Elk-Sixes Hoop Trap Results 2012-2014

Project Partners: South Coast Watershed Council (SC Council)
Curry Soil and Water Conservation District (Curry SWCD)
OR Department of Fish and Wildlife (ODFW)

Project Funding: USFS Powers Ranger District; BLM RAC (Elk-Sixes Large Wood grant); South Coast Watersheds; OR Watershed Enhancement Board

March 20, 2016

Summary
The SC Council, Curry SWCD, and ODFW Gold Beach District staff constructed two aluminum hoop traps in 2011 to sample juvenile outmigration from small, low gradient streams. In spring 2012 the traps were deployed in two tributaries of the lower Elk River – namely Cedar Creek and Swamp Creek; and in two tributaries of the lower Sixes River – namely Sullivan Gulch and Greene Creek. The traps were deployed: (1) to test the effectiveness and efficiency of the traps; (2) to determine when fish outmigrate from these subwatersheds; and (3) to determine which fish species overwinter in these subwatersheds. In spring 2013 the traps were deployed in Sullivan Gulch and Greene Creek, to record peak outmigration, and in spring 2014 the traps were deployed in Cedar Creek and Swamp Creek, also to record peak outmigration. Trap results are presented in this report.

Background
The Elk River and Sixes River have small estuaries and relatively steep, simplified mainstem channels. As a result, both watersheds lack rearing habitat; particularly overwintering habitat, which is the principal limiting factor to coho productivity in both rivers. Restoring rearing habitat in the Elk and Sixes mainstem channels is challenging because: stream size limits where and how wood structures can be used; the adjacent floodplain is highly valued pastureland, and that impedes the restoration of meanderbends, alcoves, and overflow channels; the scale and complexity of mainstem restoration makes it expensive; and the combination of in-channel hydraulics, bedload mobility, and tidal/storm fluctuations increases the risk of failure.

For these reasons, most of the rearing habitat projects implemented to-date have focused on low gradient tributaries in the lower watersheds rather than on the mainstem channels. In Elk River, Cedar Creek and Swamp Creek historically provided complex rearing habitat both within their respective valleys and where cross the Elk River floodplain and merge with the estuary. Over the past 15 years restoration projects have partially restored this complexity by addressing most of the fish passage barriers; fencing and revegetating the low gradient habitat; adding wood to these channels and their adjacent floodplains; and by constructing off-channel ponds and alcoves. In the Sixes River a tributary called Sullivan Gulch drains a vast wetland complex on the south side of the estuary that accounts for the highest quality overwintering habitat in the watershed. The segment of channel connecting the wetlands to the river was ditched in the early twentieth century to convert floodplain into pasture. In 2015 the Curry SWCD and multiple partners undertook a restoration project that re-contoured nearly 40 acres of floodplain to create and enhance wetlands, backwater areas, stream channels, and riparian habitat. On the north side of

the Sixes River a stream called Greene Creek (aka Coho Creek) runs along the margin of the floodplain-hillslope interface in a ditched channel that drains wetlands and small tributaries. Over the last 10 years Greene Creek has been enhanced through riparian fencing and planting, instream wood placements, and wetland restoration.

In 2011 the SC Council, Curry SWCD, and ODFW partnered to develop a juvenile sampling plan to evaluate the effectiveness of past and future restoration projects, and to assess productivity, in these four tributaries. In January Sullivan Gulch was sampled using a seine net and electro-shocker. The results confirmed that coho overwintered in the wetlands and ditch channels, but the sampling methodology was difficult to employ and inefficient, and it yielded limited data. In May Cedar and Swamp creeks were also sampled using the same methodology; coho were observed in both streams, but the same limits applied.

Based on these experiences we concluded that smolt traps would be a more efficient and effective method, but the small size of the tributary channels prevented the use of screw traps, which is what the local ODFW office had on hand. However in the Rogue Valley ODFW had a small, non-mechanical "hoop" trap, which we were able to use as a template. In fall 2011we secured funding from the US Forest Service (Powers Ranger District) and South Coast Watersheds 501c3 (Gold Beach) to design and construct two hoop traps. A local fabricator was hired and the traps were constructed that winter.

Hoop Trap Deployment

In April 2012 one trap was deployed to the Elk River tributaries and the other to the Sixes River tributaries, to test the traps' effectiveness and ease of operation, and to develop a better understanding of the timing of coho outmigration. Swamp Creek and Sullivan Gulch were sampled first, and then in May the traps were moved to Cedar Creek and Greene Creek. Trap operation was funded through US Forest Service and BLM grants. Sampling results demonstrated that the traps could be run effectively in each of the four tributaries, as long as they were pulled during periods of low flow, and the sampling confirmed that one person could manage the traps efficiently. Since the traps were moved between sites during peak outmigration the 2012 data is incomplete, but it did confirm that all four subwatersheds were providing overwinter habitat for coho and other species; and the data greatly improved our understanding of when fish outmigrate from these systems. The results of the 2012 sampling are provided as an attachment.

