KING COUNTY FLOOD CONTROL DISTRICT

King County

Tolt River Channel Migration Zone Draft Study and Map

Public Meeting, Sno-Valley Senior Center, May 8, 2017

6:00 – 6:30	Open House
6:30 – 6:35	Welcome and Introductions
6:35 – 7:00	Technical Presentation
7:00 – 7:10	Public Rule Presentation
7:10 –7:40	Q & A
7:40 – 8:00	Open House

Tolt River Channel Migration Zone Draft Study and Map

John Bethel, Geologist

Public Meeting, Sno-Valley Senior Center, May 8, 2017

Department of Natural Resources and Parks
Water and Land Resources Division
River and Floodplain Management Section

King County

KING COUNTY FLOOD CONTROL DISTRICT

Technical Presentation

- Overview
- Study Area
- Types of Channel Migration
- Channel Migration Zone (CMZ) Mapping Process
- Development of Draft Tolt CMZ Map
- Compare to Existing Tolt CMZ Map
- Next Steps

Channel Migration Overview

Channel Migration:

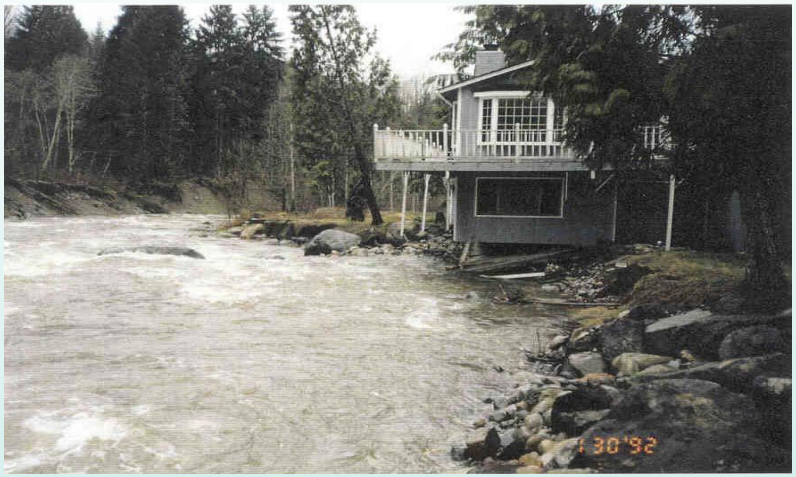
- The shifting of a river within a river valley
- A type of flood hazard

Channel Migration Zone (CMZ):

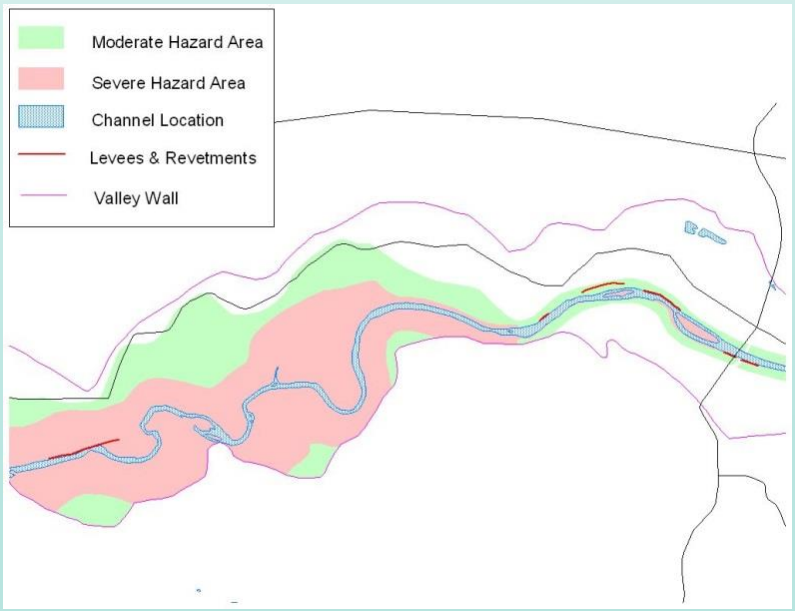
The area within which a river channel can be expected to migrate over time

Uses of CMZ Mapping:

- Inform the public about hazards
- Support flood risk reduction planning and projects
- Serve as a regulatory map in unincorporated areas



