



# Syilx Okanagan Flood and Debris Flow Risk Assessment Map Book

## Map Series 4 of 7: Mortality Indicator



*31 December 2019*



**PALMER**  
ENVIRONMENTAL  
CONSULTING  
GROUP INC.



ENGAGE | INSPIRE | MOBILIZE  
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Empowering People—Strengthening CommUNITY

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Suggested report citation: Ebbwater Consulting Inc. (2019): *Syilx* (Okanagan) Flood and Debris Flow Risk Assessment: Map Book. Prepared for the Okanagan Nation Alliance.

## Acknowledgement

The *Syilx* Okanagan Flood and Debris Flow Risk Assessment is made possible by the many *Syilx* Okanagan Nation members from across the territory who generously contributed their input, knowledge, and lived experience – all of which form the foundations of this Assessment. Special recognition is given to the *Syilx* Okanagan traditional knowledge keepers and Elders who led the watershed tours and were a guiding force in rooting the assessment in traditional *Syilx* Okanagan perspectives.

This Assessment is a testament to the power of collaboration and partnership between *Syilx* and non-*Syilx* organizations, including the project team at Ebbwater Consulting Inc. (Ebbwater), and exhibits a shared concern for how water is managed and recognized in the territory.

Support for this project came from Emergency Management British Columbia (EMBC) and Public Safety Canada (PSC) as part of the National Disaster Mitigation Program (NDMP), First Nation Adapt Program and the Real Estate Foundation of B.C. through successful applications submitted by the Okanagan Nation Alliance (ONA).

Okanagan Nation Alliance would like to acknowledge Ebbwater for the production of this Map Book, which was completed by Dickon Wells, M. Eng, with support from Silja Hund, Ph.D., Nikoletta Stamatatou, M.Sc., and Robert Larson, M.Sc. Qualitative input for the Map Book is owed to project participants, as well as Erica Crawford (SHIFT Collaborative) and Kelly Terbasket (indigenEYEZ) for leading the workshops. Cory McGregor, GIT and Derek Cronmiller, P.Geo (both of Palmer Environmental Consulting Group Ltd.) provided the information to quantitatively map debris flow hazard. The Map Book contains significant input from ONA team members Tessa Terbasket, Kathy Holland, and Skyeler Folks. The Map Book was reviewed by Tamsin Lyle, P.Eng of Ebbwater.

The team is grateful to *Syilx* Okanagan community staff who contributed to and supported the process; Colleen Marchand (OKIB), Brody Armstrong (PIB), Stephanie Paul (WFN), Jonathan Ford (WFN), Wendy Hawkes (LSIB), Trudy Peterson (LSIB), Mike Allison (USIB) and Robin Irwin (USIB). Finally, the team would like to thank the *Syilx* Okanagan Flood Adaptation Initiative Steering Committee members who will continue to work together and provide direction to co-build flood resilience in the region.

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## Introduction

The ONA was a successful Stream 1 applicant to the National Disaster Mitigation Program (NDMP) to study flood and debris flow hazard risk in the Okanagan-Similkameen region. This project is the initial phase of a multi-year flood and debris flow adaptation initiative. This project's goal is to **understand the risk due to flood and debris flows within the project area, to support priority-setting of future work.**

This Map Book is one of four outputs that form the risk assessment component of this project (Figure 1). The Map Book may also be used as the main visual reference to the Synthesis and Recommendations report, for readers to obtain a summary understanding of the project. The Qualitative, Quantitative, and Basis of, studies contain more detailed information. The Map Book summarizes the spatial results following the methods described in the Qualitative and Quantitative studies.

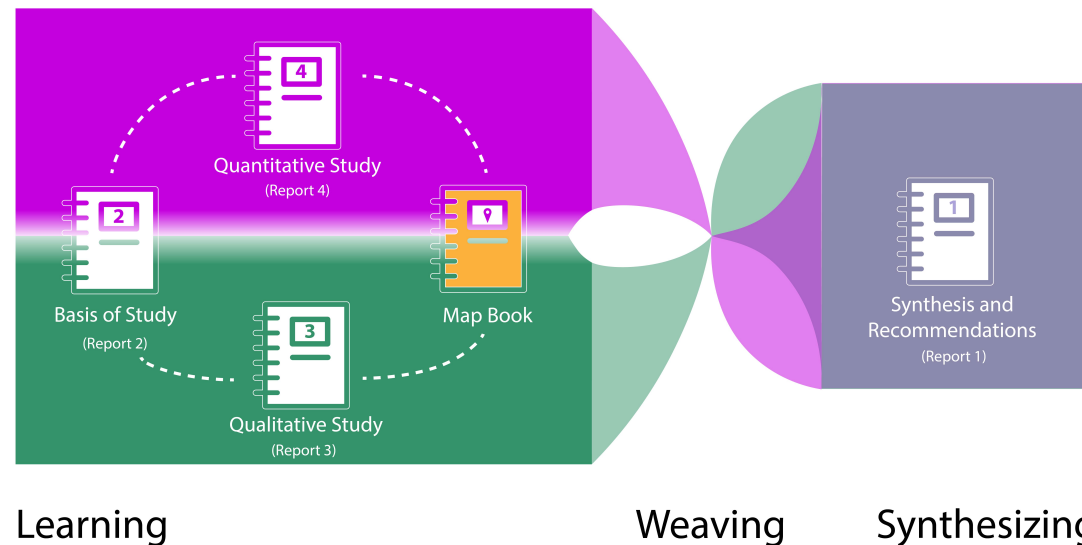


Figure 1: Project reporting diagram, with the Risk Assessment's four distinct outputs (i.e., Map Book, Basis of Study, and the complementary Qualitative and Quantitative studies).

## Overview of Maps

Ebbwater assessed the impacts from both flood and debris flow in the Okanagan-Similkameen watersheds. This assessment was done quantitatively and qualitatively. This map series is one out of a series of 7 that together form the Map Book. In aggregate, the 7 series cover the 2 hazards assessed and 6 exposure indicators. The table below lists the 7 series, and highlights the series contained herein. The qualitative maps combine impacts from both flood and debris flow hazards. The quantitative maps show consequences from flood and debris flow hazards separately. In the quantitative maps, the consequences for flood hazard are shown for the moderate magnitude scenario only.

Series	Map Book Title	Information Shown
Series 1	Flood and Debris Flow Hazard	<ul style="list-style-type: none"><li>• Debris Flow</li><li>• Low, Moderate, and High Magnitude Flood</li></ul>
Series 2	Environment Indicator	<ul style="list-style-type: none"><li>• Qualitative (Impacts)</li><li>• Quantitative (Consequences)</li></ul>
Series 3	Culture Indicator	<ul style="list-style-type: none"><li>• Qualitative (Impacts)</li><li>• Quantitative (Consequences)</li></ul>
<b>Series 4</b>	<b>Mortality Indicator</b>	<ul style="list-style-type: none"><li>• Quantitative (Consequences)</li></ul>
Series 5	Affected People Indicator	<ul style="list-style-type: none"><li>• Qualitative (Impacts)</li><li>• Quantitative (Consequences)</li></ul>
Series 6	Economy Indicator	<ul style="list-style-type: none"><li>• Qualitative (Impacts)</li><li>• Quantitative (Consequences)</li></ul>
Series 7	Disruption Indicator	<ul style="list-style-type: none"><li>• Qualitative (Impacts)</li><li>• Quantitative (Consequences)</li></ul>

## Printing and Document Navigation

All maps are designed and scaled to be printed in 'ANSI D' format. Maps are linked and can be navigated through by clicking within the following:

- Index line items on page 3.
- Blue tiles, watersheds or text, located in the top right-hand corner of the maps, where present.
- Sub-watershed index map on page 9.
- Hyperlinked Map index on page 7.

## Notes to User











### Quantitative

1. Building footprints have been used as an indicator of missing and mortality as these are the locations where people are more likely to be. All buildings within the hazard area have been shown as these are all areas of high potential exposure. In reality the missing and mortality rate is expected to be lower than that indicated on this map.
2. The building footprint (exposure) layer was clipped to the debris flow hazard areas. The hazard layer is shown in the hazard maps, and was produced by Palmer Environmental Consulting Group Inc. The method used to produce the hazard layer is described in the Quantitative Study.

### Data Sources

1. Lakes and Watercourses: BC Data Catalogue.
2. Roads: BC Data Catalogue.
3. *Sylix* Place Names: Okanagan Nation Alliance
4. Building Footprints: Regional district and municipalities and hand digitized using Bing Satellite Imagery.
5. Base Layer: OpenStreetMap data – [openstreetmap.org](http://openstreetmap.org) (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

### Icons

Information Type	
	Qualitative
	Quantitative
Hazard	
	Flood
	Debris Flow
Exposure Indicator	
	Environment
	Culture
	Mortality
	Affected People
	Economy
	Disruption

## Map Index

### Quantitative Maps

M-D-001-001	Debris Flow - Mortality - Sub-watershed Index
M-D-002-001	Debris Flow - Mortality - Quantitative Project Area Map
M-D-002-002	Debris Flow - Mortality - Quantitative Okanagan Map
M-D-002-003	Debris Flow - Mortality - Quantitative Similkameen Map
M-D-003-001	Debris Flow - Mortality - Quantitative Map Tile 1 of 20
M-D-003-002	Debris Flow - Mortality - Quantitative Map Tile 2 of 20
M-D-003-003	Debris Flow - Mortality - Quantitative Map Tile 3 of 20
M-D-003-004	Debris Flow - Mortality - Quantitative Map Tile 4 of 20
M-D-003-005	Debris Flow - Mortality - Quantitative Map Tile 5 of 20
M-D-003-006	Debris Flow - Mortality - Quantitative Map Tile 6 of 20
M-D-003-007	Debris Flow - Mortality - Quantitative Map Tile 7 of 20
M-D-003-008	Debris Flow - Mortality - Quantitative Map Tile 8 of 20
M-D-003-009	Debris Flow - Mortality - Quantitative Map Tile 9 of 20
M-D-003-010	Debris Flow - Mortality - Quantitative Map Tile 10 of 20
M-D-003-011	Debris Flow - Mortality - Quantitative Map Tile 11 of 20
M-D-003-012	Debris Flow - Mortality - Quantitative Map Tile 12 of 20
M-D-003-013	Debris Flow - Mortality - Quantitative Map Tile 13 of 20
M-D-003-014	Debris Flow - Mortality - Quantitative Map Tile 14 of 20
M-D-003-015	Debris Flow - Mortality - Quantitative Map Tile 15 of 20
M-D-003-016	Debris Flow - Mortality - Quantitative Map Tile 16 of 20
M-D-003-017	Debris Flow - Mortality - Quantitative Map Tile 17 of 20
M-D-003-018	Debris Flow - Mortality - Quantitative Map Tile 18 of 20
M-D-003-019	Debris Flow - Mortality - Quantitative Map Tile 19 of 20
M-D-003-020	Debris Flow - Mortality - Quantitative Map Tile 20 of 20



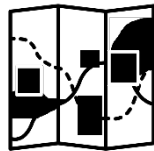
# Syilx Okanagan Flood and Debris Flow Risk Assessment

## Map Book

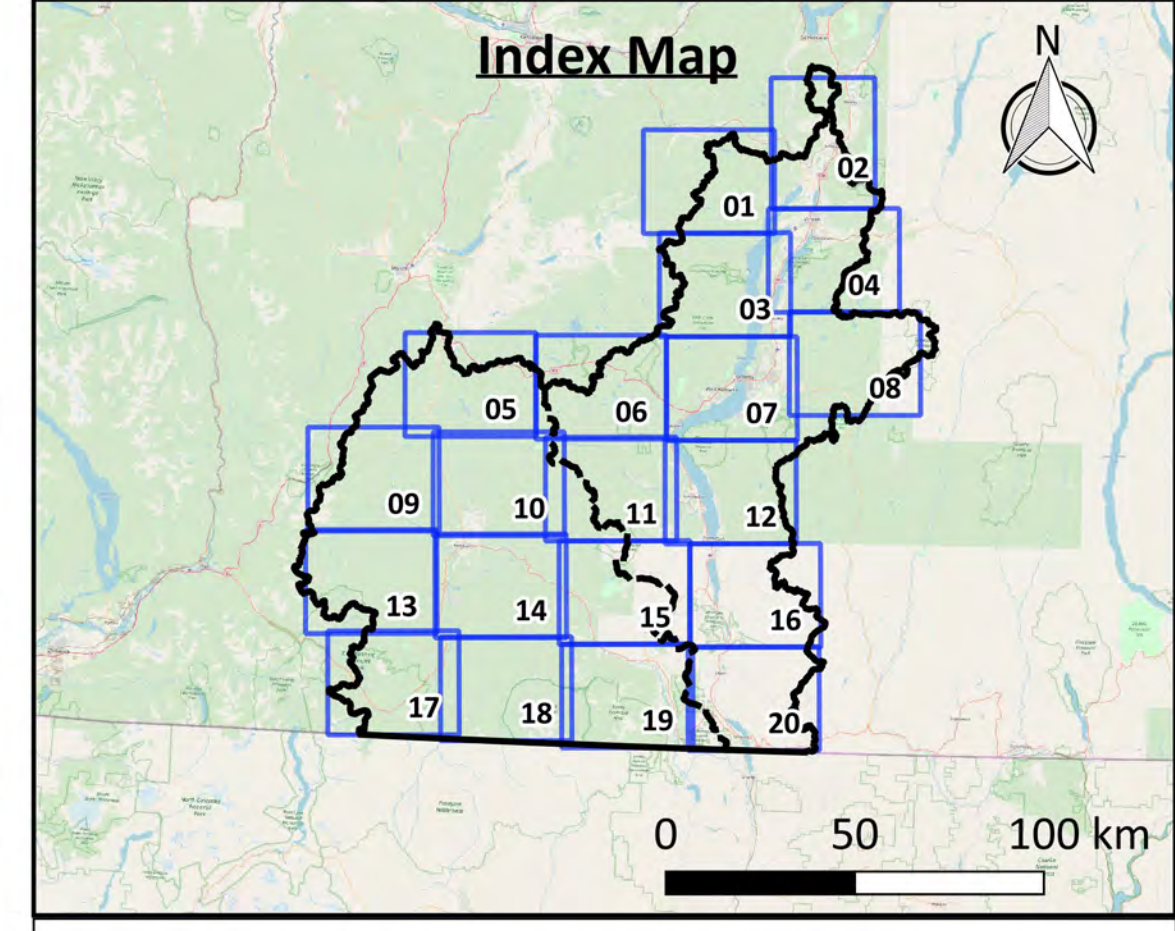
### Map Series 4 of 7: Mortality Indicator



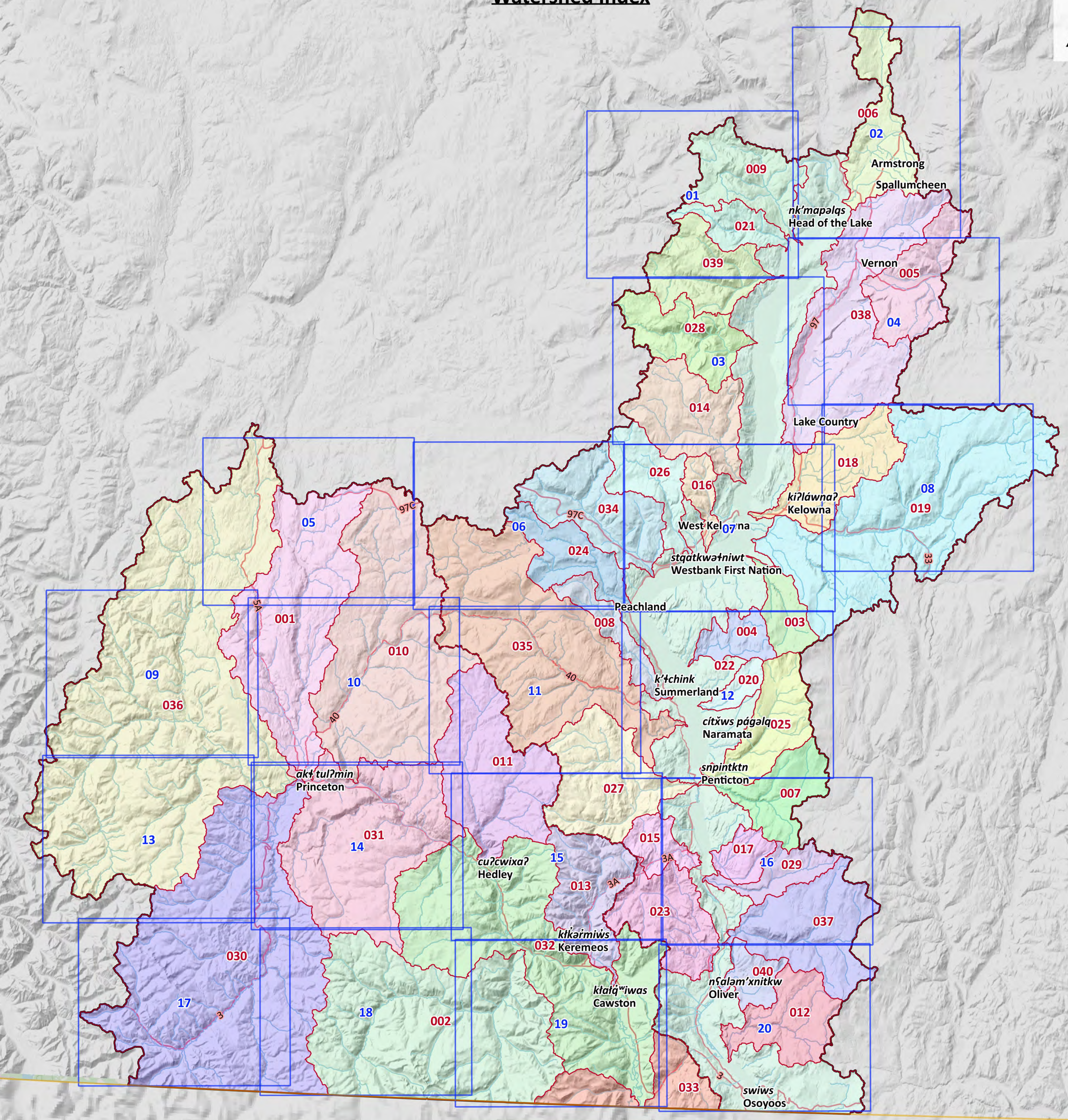
## Quantitative Debris Flow Consequence Maps



# Watershed Index



Click on the blue map tile to go to the Zoom-In map



## Legend

- |                                   |                           |
|-----------------------------------|---------------------------|
| <b>Background</b>                 | <b>Sub-Watersheds</b>     |
| — Watershed Boundary              | 001 - Allison Creek       |
| --- Okanagan-Similkameen Boundary | 002 - Ashnola River       |
| — Canada - US Border              | 003 - Bellevue Creek      |
| — Lakes                           | 004 - Chute Creek         |
| — Watercourses                    | 005 - Coldstream Creek    |
| — Highway                         | 006 - Deep Creek          |
| — Major Road                      | 007 - Ellis Creek         |
| — Map tiles                       | 008 - Eneas Creek         |
|                                   | 009 - Equis Creek         |
|                                   | 010 - Hayes Creek         |
|                                   | 011 - Hedley Creek        |
|                                   | 012 - Inkaneep Creek      |
|                                   | 013 - Keremeos Creek      |
|                                   | 014 - Lambly Creek        |
|                                   | 015 - Marron River        |
|                                   | 016 - McDougall Creek     |
|                                   | 017 - McLean Creek        |
|                                   | 018 - Mill Creek          |
|                                   | 019 - Mission Creek       |
|                                   | 020 - Naramata Creek      |
|                                   | 021 - Naswhito Creek      |
|                                   | 022 - Okanagan River      |
|                                   | 023 - Park Rill           |
|                                   | 024 - Peachland Creek     |
|                                   | 025 - Penticton Creek     |
|                                   | 026 - Powers Creek        |
|                                   | 027 - Shingle Creek       |
|                                   | 028 - Shorts Creek        |
|                                   | 029 - Shuttleworth Creek  |
|                                   | 030 - Similkameen River 1 |
|                                   | 031 - Similkameen River 2 |
|                                   | 032 - Similkameen River 3 |
|                                   | 033 - Similkameen River 4 |
|                                   | 034 - Trepanier Creek     |
|                                   | 035 - Trout Creek         |
|                                   | 036 - Tulameen River      |
|                                   | 037 - Vaseux Creek        |
|                                   | 038 - Vernon Creek        |
|                                   | 039 - Whiteman Creek      |
|                                   | 040 - Wolfcub Creek       |

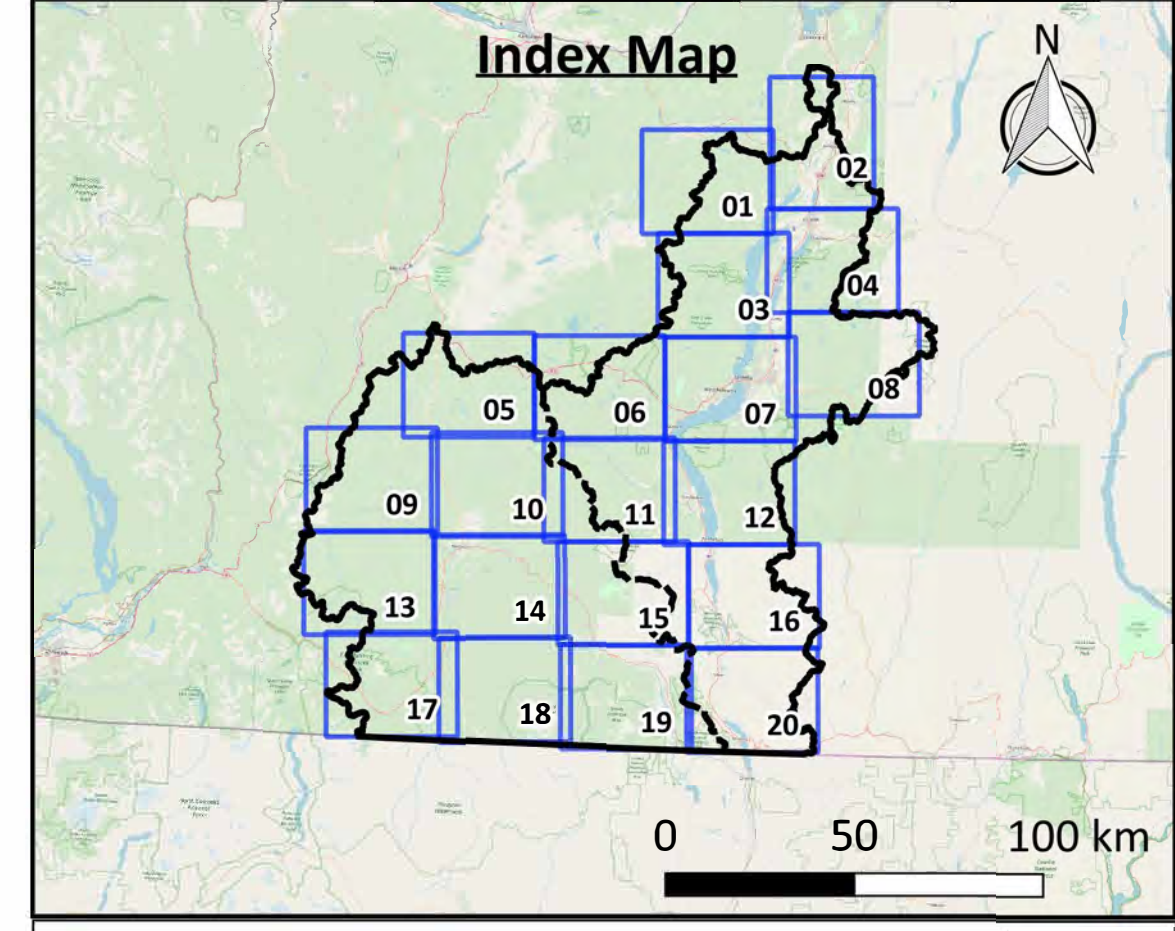
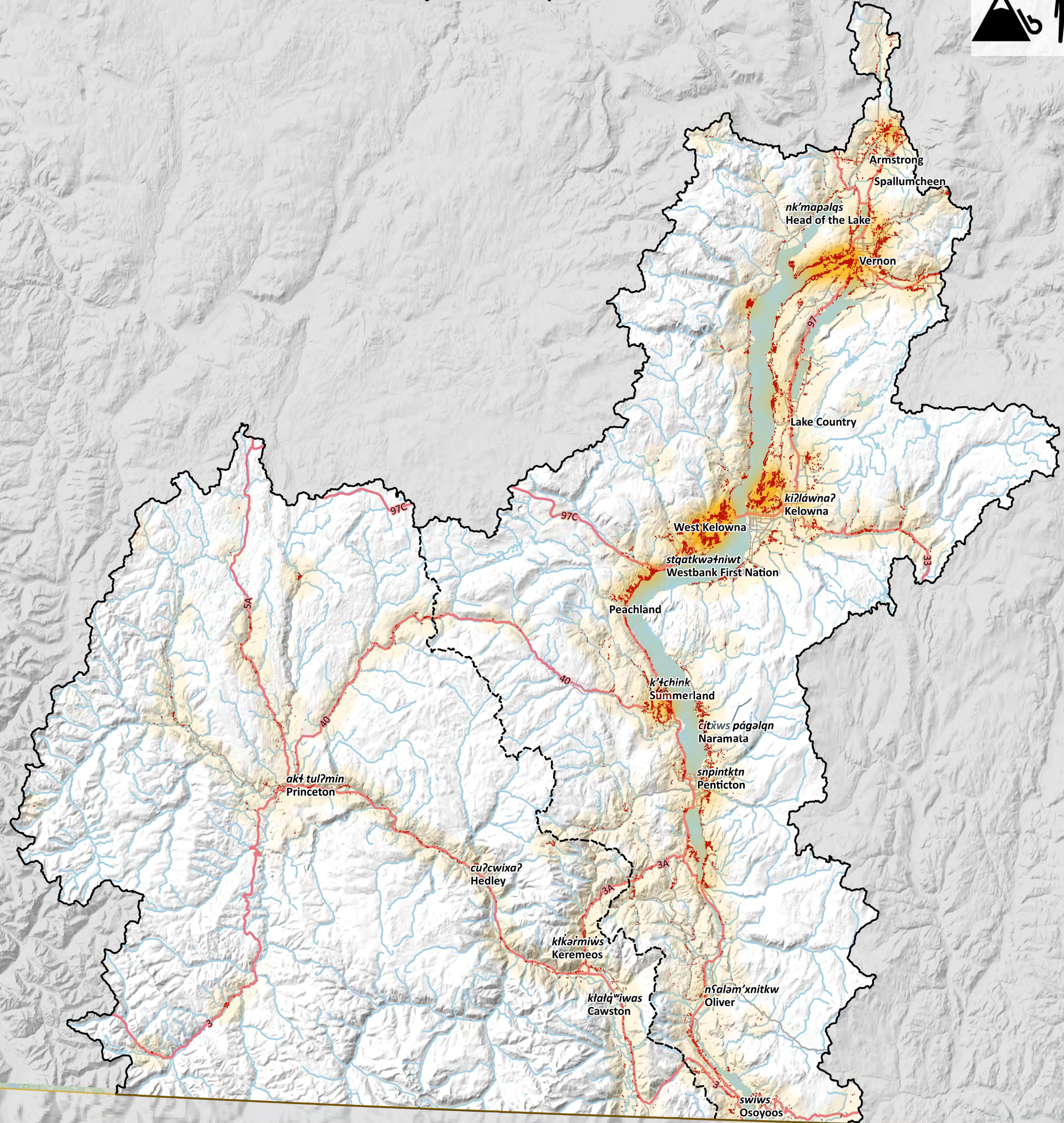
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0 10 20 30 km

