

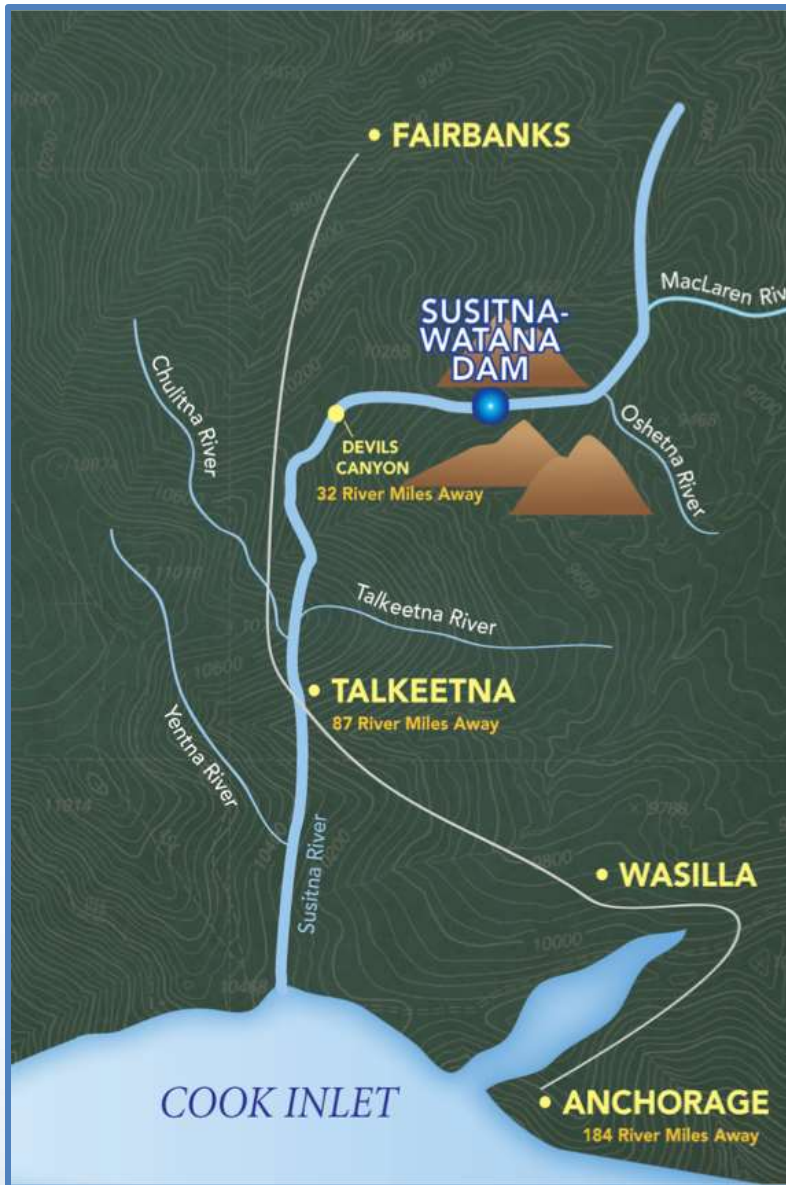
# Technical Team Meeting

## *Study 9.6 Fish Distribution and Abundance in the Middle and Lower Susitna River:*

### *Review of Sampling Techniques*

3/21/14

Prepared by R2 Resource  
Consultants, Inc.



# Study 9.6 FDA ML

*Objective: Evaluate appropriateness of fish sampling techniques by river reach*

- *Catch in 2013*
  - *Middle River*
  - *Lower River*
- *Potential to eliminate minnow trapping and hoop trapping*



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*Fish sampling methods used to estimate relative abundance in the Middle and Lower River in 2013 included:*

- *Backpack electrofishing*
- *Boat electrofishing*
- *Snorkeling*
- *Seining*
- *Minnow trapping*
- *Fyke netting*
- *Hoop trapping*
- *Angling*