In mid-March 2013 the traps were deployed to Sullivan Gulch and Green Creek, and operated by Curry SWCD staff, ODFW, and Swanson Ecological Services, LLC. Based on our 2012 data we planned to run the traps through mid-May, but the spring of 2013 was characterized by a lack of rain and near drought conditions, so we pulled the traps on April 20th due to persistently low flows. Results from the 2013 trapping again confirmed that both streams are being used as overwinter habitat, particularly for coho smolts and juvenile large scale suckers (the 2013 data is provided as an attachment). The following observations were also made from the data:

- Overall productivity in Sullivan Gulch appears to be greater than in Greene Creek, but this disparity may be attributed to differences in trap efficiencies more so than actual differences in production. Conversely, Greene Creek appears to have a greater abundance of diversity.

- Sullivan Gulch appears to provide little, if any, spawning based on a lack of adults and young of the year; this corresponds with our assessment of the habitat.
- Greene Creek appears to provide some spawning for Pacific lamprey, as evidenced by the presence of adults in the trap.
- Steelhead are present in low numbers in both systems; cutthroat are present in low numbers in Sullivan Gulch, but are abundant in Greene Creek.
- Stickleback and sculpin are common in both systems.
- Excluding stickleback and sculpin, large scale suckers are the most common fish, and coho the second most common fish, in both systems.
- Rough skinned newts are common in both systems; red legged frogs are common in Greene Creek and abundant in Sullivan Gulch.

On March 23, 2014 the traps were deployed to Cedar Creek and Swamp Creek, and operated by Curry SWCD staff, ODFW, and Swanson Ecological Services, LLC. As in 2013, flows were uncharacteristically low in the winter and spring of 2014, but we were able to operate the traps through May 23rd by pulling the traps during low flow periods. Results from the 2014 trapping again confirmed that both streams are being used as overwinter habitat by a variety of species, but overall numbers were lower than we anticipated, especially in Swamp Creek (the 2014 data is provided as an attachment). The following observations were also made from the data:

- Large Scale Suckers, which were the most common species in the Sixes tributaries after sculpin and stickleback, were absent from the Elk River tributaries.
- Cedar Creek was used by a greater diversity of species and life stages, including Steelhead smolts and adult Pacific lamprey. It also has at least one western pond turtle, which is a rare find this close to the ocean.
- Swamp Creek was multiple magnitudes of order less productive in 2014, for all species, in comparison to the 2012 data; even though the trap ran for approximately twice as many days in 2014 as it did in 2012.
- No Chinook were present in Swamp Creek in 2014 (25 were caught in 2012).

Discussion

The hoop traps proved to be an effective and efficient way to monitor juvenile fish usage in these small, low gradient streams where conventional screw traps could not operate. The traps are lightweight and durable, so one person can deploy and pull the traps. Bycatch, such as adult Pacific lamprey, western pond turtles, and red legged frogs, provided additional insight into the importance of these systems for non-targeted species.

The lack of pre-project baseline data on Swamp, Cedar, and Greene creeks prevented us from drawing any direct conclusions about the effectiveness of the restoration projects that were implemented in those streams over the last two decades, but the data could potentially be used to evaluate the effectiveness of the Sullivan Gulch project, given that Greene Creek can be used as a control. Project effectiveness monitoring aside, the data was still very informative, in the following ways:

- The presence of coho smolts in all four streams, in each survey year, confirmed the value of these overwintering habitats.

- The diversity of species found in each stream also highlights the importance of these subwatersheds on the greater aquatic ecosystem.
- The relatively large numbers of coho smolts in Sullivan Gulch and Swamp Creek in 2012, when compared to Greene Creek and Cedar Creek, respectively, suggests that the broad areas of inundation and ponding found in Sullivan Gulch and Swamp Creek are significantly more productive than the low gradient stream channels that account for most of the overwintering habitat in Greene Creek and Cedar Creek.
- The presence of large scale sucker juveniles in the Sixes River tributaries came as a surprise to ODFW, which expanded their understanding of the life history of those fish on the south coast.
- The data also suggests that winter flow plays a significant role in determining whether fish move upstream into these habitats to overwinter. This statement is based on the fact that the comparatively robust numbers observed in 2012 followed a typical winter in the Elk and Sixes watersheds, whereas the depressed numbers observed in 2013 and 2014 followed atypical winters that were unseasonably dry and lacked normal winter flows. Rationally this makes sense, and it highlights the importance of addressing low flow impediments, such as inset beaver dams built into incised ditch channels, perched culverts, and undersized culverts.

