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The following parts of Section 9.5 appear in separate files: Main report; Appendices.

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- APPENDIX A: DISTRIBUTION OF FISH RADIO-TAGGED IN THE UPPER SUSITNA RIVER, 2013
- APPENDIX B: FISH DISTRIBUTION MAPS FOR THE UPPER SUSITNA RIVER 2012 AND 2013
- APPENDIX C: SEASONAL FISH DISTRIBUTION, UPPER SUSITNA RIVER 2012 AND 2013
- APPENDIX D: UPPER RIVER FISH OBSERVATIONS AND RELATIVE ABUNDANCE, 2013

Susitna-Watana Hydroelectric Project (FERC No. 14241)

Study of Fish Distribution and Abundance in the Upper Susitna River (9.5)

Appendix A

Distribution of Fish Radio-Tagged in the Upper Susitna River, 2013

Initial Study Report

Prepared for

Alaska Energy Authority



Prepared by

R2 Resource Consultants, Inc.

February 2014 Draft

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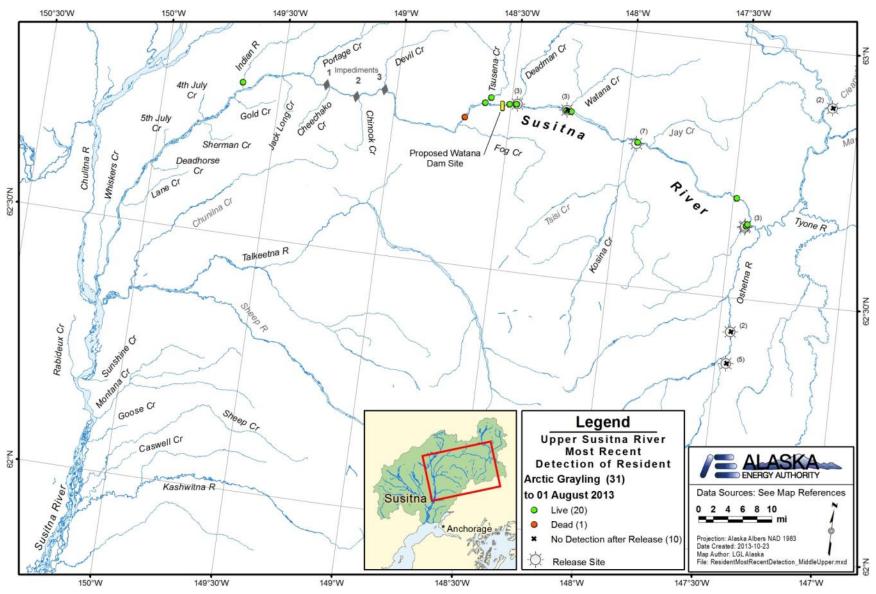


Figure A1. Distribution of Upper River radio-tagged Arctic grayling August 1, 2013.

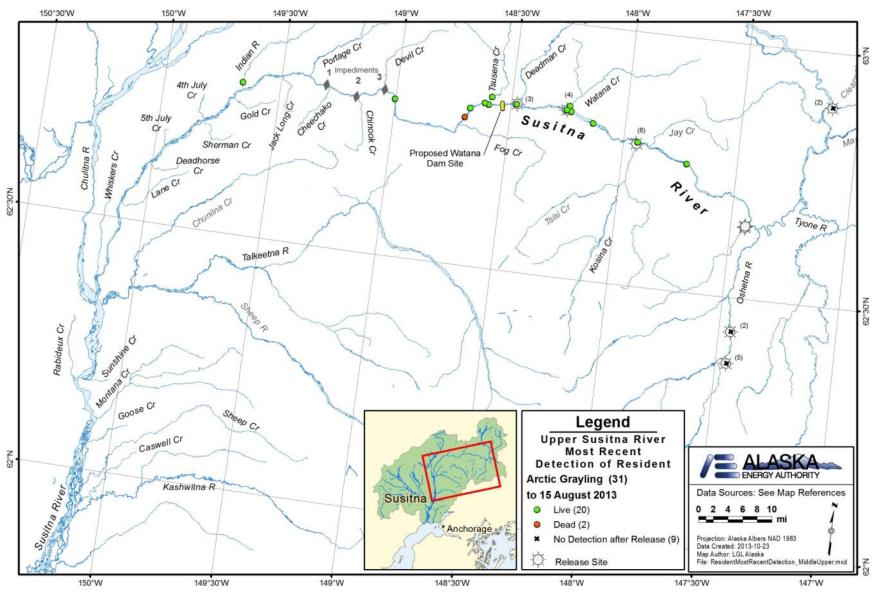


Figure A2. Distribution of Upper River radio-tagged Arctic grayling August 15, 2013.

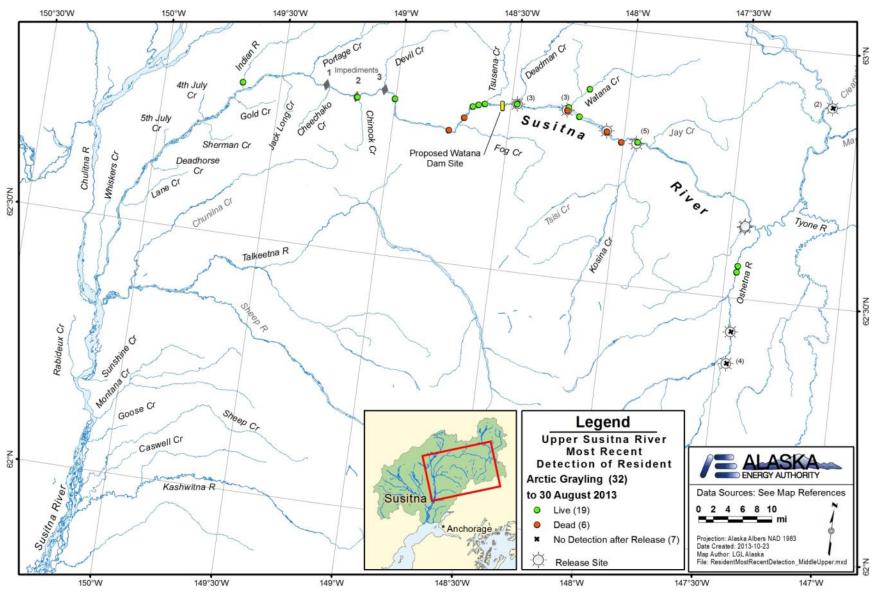


Figure A3. Distribution of Upper River radio-tagged Arctic grayling August 30, 2013.

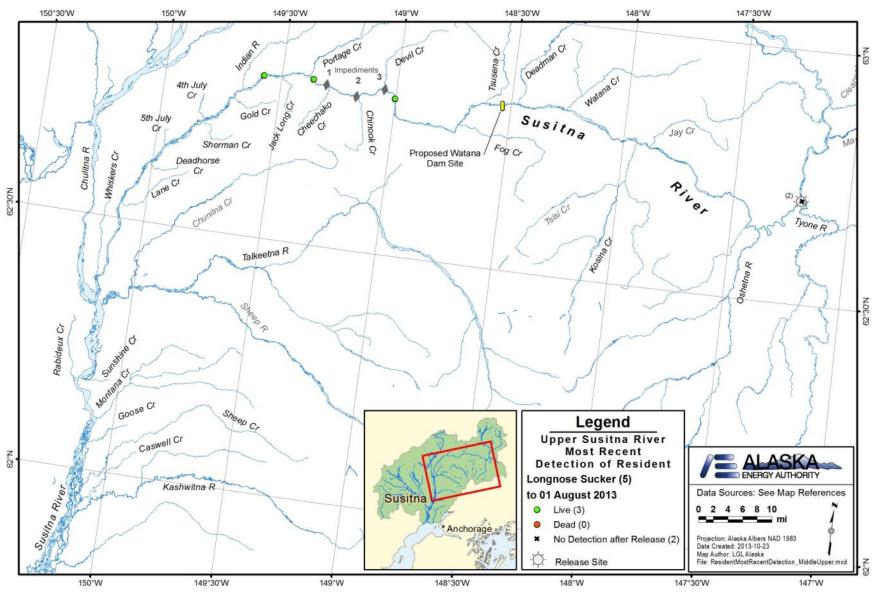


Figure A4. Distribution of Upper River radio-tagged longnose suckers August 1, 2013.

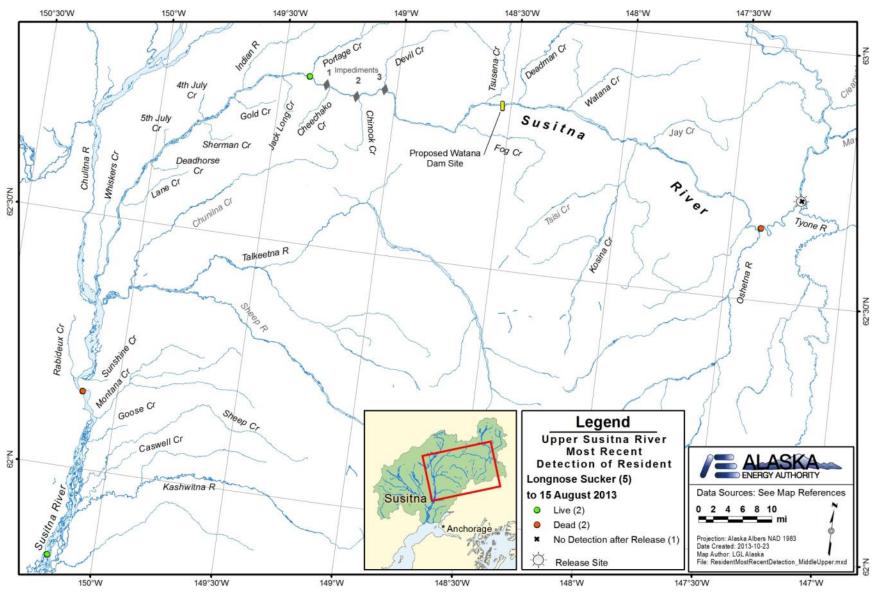


Figure A5. Distribution of Upper River radio-tagged longnose suckers August 15, 2013.

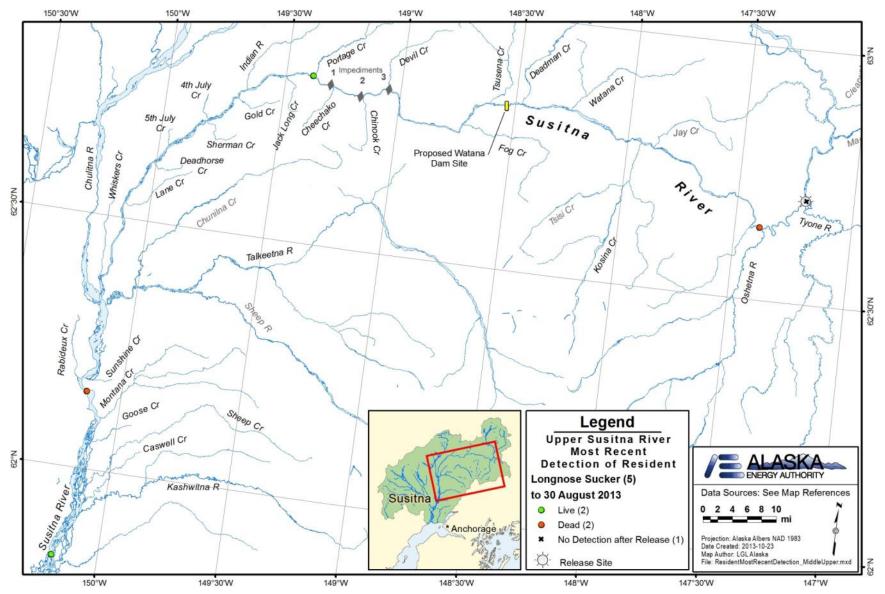


Figure A6. Distribution of Upper River radio-tagged longnose suckers August 30, 2013.

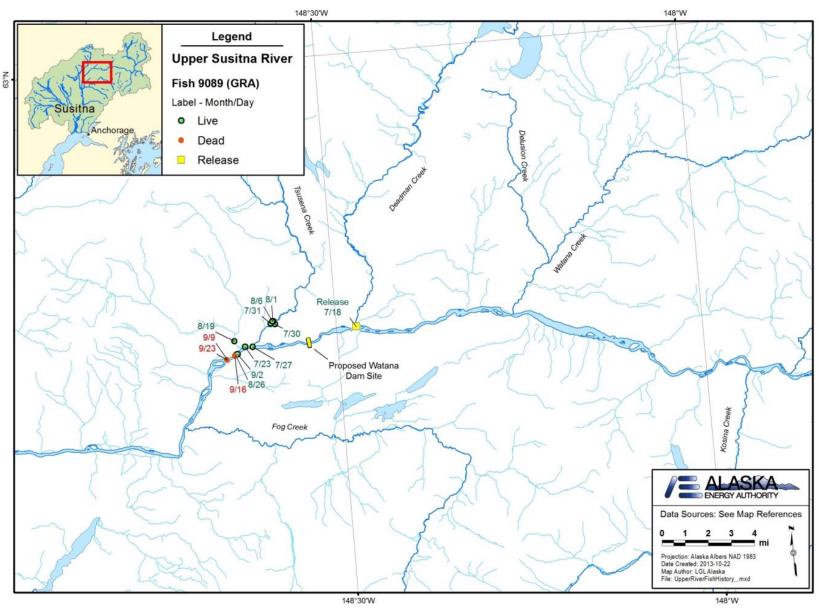


Figure A7. Movements of Upper River Arctic grayling tag ID 9089 through September, 2013.

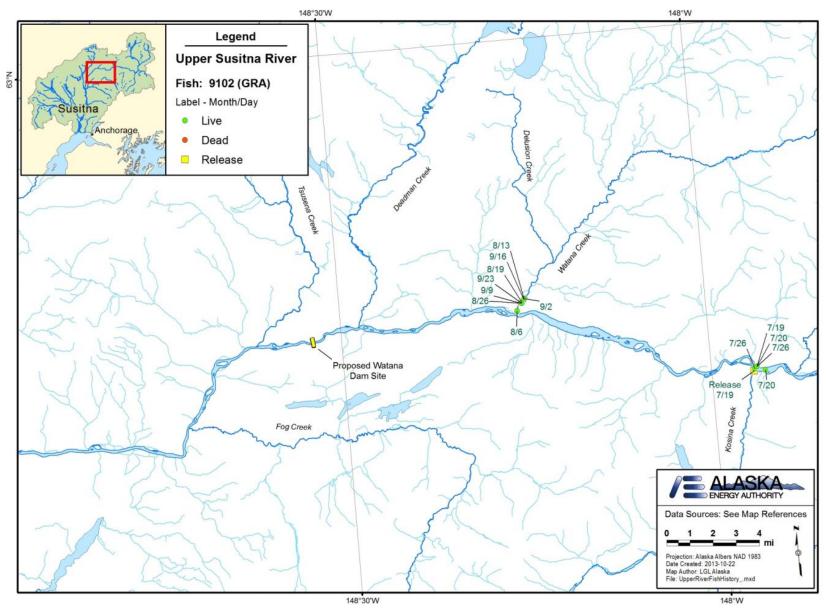


Figure A8. Movements of Upper River Arctic grayling tag ID 9102 through September, 2013.

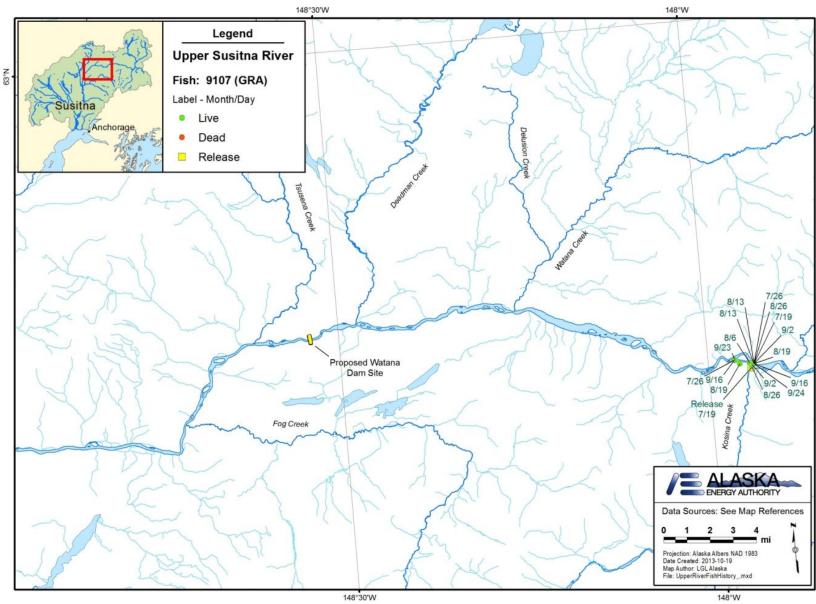


Figure A9. Movements of Upper River Arctic grayling tag ID 9107 through September, 2013.

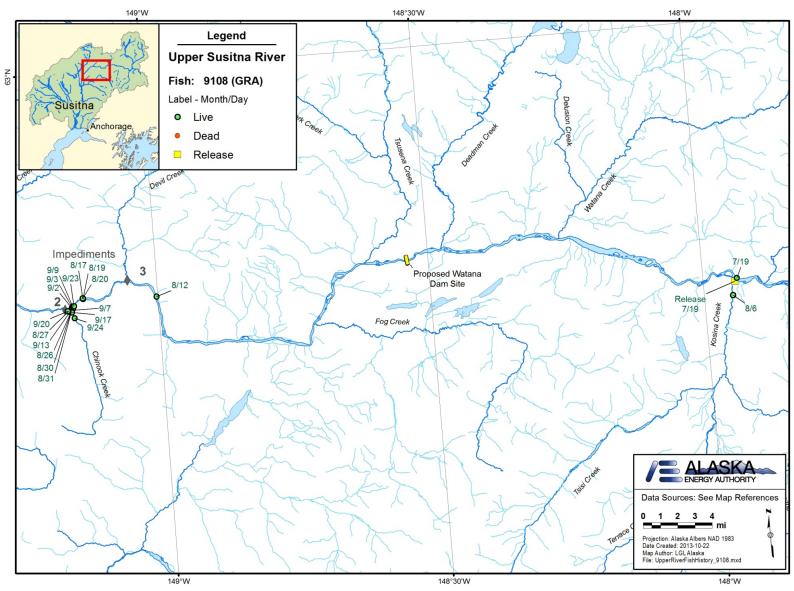


Figure A10. Movements of Upper River Arctic grayling tag ID 9108 through September, 2013.