9.6 FDA ML 2013 Middle River			Main Channel						Off-Channel							Tributary					All			
			Backpack Electrofishing (N=195; CPUE in fish/hour)	Boat Electrofishing (N=113; CPUE in fish/hour)	Snorkel (N=32; CPUE in fish/1,000 m <sup>2</sup> )	Seine (N=93; CPUE in fish/1,000 m <sup>2</sup> )	Minnow Trap (N=45; CPUE in fish/trap)	Fyke Net (N=17; CPUE in fish/trap)	Hoop Trap (N=49; CPUE in fish/trap)	Backpack Electrofishing (N=115; CPUE in fish/hour)	Boat Electrofishing (N=3; CPUE in fish/hour)	Snorkel (N=98; CPUE in fish/1,000 m <sup>2</sup> )	Seine (N=45; CPUE in fish/1,000 m <sup>2</sup> )	Minnow Trap (N=82; CPUE in fish/trap)	Fyke Net (N=23; CPUE in fish/trap)	Hoop Trap (N=3; CPUE in fish/trap)	Backpack Electrofishing (N=78; CPUE in fish/hour)	Boat Electrofishing (N=3; CPUE in fish/hour)	Snorkel (N=71; CPUE in fish/1,000 m <sup>2</sup> )	Seine (N=10; CPUE in fish/1,000 m <sup>2</sup> )	Minnow Trap (N=36; CPUE in fish/trap)	Fyke Net (N=1; CPUE in fish/trap)	Hoop Trap (N=2; CPUE in fish/trap)	Percent of Sites with CPUE=0 (N=569, all methods)
Salmon, Chinook	adult	% CPUE=0	97%						100%							94%					99%			
		Max CPUE	1.7						6.8							6.8								
	juvenile	% CPUE=0	97%	100%	94%	91%	84%	71%	98%	96%	100%	93%	78%	57%	39%	100%	95%	100%	93%	80%	67%	0%	50%	84%
		Max CPUE	14.7		2.7	35.5	1.9	31	0.2	18		1053.4	130.5	4.7	33		32.5		37.9	3.1	7.8	14	1	
Salmon, chum	adult	% CPUE=0	91%						100%							85%					94%			
		Max CPUE	61.5						19.5							289								
	juvenile	% CPUE=0	98%	100%	100%	96%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%	90%	100%	100%	100%	98%
		Max CPUE	8.7			13.3				15.8									104.3	189.8				
Salmon, coho	adult	% CPUE=0	97%						100%							93%					97%			
		Max CPUE	5						1							52.7								
	juvenile	% CPUE=0	94%	100%	78%	89%	73%	82%	98%	77%	67%	80%	58%	37%	43%	67%	78%	100%	73%	70%	33%	0%	50%	73%
		Max CPUE	29.9		1125.5	266	3.3	41	0.3	269.7	13	1555.6	4553.8	9	422	21	112.5		1054.5	5502.8	7	10	1	
Salmon, pink	adult	% CPUE=0	94%						100%							87%					95%			
		Max CPUE	6.7						0.5							4334.4								
	juvenile	% CPUE=0	100%	99%	100%	100%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	>99%
		Max CPUE			12.5					1.6														
Salmon, sockeye	adult	% CPUE=0	97%						100%							97%					98%			
		Max CPUE	1.7						2.5							4.2								
	juvenile	% CPUE=0	96%	99%	91%	86%	98%	82%	100%	88%	100%	92%	60%	89%	87%	100%	92%	100%	92%	70%	92%	100%	100%	86%
		Max CPUE	22.7	50.1	108.1	121.4	<0.1	25		76.6		1410.2	676.6	1	111		16.2		37.6	1897.5	0.1			
Arctic grayling	--	% CPUE=0	69%	81%	84%	81%	96%	82%	94%	83%	100%	89%	87%	95%	83%	100%	87%	67%	80%	100%	97%	0%	100%	75%
		Max CPUE	170	247.1	21.9	378.1	0.5	40	2	112.4		200	45.2	0.9	10		72.9	9.3	181.8		0.1	77		
Burbot	--	% CPUE=0	84%	95%	100%	94%	82%	41%	65%	76%	67%	100%	100%	79%	74%	100%	91%	67%	100%	100%	86%	0%	100%	78%
		Max CPUE	8.9	24		13.8	0.5	15	2	26.4	13			0.8	37		31.6	9.3			1	1		
Dolly Varden	--	% CPUE=0	99%	98%	97%	99%	93%	88%	98%	98%	100%	98%	93%	99%	96%	100%	74%	100%	76%	100%	89%	0%	100%	91%
		Max CPUE	5.5	9.4	0.9	1.3	0.5	4	1	3.5		44.4	12.5	0.3	1		91.4		243.5		0.7	5		
Lamprey	--	% CPUE=0	100%	100%	97%	100%	100%	94%	100%	97%	100%	100%	100%	98%	96%	100%	97%	100%	100%	100%	100%	100%	100%	98%
		Max CPUE			0.5				2	66.7				0.5	9		8.7							
Longnose sucker	--	% CPUE=0	79%	88%	94%	71%	80%	35%	80%	75%	100%	88%	80%	79%	70%	67%	91%	100%	99%	100%	97%	0%	50%	72%
		Max CPUE	171.4	34.3	5.5	73.3	0.6	22	1	979.2		41.4	505.9	2.4	19	3	8.4		36.4		0.2	5	2	
Sculpin, undifferentiated	--	% CPUE=0	15%	88%	75%	81%	56%	71%	96%	43%	67%	66%	64%	50%	74%	67%	29%	67%	75%	90%	47%	100%	100%	34%
		Max CPUE	291.2	28.3	12.1	121.4	2.4	5	1	583.3	13	66.7	276.9	3.4	5	2	398.5	9.3	111.1	1138.5	3			
Stickleback, threespine	--	% CPUE=0	100%	100%	100%	97%	96%	88%	100%	81%	100%	90%	64%	74%	65%	100%	99%	100%	99%	100%	92%	0%	100%	89%
		Max CPUE			33.3	0.1	1			470.2		8.9	67.1	78.2	1002		2.2		0.7		0.3	1		
Trout, rainbow	--	% CPUE=0	97%	92%	100%	96%	100%	94%	96%	98%	100%	98%	98%	99%	65%	67%	95%	100%	89%	90%	89%	0%	50%	91%
		Max CPUE	7.9	27.1		14.5		1	0.3	14.1		23.4	0.7	0.1	11	0.5	13.3		54.5	3.3	1.4	38	2	
Whitefish, humpback	--	% CPUE=0	100%	98%	100%	95%	100%	94%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%
		Max CPUE		50.1		66.5		2																
Whitefish, round	--	% CPUE=0	84%	78%	97%	69%	98%	65%	96%	97%	100%	98%	87%	96%	87%	100%	100%	67%	99%	90%	100%	0%	100%	83%
		Max CPUE	54.9	41.5	1.7	498.7	0.1	16	0.3	10.5		22.2	55.6	0.3	5		18.7		1	2.8		2		
Whitefish, undifferentiated	--	% CPUE=0	97%	98%	97%	87%	100%	76%	100%	99%	100%	98%	96%	99%	100%	99%	100%	99%	100%	100%	100%	100%	100%	95%
		Max CPUE	11.2	24.7	17	33.2		1		67.2		9	12.8	0.1			8.4		8.2					
Percent of Sites with No Fish			5%	45%	38%	39%	27%	12%	37%	20%	67%	22%	7%	6%	0%	0%	19%	67%	34%	50%	14%	0%	0%	

