

## PART A - APPENDIX A: REMOTE LINE MAPPING, 2012

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

**Characterization and Mapping of Aquatic  
Habitats (9.9)**

**Part A - Appendix A  
Remote Line Mapping, 2012**

**Initial Study Report**

Prepared for

Alaska Energy Authority



**SUSITNA-WATANA HYDRO**

*Clean, reliable energy for the next 100 years.*

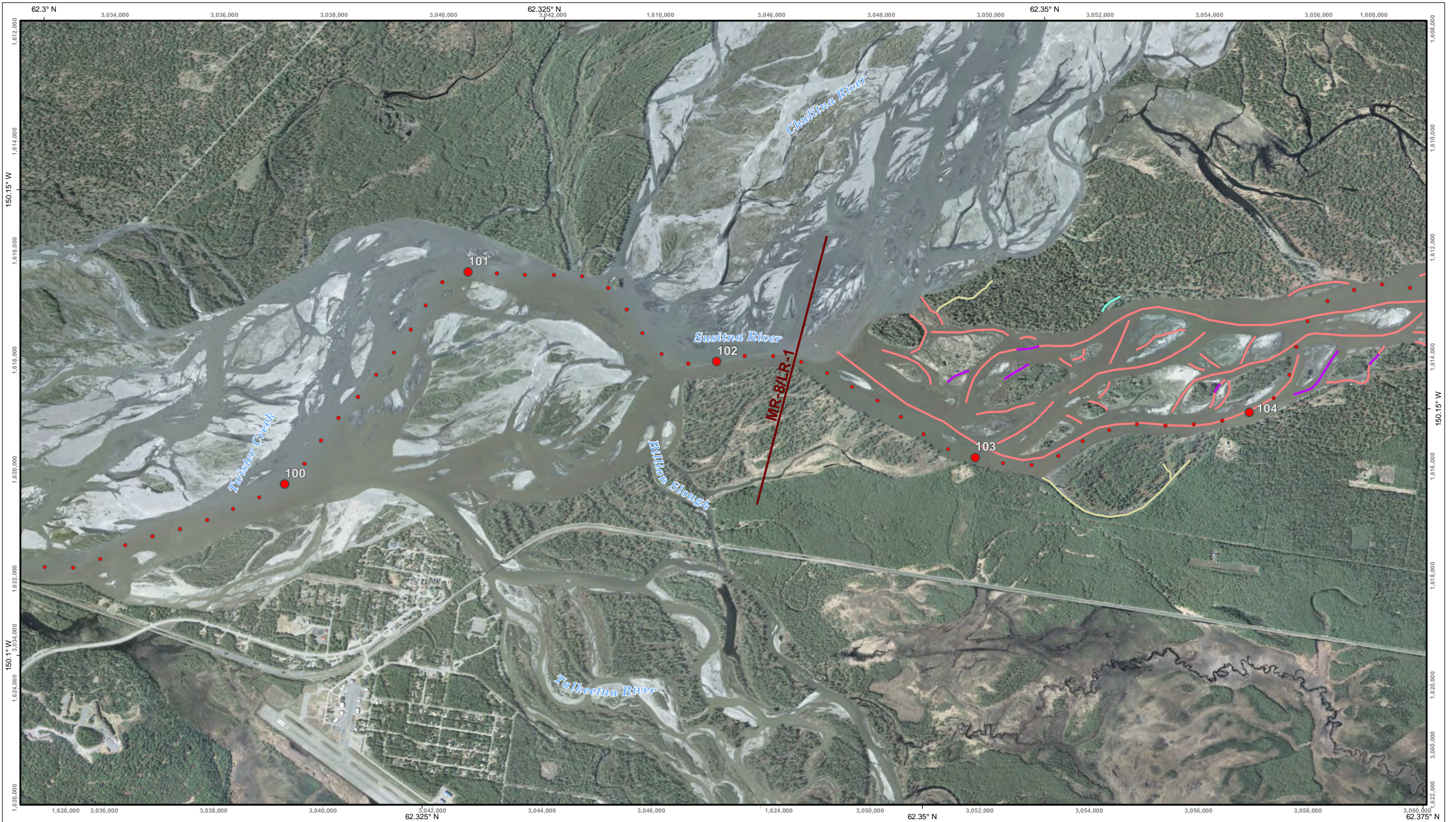
Prepared by

R2 Resource Consultants, Inc.

June 2014

## **INTRODUCTION**

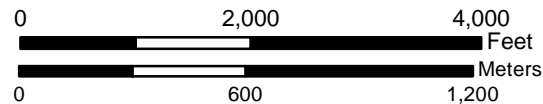
The maps contained in this map book were created using several sources of remote imagery in 2012. The habitat typing is consistent with the terminology that was current at that time, but has undergone refinement through 2013. In addition, an exercise to compare remote habitat typing with ground-based surveys conducted in 2013 is ongoing at the time of the publication of this ISR. Once this exercise is complete, final map books will be made that include both refinements of habitat definitions and typing.



# Susitna - Watana Hydroelectric Project Fish Barrier and Aquatic Habitat Field Survey Map Book



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Map Projection: NAD83 State Plane Zone 4 (Feet)  
Grid Interval: 2000'

### General Features

- Susitna Project River Miles
- Susitna Geomorphic Reach Breaks
- Focus Area

### Mesohabitats

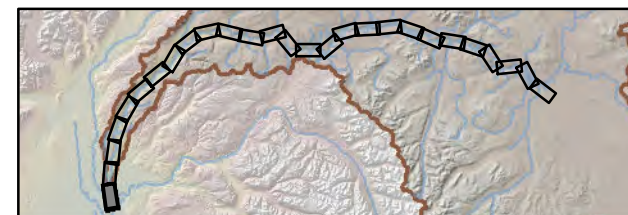
- Glide or Run
- Pool
- Rapid
- Riffle

### Macrohabitats

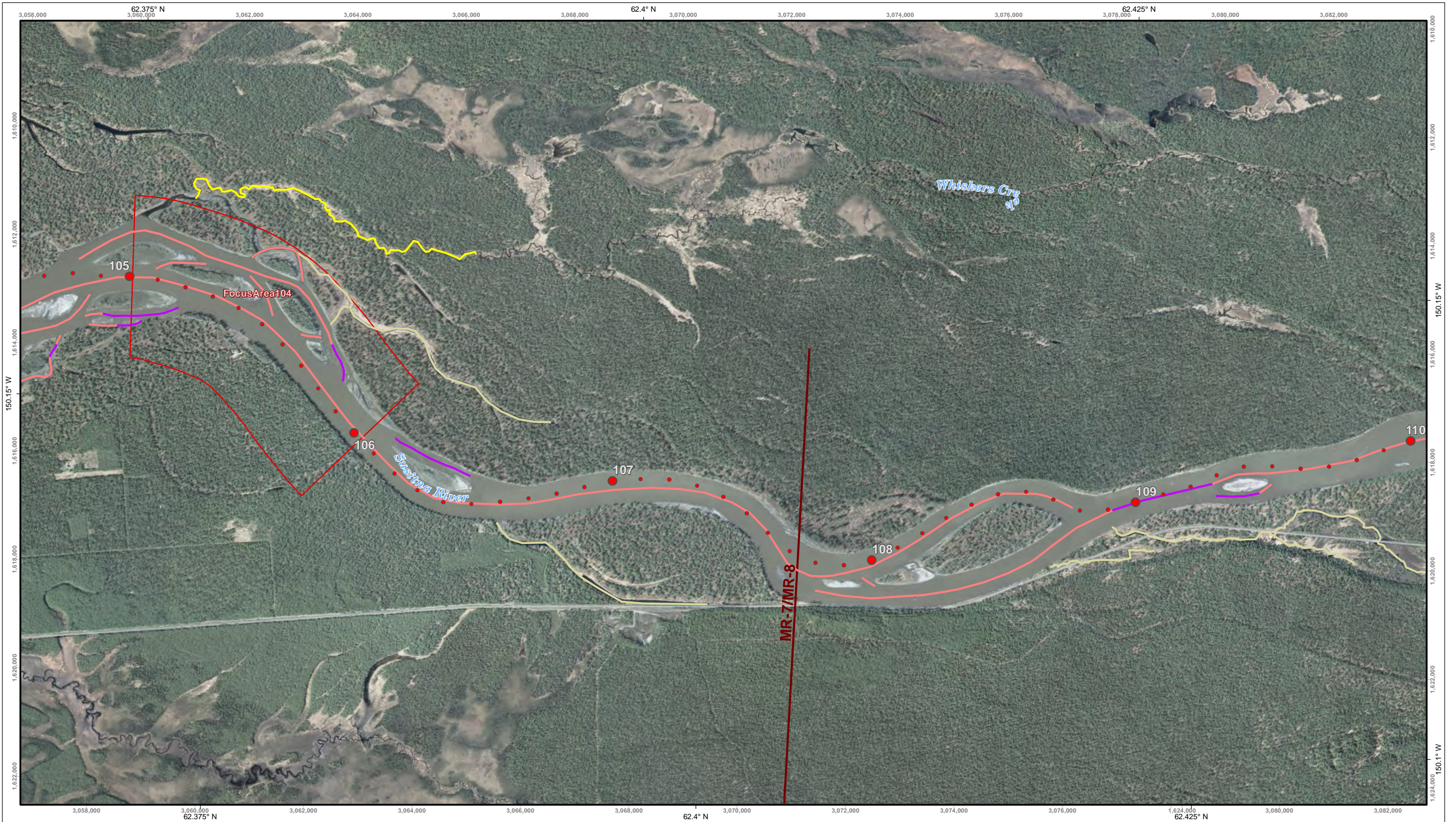
- Side Slough
- Tributary
- Unidentified
- Upland Slough

### Special Habitat Features

- Backwater
- Beaver Complex



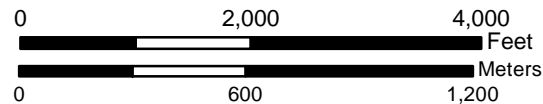
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File: HDR\_2012\_LineMapping.mxd



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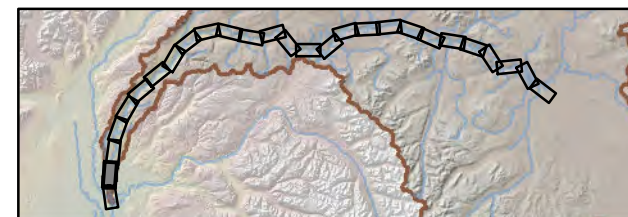
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**Macrohabitats**

