NAPA RIVER STEELHEAD AND SALMON MONITORING PROGRAM

2011-2012 SEASON

ADULT STEELHEAD IN MILLIKEN CREEK (MARCH 9, 2012)

SEPTEMBER, 2012

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SUMMARY

The Napa County Resource Conservation District (RCD) conducted adult salmon and steelhead spawner surveys, juvenile snorkel surveys, and outmigrant trapping with a rotary screw trap (RST) and fyke nets during the fall 2011/winter 2012 adult spawning period and the spring 2012 juvenile rearing and outmigration period. No adult salmon or steelhead were observed during spawner surveys in the mainstem Napa River and three tributary streams. This was likely due to a near complete lack of rainfall during the fall of 2011 and early winter 2012. Two adult steelhead were captured in Milliken Creek during outmigrant trapping in spring 2012, indicating steelhead spawning likely occurred later in the season, after we had completed our spawner surveys.

The rotary screw trap was operated for 49 days during the 2012 season, and the total catch was comparable with previous years. The capture of juvenile Chinook salmon in the RST indicated that some adult salmon were able to successfully spawn, despite poor hydrologic conditions. Chinook abundance has fluctuated substantially from year to year during our four years of monitoring, suggesting that the population is likely small and unstable. In contrast, steelhead smolt abundance and size was similar to what we have observed in previous years, suggesting that steelhead production is fairly stable from year to year. During the past four years, steelhead smolt production from the Napa River has shown a stable or slightly increasing trend.

Snorkel surveys were carried out in spring 2012. No juvenile Chinook salmon were observed in the sampling reaches, indicating that spawning was limited to the downstream-most reaches of the Napa River. In previous years, peak spawning activity has occurred much further upstream, so the spawning distribution observed this year was likely attributed to a lack of access to preferred upstream spawning areas. Juvenile steelhead were observed in relatively high densities during our Napa River snorkel surveys, indicating that steelhead spawning occurred in the mainstem.

Fyke net sampling was conducted for a total of 45 days in Milliken and Napa Creeks. We captured 11 native and six non-native fish species in Milliken Creek and six native and zero non-native fish species in Napa Creek during the spring 2012 sampling period. Steelhead catch rates severely declined as flows diminished in May. Two adult steelhead were caught and released in the Milliken fyke net.

Evidence of a coho salmon from the Napa River was found in the 2010 RST tissue samples. The specimen was originally identified as a Chinook salmon smolt in the field, but the National Marine Fisheries Service (NMFS) determined the fish was a coho salmon through genetic analysis. Due to similarities in appearances of juvenile salmonids, and the fact that field staff would not expect coho salmon in the Napa River basin, it is possible that other coho may have been missed. Ongoing genetic analysis is underway by NMFS to confirm the finding, and RCD is seeking funds to analyze additional samples. There are approximately 1,500 fin clips that have not yet been analyzed due to lack of funding.

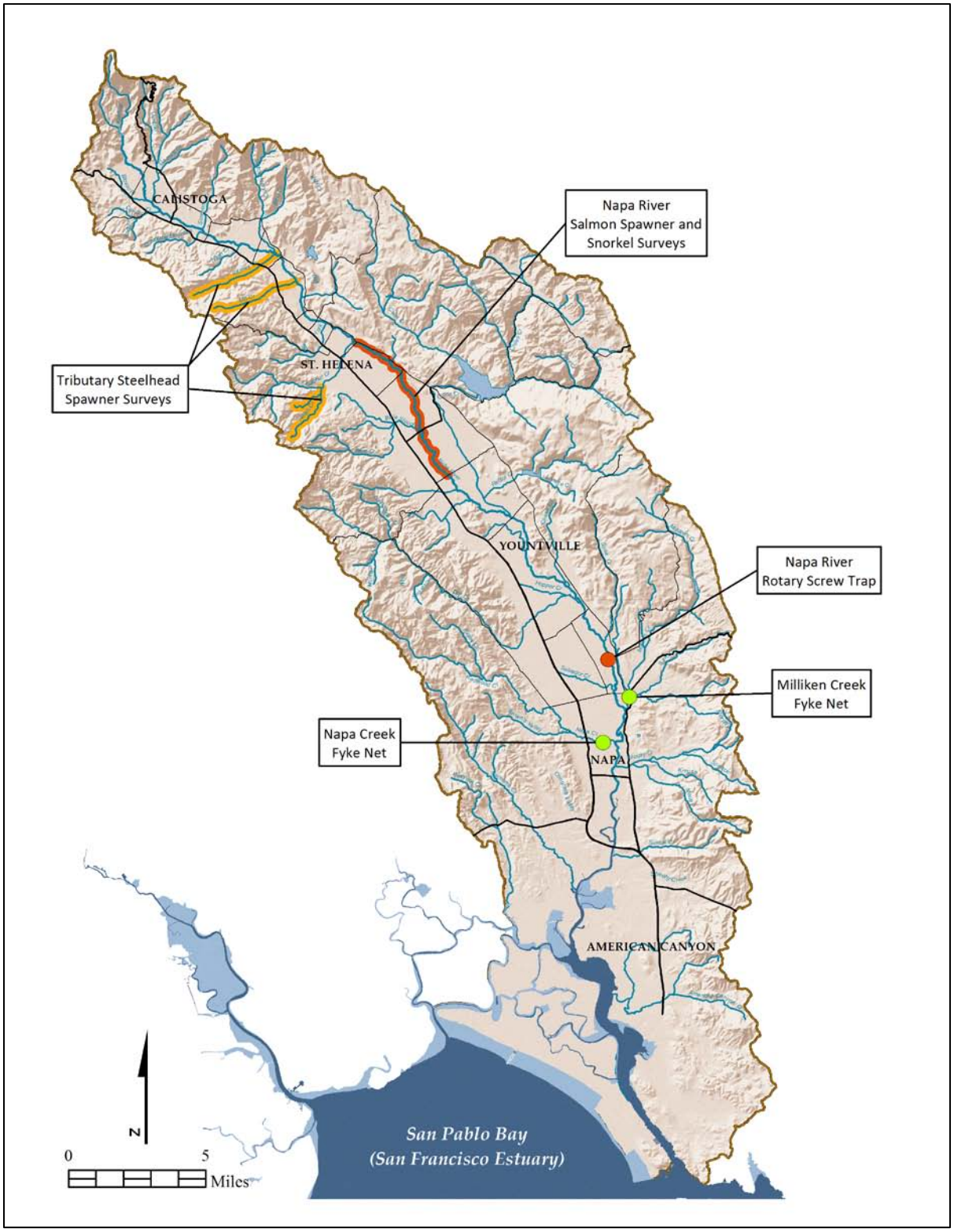

Figure 1. 2011-2012 steelhead and salmon monitoring locations in the Napa River watershed

INTRODUCTION

The Napa County Resource Conservation District (RCD) coordinates a fisheries monitoring program within the Napa River watershed. The program focuses on salmonids (steelhead and salmon), and includes adult spawner surveys, juvenile snorkel surveys, and outmigrant trapping with a rotary screw trap (RST) and fyke nets. This year's sampling and survey locations are shown in Figure 1. The purpose of this program is to describe salmonid life history details, generate population estimates, describe the composition of the Napa River fish community, and track ecological responses to ongoing habitat restoration. This report covers monitoring activities during the fall 2011/winter 2012 adult spawning period and the spring 2012 juvenile rearing and outmigration period.

