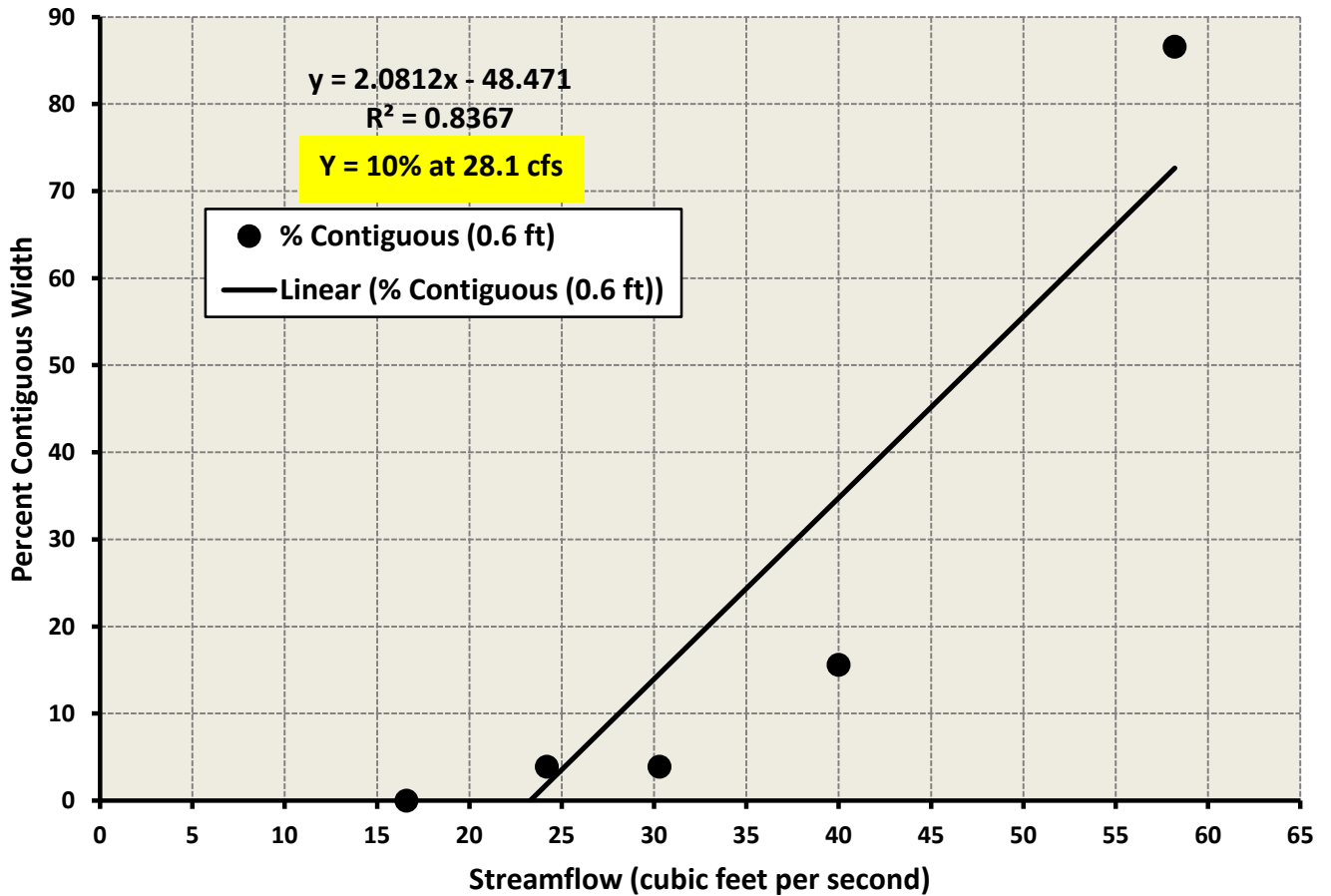


Figure 33b. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width Using 3 Transects (0.6 ft Depth Criteria; Without March 8 data).

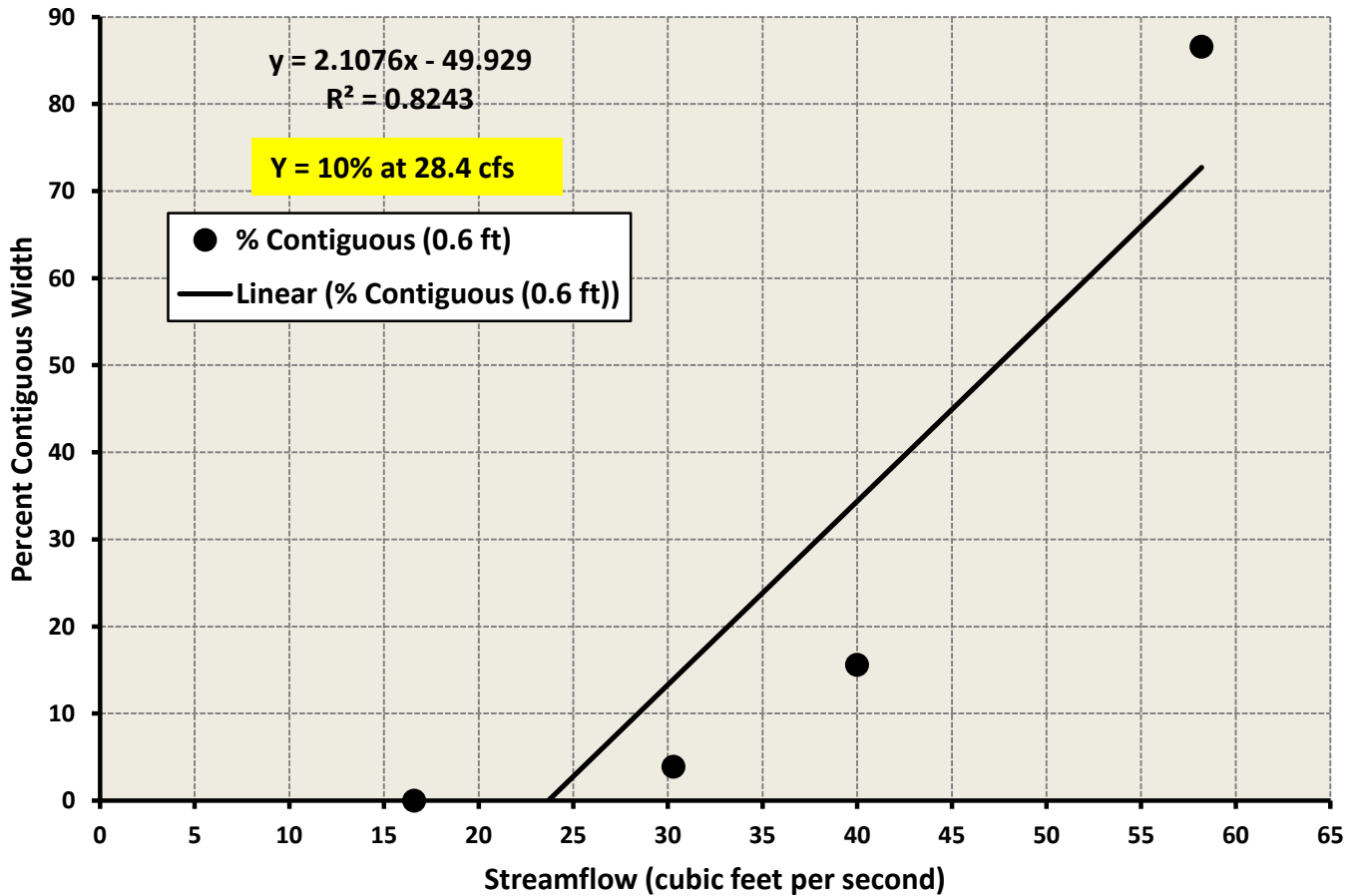


Figure 34a. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Total Passable Width Using 3 Transects (0.6 ft Depth Criteria; Includes March 8 data).

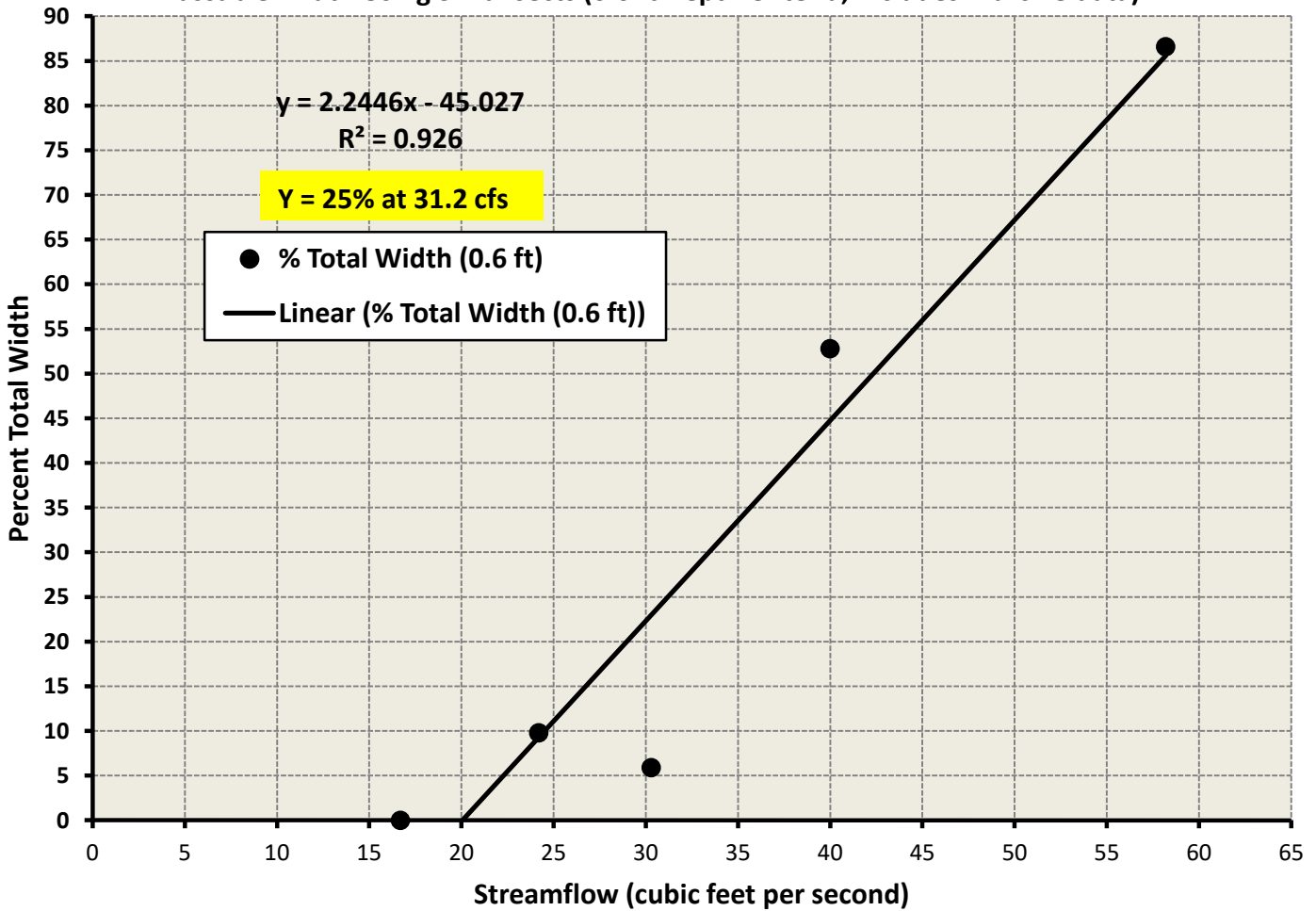


Figure 34b. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Total Passable Width (0.6 ft Depth Criteria; Without March 8 data).

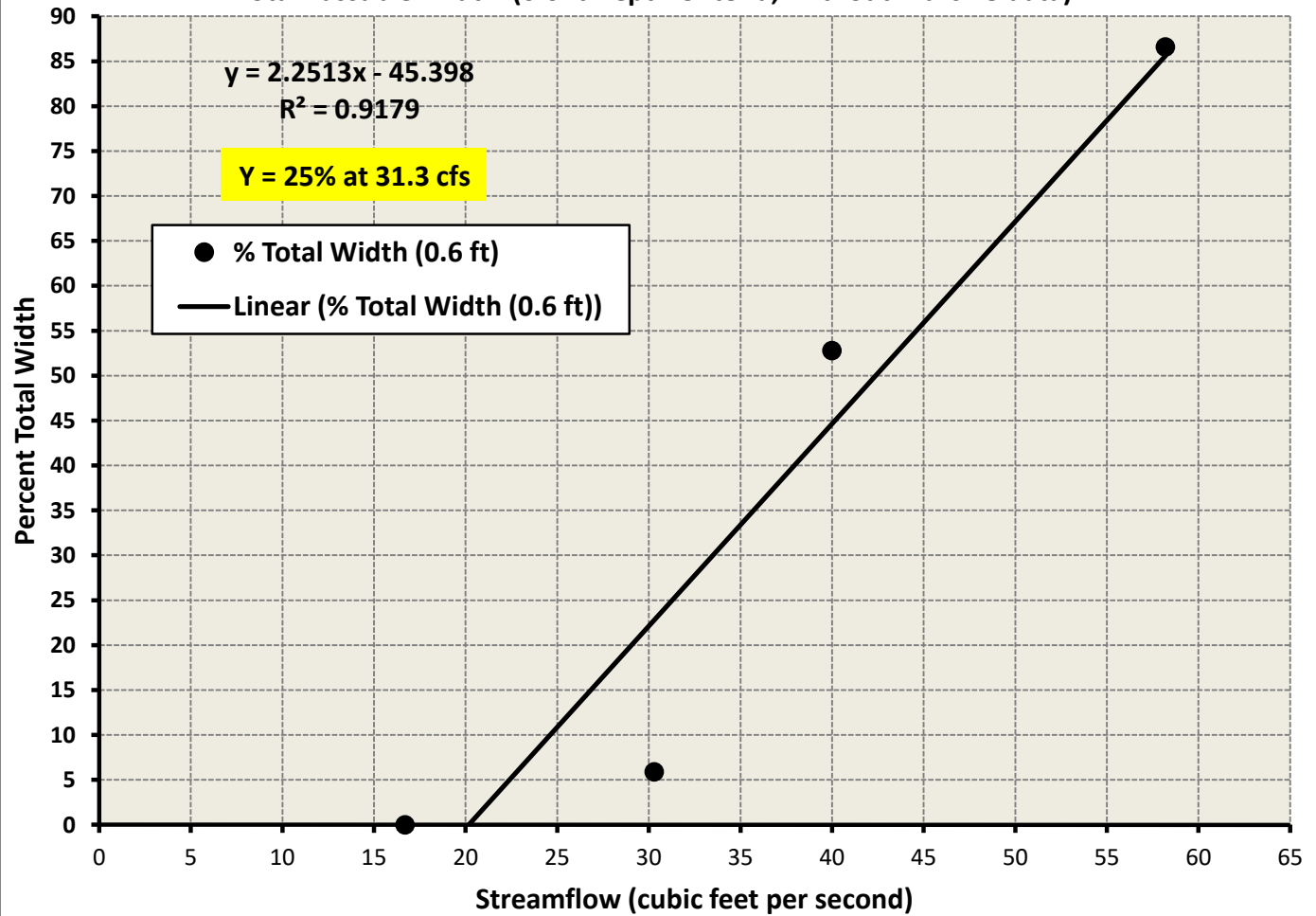


Figure 35a. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width Using 3 Transects (0.5 ft Depth Criteria; Includes March 8 data).

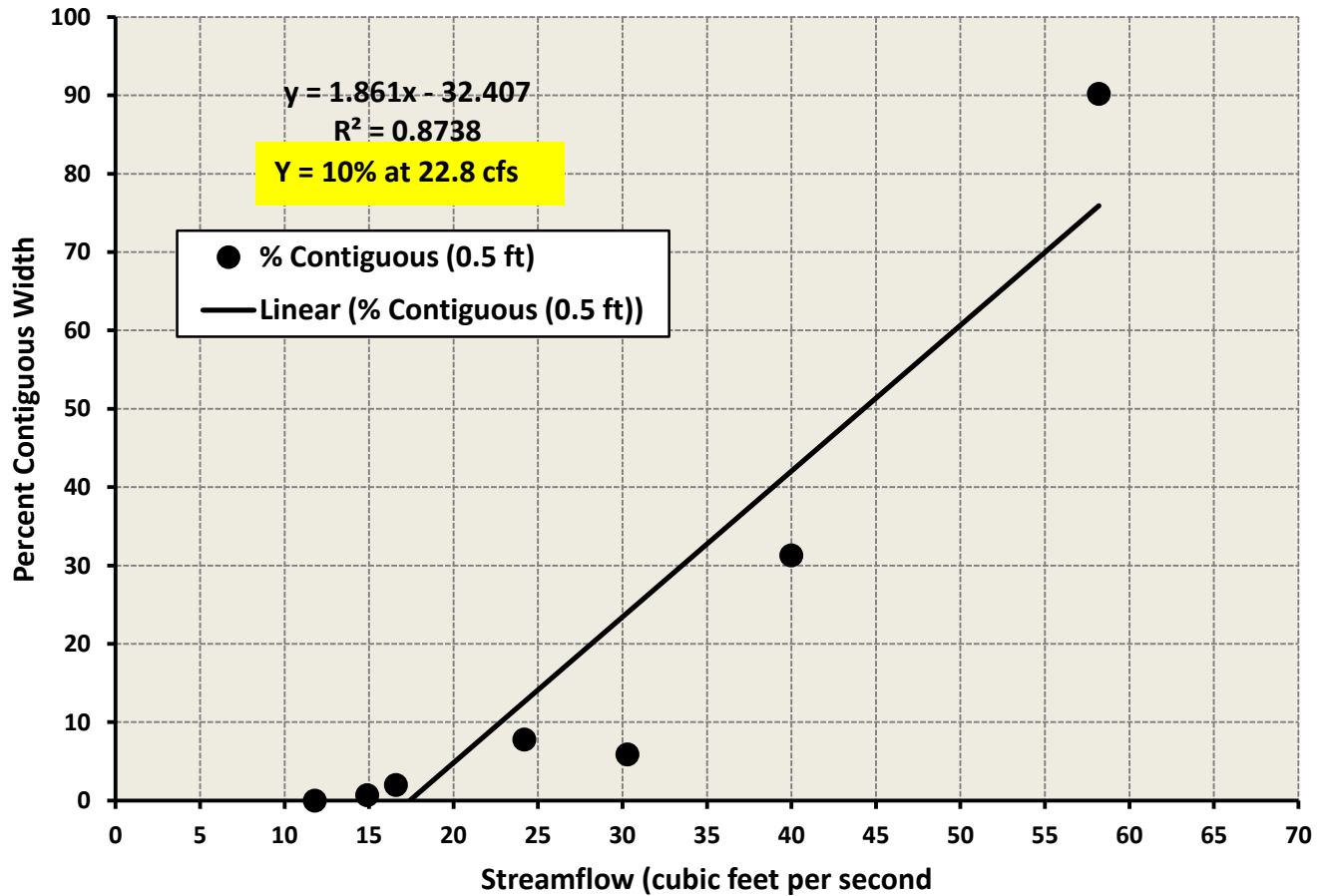


Figure 35b. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width Using 3 Transects (0.5 ft Depth Criteria; Without March 8 data).

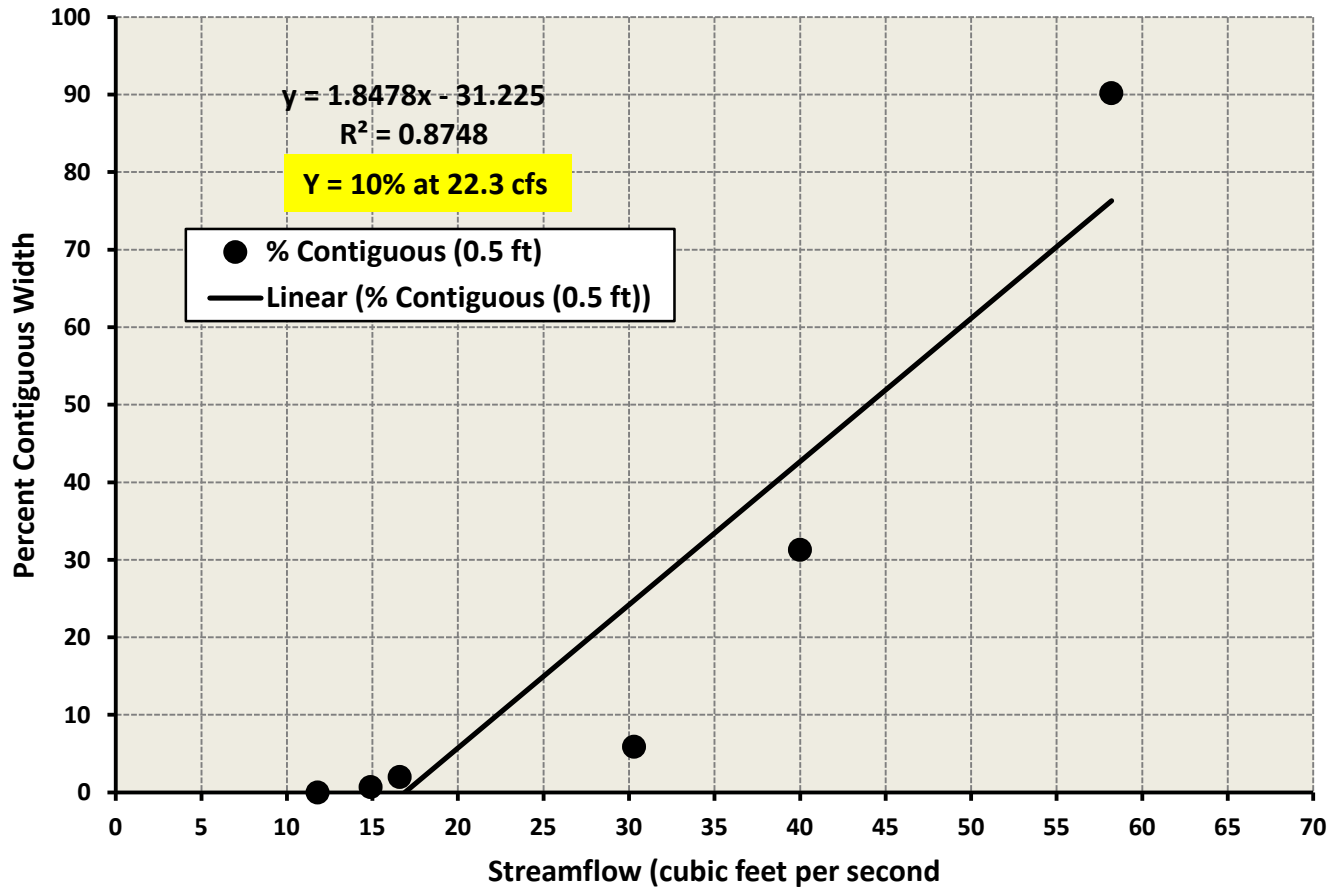


Figure 36a. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Total Passable Width Using 3 Transects (0.5 ft Depth Criteria; Includes March 8 data).

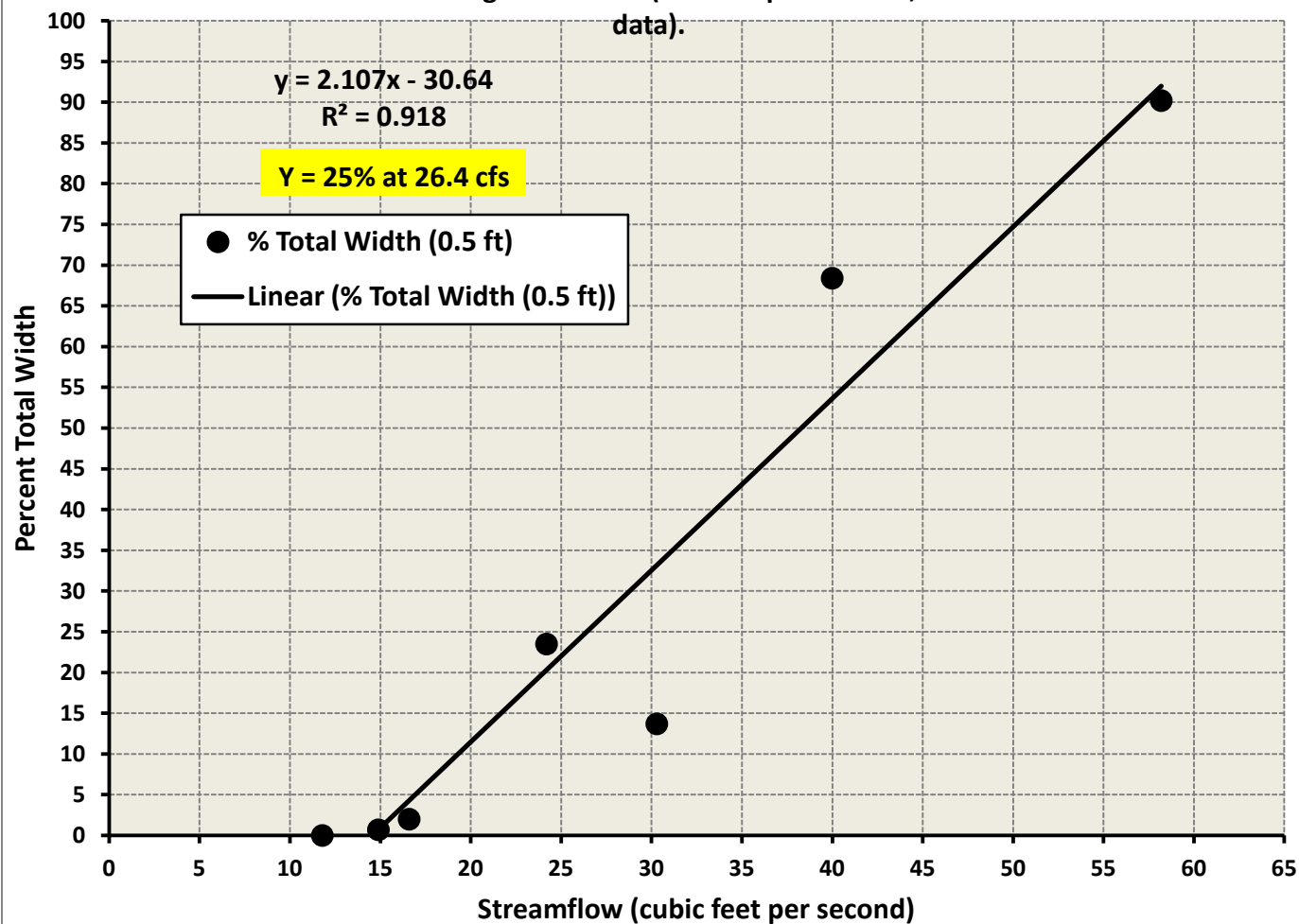


Figure 36b. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Total Passable Width Using 3 Transects (0.5 ft Depth Criteria; Without March 8 data).

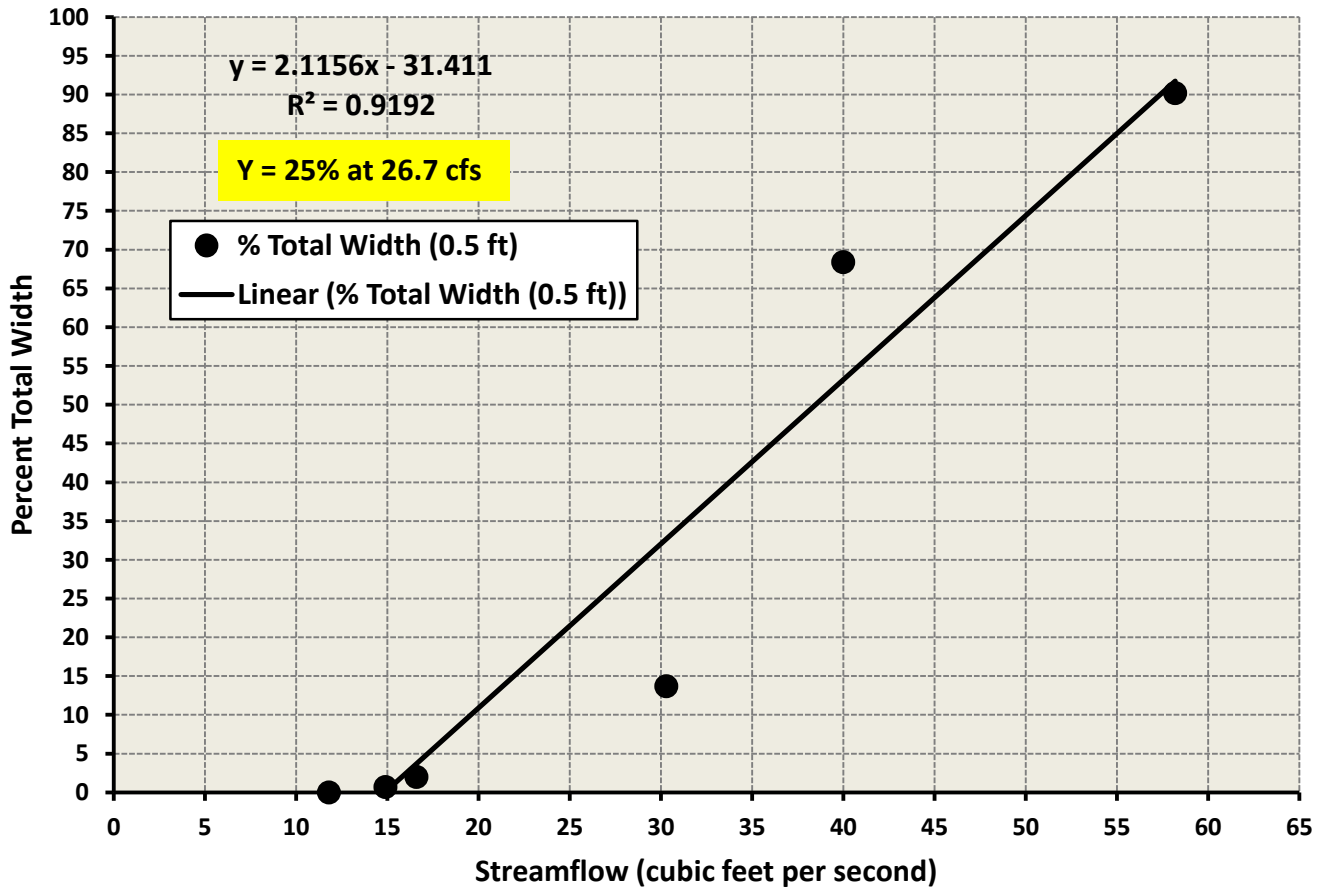
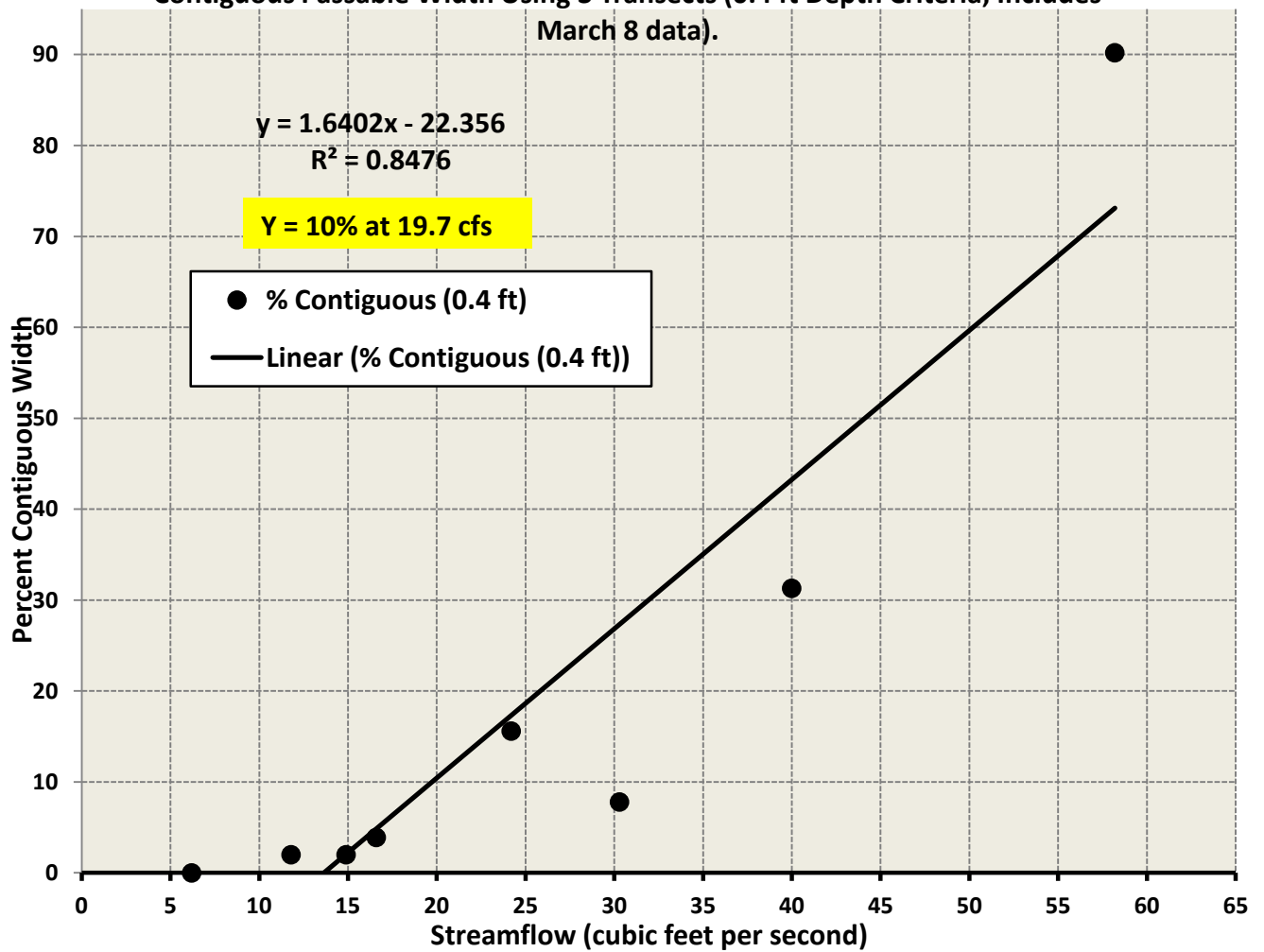


Figure 37a. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width Using 3 Transects (0.4 ft Depth Criteria; Includes March 8 data).