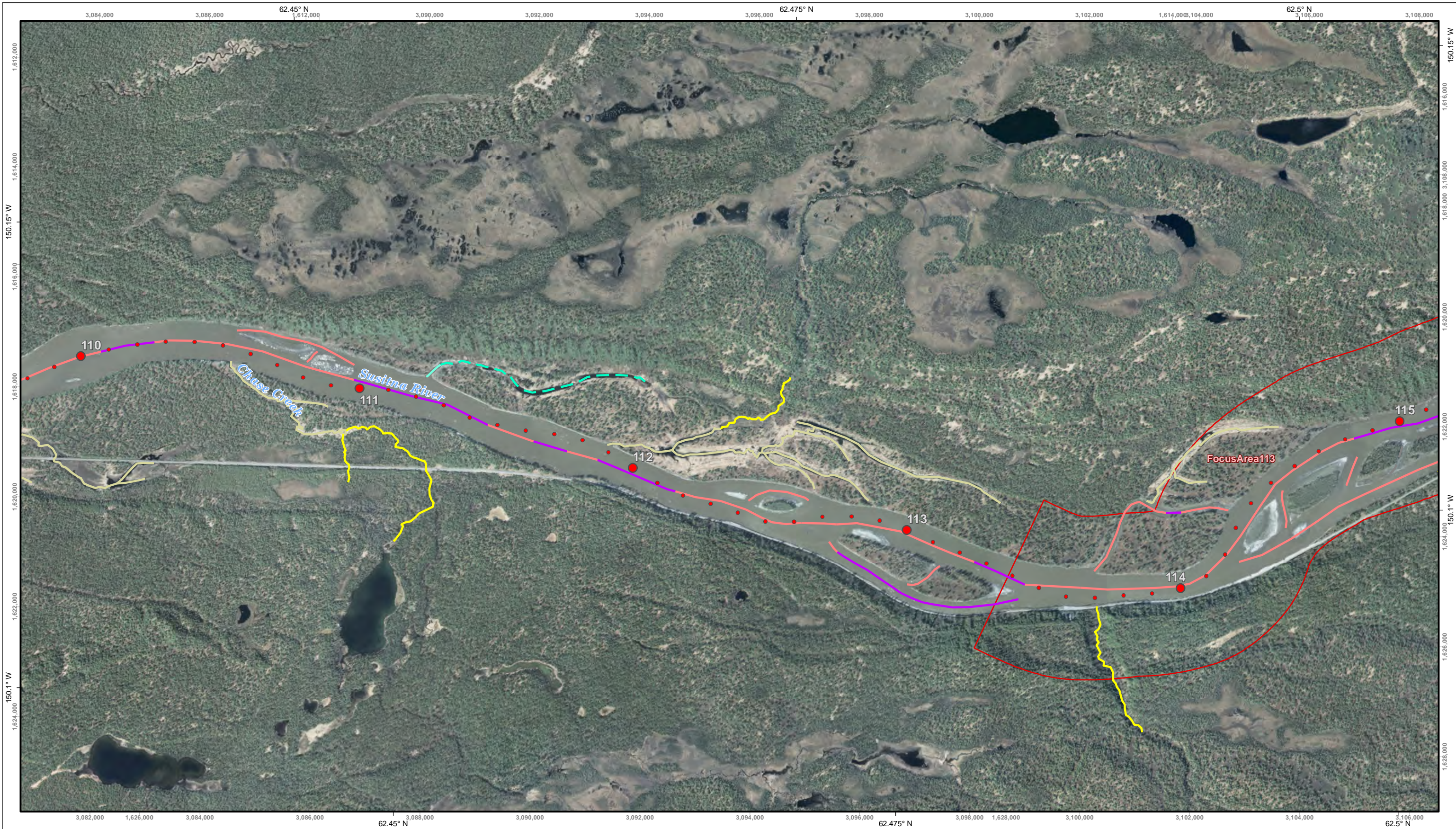
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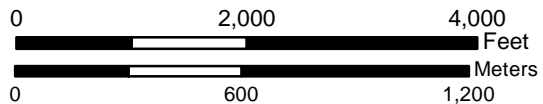
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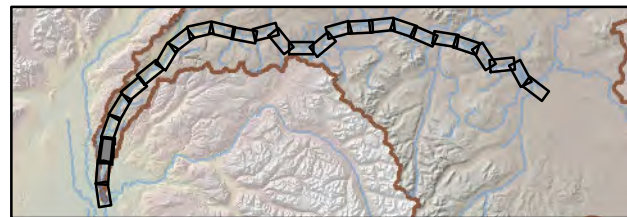
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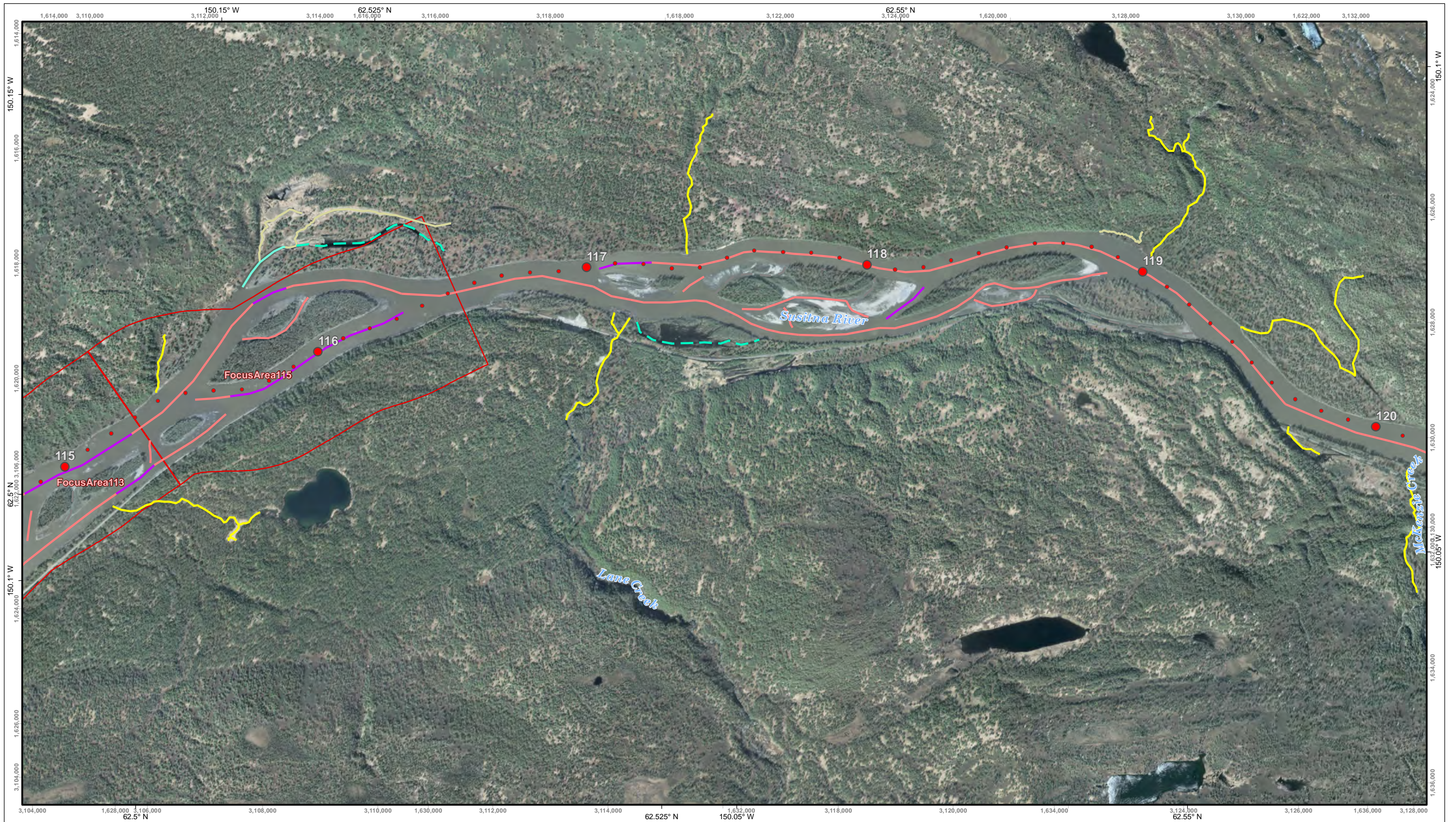
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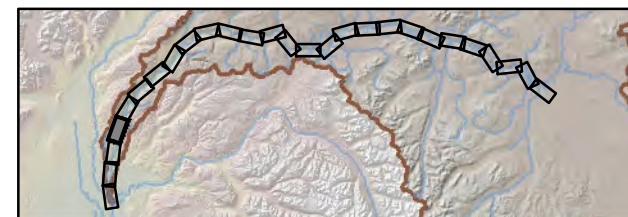
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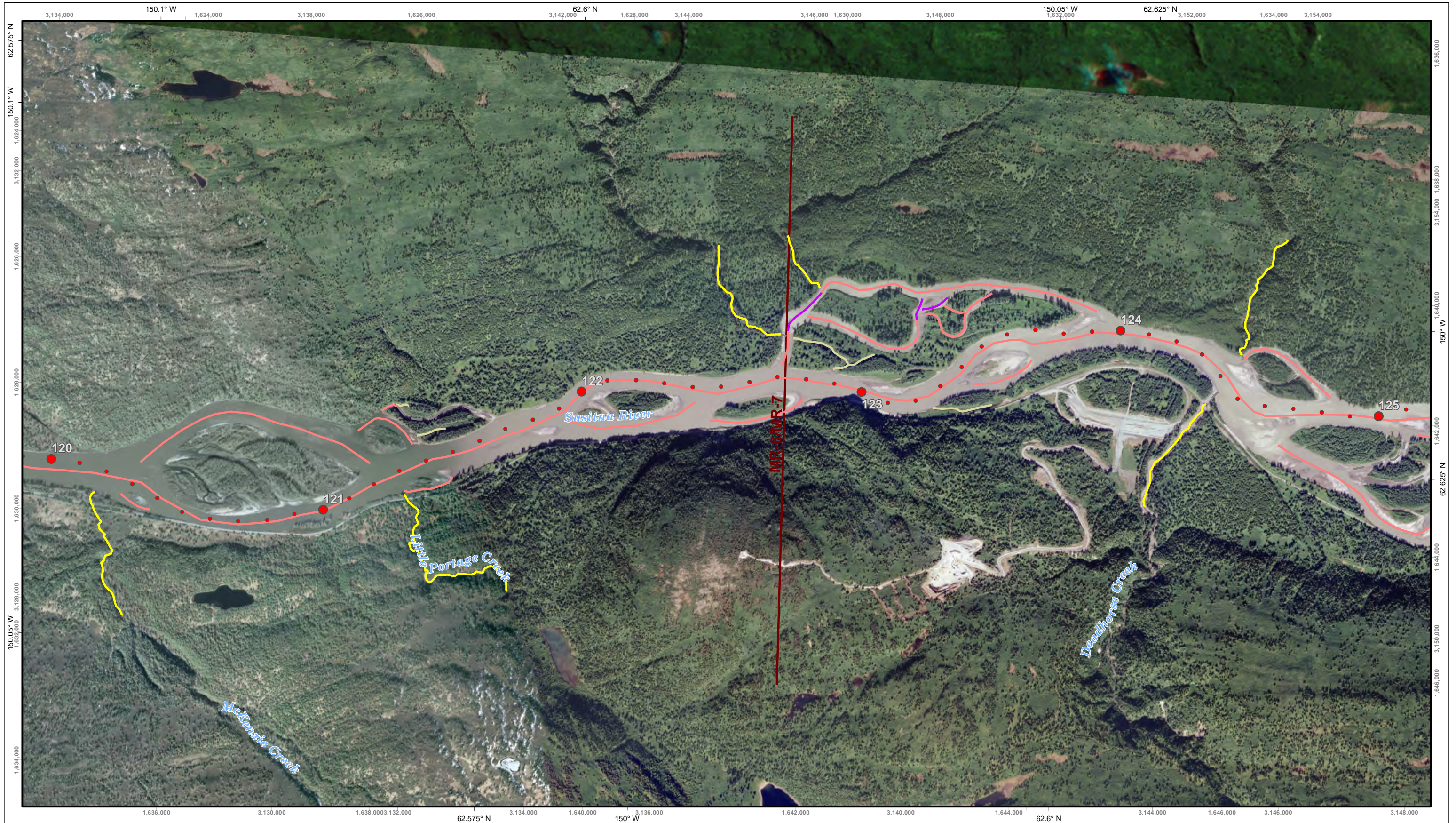
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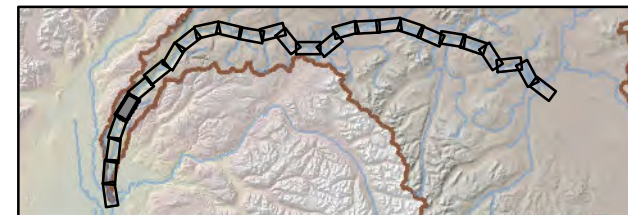


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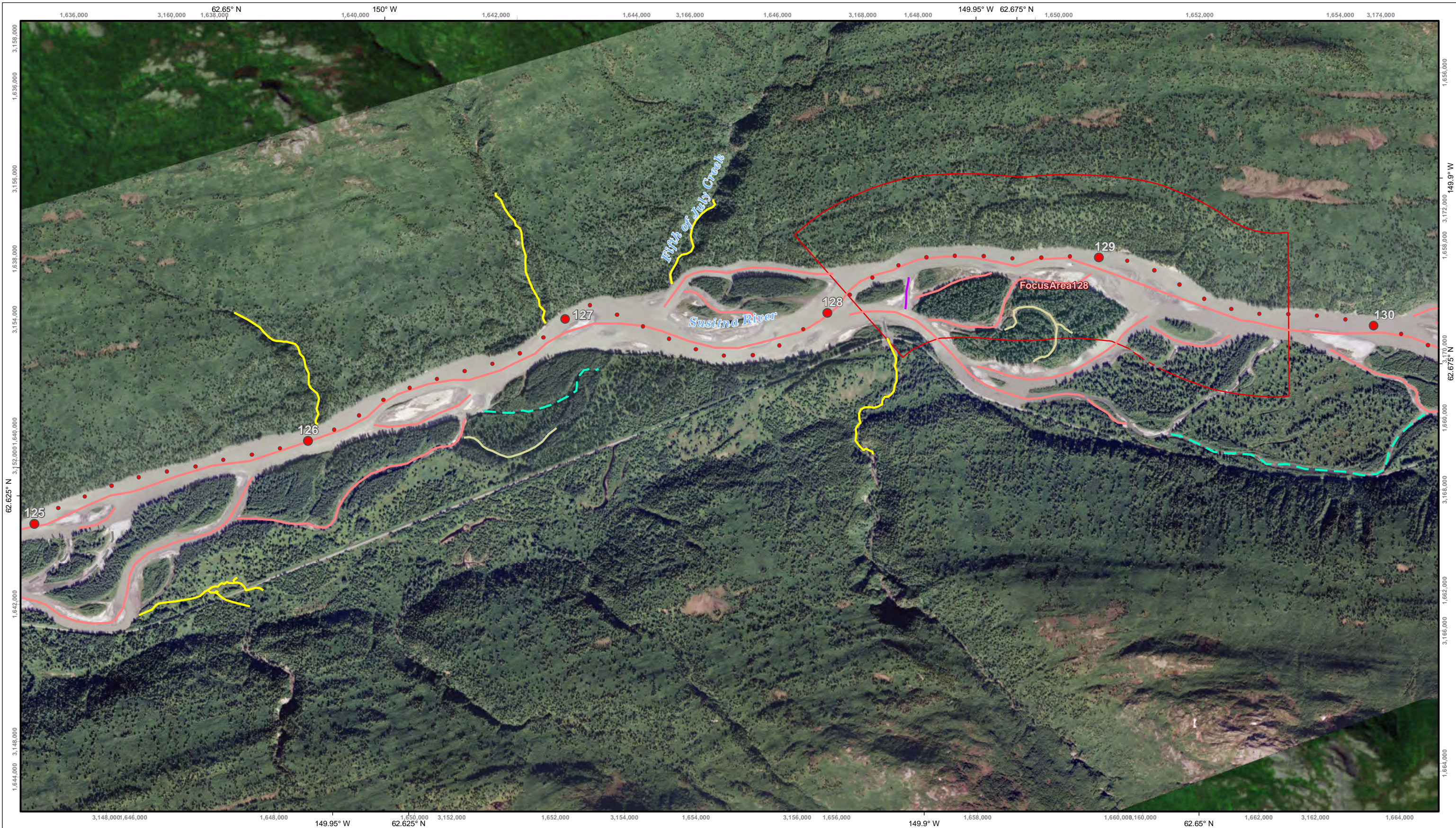
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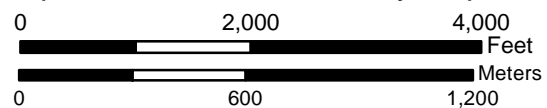




