

## APPENDIX D: MIDDLE RIVER MAINSTEM SURVEYS, 2013

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

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

**Appendix D  
Middle River Mainstem Surveys, 2013**

**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.

February 2014 Draft





**Legend**

	Instream Flow Focus Area (Upper and Lower Extent)
	Project River Mile
	Flow Arrow

<b>Macrohabitat (2013)*</b>		<b>Mesohabitat (2013)*</b>	
	Main Channel		Riffle
	Split Main Channel		Run
	Multiple Split Main Channel		Glide
	Side Channel		Pool
	Side Slough		Backwater
	Upland Slough		Clearwater Plume

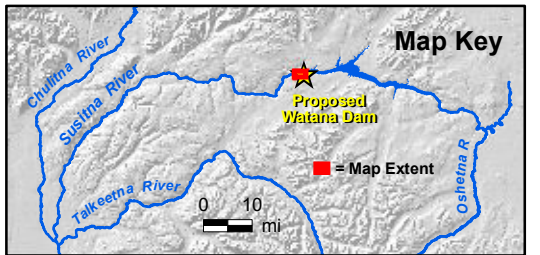
	Dry
	Beaver Complex

\* Preliminary Data

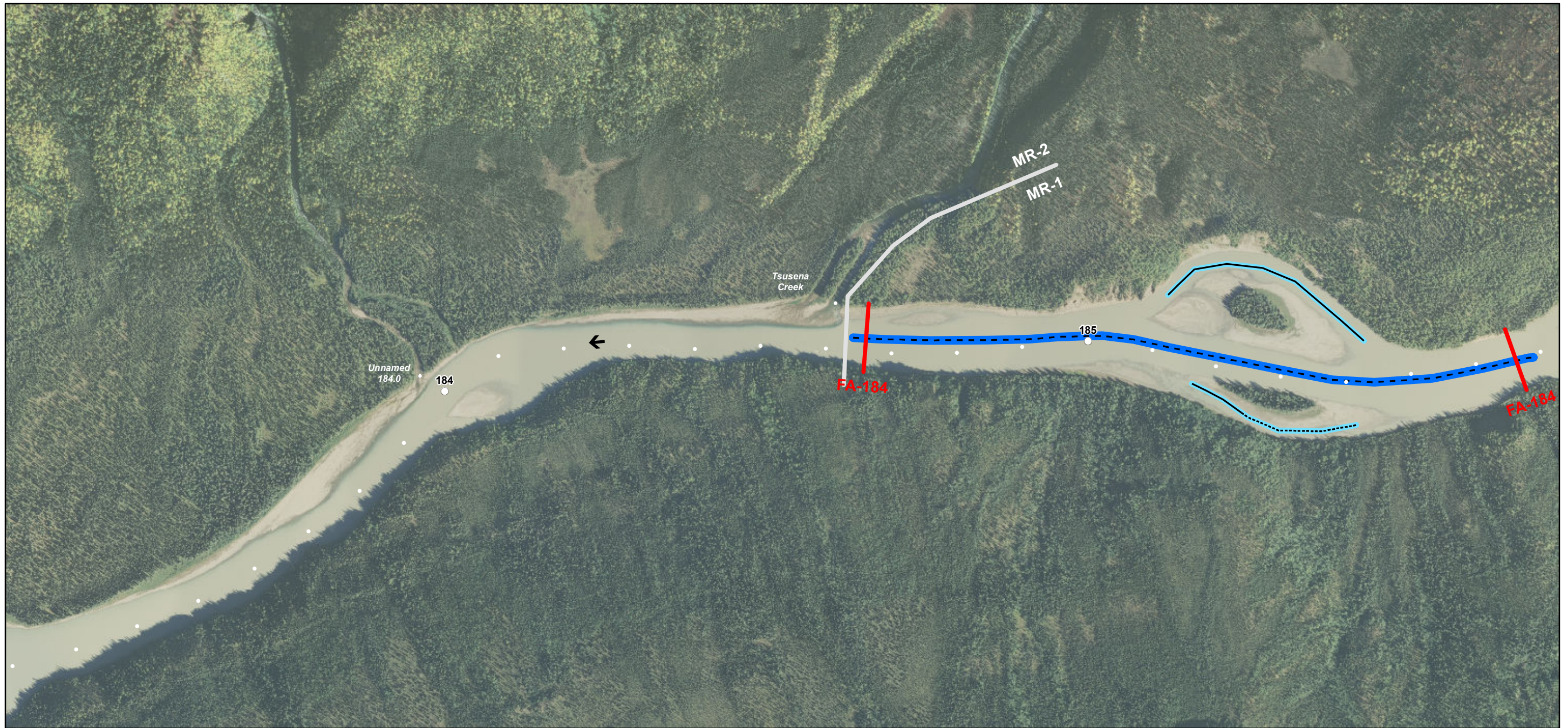
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Projection: AK SP Zone 4 NAD 1983  
 Date Created: 1/29/2014  
 Map Author: R2 - Joetta Zabolney  
 File: Map\_ISR\_FA\_AQHAB\_MS.mxd







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	Dry
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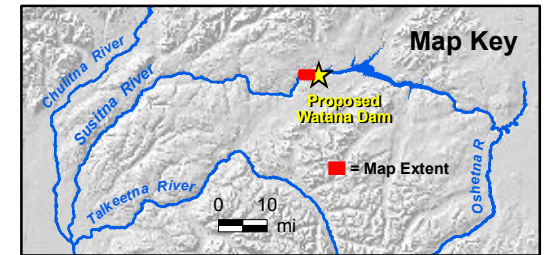
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**ALASKA ENERGY AUTHORITY**

