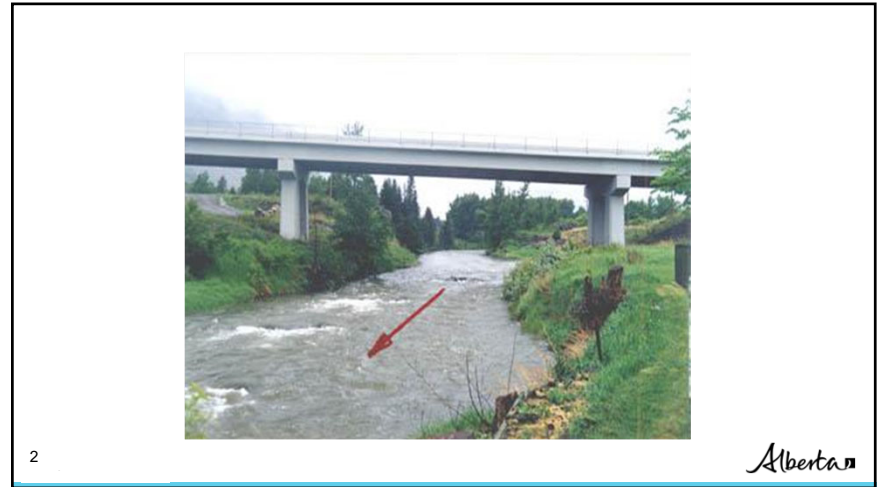


HYDROTECHNICAL CONSIDERATIONS



1



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- ## Overview
- Hydrotechnical Design
 - River Issues
 - Lateral Stability
 - Vertical Stability
 - Blockage - ice, drift
 - River Protection Works



3

Hydrotechnical Design



4

The Hydrologic Cycle



5

Alberta

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Drainage Basin Parameters

- Area
- Shape
- Slope
- Storage
- Density
- Vegetation
- Soil Type
- Initial Moisture



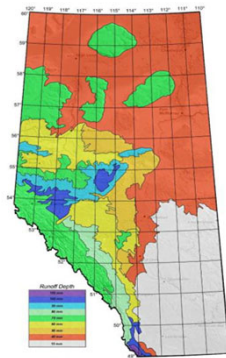
6

Alberta

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Hydrotechnical Design

- Channel Capacity
 - channel size result of long-term runoff
 - channel size affects routing of runoff
 - typical channel
 - activate overbank storage
- Historic Highwater Data
 - HWM – AT, AE, WSC, site, air photo, news
 - Location, description
- Runoff Potential
 - Limit on supply of runoff
 - Unit discharge

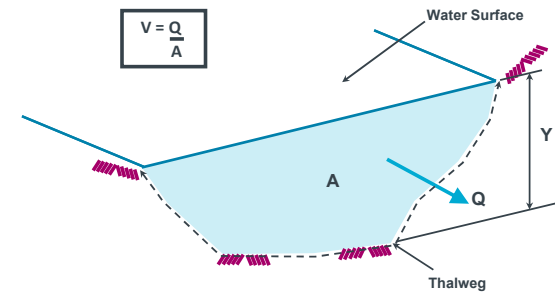


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Alberta

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Hydraulic Definitions

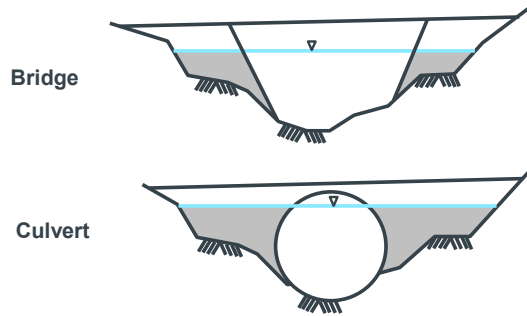


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Alberta

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Flow Area - Stream Crossing

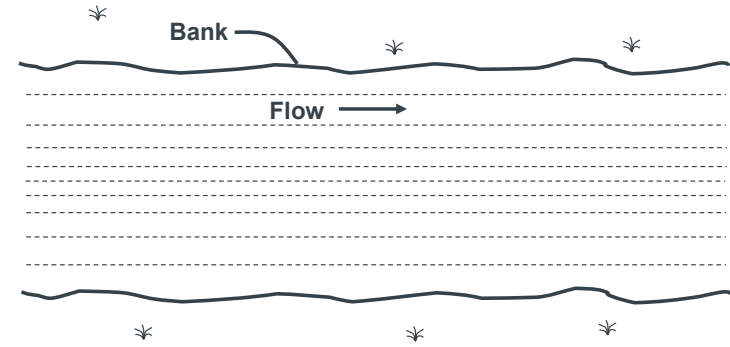


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Alberta

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Flowlines - Natural

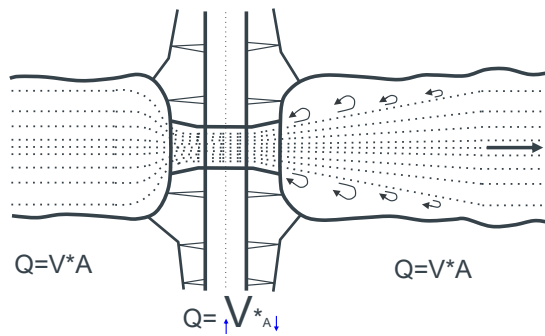


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Alberta

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Flowlines - Culvert Constriction