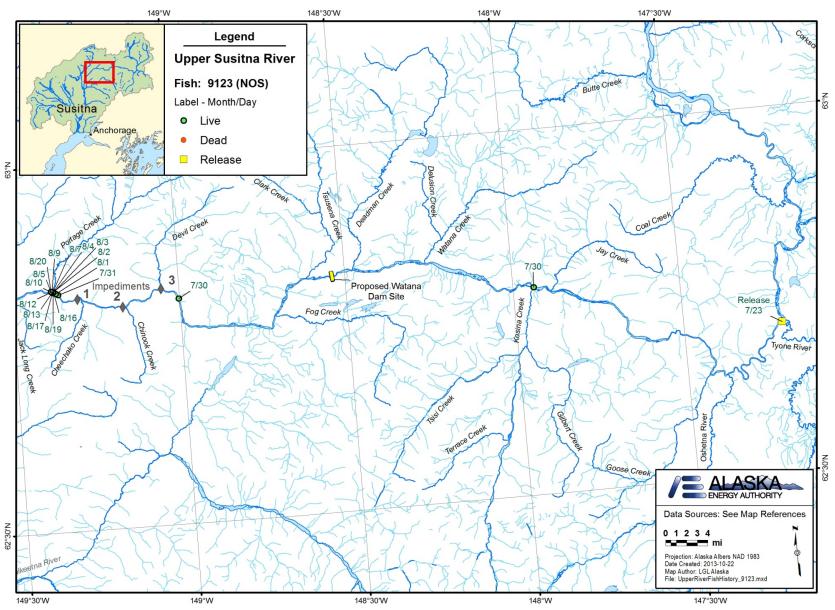


Figure A11. Movements of Upper River longnose sucker tag ID 9123 through September, 2013.

Susitna-Watana Hydroelectric Project (FERC No. 14241)

Study of Fish Distribution and Abundance in the Upper Susitna River (9.5)

Appendix B
Fish Distribution Maps for the Upper Susitna River,
2012 and 2013

Initial Study Report

Prepared for

Alaska Energy Authority



Prepared by

R2 Resource Consultants, Inc.

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1. FISH DISTRIBUTION

The following distribution maps depict the occurrence of species from Fish Distribution and Abundance sampling efforts including early life history sampling, directed tributary sampling, GRTS tributary sampling, mainstem transect sampling, rotary screw trapping,, PIT array detections, resident fish radio-telemetry detections, directed fish sampling efforts for interrelated studies, genetics sampling efforts (ISR Study 9.14), and metal/mercury sampling efforts (ISR Study 5.5). The 2013 data for fish distribution was pooled with 2012 fish distribution data (HDR 2013). These maps do not represent the distribution of adult Chinook salmon, as that was documented in detail in ISR Study 9.7.

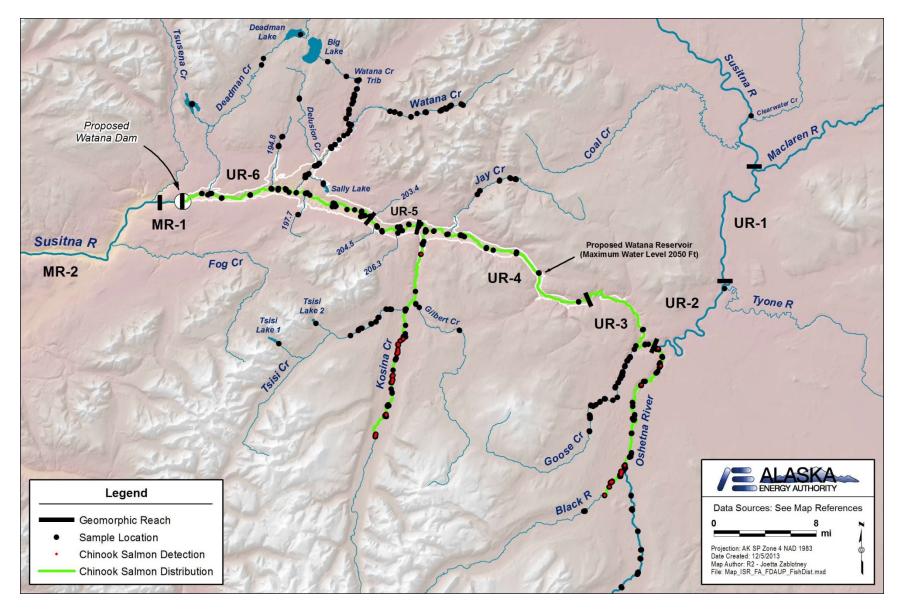


Figure B1. Upper Susitna River juvenile Chinook salmon distribution 2013. No juvenile Chinook were detected upstream of the proposed dam site in 2012. Adult Chinook distributions are reported in ISR Study 9.7.

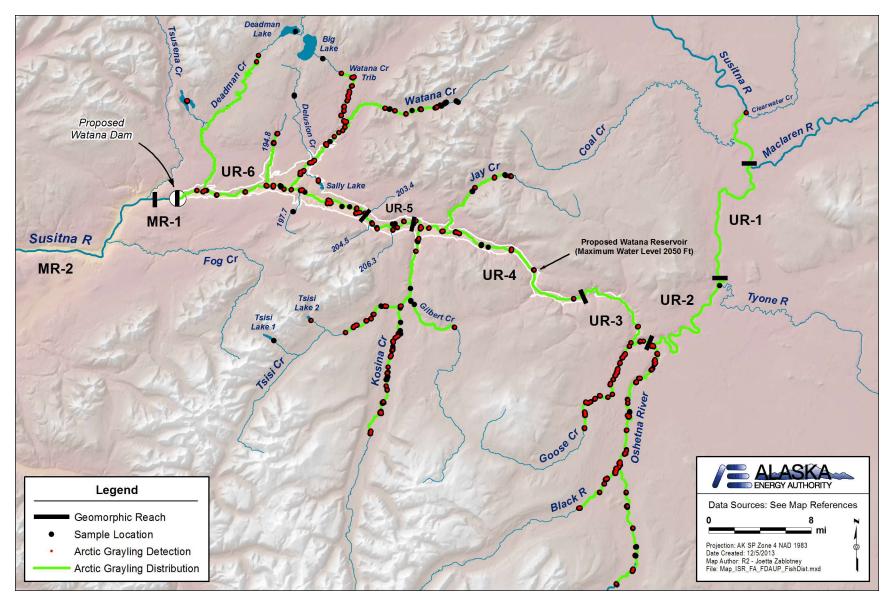


Figure B2. Upper Susitna River Arctic grayling distribution 2012 and 2013.

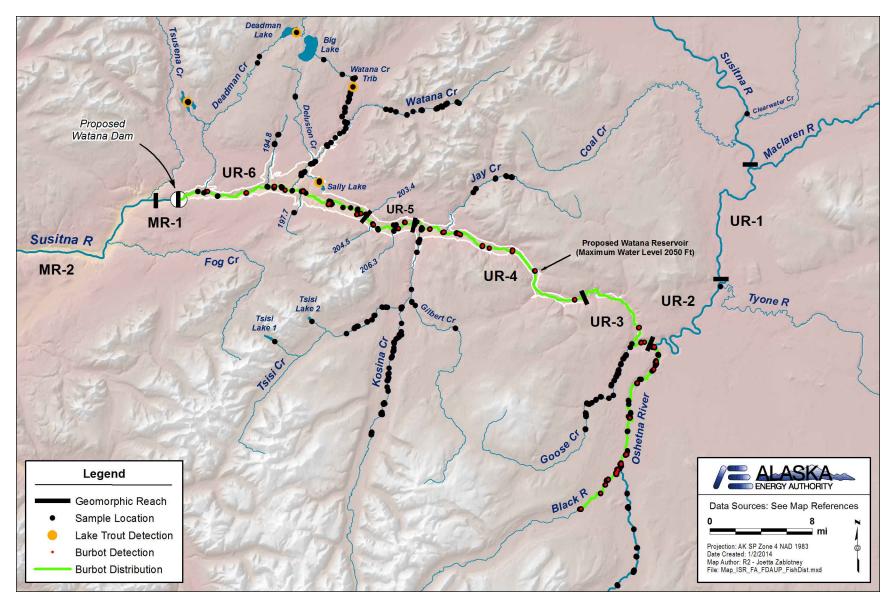


Figure B3. Upper Susitna River burbot and lake trout distribution 2012 and 2013.

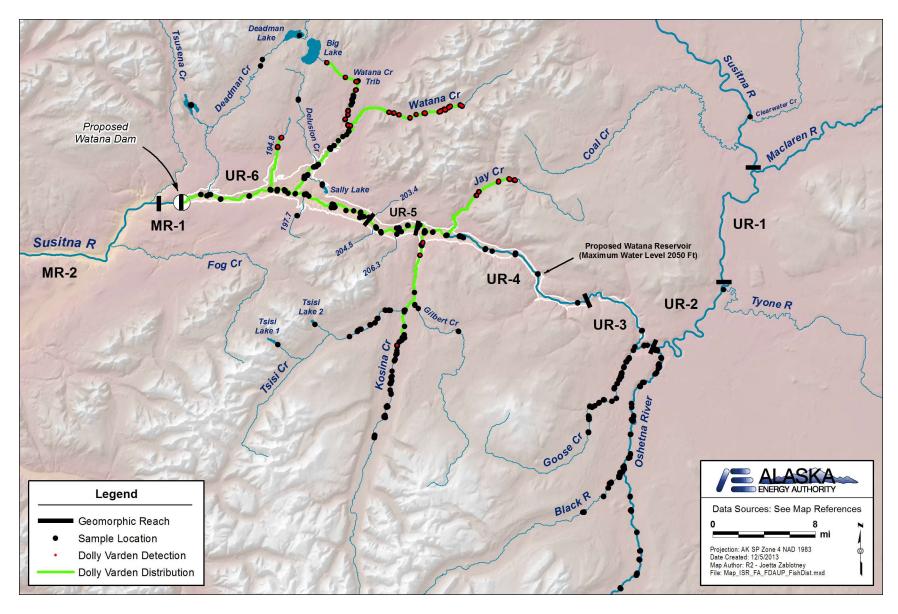


Figure B4. Upper Susitna River Dolly Varden distribution 2012 and 2013.

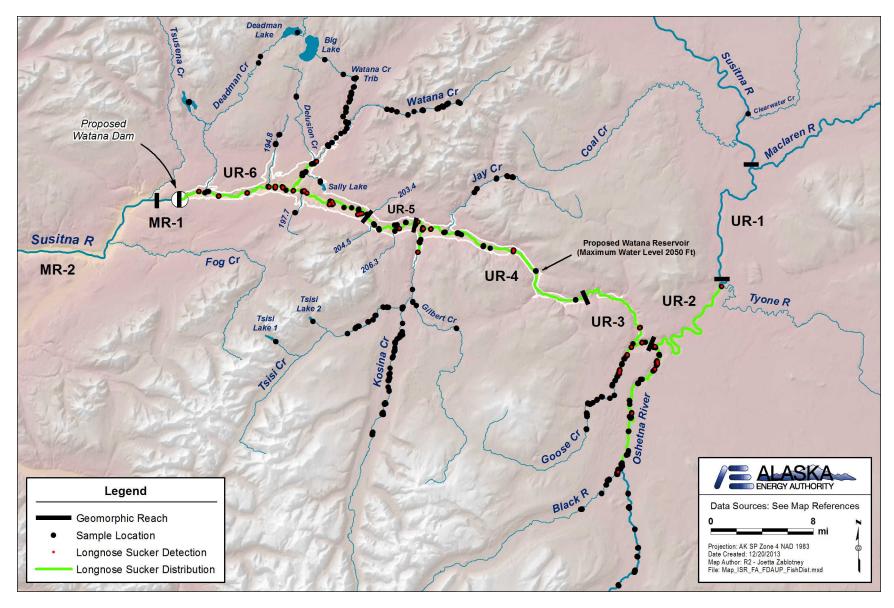


Figure B5. Upper Susitna River longnose sucker distribution 2012 and 2013.

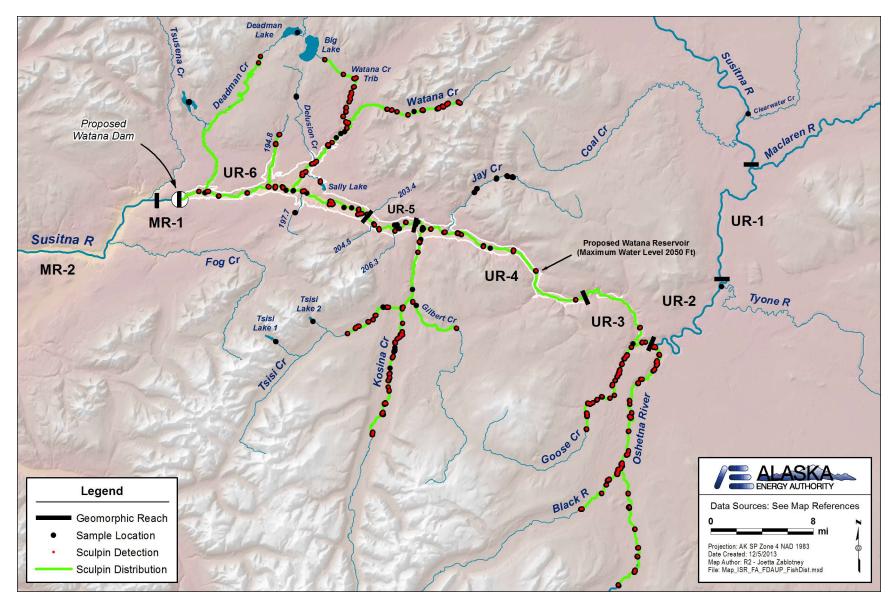


Figure B6. Upper Susitna River sculpin distribution 2012 and 2013.

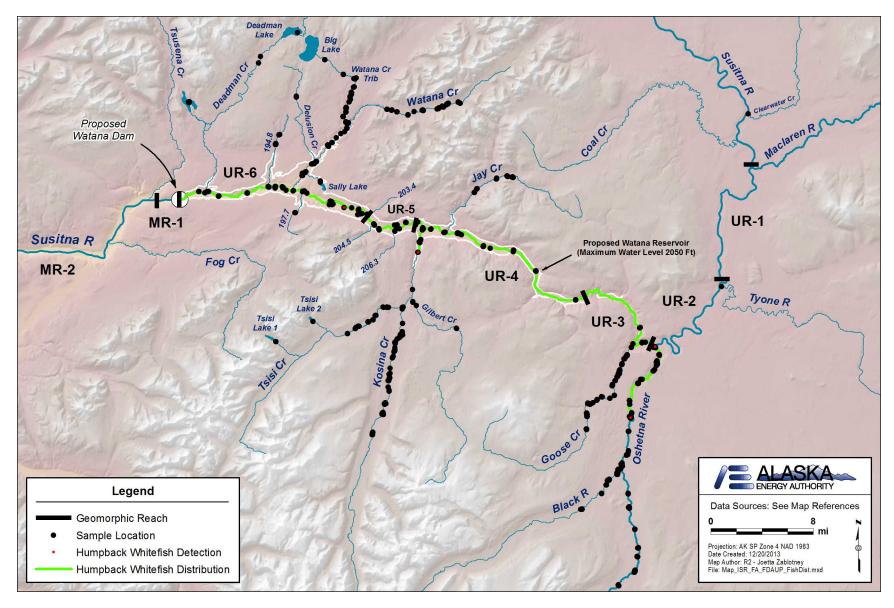


Figure B7. Upper Susitna River humpback whitefish distribution 2012 and 2013.

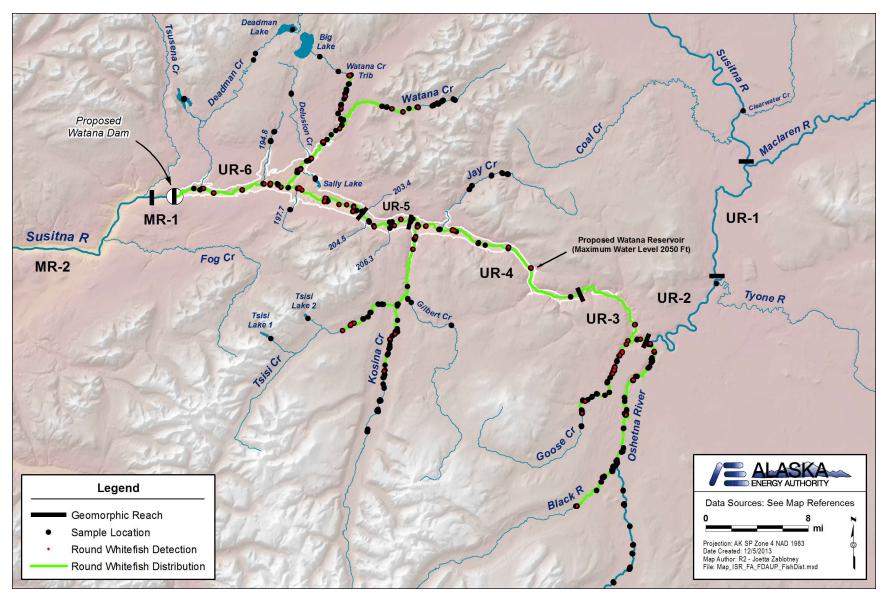


Figure B8. Upper Susitna River round whitefish distribution 2012 and 2013.

Susitna-Watana Hydroelectric Project (FERC No. 14241)

Study of Fish Distribution and Abundance in the Upper Susitna River (9.5)

Appendix C Seasonal Fish Distribution, Upper Susitna River 2012 and 2013

Initial Study Report

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Alaska Energy Authority



Prepared by

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Table C6.	Seasonal distribution of longnose sucker in the Upper Susitna River, 2012 and 2013.
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Table C9	Seasonal distribution of round whitefish in the Upper Susitna River, 2012 and 2013.

Table C1. Seasonal distribution of juvenile Chinook salmon in the Upper Susitna River, 2012 and 2013.