Date: 31 December 2019  
Produced by: Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Mortality**

ANSI D - Map No. M-D-001-001

# Project Area Map



Click above map tile for Zoom-In map  
[Click here to go to Okanagan Map](#)  
[Click here to go to Similkameen Map](#)

**Map Notes**

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2. Building footprints have been used as an indicator of missing and mortality as these are the locations where people are more likely to be. All buildings within the hazard area have been shown as these are all areas of high potential exposure. In reality the missing and mortality rate is expected to be lower than that indicated on this map.
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**Scale 1:350,000**

**Legend**

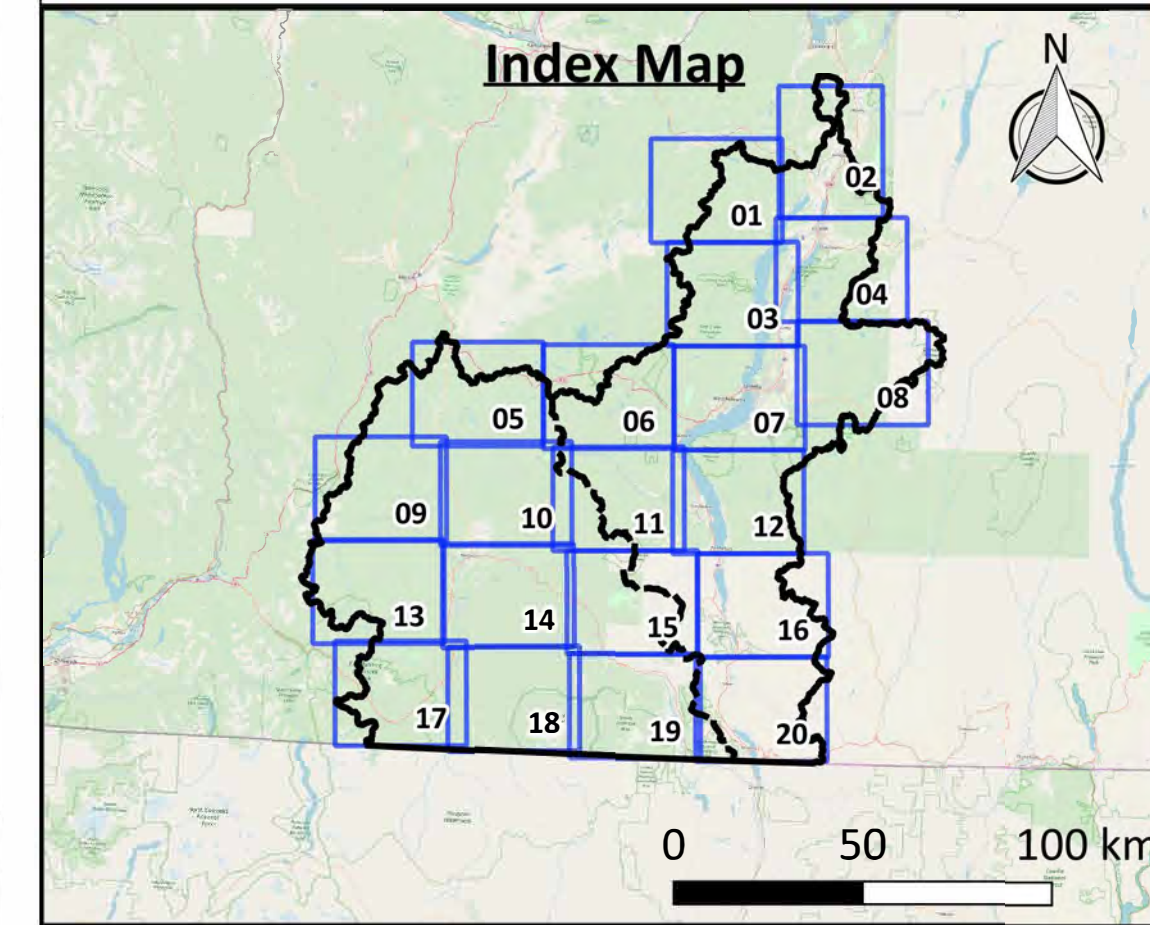
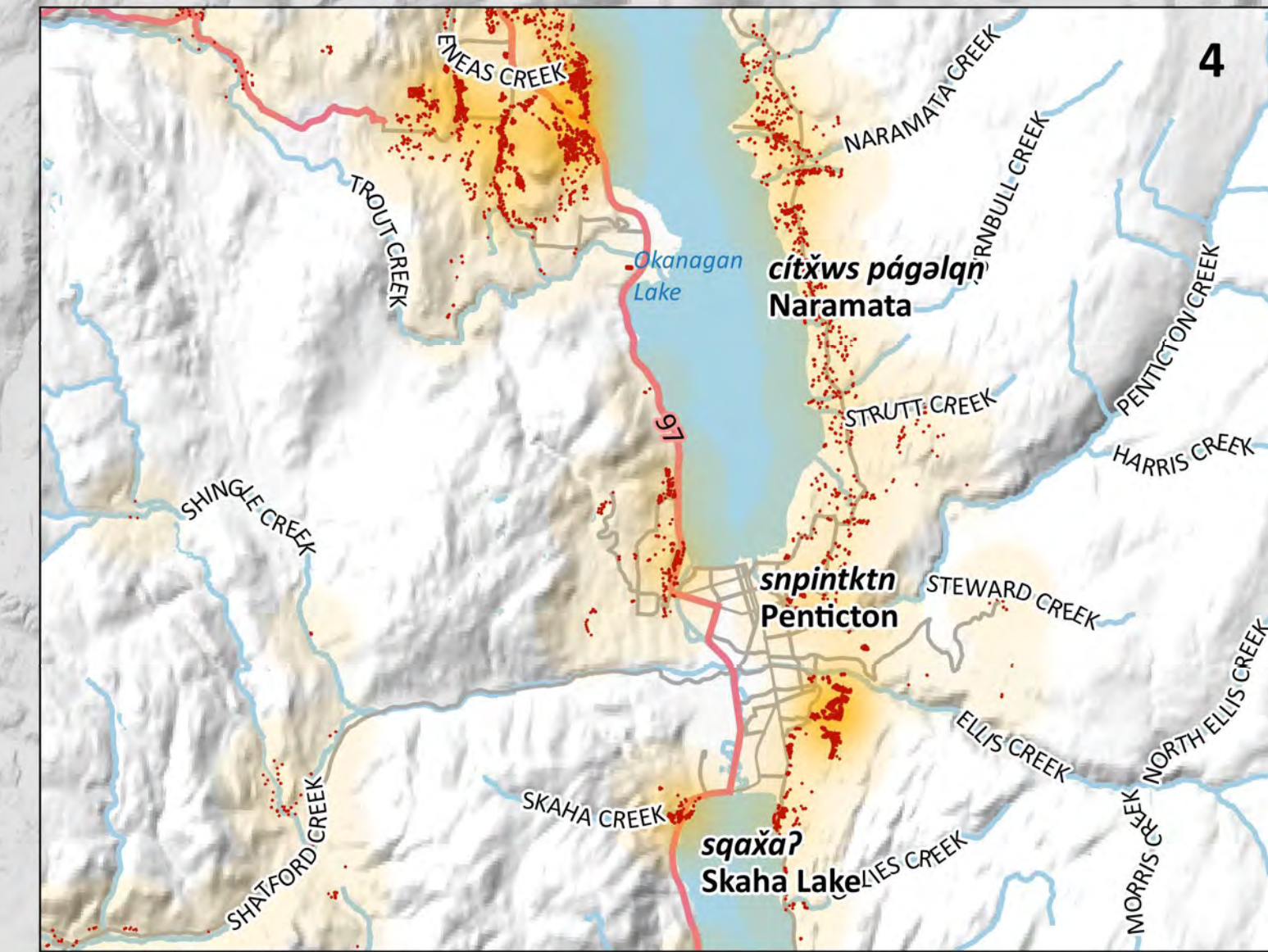
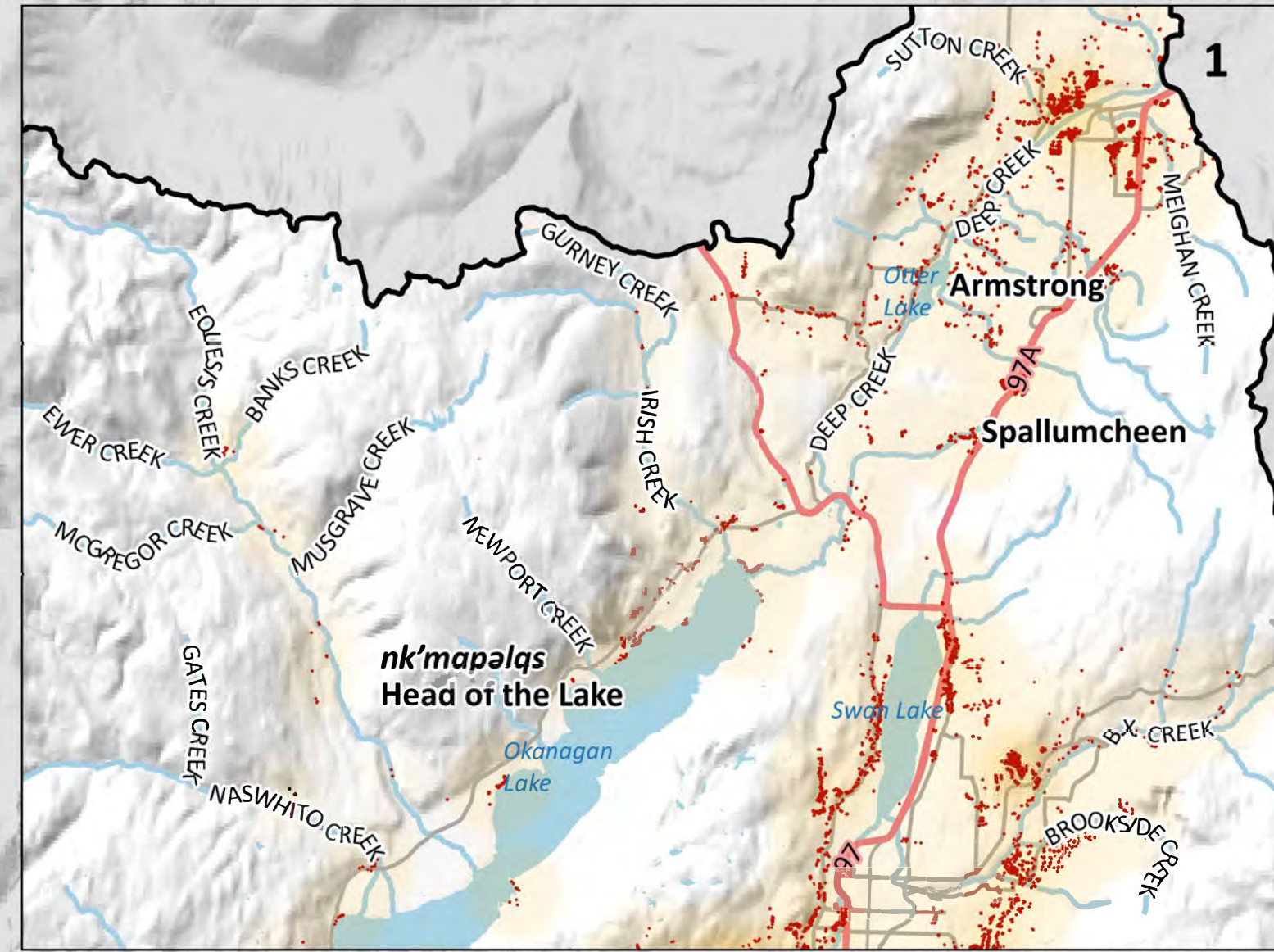
Watershed Boundary	Building Density
Canada - US Border	Affected Buildings
Lakes	
Watercourses	
Highway	
Major Road	
Okanagan - Similkameen Boundary	

Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

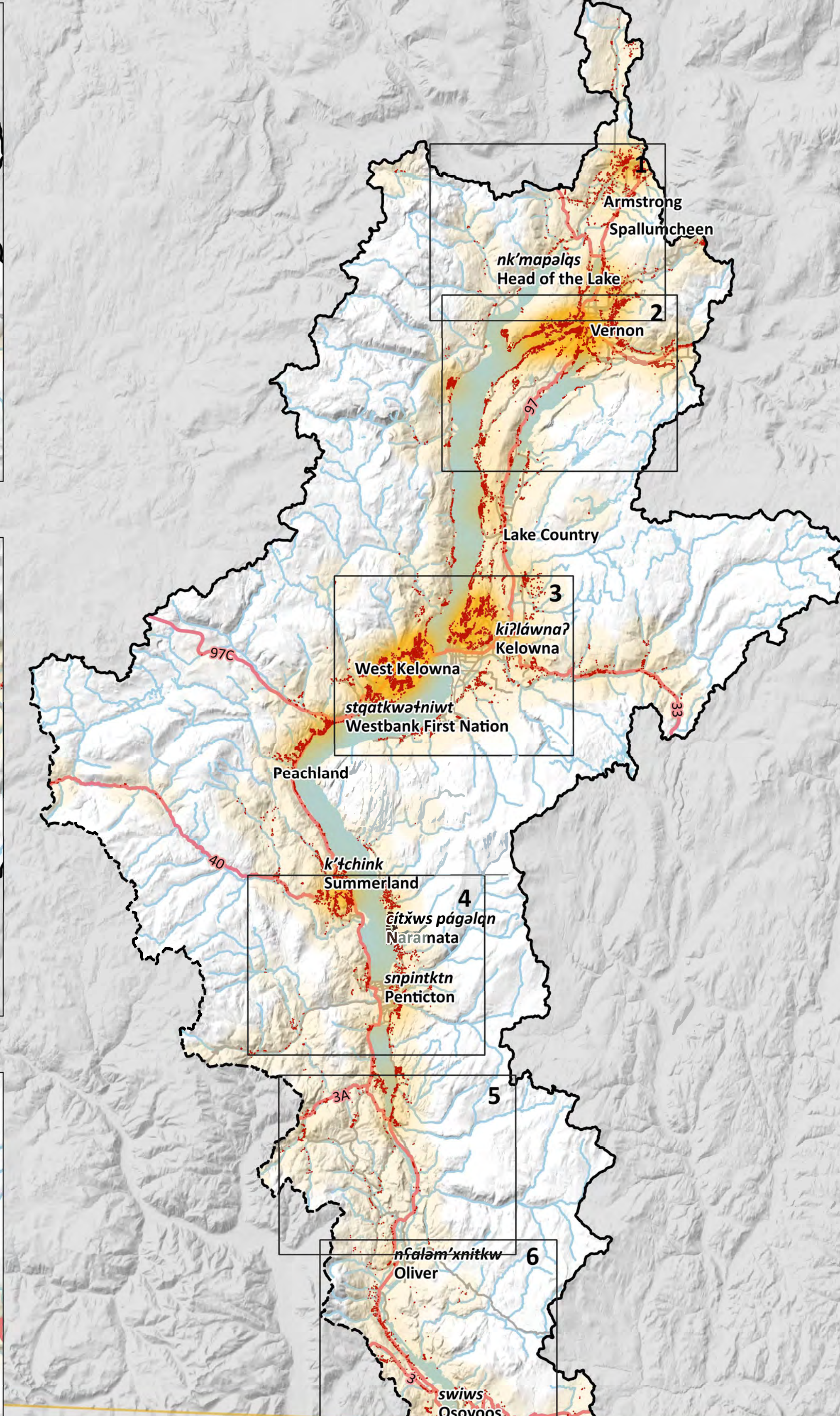
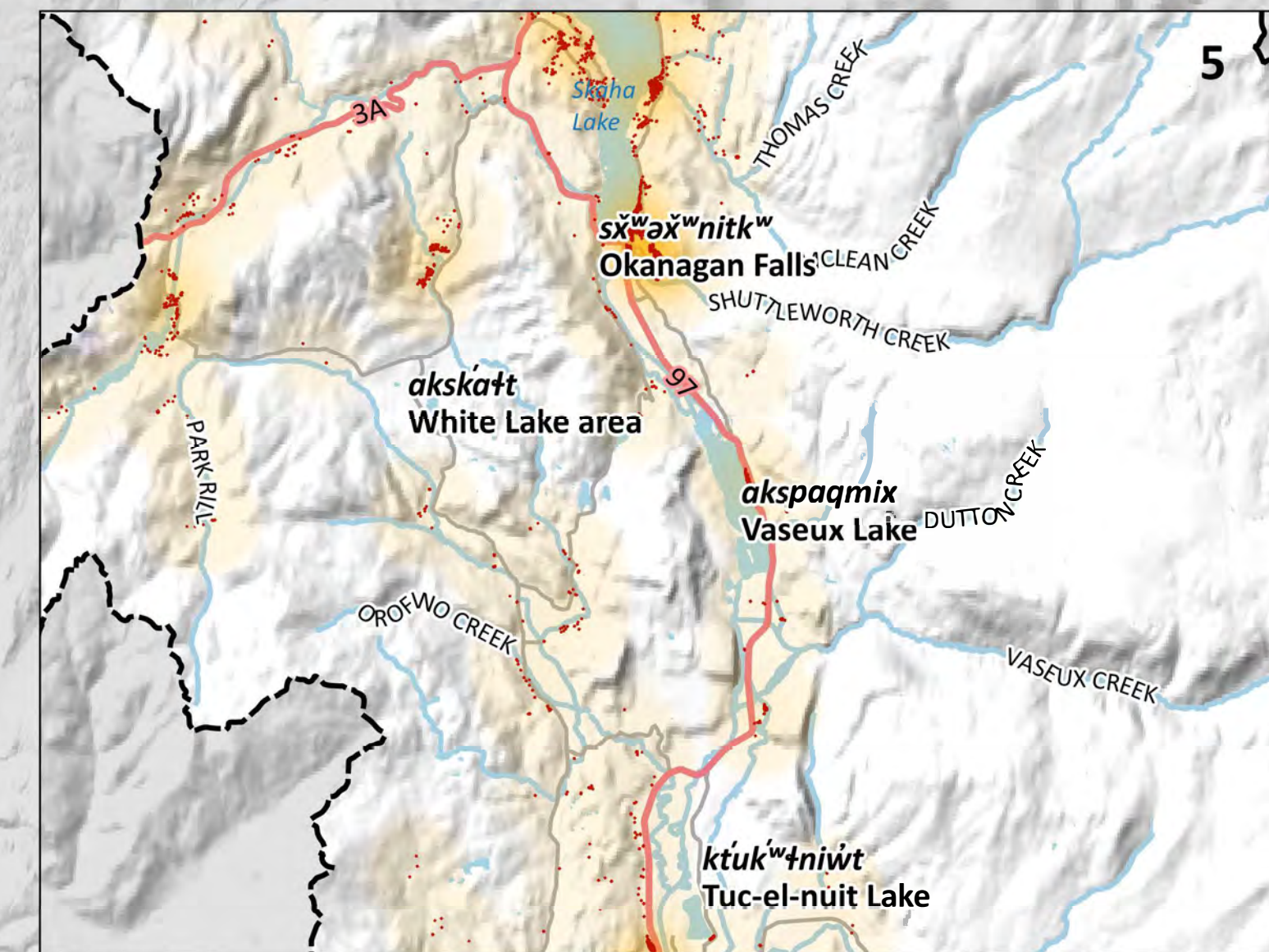
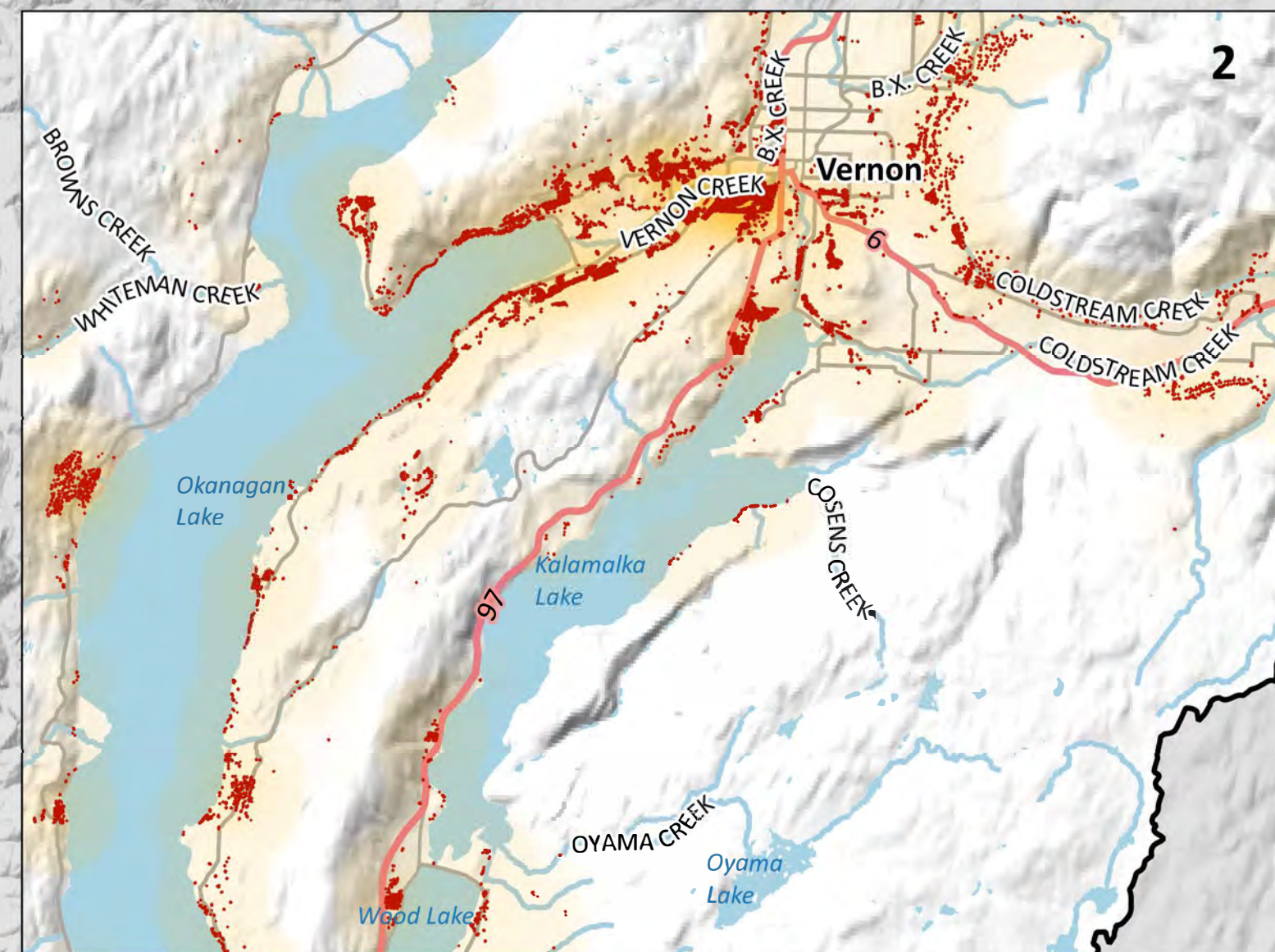
**Syilx (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**

ANSI D - Map No. M-D-002-001

# Okanagan Map



[Click above map tile for Zoom-In map](#)  
[Click here to return to Project Area map](#)  
[Click here to go to Similkameen map](#)



**Map Notes**

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**Scale**  
**Main Map 1:400,000**  
 0 10 20 30 km