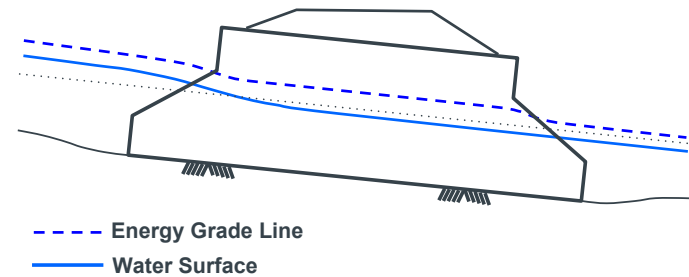


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Alberta

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Flow Profile - After Constriction



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Alberta

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File 00278 - Battle River

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File 00278 - Battle River

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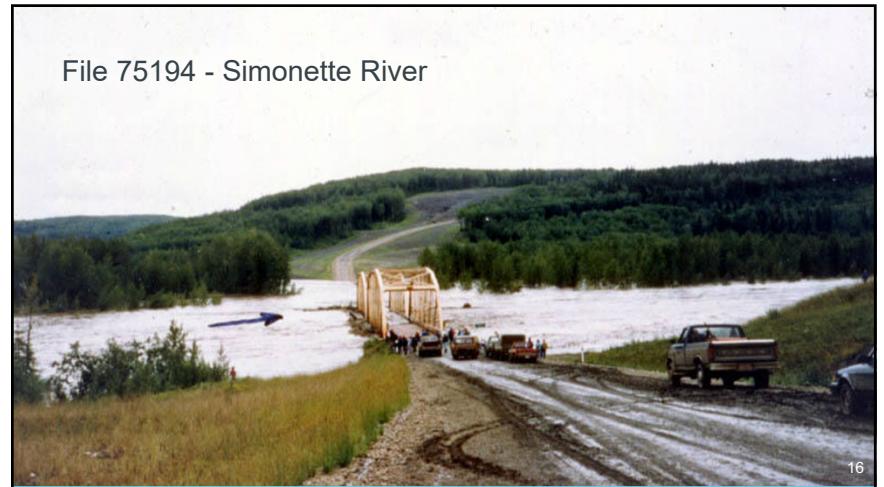
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File 00278 - Battle River

15

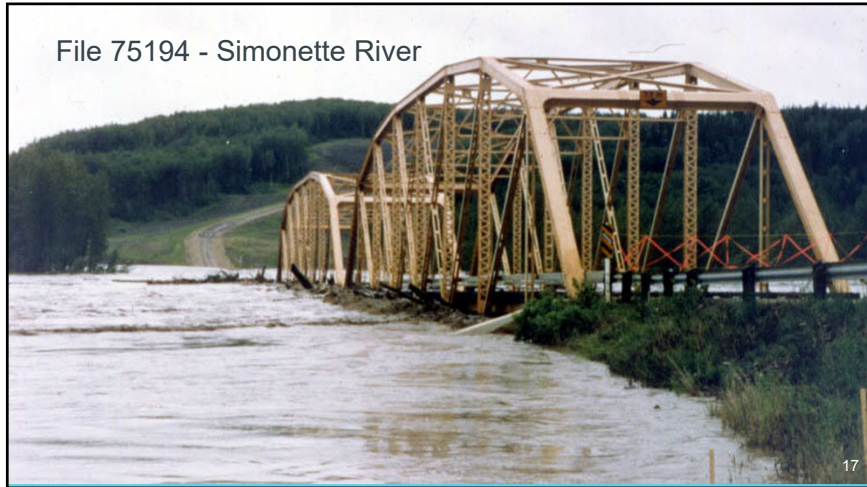
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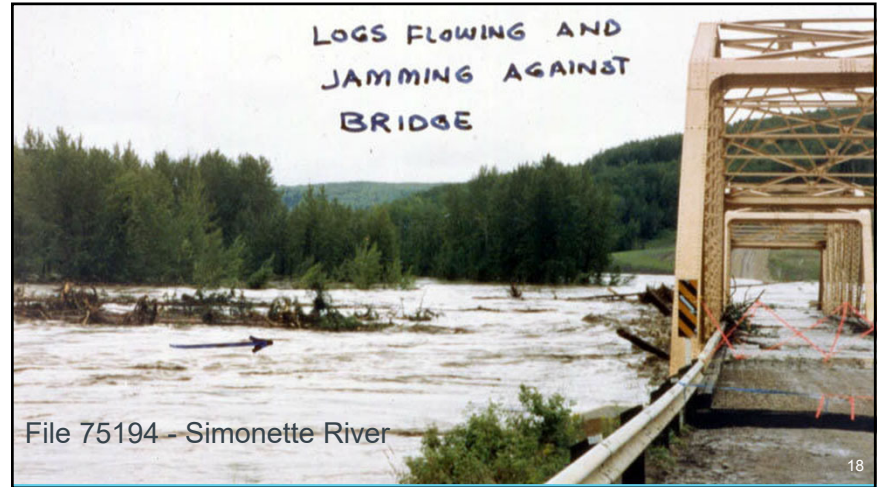
File 75194 - Simonette River