Location	PRM	ELH (June 4-June 30)	Early Summer (July 1- August 10)	Late Summer (August 11 - Sept 9)	Fall (Sept 10 - Oct 7)
Susita River Devils Canyon to Watana Dam	166.1-187.1		X		
Watana Dam	187.1				
Susitna River UR-6	187.1-203.4				
Susitna River UR-5	203.4-208.1				
Susitna River UR-4	208.1-224.9				
Susitna River UR-3	224.9-234.5				
Watana Reservoir at Full Pool	232.5				
Susitna above Oshetna	>234.5				
Aerial Mainstem - Dam site to Oshetna	187.1-235.1				
Deadman Creek	189.4				
Unnamed Tributary	194.8				
Watana Creek	196.9				
Watana Creek Tributary: Unnamed L1	N/A				
Watana Creek Tributary: Unnamed L3	N/A				
Watana Creek Tributary: Unnamed R3	N/A				
Watana Creek Tributary: Unnamed R5	N/A				
Unnamed Tributary	197.7				
Unnamed Tributary	198.4				
Unnamed Tributary	203.4				
Unnamed Tributary	204.3				
Unnamed Tributary	206.3				
Kosina Creek	209.1		X	X	Χ
Kosina Creek Tributary: Tsisi Creek	N/A				
Kosina Creek Tributary: Gilbert Creek	N/A				
Kosina Creek Tributary: Unnamed	N/A				
Jay Creek	211.0				
Goose Creek	232.8				
Oshetna River	235.1		X		Χ
Oshetna River Tributary: Black River	N/A	Х	Χ	Χ	Χ
Tyone River	247.3				
Clearwater Creek	266.6				
Deadman Basin Lake: Deadman Lake	N/A				
Deadman Basin Lake: Unnamed	N/A				
Watana Basin Lake: Sally Lake	N/A				
Unnamed Tributary Lake: Unnamed	205.9				
Kosina Basin Lake: Tsisi Lake	N/A				
Notes: Shaded cells indicate that a given locat	ion was sampl	ed.			

Table C2. Seasonal distribution of Arctic grayling in the Upper Susitna River, 2012 and 2013.

Location	PRM	ELH (June 4-June 30)	Early Summer (July 1- August 10)	Late Summer (August 11 - Sept 9)	Fall (Sept 10 - Oct 7)
Susita River Devils Canyon to Watana Dam	166.1-187.1		■ X ■	■ ■ X ■	■ X
Watana Dam	187.1				
Susitna River UR-6	187.1-203.4		_	- X	X
Susitna River UR-5	203.4-208.1		x		X
Susitna River UR-4	208.1-224.9		■ X■ ■	■ ■ ※ ■	ı X
Susitna River UR-3	224.9-234.5		■ X ■		×
Watana Reservoir at Full Pool	232.5				
Susitna above Oshetna	>234.5		X	×	
Aerial Mainstem - Dam site to Oshetna	187.1-235.1		■ X ■	■ ■ X ■	
Deadman Creek	189.4		■ X■ ■		ı
Unnamed Tributary	194.8		_ • x_ • .	• . • . • . • .	
Watana Creek	196.9		- X -	x	X
Watana Creek Tributary: Unnamed L1	N/A		X		
Watana Creek Tributary: Unnamed L3	N/A				
Watana Creek Tributary: Unnamed R3	N/A		X		
Watana Creek Tributary: Unnamed R5	N/A			- X	
Unnamed Tributary	197.7		X		
Unnamed Tributary	198.4				
Unnamed Tributary	203.4		X		
Unnamed Tributary	204.3				
Unnamed Tributary	206.3				
Kosina Creek	209.1	Χ	^	■ ■ X ■	×
Kosina Creek Tributary: Tsisi Creek	N/A	Χ	× _ ×	_	_ ' x
Kosina Creek Tributary: Gilbert Creek	N/A		X		
Kosina Creek Tributary: Unnamed	N/A				
Jay Creek	211.0		■ X■ ■		ľχ
Goose Creek	232.8		x	x	x
Oshetna River	235.1	X		X	_ X
Oshetna River Tributary: Black River	N/A	X	X		X
Tyone River	247.3				
Clearwater Creek	266.6		X		
Deadman Basin Lake: Deadman Lake	N/A				
Deadman Basin Lake: Unnamed	N/A			X	
Watana Basin Lake: Sally Lake	N/A		X		
Unnamed Tributary Lake: Unnamed	205.9				
Kosina Basin Lake: Tsisi Lake	N/A	X			-
Notes: Shaded cells indicate that a given location was sam	npled. Stippled cells indicate	that aerial flight for radio tags of	courred.		

Table C3. Seasonal distribution of burbot in the Upper Susitna River, 2012 and 2013.

Location	PRM	ELH (June 4-June 30)	Early Summer (July 1- August 10)	Late Summer (August 11 - Sept 9)	Fall (Sept 10 - Oct 7)
Susita River Devils Canyon to Watana Dam	166.1-187.1		X	X	X
Watana Dam	187.1				
Susitna River UR-6	187.1-203.4		X	X	X
Susitna River UR-5	203.4-208.1		X		X
Susitna River UR-4	208.1-224.9		X	X	X
Susitna River UR-3	224.9-234.5	i	X	X	X
Watana Reservoir at Full Pool	232.5				
Susitna above Oshetna	>234.5				
Aerial Mainstem - Dam site to Oshetna	187.1-235.1				
Deadman Creek	189.4				
Unnamed Tributary	194.8				
Watana Creek	196.9				
Watana Creek Tributary: Unnamed L1	N/A				
Watana Creek Tributary: Unnamed L3	N/A				
Watana Creek Tributary: Unnamed R3	N/A				
Watana Creek Tributary: Unnamed R5	N/A				
Unnamed Tributary	197.7				
Unnamed Tributary	198.4				
Unnamed Tributary	203.4				
Unnamed Tributary	204.3				
Unnamed Tributary	206.3				
Kosina Creek	209.1	X			
Kosina Creek Tributary: Tsisi Creek	N/A				
Kosina Creek Tributary: Gilbert Creek	N/A				
Kosina Creek Tributary: Unnamed	N/A				
Jay Creek	211.0			X	X
Goose Creek	232.8				
Oshetna River	235.1	Х	X	X	X
Oshetna River Tributary: Black River	N/A	X	X	X	X
Tyone River	247.3				
Clearwater Creek	266.6				
Deadman Basin Lake: Deadman Lake	N/A				
Deadman Basin Lake: Unnamed	N/A				
Watana Basin Lake: Sally Lake	N/A				
Unnamed Tributary Lake: Unnamed	205.9				
Kosina Basin Lake: Tsisi Lake	N/A				
Notes: Shaded cells indicate that a given location was	s sampled.				

Table C4. Seasonal distribution of Dolly Varden in the Upper Susitna River, 2012 and 2013.

Location	PRM	ELH (June 4-June 30)	Early Summer (July 1- August 10)	Late Summer (August 11 - Sept 9)	Fall (Sept 10 - Oct 7)
Susita River Devils Canyon to Watana Dam	166.1-187.1		X	X	Х
Watana Dam	187.1				
Susitna River UR-6	187.1-203.4				
Susitna River UR-5	203.4-208.1				
Susitna River UR-4	208.1-224.9				
Susitna River UR-3	224.9-234.5				
Watana Reservoir at Full Pool	232.5				
Susitna above Oshetna	>234.5				
Aerial Mainstem - Dam site to Oshetna	187.1-235.1				
Deadman Creek	189.4				
Unnamed Tributary	194.8		X	X	X
Watana Creek	196.9		Χ	X	Χ
Watana Creek Tributary: Unnamed L1	N/A				
Watana Creek Tributary: Unnamed L3	N/A				
Watana Creek Tributary: Unnamed R3	N/A				
Watana Creek Tributary: Unnamed R5	N/A		X	X	X
Unnamed Tributary	197.7				
Unnamed Tributary	198.4			X	
Unnamed Tributary	203.4				
Unnamed Tributary	204.3				
Unnamed Tributary	206.3				
Kosina Creek	209.1	X		X	X
Kosina Creek Tributary: Tsisi Creek	N/A				
Kosina Creek Tributary: Gilbert Creek	N/A				
Kosina Creek Tributary: Unnamed	N/A				
Jay Creek	211.0		Χ	X	X
Goose Creek	232.8				
Oshetna River	235.1				
Oshetna River Tributary: Black River	N/A				
Tyone River	247.3				
Clearwater Creek	266.6				
Deadman Basin Lake: Deadman Lake	N/A				
Deadman Basin Lake: Unnamed	N/A				
Watana Basin Lake: Sally Lake	N/A				
Unnamed Tributary Lake: Unnamed	205.9				
Kosina Basin Lake: Tsisi Lake	N/A				
Notes: Shaded cells indicate that a given location was	sampled.				

Table C5. Seasonal distribution of lake trout in the Upper Susitna River, 2012 and 2013.

Location	PRM	ELH (June 4-June 30)	Early Summer (July 1- August 10)	Late Summer (August 11 - Sept 9)	Fall (Sept 10 - Oct 7)
Susita River Devils Canyon to Watana Dam	166.1-187.1				
Watana Dam	187.1				
Susitna River UR-6	187.1-203.4				
Susitna River UR-5	203.4-208.1				
Susitna River UR-4	208.1-224.9				
Susitna River UR-3	224.9-234.5				
Watana Reservoir at Full Pool	232.5				
Susitna above Oshetna	>234.5				
Aerial Mainstem - Dam site to Oshetna	187.1-235.1				
Deadman Creek	189.4				
Unnamed Tributary	194.8				
Watana Creek	196.9				
Watana Creek Tributary: Unnamed L1	N/A				
Watana Creek Tributary: Unnamed L3	N/A				
Watana Creek Tributary: Unnamed R3	N/A				
Watana Creek Tributary: Unnamed R5	N/A				X
Unnamed Tributary	197.7				
Unnamed Tributary	198.4				
Unnamed Tributary	203.4				
Unnamed Tributary	204.3				
Unnamed Tributary	206.3				
Kosina Creek	209.1				
Kosina Creek Tributary: Tsisi Creek	N/A				
Kosina Creek Tributary: Gilbert Creek	N/A				
Kosina Creek Tributary: Unnamed	N/A				
Jay Creek	211.0				
Goose Creek	232.8				
Oshetna River	235.1				
Oshetna River Tributary: Black River	N/A				
Tyone River	247.3				
Clearwater Creek	266.6				
Deadman Basin Lake: Deadman Lake	N/A				Х
Deadman Basin Lake: Unnamed	N/A			X	
Watana Basin Lake: Sally Lake	N/A		X		
Unnamed Tributary Lake: Unnamed	205.9				
Kosina Basin Lake: Tsisi Lake	N/A				
Notes: Shaded cells indicate that a given location was sar	npled.				

Table C6. Seasonal distribution of longnose sucker in the Upper Susitna River, 2012 and 2013.

Location	PRM	ELH (June 4-June 30)	Early Sum	mer (July 1	1- Aug	ust 10)		Late Sumn	ner (Augu	st 11 - S	Sept 9)		Fall (Sept 10 - Oct 7)
Susita River Devils Canyon to Watana Dam	166.1-187.1				Х					Х			X
Watana Dam	187.1												
Susitna River UR-6	187.1-203.4				Х				_	Х	-		_ X
Susitna River UR-5	203.4-208.1												X
Susitna River UR-4	208.1-224.9	X		• _	ĸ	_	_	•	•	■ X		_	■ X
Susitna River UR-3	224.9-234.5			_	_	_		_	_	_X	-	_	_ X
Watana Reservoir at Full Pool	232.5					_		Ī	_		_	_	
Susitna above Oshetna	>234.5				X	_	_			X	_	_	
Aerial Mainstem - Dam site to Oshetna	187.1-235.1				Х				_	X			
Deadman Creek	189.4												
Unnamed Tributary	194.8					-		_			• .		
Watana Creek	196.9			_	Х	_		_	_	-		_	-
Watana Creek Tributary: Unnamed L1	N/A												
Watana Creek Tributary: Unnamed L3	N/A												
Watana Creek Tributary: Unnamed R3	N/A												
Watana Creek Tributary: Unnamed R5	N/A			-		_	_		_		_	_	
Unnamed Tributary	197.7			_	_	_			_				
Unnamed Tributary	198.4												
Unnamed Tributary	203.4												
Unnamed Tributary	204.3												
Unnamed Tributary	206.3												
Kosina Creek	209.1	X		-		-							X
Kosina Creek Tributary: Tsisi Creek	N/A		_ '	_		_		-	-				
Kosina Creek Tributary: Gilbert Creek	N/A								_			_	
Kosina Creek Tributary: Unnamed	N/A												
Jay Creek	211.0			•		-			-				
Goose Creek	232.8				Х					Х			
Oshetna River	235.1	X		_	Х	_		_	_	Х		_	x
Oshetna River Tributary: Black River	N/A		_	-				•		■ X		_	
Tyone River	247.3				Х								
Clearwater Creek	266.6												
Deadman Basin Lake: Deadman Lake	N/A												
Deadman Basin Lake: Unnamed	N/A												
Watana Basin Lake: Sally Lake	N/A												
Unnamed Tributary Lake: Unnamed	205.9												
Kosina Basin Lake: Tsisi Lake	N/A			_	_			-	_				
Notes: Shaded cells indicate that a given location was sa	mpled. Stippled o	ells indicate that aerial flight for ra	idio tags occurred	l									

Table C7. Seasonal distribution of sculpin in the Upper Susitna River, 2012 and 2013.

Location	PRM	ELH (June 4-June 30)	Early Summer (July 1- August 10)	Late Summer (August 11 - Sept 9)	Fall (Sept 10 - Oct 7)
Susita River Devils Canyon to Watana Dam	166.1-187.1		X	X	X
Natana Dam	187.1				
Susitna River UR-6	187.1-203.4		X	X	X
Susitna River UR-5	203.4-208.1		X	X	Х
Susitna River UR-4	208.1-224.9		X	X	Х
Susitna River UR-3	224.9-234.5		X	X	Х
Watana Reservoir at Full Pool	232.5				
Susitna above Oshetna	>234.5		X		
Aerial Mainstem - Dam site to Oshetna	187.1-235.1				
Deadman Creek	189.4		X		
Unnamed Tributary	194.8		X	X	X
Watana Creek	196.9		X	X	Х
Watana Creek Tributary: Unnamed L1	N/A		X		
Watana Creek Tributary: Unnamed L3	N/A		X		
Watana Creek Tributary: Unnamed R3	N/A		X		
Watana Creek Tributary: Unnamed R5	N/A			X	
Unnamed Tributary	197.7		X		
Unnamed Tributary	198.4				
Unnamed Tributary	203.4		Х		
Unnamed Tributary	204.3				
Unnamed Tributary	206.3		Х		
Kosina Creek	209.1	X	X	X	X
Kosina Creek Tributary: Tsisi Creek	N/A	Х	Х	X	X
Kosina Creek Tributary: Gilbert Creek	N/A		X		
Kosina Creek Tributary: Unnamed	N/A		X		
Jay Creek	211.0		Х	X	X
Goose Creek	232.8		X	X	Х
Oshetna River	235.1	Χ	X	X	Х
Oshetna River Tributary: Black River	N/A	X	X	X	Х
Tyone River	247.3				
Clearwater Creek	266.6				
Deadman Basin Lake: Deadman Lake	N/A				
Deadman Basin Lake: Unnamed	N/A				
Watana Basin Lake: Sally Lake	N/A		X		
Unnamed Tributary Lake: Unnamed	205.9				
Kosina Basin Lake: Tsisi Lake	N/A				
Notes: Shaded cells indicate that a given location wa	as sampled				

Table C8. Seasonal distribution of humpback whitefish in the Upper Susitna River, 2012 and 2013.

Location	PRM	ELH (June 4-June 30)	Early Summer (July 1- August 10)	Late Summer (August 11 - Sept 9)	Fall (Sept 10 - Oct 7)
Susita River Devils Canyon to Watana Dam	166.1-187.1				
Watana Dam	187.1				
Susitna River UR-6	187.1-203.4				X
Susitna River UR-5	203.4-208.1				
Susitna River UR-4	208.1-224.9				
Susitna River UR-3	224.9-234.5				
Watana Reservoir at Full Pool	232.5				
Susitna above Oshetna	>234.5				
Aerial Mainstem - Dam site to Oshetna	187.1-235.1				
Deadman Creek	189.4				
Unnamed Tributary	194.8				
Watana Creek	196.9				
Watana Creek Tributary: Unnamed L1	N/A				
Watana Creek Tributary: Unnamed L3	N/A				
Watana Creek Tributary: Unnamed R3	N/A				
Watana Creek Tributary: Unnamed R5	N/A				
Unnamed Tributary	197.7				
Unnamed Tributary	198.4				
Unnamed Tributary	203.4				
Unnamed Tributary	204.3				
Unnamed Tributary	206.3				
Kosina Creek	209.1				X
Kosina Creek Tributary: Tsisi Creek	N/A				
Kosina Creek Tributary: Gilbert Creek	N/A				
Kosina Creek Tributary: Unnamed	N/A				
Jay Creek	211.0				
Goose Creek	232.8				
Oshetna River	235.1	X	X	X	
Oshetna River Tributary: Black River	N/A				
Tyone River	247.3				
Clearwater Creek	266.6				
Deadman Basin Lake: Deadman Lake	N/A				
Deadman Basin Lake: Unnamed	N/A				
Watana Basin Lake: Sally Lake	N/A				
Unnamed Tributary Lake: Unnamed	205.9				
Kosina Basin Lake: Tsisi Lake	N/A				
Notes: Shaded cells indicate that a given location wa	s sampled.				

Table C9. Seasonal distribution of round whitefish in the Upper Susitna River, 2012 and 2013.

Location	PRM	ELH (June 4-June 30)	Early Summer (July 1- August 10)	Late Summer (August 11 - Sept 9)	Fall (Sept 10 - Oct 7)
Susita River Devils Canyon to Watana Dam	166.1-187.1		X	X	X
Watana Dam	187.1				
Susitna River UR-6	187.1-203.4		X	X	X
Susitna River UR-5	203.4-208.1				Χ
Susitna River UR-4	208.1-224.9			X	Χ
Susitna River UR-3	224.9-234.5			X	Χ
Watana Reservoir at Full Pool	232.5				
Susitna above Oshetna	>234.5				
Aerial Mainstem - Dam site to Oshetna	187.1-235.1				
Deadman Creek	189.4				
Unnamed Tributary	194.8				
Watana Creek	196.9		X	Χ	
Watana Creek Tributary: Unnamed L1	N/A				
Watana Creek Tributary: Unnamed L3	N/A				
Watana Creek Tributary: Unnamed R3	N/A				
Watana Creek Tributary: Unnamed R5	N/A		X	X	
Unnamed Tributary	197.7				
Unnamed Tributary	198.4				
Unnamed Tributary	203.4				
Unnamed Tributary	204.3				
Unnamed Tributary	206.3				
Kosina Creek	209.1	X	X	X	X
Kosina Creek Tributary: Tsisi Creek	N/A		Χ		
Kosina Creek Tributary: Gilbert Creek	N/A				
Kosina Creek Tributary: Unnamed	N/A				
Jay Creek	211.0				
Goose Creek	232.8		X	Χ	Χ
Oshetna River	235.1	X	Χ	Χ	Χ
Oshetna River Tributary: Black River	N/A		Χ		
Tyone River	247.3				
Clearwater Creek	266.6				
Deadman Basin Lake: Deadman Lake	N/A				
Deadman Basin Lake: Unnamed	N/A				
Watana Basin Lake: Sally Lake	N/A				
Unnamed Tributary Lake: Unnamed	205.9				
Kosina Basin Lake: Tsisi Lake	N/A				
Notes: Shaded cells indicate that a given location was sar	npled.				