**Inset Maps 1:150,000**  
 0 5 10 15 km

**Legend**

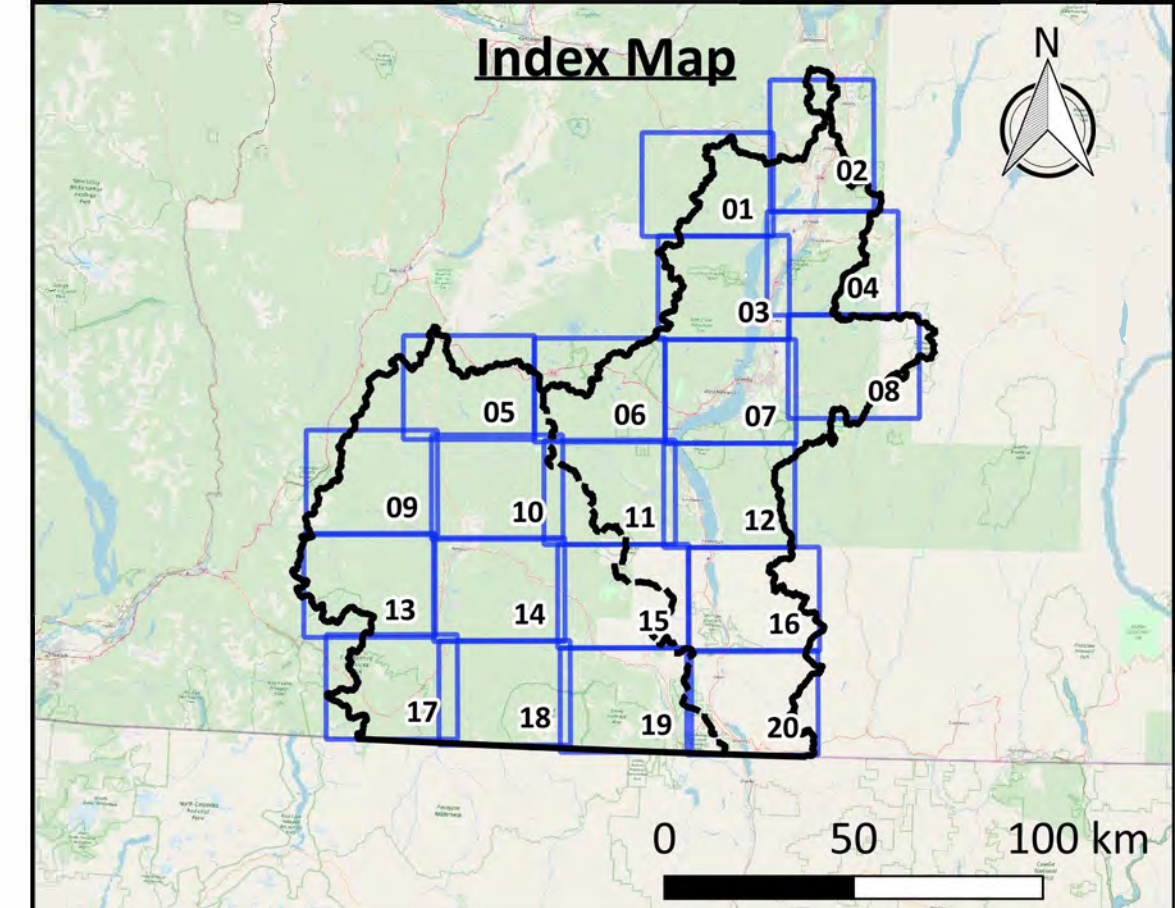
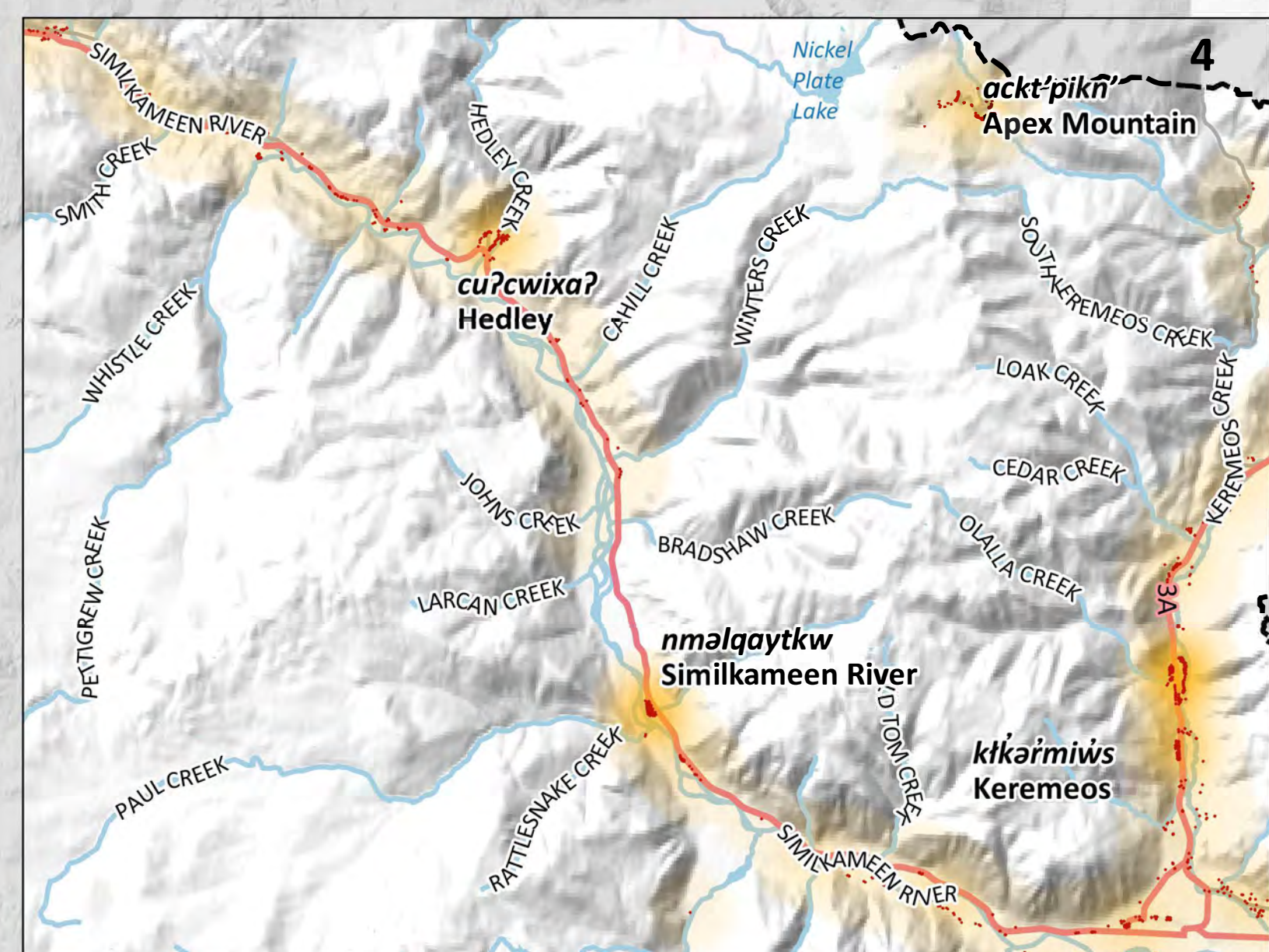
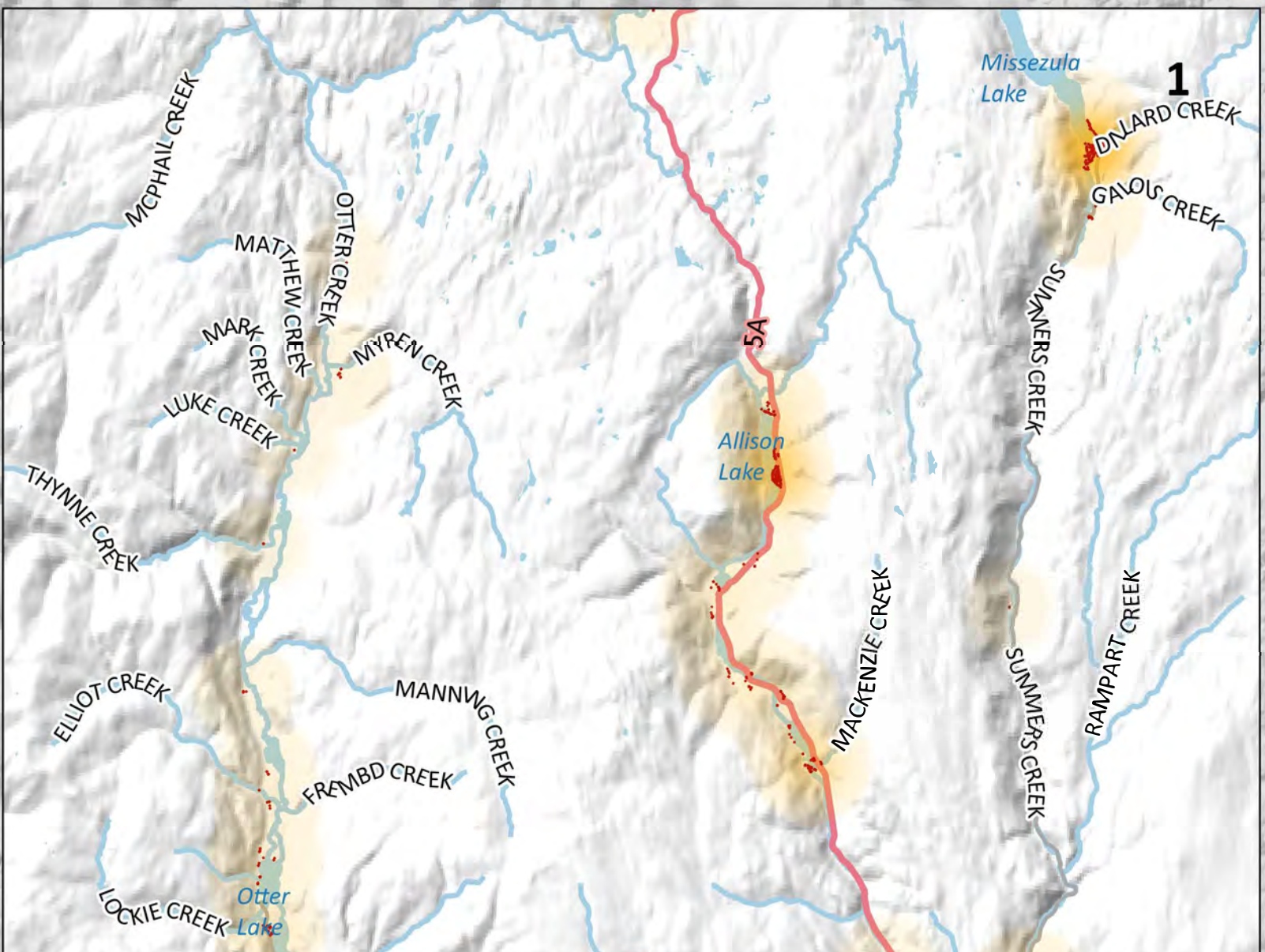
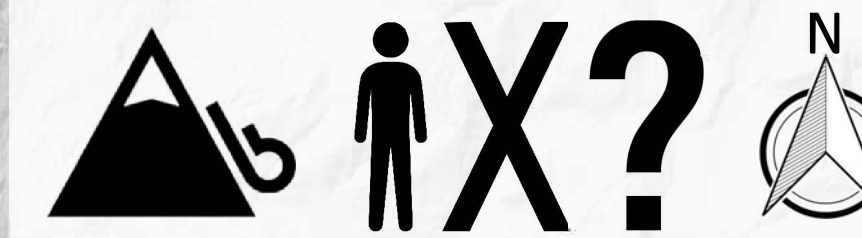
<b>Background</b>	<b>Affected Assets</b>
— Watershed Boundary	● Building Density
— Canada - US Border	■ Affected Buildings
— Lakes	
— Watercourses	
— Highway	
— Major Road	
— Okanagan - Similkameen Boundary	

Date: 31 December 06 2019  
 Produced by: Ebbwater Consulting Inc.

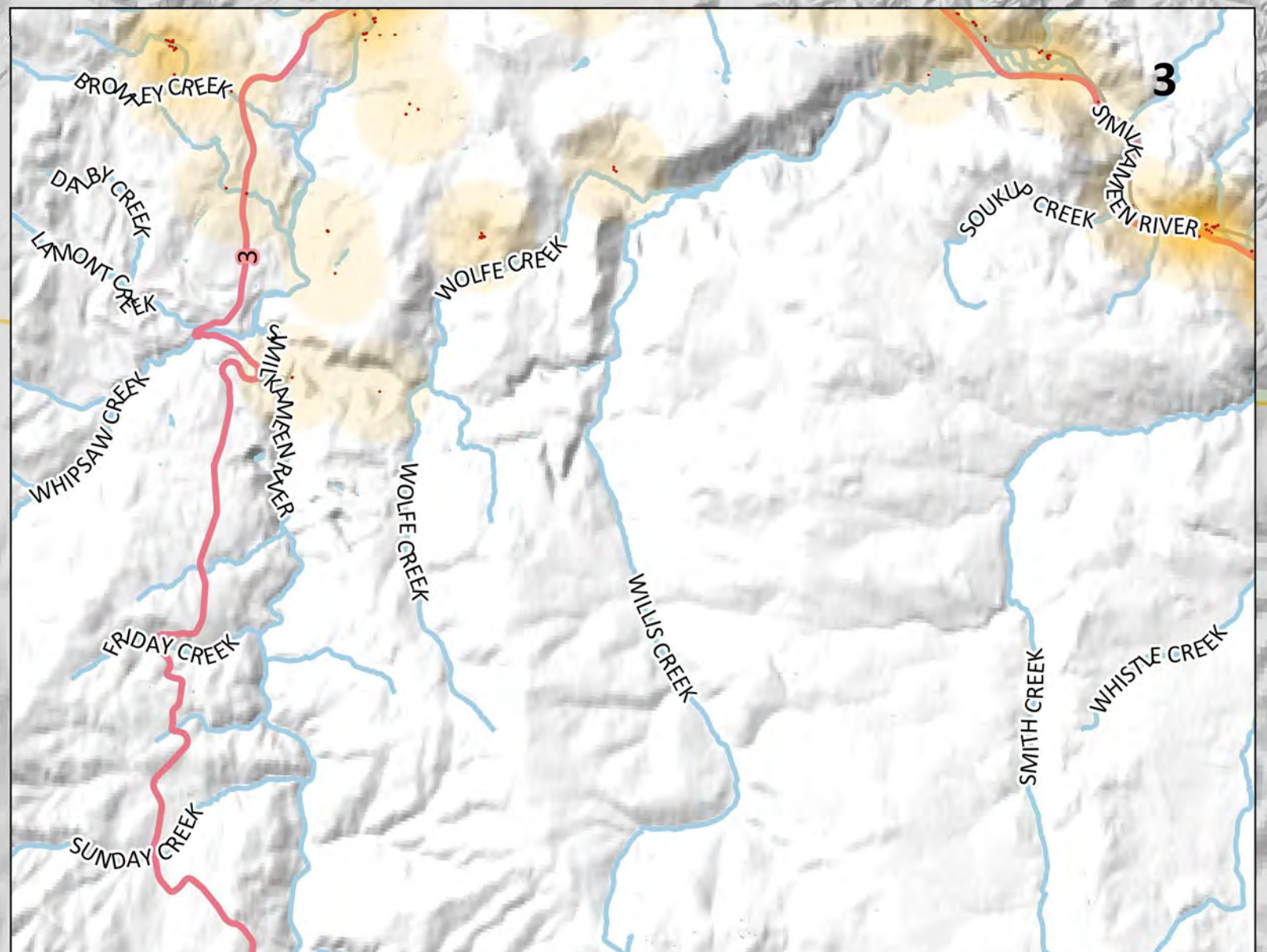
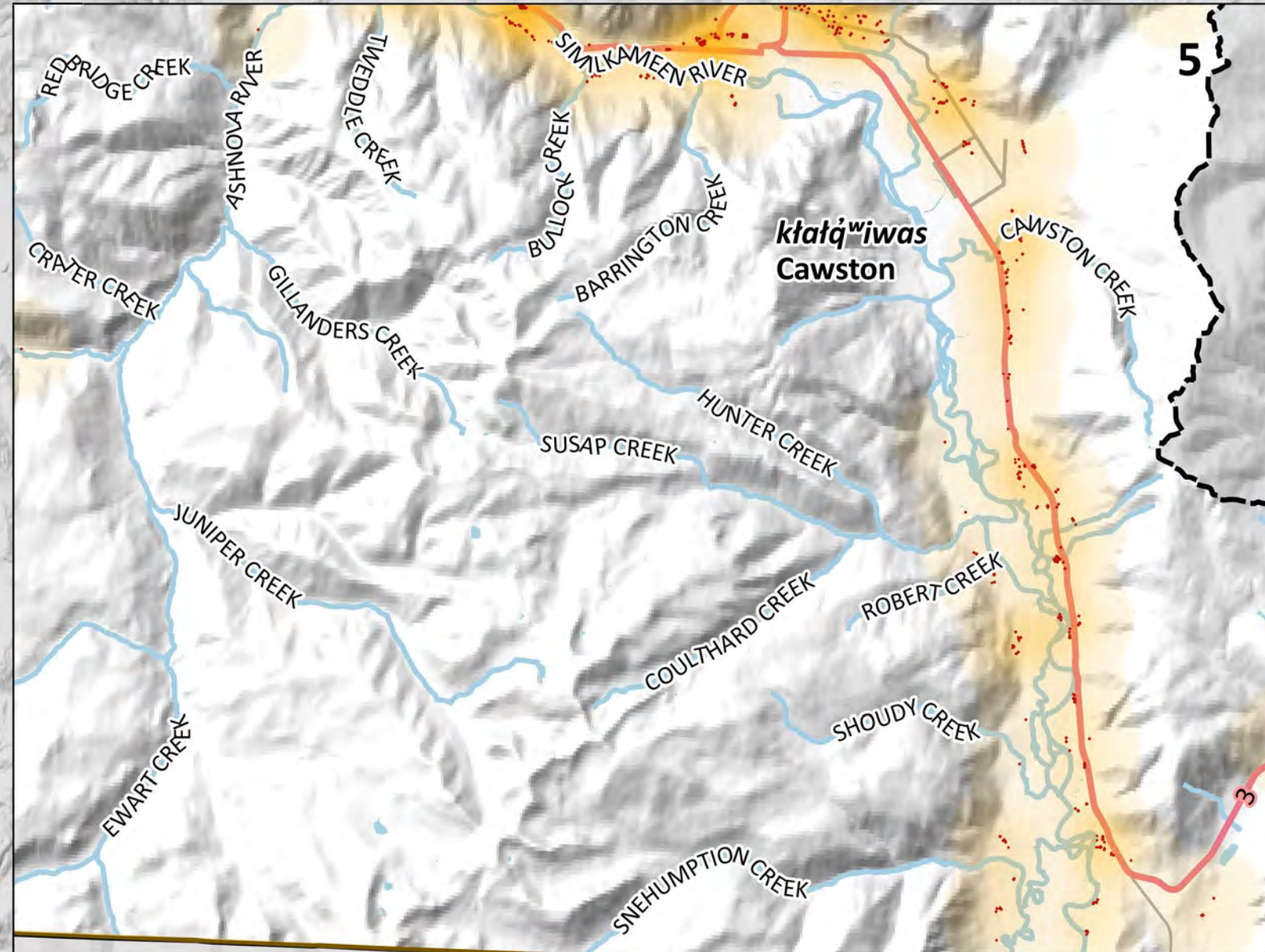
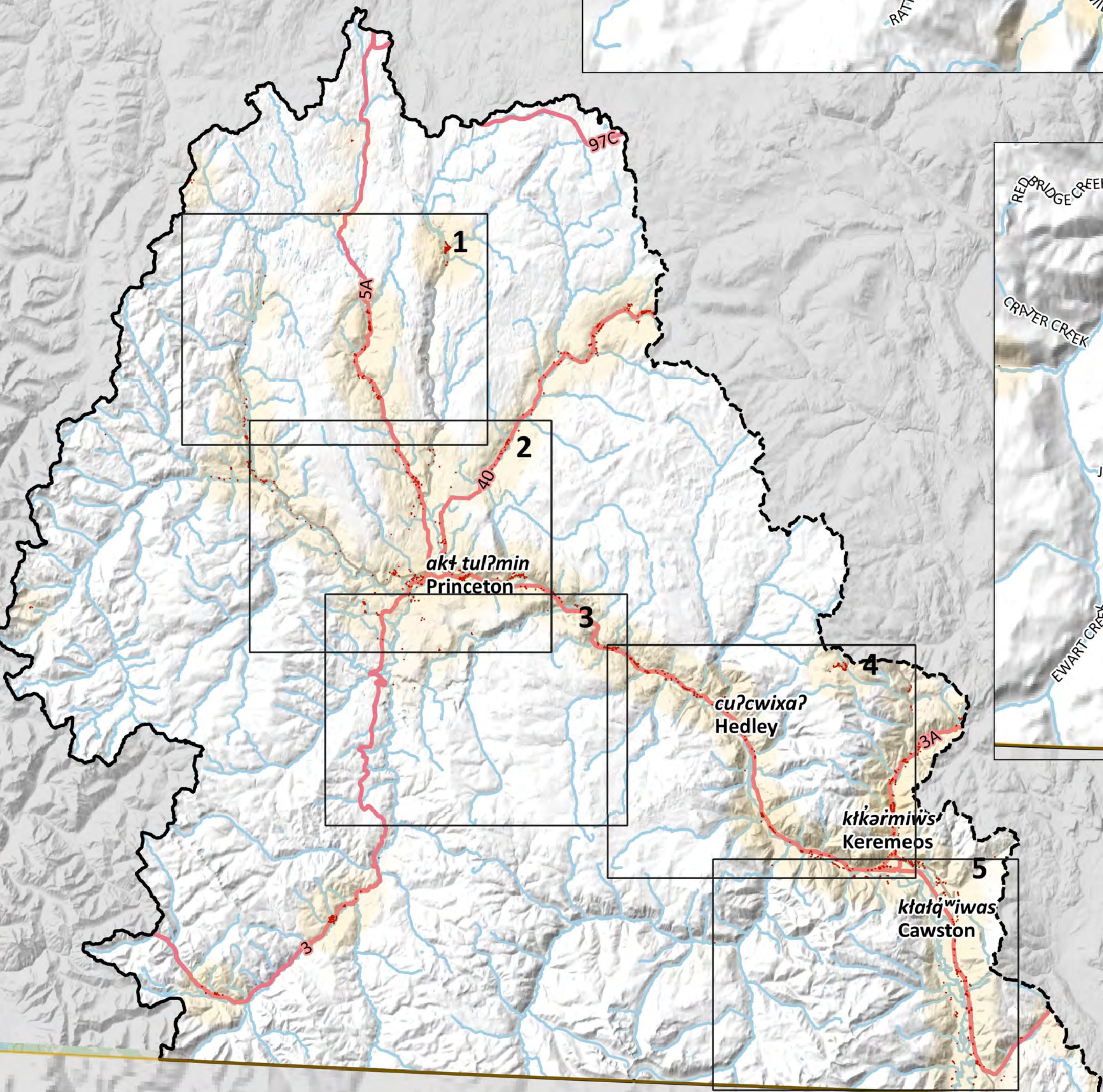
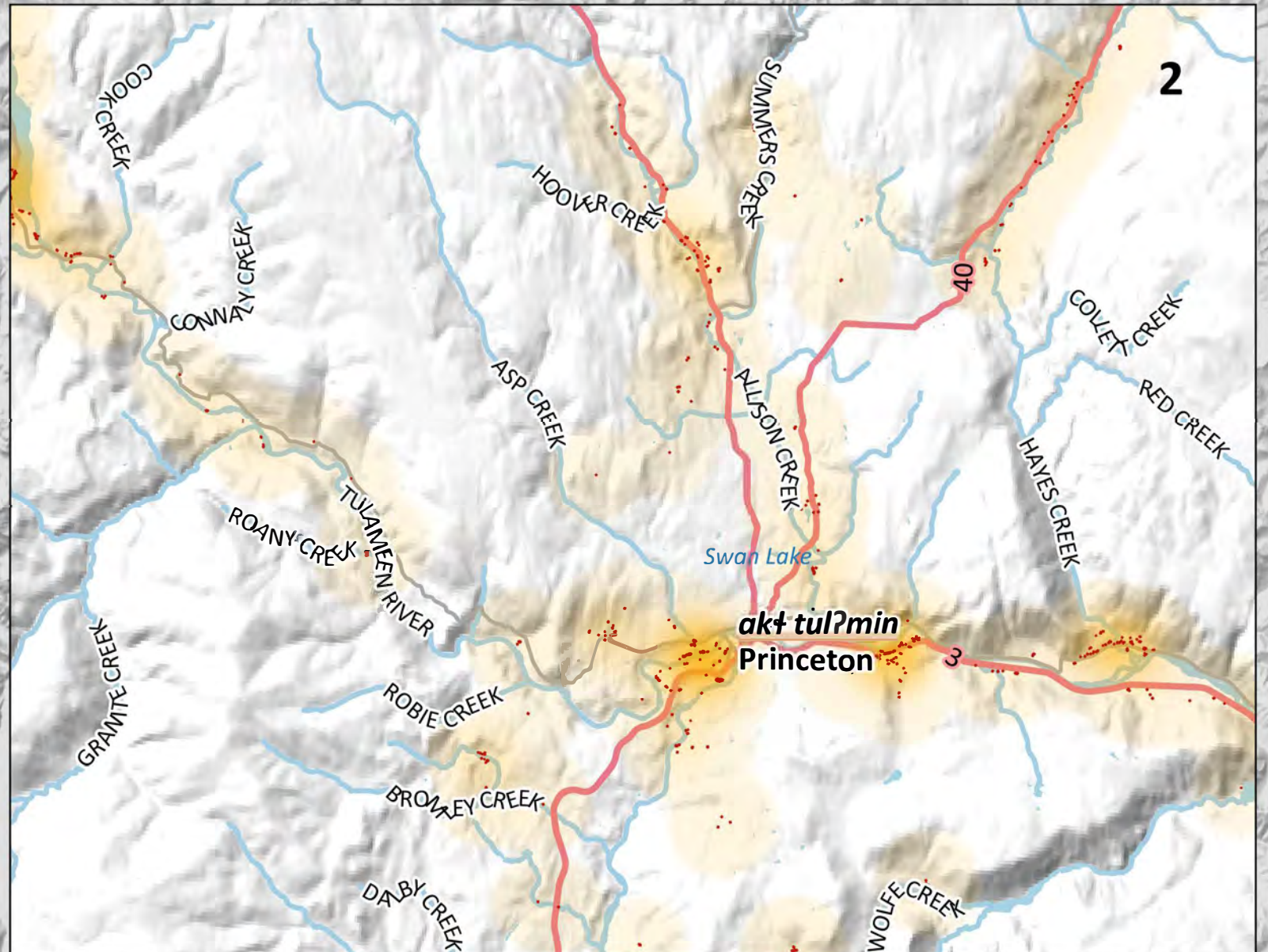
**Siylx (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality - Okanagan**

ANSI D - Map No. M-D-002-002

# Similkameen Map



Click above map tile for Zoom-In map  
[Click here to return to Project Area map](#)  
[Click here to go to Okanagan map](#)



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 0 5 10 15 km

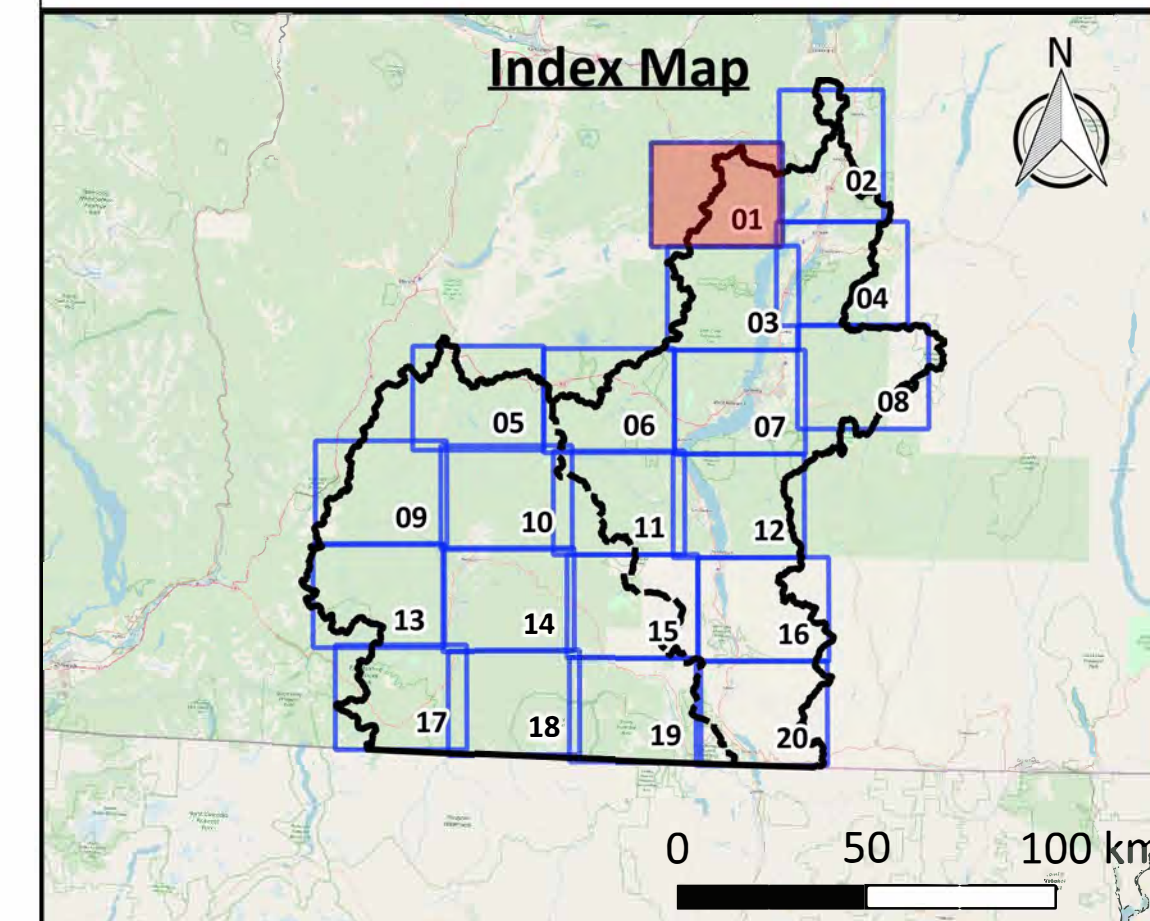
**Legend**

<b>Background</b>	<b>Affected Assets</b>
— Watershed Boundary	Building Density
— Canada - US Border	Affected Buildings
— Lakes	
— Watercourses	
— Highway	
— Major Road	
— Okanagan - Similkameen Boundary	

