Fish and Watershed Program

Richard McCleary June 2, 2010

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Presentation Outline

1. What is our mission?
2. Who are our partners?
3. What do our partners need?
4. Who is on our team?
5. What are our results?
6. What is our plan?

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1. What is our Mission?

A. Mission statement:

Equip land managers with tools and knowledge to address important watershed issues.

B. Main issues:

Partners face three specific water-related issues:

1. reducing environmental impact from road network;
2. conserving native fish and their habitat;
3. working with multiple stakeholders with broader concerns (e.g., WPACs).

1. What is our Mission?

A. Mission statement:

B. Main issues:

C. Strategy:

(1) identify partners' research needs;
(2) form partnerships strategically to address needs;
(3) develop tools / knowledge;
(4) provide training to land managers and stakeholders;
(5) communicate our work to key audiences; and
(6) inform policy makers.

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2. Who are our Partners

A. Sponsoring partners:

Alberta Sustainable Resource Development – John Diiwu

Canadian Natural Resources Ltd.

ConocoPhillips Canada

Encana Corporation

Jasper National Park of Canada

PetroCanada

Talisman Energy Inc. – Rob Gibb

West Fraser Mills Ltd. – Rick Bonar & Mark Schoenberger

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2. Who are our Partners

B. Project partners:

- Alberta Newsprint Company
- FRIAA Open Funds
- NSERC
- Trout Unlimited Canada
- Spray Lake Sawmills
- Sundre Forest Products

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3. What do our partners value?

Science-based knowledge needed to create innovative solutions

Our partners also recognize:

1. the limitations of one-size-fits all solutions,
2. the importance of having the best datasets to support their decisions.

3. What do our partners need?

Our partners require:

1. the most accurate watercourse maps with:
   a. stream classification,
   b. fish-bearing status, and
   c. high-risk stream reaches.
2. best management practices linked to maps.
3. a system to update spatial database over time.

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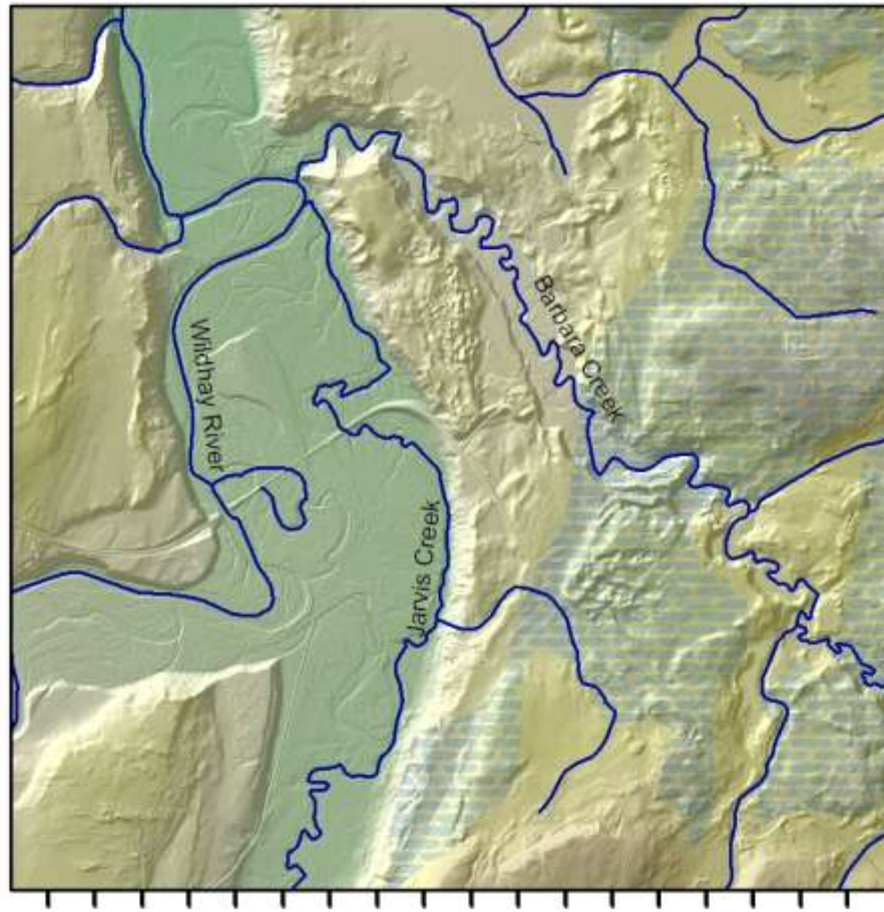
Challenges

1. Headwater streams are inherently difficult to map because:
   a. they cannot be seen in air photos (tree and shrub canopy, also small size);
   b. glaciation has largely shaped our watersheds;