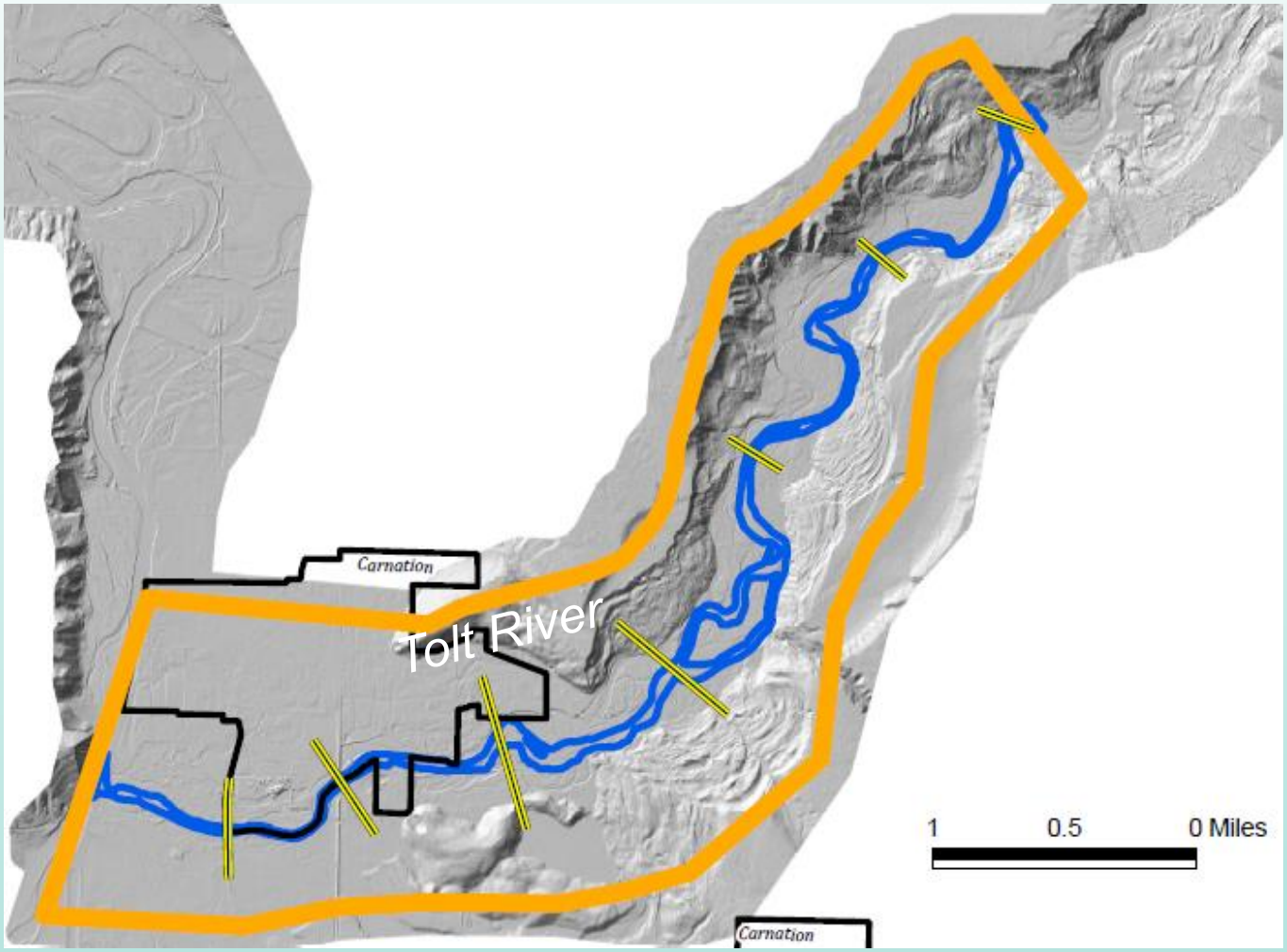
Raging River



Example CMZ Map

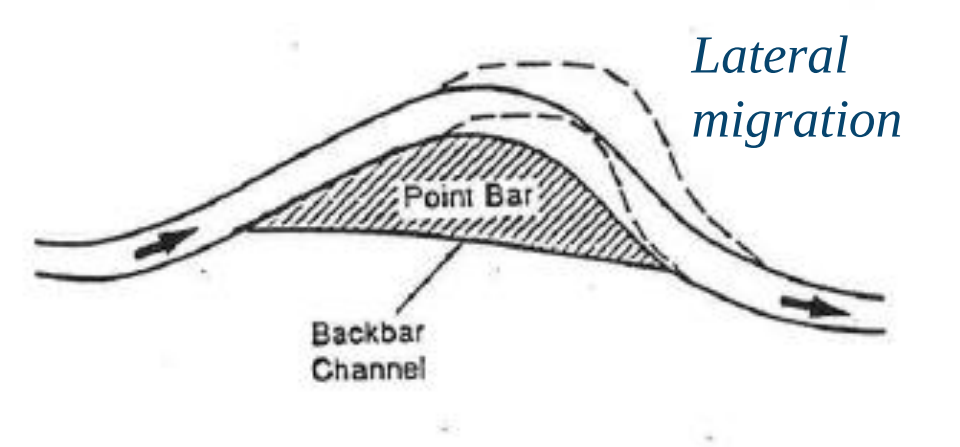
Study Area

Approximately River Mile 6 to the Mouth

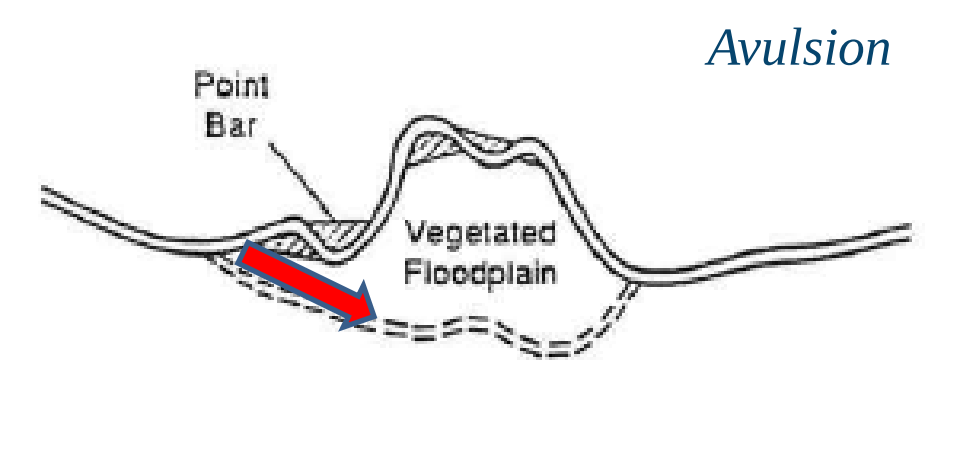


Types of Channel Migration

- **Lateral migration:** Progressive channel movement across valley bottom

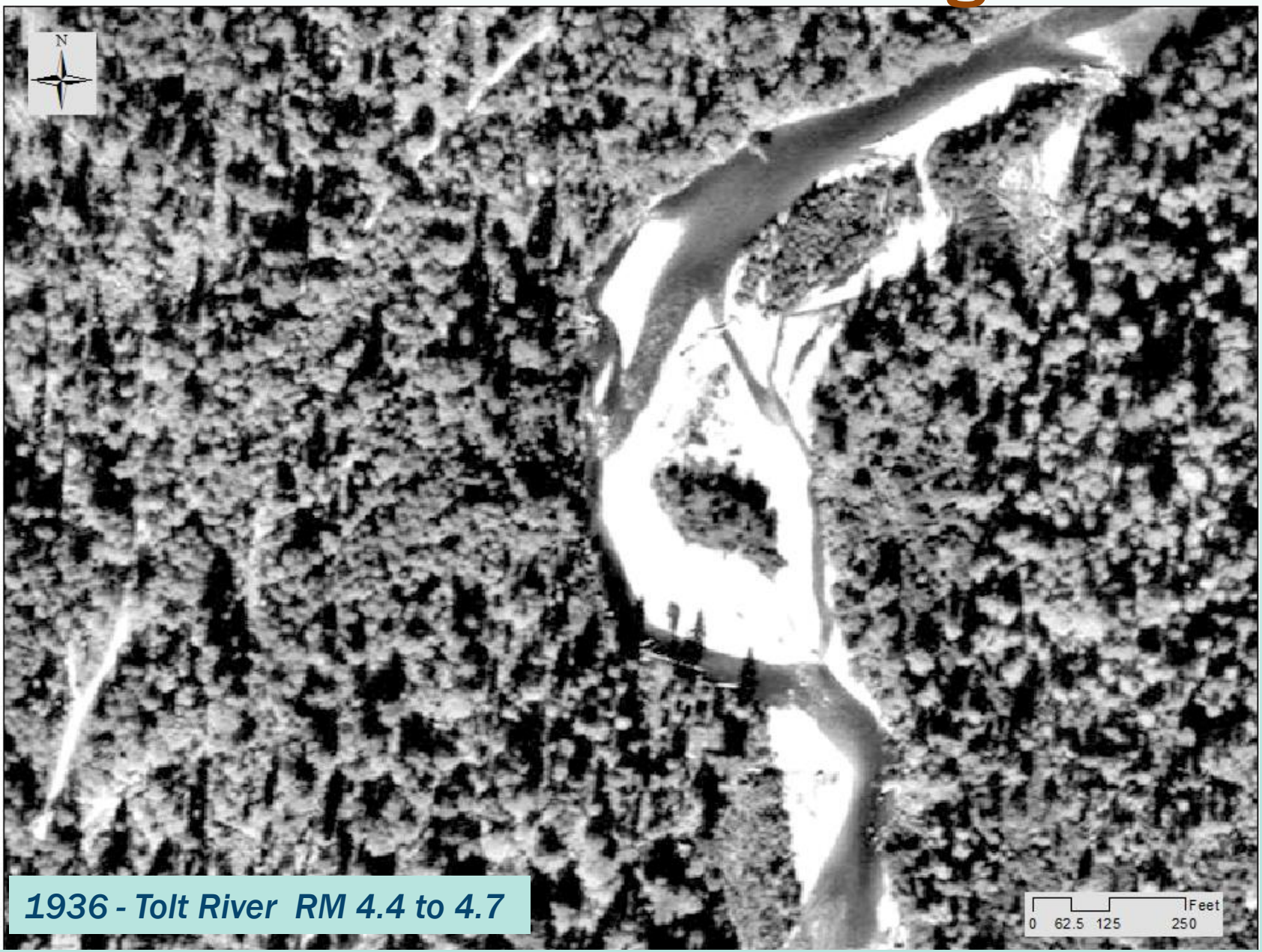


- **Avulsion:** Abrupt shift of channel location



Lateral Migration Example

Historical Channels: Lateral Migration

