- PART A APPENDIX A: DISTRIBUTION OF FISH RADIO-TAGGED IN THE UPPER SUSITNA RIVER, 2013
- PART A APPENDIX B: FISH DISTRIBUTION MAPS FOR THE UPPER SUSITNA RIVER 2012 AND 2013
- PART A APPENDIX C: SEASONAL FISH DISTRIBUTION, UPPER SUSITNA RIVER 2012 AND 2013
- PART A 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)

Part A - 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.

June 2014

#### TABLE OF FIGURES

Figure A1. Distribution of Upper River radio-tagged Arctic grayling August 1, 2013	1
Figure A2. Distribution of Upper River radio-tagged Arctic grayling August 15, 2013.	1
Figure A3. Distribution of Upper River radio-tagged Arctic grayling August 30, 2013.	1
Figure A4. Distribution of Upper River radio-tagged longnose suckers August 1, 2013	1
Figure A5. Distribution of Upper River radio-tagged longnose suckers August 15, 2013	1
Figure A6. Distribution of Upper River radio-tagged longnose suckers August 30, 2013	1
Figure A7. Movements of Upper River Arctic grayling tag ID 9089 through September, 2013	1
Figure A8. Movements of Upper River Arctic grayling tag ID 9102 through September, 2013	1
Figure A9. Movements of Upper River Arctic grayling tag ID 9107 through September, 2013	1
Figure A10. Movements of Upper River Arctic grayling tag ID 9108 through September, 2013	1
Figure A11. Movements of Upper River longnose sucker tag ID 9123 through September, 2013	1

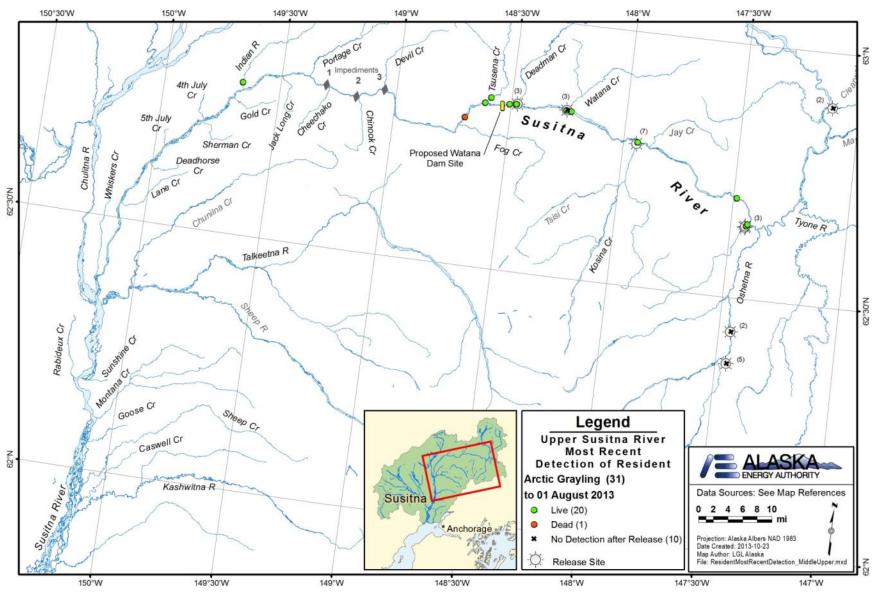


Figure A1. Distribution of Upper River radio-tagged Arctic grayling August 1, 2013.

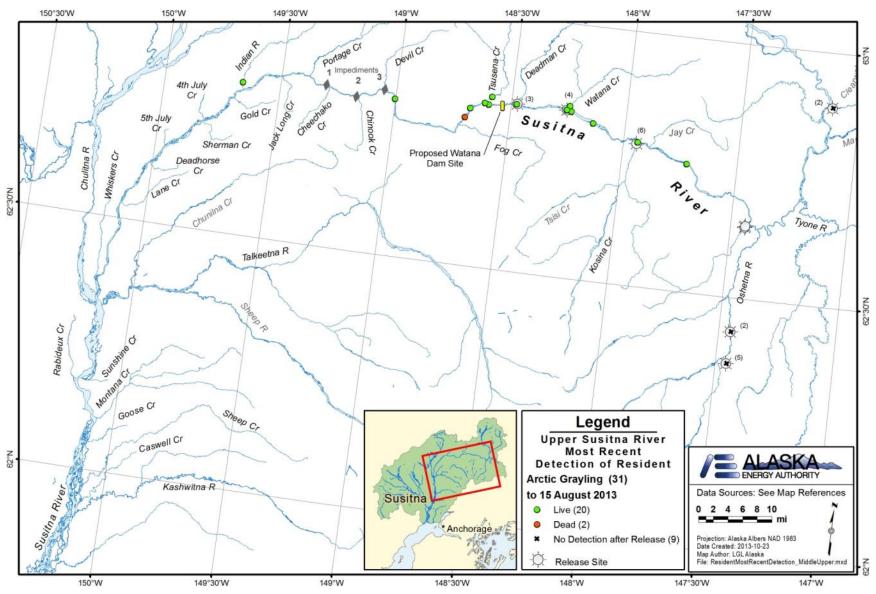


Figure A2. Distribution of Upper River radio-tagged Arctic grayling August 15, 2013.

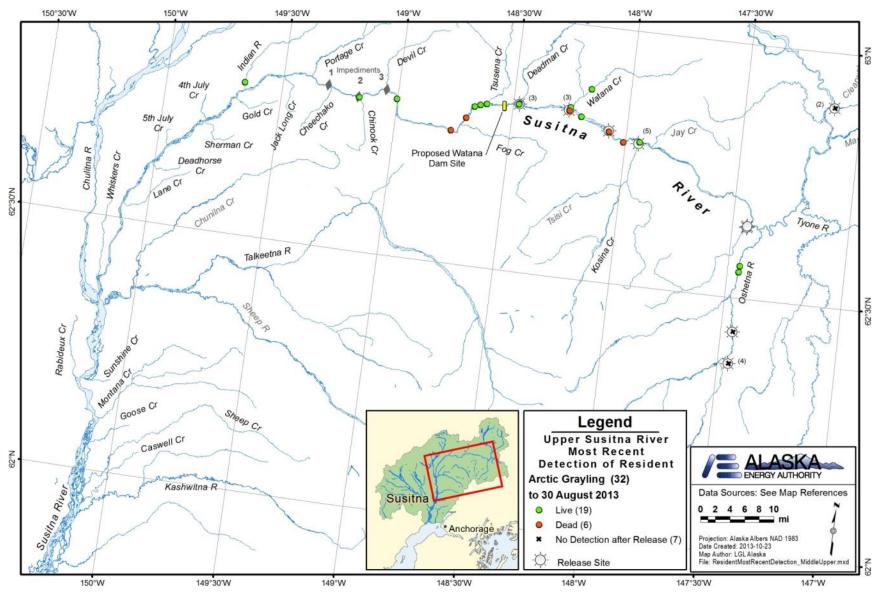


Figure A3. Distribution of Upper River radio-tagged Arctic grayling August 30, 2013.

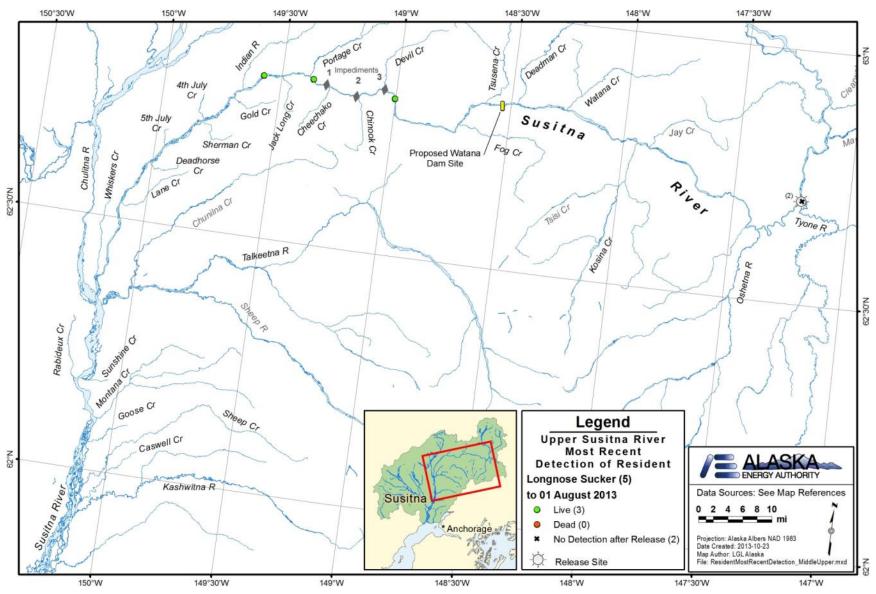


Figure A4. Distribution of Upper River radio-tagged longnose suckers August 1, 2013.