Susitna-Watana Hydroelectric Project (FERC No. 14241)

Study of Fish Distribution and Abundance in the Upper Susitna River (9.5)

Appendix D
Upper River Fish Observations and Relative
Abundance, 2013

Initial Study Report

Prepared for

Alaska Energy Authority



Prepared by

R2 Resource Consultants, Inc.

February 2014 Draft

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1. FISH OBSERVATIONS

Table D1. Upper Susitna River fish observations, 2013.

Upper River

Geomorphic Reach/PRM	Habitat	Sample Type	Salmon, Chinook (juvenile)	Arctic grayling	Burbot	Dolly Varden	Longnose sucker	Sculpin	Trout, lake	Whitefish, humpback	Whitefish, round	Whitefish, undifferentiated	Grand Total
	Oshetna River	ELH, GRTS	2	329	18		5	,		1	5		2,247
UR-2	Oshetna River: Off-Channel	GRTS		7				84					91
234.5-248.6	Black River	ELH, GRTS	73	103	13		1	939			3		1,132
	Black River: Off-Channel	GRTS	2	19	1			121					143
	Upper Extent Watana Reservoir PRM 232.5												
UR-3	Susitna River	Transect		57	12		4	44		2	17		136
224.9-234.5	Goose Creek	GRTS		1,502			7	281			42		1,832
	Susitna River	Transect		81	46		15			1	20		295
UR-4	Jay Creek	Direct		42	3	137		37					219
208.1-224.9	Kosina Creek	ELH, GRTS	116	339	1	3	9	447		1	14		930
200.1-224.5	Tsisi Creek	ELH, GRTS		310				487			4	1	802
	Tsisi Creek: Off-Channel	GRTS		23				32					55
UR-5 203.4-208.1	Susitna River	Transect		19	6			25			13		63
	Susitna River	Transect		161	16		79	188			28		472
	Susitna River: Off-Channel	Transect		3			16	75			1		95
UR-6	Watana Creek	GRTS		272		449	1	563			17		1,302
187.1-203.4	Watana Creek: Off-Channel	GRTS				13		15					28
107.1-203.4	Watana Creek Tributary	GRTS		736		56		169	1		7		969
	Watana Creek Tributary: Off-channel	GRTS				2		24					26
	Unnamed Tributary 194.8	GRTS		16		71	1	158					246
	Proposed I	Natana Dam Loc	ation	PRM 18	7.1								
	Grand Total		193	4,019	116	731	138	5,708	1	5	171	1	11,083

Table D2. Upper River Chinook salmon observations by habitat, 2013.

Juvenile Chinook salmon

Geomorphic												
Reach /PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	Late Summer	Fall	Grand Total				
	Black River		Boulder Riffle		4	10	3	17				
			Riffle	6			1	7				
UR-2			Run		38	5	6	49				
234.5-248.6	Black River: Off-Channel	Upland Slough	Run		2			2				
	Oshetna River		Boulder Riffle		1			1				
			Riffle				1	1				
	Upper Extent Watana Reservoir PRM 232.5											
	Kosina Creek		Boulder Riffle		28	24	16	68				
UR-4			Glide				3	3				
208.1-224.9			Riffle			6	8	14				
			Run			27	4	31				
		Proposed Wat	tana Dam Locati	on PRM 1	187.1							
Grand Total				6	73	72	42	193				

Table D3. Upper River Arctic grayling (all life stages) observations by habitat, 2013.

UR-2 O. 234.5-248.6 O.	Black River Black River: Off-Channel Oshetna River Oshetna River: Off-Channel Gusitna River Goose Creek		Mesohabitat Boulder Riffle Pool Riffle Run Pool Run Boulder Riffle Glide Percolation Channel Rapid Rapid Riffle Run Glide Beaver Pond Vatana Reservoir PRM 2: Riffle Run	1 10 3 3 16 67 22	15 2 35 15 1 52 1 1 22 1 1 1 21 22 1	7 5 2 27 2 1 8 8 20	14	33 11 41 41 100 100 11 11 11 11 11 11 11 11 11 11
UR-2 O: 234.5-248.6 O:	Slack River: Off-Channel Oshetna River Oshetna River: Off-Channel Susitna River Goose Creek	Side Slough Upper Extent W	Pool Riffle Run Pool Run Boulder Riffle Glide Percolation Channel Rapid Riffle Run Glide Beaver Pond Vatana Reservoir PRM 2.	10 3 16 67 22	2 35 15 1 52 1 1 1 21	27 27 2 1 8 8 20	5 6 1 28 2	1 4 1 10 10 1 1 12 7
UR-2 234.5-248.6	Oshetna River Oshetna River: Off-Channel Susitna River Goose Creek	Side Slough Upper Extent W	Riffle Run Pool Run Boulder Riffle Glide Percolation Channel Rapid Riffle Run Glide Beaver Pond Vatana Reservoir PRM 2.	10 3 16 67 22	35 15 1 52 1 1 1 21	27 27 2 1 8 8 20	28 2 2	1 4 1 10 10 1 1 12 7
UR-2 234.5-248.6	Oshetna River Oshetna River: Off-Channel Susitna River Goose Creek	Side Slough Upper Extent W	Pool Run Boulder Riffle Glide Percolation Channel Rapid Riffle Run Glide Beaver Pond //atana Reservoir PRM 2-	16 67 22	15 1 52 1 1 21 22	27 27 2 1 8 8 20	28 2	10 10 11 12 7
UR-2 234.5-248.6	Oshetna River Oshetna River: Off-Channel Susitna River Goose Creek	Side Slough Upper Extent W	Run Boulder Riffle Glide Percolation Channel Rapid Riffle Run Glide Beaver Pond //atana Reservoir PRM 2.	67 22 4	1 52 1 1 21 22	27 2 1 8 20	28 2	10 1 1 12 7
UR-2 234.5-248.6	Oshetna River Oshetna River: Off-Channel Susitna River Goose Creek	Side Slough Upper Extent W	Boulder Riffle Glide Percolation Channel Rapid Riffle Run Glide Beaver Pond //atana Reservoir PRM 2.	67 22 4	1 52 1 1 21 22	27 2 1 8 20	24	10 1 1 12 7
234.5-248.6	Oshetna River: Off-Channel Gusitna River Goose Creek	Upper Extent V	Glide Percolation Channel Rapid Riffle Run Glide Beaver Pond /atana Reservoir PRM 2.	67 22 4	1 1 21 22	2 1 8 20	24	1 12 7
234.5-248.6	Oshetna River: Off-Channel Gusitna River Goose Creek	Upper Extent V	Glide Percolation Channel Rapid Riffle Run Glide Beaver Pond /atana Reservoir PRM 2.	67 22 4	1 1 21 22	2 1 8 20	24	1 12 7
UR-3 Gi 224.9-234.5 Si Ja UR-4	Gusitna River Goose Creek	Upper Extent V	Rapid Riffle Run Glide Beaver Pond /atana Reservoir PRM 2.	67 22 4	1 21 22	8 20		1 12 7
UR-3 Gi 224.9-234.5 Si Ja UR-4	Gusitna River Goose Creek	Upper Extent V	Rapid Riffle Run Glide Beaver Pond /atana Reservoir PRM 2.	67 22 4	21 22	20		1 12 7
UR-3 Gi 224.9-234.5 Si Ja UR-4	Gusitna River Goose Creek	Upper Extent V	Riffle Run Glide Beaver Pond /atana Reservoir PRM 2: Riffle	22	22	20		7
UR-3 Gi 224.9-234.5 Si Ja UR-4 UR-4	Gusitna River Goose Creek	Upper Extent V	Run Glide Beaver Pond /atana Reservoir PRM 2. Riffle	4			15 1	
UR-3 Gi 224.9-234.5 Si Ja UR-4 UR-4	Gusitna River Goose Creek	Upper Extent V	Glide Beaver Pond /atana Reservoir PRM 2. Riffle	4			1	
UR-3 Gi 224.9-234.5 Si Ja UR-4 UR-4	Gusitna River Goose Creek	Upper Extent V	Beaver Pond Vatana Reservoir PRM 2: Riffle				-	
UR-3 G 224.9-234.5 Si Ja	Goose Creek		Vatana Reservoir PRM 2 Riffle					
UR-3 G 224.9-234.5 Si Ja	Goose Creek		Riffle					
UR-3 G 224.9-234.5 Si Ja	Goose Creek	Main Gramer			1		16	1
224.9-234.5 St Ja UR-4					10		30	4
224.9-234.5 St Ja UR-4			Boulder Riffle		394	192	67	65
Sı Ja Kı UR-4			Pool		233	233	19	48
Ja Ko UR-4			Riffle			13	12	6
Ja Ko UR-4					39 147	113	40	30
Ja Ko UR-4		Maia Obassal	Run					2
UR-4	Susitna River	Main Channel	Run		5	6	18	
UR-4		Split Main Channel	Run		7	1	13	2
UR-4		Clearwater Plume	Clearwater Plume	14	8	2	7	3
UR-4	lay Creek		Pool		5	1	18	2
UR-4			Riffle		1	1		:
UR-4			Run		11	1	4	1
_	Kosina Creek		Boulder Riffle	2	21	47	60	13
_			Glide				46	4
208.1-224.9			Percolation Channel	1				
			Pool	78				7
			Rapid	11				1
			Riffle	67				6
			Run		2	1	3	(
Ts	sisi Creek		Boulder Riffle		70	2	17	8
			Glide	113				113
			Riffle	22	53	6	7	8
			Run		18	2		2
Ts	sisi Creek: Off-Channel	Side Slough	Percolation Channel		6	14	3	2
JR-5 203.4-208.1 St	Susitna River	Main Channel	Run		1	1	17	19
Sı	Susitna River	Main Channel	Run		2	21	96	119
		Side Channel	Pool		7	2	3	1:
			Riffle		1	1	3	
		Split Main Channel	Run		8	3	14	25
Sı	Susitna River: Off-Channel	Side Slough	Pool		2		1	
Ur	Jnnamed Tributary 194.8		Pool		9			
	•		Run		7			
UR-6	Vatana Creek		Boulder Riffle		43	15	24	8:
187.1-203.4		İ	Pool		24	5		2
 			Riffle		18	10	21	4
			Run		35	51	21	11
w	Vatana Creek Tributary		Boulder Riffle		5	17	24	4
<u> </u>	y		Rapid		J	13	5	1
-			Riffle		235	78	52	36
<u> </u>			Run		235	27	56	30

Notes: All data are provisional and subject to ongoing QA/QC. Observations are reported within tributaries or mainstem geomorphic reach by habitat type by season: Spring (June 4-29), Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: Early-Life History sampling (ELH), GRTS tributary sampling (GRTS), direct tributary sampling (Direct), mainstem transect sampling (Transect), and visual observations.

431

1,818

952 818

4,019

Grand Total

Table D4. Upper River juvenile Arctic grayling observations by habitat, 2013.

	T	Arctic grayl	ing, juvenile (<190m	m)	T			
Geomorphic Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	Late Summer	Fall	Grand Total
	Black River		Boulder Riffle		13	5	7	25
			Pool	1				1
			Riffle	7	2		1	10
			Run	1	31	4	5	41
	Black River: Off-Channel	Upland Slough	Pool		2		1	3
UR-2	Oshetna River		Boulder Riffle		20	13	9	42
234.5-248.6			Glide			1	2	3
20 110 2 1010			Percolation Channel		1	1		2
			Rapid	6				6
			Riffle	57	18	8	16	99
			Run	19	8	2	6	35
	Oshetna River: Off-Channel	Side Slough	Glide		1	1	1	3
			Beaver Pond	2				2
	1		/atana Reservoir PRM 2	32.5	1			
	Susitna River	Main Channel	Riffle		1		10	11
			Run		10		5	15
UR-3	Goose Creek		Boulder Riffle		267	148	56	471
224.9-234.5			Pool		72	92	10	174
			Riffle		31	9	10	50
	0 '' 0'	14 : 01	Run		82	21	17	120
	Susitna River	Main Channel	Run		2		7	9
		Split Main Channel		40	1	1	5	7
		Clearwater Plume	Clearwater Plume	10	8	2	3	23
	Jay Creek		Pool		3	4	6	9
			Riffle		1	1	3	5
	Vasina Creak		Run Boulder Riffle	2	12	41	53	108
	Kosina Creek				12	41	46	46
UR-4			Glide Pool	35			40	35
208.1-224.9			Rapid	2				2
			Riffle	48				48
			Run	40	1		1	2
	Tsisi Creek		Boulder Riffle		33	2	11	46
	TSISI OICCK		Glide	72			- ' '	72
			Riffle	1	38	4	5	48
			Run		12	2	Ů	14
	Tsisi Creek: Off-Channel	Side Slough	Percolation Channel		4	13	3	20
UR-5 203.4-208.1	Susitna River	Main Channel	Run				6	6
	Susitna River	Main Channel	Run		2	3	21	26
		Side Channel	Pool		7	2	3	12
			Riffle		1	1	2	4
		Split Main Channel	Run		8	2	8	18
	Susitna River: Off-Channel	Side Slough	Pool		2		1	3
	Unnamed Tributary 194.8		Run		2			2
UR-6	Watana Creek		Boulder Riffle		22	7	2	31
187.1-203.4			Pool		4	4		8
			Riffle		7	2	19	28
			Run		25	25	21	71
	Watana Creek Tributary		Boulder Riffle		5	11	10	26
			Rapid			5	2	7
			Riffle		122	53	38	213
			Run		135	14	38	187
		Proposed Watar	na Dam Location PRM 1	87.1				-
Grand Total				263	1,017	501	470	2,251

Table D5. Upper River juvenile or adult Arctic grayling observations by habitat, 2013.

Arctic grayling, juvenile or adult (190-328mm)

		Arctic grayling, ju	venile or adult (190-	·328mm)				
Geomorphic Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	Late Summer	Fall	Grand Total
	Black River		Boulder Riffle		2	2	6	10
			Riffle				4	4
			Run	2	4	1	1	8
	Black River: Off-Channel	Upland Slough	Pool		8	2		10
UR-2			Run		1			1
234.5-248.6	Oshetna River		Boulder Riffle		22	10	7	39
			Glide			1		1
			Rapid		1			1
			Riffle	5	1		8	14
			Run	3	12	4	7	26
		Upper Extent V	Vatana Reservoir PRM 2	32.5				
	Susitna River	Main Channel	Riffle				6	6
			Run				9	9
UR-3	Goose Creek		Boulder Riffle		96	41	9	146
224.9-234.5			Pool		100	128	7	235
			Riffle		3 4	1	8	
			Run		50	84		152
	Susitna River	Main Channel	Run		2	4	9	15
		Split Main Channel	Run		3		4	7
		Clearwater Plume	Clearwater Plume				2	2
	Jay Creek		Pool		2		3	5
			Run		4		1	5
	Kosina Creek		Boulder Riffle		7	5	6	18
UR-4			Pool	36				36
208.1-224.9			Rapid	8				8
200.1-224.3			Riffle	15				15
			Run		1	1	1	3
	Tsisi Creek		Boulder Riffle		34		6	40
			Glide	26				26
			Riffle	20	14	2	2	38
			Run		6			6
	Tsisi Creek: Off-Channel	Side Slough	Percolation Channel		2	1		3
UR-5 203.4-208.1	Susitna River	Main Channel	Run		1		9	10
	Susitna River	Main Channel	Run			14	44	58
		Side Channel	Riffle				1	1
		Split Main Channel	Run				3	3
	Unnamed Tributary 194.8		Pool		7			7
			Run		5			5
UR-6	Watana Creek		Boulder Riffle		14	8	17	39
187.1-203.4			Pool		13	1		14
107.1-203.4			Riffle		11	7	2	20
			Run		10	19	4	33
	Watana Creek Tributary		Boulder Riffle			5		15
			Rapid			7	3	10
			Riffle		93	21	13	127
			Run		79	12	18	109
		Proposed Wata	na Dam Location PRM 1	187.1				
Grand Total				115	608	384	241	1,348

Table D6. Upper River adult Arctic grayling observations by habitat, 2013.

Arctic grayling, adult (>328 mm)

Geomorphic		1	/ling, adult (>328 mm	., 				
Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	Late Summer	Fall	Grand Total
	Black River		Boulder Riffle				1	1
		1	Riffle	3				3
	Black River: Off-Channel	Upland Slough	Pool		5			5
UR-2	Oshetna River	1,1,1,1,1,1	Boulder Riffle		10	4	12	
234.5-248.6			Rapid	10				10
			Riffle	5	2			7
			Run		2	14	2	18
	Oshetna River: Off-Channel		Beaver Pond	2				2
	•	Upper Extent V	Vatana Reservoir PRM 2	32.5	•	•		•
	Susitna River	Main Channel	Run				16	16
UD 2	Goose Creek		Boulder Riffle		26	3	2	31
UR-3 224.9-234.5			Pool		61	13	2	76
224.9-234.3			Riffle		5		1	6
			Run		12	8	5	25
	Susitna River	Main Channel	Run		1	2	2	5
		Split Main Channel	Run		3		4	7
		Clearwater Plume	Clearwater Plume	4			2	6
	Jay Creek		Pool			1	9	10
			Run		6			6
	Kosina Creek		Boulder Riffle		2	1	1	4
UR-4			Percolation Channel	1				1
208.1-224.9			Pool	7				7
			Rapid	1				1
			Riffle	4				4
			Run				1	1
	Tsisi Creek		Boulder Riffle		3			3
			Glide	15				15
			Riffle	1	1		1 2 4 31 1 3	2
UR-5 203.4-208.1	Susitna River	Main Channel	Run			1		3
	Susitna River	Main Channel	Run			4	31	35
		Split Main Channel	Run			1	3	4
	Unnamed Tributary 194.8		Pool		2			2
	Watana Creek		Boulder Riffle		7		5	
UR-6			Pool		7			7
187.1-203.4			Riffle			1		1
			Run			7		8
	Watana Creek Tributary		Boulder Riffle			1	4	Ü
			Rapid			1	_	1
			Riffle		20		1	25
			Run		10	1		11
		Proposed Wata	na Dam Location PRM 1					
Grand Total				53	185	67	107	412

Table D7. Upper River burbot observations by habitat, 2013.