For more information contact:
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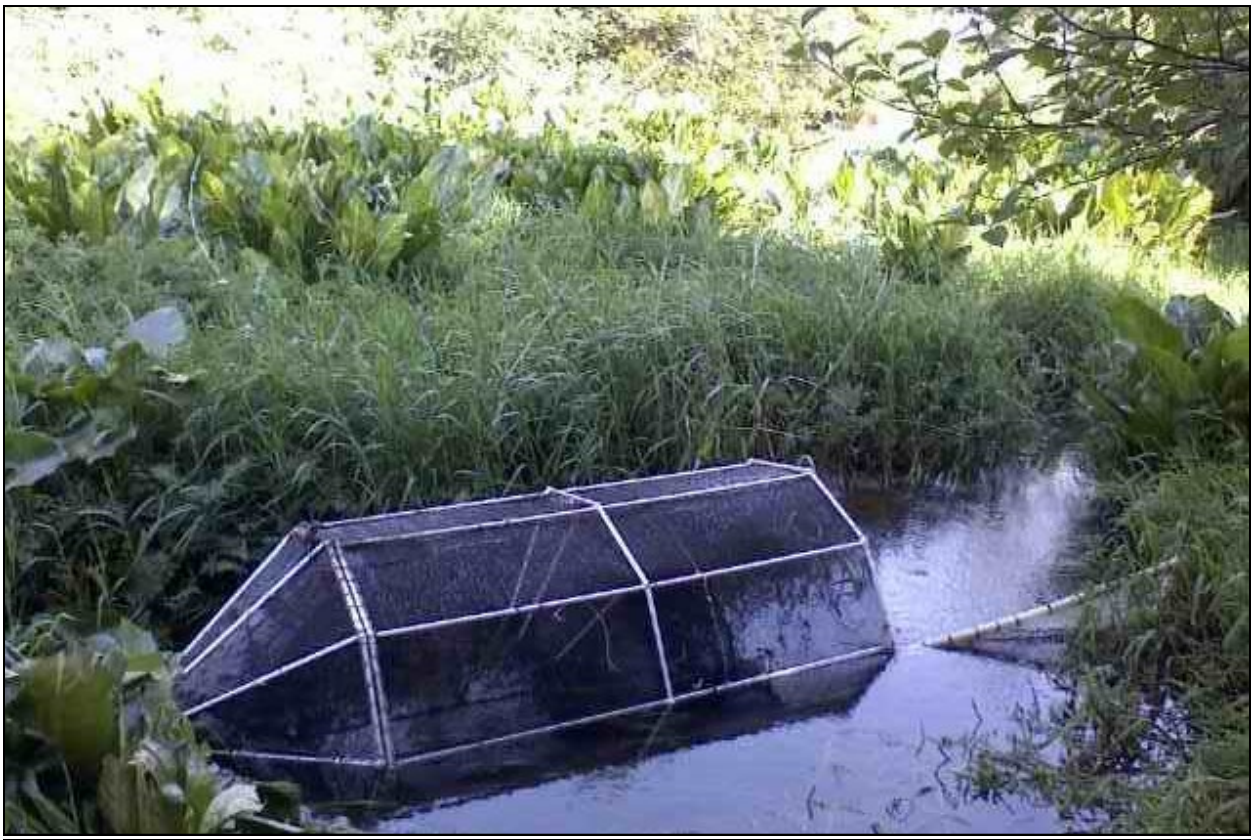
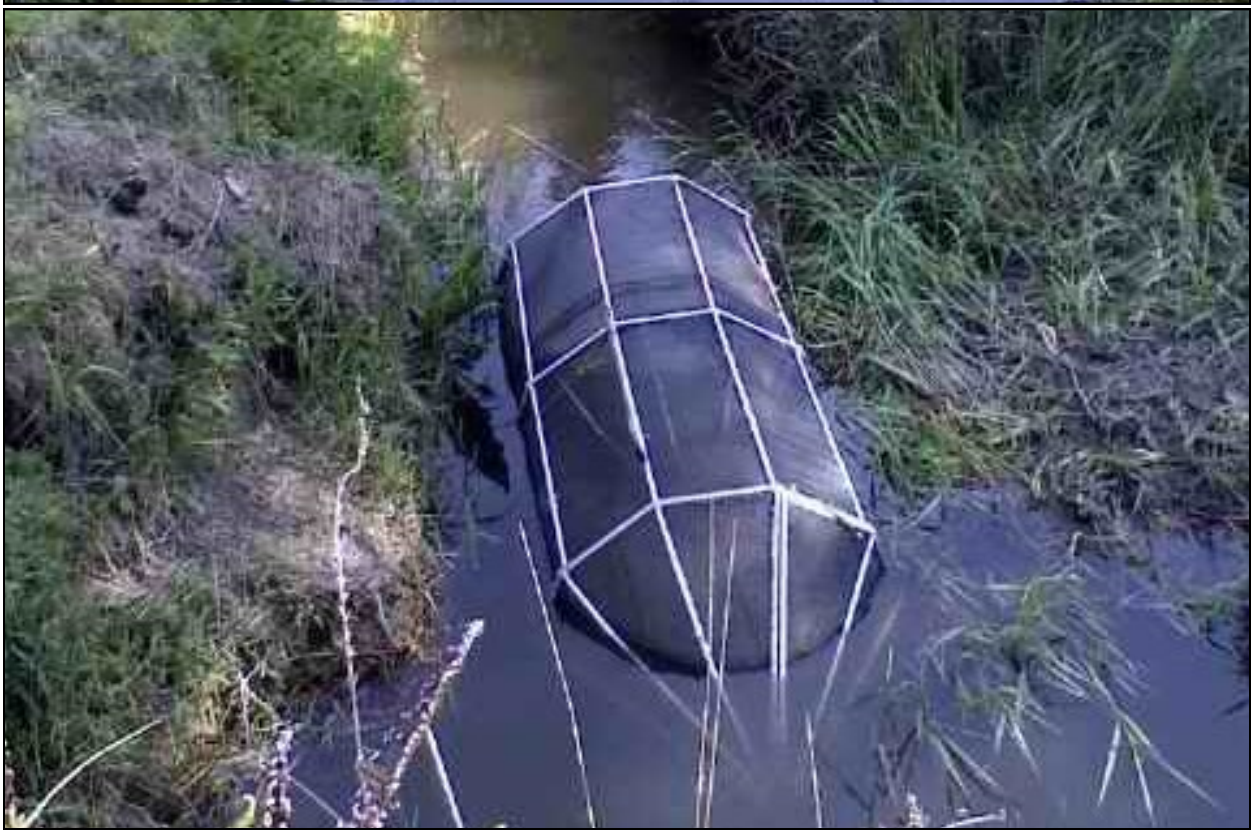
Steve Mazur (541) 247-7605 – ODFW Gold Beach District