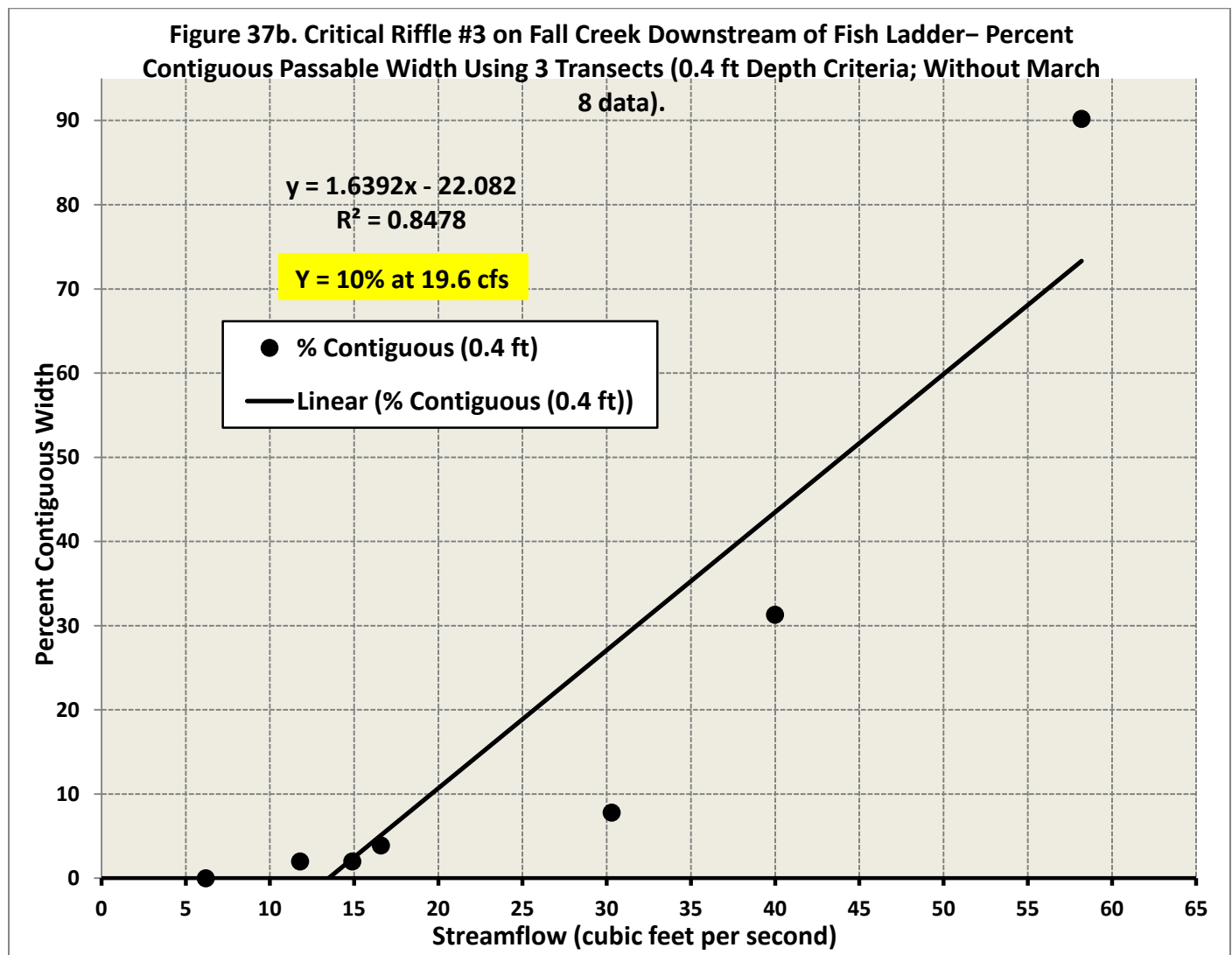


Figure 38a. Critical Riffle #3 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width Using 3 Transects (0.4 feet Depth Criteria; Includes March 8 data).

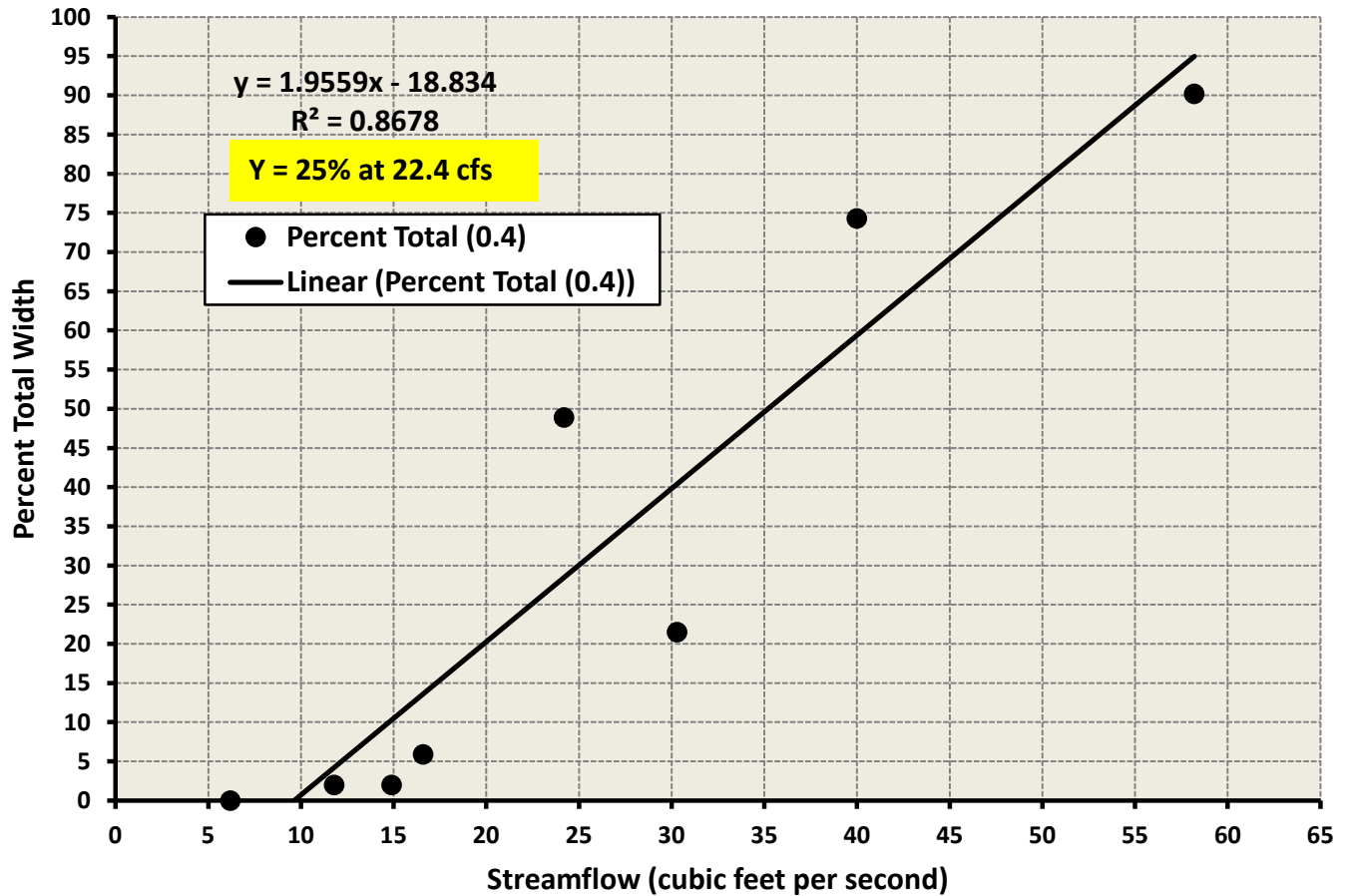


Figure 38b. Critical Riffle #3 on Fall Creek Downstream of the Fish Ladder–
Percent Total Passable Width Using 3 Transects (0.4 feet Depth Criteria; Without
March 8 data).

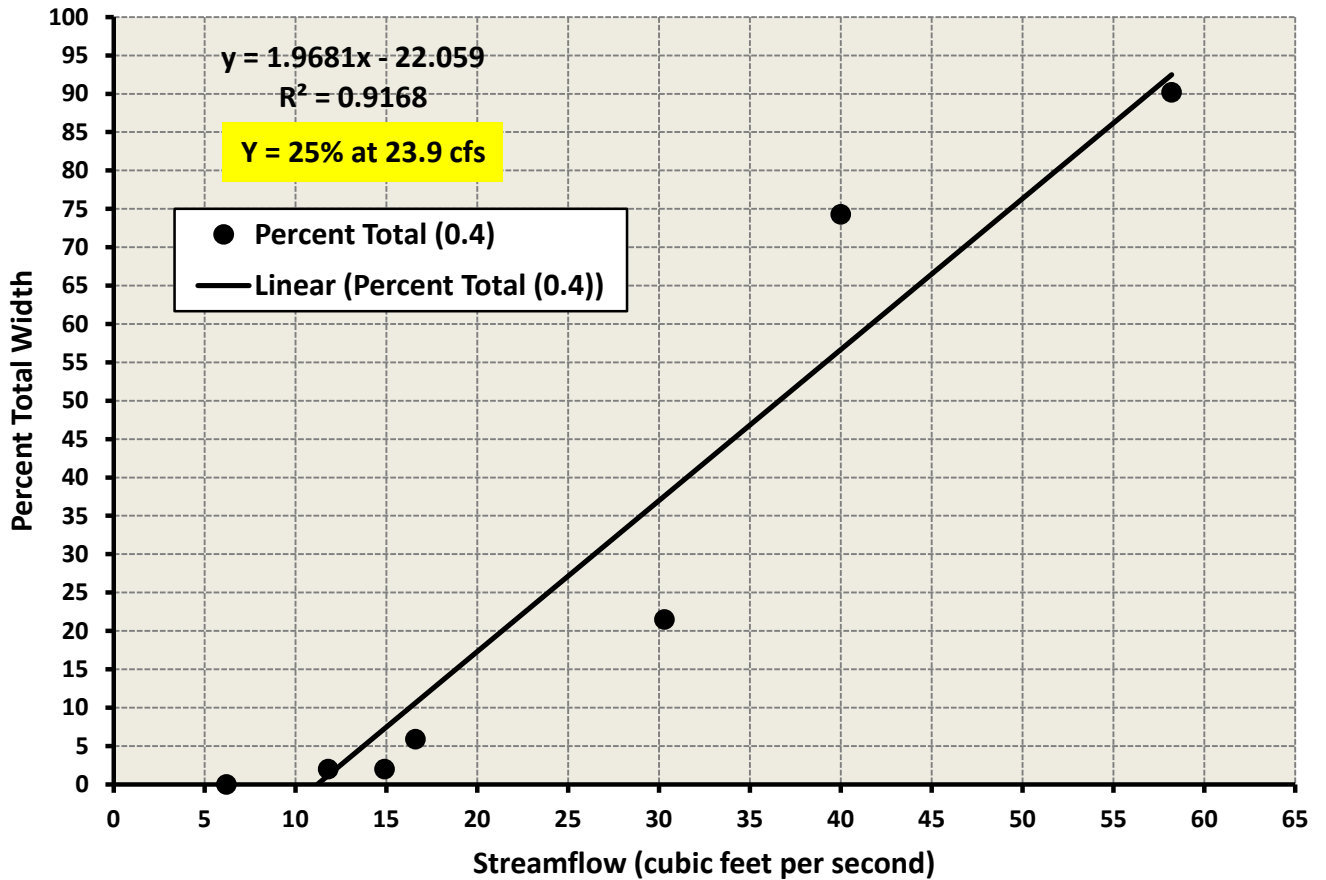


Figure 39a. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width Using 3 Transects (0.3 ft Depth Criteria; Includes March 8 Data).

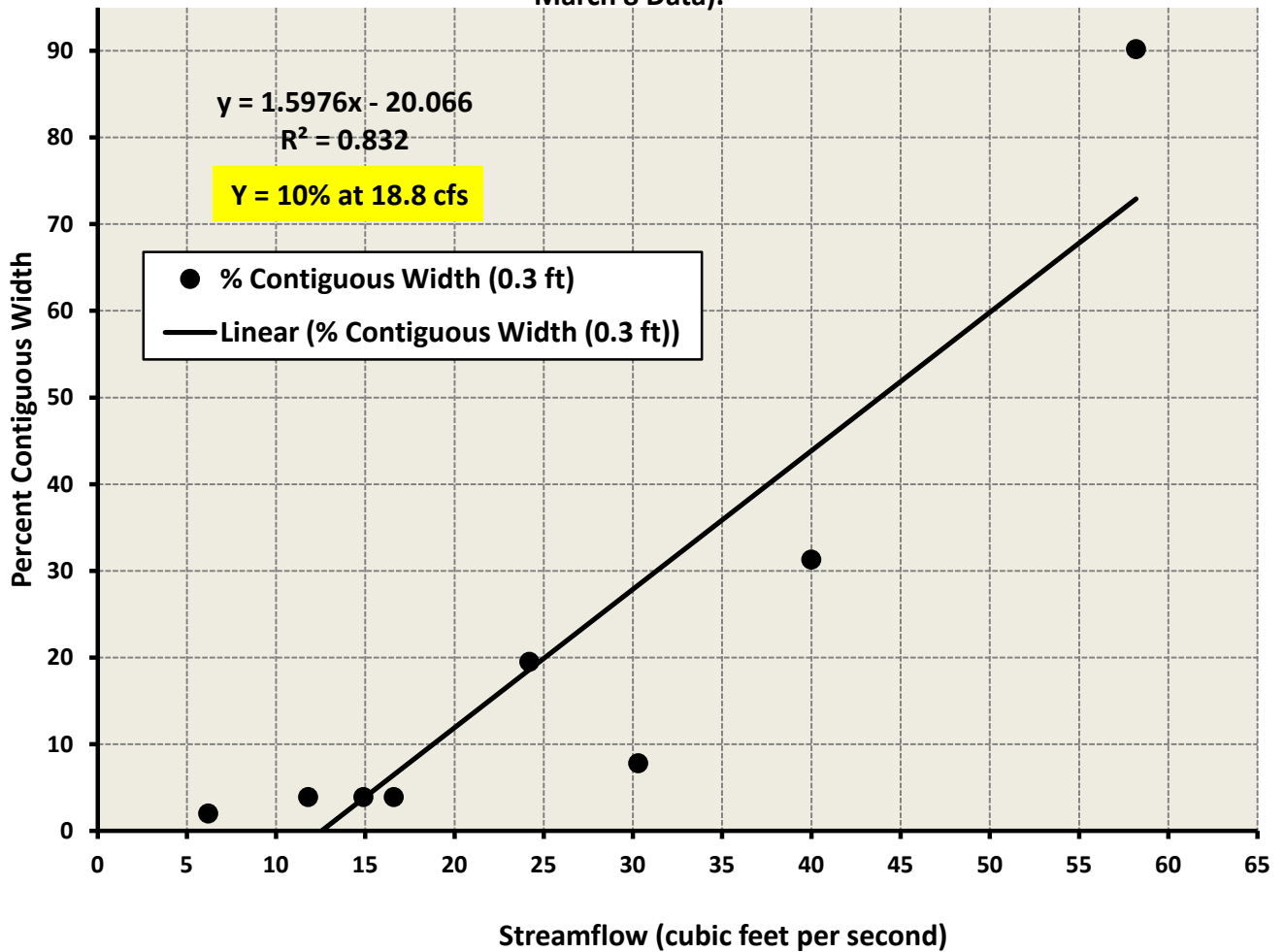


Figure 39b. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width Using 3 Transects (0.3 ft Depth Criteria; Without March 8 data).

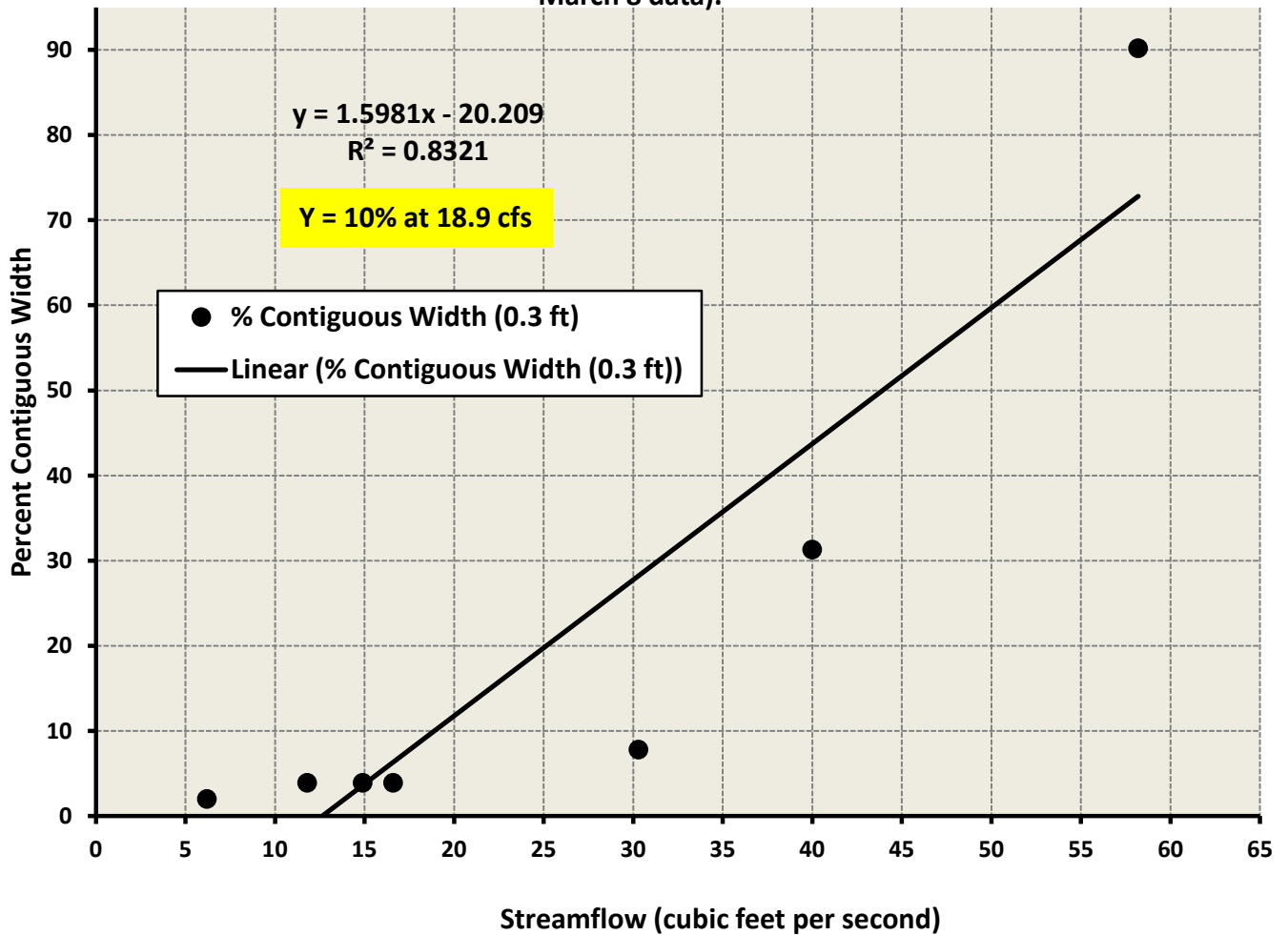


Figure 40a. Critical Riffle #3 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width Using 3 Transects (0.3 feet Depth Criteria; Includes March 8 data).

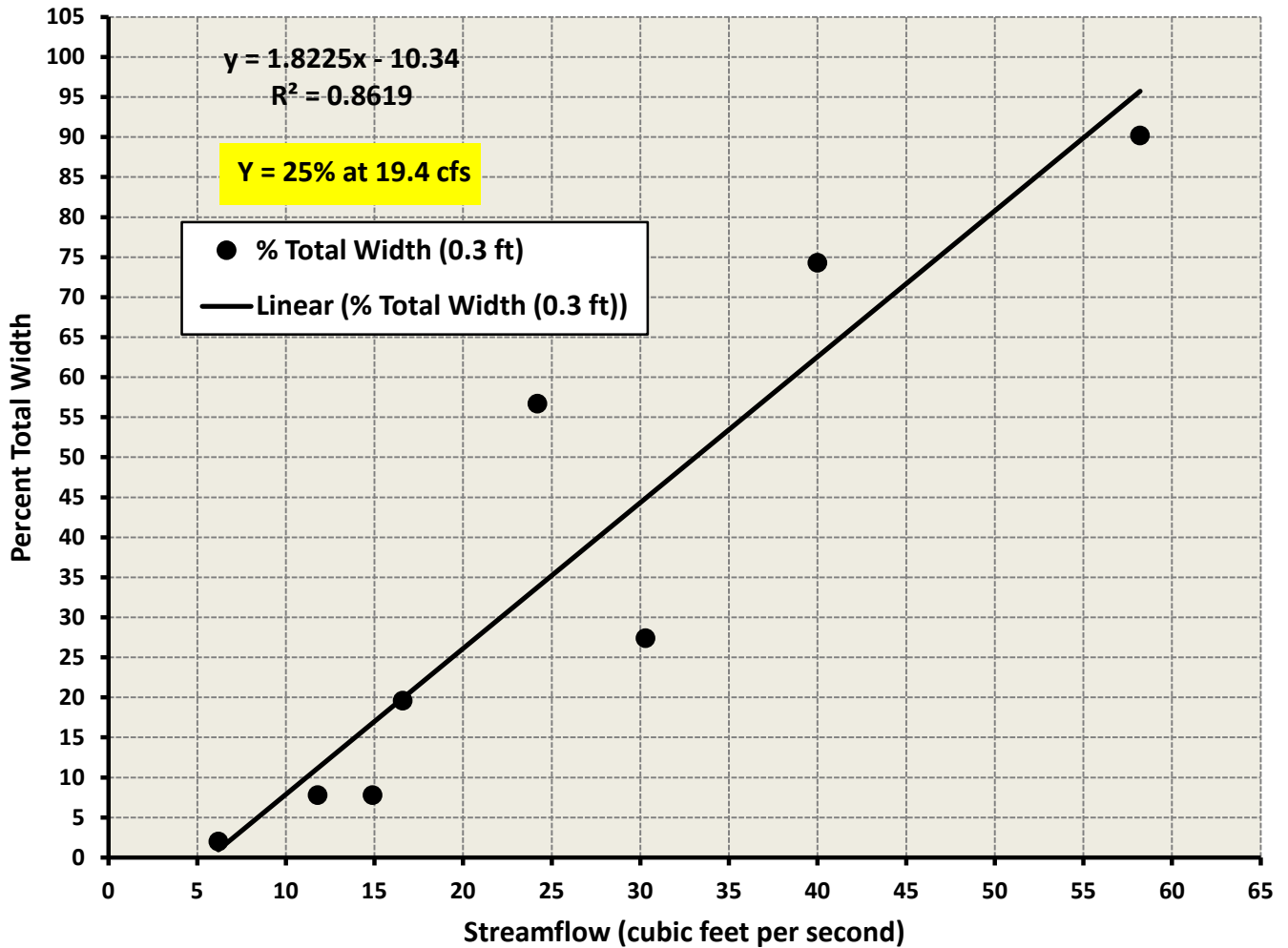


Figure 40b. Critical Riffle #3 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width Using 3 Transects (0.3 feet Depth Criteria; Without March 8 data).

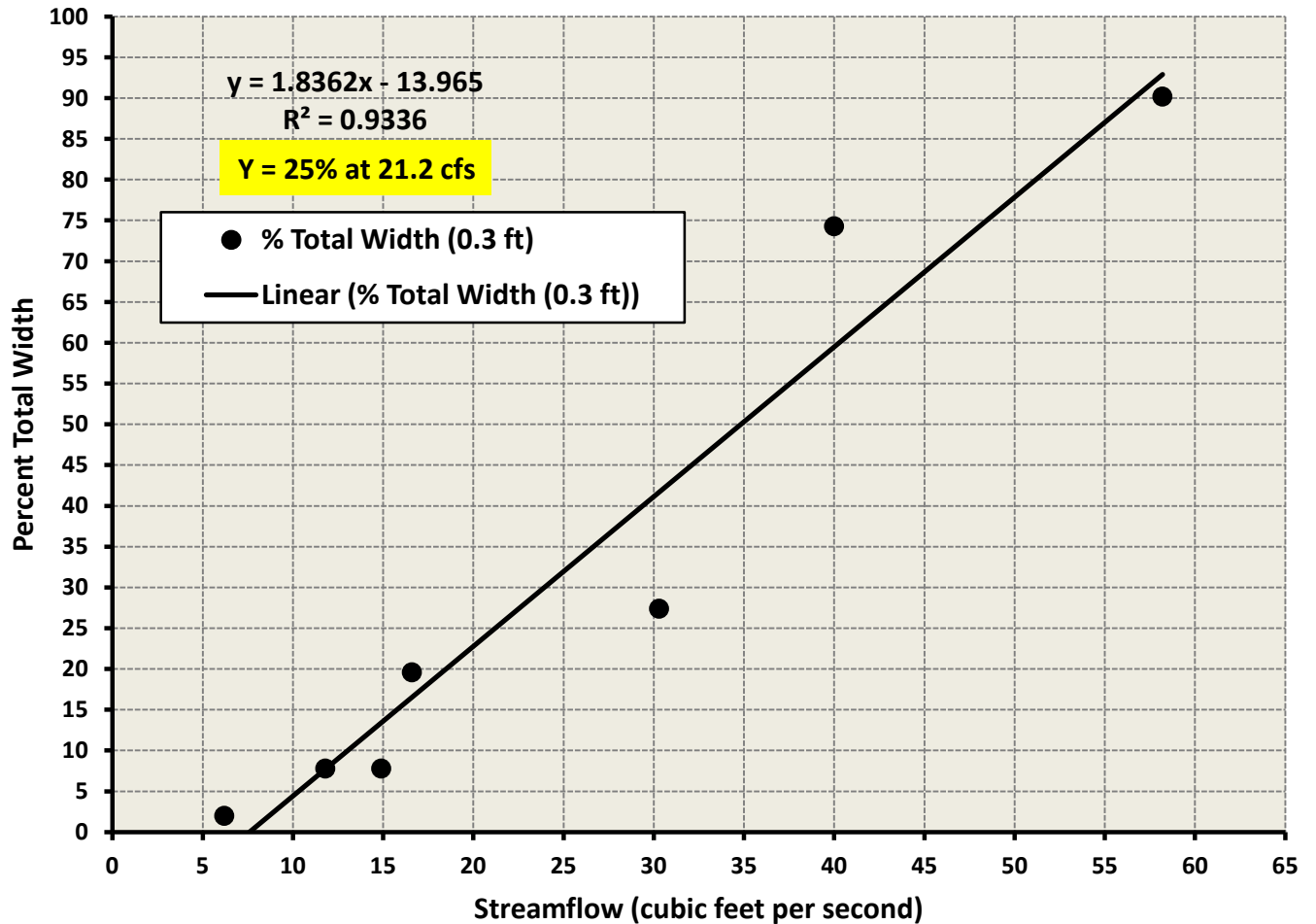


Figure 41a. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width Using 3 Transects (0.2 ft Depth Criteria; Includes March 8 data).

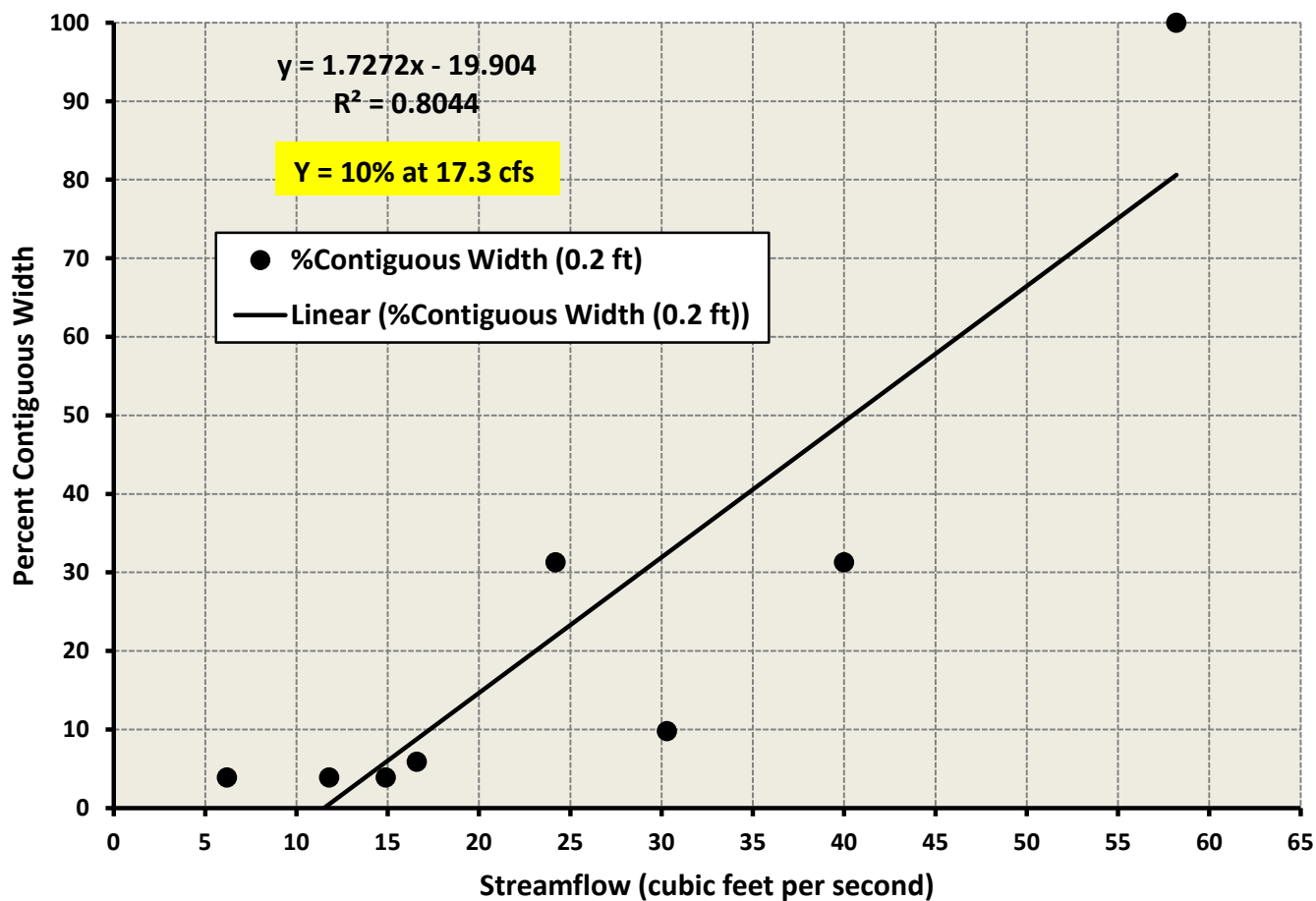


Figure 41b. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width Using 3 Transects (0.2 ft Depth Criteria; Without March 8 data).

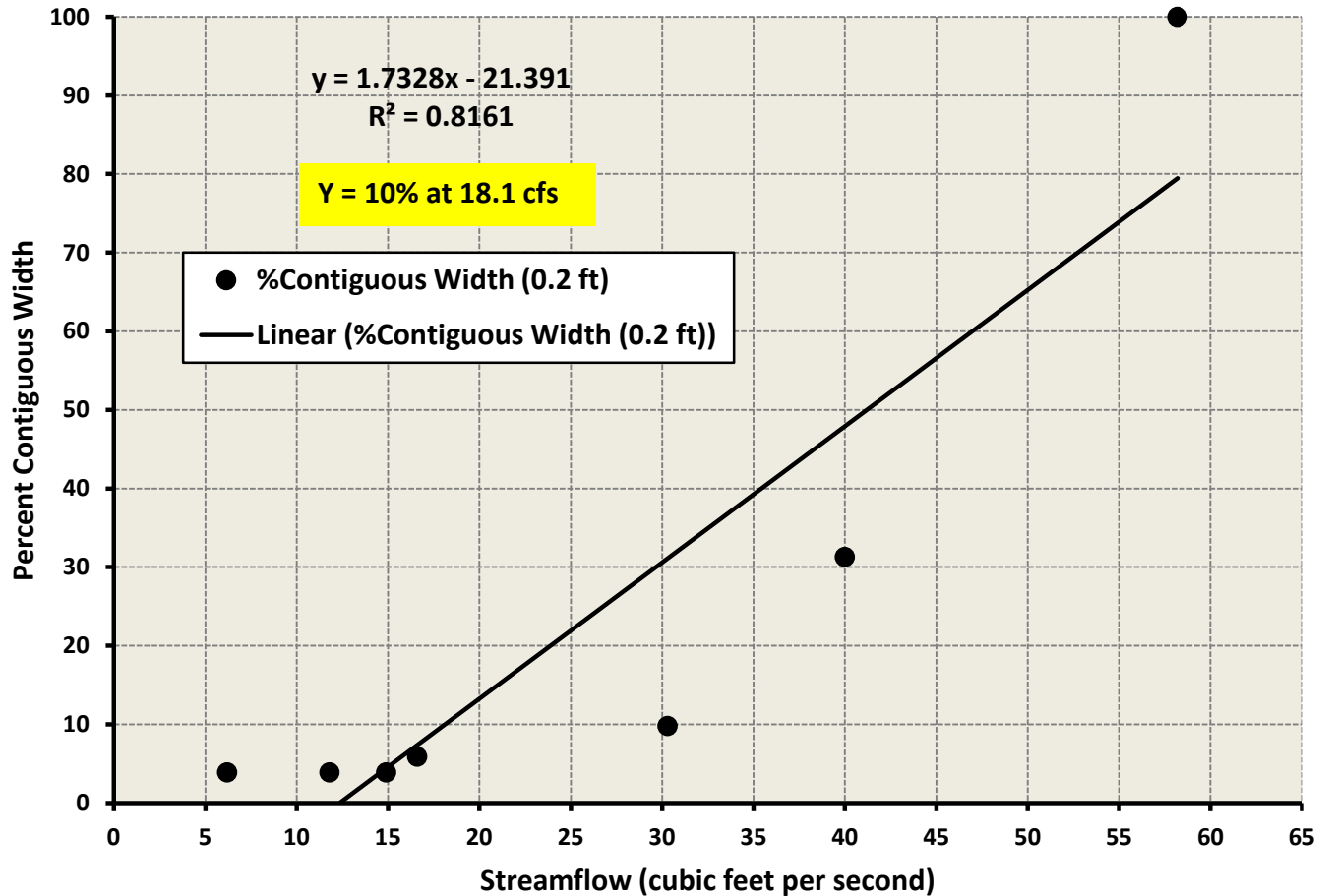


Figure 42a. Critical Riffle #3 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width Using 3 Transects (0.2 feet Depth Criteria; Includes March 8 data).