0 1,000 Feet

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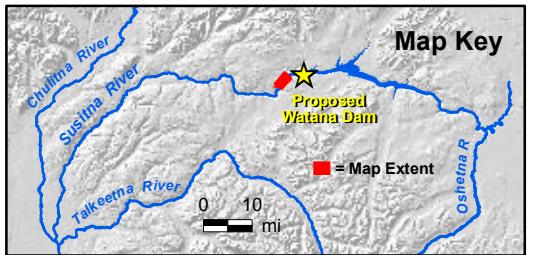
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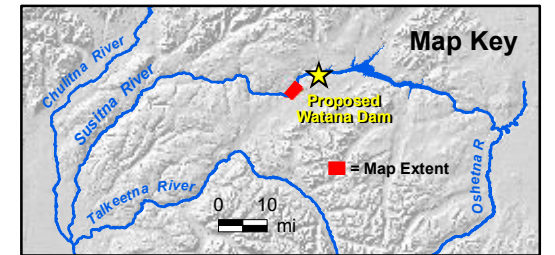
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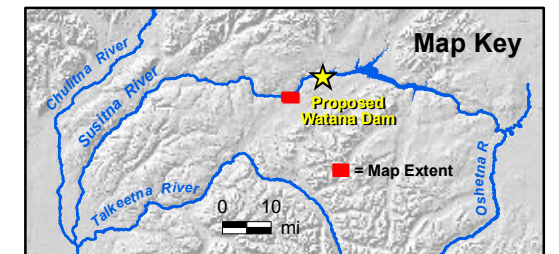
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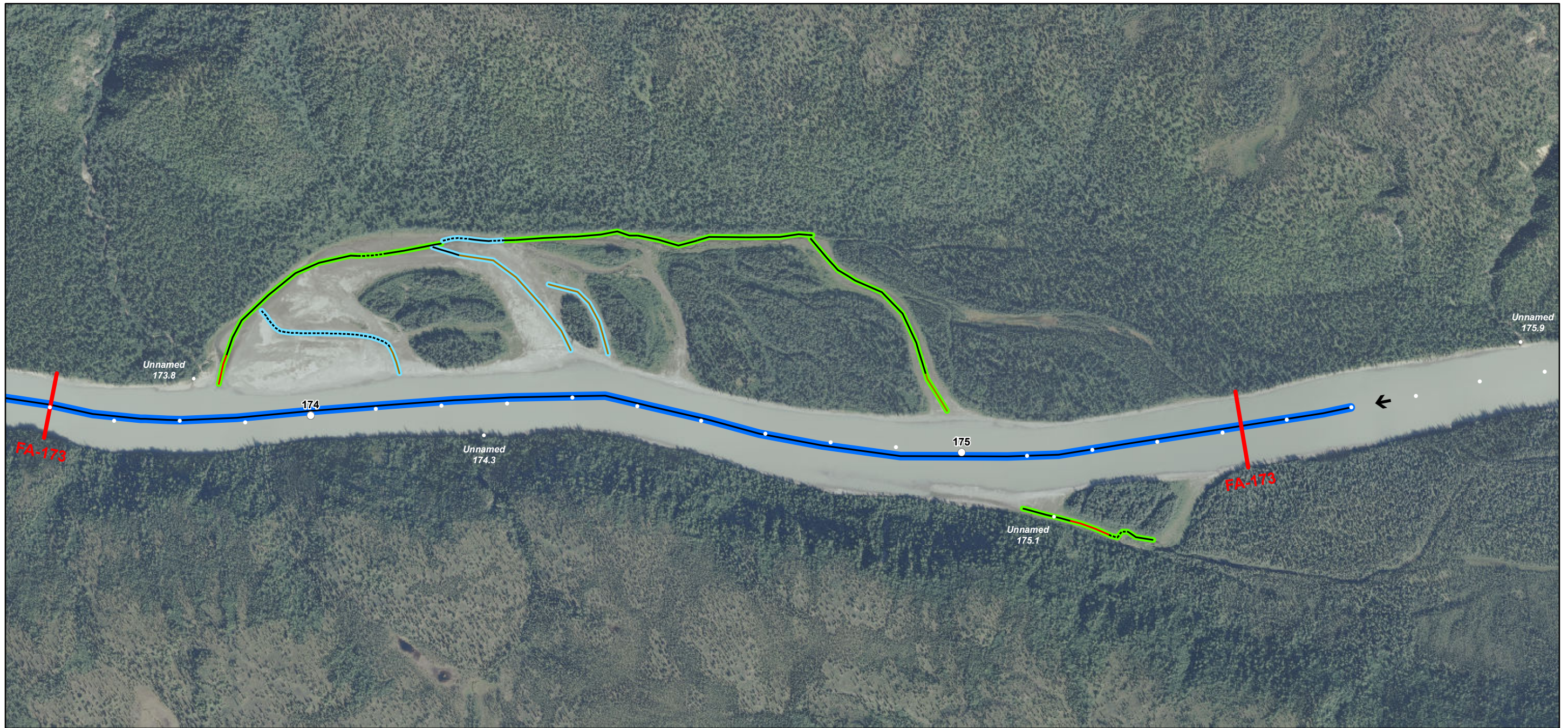


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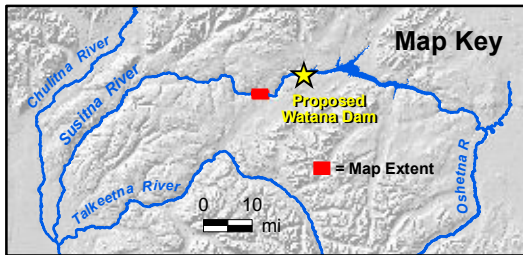
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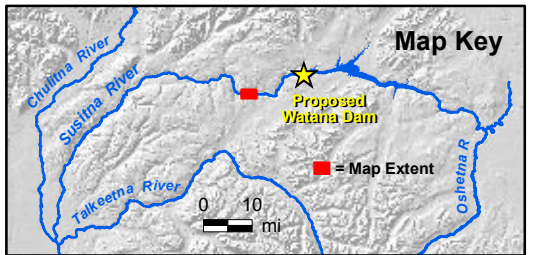
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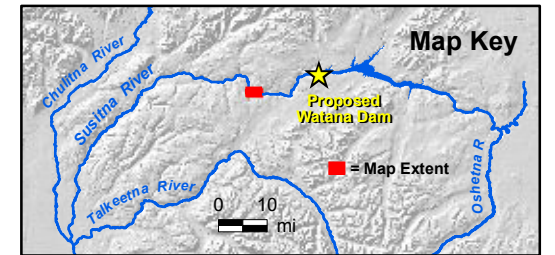
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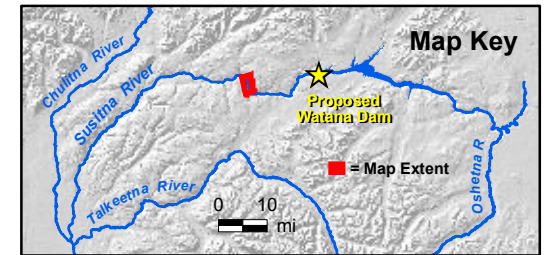
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Map Author: R2 - Joetta Zabolney  
File: Map\_ISR\_FA\_AQHAB\_MSP9.mxd







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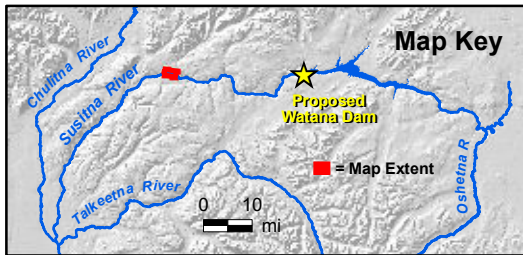
- Dry
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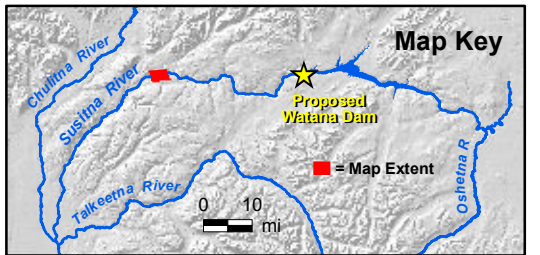
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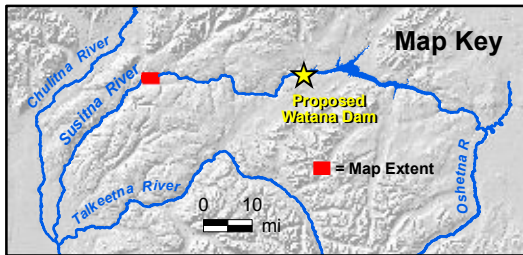
<b>Macrohabitat (2013)*</b>	<b>Mesohabitat (2013)*</b>
<span style="color: blue;">—</span> Main Channel	<span style="color: brown;">—</span> Dry
<span style="color: blue;">- - -</span> Split Main Channel	<span style="color: orange;">—</span> Beaver Complex
<span style="color: blue;">- · - · -</span> Multiple Split Main Channel	<span style="color: brown;">- · - · -</span> Riffle
<span style="color: lightblue;">—</span> Side Channel	<span style="color: black;">- - -</span> Run
<span style="color: green;">—</span> Side Slough	<span style="color: black;">—</span> Glide
<span style="color: yellow;">—</span> Upland Slough	<span style="color: red;">—</span> Pool
	<span style="color: grey;">—</span> Backwater
	<span style="color: pink;">—</span> Clearwater Plume