FOCUS SPECIES

Steelhead

Steelhead return to the Napa River to spawn in the winter, typically from January to March; although in years with abundant late-season rainfall, adult fish have been observed spawning as late as May. Steelhead spawning is difficult to document because adult fish migrate primarily at night and spawn during winter storm flows when water clarity is low. Therefore, not much is known about the specific movement patterns of adult steelhead in the Napa River watershed. In order to maximize access to high-gradient and often intermittent streams, adult fish typically migrate upstream on the receding limbs of winter storm flows. In years with below average runoff, access to small tributary streams, which this species prefers, can be limited. Steelhead spawning in the mainstem Napa River has been recently documented, although it appears to be most prevalent in dry years when access to prime tributary spawning habitat is limited by low streamflow (Koehler and Blank 2010).

Juvenile steelhead rear in freshwater for one or more years before smolting (outmigrating) to the ocean. Juvenile fish typically remain in cool, shady streams with perennial flow for up to three years before smolting at 125 to 200 mm (about five to eight inches) in length (Koehler and Blank, 2011). During their freshwater rearing and growth phase, juvenile steelhead feed mostly on aquatic and terrestrial invertebrates and may move around within a stream and between streams at higher flows. Therefore, unimpeded migration and dispersal routes are an important component of steelhead rearing habitat.

Chinook salmon

Chinook salmon return to the Napa River to spawn in the fall, typically around late September and early October. Adult fish will hold in deep pools in the estuarine portion of the river near the city of Napa for a month or more waiting for the first rains of the season to generate runoff. Once a sufficient storm occurs, adult salmon swim immediately upstream to suitable spawning areas before flows recede. During this part of the year, winter baseflow is usually not well-established, and the Napa River is still very flashy (i.e. subject to rapid increases and decreases

in flow). As a result, Chinook salmon migration can be limited both temporally and spatially by rapidly changing flow conditions. Fish that are able to swim upstream to suitable spawning areas construct spawning redds (nests) in the streambed gravels and cobbles typically within a day or two. After spawning, spent salmon will remain in the area for several weeks before dying. Peak spawning activity occurs from November through early January (Koehler 2008).

Juvenile Chinook salmon spend several months rearing in the Napa River from January through June. Chinook salmon smolts are typically 80-100 mm (approximately three to four inches) long when they enter the estuary. Outmigration occurs throughout the spring with a peak occurring in May as freshwater outflows diminish (Koehler and Blank 2011).

ADULT SPAWNER SURVEYS

RCD conducted four salmon spawner surveys in the mainstem Napa River and three steelhead spawner surveys in tributary streams during the fall 2011/winter 2012 season (Figure 1, Table 1). No live adult salmonids, carcasses, or spawning redds were observed during these surveys. Based on our spawner and snorkel survey results, it appears that Chinook salmon did not spawn in the surveyed reaches of the Napa River during the fall 2011/winter 2012. However, we collected juvenile Chinook smolts in the RST, which indicates that some Chinook spawning did occur this year; the exact location of this spawning activity is unknown.

Rainfall was very limited during the typical peak Chinook spawning period of November and December. The first significant runoff event of the 2011-12 water year did not occur until late January, 2012. Therefore, it is likely that only a small fraction of the Chinook salmon observed in the Napa River estuary in October and November of 2011 were able to successfully migrate into the system. Spawning appears to have been concentrated lower in the Napa River than in years past due to limited access to upstream reaches as a result of these low flow conditions.

Stream	Reach	Date	Target Species	Distance Surveyed (miles)	# of Redds Counted	# of Adult Fish Counted
Napa River	RDRT North	11/29/2011	Chinook	2.41	0	0
Napa River	RDRT South	1/27/2012	Chinook	2.27	0	0
Napa River	Zinfandel	1/31/2012	Chinook	2.24	0	0
Napa River	RDRT North	2/1/2012	Chinook	2.41	0	0
Heath Creek	-	2/14/2012	Steelhead	1.15	0	0
Mill Creek	-	2/15/2012	Steelhead	0.91	0	0
Ritchey Creek	-	2/16/2012	Steelhead	1.71	0	0

Table 1. Summary of adult spawner survey results during the 2011-2012 season.
Note: Mainstem Napa River reaches included RDRT North (Rutherford Road Bridge to Zinfandel Lane Bridge), RDRT South (Oakville Crossroad Bridge to Rutherford Bridge), and Zinfandel (Zinfandel Lane Bridge to Pope Street Bridge). Tributary surveys started near their drainage confluence and extended upstream to the end of anadromy.

Observing adult steelhead is difficult in natural stream systems, and therefore our lack of sightings of this species does not necessarily indicate a lack of spawning activity. It is possible, and perhaps likely, that steelhead spawning may have occurred later in the spring after our survey period. This is corroborated by the fact that we caught two adult steelhead in our Milliken Fyke net in March and April. Based on our four years of smolt monitoring, steelhead appear to have a relatively steady adult spawner population within the Napa River watershed. Steelhead smolt outmigration has been steady or slightly increasing during this monitoring period, and smolts have been generally large and healthy (see outmigrant trapping results in this report for more details). Although rarely documented, steelhead spawning appears to be sufficient, at least in most years, to maintain the current population.

SNORKEL SURVEYS

RCD conducted two snorkel surveys in spring 2012 to document salmonid presence/absence and relative abundance in the Napa River. The first survey on May 17, 2012 extended from the Rutherford Road Bridge to Zinfandel Lane (aka RDRT North reach). Streamflow was 16 cubic feet per second (cfs), according to the USGS streamgage at Pope Street. No juvenile Chinook salmon were observed during the survey. Juvenile steelhead were abundant throughout the survey, with the highest densities observed in runs and riffles. Steelhead ranged from approximately 80-150mm (3-6 inches), with occasional larger fish observed. An adult Pacific lamprey (*Entosphenus tridentata*) was observed building a redd approximately 1,000 meters upstream of the Rutherford Road Bridge (Figure 2).

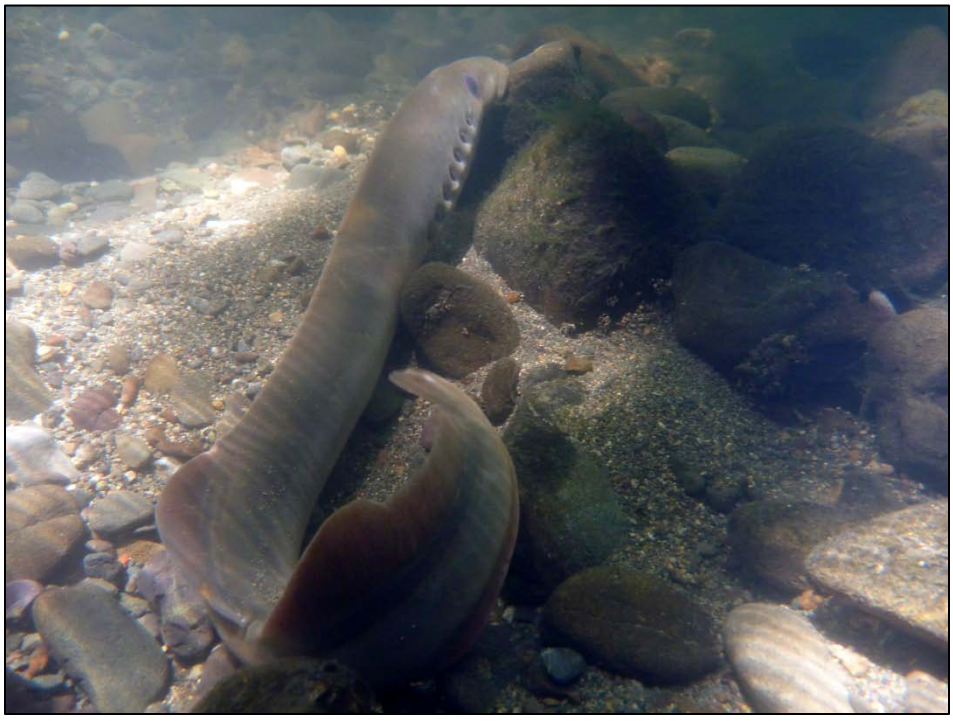

Figure 2. Adult Pacific lamprey constructing a redd (5-17-2012)

The second snorkel survey was conducted on May 30, 2012, and extended from Zinfandel Lane to Pope Street. Streamflow was 9.4 cfs according to the USGS streamgage at Pope Street. No juvenile Chinook were observed during this survey. As with the earlier survey, juvenile steelhead were abundant throughout the survey, with the highest densities observed in swift-water habitats just upstream of the Zinfandel Lane Bridge (Figure 3). Although these were not quantitative surveys, the RCD biologist noted that densities of steelhead appeared much higher than those observed during surveys in previous years.