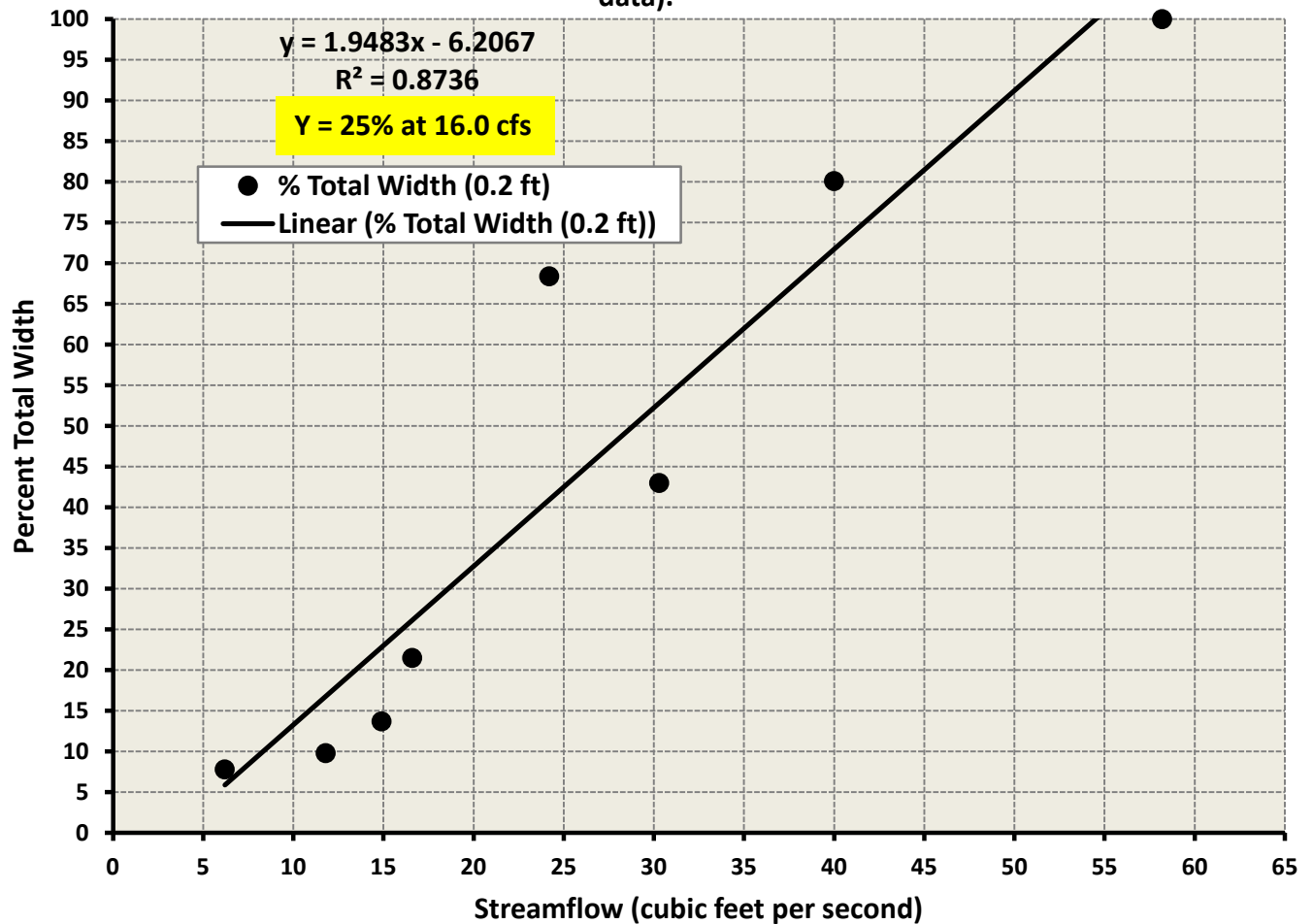


Figure 42b. Critical Riffle #3 on Fall Creek Downstream of the Fish Ladder–
Percent Total Passable Width Using 3 Transects (0.2 feet Depth Criteria; Without
March 8 data).

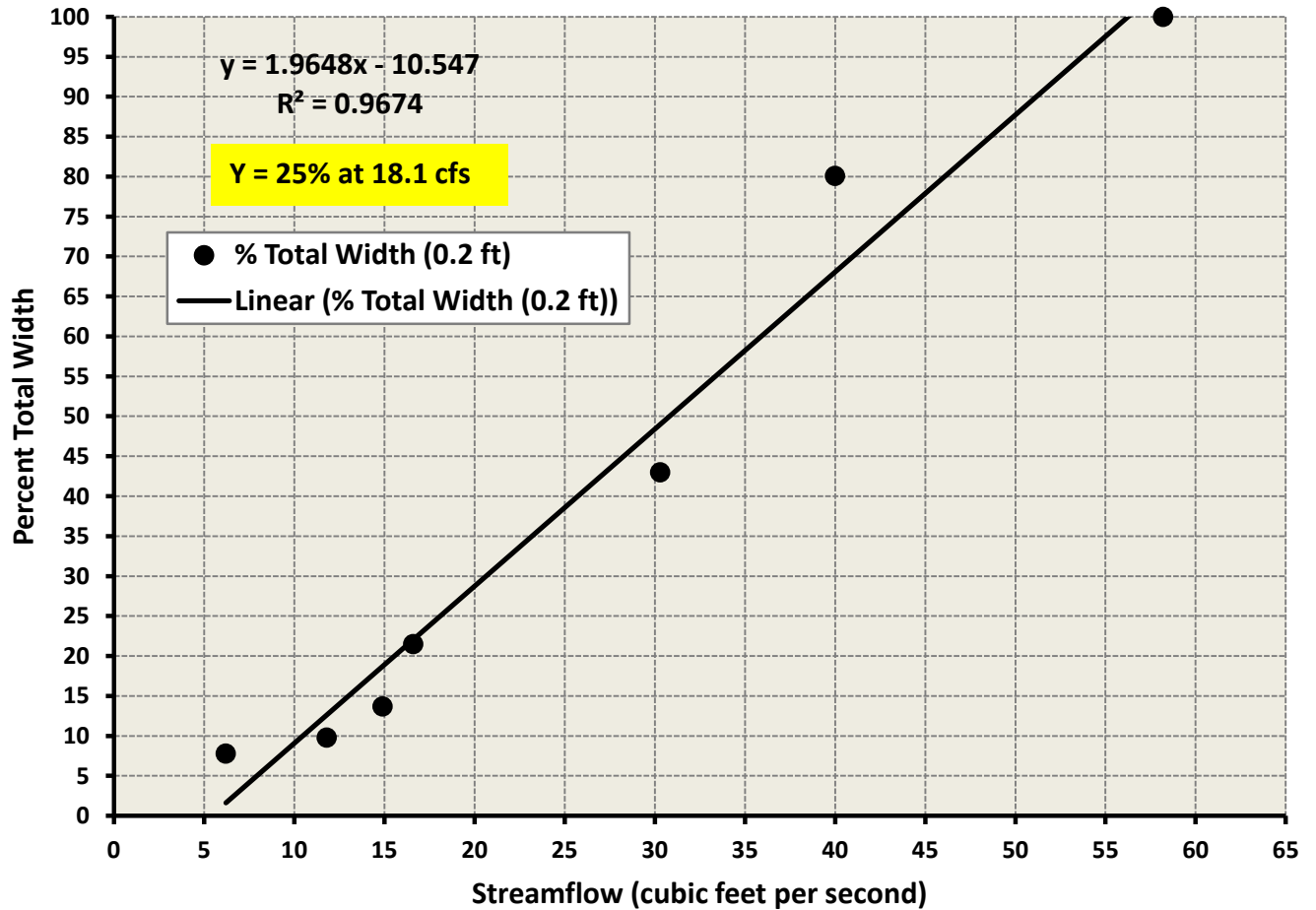


Figure 43. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width **Using Transect 3 Only** (0.2 ft Depth Criteria; Includes March 8 data).

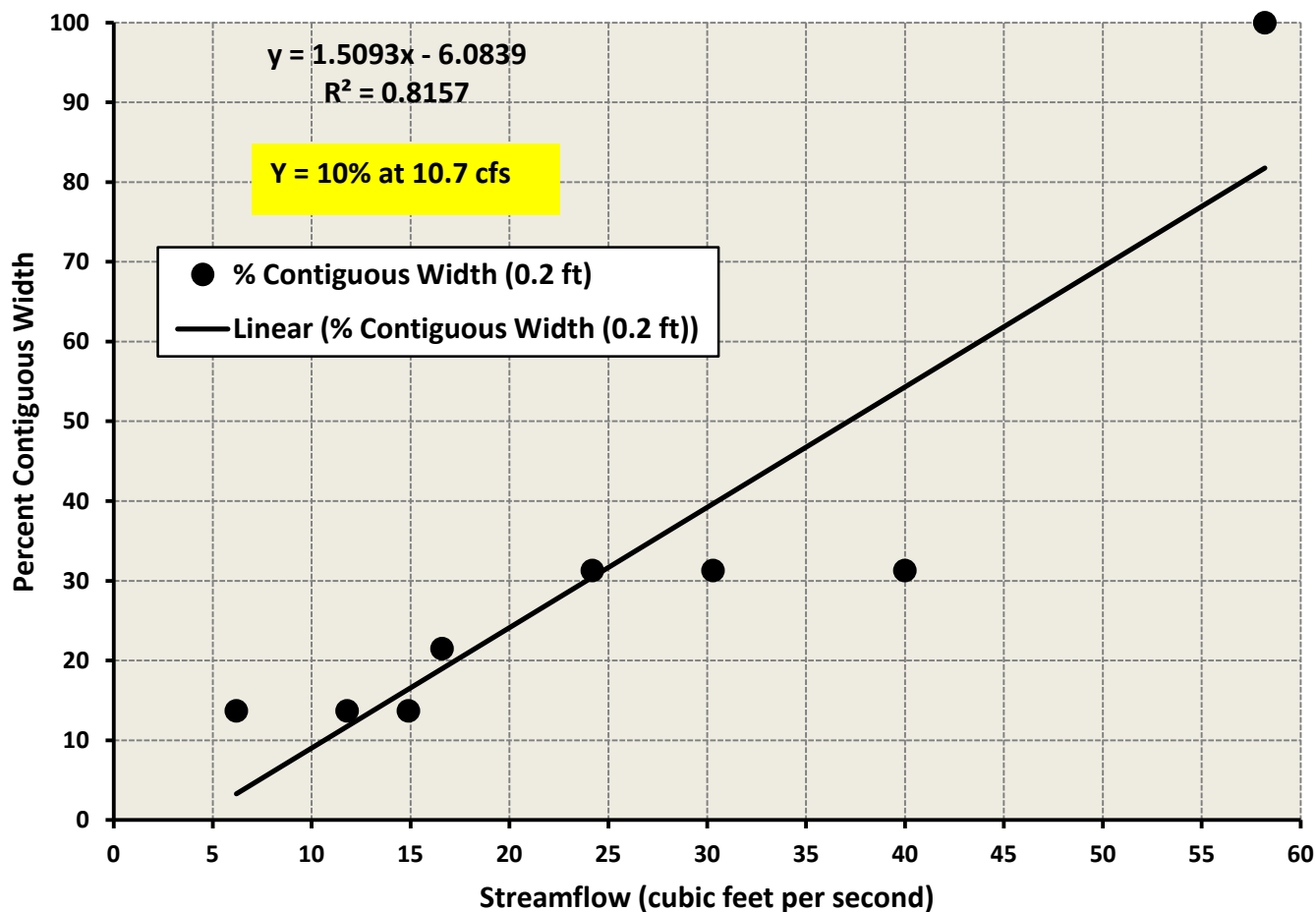


Figure 44. Critical Riffle #3 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width **Using Transect 3 Only** (0.2 feet Depth Criteria; Includes March 8 data).

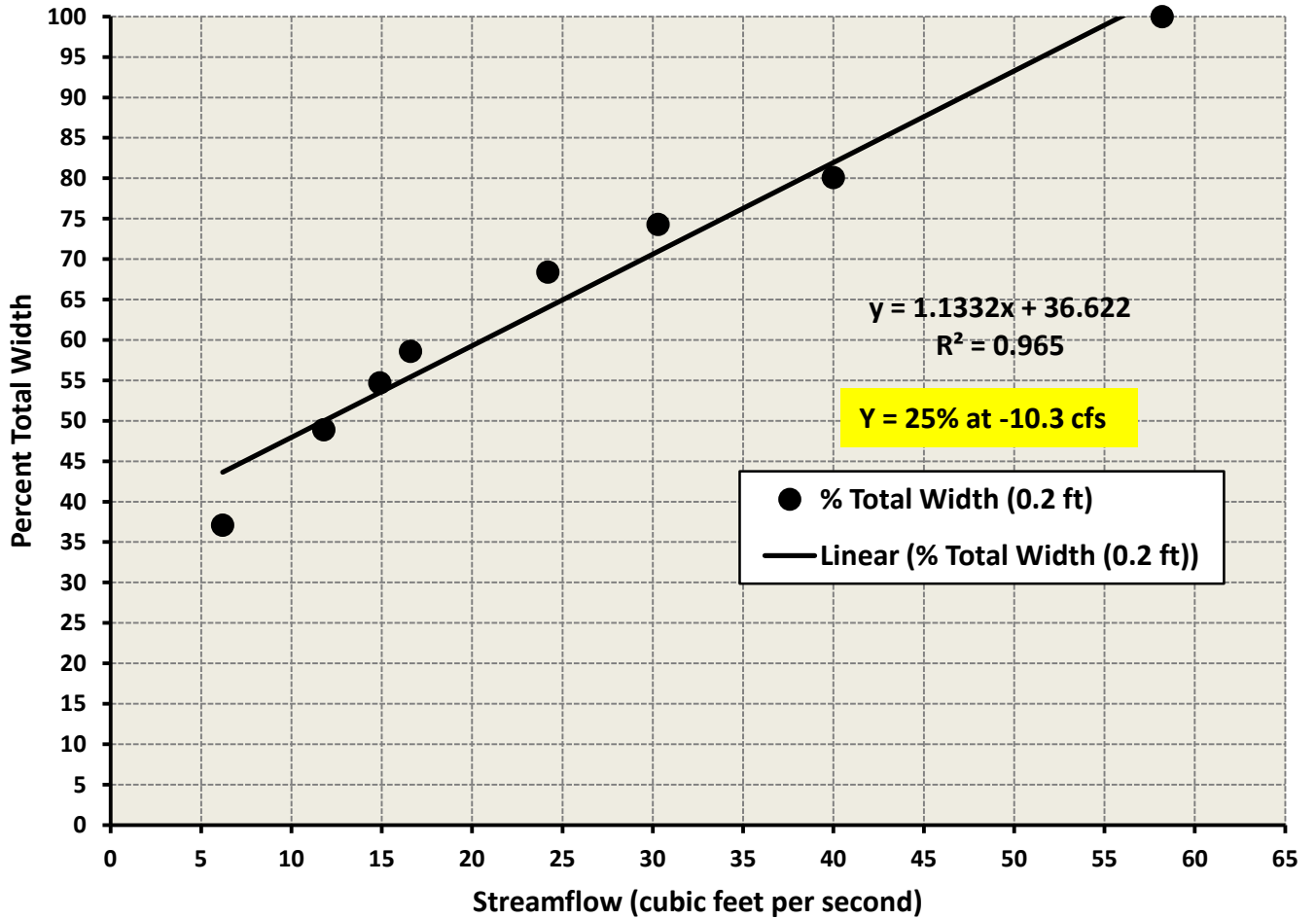


Figure 45. Critical Riffle #3 on Fall Creek Downstream of Fish Ladder– Percent Contiguous Passable Width **Using Transect 5 Only** (0.2 ft Depth Criteria).

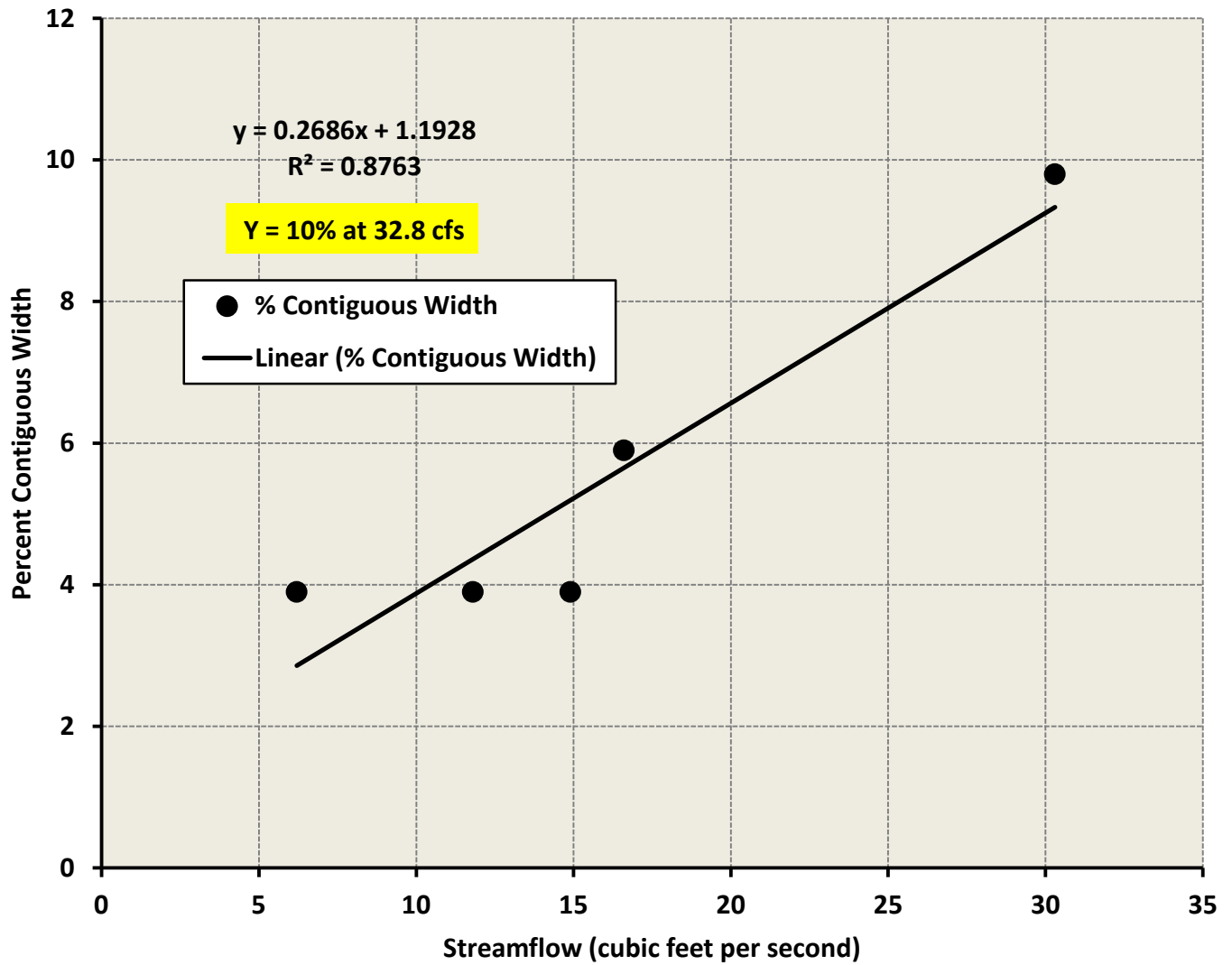
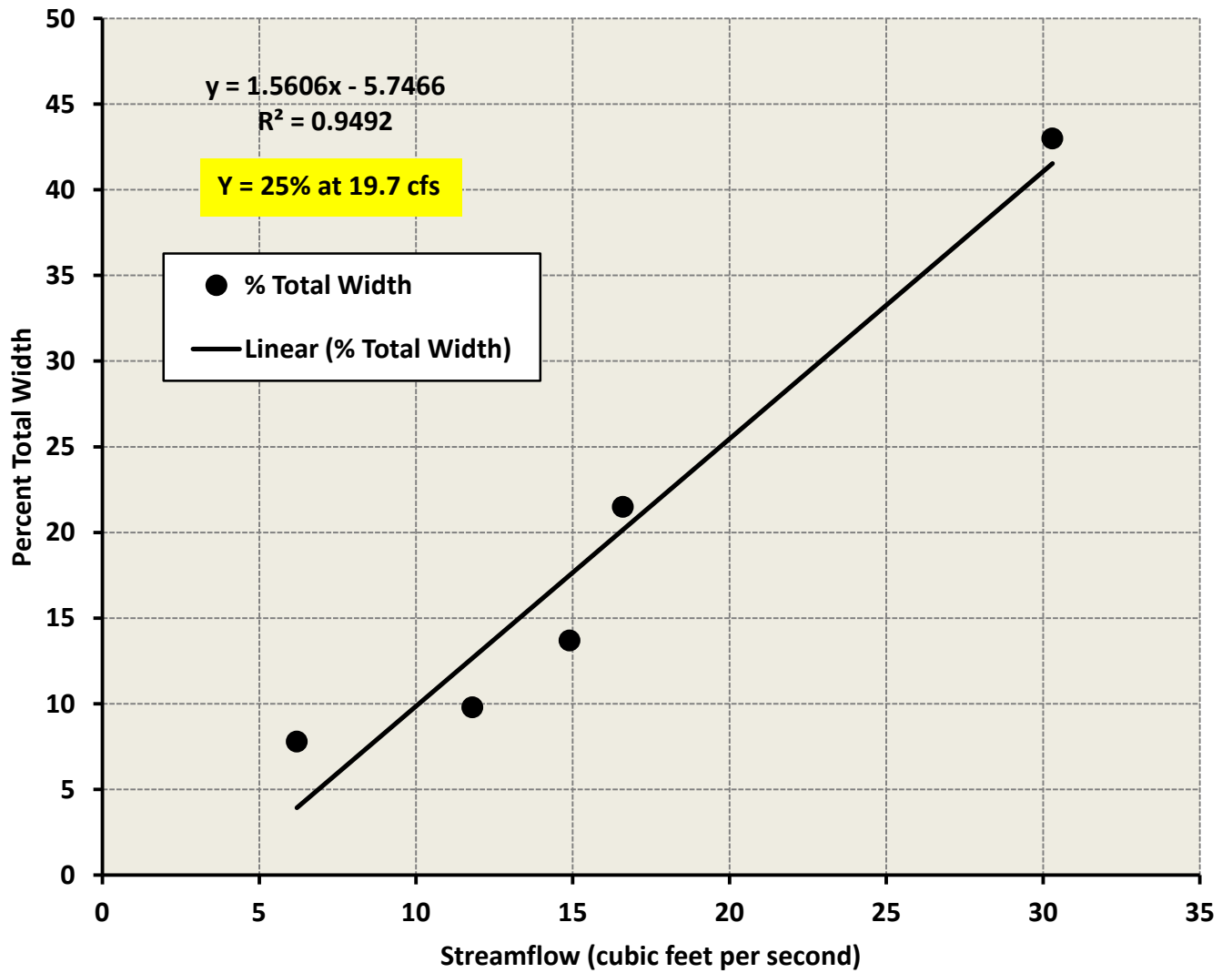


Figure 46. Critical Riffle #3 on Fall Creek Downstream of the Fish Ladder– Percent Total Passable Width **Using Transect 5 Only** (0.2 feet Depth Criteria).



Appendix A. Photos.



Critical Riffle #1; Transect #1; Water flowing right to left; **53.1 cfs** 14 March 2016



Critical Riffle #1; Transect #1; Water flowing left to right; **53.1 cfs** 14 March 2016



Critical Riffle #1; Transect #1; Water flowing right to left; **44.1 cfs** 15 March 2016



Critical Riffle #1; Transect #1; Water flowing right to left; **22.8 cfs** 8 March 2016



Critical Riffle #1; Transect #1; Water flowing right to left; **22.8 cfs** 8 March 2016



Critical Riffle #1; Transect #1; Water flowing right to left; **16.0 cfs** 26 March 2016



Critical Riffle #1; Transect #1; Water flowing right to left; **16.0 cfs** 26 March 2016



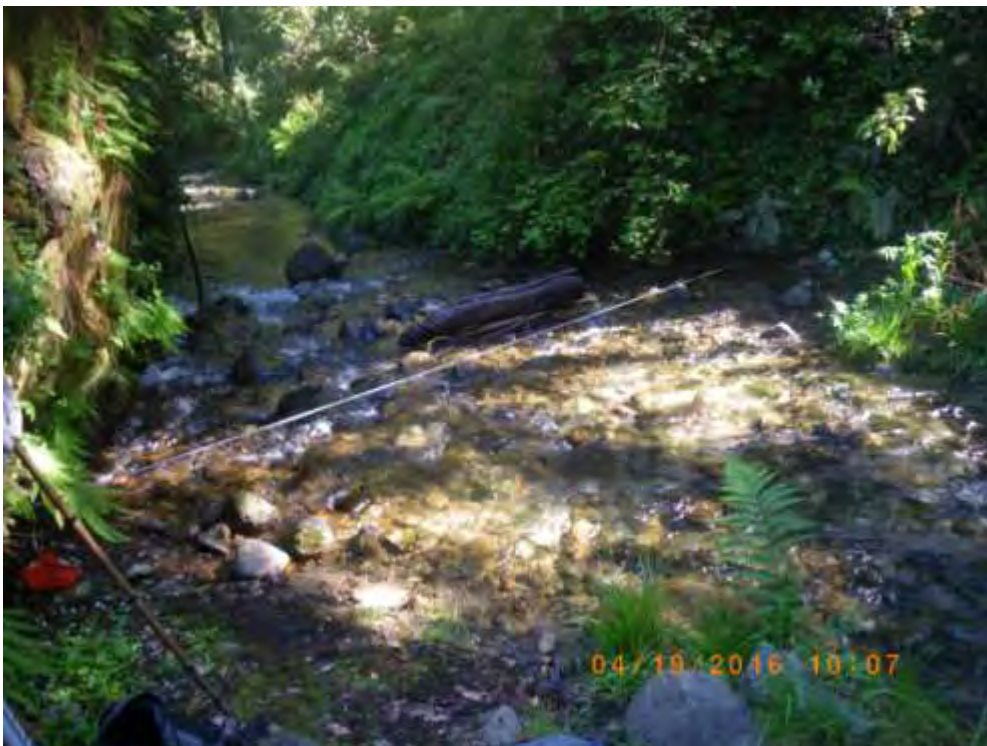
Critical Riffle #1; Transect #1; Water flowing right to left; **15.1 cfs** 29 March 2016



Critical Riffle #1; Transect #1; Water flowing right to left; **9.9 cfs** 4 April 2016



Critical Riffle #1; Transect #1; Water flowing top to bottom; **9.9 cfs** 4 April 2016



Critical Riffle #1; Transect #1; Water flowing right to left; **8.0 cfs** 19 April 2016



Critical Riffle #1; Transect #1; Water flowing top to bottom; **8.0 cfs** 19 April 2016



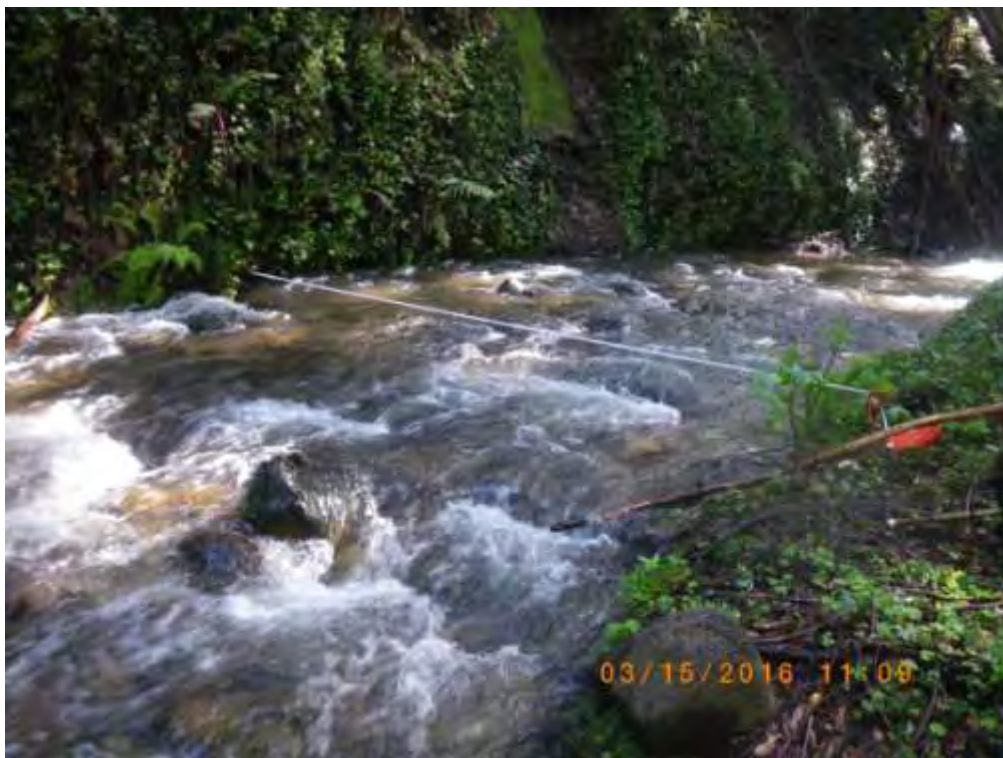
Critical Riffle #2; Transect #2; Water flowing right to left; **55.7 cfs** 14 March 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **55.7 cfs** 14 March 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **55.7 cfs** 14 March 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **45.3 cfs** 15 March 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **45.3 cfs** 15 March 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **27.5 cfs** 8 March 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **27.5 cfs** 8 March 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **18.1 cfs** 26 March 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **18.1 cfs** 26 March 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **15.5 cfs** 29 March 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **15.5 cfs** 29 March 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **12.4 cfs** 4 April 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **12.4 cfs** 4 April 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **7.1 cfs** 4 May 2016



Critical Riffle #2; Transect #2; Water flowing right to left; **7.1 cfs**

4 May 2016



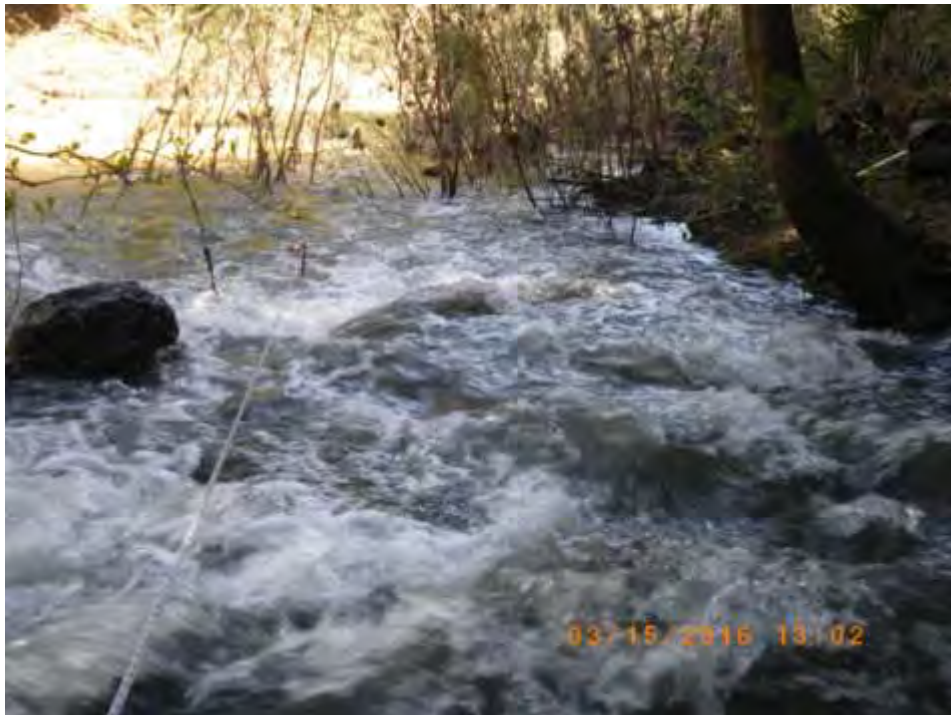
Critical Riffle #3; Transect #4 (shallowest); Water flowing top to bottom; **58.2 cfs** 14 March 2016



Critical Riffle #3; Transect #3b (upstream of Transect #3); Water flowing top to bottom; **58.2 cfs**
 San Lorenzo flowing at **2,040 cfs** at Big Trees 14 March 2016



Critical Riffle #3; Transect #3; Water flowing left to right; **40.0 cfs**
 San Lorenzo flowing at **948 cfs** at Big Trees 15 March 2016