Challenges

Non-glaciated,
consistent material

Glaciated, mixed material,
plateau benchlands

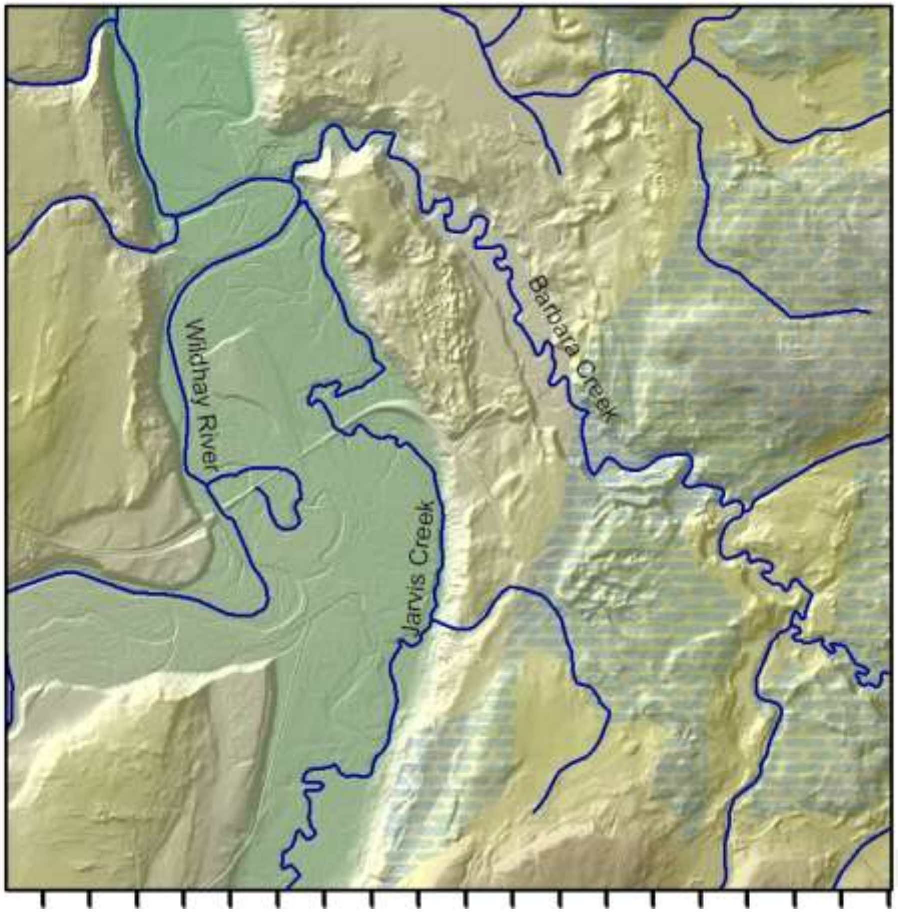


50,000,000 years of erosion

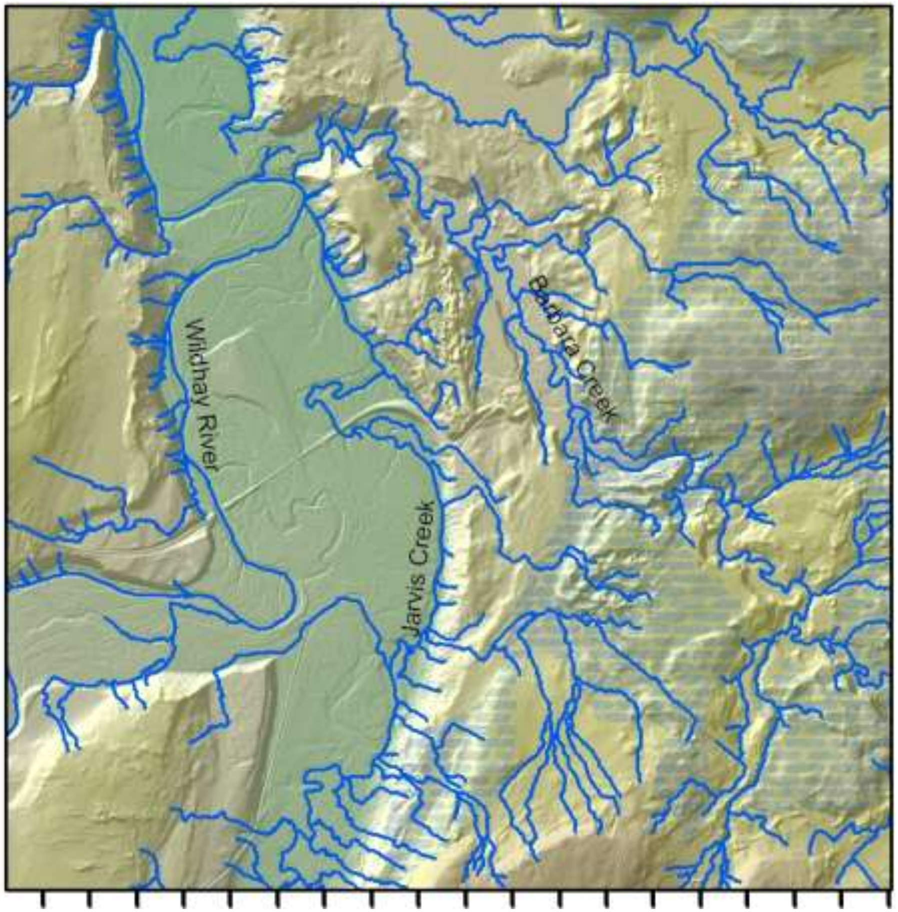
12,000 years of erosion
(Roed 1968)