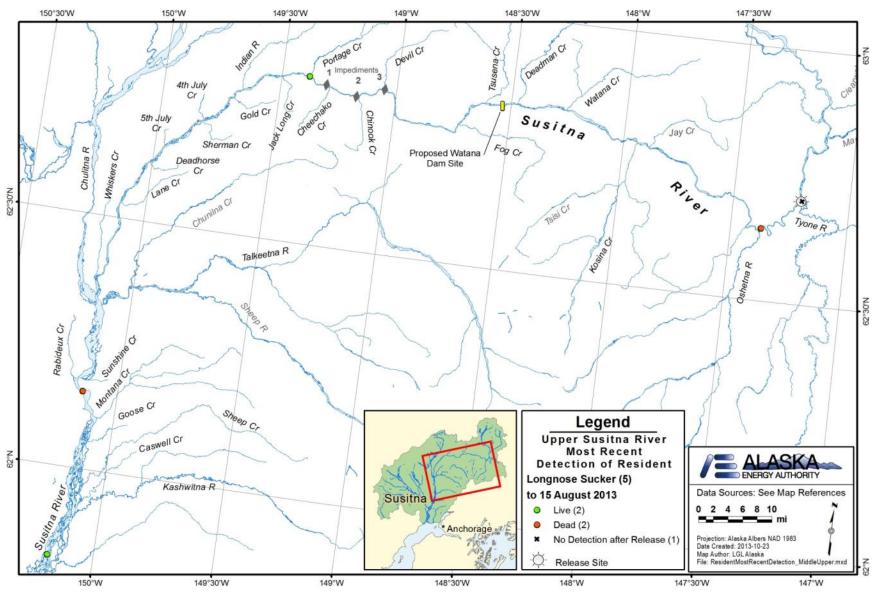


Figure A5. Distribution of Upper River radio-tagged longnose suckers August 15, 2013.

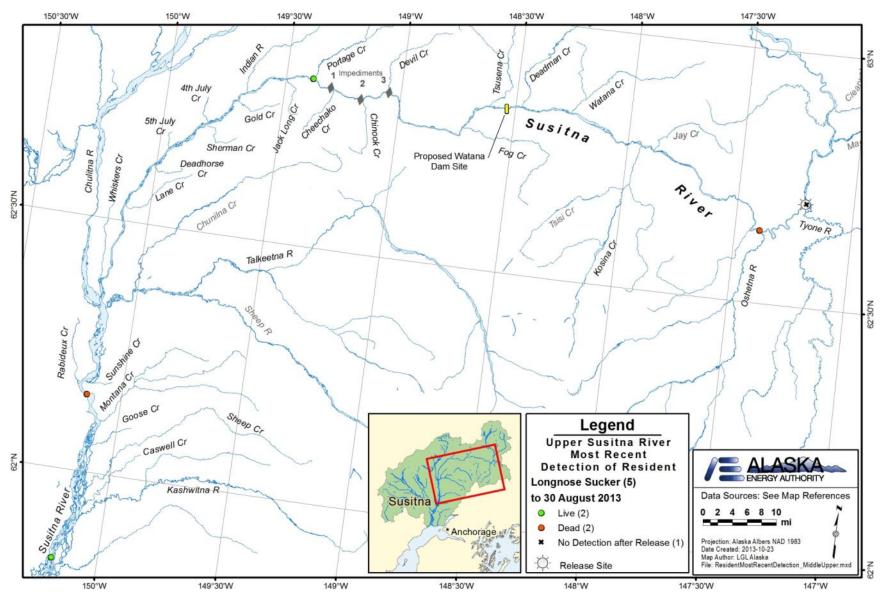


Figure A6. Distribution of Upper River radio-tagged longnose suckers August 30, 2013.

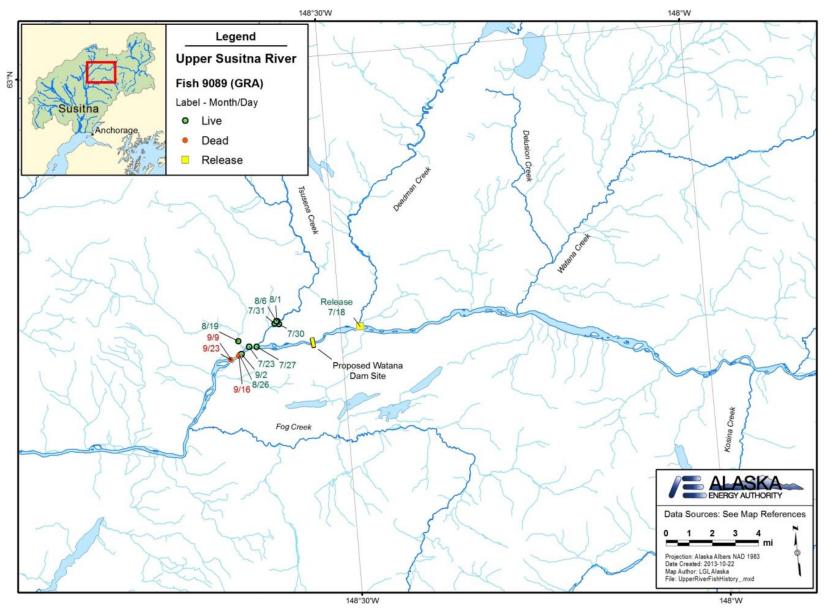


Figure A7. Movements of Upper River Arctic grayling tag ID 9089 through September, 2013.

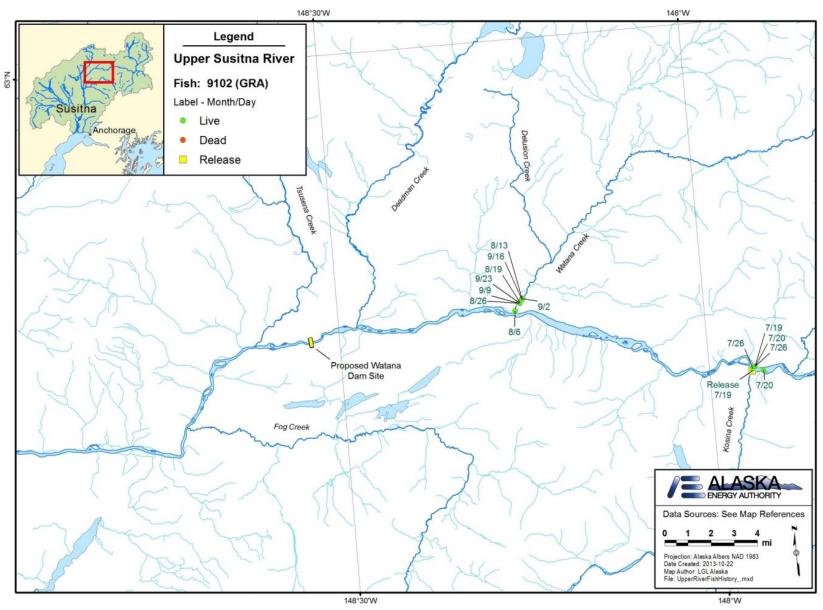


Figure A8. Movements of Upper River Arctic grayling tag ID 9102 through September, 2013.

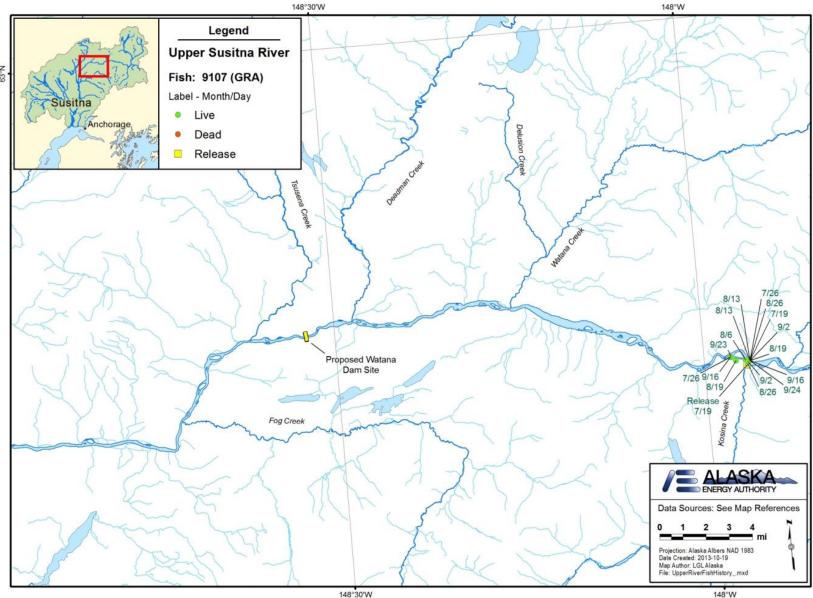


Figure A9. Movements of Upper River Arctic grayling tag ID 9107 through September, 2013.

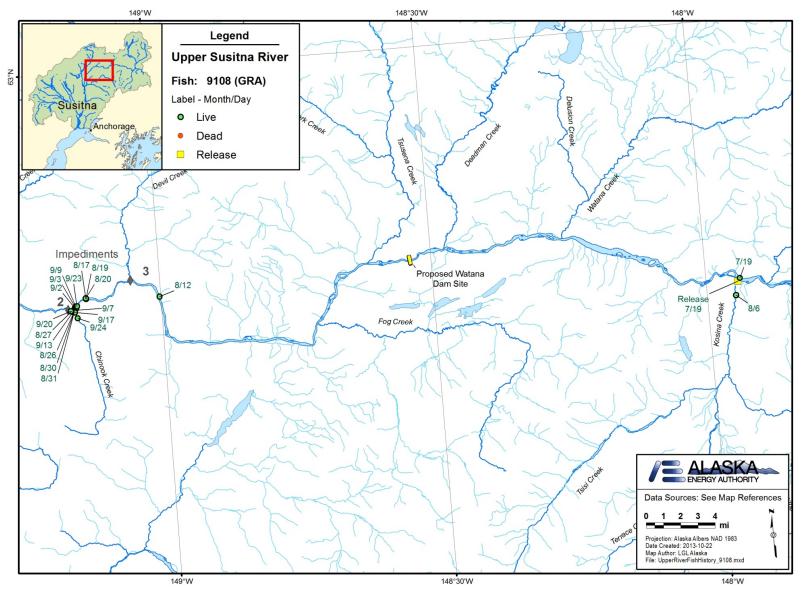


Figure A10. Movements of Upper River Arctic grayling tag ID 9108 through September, 2013.