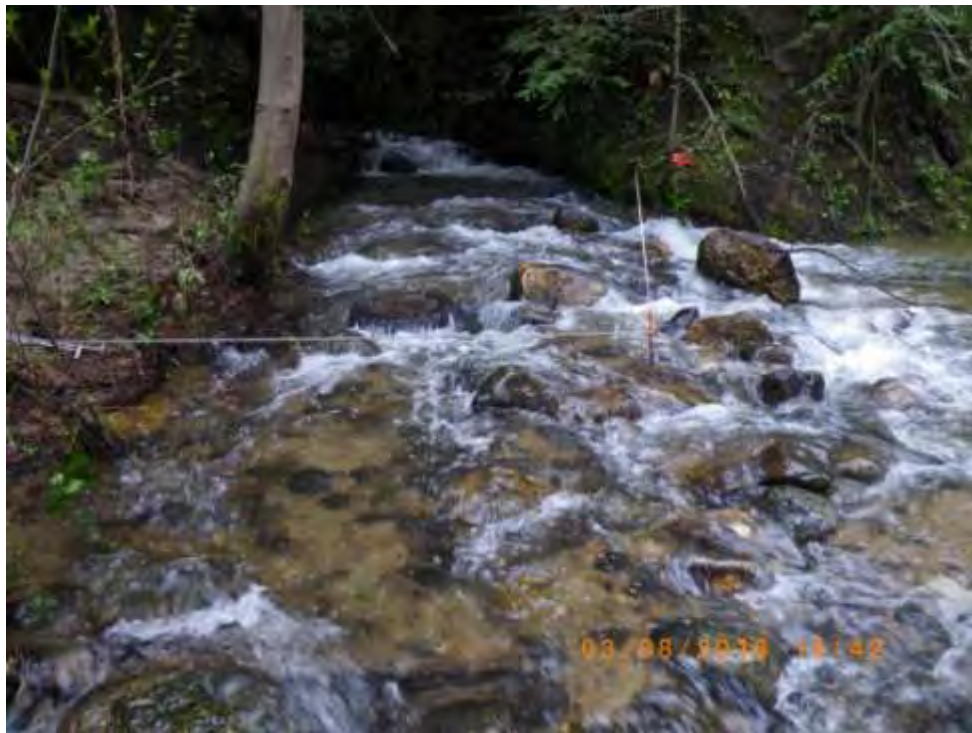
Critical Riffle #3; Transect #3; Water flowing right to left; **40.0 cfs** 15 March 2016



Critical Riffle #3; Transect #5; Water flowing top to bottom; **30.3 cfs** 17 March 2016



Critical Riffle #3; Transect #5; Water flowing left to right; **30.3 cfs**
 San Lorenzo flowing at **505** cfs at Big Trees 17 March 2016



Critical Riffle #3; Transect #3; Water flowing top to bottom; **24.2 cfs** 8 March 2016



Critical Riffle #3; Transect #3; Water flowing left to right; **24.2 cfs**
 San Lorenzo flowing at **732 cfs** at Big Trees 8 March 2016



Critical Riffle #3; Transect #5; Water flowing left to right; **16.7 cfs** 26 March 2016



Critical Riffle #3; Transect #5; Water flowing top to bottom; **16.7 cfs**
 San Lorenzo flowing at **193 cfs** at Big Trees 26 March 2016



Critical Riffle #3 (Michelsen); Fall Creek streamflow approximately **16 cfs**
 28 March 2016



Critical Riffle #3; Transect #5; Water flowing left to right; **14.9 cfs**
San Lorenzo flowing at **158 cfs** at Big Trees 29 March 2016



Critical Riffle #3; Transect #5; Water flowing top to bottom; **14.9 cfs** 29 March 2016



Critical Riffle #3; Transect #5; Water flowing left to right; **11.8 cfs**
 San Lorenzo flowing at **108 cfs** at Big Trees 4 April 2016



Critical Riffle #3; Transect #5; Water flowing left to right; **11.8 cfs** 4 April 2016



Critical Riffle #3; Transect #5; Water flowing right to left; **11.8 cfs** 4 April 2016



Critical Riffle #3; Transect #3; Water flowing right to left; **6.2 cfs**
San Lorenzo flowing at **48 cfs** at Big Trees 4 May 2016



Critical Riffle #3; Transect #3; Water flowing bottom to top; **6.2 cfs**

4 May 2016



Critical Riffle #3; Transect #3; Water flowing left to right; **6.2 cfs**

4 May 2016



Critical Riffle #3; Transect #5; Water flowing right to left; **6.2 cfs** 4 May 2016



Critical Riffle #3; Transect #5; Water flowing left to right; **6.2 cfs** 4 May 2016



Critical Riffle #3; Transect #5; Water flowing top to bottom; **6.2 cfs**

4 May 2016



Critical Riffle #3; Water flowing top to bottom; **approximately 2.7 cfs according to fish ladder weir**
San Lorenzo flowing at **42** cfs at Big Trees

26 March 2016



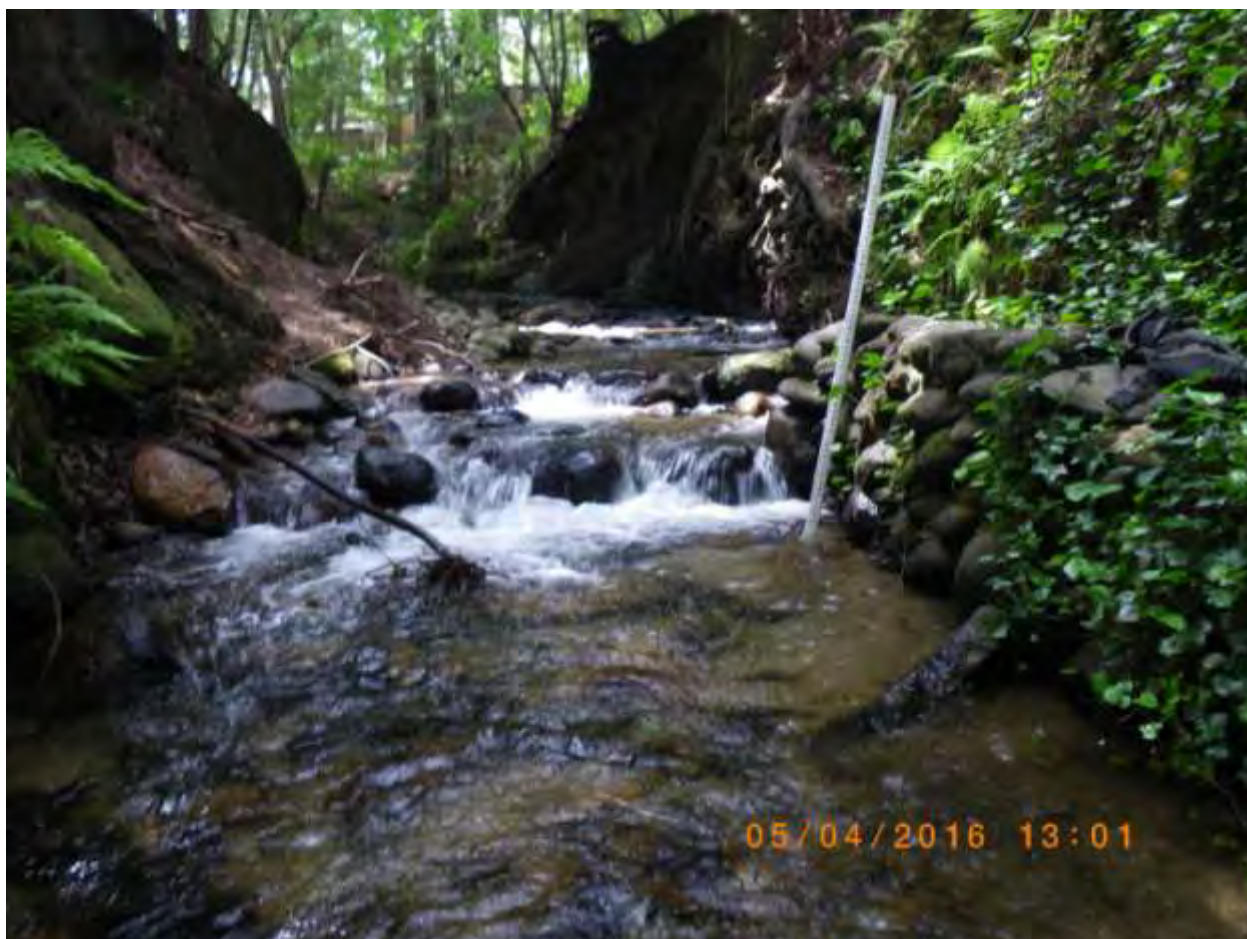
Critical Riffle #3; Water flowing top to bottom; **approximately 2.7 cfs according to fish ladder weir**
San Lorenzo flowing at **42** cfs at Big Trees

26 March 2016



Streamflow transect above CR-3 and below unnamed tributary; **6.2 cfs**

4 May 2016



Boulder cascade between creekmouth and Highway 9 (artificial wall on right); **6.2 cfs** 4 May 2016



Boulder cascade between creekmouth and Highway 9 (artificial wall on right); **6.2 cfs** 4 May 2016



Boulder cascade between creekmouth and Highway 9;
Artificial wall on left with water flowing left to right; **6.2 cfs** 4 May 2016



Fall Creek Fish Ladder; **53.1 cfs**

14 March 2016



Fall Creek Fish Ladder; **53.1 cfs**

14 March 2016





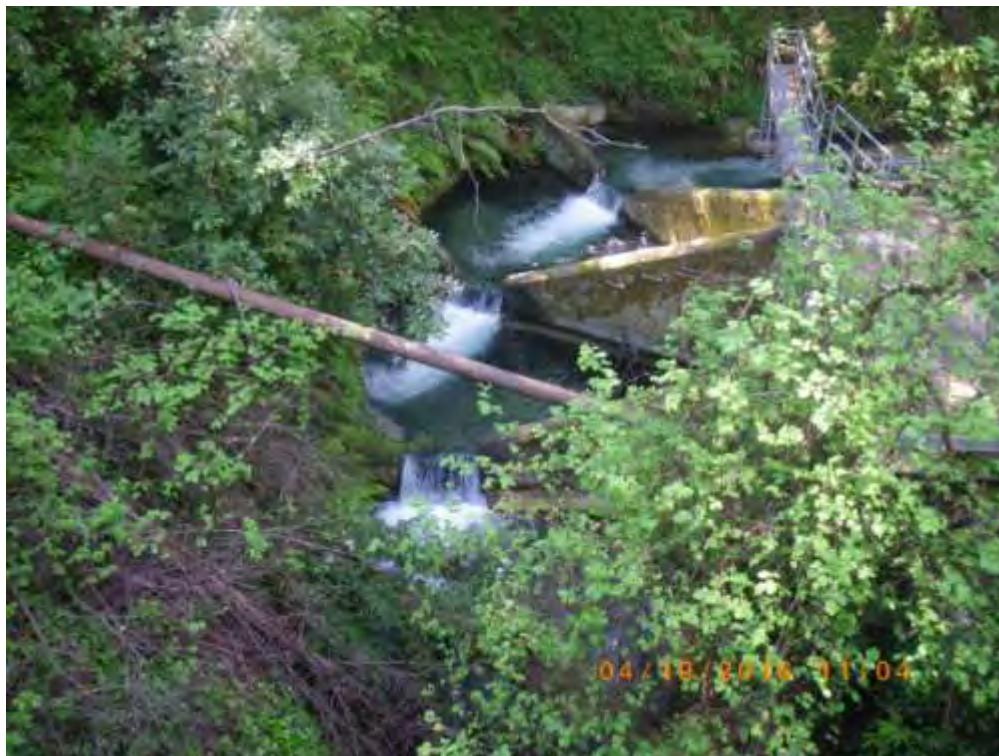
Fall Creek Fish Ladder; **44.1 cfs**

15 March 2016



Fall Creek Fish Ladder; **9.9 cfs**

4 April 2016



Fall Creek Fish Ladder; **8.0 cfs**

19 April 2016



Creek Fish Ladder; lower weir; **8.0 cfs**

19 April 2016

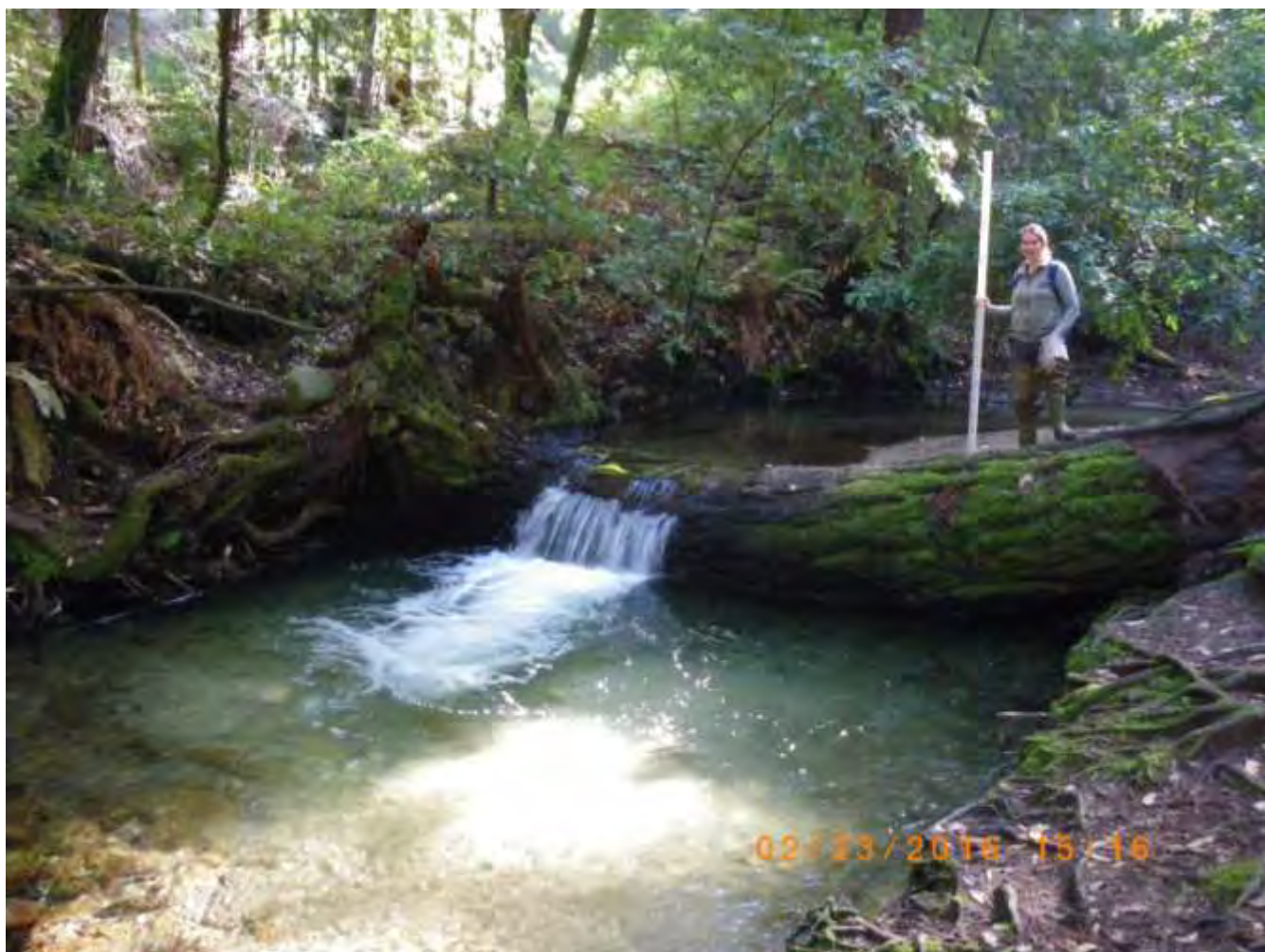


Creek Fish Ladder; upper weir; **8.0 cfs**

19 April 2016



Boulder Cascade before Douglas Fir falls; upstream of Fall Creek fish ladder; **approx. 2.5 cfs**
23 February 2016



Douglas Fir falls on Fall Creek- 1,310 feet upstream of fish ladder; **approx. 2.5 cfs** 23 February 2016



Douglas Fir falls on Fall Creek- 1,310 feet upstream of fish ladder; **approx. 2.5 cfs** 23 February 2016

**Appendix B1. Data Tables for Transect 1 (Critical Riffle 1) and Channel
Width Calculations at Various Depth Criteria.**

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder

Site Name: Fall 1

Riffle Name: R-1

Site Description: Below clearing in riparian

GPS: N37.05413; W122.07918

Coordinates: (acc. 8 m)

CRA

Sample Event No. (1-6) and targeted flow: 1- Middle flow

Critical Riffle Total Width hp to tp (ft): 28.15

Reference Discharge (cfs): 22.8 cfs

Meter number: 1

Notes: _____

Date: 3/8/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: _____

Staff Gage Start: 193 mm End: 193 mm

Time Start: 9:30 Time Stop: 9:57

LBWE: 1.0 RBWE: 28.0

Target Depth (ft):

% Usable:

Target Species 1		Target Species 2		Target Species 3	
0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
5.3%	5.3%	44.4%	10.7%	55.1%	17.8%

Station	Distance	Depth*	Width
1	1.0	OW	0.50
2	1.5	0.10	0.50
3	2.0	0.11	0.50
4	2.5	0.26	0.50
5	3.0	0.37	0.50
6	3.5	0.78	0.50
7	4.0	0.95	0.50
8	4.5	0.73	0.50
9	5.0	0.20	0.50
10	5.5	0.22	0.50
11	6.0	0.50	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5

12	6.5	0.55	0.50
13	7.0	0.59	0.50
14	7.5	0.62	0.50
15	8.0	0.56	0.50
16	8.5	0.66	0.50
17	9.0	0.34	0.50
18	9.5	0.52	0.50
19	10.0	0.50	0.50
20	10.5	0.53	0.50
21	11.0	0.10	0.50
22	11.5	0.15	0.50
23	12.0	0.10	0.50
24	12.5	0.14	0.50
25	13.0	0.37	0.50
26	13.5	0.36	0.50
27	14.0	0.16	0.50
28	14.5	0.26	0.50
29	15.0	0.23	0.50
30	15.5	0.16	0.50

		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5

Station	Distance	Depth	Width
31	16.0	0.06	0.50
32	16.5	0.10	0.50
33	17.0	0.10	0.50
34	17.5	0.46	0.50
35	18.0	0.47	0.50
36	18.5	0.28	0.50
37	19.0	0.48	0.50
38	19.5	0.62	0.50
39	20.0	0.67	0.50
40	20.5	0.46	0.50
41	21.0	0.55	0.50
42	21.5	0.57	0.50
43	22.0	0.38	0.50
44	22.5	0.26	0.50
45	23.0	0.44	0.50
46	23.5	0.40	0.50
47	24.0	0.42	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5

48	24.5	0.58	0.50
49	25.0	0.58	0.50
50	25.5	0.36	0.50
51	26.0	0.15	0.50
52	26.5	0.14	0.50
53	27.0	0.16	0.50
54	27.5	0.15	0.50
55	28.0	OW	0.00

		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	27.0	(ft) Width:	1.5	1.5	12.5	3.0	15.5	5.0
Maximum Transect Length**:	28.15	(ft) Percent:	5.3%	5.3%	44.4%	10.7%	55.1%	17.8%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder
 Site Name: Fall 1
 Riffle Name: R-1
 Site Description: Below clearing in riparian
 GPS Coordinate: N37.05413; W122.07918
 s: (acc. 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 1- Middle flow
 Critical Riffle Total Width hp to tp (ft): 28.15
 Reference Discharge (cfs): 22.8 cfs
 Meter number: 1

Date: 3/8/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner

Photo File Name: _____

Staff Gage Start: 193 mm End: 193 mm

Time Start: 9:30 Time Stop: 9:57

LBWE : 1.0 RBWE : 28.0

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
12.4 %	5.3%	32.0 %	10.7%	67.5 %	30.2 %

Station	Distance	Depth*	Width
1	1.0	OW	0.50
2	1.5	0.10	0.50
3	2.0	0.11	0.50
4	2.5	0.26	0.50
5	3.0	0.37	0.50
6	3.5	0.78	0.50
7	4.0	0.95	0.50
8	4.5	0.73	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
				0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5

9	5.0	0.20	0.50
10	5.5	0.22	0.50
11	6.0	0.50	0.50
12	6.5	0.55	0.50
13	7.0	0.59	0.50
14	7.5	0.62	0.50
15	8.0	0.56	0.50
16	8.5	0.66	0.50
17	9.0	0.34	0.50
18	9.5	0.52	0.50
19	10.0	0.50	0.50
20	10.5	0.53	0.50
21	11.0	0.10	0.50
22	11.5	0.15	0.50
23	12.0	0.10	0.50
24	12.5	0.14	0.50
25	13.0	0.37	0.50
26	13.5	0.36	0.50
27	14.0	0.16	0.50
28	14.5	0.26	0.50
29	15.0	0.23	0.50
30	15.5	0.16	0.50

				0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

Station	Distance	Depth	Width
31	16.0	0.06	0.50
32	16.5	0.10	0.50
33	17.0	0.10	0.50
34	17.5	0.46	0.50
35	18.0	0.47	0.50
36	18.5	0.28	0.50
37	19.0	0.48	0.50
38	19.5	0.62	0.50
39	20.0	0.67	0.50
40	20.5	0.46	0.50
41	21.0	0.55	0.50
42	21.5	0.57	0.50
43	22.0	0.38	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5

44	22.5	0.26	0.50
45	23.0	0.44	0.50
46	23.5	0.40	0.50
47	24.0	0.42	0.50
48	24.5	0.58	0.50
49	25.0	0.58	0.50
50	25.5	0.36	0.50
51	26.0	0.15	0.50
52	26.5	0.14	0.50
53	27.0	0.16	0.50
54	27.5	0.15	0.50
55	28.0	OW	0.00
56			0.00
57			0.00
58			0.00
59			0.00
60			0.00
61			0.00
62			0.00
63			0.00
64			0.00
65			0.00
66			0.00
67			0.00
68			0.00
69			0.00
70			0.00
71			0.00
72			0.00
73			0.00
74			0.00
75			0.00

Must manually select "COUNT" range for continuous cells

*OW = Out of Water

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder

Site Name: Fall 1

Riffle Name: R-1

Site Description: Below clearing in riparian

GPS Coordinates: N37.05413; W122.07918 (acc. 8 m)

CRA Sample Event No. (1-6) and targeted flow: 2- upper

Critical Riffle Total Width hp to tp (ft): 28.15

Reference Discharge (cfs): 53.1

Meter number: 1

Date: 3/14/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: 426 426

Staff Gage Start: mm End: mm

Time Start: 11:20 Time Stop: 11:44

LBWE: 0.6 RBWE: 28.75

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
49.7%	19.5%	78.2%	37.3%	85.3%	37.3%

Station	Distance	Depth*	Width
1	0.5	0.00	0.50
2	1.0	0.18	0.50
3	1.5	0.29	0.50
4	2.0	0.45	0.50
5	2.5	0.87	0.50
6	3.0	0.89	0.50
7	3.5	1.07	0.50
8	4.0	1.10	0.50
9	4.5	1.10	0.50
10	5.0	0.42	0.50
11	5.5	0.53	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5

12	6.0	0.72	0.50
13	6.5	0.70	0.50
14	7.0	0.73	0.50
15	7.5	0.96	0.50
16	8.0	0.77	0.50
17	8.5	0.92	0.50
18	9.0	0.72	0.50
19	9.5	0.81	0.50
20	10.0	0.83	0.50
21	10.5	0.79	0.50
22	11.0	0.71	0.50
23	11.5	0.66	0.50
24	12.0	0.42	0.50
25	12.5	0.27	0.50
26	13.0	0.56	0.50
27	13.5	0.51	0.50
28	14.0	0.34	0.50
29	14.5	0.48	0.50
30	15.0	0.41	0.50

Station	Distance	Depth	Width
31	15.5	0.35	0.50
32	16.0	0.28	0.50
33	16.5	0.40	0.50
34	17.0	0.35	0.50
35	17.5	0.65	0.50
36	18.0	0.76	0.50
37	18.5	0.72	0.50
38	19.0	0.92	0.50
39	19.5	0.80	0.50
40	20.0	0.86	0.50
41	20.5	0.45	0.50
42	21.0	0.71	0.50
43	21.5	0.72	0.50
44	22.0	0.64	0.50
45	22.5	0.55	0.50
46	23.0	0.78	0.50
47	23.5	0.79	0.50

0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5

48	24.0	0.72	0.50
49	24.5	0.76	0.50
50	25.0	0.80	0.50
51	25.5	0.61	0.50
52	26.0	0.45	0.50
53	26.5	0.38	0.50
54	27.0	0.23	0.50
55	27.5	0.26	0.50
56	28.0	0.25	0.50
57	28.5	0.12	0.25
58	28.75	0.00	0.00

0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	28.15	(ft) Width:	14.0	5.5	22.0	10.5	24.0	10.5
Maximum Transect Length**:	28.15	(ft) Percent:	49.7%	19.5%	78.2%	37.3%	85.3%	37.3%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder
 Site Name: Fall 1
 Riffle Name: R-1
 Site Description: Below clearing in riparian
 GPS Coordinates: N37.05413; W122.07918
 (acc. 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 2- upper
 Critical Riffle Total Width hp to tp (ft): 28.15
 Reference Discharge (cfs): 53.1
 Meter number: 1

Date: 3/14/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner
 Photo File Name: _____
 Staff Gage Start: 426 mm End: 426 mm

Time Start: 11:20 Time Stop: 11:44

LBWE: 0.6 RBWE: 28.75

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total		Total		Total	
Cont.		Cont.		Cont.	
56.8%		63.9%		95.9%	
21.3%		23.1%		95.9%	

Station	Distance	Depth*	Width
1	0.5	0.00	0.50
2	1.0	0.18	0.50
3	1.5	0.29	0.50
4	2.0	0.45	0.50
5	2.5	0.87	0.50
6	3.0	0.89	0.50
7	3.5	1.07	0.50
8	4.0	1.10	0.50
9	4.5	1.10	0.50
10	5.0	0.42	0.50
11	5.5	0.53	0.50
12	6.0	0.72	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
				0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5

13	6.5	0.70	0.50
14	7.0	0.73	0.50
15	7.5	0.96	0.50
16	8.0	0.77	0.50
17	8.5	0.92	0.50
18	9.0	0.72	0.50
19	9.5	0.81	0.50
20	10.0	0.83	0.50
21	10.5	0.79	0.50
22	11.0	0.71	0.50
23	11.5	0.66	0.50
24	12.0	0.42	0.50
25	12.5	0.27	0.50
26	13.0	0.56	0.50
27	13.5	0.51	0.50
28	14.0	0.34	0.50
29	14.5	0.48	0.50
30	15.0	0.41	0.50

0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

Station	Distance	Depth	Width
31	15.5	0.35	0.50
32	16.0	0.28	0.50
33	16.5	0.40	0.50
34	17.0	0.35	0.50
35	17.5	0.65	0.50
36	18.0	0.76	0.50
37	18.5	0.72	0.50
38	19.0	0.92	0.50
39	19.5	0.80	0.50
40	20.0	0.86	0.50
41	20.5	0.45	0.50
42	21.0	0.71	0.50
43	21.5	0.72	0.50
44	22.0	0.64	0.50
45	22.5	0.55	0.50
46	23.0	0.78	0.50
47	23.5	0.79	0.50
48	24.0	0.72	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
				0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5

49	24.5	0.76	0.50
50	25.0	0.80	0.50
51	25.5	0.61	0.50
52	26.0	0.45	0.50
53	26.5	0.38	0.50
54	27.0	0.23	0.50
55	27.5	0.26	0.50
56	28.0	0.25	0.50
57	28.5	0.12	0.25
58	28.75	0.00	0.00

0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	28.15	(ft) Width:	16.0	6.0	18.0	6.5	27.0	27.0
Maximum Transect Length**:	28.15	(ft) Percent:	56.8%	21.3%	63.9%	23.1%	95.9%	95.9%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder
 Site Name: Fall 1
 Riffle Name: R-1
 Site Description: Below clearing in riparian
 GPS Coordinates: N37.05413; W122.07918
 (acc. 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 3- upper middle
 Critical Riffle Total Width hp to tp (ft): 28.15 ft
 Reference Discharge (cfs): 44.1
 Meter number: 1

Date: 3/15/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner
 Photo File Name: _____
 Staff Gage Start: 412 mm End: 412 mm

Time Start: 8:58 Time Stop: 9:23

LBWE: 0.7 RBWE: 28.7

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total		Total		Total	
Cont.		Cont.		Cont.	
24.9%		65.7%		81.7%	
8.9%		28.4%		37.3%	

Station	Distance	Depth*	Width
1	0.5	0.00	0.50
2	1.0	0.12	0.50
3	1.5	0.28	0.50
4	2.0	0.22	0.50
5	2.5	0.40	0.50
6	3.0	0.45	0.50
7	3.5	0.91	0.50
8	4.0	0.95	0.50
9	4.5	1.00	0.50
10	5.0	0.99	0.50
11	5.5	0.39	0.50
12	6.0	0.65	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5

13	6.5	0.70	0.50
14	7.0	0.75	0.50
15	7.5	0.79	0.50
16	8.0	0.70	0.50
17	8.5	0.77	0.50
18	9.0	0.61	0.50
19	9.5	0.63	0.50
20	10.0	0.68	0.50
21	10.5	0.60	0.50
22	11.0	0.55	0.50
23	11.5	0.35	0.50
24	12.0	0.44	0.50
25	12.5	0.23	0.50
26	13.0	0.45	0.50
27	13.5	0.50	0.50
28	14.0	0.28	0.50
29	14.5	0.41	0.50
30	15.0	0.36	0.50

0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5

Station	Distance	Depth	Width
31	15.5	0.28	0.50
32	16.0	0.22	0.50
33	16.5	0.35	0.50
34	17.0	0.27	0.50
35	17.5	0.30	0.50
36	18.0	0.57	0.50
37	18.5	0.40	0.50
38	19.0	0.67	0.50
39	19.5	0.78	0.50
40	20.0	0.78	0.50
41	20.5	0.55	0.50
42	21.0	0.70	0.50
43	21.5	0.69	0.50
44	22.0	0.66	0.50
45	22.5	0.48	0.50
46	23.0	0.68	0.50
47	23.5	0.63	0.50
48	24.0	0.59	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5

49	24.5	0.72	0.50
50	25.0	0.70	0.50
51	25.5	0.56	0.50
52	26.0	0.35	0.50
53	26.5	0.39	0.50
54	27.0	0.36	0.50
55	27.5	0.37	0.50
56	28.0	0.17	0.50
57	28.5	0.05	0.20
58	28.70	0.00	0.00

0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	28.0	(ft) Width:	7.0	2.5	18.5	8.0	23.0	10.5
Maximum Transect Length**:	28.15	(ft) Percent:	24.9%	8.9%	65.7%	28.4%	81.7%	37.3%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder
 Site Name: Fall 1
 Riffle Name: R-1
 Site Description: Below clearing in riparian
 GPS Coordinates: N37.05413; W122.07918
 (acc. 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 3- upper middle
 Critical Riffle Total Width hp to tp (ft): 28.15 ft
 Reference Discharge (cfs): 44.1
 Meter number: 1

Date: 3/15/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner
 Photo File Name: _____
 Staff Gage Start: 412 mm End: 412 mm

Time Start: 8:58 Time Stop: 9:23

LBWE: 0.7 RBWE: 28.7

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total		Total		Total	
Cont.		Cont.		Cont.	
42.6%		53.3%		94.1%	
17.8%		19.5%		94.1%	

Station	Distance	Depth*	Width
1	0.5	0.00	0.50
2	1.0	0.12	0.50
3	1.5	0.28	0.50
4	2.0	0.22	0.50
5	2.5	0.40	0.50
6	3.0	0.45	0.50
7	3.5	0.91	0.50
8	4.0	0.95	0.50
9	4.5	1.00	0.50
10	5.0	0.99	0.50
11	5.5	0.39	0.50
12	6.0	0.65	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
				0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5

13	6.5	0.70	0.50
14	7.0	0.75	0.50
15	7.5	0.79	0.50
16	8.0	0.70	0.50
17	8.5	0.77	0.50
18	9.0	0.61	0.50
19	9.5	0.63	0.50
20	10.0	0.68	0.50
21	10.5	0.60	0.50
22	11.0	0.55	0.50
23	11.5	0.35	0.50
24	12.0	0.44	0.50
25	12.5	0.23	0.50
26	13.0	0.45	0.50
27	13.5	0.50	0.50
28	14.0	0.28	0.50
29	14.5	0.41	0.50
30	15.0	0.36	0.50

0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

Station	Distance	Depth	Width
31	15.5	0.28	0.50
32	16.0	0.22	0.50
33	16.5	0.35	0.50
34	17.0	0.27	0.50
35	17.5	0.30	0.50
36	18.0	0.57	0.50
37	18.5	0.40	0.50
38	19.0	0.67	0.50
39	19.5	0.78	0.50
40	20.0	0.78	0.50
41	20.5	0.55	0.50
42	21.0	0.70	0.50
43	21.5	0.69	0.50
44	22.0	0.66	0.50
45	22.5	0.48	0.50
46	23.0	0.68	0.50
47	23.5	0.63	0.50
48	24.0	0.59	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
				0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5

49	24.5	0.72	0.50
50	25.0	0.70	0.50
51	25.5	0.56	0.50
52	26.0	0.35	0.50
53	26.5	0.39	0.50
54	27.0	0.36	0.50
55	27.5	0.37	0.50
56	28.0	0.17	0.50
57	28.5	0.05	0.20
58	28.70	0.00	0.00

0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	28.0	(ft) Width:	12.0	5.0	15.0	5.5	26.5	26.5
Maximum Transect Length**:	28.15	(ft) Percent:	42.6%	17.8%	53.3%	19.5%	94.1%	94.1%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder
 Site Name: Fall 1
 Riffle Name: R-1
 Site Description: Below clearing in riparian
 GPS: N37.05413; W122.07918
 Coordinates: (acc. 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 4- middle
 Critical Riffle Total Width hp to tp (ft): 28.15
 Reference Discharge (cfs): 16.0
 Meter number: 1

Date: 3/26/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner
 Photo File Name: _____
 Staff Gage Start: 330 mm End: 330 mm

Time Start: 9:04 Time Stop: 9:25

LBWE: 2.0 RBWE: 27.5

Target Species Depth Criteria (ft):

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
5.3%	5.3%	32.0%	10.7%	48.0%	17.8%

% Usable:

Station	Distance	Depth*	Width
1	2.0	0.00	0.50
2	2.5	0.15	0.50
3	3.0	0.25	0.50
4	3.5	0.75	0.50
5	4.0	0.74	0.50
6	4.5	0.70	0.50
7	5.0	0.16	0.50
8	5.5	0.16	0.50
9	6.0	0.40	0.50
10	6.5	0.43	0.50
11	7.0	0.46	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5