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**Produced by:** Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality - Similkameen**

**Zoom-In Map**



Click above map tile for Zoom-In map  
[Click here to return to Project Area map](#)  
[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

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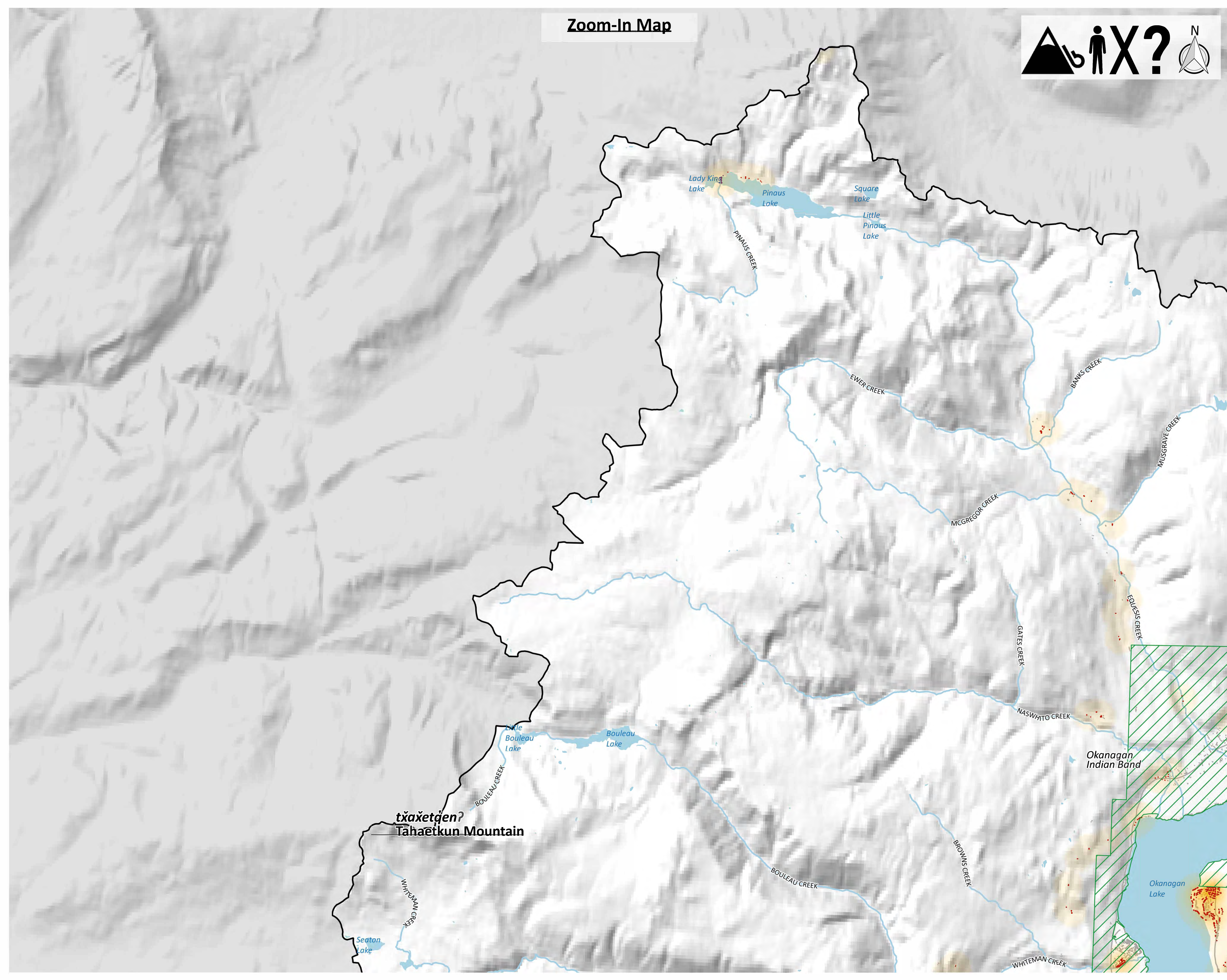
**Legend**

- |                                     |                        |
|-------------------------------------|------------------------|
| <b>Background</b>                   | <b>Affected Assets</b> |
| — Watershed Boundary                | 🔥 Building Density     |
| — Canada - US Border                | 🏠 Affected Buildings   |
| ▨ Reserves                          |                        |
| ▨ Building Footprints               |                        |
| 🌊 Lakes                             |                        |
| — Watercourses                      |                        |
| — Highway                           |                        |
| — Major Road                        |                        |
| --- Okanagan - Similkameen Boundary |                        |

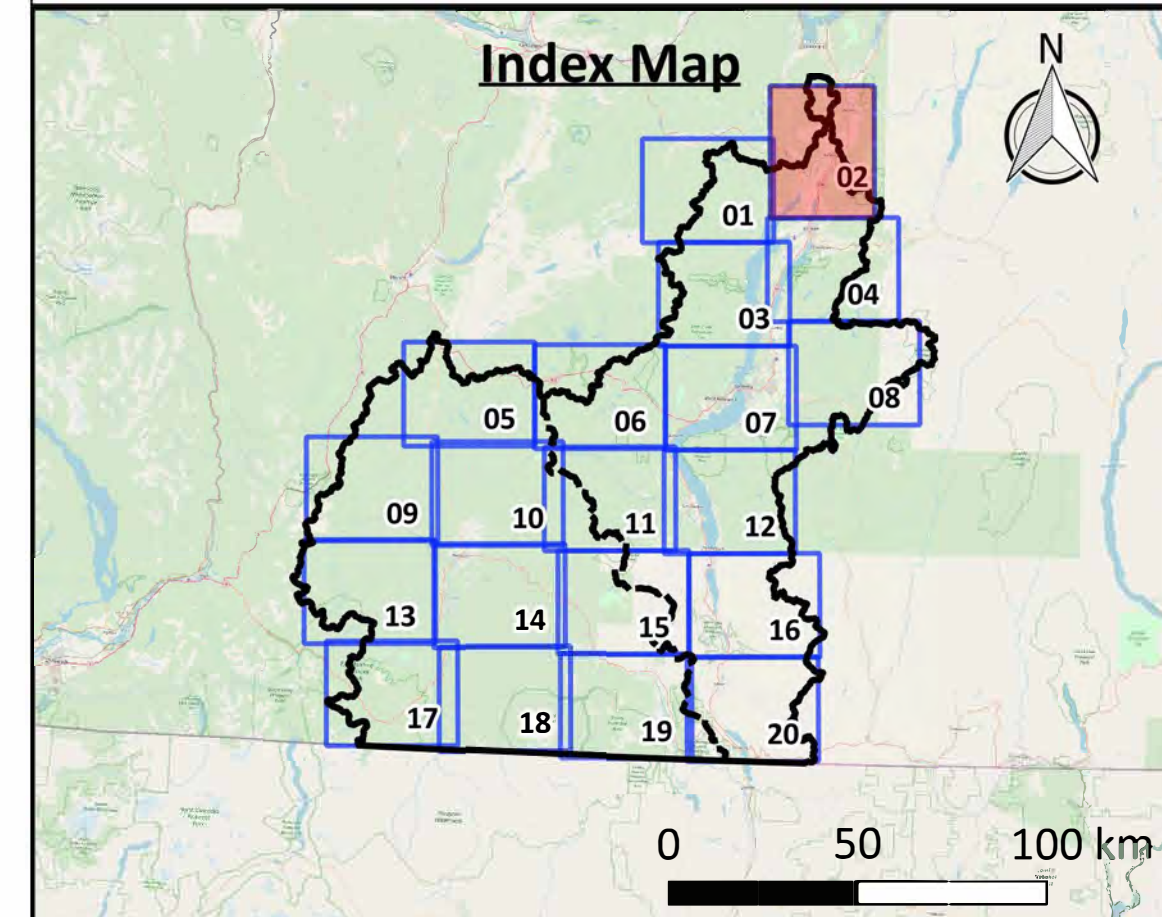
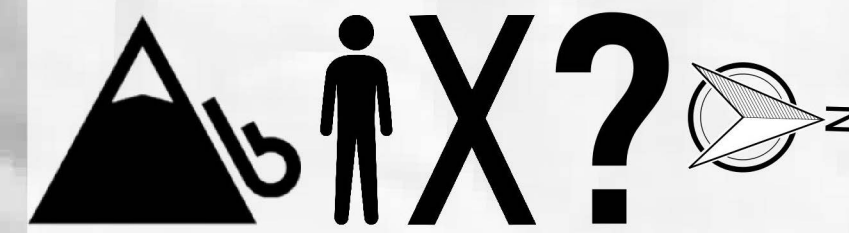
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**Syilx (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**

ANSI D - Map No. M-D-003-001



**Zoom-In Map**



Click above map tile for Zoom-In map  
[Click here to return to Project Area map](#)  
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3. The building footprint (exposure) layer was clipped to the debris flow hazard areas. The hazard layer is shown in the hazard maps, and was produced by Palmer Environmental Consulting Group Inc. The method used to produce the hazard layer is described in the Quantitative Study.

**Data Sources**

1. Lakes and Watercourses: BC Data Catalogue.
2. Roads: BC Data Catalogue.
3. Sylix Place Names: Okanagan Nation Alliance.
4. Building Footprints: Regional district and municipalities and hand digitized using Bing Satellite Imagery.
5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

**Scale 1:50,000**



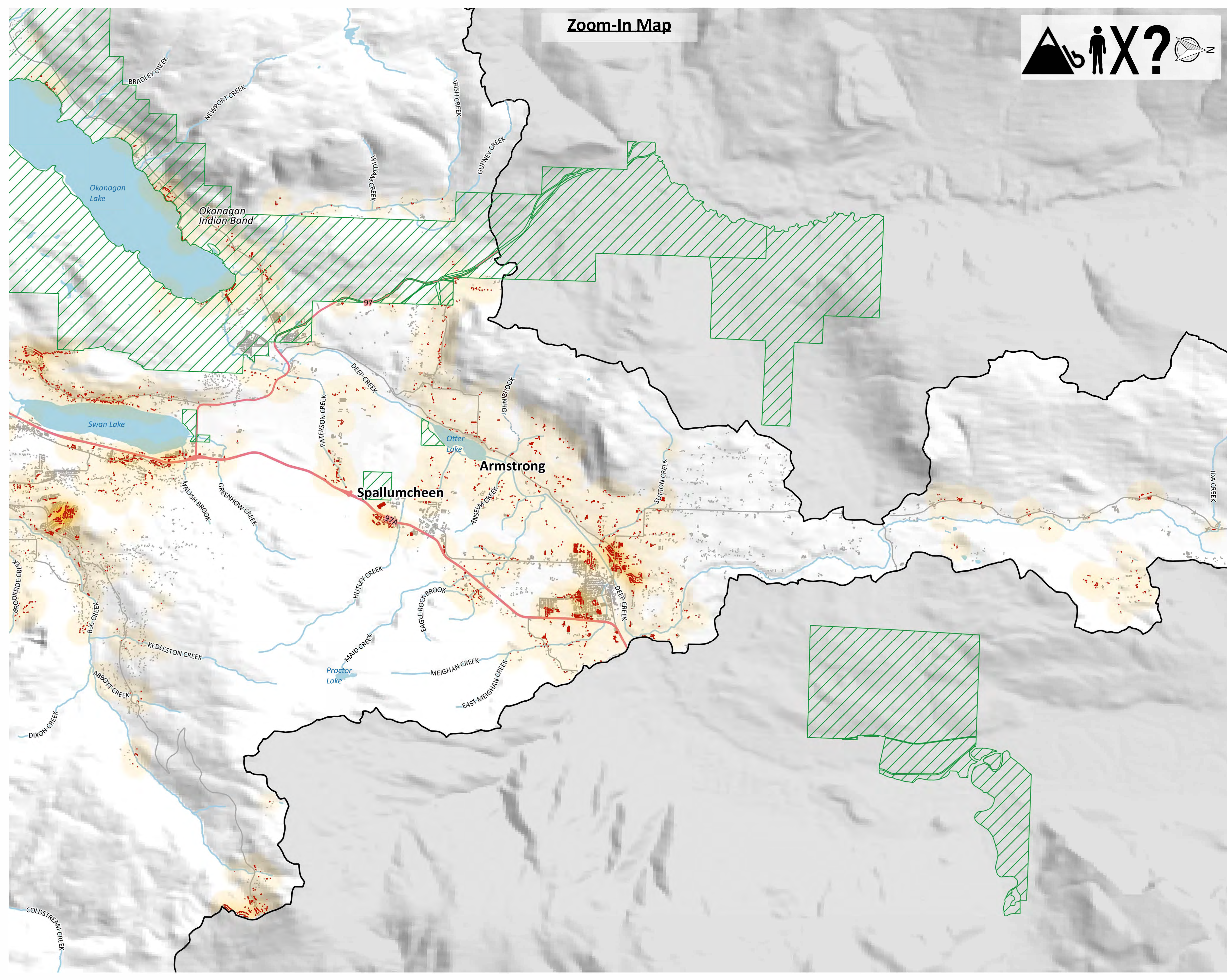
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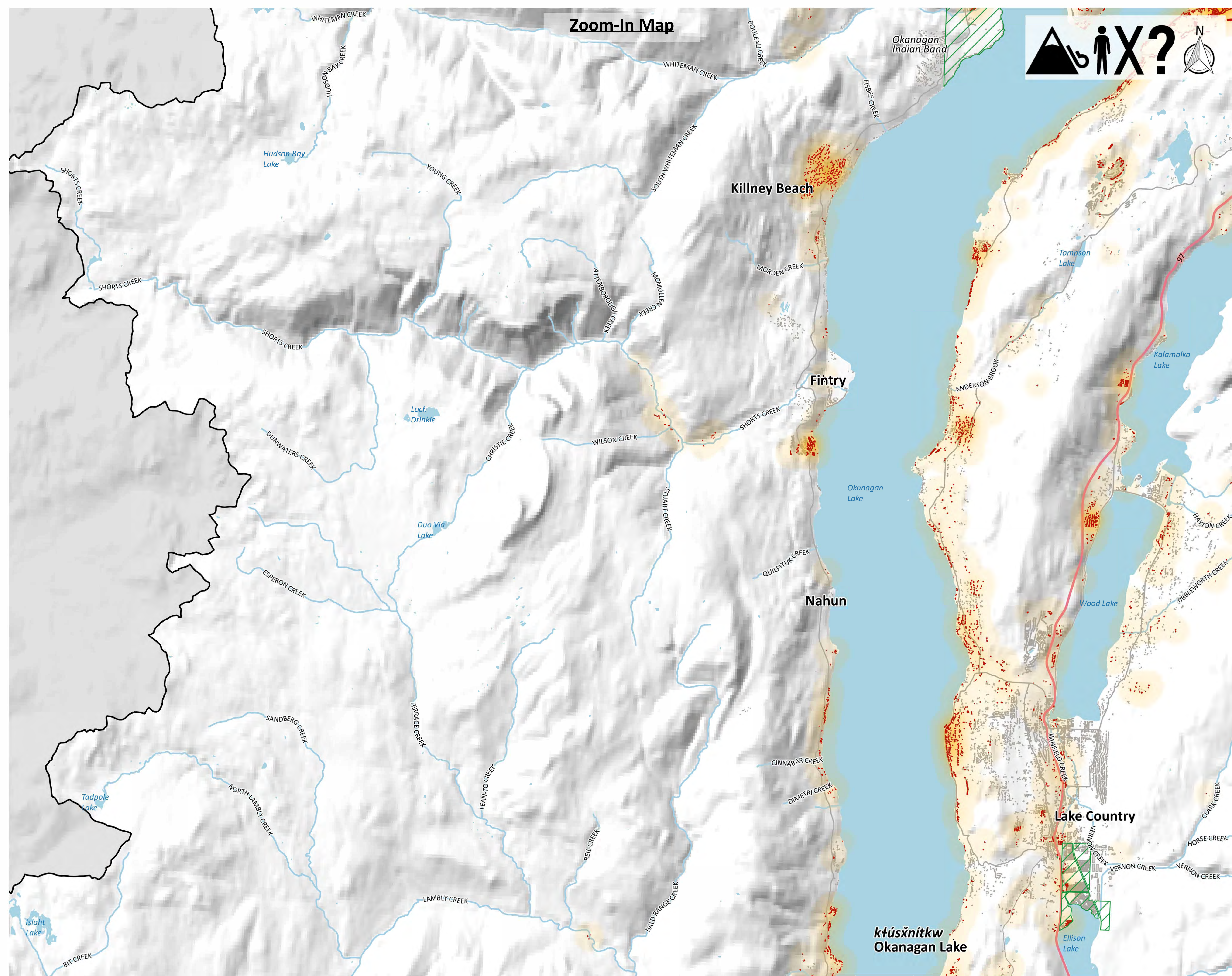
- |                                     |                        |
|-------------------------------------|------------------------|
| <b>Background</b>                   | <b>Affected Assets</b> |
| — Watershed Boundary                | 🔴 Building Density     |
| — Canada - US Border                | 🔴 Affected Buildings   |
| ▨ Reserves                          |                        |
| ▨ Building Footprints               |                        |
| 🟦 Lakes                             |                        |
| — Watercourses                      |                        |
| — Highway                           |                        |
| — Major Road                        |                        |
| --- Okanagan - Similkameen Boundary |                        |

Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

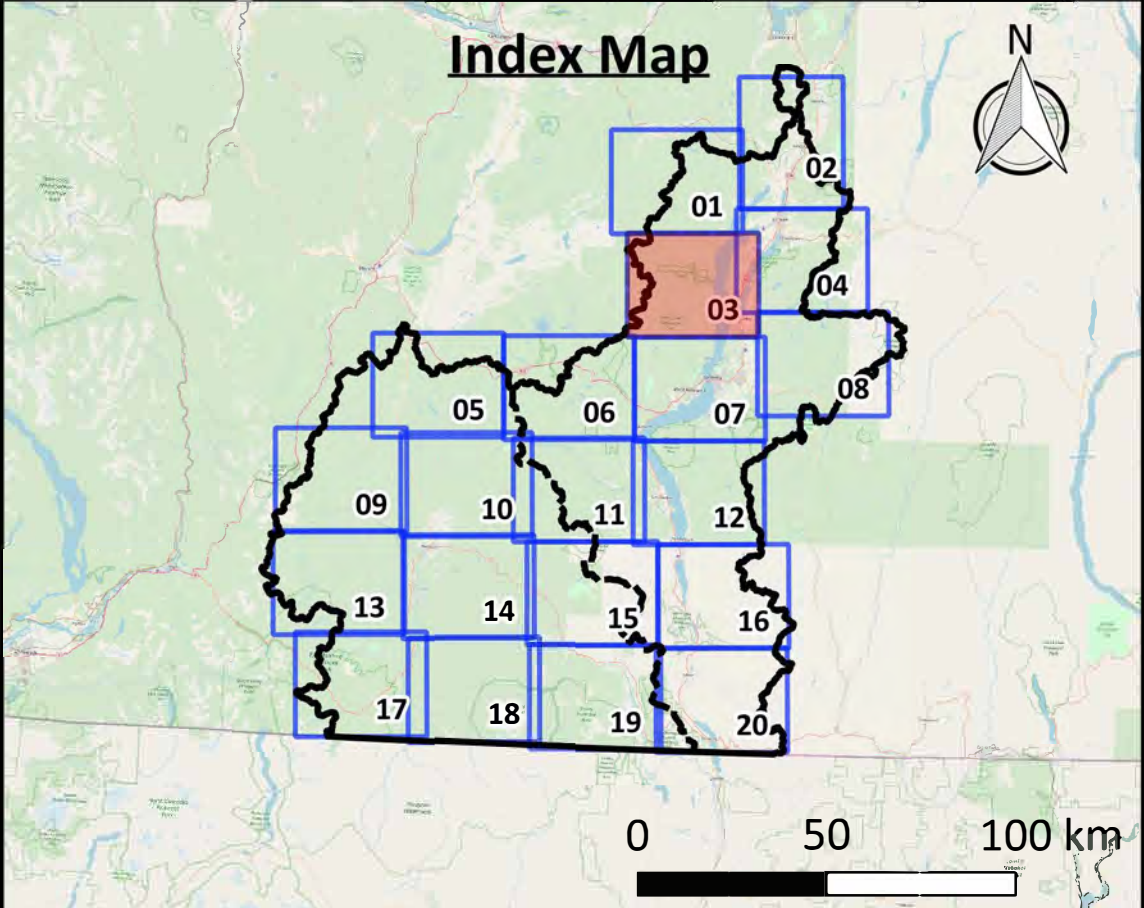
**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**

ANSI D - Map No. M-D-003-002





**Zoom-In Map**



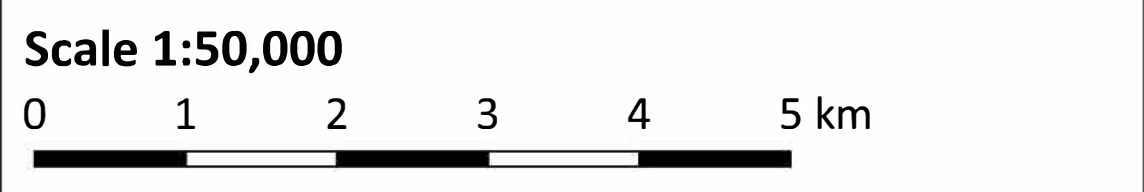
Click above map tile for Zoom-In map  
[Click here to return to Project Area map](#)  
[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

**Map Notes**

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**Data Sources**

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- Roads: BC Data Catalogue.
- Siylx Place Names: Okanagan Nation Alliance.
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- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.