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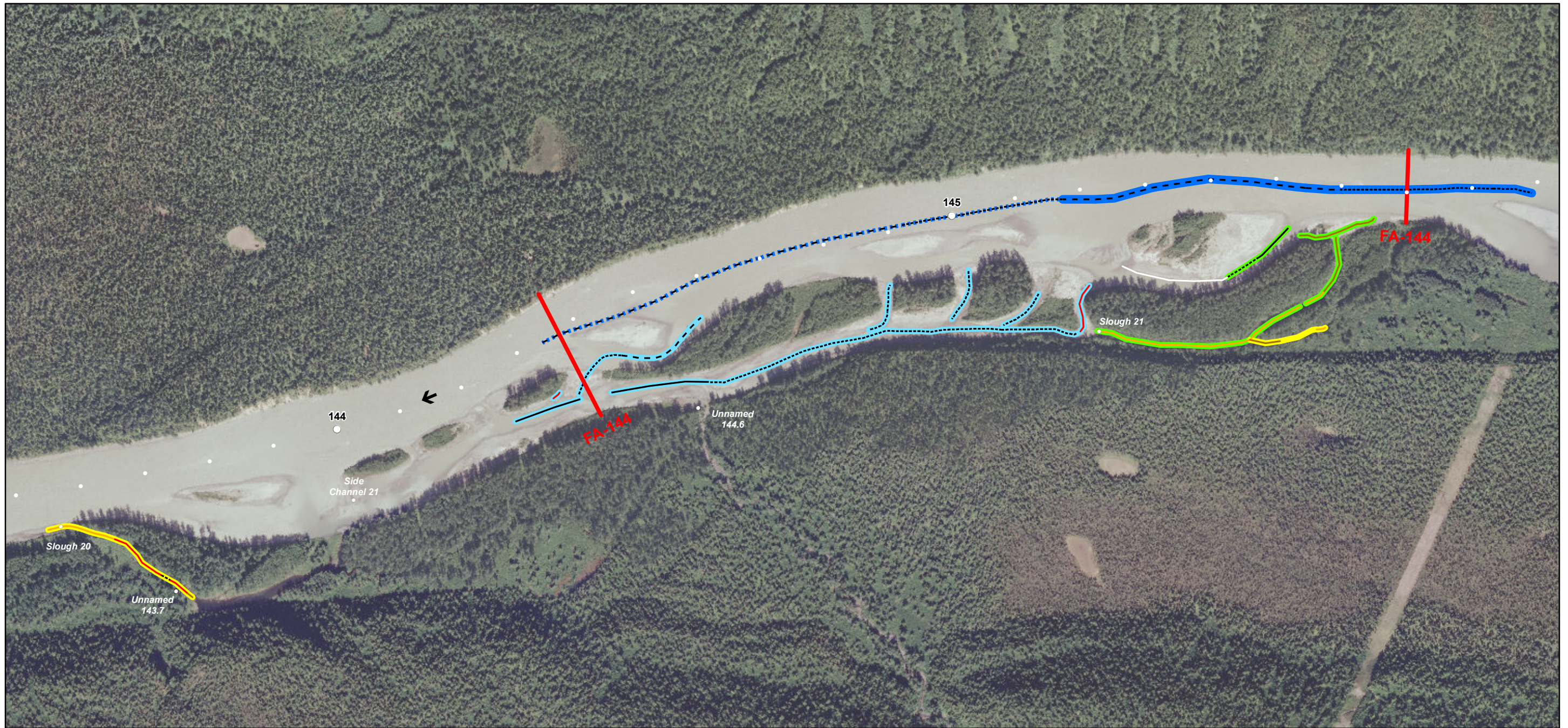
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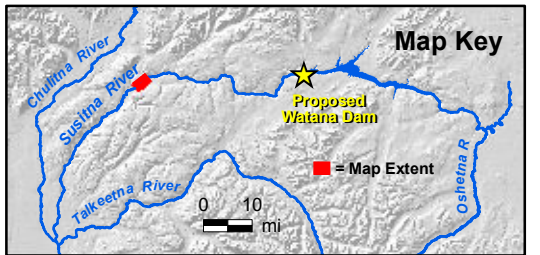
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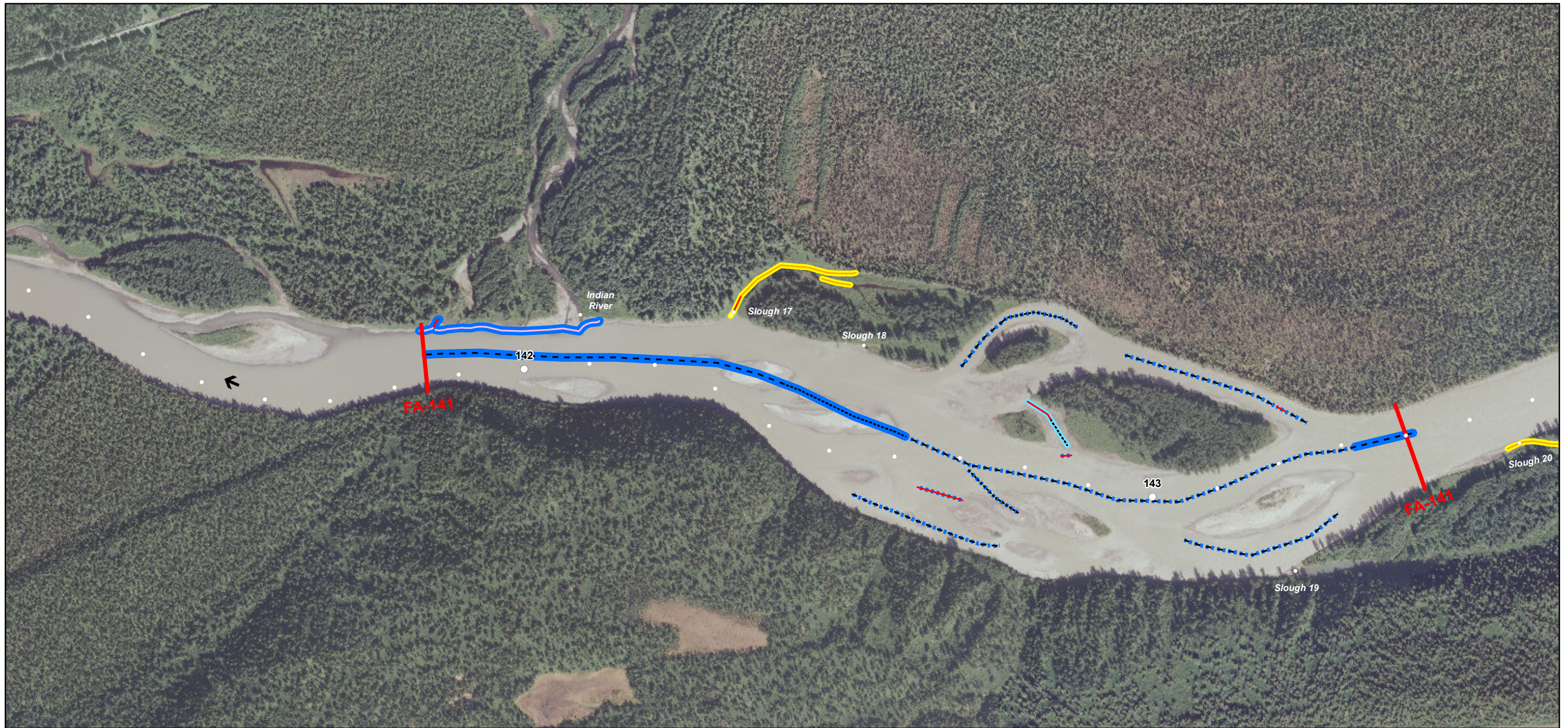
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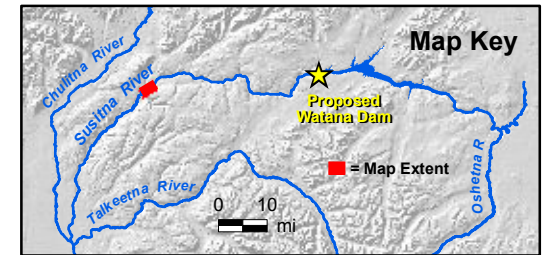
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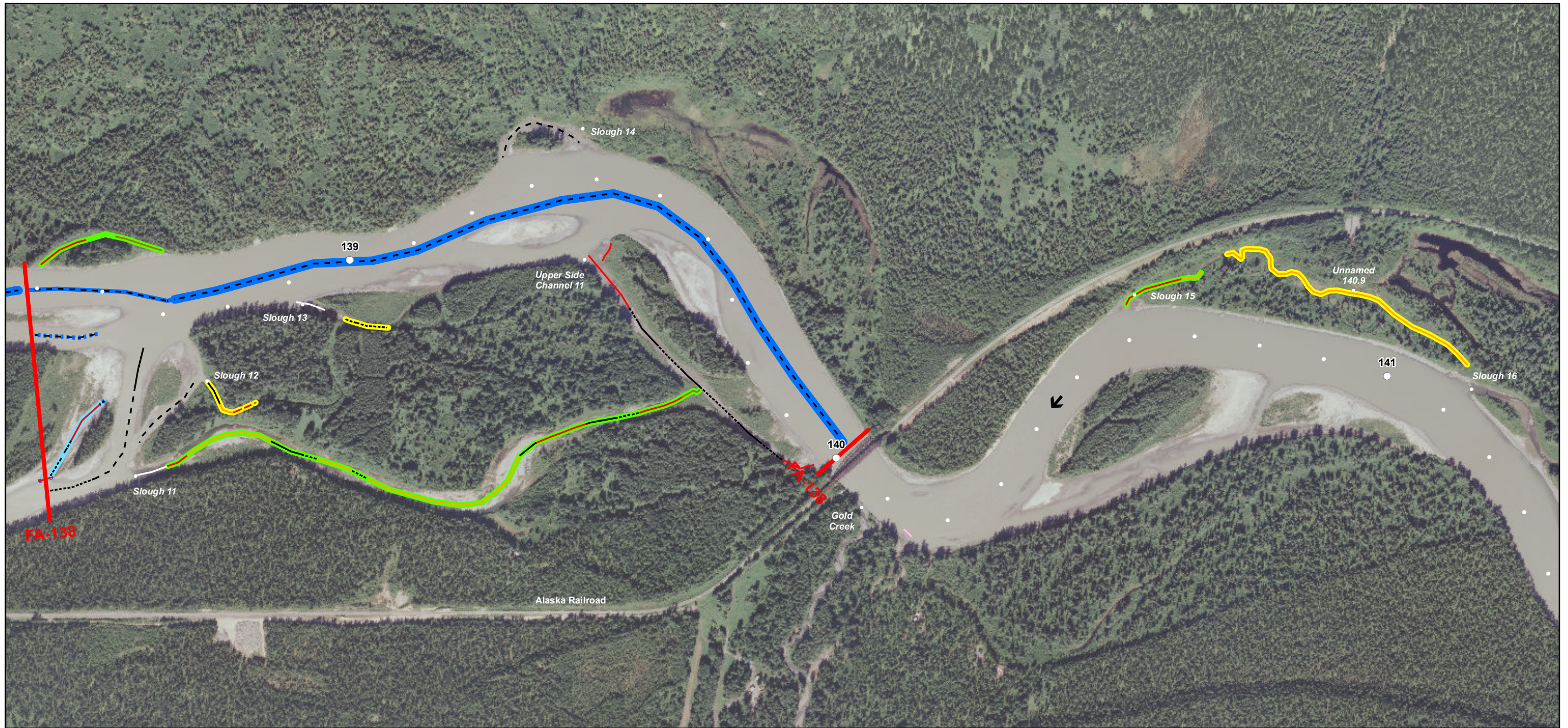
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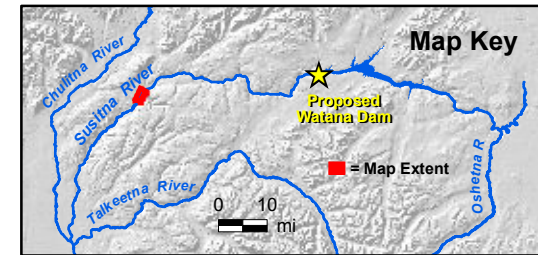
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|---|--|--|
| <b>Macrohabitat (2013)*</b>   | <b>Mesohabitat (2013)*</b>                           |  |
| <span style="color: blue;">—</span> Main Channel                        | <span style="color: blue;">- - -</span> Riffle       | <span style="color: brown;">—</span> Dry             |
| <span style="color: blue;">- - -</span> Split Main Channel              | <span style="color: black;">- - -</span> Run         | <span style="color: orange;">—</span> Beaver Complex |
| <span style="color: blue;">- - - - -</span> Multiple Split Main Channel | <span style="color: black;">—</span> Glide           |  |
| <span style="color: lightblue;">—</span> Side Channel                   | <span style="color: red;">—</span> Pool              |  |
| <span style="color: green;">—</span> Side Slough                        | <span style="color: grey;">—</span> Backwater        |  |
| <span style="color: yellow;">—</span> Upland Slough                     | <span style="color: pink;">—</span> Clearwater Plume |  |
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**ALASKA ENERGY AUTHORITY**