Challenges

Air-photo interpreted streams

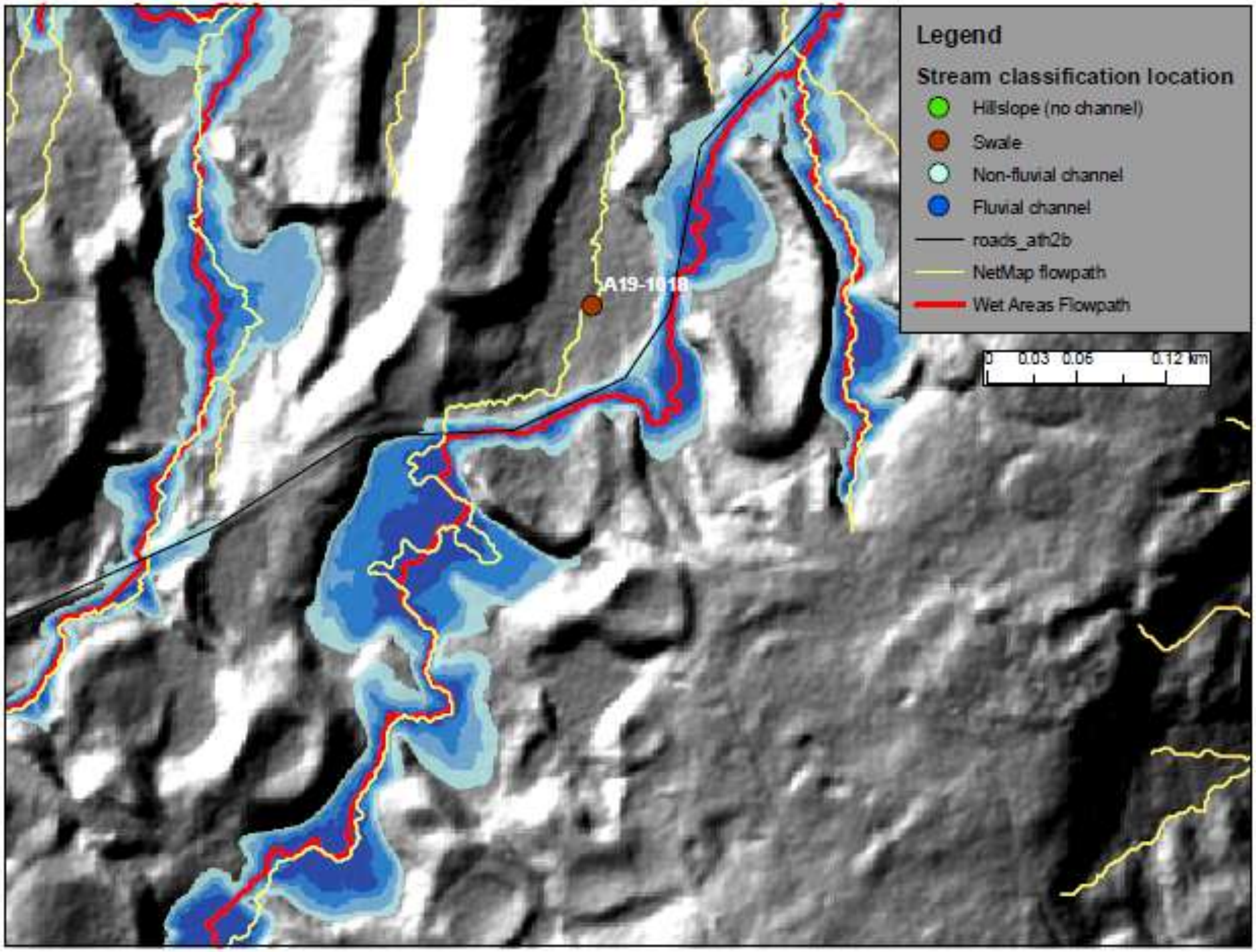


Flowpaths predicted from LiDAR



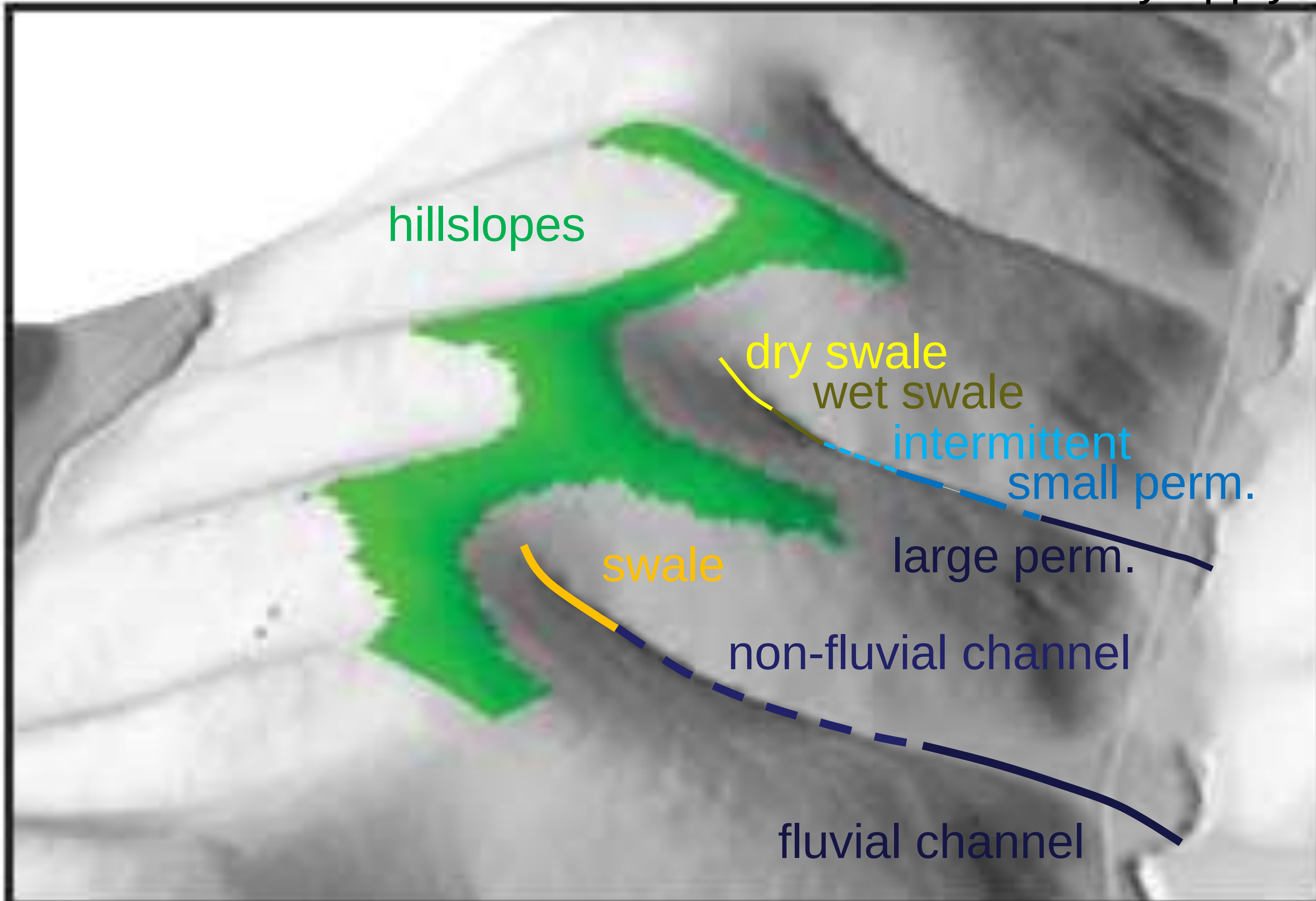
Challenges

LiDAR flowpaths are diverted by road beds



Challenges

Ground rules classification difficult to consistently apply



4. Who is on our Team

1. FRI employees
2. UBC Dept. of Geography
   - Prof. Marwan Hassan
   - Prof. Dan Moore
3. Earth Systems Institute (Wash. and Calif.)
   - Dr. Lee Benda
   - Dr. Dan Miller
   - Kevin Andras