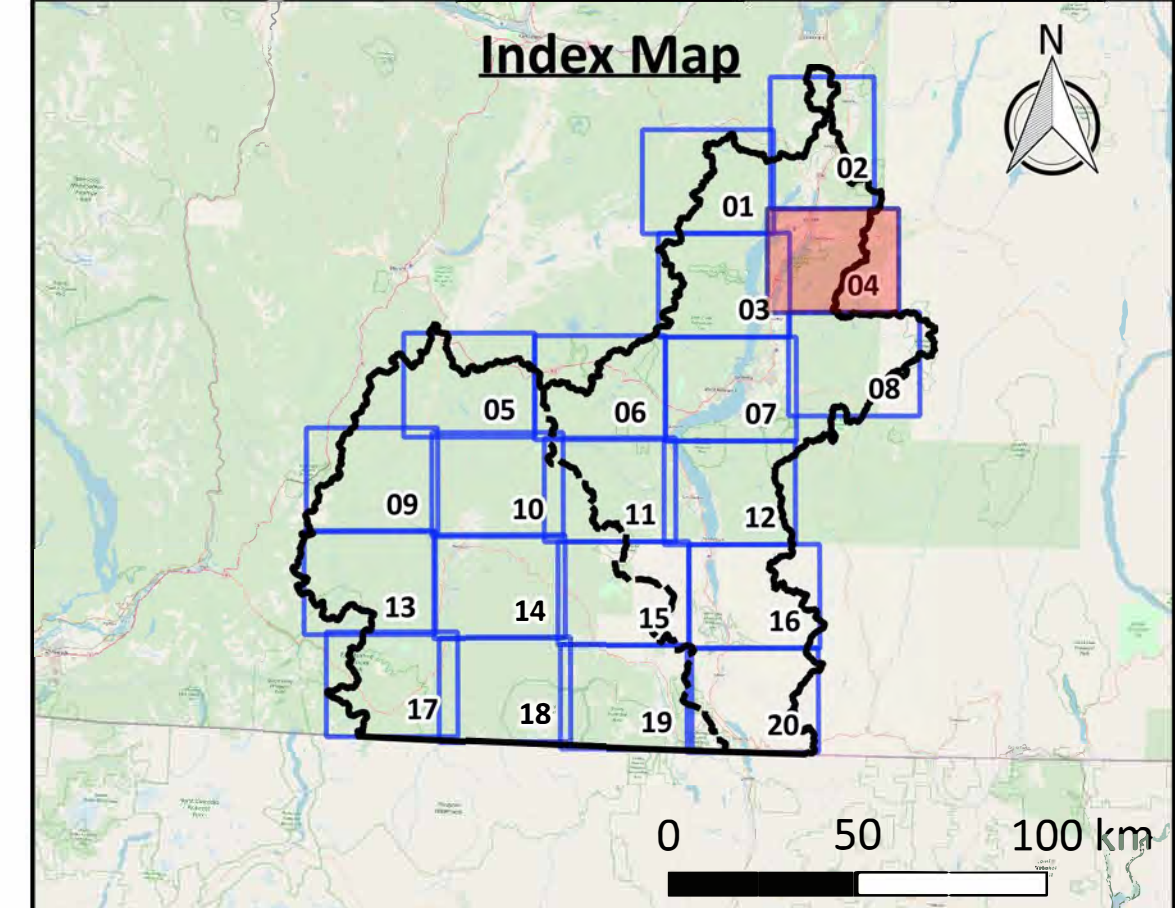
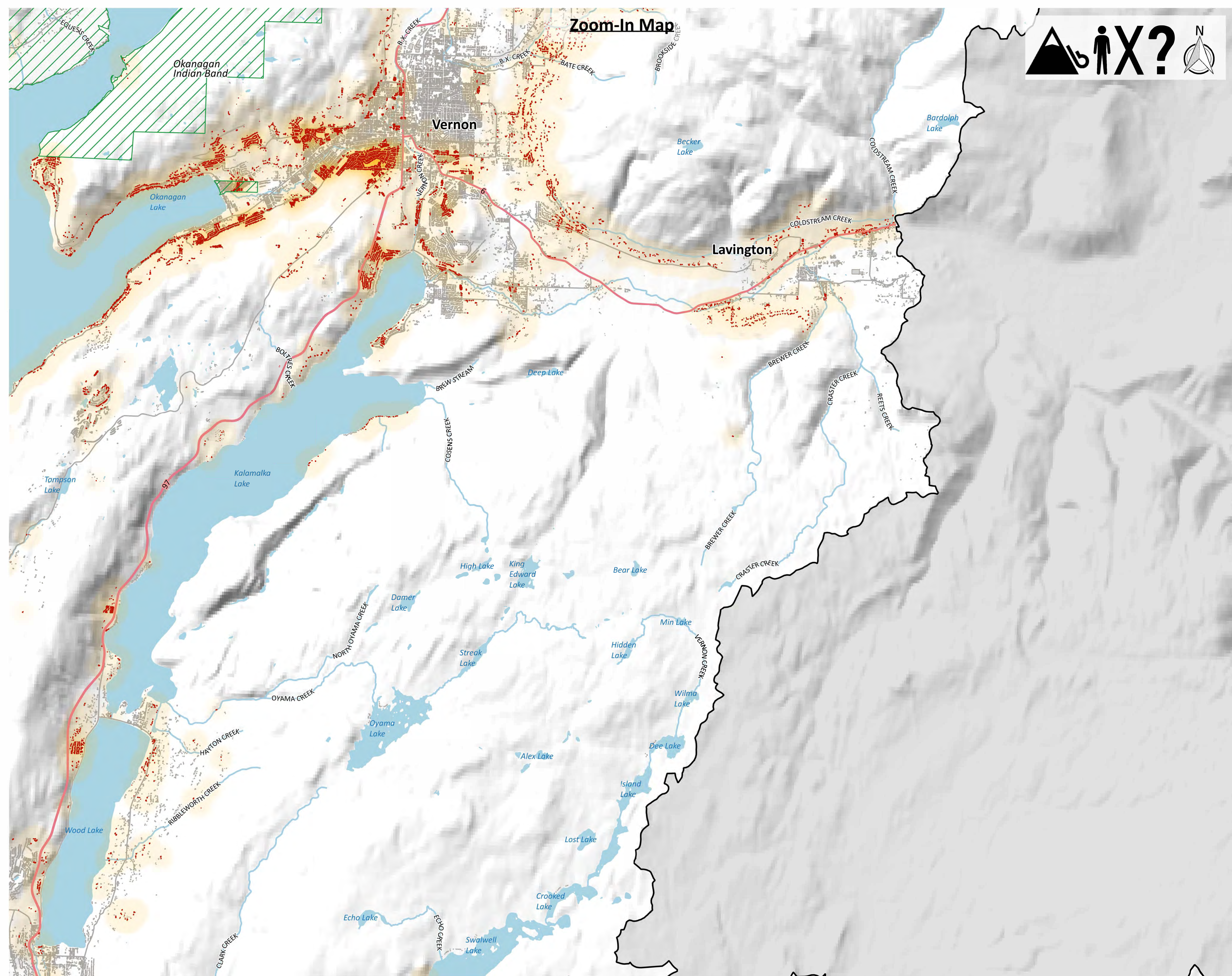
**Legend**

Watershed Boundary	Building Density
Canada - US Border	Affected Buildings
Reserves	
Building Footprints	
Lakes	
Watercourses	
Highway	
Major Road	
Okanagan - Similkameen Boundary	

**Date:** 31 December 2019  
**Produced by:** Ebbwater Consulting Inc.

**Siylx (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**





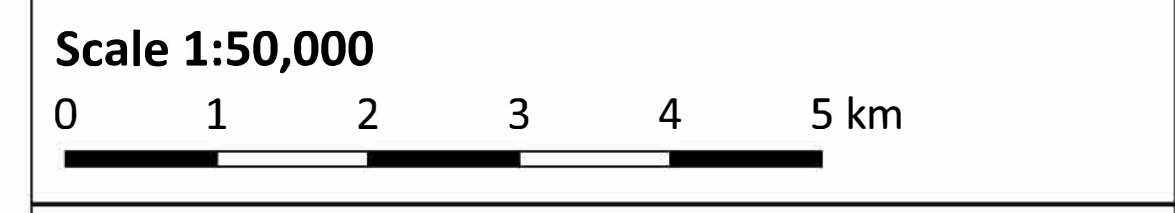
Click above map tile for Zoom-In map  
[Click here to return to Project Area map](#)  
[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

**Map Notes**

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- Roads: BC Data Catalogue.
- Sylix Place Names: Okanagan Nation Alliance.
- Building Footprints: Regional district and municipalities and hand digitized using Bing Satellite Imagery.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.



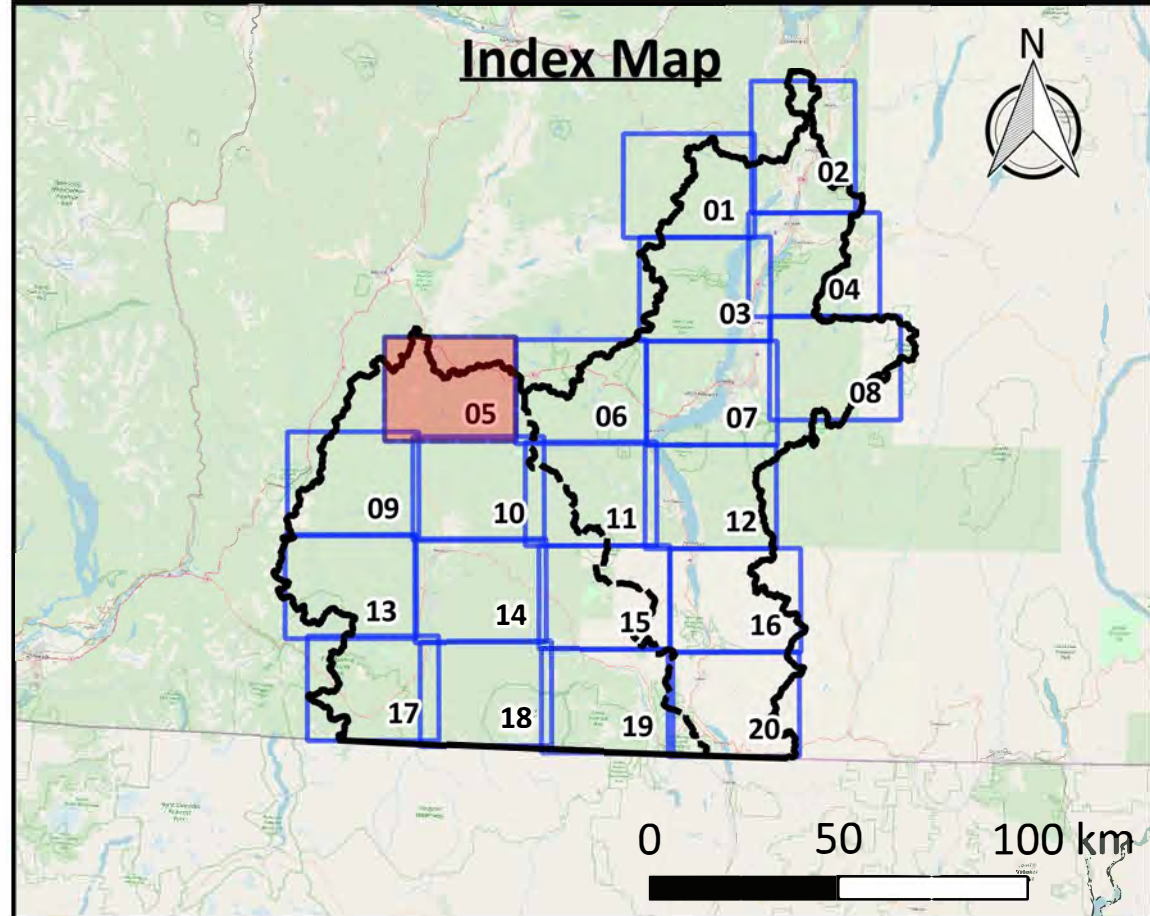
**Legend**

<b>Background</b>	<b>Affected Assets</b>
— Watershed Boundary	🔴 Building Density
— Canada - US Border	🔴 Affected Buildings
▨ Reserves	
▨ Building Footprints	
🟦 Lakes	
— Watercourses	
— Highway	
— Major Road	
— Okanagan - Similkameen Boundary	

Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**

**Zoom-In Map**



Click above map tile for Zoom-In map  
[Click here to return to Project Area map](#)  
[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

**Map Notes**

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2. Building footprints have been used as an indicator of missing and mortality as these are the locations where people are more likely to be. All buildings within the hazard area have been shown as these are all areas of high potential exposure. In reality the missing and mortality rate is expected to be lower than that indicated on this map.
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3. Sylix Place Names: Okanagan Nation Alliance.
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5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

**Scale 1:50,000**



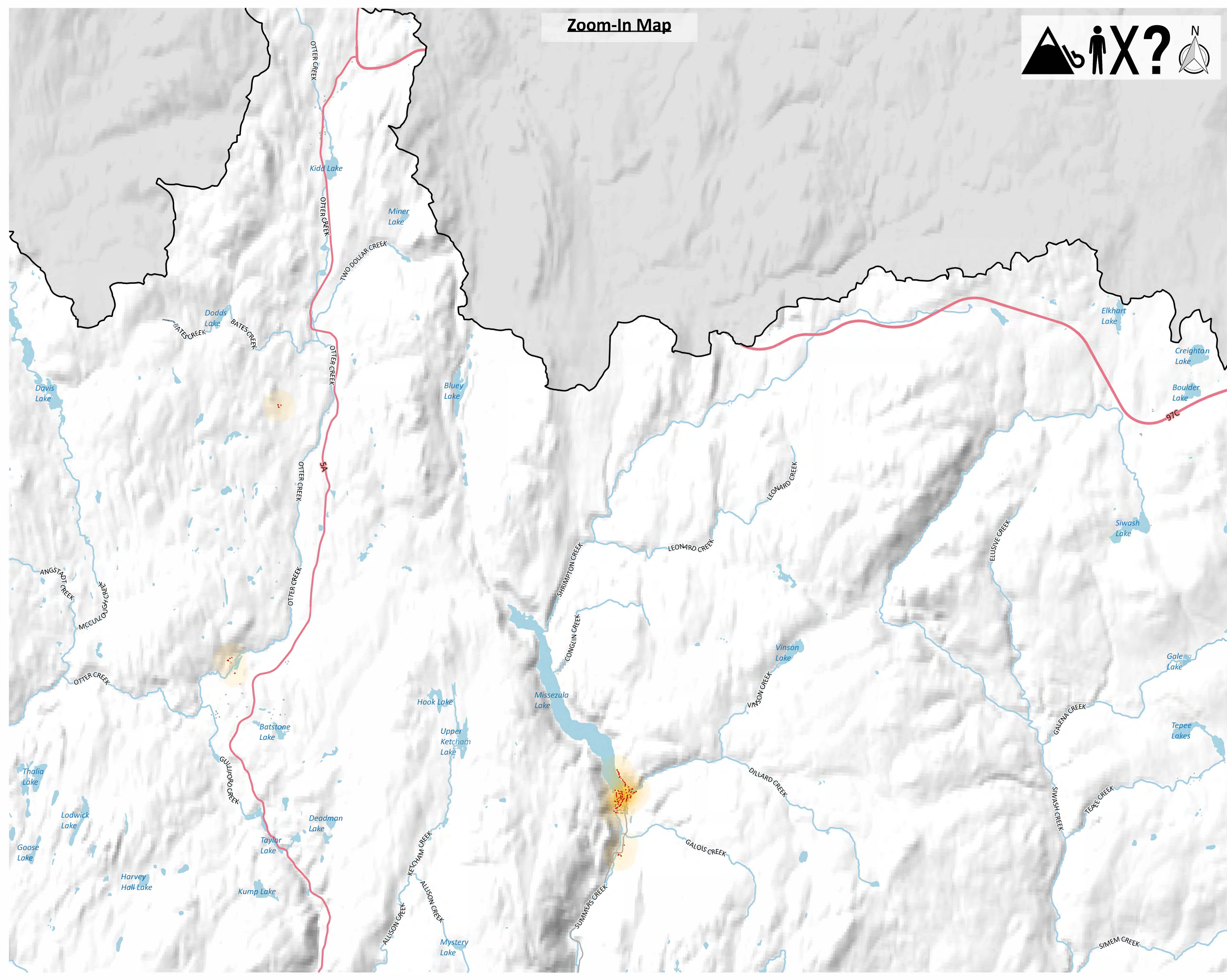
**Legend**

- |                                   |                        |
|-----------------------------------|------------------------|
| <b>Background</b>                 | <b>Affected Assets</b> |
| — Watershed Boundary              | 🔴 Building Density     |
| — Canada - US Border              | 🔴 Affected Buildings   |
| 🟩 Reserves                        |                        |
| 🟤 Building Footprints             |                        |
| 🟦 Lakes                           |                        |
| — Watercourses                    |                        |
| — Highway                         |                        |
| — Major Road                      |                        |
| — Okanagan - Similkameen Boundary |                        |

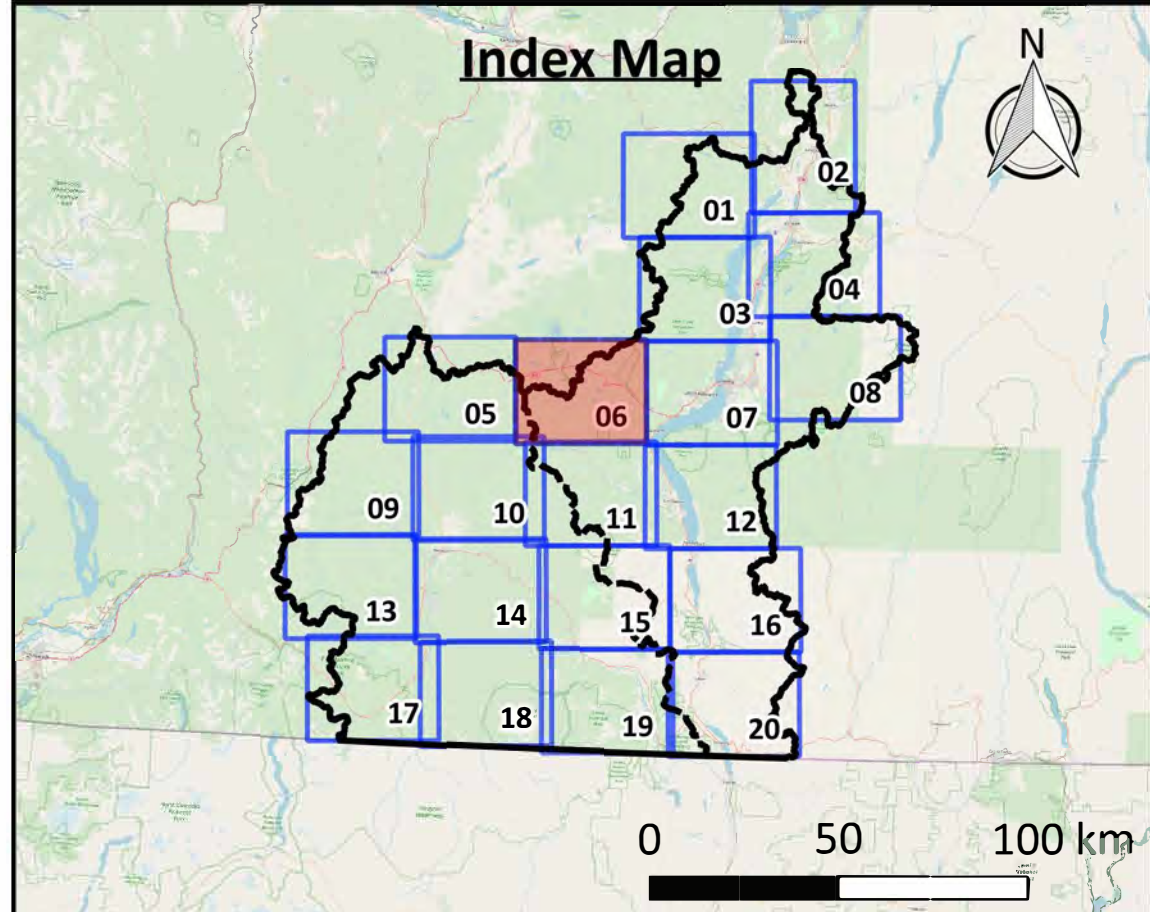
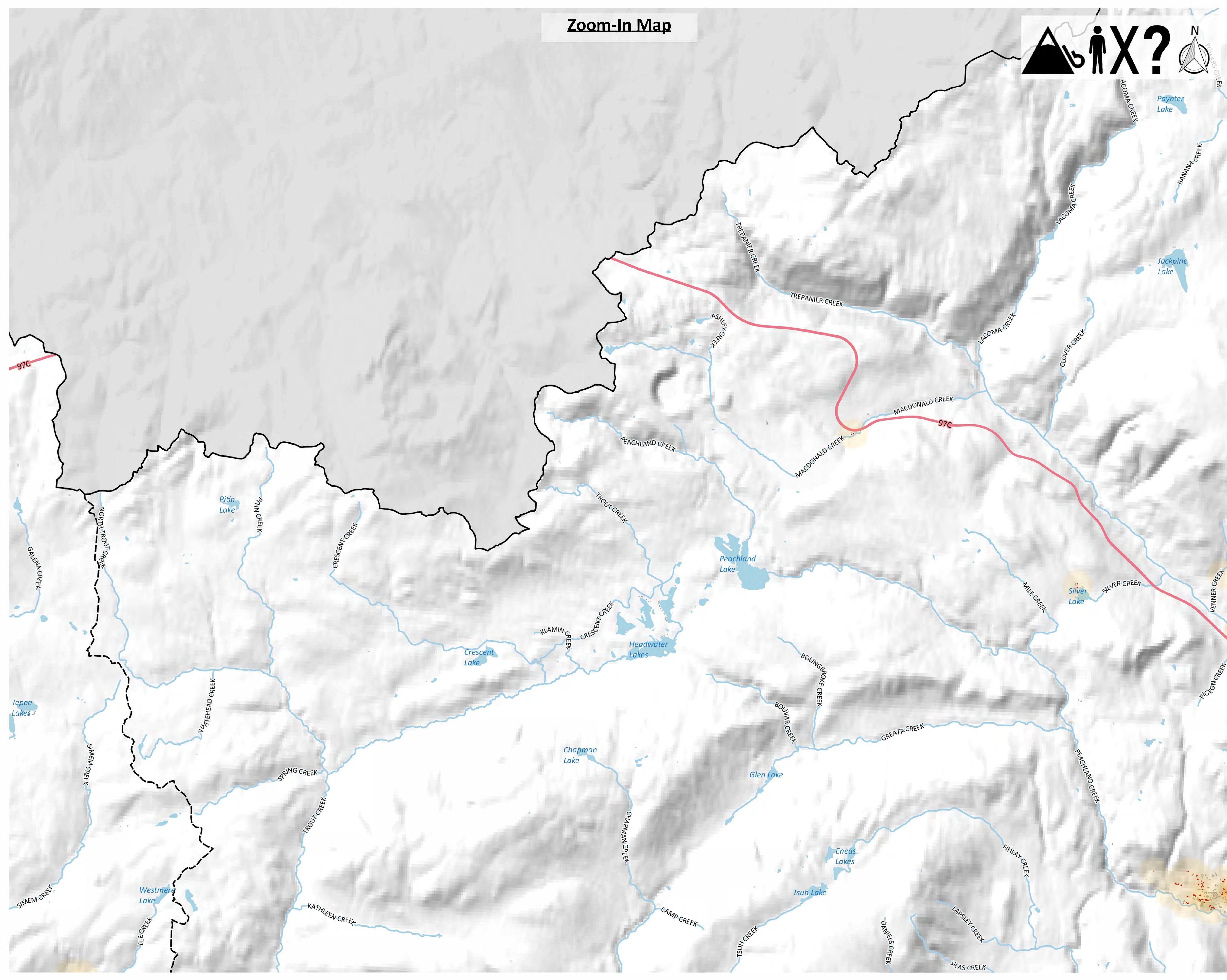
Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**

ANSI D - Map No. M-D-003-005



**Zoom-In Map**



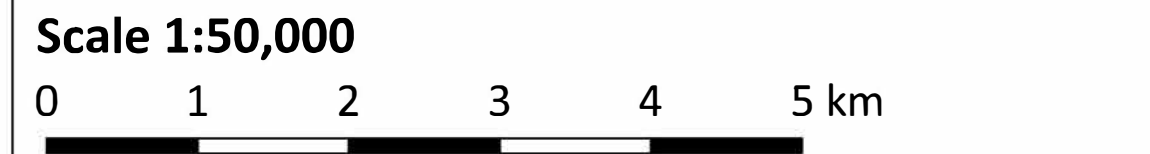
[Click above map tile for Zoom-In map](#)  
[Click here to return to Project Area map](#)  
[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

**Map Notes**

1. Map produced by Ebbwater Consulting Inc.
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**Data Sources**

1. Lakes and Watercourses: BC Data Catalogue.
2. Roads: BC Data Catalogue.
3. *Sylix* Place Names: Okanagan Nation Alliance.
4. Building Footprints: Regional district and municipalities and hand digitized using Bing Satellite Imagery.
5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

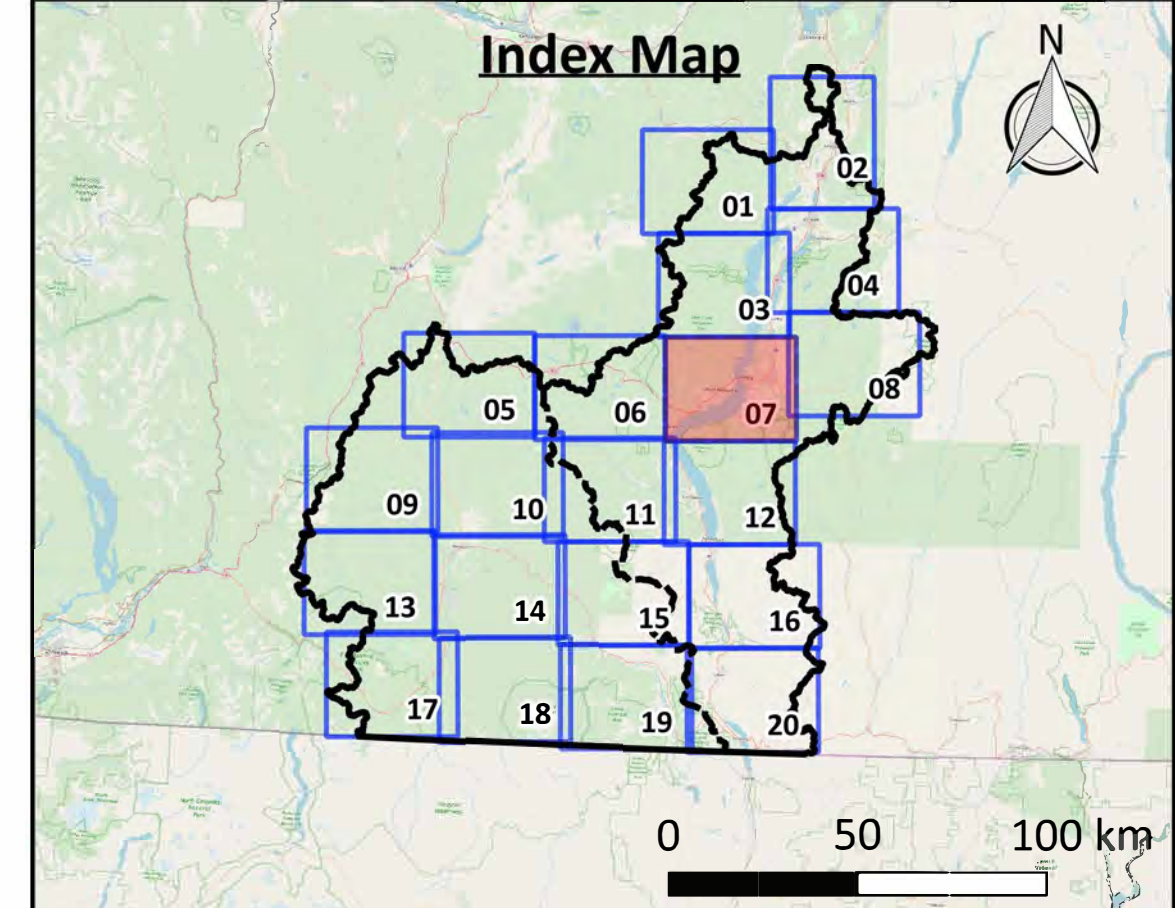
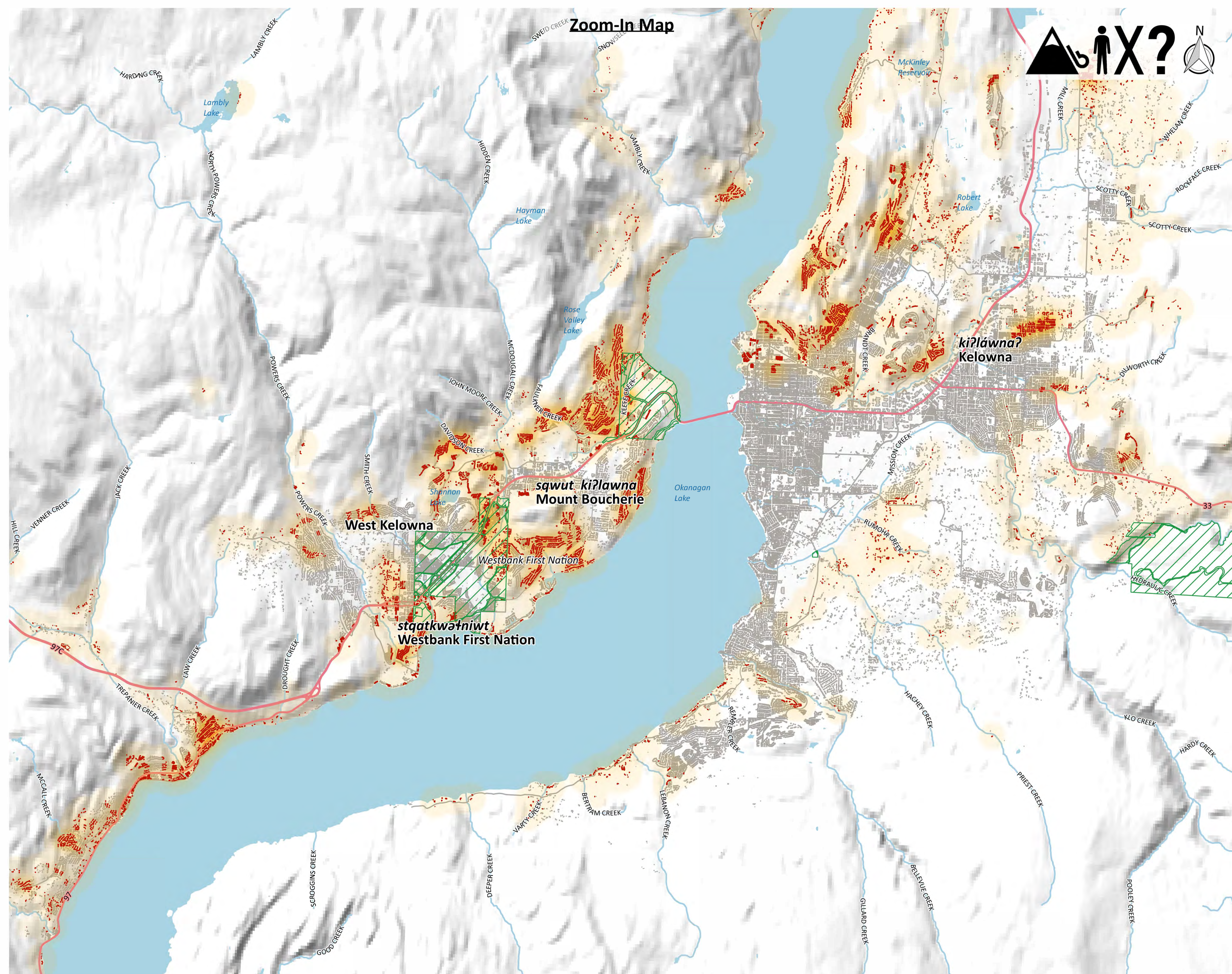


**Legend**

Watershed Boundary	Building Density
Canada - US Border	Affected Buildings
Reserves	
Building Footprints	
Lakes	
Watercourses	
Highway	
Major Road	
Okanagan - Similkameen Boundary	

**Date:** 31 December 2019  
**Produced by:** Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**



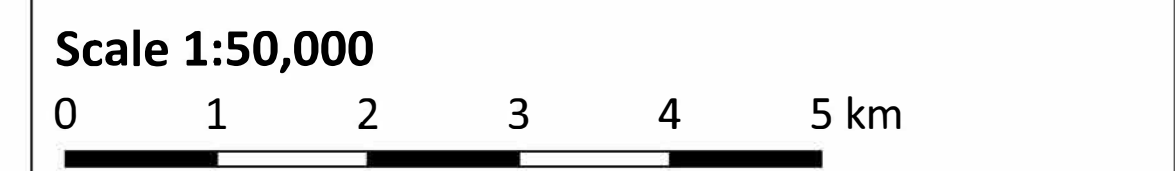
Click above map tile for Zoom-In map  
[Click here to return to Project Area map](#)  
[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

**Map Notes**

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5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.