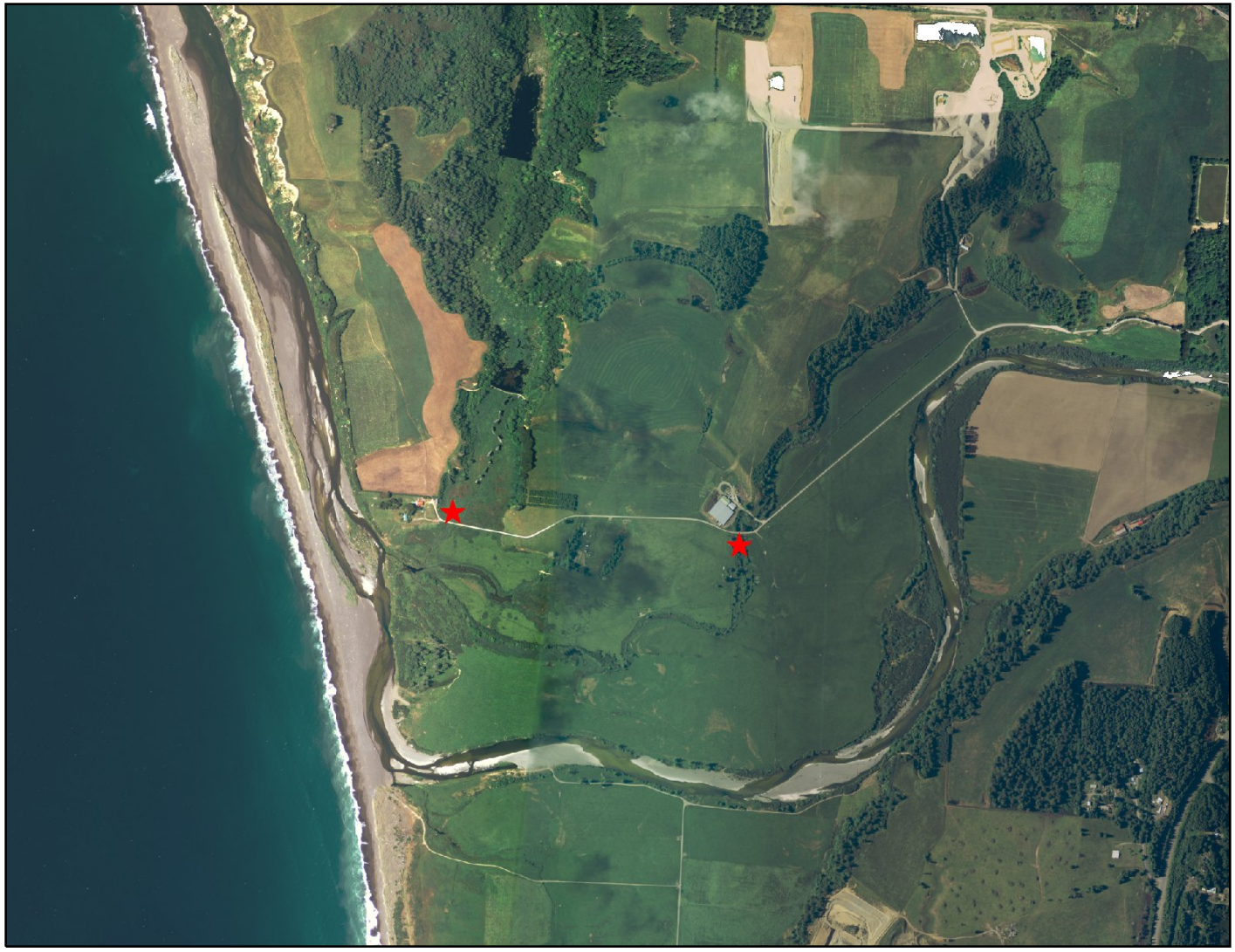
Smolt Trap Operation 2012—top photo shows a hoop trap fishing Cedar Creek (Elk River); bottom photo shows a hoop trap fishing Greene Creek (Sixes River). A local fabricator built the traps out of aluminum, using an existing ODFW trap as a template. The traps work by funneling fish through an inside cone that prevents them from swimming back upstream. To empty the catch the traps are pulled partially out of the water and the contents netted out.