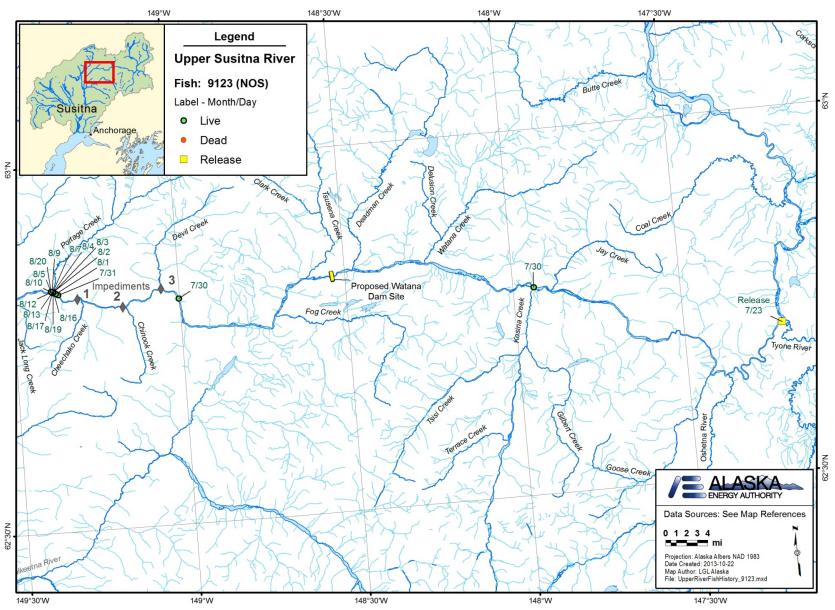


Figure A11. Movements of Upper River longnose sucker tag ID 9123 through September, 2013.

# Susitna-Watana Hydroelectric Project (FERC No. 14241)

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

Part A - 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.

June 2014

### LIST OF FIGURES

Figure B1. Upper Susitna River juvenile Chinook salmon distribution 2013.	2
Figure B2. Upper Susitna River Arctic grayling distribution 2012 and 2013.	3
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	<i>6</i>
Figure B6. Upper Susitna River sculpin distribution 2012 and 2013.	7
Figure B7. Upper Susitna River humpback whitefish distribution 2012 and 2013	
Figure B8. Upper Susitna River round whitefish distribution 2012 and 2013.	

#### 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.

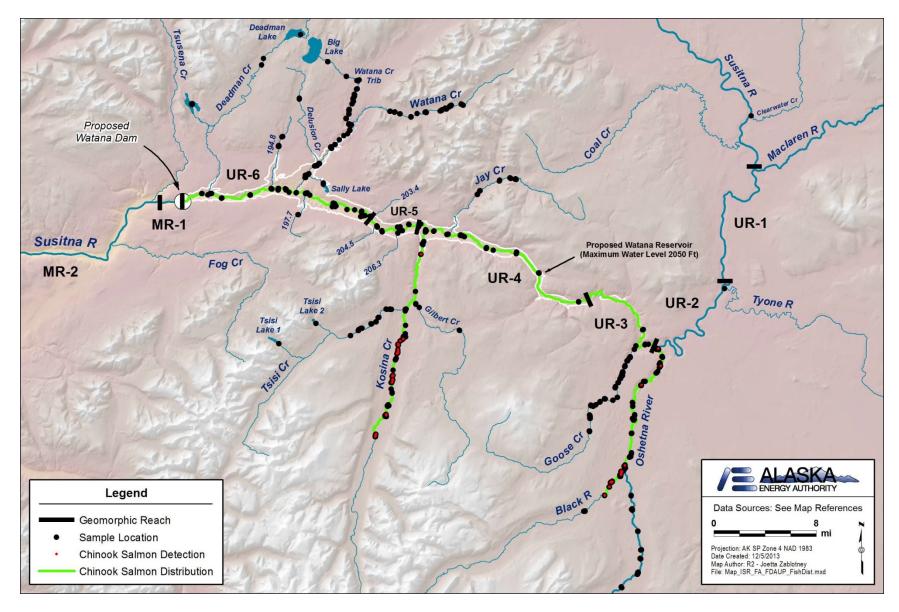


Figure B1. Upper Susitna River juvenile Chinook salmon distribution 2013. No juvenile Chinook were detected upstream of the proposed dam site in 2012. Adult Chinook distributions are reported in ISR Study 9.7.

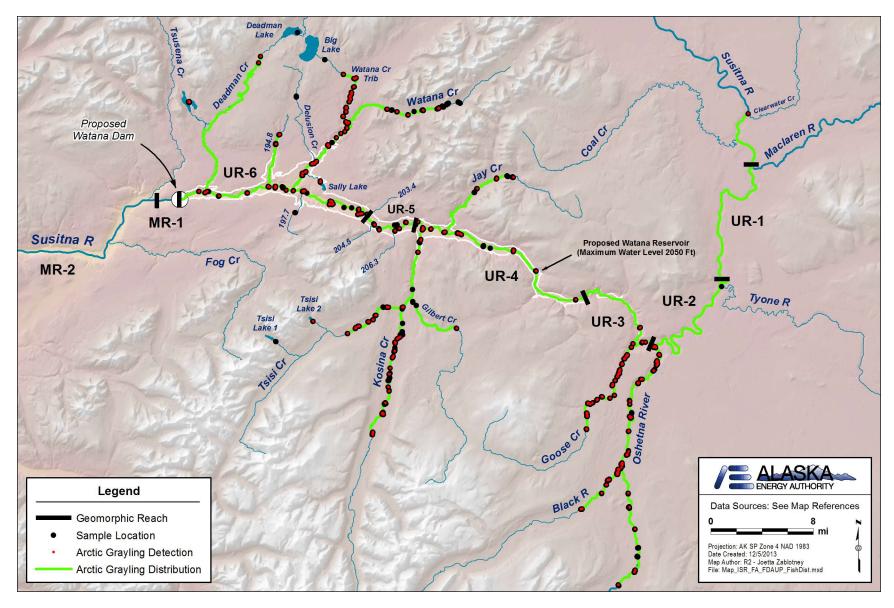


Figure B2. Upper Susitna River Arctic grayling distribution 2012 and 2013.

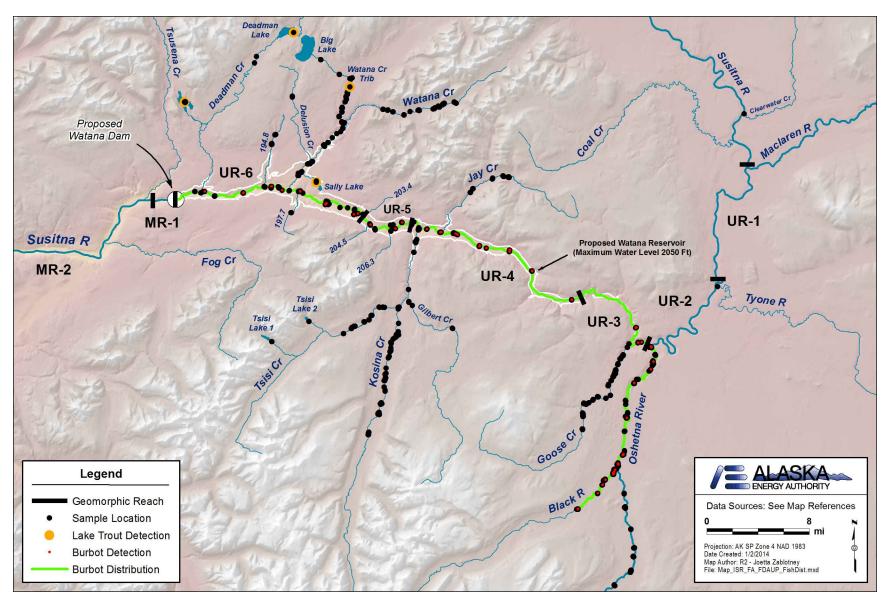


Figure B3. Upper Susitna River burbot and lake trout distribution 2012 and 2013.