0 1,000 Feet

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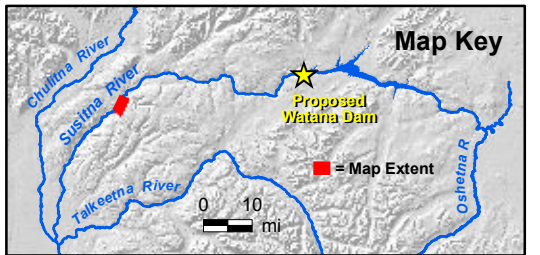
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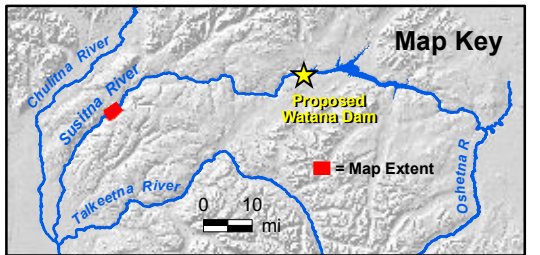
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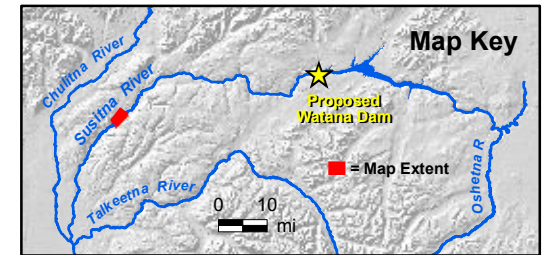
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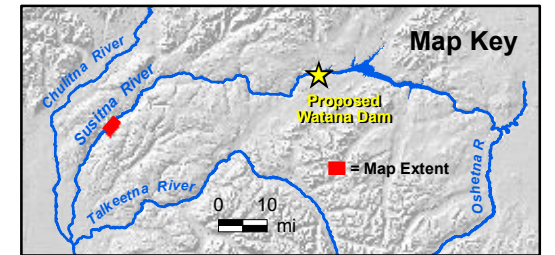
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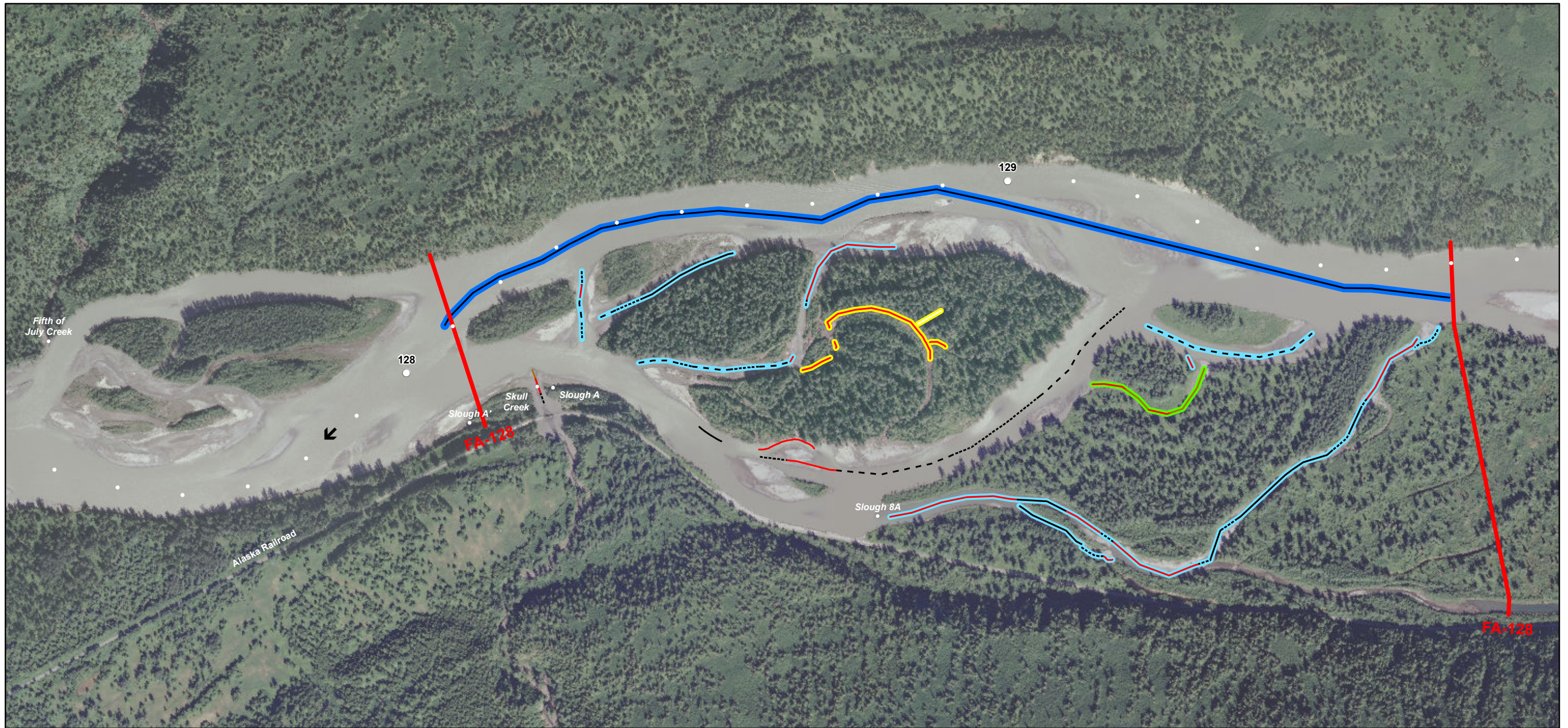
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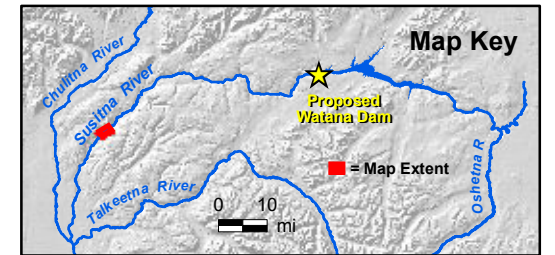
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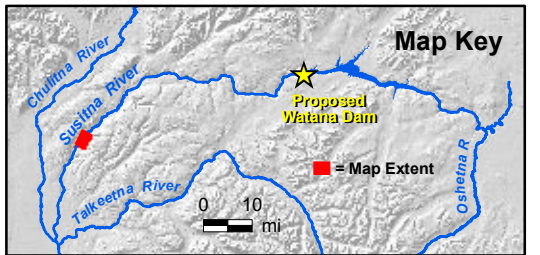
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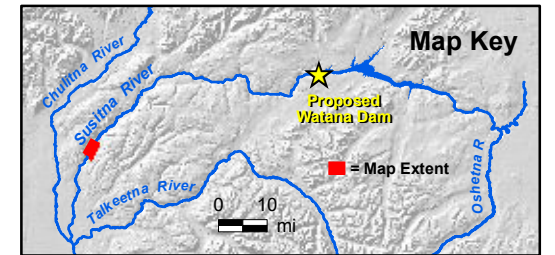
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- ⋯ Riffle
- - - Run
- Glide
- Pool
- Backwater
- Clearwater Plume

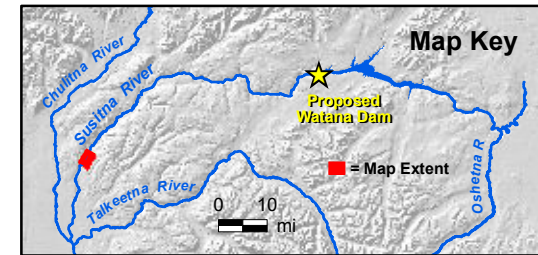
- █ Dry
- █ Beaver Complex

\* Preliminary Data

Orthophoto Source: 2011 Matanuska-Susitna Borough LiDAR & Imagery Project



Projection: AK SP Zone 4 NAD 1983  
 Date Created: 1/29/2014  
 Map Author: R2 - Joetta Zablotney  
 File: Map\_ISR\_FA\_AQHAB\_MS.mxd





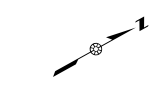


- Legend**
- █ Instream Flow Focus Area (Upper and Lower Extent)
  - Project River Mile
  - ← Flow Arrow

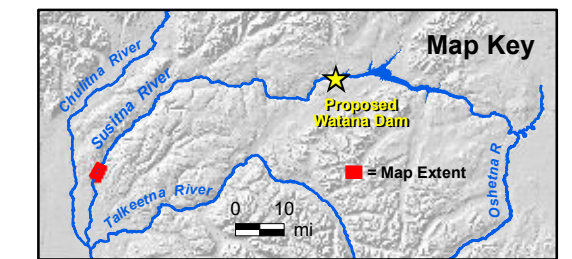
- Macrohabitat (2013)\***
- █ Main Channel
  - █ Split Main Channel
  - ▒ Multiple Split Main Channel
  - █ Side Channel
  - █ Side Slough
  - █ Upland Slough

- Mesohabitat (2013)\***
- ⋯ Riffle
  - - - Run
  - Glide
  - Pool
  - Backwater
  - Clearwater Plume
  - Dry
  - Beaver Complex
- \* Preliminary Data*