12	7.5	0.52	0.50
13	8.0	0.40	0.50
14	8.5	0.56	0.50
15	9.0	0.35	0.50
16	9.5	0.39	0.50
17	10.0	0.41	0.50
18	10.5	0.35	0.50
19	11.0	0.02	0.50
20	11.5	0.06	0.50
21	12.0	0.14	0.50
22	12.5	0.09	0.50
23	13.0	0.31	0.50
24	13.5	0.38	0.50
25	14.0	0.15	0.50
26	14.5	0.20	0.50
27	15.0	0.17	0.50
28	15.5	0.10	0.50
29	16.0	0.01	0.50
30	16.5	0.06	0.50

		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

Station	Distance	Depth	Width
31	17.0	0.05	0.50
32	17.5	0.15	0.50
33	18.0	0.34	0.50
34	18.5	0.26	0.50
35	19.0	0.45	0.50
36	19.5	0.58	0.50
37	20.0	0.60	0.50
38	20.5	0.21	0.50
39	21.0	0.40	0.50
40	21.5	0.40	0.50
41	22.0	0.36	0.50
42	22.5	0.23	0.50
43	23.0	0.43	0.50
44	23.5	0.25	0.50
45	24.0	0.41	0.50
46	24.5	0.40	0.50
47	25.0	0.30	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5

48	25.5	0.36	0.50
49	26.0	0.07	0.50
50	26.5	0.07	0.50
51	27.0	0.16	0.50
52	27.5	0.00	0.00

				0.5	0.5

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	25.5	(ft) Width:	1.5	1.5	9.0	3.0	13.5	5.0
Maximum Transect Length**:	28.15	(ft) Percent:	5.3%	5.3%	32.0%	10.7%	48.0%	17.8%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder
 Site Name: Fall 1
 Riffle Name: R-1
 Site Description: Below clearing in riparian
 GPS: N37.05413; W122.07918
 Coordinates: (acc. 8 m)
 CRA
 Sample Event No. (1-6) and targeted flow: 4- middle
 Critical Riffle Total Width hp to tp (ft): 28.15
 Reference Discharge (cfs): 16.0
 Meter number: 1

Date: 3/26/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner
 Photo File Name:
 Staff Gage Start: 330 mm End: 330 mm

Time Start: 9:04 Time Stop: 9:25

LBWE: 2.0 RBWE: 27.5

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
7.1%	5.3%	12.4%	5.3%	58.6%	28.4%

Station	Distance	Depth*	Width
1	2.0	0.00	0.50
2	2.5	0.15	0.50
3	3.0	0.25	0.50
4	3.5	0.75	0.50
5	4.0	0.74	0.50
6	4.5	0.70	0.50
7	5.0	0.16	0.50
8	5.5	0.16	0.50
9	6.0	0.40	0.50
10	6.5	0.43	0.50
11	7.0	0.46	0.50
12	7.5	0.52	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5

13	8.0	0.40	0.50
14	8.5	0.56	0.50
15	9.0	0.35	0.50
16	9.5	0.39	0.50
17	10.0	0.41	0.50
18	10.5	0.35	0.50
19	11.0	0.02	0.50
20	11.5	0.06	0.50
21	12.0	0.14	0.50
22	12.5	0.09	0.50
23	13.0	0.31	0.50
24	13.5	0.38	0.50
25	14.0	0.15	0.50
26	14.5	0.20	0.50
27	15.0	0.17	0.50
28	15.5	0.10	0.50
29	16.0	0.01	0.50
30	16.5	0.06	0.50

				0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

Station	Distance	Depth	Width
31	17.0	0.05	0.50
32	17.5	0.15	0.50
33	18.0	0.34	0.50
34	18.5	0.26	0.50
35	19.0	0.45	0.50
36	19.5	0.58	0.50
37	20.0	0.60	0.50
38	20.5	0.21	0.50
39	21.0	0.40	0.50
40	21.5	0.40	0.50
41	22.0	0.36	0.50
42	22.5	0.23	0.50
43	23.0	0.43	0.50
44	23.5	0.25	0.50
45	24.0	0.41	0.50
46	24.5	0.40	0.50
47	25.0	0.30	0.50
48	25.5	0.36	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
				0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

49	26.0	0.07	0.50
50	26.5	0.07	0.50
51	27.0	0.16	0.50
52	27.5	0.00	0.00

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	25.5	(ft) Width:	2.0	1.5	3.5	1.5	16.5	8.0
Maximum Transect Length**:	28.15	(ft) Percent:	7.1%	5.3%	12.4%	5.3%	58.6%	28.4%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder

Site Name: Fall 1

Riffle Name: R-1

Site Description: Below clearing in riparian

GPS: N37.05413; W122.07918

Coordinates: (acc. 8 m)

CRA Sample Event No. (1-6) and targeted flow: 5- middle

Critical Riffle Total Width hp to tp (ft): 28.15

Reference Discharge (cfs): 15.1

Meter number: 1

Date: 3/19/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: _____

Staff Gage Start: 329 mm End: 329 mm

Time Start: 8:44 Time Stop: 9:05

LBWE: 2.2 RBWE: 27.4

Target Species Depth Criteria (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
0.0%	0.0%	16.0%	5.3%	37.3%	12.4%

Station	Distance	Depth*	Width
1	2.0	0.00	0.50
2	2.5	0.06	0.50
3	3.0	0.10	0.50
4	3.5	0.62	0.50
5	4.0	0.67	0.50
6	4.5	0.66	0.50
7	5.0	0.10	0.50
8	5.5	0.09	0.50
9	6.0	0.34	0.50
10	6.5	0.37	0.50
11	7.0	0.36	0.50
12	7.5	0.48	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5

13	8.0	0.40	0.50
14	8.5	0.47	0.50
15	9.0	0.35	0.50
16	9.5	0.26	0.50
17	10.0	0.36	0.50
18	10.5	0.28	0.50
19	11.0	0.03	0.50
20	11.5	0.03	0.50
21	12.0	0.06	0.50
22	12.5	0.12	0.50
23	13.0	0.28	0.50
24	13.5	0.36	0.50
25	14.0	0.13	0.50
26	14.5	0.10	0.50
27	15.0	0.13	0.50
28	15.5	0.09	0.50
29	16.0	0.00	0.50
30	16.5	0.00	0.50

		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

Station	Distance	Depth	Width
31	17.0	0.02	0.50
32	17.5	0.10	0.50
33	18.0	0.30	0.50
34	18.5	0.20	0.50
35	19.0	0.26	0.50
36	19.5	0.40	0.50
37	20.0	0.48	0.50
38	20.5	0.20	0.50
39	21.0	0.39	0.50
40	21.5	0.40	0.50
41	22.0	0.29	0.50
42	22.5	0.20	0.50
43	23.0	0.25	0.50
44	23.5	0.17	0.50
45	24.0	0.34	0.50
46	24.5	0.30	0.50
47	25.0	0.31	0.50
48	25.5	0.34	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

49	26.0	0.05	0.50
50	26.5	0.09	0.50
51	27.0	0.06	0.40
52	27.4	0.00	0.00

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	25.20	(ft) Width:	0.0	0.0	4.5	1.5	10.5	3.5
Maximum Transect Length**:	28.15	(ft) Percent:	0.0%	0.0%	16.0%	5.3%	37.3%	12.4%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder
 Site Name: Fall 1
 Riffle Name: R-1
 Site Description: Below clearing in riparian
 GPS: N37.05413; W122.07918
 Coordinates: (acc. 8 m)
 CRA
 Sample Event No. (1-6) and targeted flow: 5- middle
 Critical Riffle Total Width hp to tp (ft): 28.15
 Reference Discharge (cfs): 15.1
 Meter number: 1

Date: 3/19/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner
 Photo File Name:
 Staff Gage Start: 329 mm End: 329 mm

Time Start: 8:44 Time Stop: 9:05

LBWE: 2.2 RBWE: 27.4

Target Species Depth Criteria (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
5.3%	5.3%	5.3%	5.3%	53.3%	19.5%

Station	Distance	Depth*	Width
1	2.0	0.00	0.50
2	2.5	0.06	0.50
3	3.0	0.10	0.50
4	3.5	0.62	0.50
5	4.0	0.67	0.50
6	4.5	0.66	0.50
7	5.0	0.10	0.50
8	5.5	0.09	0.50
9	6.0	0.34	0.50
10	6.5	0.37	0.50
11	7.0	0.36	0.50
12	7.5	0.48	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

13	8.0	0.40	0.50
14	8.5	0.47	0.50
15	9.0	0.35	0.50
16	9.5	0.26	0.50
17	10.0	0.36	0.50
18	10.5	0.28	0.50
19	11.0	0.03	0.50
20	11.5	0.03	0.50
21	12.0	0.06	0.50
22	12.5	0.12	0.50
23	13.0	0.28	0.50
24	13.5	0.36	0.50
25	14.0	0.13	0.50
26	14.5	0.10	0.50
27	15.0	0.13	0.50
28	15.5	0.09	0.50
29	16.0	0.00	0.50
30	16.5	0.00	0.50

				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

Station	Distance	0.02	Width
31	17.0	0.02	0.50
32	17.5	0.10	0.50
33	18.0	0.30	0.50
34	18.5	0.20	0.50
35	19.0	0.26	0.50
36	19.5	0.40	0.50
37	20.0	0.48	0.50
38	20.5	0.20	0.50
39	21.0	0.39	0.50
40	21.5	0.40	0.50
41	22.0	0.29	0.50
42	22.5	0.20	0.50
43	23.0	0.25	0.50
44	23.5	0.17	0.50
45	24.0	0.34	0.50
46	24.5	0.30	0.50
47	25.0	0.31	0.50
48	25.5	0.34	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

49	26.0	0.05	0.50
50	26.5	0.09	0.50
51	27.0	0.06	0.40
52	27.4	0.00	0.00

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	25.2	(ft) Width:	1.5	1.5	1.5	1.5	15.0	5.5
Maximum Transect Length**:	28.15	(ft) Percent:	5.3%	5.3%	5.3%	5.3%	53.3%	19.5%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder
 Site Name: Fall 1
 Riffle Name: R-1
 Site Description: Below clearing in riparian
 GPS: N37.05413; W122.07918
 Coordinates: (acc. 8 m)
 CRA
 Sample Event No. (1-6) and targeted flow: 6- low middle
 Critical Riffle Total Width hp to tp (ft): 28.15
 Reference Discharge (cfs): 9.9
 Meter number: 1

Date: 4/4/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner
 Photo File Name: P1,2,3
 Staff Gage Start: 310 mm End: 310 mm

Time Start: 8:55 Time Stop: 9:21

LBWE: 2.2 RBWE: 27.0

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
0.0%	0.0%	12.4%	5.3%	33.7%	12.4%

Station	Distance	Depth*	Width
1	2.0	0.00	0.50
2	2.5	0.04	0.50
3	3.0	0.06	0.50
4	3.5	0.52	0.50
5	4.0	0.65	0.50
6	4.5	0.62	0.50
7	5.0	0.05	0.50
8	5.5	0.06	0.50
9	6.0	0.32	0.50
10	6.5	0.36	0.50
11	7.0	0.35	0.50
12	7.5	0.43	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
		0.5	0.5	0.5	0.5

13	8.0	0.31	0.50
14	8.5	0.41	0.50
15	9.0	0.32	0.50
16	9.5	0.16	0.50
17	10.0	0.26	0.50
18	10.5	0.23	0.50
19	11.0	0.01	0.50
20	11.5	0.03	0.50
21	12.0	0.01	0.50
22	12.5	0.08	0.50
23	13.0	0.27	0.50
24	13.5	0.33	0.50
25	14.0	0.10	0.50
26	14.5	0.11	0.50
27	15.0	0.12	0.50
28	15.5	0.03	0.50
29	16.0	0.00	0.50
30	16.5	0.00	0.50

				0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5

Station	Distance	Depth	Width
31	17.0	0.00	0.50
32	17.5	0.02	0.50
33	18.0	0.30	0.50
34	18.5	0.21	0.50
35	19.0	0.23	0.50
36	19.5	0.41	0.50
37	20.0	0.48	0.50
38	20.5	0.17	0.50
39	21.0	0.36	0.50
40	21.5	0.24	0.50
41	22.0	0.26	0.50
42	22.5	0.14	0.50
43	23.0	0.37	0.50
44	23.5	0.19	0.50
45	24.0	0.34	0.50
46	24.5	0.32	0.50
47	25.0	0.27	0.50
48	25.5	0.31	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

49	26.0	0.02	0.50
50	26.5	0.03	0.50
51	27.0	0.00	0.00

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	24.80	(ft) Width:	0.0	0.0	3.5	1.5	9.5	3.5
Maximum Transect Length**:	28.15	(ft) Percent:	0.0%	0.0%	12.4%	5.3%	33.7%	12.4%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder

Site Name: Fall 1

Riffle Name: R-1

Site Description: Below clearing in riparian

GPS: N37.05413; W122.07918

Coordinates: (acc. 8 m)

CRA

Sample Event No. (1-6) and targeted flow: 6- low middle

Critical Riffle Total Width hp to tp (ft): 28.15

Reference Discharge (cfs): 9.9

Meter number: 1

Date: 4/4/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: P1,2,3

Staff Gage Start: 310 mm End: 310 mm

Time Start: 8:55 Time Stop: 9:21

LBWE: 2.2 RBWE: 27.0

Target Species Depth Criteria (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
3.6%	3.6%	5.3%	5.3%	48.0%	12.4%

Station	Distance	Depth*	Width
1	2.0	0.00	0.50
2	2.5	0.04	0.50
3	3.0	0.06	0.50
4	3.5	0.52	0.50
5	4.0	0.65	0.50
6	4.5	0.62	0.50
7	5.0	0.05	0.50
8	5.5	0.06	0.50
9	6.0	0.32	0.50
10	6.5	0.36	0.50
11	7.0	0.35	0.50
12	7.5	0.43	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

13	8.0	0.31	0.50
14	8.5	0.41	0.50
15	9.0	0.32	0.50
16	9.5	0.16	0.50
17	10.0	0.26	0.50
18	10.5	0.23	0.50
19	11.0	0.01	0.50
20	11.5	0.03	0.50
21	12.0	0.01	0.50
22	12.5	0.08	0.50
23	13.0	0.27	0.50
24	13.5	0.33	0.50
25	14.0	0.10	0.50
26	14.5	0.11	0.50
27	15.0	0.12	0.50
28	15.5	0.03	0.50
29	16.0	0.00	0.50
30	16.5	0.00	0.50

				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

Station	Distance	Depth	Width
31	17.0	0.00	0.50
32	17.5	0.02	0.50
33	18.0	0.30	0.50
34	18.5	0.21	0.50
35	19.0	0.23	0.50
36	19.5	0.41	0.50
37	20.0	0.48	0.50
38	20.5	0.17	0.50
39	21.0	0.36	0.50
40	21.5	0.24	0.50
41	22.0	0.26	0.50
42	22.5	0.14	0.50
43	23.0	0.37	0.50
44	23.5	0.19	0.50
45	24.0	0.34	0.50
46	24.5	0.32	0.50
47	25.0	0.27	0.50
48	25.5	0.31	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

49	26.0	0.02	0.50
50	26.5	0.03	0.50
51	27.0	0.00	0.00

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	24.8	(ft) Width:	1.0	1.0	1.5	1.5	13.5	3.5
Maximum Transect Length**:	28.15	(ft) Percent:	3.6%	3.6%	5.3%	5.3%	48.0%	12.4%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder
 Site Name: Fall 1
 Riffle Name: R-1
 Site Description: Below clearing in riparian
 GPS Coordinates: N37.05413; W122.07918
 : (acc. 8 m)
 CRA Event No. (1-6) and targeted flow: 7- low
 Critical Riffle Total Width hp to tp (ft): 28.15
 Reference Discharge (cfs): 8
 Meter number: 1

Date: 4/19/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner
 Photo File Name: _____
 Staff Gage Start: 269 mm End: 269 mm
 Time Start: 9:38 Time Stop: 10:00

LBWE : 3.0 RBWE : 26.0

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
0.0%	0.0%	7.1%	5.3%	16.0%	5.3%

Station	Distance	Depth *	Width
1	3.0	0.00	0.50
2	3.5	0.40	0.50
3	4.0	0.52	0.50
4	4.5	0.46	0.50
5	5.0	0.01	0.50
6	5.5	0.005	0.50
7	6.0	0.19	0.50
8	6.5	0.20	0.50
9	7.0	0.25	0.50
10	7.5	0.32	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5

47	26.0	0.00	0.00						
----	------	------	------	--	--	--	--	--	--

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	23.0	(ft) Width:	0.0	0.0	2.0	1.5	4.5	1.5
Maximum Transect Length**:	28.15	(ft) Percent	0.0%	0.0%	7.1%	5.3%	16.0%	5.3%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek - Below Fish Ladder
 Site Name: Fall 1
 Riffle Name: R-1
 Site Description: Below clearing in riparian
 GPS Coordinates: N37.05413; W122.07918 (acc. 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 7- low
 Critical Riffle Total Width hp to tp (ft): 28.15
 Reference Discharge (cfs): 8
 Meter number: 1

Date: 4/19/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner
 Photo File Name: _____
 Staff Gage Start: 269 mm End: 269 mm

Time Start: 9:38 Time Stop: 10:00

LBWE: 3.0 RBWE: 26.0

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
0.0%	0.0%	1.8%	1.8%	32.0%	8.9%

Station	Distance	Depth*	Width
1	3.0	0.00	0.50
2	3.5	0.40	0.50
3	4.0	0.52	0.50
4	4.5	0.46	0.50
5	5.0	0.01	0.50
6	5.5	0.005	0.50
7	6.0	0.19	0.50
8	6.5	0.20	0.50
9	7.0	0.25	0.50
10	7.5	0.32	0.50
11	8.0	0.22	0.50
12	8.5	0.34	0.50

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
		0.5	0.5	0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

13	9.0	0.17	0.50
14	9.5	0.15	0.50
15	10.0	0.15	0.50
16	10.5	0.18	0.50
17	11.0	0.00	0.50
18	11.5	0.01	0.50
19	12.0	0.00	0.50
20	12.5	0.01	0.50
21	13.0	0.20	0.50
22	13.5	0.22	0.50
23	14.0	0.06	0.50
24	14.5	0.03	0.50
25	15.0	0.07	0.50
26	15.5	0.00	0.50
27	16.0	0.00	0.50
28	16.5	0.00	0.50
29	17.0	0.00	0.50
30	17.5	0.00	0.50

				0.5	0.5
				0.5	0.5

Station	Distance	Depth	Width
31	18.0	0.22	0.50
32	18.5	0.17	0.50
33	19.0	0.16	0.50
34	19.5	0.30	0.50
35	20.0	0.40	0.50
36	20.5	0.15	0.50
37	21.0	0.30	0.50
38	21.5	0.23	0.50
39	22.0	0.20	0.50
40	22.5	0.10	0.50
41	23.0	0.30	0.50
42	23.5	0.14	0.50
43	24.0	0.16	0.50
44	24.5	0.22	0.50
45	25.0	0.19	0.50
46	25.5	0.12	0.50
47	26.0	0.00	0.00

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5
				0.5	0.5

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	23.0	(ft) Width:	0.0	0.0	0.5	0.5	9.0	2.5
Maximum Transect Length**:	28.15	(ft) Percent:	0.0%	0.0%	1.8%	1.8%	32.0%	8.9%

Critical Riffle Analysis for Fish Passage in California
Standard Operating Procedure DFG-IFP-001
Cumulative Calculations and Linear Regression Details

Location: Fall Creek - Below Fish Ladder

Site Name: Fall Riffle # 1

Riffle Name: Transect #1

Site Description: Below clearing in riparian

GPS Coordinates: N37.05413; W122.07918 (acc. 8 m)

Date: 4/26/2016

Data Entry Staff: Alley

Depth Criteria

0.7 ft	0.4 ft	0.3 ft
--------	--------	--------

Event	Flow (cfs)	Percent Total (0.7)	Percent Total (0.4)	Percent Total (0.3)
1	22.8	5.3	44.4	55.1
2	53.1	49.7	78.2	85.3
3	44.1	24.9	65.7	81.7
4	16	5.3	32	48
5	15	0	16	37.3
6	9.9	0	12.4	33.7
7	8	0	7.1	16

Event	Flow (cfs)	Percent Cont.(0.7)	Percent Cont.(0.4)	Percent Cont.(0.3)
1	22.8	5.3	10.7	17.8
2	53.1	19.5	37.3	37.3
3	44.1	8.9	28.4	37.3
4	16	5.3	10.7	17.8
5	15	0	5.3	12.4
6	9.9	0	5.3	12.4
7	8	0	5.3	5.3

Flow (cfs)	Percent Total (0.4)
22.8	44.4
53.1	78.2
44.1	65.7
16	32
15	16
9.9	12.4
8	7.1

Flow (cfs)	Percent Total (0.3)
22.8	55.1
53.1	85.3
44.1	81.7
16	48
15	37.3
9.9	33.7
8	16

Flow (cfs)	Percent Cont. (0.4)
22.8	10.7
53.1	37.3
44.1	28.4
16	10.7
15	5.3
9.9	5.3
8	5.3

Flow (cfs)	Percent Cont. (0.3)
22.8	17.8
53.1	37.3
44.1	37.3
16	17.8
15	12.4
9.9	12.4
8	5.3

Critical Riffle Analysis for Fish Passage in California
Standard Operating Procedure DFG-IFP-001
Cumulative Calculations

Location: Fall Creek - Below Fish Ladder

Site Name: Fall Critical Riffle # 1

Riffle Name: Transect 1

Site Description: Below clearing in riparian

GPS Coordinates: N37.05413; W122.07918 (acc. 8 m)

Date: 4/26/2016

Data Entry Staff: Alley

Target Depth Criteria (ft):	0.6	0.5	0.2
-----------------------------	-----	-----	-----

Event	Flow (cfs)	Percent Total (0.6)	Percent Total (0.5)	Percent Total (0.2)
1	22.8	5.3	32	55.1
2	53.1	49.7	63.9	85.3
3	44.1	23.1	53.3	81.7
4	16	5.3	12.4	48
5	15	0	5.3	37.3
6	9.9	0	5.3	33.7
7	8	0	1.8	16

Event	Flow (cfs)	Percent Cont. (0.6)	Percent Cont. (0.5)	Percent Cont. (0.2)
1	22.8	5.3	10.7	17.8
2	53.1	19.5	23.1	37.3
3	44.1	7.1	19.5	37.3
4	16	5.3	5.3	17.8
5	15	0	5.3	12.4
6	9.9	0	5.3	12.4
7	8	0	1.8	5.3

Flow (cfs)	Percent Total (0.5)
22.8	32
53.1	63.9
44.1	53.3
16	12.4
15	5.3
9.9	5.3
8	1.8

Flow (cfs)	Percent Total (0.2)
22.8	55.1
53.1	85.3
44.1	81.7
16	48
15	37.3
9.9	33.7
8	16

Flow (cfs)	Percent Cont. (0.5)
22.8	10.7
53.1	23.1
44.1	19.5
16	5.3
15	5.3
9.9	5.3
8	1.8

Flow (cfs)	Percent Cont. (0.2)
22.8	17.8
53.1	37.3
44.1	37.3
16	17.8
15	12.4
9.9	12.4
8	5.3

**Appendix B2. Data Tables for Transect 2 (Critical Riffle 2) and Channel
Width Calculations at Various Depth Criteria.**

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder

Site Name: Fall #2

Riffle Name: R-2

Site Description: Within 2015 Fish sampling site

GPS Coordinates: N37.05930; W122.07835

Sample Event No. (1-6) and targeted flow: 1

Critical Riffle Total Width hp to tp (ft): 17.95

Reference Discharge (cfs): 27.5

Meter number: 1

Notes: _____

Date: 3/8/2016

Field Staff: Alley, Steiner

Data Entry Staff: Alley

Photo File Name: _____

Staff Gage Start: 139 mm End: 139 mm

Time Start: 11:39 Time Stop: 12:01

LBWE: 0.0 RBWE: 17.5

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
15.6 %	5.8%	60.4 %	25.3%	76.0 %	25.3 %

Station	Distance	Depth *	Width
1	0.00	0.30	0.35
2	0.35	0.25	0.35
3	0.70	0.30	0.35
4	1.05	0.36	0.35
5	1.40	0.31	0.35
6	1.75	0.37	0.35
7	2.10	0.61	0.35
8	2.45	0.89	0.35
9	2.80	1.01	0.35
10	3.15	0.65	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35

11	3.50	0.78	0.35
12	3.85	0.62	0.35
13	4.20	0.15	0.35
14	4.55	0.17	0.35
15	4.90	0.70	0.35
16	5.25	0.51	0.35
17	5.60	0.53	0.35
18	5.95	0.66	0.35
19	6.30	0.54	0.35
20	6.65	0.29	0.35
21	7.00	0.39	0.35
22	7.35	0.22	0.35
23	7.70	0.27	0.35
24	8.05	0.53	0.35
25	8.40	0.56	0.35
26	8.75	0.70	0.35
27	9.10	0.71	0.35
28	9.45	0.70	0.35
29	9.80	0.69	0.35
30	10.15	0.70	0.35

11 0.61

Station	Distance	Depth	Width
31	10.50	0.61	0.35
32	10.85	0.68	0.35
33	11.20	0.58	0.35
34	11.55	0.68	0.35
35	11.90	0.66	0.35
36	12.25	0.66	0.35
37	12.60	0.17	0.35
38	12.95	0.11	0.35
39	13.30	0.08	0.35
40	13.65	0.06	0.35
41	14.00	0.05	0.35
42	14.35	0.44	0.35
43	14.70	0.50	0.35
44	15.05	0.64	0.35
45	15.40	0.55	0.35

0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35

0.4 0.4

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35

46	15.75	0.51	0.35
47	16.10	0.49	0.35
48	16.45	0.35	0.35
49	16.80	0.37	0.35
50	17.15	0.15	0.35
51	17.50	0.00	0.00

		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	17.5 0	(ft) Width:	2.80	1.05	10.85	4.55	13.65	4.55
Maximum Transect Length**:	17.9 5	(ft) Percent:	15.6 %	5.8%	60.4 %	25.3%	76.0 %	25.3 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder

Site Name: Fall #2

Riffle Name: R-2

Site Description: Within 2015 Fish sampling site

GPS Coordinates: N37.05930; W122.07835

CRA Sample Event No. (1-6) and targeted flow: 1

Critical Riffle Total Width hp to tp (ft): 17.95

Reference Discharge (cfs): 27.5

Meter number: 1

Notes: _____

Date: 3/8/2016

Field Staff: Alley, Steiner

Data Entry Staff: Alley

Photo File Name: _____

Staff Gage Start: 139 mm End: 139 mm

Time Start: 11:39 Time Stop: 12:01

LBWE: 0.0 RBWE: 17.5

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
39.0%	11.7%	56.5%	25.3%	83.8%	42.9%

Station	Distance	Depth*	Width
1	0.00	0.30	0.35
2	0.35	0.25	0.35
3	0.70	0.30	0.35
4	1.05	0.36	0.35
5	1.40	0.31	0.35
6	1.75	0.37	0.35
7	2.10	0.61	0.35
8	2.45	0.89	0.35
9	2.80	1.01	0.35
10	3.15	0.65	0.35
11	3.50	0.78	0.35
12	3.85	0.62	0.35
13	4.20	0.15	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35

14	4.55	0.17	0.35
15	4.90	0.70	0.35
16	5.25	0.51	0.35
17	5.60	0.53	0.35
18	5.95	0.66	0.35
19	6.30	0.54	0.35
20	6.65	0.29	0.35
21	7.00	0.39	0.35
22	7.35	0.22	0.35
23	7.70	0.27	0.35
24	8.05	0.53	0.35
25	8.40	0.56	0.35
26	8.75	0.70	0.35
27	9.10	0.71	0.35
28	9.45	0.70	0.35
29	9.80	0.69	0.35
30	10.15	0.70	0.35

11 0.61

Station	Distance	Depth	Width
31	10.50	0.61	0.35
32	10.85	0.68	0.35
33	11.20	0.58	0.35
34	11.55	0.68	0.35
35	11.90	0.66	0.35
36	12.25	0.66	0.35
37	12.60	0.17	0.35
38	12.95	0.11	0.35
39	13.30	0.08	0.35
40	13.65	0.06	0.35
41	14.00	0.05	0.35
42	14.35	0.44	0.35
43	14.70	0.50	0.35
44	15.05	0.64	0.35
45	15.40	0.55	0.35
46	15.75	0.51	0.35
47	16.10	0.49	0.35
48	16.45	0.35	0.35

0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35

0.4 0.4 0.4

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35

49	16.80	0.37	0.35
50	17.15	0.15	0.35
51	17.50	0.00	0.00

				0.35	0.35

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	17.5	(ft) Width:	7.00	2.10	10.15	4.55	15.05	7.70
Maximum Transect Length**:	17.95	(ft) Percent:	39.0%	11.7%	56.5%	25.3%	83.8%	42.9%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall #2
 Riffle Name: R-2
 Site Description: Within 2015 Fish sampling site
 GPS Coordinates: N37.05930; W122.07835
 CRA Sample Event No. (1-6) and targeted flow: 2
 Critical Riffle Total Width hp to tp (ft): 17.95
 Reference Discharge (cfs): 55.7
 Meter number: 1

Date: 3/14/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Alley
 Photo File Name: _____
 Staff Gage Start: 296 mm End: 296 mm
 Time Start: 13:06 Time Stop: 13:28

LBWE: 0.0 RBWE: 17.95

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
66.3%	17.5%	91.6%	70.2%	95.5%	74.1%

Station	Distance	Depth*	Width
1	0.00	0.84	0.35
2	0.35	0.58	0.35
3	0.70	0.69	0.35
4	1.05	0.72	0.35
5	1.40	0.65	0.35
6	1.75	0.73	0.35
7	2.10	1.30	0.35
8	2.45	1.33	0.35
9	2.80	1.29	0.35
10	3.15	1.33	0.35
11	3.50	1.10	0.35
12	3.85	1.16	0.35
13	4.20	0.58	0.35
14	4.55	0.54	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35

15	4.90	1.06	0.35
16	5.25	0.82	0.35
17	5.60	0.76	0.35
18	5.95	0.92	0.35
19	6.30	0.80	0.35
20	6.65	0.60	0.35
21	7.00	0.85	0.35
22	7.35	0.81	0.35
23	7.70	0.79	0.35
24	8.05	0.80	0.35
25	8.40	0.73	0.35
26	8.75	0.79	0.35
27	9.10	0.80	0.35
28	9.45	0.96	0.35
29	9.80	0.76	0.35
30	10.15	0.67	0.35

0.87

Station	Distance	Depth	Width
31	10.50	0.87	0.35
32	10.85	0.95	0.35
33	11.20	0.90	0.35
34	11.55	0.96	0.35
35	11.90	0.72	0.35
36	12.25	0.88	0.35
37	12.60	0.34	0.35
38	12.95	0.32	0.35
39	13.30	0.27	0.35
40	13.65	0.27	0.35
41	14.00	0.26	0.35
42	14.35	1.03	0.35
43	14.70	0.90	0.35
44	15.05	0.96	0.35
45	15.40	0.73	0.35
46	15.75	0.68	0.35
47	16.10	0.62	0.35
48	16.45	0.68	0.35
49	16.80	0.62	0.35

0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35

0.4

0.4

0.4

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35

50	17.15	0.52	0.35
51	17.50	0.49	0.35
52	17.85	0.16	0.10
53	17.95	0.00	0.00

		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	17.95	(ft) Width:	11.9	3.2	16.5	12.6	17.2	13.3
Maximum Transect Length**:	17.95	(ft) Percent:	66.3%	17.5%	91.6%	70.2%	95.5%	74.1%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder

Site Name: Fall #2

Riffle Name: R-2

Site Description: Within 2015 Fish sampling site

GPS Coordinates: N37.05930; W122.07835

CRA Sample Event No. (1-6) and targeted flow: 2

Critical Riffle Total Width hp to tp (ft): 17.95

Reference Discharge (cfs): 55.7

Meter number: 1

Date: 3/14/2016

Field Staff: Alley, Steiner

Data Entry Staff: Alley

Photo File Name: 296 296

Staff Gage Start: mm End: mm

Time Start: 13:06 Time Stop: 13:28

LBWE: 0.0 RBWE: 17.95

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
81.9%	42.9%	89.7%	70.2%	101.4%	99.4%

Station	Distance	Depth*	Width
1	0.00	0.84	0.35
2	0.35	0.58	0.35
3	0.70	0.69	0.35
4	1.05	0.72	0.35
5	1.40	0.65	0.35
6	1.75	0.73	0.35
7	2.10	1.30	0.35
8	2.45	1.33	0.35
9	2.80	1.29	0.35
10	3.15	1.33	0.35
11	3.50	1.10	0.35
12	3.85	1.16	0.35
13	4.20	0.58	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35

0.87

Fall Creek Salmonid Passage Study– Spring 2016
D.W. ALLEY & Associates

0.4

Page 191

49	16.80	0.62	0.35
50	17.15	0.52	0.35
51	17.50	0.49	0.35
52	17.85	0.16	0.10
53	17.95	0.00	0.00

0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	17.95	(ft) Width:	14.7	7.7	16.1	12.6	18.2	17.9
Maximum Transect Length**:	17.95	(ft) Percent:	81.9%	42.9%	89.7%	70.2%	101.4%	99.4%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder

Site Name: Fall #2

Riffle Name: R-2

Site Description: Within 2015 Fish sampling site

GPS Coordinates: N37.05930; W122.07835

CRA Sample Event No. (1-6) and targeted flow: 3- upper middle

Critical Riffle Total Width hp to tp (ft): 17.95

Reference Discharge (cfs): 45.3

Meter number: 1

Date: 3/15/2016

Field Staff: Alley, Steiner

Data Entry Staff: Alley

Photo File Name: _____

Staff Gage Start: 242 mm End: 242 mm

Time Start: 10:41 Time Stop: 11:10

LBWE: 0.0 RBWE: 17.9

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
46.8%	11.7%	85.8%	44.8%	91.6%	70.2%