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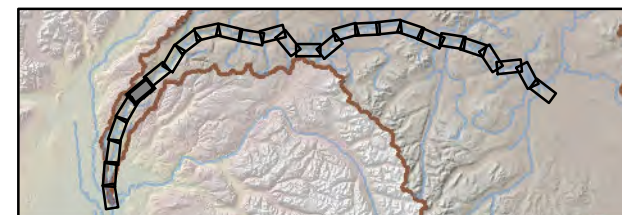


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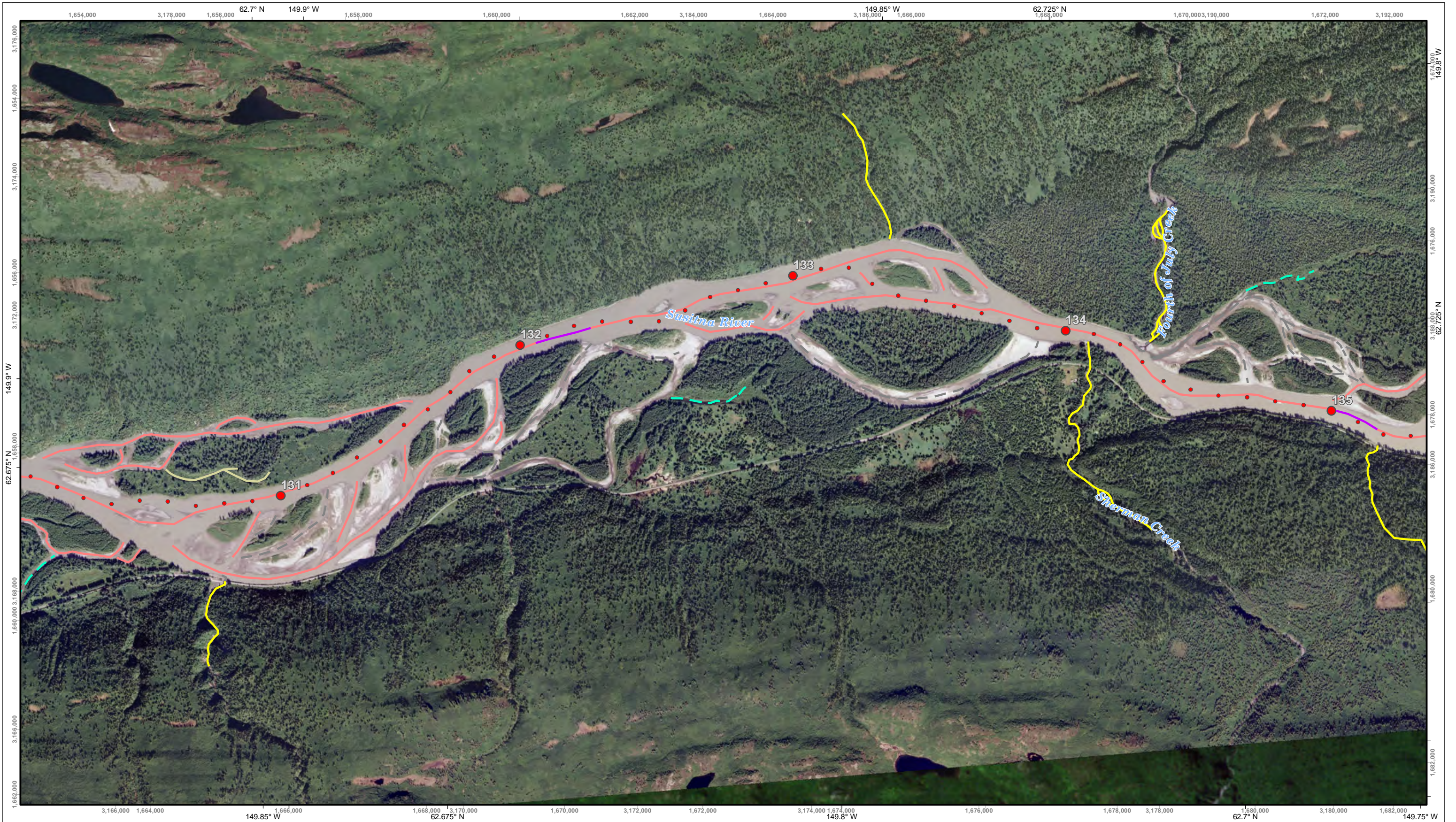


Map Projection: NAD83 State Plane Zone 4 (Feet)  
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General Features			
<span style="color: red;">●</span>	Susitna Project River Miles	<span style="color: red;">—</span>	Glide or Run
<span style="color: red;">—</span>	Susitna Geomorphic Reach Breaks	<span style="color: yellow;">—</span>	Pool
<span style="border: 1px solid red; display: inline-block; width: 10px; height: 10px;"></span>	Focus Area	<span style="color: cyan;">—</span>	Rapid
		<span style="color: purple;">—</span>	Riffle
		<span style="color: green;">—</span>	Side Slough
		<span style="color: grey;">—</span>	Tributary
		<span style="color: brown;">—</span>	Unidentified
		<span style="color: olive;">—</span>	Upland Slough
		<span style="color: cyan;">—</span>	Backwater
		<span style="color: cyan;">—</span>	Beaver Complex



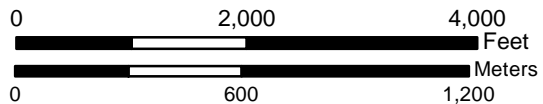
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**Mesohabitats**

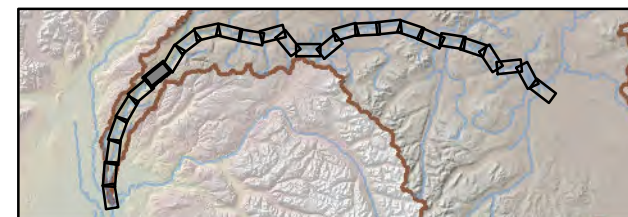
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**Macrohabitats**

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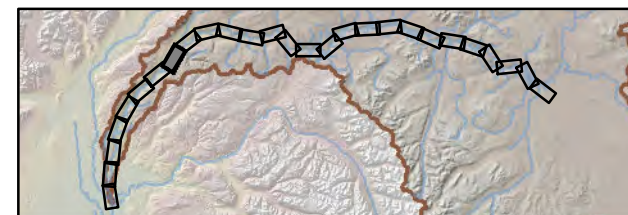


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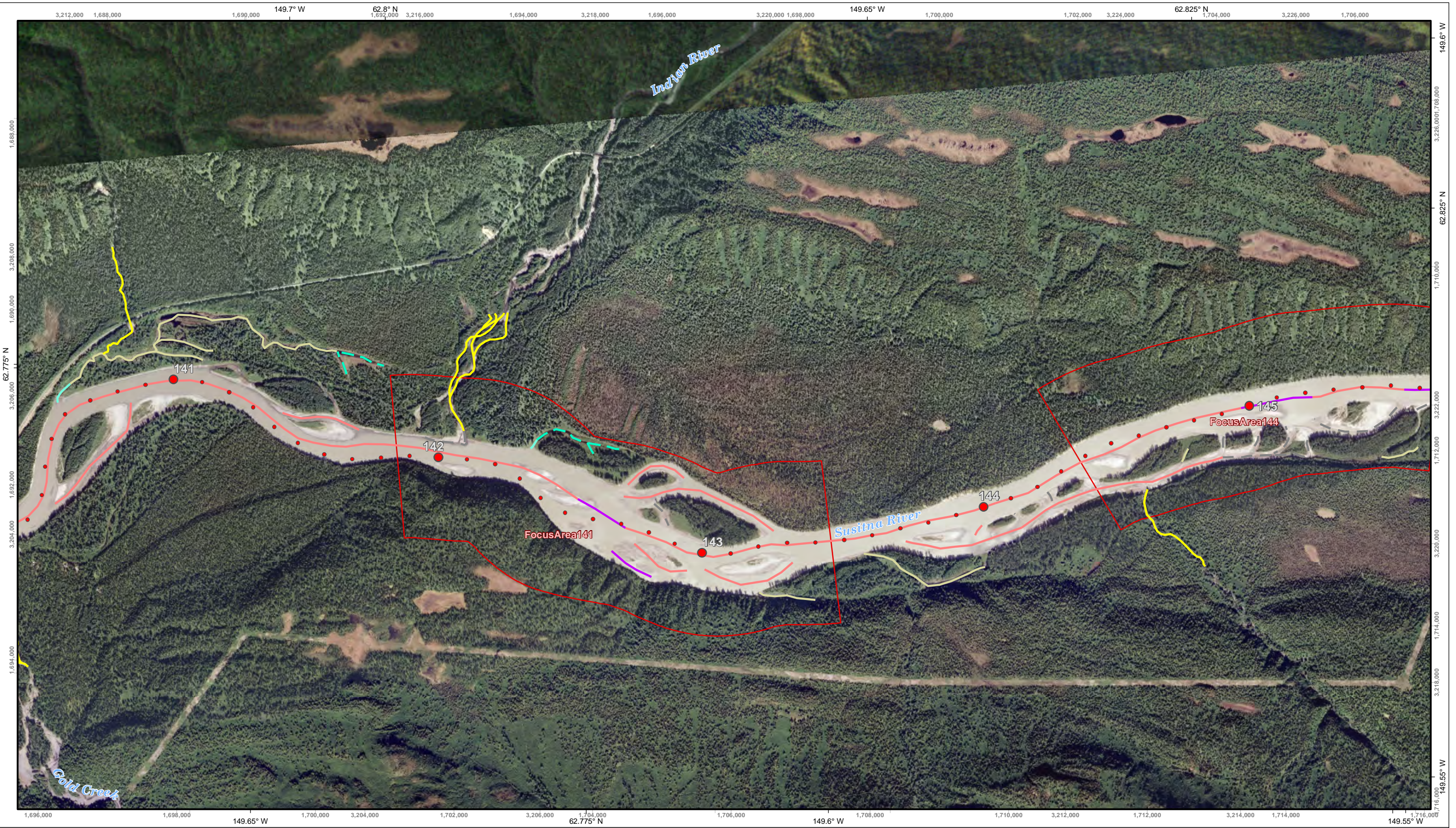


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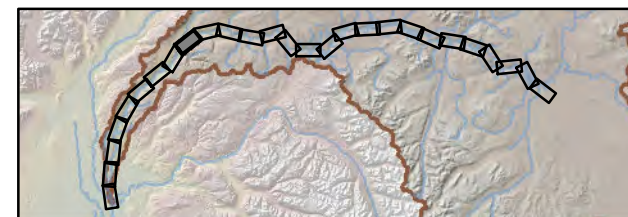


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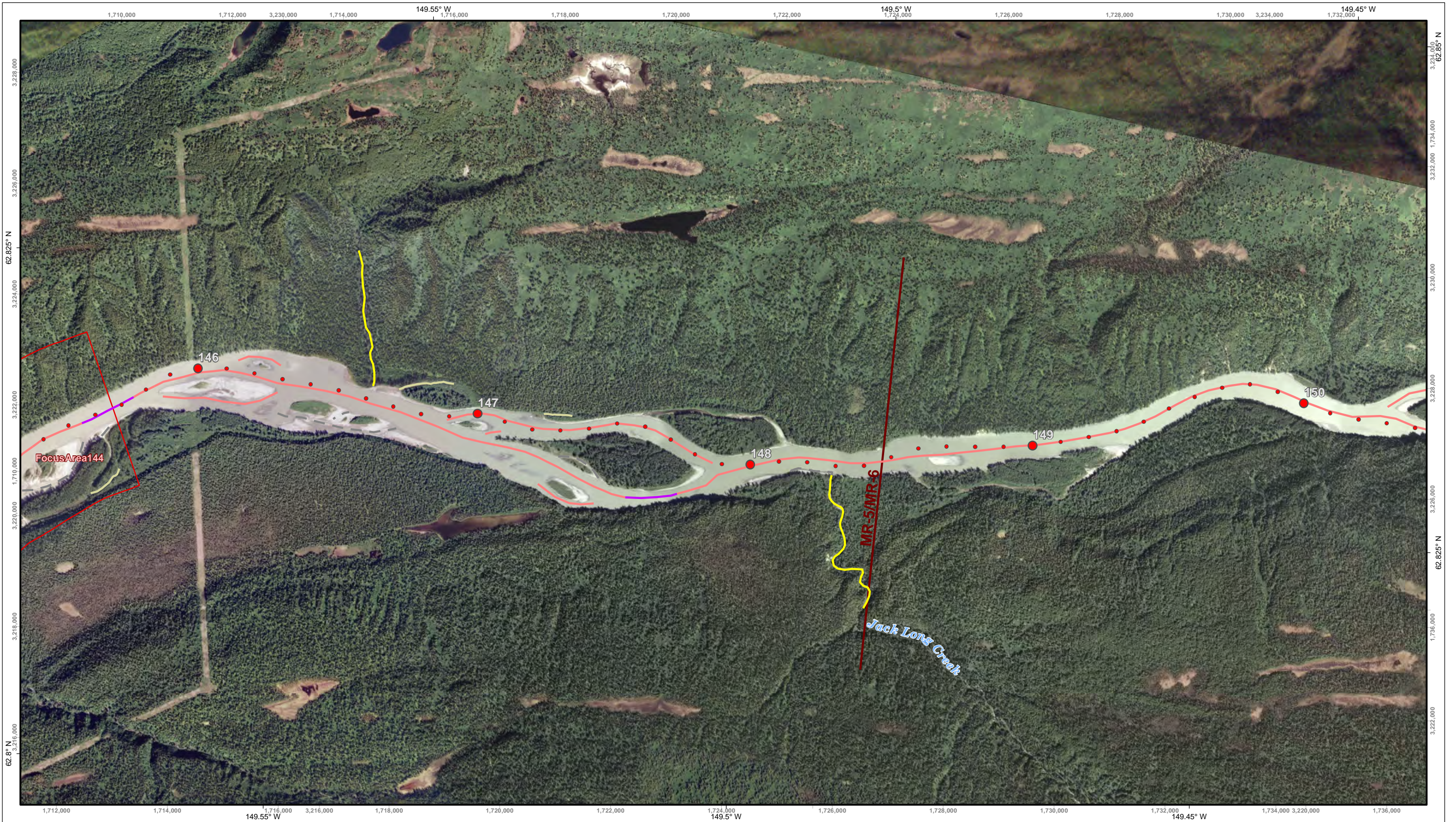