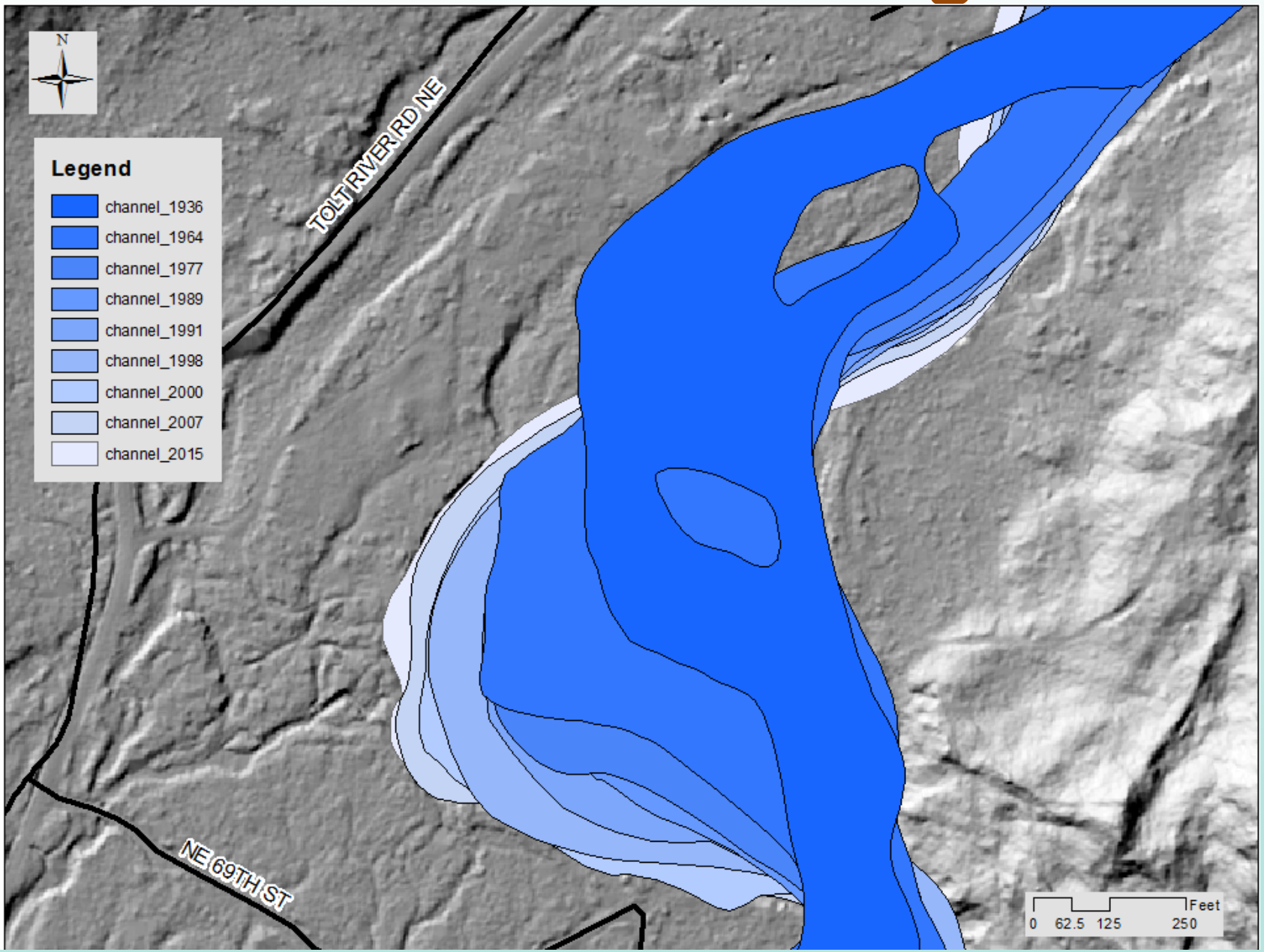


1936 - Tolt River RM 4.4 to 4.7

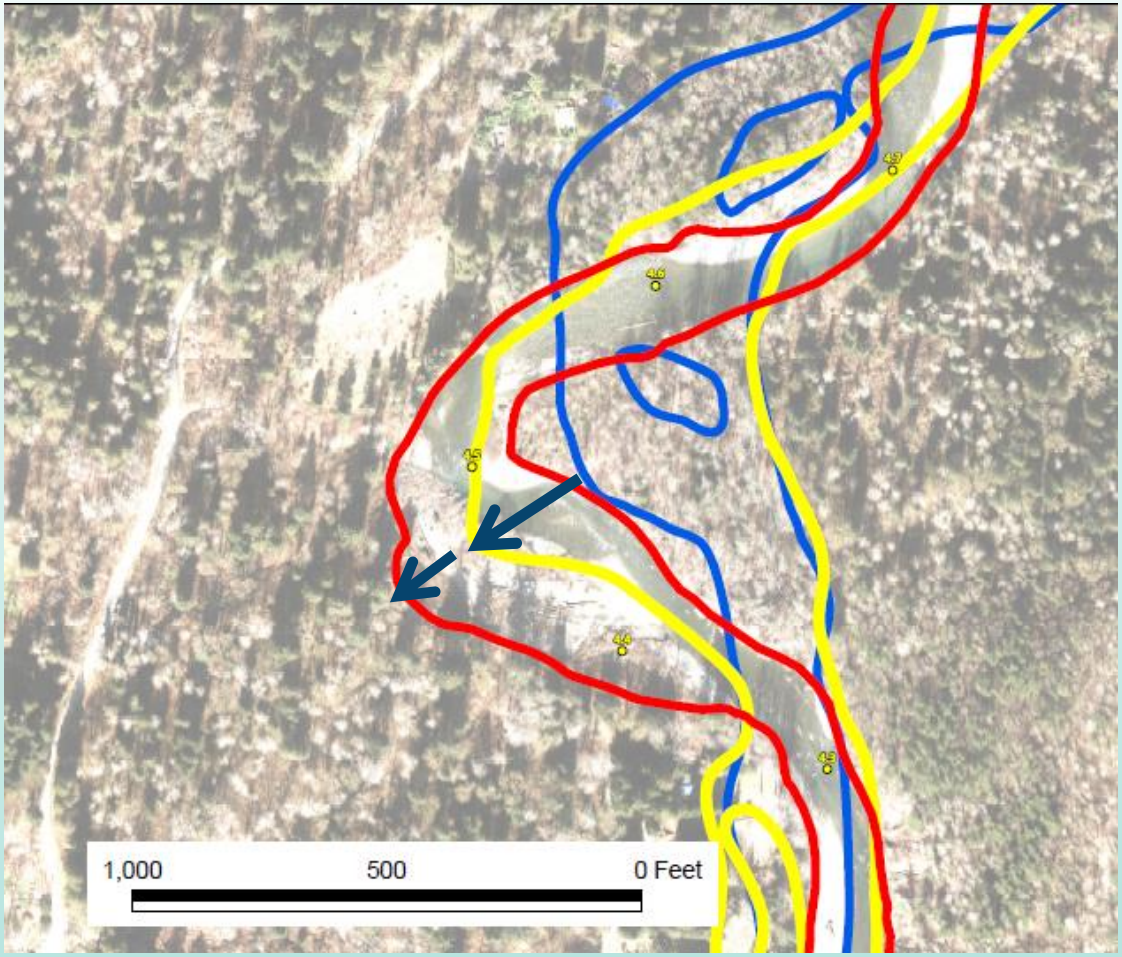
Historical Channels: Lateral Migration

2015 - Tolt River RM 4.4 to 4.7

Historical Channels: Lateral Migration



Historical Channels: Lateral Migration



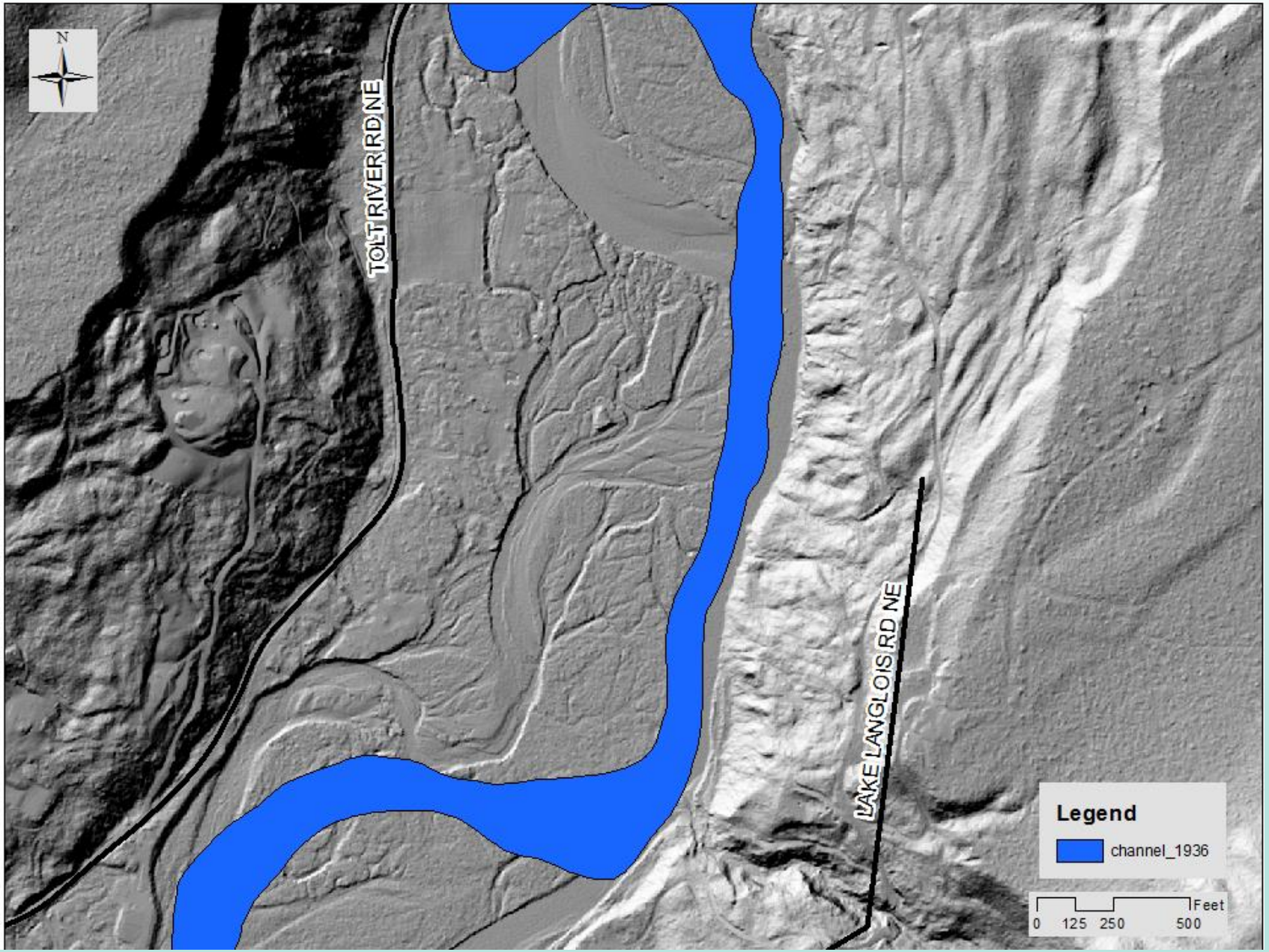
Lateral migration rate = distance/time

Avulsion Example

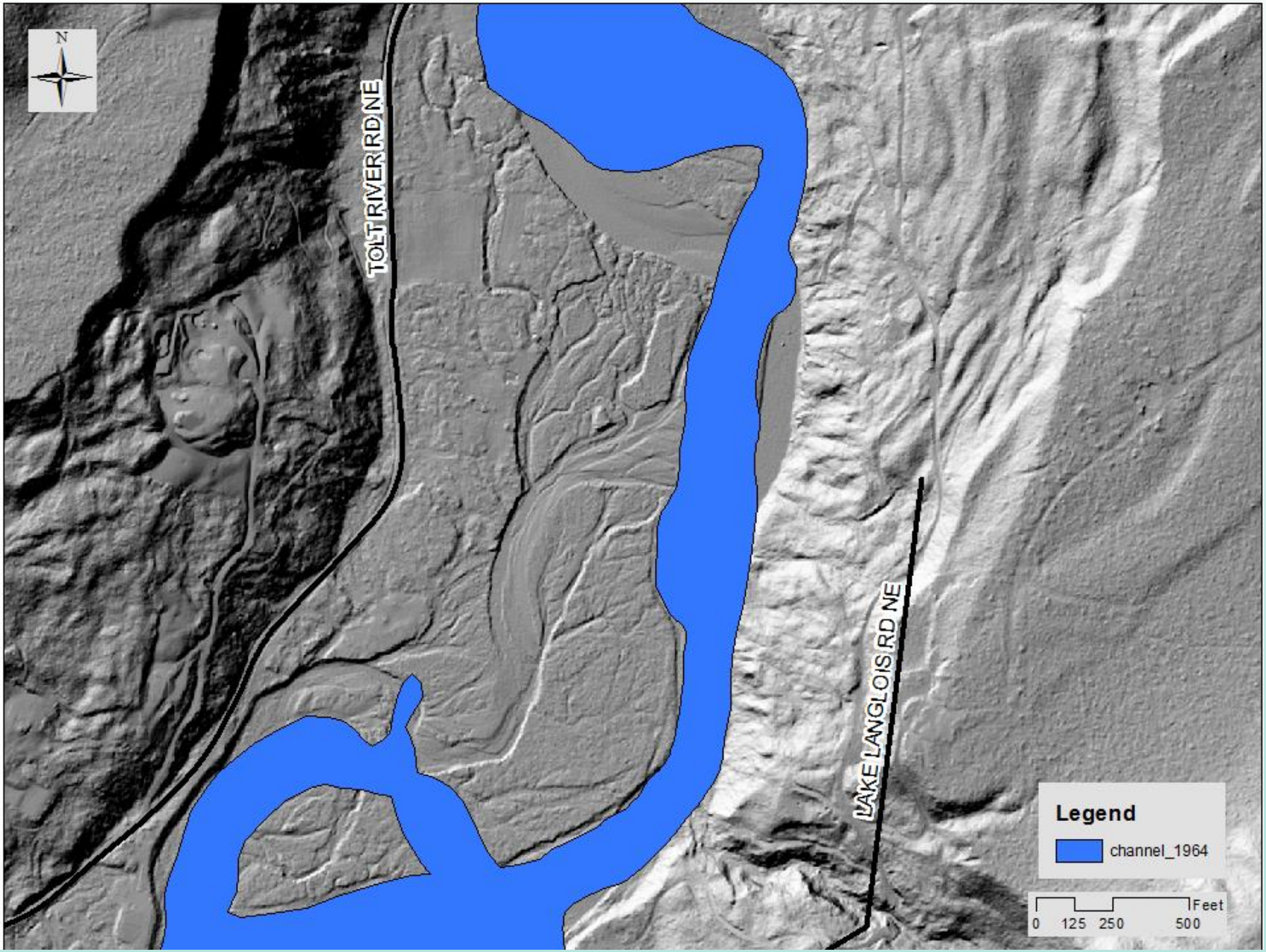
1936 - RM 2.8 to 3.5

2015 - RM 2.8 to 3.5