Station	Distance	Depth*	Width
1	0.00	0.70	0.35
2	0.35	0.47	0.35
3	0.70	0.64	0.35
4	1.05	0.61	0.35
5	1.40	0.52	0.35
6	1.75	0.58	0.35
7	2.10	0.90	0.35
8	2.45	1.08	0.35
9	2.80	1.29	0.35
10	3.15	0.90	0.35
11	3.50	0.96	0.35
12	3.85	0.51	0.35
13	4.20	0.38	0.35
14	4.55	0.45	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
0.35	0.35	0.35	0.35	0.35	0.4
		0.35	0.35	0.35	0.4
		0.35	0.35	0.35	0.4
		0.35	0.35	0.35	0.4
		0.35	0.35	0.35	0.4
		0.35	0.35	0.35	0.4
0.35	0.35	0.35	0.35	0.35	0.4
0.35	0.35	0.35	0.35	0.35	0.4
0.35	0.35	0.35	0.35	0.35	0.4
0.35	0.35	0.35	0.35	0.35	0.4
		0.35	0.35	0.35	0.4
				0.35	0.4
		0.35	0.35	0.35	0.4

15	4.90	0.82	0.35
16	5.25	0.77	0.35
17	5.60	0.67	0.35
18	5.95	0.85	0.35
19	6.30	0.70	0.35
20	6.65	0.44	0.35
21	7.00	0.53	0.35
22	7.35	0.40	0.35
23	7.70	0.72	0.35
24	8.05	0.71	0.35
25	8.40	0.56	0.35
26	8.75	0.73	0.35
27	9.10	0.70	0.35
28	9.45	0.76	0.35
29	9.80	0.69	0.35
30	10.15	0.68	0.35

0.80

Station	Distance	Depth	Width
31	10.50	0.80	0.35
32	10.85	0.92	0.35
33	11.20	0.86	0.35
34	11.55	0.84	0.35
35	11.90	0.77	0.35
36	12.25	0.83	0.35
37	12.60	0.29	0.35
38	12.95	0.24	0.35
39	13.30	0.20	0.35
40	13.65	0.19	0.35
41	14.00	0.24	0.35
42	14.35	0.39	0.35
43	14.70	0.70	0.35
44	15.05	0.84	0.35
45	15.40	0.67	0.35
46	15.75	0.62	0.35
47	16.10	0.55	0.35
48	16.45	0.64	0.35
49	16.80	0.59	0.35

0.35	0.35	0.35	0.35	0.35	0.4
0.35	0.35	0.35	0.35	0.35	0.4
		0.35	0.35	0.35	0.4
0.35	0.35	0.35	0.35	0.35	0.4
0.35	0.35	0.35	0.35	0.35	0.4
		0.35	0.35	0.35	0.4
		0.35	0.35	0.35	0.4
		0.35	0.35	0.35	0.4
0.35	0.35	0.35	0.35	0.35	0.4
0.35	0.35	0.35	0.35	0.35	0.4
		0.35	0.35	0.35	0.4
0.35	0.35	0.35	0.35	0.35	0.4
0.35	0.35	0.35	0.35	0.35	0.4
		0.35	0.35	0.35	0.4
		0.35	0.35	0.35	0.4

0.4

0.4

0.4

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
				0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35

50	17.15	0.41	0.35
51	17.50	0.34	0.35
52	17.85	0.06	0.10
53	17.95	0.00	0.00

		0.35	0.35	0.35	0.35
				0.35	0.35

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	17.90	(ft) Width:	8.40	2.10	15.40	8.05	16.45	12.60
Maximum Transect Length**:	17.95	(ft) Percent:	46.8%	11.7%	85.8%	44.8%	91.6%	70.2%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall #2
 Riffle Name: R-2
 Site Description: Within 2015 Fish sampling site
 GPS Coordinates: N37.05930; W122.07835
 CRA Sample Event No. (1-6) and targeted flow: 3- upper middle
 Critical Riffle Total Width hp to tp (ft): 17.95
 Reference Discharge (cfs): 45.3
 Meter number: 1
-

Date: 3/15/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Alley
 Photo File Name: 242
 Staff Gage Start: mm End: 242
mm
 Time Start: 10:41 Time Stop: 11:10

LBWE: 0.0 RBWE: 17.9

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
62.4%	21.4%	76.0%	27.3%	99.4%	76.0%

Station	Distance	Depth*	Width
1	0.00	0.70	0.35
2	0.35	0.47	0.35
3	0.70	0.64	0.35
4	1.05	0.61	0.35
5	1.40	0.52	0.35
6	1.75	0.58	0.35
7	2.10	0.90	0.35
8	2.45	1.08	0.35
9	2.80	1.29	0.35
10	3.15	0.90	0.35
11	3.50	0.96	0.35
12	3.85	0.51	0.35
13	4.20	0.38	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
0.35	0.35	0.35	0.35	0.35	0.35
				0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35

14	4.55	0.45	0.35
15	4.90	0.82	0.35
16	5.25	0.77	0.35
17	5.60	0.67	0.35
18	5.95	0.85	0.35
19	6.30	0.70	0.35
20	6.65	0.44	0.35
21	7.00	0.53	0.35
22	7.35	0.40	0.35
23	7.70	0.72	0.35
24	8.05	0.71	0.35
25	8.40	0.56	0.35
26	8.75	0.73	0.35
27	9.10	0.70	0.35
28	9.45	0.76	0.35
29	9.80	0.69	0.35
30	10.15	0.68	0.35

0.80

Station	Distance	Depth	Width
31	10.50	0.80	0.35
32	10.85	0.92	0.35
33	11.20	0.86	0.35
34	11.55	0.84	0.35
35	11.90	0.77	0.35
36	12.25	0.83	0.35
37	12.60	0.29	0.35
38	12.95	0.24	0.35
39	13.30	0.20	0.35
40	13.65	0.19	0.35
41	14.00	0.24	0.35
42	14.35	0.39	0.35
43	14.70	0.70	0.35
44	15.05	0.84	0.35
45	15.40	0.67	0.35
46	15.75	0.62	0.35
47	16.10	0.55	0.35
48	16.45	0.64	0.35

				0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35

0.4

0.4

0.4

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35

49	16.80	0.59	0.35
50	17.15	0.41	0.35
51	17.50	0.34	0.35
52	17.85	0.06	0.10
53	17.95	0.00	0.00

		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35

Must manually select "COUNT" range for continuous cells

	17.9	(ft) Width:	11.2	3.9	13.7	4.9	17.9	13.7
Maximum Transect Length**:	17.95	(ft) Percent:	62.4%	21.4%	76.0%	27.3%	99.4%	76.0%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall #2
 Riffle Name: R-2
 Site Description: Within 2015 Fish sampling site
 GPS Coordinates: N37.05930; W122.07835
 CRA Sample Event No. (1-6) and targeted flow: 4-middle
 Critical Riffle Total Width hp to tp (ft): 17.95
 Reference Discharge (cfs): 18.2
 Meter number: 1

Date: 3/26/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Alley
 Photo File Name: _____
 Staff Gage Start: 176 mm End: 176 mm
 Time Start: 10:31 Time Stop: 10:56

LBWE: 0.0 : 17.6

Target Species Depth Criteria (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
1.9%	1.9%	42.9 %	13.6%	58.5 %	23.4 %

Station	Distance	Depth *	Width
1	0.00	0.24	0.35
2	0.35	0.18	0.35
3	0.70	0.23	0.35
4	1.05	0.30	0.35
5	1.40	0.25	0.35
6	1.75	0.20	0.35
7	2.10	0.51	0.35
8	2.45	0.56	0.35
9	2.80	0.97	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35

10	3.15	0.52	0.35
11	3.50	0.56	0.35
12	3.85	0.16	0.35
13	4.20	0.08	0.35
14	4.55	0.12	0.35
15	4.90	0.49	0.35
16	5.25	0.42	0.35
17	5.60	0.36	0.35
18	5.95	0.48	0.35
19	6.30	0.39	0.35
20	6.65	0.14	0.35
21	7.00	0.19	0.35
22	7.35	0.10	0.35
23	7.70	0.19	0.35
24	8.05	0.29	0.35
25	8.40	0.30	0.35
26	8.75	0.45	0.35
27	9.10	0.41	0.35
28	9.45	0.50	0.35
29	9.80	0.39	0.35
30	10.15	0.50	0.35

		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35

Station	Distance	Depth	Width
31	10.50	0.49	0.35
32	10.85	0.55	0.35
33	11.20	0.51	0.35
34	11.55	0.57	0.35
35	11.90	0.44	0.35
36	12.25	0.55	0.35
37	12.60	0.00	0.35
38	12.95	0.00	0.35
39	13.30	0.00	0.35
40	13.65	0.00	0.35
41	14.00	0.00	0.35
42	14.35	0.24	0.35
43	14.70	0.31	0.35
44	15.05	0.51	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35

45	15.40	0.41	0.35
46	15.75	0.40	0.35
47	16.10	0.47	0.35
48	16.45	0.31	0.35
49	16.80	0.36	0.35
50	17.15	0.15	0.35
51	17.50	0.05	0.10
52	17.60	0.00	0.00

		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	17.6 (ft)						
	0 Width:	0.35	0.35	7.70	2.45	10.50	4.20
Maximum Transect Length**:	17.9 (ft)			42.9		58.5	23.4
	5 Percent:	1.9%	1.9%	%	13.6%	%	%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall #2
 Riffle Name: R-2
 Site Description: Within 2015 Fish sampling site
 GPS Coordinates: N37.05930; W122.07835
 CRA Sample Event No. (1-6) and targeted flow: 4- middle
 Critical Riffle Total Width hp to tp (ft): 17.95
 Reference Discharge (cfs): 18.2
 Meter number: 1

Date: 3/26/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Alley
 Photo File Name: _____
 Staff Gage Start: 176 mm End: 176 mm

Time Start: 10:31 Time Stop: 10:56

LBWE: 0.0 RBWE: 17.6

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
1.9%	1.9%	23.4%	9.7%	70.2%	25.3%

Station	Distance	Depth*	Width
1	0.00	0.24	0.35
2	0.35	0.18	0.35
3	0.70	0.23	0.35
4	1.05	0.30	0.35
5	1.40	0.25	0.35
6	1.75	0.20	0.35
7	2.10	0.51	0.35
8	2.45	0.56	0.35
9	2.80	0.97	0.35
10	3.15	0.52	0.35
11	3.50	0.56	0.35
12	3.85	0.16	0.35
13	4.20	0.08	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35

14	4.55	0.12	0.35
15	4.90	0.49	0.35
16	5.25	0.42	0.35
17	5.60	0.36	0.35
18	5.95	0.48	0.35
19	6.30	0.39	0.35
20	6.65	0.14	0.35
21	7.00	0.19	0.35
22	7.35	0.10	0.35
23	7.70	0.19	0.35
24	8.05	0.29	0.35
25	8.40	0.30	0.35
26	8.75	0.45	0.35
27	9.10	0.41	0.35
28	9.45	0.50	0.35
29	9.80	0.39	0.35
30	10.15	0.50	0.35

Station	Distance	Depth	Width
31	10.50	0.49	0.35
32	10.85	0.55	0.35
33	11.20	0.51	0.35
34	11.55	0.57	0.35
35	11.90	0.44	0.35
36	12.25	0.55	0.35
37	12.60	0.00	0.35
38	12.95	0.00	0.35
39	13.30	0.00	0.35
40	13.65	0.00	0.35
41	14.00	0.00	0.35
42	14.35	0.24	0.35
43	14.70	0.31	0.35
44	15.05	0.51	0.35
45	15.40	0.41	0.35
46	15.75	0.40	0.35
47	16.10	0.47	0.35
48	16.45	0.31	0.35
49	16.80	0.36	0.35

				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35

50	17.15	0.15	0.35
51	17.50	0.05	0.10
52	17.60	0.00	0.00

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	17.6	(ft) Width:	0.35	0.35	4.20	1.75	12.60	4.55
Maximum Transect Length**:	17.95	(ft) Percent:	1.9%	1.9%	23.4%	9.7%	70.2%	25.3%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall #2
 Riffle Name: R-2
 Site Description: Within 2015 Fish sampling site
 GPS Coordinates: N37.05930; W122.07835
 CRA Sample Event No. (1-6) and targeted flow: 5-middle
 Critical Riffle Total Width hp to tp (ft): 17.95
 Reference Discharge (cfs): 15.5
 Meter number: 1

Date: 29 Marcy 2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Alley
 Photo File Name: Photos 1-2
 Staff Gage Start: 169 End: 168 mm
 Time Start: 10:16 Time Stop: 10:46

LBWE: 0.0 : 17.5

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
1.9%	1.9%	35.1%	13.6%	56.5%	21.4%

Station	Distance	Depth *	Width h
1	0.00	0.20	0.35
2	0.35	0.12	0.35
3	0.70	0.16	0.35
4	1.05	0.25	0.35
5	1.40	0.20	0.35
6	1.75	0.18	0.35
7	2.10	0.46	0.35
8	2.45	0.59	0.35
9	2.80	0.92	0.35
10	3.15	0.48	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35

11	3.50	0.58	0.35
12	3.85	0.14	0.35
13	4.20	0.06	0.35
14	4.55	0.09	0.35
15	4.90	0.45	0.35
16	5.25	0.34	0.35
17	5.60	0.30	0.35
18	5.95	0.43	0.35
19	6.30	0.34	0.35
20	6.65	0.11	0.35
21	7.00	0.17	0.35
22	7.35	0.07	0.35
23	7.70	0.34	0.35
24	8.05	0.17	0.35
25	8.40	0.22	0.35
26	8.75	0.42	0.35
27	9.10	0.36	0.35
28	9.45	0.46	0.35
29	9.80	0.41	0.35
30	10.15	0.40	0.35

0.45

Station	Distance	Depth *	Width h
31	10.50	0.45	0.35
32	10.85	0.50	0.35
33	11.20	0.47	0.35
34	11.55	0.49	0.35
35	11.90	0.39	0.35
36	12.25	0.45	0.35
37	12.60	0.00	0.35
38	12.95	0.00	0.35
39	13.30	0.00	0.35
40	13.65	0.00	0.35
41	14.00	0.00	0.35
42	14.35	0.27	0.35
43	14.70	0.38	0.35
44	15.05	0.55	0.35
45	15.40	0.37	0.35

		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35

46	15.75	0.43	0.35
47	16.10	0.39	0.35
48	16.45	0.38	0.35
49	16.80	0.35	0.35
50	17.15	0.18	0.35
51	17.50	0.03	0.10
52	17.60	0.00	0.00

		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	17.5	(ft) Width:	0.35	0.35	6.30	2.45	10.15	3.85
Maximum Transect Length**:	17.9	(ft) Percent:	1.9%	1.9%	35.1 %	13.6%	56.5 %	21.4 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall #2
 Riffle Name: R-2
 Site Description: Within 2015 Fish sampling site
 GPS Coordinates: N37.05930; W122.07835
 CRA Sample Event No. (1-6) and targeted flow: 5- middle
 Critical Riffle Total Width hp to tp (ft): 17.95
 Reference Discharge (cfs): 15.5
 Meter number: 1

Date: 29 Marcy 2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Alley
 Photo File Name: _____
 Staff Gage Start: 169 End: 168 mm

Time Start: 10:16 Time Stop: 10:46

LBWE: 0.0 RBWE: 17.5

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
1.9%	1.9%	9.7%	3.9%	66.3%	23.4%

Station	Distance	Depth*	Width
1	0.00	0.20	0.35
2	0.35	0.12	0.35
3	0.70	0.16	0.35
4	1.05	0.25	0.35
5	1.40	0.20	0.35
6	1.75	0.18	0.35
7	2.10	0.46	0.35
8	2.45	0.59	0.35
9	2.80	0.92	0.35
10	3.15	0.48	0.35
11	3.50	0.58	0.35
12	3.85	0.14	0.35
13	4.20	0.06	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35

14	4.55	0.09	0.35
15	4.90	0.45	0.35
16	5.25	0.34	0.35
17	5.60	0.30	0.35
18	5.95	0.43	0.35
19	6.30	0.34	0.35
20	6.65	0.11	0.35
21	7.00	0.17	0.35
22	7.35	0.07	0.35
23	7.70	0.34	0.35
24	8.05	0.17	0.35
25	8.40	0.22	0.35
26	8.75	0.42	0.35
27	9.10	0.36	0.35
28	9.45	0.46	0.35
29	9.80	0.41	0.35
30	10.15	0.40	0.35

0.45

Station	Distance	Depth*	Width
31	10.50	0.45	0.35
32	10.85	0.50	0.35
33	11.20	0.47	0.35
34	11.55	0.49	0.35
35	11.90	0.39	0.35
36	12.25	0.45	0.35
37	12.60	0.00	0.35
38	12.95	0.00	0.35
39	13.30	0.00	0.35
40	13.65	0.00	0.35
41	14.00	0.00	0.35
42	14.35	0.27	0.35
43	14.70	0.38	0.35
44	15.05	0.55	0.35
45	15.40	0.37	0.35
46	15.75	0.43	0.35
47	16.10	0.39	0.35
48	16.45	0.38	0.35

				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35

49	16.80	0.35	0.35
50	17.15	0.18	0.35
51	17.50	0.03	0.10
52	17.60	0.00	0.00

				0.35	0.35

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	17.5	(ft) Width:	0.35	0.35	1.75	0.70	11.90	4.20
Maximum Transect Length**:	17.95	(ft) Percent:	1.9%	1.9%	9.7%	3.9%	66.3%	23.4%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall #2
 Riffle Name: R-2
 Site Description: Within 2015 Fish sampling site
 GPS Coordinates: N37.05930; W122.07835
 CRA Sample Event No. (1-6) and targeted flow: 6- low middle
 Critical Riffle Total Width hp to tp (ft): 17.95
 Reference Discharge (cfs): 12.4
 Meter number: 1

Date: 4/4/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Alley
 Photo File Name: _____
 Staff Gage Start: 163 mm End: 163 mm
 Time Start: 10:23 Time Stop: 10:46

LBWE: 0.0 RBWE: 17.2

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
1.9%	1.9%	19.5%	9.7%	48.7%	21.4%

Station	Distance	Depth *	Width
1	0.00	0.12	0.35
2	0.35	0.09	0.35
3	0.70	0.14	0.35
4	1.05	0.22	0.35
5	1.40	0.15	0.35
6	1.75	0.17	0.35
7	2.10	0.41	0.35
8	2.45	0.54	0.35
9	2.80	0.87	0.35
10	3.15	0.45	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35

11	3.50	0.54	0.35
12	3.85	0.09	0.35
13	4.20	0.03	0.35
14	4.55	0.05	0.35
15	4.90	0.39	0.35
16	5.25	0.31	0.35
17	5.60	0.26	0.35
18	5.95	0.40	0.35
19	6.30	0.29	0.35
20	6.65	0.07	0.35
21	7.00	0.09	0.35
22	7.35	0.03	0.35
23	7.70	0.30	0.35
24	8.05	0.15	0.35
25	8.40	0.19	0.35
26	8.75	0.35	0.35
27	9.10	0.32	0.35
28	9.45	0.38	0.35
29	9.80	0.34	0.35
30	10.15	0.36	0.35

		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35

Station	Distance	Depth	Width
31	10.50	0.41	0.35
32	10.85	0.48	0.35
33	11.20	0.43	0.35
34	11.55	0.39	0.35
35	11.90	0.33	0.35
36	12.25	0.36	0.35
37	12.60	0.00	0.35
38	12.95	0.00	0.35
39	13.30	0.00	0.35
40	13.65	0.00	0.35
41	14.00	0.00	0.35
42	14.35	0.21	0.35
43	14.70	0.28	0.35
44	15.05	0.51	0.35
45	15.40	0.33	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35

46	15.75	0.35	0.35
47	16.10	0.28	0.35
48	16.45	0.35	0.35
49	16.80	0.30	0.35
50	17.15	0.05	0.05
51	17.20	0.00	0.00

				0.35	0.35
				0.35	0.35
				0.35	0.35

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	17.2	(ft) Width:	0.35	0.35	3.50	1.75	8.75	3.85
Maximum Transect Length**:	18.0	(ft) Percent:	1.9%	1.9%	19.5%	9.7%	48.7%	21.4%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall #2
 Riffle Name: R-2
 Site Description: Within 2015 Fish sampling site
 GPS Coordinates: N37.05930; W122.07835
 CRA Sample Event No. (1-6) and targeted flow: 6- low middle
 Critical Riffle Total Width hp to tp (ft): 17.95
 Reference Discharge (cfs): 12.4
 Meter number: 1

Date: 4/4/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Alley
 Photo File Name: _____
 Staff Gage Start: 163 mm End: 163 mm

Time Start: 10:23 Time Stop: 10:46

LBWE: 0.0 RBWE: 17.2

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
1.9%	1.9%	7.8%	3.9%	60.4%	21.4%

Station	Distance	Depth*	Width
1	0.00	0.12	0.35
2	0.35	0.09	0.35
3	0.70	0.14	0.35
4	1.05	0.22	0.35
5	1.40	0.15	0.35
6	1.75	0.17	0.35
7	2.10	0.41	0.35
8	2.45	0.57	0.35
9	2.80	0.87	0.35
10	3.15	0.45	0.35
11	3.50	0.54	0.35
12	3.85	0.09	0.35
13	4.20	0.03	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35

14	4.55	0.05	0.35
15	4.90	0.39	0.35
16	5.25	0.31	0.35
17	5.60	0.26	0.35
18	5.95	0.40	0.35
19	6.30	0.29	0.35
20	6.65	0.07	0.35
21	7.00	0.09	0.35
22	7.35	0.03	0.35
23	7.70	0.30	0.35
24	8.05	0.15	0.35
25	8.40	0.19	0.35
26	8.75	0.35	0.35
27	9.10	0.32	0.35
28	9.45	0.38	0.35
29	9.80	0.34	0.35
30	10.15	0.36	0.35

				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35

Station	Distance	Depth	Width
31	10.50	0.41	0.35
32	10.85	0.48	0.35
33	11.20	0.43	0.35
34	11.55	0.39	0.35
35	11.90	0.33	0.35
36	12.25	0.36	0.35
37	12.60	0.00	0.35
38	12.95	0.00	0.35
39	13.30	0.00	0.35
40	13.65	0.00	0.35
41	14.00	0.00	0.35
42	14.35	0.21	0.35
43	14.70	0.28	0.35
44	15.05	0.51	0.35
45	15.40	0.33	0.35
46	15.75	0.35	0.35
47	16.10	0.28	0.35
48	16.45	0.35	0.35
49	16.80	0.30	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35

50	17.15	0.05	0.05
51	17.20	0.00	0.00

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	17.20	(ft) Width:	0.35	0.35	1.40	0.70	10.85	3.85
Maximum Transect Length**:	17.95	(ft) Percent:	1.9%	1.9%	7.8%	3.9%	60.4%	21.4%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall #2
 Riffle Name: R-2
 Site Description: Within 2015 Fish sampling site
 GPS Coordinates: N37.05930; W122.07835
 CRA Sample Event No. (1-6) and targeted flow: 7- low
 Critical Riffle Total Width hp to tp (ft): 17.95
 Reference Discharge (cfs): 7.1
 Meter number: 1

Date: 5/4/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Alley
 Photo File Name: _____

Staff Gage Start: 107 mm End: 108 mm

Time Start: 0:00 Time Stop: 0:00

LBWE : 0.0 RBWE : 17.1

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
1.9%	1.9%	3.9%	1.9%	13.6%	7.8%

Station	Distance	Depth *	Width
1	0.00	0.06	0.35
2	0.35	0.01	0.35
3	0.70	0.02	0.35
4	1.05	0.09	0.35
5	1.40	0.04	0.35
6	1.75	0.05	0.35
7	2.10	0.28	0.35
8	2.45	0.31	0.35
9	2.80	0.73	0.35
10	3.15	0.32	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
				0.35	0.35

0.25

Cell Width Meeting Criteria

Total	Cont.	Total	Cont.	Total	Cont.
				0.35	0.35
				0.35	0.35
		0.35	0.35	0.35	0.35

46	15.75	0.29	0.35
47	16.10	0.16	0.35
48	16.45	0.24	0.35
49	16.80	0.18	0.35
50	17.15	0.00	0.35
51	17.50		0.10
52	17.60		0.00

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	17.1 5	(ft) Width:	0.35	0.35	0.70	0.35	2.45	1.40
Maximum Transect Length**:	17.9 5	(ft) Percent :	1.9%	1.9%	3.9%	1.9%	13.6 %	7.8%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder

Site Name: Fall #2

Riffle Name: R-2

Site Description: Within 2015 Fish sampling site

GPS Coordinates: N37.05930; W122.07835

CRA Sample Event No. (1-6) and targeted flow: 7 - low

Critical Riffle Total Width hp to tp (ft): 17.95

Reference Discharge (cfs): 7.1

Meter number: 1

Date: 5/4/2016

Field Staff: Alley, Steiner

Data Entry Staff: Alley

Photo File Name: 4-Jan

Staff Gage Start: 107 mm End: 108 mm

Time Start: 0:00 Time Stop: 0:00

LBWE: 0.0 RBWE: 17.1

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
1.9%	1.9%	1.9%	1.9%	42.9%	11.7%

Station	Distance	Depth*	Width
1	0.00	0.06	0.35
2	0.35	0.01	0.35
3	0.70	0.02	0.35
4	1.05	0.09	0.35
5	1.40	0.04	0.35
6	1.75	0.05	0.35
7	2.10	0.28	0.35
8	2.45	0.31	0.35
9	2.80	0.73	0.35
10	3.15	0.32	0.35
11	3.50	0.38	0.35
12	3.85	0.00	0.35
13	4.20	0.00	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.35	0.35
				0.35	0.35
0.35	0.35	0.35	0.35	0.35	0.35
				0.35	0.35
				0.35	0.35

14	4.55	0.00	0.35
15	4.90	0.24	0.35
16	5.25	0.22	0.35
17	5.60	0.14	0.35
18	5.95	0.28	0.35
19	6.30	0.18	0.35
20	6.65	0.00	0.35
21	7.00	0.00	0.35
22	7.35	0.00	0.35
23	7.70	0.06	0.35
24	8.05	0.01	0.35
25	8.40	0.07	0.35
26	8.75	0.23	0.35
27	9.10	0.19	0.35
28	9.45	0.28	0.35
29	9.80	0.24	0.35
30	10.15	0.19	0.35

				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35

Station	Distance	Depth*	Width
31	10.50	0.25	0.35
32	10.85	0.28	0.35
33	11.20	0.31	0.35
34	11.55	0.36	0.35
35	11.90	0.24	0.35
36	12.25	0.29	0.35
37	12.60	0.00	0.35
38	12.95	0.00	0.35
39	13.30	0.00	0.35
40	13.65	0.00	0.35
41	14.00	0.00	0.35
42	14.35	0.19	0.35
43	14.70	0.25	0.35
44	15.05	0.42	0.35
45	15.40	0.21	0.35
46	15.75	0.29	0.35
47	16.10	0.16	0.35
48	16.45	0.24	0.35
49	16.80	0.18	0.35

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35
				0.35	0.35

50	17.15	0.00	0.35
51	17.50		0.10
52	17.60		0.00

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	17.15	(ft) Width:	0.35	0.35	0.35	0.35	7.70	2.10
Maximum Transect Length**:	17.95	(ft) Percent:	1.9%	1.9%	1.9%	1.9%	42.9%	11.7%

Critical Riffle Analysis for Fish Passage in California
Standard Operating Procedure DFG-IFP-001
Cumulative Calculations and Linear Regression Coordinates

Location: Fall Creek below the Fish Ladder

Site Name: Fall Critical Riffle #2

Riffle Name: Transect #2

Site Description: Within 2015 Fish sampling site

GPS Coordinates: N37.05930; W122.07835

Date: 4/28/2016

Data Entry Staff: Alley

Notes: _____	Target Depth Criteria (ft):	0.7	0.4	0.3
--------------	-----------------------------	-----	-----	-----

Event	Flow (cfs)	Percent Total (0.7)	Percent Total (0.4)	Percent Total (0.3)
1	27.5	15.6	60.4	76
2	55.7	66.3	91.6	95.5
3	45.3	46.8	85.8	91.6
4	18.2	1.9	42.9	58.5
5	15.5	1.9	35.1	56.5
6	12.4	1.9	19.2	48.7
7	7.1	1.9	3.9	13.6

Event	Flow (cfs)	Percent Cont. (0.7)	Percent Cont. (0.4)	Percent Cont. (0.3)
1	27.5	5.8	25.3	25.3
2	55.7	17.5	70.2	74.1
3	45.3	11.7	44.8	70.2
4	18.2	1.9	13.6	23.4
5	15.5	1.9	13.6	21.4
6	12.4	1.9	9.7	21.4
7	7.1	1.9	1.9	7.8

Flow (cfs)	Percent Total (0.4)
27.5	60.4
55.7	91.6
45.3	85.8
18.2	42.9
15.5	35.1
12.4	19.2
7.1	3.9

Flow (cfs)	Percent Total (0.3)
27.5	76
55.7	95.5
45.3	91.6
18.2	58.5
15.5	56.5
12.4	48.7
7.1	13.6

Flow (cfs)	Percent Cont. (0.4)
27.5	25.3
55.7	70.2
45.3	44.8
18.2	13.6
15.5	13.6
12.4	9.7
7.1	1.9

Flow (cfs)	Percent Cont. (0.3)
27.5	25.3
55.7	74.1
45.3	70.2
18.2	23.4
15.5	21.4
12.4	21.4
7.1	7.8

Critical Riffle Analysis for Fish Passage in California
Standard Operating Procedure DFG-IFP-001
Cumulative Calculations and Linear Regression Coordinates

Location: Fall Creek below the Fish Ladder

Site Name: Fall Critical Riffle #2

Riffle Name: Transect #2

Site Description: Within 2015 Fish sampling site

GPS Coordinates: N37.05930; W122.07835

Date: 5/6/2016

Data Entry Staff: Alley

**Target Depth
Criteria (ft):**

0.6

0.5

0.2

Event	Flow (cfs)	Percent Total (0.6)	Percent Total (0.5)	Percent Total (0.2)
1	27.5	39	56.5	83.8
2	55.7	81.9	89.7	100
3	45.3	62.4	76	99.4
4	18.2	1.9	23.4	70.2
5	15.5	1.9	9.7	66.3
6	12.4	1.9	7.8	60.4
7	7.1	1.9	1.9	42.9

Event	Flow (cfs)	Percent Cont. (0.6)	Percent Cont. (0.5)	Percent Cont. (0.2)
1	27.5	11.7	25.3	42.9
2	55.7	42.9	70.2	99.4
3	45.3	21.4	27.3	76
4	18.2	1.9	9.7	25.3
5	15.5	1.9	3.9	23.4
6	12.4	1.9	3.9	21.4
7	7.1	1.9	1.9	11.7

Flow (cfs)	Percent Total (0.5)
27.5	56.5
55.7	89.7
45.3	76
18.2	23.4
15.5	9.7
12.4	7.8
7.1	1.9

Flow (cfs)	Percent Total (0.2)
27.5	83.8
55.7	100
45.3	99.4
18.2	70.2
15.5	66.3
12.4	60.4
7.1	42.9

Flow (cfs)	Percent Cont. (0.5)
27.5	25.3
55.7	70.2
45.3	27.3
18.2	9.7
15.5	3.9
12.4	3.9
7.1	1.9

Flow (cfs)	Percent Cont. (0.2)
27.5	42.9
55.7	99.4
45.3	76
18.2	25.3
15.5	23.4
12.4	21.4
7.1	11.7

**Appendix B3. Data Tables for Transect 3 (Critical Riffle 3) and Channel
Width Calculations at Various Depth Criteria.**

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Transect Name: R-3a
 Site Description: Creekmouth
 GPS Coordinate s: N37.05930; W122.07835 (acc. = 8 m)
 Sample Event No. (1-6) and targeted flow: 1- middle
 Critical Riffle Total Width hp to tp (ft): 30.7
 Reference Discharge (cfs): 24.2
 Meter number: 1
 Notes: _____

Date: 3/8/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner
 Photo File Name: _____

Staff Gage Start: 288 mm End: 288 mm

Time Start: 13:43 Time Stop: 14:09

LBWE : 5.7 RBWE : 34.5

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
2.0 %	2.0%	48.9 %	15.6%	56.7 %	19.5 %

Station	Distance	Depth*	Width
1	5.7	0.00	0.60
2	6.3	0.50	0.60
3	6.9	0.46	0.60
4	7.5	0.44	0.60
5	8.1	0.46	0.60
6	8.7	0.51	0.60
7	9.3	0.50	0.60
8	9.9	0.60	0.60
9	10.5	0.67	0.60
10	11.1	0.00	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6

11	11.7	0.00	0.60
12	12.3	0.45	0.60
13	12.9	0.38	0.60
14	13.5	0.22	0.60
15	14.1	0.20	0.60
16	14.7	0.28	0.60
17	15.3	0.28	0.60
18	15.9	0.54	0.60
19	16.5	0.52	0.60
20	17.1	0.30	0.60
21	17.7	0.50	0.60
22	18.3	0.45	0.60
23	18.9	0.48	0.60
24	19.5	0.40	0.60
25	20.1	0.60	0.60
26	20.7	0.43	0.60
27	21.3	0.57	0.60
28	21.9	0.08	0.60
29	22.5	0.16	0.60
30	23.1	0.44	0.60

		0.6	0.6	0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6

Station	Distance	Depth	Width
31	23.7	0.15	0.60
32	24.3	0.09	0.60
33	24.9	0.11	0.60
34	25.5	0.00	0.60
35	26.1	0.75	0.60
36	26.7	0.66	0.60
37	27.3	0.10	0.60
38	27.9	0.15	0.60
39	28.5	0.40	0.60
40	29.1	0.10	0.60
41	29.7	0.40	0.60
42	30.3	0.48	0.60
43	30.9	0.34	0.60
44	31.5	0.21	0.60
45	32.1	0.18	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6

46	32.7	0.45	0.60
47	33.3	0.20	0.60
48	33.9	0.30	0.60
49	34.5	0.00	0.00

		0.6	0.6	0.6	0.6
				0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	28.8	(ft) Width:	0.6	0.6	15.0	4.8	17.4	6.0
Maximum Transect Length**:	30.7	(ft) Percent	2.0 %	2.0%	48.9 %	15.6%	56.7 %	19.5 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Transect Name: R-3a
 Site Description: Creekmouth
 GPS Coordinate: N37.05930; W122.07835
 s: (acc. = 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 1- middle
 Critical Riffle Total Width hp to tp (ft): 30.7
 Reference Discharge (cfs): 24.2
 Meter number: 1
 Notes: _____

Date: 3/8/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner
 Photo File Name: _____
 Staff Gage Start: 288 mm End: 288 mm