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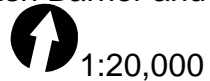
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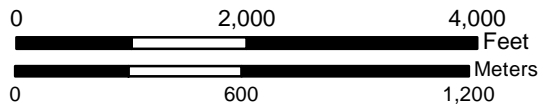
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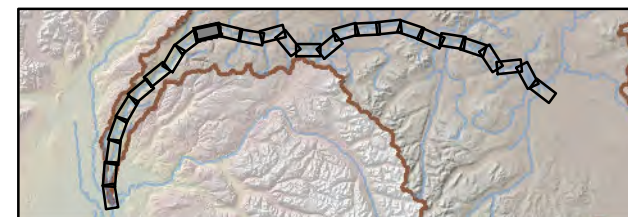
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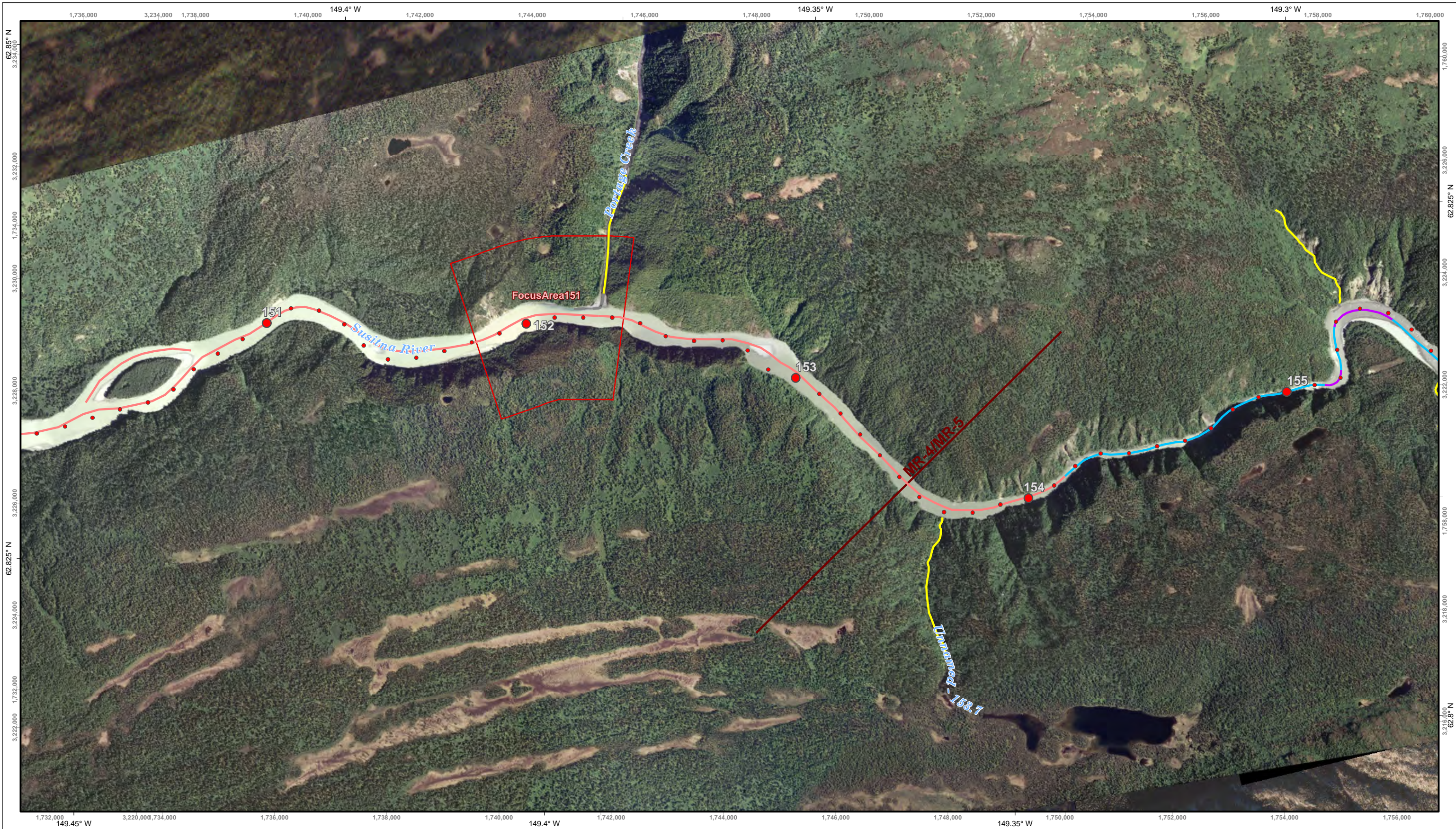
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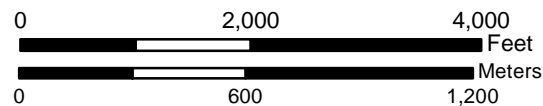
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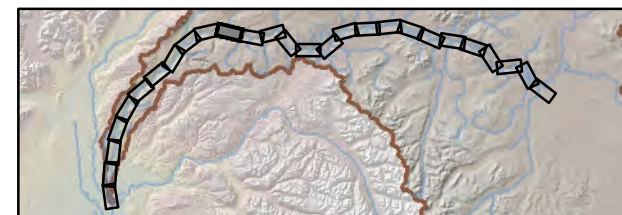


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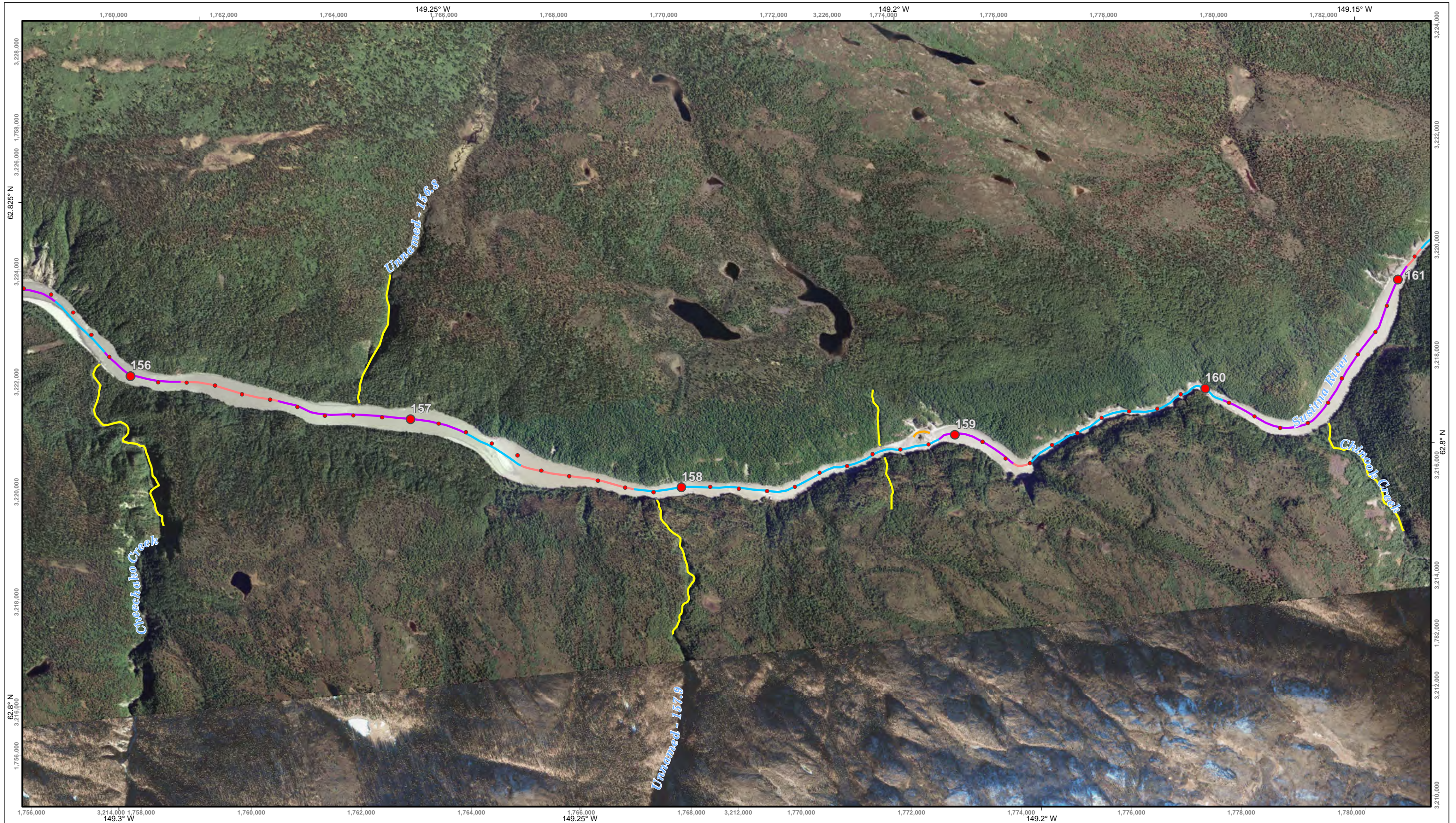