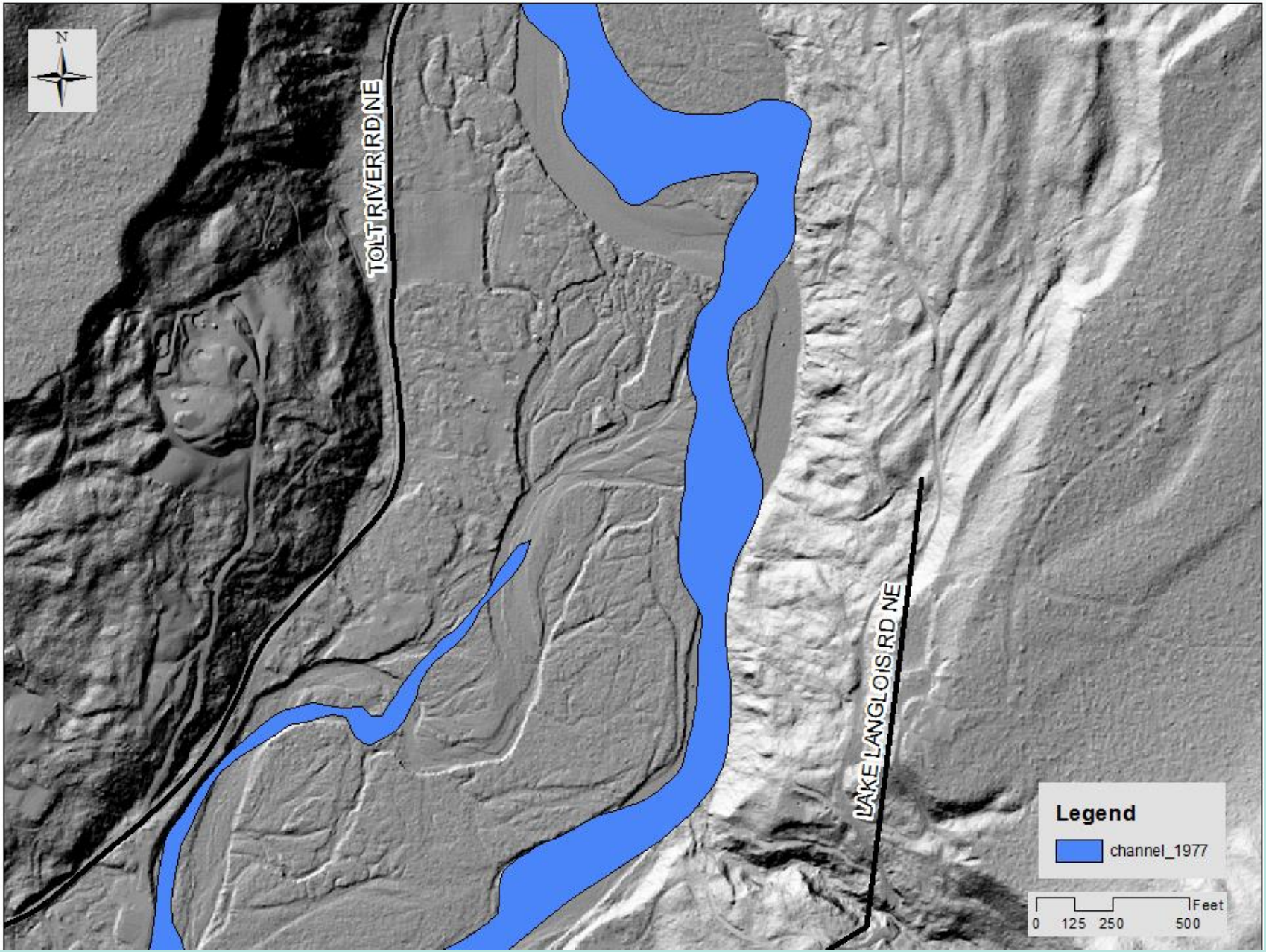
1936 - RM 2.8 to 3.5



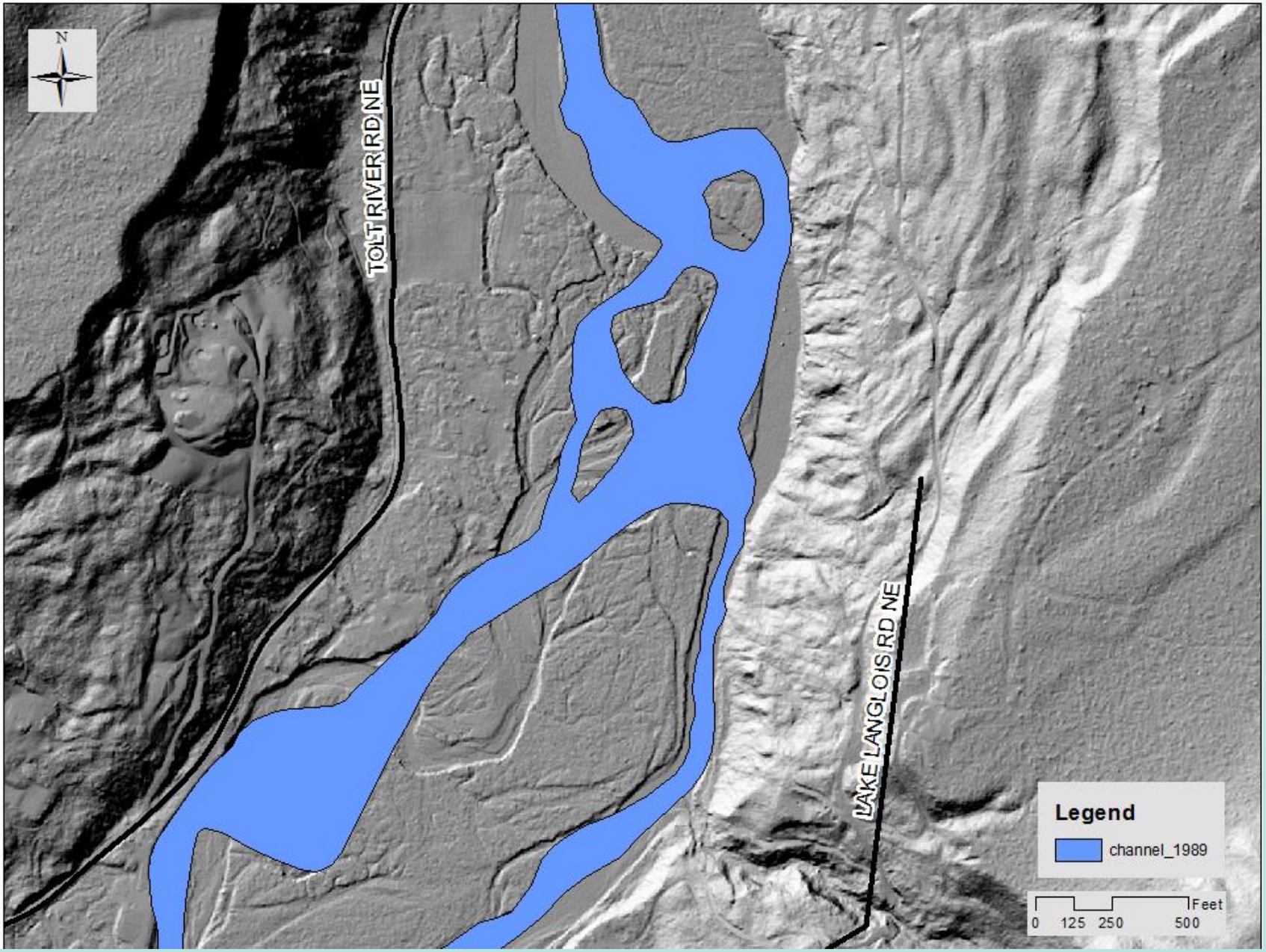
1964 - RM 2.8 to 3.5



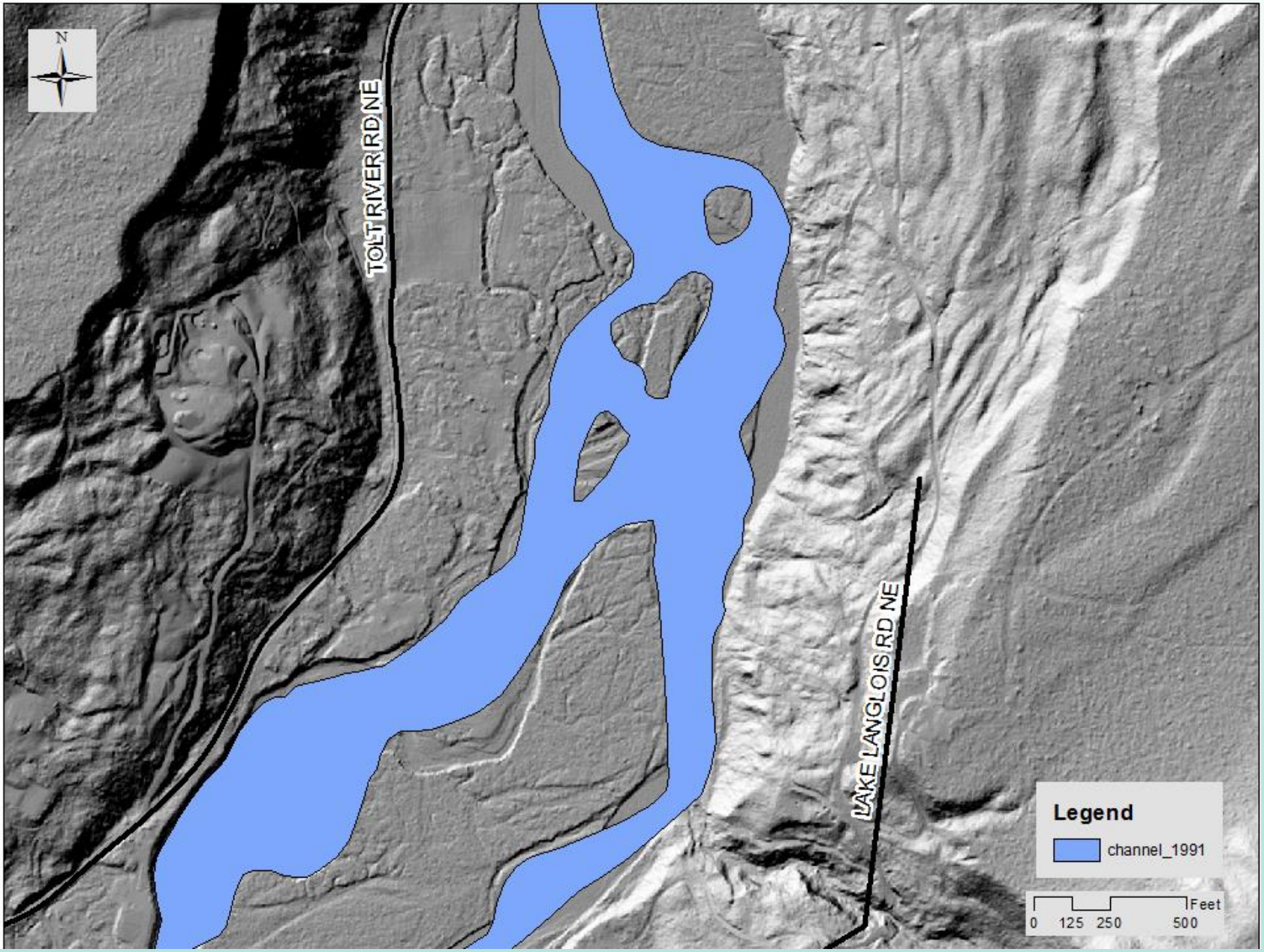
1977 - RM 2.8 to 3.5



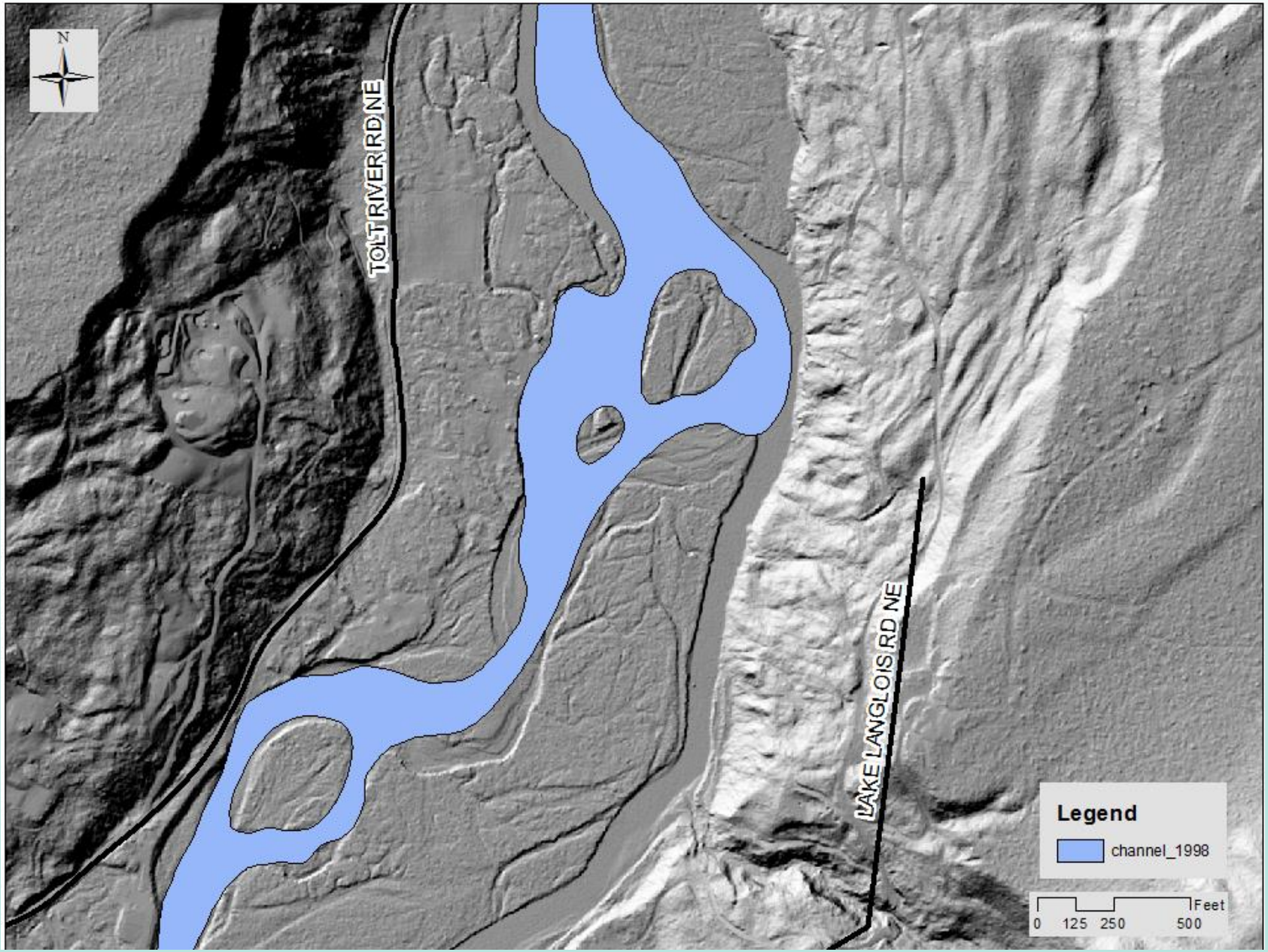
1989 - RM 2.8 to 3.5



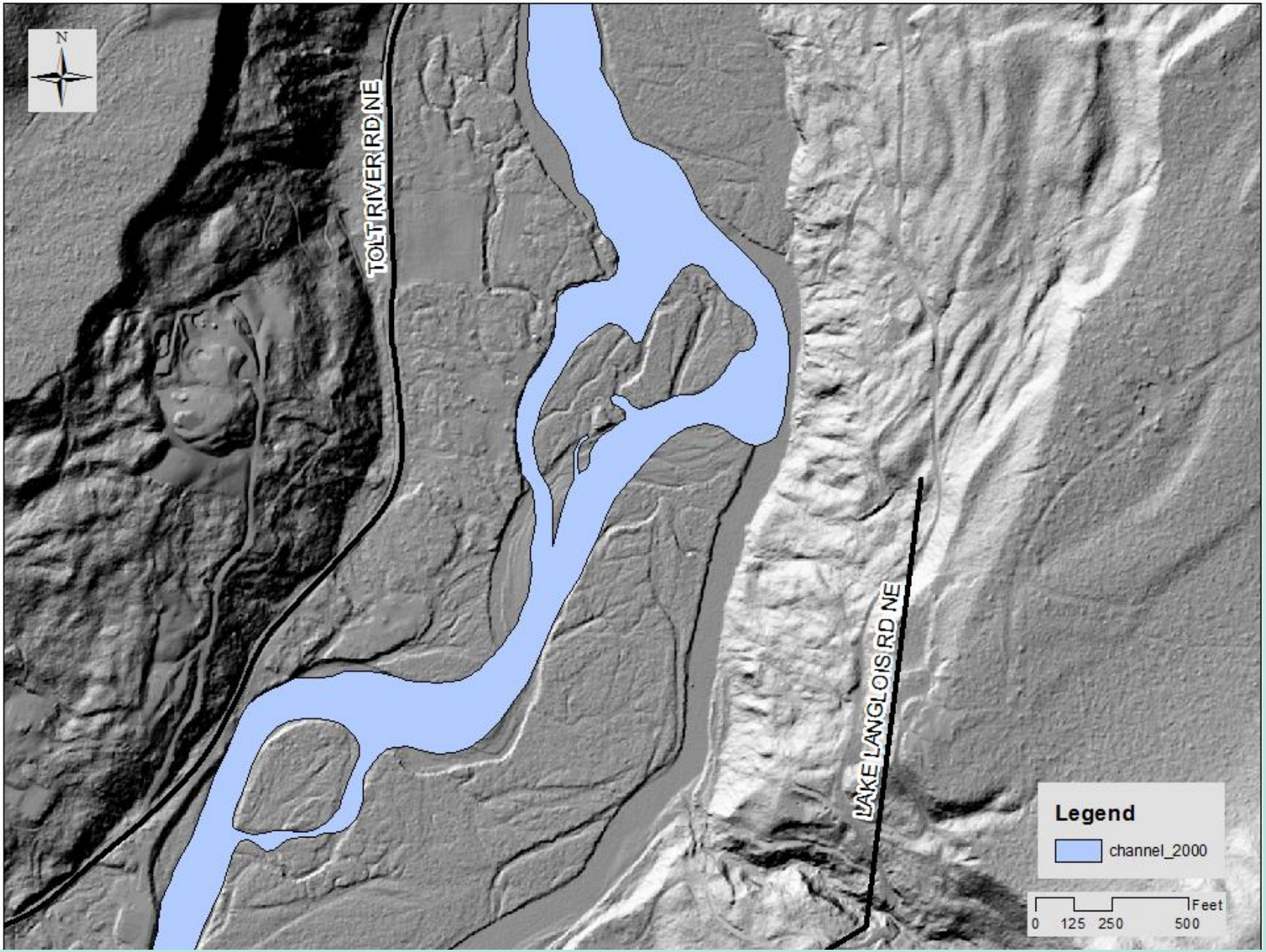
1991 - RM 2.8 to 3.5



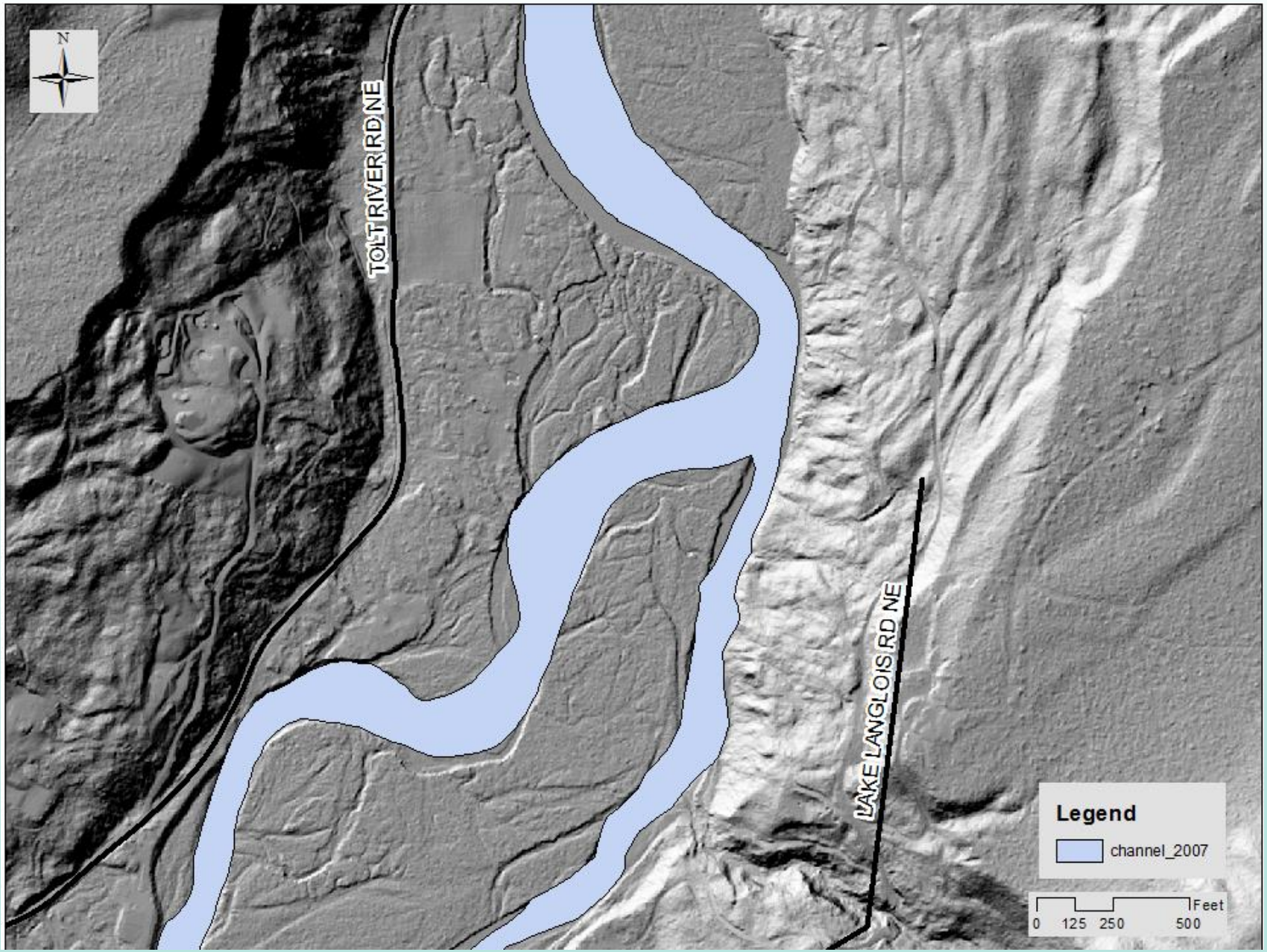
1998 - RM 2.8 to 3.5



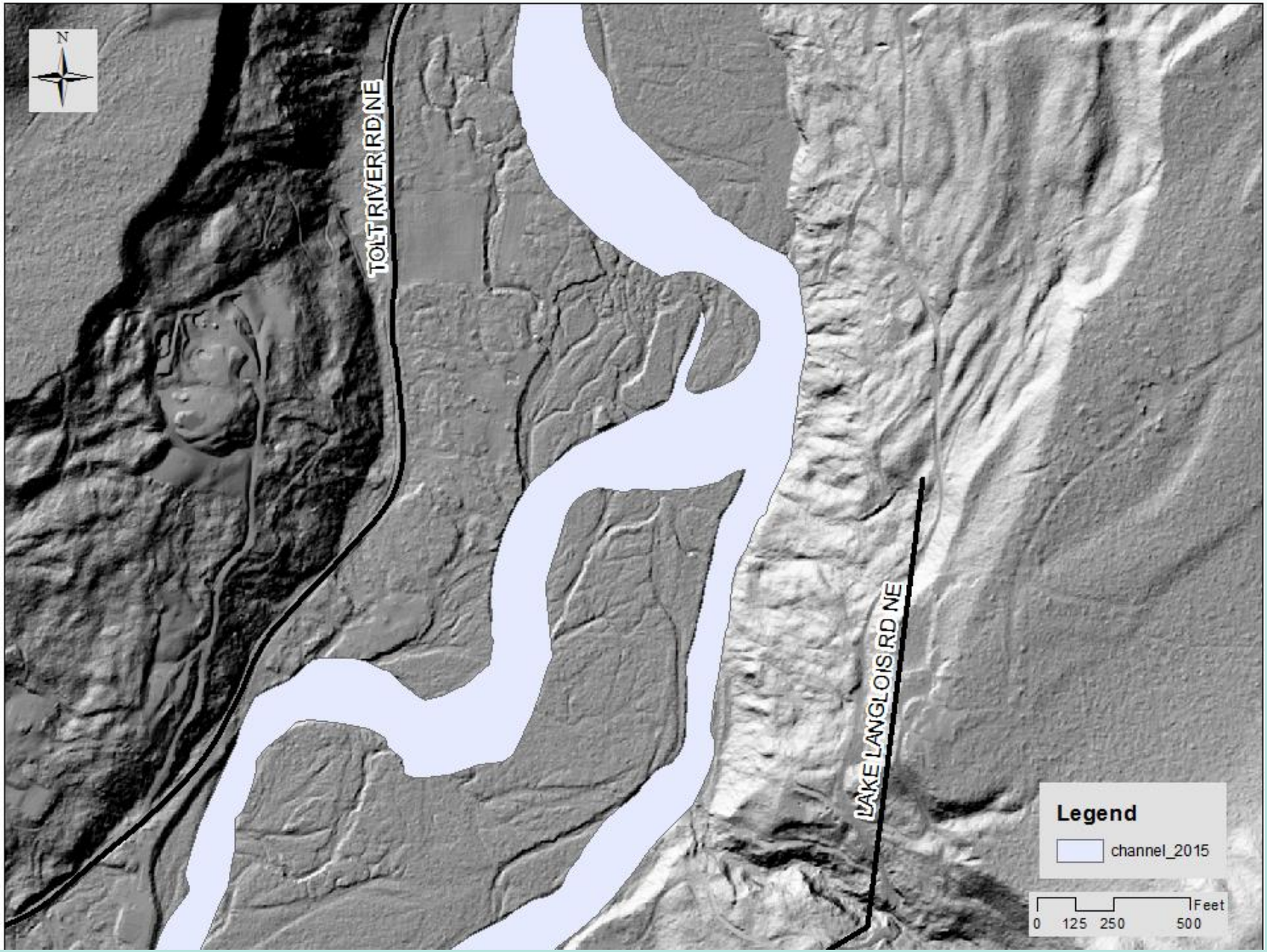
2000 - RM 2.8 to 3.5