Time Start: 13:43 Time Stop: 14:09

LBWE : 5.7 RBWE : 34.5

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
9.8 %	3.9%	23.5 %	7.8%	68.4 %	31.3 %

Station	Distance	Depth*	Width
1	5.7	0.00	0.60
2	6.3	0.50	0.60
3	6.9	0.46	0.60
4	7.5	0.44	0.60
5	8.1	0.46	0.60
6	8.7	0.51	0.60
7	9.3	0.50	0.60
8	9.9	0.60	0.60
9	10.5	0.67	0.60
10	11.1	0.00	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.6	0.6	0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6

11	11.7	0.00	0.60
12	12.3	0.45	0.60
13	12.9	0.38	0.60
14	13.5	0.22	0.60
15	14.1	0.20	0.60
16	14.7	0.28	0.60
17	15.3	0.28	0.60
18	15.9	0.54	0.60
19	16.5	0.52	0.60
20	17.1	0.30	0.60
21	17.7	0.50	0.60
22	18.3	0.45	0.60
23	18.9	0.48	0.60
24	19.5	0.40	0.60
25	20.1	0.60	0.60
26	20.7	0.43	0.60
27	21.3	0.57	0.60
28	21.9	0.08	0.60
29	22.5	0.16	0.60
30	23.1	0.44	0.60

24

Station	Distance	Depth	Width
31	23.7	0.15	0.60
32	24.3	0.09	0.60
33	24.9	0.11	0.60
34	25.5	0.00	0.60
35	26.1	0.75	0.60
36	26.7	0.66	0.60
37	27.3	0.10	0.60
38	27.9	0.15	0.60
39	28.5	0.40	0.60
40	29.1	0.10	0.60
41	29.7	0.40	0.60
42	30.3	0.48	0.60
43	30.9	0.34	0.60
44	31.5	0.21	0.60
45	32.1	0.18	0.60

				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6

46	32.7	0.45	0.60
47	33.3	0.20	0.60
48	33.9	0.30	0.60
49	34.5	0.00	0.00

				0.6	0.6
				0.6	0.6
				0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	28.8	(ft) Width:	3.0	1.2	7.2	2.4	21.0	9.6
Maximum Transect Length**:	30.7	(ft) Percent	9.8 %	3.9%	23.5 %	7.8%	68.4 %	31.3 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Transect Name: R-4
 Site Description: Creekmouth
 GPS Coordinate: N37.05930; W122.07835
s: (acc. = 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 2- high
 Critical Riffle Total Width hp to tp (ft): 19.40
 Reference Discharge (cfs): 58.2
 Meter number: 1
 Notes: SLR Big Trees 2010 cfs @ 0950hr
Shallowest transect in riffle

Date: 3/14/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner

Photo File Name: _____

Staff Gage Start: 445 mm End: 430 mm

Time Start: 9:50 Time Stop: 10:03

LBW E: 1.5 RBW E: 20.9

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
86.6 %	86.6 %	90.2 %	90.2 %	90.2 %	90.2 %

Station	Distance	Depth*	Width
1	1.5	0.00	0.70
2	2.2	0.29	0.70
3	2.9	0.51	0.70
4	3.6	0.78	0.70
5	4.3	1.07	0.70
6	5.0	1.26	0.70
7	5.7	1.48	0.70
8	6.4	1.51	0.70
9	7.1	1.47	0.70

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7

10	7.8	1.46	0.70
11	8.5	1.48	0.70
12	9.2	1.43	0.70
13	9.9	1.58	0.70
14	10.6	1.55	0.70
15	11.3	1.64	0.70
16	12.0	1.66	0.70
17	12.7	1.64	0.70
18	13.4	1.88	0.70
19	14.1	2.11	0.70
20	14.8	2.30	0.70
21	15.5	2.26	0.70
22	16.2	2.27	0.70
23	16.9	2.25	0.70
24	17.6	2.26	0.70
25	18.3	2.12	0.70
26	19.0	1.45	0.70
27	19.7	0.83	0.70
28	20.4	0.29	0.50
29	20.9	0.00	0.00

Must manually select "COUNT" range for continuous cells								
Wetted Width this Event:	19.4	(ft) Width:	16.8	16.8	17.5	17.5	17.5	17.5
Maximum Transect Length**:	19.4	(ft) Percent:	86.6 %	86.6 %	90.2 %	90.2 %	90.2 %	90.2 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Transect Name: R-4
 Site Description: Creekmouth
 GPS Coordinate: N37.05930; W122.07835 (acc. = 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 2- high
 Critical Riffle Total Width hp to tp (ft): 19.40
 Reference Discharge (cfs): 58.2
 Meter number: 1
 Notes: SLR Big Trees 2010 cfs @ 0950hr
Shallowest transect in riffle

Date: 3/14/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner

Photo File Name: _____

Staff Gage Start: 445 mm End: 430 mm

Time Start: 9:50 Time Stop: 10:03

LBW E: 1.5 RBW E: 20.9

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
86.6 %	86.6 %	90.2 %	90.2 %	100.0 %	100.0 %

Station	Distance	Depth*	Width
1	1.5	0.00	0.70
2	2.2	0.29	0.70
3	2.9	0.51	0.70
4	3.6	0.78	0.70
5	4.3	1.07	0.70
6	5.0	1.26	0.70
7	5.7	1.48	0.70
8	6.4	1.51	0.70

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.7	0.7
		0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7

0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
				0.7	0.7

Wetted Width this Event:	19.4	(ft) Width:	16.8	16.8	17.5	17.5	19.4	19.4
Maximum Transect Length**:	19.4	(ft) Percent:	86.6 %	86.6 %	90.2 %	90.2%	100.0 %	100.0 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Transect Name: R-3a
 Site Description: Creekmouth
 GPS Coordinate: N37.05930; W122.07835 (acc. = 8 m)
 Sample Event No. (1-6) and targeted flow: 3- high middle
 Critical Riffle Total Width hp to tp (ft): 30.70
 Reference Discharge (cfs): 40
 Meter number: 1
 Notes: SLR Big Trees 948 cfs @ 1221hr; 921 @ 1255hr @ 1311hr

Date: 3/15/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner

Photo File Name: _____

Staff Gage Start: 267 mm End: 267 mm

Time Start: 12:24 Time Stop: 12:53

LBW E: 3.8 RBW E: 34.5

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
37.1 %	15.6 %	72.3 %	31.3 %	72.3 %	31.3 %

Station	Distance	Depth*	Width
1	3.3	0.00	0.60
2	3.9	0.05	0.60
3	4.5	0.10	0.60
4	5.1	0.25	0.60
5	5.7	0.47	0.60
6	6.3	0.82	0.60
7	6.9	0.90	0.60
8	7.5	0.77	0.60
9	8.1	0.79	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6

10	8.7	0.80	0.60
11	9.3	0.82	0.60
12	9.9	0.85	0.60
13	10.5	1.03	0.60
14	11.1	0.20	0.60
15	11.7	0.17	0.60
16	12.3	0.75	0.60
17	12.9	0.75	0.60
18	13.5	0.70	0.60
19	14.1	0.56	0.60
20	14.7	0.70	0.60
21	15.3	0.61	0.60
22	15.9	0.85	0.60
23	16.5	0.90	0.60
24	17.1	0.56	0.60
25	17.7	0.74	0.60
26	18.3	0.54	0.60
27	18.9	0.73	0.60
28	19.5	0.66	0.60
29	20.1	0.90	0.60
30	20.7	0.63	0.60

0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6

Station	Distance	Depth	Width
31	21.3	0.58	0.60
32	21.9	0.11	0.60
33	22.5	0.15	0.60
34	23.1	0.49	0.60
35	23.7	0.27	0.60
36	24.3	0.17	0.60
37	24.9	0.17	0.60
38	25.5	0.16	0.60
39	26.1	0.69	0.60
40	26.7	0.65	0.60
41	27.3	0.07	0.60
42	27.9	0.15	0.60
43	28.5	0.58	0.60
44	29.1	0.12	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6

45	29.7	0.67	0.60
46	30.3	0.80	0.60
47	30.9	0.50	0.60
48	31.5	0.65	0.60
49	32.1	0.70	0.60
50	32.7	0.64	0.60
51	33.3	0.56	0.60
52	33.9	0.45	0.60
53	34.5	0.00	0.00

		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	30.7	(ft) Width:	11.4	4.8	22.2	9.6	22.2	9.6
Maximum Transect Length**:	30.7	(ft) Percent:	37.1 %	15.6 %	72.3 %	31.3%	72.3 %	31.3 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder

Site Name Fall 3

Transect Name: R-3a

Site Description: Creekmouth

GPS Coordinates: N37.05930; W122.07835 (acc. = 8 m)

CRA Sample Event No. (1-6) and targeted flow: 3- high middle

Critical Riffle Total Width hp to tp (ft): 30.70

Reference Discharge (cfs): 40

Meter number: 1

Notes: SLR Big Trees 948 cfs @ 1221hr; 921 @ 1255hr @ 1311hr

Date: 3/15/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: _____

Staff Gage Start: 267 mm End: 267 mm

Time Start: 12:24 Time Stop: 12:53

LBW E: 3.8 RBW E: 34.5

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
52.8 %	15.6 %	68.4 %	31.3 %	80.1 %	31.3 %

Station	Distance	Depth*	Width
1	3.3	0.00	0.60
2	3.9	0.05	0.60
3	4.5	0.10	0.60
4	5.1	0.25	0.60
5	5.7	0.47	0.60
6	6.3	0.82	0.60
7	6.9	0.90	0.60
8	7.5	0.77	0.60
9	8.1	0.79	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.6	0.6
				0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6

10	8.7	0.80	0.60
11	9.3	0.82	0.60
12	9.9	0.85	0.60
13	10.5	1.03	0.60
14	11.1	0.20	0.60
15	11.7	0.17	0.60
16	12.3	0.75	0.60
17	12.9	0.75	0.60
18	13.5	0.70	0.60
19	14.1	0.56	0.60
20	14.7	0.70	0.60
21	15.3	0.61	0.60
22	15.9	0.85	0.60
23	16.5	0.90	0.60
24	17.1	0.56	0.60
25	17.7	0.74	0.60
26	18.3	0.54	0.60
27	18.9	0.73	0.60
28	19.5	0.66	0.60
29	20.1	0.90	0.60
30	20.7	0.63	0.60

24 0.58

Station	Distance	Depth	Width
31	21.3	0.58	0.60
32	21.9	0.11	0.60
33	22.5	0.15	0.60
34	23.1	0.49	0.60
35	23.7	0.27	0.60
36	24.3	0.17	0.60
37	24.9	0.17	0.60
38	25.5	0.16	0.60
39	26.1	0.69	0.60
40	26.7	0.65	0.60
41	27.3	0.07	0.60
42	27.9	0.15	0.60
43	28.5	0.58	0.60
44	29.1	0.12	0.60

0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
				0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6

0.6 0.6

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.6	0.6	0.6	0.6
				0.6	0.6
				0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6

45	29.7	0.67	0.60
46	30.3	0.80	0.60
47	30.9	0.50	0.60
48	31.5	0.65	0.60
49	32.1	0.70	0.60
50	32.7	0.64	0.60
51	33.3	0.56	0.60
52	33.9	0.45	0.60
53	34.5	0.00	0.00

0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	30.7	(ft) Width:	16.2	4.8	21.0	9.6	24.6	9.6
Maximum Transect Length**:	30.7	(ft) Percent:	52.8 %	15.6 %	68.4 %	31.3 %	80.1 %	31.3 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Riffle Name: R-3a
 Site Description: Creekmouth
 GPS Coordinates: N37.05930; W122.07835 (acc. = 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 2- high
 Critical Riffle Total Width hp to tp (ft): 30.70
 Reference Discharge (cfs): 30.3
 Meter number: 1
 Notes: SLR Big Trees 505 cfs @ 1033hr; 489 cfs @ 1125hr

Date: 3/17/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner

Photo File Name: _____

Staff Gage Start: 258 mm End: 258 mm

Time Start: 10:08 Time Stop: 10:33

LBW E: 5.1 RBW E: 34.5

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
13.7 %	5.9%	52.8 %	15.6 %	66.4 %	17.6 %

Station	Distance	Depth*	Width
1	5.1	0.00	0.60
2	5.7	0.14	0.60
3	6.3	0.61	0.60
4	6.9	0.63	0.60
5	7.5	0.56	0.60
6	8.1	0.67	0.60
7	8.7	0.45	0.60
8	9.3	0.56	0.60
9	9.9	0.60	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6

10	10.5	0.70	0.60
11	11.1	0.03	0.60
12	11.7	0.00	0.60
13	12.3	0.47	0.60
14	12.9	0.47	0.60
15	13.5	0.30	0.60
16	14.1	0.27	0.60
17	14.7	0.41	0.60
18	15.3	0.37	0.60
19	15.9	0.21	0.60
20	16.5	0.35	0.60
21	17.1	0.30	0.60
22	17.7	0.63	0.60
23	18.3	0.55	0.60
24	18.9	0.70	0.60
25	19.5	0.75	0.60
26	20.1	0.70	0.60
27	20.7	0.46	0.60
28	21.3	0.75	0.60
29	21.9	0.06	0.60
30	22.5	0.11	0.60

24 0.39

Station	Distance	Depth	Width
31	23.1	0.39	0.60
32	23.7	0.27	0.60
33	24.3	0.15	0.60
34	24.9	0.16	0.60
35	25.5	0.05	0.60
36	26.1	0.75	0.60
37	26.7	0.65	0.60
38	27.3	0.16	0.60
39	27.9	0.10	0.60
40	28.5	0.53	0.60
41	29.1	0.13	0.60
42	29.7	0.43	0.60
43	30.3	0.74	0.60
44	30.9	0.29	0.60

0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6

0.6

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6

45	31.5	0.59	0.60
46	32.1	0.59	0.60
47	32.7	0.59	0.60
48	33.3	0.52	0.60
49	33.9	0.30	0.60
50	34.5	0.00	0.00

		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	29.4	(ft) Width:	4.2	1.8	16.2	4.8	20.4	5.4
Maximum Transect Length**:	30.7	(ft) Percent:	13.7 %	5.9%	52.8 %	15.6 %	66.4 %	17.6 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder

Site Name: Fall 3

Riffle Name: R-3a

Site Description: Creekmouth

GPS Coordinates: N37.05930; W122.07835 (acc. = 8 m)

CRA Sample Event No. (1-6) and targeted flow: 2- high

Critical Riffle Total Width hp to tp (ft): 30.70

Reference Discharge (cfs): 30.3

Meter number: 1

Notes: SLR Big Trees 505 cfs @ 1033hr; 489 cfs @ 1125hr

Date: 3/17/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: _____

Staff Gage Start: 258 mm End: 258 mm

Time Start: 10:08 Time Stop: 10:33

LBW E: 5.1 RBW E: 34.5

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
25.4 %	5.9%	41.0 %	9.8%	74.3 %	31.3 %

Station	Distance	Depth*	Width
1	5.1	0.00	0.60
2	5.7	0.14	0.60
3	6.3	0.61	0.60
4	6.9	0.63	0.60
5	7.5	0.56	0.60
6	8.1	0.67	0.60
7	8.7	0.45	0.60
8	9.3	0.56	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6

9	9.9	0.60	0.60
10	10.5	0.70	0.60
11	11.1	0.03	0.60
12	11.7	0.00	0.60
13	12.3	0.47	0.60
14	12.9	0.47	0.60
15	13.5	0.30	0.60
16	14.1	0.27	0.60
17	14.7	0.41	0.60
18	15.3	0.37	0.60
19	15.9	0.21	0.60
20	16.5	0.35	0.60
21	17.1	0.30	0.60
22	17.7	0.63	0.60
23	18.3	0.55	0.60
24	18.9	0.70	0.60
25	19.5	0.75	0.60
26	20.1	0.70	0.60
27	20.7	0.46	0.60
28	21.3	0.75	0.60
29	21.9	0.06	0.60
30	22.5	0.11	0.60

24 0.39

Station	Distance	Depth	Width
31	23.1	0.39	0.60
32	23.7	0.27	0.60
33	24.3	0.15	0.60
34	24.9	0.16	0.60
35	25.5	0.05	0.60
36	26.1	0.75	0.60
37	26.7	0.65	0.60
38	27.3	0.16	0.60
39	27.9	0.10	0.60
40	28.5	0.53	0.60
41	29.1	0.13	0.60
42	29.7	0.43	0.60
43	30.3	0.74	0.60

0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
				0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6

0.6

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.6	0.6
				0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6

44	30.9	0.29	0.60
45	31.5	0.59	0.60
46	32.1	0.59	0.60
47	32.7	0.59	0.60
48	33.3	0.52	0.60
49	33.9	0.30	0.60
50	34.5	0.00	0.00

				0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	29.4	(ft) Width:	7.8	1.8	12.6	3.0	22.8	9.6
Maximum Transect Length**:	30.7	(ft) Percent:	25.4 %	5.9%	41.0 %	9.8%	74.3 %	31.3 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Riffle Name: R-3a
 Site Description: Creekmouth
 GPS Coordinate: N37.05930; W122.07835 (acc. = 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 5- middle
 Critical Riffle Total Width hp to tp (ft): 30.70
 Reference Discharge (cfs): 16.7
 Meter number: 1
 Notes: SLR Big Trees 193 cfs @ 1217hr & 1251hr

Date: 3/26/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner

Photo File Name: _____

Staff Gage Start: 196 mm End: 196 mm

Time Start: 12:16 Time Stop: 12:40

LBW E: 6.0 RBW E: 34.5

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
2.0 %	2.0%	29.3 %	15.6%	46.9 %	15.6 %

Station	Distance	Depth*	Width
1	5.7	0.00	0.60
2	6.3	0.49	0.60
3	6.9	0.47	0.60
4	7.5	0.40	0.60
5	8.1	0.49	0.60
6	8.7	0.45	0.60
7	9.3	0.49	0.60
8	9.9	0.51	0.60
9	10.5	0.50	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6

10	11.1	0.00	0.60
11	11.7	0.00	0.60
12	12.3	0.31	0.60
13	12.9	0.32	0.60
14	13.5	0.20	0.60
15	14.1	0.10	0.60
16	14.7	0.30	0.60
17	15.3	0.34	0.60
18	15.9	0.31	0.60
19	16.5	0.40	0.60
20	17.1	0.20	0.60
21	17.7	0.51	0.60
22	18.3	0.46	0.60
23	18.9	0.71	0.60
24	19.5	0.34	0.60
25	20.1	0.45	0.60
26	20.7	0.31	0.60
27	21.3	0.19	0.60
28	21.9	0.00	0.60
29	22.5	0.00	0.60
30	23.1	0.50	0.60

24 0.04

Station	Distance	Depth	Width
31	23.7	0.04	0.60
32	24.3	0.02	0.60
33	24.9	0.00	0.60
34	25.5	0.00	0.60
35	26.1	0.41	0.60
36	26.7	0.25	0.60
37	27.3	0.03	0.60
38	27.9	0.06	0.60
39	28.5	0.35	0.60
40	29.1	0.05	0.60
41	29.7	0.20	0.60
42	30.3	0.20	0.60
43	30.9	0.26	0.60
44	31.5	0.10	0.60

				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.6	0.6	0.6	0.6
				0.6	0.6

45	32.1	0.09	0.60
46	32.7	0.35	0.60
47	33.3	0.15	0.60
48	33.9	0.18	0.60
49	34.5	0.00	0.00

				0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	28.8	(ft) Width:	0.6	0.6	9.0	4.8	14.4	4.8
Maximum Transect Length**:	30.7	(ft) Percent:	2.0 %	2.0%	29.3 %	15.6%	46.9 %	15.6 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Riffle Name: R-3a
 Site Description: Creekmouth
 GPS Coordinate: N37.05930; W122.07835 (acc. = 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 5- middle
 Critical Riffle Total Width hp to tp (ft): 30.70
 Reference Discharge (cfs): 16.7
 Meter number: 1
 Notes: SLR Big Trees 193 cfs @ 1217hr & 1251hr

Date: 3/26/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner

Photo File Name: _____

Staff Gage Start: 196 mm End: 196 mm

Time Start: 12:16 Time Stop: 12:40

LBW E: 6.0 RBW E: 34.5

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
2.0 %	2.0%	9.8 %	3.9%	58.6 %	21.5 %

Station	Distance	Depth*	Width
1	5.7	0.00	0.60
2	6.3	0.49	0.60
3	6.9	0.47	0.60
4	7.5	0.40	0.60
5	8.1	0.49	0.60
6	8.7	0.45	0.60
7	9.3	0.49	0.60
8	9.9	0.51	0.60
9	10.5	0.50	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6

10	11.1	0.00	0.60
11	11.7	0.00	0.60
12	12.3	0.31	0.60
13	12.9	0.32	0.60
14	13.5	0.20	0.60
15	14.1	0.10	0.60
16	14.7	0.30	0.60
17	15.3	0.34	0.60
18	15.9	0.31	0.60
19	16.5	0.40	0.60
20	17.1	0.20	0.60
21	17.7	0.51	0.60
22	18.3	0.46	0.60
23	18.9	0.71	0.60
24	19.5	0.34	0.60
25	20.1	0.45	0.60
26	20.7	0.31	0.60
27	21.3	0.19	0.60
28	21.9	0.00	0.60
29	22.5	0.00	0.60
30	23.1	0.50	0.60

24 0.04

Station	Distance	Depth	Width
31	23.7	0.04	0.60
32	24.3	0.02	0.60
33	24.9	0.00	0.60
34	25.5	0.00	0.60
35	26.1	0.41	0.60
36	26.7	0.25	0.60
37	27.3	0.03	0.60
38	27.9	0.06	0.60
39	28.5	0.35	0.60
40	29.1	0.05	0.60
41	29.7	0.20	0.60
42	30.3	0.20	0.60
43	30.9	0.26	0.60
44	31.5	0.10	0.60

				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6

45	32.1	0.09	0.60
46	32.7	0.35	0.60
47	33.3	0.15	0.60
48	33.9	0.18	0.60
49	34.5	0.00	0.00

				0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	28.8	(ft) Width:	0.6	0.6	3.0	1.2	18.0	6.6
Maximum Transect Length**:	30.7	(ft) Percent	2.0 %	2.0%	9.8 %	3.9%	58.6 %	21.5 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Riffle Name: R-3a
 Site Description: Creekmouth
 GPS Coordinate: N37.05930; W122.07835
 s: (acc. = 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 6- low medium
 Critical Riffle Total Width hp to tp (ft): 30.70
 Reference Discharge (cfs): 14.9
 Meter number: 1
 Notes: 158 CFS @ 1159hr & 1254hr

Date: 3/29/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner
 Photo File Name: _____
 Staff Gage: 196 196
 Start: mm End: mm

Time Start: 11:59 Time Stop: 12:21

LBWE: 6.3 RBWE: 34.2

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	39.1 %	13.7%	45.0 %	13.7 %

Station	Distance	Depth*	Width
1	5.7	0.00	0.60
2	6.3	0.00	0.60
3	6.9	0.43	0.60
4	7.5	0.50	0.60
5	8.1	0.46	0.60
6	8.7	0.44	0.60
7	9.3	0.42	0.60
8	9.9	0.50	0.60
9	10.5	0.43	0.60
10	11.1	0.00	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6

11	11.7	0.00	0.60
12	12.3	0.26	0.60
13	12.9	0.35	0.60
14	13.5	0.18	0.60
15	14.1	0.11	0.60
16	14.7	0.28	0.60
17	15.3	0.21	0.60
18	15.9	0.34	0.60
19	16.5	0.34	0.60
20	17.1	0.19	0.60
21	17.7	0.54	0.60
22	18.3	0.43	0.60
23	18.9	0.47	0.60
24	19.5	0.58	0.60
25	20.1	0.46	0.60
26	20.7	0.47	0.60
27	21.3	0.55	0.60
28	21.9	0.00	0.60
29	22.5	0.00	0.60
30	23.1	0.45	0.60

24

Station	Distance	Depth	Width
31	23.7	0.00	0.60
32	24.3	0.01	0.60
33	24.9	0.00	0.60
34	25.5	0.00	0.60
35	26.1	0.42	0.60
36	26.7	0.40	0.60
37	27.3	0.00	0.60
38	27.9	0.06	0.60
39	28.5	0.41	0.60
40	29.1	0.00	0.60
41	29.7	0.04	0.60
42	30.3	0.44	0.60
43	30.9	0.25	0.60
44	31.5	0.14	0.60
45	32.1	0.14	0.60

				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6

46	32.7	0.44	0.60
47	33.3	0.05	0.60
48	33.9	0.21	0.60
49	34.5	0.00	0.00

		0.6	0.6	0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	28.8	(ft) Width:	0.0	0.0	12.0	4.2	13.8	4.2
Maximum Transect Length**:	30.7	(ft) Percent	0.0 %	0.0%	39.1 %	13.7%	45.0 %	13.7 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Riffle Name: R-3a
 Site Description: Creekmouth
 GPS Coordinates: N37.05930; W122.07835
 : (acc. = 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 6- low medium
 Critical Riffle Total Width hp to tp (ft): 30.70
 Reference Discharge (cfs): 14.9
 Meter number: 1
 Notes: 158 CFS @ 1159hr & 1254hr

Date: 3/29/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner
 Photo File Name: _____
 Staff Gage Start: 196 mm End: 196 mm

Time Start: 11:59 Time Stop: 12:21

LBWE : 6.3 RBWE : 34.2

Target Species Depth Criteria (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	9.8%	2.0%	54.7 %	13.7 %

Station	Distance	Depth*	Width
1	5.7	0.00	0.60
2	6.3	0.00	0.60
3	6.9	0.43	0.60
4	7.5	0.50	0.60
5	8.1	0.46	0.60
6	8.7	0.44	0.60
7	9.3	0.42	0.60
8	9.9	0.50	0.60
9	10.5	0.43	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6

10	11.1	0.00	0.60
11	11.7	0.00	0.60
12	12.3	0.26	0.60
13	12.9	0.35	0.60
14	13.5	0.18	0.60
15	14.1	0.11	0.60
16	14.7	0.28	0.60
17	15.3	0.21	0.60
18	15.9	0.34	0.60
19	16.5	0.34	0.60
20	17.1	0.19	0.60
21	17.7	0.54	0.60
22	18.3	0.43	0.60
23	18.9	0.47	0.60
24	19.5	0.58	0.60
25	20.1	0.46	0.60
26	20.7	0.47	0.60
27	21.3	0.55	0.60
28	21.9	0.00	0.60
29	22.5	0.00	0.60
30	23.1	0.45	0.60

24

Station	Distance	Depth	Width
31	23.7	0.00	0.60
32	24.3	0.01	0.60
33	24.9	0.00	0.60
34	25.5	0.00	0.60
35	26.1	0.42	0.60
36	26.7	0.40	0.60
37	27.3	0.00	0.60
38	27.9	0.06	0.60
39	28.5	0.41	0.60
40	29.1	0.00	0.60
41	29.7	0.04	0.60
42	30.3	0.44	0.60
43	30.9	0.25	0.60
44	31.5	0.14	0.60

				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6

45	32.1	0.14	0.60
46	32.7	0.44	0.60
47	33.3	0.05	0.60
48	33.9	0.21	0.60
49	34.5	0.00	0.00

				0.6	0.6
				0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	28.8	(ft) Width:	0.0	0.0	3.0	0.6	16.8	4.2
Maximum Transect Length**:	30.7	(ft) Percent	0.0 %	0.0%	9.8%	2.0%	54.7 %	13.7 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Riffle Name: R-3a
 Site Description: Creekmouth
 GPS Coordinate: N37.05930; W122.07835 (acc. = 8 m)
 CRA Sample Event No. (1-6) and targeted flow: low middle
 Critical Riffle Total Width hp to tp (ft): 30.70
 Reference Discharge (cfs): 11.8
 Meter number: 1
 Notes: 108 cfs @ 1214hr; 106 cfs @ 1354 hr

Date: 4/4/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner

Photo File Name: Photo 10-13

Staff Gage Start: 178 mm End: 178 mm

Time Start: 12:13 Time Stop: 12:42

LBWE: 6.3 RBW E: 34.2

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	9.8%	3.9%	35.2 %	13.7 %

Station	Distance	Depth*	Width
1	5.7	0.00	0.60
2	6.3	0.00	0.60
3	6.9	0.36	0.60
4	7.5	0.35	0.60
5	8.1	0.45	0.60
6	8.7	0.30	0.60
7	9.3	0.35	0.60
8	9.9	0.35	0.60
9	10.5	0.47	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6

10	11.1	0.00	0.60
11	11.7	0.00	0.60
12	12.3	0.24	0.60
13	12.9	0.32	0.60
14	13.5	0.10	0.60
15	14.1	0.06	0.60
16	14.7	0.21	0.60
17	15.3	0.20	0.60
18	15.9	0.28	0.60
19	16.5	0.29	0.60
20	17.1	0.10	0.60
21	17.7	0.39	0.60
22	18.3	0.39	0.60
23	18.9	0.32	0.60
24	19.5	0.47	0.60
25	20.1	0.44	0.60
26	20.7	0.39	0.60
27	21.3	0.39	0.60
28	21.9	0.00	0.60
29	22.5	0.00	0.60
30	23.1	0.20	0.60

24 0.00

Station	Distance	Depth	Width
31	23.7	0.00	0.60
32	24.3	0.00	0.60
33	24.9	0.00	0.60
34	25.5	0.00	0.60
35	26.1	0.32	0.60
36	26.7	0.18	0.60
37	27.3	0.00	0.60
38	27.9	0.03	0.60
39	28.5	0.30	0.60
40	29.1	0.00	0.60
41	29.7	0.02	0.60
42	30.3	0.18	0.60
43	30.9	0.16	0.60
44	31.5	0.06	0.60

				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
				0.6	0.6
				0.6	0.6

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.6	0.6
				0.6	0.6

45	32.1	0.06	0.60
46	32.7	0.40	0.60
47	33.3	0.00	0.60
48	33.9	0.20	0.60
49	34.5	0.00	0.00

		0.6	0.6	0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	27.9 0	(ft) Width:	0.0	0.0	3.0	1.2	10.8	4.2
Maximum Transect Length**:	30.7 0	(ft) Percent:	0.0 %	0.0%	9.8%	3.9%	35.2 %	13.7 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Riffle Name: R-3a
 Site Description: Creekmouth
 GPS Coordinate: N37.05930; W122.07835 (acc. = 8 m)
 CRA Sample Event No. (1-6) and targeted flow: low middle
 Critical Riffle Total Width hp to tp (ft): 30.70
 Reference Discharge (cfs): 11.8
 Meter number: 1
 Notes: 108 cfs @ 1214hr; 106 cfs @ 1354 hr

Date: 4/4/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner

Photo File Name: Photo 10-13

Staff Gage Start: 178 mm End: 178 mm

Time Start: 12:13 Time Stop: 12:42

LBWE: 6.3 RBWE: 34.2

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	0.0%	0.0%	48.9 %	13.7 %

Station	Distance	Depth*	Width
1	5.7	0.00	0.60
2	6.3	0.00	0.60
3	6.9	0.36	0.60
4	7.5	0.35	0.60
5	8.1	0.45	0.60
6	8.7	0.30	0.60
7	9.3	0.35	0.60
8	9.9	0.35	0.60
9	10.5	0.47	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6

10	11.1	0.00	0.60
11	11.7	0.00	0.60
12	12.3	0.24	0.60
13	12.9	0.32	0.60
14	13.5	0.10	0.60
15	14.1	0.06	0.60
16	14.7	0.21	0.60
17	15.3	0.20	0.60
18	15.9	0.28	0.60
19	16.5	0.29	0.60
20	17.1	0.10	0.60
21	17.7	0.39	0.60
22	18.3	0.39	0.60
23	18.9	0.32	0.60
24	19.5	0.47	0.60
25	20.1	0.44	0.60
26	20.7	0.39	0.60
27	21.3	0.39	0.60
28	21.9	0.00	0.60
29	22.5	0.00	0.60
30	23.1	0.20	0.60

24 0.00

Station	Distance	Depth	Width
31	23.7	0.00	0.60
32	24.3	0.00	0.60
33	24.9	0.00	0.60
34	25.5	0.00	0.60
35	26.1	0.32	0.60
36	26.7	0.18	0.60
37	27.3	0.00	0.60
38	27.9	0.03	0.60
39	28.5	0.30	0.60
40	29.1	0.00	0.60
41	29.7	0.02	0.60
42	30.3	0.18	0.60
43	30.9	0.16	0.60
44	31.5	0.06	0.60

				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.6	0.6
				0.6	0.6

45	32.1	0.06	0.60
46	32.7	0.40	0.60
47	33.3	0.00	0.60
48	33.9	0.20	0.60
49	34.5	0.00	0.00

				0.6	0.6
				0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	27.9 0	(ft) Width:	0.0	0.0	0.0	0.0	15.0	4.2
Maximum Transect Length**:	30.7 0	(ft) Percent:	0.0 %	0.0%	0.0%	0.0%	48.9 %	13.7 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Riffle Name: R-3a
 Site Description: Creekmouth
 GPS Coordinate: N37.05930; W122.07835 (acc. = 8 m)
 CRA Sample Event No. (1-6) and targeted flow: low
 Critical Riffle Total Width hp to tp (ft): 27.90
 Reference Discharge (cfs): 6.2
 Meter number: 1
 Notes: SLR Big Tree 48 cfs @ 1158hr and 1325hr

Date: 5/4/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner

Photo File Name: Photos 7-11

Staff Gage Start: 120 mm End: 120 mm

Time Start: 120 0 hr Time Stop: 1218 hr

LBW E: 6.3 RBW E: 34.2

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	9.8 %	3.9%	19.5 %	5.9%

Station	Distance	Depth*	Width
1	5.7	0.00	0.60
2	6.3	0.00	0.60
3	6.9	0.40	0.60
4	7.5	0.30	0.60
5	8.1	0.39	0.60
6	8.7	0.22	0.60
7	9.3	0.33	0.60
8	9.9	0.16	0.60
9	10.5	0.45	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.6	0.6	0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
		0.6	0.6	0.6	0.6

10	11.1	0.00	0.60
11	11.7	0.00	0.60
12	12.3	0.22	0.60
13	12.9	0.29	0.60
14	13.5	0.06	0.60
15	14.1	0.16	0.60
16	14.7	0.19	0.60
17	15.3	0.16	0.60
18	15.9	0.20	0.60
19	16.5	0.22	0.60
20	17.1	0.06	0.60
21	17.7	0.33	0.60
22	18.3	0.25	0.60
23	18.9	0.25	0.60
24	19.5	0.44	0.60
25	20.1	0.43	0.60
26	20.7	0.29	0.60
27	21.3	0.43	0.60
28	21.9	0.00	0.60
29	22.5	0.00	0.60
30	23.1	0.15	0.60

				0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6
		0.6	0.6	0.6	0.6

Station	Distance	Depth	Width
31	23.7	0.00	0.60
32	24.3	0.00	0.60
33	24.9	0.00	0.60
34	25.5	0.00	0.60
35	26.1	0.21	0.60
36	26.7	0.15	0.60
37	27.3	0.00	0.60
38	27.9	0.00	0.60
39	28.5	0.11	0.60
40	29.1	0.00	0.60
41	29.7	0.00	0.60
42	30.3	0.13	0.60
43	30.9	0.12	0.60
44	31.5	0.02	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.