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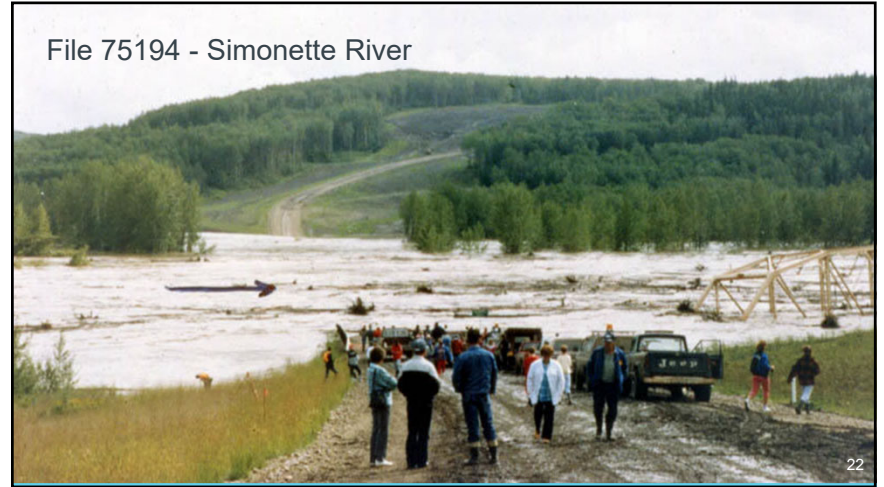
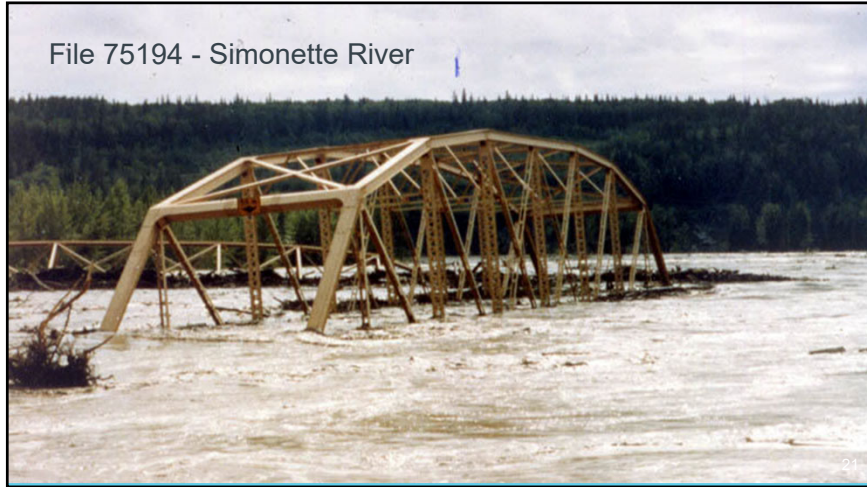
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File 07107 - Iron Creek

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File 76887 - Smith Creek

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File 76887 – Smith Creek

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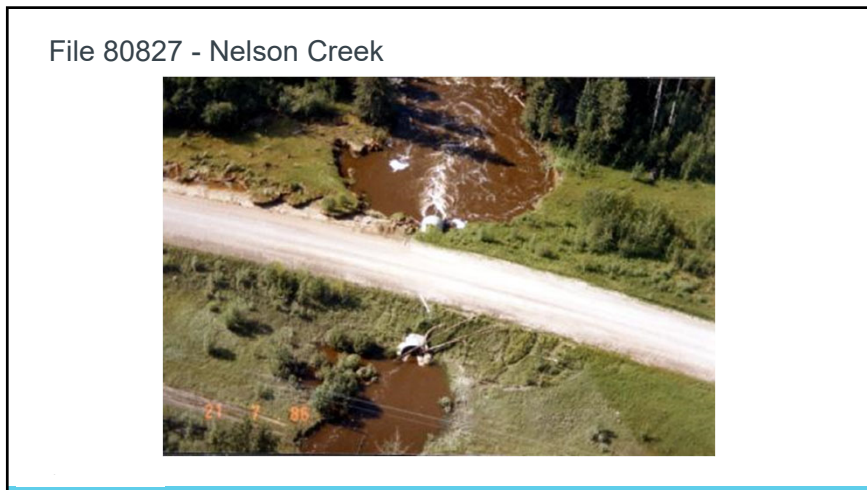