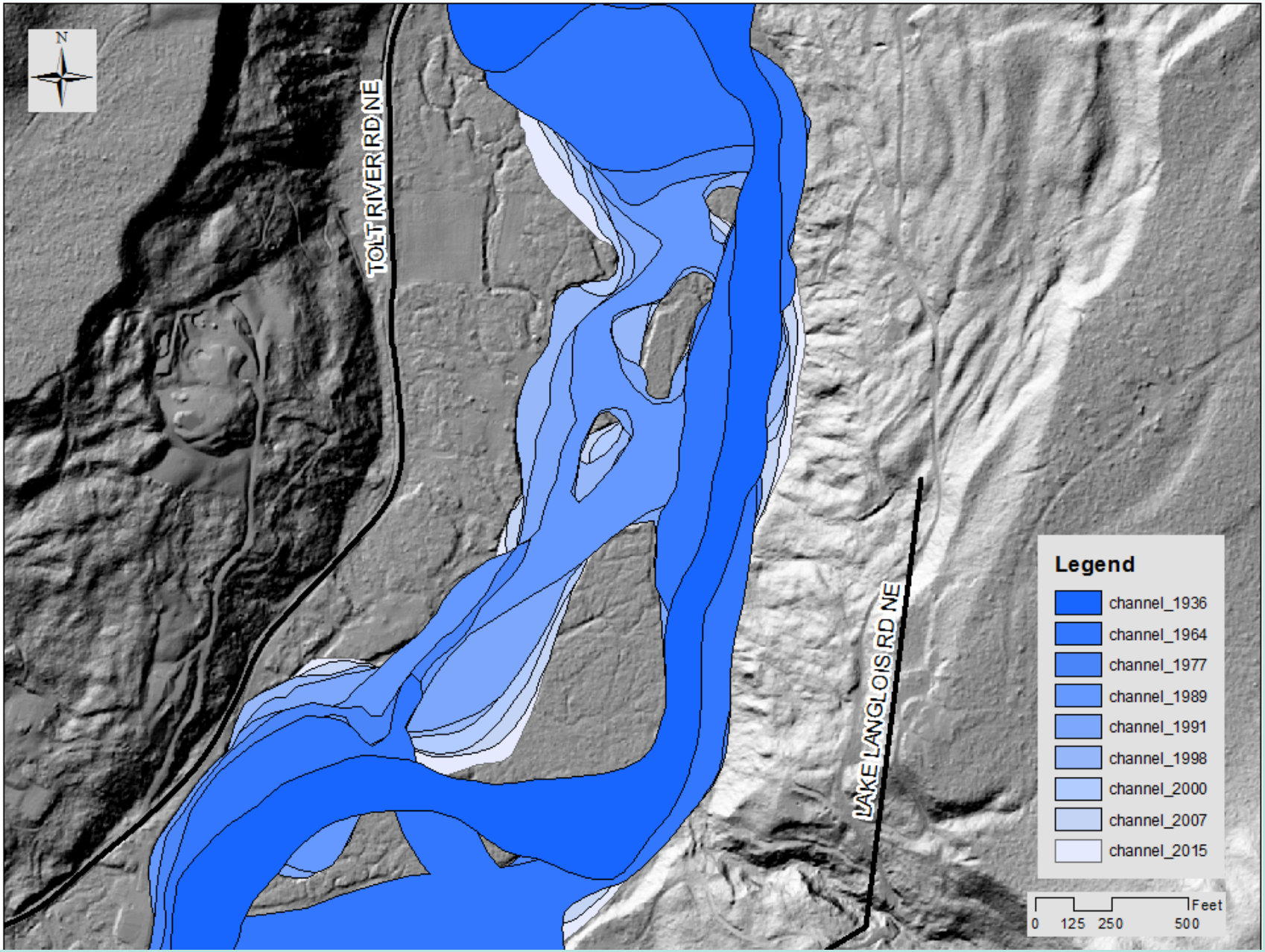
2007 - RM 2.8 to 3.5



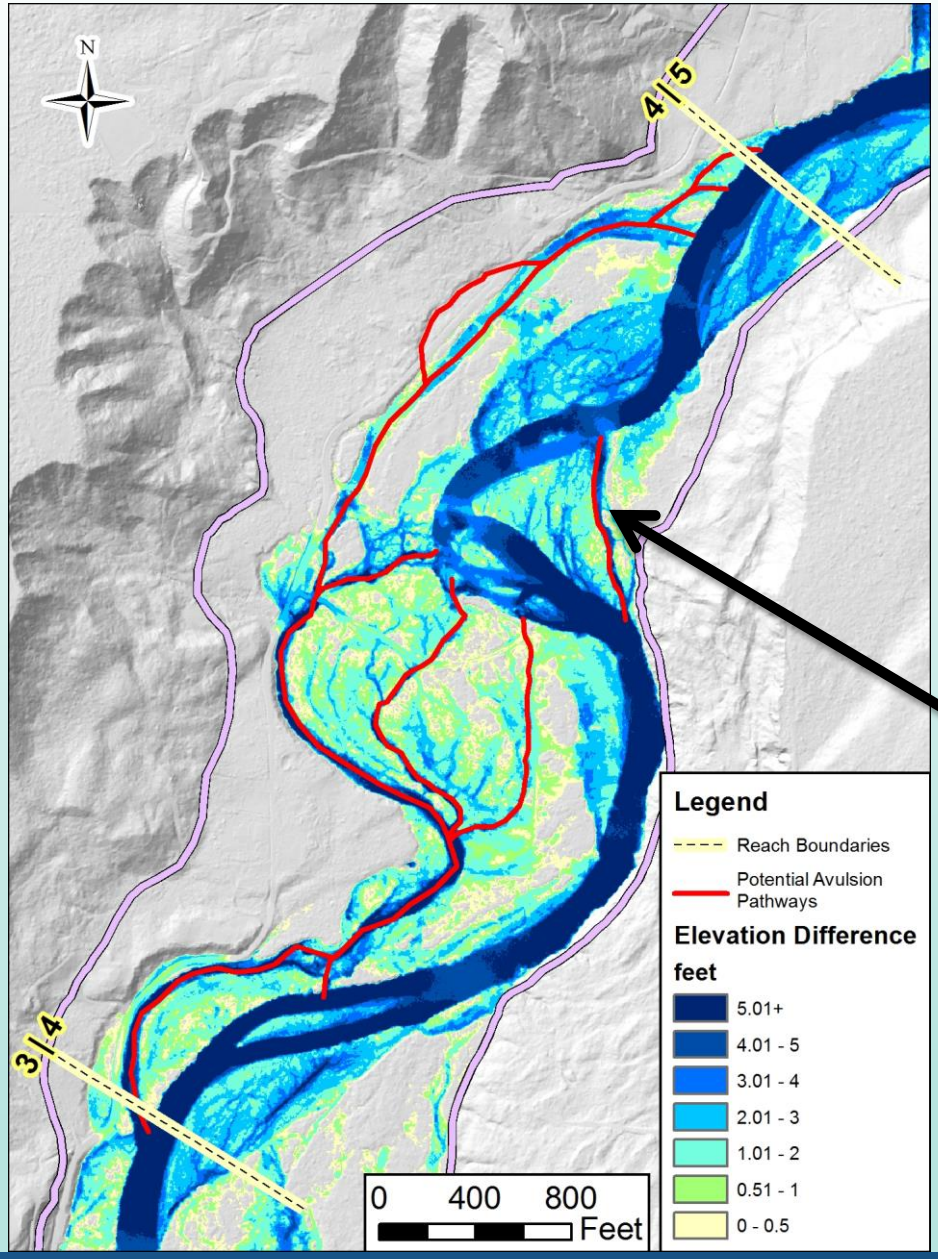
2015 - RM 2.8 to 3.5



Channel Avulsion - RM 2.8 to 3.5



Potential Avulsion Pathways



- Side channels & low-lying areas
- Elevation difference map
- Field verify

Development of Draft ToIt River Channel Migration Zone Map

CMZ Mapping Process

- **Evaluate historical & present conditions**
  1. Riverbank materials
  2. Historical channels