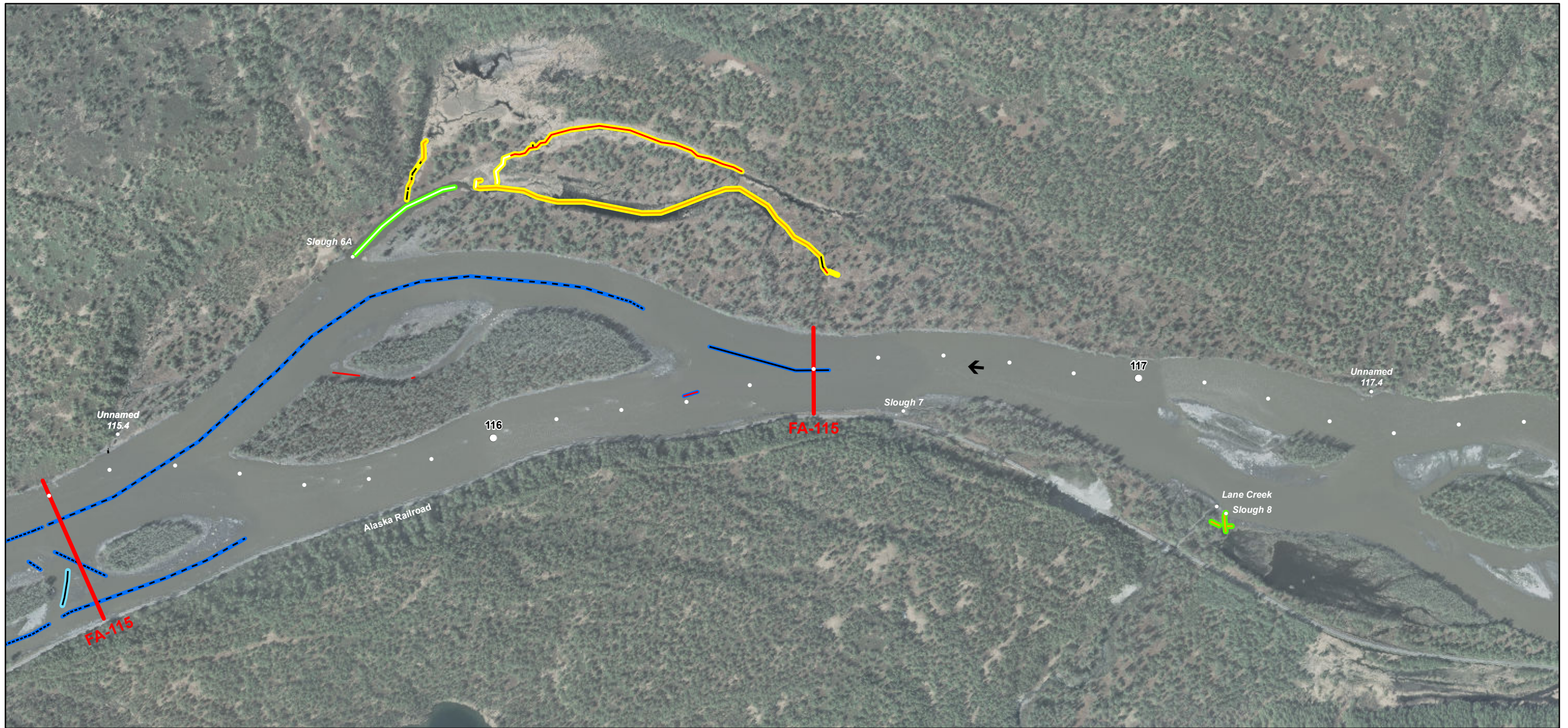
Orthophoto Source: 2011 Matanuska-Susitna Borough LiDAR & Imagery Project



Projection: AK SP Zone 4 NAD 1983  
 Date Created: 1/29/2014  
 Map Author: R2 - Joetta Zabloney  
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**Legend**

- Instream Flow Focus Area (Upper and Lower Extent)
- Project River Mile
- ← Flow Arrow

**Macrohabitat (2013)\***

- Main Channel
- - - Split Main Channel
- - - - - Multiple Split Main Channel
- Side Channel
- Side Slough
- Upland Slough

**Mesohabitat (2013)\***

- - - - - Riffle
- - - Run
- Glide
- Pool
- Backwater
- Clearwater Plume
- Dry
- Beaver Complex

*\* Preliminary Data*

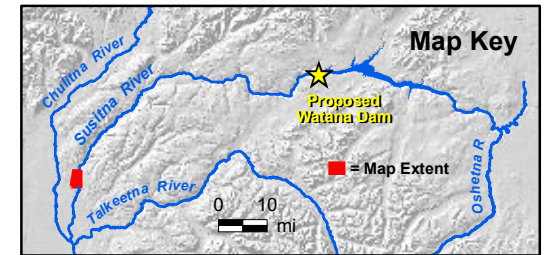
Orthophoto Source: 2011 Matanuska-Susitna Borough LiDAR & Imagery Project

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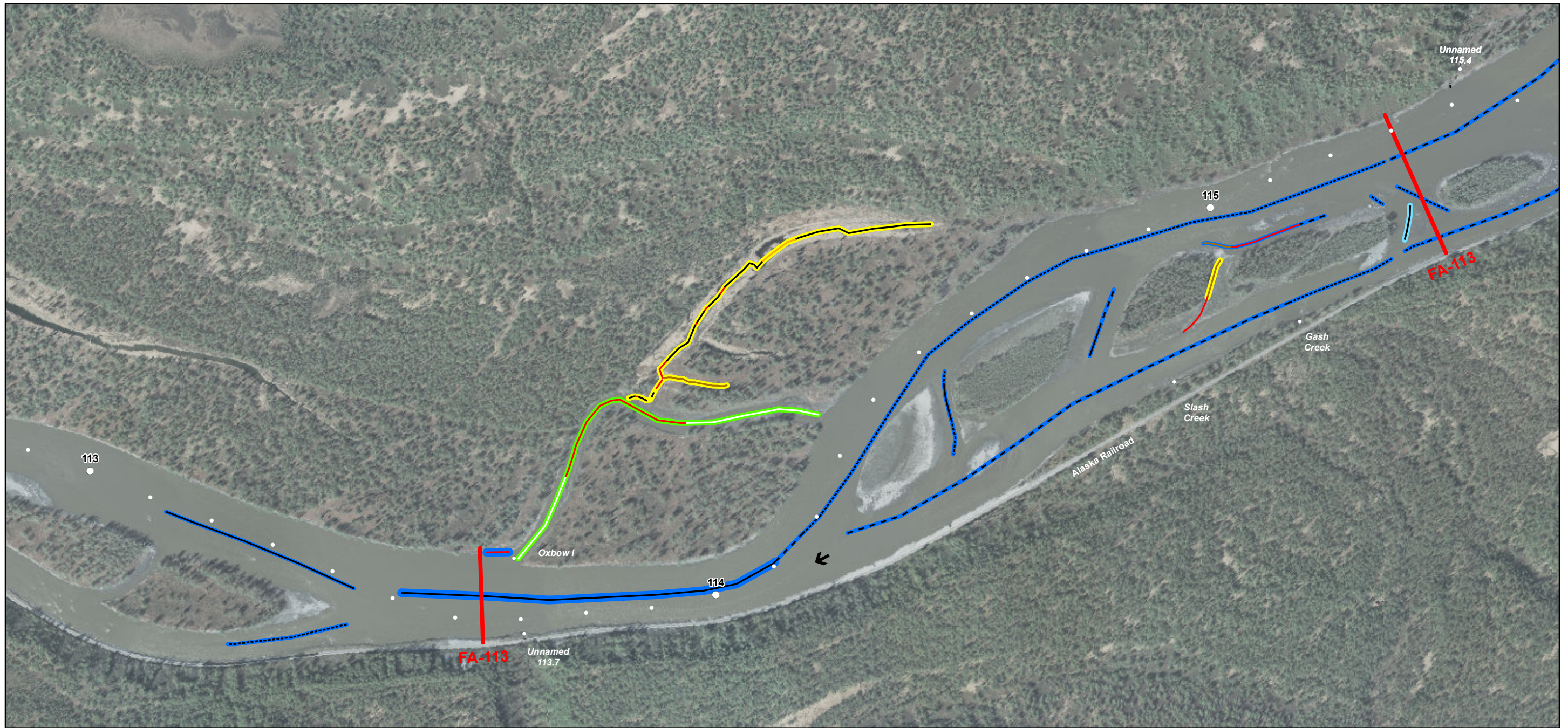
0 1,000 Feet