BF76474 – Smoky River at Grande Cache

June 1972
Smoky River Grande Cac80

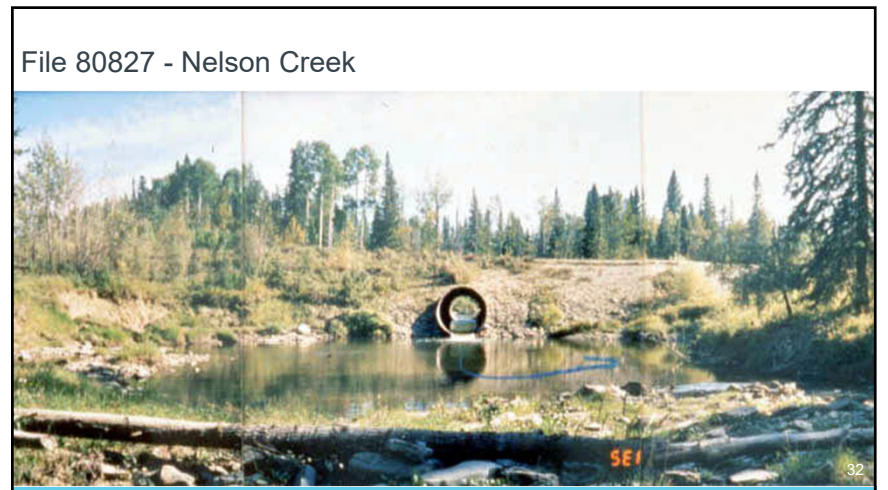
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File 80827 - Nelson Creek

31



File 80827 - Nelson Creek

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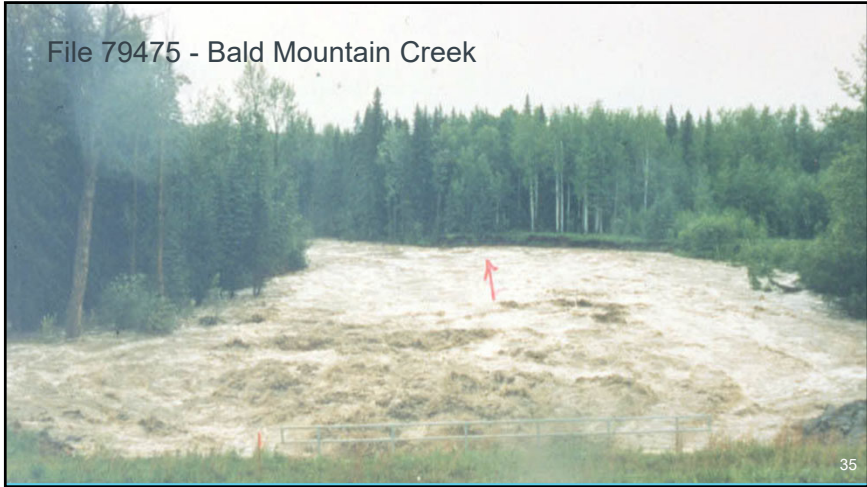
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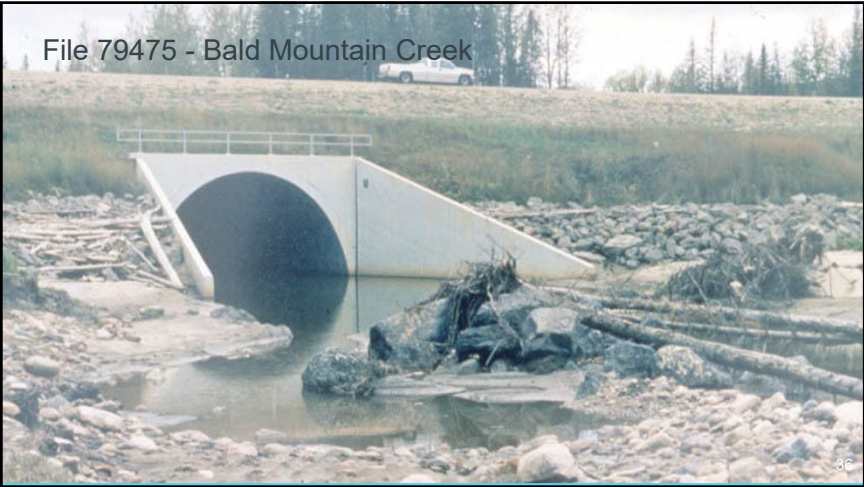
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River Issues

Lateral Stream Stability

Alberta

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Stability of Stream Types

Prairies
Mountains

Alberta

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Meander Cutoff

How does the gradient change with meandering and meander cutoff?