Smolt Trap Operation 2012—some of the species caught in the traps include (starting in the upper left corner and going clockwise): coho smolt, large scale sucker juvenile, adult Pacific lamprey, sculpin, and crayfish. Other species caught in the traps included steelhead, cutthroat, stickleback, and a variety of crayfish.

Elk River Trap Sites



Legend

0 2000 4000 6000 ft.

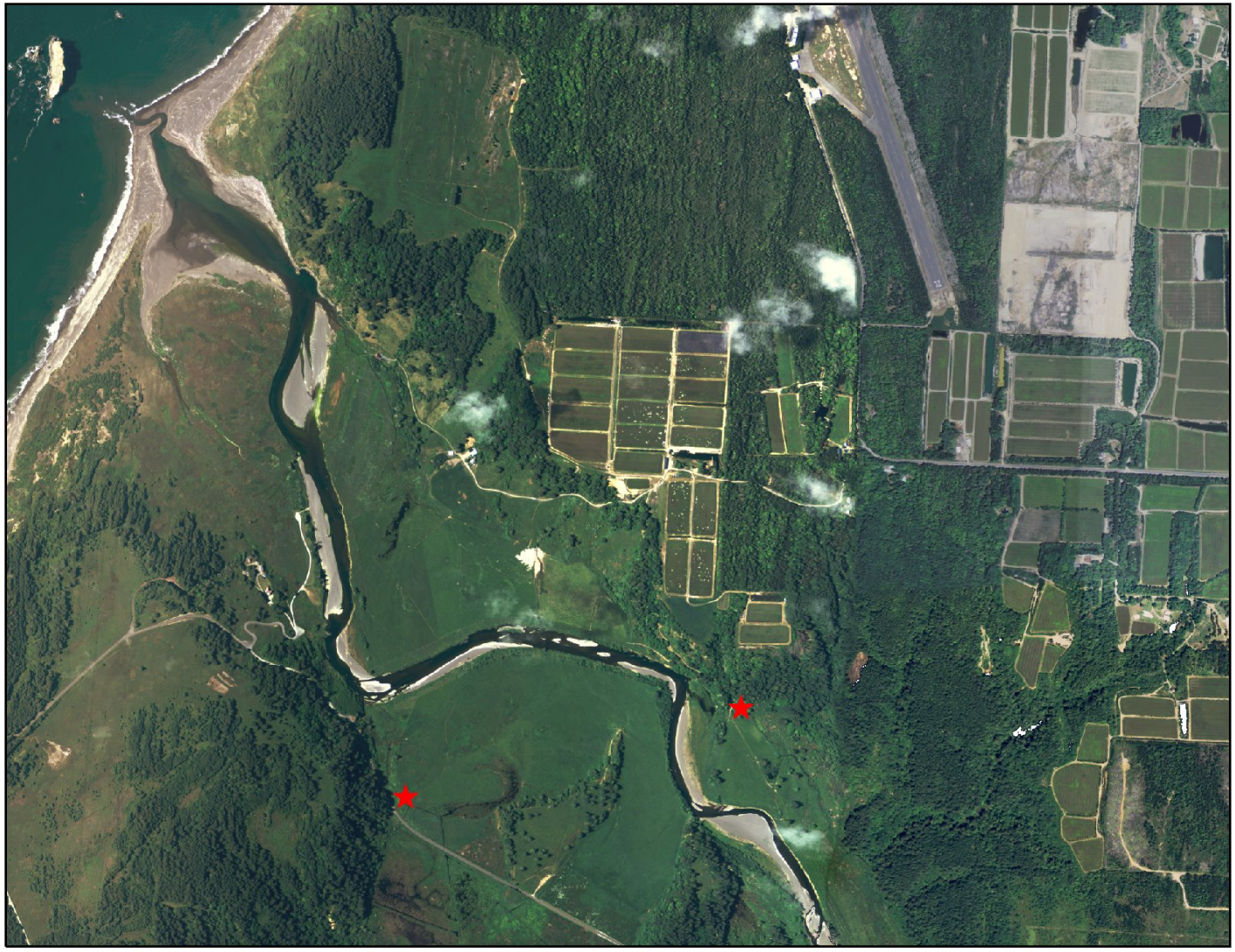
Map center: 42° 47' 51" N, 124° 30' 55" W