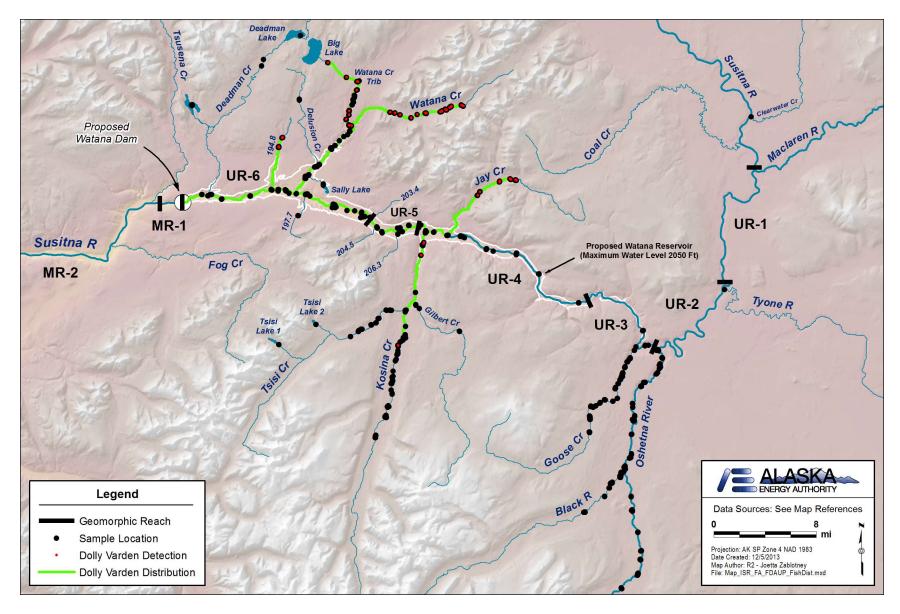


Figure B4. Upper Susitna River Dolly Varden distribution 2012 and 2013.

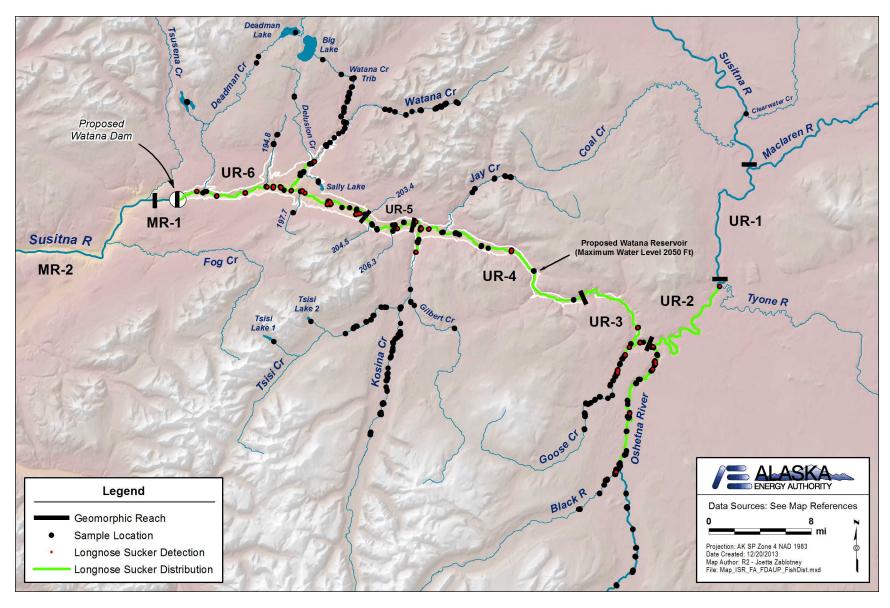


Figure B5. Upper Susitna River longnose sucker distribution 2012 and 2013.

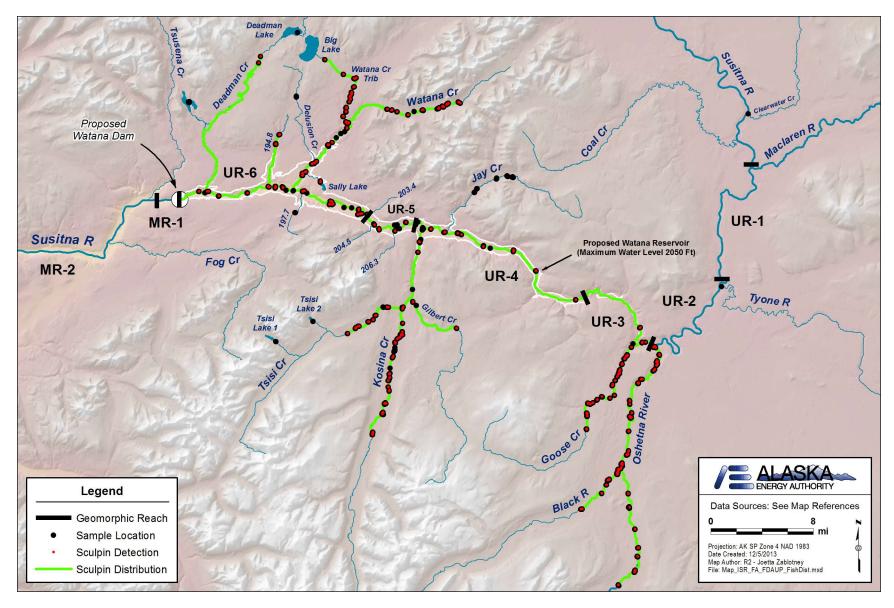


Figure B6. Upper Susitna River sculpin distribution 2012 and 2013.

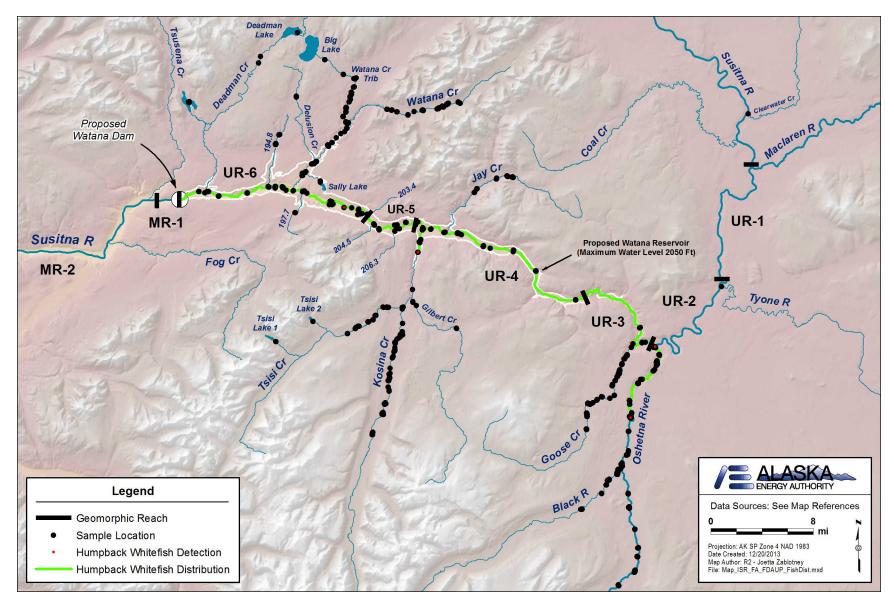


Figure B7. Upper Susitna River humpback whitefish distribution 2012 and 2013.

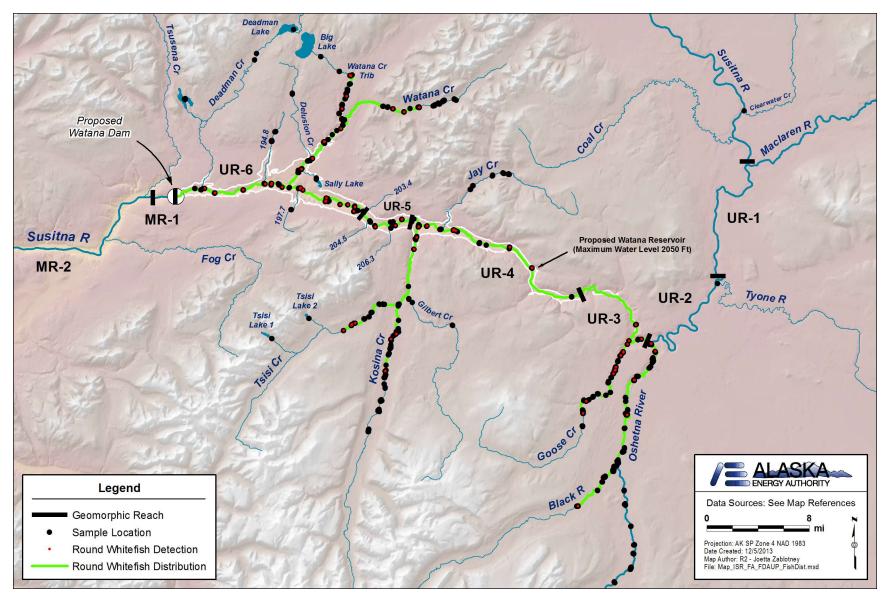


Figure B8. Upper Susitna River round whitefish distribution 2012 and 2013.

## Susitna-Watana Hydroelectric Project (FERC No. 14241)

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

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

### **Initial Study Report**

Prepared for

Alaska Energy Authority



Prepared by

R2 Resource Consultants, Inc.