Alberta

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BF9259 – Freeman River

Alberta

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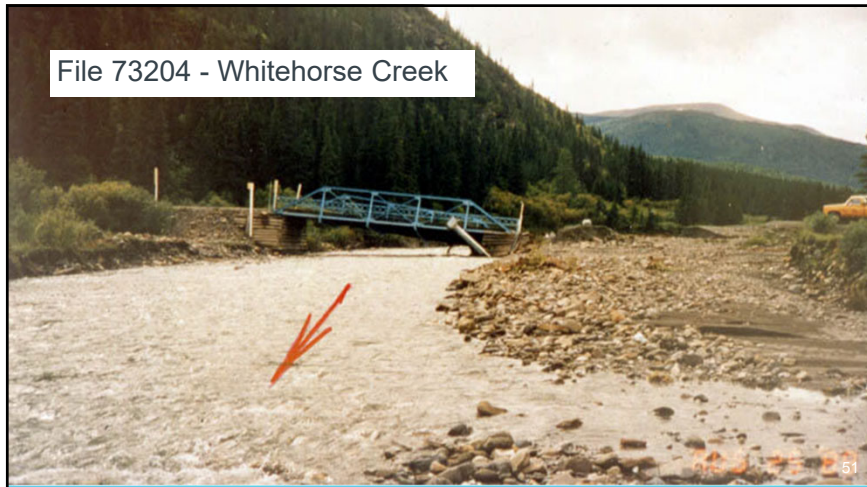
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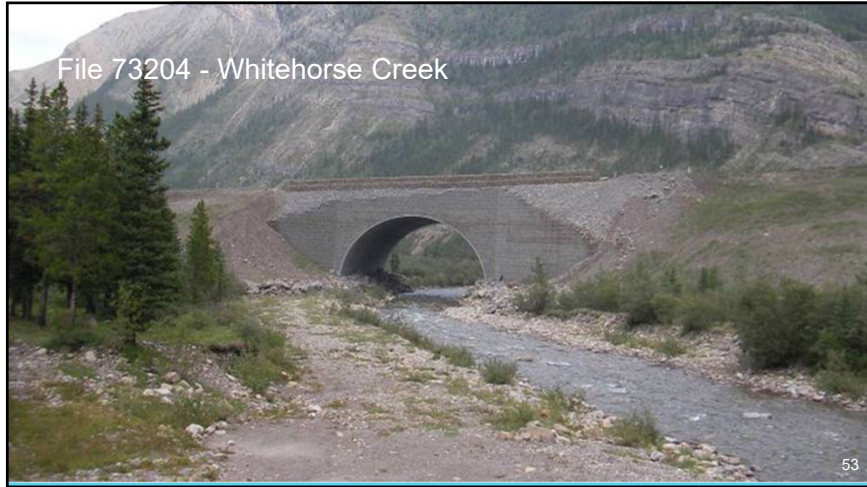
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River Issues

Blockages, Drift, Ice...

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File 72964 – Howard Ck

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File 74364 – Tributary to Bow River

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File 74364 – Tributary to Bow River

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BF 6754 Bow River at Cluny

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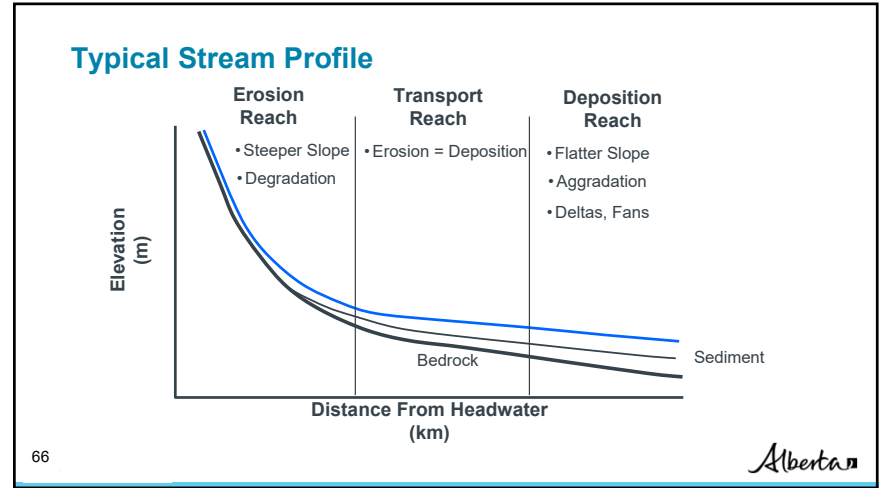
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River Issues