N

Scale: 1:20,000

Notes: Red Stars denote trap locations - Swamp Creek (west) and Cedar Creek (east)

Sixes River Trap Sites



Legend

0 2000 4000 6000 ft.

Map center: 42° 50' 45" N, 124° 31' 33" W

N

Scale: 1:20,000

Notes: Red Stars indicate traps locations on Sullivan Gulch (south) and Greene Creek (north)

Smolt Trap: Greene Creek 2012

Location:	Trap Notes:	Personnel:
Greene Creek Sixes River Ranch	Hoop trap placed slightly upstream from the culvert 46 inches tapering to 5 inches	A. McKenzie

Date (2012)	Water Temp (F)	Coho 1+	Coho Fry	Ct	Pacific Lamprey	Sculpin	Stickle-back	Large Scale Suckers	Notes
5/10	**54**	4	1	6	0	55	8	19	
5/11	56	4	1	9	0	40	11	28	
5/12	**56**	1	1	5	0	12	7	14	Patched Muskrat hole in trap
5/14	57	1	4	13	0	35	20	6	
5/15	58	2	0	5	1	13	11	8	
5/17	57	2	0	0	0	5	14	4	
5/18	57	0	0	0	0	4	21	3	
	Totals	**14**	**7**	**38**	**1**	**164**	**92**	**82**	

Smolt Trap: Sullivan Gulch 2012

Location:	Trap Notes:	Personnel:
Sullivan Gulch (Sixes) Cape Blanco Rd.	Hoop trap placed slightly down stream from Cape Blanco Rd. 46 inches tapering to 5 inches	A. McKenzie

Date (2012)	Water Temp (F)	Coho 1+	Coho Fry	Ct	Chnk 1+	Sculpin	Stickle-back	Large Scale Suckers	Notes
4/27	**59**	23	1	1	0	7	20	3	
4/28	59	14	0	3	0	17	21	1	
4/29	**59**	7	0	2	0	10	7	1	Water level became too low to run trap
	Totals	**44**	**1**	**6**	**0**	**34**	**48**	**5**	

Smolt Trap: Cedar Creek 2012

Location:	Trap Notes:	Personnel:
Cedar Creek (Elk River) McKenzie Rd.	Hoop trap placed 75 yards down stream from McKenzie Rd. 46 inches tapering to 5 inches	A. McKenzie

Date (2012)	Water Temp (F)	Coho 1+	Coho Fry	Sthd 1+	Ct	Sculpin	Stickle-back	Pacific Lamprey Adults	Notes
5/10	**54**	2	1	1	8	1	3	0	
5/11	56	0	0	0	5	1	7	0	recaught 2 Ct
5/12	**56**	0	0	1	9	2	3	0	1 crawdad
5/14	58	0	0	0	4	5	18	0	2 crawdad
5/15	58	1	0	0	8	1	7	1	
5/17	57	0	0	0	2	0	2	0	
5/18	56	0	0	0	1	0	0	3	2 crawdad
	Totals	**3**	**1**	**2**	**37**	**10**	**40**	**4**	

Smolt Trap: Swamp Creek 2012

Location:	Trap Notes:	Personnel:
Swamp Creek McKenzie Rd.	Hoop trap placed directly up stream from McKenzie Rd. 46 inches tapering to 5 inches	A. McKenzie

Date (2012)	Water Temp (F)	Coho 1+	Ct	Sthd 1+	Chnk	Sculpin	Stickle-back	Pacific Lamprey Adults	Notes
4/3	N/A	0	1	0	1	0	0	0	
4/4	50	3	1	1	0	1	0	0	
4/5	50	2	1	0	0	24	1	0	
4/6	50	3	4	1	3	14	2	0	
4/8	51	1	1	0	0	9	1	1	Muskrat in trap
4/9	52	0	0	0	0	12	1	0	
4/10	51	0	0	1	0	7	4	0	
4/12	51	0	0	0	0	8	4	0	
4/13	50	1	2	0	0	1	2	0	Patched hole
4/16	52	6	6	3	0	38	4	0	
4/17	51	24	12	2	3	41	2	0	
4/19	52	8	1	3	5	46	0	1	
4/20	59	89	18	5	4	52	2	0	
4/21	59	28	29	7	1	149	4	0	
4/23	59	56	42	27	5	172	3	0	
4/24	59	27	17	1	0	43	4	0	Muskrat in trap
4/25	58	15	6	7	3	4	3	0	
4/27	57	23	4	0	0	126	2	0	Very high water
Totals:	**N/A**	**286**	**145**	**58**	**25**	**747**	**39**	**2**	