0 10 mi

Projection: AK SP Zone 4 NAD 1983  
 Date Created: 1/29/2014  
 Map Author: R2 - Joetta Zabolney  
 File: Map\_ISR\_FA\_AQHAB\_MS.mxd







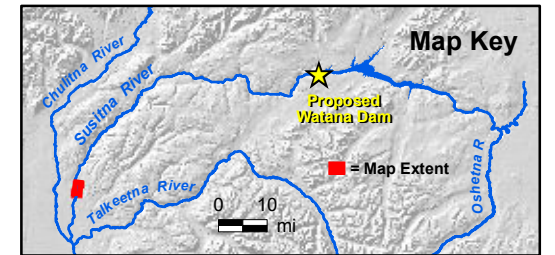
- Legend**
- Instream Flow Focus Area (Upper and Lower Extent)
  - Project River Mile
  - ← Flow Arrow

- |   |   |  |
|---|---|--|
| <b>Macrohabitat (2013)*</b>   | <b>Mesohabitat (2013)*</b>  |  |
| <span style="color: blue;">—</span> Main Channel                        | <span style="border-bottom: 1px dashed black;">    </span> Riffle | <span style="color: orange;">—</span> Dry            |
| <span style="color: blue;">- - -</span> Split Main Channel              | <span style="border-bottom: 1px dashed black;">    </span> Run    | <span style="color: yellow;">—</span> Beaver Complex |
| <span style="color: blue;">- - - - -</span> Multiple Split Main Channel | <span style="border-bottom: 1px solid black;">    </span> Glide   |  |
| <span style="color: lightblue;">—</span> Side Channel                   | <span style="color: red;">—</span> Pool                           |  |
| <span style="color: green;">—</span> Side Slough                        | <span style="color: grey;">—</span> Backwater                     |  |
| <span style="color: yellow;">—</span> Upland Slough                     | <span style="color: pink;">—</span> Clearwater Plume              |  |
- \* Preliminary Data

Orthophoto Source: 2011 Matanuska-Susitna Borough LiDAR & Imagery Project



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**Legend**

- Instream Flow Focus Area (Upper and Lower Extent)
- Project River Mile
- ← Flow Arrow

**Macrohabitat (2013)\***

- Main Channel
- - - Split Main Channel
- - - - - Multiple Split Main Channel
- Side Channel
- Side Slough
- Upland Slough

**Mesohabitat (2013)\***

- - - - - Riffle
- - - Run
- Glide
- Pool
- Backwater
- Clearwater Plume

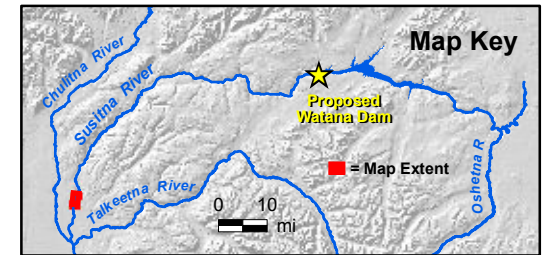
- Dry
- Beaver Complex

\* Preliminary Data

Orthophoto Source: 2011 Matanuska-Susitna Borough LiDAR & Imagery Project



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**Legend**

- Instream Flow Focus Area (Upper and Lower Extent)
- Project River Mile
- ← Flow Arrow

**Macrohabitat (2013)\***

- Main Channel
- - - Split Main Channel
- · - · - Multiple Split Main Channel
- Side Channel
- Side Slough
- Upland Slough

**Mesohabitat (2013)\***

- · - · - Riffle
- - - Run
- Glide
- Pool
- Backwater
- Clearwater Plume

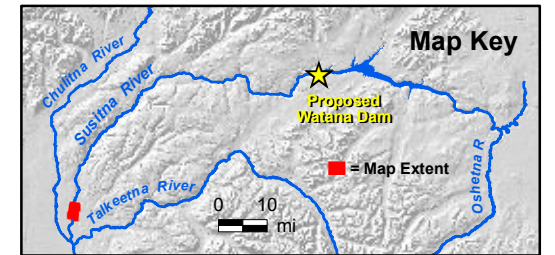
- Dry
- Beaver Complex

\* Preliminary Data

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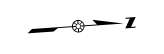


- Legend**
- Instream Flow Focus Area (Upper and Lower Extent)
  - Project River Mile
  - ← Flow Arrow

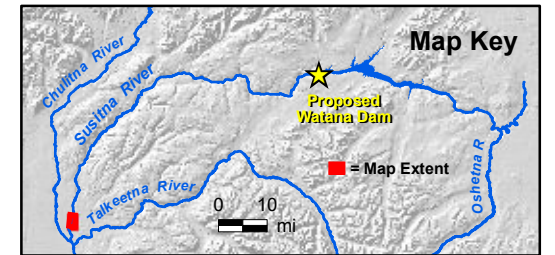
- Macrohabitat (2013)\***
- Main Channel
  - Split Main Channel
  - - - - Multiple Split Main Channel
  - Side Channel
  - Side Slough
  - Upland Slough
- Mesohabitat (2013)\***
- Riffle
  - - - - Run
  - Glide
  - Pool
  - Backwater
  - Clearwater Plume

- Dry
  - Beaver Complex
- \* Preliminary Data

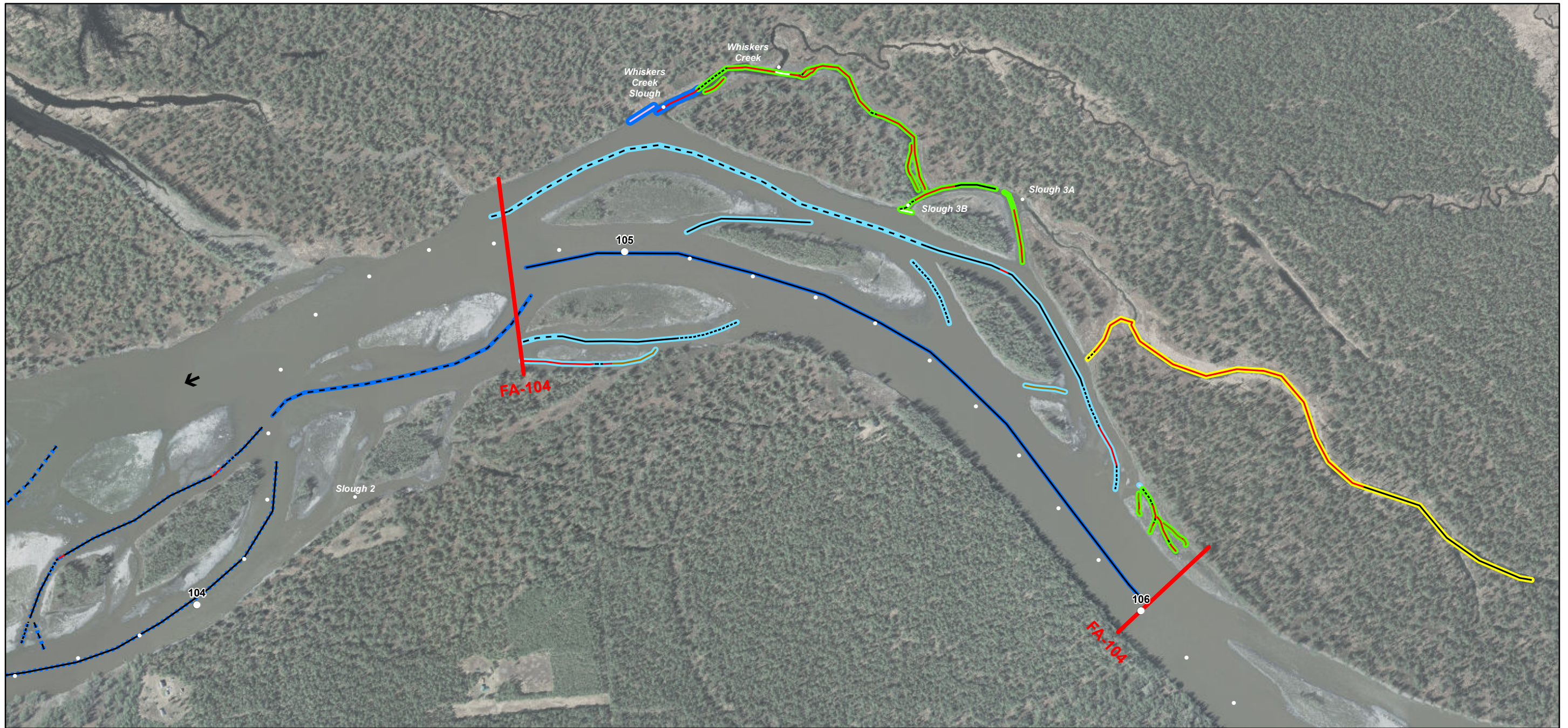
Orthophoto Source: 2011 Matanuska-Susitna Borough LiDAR & Imagery Project