Burbo

Geomorphic								
Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	Late Summer	Fall	Grand Total
	Black River		Boulder Riffle		1	2	3	6
			Riffle	1				1
			Run	2		1	3 3 1 1 4 3 3 14 9 9	6
UR-2	Black River: Off-Channel	Upland Slough	Run		1			1
234.5-248.6	Oshetna River		Boulder Riffle		1		1	2
234.3-240.0			Glide		1	2		3
			Percolation Channel	1				1
			Riffle				4	4
			Run	1	3	1	3	8
		Upper Extent W	atana Reservoir PRM 23	32.5		•		•
UR-3	Susitna River	Main Channel	Riffle		2	3	1	6
224.9-234.5			Run		2	1	3	6
	Susitna River	Main Channel	Run		5	5	14	24
UR-4		Split Main Channel	Run		3			3
208.1-224.9		Clearwater Plume	Clearwater Plume	1	3	6	9	19
200.1-224.9	Jay Creek		Pool		1		2	3
	Kosina Creek		Riffle	1				1
UR-5 203.4-208.1	Susitna River	Main Channel	Run		6			6
	Susitna River	Main Channel	Run		1	8	1	10
UR-6		Side Channel	Pool		1			1
187.1-203.4			Riffle		1		1	2
		Split Main Channel	Run		3			3
	•	Proposed Wata	na Dam Location PRM 1	87.1	•	•		
Grand Total				7	35	29	45	116

Table D8. Upper River Dolly Varden observations by habitat, 2013.

Dolly Varden

Geomorphic								
Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	Late Summer	Fall	Grand Total
		Upper Extent Wa	atana Reservoir PRM 23	2.5				
	Jay Creek		Pool		69		17	86
UR-4			Run		43	1	7	51
208.1-224.9	Kosina Creek		Pool	1				1
			Riffle	2				2
	Unnamed Tributary 194.8		Pool		2	5	10	17
			Riffle		9	3		12
			Run		15	21	6	42
	Watana Creek		Boulder Riffle		23	8	1	32
			Pool		187	2	1	190
UR-6			Riffle		84	13	12	109
187.1-203.4			Run		68	44	6	118
107.1-203.4	Watana Creek: Off-Channel	Side Slough	Glide		4	5	3	12
			Percolation Channel			1		1
	Watana Creek Tributary		Rapid			1		1
			Riffle		12	26	11	49
			Run		5	1		6
	Watana Creek Tributary: Off-channel	Side Slough	Glide		2			2
		Proposed Watan	a Dam Location PRM 18	37.1		_		
Grand Total				3	523	131	74	731

Notes: All data are provisional and subject to ongoing QA/QC. Observations are reported within tributaries or mainstem geomorphic reach by habitat type by season: Spring (June 4-29), Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: Early-Life History sampling (ELH), GRTS tributary sampling (GRTS), direct tributary sampling (Direct), mainstem transect sampling (Transect), and visual observations.

Table D9. Upper River lake trout observations by habitat, 2013.

Lake trout

Geomorphic										
Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Fall	Grand Total					
Upper Extent Watana Reservoir PRM 232.5										
UR-6 / 187.1-203.4	Watana Creek Tributary		Riffle	1	1					
Proposed Watana Dam Location PRM 187.1										
Grand Total				1	1					

Table D10. Upper River longnose sucker observations by habitat, 2013.

Longnose sucker

Geomorphic								
Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	Late Summer	Fall	Grand Total
	Black River		Run			1		1
UR-2	Oshetna River		Boulder Riffle				1	1
234.5-248.6			Run	3	1			4
		Upper Extent	Watana Reservoir PRI	M 232.5				
	Susitna River	Main Channel	Riffle				1	1
UR-3			Run			3		3
224.9-234.5	Goose Creek		Boulder Riffle		4			4
224.9-234.3			Pool		1	1		2
			Run		1			1
	Susitna River	Main Channel	Run				2	2
UR-4		Split Main Channel	Run		2			2
208.1-224.9		Clearwater Plume	Clearwater Plume	2	2	2	5	11
	Kosina Creek		Riffle	9				9
	Susitna River	Main Channel	Run		10	9		19
		Side Channel	Pool		6	2	2	10
UR-6			Riffle		11		15	26
187.1-203.4		Split Main Channel	Run		10	14		24
107.1-203.4	Susitna River: Off-Channel	Side Slough	Pool		4	10	2	16
	Unnamed Tributary 194.8		Run		1			1
	Watana Creek		Boulder Riffle		1			1
		Proposed Wat	ana Dam Location PR	M 187.1				
Grand Total				14	54	42	28	138

Table D11. Upper River sculpin observations by habitat, 2013.

		Sculpin	1					
Geomorphic Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	I ate Summer	Fall	Grand Total
Keacii/FKWi	Black River	Wacionabitat	Boulder Riffle	opining	177	92	71	340
	DIGOR PAPEL		Pool	22		02	- '	22
			Riffle	90	35	34	13	172
			Run	26	214	95	70	405
	Black River: Off-Channel	Upland Slough	Pool		5	51	33	89
	Black River. On-Onlanner	Opiana Glough	Run		11	5	16	32
UR-2	Oshetna River		Boulder Riffle		234	149	159	542
234.5-248.6	Osnetna River		Glide		51		159	
234.3-240.0			Percolation Channel			6	12	65
					4	4		20
			Pool	- 44	44	10	11	55
			Rapid	41	30	16	28	115
			Riffle	233	163	142	92	630
			Run	105	142	125	88	460
	Oshetna River: Off-Channel	Side Slough	Glide		34	25	25	84
		Upper Extent Watana Res	ervoir PRM 232.5					
	Susitna River	Main Channel	Riffle		4	9	1	14
			Run		25	3	2	30
UR-3	Goose Creek		Boulder Riffle		120	47	25	192
224.9-234.5			Pool		2	2	6	10
			Riffle		15	7	10	32
			Run		27	7	13	47
	Susitna River	Main Channel	Run		8	17	24	49
		Split Main Channel	Run		5	2	13	20
		Clearwater Plume	Clearwater Plume	5	17	10	31	63
	Jay Creek	ologimator i lamo	Pool	H	5	1	- 0.	6
	buy oreek		Riffle		13	3	4	20
			Run		6	3	5	11
	Kosina Creek		Boulder Riffle	23	40	63	79	205
	ROSIIIa Creek		Glide	27	40	03	20	47
UR-4							20	
208.1-224.9			Percolation Channel	11				11
			Rapid	4				4
			Riffle	71	19	10	47	147
			Run		1	16	16	33
	Tsisi Creek		Boulder Riffle		38	14	40	92
			Glide	160				160
			Riffle	1	72	41	46	160
			Run		34	35	6	75
	Tsisi Creek: Off-Channel	Side Slough	Percolation Channel			6	26	32
UR-5 203.4-208.1	Susitna River	Main Channel	Run		1	4	20	25
	Susitna River	Main Channel	Run		17	34	15	66
		Side Channel	Pool		16	14	17	47
			Riffle		2	12	9	23
		Split Main Channel	Run		8	21	23	52
	Susitna River: Off-Channel	Side Slough	Pool		4	55	16	75
	Unnamed Tributary 194.8	2.23 0.00g.i	Pool		25	25	39	89
	omaniou inibutary 104.0		Riffle		3	1	55	4
			Run	 	30	20	15	65
	Watana Crook				21		9	
IID C	Watana Creek		Boulder Riffle	-		42		72
UR-6			Pool		9	2	2	13
187.1-203.4			Riffle	<u> </u>	164	45	49	258
			Run		80	74	66	220
	Watana Creek: Off-Channel	Side Slough	Glide		1	3	2	6
			Percolation Channel			1		1
		Side Slough Beaver Complex			1	4	3	8
	Watana Creek Tributary		Boulder Riffle		10	4		14
			Rapid			5	5	10
			Riffle		85	31	17	133
			Run		1	8	3	12
	Watana Creek Tributary: Off-channel	Side Slough	Glide		8	14	2	24
	-	Proposed Watana Dam Lo			-			
Grand Total				819	2,081	1.456	1,352	5,708

Table D12. Upper River humpback whitefish observations by habitat, 2013.

Whitefish, humpback

Geomorphic										
Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	Grand Total				
		Upper Extent Watar	na Reservoir PRM 232	2.5						
UR-2 234.5-248.6	Oshetna River		Riffle	1		1				
UR-3 224.9-234.5	Susitna River	Main Channel	Run		2	2				
UR-4	Susitna River	Clearwater Plume	Clearwater Plume	1		1				
208.1-224.9	Kosina Creek		Riffle	1		1				
	Proposed Watana Dam Location PRM 187.1									
Grand Total				3	2	5				

Table D13. Upper River round whitefish observations by habitat, 2013.

Whitefish, round

Geomorphic			elisii, louliu					
Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	Late Summer	Fall	Grand Total
	Black River		Boulder Riffle		1			1
			Run		2			2
UR-2	Oshetna River		Rapid	1				1
234.5-248.6			Riffle				3	3
			Run	1				1
	•	Upper Extent Wa	tana Reservoir PRM	232.5				
	Susitna River	Main Channel	Riffle			1	1	2
up a			Run				15	15
UR-3	Goose Creek		Boulder Riffle		8	1		9
224.9-234.5			Pool		10	14		24
			Run		2	7		9
	Susitna River	Main Channel	Run			4	6	10
		Split Main Channel	Run			1	2	3
UR-4		Clearwater Plume	Clearwater Plume	1			6	7
208.1-224.9	Kosina Creek		Boulder Riffle		2			2
200.1-224.5			Pool	12				12
	Tsisi Creek		Riffle		2			2
			Run		2			2
UR-5 203.4-208.1	Susitna River	Main Channel	Run		1	2	10	13
	Susitna River	Main Channel	Run		3	6	4	13
		Side Channel	Riffle		3		3	6
		Split Main Channel	Run		4		5	9
	Susitna River: Off-Channel	Side Slough	Pool		1			1
UR-6	Watana Creek		Boulder Riffle		3	1		4
187.1-203.4			Pool		3			3
107.1-203.4			Riffle		7	1		8
			Run		2			2
	Watana Creek Tributary		Rapid			1		1
			Riffle		4	1		5
			Run		1			1
		Proposed Watana	Dam Location PRM					
Grand Total				15	61	40	55	171

2. RELATIVE ABUNDANCE

As discussed in ISR Study 9.5, Section 4.4.2.2, catch per unit effort (CPUE) estimates were used to describe the relative abundance of fish species among habitats within the Upper River study area. Additional details concerning the calculation of CPUE are provided below, along with a summary of sampling effort (Table D15 through D18), gear-specific CPUE by species (Table D14), and gear-specific average CPUE by habitat type (Tables D19 through D43).

Catch per unit effort estimates were derived for each of the three types of Fish Distribution and Abundance protocols used in the Upper River: GRTS-sampling tributaries, direct-sampling tributaries, and mainstem Susitna River transects. The approach used to estimate CPUE was largely similar among each of these components. In all cases, CPUE was evaluated specific to gear type, species, and sampling event (i.e., early summer, late summer, or fall), and the analysis also distinguished between juvenile and adult life stages for Pacific salmon. Furthermore, the analysis conducted for each sampling component was specific to mesohabitat type. However, as a direct result of differences in the study design and site selection process among the sampling components, different analytical approaches were used to derive average CPUE values at the macrohabitat scale. Average CPUE values for each GRTS-sampled tributary represent the average CPUE among individual GRTS segments with a given tributary. For direct-sampling tributaries, average CPUE was calculated as the average among sampling reaches within a given tributary. In the mainstem Susitna River, the mesohabitat-specific CPUE estimates were averaged among macrohabitat units within each geomorphic reach. In the analysis that follows, these differences are discussed when relevant to the calculations being described.

At the mesohabitat unit level, CPUE was calculated as follows for each gear type, species, life stage, and sampling event combination:

 $CPUE_{Meso} = C_{Meso}/E_{Meso}$,

where $CPUE_{Meso}$ = catch per unit effort for a given mesohabitat unit,

 C_{Meso} = total fish captured within a given mesohabitat unit, and

 E_{Meso} = total effort within a given mesohabitat unit.

For backpack and boat electrofishing, E_{Meso} was recorded as the electrofishing pulse duration in seconds, and for reporting purposes was expressed in hours. That is,

 E_{Meso} = pulse duration in seconds × (1 minute/60 seconds) × (1 hour/60 minutes) = pulse duration in hours.

For snorkeling and seining, E_{Meso} was calculated by determining the total area sampled at a given mesohabitat unit. Specifically,

 E_{Meso} = length of area sampled in meters × width of area sampled in meters = area sampled in square meters.

For snorkeling and seining, $CPUE_{Meso}$ estimates were then standardized to 1,000 m² using a factor of 1,000.

When sampling within a GRTS segment, a direct sampling reach, or a mainstem macrohabitat site included multiple mesohabitat units of the same type (e.g., two distinct pools), the associated $CPUE_{Meso}$ values were calculated using the total catch and the total effort across mesohabitat units. For example,

$$CPUE_{Meso} = (C_{Meso1} + C_{Meso2} + ... + C_{Meson})/(E_{Meso1} + E_{Meso2} + ... + E_{Meson})$$

After determining CPUE_{Meso} values for a given mesohabitat type, the average CPUE was calculated as:

$$CPUE_{Avg} = (\Sigma \ CPUE_{Meso})/N,$$

where N =sample size.

Specific definitions for N vary among the three sampling components. For GRTS-sampled tributaries,

 $N_{m,g,e}$ = number of GRTS segments within a given tributary containing mesohabitat type "m" that was sampled using gear type "g" during sampling event "e".

For direct sampling tributaries,

 $N_{m,g,e}$ = number of sampling reaches within a given tributary containing mesohabitat type "m" that was sampled using gear type "g" during sampling event "e".

For mainstem transect sampling, average CPUE estimates for each mesohabitat type were calculated specific to mainstem macrohabitat types within each geomorphic reach. In this case,

 $N_{M,m,g,e}$ = number of macrohabitat units of type "M" within a given geomorphic reach containing mesohabitat type "m" that was sampled using gear type "g" during sampling event "e".

Actual sample sizes and the total effort supporting gear-specific average CPUE values are provided in Tables D15 through D18.

Table D14. Summary of relative abundance by capture method for main channel, off-channel, and tributary habitats of the Upper River, 2013.

		М	ain Chann	el	Off-Ch	nannel		Tributary		All
Species		Backpack Electrofishing (N=60; CPUE in fish/hour)	Boat Electrofishing (N=47; CPUE in fish/hour)	Seine (N=13; CPUE in fish/1,000 m^2)	Backpack Electrofishing (N=3; CPUE in fish/hour)	Boat Electrofishing (N=3; CPUE in fish/hour)	Backpack Electrofishing (N=396, CPUE in fish/hour)	Snorkel (N=172; CPUE in fish/1,000 m^2)	Seine (N=4; CPUE in fish/1,000 m^2)	Percent of Sites with CPUE=0 (N=472; all methods)
Salmon, juvenile Chinook	% CPUE=0	100%	100%	100%	100%	100%	94%	98%	100%	95%
	Max CPUE						160	31.4		
Arctic grayling	% CPUE=0	50%	64%	38%	33%	100%	49%	40%	100%	41%
	Max CPUE	86.9	226.3	21.7	9.9		253.1	1500		
Burbot	% CPUE=0	70%	77%	92%	100%	100%	96%	100%	100%	90%
	Max CPUE	32.4	12.2	0.7			34.1			
Dolly Varden	% CPUE=0	100%	100%	100%	100%	100%	88%	88%	100%	88%
	Max CPUE						453.3	330		
Longnose sucker	% CPUE=0	78%	94%	38%	33%	67%	98%	97%	100%	93%
	Max CPUE	24.1	11.9	47.2	9.9	5.6	12	11		
Sculpin, undifferentiated	% CPUE=0	25%	91%	62%	0%	100%	20%	93%	100%	22%
	Max CPUE	162.4	7.3	10.9	59		363	100		
Trout, lake	% CPUE=0	100%	100%	100%	100%	100%	>99%	100%	100%	>99%
	Max CPUE						18.5			
Whitefish, round	% CPUE=0	83%	68%	54%	67%	100%	98%	88%	100%	88%
	Max CPUE	40.8	22.3	5.1	5		46.2	69		
Whitefish, undifferentiated	% CPUE=0	100%	100%	100%	100%	100%	100%	99%	100%	>99%
	Max CPUE							0.5		
Percent of Sites with No	Fish	17%	47%	23%	0%	67%	10%	31%	100%	

Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries or mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling, direct tributary sampling, and mainstem transect sampling.

Table D15. Sample sizes and total effort used for calculating average CPUE for backpack electrofishing in the Upper River, 2013.

Geo-		Macro-	Meso-	Sa	ample Size (N)	Total Effort (pulse duration in seconds)			
morphic Reach	Stream	habitat Type	habitat Type	Early Summer	Late Summer	Fall	Early Summer	Late Summer	Fall	
			Boulder Riffle	7	7	7	3087	2735	3550	
			Glide	2	2	2	628	490	852	
	Oshetna	Tributary	Percolation Channel	1	1	1	305	191	189	
UR-2	River		Pool	1		1	301		247	
(PRM			Rapid	1	1	1	320	250	370	
234.5-			Riffle	5	5	5	2513	1540	2470	
248.6)			Run	7	7	7	2913	2707	3332	
	Dlook	Black River Tributary	Boulder Riffle	4	4	4	1763	1298	1581	
			Pool	1	1	1	328	256	455	
River	kiver	Riffle	1	1	1	316	313	261		
			Run	3	3	3	1748	1382	1767	
			Watana Res	ervoir at Full	Pool (PRM 2	32.5)				
	Susitna	Main	Riffle	1	1	1	580	794	556	
	River	Channel	Run	1	1	1	800	988	441	
UR-3 (PRM	_	Tributary	Boulder Riffle	19	18	17	9120	5880	6597	
224.9-	Goose		Pool	4	4	4	812	873	1283	
234.5)	Creek		Riffle	3	3	4	834	670	923	
			Run	6	7	6	1945	2562	2109	
			Clearwater Plume	Clearwater Plume	3	3	2	1643	1780	2250
	Susitna River	Main Channel	Run	4	4	5	2892	2559	3438	
		Split Main Channel	Run	1	1	1	939	904	902	
	lau		Pool	1	2	2	587	522	641	
	Jay Creek ¹	Tributary	Riffle	1	1	1	224	117	85	
UR-4	Orook		Run	2	2	2	363	690	380	
(PRM 208.1-			Boulder Riffle	4	4	4	2152	2408	2829	
224.9)	Kosina	Tributary	Glide			1			163	
	Creek	,	Riffle	2	2	2	845	851	1006	
			Run	1	2	2	510	701	673	
			Boulder Riffle	2	2	2	933	865	1040	
	Tsisi Creek	Tributary	Percolation Channel	1	1	1	498	678	256	
	JIOOK		Riffle	4	4	4	1148	1528	1719	
			Run	2	2	1	526	794	395	

Table D15. Continued.