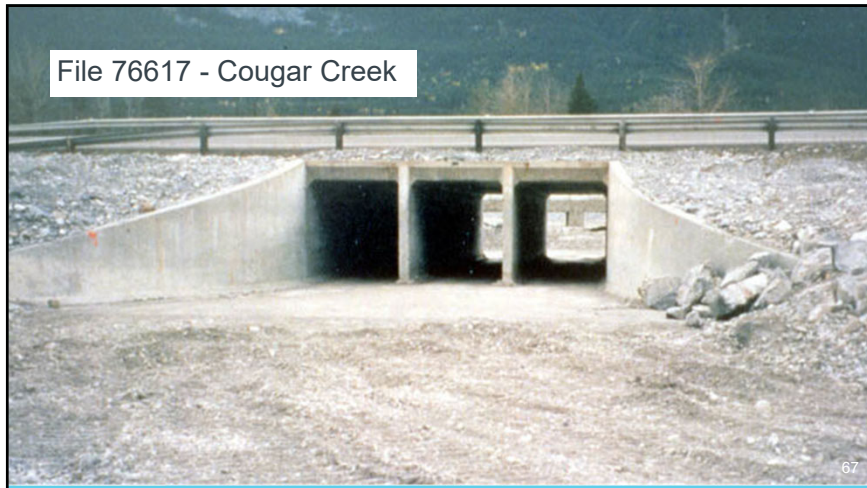
Vertical Stream Stability

65 Alberta

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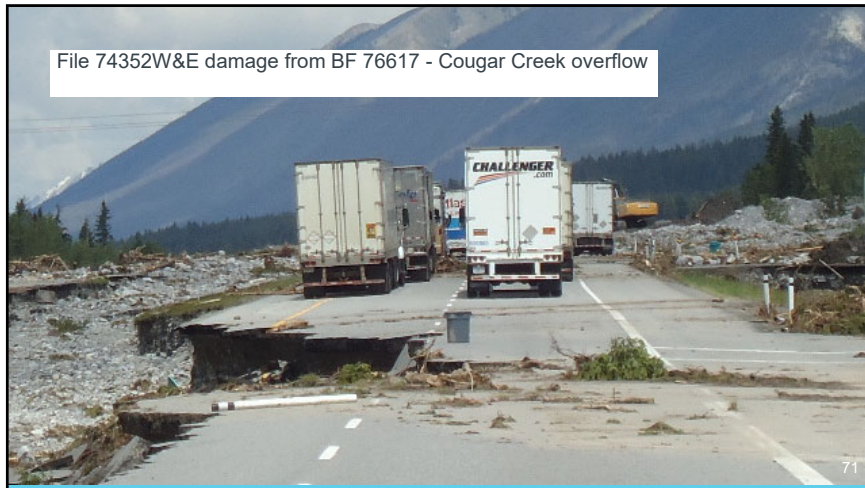
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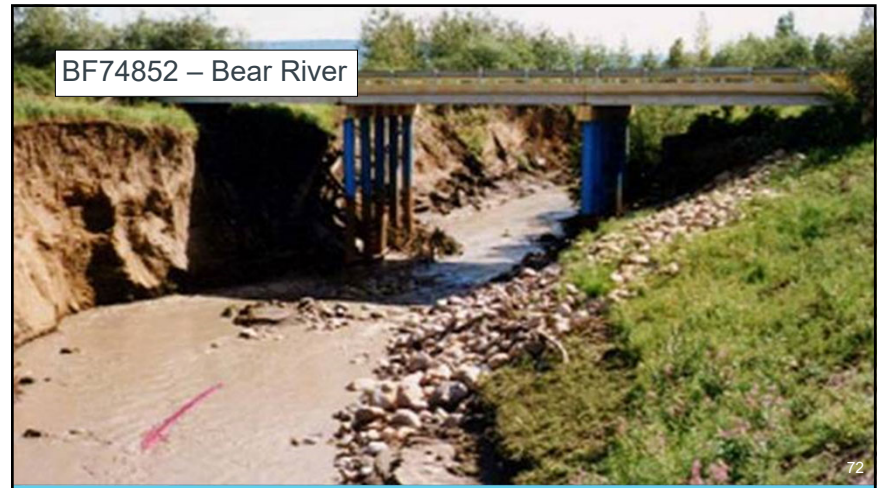
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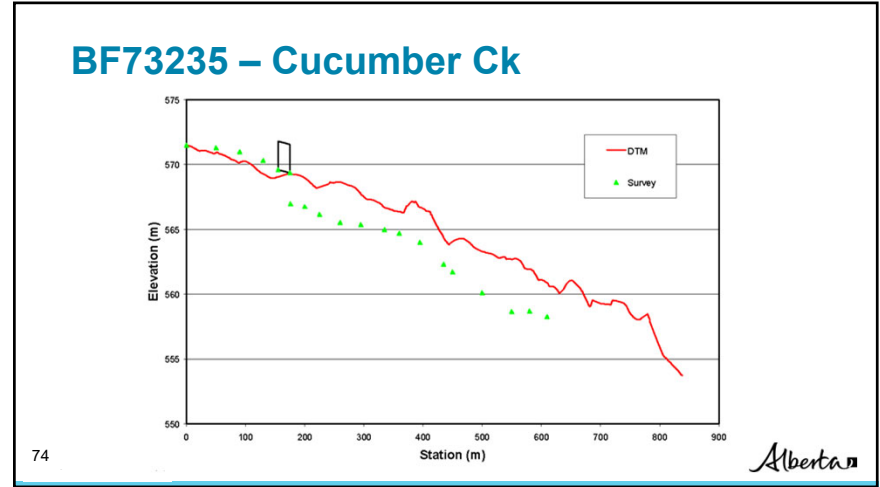
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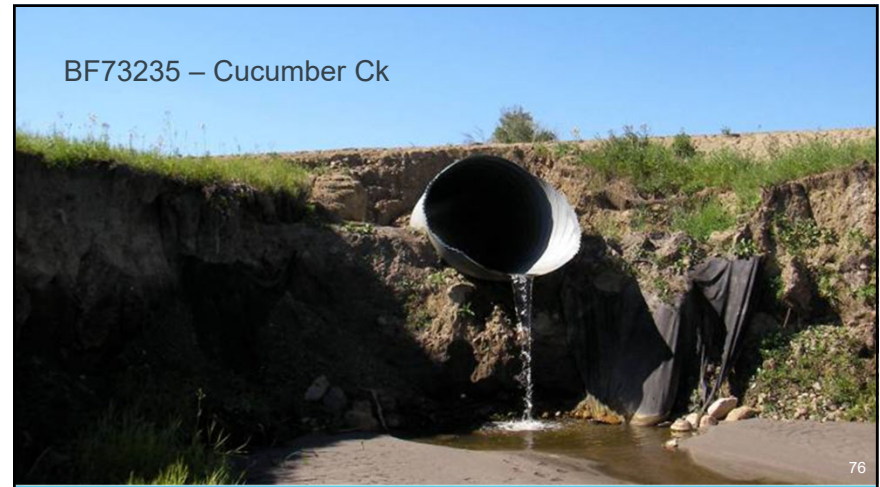
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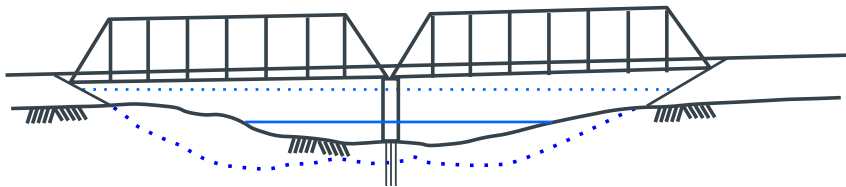