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**Legend**

- Instream Flow Focus Area (Upper and Lower Extent)
- Project River Mile
- ← Flow Arrow

**Macrohabitat (2013)\***

- Main Channel
- - - Split Main Channel
- · - · - Multiple Split Main Channel
- Side Channel
- Side Slough
- Upland Slough

**Mesohabitat (2013)\***

- · - · - Riffle
- - - Run
- Glide
- Pool
- Backwater
- Clearwater Plume

- Dry
- Beaver Complex

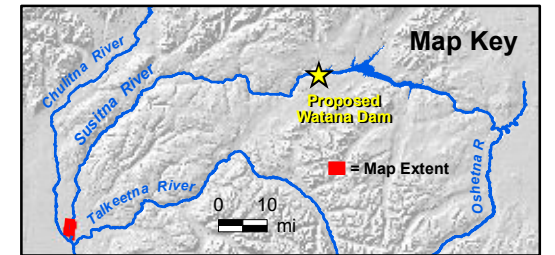
\* Preliminary Data

Orthophoto Source: 2011 Matanuska-Susitna Borough LiDAR & Imagery Project

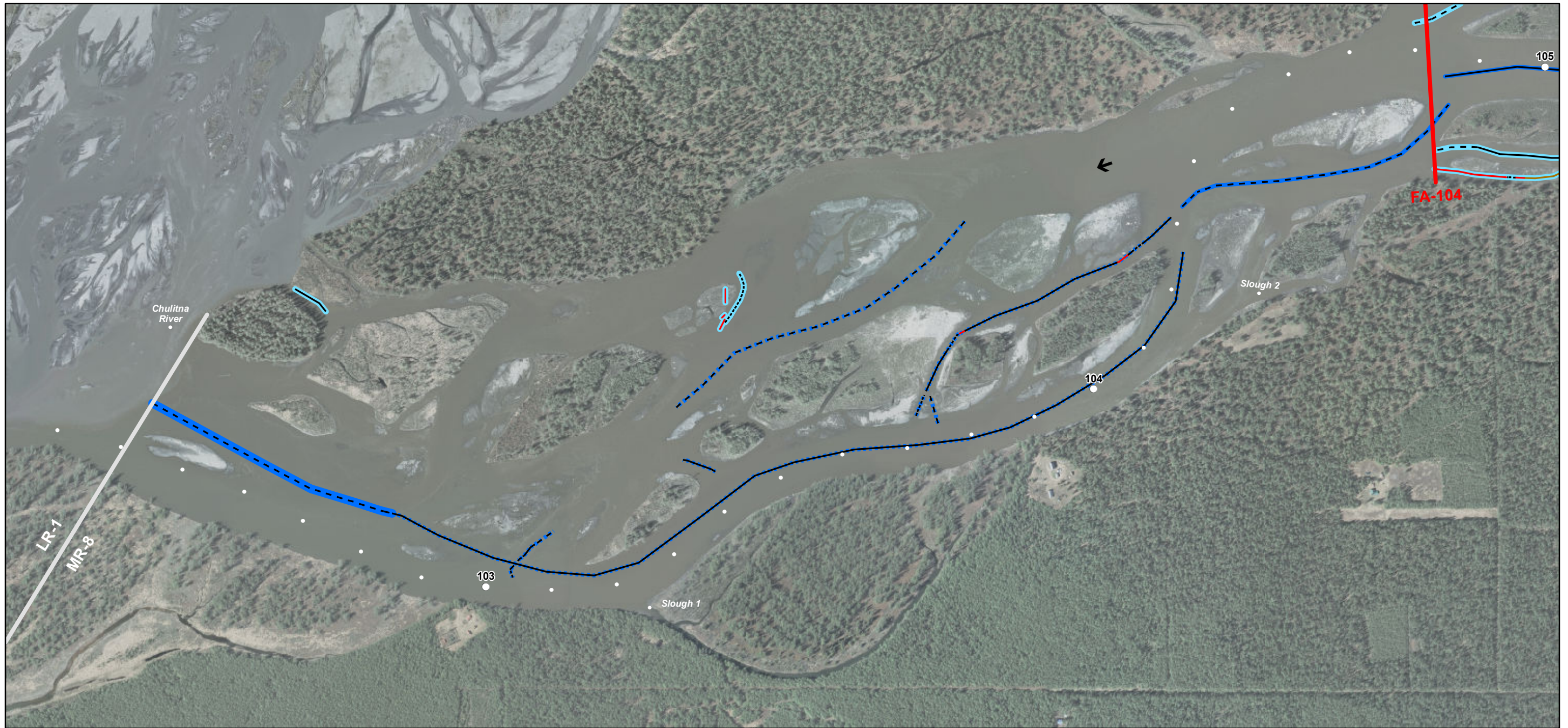


0 1,000 Feet

Projection: AK SP Zone 4 NAD 1983  
 Date Created: 1/29/2014  
 Map Author: R2 - Joetta Zabolney  
 File: Map\_ISR\_FA\_AQHAB\_MS.mxd







- Legend**
- Instream Flow Focus Area (Upper and Lower Extent)
  - Project River Mile
  - ← Flow Arrow

- |   |   |   |
|---|---|---|
| <p><b>Macrohabitat (2013)*</b></p> <ul style="list-style-type: none"> <li><span style="color: blue;">—</span> Main Channel</li> <li><span style="color: blue;">- - -</span> Split Main Channel</li> <li><span style="color: blue;">- · - · -</span> Multiple Split Main Channel</li> <li><span style="color: cyan;">—</span> Side Channel</li> <li><span style="color: green;">—</span> Side Slough</li> <li><span style="color: yellow;">—</span> Upland Slough</li> </ul> | <p><b>Mesohabitat (2013)*</b></p> <ul style="list-style-type: none"> <li><span style="color: brown;">- · - · -</span> Riffle</li> <li><span style="color: black;">- - -</span> Run</li> <li><span style="color: black;">—</span> Glide</li> <li><span style="color: red;">—</span> Pool</li> <li><span style="color: grey;">—</span> Backwater</li> <li><span style="color: pink;">—</span> Clearwater Plume</li> </ul> | <ul style="list-style-type: none"> <li><span style="color: orange;">—</span> Dry</li> <li><span style="color: yellow;">—</span> Beaver Complex</li> </ul> <p>* Preliminary Data</p> |
|---|---|---|

Orthophoto Source: 2011 Matanuska-Susitna Borough LiDAR & Imagery Project

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0 1,000 Feet

Projection: AK SP Zone 4 NAD 1983  
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