0		Maara	Meso-	Sa	mple Size (M)		Total Effort uration in s		
Geo- morphic Reach	Stream	Macro- habitat Type	habitat Type	Early Summer	Late Summer	Fall	Early Summer	Late Summer	Fall	
UR-5 (PRM 203.4- 208.1)	Susitna River	Main Channel	Run	2	2	2	1404	1474	1128	
		Main Channel	Run	4	4	4	2361	2695	2165	
		Side	Pool	1	1	1	747	606	755	
	Susitna River	Channel	Riffle	1	1	1	527	738	585	
R		River	Side Slough	Pool	1	1	1	725	1098	669
		Split Main Channel	Run	2	2	2	1377	1129	1024	
		Tributary	Beaver Pond	1	1	2	180	316	478	
	Watana Creek		Boulder Riffle	3	3	3	1225	861	1053	
			Glide	1	1	1	174	564	212	
UR-6 (PRM			Percolation Channel	1	1	1	100	76	137	
187.1- 203.4)			Pool	1	3	1	175	614	250	
203.4)			Riffle	8	8	8	2954	2518	2043	
			Run	10	9	10	2960	3647	3145	
			Boulder Riffle	2	2	1	551	458	128	
	Watana	T.21 (c.)	Glide	1	1	1	298	454	110	
	Creek Tributary	Tributary	Rapid		2	1		385	367	
	Tributary		Riffle	12	10	10	4235	3939	3229	
			Run	3	2	3	546	325	530	
	Unnamed		Pool	2	2	2	666	907	724	
	Tributary	Tributary	Riffle	1	1	1	317	320	186	
	194.8		Run	1		1	574		467	
			Proposed Wata	ana Dam Lo	cation (PRM	187.1)				

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details. Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries or mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling, direct tributary sampling, and mainstem transect sampling.

Table D16. Sample sizes and total effort used for calculating average CPUE for boat electrofishing in the Upper River, 2013.

			Sa	mple Size (N)	Total Effort (pulse duration in second				
Geomorphic Reach	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall	Early Summer	Late Summer	Fall		
		Watana Rese	ervoir at Full	Pool (PRM	232.5)					
UR-3		Riffle	1	1	1	169	184	309		
(PRM 224.9- 234.5)	Main Channel	Run	1	1	1	310	123	695		
UR-4	Clearwater Plume	Clearwater Plume		1	1		127	909		
(PRM 208.1-	Main Channel	Run	5	5	5	3493	1374	3216		
224.9)	Split Main Channel	Run	1	1	1	912	273	495		
UR-5 (PRM 203.4- 208.1)	Main Channel	Run	2	2	2	1899	520	1731		
LID C	Main Channel	Run	4	4	4	3325	3320	2360		
UR-6 (PRM 187.1-	Side Slough	Pool	1	1	1	645	401	439		
203.4)	Split Main Channel	Run	1	1	1	477	382	485		
	Proposed Watana Dam Location (PRM 187.1)									

Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: mainstem transect sampling.

Table D17. Sample sizes and total effort used for calculating average CPUE for seining in the Upper River, 2013.

Geo-				Sa	mple Size (<i>l</i>	V)	Total Effort (area sampled in square meters			
morphic Reach	Stream	Macro- habitat Type	Meso- habitat Type	Early Summer	Late Summer	Fall	Early Summer	Late Summer	Fall	
UR-2	_		Pool	1			21			
(PRM	Oshetna	Tributary	Riffle	1			147			
234.5- 248.6)	River		Run	1			700			
			Watana Res	ervoir at Ful	Pool (PRM	232.5)				
UR-4 (PRM 208.1- 224.9)	Susitna River	Main Channel	Run	2			375			
		Main Channel	Run	1	1	1	1400	600	780	
LID 6	Cuaitaa	Cide Observat	Pool	1	1	1	900	92	150	
UR-6 (PRM	Susitna River	Side Channel	Riffle	1		1	212		390	
187.1- 203.4)		Split Main Channel	Run	1	1	1	1530	960	475	
,	Watana Creek	Tributary	Riffle	1			240			
	Proposed Watana Dam Location (PRM 187.1)									

Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries or mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling and mainstem transect sampling.

Table D18. Sample sizes and total effort used for calculating average CPUE for snorkeling in the Upper River, 2013.

Geo-			S	ample Size (<i>N</i>	0	(area san	Total Effort npled in square	meters)
morphic Reach	Stream	Mesohabitat Type	Early Summer	Late Summer	Fall	Early Summer	Late Summer	Fall
			Watana Rese	ervoir at Full Po	ool (PRM 232	2.5)		
UR-3		Boulder Riffle	8	8	7	6396	8363	8647
(PRM 224.9-	Goose Creek	Pool	4	3	2	2193	1121	1596
234.5)	Creek	Riffle	1		1	10		32
201.0)		Run	5	6	4	2021	2737	3684
	Jay	Pool	1	1	1	345	400	475
	Creek ¹	Run	1	1	1	400	1039	500
	Kosina	Boulder Riffle	4	4	3	4145	9900	7500
UR-4	Creek	Glide			1			140
(PRM		Run		1	1		3900	3000
208.1- 224.9)	Tsisi Creek	Boulder Riffle	2	1	2	2700	2600	2000
		Percolation Channel	1	1	1	280	760	50
		Riffle	4	3	4	4375	3000	3100
		Run	2	1	1	3400	2500	1000
		Beaver Pond	1	1	1	1000	1250	1500
	Watana	Boulder Riffle	2	2	1	2020	3300	2000
	Creek	Pool	3	3	3	975	941	1220
		Riffle	3	2	4	2750	1500	4300
UR-6		Run	6	6	4	5600	5610	3900
(PRM 187.1-	Watana	Boulder Riffle		1	2		200	435
203.4)	Creek	Rapid		1	1		300	1030
-	Tributary	Riffle	8	4	5	4348	2290	3875
		Run	3	2	3	640	300	1750
	Unnamed	Pool	2	2		325	450	
	Tributary	Riffle	1	1		150	200	
	194.8	Run	1	1		190	300	

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details. Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling and direct tributary sampling.

Table D19. Average CPUE (fish per hour of shocking time) for Chinook salmon using backpack electrofishing in the Upper River, 2013.

Geo-				Salmon	, Chinook (juv	venile)
morphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
			Boulder Riffle	2.3	0	0
			Glide	0	0	0
			Percolation Channel	0	0	0
	Oshetna River	Tributary	Pool	0		0
UR-2	Mivei		Rapid	0	0	0
(PRM 234.5-			Riffle	0	0	1.6
248.6)			Run	0	0	0
,			Boulder Riffle	1.5	12.4	6.5
	Division Division	T.9. (Pool	0	0	0
	Black River	Tributary	Riffle	0	0	0
			Run	47.5	7.6	10.6
		Watana Rese	ervoir at Full Pool (PRM 232.5)			
	Susitna River	Main Channal	Riffle	0	0	0
UR-3	Susilia Rivei	Main Channel	Run	0	0	0
(PRM		Tributary	Boulder Riffle	0	0	0
224.9-			Pool	0	0	0
234.5)	Goose Creek		Riffle	0	0	0
			Run	0	0	0
		Clearwater Plume	Clearwater Plume	0	0	0
	Susitna River	Main Channel	Run	0	0	0
		Split Main Channel	Run	0	0	0
			Pool	0	0	0
	Jay Creek ¹	Tributary	Riffle	0	0	0
UR-4			Run	0	0	0
(PRM			Boulder Riffle	7.6	19.5	17.4
208.1-	Kasing O	Tributan	Glide			44.2
224.9)	Kosina Creek	Tributary	Riffle	0	4.0	10.5
			Run	0	80.0	0
			Boulder Riffle	0	0	0
	T	T 11 (Percolation Channel	0	0	0
	Tsisi Creek	Tributary	Riffle	0	0	0
			Run	0	0	0

Table-D19. Continued.

Geo-				Salmon	, Chinook (juv	enile)
morphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
UR-5 (PRM 203.4- 208.1)	Susitna River	Main Channel	Run	0	0	0
		Main Channel	Run	0	0	0
		Side Channel	Pool	0	0	0
	Susitna River	Side Charmer	Riffle	0	0	0
		Side Slough	Pool	0	0	0
		Split Main Channel	Run	0	0	0
	Watana Creek	I I rini itarv	Beaver Pond	0	0	0
			Boulder Riffle	0	0	0
			Glide	0	0	0
UR-6			Percolation Channel	0	0	0
(PRM			Pool	0	0	0
Ì87.1-			Riffle	0	0	0
203.4)			Run	0	0	0
			Boulder Riffle	0	0	0
	Watana		Glide	0	0	0
	Creek	Tributary	Rapid		0	0
	Tributary		Riffle	0	0	0
			Run	0	0	0
	Unnamed		Pool	0	0	0
	Tributary	Tributary	Riffle	0	0	0
	194.8		Run	0		0
	•	Proposed Wata	ana Dam Location (PRM 187.1			

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details.

Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries or mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling, direct tributary sampling, and mainstem transect sampling.

Table D20. Average CPUE (fish per 1,000 square meters) for Chinook salmon using snorkeling in the Upper River, 2013.

			Salmo	on, Chinook (juveni	le)
Geomorphic Reach	Stream	Mesohabitat Type	Early Summer	Late Summer	Fall
		Watana Reservoir at Full Poo	ol (PRM 232.5)		
UR-3		Boulder Riffle	0	0	0
(PRM 221.9-	Goose Creek	Pool	0	0	0
234.5)	Goose Creek	Riffle	0		0
		Run	0	0	0
	Jay Creek ¹	Pool	0	0	0
	Jay Oreek	Run	0	0	0
		Boulder Riffle	9.2	0	0
UR-4	Kosina Creek	Glide			0
(PRM 208.1- 224.9)		Run		0	0
224.9)	Tsisi Creek	Boulder Riffle	0	0	0
		Percolation Channel	0	0	0
		Riffle	0	0	0
		Run	0	0	0
		Beaver Pond	0	0	0
		Boulder Riffle	0	0	0
	Watana Creek	Pool	0	0	0
		Riffle	0	0	0
UR-6		Run	0	0	0
(PRM 187.1-		Boulder Riffle		0	0
203.4)	Watana Creek	Rapid		0	0
	Tributary	Riffle	0	0	0
		Run	0	0	0
		Pool	0	0	
	Unnamed Tributary 194.8	Riffle	0	0	
	711butary 134.0	Run	0	0	
		Proposed Watana Dam Locati			

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details. Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling and direct tributary sampling.

Table D21. Average CPUE (fish per hour of shocking time) for Arctic grayling using backpack electrofishing in the Upper River, 2013.

Geo-				Α	Arctic grayling		
morphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall	
	- Cu Cum	Į.	Boulder Riffle	25.9	9.7	5.6	
			Glide	0	14.7	14.1	
			Percolation Channel	11.8	18.8	0	
	Oshetna River	Tributary	Pool	0		0	
UR-2	IXIVEI		Rapid	0	0	0	
(PRM 234.5-			Riffle	21.5	11.6	27.0	
248.6)			Run	5.8	2.8	3.2	
,			Boulder Riffle	21.4	8.5	16.2	
	Division Division	T.9. (Pool	87.8	0	7.9	
	Black River	Tributary	Riffle	22.8	0	0	
			Run	48.4	13.8	11.5	
	I.	Watana Rese	ervoir at Full Pool (PRM 232.5)	_ <u></u>	<u>I</u>		
	Susitna River		Riffle	6.2	0	77.7	
LID 0		Main Channel	Run	4.5	0	57.1	
UR-3 (PRM	Goose Creek	Creek Tributary	Boulder Riffle	33.0	31.4	14.4	
224.9-			Pool	0	27.8	20.5	
234.5)			Riffle	59.4	72.6	73.8	
			Run	30.7	43.6	9.7	
		Clearwater Plume	Clearwater Plume	30.1	6.7	6.5	
	Susitna River	Main Channel	Run	0	0	7.6	
		Split Main Channel	Run	15.3	4.0	8.0	
			Pool	30.7	0	59.7	
	Jay Creek ¹	Tributary	Riffle	16.1	30.8	0	
			Run	78.3	0	23.8	
UR-4 (PRM			Boulder Riffle	1.8	13.6	32.7	
208.1-		T " (Glide			176.7	
224.9)	Kosina Creek	Tributary	Riffle	0	0	0	
			Run	0	0	5.5	
			Boulder Riffle	18.3	3.1	3.6	
			Percolation Channel	21.7	21.2	28.1	
	Tsisi Creek	Tributary	Riffle	22.9	8.3	15.6	
			Run	6.3	9.4	0	

Table-D21. Continued.

Geo-				А	rctic grayling	
morphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
UR-5 (PRM 203.4- 208.1)	Susitna River	Main Channel	Run	0	0	18.9
		Main Channel	Run	0	1.9	27.0
		Side Channel	Pool	4.8	0	14.3
	Susitna River	Side Channel	Riffle	6.8	4.9	12.3
		Side Slough	Pool	9.9	0	5.4
		Split Main Channel	Run	5.3	0	7.2
	Watana Creek	Tributary	Beaver Pond	0	0	0
			Boulder Riffle	38.6	7.5	36.2
			Glide	0	0	0
UR-6			Percolation Channel	0	0	0
(PRM			Pool	0	0	0
Ì87.1-			Riffle	6.3	5.4	28.5
203.4)			Run	26.2	13.2	20.8
			Boulder Riffle	11.8	16.6	112.5
	Watana		Glide	0	0	0
	Creek	Tributary	Rapid		36.0	9.8
	Tributary		Riffle	33.3	15.3	12.7
			Run	76.5	55.6	104.3
	Unnamed		Pool	27.3	0	0
	Tributary	Tributary	Riffle	0	0	0
	194.8		Run	18.8		0
		Proposed Wata	ana Dam Location (PRM 187.1)			

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details.

Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries or mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling, direct tributary sampling, and mainstem transect sampling.

Table D22. Average CPUE (fish per hour of shocking time) for Arctic grayling using boat electrofishing in the Upper River, 2013.

				Arctic grayling	
Geomorphic Reach	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
	Watana I	Reservoir at Full Pool (PRM 23	32.5)		
UR-3	Main Channal	Riffle	0	0	46.6
(PRM 224.9-234.5)	Main Channel	Run	0	0	15.5
	Clearwater Plume	Clearwater Plume		0	11.9
UR-4 (PRM 208.1-224.9)	Main Channel	Run	1.1	0	1.7
(FRIVI 200. 1-224.9)	Split Main Channel	Run	0	0	36.4
UR-5 (PRM 203.4-208.1)	Main Channel	Run	1.6	0	16.4
	Main Channel	Run	0	6.4	72.7
UR-6 (PRM 187.1-203.4)	Side Slough	Pool	0	0	0
(FRIVI 107.1-203.4)	Split Main Channel	Run	0	0	22.3
	Proposed	Watana Dam Location (PRM	187.1)		

Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: mainstem transect sampling.

Table D23. Average CPUE (fish per 1,000 square meters) for Arctic grayling using seining in the Upper River, 2013.

					Arctic grayling	
Geomorphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
UR-2	Ochotno		Pool	0		
(PRM 234.5-	Oshetna River	Tributary	Riffle	0		
248.6)	Taver		Run	0		
		Watana Reservoir	at Full Pool (PRM 232.5))		
UR-4 (PRM 208.1- 224.9)	Susitna River	Main Channel	Run	0		
	0	Main Channel	Run	1.4	1.7	1.3
LID C		D' O' I . O' I	Pool	6.7	21.7	0
UR-6 (PRM 187.1-	Susitna River	Side Channel	Riffle	0		0
203.4)		Split Main Channel	Run	3.9	3.1	10.5
	Watana Creek	Tributary	Riffle	0		
		Proposed Watana D	am Location (PRM 187.	1)		

Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries or mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling and mainstem transect sampling.

Table D24. Average CPUE (fish per 1,000 square meters) for Arctic grayling using snorkeling in the Upper River, 2013.

			Arctic grayling			
Geomorphic Reach	Stream	Mesohabitat Type	Early Summer	Late Summer	Fall	
		Watana Reservoir at Full Po				
UR-3		Boulder Riffle	43.3	19.8	1.8	
(PRM 221.9-	Goose Creek	Pool	111.2	135.3	2.5	
234.5)	Goose Creek	Riffle	1500.0		0	
		Run	52.6	90.0	12.6	
	Jay Creek1	Pool	0	0	2.1	
	Jay Creek	Run	0	0	0	
		Boulder Riffle	4.0	3.1	2.7	
UR-4	Kosina Creek	Glide			221.4	
(PRM 208.1-		Run		0	0.3	
224.9)	Tsisi Creek	Boulder Riffle	13.0	0	7.5	
		Percolation Channel	10.7	10.5	0	
		Riffle	15.3	10.0	0.3	
		Run	5.3	0	0	
	Watana Creek	Beaver Pond	0	0	0	
		Boulder Riffle	37.0	2.9	7.0	
		Pool	17.4	37.0	0	
		Riffle	2.2	0.6	0	
UR-6		Run	1.4	1.2	0	
(PRM 187.1-		Boulder Riffle		55.0	57.9	
203.4)	Watana Creek	Rapid		26.7	1.9	
,	Tributary	Riffle	38.9	20.5	9.4	
		Run	227.5	50.0	28.0	
		Pool	12.9	0		
	Unnamed	Riffle	0	0		
	Tributary 194.8	Run	21.1	0		
	1	Proposed Watana Dam Locat	ion (PRM 187.1)			

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details. Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling and direct tributary sampling.

Table D25. Average CPUE (fish per hour of shocking time) for burbot using backpack electrofishing in the Upper River, 2013.

Geo-				Burbot			
morphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall	
			Boulder Riffle	0.9	0	0.6	
			Glide	5.8	7.8	0	
			Percolation Channel	0	0	0	
	Oshetna River	Tributary	Pool	0		0	
UR-2	INVGI		Rapid	0	0	0	
(PRM 234.5-			Riffle	0	0	4.1	
248.6)			Run	3.1	0.4	3.4	
,			Boulder Riffle	1.5	3.0	0	
	Di i D'	T.9. C.	Pool	0	0	0	
	Black River	Tributary	Riffle	0	0	0	
			Run	1.9	1.9	6.8	
	•	Watana Rese	ervoir at Full Pool (PRM 232.5)	•			
	Susitna River	Main Obanasi	Riffle	6.2	4.5	0	
UR-3		Main Channel	Run	0	3.6	8.2	
(PRM		r Tributary	Boulder Riffle	0	0	0	
224.9-			Pool	0	0	0	
234.5)	Goose Creek		Riffle	0	0	0	
			Run	0	0	0	
		Clearwater Plume	Clearwater Plume	5.1	12.1	2.3	
	Susitna River	Main Channel	Run	3.2	3.1	3.4	
		Split Main Channel	Run	3.8	0	0	
			Pool	6.1	0	17.1	
	Jay Creek ¹	Tributary	Riffle	0	0	0	
LID 4			Run	0	0	0	
UR-4 (PRM			Boulder Riffle	0	0	0	
208.1-	Kasing O	Tributan	Glide			0	
224.9)	Kosina Creek	Tributary	Riffle	0	0	0	
			Run	0	0	0	
			Boulder Riffle	0	0	0	
	T	T 11 (Percolation Channel	0	0	0	
	Tsisi Creek	Tributary	Riffle	0	0	0	
			Run	0	0	0	

Table-D25. Continued.