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General Features			
<span style="color: red;">●</span>	Susitna Project River Miles	<span style="color: red;">—</span>	Mesohabitats
<span style="color: red;">—</span>	Susitna Geomorphic Reach Breaks	<span style="color: red;">—</span>	Glide or Run
<span style="border: 1px solid red; display: inline-block; width: 10px; height: 10px;"></span>	Focus Area	<span style="color: orange;">—</span>	Pool
		<span style="color: blue;">—</span>	Rapid
		<span style="color: purple;">—</span>	Riffle
		<span style="color: yellow;">—</span>	Side Slough
		<span style="color: grey;">—</span>	Tributary
		<span style="color: grey;">—</span>	Unidentified
		<span style="color: olive;">—</span>	Upland Slough
		<span style="color: cyan;">—</span>	Special Habitat Features
		<span style="color: cyan;">—</span>	Backwater
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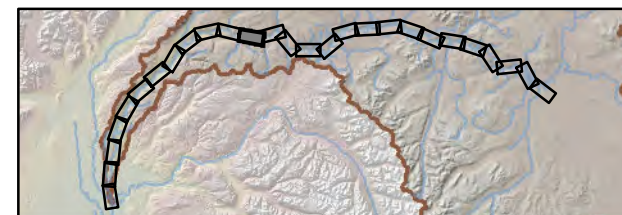
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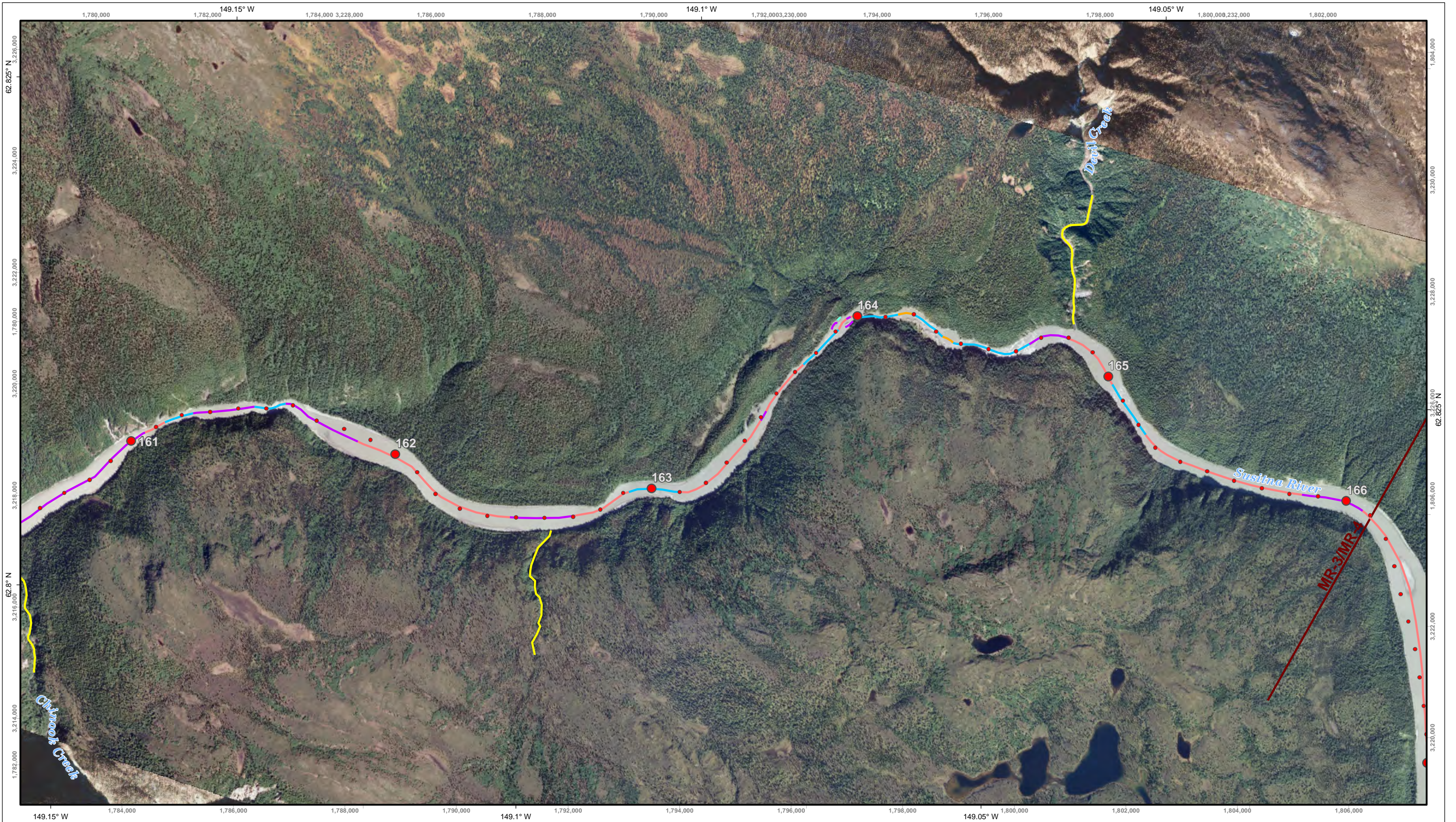
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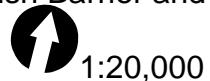
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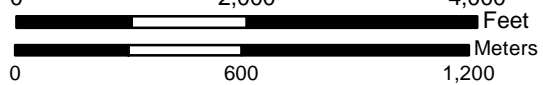
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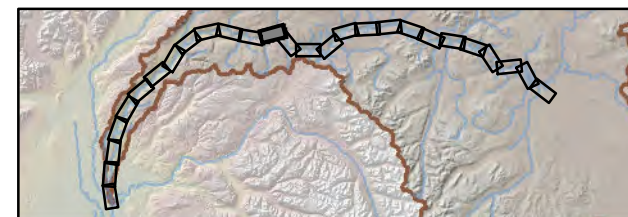
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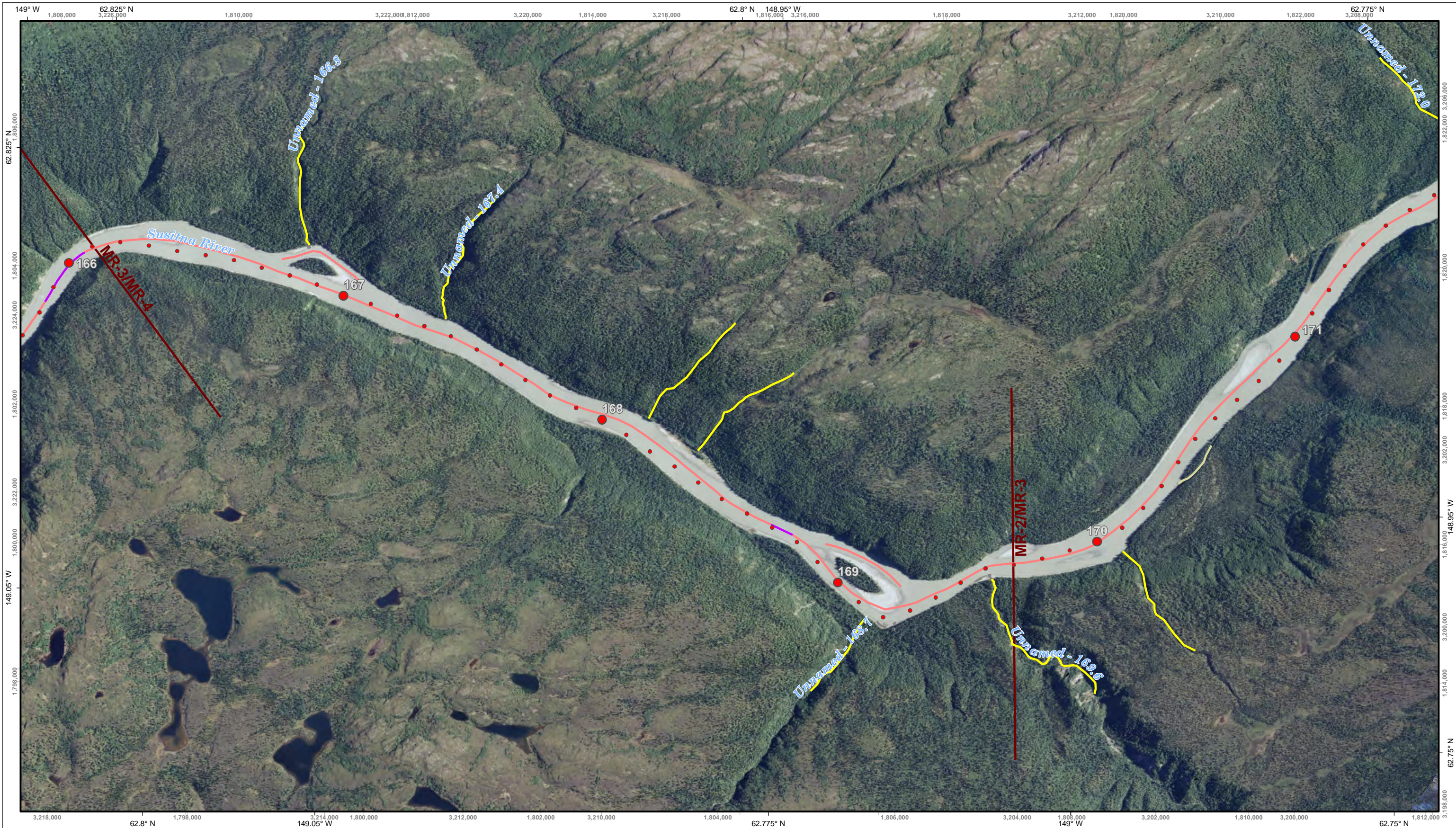
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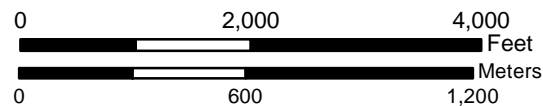




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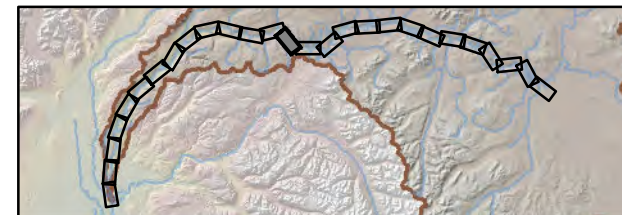
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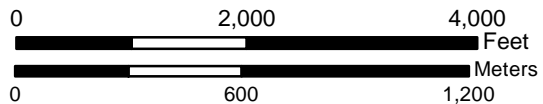
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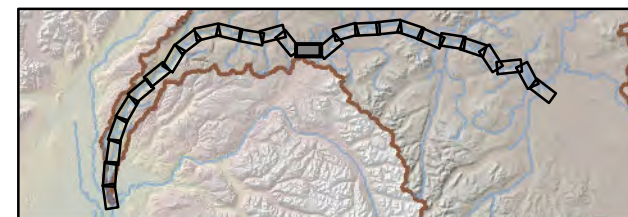
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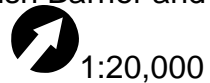
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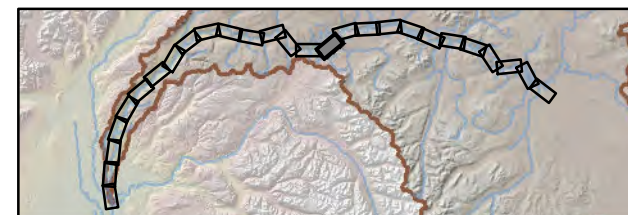
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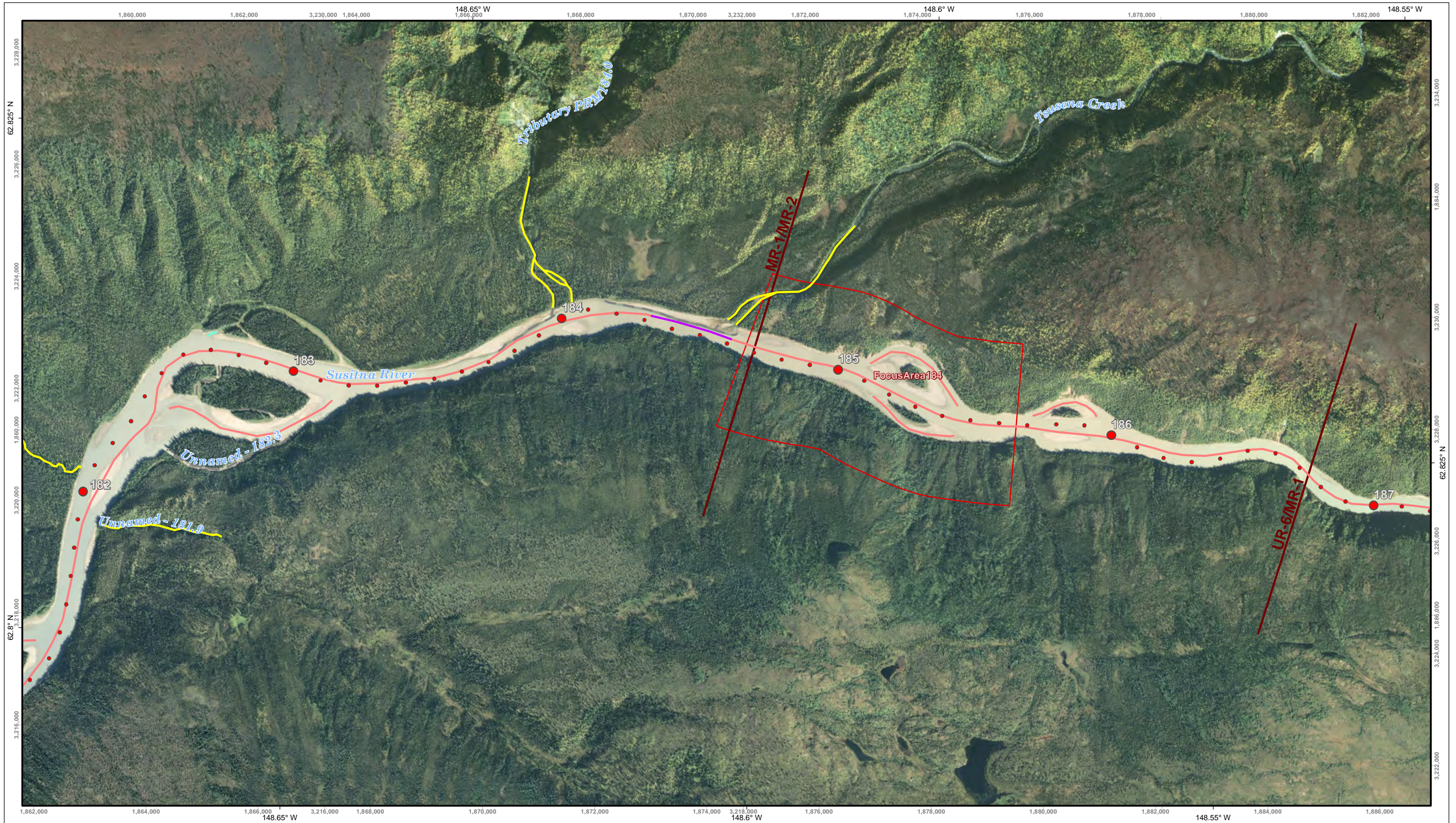
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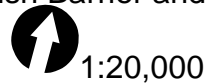
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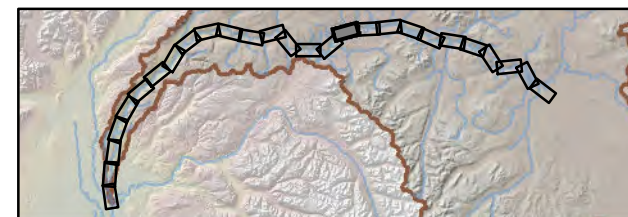