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General Scour



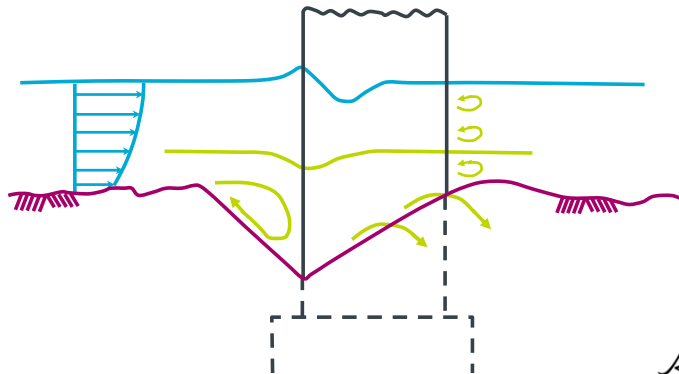
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Local Scour Profile



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Drift accumulation

Increased velocities and scour around piers.



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Smoky River CanFor Bridge

- Failure of a pier on spread footing due to general scour



81



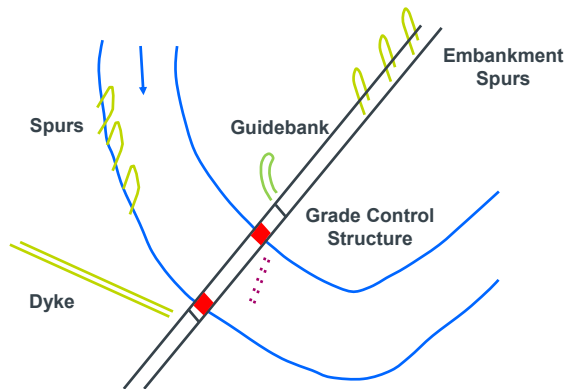
River Issues

River Protection Works

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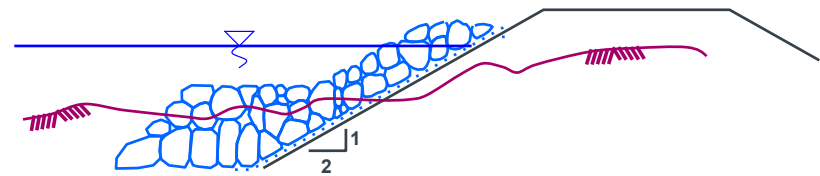
Location of River Protection Works



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Typical Rock Riprap Section



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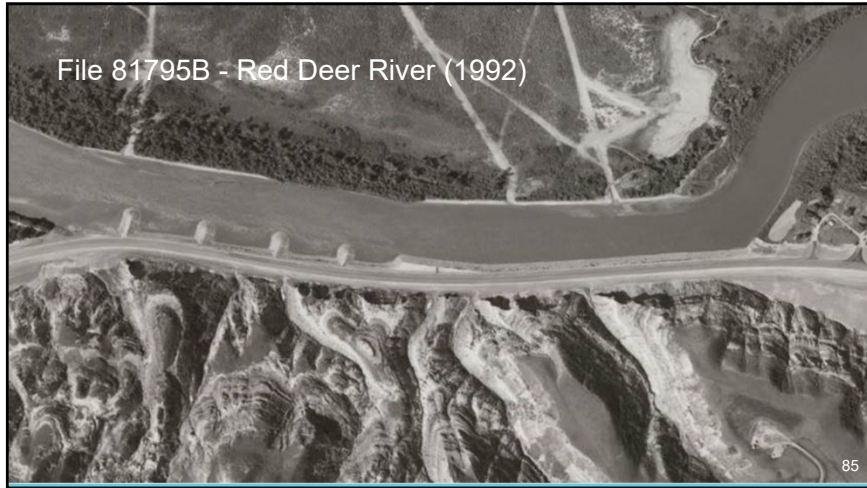