Figure 3. Steelhead parr in the Napa River near Zinfandel Lane (5-30-2012)

OUTMIGRANT TRAPPING

Rotary Screw Trap

An eight-foot diameter RST was installed in the mainstem Napa River on February 23, 2012 at the same sampling location used in previous years (Figure 1). The site is located on private property approximately 3.2 km (2 miles) downstream of the Oak Knoll Avenue Bridge, very close to the upper extent of tidal influence. Approximately 67% (118 miles) of the total anadromous salmonid habitat in the Napa River watershed is located upstream of this site. Details on how the trap was operated and processed are available in Appendix B.

The RST was operated for a total of 49 days during the spring 2012 outmigrant period. During the 2012 season, a total of 24 fish species were captured including 13 natives and 11 exotics (Tables 2 and 3). Flow was insufficient (approximately 18 cfs) to spin the trap when it was initially installed and for several weeks following installation (Figure 4). A series of large storms in March then brought flows up too high to operate the trap safely (Figure 5). A hydrograph of the entire sampling period is shown in Appendix A.

Figure 4. Rotary screw trap volunteers and RCD staff on installation day, February 23, 2012


Figure 5. Rotary screw trap out of operation during a 6,000+ cfs event on March 14, 2012

From 2009 to 2012, native fish species comprised 98.4% of the total rotary screw trap catch. This total does not include estimates of larval suckers and minnows, which were too abundant to accurately count in all four years of sampling. The three most common native species collected during the four-year monitoring period were Chinook salmon (Figure 8), California roach, and steelhead/rainbow trout (Figures 6 and 7). The most common non-native fish species were largemouth bass, bluegill, and golden shiner.

Common Name	Scientific Name	2009	2010	2011	2012	Total
Steelhead / Rainbow trout	*Oncorhynchus mykiss*					
Fry / Parr (<130 mm)		941	94	7	152	**1,194**
Smolt (>130mm)		119	251	175	160	**705**
Adult or Resident (>300 mm)		0	3	4	0	**7**
Chinook Salmon	*Oncorhynchus tshawytscha*					
Parr / Smolt		1	1,520	7,377	488	**9,386**
Coho Salmon[1]	*Oncorhynchus kisutch*					
Smolt		0	1	0	0	**1**
Kokanee/ Sockeye Salmon	*Oncorhynchus nerka*					
Parr / Smolt		0	342	0	0	**342**
Pacific Lamprey	*Entosphenus tridentata*					
Adult		25	11	38	64	**138**
Ammocete[2]		-	-	-	9	**9**
River Lamprey	*Lampetra ayresi*					
Adult[2]		-	2	21	9	**32**
Brook Lamprey	*Lampetra cf. pacifica*					
Adult[2]		-	0	64	7	**71**
Lampetra Sp. Ammocete[2]	*Lampetra sp.*	-	-	-	19	**19**
Unidentified Lamprey Sp.	-	216	248	111	25	**600**
Sacramento Splittail	*Mylopharodon conocephalus*	2	6	0	1	**9**
Hardhead	*Pogonichthys macrolepidotus*	0	0	1	0	**1**
Sacramento Pikeminnow	*Ptychocheilus grandis*	28	87	192	191	**498**
California Roach[3]	*Hesperoleucus symmetricus*	4,744	3,571	336	330	**8,981**
Sacramento Sucker	*Catostomus occidentalis*					
Adult		82	419	207	33	**741**
Juvenile / Larvae[3]		48,950	25,644	25,382	10,201	**110,177**
Tule Perch	*Hysterocarpus traski*	6	28	30	20	**84**
Prickly Sculpin	*Cottus asper*	242	124	62	66	**494**
Three-spine Stickleback	*Gasterosteus aculeatus*	116	76	273	50	**515**

[1] One salmonid specimen from April 30, 2010 was identified as a juvenile Chinook salmon in the field and later determined to be a coho salmon through genetic analysis by the National Marine Fisheries Service. Additional analysis is underway to verify this result.

[2] Lamprey ammocetes and adult river and brook lampreys were only differentiated consistently during the 2012 season.

[3] Counts of larval sucker and minnow specimens were visually estimated.

Table 2. Native fish species collected in the Napa River rotary screw trap from 2009 to 2012. Note: salmonid totals include recaptured fish from efficiency releases.

Common Name	Scientific Name	2009	2010	2011	2012	Total
Bluegill	*Lepomis macrochirus*	29	100	86	41	**256**
Redear Sunfish	*Lepomis microlophus*	0	8	0	0	**8**
Pumpkinseed	*Lepomis gibbosus*	0	0	1	0	**1**
Green Sunfish	*Lepomis cyanellus*	0	2	5	0	**7**
Black Crappie	*Pomoxis nigromaculatus*	1	0	1	1	**3**
Largemouth Bass	*Micropterus salmoides*					
Larvae / Juvenile		0	969	0	0	**969**
Adult		2	1	4	3	**10**
Western Mosquitofish	*Gambusia affinis*	1	0	2	3	**6**
Wakasagi	*Hypomesus nipponensis*	0	9	0	0	**9**
Threadfin Shad	*Dorosoma petenense*	0	2	3	1	**6**
Inland Silverside	*Menidia beryllina*	0	12	1	0	**13**
Fathead Minnow	*Pimephales promelas*	2	4	20	0	**26**
Common Carp	*Cyprinus carpio*	1	0	0	0	**1**
Golden Shiner	*Notemigonus crysoleucas*	1	11	18	1	**31**
White Catfish	*Ameiurus catus*	0	1	0	1	**2**
Brown Bullhead	*Ameiurus nebulosus*	2	3	3	3	**11**
Channel Catfish	*Ictalurus punctatus*	1	0	0	0	**1**
Striped Bass	*Morone saxatilis*	3	2	0	1	**6**

Non-Fish Taxa

Bullfrog	*Rana catesbeiana*					
Larvae (tadpole)		500	1,401	632	111	**2,644**
Adult		1	2	5	2	**10**
Pacific Chorus Frog Tadpole	*Pseudacris regilla*	0	32	0	0	**32**
Signal Crayfish	*Pacifastacus leniusculus*	3	103	79	128	**313**
Red Swamp Crayfish	*Procambarus clarkii*	40	233	78	46	**397**
Red-eared Slider Turtle	*Trachemys scripta elegans*	0	3	1	1	**5**
Western Pond Turtle	*Actinemys marmorata*	2	1	1	1	**5**

Table 3. Non-native fish species and non-fish taxa collected in the Napa River rotary screw trap from 2009 to 2012