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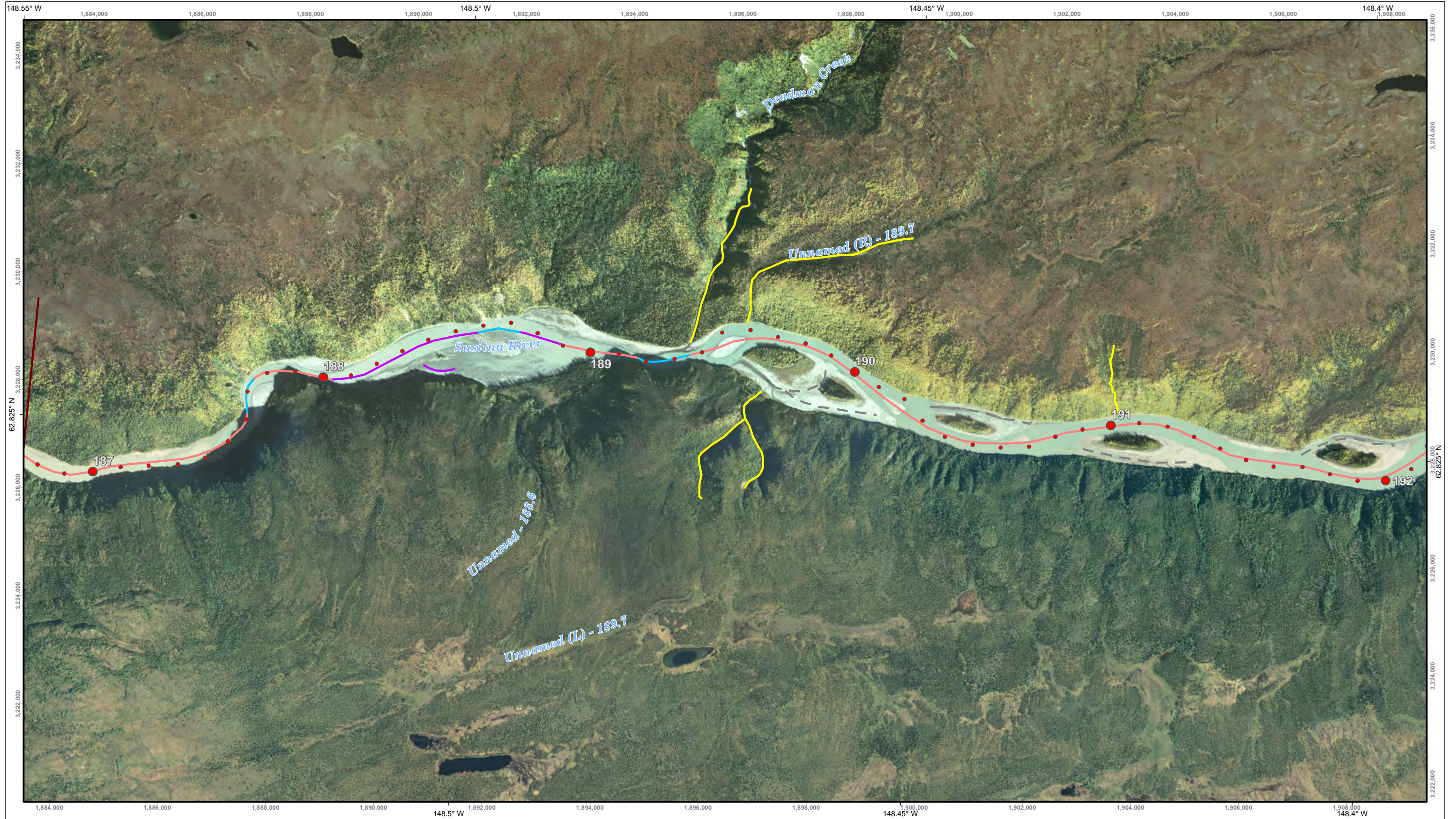


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		<span style="color: cyan;">—</span>	Backwater
		<span style="color: cyan;">—</span>	Beaver Complex



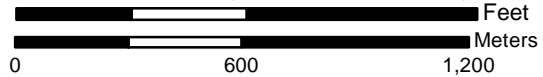
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 File: HDR\_2012\_LineMapping.mxd



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**Fish Barrier and Aquatic Habitat Field Survey Map Book**



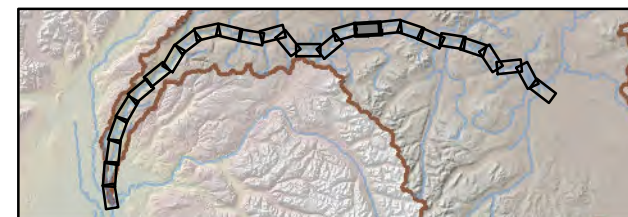
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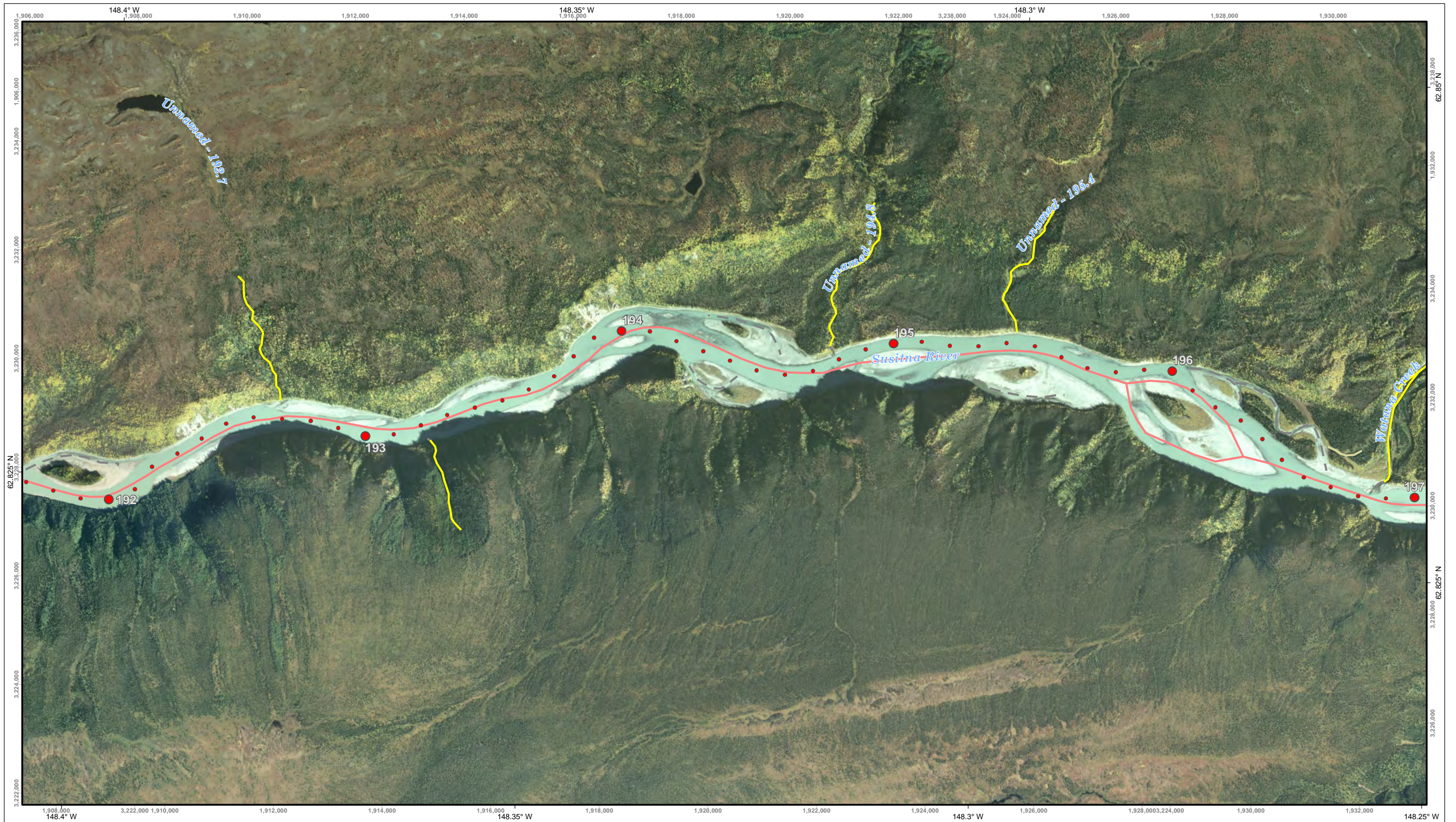
Map Projection: NAD83 State Plane Zone 4 (Feet)  
 Grid Interval: 2000'

**General Features**

- Susitna Project River Miles
  - Susitna Geomorphic Reach Breaks
  - Focus Area
- |   |  |  |
|---|--|--|
| <p><b>Mesohabitats</b></p> <ul style="list-style-type: none"> <li><span style="color: red;">—</span> Glide or Run</li> <li><span style="color: orange;">—</span> Pool</li> <li><span style="color: blue;">—</span> Rapid</li> <li><span style="color: purple;">—</span> Riffle</li> </ul> | <p><b>Macrohabitats</b></p> <ul style="list-style-type: none"> <li><span style="color: yellow;">—</span> Side Slough</li> <li><span style="color: grey;">—</span> Tributary</li> <li><span style="color: grey;">—</span> Unidentified</li> <li><span style="color: olive;">—</span> Upland Slough</li> </ul> | <p><b>Special Habitat Features</b></p> <ul style="list-style-type: none"> <li><span style="color: cyan;">—</span> Backwater</li> <li><span style="color: teal;">—</span> Beaver Complex</li> </ul> |
|---|--|--|



Date Created: 1/29/2014  
 Map Author: HDR Alaska - MAD  
 File: HDR\_2012\_LineMapping.mxd



# Susitna - Watana Hydroelectric Project

## Fish Barrier and Aquatic Habitat Field Survey Map Book



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Map Projection: NAD83 State Plane Zone 4 (Feet)  
Grid Interval: 2000'

### General Features

- Susitna Project River Miles
- Susitna Geomorphic Reach Breaks
- Focus Area

### Mesohabitats

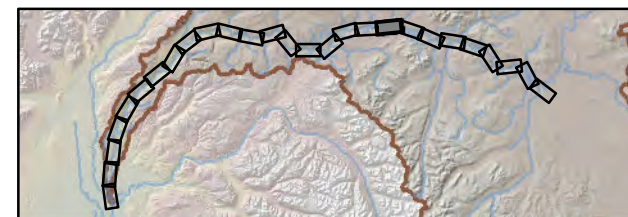
- Glide or Run
- Pool
- Rapid
- Riffle

### Macrohabitats

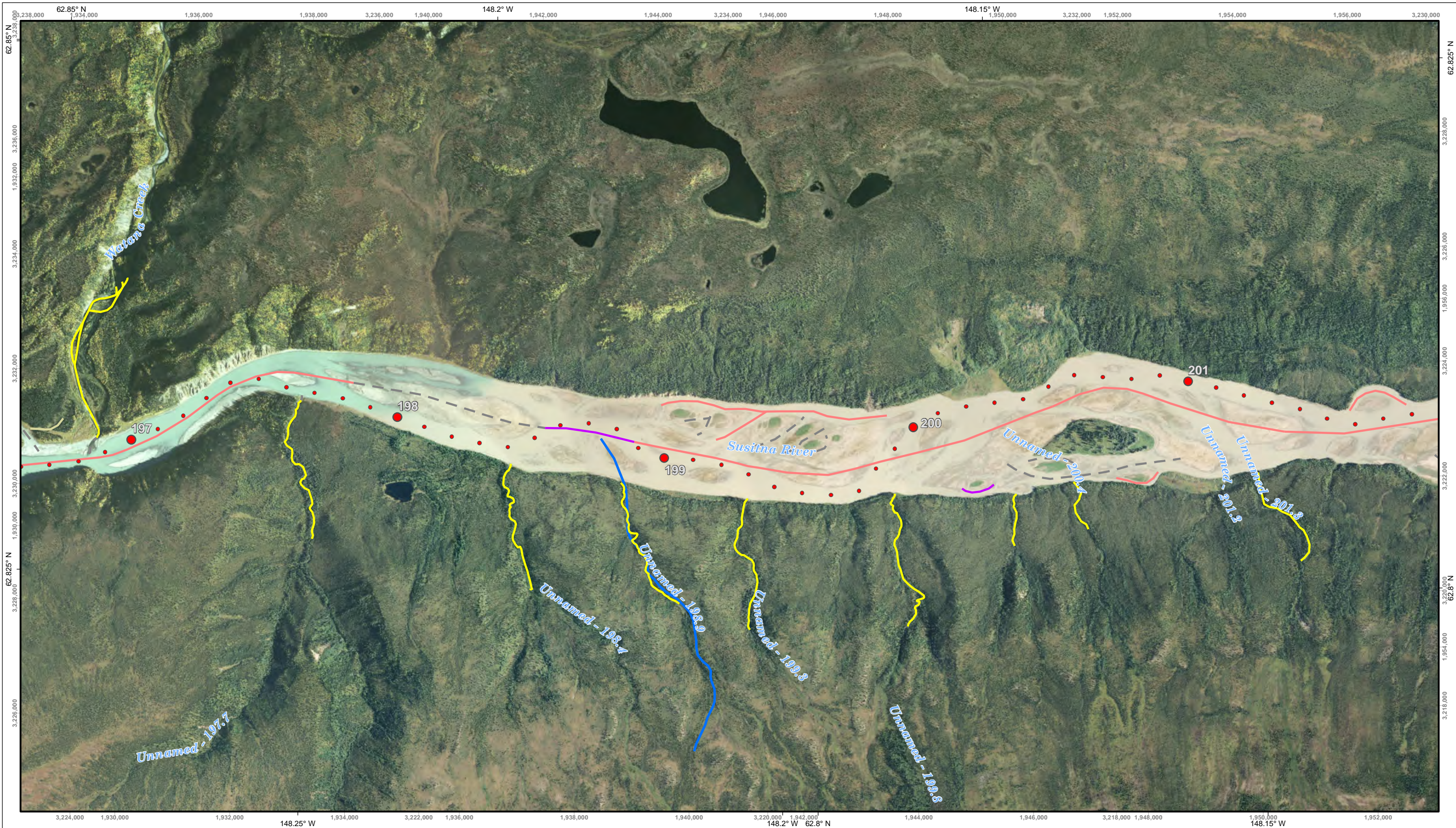
- Side Slough
- Tributary
- Unidentified
- Upland Slough