Greene Creek (Sweet Ranch) Juvenile Monitoring: 2013 Hoop Trap Totals

Date	Person	Temp F	Sthd smolt (>=120mm)	Sthd 1+ >=80mm	Coho smolt (>80mm)	Coho 0+ (<80 mm)	CT >=120mm	CT >=80mm	LSS Juv	LSS Adult	Lamprey Juvenile	Lamprey Adults	Trout 0+ (<80mm)	Stickle-back	Sculpin	Newts	Red LeggedFrogs	Comments
3/19/2013	DW	49			1		2	1					2	1	12	6		med flow, entry 6" deep
3/20/2013	DW	n/a												5	9	5	1	moved trap u/s
3/21/2013	DW	48					3	1						3		2	1	
3/22/2013	MS	50.5					1								1			
3/24/2013	MS	49.5							1						5	5		
3/25/2013	DW	49					1		3					9	3	7	5	fixed 3 holes- 1 puncture, 2 chew holes
3/26/2013	DW	53					1	2					2	2	2		1	pulled trap
4/3/2013	MS	53	1		1		1		1					5	10			
4/4/2013	DW	52.5	1		9			5	3			1		3	15	5	1	
4/5/2013	SM	n/a			8		1	6	14					4	20		3	rained last night
4/6/2013	MS	53	1		14		14		25			1		30	30			pulled trap
4/10/2013	MS	52.5			4		2		15					20	40			1-half pound steelhead/ spawned out
4/12/2013	DW	52.5			9			3	11					12	33		1	pulled trap
4/17/2013	DW	54			8		4		2					2	7			
4/18/2013	DW	50.5			3		1		1					2	10	1		
4/20/2013	MS	56	2		3			1		2				10	10			Pulled trap- last entry for season
			Total	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	
			5	0	60	0	31	19	76	2	0	2	4	108	207	31	13	

Persons: SM - Steve Mazur (ODFW); DW - Dustin Williams (Curry SWCD); MS - Matt Swanson (Swanson Ecological Services, LLC)

Sullivan Gulch Juvenile Monitoring: 2013 Hoop Trap Totals

Date	Person	Temp F	Sthd smolt (>=120mm)	Sthd 1+ >=80mm	Coho smolt (>80mm)	Coho 0+ (<80 mm)	CT >=120mm	CT >=80mm	LSS Juv	LSS Adult	Lamprey Juvenile	Lamprey Adults	Trout 0+ (<80mm)	Stickle-back	Sculpin	Newts	Red LeggedFrogs	Comments
3/12/2013	SM/TC	n/a		1	2				3					15	5			muskrat hole
3/13/2012	SM	n/a			1				2					20	5	5		
3/19/2013	DW	48		5										12	8	1	5	low flow, entry to trap barely submerged
3/20/2013	DW	53			1			2						10	12	13	16	high flow, entire trap nearly submerged
3/21/2013	DW	n/a												15	10	5	9	moved trap, flow dropped
3/22/2013	MS	51												20	10		10	
3/24/2013	MS	47.5			31			1	1					30	30			
3/25/2013	DW	49			1									3	4		3	fixed 1- chew hole, low water
3/26/2013	DW	52		1	3			2	1					5	6		5	pulled trap, low water
4/3/2013	MS	56			17			2	21					40	30	20	30	
4/4/2013	DW	54			18			2	3	1				5	2	7	3	
4/5/2013	SM				11				3					5	3	2		rained, flows up
4/6/2013	MS	55							1					15	20			pulled trap
4/10/2013	MS	54.5	1		12			3	77					100	50	3		
4/12/2013	DW	51.5	2		8	1			6					5	25	1		pulled trap
4/17/2013	DW	52.5			3				7					3	12		1	
4/18/2013	DW	53							1							1		low flow, entry to trap barely submerged
4/20/2013	MS	n/a			12	3			19					50	20	3	5	Pulled trap- last entry of season
			Total	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	
			3	7	120	4	0	12	145	1	0	0	0	353	252	61	87	

Persons: SM - Steve Mazur (ODFW); DW - Dustin Williams (Curry SWCD); MS - Matt Swanson (Swanson Ecological Services, LLC)