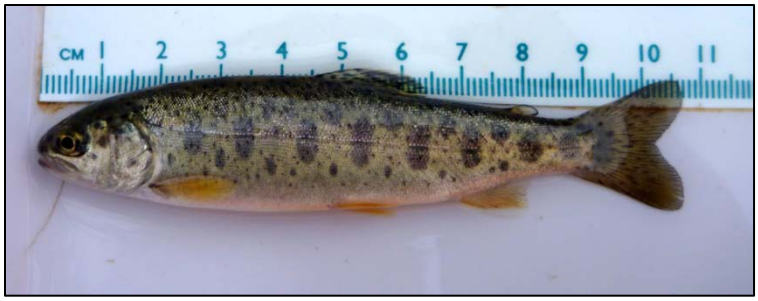

Figure 6. Typical Napa River steelhead parr with a fork length around 100mm

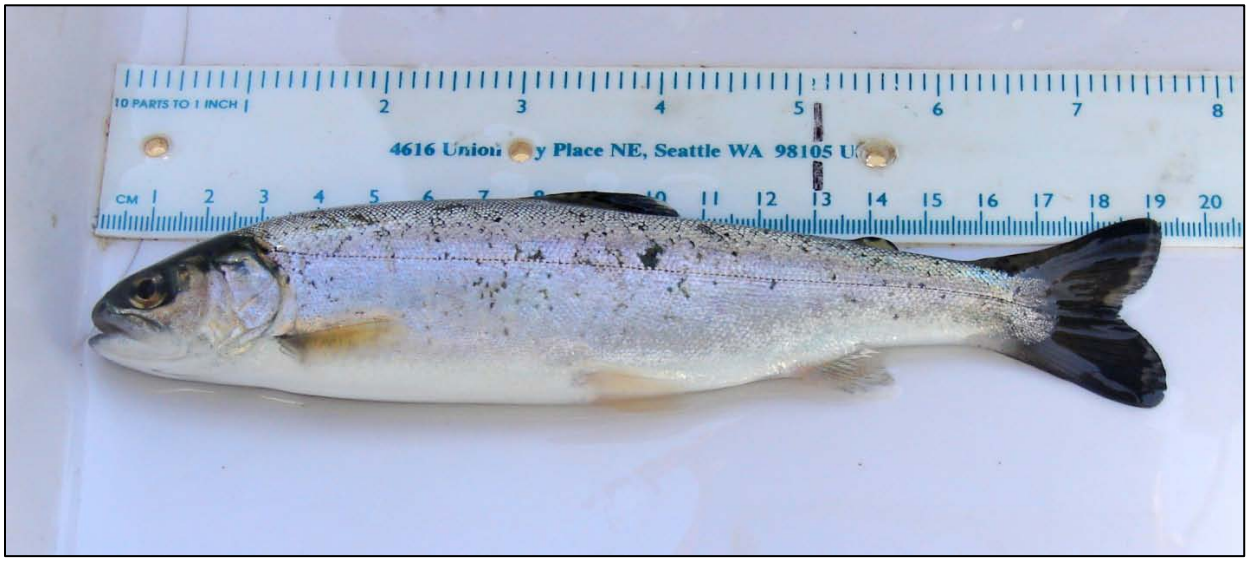

Figure 7. Typical Napa River steelhead smolt with a fork length around 185mm

Figure 8. Typical Napa River Chinook salmon smolt with a fork length around 90mm

Steelhead smolt length (measured as fork length) during the past four years of sampling has averaged 187mm (7.4 inches). The median steelhead smolt size was 179mm (7.0 inches) in 2012. It appears that the size and range of steelhead smolts has varied little during the past four years (Figure 9), despite significant variability in environmental conditions including rainfall amounts and timing as well as seasonal flow patterns. Several studies have found a strong correlation between steelhead smolt size and ocean survival rates, with larger smolts having greater odds of returning as adults (Bond et al 2008, Ward and Slaney1988, Ward et al 1989). Given their large size, we would expect Napa River steelhead smolts to have relatively high ocean survival rates, perhaps 15-25% based on literature.

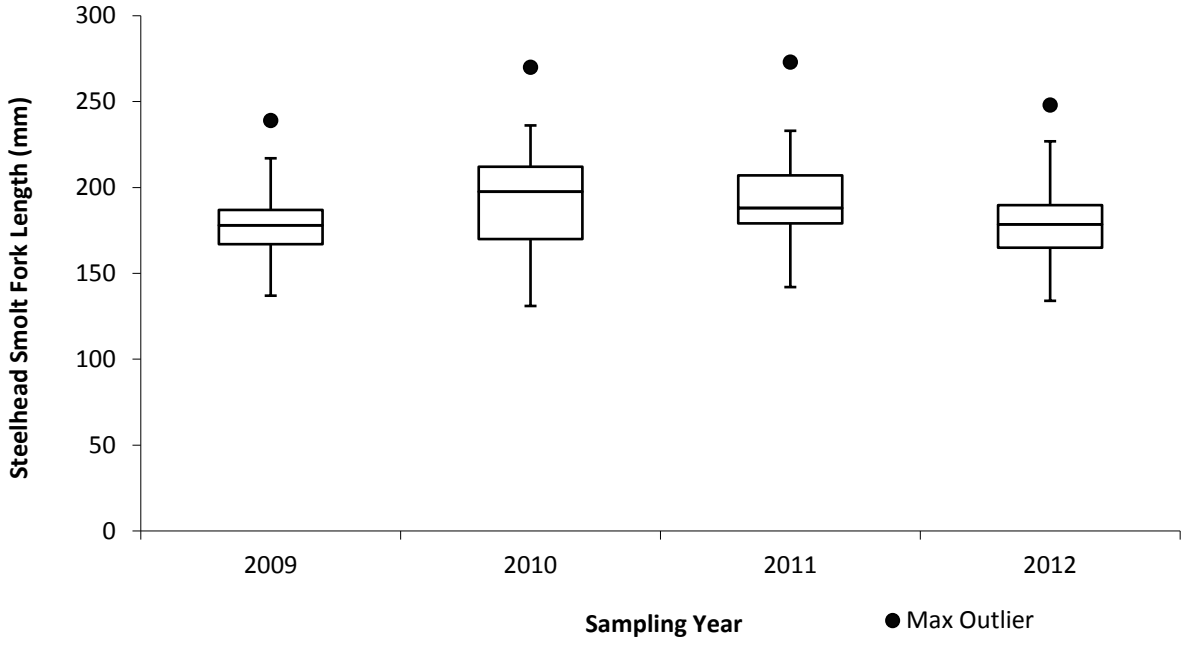

Figure 9. Box plot of steelhead smolt length from the Napa River rotary screw trap 2009-2012. Note: The bottom and top of each box are the 25th and 75th percentiles respectively. The line near the middle of each box is the median, and the vertical lines (whiskers) represent the lowest and highest values within 1.5 times the inter-quartile range. The maximum outlier values represent the largest individual measurement for each year.

Steelhead smolts were collected consistently throughout the 2012 season with the highest numbers captured during the third week in April. As observed in previous years, the highest steelhead catches corresponded with elevated flows following storms (Figure 10). Chinook salmon smolts were collected more regularly toward the end of the season with a peak around early May (Figure 11).