### Special Habitat Features

- Backwater
- Beaver Complex



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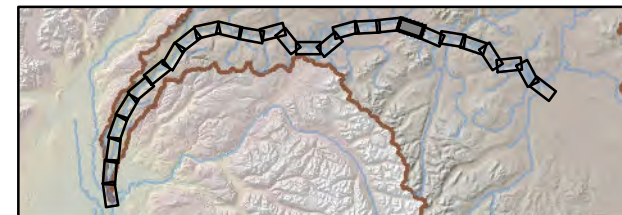
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Map Projection: NAD83 State Plane Zone 4 (Feet)  
 Grid Interval: 2000'

**General Features**

- Susitna Project River Miles
- Susitna Geomorphic Reach Breaks
- Focus Area
- Mesohabitats: Pool
- Mesohabitats: Rapid
- Mesohabitats: Riffle
- Macrohabitats: Side Slough
- Macrohabitats: Tributary
- Macrohabitats: Unidentified
- Macrohabitats: Upland Slough
- Special Habitat Features: Backwater
- Special Habitat Features: Beaver Complex



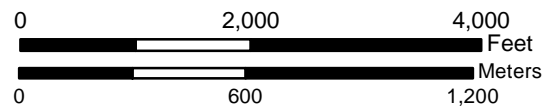
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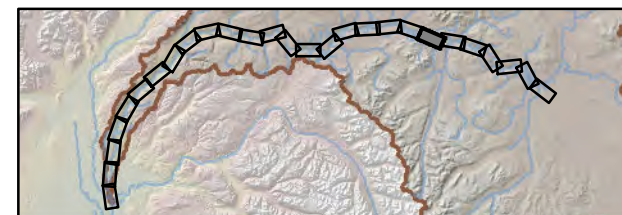
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Map Projection: NAD83 State Plane Zone 4 (Feet)  
 Grid Interval: 2000'

**General Features**

- Susitna Project River Miles
  - Susitna Geomorphic Reach Breaks
  - Focus Area
- |   |  |  |
|---|--|--|
| <p><b>Mesohabitats</b></p> <ul style="list-style-type: none"> <li><span style="color: red;">—</span> Glide or Run</li> <li><span style="color: orange;">—</span> Pool</li> <li><span style="color: cyan;">—</span> Rapid</li> <li><span style="color: purple;">—</span> Riffle</li> </ul> | <p><b>Macrohabitats</b></p> <ul style="list-style-type: none"> <li><span style="color: yellow;">—</span> Side Slough</li> <li><span style="color: grey;">—</span> Tributary</li> <li><span style="color: grey;">—</span> Unidentified</li> <li><span style="color: olive;">—</span> Upland Slough</li> </ul> | <p><b>Special Habitat Features</b></p> <ul style="list-style-type: none"> <li><span style="color: cyan;">—</span> Backwater</li> <li><span style="color: teal;">—</span> Beaver Complex</li> </ul> |
|---|--|--|



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# Susitna - Watana Hydroelectric Project

## Fish Barrier and Aquatic Habitat Field Survey Map Book



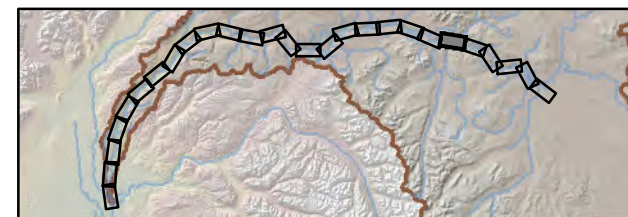
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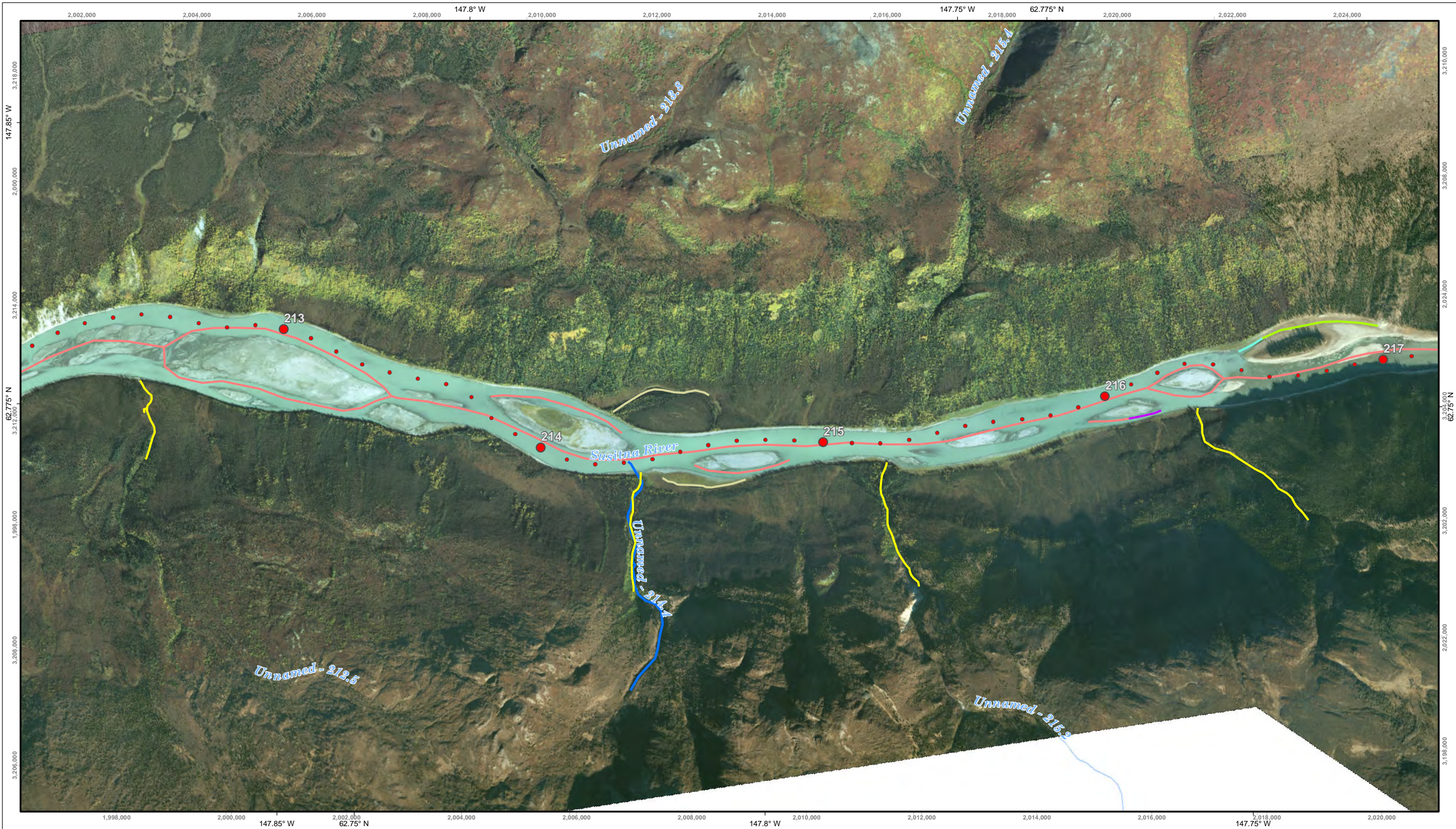
Map Projection: NAD83 State Plane Zone 4 (Feet)  
Grid Interval: 2000'

### General Features

- Susitna Project River Miles
  - Susitna Geomorphic Reach Breaks
  - Focus Area
- |   |  |  |
|---|--|--|
| <b>Mesohabitats</b><br><span style="color: red;">—</span> Glide or Run<br><span style="color: orange;">—</span> Pool<br><span style="color: blue;">—</span> Rapid<br><span style="color: purple;">—</span> Riffle | <b>Macrohabitats</b><br><span style="color: yellow;">—</span> Side Slough<br><span style="color: grey;">—</span> Tributary<br><span style="color: grey;">—</span> Unidentified<br><span style="color: olive;">—</span> Upland Slough | <b>Special Habitat Features</b><br><span style="color: cyan;">—</span> Backwater<br><span style="color: teal;">—</span> Beaver Complex |
|---|--|--|



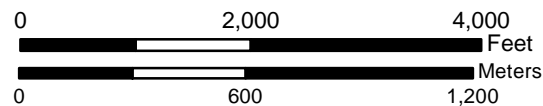
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**Susitna - Watana Hydroelectric Project**  
 Fish Barrier and Aquatic Habitat Field Survey Map Book



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Map Projection: NAD83 State Plane Zone 4 (Feet)  
 Grid Interval: 2000'

**General Features**

- Susitna Project River Miles
- Susitna Geomorphic Reach Breaks
- Focus Area

**Mesohabitats**

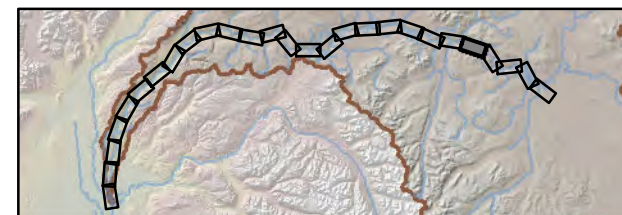
- Glide or Run
- Pool
- Rapid
- Riffle

**Macrohabitats**

- Side Slough
- Tributary
- Unidentified
- Upland Slough

**Special Habitat Features**

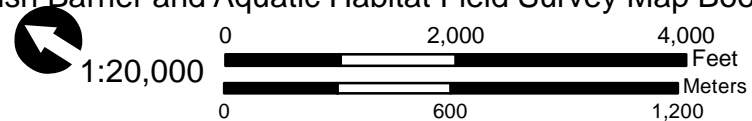
- Backwater
- Beaver Complex



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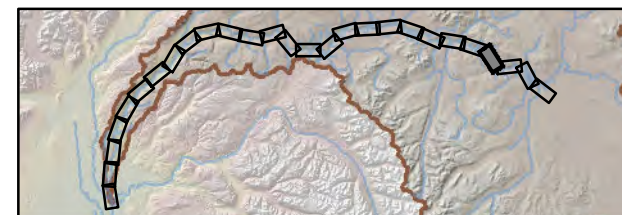


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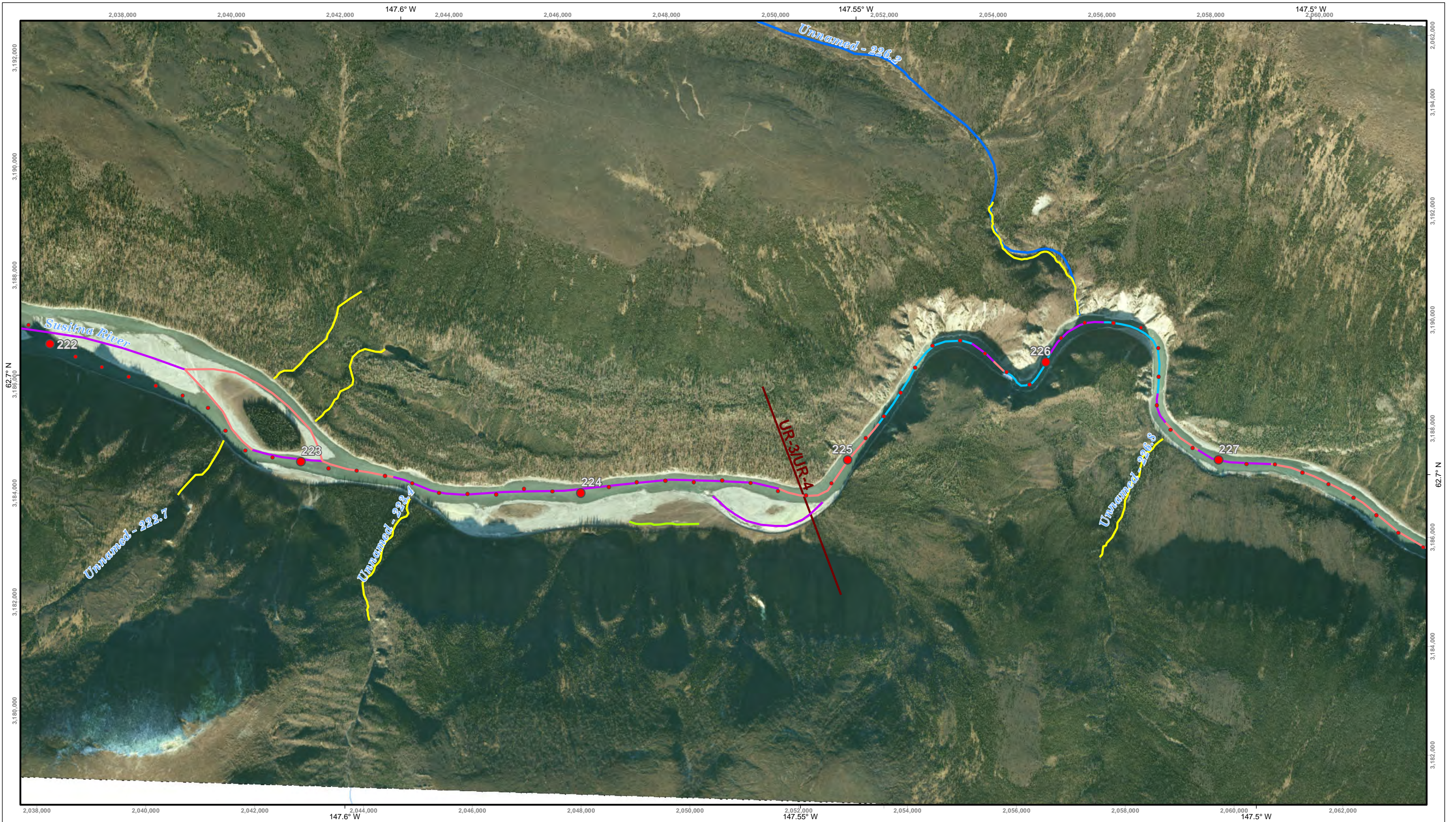