  3. Lateral channel migration
  4. Avulsion pathways
  5. Barriers to channel migration
- **Fieldwork, GIS analyses**
- **Identify CMZ components**

Blockage by landslides not mapped

Natural Riverbank Materials

Erosion-resistant bluff

Erodible alluvium

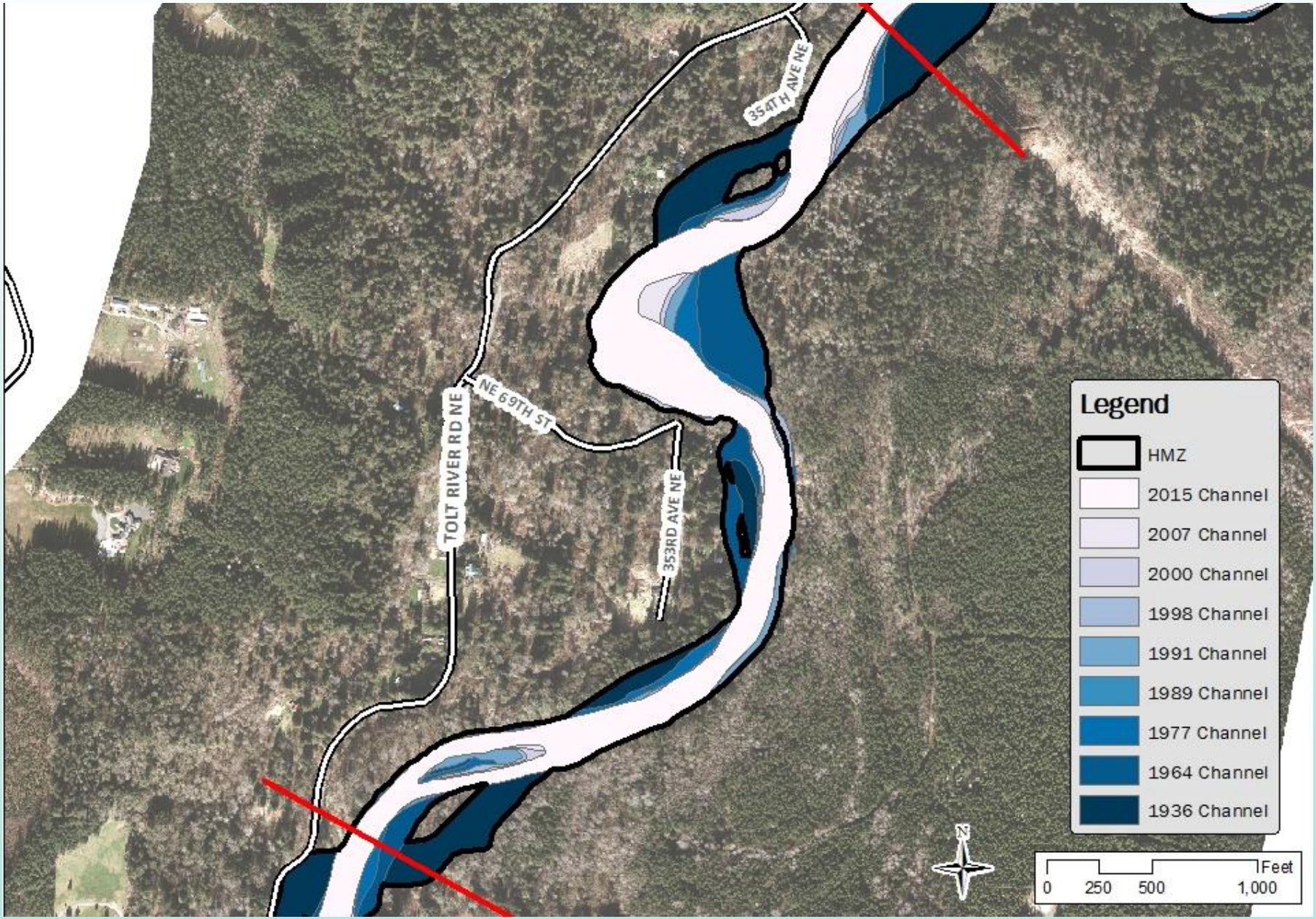
Artificial Riverbank Materials

Riprap Bank Armoring: Approx. RM 1.8 to Mouth

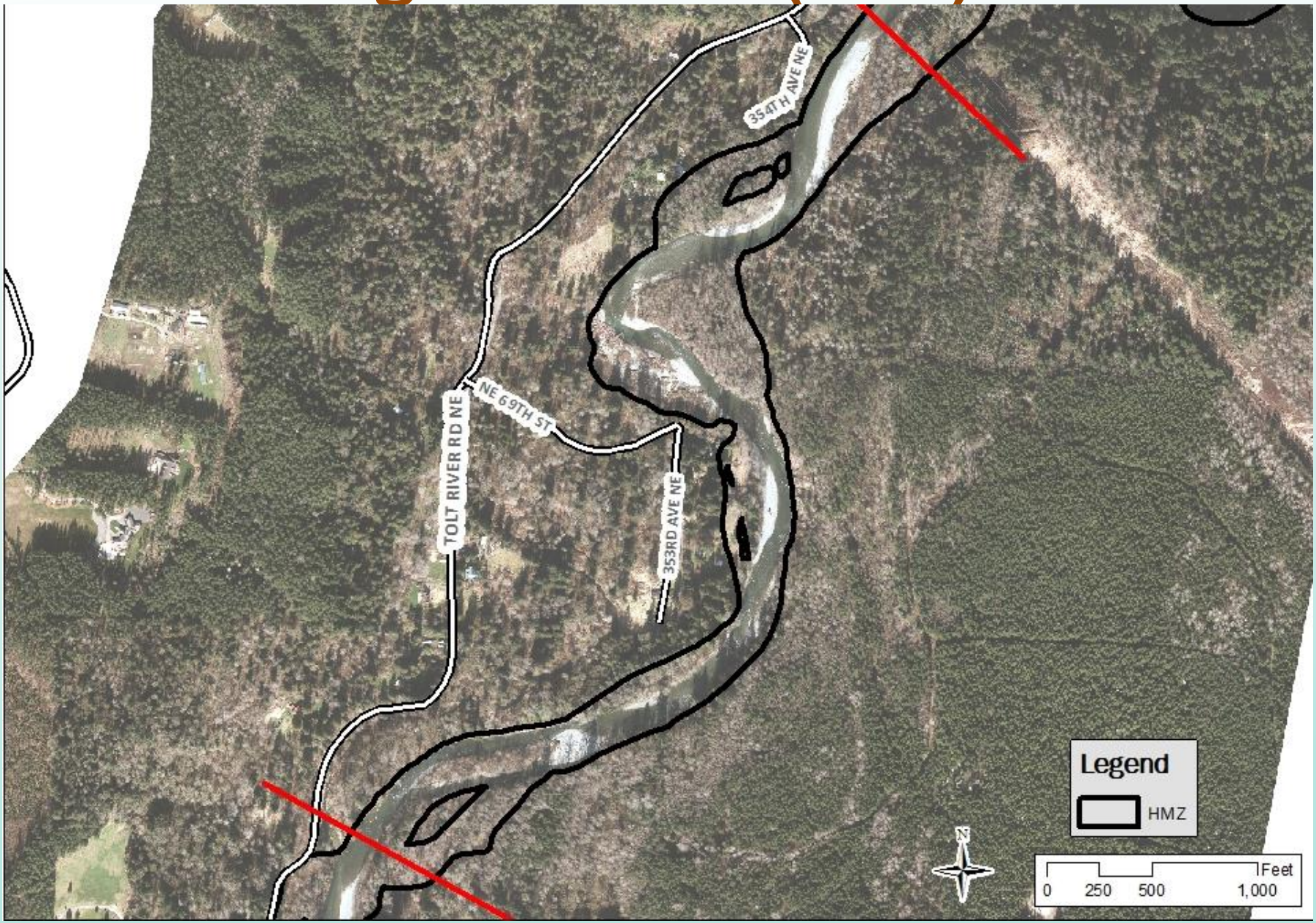
SR 203 & Snoqualmie Valley Trail Bridges Constrain Channel