# 9.6 FDA ML 2013 Lower River

			Main Channel					Off-Channel							Tributary						All		
			Backpack Electrofishing (N=45; CPUE in fish/hour)	Boat Electrofishing (N=28; CPUE in fish/hour)	Snorkel (N=6; CPUE in fish/1,000 m <sup>2</sup> )	Seine (N=54; CPUE in fish/1,000 m <sup>2</sup> )	Minnow Trap (N=27; CPUE in fish/trap)	Hoop Trap (N=28; CPUE in fish/trap)	Backpack Electrofishing (N=13; CPUE in fish/hour)	Boat Electrofishing (N=9; CPUE in fish/hour)	Snorkel (N=4; CPUE in fish/1,000 m <sup>2</sup> )	Seine (N=8; CPUE in fish/1,000 m <sup>2</sup> )	Minnow Trap (N=16; CPUE in fish/trap)	Fyke Net (N=3; CPUE in fish/trap)	Hoop Trap (N=11; CPUE in fish/trap)	Backpack Electrofishing (N=4; CPUE in fish/hour)	Boat Electrofishing (N=3; CPUE in fish/hour)	Snorkel (N=9; CPUE in fish/1,000 m <sup>2</sup> )	Seine (N=4; CPUE in fish/1,000 m <sup>2</sup> )	Minnow Trap (N=12; CPUE in fish/trap)	Fyke Net (N=2; CPUE in fish/trap)	Hoop Trap (N=8; CPUE in fish/trap)	Percent of Sites with CPUE=0 (N=132; all methods)
Salmon, Chinook	adult	% CPUE=0	100%					100%							89%						98%		
		Max CPUE	1					2.5							2.5								
	juvenile	% CPUE=0	89%	100%	100%	85%	85%	89%	92%	89%	100%	50%	63%	33%	91%	100%	100%	100%	100%	58%	0%	63%	74%
		Max CPUE	43.7			17	0.1	1.5	2.4	5.9		20	0.5	11	2.5					0.4	2	8	
Salmon, chum	adult	% CPUE=0	83%					100%							89%						94%		
		Max CPUE	25					4.7							0.3								
	juvenile	% CPUE=0	98%	100%	100%	98%	100%	100%	92%	100%	100%	75%	88%	67%	91%	100%	100%	100%	100%	83%	100%	100%	92%
		Max CPUE	2			2.1			4.8			16	0.1	1	0.3					0.1			
Salmon, coho	adult	% CPUE=0	83%					100%							100%						95%		
		Max CPUE	62.5					5							2								
	juvenile	% CPUE=0	98%	100%	100%	91%	89%	89%	62%	100%	100%	88%	50%	100%	82%	100%	100%	100%	75%	50%	0%	38%	76%
		Max CPUE	8			18.9	0.2	1.5	21.1			5.6	0.5	45	45				1	0.5	10	3	
Salmon, pink	adult	% CPUE=0	100%					100%							89%						94%		
		Max CPUE	1.4					1							15								
	juvenile	% CPUE=0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Max CPUE																					
Salmon, sockeye	adult	% CPUE=0	83%					100%							89%						97%		
		Max CPUE	1.3					1.3							1.3								
	juvenile	% CPUE=0	96%	100%	100%	78%	96%	100%	54%	100%	100%	38%	81%	33%	82%	75%	100%	100%	50%	75%	100%	100%	77%
		Max CPUE	4.2			6.7	0.1		69.2			280	0.5	10	1.5	3.6			3.1	0.3			
Arctic grayling	--	% CPUE=0	96%	89%	100%	89%	96%	100%	100%	89%	100%	75%	100%	67%	100%	100%	100%	75%	92%	0%	100%	87%	