Swamp Creek (Elk River) Juvenile Monitoring: 2014 Hoop Trap Results

Date	Person	Sthd smolt (>=120mm)	Sthd 1+ >=80mm	Coho smolt (>80mm)	Coho 0+ (<80 mm)	CT >=120mm	CT >=80mm	LSS Juv	LSS Adult	Lamprey Juvenile	Lamprey Adults	Trout 0+ (<80mm)	Stickle-back	Sculpin	Newts	Red LeggedFrogs	Comments
3/23/2014	MS												1	2	lots		20 to 40 newts
3/26/2014	MS													5	lots		pulled trap
4/1/2014	MS																deployed trap
4/2/2014	DC/MS												2	5		1	
4/3/2014	DC/MS			1										2			
4/4/2014	DC												2	1	7		pulled trap
4/7/2014	DC																deployed trap
4/8/2014	DC												1	1			
4/9/2014	DC					1	1								2-3		
4/10/2014	MS																pulled trap
4/13/2014	DC																deployed trap
4/14/2014	DC														2-3		
4/15/2014	DC												1		3		
4/16/2014	DC		1											4			
4/17/2014	DC												1				
4/18/2014	DC																pulled trap
4/21/2014	DC																deployed trap
4/22/2014	DC			1		1								6			
4/23/2014	DC																
4/24/2014	DC																
4/25/2014	DC																pulled trap
4/28/2014	DC																deployed trap
4/29/2014	DC												1	1			
4/30/2014	DC												1				
5/1/2014	DC			1		1											
5/2/2014	DC			1		1	1						7				pulled trap
5/5/2014	DC																deployed trap
5/6/2014	DC												1				
5/7/2014	DC												2				
5/8/2014	DC				1												pulled trap
5/12/2014	DC																deployed trap
5/13/2014	DC														1		
5/14/2014	DC			1	1	6	1						15	1			
5/15/2014	DC																
5/16/2014	DC																pulled trap
5/19/2014	DC																deployed trap
5/20/2014	DC														2-3		
5/21/2014	DC														1		
5/22/2014	DC																1crayfish
5/23/2014	DC			1									3				1crayfish pulled trap
		Total	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	
		0	1	6	2	10	3	0	0	0	0	0	38	28	12	1	

Persons: SM - Steve Mazur (ODFW); DC - David Clark (Swanson Ecological Services, LLC); MS - Matt Swanson (Swanson Ecological Services, LLC)

Cedar Creek (Elk River) Juvenile Monitoring: 2014 Hoop Trap Results

Date	Person	Sthd smolt (>=120mm)	Sthd 1+ >=80mm	Coho smolt (>80mm)	Coho 0+ (<80 mm)	CT >=120mm	CT >=80mm	LSS Juv	LSS Adult	Lamprey Juvenile	Lamprey Adults	Trout 0+ (<80mm)	Stickle-back	Sculpin	Newts	Red LeggedFrogs	Comments
3/23/2014	MS		1										3	1	afew		
3/26/2014	MS	1			2	3	4						2	3	afew		trap pulled
4/1/2014	MS																deployed trap
4/2/2014	DC/MS			1		1	3						1				
4/3/2014	DC/MS					3											1 adult pond turtle
4/4/2014	DC					2	3						5		2		trap pulled
4/7/2014	DC																deployed trap
4/8/2014	DC					1	1								2-3		
4/9/2014	DC			1		2	4								2-3		
4/10/2014	DC						2										trap pulled
4/13/2014	DC																deployed trap
4/14/2014	DC					1					2		10	1			
4/15/2014	DC						3						2	1			
4/16/2014	DC						1						3				
4/17/2014	DC	1				1							3	1			
4/18/2014	DC						1								5		trap pulled
4/21/2014	DC																deployed trap
4/22/2014	DC		1			2	3				1		1	1			
4/23/2014	DC					6	13				1			1			
4/24/2014	DC						2						2				
4/25/2014	DC																nothing trap pulled
4/28/2014	DC																deployed trap
4/29/2014	DC												2		2-3		
4/30/2014	DC					1	1						6	1			1 crayfish
5/1/2014	DC					1	1						6				
5/2/2014	DC				1								2				trap pulled
5/5/2014	DC																deployed trap
5/6/2014	DC					1	1						3				
5/7/2014	DC												8		2-3		
5/8/2014	DC												4				
5/9/2014	DC					3	2						2				trap pulled
5/12/2014	DC																deployed trap
5/13/2014	DC					1							3				
5/14/2014	DC												1				
5/15/2014	DC												3				
5/16/2014	DC				1	1							4				trap pulled
5/19/2014	DC																deployed trap
5/20/2014	DC												3				
5/21/2014	DC												4				
5/22/2014	DC												4		1		
5/23/2014	DC												5				trap pulled
		Total	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**	
		2	2	2	4	30	45	0	0	0	4	0	92	10	8	0	

Persons: SM - Steve Mazur (ODFW); DC - David Clark (Swanson Ecological Services, LLC); MS - Matt Swanson (Swanson Ecological Services, LLC)