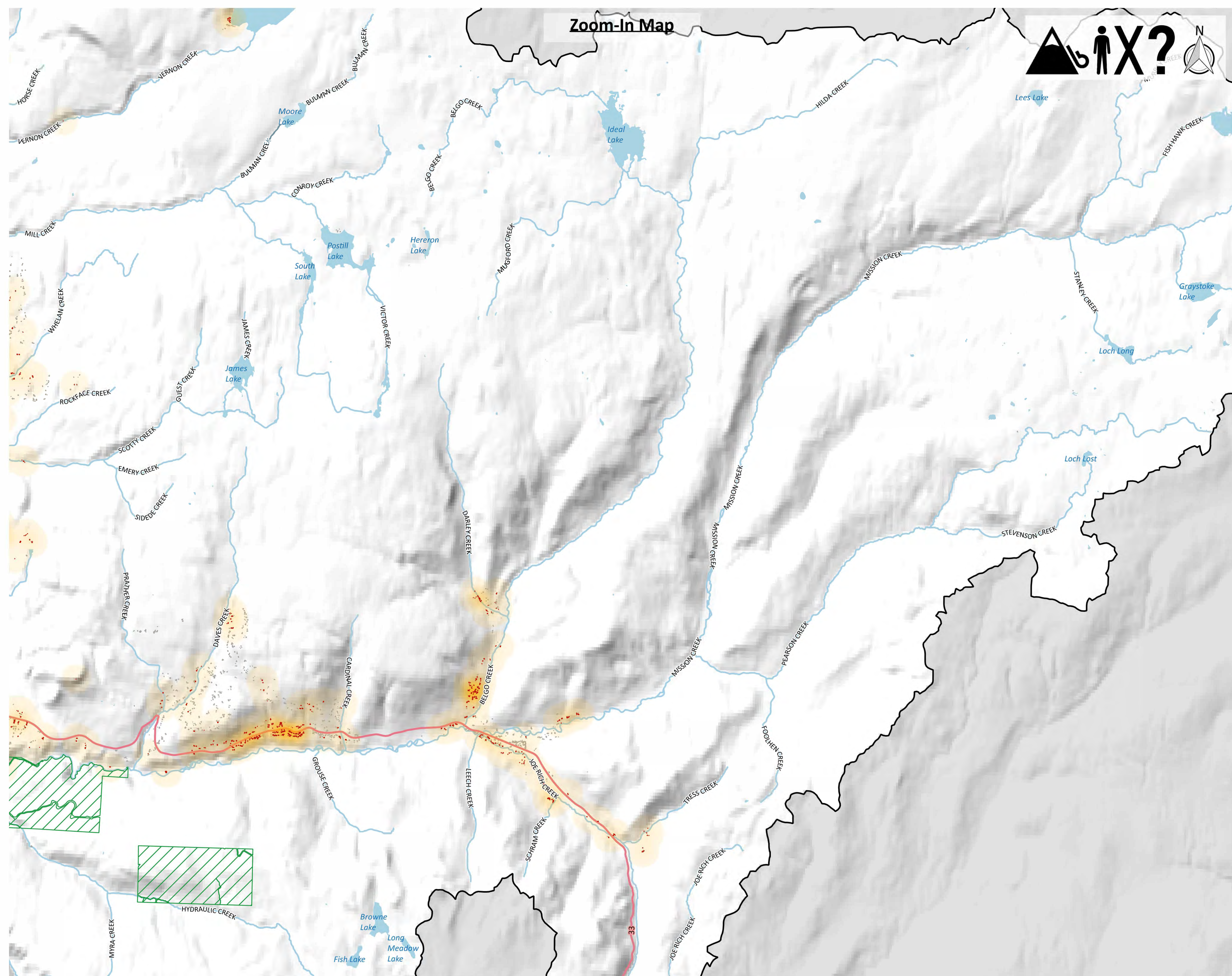
**Legend**

Watershed Boundary	Building Density
Canada - US Border	Affected Buildings
Reserves	
Building Footprints	
Lakes	
Watercourses	
Highway	
Major Road	
Okanagan - Similkameen Boundary	

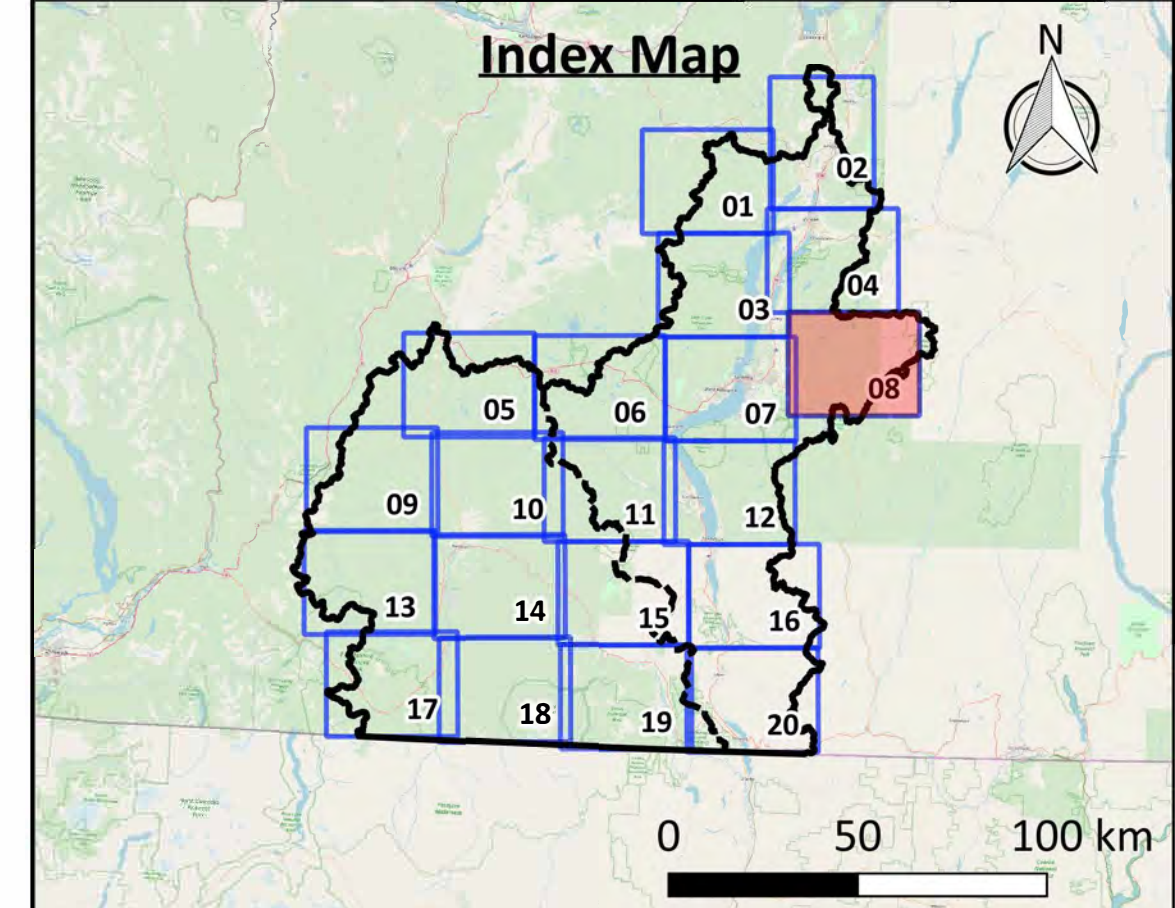
Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

**Siylx (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**

ANSI D - Map No. M-D-003-007



**Zoom-In Map**



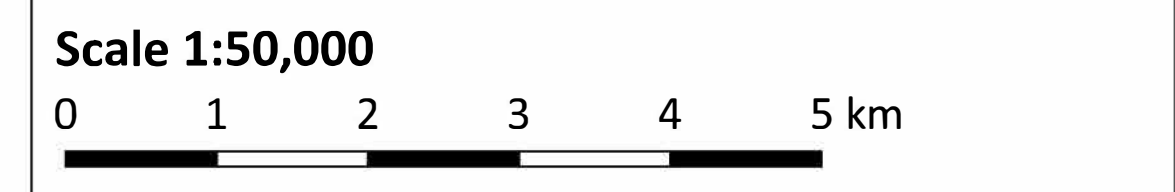
Click above map tile for Zoom-In map  
[Click here to return to Project Area map](#)  
[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

**Map Notes**

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2. Roads: BC Data Catalogue.
3. Sylix Place Names: Okanagan Nation Alliance.
4. Building Footprints: Regional district and municipalities and hand digitized using Bing Satellite Imagery.
5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.



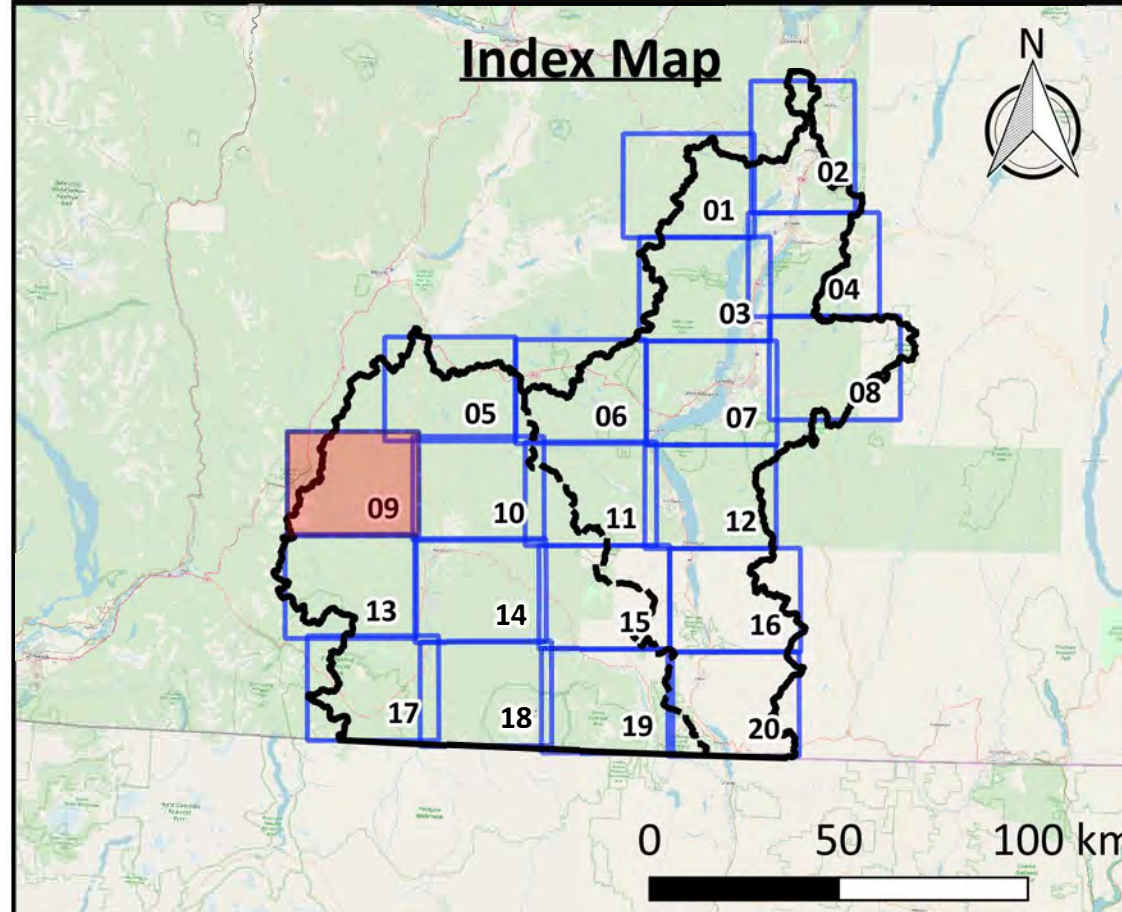
**Legend**

<b>Background</b>	<b>Affected Assets</b>
— Watershed Boundary	🔴 Building Density
— Canada - US Border	🔴 Affected Buildings
▨ Reserves	
■ Building Footprints	
■ Lakes	
— Watercourses	
— Highway	
— Major Road	
--- Okanagan - Similkameen Boundary	

**Date:** 31 December 2019  
**Produced by:** Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**

**Zoom-In Map**



Click above map tile for Zoom-In map  
[Click here to return to Project Area map](#)  
[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

**Map Notes**

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5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

**Scale 1:50,000**



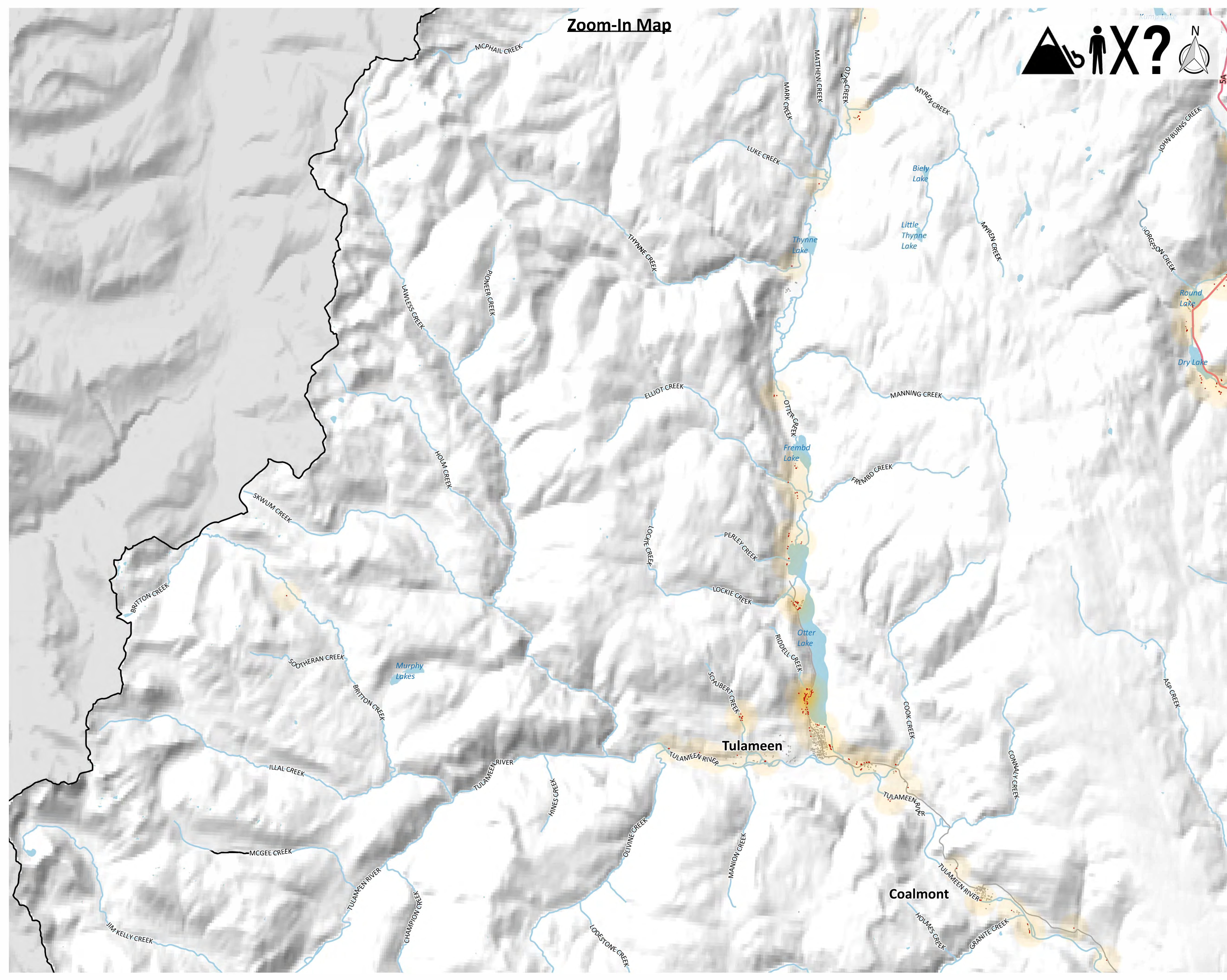
**Legend**

- |                                   |                        |
|-----------------------------------|------------------------|
| <b>Background</b>                 | <b>Affected Assets</b> |
| — Watershed Boundary              | 🔥 Building Density     |
| — Canada - US Border              | 🏠 Affected Buildings   |
| 🟩 Reserves                        |                        |
| 🏠 Building Footprints             |                        |
| 🌊 Lakes                           |                        |
| — Watercourses                    |                        |
| — Highway                         |                        |
| — Major Road                      |                        |
| — Okanagan - Similkameen Boundary |                        |

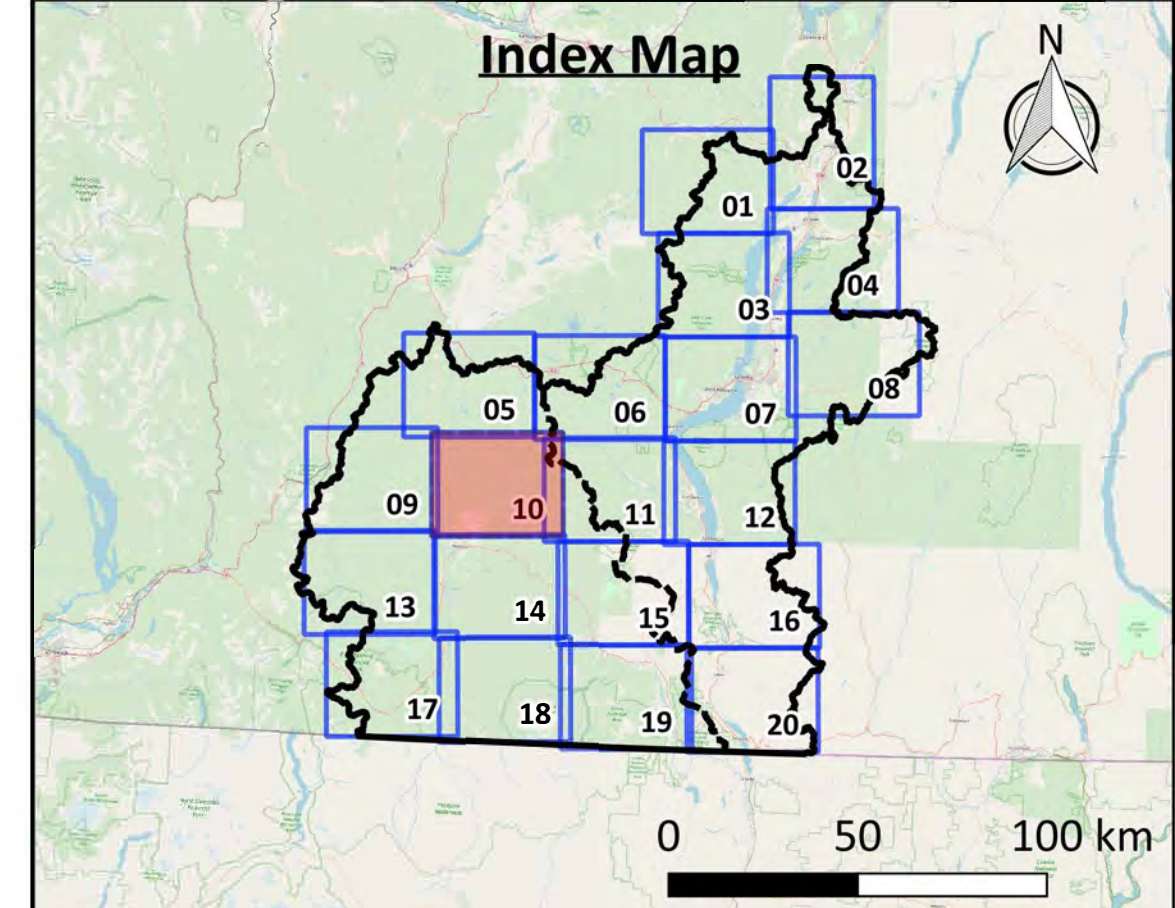
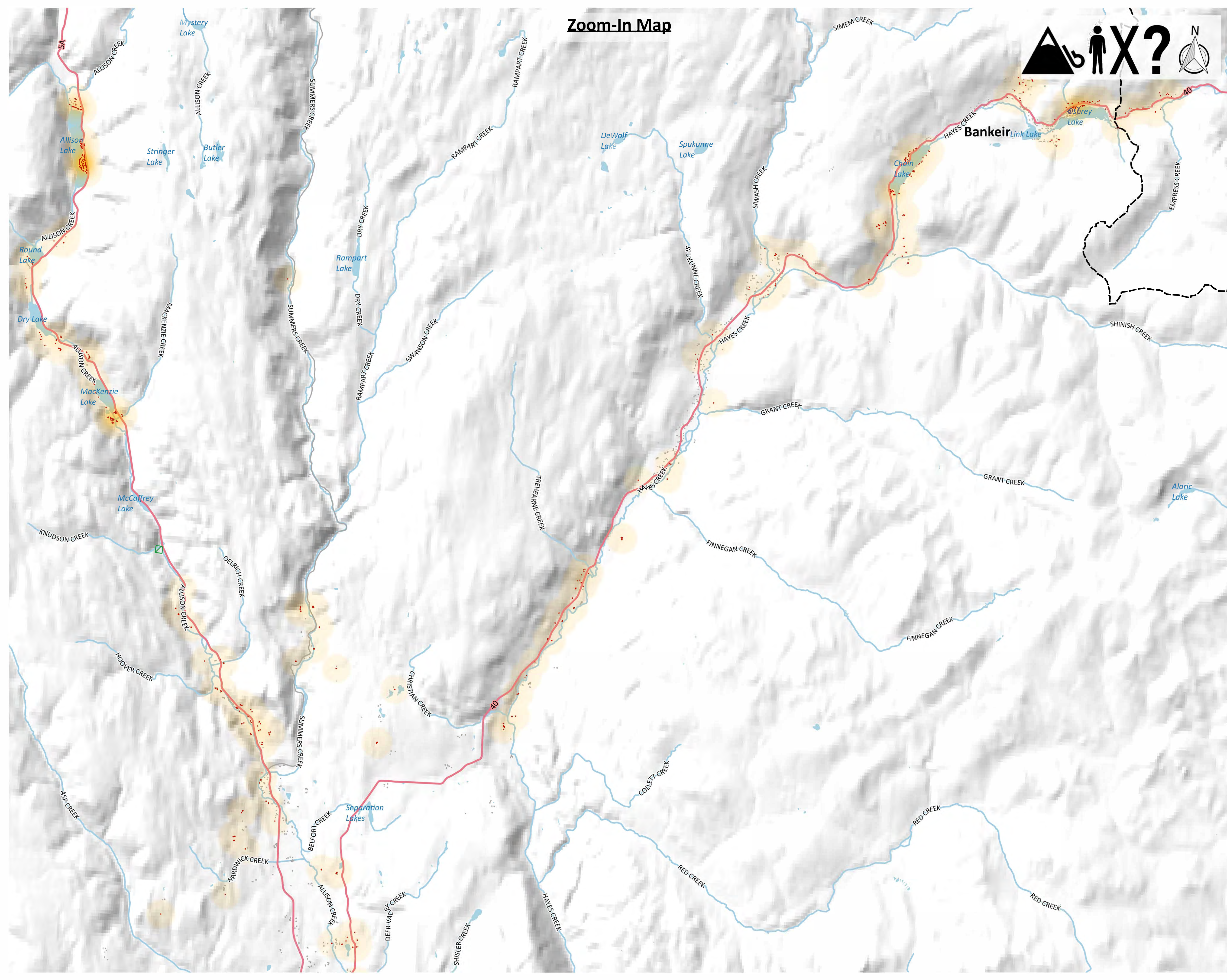
Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**

ANSI D - Map No. M-D-003-009



# Zoom-In Map



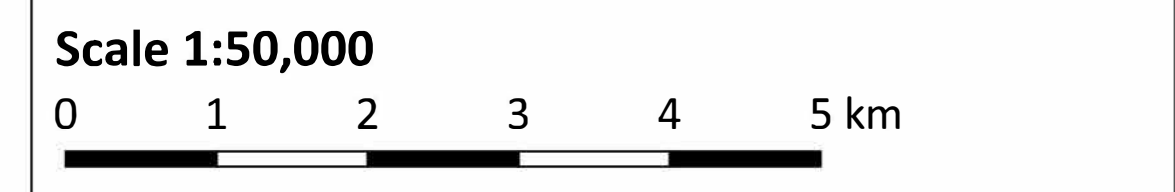
[Click above map tile for Zoom-In map](#)  
[Click here to return to Project Area map](#)  
[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

**Map Notes**

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5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.