2015 Aerial Photo – Historical Channel Locations

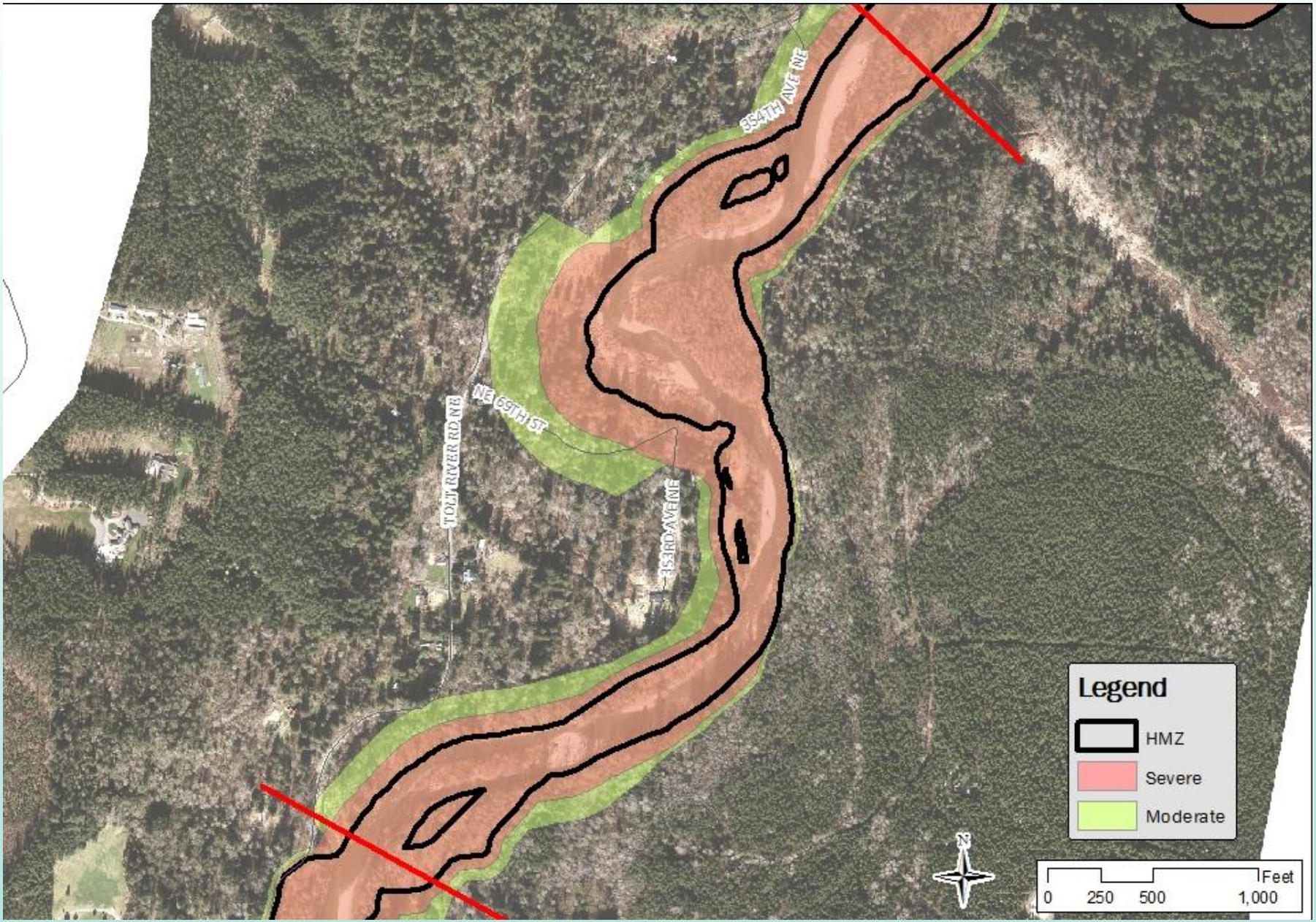
Historical Channel Locations



Historical Migration Zone (HMZ)



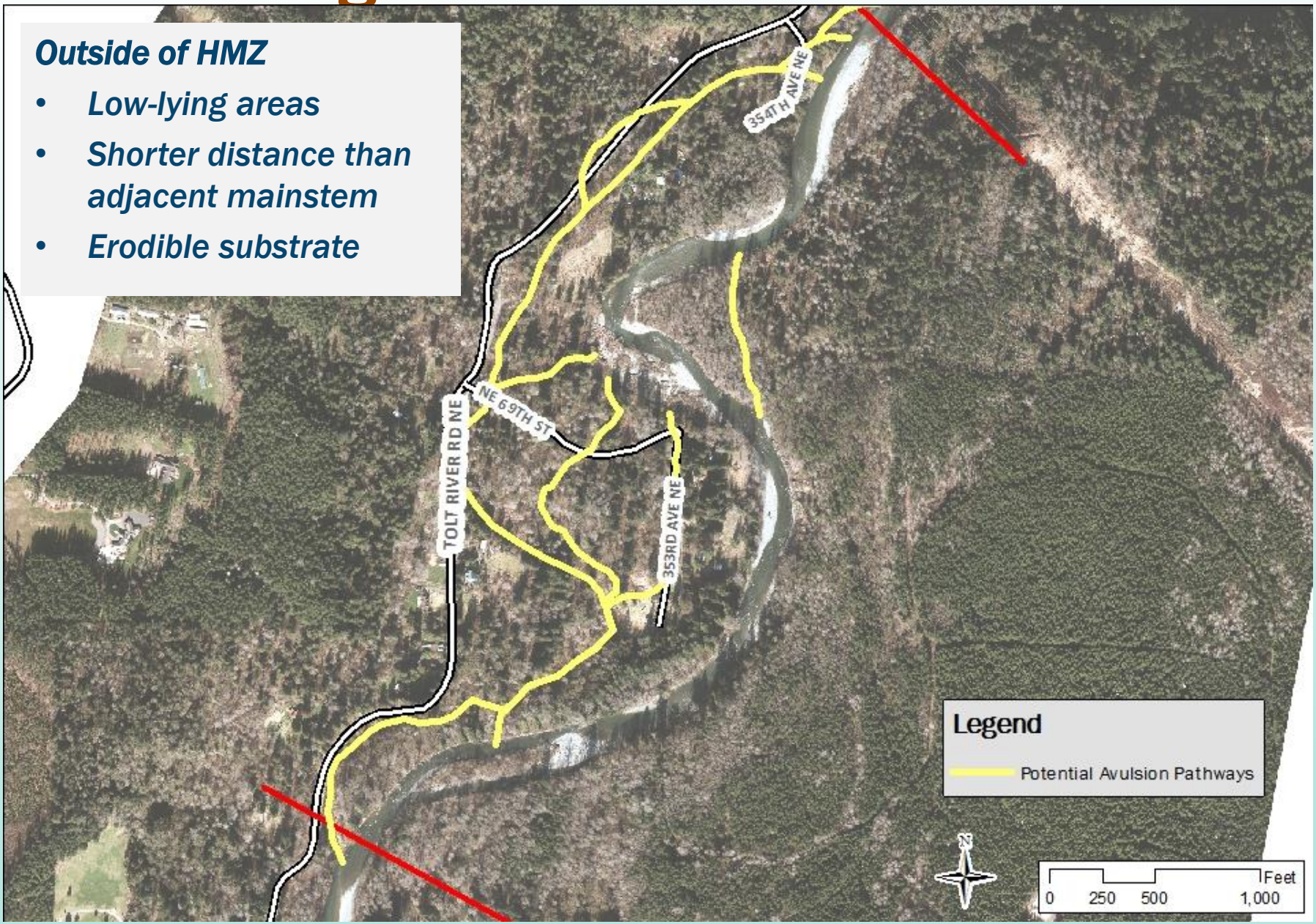
Erosion Setbacks from HMZ and 2015 Channel