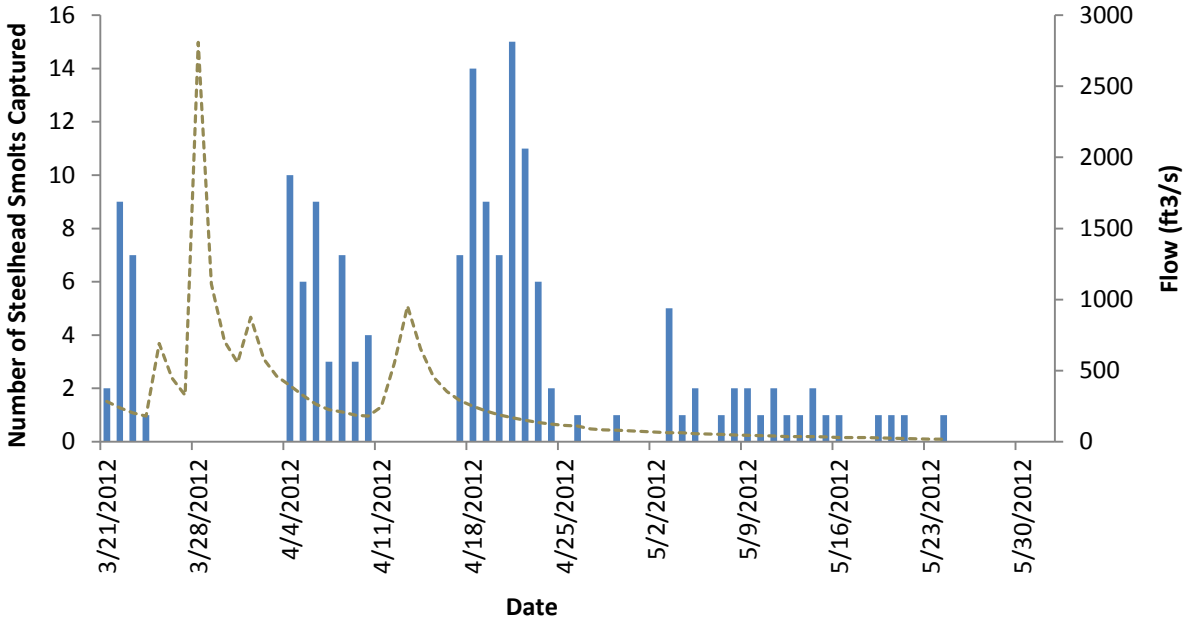

Figure 10. Daily steelhead smolt catch (blue bars) relative to daily mean streamflow (gray line) during the entire sampling period. Flow data source: USGS 11458000 - Napa River at Oak Knoll Ave.

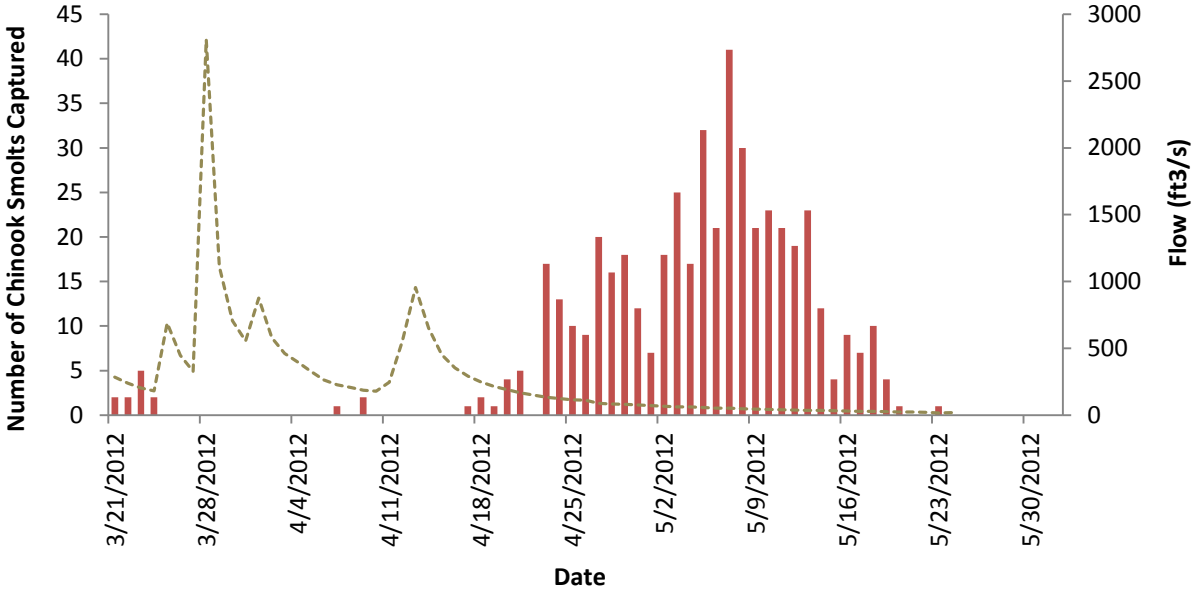

Figure 11. Daily Chinook parr/smolt catch (red bars) relative to daily mean streamflow (gray line) during the entire sampling period. Flow data source: USGS 11458000 - Napa River at Oak Knoll Ave.

Trap Efficiency

The trapping efficiency of the rotary screw trap was calculated on a weekly basis via mark-recapture trials. A total of 85 steelhead and 272 Chinook were marked with a combination of fin clips and Passive Induced Transponder (PIT) tags and released upstream of the trap throughout the season. Trapping efficiency was calculated by dividing the number of marked fish released to the number of marked fish recaptured. Over the 2012 sampling season, our trapping efficiencies were 21.2% for steelhead and 37.5% for Chinook. These efficiencies were higher than the running average of all sampling years (Table 4).

Species	Total number of smolts captured	Number of marked smolts released upstream	Number of smolts recaptured	Estimated 2012 trap efficiency	Average trap efficiency (2010-12)
Steelhead	142	85	18	21.2%	14.8%
Chinook	406	272	102	37.5%	23.5%

Table 4. Trapping efficiency estimates over the entire 2012 sampling period as well as the average annual efficiency from 2010-2012. Note: Trapping efficiency was not calculated during the 2009 season.

Population Estimates

Population estimates (i.e. smolt passage estimates) were calculated for the 2010-2012 sampling years using methods described in previous years' reports (Koehler and Blank, 2011) as well as in Carlson et al 1998. These smolt passage estimates represent the total number of fish estimated to have passed the trap site during each sampling season (Table 5). It is important to note that the trap site is located at a point that drains approximately 67% of the total salmonid habitat length within the Napa River watershed; therefore these are partial estimates of total-basin populations. Additionally, the trap was only operated for a fraction of the total outmigration period each year, primarily due to logistical constraints of sampling in a highly variable river system. Given these limitations, we feel that the most reliable and standardized metric for assessing population trends during the past four years of sampling is the catch-per-unit-effort (CPUE).

Year	Days Sampled	Steelhead			Chinook		
		Captured	Passage Estimate	CPUE	Captured	Passage Estimate	CPUE
2009	69	119	2,519 (± 2,810)*	1.7	1	N/A	N/A
2010	89	242	1,946 (±738)	2.7	1,371	6,888 (± 1,077)	15.5
2011	72	166	970 (± 456)	2.3	7,265	68,613 (± 19,611)	101.5
2012	49	142	643 (±265)	2.9	406	1,076 (± 183)	8.3

Table 5. Observed catch, total passage estimates, and catch-per-unit-effort (CPUE) of steelhead and Chinook smolts from 2009-2012. Note: Catch-per-unit-effort (CPUE) was calculated by dividing the total catch by the total number of days sampled. One unit of effort is equal to one 24-hour period.
*2009 estimates were calculated using very limited mark-recapture data, and therefore exhibit very high error

CPUE was calculated for steelhead and Chinook smolts by dividing the total number of fish collected by the number of days sampled (Table 5). This allows standardization of catch data over multiple years with different sampling periods. Results for steelhead show a relatively stable or slightly increasing trend during the 2009-2012 period (Figure 12). Results for Chinook show tremendous interannual variability in terms of juvenile production (Figure 13). This variability in Chinook abundance suggests that the population is relatively small and may be more susceptible to environmental variability from one year to the next.