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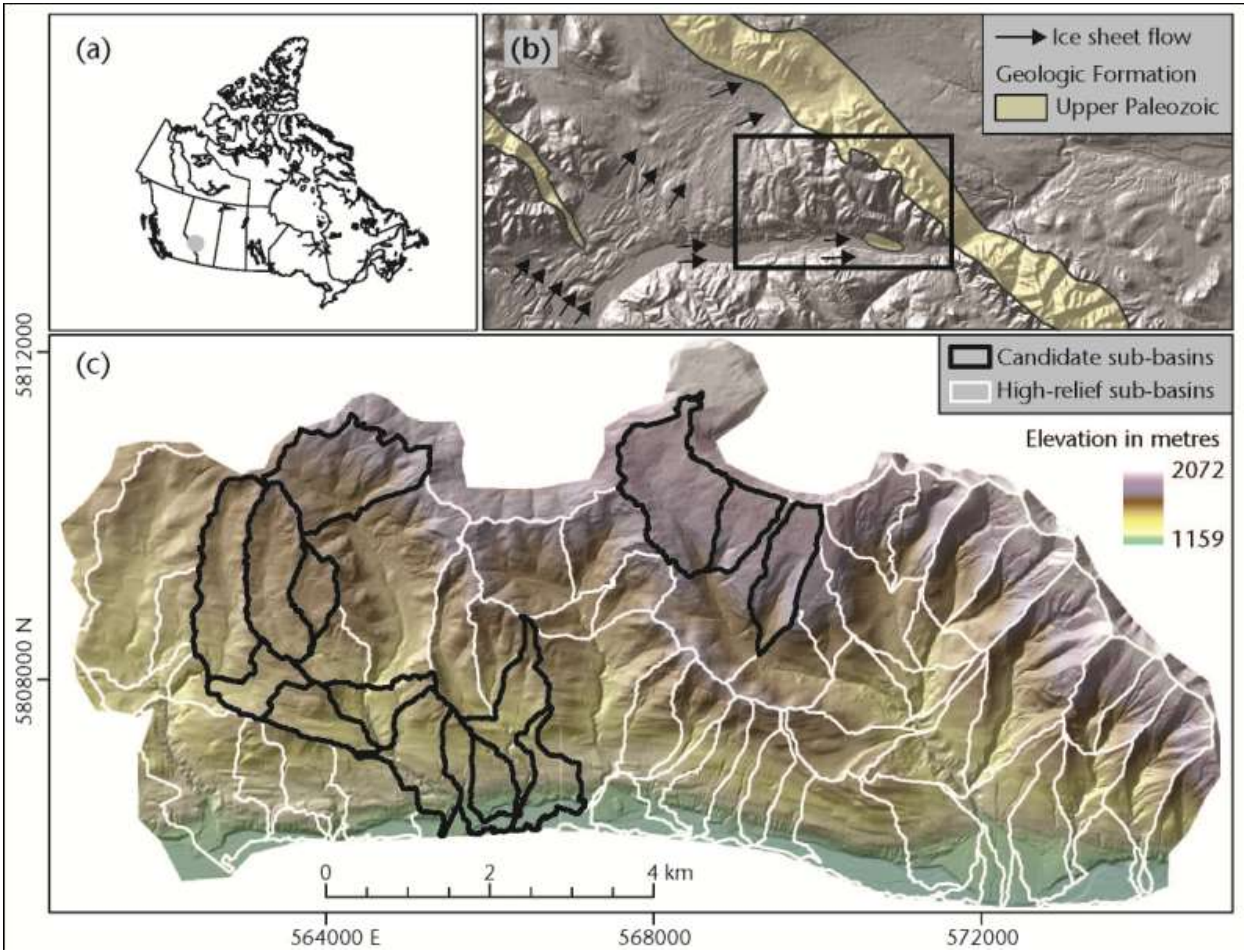
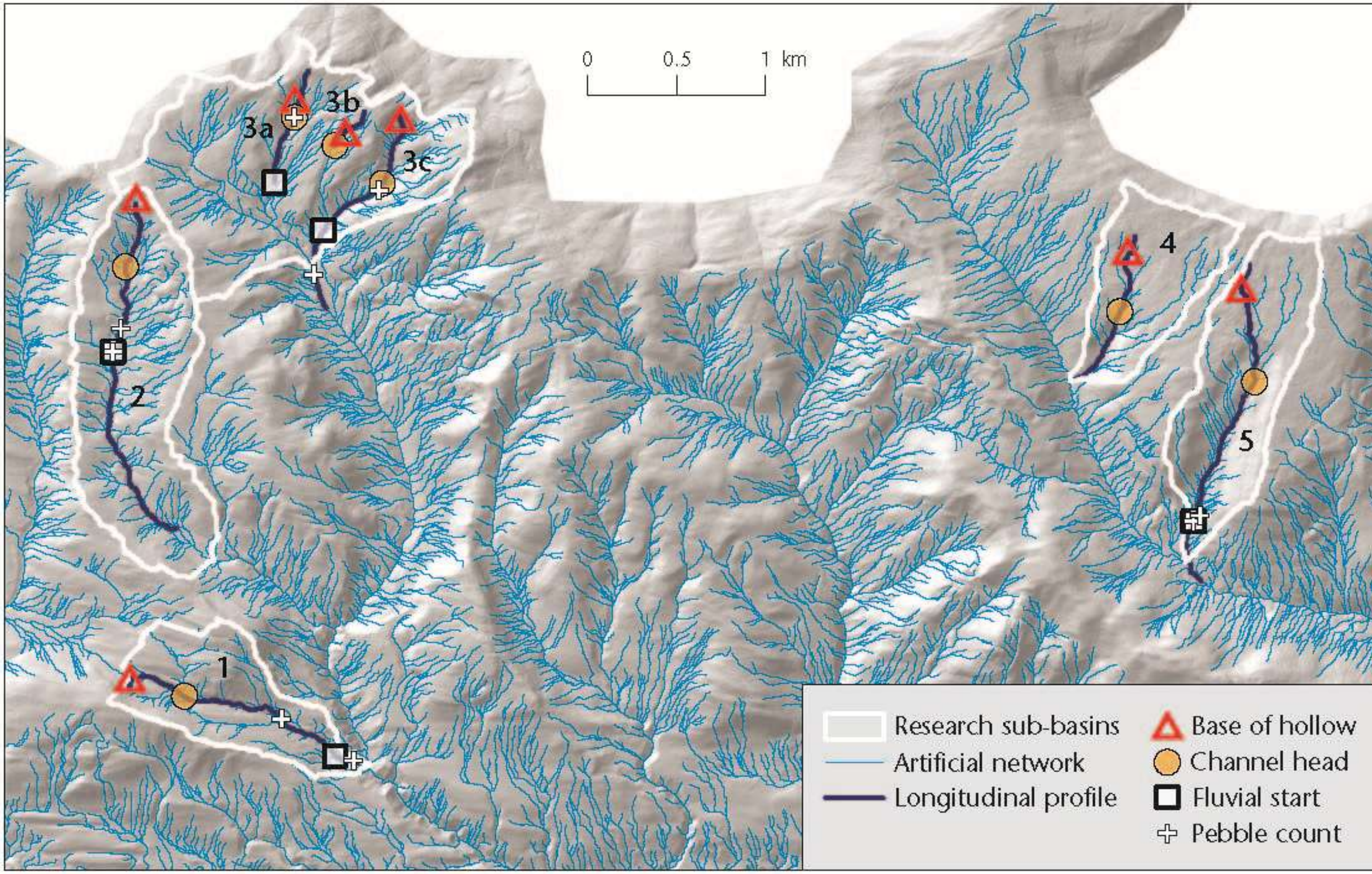
5. Results: Dutch Creek LiDAR Project