45	32.1	0.03	0.60
46	32.7	0.35	0.60
47	33.3	0.00	0.60
48	33.9	0.10	0.60
49	34.5	0.00	0.00

				0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	27.9 0	(ft) Width:	0.0	0.0	3.0	1.2	6.0	1.8
Maximum Transect Length**:	30.7 0	(ft) Percent:	0.0 %	0.0%	9.8 %	3.9%	19.5 %	5.9%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek below the Fish Ladder
 Site Name: Fall 3
 Riffle Name: R-3a
 Site Description: Creekmouth
 GPS Coordinate: N37.05930; W122.07835 (acc. = 8 m)
 CRA Sample Event No. (1-6) and targeted flow: 2- high
 Critical Riffle Total Width hp to tp (ft): 27.90
 Reference Discharge (cfs): 6.2
 Meter number: 1
 Notes: SLR Big Trees 48 cfs @ 1158hr & 1325hr

Date: 5/4/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner

Photo File Name: Photos 7-11

Staff Gage Start: 120 mm End: 120 mm

Time Start: 120 0 hr Time Stop: 1218 hr

LBW E: 6.3 RBW E: 34.2

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	0.0 %	0.0%	37.1 %	13.7 %

Station	Distance	Depth*	Width
1	5.7	0.00	0.60
2	6.3	0.00	0.60
3	6.9	0.40	0.60
4	7.5	0.30	0.60
5	8.1	0.39	0.60
6	8.7	0.22	0.60
7	9.3	0.33	0.60
8	9.9	0.16	0.60
9	10.5	0.45	0.60

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6

10	11.1	0.00	0.60
11	11.7	0.00	0.60
12	12.3	0.22	0.60
13	12.9	0.29	0.60
14	13.5	0.06	0.60
15	14.1	0.16	0.60
16	14.7	0.19	0.60
17	15.3	0.16	0.60
18	15.9	0.20	0.60
19	16.5	0.22	0.60
20	17.1	0.06	0.60
21	17.7	0.33	0.60
22	18.3	0.25	0.60
23	18.9	0.25	0.60
24	19.5	0.44	0.60
25	20.1	0.43	0.60
26	20.7	0.29	0.60
27	21.3	0.43	0.60
28	21.9	0.00	0.60
29	22.5	0.00	0.60
30	23.1	0.15	0.60

24

Station	Distance	Depth	Width
31	23.7	0.00	0.60
32	24.3	0.00	0.60
33	24.9	0.00	0.60
34	25.5	0.00	0.60
35	26.1	0.21	0.60
36	26.7	0.15	0.60
37	27.3	0.00	0.60
38	27.9	0.00	0.60
39	28.5	0.11	0.60
40	29.1	0.00	0.60
41	29.7	0.00	0.60
42	30.3	0.13	0.60
43	30.9	0.12	0.60
44	31.5	0.02	0.60

				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6
				0.6	0.6

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.6	0.6

45	32.1	0.03	0.60
46	32.7	0.35	0.60
47	33.3	0.00	0.60
48	33.9	0.10	0.60
49	34.5	0.00	0.00

				0.6	0.6

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	27.9 0	(ft) Width:	0.00	0.00	0.00	0.00	11.40	4.20
Maximum Transect Length**:	30.7 0	(ft) Percent:	0.0 %	0.0 0.0%	0.0 %	0.0 0.0%	37.1 %	13.7 %

Critical Riffle Analysis for Fish Passage in California
Standard Operating Procedure DFG-IFP-001
Cumulative Calculations and Linear Regression Coordinates from 3 transects

Location: Fall Creek below the Fish Ladder

Site Name Fall 3

Riffle Name: Transects #3a, #4 and #5

Site Description: Creekmouth

GPS Coordinates: N37.05930; W122.07835 (acc. = 8 m)

Date: 5/5/2016

Data Entry Staff: Alley

Notes: _____	Target Depth (ft):	0.7	0.4	0.3
--------------	--------------------	-----	-----	-----

Event	Flow (cfs)	Percent Total (0.7)	Percent Total (0.4)	Percent Total (0.3)
2	58.2	86.6	90.2	90.2
3	40	37.1	74.3	74.3
4	30.3	0	21.5	27.4
5	16.6	0	5.9	19.6
6	14.9	0	2	7.8
7	11.8	0	2	7.8
8	6.2	0	0	2

Event	Flow (cfs)	Percent Cont. (0.7)	Percent Cont. (0.4)	Percent Cont. (0.3)
2	58.2	86.6	90.2	90.2
3	40	15.6	31.3	31.3
4	30.3	0	7.8	7.8
5	16.6	0	3.9	3.9
6	14.9	0	2	3.9
7	11.8	0	2	3.9
8	6.2	0	0	2

Flow (cfs)	Percent Total (0.4)
58.2	90.2
40	74.3
30.3	21.5
16.6	5.9
14.9	2
11.8	2
6.2	0

Flow (cfs)	Percent Total (0.3)
58.2	90.2
40	74.3
30.3	27.4
16.6	19.6
14.9	7.8
11.8	7.8
6.2	2

Flow (cfs)	Percent Cont. (0.4)
58.2	90.2
40	31.3
30.3	7.8
16.6	3.9
14.9	2
11.8	2
6.2	0

Flow (cfs)	Percent Cont. (0.3)
58.2	90.2
40	31.3
30.3	7.8
16.6	3.9
14.9	3.9
11.8	3.9
6.2	2

**Appendix B4. Data Tables for Transect 5 (Critical Riffle 3) and Channel
Width Calculations at Various Depth Criteria.**

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek at Creekmouth

Site Name Fall #3

Riffle Name: R-5

Site Description: Lowermost transect across riffle

GPS Coordinates: N37.05930; W122.07835

CRA Sample Event No. (1-6) and targeted flow: 1- high

Critical Riffle Total Width hp to tp (ft): 35.8

Reference Discharge (cfs): 30.3

Meter number: 1

Notes: SLR Big Trees 512 cfs @ 0931hr; 489 cfs @ 1125hr

Date: 3/17/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: Photos 1-3

Staff Gage Start: 258m End: 258m

Time Start: 9:31 Time Stop: 10:02

LBW E: 4.0 RBW E: 39.8

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	21.5 %	7.8%	27.4 %	7.8 %

Station	Distance	Depth*	Width
1	4.0	0.00	0.70
2	4.7	0.26	0.70
3	5.4	0.05	0.70
4	6.1	0.53	0.70
5	6.8	0.00	0.70
6	7.5	0.00	0.70
7	8.2	0.30	0.70
8	8.9	0.17	0.70

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.7	0.7	0.7	0.7
				0.7	0.7

9	9.6	0.21	0.70
10	10.3	0.26	0.70
11	11.0	0.13	0.70
12	11.7	0.15	0.70
13	12.4	0.11	0.70
14	13.1	0.03	0.70
15	13.8	0.09	0.70
16	14.5	0.02	0.70
17	15.2	0.00	0.70
18	15.9	0.17	0.70
19	16.6	0.10	0.70
20	17.3	0.01	0.70
21	18.0	0.43	0.70
22	18.7	0.01	0.70
23	19.4	0.09	0.70
24	20.1	0.02	0.70
25	20.8	0.60	0.70
26	21.5	0.19	0.70
27	22.2	0.00	0.70
28	22.9	0.00	0.70
29	23.6	0.29	0.70
30	24.3	0.26	0.70

		0.7	0.7	0.7	0.7
		0.7	0.7	0.7	0.7

Station	Distance	Depth	Width
31	25.0	0.40	0.70
32	25.7	0.35	0.70
33	26.4	0.20	0.70
34	27.1	0.06	0.70
35	27.8	0.26	0.70
36	28.5	0.00	0.70
37	29.2	0.00	0.70
38	29.9	0.00	0.70
39	30.6	0.31	0.70
40	31.3	0.08	0.70
41	32.0	0.03	0.70
42	32.7	0.06	0.70
43	33.4	0.01	0.70

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
		0.7	0.7	0.7	0.7
				0.7	0.7
				0.7	0.7

44	34.1	0.01	0.70
45	34.8	0.40	0.70
46	35.5	0.51	0.70
47	36.2	0.57	0.70
48	36.9	0.57	0.70
49	37.6	0.06	0.70
50	38.3	0.20	0.70
51	39.0	0.63	0.70
52	39.7	0.64	0.10
53	39.8	0.00	0.00

		0.7	0.7	0.7	0.7
		0.7	0.7	0.7	0.7
		0.7	0.7	0.7	0.7
		0.7	0.7	0.7	0.7
		0.7	0.7	0.7	0.7
		0.7	0.7	0.7	0.7

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	35.8	(ft) Width:	0.0	0.0	7.7	2.8	9.8	2.8
Maximum Transect Length**:	35.8	(ft) Percent:	0.0 %	0.0%	21.5 %	7.8%	27.4 %	7.8 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek at Creekmouth

Site Name Fall #3

Riffle Name: R-5

Site Description: Lowermost transect across riffle

GPS Coordinates: N37.05930; W122.07835

CRA Sample Event No. (1-6) and targeted flow: 1- high

Critical Riffle Total Width hp to tp (ft): 35.8

Reference Discharge (cfs): 30.3

Meter number: 1

Notes: SLR Big Trees 512 cfs @ 0931hr; 489 cfs @ 1125hr

Date: 3/17/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: Photos 1-3

Staff Gage Start: 258m End: 258m

Time Start: 9:31 Time Stop: 10:02

LBW E: 4.0 RBW E: 39.8

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
5.9%	3.9%	13.7%	5.9%	43.0%	9.8%

Station	Distance	Depth*	Width
1	4.0	0.00	0.70
2	4.7	0.26	0.70
3	5.4	0.05	0.70
4	6.1	0.53	0.70
5	6.8	0.00	0.70
6	7.5	0.00	0.70
7	8.2	0.30	0.70
8	8.9	0.17	0.70
9	9.6	0.21	0.70

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.7	0.7
		0.7	0.7	0.7	0.7
				0.7	0.7
				0.7	0.7

10	10.3	0.26	0.70
11	11.0	0.13	0.70
12	11.7	0.15	0.70
13	12.4	0.11	0.70
14	13.1	0.03	0.70
15	13.8	0.09	0.70
16	14.5	0.02	0.70
17	15.2	0.00	0.70
18	15.9	0.17	0.70
19	16.6	0.10	0.70
20	17.3	0.01	0.70
21	18.0	0.43	0.70
22	18.7	0.01	0.70
23	19.4	0.09	0.70
24	20.1	0.02	0.70
25	20.8	0.60	0.70
26	21.5	0.19	0.70
27	22.2	0.00	0.70
28	22.9	0.00	0.70
29	23.6	0.29	0.70
30	24.3	0.26	0.70

25.0 0.40

Station	Distance	Depth	Width
31	25.0	0.40	0.70
32	25.7	0.35	0.70
33	26.4	0.20	0.70
34	27.1	0.06	0.70
35	27.8	0.26	0.70
36	28.5	0.00	0.70
37	29.2	0.00	0.70
38	29.9	0.00	0.70
39	30.6	0.31	0.70
40	31.3	0.08	0.70
41	32.0	0.03	0.70
42	32.7	0.06	0.70
43	33.4	0.01	0.70
44	34.1	0.01	0.70

				0.7	0.7
				0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
				0.7	0.7
				0.7	0.7

0.7

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.7	0.7
				0.7	0.7
				0.7	0.7
				0.7	0.7
				0.7	0.7

45	34.8	0.40	0.70
46	35.5	0.51	0.70
47	36.2	0.57	0.70
48	36.9	0.57	0.70
49	37.6	0.06	0.70
50	38.3	0.20	0.70
51	39.0	0.63	0.70
52	39.7	0.64	0.10
53	39.8	0.00	0.00

				0.7	0.7
		0.7	0.7	0.7	0.7
		0.7	0.7	0.7	0.7
		0.7	0.7	0.7	0.7
				0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7
0.7	0.7	0.7	0.7	0.7	0.7

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	35.8	(ft) Width:	2.1	1.4	4.9	2.1	15.4	3.5
Maximum Transect Length**:	35.8	(ft) Percent:	5.9 %	3.9%	13.7 %	5.9%	43.0 %	9.8 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek at Creekmouth
 Site Name Fall #3
 Riffle Name: R-5
 Site Description: Lowermost transect across riffle
 GPS Coordinate s: N37.05930; W122.07835
 CRA Sample Event No. (1-6) and targeted flow: 2-middle
 Critical Riffle Total Width hp to tp (ft): 35.8
 Reference Discharge (cfs): 16.7
 Meter number: 1
 Notes: SLR Big Trees 193 cfs @ 1251hr; 192 cfs @ 1407hr

Date: 3/26/2016
 Field Staff: Alley, Steiner
 Data Entry Staff: Steiner

Photo File Name: Photos 12-15

Staff Gage Start: 196 mm End: 196 mm

Time Start: 12:51 Time Stop: 13:20

LBW E: 4.2 RBW E: 39.7

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	5.9 %	3.9%	19.6 %	3.9 %

Station	Distance	Depth*	Width
1	4.0	0.00	0.70
2	4.7	0.12	0.70
3	5.4	0.00	0.70
4	6.1	0.03	0.70
5	6.8	0.00	0.70
6	7.5	0.39	0.70
7	8.2	0.31	0.70
8	8.9	0.10	0.70
9	9.6	0.04	0.70

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.7	0.7
				0.7	0.7

45	34.8	0.21	0.70
46	35.5	0.40	0.70
47	36.2	0.42	0.70
48	36.9	0.11	0.70
49	37.6	0.30	0.70
50	38.3	0.15	0.70
51	39.0	0.53	0.70
52	39.7	0.00	0.00

		0.7	0.7	0.7	0.7
		0.7	0.7	0.7	0.7
				0.7	0.7
		0.7	0.7	0.7	0.7

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	35.5	(ft) Width:	0.0	0.0	2.1	1.4	7.0	1.4
Maximum Transect Length**:	35.8	(ft) Percent:	0.0 %	0.0%	5.9 %	3.9%	19.6 %	3.9 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek at Creekmouth

Site Name Fall #3

Riffle Name: R-5

Site Description: Lowermost transect across riffle

GPS Coordinate s: N37.05930; W122.07835

CRA Sample Event No. (1-6) and targeted flow: 2-middle

Critical Riffle Total Width hp to tp (ft): 35.8

Reference Discharge (cfs): 16.7

Meter number: 1

Notes: SLR Big Trees 193 cfs @ 1251hr; 192 cfs @ 1407hr

Date: 3/26/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: Photos 12-15

Staff Gage Start: 196 mm End: 196 mm

Time Start: 12:51 Time Stop: 13:20

LBW E: 4.2 RBW E: 39.7

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	2.0 %	2.0%	21.5 %	5.9 %

Station	Distance	Depth*	Width
1	4.0	0.00	0.70
2	4.7	0.12	0.70
3	5.4	0.00	0.70
4	6.1	0.03	0.70
5	6.8	0.00	0.70
6	7.5	0.39	0.70
7	8.2	0.31	0.70
8	8.9	0.10	0.70
9	9.6	0.04	0.70

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.7	0.7
				0.7	0.7

25.0	0.36
------	------

Fall Creek Salmonid Passage Study– Spring 2016
D.W. ALLEY & Associates

0.7Page 284

45	34.8	0.21	0.70
46	35.5	0.40	0.70
47	36.2	0.42	0.70
48	36.9	0.11	0.70
49	37.6	0.30	0.70
50	38.3	0.15	0.70
51	39.0	0.53	0.70
52	39.7	0.00	0.00

				0.7	0.7
				0.7	0.7
				0.7	0.7
				0.7	0.7
		0.7	0.7	0.7	0.7

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	35.5	(ft) Width:	0.0	0.0	0.7	0.7	7.7	2.1
Maximum Transect Length**:	35.8	(ft) Percent:	0.0 %	0.0%	2.0 %	2.0%	21.5 %	5.9 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek at Creekmouth

Site Name Fall #3

Riffle Name: R-5

Site Description: Lowermost transect across riffle

GPS Coordinate s: N37.05930; W122.07835

CRA Sample Event No. (1-6) and targeted flow: 3- middle

Critical Riffle Total Width hp to tp (ft): 35.8

Reference Discharge (cfs): 14.85

Meter number: 1

Notes: SLR Big Trees 158 cfs @ 1254hr & 1335hr

Date: 3/29/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: Photos 12-17

Staff Gage Start: 196 mm End: 196 mm

Time Start: 12:28 Time Stop: 12:54

LBW E: 4.2 RBW E: 39.6

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	2.0 %	2.0%	7.8 %	3.9%

Station	Distance	Depth*	Width
1	4.0	0.00	0.70
2	4.7	0.12	0.70
3	5.4	0.00	0.70
4	6.1	0.02	0.70
5	6.8	0.00	0.70
6	7.5	0.35	0.70
7	8.2	0.34	0.70
8	8.9	0.05	0.70
9	9.6	0.01	0.70

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.7	0.7
				0.7	0.7

45	34.8	0.16	0.70
46	35.5	0.17	0.70
47	36.2	0.31	0.70
48	36.9	0.00	0.70
49	37.6	0.00	0.70
50	38.3	0.11	0.70
51	39.0	0.53	0.60
52	39.6	0.00	0.00

				0.7	0.7
		0.7	0.7	0.7	0.7

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	35.4	(ft) Width:	0.0	0.0	0.7	0.7	2.8	1.4
Maximum Transect Length**:	35.8	(ft) Percent:	0.0 %	0.0%	2.0 %	2.0%	7.8 %	3.9%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek at Creekmouth

Site Name Fall #3

Riffle Name: R-5

Site Description: Lowermost transect across riffle

GPS Coordinate s: N37.05930; W122.07835

CRA Sample Event No. (1-6) and targeted flow: 3- middle

Critical Riffle Total Width hp to tp (ft): 35.8

Reference Discharge (cfs): 14.85

Meter number: 1

Notes: SLR Big Trees 158 cfs @ 1254hr & 1335hr

Date: 3/29/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: Photos 12-17

Staff Gage Start: 196 mm End: 196 mm

Time Start: 12:28 Time Stop: 12:54

LBW E: 4.2 RBW E: 39.6

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	2.0 %	2.0%	13.7 %	3.9%

Station	Distance	Depth*	Width
1	4.0	0.00	0.70
2	4.7	0.12	0.70
3	5.4	0.00	0.70
4	6.1	0.02	0.70
5	6.8	0.00	0.70
6	7.5	0.35	0.70
7	8.2	0.34	0.70
8	8.9	0.05	0.70
9	9.6	0.01	0.70

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.7	0.7
				0.7	0.7

25.0

[illegible]

Fall Creek Salmonid Passage Study– Spring 2016
D.W. ALLEY & Associates

45	34.8	0.16	0.70
46	35.5	0.17	0.70
47	36.2	0.31	0.70
48	36.9	0.00	0.70
49	37.6	0.00	0.70
50	38.3	0.11	0.70
51	39.0	0.53	0.60
52	39.6	0.00	0.00

				0.7	0.7
		0.7	0.7	0.7	0.7

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	35.4	(ft) Width:	0.0	0.0	0.7	0.7	4.9	1.4
Maximum Transect Length**:	35.8	(ft) Percent:	0.0 %	0.0%	2.0 %	2.0%	13.7 %	3.9%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek at Creekmouth

Site Name Fall #3

Riffle Name: R-5

Site Description: Lowermost transect across riffle

GPS Coordinate s: N37.05930; W122.07835

CRA Sample Event No. (1-6) and targeted flow: 4-low

Critical Riffle Total Width hp to tp (ft): 35.8

Reference Discharge (cfs): 11.8

Meter number: 1

Notes: SLR Big Trees 108 cfs @ 1310hr; 106 cfs @ 1354hr

Date: 4/4/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: Photos 14-17

Staff Gage Start: 178 mm End: 178 mm

Time Start: 12:50 Time Stop: 13:09

LBWE : 4.4 RBWE : 39.6

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
0.0%	0.0%	2.0%	2.0%	7.8%	3.9%

Station	Distance	Depth*	Width
1	4.0	0.00	0.70
2	4.7	0.14	0.70
3	5.4	0.00	0.70
4	6.1	0.01	0.70
5	6.8	0.00	0.70
6	7.5	0.38	0.70
7	8.2	0.29	0.70
8	8.9	0.05	0.70
9	9.6	0.01	0.70

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.7	0.7

10	10.3	0.09	0.70
11	11.0	0.01	0.70
12	11.7	0.07	0.70
13	12.4	0.00	0.70
14	13.1	0.01	0.70
15	13.8	0.00	0.70
16	14.5	0.00	0.70
17	15.2	0.01	0.70
18	15.9	0.00	0.70
19	16.6	0.00	0.70
20	17.3	0.00	0.70
21	18.0	0.14	0.70
22	18.7	0.00	0.70
23	19.4	0.09	0.70
24	20.1	0.00	0.70
25	20.8	0.10	0.70
26	21.5	0.01	0.70
27	22.2	0.00	0.70
28	22.9	0.00	0.70
29	23.6	0.06	0.70
30	24.3	0.00	0.70

[illegible]

Station	Distance	Depth	Width
31	25.0	0.06	0.70
32	25.7	0.12	0.70
33	26.4	0.01	0.70
34	27.1	0.00	0.70
35	27.8	0.01	0.70
36	28.5	0.00	0.70
37	29.2	0.00	0.70
38	29.9	0.00	0.70
39	30.6	0.02	0.70
40	31.3	0.00	0.70
41	32.0	0.00	0.70
42	32.7	0.00	0.70
43	33.4	0.00	0.70
44	34.1	0.00	0.70

[illegible]

45	34.8	0.10	0.70
46	35.5	0.16	0.70
47	36.2	0.32	0.70
48	36.9	0.00	0.70
49	37.6	0.00	0.70
50	38.3	0.08	0.70
51	39.0	0.44	0.70
52	39.7	0.30	0.10
53	39.8	0.00	0.00

				0.7	0.7
		0.7	0.7	0.7	0.7
				0.7	0.7

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	35.2	(ft) Width:	0.0	0.0	0.7	0.7	2.8	1.4
Maximum Transect Length**:	35.8	(ft) Percent	0.0 %	0.0%	2.0%	2.0%	7.8%	3.9%

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek at Creekmouth

Site Name Fall #3

Riffle Name: R-5

Site Description: Lowermost transect across riffle

GPS Coordinate s: N37.05930; W122.07835

CRA Sample Event No. (1-6) and targeted flow: 1- high

Critical Riffle Total Width hp to tp (ft): 35.8

Reference Discharge (cfs): 11.8

Meter number: 1

Notes: SLR Big Trees 108 cfs @ 1310hr; 106 cfs @ 1354hr

Date: 4/4/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: Photos 14-17

Staff Gage Start: 178 mm End: 178 mm

Time Start: 12:50 Time Stop: 13:09

LBW E: 4.4 RBW E: 39.6

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	0.0 %	0.0%	9.8 %	3.9 %

Station	Distance	Depth*	Width
1	4.0	0.00	0.70
2	4.7	0.14	0.70
3	5.4	0.00	0.70
4	6.1	0.01	0.70
5	6.8	0.00	0.70
6	7.5	0.38	0.70
7	8.2	0.29	0.70
8	8.9	0.05	0.70
9	9.6	0.01	0.70

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.7	0.7
				0.7	0.7

25.0

[illegible]

Fall Creek Salmonid Passage Study– Spring 2016
D.W. ALLEY & Associates

45	34.8	0.10	0.70
46	35.5	0.16	0.70
47	36.2	0.32	0.70
48	36.9	0.00	0.70
49	37.6	0.00	0.70
50	38.3	0.08	0.70
51	39.0	0.44	0.70
52	39.7	0.30	0.10
53	39.8	0.00	0.00

				0.7	0.7
				0.7	0.7
				0.7	0.7

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	35.2	(ft) Width:	0.0	0.0	0.0	0.0	3.5	1.4
Maximum Transect Length**:	35.8	(ft) Percent t:	0.0 %	0.0 0.0%	0.0 %	0.0 0.0%	9.8 %	3.9 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek at Creekmouth

Site Name Fall #3

Riffle Name: R-5

Site Description: Lowermost transect across riffle

GPS Coordinate s: N37.05930; W122.07835

CRA Sample Event No. (1-6) and targeted flow: 5- lowest

Critical Riffle Total Width hp to tp (ft): 35.8

Reference Discharge (cfs): 6.2

Meter number: 1

Notes: SLR Big Trees 48 cfs @ 1242hr & 1325hr

Date: 5/4/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: Photos 12-17

Staff Gage Start: 120m End: 120m

Time Start: 12:27 Time Stop: 12:41

LBW E: 4.5 RBW E: 39.6

Target Depth (ft):

% Usable:

0.7		0.4		0.3	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	0.0%	0.0%	2.0%	2.0 %

Station	Distance	Depth*	Width
1	4.0	0.00	0.70
2	4.7	0.00	0.70
3	5.4	0.00	0.70
4	6.1	0.00	0.70
5	6.8	0.00	0.70
6	7.5	0.00	0.70
7	8.2	0.20	0.70
8	8.9	0.00	0.70
9	9.6	0.00	0.70

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.

25.0	0.00
------	------

[illegible]

Fall Creek Salmonid Passage Study– Spring 2016
D.W. ALLEY & Associates

45	34.8	0.04	0.70
46	35.5	0.02	0.70
47	36.2	0.24	0.70
48	36.9	0.00	0.70
49	37.6	0.00	0.70
50	38.3	0.00	0.70
51	39.0	0.34	0.50
52	39.5	0.23	0.10
53	39.6	0.00	0.00

				0.7	0.7

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	35.1	(ft) Width:	0.0	0.0	0.0	0.0	0.7	0.7
Maximum Transect Length**:	35.8	(ft) Percent:	0.0 %	0.0%	0.0%	0.0%	2.0%	2.0 %

Critical Riffle Analysis for Fish Passage in California

Standard Operating Procedure DFG-IFP-001

Location: Fall Creek at Creekmouth

Site Name Fall #3

Riffle Name: R-5

Site Description: Lowermost transect across riffle

GPS Coordinate s: N37.05930; W122.07835

CRA Sample Event No. (1-6) and targeted flow: 5-lowest

Critical Riffle Total Width hp to tp (ft): 35.8

Reference Discharge (cfs): 6.2

Meter number: 1

Notes: SLR Big Trees 48 cfs @ 1242hr & 1325hr

Date: 5/4/2016

Field Staff: Alley, Steiner

Data Entry Staff: Steiner

Photo File Name: Photos 12-17

Staff Gage Start: 120m End: 120m

Time Start: 9:31 Time Stop: 10:02

LBW E: 4.5 RBW E: 39.6

Target Depth (ft):

% Usable:

0.6		0.5		0.2	
Total	Cont.	Total	Cont.	Total	Cont.
0.0 %	0.0%	0.0%	0.0%	7.8%	3.9 %

Station	Distance	Depth*	Width
1	4.0	0.00	0.70
2	4.7	0.00	0.70
3	5.4	0.00	0.70
4	6.1	0.00	0.70
5	6.8	0.00	0.70
6	7.5	0.00	0.70
7	8.2	0.20	0.70
8	8.9	0.00	0.70
9	9.6	0.00	0.70

Cell Width Meeting Criteria					
Total	Cont.	Total	Cont.	Total	Cont.
				0.7	0.7

10	10.3	0.10	0.70
11	11.0	0.00	0.70
12	11.7	0.06	0.70
13	12.4	0.00	0.70
14	13.1	0.00	0.70
15	13.8	0.00	0.70
16	14.5	0.00	0.70
17	15.2	0.00	0.70
18	15.9	0.00	0.70
19	16.6	0.00	0.70
20	17.3	0.00	0.70
21	18.0	0.11	0.70
22	18.7	0.00	0.70
23	19.4	0.01	0.70
24	20.1	0.00	0.70
25	20.8	0.05	0.70
26	21.5	0.00	0.70
27	22.2	0.00	0.70
28	22.9	0.00	0.70
29	23.6	0.02	0.70
30	24.3	0.00	0.70

[illegible]

Station	Distance	Depth	Width
31	25.0	0.00	0.70
32	25.7	0.09	0.70
33	26.4	0.00	0.70
34	27.1	0.00	0.70
35	27.8	0.03	0.70
36	28.5	0.00	0.70
37	29.2	0.00	0.70
38	29.9	0.00	0.70
39	30.6	0.05	0.70
40	31.3	0.00	0.70
41	32.0	0.00	0.70
42	32.7	0.00	0.70
43	33.4	0.00	0.70
44	34.1	0.00	0.70

[illegible]

45	34.8	0.04	0.70
46	35.5	0.02	0.70
47	36.2	0.24	0.70
48	36.9	0.00	0.70
49	37.6	0.00	0.70
50	38.3	0.00	0.70
51	39.0	0.34	0.70
52	39.7	0.23	0.10
53	39.8	0.00	0.00

				0.7	0.7
				0.7	0.7
				0.7	0.7

Must manually select "COUNT" range for continuous cells

Wetted Width this Event:	35.1	(ft) Width:	0.0	0.0	0.0	0.0	2.8	1.4
Maximum Transect Length**:	35.8	(ft) Percent:	0.0 %	0.0%	0.0%	0.0%	7.8%	3.9 %

Appendix C. Riffle measurements taken during 23 February 2016 survey of lower Fall Creek to locate critical passage riffles.

Distance to riffle bottom	Transect distance from creekmouth	Channel width	Avg. riffle depth	Max. riffle depth	Thalweg max. depth	Thalweg width	Distance to riffle top	Riffle Length
0 (CR-3)	3	35			0.15	2.0	23	23
50	93	20			0.4	3	109	59
138	221	17.5			0.5	2		
	292	18.5			0.3	2		
138	533	13			0.6	2	563	425
629	734	16.5			0.4	3	747	118
793 (CR-2)	808	16			0.25	2.3	832	39
854							930	76
957							1024	67
1213			0.5	0.9			1328	115
1365			0.4	0.9			1389	24
1407			0.5	0.8			1432	25
1464	1475	18			0.35	3	1506	42
1595			0.6	0.9			1636	41
1668			0.4	0.6			1783	115
1800	1809	16			0.25	5	1875	75
1951	1595		0.5	0.7			1966	15
2054	1595		0.6	1			2087	33
2149	1595		0.5	0.9			2223	74
2255 (CR-1)	2267	25			0.25	4	2278	23
2323							2419	96
2445			0.5	0.8			2475	30
2491			0.55	0.9			2554	63
2582							2620	38
							Total	1616

Appendix D. Shallow riffle depths (often less than 0.2 feet deep) where YOY and yearling steelhead were captured in Central Coast streams.

Date	Site	Habitat Type	Average Depth (ft)	Maximum Depth (ft)	Habitat Length (ft)	# YOY Steelhead Captured	# Yearling Steelhead Captured	Average Fork Length (mm)
9-1-15	SLR-10	Riffle	0.1	0.2*	15	2		64
8-27-15	SLR-11	Riffle	0.15	0.4	21	4		74
9-3-15	Zay-13c	Riffle	0.15	0.4	22	6	1	81
9-3-15	Zay-13d	Riffle	0.2	0.4	15	8		51
9-7-15	Fall-15a	Riffle	0.15	0.4	18	1		53
8-27-15	Bear-18a	Riffle	0.2	0.4	24	4		65
9-11-15	Soq-10	Riffle	0.15	0.2	13	5		60
9-10-15	WSoq-21	Riffle	0.2	0.4	24	4		66
8-25-14	SLR-11	Glide	0.15	0.4	21	4		58
9-9-14	Lomp-13e	Riffle	0.05	0.2	9	3		41
8-29-14	Bean-14b	Riffle	0.15	0.2	22	9	1	60
8-27-14	Fall-15a	Riffle	0.25	0.4	30	6	1	69
9-8-14	Branc-21b	Riffle	0.2	0.4	17	1		63
9-11-14	ESoq-13a	Riffle	0.1	0.2	9	3		68
8-27-13	Lomp-13e	Riffle	0.05	0.3	10	2	1	87
9-2-13	Bean-14b	Riffle	0.1	0.2	19	5		79
9-9-13	ESoq-13a	Riffle	0.1	0.3	31	6		57
10-14-03	San Simeon-3	Riffle	0.1	0.15	7	1		48 (SL)
10-14-03	San Simeon-3	Riffle	0.2	0.25	19	4		50 (SL)
10-15-03	Santa Rosa-0b	Riffle	0.15	0.3	22	2		53 (SL)
10-16-03	Santa Rosa-2	Riffle	0.15	0.3	33	5		52 (SL)
10-17-03	Santa Rosa-2	Riffle	0.2	0.25	30	1		56 (SL)
10-17-03	Santa Rosa-3a	Riffle/Run	0.1	0.15	22	4		55 (SL)
10-20-03	Santa Rosa- 4	Riffle	.05	0.1	11	1		41 (SL)
10-20-03	Santa Rosa-5	Riffle	0.1	0.2	26	2		49 (SL)
10-13-03	Santa Rosa-6	Riffle	0.15	0.3	10	2		39 (SL)
10-20-06	Santa Rosa-0a	Run-Riffle	0.1	0.2	46	4 (Yearling size)	2	139 (SL)
10-17-06	Santa Rosa-2	Riffle	0.15	0.3	2	1 (Yearling size)		109 (SL)
10-18-06	Santa Rosa-3a	Riffle	0.2	0.3	48	21		67 (SL)

*Red print denotes habitat with maximum depth of 0.2 feet or less.