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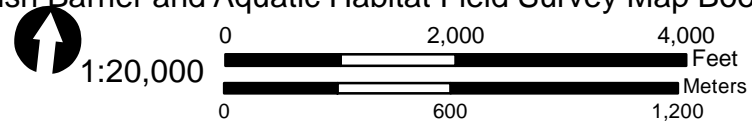
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●	Susitna Project River Miles	—	—	—
—	Susitna Geomorphic Reach Breaks	—	—	—
□	Focus Area	—	—	—
—		—	—	—
		—	—	—
		—	—	—
		—	—	—
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		—	—	—



Date Created: 1/29/2014  
 Map Author: HDR Alaska - MAD  
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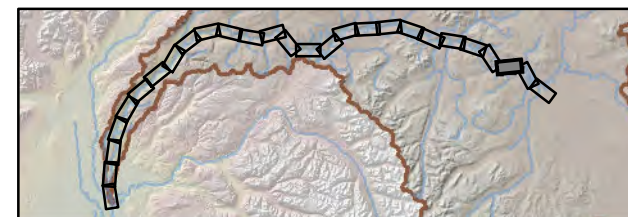


**Susitna - Watana Hydroelectric Project**  
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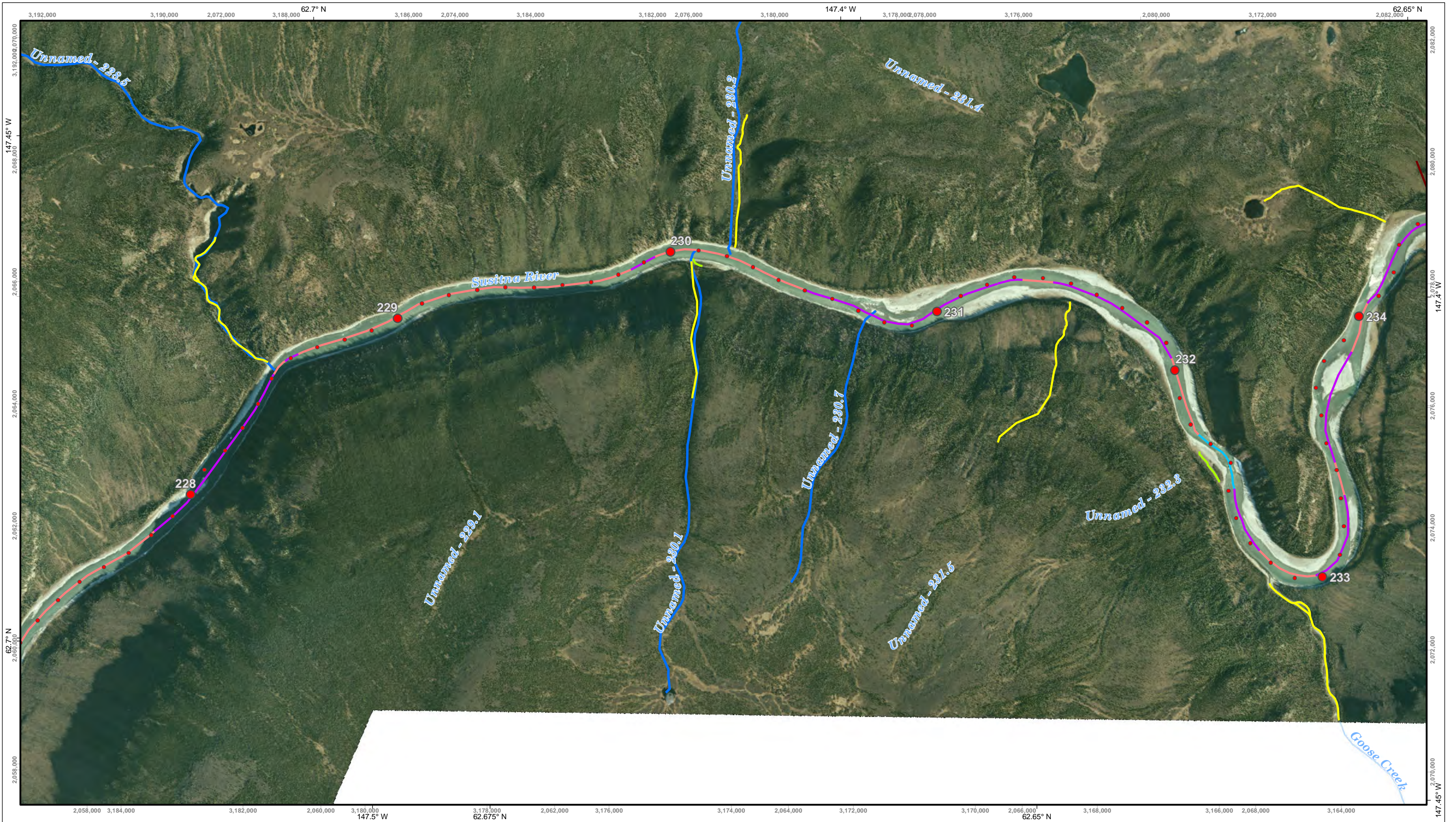


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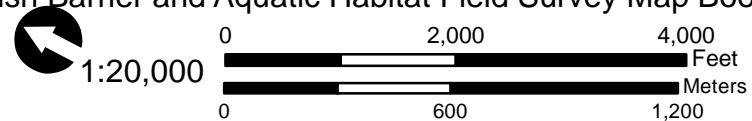
General Features			
<span style="color: red;">●</span>	Susitna Project River Miles	<span style="color: red;">—</span>	Glide or Run
<span style="color: red;">—</span>	Susitna Geomorphic Reach Breaks	<span style="color: yellow;">—</span>	Pool
<span style="border: 1px solid red; display: inline-block; width: 10px; height: 10px;"></span>	Focus Area	<span style="color: blue;">—</span>	Rapid
		<span style="color: purple;">—</span>	Riffle
		<span style="color: green;">—</span>	Side Slough
		<span style="color: grey;">—</span>	Tributary
		<span style="color: brown;">—</span>	Unidentified
		<span style="color: olive;">—</span>	Upland Slough
		<span style="color: cyan;">—</span>	Backwater
		<span style="color: teal;">—</span>	Beaver Complex



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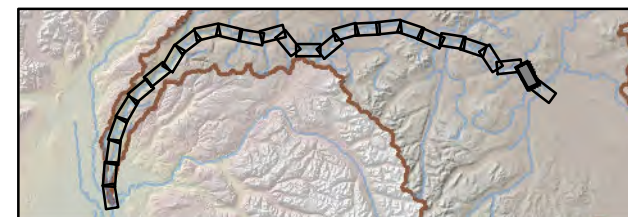


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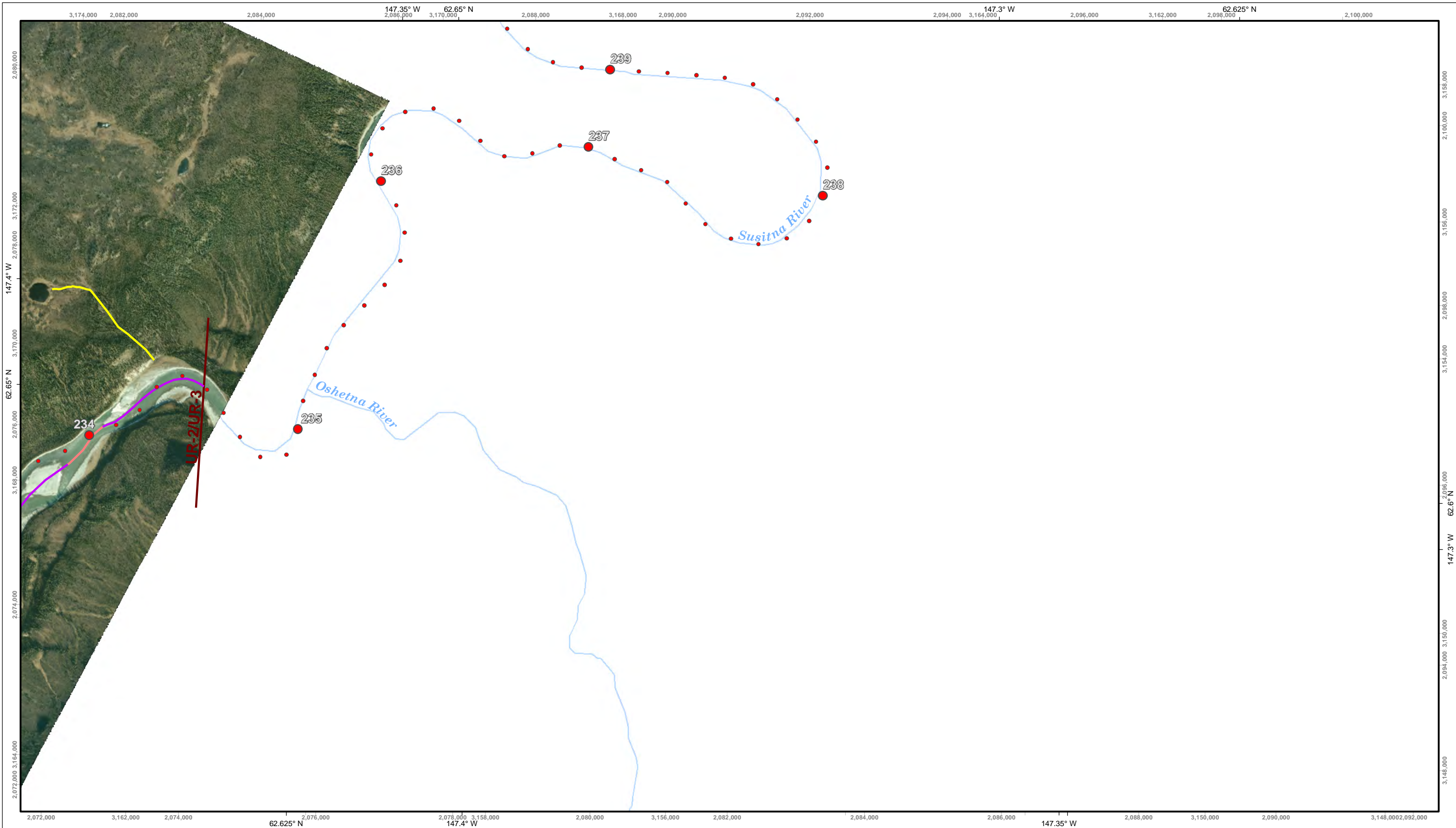


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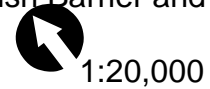
General Features			
<span style="color: red;">●</span>	Susitna Project River Miles	<span style="color: red;">—</span>	Glide or Run
<span style="border: 1px solid red; display: inline-block; width: 10px; height: 10px;"></span>	Susitna Geomorphic Reach Breaks	<span style="color: orange;">—</span>	Pool
<span style="border: 1px solid red; display: inline-block; width: 10px; height: 10px;"></span>	Focus Area	<span style="color: blue;">—</span>	Rapid
		<span style="color: purple;">—</span>	Riffle
Mesohabitats			
		<span style="color: yellow;">—</span>	Side Slough
		<span style="color: grey;">—</span>	Tributary
		<span style="color: grey;">—</span>	Unidentified
		<span style="color: olive;">—</span>	Upland Slough
Macrohabitats			
		<span style="color: green;">—</span>	Backwater
		<span style="color: cyan;">—</span>	Beaver Complex



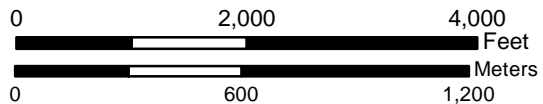
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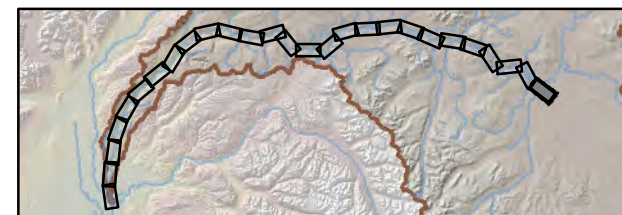


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Map Projection: NAD83 State Plane Zone 4 (Feet)  
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General Features			
<span style="color: red;">●</span> Susitna Project River Miles	<span style="color: red;">—</span> Glide or Run	<span style="color: yellow;">—</span> Side Slough	<span style="color: cyan;">—</span> Backwater
<span style="color: red;">—</span> Susitna Geomorphic Reach Breaks	<span style="color: orange;">—</span> Pool	<span style="color: yellow;">—</span> Tributary	<span style="color: cyan;">—</span> Beaver Complex
<span style="border: 1px solid red; display: inline-block; width: 10px; height: 10px;"></span> Focus Area	<span style="color: blue;">—</span> Rapid	<span style="color: grey;">—</span> Unidentified	
	<span style="color: purple;">—</span> Riffle	<span style="color: olive;">—</span> Upland Slough	



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