June 2014

#### LIST OF TABLES

	Seasonal distribution of juvenile Chinook salmon in the Upper Susitna River, 2012
Table C2.	Seasonal distribution of Arctic grayling in the Upper Susitna River, 2012 and 2013 2
Table C3.	Seasonal distribution of burbot in the Upper Susitna River, 2012 and 2013 3
Table C4.	Seasonal distribution of Dolly Varden in the Upper Susitna River, 2012 and 2013 $4$
Table C5.	Seasonal distribution of lake trout in the Upper Susitna River, 2012 and 2013 5
Table C6.	Seasonal distribution of longnose sucker in the Upper Susitna River, 2012 and 2013. 6
Table C7.	Seasonal distribution of sculpin in the Upper Susitna River, 2012 and 20137
	Seasonal distribution of humpback whitefish in the Upper Susitna River, 2012 and 8
Table C9.	Seasonal distribution of round whitefish in the Upper Susitna River, 2012 and 2013. 9

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		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				
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	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
Oshetna River Tributary: Black River	N/A	Χ	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 loca	tion 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_	<u>x</u>	<b>x</b>
Susitna River UR-5	203.4-208.1		x		X
Susitna River UR-4	208.1-224.9		■ X■ X■	■ ■ ※ ■	ı X
Susitna River UR-3	224.9-234.5		■ X ■		■ 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■ ■		I
Unnamed Tributary	194.8		_ • _ • <sub>X</sub> _ • _		•
Watana Creek	196.9		X	. X	<b>X</b>
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	X	■ X ■	■ ■ X ■	<b>■</b> X
Kosina Creek Tributary: Tsisi Creek	N/A	X	x	X X	_ x
Kosina Creek Tributary: Gilbert Creek	N/A		X		
Kosina Creek Tributary: Unnamed	N/A				
Jay Creek	211.0		■ X■ ■		Ι χ
Goose Creek	232.8		X X	<u>x</u>	■ X
Oshetna River	235.1	X	. X	. X	<b>X</b>
Oshetna River Tributary: Black River	N/A	X	■ X■ ■	<b>.</b>	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 sampled. Sti	ppled cells indicate	that aerial flight for radio tags oc	curred.		

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		Х	X	Х
Watana Dam	187.1				
Susitna River UR-6	187.1-203.4		X	X	X
Susitna River UR-5	203.4-208.1		X		Χ
Susitna River UR-4	208.1-224.9		X	X	Χ
Susitna River UR-3	224.9-234.5		X	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				
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	X	X	X	Χ
Oshetna River Tributary: Black River	N/A	Χ	X	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 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	Х	Χ
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		X	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			Х	
Unnamed Tributary	203.4				
Unnamed Tributary	204.3				
Unnamed Tributary	206.3				
Kosina Creek	209.1	Χ		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		X	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 sar	mpled.				

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.	<u> </u>			

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

Location	PRM	ELH (June 4-June 30)	Early Sumn	ner (July 1- Au	gust 10)	Late Summer (August 11 - Sept 9)		9)	Fall (Sept 10 - Oct 7)			
Susita River Devils Canyon to Watana Dam	166.1-187.1		-	■ X	-		-	-	X <b>=</b>	-		Х
Watana Dam	187.1											
Susitna River UR-6	187.1-203.4		-	Х	• -		. • .	. •	Х	_ •		Χ
Susitna River UR-5	203.4-208.1											Χ
Susitna River UR-4	208.1-224.9	Х	_	_   <b> </b>	_	_			<b>■</b> X	•		Χ
Susitna River UR-3	224.9-234.5		_	_	• _			_	Х	_ =	_	Χ
Watana Reservoir at Full Pool	232.5				_	1				_	_	
Susitna above Oshetna	>234.5		_	¥	•				Χ			
Aerial Mainstem - Dam site to Oshetna	187.1-235.1			■ X					X $\blacksquare$			
Deadman Creek	189.4				-							
Unnamed Tributary	194.8		-		• -	-			_			
Watana Creek	196.9			X		_		_	_			
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	•									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		-	Х	-	-		-	Х	_		
Oshetna River	235.1	X		X		_			Х			Χ
Oshetna River Tributary: Black River	N/A		_			_		_	<b>■</b> 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 wa	is sampled. Stippled c	ells indicate that aerial flight for r	adio tags occurred.		_							

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
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	X
Susitna River UR-4	208.1-224.9		X	X	X
Susitna River UR-3	224.9-234.5		X	X	X
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	X
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		X		
Unnamed Tributary	204.3				
Unnamed Tributary	206.3		X		
Kosina Creek	209.1	X	X	X	X
Kosina Creek Tributary: Tsisi Creek	N/A	X	X	X	X
Kosina Creek Tributary: Gilbert Creek	N/A		X		
Kosina Creek Tributary: Unnamed	N/A		X		
Jay Creek	211.0		X	X	X
Goose Creek	232.8		X	X	X
Oshetna River	235.1	X	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		X		
Unnamed Tributary Lake: Unnamed	205.9				
Kosina Basin Lake: Tsisi Lake	N/A				
Notes: Shaded cells indicate that a given location was	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	Х	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	is 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				X
Susitna River UR-4	208.1-224.9			X	X
Susitna River UR-3	224.9-234.5			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		X	X	
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		X		
Kosina Creek Tributary: Gilbert Creek	N/A				
Kosina Creek Tributary: Unnamed	N/A				
Jay Creek	211.0				
Goose Creek	232.8		X	X	X
Oshetna River	235.1	X	X	X	X
Oshetna River Tributary: Black River	N/A		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.				

# Susitna-Watana Hydroelectric Project (FERC No. 14241)

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

Part A - Appendix D
Upper River Fish Observations and Relative
Abundance, 2013

## **Initial Study Report**

Prepared for

Alaska Energy Authority



Prepared by

R2 Resource Consultants, Inc.

June 2014

### TABLE OF CONTENTS

1.	Fish Observations	. 1
2.	Relative Abundance	13
LIS	ST OF TABLES	
Tab	le D1. Upper Susitna River fish observations, 2013	. 1
Tab	le D2. Upper River Chinook salmon observations by habitat, 2013.	. 2
Tab	le D3. Upper River Arctic grayling (all life stages) observations by habitat, 2013	. 3
Tab	le D4. Upper River juvenile Arctic grayling observations by habitat, 2013.	. 4
Tab	le D5. Upper River juvenile or adult Arctic grayling observations by habitat, 2013	. 5
Tab	le D6. Upper River adult Arctic grayling observations by habitat, 2013.	. 6
Tab	le D7. Upper River burbot observations by habitat, 2013.	. 7
Tab	le D8. Upper River Dolly Varden observations by habitat, 2013	. 8
Tab	le D9. Upper River lake trout observations by habitat, 2013.	. 8
Tab	le D10. Upper River longnose sucker observations by habitat, 2013	. 9
Tab	le D11. Upper River sculpin observations by habitat, 2013.	10
Tab	le D12. Upper River humpback whitefish observations by habitat, 2013.	11
Tab	le D13. Upper River round whitefish observations by habitat, 2013.	12
	le D14. Summary of relative abundance by capture method for main channel, off-chann tributary habitats of the Upper River, 2013.	-
	le D15. Sample sizes and total effort used for calculating average CPUE for backpa trofishing in the Upper River, 2013	
	le D16. Sample sizes and total effort used for calculating average CPUE for bottofishing in the Upper River, 2013	
	le D17. Sample sizes and total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average CPUE for seining in total effort used for calculating average cPUE for seining in total effort used for calculating average cPUE for seining average cPUE for sei	
	le D18. Sample sizes and total effort used for calculating average CPUE for snorkeling in total effort used for calculating average CPUE for snorkeling in total effort used for calculating average CPUE for snorkeling in t	
	le D19. Average CPUE (fish per hour of shocking time) for Chinook salmon using backpa trofishing in the Upper River, 2013.	

Table D20. Average CPUE (fish per 1,000 square meters) for Chinook salmon using snorkeling in the Upper River, 2013
Table D21. Average CPUE (fish per hour of shocking time) for Arctic grayling using backpack electrofishing in the Upper River, 2013.
Table D22. Average CPUE (fish per hour of shocking time) for Arctic grayling using boat electrofishing in the Upper River, 2013.
Table D23. Average CPUE (fish per 1,000 square meters) for Arctic grayling using seining in the Upper River, 2013.
Table D24. Average CPUE (fish per 1,000 square meters) for Arctic grayling using snorkeling in the Upper River, 2013.
Table D25. Average CPUE (fish per hour of shocking time) for burbot using backpack electrofishing in the Upper River, 2013.
Table D26. Average CPUE (fish per hour of shocking time) for burbot using boat electrofishing in the Upper River, 2013
Table D27. Average CPUE (fish per 1,000 square meters) for burbot using seining in the Upper River, 2013
Table D28. Average CPUE (fish per hour of shocking time) for Dolly Varden using backpack electrofishing in the Upper River, 2013
Table D29. Average CPUE (fish per 1,000 square meters) for Dolly Varden using snorkeling in the Upper River, 2013
Table D30. Average CPUE (fish per hour of shocking time) for longnose sucker using backpack electrofishing in the Upper River, 2013.
Table D31. Average CPUE (fish per hour of shocking time) for longnose sucker using boat electrofishing in the Upper River, 2013
Table D32. Average CPUE (fish per 1,000 square meters) for longnose sucker using seining in the Upper River, 2013
Table D33. Average CPUE (fish per 1,000 square meters) for longnose sucker using snorkeling in the Upper River, 2013
Table D34. Average CPUE (fish per hour of shocking time) for sculpin using backpack electrofishing in the Upper River, 2013
Table D35. Average CPUE (fish per hour of shocking time) for sculpin using boat electrofishing in the Upper River, 2013
Table D36. Average CPUE (fish per 1,000 square meters) for sculpin using seining in the Upper River, 2013

Table D37. Average CPUE (fish per 1,000 square meters) for sculpin using snorkeling in the Upper River, 2013
Table D38. Average CPUE (fish per hour of shocking time) for lake trout using backpack electrofishing in the Upper River, 2013
Table D39. Average CPUE (fish per hour of shocking time) for round whitefish using backpack electrofishing in the Upper River, 2013
Table D40. Average CPUE (fish per hour of shocking time) for round whitefish using boat electrofishing in the Upper River, 2013
Table D41. Average CPUE (fish per 1,000 square meters) for round whitefish using seining in the Upper River, 2013
Table D42. Average CPUE (fish per 1,000 square meters) for round whitefish using snorkeling in the Upper River, 2013
Table D43. Average CPUE (fish per 1,000 square meters) for undifferentiated whitefish species using snorkeling in the Upper River, 2013.