Geo-					Burbot	
morphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
UR-5 (PRM 203.4- 208.1)	Susitna River	Main Channel	Run	0	0	0
		Main Channel	Run	0	1.0	0
		Cida Channal	Pool	4.8	0	0
	Susitna River	Side Channel	Riffle	6.8	0	6.2
		Side Slough	Pool	0	0	0
		Split Main Channel	Run	0	0	0
	Watana Creek	Tributary	Beaver Pond	0	0	0
			Boulder Riffle	0	0	0
			Glide	0	0	0
UR-6			Percolation Channel	0	0	0
(PRM	Oleck		Pool	0	0	0
187.1-			Riffle	0	0	0
203.4)			Run	0	0	0
			Boulder Riffle	0	0	0
	Watana	ana	Glide	0	0	0
	Creek	Tributary	Rapid		0	0
	Tributary		Riffle	0	0	0
			Run	0	0	0
	Unnamed		Pool	0	0	0
	Tributary	Tributary	Riffle	0	0	0
	194.8		Run	0		0
		Proposed Wata	ana Dam Location (PRM 187.1)		

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details.

Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries or mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling, direct tributary sampling, and mainstem transect sampling.

Table D26. Average CPUE (fish per hour of shocking time) for burbot using boat electrofishing in the Upper River, 2013.

			Burbot		
Geomorphic Reach	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
	Watana	a Reservoir at Full Pool (PRM 2	232.5)		
UR-3	Main Observal	Riffle	0	0	11.7
(PRM 224.9-234.5)	Main Channel	Run	0	0	5.2
,	Clearwater Plume	Clearwater Plume		0	0
UR-4 (PRM 208.1-224.9)	Main Channel	Run	0.6	2.4	5.7
(FRIVI 200.1-224.9)	Split Main Channel	Run	0	0	0
UR-5 (PRM 203.4-208.1)	Main Channel	Run	3.3	0	0
	Main Channel	Run	1.0	3.1	0
UR-6 (PRM 187.1-203.4)	Side Slough	Pool	0	0	0
	Split Main Channel	Run	0	0	0
	Propose	d Watana Dam Location (PRM	187.1)		

Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: mainstem transect sampling.

Table D27. Average CPUE (fish per 1,000 square meters) for burbot using seining in the Upper River, 2013.

					Burbot	
Geomorphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
UR-2			Pool	0		
(PRM 234.5-	Oshetna River	Tributary	Riffle	0		
248.6)	Trivei		Run	0		
		Watana Reservoir	at Full Pool (PRM 232.5))		
UR-4 (PRM 208.1- 224.9)	Susitna River	Main Channel	Run	0		
		Main Channel	Run	0	0	0
LID C	Overthe a Division	Oids Observed	Pool	0	0	0
UR-6 (PRM 187.1-	Susitna River	Side Channel	Riffle	0		0
203.4)		Split Main Channel	Run	0.7	0	0
,	Watana Creek	Tributary	Riffle	0		
		Proposed Watana D	am Location (PRM 187.	1)	•	

Table D28. Average CPUE (fish per hour of shocking time) for Dolly Varden using backpack electrofishing in the Upper River, 2013.

Geo-				ı	Dolly Varden		
morphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall	
			Boulder Riffle	0	0	0	
			Glide	0	0	0	
			Percolation Channel	0	0	0	
	Oshetna River	Tributary	Pool	0		0	
UR-2	TAVCI		Rapid	0	0	0	
(PRM 234.5-			Riffle	0	0	0	
248.6)			Run	0	0	0	
,			Boulder Riffle	0	0	0	
	Dia ale Diesa	Tributon	Pool	0	0	0	
	Black River	Tributary	Riffle	0	0	0	
			Run	0	0	0	
		Watana Rese	ervoir at Full Pool (PRM 232.5)				
	Cueites Diver	Cupitno Divor	Main Channel	Riffle	0	0	0
UR-3	Susitna River	Main Channei	Run	0	0	0	
(PRM			Boulder Riffle	0	0	0	
224.9-	0	T.9. (Pool	0	0	0	
234.5)	Goose Creek	e Creek Tributary	Riffle	0	0	0	
			Run	0	0	0	
		Clearwater Plume	Clearwater Plume	0	0	0	
	Susitna River	Main Channel	Run	0	0	0	
		Split Main Channel	Run	0	0	0	
			Pool	79.7	0	50.2	
	Jay Creek1	Tributary	Riffle	0	0	0	
UR-4			Run	120.7	0	15.7	
(PRM			Boulder Riffle	0	0	0	
208.1-	Kasina Onask	Tuibutan	Glide			0	
224.9)	Kosina Creek	Tributary	Riffle	0	0	0	
			Run	0	0	0	
			Boulder Riffle	0	0	0	
	Taiai O	Tallerateur	Percolation Channel	0	0	0	
	Tsisi Creek	Tributary	Riffle	0	0	0	
			Run	0	0	0	

Table-D28. Continued.

Geo-					Dolly Varden	
morphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
UR-5 (PRM 203.4- 208.1)	Susitna River	Main Channel	Run	0	0	0
		Main Channel	Run	0	0	0
		Side Channel	Pool	0	0	0
	Susitna River		Riffle	0	0	0
		Side Slough	Pool	0	0	0
		Split Main Channel	Run	0	0	0
		I ribilitary	Beaver Pond	0	0	0
			Boulder Riffle	27.9	6.9	5.3
			Glide	62.1	12.8	50.9
UR-6	Watana Creek		Percolation Channel	0	47.4	0
(PRM	Oleck		Pool	41.1	10.2	14.4
Ì87.1-			Riffle	82.4	7.3	17.7
203.4)			Run	18.7	3.5	5.4
			Boulder Riffle	0	0	0
	Watana		Glide	24.2	0	0
	Creek	Tributary	Rapid		12.0	0
	Tributary		Riffle	3.3	7.9	3.8
Linns			Run	0	11.0	0
	Unnamed		Pool	10.3	11.8	35.2
	Tributary	Tributary	Riffle	56.8	0	0
	194.8		Run	75.3		38.5
		Proposed Wata	ana Dam Location (PRM 187.1)			

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details. Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries or mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling, direct tributary sampling, and mainstem transect sampling.

Table D29. Average CPUE (fish per 1,000 square meters) for Dolly Varden using snorkeling in the Upper River, 2013.

				Dolly Varden	
Geomorphic Reach	Stream	Mesohabitat Type	Early Summer	Late Summer	Fall
	-	Watana Reservoir at Full Poo			
UR-3		Boulder Riffle	0	0	0
(PRM 221.9-	Goose Creek	Pool	0	0	0
234.5)	Goose Creek	Riffle	0		0
		Run	0	0	0
	lay Crack1	Pool	130.4	0	0
	Jay Creek ¹	Run	50.0	0	4.0
UR-4	Kosina Creek	Boulder Riffle	0	0	0
		Glide			0
(PRM 208.1-		Run		0	0
224.9)	Tsisi Creek	Boulder Riffle	0	0	0
		Percolation Channel	0	0	0
		Riffle	0	0	0
		Run	0	0	0
		Beaver Pond	0	0	0
		Boulder Riffle	13.4	0	0
	Watana Creek	Pool	191.0	0	0
		Riffle	10.8	0	0
UR-6		Run	6.3	4.4	0
(PRM 187.1-		Boulder Riffle		0	0
203.4)	Watana Creek	Rapid		0	0
,	Tributary	Riffle	0	0	0
		Run	0	0	0
		Pool	0	0	
	Unnamed	Riffle	20.0	5.0	
	Tributary 194.8	Run	15.8	0	
	1	Proposed Watana Dam Locati	on (PRM 187.1)	1	

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details. Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling and direct tributary sampling.

Table D30. Average CPUE (fish per hour of shocking time) for longnose sucker using backpack electrofishing in the Upper River, 2013.

Geo-				Lo	ngnose sucke	r
morphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
			Boulder Riffle	0	0	0.6
			Glide	0	0	0
			Percolation Channel	0	0	0
	Oshetna River	Tributary	Pool	0		0
UR-2	IXIVEI		Rapid	0	0	0
(PRM 234.5-			Riffle	0	0	0
234.5-			Run	1.7	0	0
			Boulder Riffle	0	0	0
	D D.	Tributany	Pool	0	0	0
	Black River	Tributary	Riffle	0	0	0
			Run	0	1.9	0
		Watana Rese	ervoir at Full Pool (PRM 232.5)			
	Overitore Divers	Main Obanası	Riffle	0	0	6.5
UR-3	Susitna River	Main Channel	Run	0	10.9	0
(PRM		Tributary	Boulder Riffle	0.7	0	0
224.9-			Pool	0	0	0
234.5)	Goose Creek		Riffle	0	0	0
			Run	0.9	0	0
		Clearwater Plume	Clearwater Plume	3.0	2.6	0
	Susitna River	Main Channel	Run	0	0	1.6
		Split Main Channel	Run	3.8	0	0
			Pool	0	0	0
	Jay Creek ¹	Tributary	Riffle	0	0	0
LID 4			Run	0	0	0
UR-4 (PRM			Boulder Riffle	0	0	0
208.1-		T % 1	Glide			0
224.9)	Kosina Creek	Tributary	Riffle	0	0	0
			Run	0	0	0
			Boulder Riffle	0	0	0
	T	T " .	Percolation Channel	0	0	0
	Tsisi Creek	Tributary	Riffle	0	0	0
			Run	0	0	0

Table-D30. Continued.

			Lo	Longnose sucker		
Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall	
Susitna River	Main Channel	Run	0	0	0	
	Main Channel	Run	5.7	0	0	
	Side Channel	Pool	24.1	5.9	9.5	
Susitna River		Riffle	0	0	12.3	
	Side Slough	Pool	9.9	0	5.4	
	Split Main Channel	Run	2.5	0	0	
	Tributary	Beaver Pond	0	0	0	
		Boulder Riffle	2.7	0	0	
		Glide	0	0	0	
		Percolation Channel	0	0	0	
Oleek		Pool	0	0	0	
		Riffle	0	0	0	
		Run	0	0	0	
		Boulder Riffle	0	0	0	
Watana		Glide	0	0	0	
Creek	Tributary	Rapid		0	0	
Tributary		Riffle	0	0	0	
		Run	0	0	0	
Unnamed		Pool	0	0	0	
Tributary	Tributary	Riffle	0	0	0	
194.8		Run	0		0	
	Susitna River Susitna River Watana Creek Tributary Unnamed Tributary	Susitna River Main Channel Main Channel Side Channel Side Slough Split Main Channel Tributary Watana Creek Tributary Unnamed Tributary Tributary Tributary Tributary	Susitna River Main Channel Run	Stream Macrohabitat Type Mesohabitat Type Early Summer Susitna River Main Channel Run 0 Susitna River Main Channel Run 5.7 Side Channel Pool 24.1 Riffle 0 9.9 Split Main Channel Run 2.5 Beaver Pond 0 0 Boulder Riffle 2.7 Glide 0 Percolation Channel 0 Pool 0 Run 0 Boulder Riffle 0 Run 0 Boulder Riffle 0 Run 0 Rapid 0 Run 0 Run 0 Run 0 Pool 0 Run 0 Run 0 Riffle 0 Riffle 0 Run 0 Run 0 Run 0	Stream Macrohabitat Type Mesohabitat Type Early Summer Late Summer Susitna River Main Channel Run 0 0 Susitna River Main Channel Run 5.7 0 Side Channel Pool 24.1 5.9 Riffle 0 0 Side Slough Pool 9.9 0 Split Main Channel Run 2.5 0 Beaver Pond 0 0 0 Boulder Riffle 2.7 0 Glide 0 0 Percolation Channel 0 0 Pool 0 0 Run 0 0 Run 0 0 Rapid 0 0 Riffle 0 0 Run 0 0 Run 0 0 Riffle 0 0 Riffle 0 0 Run 0 0	

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details.

Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries or mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling, direct tributary sampling, and mainstem transect sampling.

Table D31. Average CPUE (fish per hour of shocking time) for longnose sucker using boat electrofishing in the Upper River, 2013.

			Lo	ongnose sucker	
Geomorphic Reach	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
	Watana F	Reservoir at Full Pool (PRM 23	32.5)		
UR-3 (PRM 224.9-234.5)	Main Channal	Riffle	0	0	0
	Main Channel	Run	0	0	0
	Clearwater Plume	Clearwater Plume		0	11.9
UR-4 (PRM 208.1-224.9)	Main Channel	Run	0	0	0
(FRIVI 200.1-224.9)	Split Main Channel	Run	0	0	0
UR-5 (PRM 203.4-208.1)	Main Channel	Run	0	0	0
	Main Channel	Run	0	2.0	0
UR-6	Side Slough	Pool	5.6	0	0
(PRM 187.1-203.4)	Split Main Channel	Run	0	0	0
	Proposed	Watana Dam Location (PRM	187.1)		

Table D32. Average CPUE (fish per 1,000 square meters) for longnose sucker using seining in the Upper River, 2013.

				Lo	ongnose sucke	r
Geomorphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
UR-2			Pool	0		
(PRM 234.5-	Oshetna River	Tributary	Riffle	0		
248.6)	Nivei		Run	0		
		Watana Reservoir	at Full Pool (PRM 232.5)		•	
UR-4 (PRM 208.1- 224.9)	Susitna River	Main Channel	Run	0		
		Main Channel	Run	2.9	6.7	0
LID C	Overthe a Division	Olda Ohamad	Pool	1.1	10.9	0
UR-6 (PRM 187.1-	Susitna River	Side Channel	Riffle	47.2	47.2	30.8
203.4)		Split Main Channel	Run	1.3	11.5	0
,	Watana Creek	Tributary	Riffle	0		
		Proposed Watana D	am Location (PRM 187.	1)	•	

Table D33. Average CPUE (fish per 1,000 square meters) for longnose sucker using snorkeling in the Upper River, 2013.

			L	ongnose sucker	
Geomorphic Reach	Stream	Mesohabitat Type	Early Summer	Late Summer	Fall
		Watana Reservoir at Full Poo			
UR-3		Boulder Riffle	0.2	0	0
(PRM 221.9-	Goose Creek	Pool	0.8	3.7	0
234.5)	Goose Creek	Riffle	0		0
		Run	0	0	0
	Jay Creek1	Pool	0	0	0
	Jay Creek	Run	0	0	0
	Kosina Creek	Boulder Riffle	0	0	0
UR-4		Glide			0
(PRM 208.1-		Run		0	0
224.9)	Tsisi Creek	Boulder Riffle	0	0	0
		Percolation Channel	0	0	0
		Riffle	0	0	0
		Run	0	0	0
		Beaver Pond	0	0	0
		Boulder Riffle	0	0	0
	Watana Creek	Pool	0	0	0
		Riffle	0	0	0
UR-6		Run	0	0	0
(PRM 187.1-		Boulder Riffle		0	0
203.4)	Watana Creek	Rapid		0	0
,	Tributary	Riffle	0	0	0
		Run	0	0	0
		Pool	0	0	
	Unnamed	Riffle	0	0	
	Tributary 194.8	Run	5.3	0	
	1	Proposed Watana Dam Locati	on (PRM 187.1)		

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details. Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling and direct tributary sampling.

Table D34. Average CPUE (fish per hour of shocking time) for sculpin using backpack electrofishing in the Upper River, 2013.

Geo-				Sculpi	n, undifferent	ated
morphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
			Boulder Riffle	84.7	113.4	98.9
			Glide	114.3	78.9	65.1
			Percolation Channel	47.2	75.4	19.0
	Oshetna River	Tributary	Pool	71.8		14.6
UR-2	Taver		Rapid	168.8	86.4	175.1
(PRM 234.5-			Riffle	56.9	71.6	82.9
248.6)			Run	39.2	57.0	68.9
,	,		Boulder Riffle	73.5	106.4	104.6
	Division Division	T 9. (c.	Pool	54.9	210.9	197.8
	Black River	Tributary	Riffle	136.7	92.0	96.6
			Run	169.0	129.2	114.1
		Watana Rese	ervoir at Full Pool (PRM 232.5)			
	Susitna River	Main Channel	Riffle	24.8	27.2	6.5
UR-3	Susitna River	River Main Channel	Run	13.5	10.9	8.2
(PRM		Preek Tributary	Boulder Riffle	21.2	17.5	10.9
224.9-	0		Pool	2.7	0	15.7
234.5)	Goose Creek		Riffle	65.1	27.5	39.6
			Run	16.1	6.8	9.2
		Clearwater Plume	Clearwater Plume	59.2	24.1	16.0
	Susitna River	Main Channel	Run	8.2	6.1	6.2
		Split Main Channel	Run	7.7	8.0	12.0
			Pool	30.7	8.9	0
	Jay Creek ¹	Tributary	Riffle	208.9	92.3	169.4
UR-4			Run	19.6	0	35.8
(PRM			Boulder Riffle	37.3	31.6	52.3
208.1-	.1-	Tributan	Glide			154.6
224.9)	Kosina Creek	Tributary	Riffle	42.7	17.0	60.5
			Run	7.1	5.0	31.8
			Boulder Riffle	81.7	37.4	70.4
	Talai O a al	Tallerstein	Percolation Channel	0	15.9	98.4
	Tsisi Creek	Tributary	Riffle	193.0	72.4	40.5
			Run	106.6	156.9	36.5

Table-D34. Continued.

Geo-				Sculpi	n, undifferenti	ated
morphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
UR-5 (PRM 203.4- 208.1)	Susitna River	Main Channel	Run	2.3	9.2	18.5
		Main Channel	Run	1.4	9.5	15.0
		Side Channel	Pool	53.0	47.5	57.2
	Susitna River		Riffle	6.8	39.0	24.6
		Side Slough	Pool	19.9	59.0	48.4
		Split Main Channel	Run	18.5	19.2	47.3
			Beaver Pond	20.0	22.8	5.4
			Boulder Riffle	59.4	73.9	26.8
			Glide	20.7	6.4	17.0
UR-6	Watana Creek	Tributary	Percolation Channel	0	0	0
(PRM	Oleck		Pool	41.1	0	28.8
187.1-			Riffle	139.3	18.0	81.7
203.4)			Run	84.8	25.7	65.0
			Boulder Riffle	27.9	11.0	0
	Watana		Glide	36.2	47.6	65.5
	Creek	Tributary	Rapid		31.7	19.6
	Tributary		Riffle	36.7	13.8	14.0
Unnam			Run	0	44.4	13.3
	Unnamed		Pool	120.2	33.4	78.6
	Tributary	Tributary	Riffle	34.1	11.3	0
	194.8		Run	181.9		38.5
		Proposed Wata	ana Dam Location (PRM 187.1))		

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details. Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries or mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling, direct tributary sampling, and mainstem transect sampling.