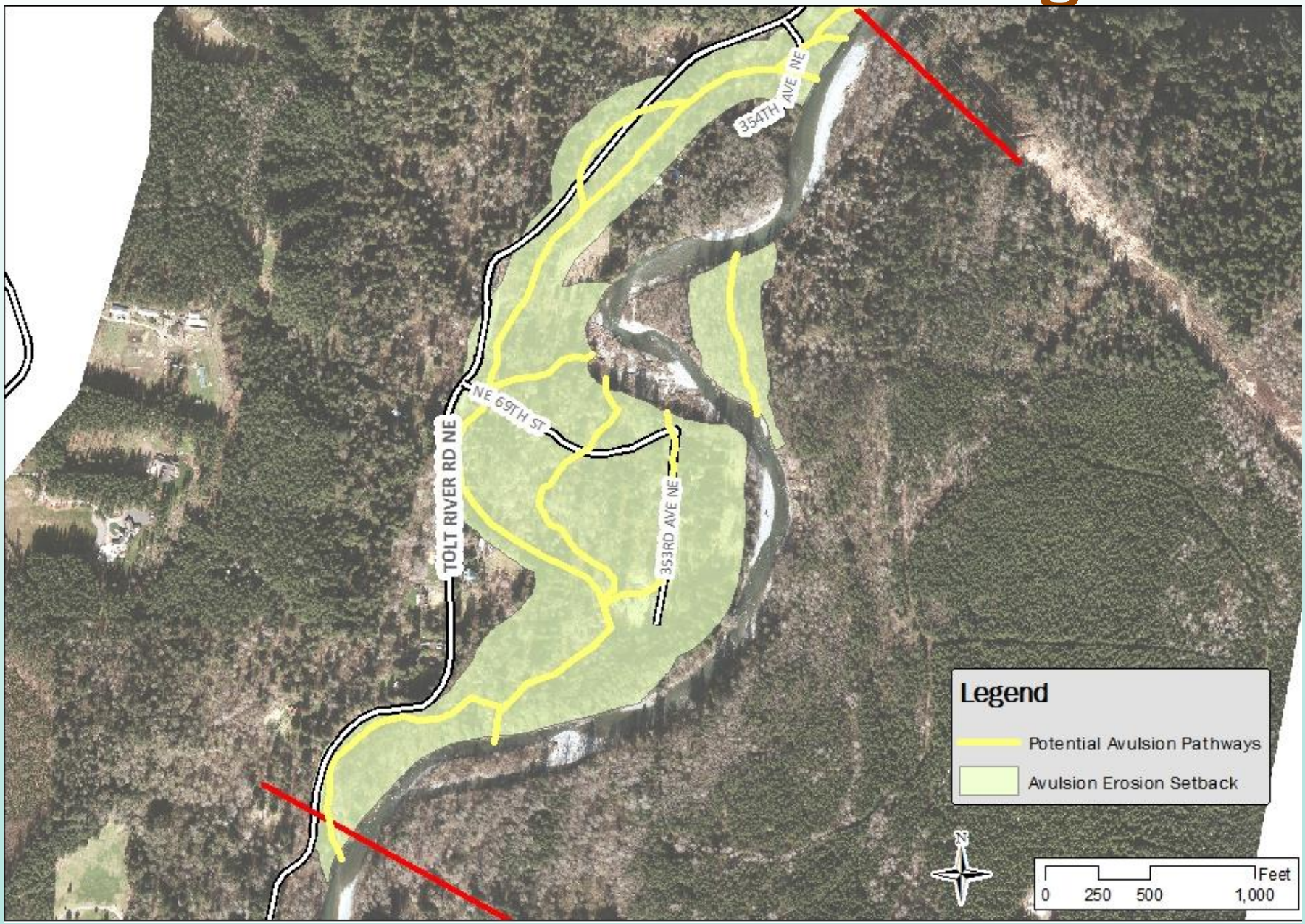
Avulsion Alignments

Outside of HMZ

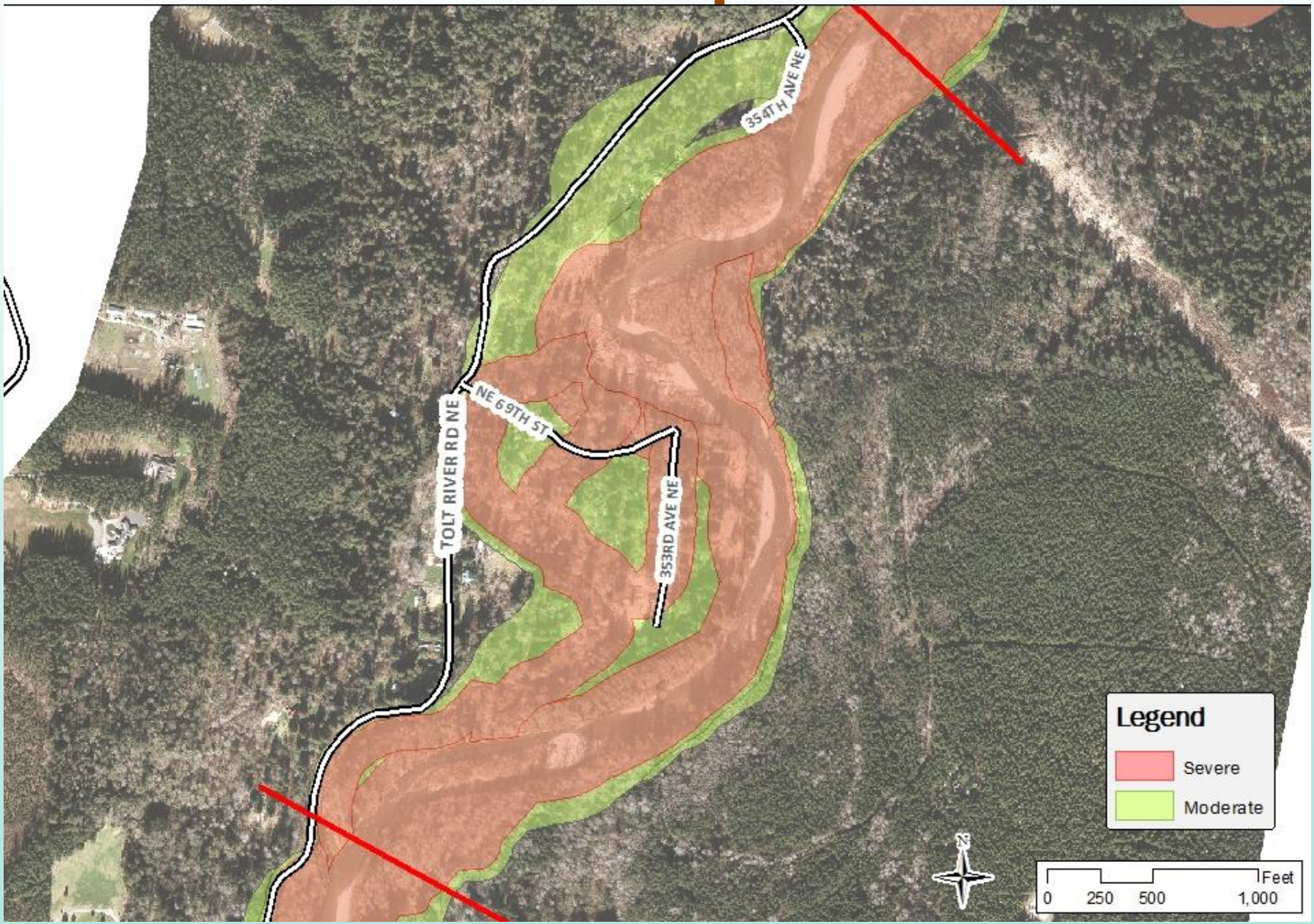
- *Low-lying areas*
- *Shorter distance than adjacent mainstem*
- *Erodible substrate*



Erosion Setbacks from Avulsion Alignments



Unconstrained CMZ Map



Barriers to Channel Migration

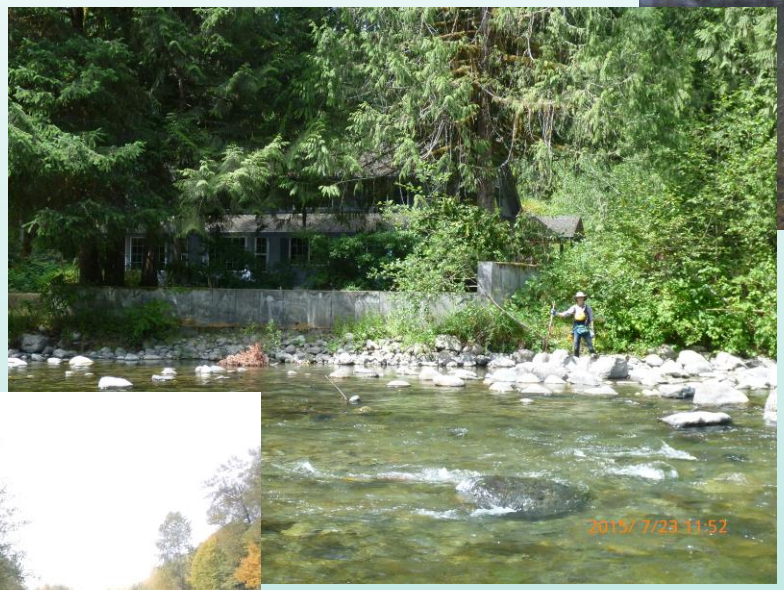
SR 203

Bank Armoring, e.g., Frew Levee

Tolt River Road NE

Not Barriers

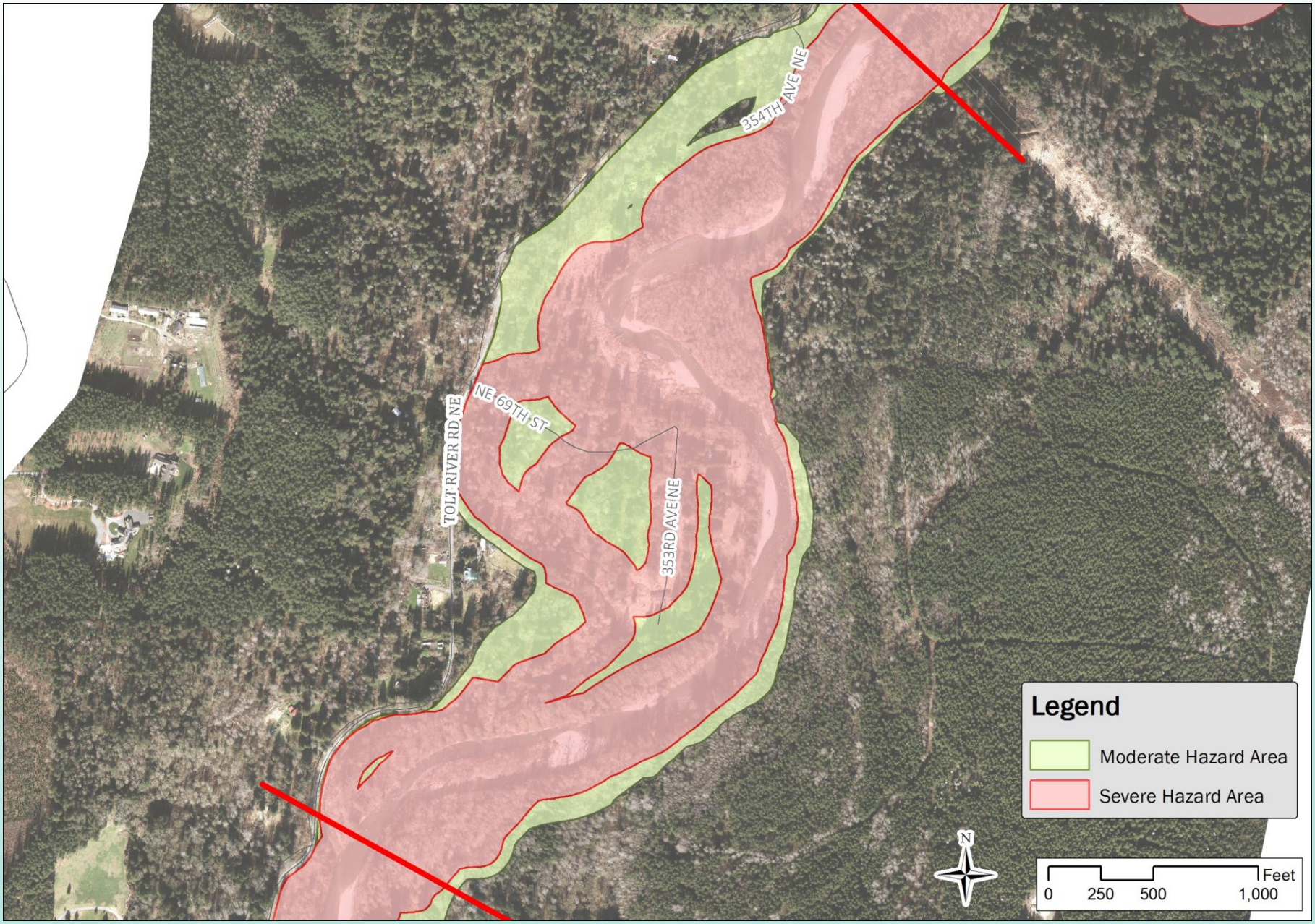
Girl Scout Camp Levee



Private Concrete Floodwall

Remlinger Revetment

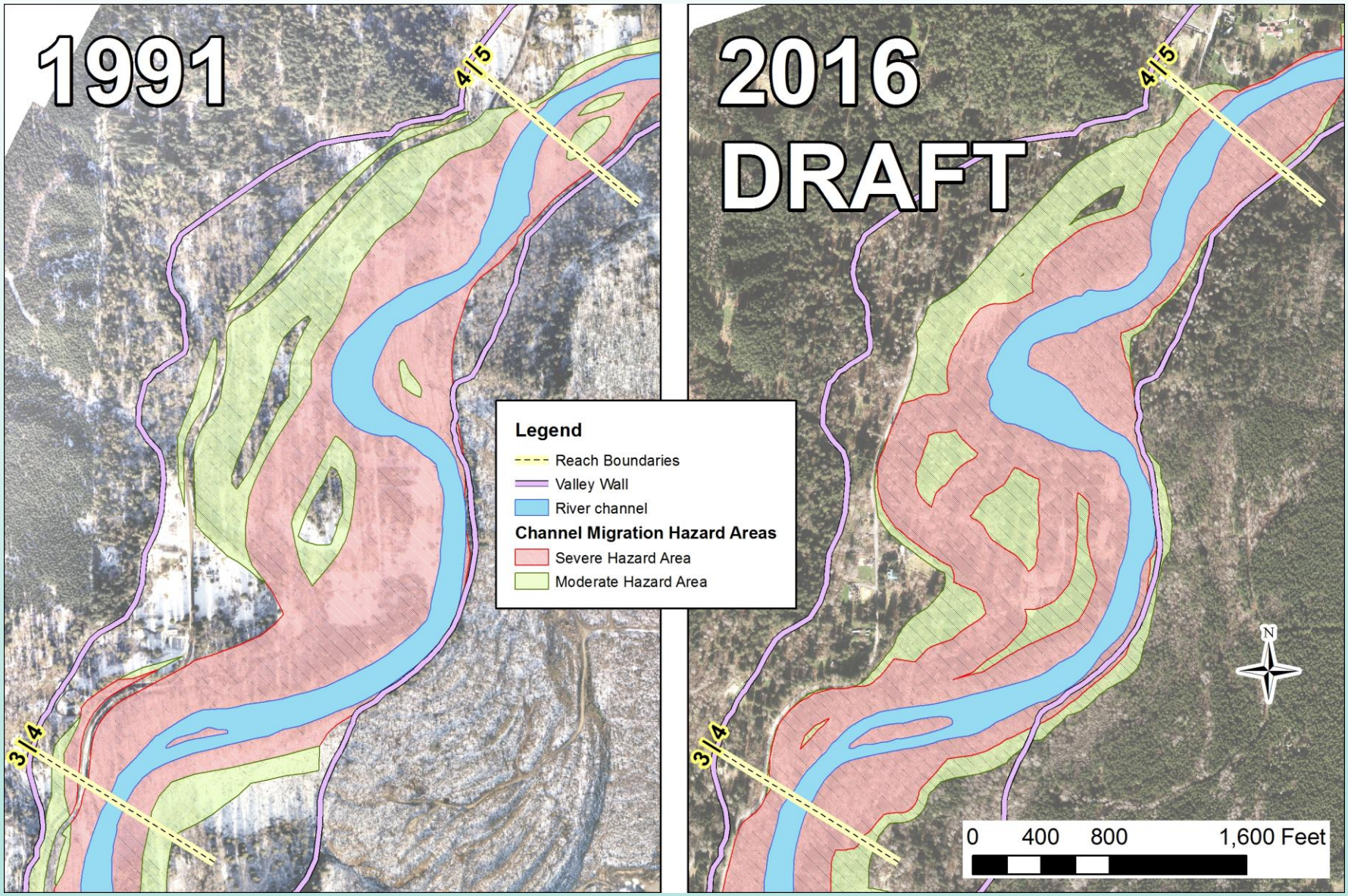
Draft CMZ Map



Tolt CMZ Update - Changes Since 1991

- 25 years of channel evolution
- 2012 Shoreline Master Plan Update
- 2014 King County revises CMZ mapping methods
- Advances in mapping technology
  - LiDAR, GIS, New Geologic Mapping

1991 Existing CMZ & 2016 Draft CMZ



King County Channel Migration Public Rule

Steve Bottheim, Geologist

Public Meeting, Sno-Valley Senior Center, May 8, 2017

Department of Permitting and Environmental Review

King County

Next Steps: Tolt River CMZ Studies	Timeframe
Public meeting	May 8, 2017
Public comment period ends • Written comments to DNRP, John Bethel	May 31, 2017
Respond to comments and revise draft study and map as necessary.	July 2017
Provide final study and map to DPER for adoption via Public Rule process	Target - Early August 2017
Final study and map effective 30 days after adoption (signature by DPER department director)	Target – September 1, 2017

DNRP = KC Department of Natural Resources and Parks
DPER = KC Department of Permitting and Environmental Review

Questions?

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