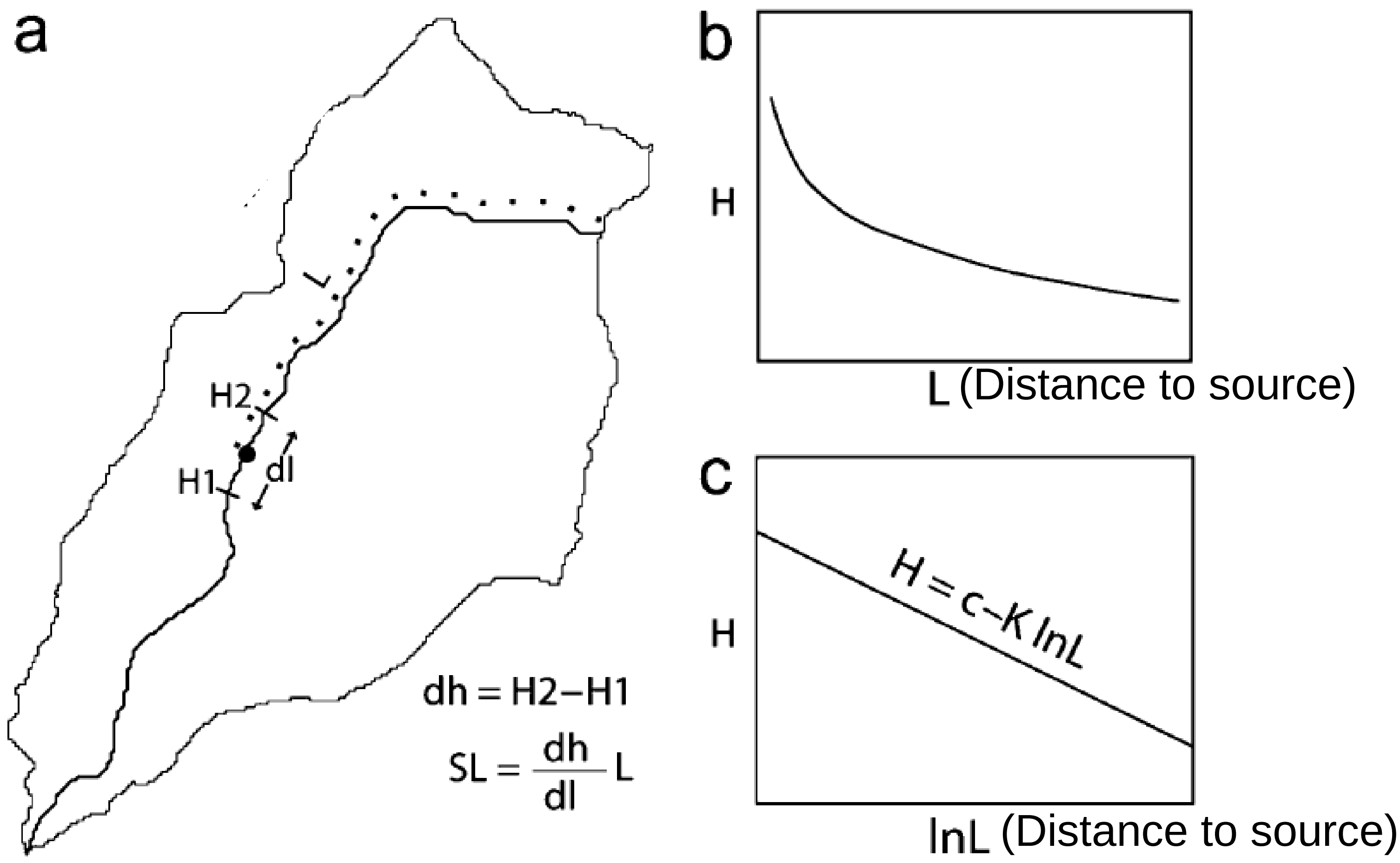


5. Results: Preliminary network and fieldwork



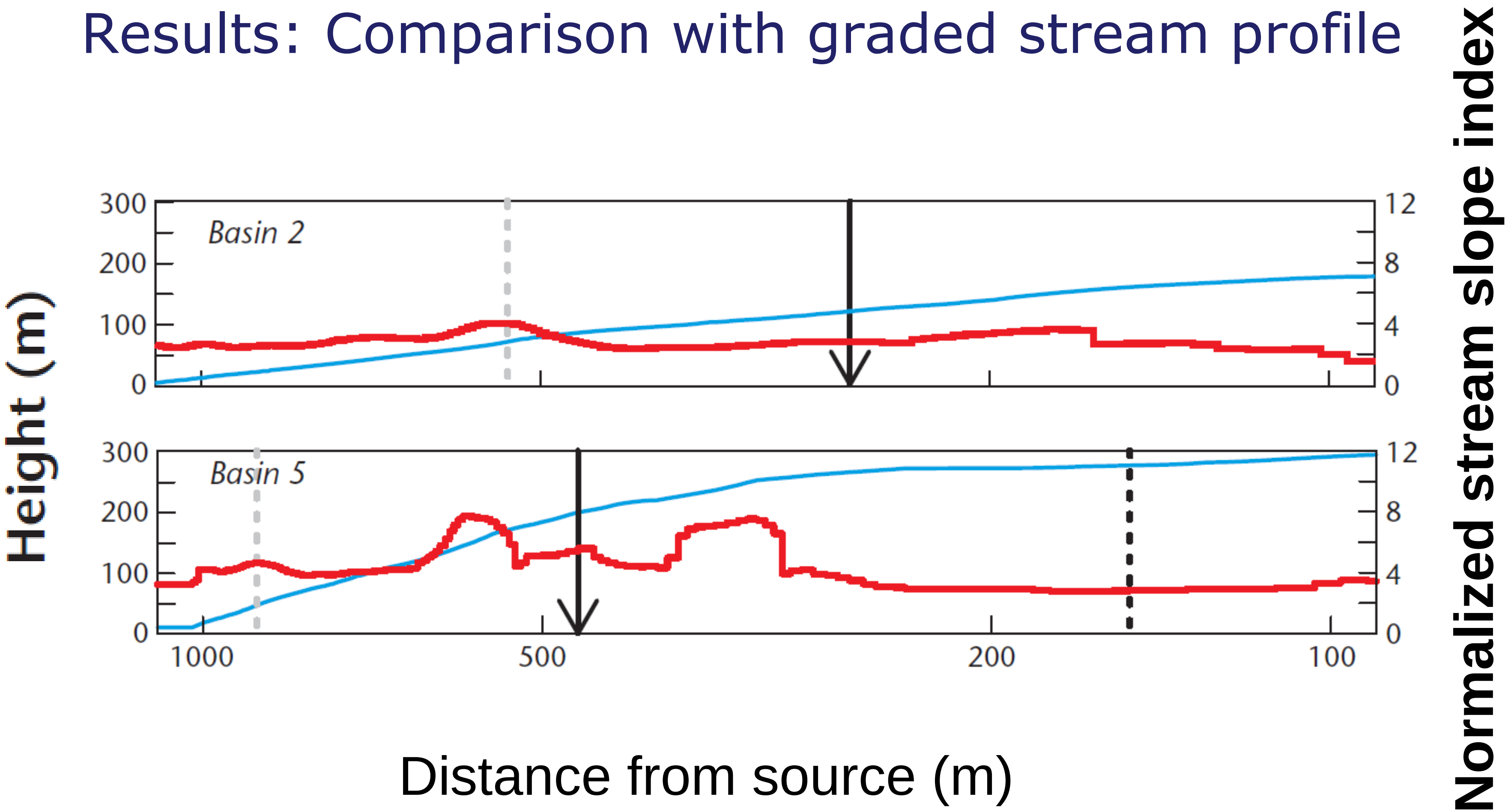
1. Intentionally over-estimated drainage network using LiDAR.
2. Divided network into 10 m reaches, each with drainage area, slope, etc.
3. Swales start near 2 ha, non-fluvial channels 20 ha, and fluvial channels 70 ha.