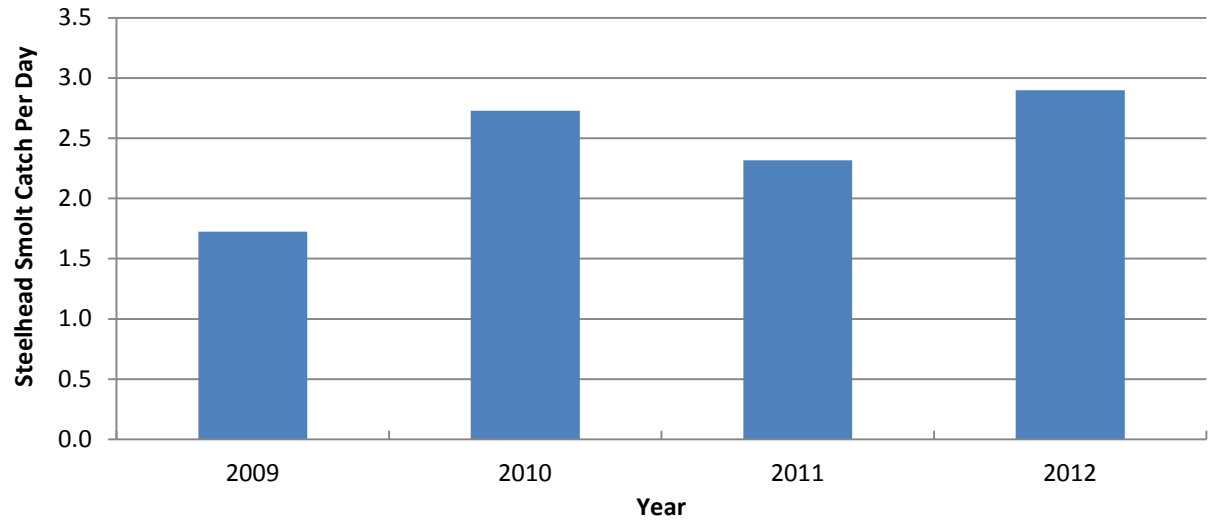

Figure 12. Number of steelhead smolts captured per day (CPUE) in the Napa River rotary screw trap from 2009-2012.

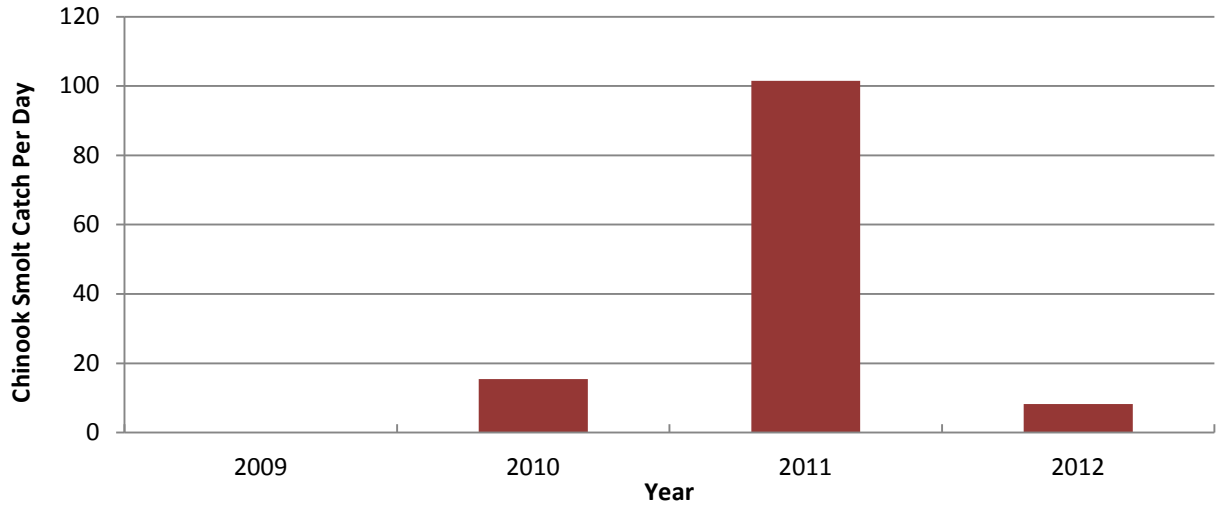

Figure 13. Number of Chinook salmon smolts/parr captured per day (CPUE) in the Napa River rotary screw trap from 2009-2012.

Fyke Nets

Two fyke nets were installed during the spring 2012 outmigrant season as part of a two-year study, funded by the Department of Fish and Game, to collect and describe steelhead smolts in Milliken and Napa/Redwood Creeks (Figures 14 and 15). The goal of the fyke net sampling was to document the size (length and weight), abundance, and run timing of steelhead in these streams where little current data exists. Results of this monitoring are intended to help fill in data gaps for tributary systems that drain into the Napa River downstream of the rotary screw trap and provide information on the relative contribution these systems make to the overall steelhead population.

Many logistical challenges needed to be worked out to effectively operate the traps. Therefore, data from this first year of sampling are somewhat preliminary and incomplete. Operating the fyke nets during periods of high to moderate flow proved especially difficult, and often impossible, due to high debris loading and gear damage. Both traps were installed in early March and removed in early June. We operated the traps a total of 45 sampling days during this period.

Figure 14. Napa Creek fyke net during moderate flow.

Figure 15. Milliken Creek fyke net during low flow.

We captured 11 native and six non-native fish species in Milliken Creek and six native and zero non-native fish species in Napa Creek (Table 6) during the spring 2012 sampling period. Steelhead catch rates declined sharply as flows diminished in May.

Common Name	Scientific Name	Milliken Cr. 2012	Napa Cr. 2012
Steelhead / Rainbow trout	*Oncorhynchus mykiss*		
Fry / Parr (<130 mm)		31	23
Smolt (>130mm)		79	49
Adult or Resident (>300 mm)		2	1
Chinook Salmon (Parr)	*Oncorhynchus tshawytscha*	1	0
Pacific Lamprey (Adult)	*Entosphenus tridentata*	9	0
River Lamprey (Adult)	*Lampetra ayresi*	1	0
Brook Lamprey (Adult)	*Lampetra cf. pacifica*	34	0
Lampetra Sp. (Ammocete)	*Lampetra sp.*	11	0
Unidentified Lamprey Sp. (Ammocete)	-	5	0
Sacramento Pikeminnow	*Ptychocheilus grandis*	7	1
California Roach	*Hesperoleucus symmetricus*	819	456
Sacramento Sucker	*Catostomus occidentalis*		
Adult		1	3
Juvenile / Larvae		19	33
Tule Perch	*Hysterocarpus traski*	1	0
Prickly Sculpin	*Cottus asper*	141	52
Three-spine Stickleback	*Gasterosteus aculeatus*	109	16
Bluegill	*Lepomis macrochirus*	27	0
Green Sunfish	*Lepomis cyanellus*	1	0
Black Crappie	*Pomoxis nigromaculatus*	2	0
Largemouth Bass	*Micropterus salmoides*		
Adult		2	0
Larvae (<25mm)		1	0
Inland Silverside	*Menidia beryllina*	4	0
Fathead Minnow	*Pimephales promelas*	5	0
Non-Fish Taxa			
Bullfrog Tadpole	*Rana catesbeiana*	73	4
Bullfrog Adult	*Rana catesbeiana*	7	1
Western Toad	*Bufo boreas*	12	0
Signal Crayfish	*Pacifastacus leniusculus*	23	45
Red Swamp Crayfish	*Procambarus clarkii*	10	3
Red-eared Slider Turtle	*Trachemys scripta elegans*	0	1
Western Pond Turtle	*Actinemys marmorata*	3	1

Table 6. Total 2012 catch data from the Napa Creek and Milliken Creek fyke nets.