#### 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	<b>Grand Total</b>				
	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	ion PRM	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 UR-4	Gusitna River Goose Creek	Upper Extent V	Rapid Riffle Run Glide Beaver Pond /atana Reservoir PRM 2. Riffle	67 22 4	1 21 22	8 20		1 12 7
UR-3 Gi 224.9-234.5 Si Ja UR-4 UR-4	Gusitna River Goose Creek	Upper Extent V	Rapid Riffle Run Glide Beaver Pond /atana Reservoir PRM 2. Riffle	67 22 4	21 22	20		1 12 7
UR-3 Gi 224.9-234.5 Si Ja UR-4 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
Si Ja Ko 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
<b> </b>			Riffle		18	10	21	4
<u> </u>			Run		35	51	26	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)				
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				
	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	- 55		- ' '	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)

	ı	Arctic graying, ju	venile or adult (190-	32011111)				
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		Topiania areagi:	Run		1	_		1
234.5-248.6	Oshetna River		Boulder Riffle		22	10	7	39
		1	Glide			1	·	1
		1	Rapid		1			1
		1	Riffle	5	1		8	14
		1	Run	3	12	4	7	26
		Unner Extent V	/atana Reservoir PRM 2					
	Susitna River	Main Channel	Riffle	1			6	6
	Ousitila Kivei	Main Onannei	Run				9	9
UR-3 224.9-234.5	Goose Creek		Boulder Riffle		96	41	9	146
	GOOSE GIEEK		Pool		100	128	7	235
224.5-204.0			Riffle		3	4	1	8
		+	Run		50	84	18	152
	Susitna River	Main Channel	Run	1	2	4	9	152
	Susitiia Rivei	Split Main Channel	Run		3	4	4	7
		Clearwater Plume	Clearwater Plume		3		2	
	lau Craak	Clearwater Plume			2			2 5
	Jay Creek		Pool		2		3	
	v · o ·		Run		4		1	5
	Kosina Creek		Boulder Riffle		7	5	6	18
UR-4		<del> </del>	Pool	36				36
208.1-224.9		<u> </u>	Rapid	8				8
		<u> </u>	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		58
		Side Channel	Riffle				1	1
		Split Main Channel	Run				3	3
	Unnamed Tributary 194.8		Pool		7			7
		ļ	Run		5			5
UR-6	Watana Creek		Boulder Riffle		14		17	39
187.1-203.4			Pool		13			14
		1	Riffle		11	7		20
		1	Run		10			33
	Watana Creek Tributary		Boulder Riffle			5	10	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)

		Arctic gray	ling, adult (>328 mm	1)				
Geomorphic								
Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	Late Summer	Fall	<b>Grand Total</b>
	Black River		Boulder Riffle				1	1
			Riffle	3				3
	Black River: Off-Channel	Upland Slough	Pool		5			5
UR-2	Oshetna River		Boulder Riffle		10	4	12	26
234.5-248.6			Rapid	10				10
			Riffle	5	2			7
			Run		2	14	2	18
	Oshetna River: Off-Channe		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			Pool		61	13	2	76
224.9-234.5			Riffle		5		1	6
			Run		12	8	5	
	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	
	,		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
	10.01 0.001		Glide	15				15
			Riffle	1	1			2
UR-5 203.4-208.1	Susitna River	Main Channel	Run			1	2	3
	Susitna River	Main Channel	Run			4	31	35
	- Cuolala I (170)	Split Main Channel				1	3	
	Unnamed Tributary 194.8	opine in an in on a mile	Pool		2	'		2
	Watana Creek		Boulder Riffle		7		5	
	Watana Orcen		Pool		7			7
UR-6			Riffle		<u>'</u>	1		1
187.1-203.4			Run			7	1	8
	Watana Creek Tributary		Boulder Riffle			1	1	5
	y		Rapid			1	_	1
			Riffle		20	4	1	25
			Run		10		<u> </u>	11
		Proposed Water	na Dam Location PRM 1	187 1	10	Į Į		''
Grand Total		rioposed watai	na Dani Location PRM 1	53	185	67	107	412
Granu Total				33	100	07	107	412

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

#### Burbot

Geomorphic								
Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	Late Summer	Fall	<b>Grand Total</b>
	Black River		Boulder Riffle		1	2	3	6
			Riffle	1				1
			Run	2		1	3	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	<b>Grand Total</b>
		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	<b>Grand Total</b>					
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										
<b>Grand Total</b>				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	<b>Grand Total</b>
	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	A 232.5				
	Susitna River	Main Channel	Riffle				1	1
UR-3			Run			3		3
224.9-234.5	Goose Creek		Boulder Riffle		4			4
224.3-234.3			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.

		Sculpi	1					
Geomorphic Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	Late Summer	Fall	Grand Total
	Black River		Boulder Riffle		177	92	71	340
			Pool	22				22
			Riffle	90	35	34	13	172
			Run	26	214	95	70	405
	Black River: Off-Channel	Upland Slough	Pool		5	51	33	89
			Run		11	5	16	32
UR-2	Oshetna River		Boulder Riffle		234	149	159	542
234.5-248.6			Glide		51	6	8	65
			Percolation Channel		4	4	12	20
			Pool		44		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 Re		1				
	Susitna River	Main Channel	Riffle		4	9	1	14
	Outstand Naves	Main Chamio	Run		25	3	2	30
UR-3	Goose Creek		Boulder Riffle	<del>                                     </del>	120	47	25	192
224.9-234.5			Pool		2	2	6	102
117.0 207.0			Riffle	<del>                                     </del>	15	7	10	32
			Run		27	7	13	47
	Sualtra Divar	Main Channel				17	24	49
	Susitna River		Run		8			
		Split Main Channel	Run	_	5	2	13	20
		Clearwater Plume	Clearwater Plume	5		10	31	63
	Jay Creek		Pool		5	1		6
			Riffle		13	3	4	20
			Run		6		5	11
	Kosina Creek		Boulder Riffle	23	40	63	79	205
UR-4			Glide	27			20	47
208.1-224.9			Percolation Channel	11				11
200.1 224.0			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	S.as Glough	Pool	<del>                                     </del>	25	25	39	89
	Omnumed Tributary 134.0		Riffle		3	1	JJ	4
			Run	<del>                                     </del>	30	20	15	65
ļ	Watana Crook			-	21	42		
UD C	Watana Creek		Boulder Riffle				9	72
UR-6			Pool	-	9	2	2	13
187.1-203.4			Riffle	-	164	45	49	258
		a a	Run		80	74	66	220
	Watana Creek: Off-Channel	Side Slough	Glide		1	3	2	6
			Percolation Channel			1		1
		Side Slough Beaver Complex	Beaver Pond		1	4	3	8
	Watana Creek Tributary		Boulder Riffle		10	4		14
			Rapid			5	5	10
			Riffle		85	31	17	133
		i	Dun		1	8	3	12
			Run			U	J	14
	Watana Creek Tributary: Off-channel	Side Slough						24
	Watana Creek Tributary: Off-channel	Side Slough  Proposed Watana Dam Lo	Glide		8	14	2	

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

#### Whitefish, humpback

Geomorphic						
Reach/PRM	Habitat	Macrohabitat	Mesohabitat	Spring	Early Summer	<b>Grand Total</b>
		Upper Extent Watar	a 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 D	am Location PRM 18	7.1		
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
110.0			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
200.1-224.9			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 m<sup>2</sup> 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<sub>Meso</sub> values for a given mesohabitat type, the average CPUE was calculated as:

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

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)	<b>Snorkel</b> (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)	(pulse d	Total Effort luration in s	
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
			Boulder Riffle	4	4	4	1763	1298	1581
	Black	Tributary	Pool	1	1	1	328	256	455
	River		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			Boulder Riffle	19	18	17	9120	5880	6597
224.9-	Goose	Tributary	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
	la		Pool	1	2	2	587	522	641
	Jay Creek <sup>1</sup>	Tributary	Riffle	1	1	1	224	117	Fall 3550 852 189 247 370 2470 3332 1581 455 261 1767  556 441 6597 1283 923 2109 2250 3438 902
UR-4	Orcck		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	Channel	Riffle	1	1	1	527	738	585
	River	Side Slough	Pool	1	1	1	725	1098	669
		Split Main Channel	Run	2	2	2	1377	1129	1024
			Beaver Pond	1	1	2	180	316	478
			Boulder Riffle	3	3	3	1225	861	1053
	14/-1		Glide	1	1	1	174	564	212
UR-6 (PRM	Watana Creek	Tributary	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)			

<sup>1.</sup> 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 uration in s	
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 Wat	ana Dam Lo	cation (PRIV	l 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-			Meso-	Sa	mple Size ( <i>l</i>	V)		Total Effort led in squar	e meters)
morphic Reach	Stream	Macro- habitat Type	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	servoir 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 Observed	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		
		F	Proposed Wa	itana Dam Lo	ocation (PRN	/I 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.