The Graded River Profile



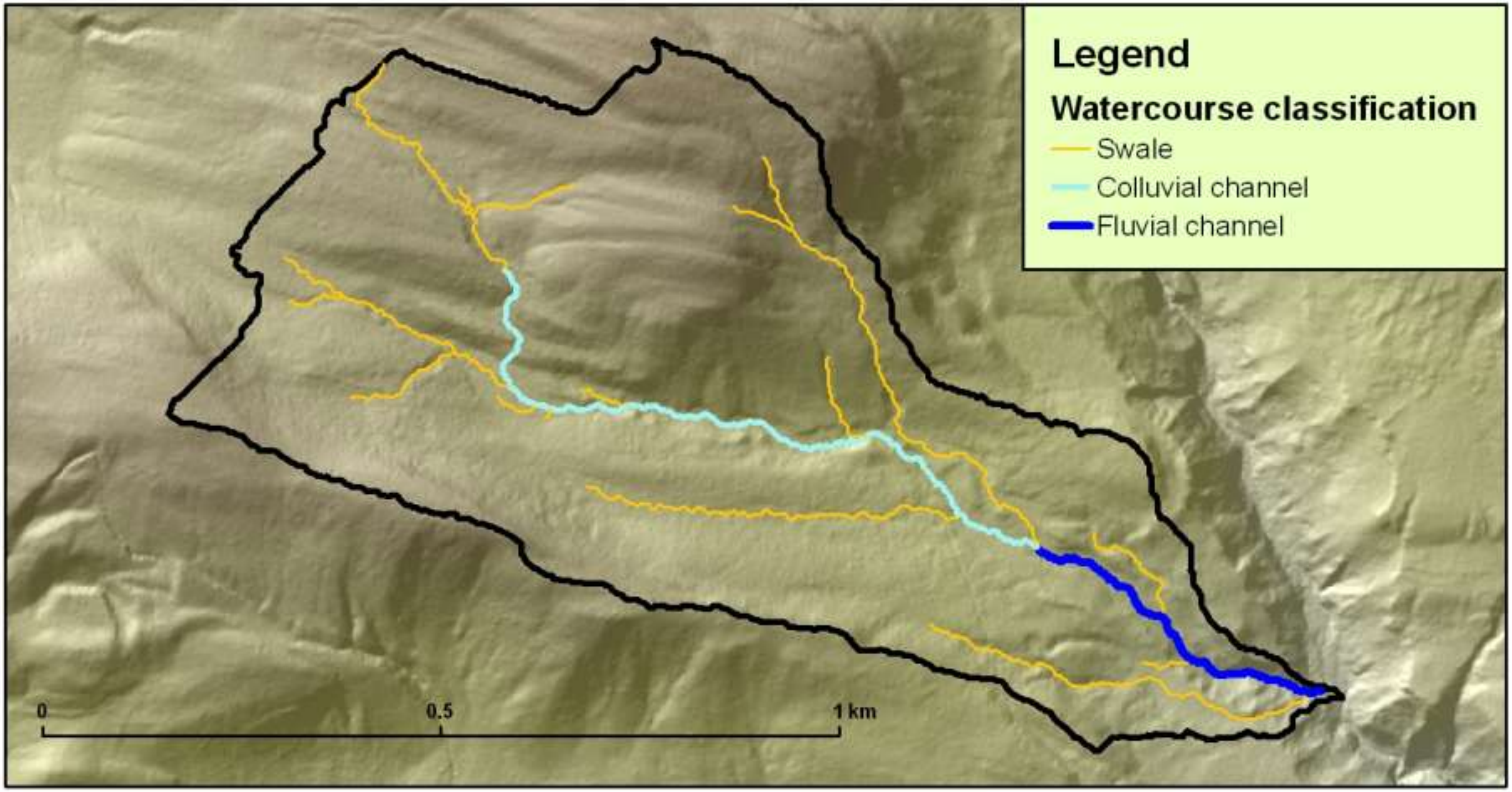
(Perez-pena et al., 2008)