CONCLUSIONS

- Catch rates of steelhead smolts in the RST have been stable or slightly increasing during the past four years, suggesting that the Napa River consistently produces steelhead smolts from one year to the next despite significant variability in environmental conditions including rainfall amounts and timing as well as season flow patterns.

- Chinook salmon spawning was limited by poor hydrologic conditions in fall 2011 / winter 2012. An unknown, but likely small, number of Chinook successfully spawned in the lower reaches of the mainstem Napa River, as indicated by the capture of Chinook smolts in the RST.

- Steelhead smolts collected in the RST during the past four years have had a median length of 187 mm (7.4 inches); this large average size would be expected to produce high ocean survival rates. The size and range of steelhead smolts has varied little during the past four years.

- The presence of a juvenile coho salmon was discovered by genetic analysis of 2010 tissue samples. RCD and NMFS are currently confirming the finding and seeking funding to analyze additional samples from the same period.

- The RCD and our partners plan to operate the RST and fyke nets in the same locations during the spring 2013 season.

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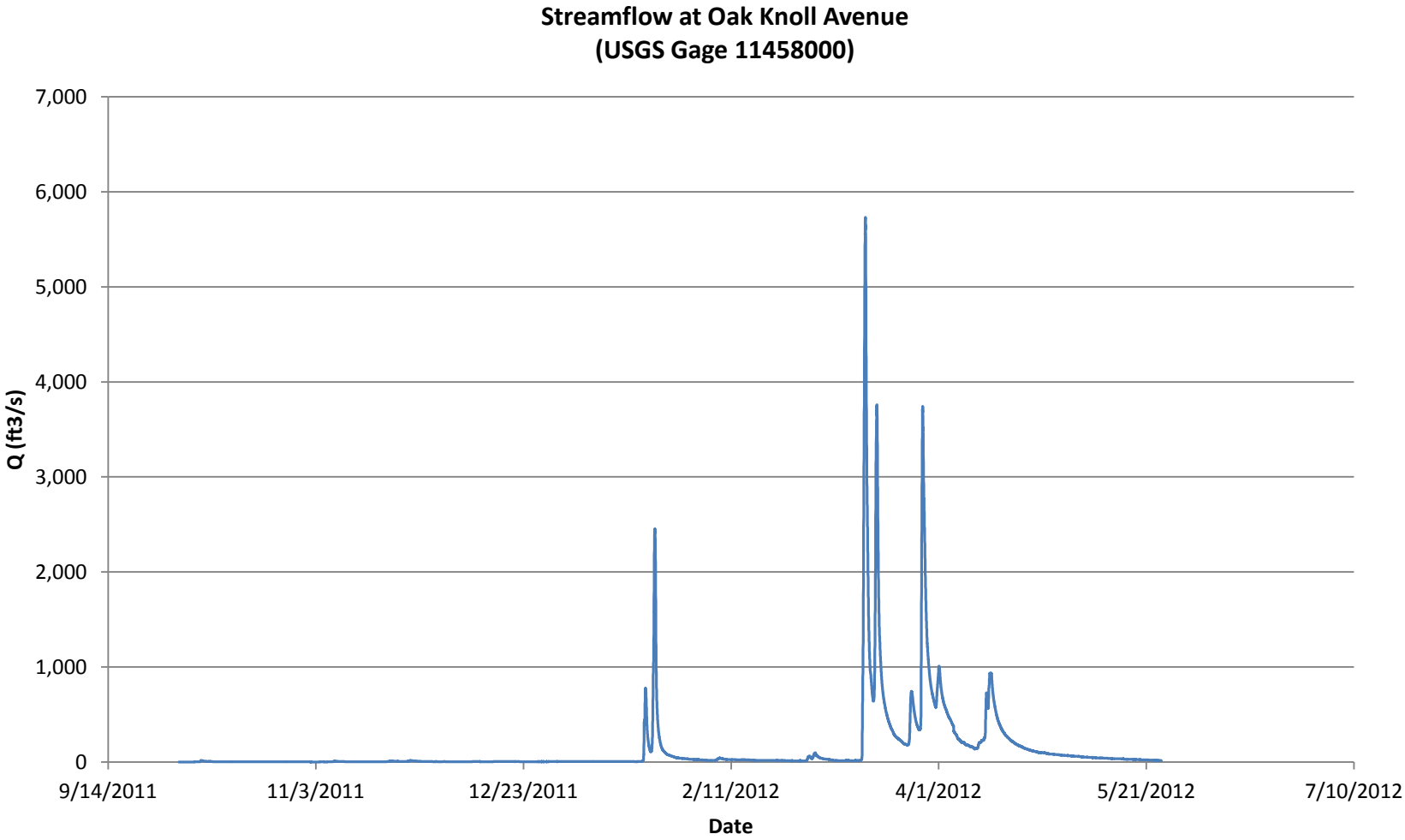
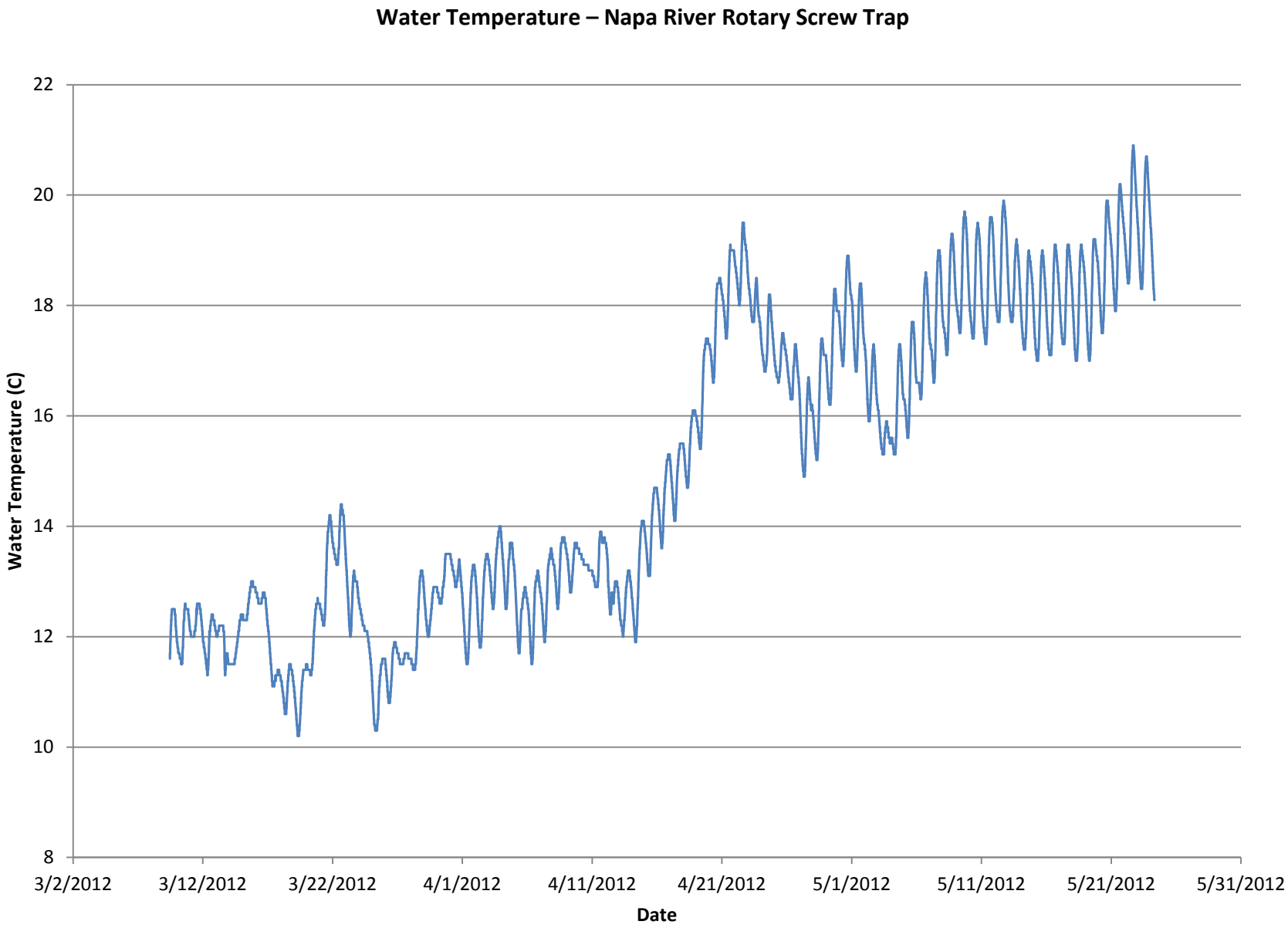
APPENDICES