		Max CPUE	7.8	8.6		3.5	0.1		5.9			1.2		1		100%	100%	100%	1	<0.1	3		
Burbot	--	% CPUE=0	91%	86%	100%	85%	81%	54%	85%	78%	100%	88%	56%	67%	18%	75%	100%	100%	100%	92%	100%	50%	64%
		Max CPUE	4.5	19.7		2.1	0.1	2	10.6	47.6		0.5	0.5	9	2	7.1				<0.1		1	
Dolly Varden	--	% CPUE=0	96%	100%	100%	96%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	100%	96%	
		Max CPUE	5.2			1.7															2		
Lamprey	--	% CPUE=0	91%	96%	100%	100%	96%	64%	100%	78%	100%	100%	94%	33%	82%	75%	100%	100%	100%	67%	100%	100%	81%
		Max CPUE	28.6	8.9			0.1	9		8.7			<0.1	1	0.5	2.8				0.2			
Longnose sucker	--	% CPUE=0	51%	75%	100%	30%	70%	82%	77%	56%	100%	75%	44%	33%	36%	100%	100%	100%	75%	67%	0%	63%	37%
		Max CPUE	34.2	59.2		100	0.9	6	23.6	52.9		50	2.9	188	23				1	0.1	5	0.3	
Northern pike	--	% CPUE=0	100%	93%	100%	100%	100%	100%	100%	100%	100%	88%	100%	100%	100%	75%	100%	89%	100%	92%	100%	100%	97%
		Max CPUE		29.6								0.5				15.7			40	0.5			
Sculpin, undifferentiated	--	% CPUE=0	11%	100%	100%	56%	78%	89%	46%	100%	100%	38%	31%	33%	82%	100%	100%	100%	25%	33%	100%	88%	37%
		Max CPUE	1009.8			16.7	0.3	1	77.8			5	0.5	1	0.5	125.1			8.7	0.7		8	
Stickleback, ninespine	--	% CPUE=0	100%	100%	100%	94%	85%	100%	92%	100%	100%	100%	81%	33%	91%	100%	100%	100%	100%	92%	50%	88%	89%
		Max CPUE				34	1.5		17.7				0.1	1	0.3					<0.1	2	0.3	
Stickleback, threespine	--	% CPUE=0	91%	100%	100%	91%	56%	96%	38%	100%	100%	50%	25%	33%	82%	50%	100%	78%	75%	67%	100%	63%	66%
		Max CPUE	34.1			38	43.3	2	158.6			152.8	22.4	175	495	8.3		1.3	4.8	14.5		17	
Trout, rainbow	--	% CPUE=0	98%	100%	100%	96%	100%	100%	85%	100%	100%	100%	94%	100%	100%	75%	100%	100%	100%	92%	0%	100%	93%
		Max CPUE	5.2			1			74				1.3			5.7				0.1	7		
Whitefish, Bering cisco	--	% CPUE=0	98%	100%	100%	100%	100%	100%	100%	89%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98%
		Max CPUE	3.1						8.7														
Whitefish, humpback	--	% CPUE=0	100%	100%	100%	98%	96%	100%	100%	89%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98%
		Max CPUE				2.1	<0.1		29.4														
Whitefish, round	--	% CPUE=0	87%	96%	100%	69%	96%	93%	100%	100%	100%	88%	100%	67%	82%	100%	100%	100%	50%	100%	0%	88%	77%
		Max CPUE	12.9	6		12.5	1.2	1				1		3	0.5				3.1		1	10	
Whitefish, undifferentiated	--	% CPUE=0	93%	100%	100%	83%	96%	100%	92%	89%	100%	75%	100%	100%	91%	100%	100%	100%	100%	100%	100%	100%	89%
		Max CPUE	13.7			37.5	0.1		6.5	8.7		10		1.5									
<b>Percent of Sites with No Fish</b>			4%	21%	83%	11%	19%	18%	15%	0%	100%	0%	6%	0%	0%	0%	67%	67%	25%	0%	0%	0%	