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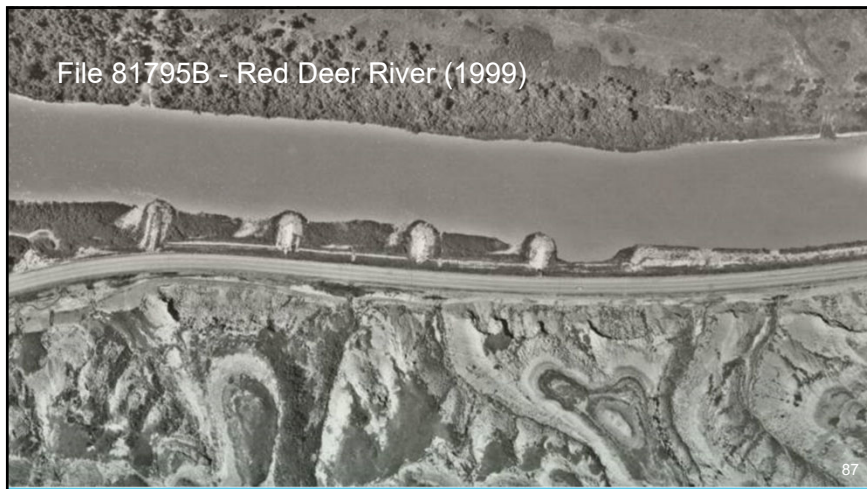
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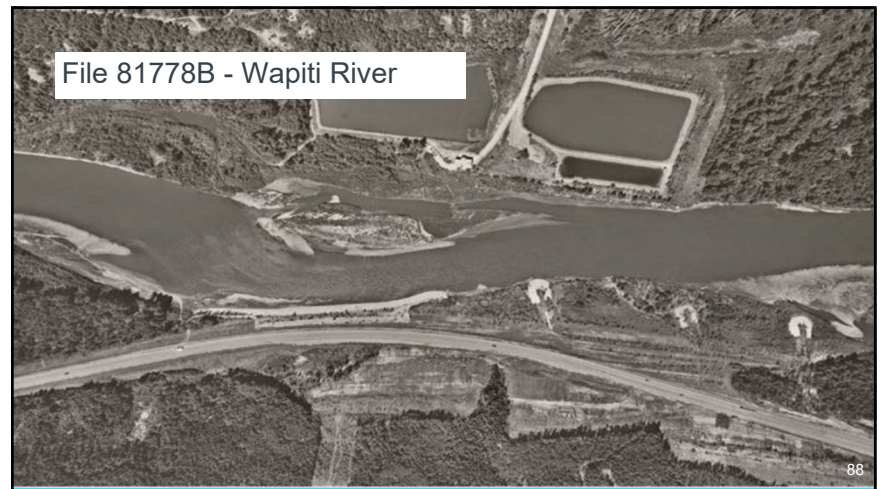
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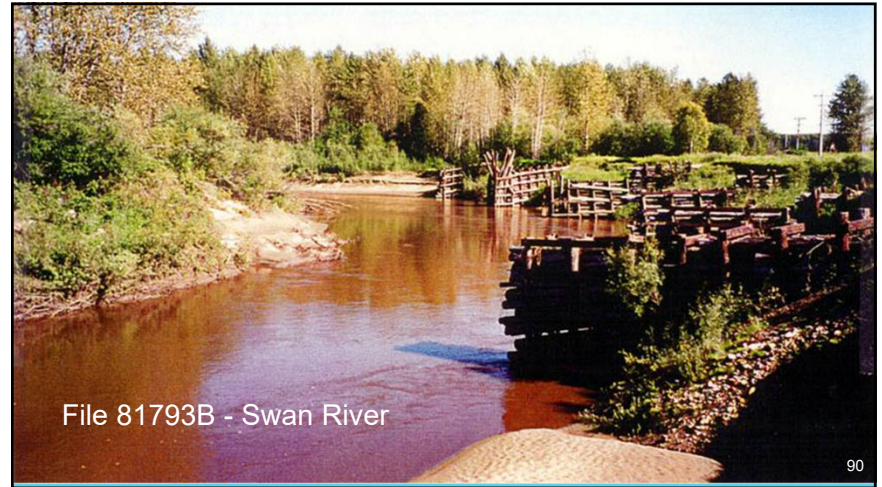
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