Table D35. Average CPUE (fish per hour of shocking time) for sculpin using boat electrofishing in the Upper River, 2013.

			Sculp	in, undifferentia	ted
Geomorphic Reach	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
	Watana	Reservoir at Full Pool (PRM 2	32.5)		
UR-3	Main Channal	Riffle	0	0	0
(PRM 224.9-234.5)	Main Channel	Run	0	0	0
	Clearwater Plume	Clearwater Plume		0	4.0
UR-4 (PRM 208.1-224.9)	Main Channel	Run	0	0	0
(FRIVI 200. 1-224.9)	Split Main Channel	Run	3.9	0	7.3
UR-5 (PRM 203.4-208.1)	Main Channel	Run	0	0	0
	Main Channel	Run	0	1.5	0
UR-6	Side Slough	Pool	0	0	0
(PRM 187.1-203.4)	Split Main Channel	Run	0	0	0
	Proposed	Watana Dam Location (PRM	187.1)		

Table D36. Average CPUE (fish per 1,000 square meters) for sculpin using seining in the Upper River, 2013.

Sculpin, undifferentiate						
Geomorphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
UR-2			Pool	0		
(PRM 234.5-	Oshetna River	Tributary	Riffle	0		
248.6)	INVE		Run	0		
		Watana Reservoir	at Full Pool (PRM 232.5)			
UR-4 (PRM 208.1- 224.9)	Susitna River	Main Channel	Run	0		
	0 11 51	Main Channel	Run	0.7	0	0
LID C		Olds Observat	Pool	3.3	10.9	0
UR-6 (PRM 187.1-	Susitna River	Side Channel	Riffle	4.7		0
203.4)		Split Main Channel	Run	0.7	0	0
	Watana Creek	Tributary	Riffle	0		
		Proposed Watana D	am Location (PRM 187.	1)	•	

Table D37. Average CPUE (fish per 1,000 square meters) for sculpin using snorkeling in the Upper River, 2013.

			Scul	pin, undifferentiate	d
Geomorphic Reach	Stream	Mesohabitat Type	Early Summer	Late Summer	Fall
		Watana Reservoir at Full Po			
UR-3		Boulder Riffle	0.1	0	0
(PRM 221.9-	Goose Creek	Pool	0	0	0
234.5)	Goose Creek	Riffle	100.0		0
		Run	0.9	0	0
	Jay Creek1	Pool	0	0	0
	Jay Creek	Run	0	0	0
		Boulder Riffle	0.2	0	0
UR-4	Kosina Creek	Glide			0
(PRM 208.1-		Run		0	0
224.9)	Tsisi Creek	Boulder Riffle	0.7	0	0.5
		Percolation Channel	0	0	0
		Riffle	0.1	0	0
		Run	0.2	0	0
	Watana Creek	Beaver Pond	0	0	0
		Boulder Riffle	0	0	0
		Pool	0	0	0
		Riffle	0	0	0
UR-6		Run	0	0	0
(PRM 187.1-		Boulder Riffle		0	0
203.4)	Watana Creek	Rapid		0	0
,	Tributary	Riffle	0.3	0	0
		Run	0	2.8	0
		Pool	2.9	0	
	Unnamed	Riffle	0	0	
	Tributary 194.8	Run	5.3	0	
	1	Proposed Watana Dam Locat	ion (PRM 187.1)		

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details. Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling and direct tributary sampling.

Table D38. Average CPUE (fish per hour of shocking time) for lake trout using backpack electrofishing in the Upper River, 2013.

Name	Geo-				Trout, lake			
UR-2 (PRM 234-5-248-6) Parcentage Problem Probl	morphic	Stream	Macrohabitat Type	Mesohabitat Type			Fall	
UR-2 (PRM (PRM 224.9- 234.5) Percolation Channel O			,.		0	0	0	
Oshetna River Pool O				Glide	0	0	0	
River River River River Rapid 0				Percolation Channel	0	0	0	
Rapid			Tributary	Pool	0		0	
Run		Kivei		Rapid	0	0	0	
Run				Riffle	0	0	0	
Black River Black River Black River Tributary Boulder Riffle Double Do				Run	0	0	0	
Black River Tributary Riffle	,			Boulder Riffle	0	0	0	
Riffle		D D.		Pool	0	0	0	
Value Valu		Black River	Tributary	Riffle	0	0	0	
UR-3 (PRM 224.9-234.5) Susitna River Main Channel Riffle				Run	0	0	0	
Susitna River Main Channel Run		1	Watana Rese	ervoir at Full Pool (PRM 232.5)				
Name		Susitna River		Riffle	0	0	0	
PRM 224.9- 234.5 Goose Creek Tributary Boulder Riffle D	LID 2		Main Channel	Run	0	0	0	
Pool O O O O		Goose Creek	Tributary	Boulder Riffle	0	0	0	
Riffle	224.9-			Pool	0	0	0	
Susitna River Clearwater Plume Clearwater Plume O O O	234.5)			Riffle	0	0	0	
Susitna River Main Channel Run 0 0 0 0				Run	0	0	0	
Split Main Channel Run 0 0 0			Clearwater Plume	Clearwater Plume	0	0	0	
UR-4 (PRM 208.1-224.9) Kosina Creek Tributary Fool		Susitna River	Susitna River	Main Channel	Run	0	0	0
UR-4 (PRM 208.1-224.9) Kosina Creek Tributary Riffle 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			Split Main Channel	Run	0	0	0	
UR-4 (PRM 208.1- 224.9) Kosina Creek Tributary Example 1				Pool	0	0	0	
UR-4 (PRM 208.1- 224.9) Kosina Creek Tributary Boulder Riffle 0 0 0 0 Glide 0 0 Riffle 0 0 0 Run 0 0 Boulder Riffle 0 0 0 0 Percolation Channel 0 0 0		Jay Creek ¹	Tributary	Riffle	0	0	0	
Rosina Creek Tributary Boulder Riffle 0 0 0 0	LID 4			Run	0	0	0	
Rosina Creek Tributary Glide 0 0 0				Boulder Riffle	0	0	0	
Riffle	208.1-		T 11 (Glide			0	
Boulder Riffle	224.9)	Kosina Creek	Tributary	Riffle	0	0	0	
Percolation Channel 0 0 0				Run	0	0	0	
Tsisi Croek Tributary				Boulder Riffle	0	0	0	
I sisi Creek I ributary Riffle 0 0 0			_ , ,	Percolation Channel	0	0	0	
		I sisi Creek	Tributary	Riffle	0	0	0	
Run 0 0 0				Run	0	0	0	

Table-D38. Continued.

			Trout, lake		
Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
Susitna River	Main Channel	Run	0	0	0
	Main Channel	Run	0	0	0
	Side Channel	Pool	0	0	0
Susitna River	Side Channel	Riffle	0	0	0
	Side Slough	Pool	0	0	0
	Split Main Channel	Run	0	0	0
Watana Creek	I I ribilitary	Beaver Pond	0	0	0
		Boulder Riffle	0	0	0
		Glide	0	0	0
		Percolation Channel	0	0	0
		Pool	0	0	0
		Riffle	0	0	0
		Run	0	0	0
		Boulder Riffle	0	0	0
Watana		Glide	0	0	0
Creek	Tributary	Rapid		0	0
Tributary		Riffle	0	0	1.8
		Run	0	0	0
Unnamed		Pool	0	0	0
Tributary	Tributary	Riffle	0	0	0
194.8		Run	0		0
	Susitna River Susitna River Watana Creek Tributary Unnamed Tributary	Susitna River Main Channel Main Channel Side Channel Side Slough Split Main Channel Tributary Watana Creek Tributary Unnamed Tributary Tributary Tributary Tributary	Susitna River Main Channel Run	Stream Macrohabitat Type Mesohabitat Type Summer Susitna River Main Channel Run 0 Susitna River Main Channel Run 0 Side Channel Pool 0 Riffle 0 Side Slough Pool 0 Split Main Channel Run 0 Beaver Pond 0 0 Boulder Riffle 0 0 Glide 0 0 Percolation Channel 0 0 Riffle 0 0 Riffle 0 0 Riffle 0 0 Rapid 0 0 Run 0 0 Run	Stream Macrohabitat Type Mesohabitat Type Summer Summer Susitna River Main Channel Run 0 0 Susitna River Main Channel Run 0 0 Side Channel Pool 0 0 Riffle 0 0 0 Solide Slough Pool 0 0 Split Main Channel Run 0 0 Beaver Pond 0 0 0 Boulder Riffle 0 0 0 Glide 0 0 0 Percolation Channel 0 0 0 Riffle 0 0 0 Run 0 0 0 Rapid 0 0 Run 0 0

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details. Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries or mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling, direct tributary sampling, and mainstem transect sampling.

Table D39. Average CPUE (fish per hour of shocking time) for round whitefish using backpack electrofishing in the Upper River, 2013.

National Parish Stream Macrohabitat Type Mesohabitat Type Summer Summer Falt	Geo-				W	hitefish, round	k	
UR-2 (PRM 234.5- 248.6)	morphic	Stream	Macrohabitat Type	Mesohabitat Type			Fall	
UR-2 (PRM 234.5-248.6)					0	0	0	
UR-2 (PRM 234.5-248.6)				Glide	0	0	0	
River River River River River Rapid Rapid Rapid Rapid Rapid Rapid Riffle Run River River				Percolation Channel	0	0	0	
Rapid 0 0 0 0 0 0 0 0 0			Tributary	Pool	0		0	
Run		MINGI		Rapid	0	0	0	
Run				Riffle	0	0	4.7	
Boulder Riffle				Run	0	0	0	
Black River	,			Boulder Riffle	0	0	0	
Riffle		DI I D'	T.9. (Pool	0	0	0	
Value Watana Reservoir at Full Pool (PRM 232.5) Susitna River Main Channel Riffle 0 4.5 0		Black River	Tributary	Riffle	0	0	0	
Susitna River Main Channel Riffle 0 4.5 0				Run	0	0	0	
UR-3 (PRM 224.9- 234.5) Goose Creek Tributary Susitna River Main Channel Run 0 0 40.8 Pool 0 0.7 0		•	Watana Rese	ervoir at Full Pool (PRM 232.5)	•			
UR-3 (PRM 224.9- 234.5) Goose Creek Tributary Run 0 0 40.8 Pool 0 0.7 0		Susitna River	Main Channel	Riffle	0	4.5	0	
(PRM Boulder Riffle 0 0.7 0 224.9- Pool 0 11.5 0 234.5) Goose Creek Tributary Tributary 0 11.5 0	LID 2			Run	0	0	40.8	
224.9- 234.5) Goose Creek Tributary		Goose Creek	Tributary	Boulder Riffle	0	0.7	0	
234.5) Goose Creek Tributary Riffle 0 0 0	224.9-			Pool	0	11.5	0	
	234.5)			Riffle	0	0	0	
Run 0 1.6 0				Run	0	1.6	0	
Clearwater Plume Clearwater Plume 0 0 6.1			Clearwater Plume	Clearwater Plume	0	0	6.1	
Susitna River Main Channel Run 0 1.4 0		Susitna River	Susitna River	Main Channel	Run	0	1.4	0
Split Main Channel Run 0 4.0 0			Split Main Channel	Run	0	4.0	0	
Pool 0 0 0				Pool	0	0	0	
Jay Creek¹ Tributary Riffle 0 0		Jay Creek ¹	Tributary	Riffle	0	0	0	
UR-4 Run 0 0 0	LID 4			Run	0	0	0	
OR-4 (PRM Boulder Riffle 0 0 0				Boulder Riffle	0	0	0	
208.1- Glide 0	208.1-		T " (Glide			0	
224.9) Kosina Creek Tributary Riffle 0 0 0	224.9)	Kosina Creek	Tributary	Riffle	0	0	0	
Run 0 0 0				Run	0	0	0	
Boulder Riffle 0 0 0				Boulder Riffle	0	0	0	
				Percolation Channel	0	0	0	
Tsisi Creek Tributary Riffle 0 0 0		Tsisi Creek	Tributary	Riffle	0	0	0	
Run 0 0 0				Run	0	0	0	

Table-D39. Continued.

Geo-				W	hitefish, round	
morphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
UR-5 (PRM 203.4- 208.1)	Susitna River	Main Channel	Run	0	0	3.4
		Main Channel	Run	1.4	0	0
		Side Channel	Pool	0	0	0
	Susitna River	Side Channel	Riffle	13.7	0	6.2
		Side Slough	Pool	5.0	0	0
		Split Main Channel	Run	0	0	0
	Watana Creek	I I ribi itan/	Beaver Pond	0	0	0
			Boulder Riffle	5.4	3.7	0
			Glide	0	0	0
UR-6			Percolation Channel	0	0	0
(PRM			Pool	0	0	0
Ì87.1-			Riffle	3.7	1.3	0
203.4)			Run	0	0	0
			Boulder Riffle	0	0	0
	Watana		Glide	0	0	0
	Creek	Tributary	Rapid		0	0
	Tributary		Riffle	0	0	0
			Run	0	0	0
	Unnamed		Pool	0	0	0
	Tributary	Tributary	Riffle	0	0	0
	194.8		Run	0		0
		Proposed Wata	ana Dam Location (PRM 187.1)			

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details. Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries or mainstem geomorphic reach as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling, direct tributary sampling, and mainstem transect sampling.

Table D40. Average CPUE (fish per hour of shocking time) for round whitefish using boat electrofishing in the Upper River, 2013.

Whitefish, round							
Geomorphic Reach	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall		
	Watana	Reservoir at Full Pool (PRM 2	32.5)				
UR-3	Main Channal	Riffle	0	0	11.7		
(PRM 224.9-234.5)	Main Channel	Run	0	0	15.5		
UR-4 (PRM 208.1-224.9)	Clearwater Plume	Clearwater Plume		0	4.0		
	Main Channel	Run	0	2.7	2.5		
(FRIVI 200. 1-224.9)	Split Main Channel	Run	0	0	7.3		
UR-5 (PRM 203.4-208.1)	Main Channel	Run	0	0	15.4		
	Main Channel	Run	0	2.3	6.4		
UR-6 (PRM 187.1-203.4)	Side Slough	Pool	0	0	0		
(FIXW 107.1-203.4)	Split Main Channel	Run	0	0	22.3		
	Proposed	Watana Dam Location (PRM	187.1)				

Table D41. Average CPUE (fish per 1,000 square meters) for round whitefish using seining in the Upper River, 2013.

Whitefish, round						
Geomorphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
UR-2			Pool	0		
(PRM 234.5-	Oshetna River	Tributary	Riffle	0		
248.6)	INVE		Run	0		
		Watana Reservoir	at Full Pool (PRM 232.5)			
UR-4 (PRM 208.1- 224.9)	Susitna River	Main Channel	Run	0		
		Main Channel	Run	1.4	3.3	0
LID C			Pool	0	0	0
UR-6 (PRM 187.1-	Susitna River	Side Channel	Riffle	4.7		5.1
203.4)		Split Main Channel	Run	2.6	0	2.1
	Watana Creek	Tributary	Riffle	0		
	•	Proposed Watana D	am Location (PRM 187.	1)	<u> </u>	

Table D42. Average CPUE (fish per 1,000 square meters) for round whitefish using snorkeling in the Upper River, 2013.

			,	Whitefish, round	
Geomorphic Reach	Stream	Mesohabitat Type	Early Summer	Late Summer	Fall
		Watana Reservoir at Full Poo			
UR-3 (PRM 221.9-		Boulder Riffle	2.0	0	0
	Goose Creek	Pool	5.0	9.4	0
234.5)	Goose Creek	Riffle	0		0
		Run	0.7	11.5	0
	Jay Creek1	Pool	0	0	0
	Jay Creek	Run	0	0	0
		Boulder Riffle	0.4	0	0
UR-4	Kosina Creek	Glide			0
(PRM 208.1- 224.9)		Run		0	0
	Tsisi Creek	Boulder Riffle	0	0	0
		Percolation Channel	0	0	0
		Riffle	1.8	0	0
		Run	0.7	0	0
	Watana Creek	Beaver Pond	0	0	0
		Boulder Riffle	1.7	0	0
		Pool	3.3	0	0
		Riffle	0.4	0	0
UR-6		Run	0	0	0
(PRM 187.1-		Boulder Riffle		0	0
203.4)	Watana Creek	Rapid		3.3	0
,	Tributary	Riffle	1.8	0.3	0
		Run	0	0	0
		Pool	0	0	
	Unnamed	Riffle	0	0	
	Tributary 194.8	Run	0	0	
	1	Proposed Watana Dam Locati	on (PRM 187.1)	<u> </u>	

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details. Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling and direct tributary sampling.

Table D43. Average CPUE (fish per 1,000 square meters) for undifferentiated whitefish species using snorkeling in the Upper River, 2013.

	Whitefish, undifferentiated					
Geomorphic Reach	Stream	Mesohabitat Type	Early Summer	Late Summer	Fall	
		Watana Reservoir at Full Poo	ol (PRM 232.5)			
UR-3 (PRM 221.9-		Boulder Riffle	0	0	0	
	Goose Creek	Pool	0	0	0	
234.5)	Goose Creek	Riffle	0		0	
		Run	0	0	0	
	lay Crook1	Pool	0	0	0	
	Jay Creek ¹	Run	0	0	0	
		Boulder Riffle	0	0	0	
UR-4	Kosina Creek	Glide			0	
(PRM 208.1-		Run		0	0	
224.9)	Tsisi Creek	Boulder Riffle	0.3	0	0	
		Percolation Channel	0	0	0	
		Riffle	0	0	0	
		Run	0	0	0	
	Watana Creek	Beaver Pond	0	0	0	
		Boulder Riffle	0	0	0	
		Pool	0	0	0	
		Riffle	0	0	0	
UR-6		Run	0	0	0	
(PRM 187.1-		Boulder Riffle		0	0	
203.4)	Watana Creek	Rapid		0	0	
•	Tributary	Riffle	0	0	0	
		Run	0	0	0	
		Pool	0	0		
	Unnamed	Riffle	0	0		
	Tributary 194.8	Run	0	0		
		Proposed Watana Dam Locati	on (PRM 187.1)	L		

^{1.} Jay Creek was a direct-sampling tributary in which non-random site selection was used. See ISR Study 9.5 Section 4.4.2.2 for details. Notes: All data are provisional and subject to ongoing QA/QC. CPUE was calculated within tributaries as an average among sites by habitat type by season: Early Summer (July 13-August 11), Late Summer (August 12-September 9), and Fall (September 10-October 4). Data sources include: GRTS tributary sampling and direct tributary sampling.