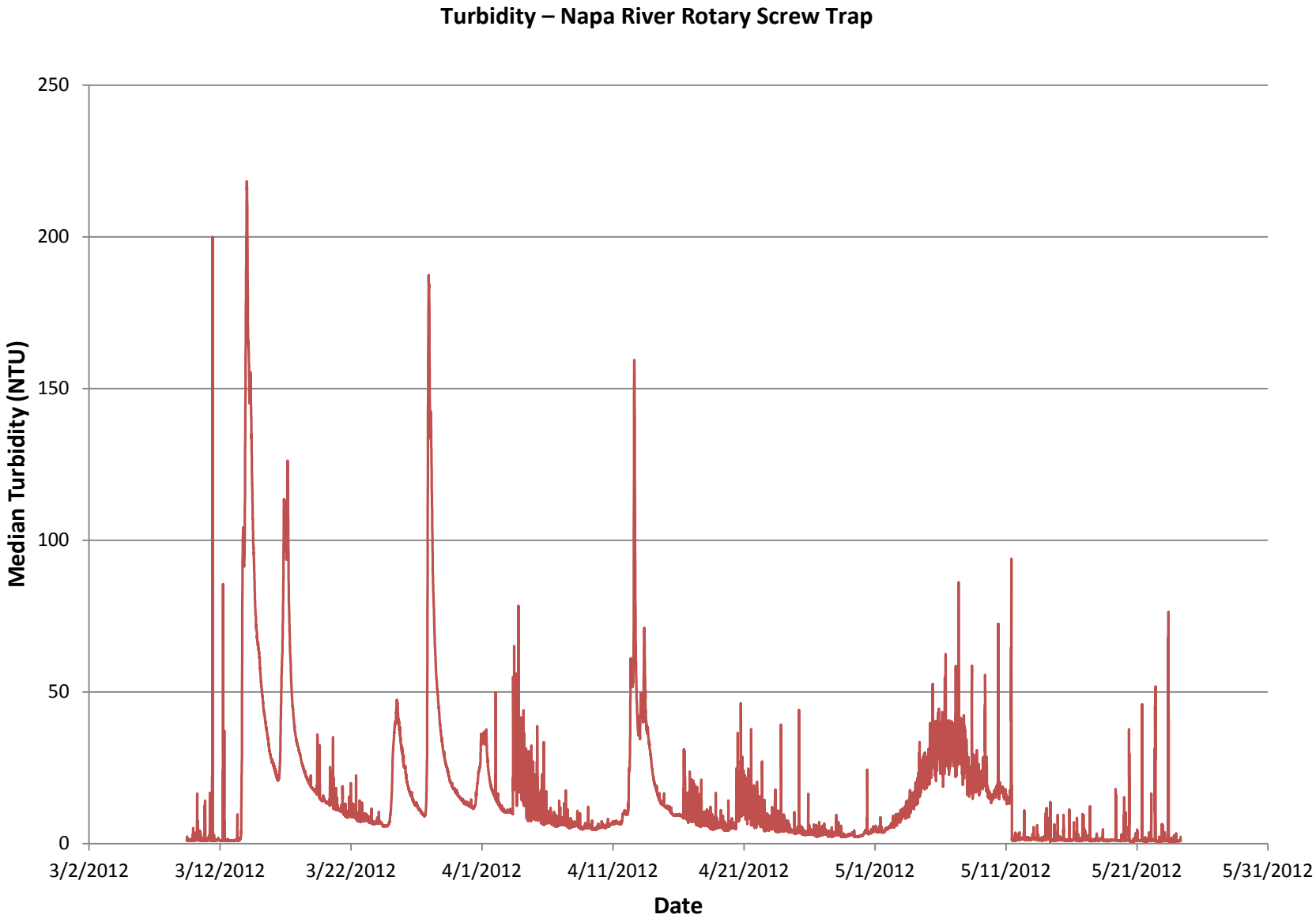
APPENDIX A: NAPA RIVER FLOW, WATER TEMPERATURE, AND TURBIDITY

APPENDIX B: ROTARY SCREW TRAP DECISION TREE

APPENDIX A: NAPA RIVER FLOW, WATER TEMPERATURE, AND TURBIDITY




Water Temperature – Napa River Rotary Screw Trap
Water Temperature (C)
22
20
18
16
14
12
10
8
3/2/2012
3/12/2012
3/22/2012
4/1/2012
4/11/2012
4/21/2012
5/1/2012
5/11/2012
5/21/2012
5/31/2012
Date


Turbidity – Napa River Rotary Screw Trap
Median Turbidity (NTU)
250
200
150
100
50
0
3/2/2012
3/12/2012
3/22/2012
4/1/2012
4/11/2012
4/21/2012
5/1/2012
5/11/2012
5/21/2012
5/31/2012
Date

APPENDIX B: ROTARY SCREW TRAP PROCESSING DECISION TREE

Species	Size	Recap?	# of fish	Work up	Release site
Steelhead	≥ 130 mm (smolts)	no	first 30	record observed & applied marks, length, weight, genetics (individual ID)	up
			31+	count	down
		yes	all	record observed marks, **Do not anesthetize**	down
	< 130 mm (yoy/parr)	n/a	first 20	length, weight, genetics (pooled)	down
			21+	count	down
	adult	n/a	all	record observed marks (look for a clip) and sex, estimate length. **Do not anesthetize. Take pictures if possible**	down (immediate release)
Chinook or other salmon	≥ 40 mm (smolts)	no	first 20	length, weight, genetics (pooled)	up
			21+	count	down
		yes	all	record observed marks, **Do not anesthetize**	down
	< 40 mm (yoy/parr)	n/a	all	count	down
All other species	all	n/a	all	count	down

Steelhead and salmon should only be in the Tricaine solution for **30 minutes or less.**

All steelhead and salmon should be visually inspected for marks before being processed.
Recaptured fish should not be anesthetized.