Coo			S	ample Size (A	n	(area san	Total Effort (area sampled in square meters)			
Geo- 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		
224.9- 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 <sup>1</sup>	Run	1	1	1	400	1039	500		
	Kosina	Boulder Riffle	4	4	3	4145	9900	7500		
UR-4	Creek	Glide			1			### Fall   8647   1596   32   3684   475   500		
(PRM		Run		1	1		3900	3000		
208.1- 224.9)		Boulder Riffle	2	1	2	2700	2600	2000		
	Tsisi Creek	Percolation Channel	1	1	1	280	760	Fall  8647  1596  32  3684  475  500  7500  140  3000  2000  50  3100  1000  1500  2000  1220  4300  3900  435  1030  3875		
		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	Fall  8647  1596  32  3684  475  500  7500  140  3000  2000  50  3100  1000  1500  2000  1220  4300  3900  435  1030  3875		
		Riffle	3	2	4	2750	1500	4300		
UR-6		Run	6	6	4	5600	5610	50 3100 1000 1500 2000 1220 4300 3900		
(PRM 187.1-	Watana	Boulder Riffle		1	2		200	435		
203.4)	Creek	Rapid		1	1		300	Fall  8647 1596 32 3684 475 500 7500 140 3000 2000 50 3100 1000 1500 2000 1220 4300 3900 435 1030 3875		
	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			

<sup>1.</sup> 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	ı, Chinook (juv	renile)
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	TUVOI		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
	Dia ala Dia an	Tallerateur	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)			
	Cusitas Diver	Main Channal	Riffle	0	0	0
נ חוו	Susitna River	Main Channel	Run	0	0	0
			Boulder Riffle	0	0	0
224.9-		T " (	Pool	0	0	0
234.5)	Goose 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	0	0	0
	Jay Creek <sup>1</sup>	Tributary	Riffle	0	0	0
LID 4			Run	0	0	0
UR-4 (PRM			Boulder Riffle	7.6	19.5	17.4
208.1-		T " .	Glide			44.2
224.9)	Kosina Creek	Tributary	Riffle	0	4.0	10.5
			Run	0	80.0	0
			Boulder Riffle	0	0	0
		_ , ,	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 Chamlei	Riffle	0	0	0
		Side Slough	Pool	0	0	0
		Split Main Channel	Run	0	0	0
			Beaver Pond	0	0	0
			Boulder Riffle	0	0	0
			Glide	0	0	0
UR-6	Watana Creek	Tributary	Percolation Channel	0	0	0
(PRM	Orcck		Pool	0	0	Fall  0  0 0 0 0 0 0 0 0 0 0 0
187.1-			Riffle	0	0	0
203.4)			Run	0	0	0
			Boulder Riffle	0	0	0
	Watana		Glide	0	0	Fall  0  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	Creek	Tributary	Rapid		0	0
	Tributary		Riffle	0	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
			Run	0	0	0
-	Unnamed		Pool	0	0	0
	Tributary	Tributary	Riffle	0	0	0
	194.8		Run	0		0

<sup>1.</sup> 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	Salmon, Chinook (juvenile)			
Geomorphic Reach	Stream	Mesohabitat Type	Early Summer	Late Summer	Fall		
		Watana Reservoir at Full Pool					
UR-3		Boulder Riffle	0	0	0		
(PRM 221.9-	Goose Creek	Pool	0	0	0		
234.5)	GOOGC GICCK	Riffle	0		0		
		Run	0	0	0		
	Jay Creek <sup>1</sup>	Pool	0	0	0		
	Jay Oleek	Run	0	0	0		
		Boulder Riffle	9.2	0	0		
UR-4	Kosina Creek	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	0	0			
	_1	Proposed Watana Dam Location	n (PRM 187.1)				

<sup>1.</sup> 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-				A	rctic grayling	
morphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
			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	TAVOI		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
	Disak Divar	Tuibutan	Pool	87.8	0	7.9
	Black River	Tributary	Riffle	22.8	0	0
			Run	48.4	13.8	11.5
	•	Watana Rese	ervoir at Full Pool (PRM 232.5)	•	•	
	Susitna River	Main Obanası	Riffle	6.2	0	77.7
UR-3		Main Channel	Run	4.5	0	57.1
(PRM		Tributary	Boulder Riffle	33.0	31.4	14.4
224.9-	0		Pool	0	27.8	20.5
234.5)	Goose Creek		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 <sup>1</sup>	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)			

<sup>1.</sup> 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.

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.

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)	INVE		Run	0		
		Watana Reservoir a	at Full Pool (PRM 232.5)			
UR-4 (PRM 208.1- 224.9)	Susitna River	Main Channel	Run	0		
	0 11 10	Main Channel	Run	1.4	1.7	1.3
LID C		0.1.0	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		
		Beaver Pond	0	0	0		
	Watana Creek	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)				

<sup>1.</sup> 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	TAIVEI		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
	Division Division	T.9. (	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 Channel	Riffle	6.2	4.5	0
LID 2			Run	0	3.6	8.2
UR-3 (PRM	Goose Creek	Tributary	Boulder Riffle	0	0	0
224.9-			Pool	0	0	0
234.5)			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 Creek1	Tributary	Riffle	0	0	0
LID 4			Run	0	0	0
UR-4 (PRM			Boulder Riffle	0	0	0
208.1-		T.9. (	Glide			0
224.9)	Kosina Creek	Tributary	Riffle	0	0	0
			Run	0	0	0
			Boulder Riffle	0	0	0
			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
		Side Channel	Pool	4.8	0	0
	Susitna River	Side Chamler	Riffle	6.8	0	6.2
		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
UR-6			Percolation Channel	0	0	0
(PRM			Pool	0	0	0
187.1-			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)	)		

<sup>1.</sup> 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	0 - 1 - 0 - 1 - 0 - 1 - 1	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)		

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

Geo-					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
		Tributary	Pool	0		0
UR-2			Rapid	0	0	0
(PRM 234.5-			Riffle	0	0	0
248.6)			Run	0	0	0
,			Boulder Riffle	0	0	0
		T 11 /	Pool	0	0	0
	Black River	Tributary	Riffle	0	0	0
			Run	0	0	0
	•	Watana Rese	ervoir at Full Pool (PRM 232.5)			
Susitna River		Riffle	0	0	0	
	Main Channel	Run	0	0	0	
(PRM	UR-3 (PRM	Goose Creek 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	79.7	0	50.2
	Jay Creek <sup>1</sup>	Tributary	Riffle	0	0	0
LID 4			Run	120.7	0	15.7
UR-4 (PRM			Boulder Riffle	0	0	0
208.1-		T 7. (	Glide			0
224.9)	Kosina Creek	Tributary	Riffle	0	0	0
		Run	0	0	0	
			Boulder Riffle	0	0	0
			Percolation Channel	0	0	0
	Tsisi Creek	Tributary	Riffle	0	0	0
			Run	0	0	0

## Table-D28. Continued.

				Dolly Varden	
Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
Susitna River	Main Channel	Run	0	0	0
	Main Channel	Run	0	0	0
	Cide 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
	I I ribilitary	Beaver Pond	0	0	0
		Boulder Riffle	27.9	6.9	5.3
		Glide	62.1	12.8	50.9
		Percolation Channel	0	47.4	0
Orcci		Pool	41.1	10.2	14.4
		Riffle	82.4	7.3	17.7
		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
Unnamed		Run	0	11.0	0
		Pool	10.3	11.8	35.2
Tributary	Tributary	Riffle	56.8	0	0
194.8		Run	75.3		38.5
	Susitna River  Susitna River  Watana Creek  With the state of the stat	Susitna River  Main Channel  Side Channel  Side Slough Split Main Channel  Watana Creek Tributary  Unnamed Tributary  Tributary  Tributary  Tributary  Tributary	Susitna River  Main Channel  Run  Pool Riffle  Side Channel  Side Slough Pool Split Main Channel  Run  Beaver Pond Boulder Riffle  Glide  Percolation Channel  Pool Riffle  Run  Pool Riffle Glide  Prool Riffle Run  Watana Creek Tributary   Stream         Macrohabitat Type         Mesohabitat Type         Early Summer           Susitna River         Main Channel         Run         0           Susitna River         Main Channel         Run         0           Side Channel         Pool         0           Riffle         0         0           Side Slough         Pool         0           Split Main Channel         Run         0           Beaver Pond         0         0           Boulder Riffle         27.9           Glide         62.1           Percolation Channel         0           Pool         41.1           Riffle         82.4           Run         18.7           Boulder Riffle         0           Glide         24.2           Rapid         7           Tributary         Riffle         3.3           Run         0           Unnamed         Tributary         Pool         10.3           Riffle         56.8	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           Side Slough         Pool         0         0           Split Main Channel         Run         0         0           Beaver Pond         0         0         0           Boulder Riffle         27.9         6.9           Glide         62.1         12.8           Percolation Channel         0         47.4           Pool         41.1         10.2           Riffle         82.4         7.3           Run         18.7         3.5           Boulder Riffle         0         0           Glide         24.2         0           Creek         Tributary         Rapid         12.0           Riffle         3.3         7.9           Run         0         11.0           Unnamed         Tributary         Ri	

<sup>1.</sup> 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 Po	<del></del>		
UR-3		Boulder Riffle	0	0	0
(PRM 221.9-	Goose Creek	Pool	0	0	0
234.5)	GOOGC OTCCK	Riffle	0		0
		Run	0	0	0
	Jay Creek <sup>1</sup>	Pool	130.4	0	0
	Jay Oreek	Run	50.0	0	4.0
	Kosina Creek	Boulder Riffle	0	0	0
UR-4		Glide			0
(PRM 208.1- 224.9)		Run		0	0
	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 Locat	ion (PRM 187.1)	l l	