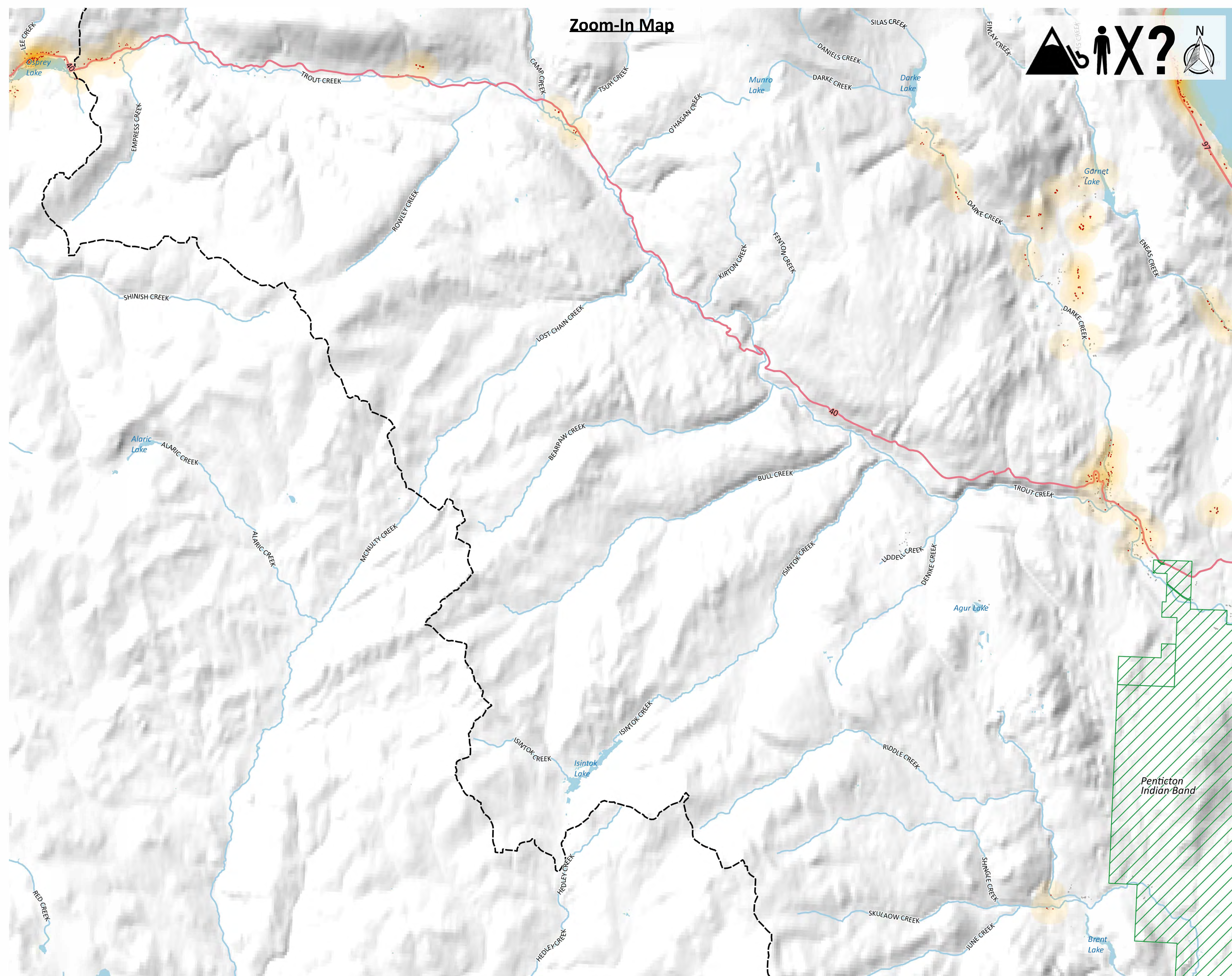
**Legend**

Watershed Boundary	Building Density
Canada - US Border	Affected Buildings
Reserves	
Building Footprints	
Lakes	
Watercourses	
Highway	
Major Road	
Okanagan - Similkameen Boundary	

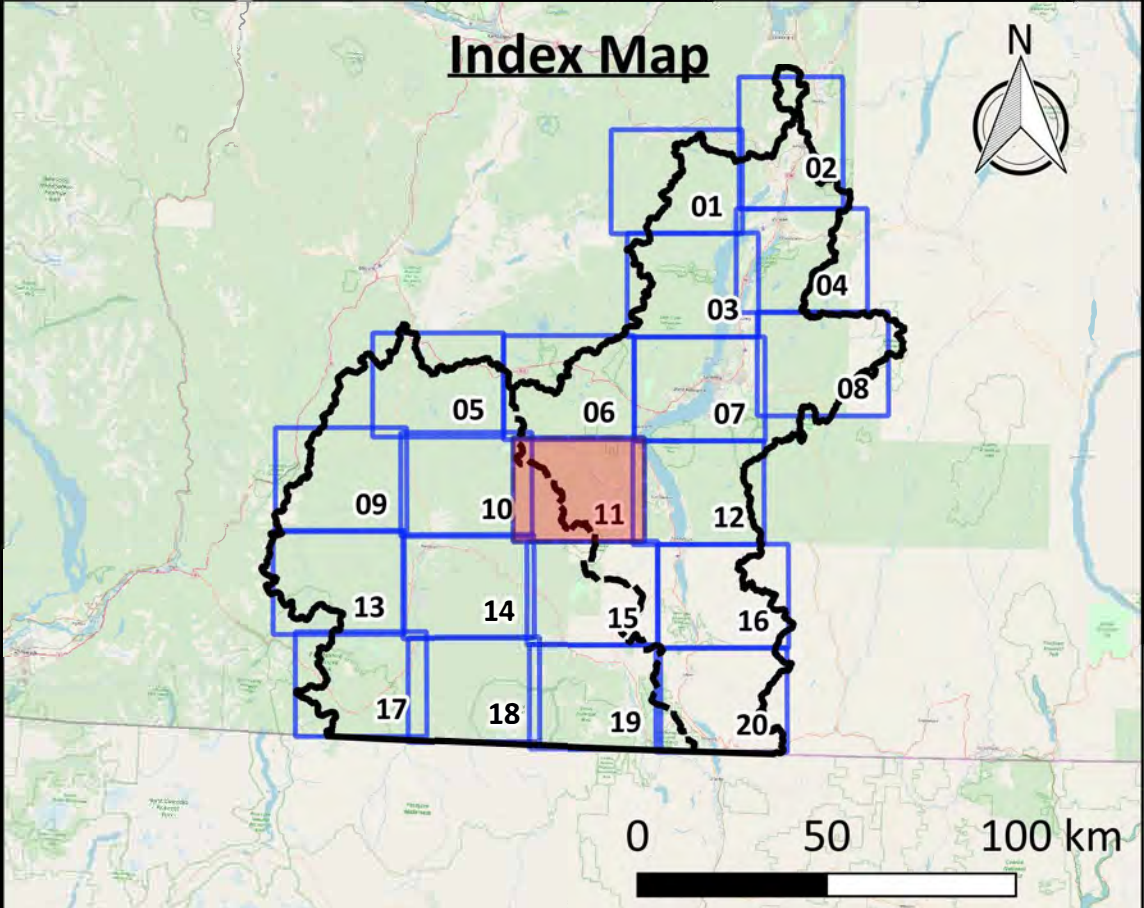
**Date:** 31 December 2019  
**Produced by:** Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**

ANSI D - Map No. M-D-003-010



**Zoom-In Map**



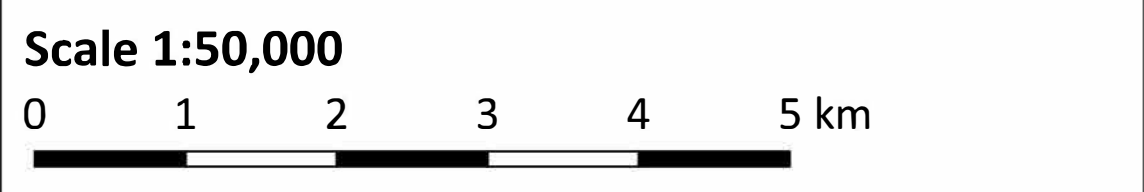
Click above map tile for Zoom-In map  
[Click here to return to Project Area map](#)  
[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

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5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.



**Legend**

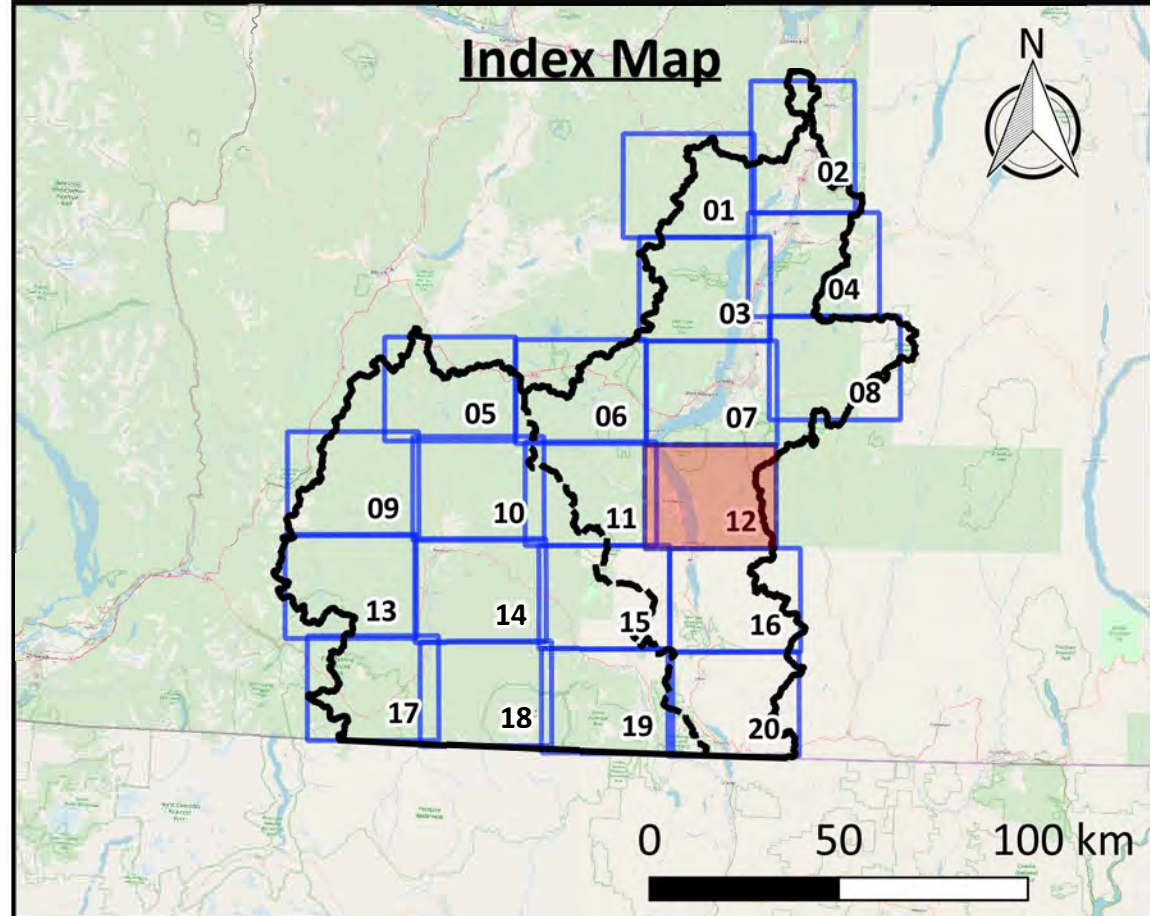
Watershed Boundary	Building Density
Reserves	Affected Buildings
Building Footprints	
Lakes	
Watercourses	
Highway	
Major Road	
Okanagan - Similkameen Boundary	

Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**



# Zoom-In Map



Click above map tile for Zoom-In map  
[Click here to return to Project Area map](#)  
[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

### Map Notes

1. Map produced by Ebbwater Consulting Inc.
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2. Roads: BC Data Catalogue.
3. Sylix Place Names: Okanagan Nation Alliance.
4. Building Footprints: Regional district and municipalities and hand digitized using Bing Satellite Imagery.
5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

### Scale 1:50,000



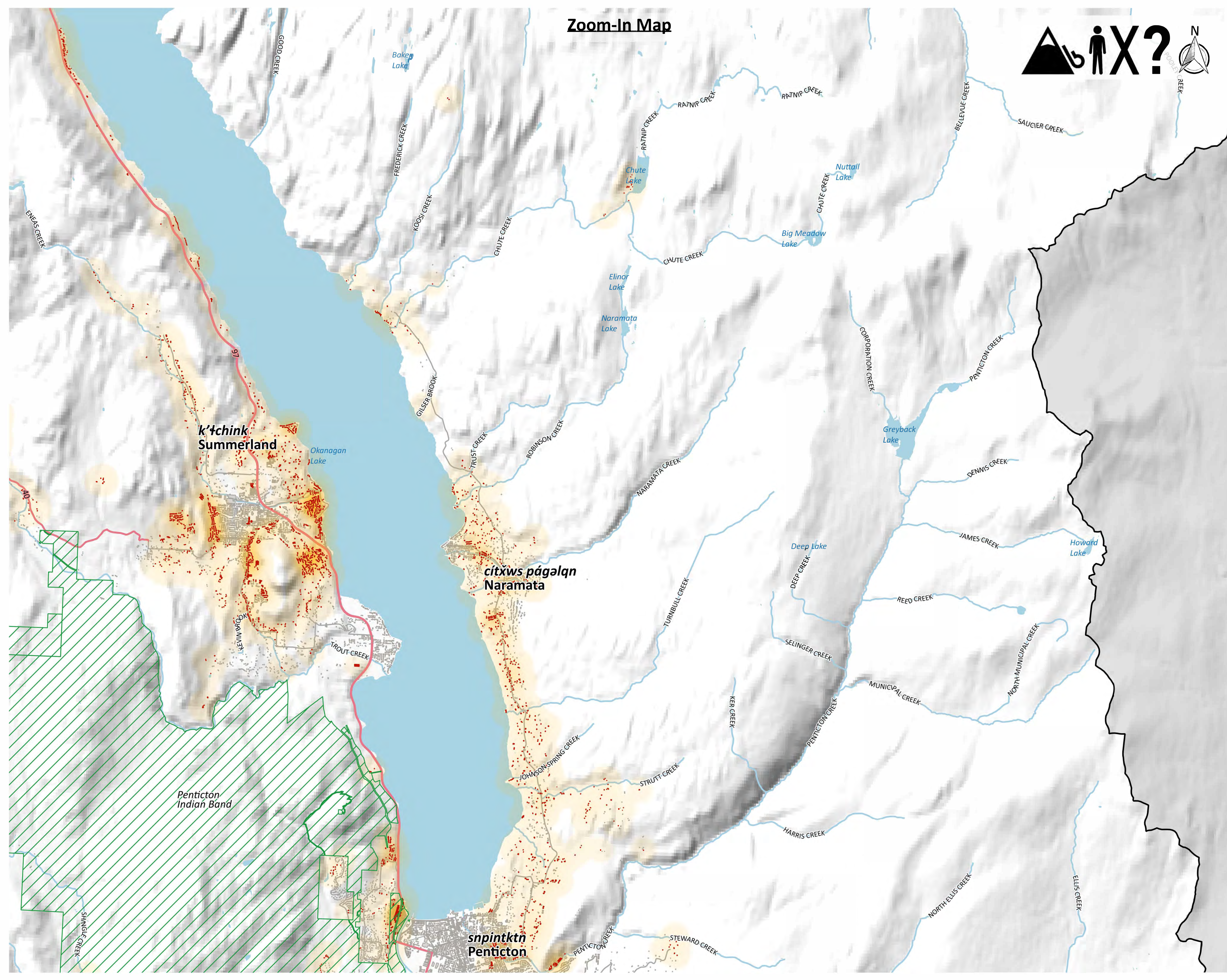
### Legend

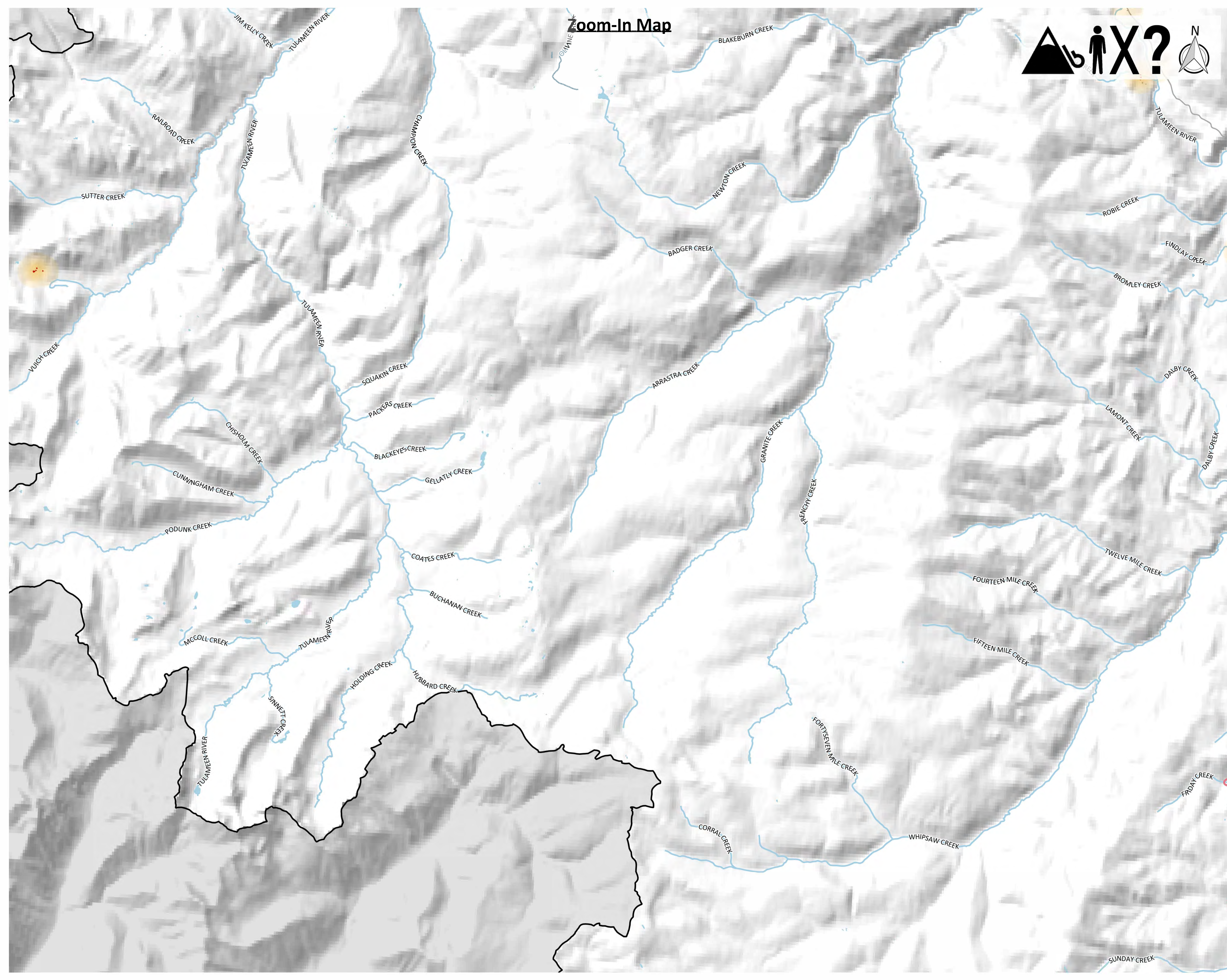
- |                                   |                        |
|-----------------------------------|------------------------|
| <b>Background</b>                 | <b>Affected Assets</b> |
| — Watershed Boundary              | 🔥 Building Density     |
| — Canada - US Border              | 🏠 Affected Buildings   |
| ▨ Reserves                        |                        |
| ■ Building Footprints             |                        |
| ■ Lakes                           |                        |
| — Watercourses                    |                        |
| — Highway                         |                        |
| — Major Road                      |                        |
| — Okanagan - Similkameen Boundary |                        |

Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

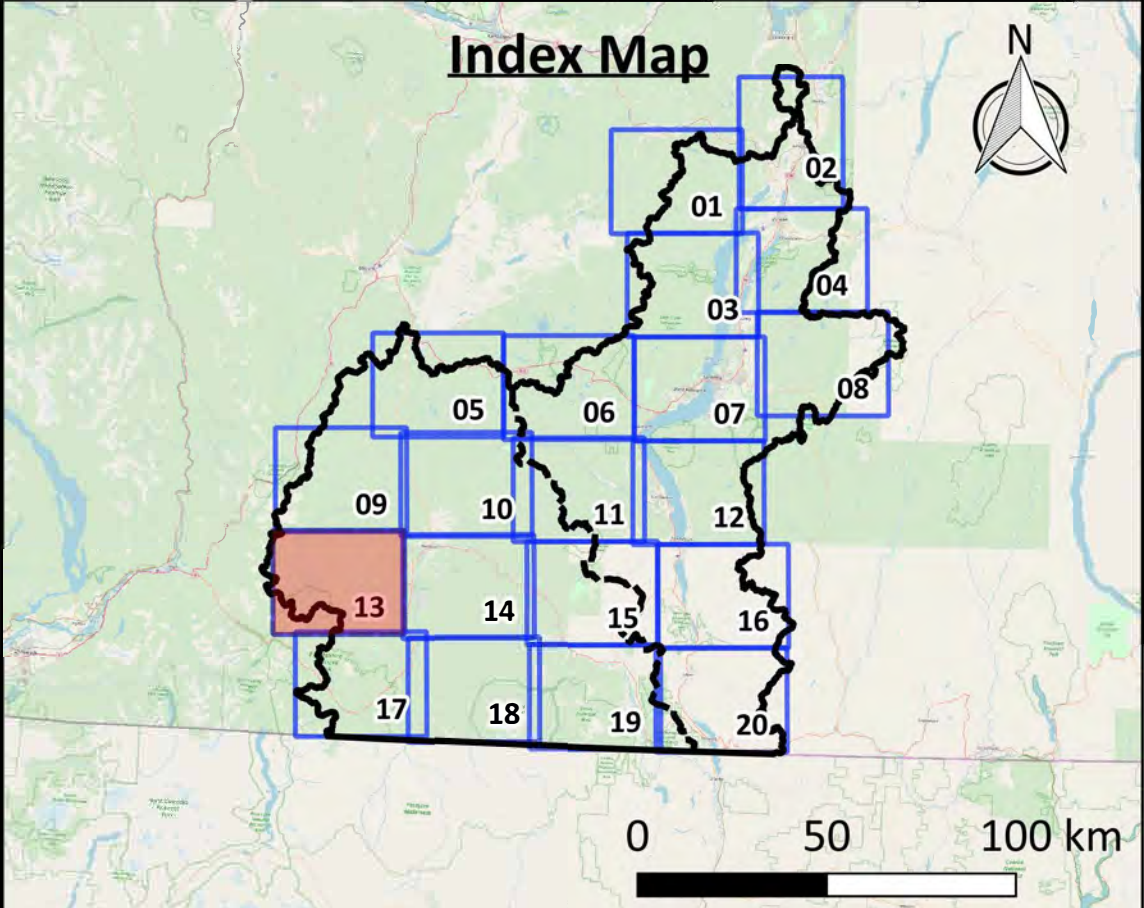
## Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project Debris Flow - Missing and Mortality

ANSI D - Map No. M-D-003-012





**Zoom-In Map**



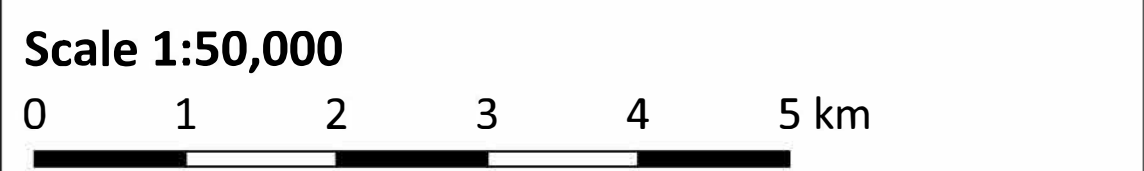
Click above map tile for Zoom-In map  
[Click here to return to Project Area map](#)  
[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

**Map Notes**

1. Map produced by Ebbwater Consulting Inc.
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**Data Sources**

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2. Roads: BC Data Catalogue.
3. Sylix Place Names: Okanagan Nation Alliance.
4. Building Footprints: Regional district and municipalities and hand digitized using Bing Satellite Imagery.
5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