Results: Comparison with graded stream profile



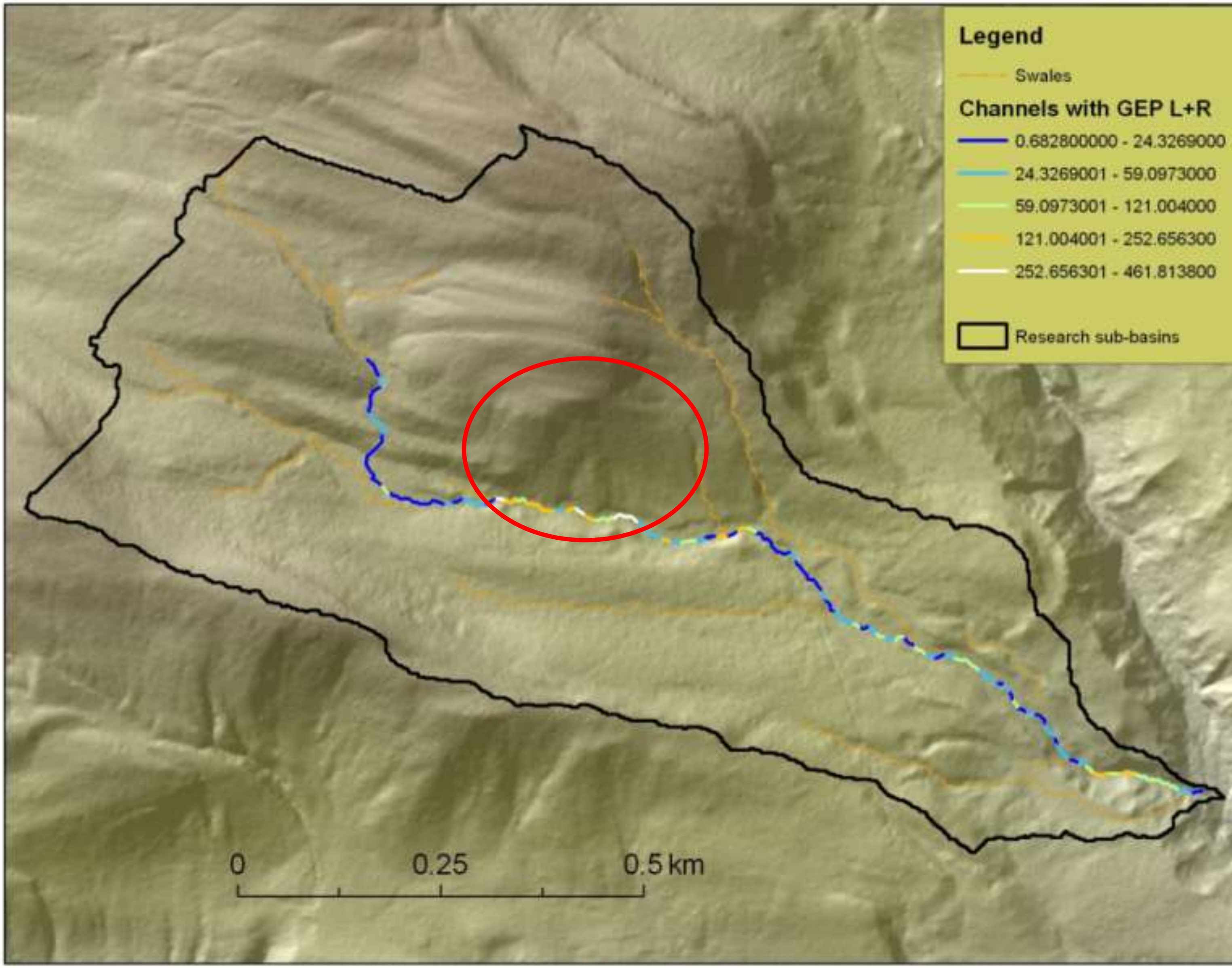
As channel profile complexity increases, so does distance from source for channel type transitions.
Consistent with Toth (1963).

Results: a standard channel classification can be applied in the field and predicted remotely from LiDAR



Transitions are dynamic.
Channel heads migrate upstream during major events.

Results: High risk sediment delivery locations can be predicted by linking a hillslope erosion model with channels



Current Process	Case Study	Best informed process
1. Identify road / pipeline route 2 years + in advance.	1. Identify pipeline route 1 year in advance	1. Identify route one year in advance.
2. Use Alberta streams map to identify crossing locations.	2. Assume fish present and plan to use directional drilling at all stream crossings.	2. Use watershed database with LiDAR-derived stream network to identify all crossing locations.
3. During initial field layout, identify all unmapped stream crossings.	3. Directional drilling fails under small permanent.	3. During initial field layout, identify all false streams and any unmapped stream crossings.
4. Determine fish-bearing status at all crossing locations based on 2 years of field work.	4. FRI model indicates low probability of fish.	4. Determine fish-bearing status at all crossings based on spatial database, plus one year of field work at all crossing locations.
5. Identify suitable design options for each crossing.	5. Application made to DFO for open cut is rejected due to lack of field work.	5. Identify crossing design options also considering wet areas mapping, erosion risk, etc.
	6. Directional drill is successful from other side.	6. Update spatial database with all new information.
RISKS & COSTS: time, lost information - unmapped streams, fish-bearing status based on limited information.	**High cost, information lost.**	**Low cost, highly informed decisions, opportunity for innovation, knowledge captured for future use.**

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6. Plan

1. Publish Dutch Creek Project.
2. Complete Hinton region channel classification model and explore linkages to wet areas mapping.
3. Expand occurrence models for native fish throughout Upper Athabasca River watershed.
4. Explore "All Lands, All Stakeholders, Science Tool Initiative" currently underway in western United States.

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Working to provide the information required for innovation.

Acknowledgements:

Thanks to FRI Sponsors and Project Partners

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