<sup>1.</sup> 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
		na Tributary	Percolation Channel	0	0	0
	Oshetna River		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
	Diagle Diver	T " .	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)			
	Susitna River	Main Ohamal	Riffle	0	0	6.5
UR-3		Main Channel	Run	0	10.9	0
(PRM			Boulder Riffle	0.7	0	0
224.9-		T " .	Pool	0	0	0
234.5)	Goose Creek Trib	Goose Creek Tributary	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 <sup>1</sup>	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 sucke		
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	
	Cida Channal	Pool	24.1	5.9	9.5	
Susitna River	Side Charmer	Riffle	0	0	12.3	
	Side Slough	Pool	9.9	0	5.4	
	Split Main Channel	Run	2.5	0	0	
	I I rini itarv	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	
Unnamed		Run	0	0	0	
	namad	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         Summer         Summer           Susitna River         Main Channel         Run         0         0           Susitna River         Main Channel         Run         5.7         0           Susitna River         Main Channel         Pool         24.1         5.9           Riffle         0         0         0           Side Channel         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         0           Glide         0         0         0           Percolation Channel         0         0         0           Riffle         0         0         0           Run         0         0         0           Watana         Tributary         Rapid         0         0           Glide         0         0         0           Rapid         0         0         0           Run         0         0	

<sup>1.</sup> 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	ngnose sucker	
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
LID 4	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 (PRM 187.1-203.4)	Side Slough	Pool	5.6	0	0
(FIXIVI 107.1-203.4)	Split Main Channel	Run	0	0	0
	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 D32. Average CPUE (fish per 1,000 square meters) for longnose sucker using seining in the Upper River, 2013.

				Lo	Longnose sucker		
Geomorphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall	
UR-2			Pool	0			
(PRM 234.5-	Oshetna	Tributary	Riffle	0			
248.6) RIV	IXIVEI	River	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 0		0:1-011	Pool	1.1	10.9	0	
UR-6 (PRM 187.1-	Susitna River	Side Channel	Riffle	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)			

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 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 Greek	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 (PRM 208.1- 224.9)		Glide			0
		Run		0	0
	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)		

<sup>1.</sup> 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	in, undifferent	iated
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
		Tributary	Pool	71.8		14.6
UR-2			Rapid	168.8	86.4	175.1
			Riffle	56.9	71.6	82.9
248.6)	UR-2 (PRM 234.5-		Run	39.2	57.0	68.9
,			Boulder Riffle	73.5	106.4	104.6
	DI 1 D:		Pool	54.9	210.9	197.8
	Black River	Tributary	Riffle	136.7	92.0	96.6
			Run	169.0	129.2	114.1
	1	Watana Rese	ervoir at Full Pool (PRM 232.5)	•	•	
Susitna River		Riffle	24.8	27.2	6.5	
	er Main Channel	Run	13.5	10.9	8.2	
(PRM			Boulder Riffle	21.2	17.5	10.9
224.9-		e Creek Tributary	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 Creek1	Tributary	Riffle	208.9	92.3	169.4
LID 4			Run	19.6	0	35.8
UR-4 (PRM			Boulder Riffle	37.3	31.6	52.3
208.1-		T 11 (	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
			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
		Cida Channal	Pool	53.0	47.5	57.2
	Susitna River	Side Channel	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
		Vatana Creek Tributary	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		Percolation Channel	0	0	0
(PRM	Oleck		Pool	41.1	0	28.8
Ì87.1-			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
	Unnamed		Run	0	44.4	13.3
		namod	Pool	120.2	33.4	78.6
	Tributary	Tributary	Riffle	34.1	11.3	0
	194.8		Run	181.9		38.5
		Proposed Water	ana Dam Location (PRM 187.1	  )		

<sup>1.</sup> 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
UB 4	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)		

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

				Sculp	ated	
Geomorphic Reach	Stream	Macrohabitat Type	Mesohabitat Type	Early Summer	Late Summer	Fall
UR-2	0.1.1		Pool	0		
(PRM 234.5-	Oshetna River	Tributary Riffl	Riffle	0		
248.6)	Mivei		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	0.7	0	0
LID C	Overite a Division	Olds Observal	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)	•	

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

			Scul	Sculpin, undifferentiated			
Geomorphic Reach	Stream	Mesohabitat Type	Early Summer	Late Summer	Fall		
	_	Watana Reservoir at Full Po					
UR-3 (PRM 221.9- 234.5)	Goose Creek	Boulder Riffle	0.1	0	0		
		Pool	0	0	0		
234.5)	Goose Creek	Riffle	100.0		0		
		Run	0.9	0	0		
LID 4	lov Crook1	Pool	0	0	0		
	Jay Creek <sup>1</sup>	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		
		Beaver Pond	0	0	0		
	Watana Creek	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 Loca	tion (PRM 187 1)				

<sup>1.</sup> 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	UR-3 (PRM 224.9- 234.5) Goose	0 11 51	Main Channel	Riffle	0	0	0
PRM   224.9-   234.5     Goose Creek   Tributary     Boulder Riffle   D		Susitna River		Run	0	0	0
Pool   O   O   O   O		Goose Creek	Tributary	Boulder Riffle	0	0	0
Riffle				Pool	0	0	0
Susitna River   Clearwater Plume   Clearwater Plume   O   O   O				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	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	UR-4 (PRM 208.1- 224.9) Kosina	Jay Creek <sup>1</sup>	Tributary	Riffle	0	0	0
Rosina Creek   Tributary   Boulder Riffle   0   0   0   0				Run	0	0	0
Rosina Creek   Tributary   Glide   0   0   0   0   0   0   0   0   0				Boulder Riffle	0	0	0
Riffle			T 11 (	Glide			0
Boulder Riffle		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
	Tributary	Beaver Pond	0	0	0
		Boulder Riffle	0	0	0
		Glide	0	0	0
		Percolation Channel	0	0	0
Orcon		Pool	0	0	0
		Riffle	0	0	0
		Run	0	0	0
		Boulder Riffle	0	0	0
Watana	na	Glide	0	0	0
Creek	Tributary	Rapid		0	0
Creek 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           Side 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           Riffle         0         0           Run         0         0

<sup>1.</sup> 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
Watana Reservoir at Full Pool (PRM 232.5)    UR-3 (PRM 224.9- 234.5)   Goose Creek   Tributary   Tri	Black River	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	UR-3 (PRM 224.9- 234.5) Go	Susitna River		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			Main Channel	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				Pool	0	11.5	0
				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	Main Channel	Run	0	1.4	0
Split Main Channel Run 0 4.0 0				Split Main Channel	Run	0	4.0
Pool 0 0 0				Pool	0	0	0
Jay Creek¹   Tributary     Riffle   0   0	UR-4 (PRM 208.1- 224.9) Ko	Jay Creek <sup>1</sup>	Tributary	Riffle	0	0	0
Run 0 0 0				Run	0	0	0
				Boulder Riffle	0	0	0
208.1- Glide 0			T " (	Glide			0
224.9) Kosina Creek Tributary Riffle 0 0 0		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	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 UR-6 (PRM 187.1- 203.4)			Beaver Pond	0	0	0
			Boulder Riffle	5.4	3.7	0
			Glide	0	0	0
	Tributary	Percolation Channel	0	0	0	
		Pool	0	0	0	
		Riffle	3.7	1.3	0	
			Run	0	0	0
			Boulder Riffle	0	0	0
	Watana		Glide	0	0	0
Watana Creek Tributary Unnamed Tributary	Creek	Tributary	Rapid		0	0
		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)			

<sup>1.</sup> 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.

			V	/hitefish, 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
	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
(FIXIVI 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 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	0 " 5"	0:1 01 1	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>	

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 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
	T	Watana Reservoir at Full Pool			
UR-3		Boulder Riffle	2.0	0	0
(PRM 221.9-	Goose Creek	Pool	5.0	9.4	0
234.5)	Ooose Creek	Riffle	0		0
		Run	0.7	11.5	0
	Jay Creek <sup>1</sup>	Pool	0	0	0
	Jay Creek	Run	0	0	0
UR-4 (PRM 208.1- 224.9)		Boulder Riffle	0.4	0	0
	Kosina Creek	Glide			0
		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
		Beaver Pond	0	0	0
	Watana Creek	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
1	Watana Creek	Rapid		3.3	0
203.4)	Tributary	Riffle	1.8	0.3	0
		Run	0	0	0
		Pool	0	0	
	Unnamed	Riffle	0	0	
	Tributary 194.8	Run	0	0	
		Proposed Watana Dam Locatio	n (PRM 187.1)	L	

<sup>1.</sup> 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.

			White	Whitefish, undifferentiated			
Geomorphic Reach	Stream	Mesohabitat Type	Early Summer	Late Summer	Fall		
	_	Watana Reservoir at Full Po	<del></del>				
UR-3 (PRM 221.9- 234.5)	Goose Creek	Boulder Riffle	0	0	0		
		Pool	0	0	0		
234.5)	Goose Creek	Riffle	0		0		
		Run	0	0	0		
	Jay Creek1	Pool	0	0	0		
	Jay Creek	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			
	1	Proposed Watana Dam Locat	tion (PRM 187 1)				

<sup>1.</sup> 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.