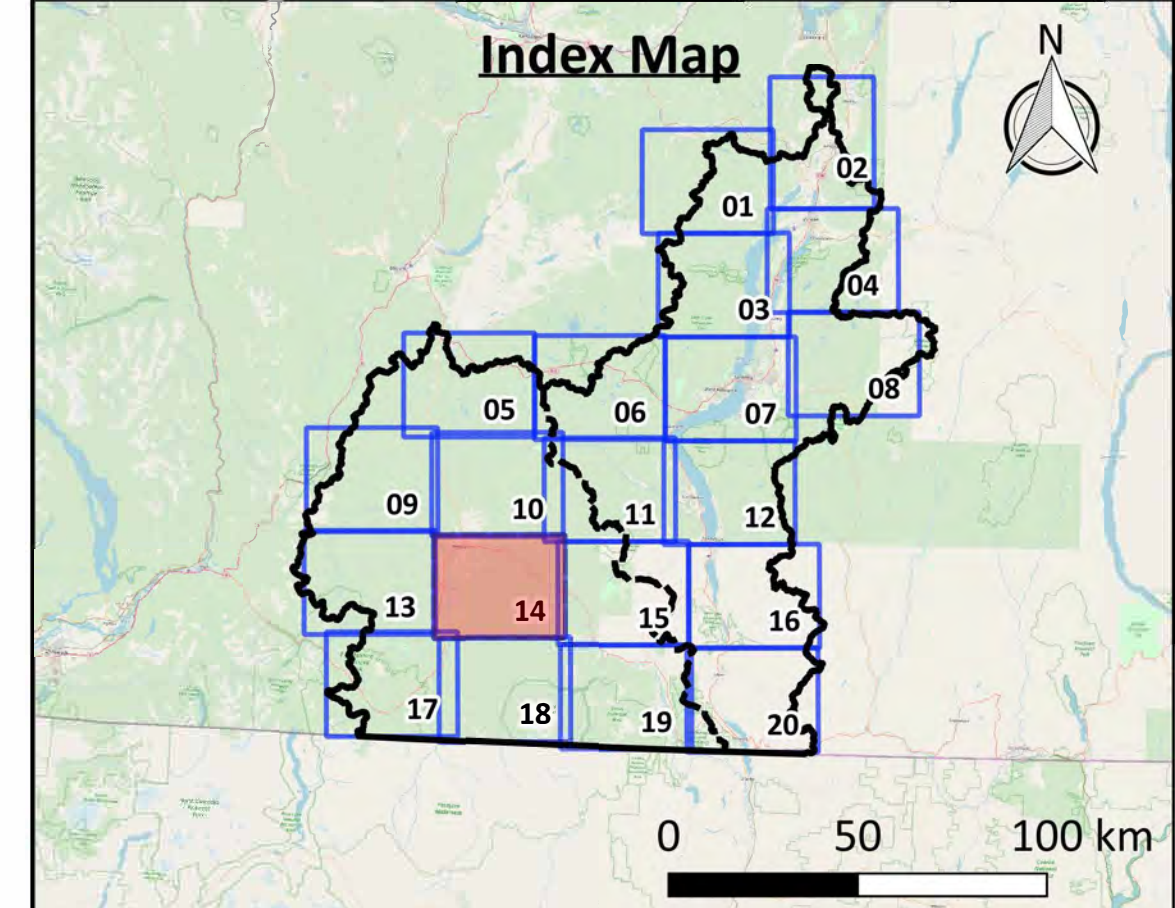
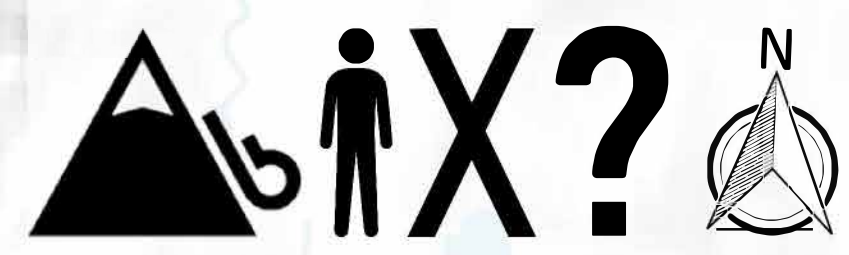
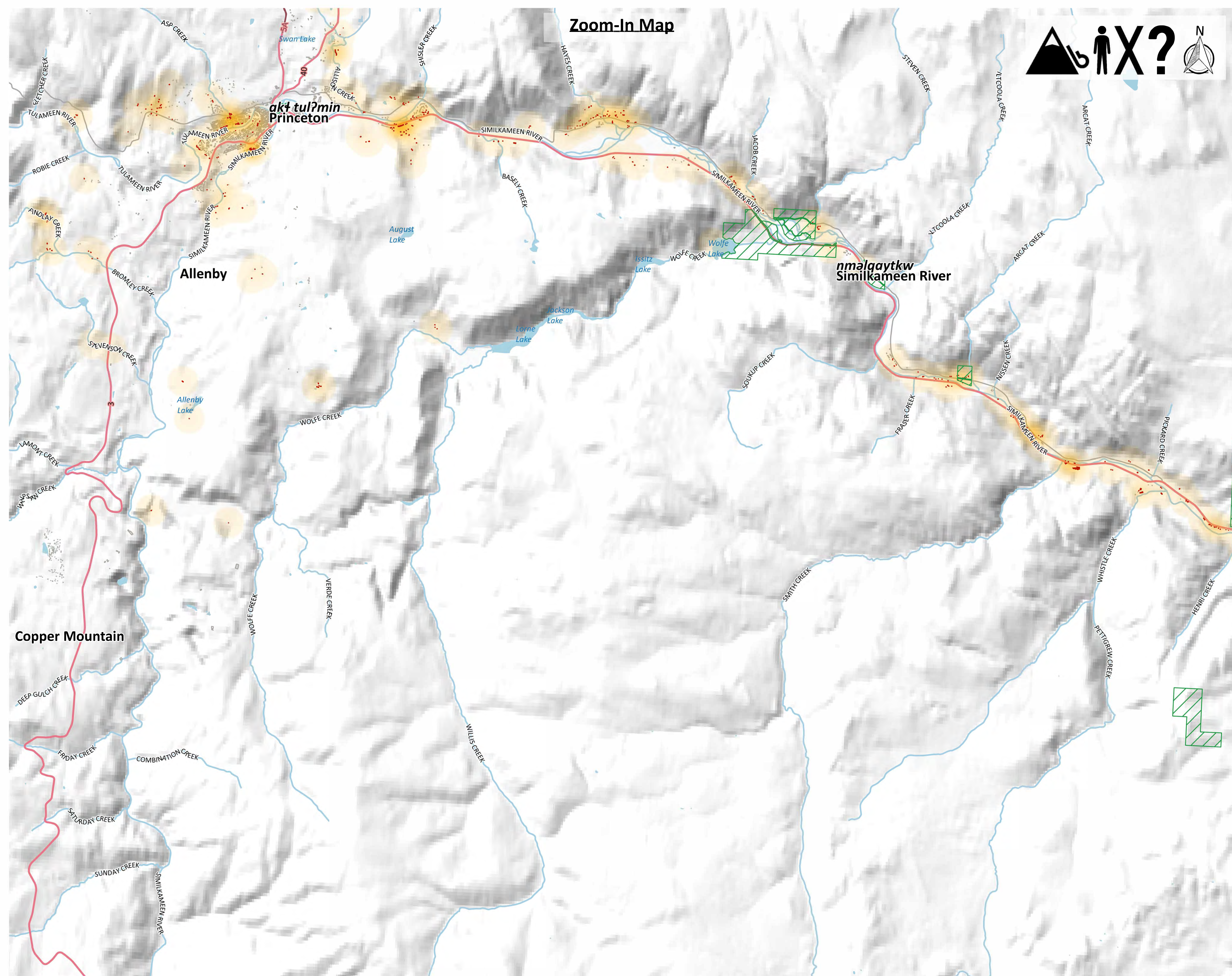


**Legend**

Watershed Boundary	Building Density
Canada - US Border	Affected Buildings
Reserves	
Building Footprints	
Lakes	
Watercourses	
Highway	
Major Road	
Okanagan - Similkameen Boundary	

Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**



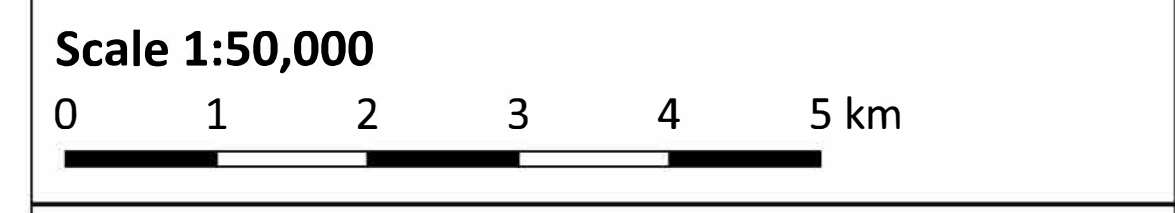
Click above map tile for Zoom-In map  
[Click here to return to Project Area map](#)  
[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

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5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.



**Legend**

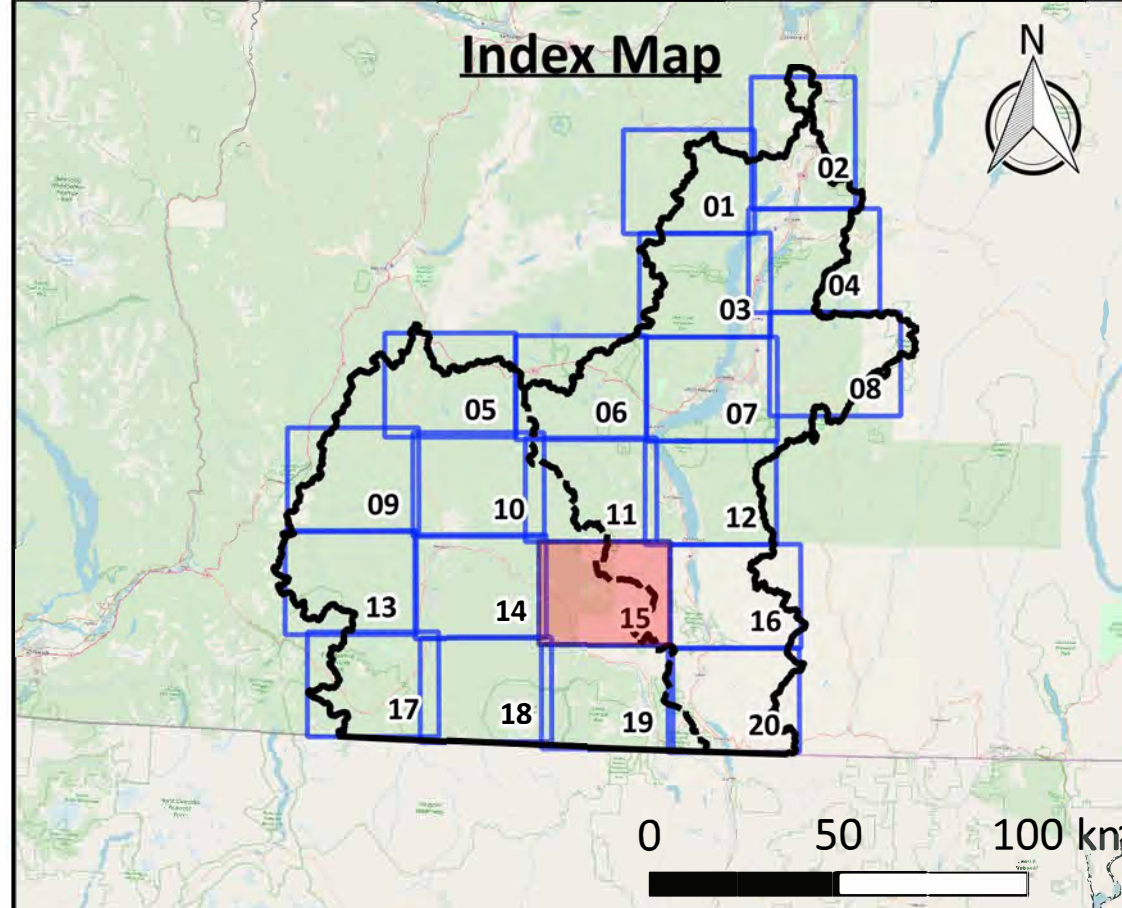
Watershed Boundary	Building Density
Canada - US Border	Affected Buildings
Reserves	
Building Footprints	
Lakes	
Watercourses	
Highway	
Major Road	
Okanagan - Similkameen Boundary	

Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**

ANSI D - Map No. M-D-003-014

# Zoom-In Map



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[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

### Map Notes

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2. Building footprints have been used as an indicator of missing and mortality as these are the locations where people are more likely to be. All buildings within the hazard area have been shown as these are all areas of high potential exposure. In reality the missing and mortality rate is expected to be lower than that indicated on this map.
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2. Roads: BC Data Catalogue.
3. Sylix Place Names: Okanagan Nation Alliance.
4. Building Footprints: Regional district and municipalities and hand digitized using Bing Satellite Imagery.
5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

### Scale 1:50,000



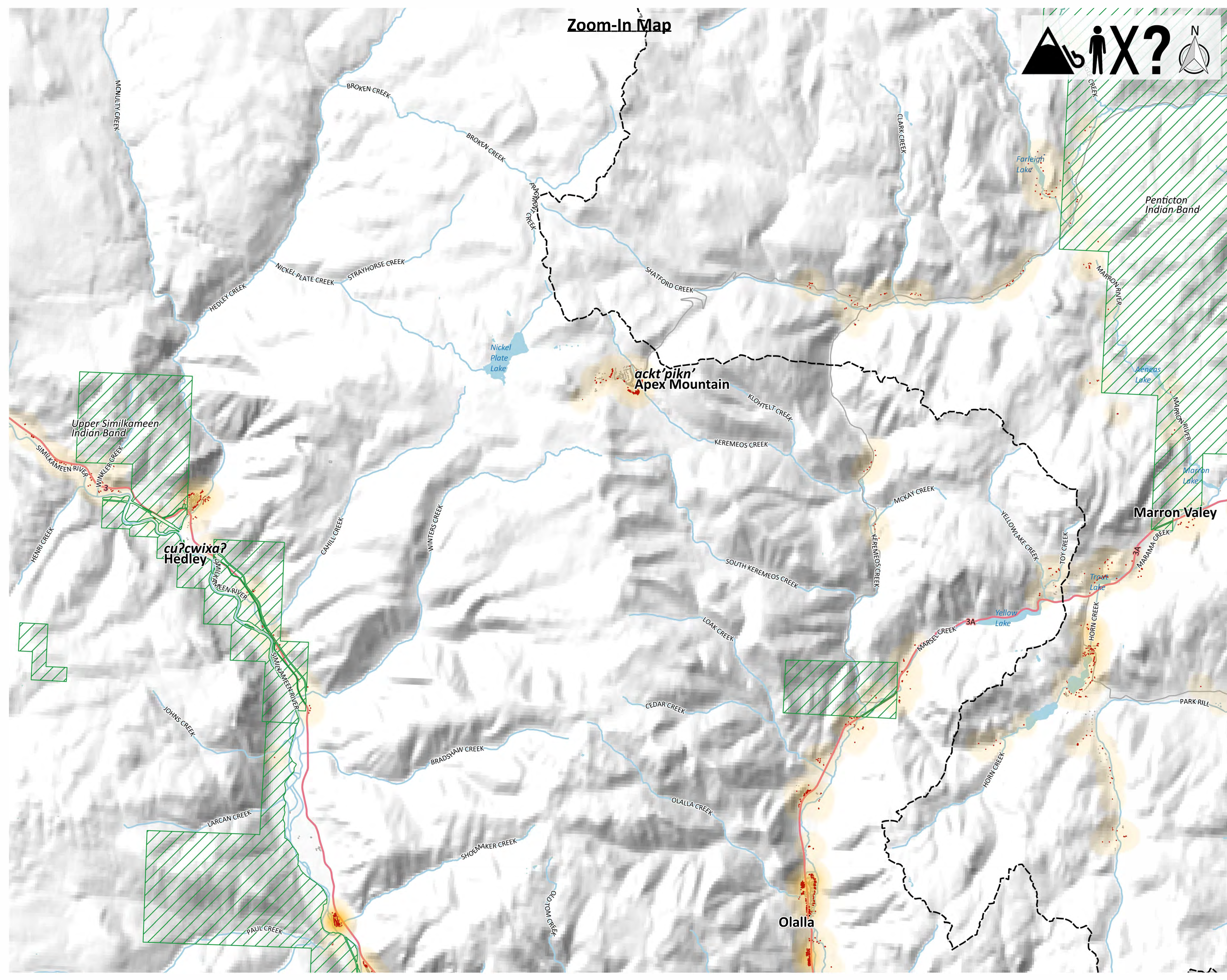
### Legend

- |                                     |                        |
|-------------------------------------|------------------------|
| <b>Background</b>                   | <b>Affected Assets</b> |
| — Watershed Boundary                | 🔴 Building Density     |
| — Canada - US Border                | 🔴 Affected Buildings   |
| ▨ Reserves                          |                        |
| ▨ Building Footprints               |                        |
| 🟦 Lakes                             |                        |
| — Watercourses                      |                        |
| — Highway                           |                        |
| — Major Road                        |                        |
| --- Okanagan - Similkameen Boundary |                        |

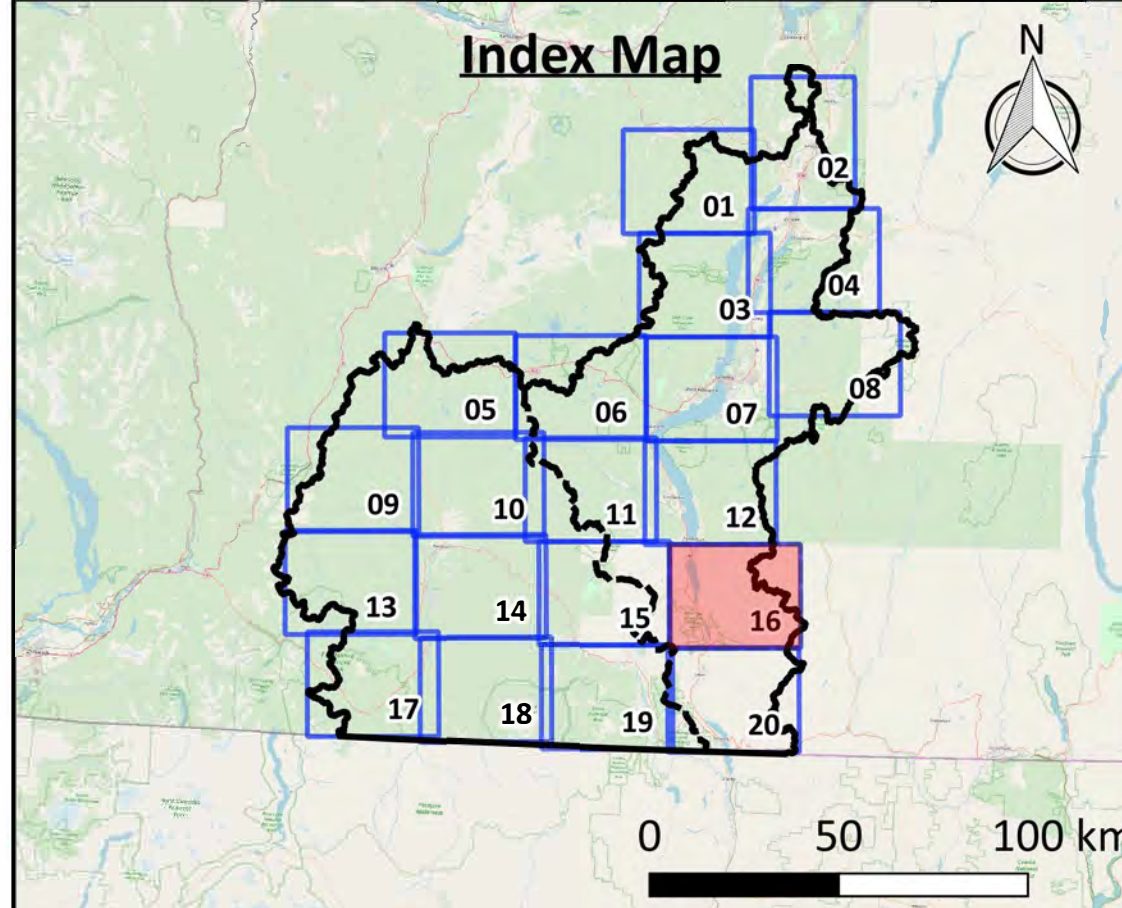
Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

## Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project Debris Flow - Missing and Mortality

ANSI D - Map No. M-D-003-015



**Zoom-In Map**



Click above map tile for Zoom-In map  
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[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

**Map Notes**

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2. Roads: BC Data Catalogue.
3. Sylix Place Names: Okanagan Nation Alliance.
4. Building Footprints: Regional district and municipalities and hand digitized using Bing Satellite Imagery.
5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

**Scale 1:50,000**



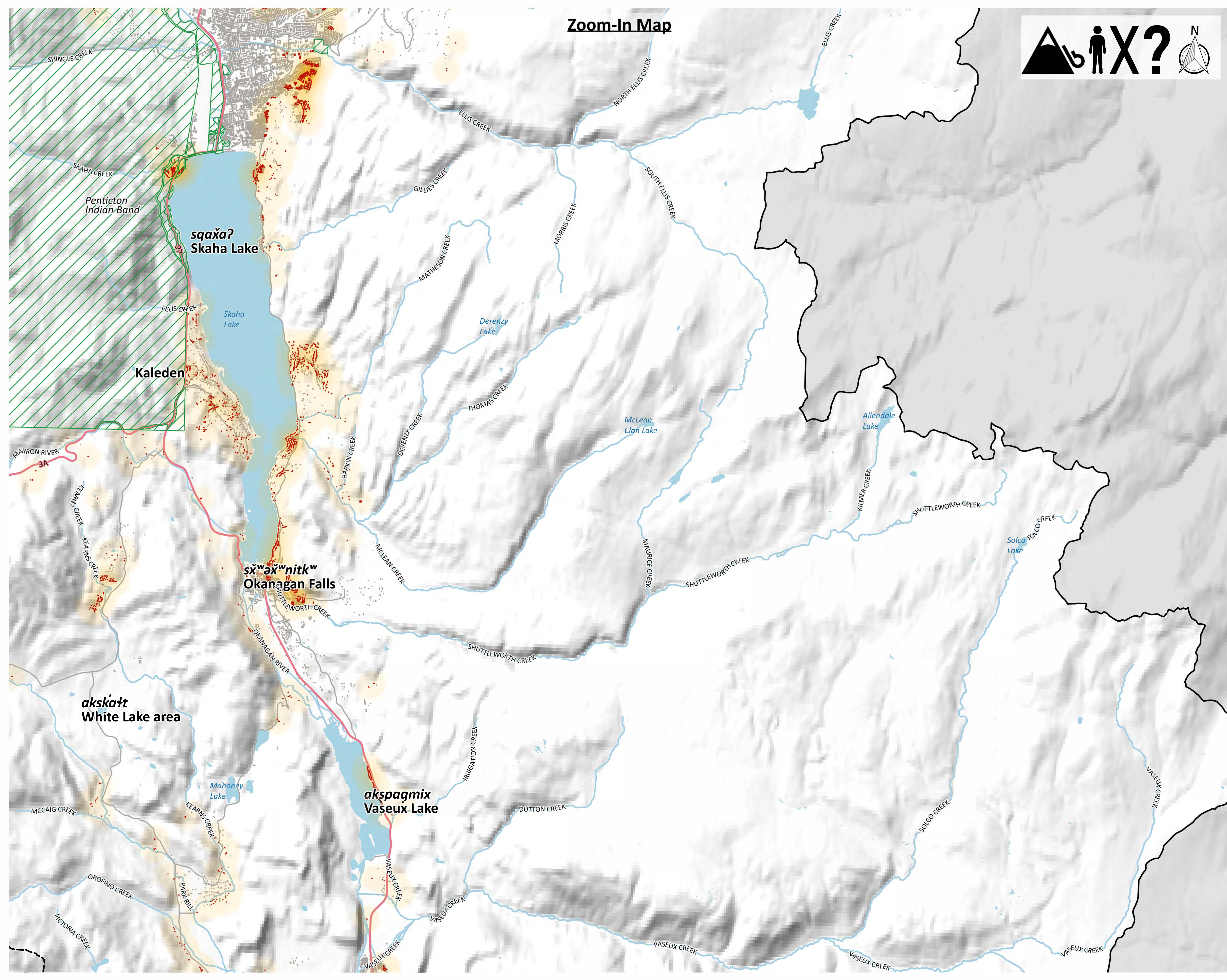
**Legend**

- |                                     |                        |
|-------------------------------------|------------------------|
| <b>Background</b>                   | <b>Affected Assets</b> |
| — Watershed Boundary                | 🔥 Building Density     |
| — Canada - US Border                | 🏠 Affected Buildings   |
| ▨ Reserves                          |                        |
| ▨ Building Footprints               |                        |
| 🌊 Lakes                             |                        |
| — Watercourses                      |                        |
| — Highway                           |                        |
| — Major Road                        |                        |
| --- Okanagan - Similkameen Boundary |                        |

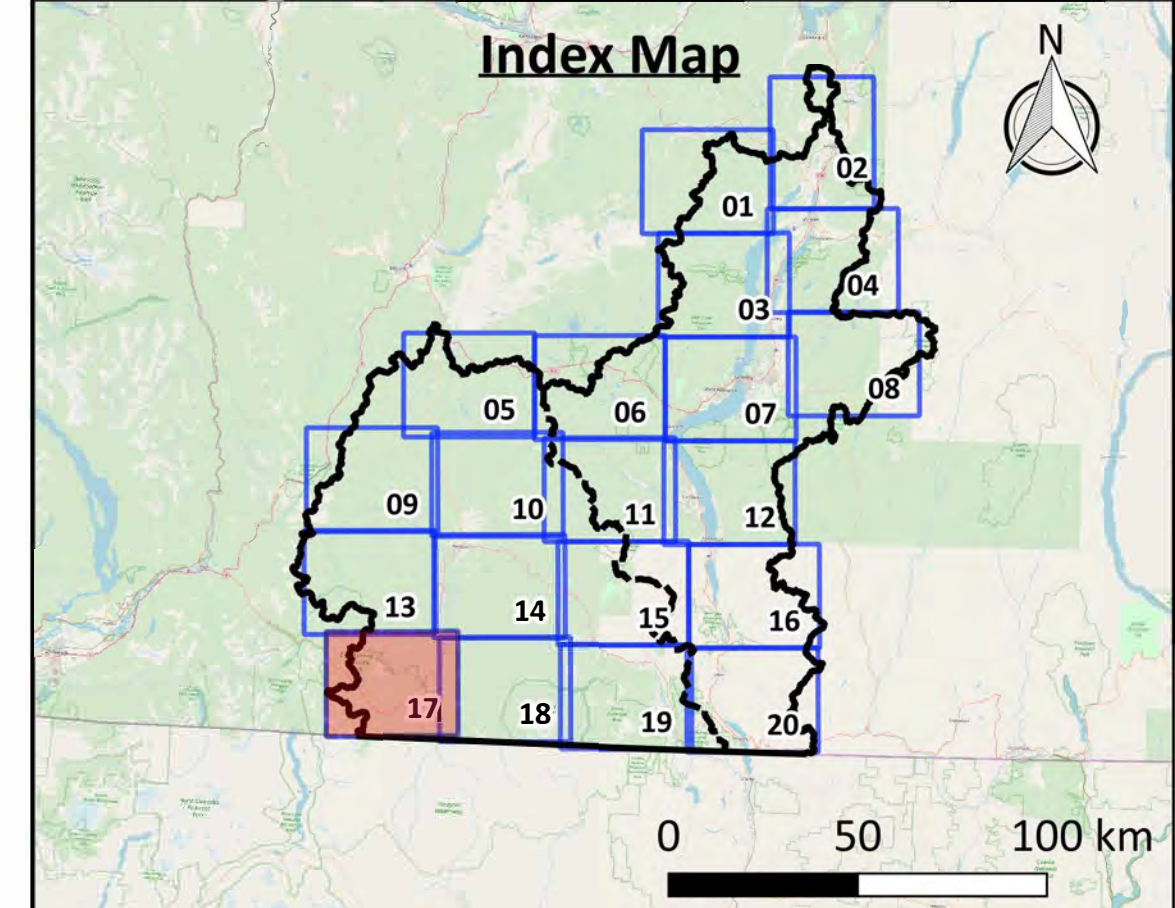
Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**

ANSI D - Map No. M-D-003-016



**Zoom-In Map**



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[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

**Map Notes**

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- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

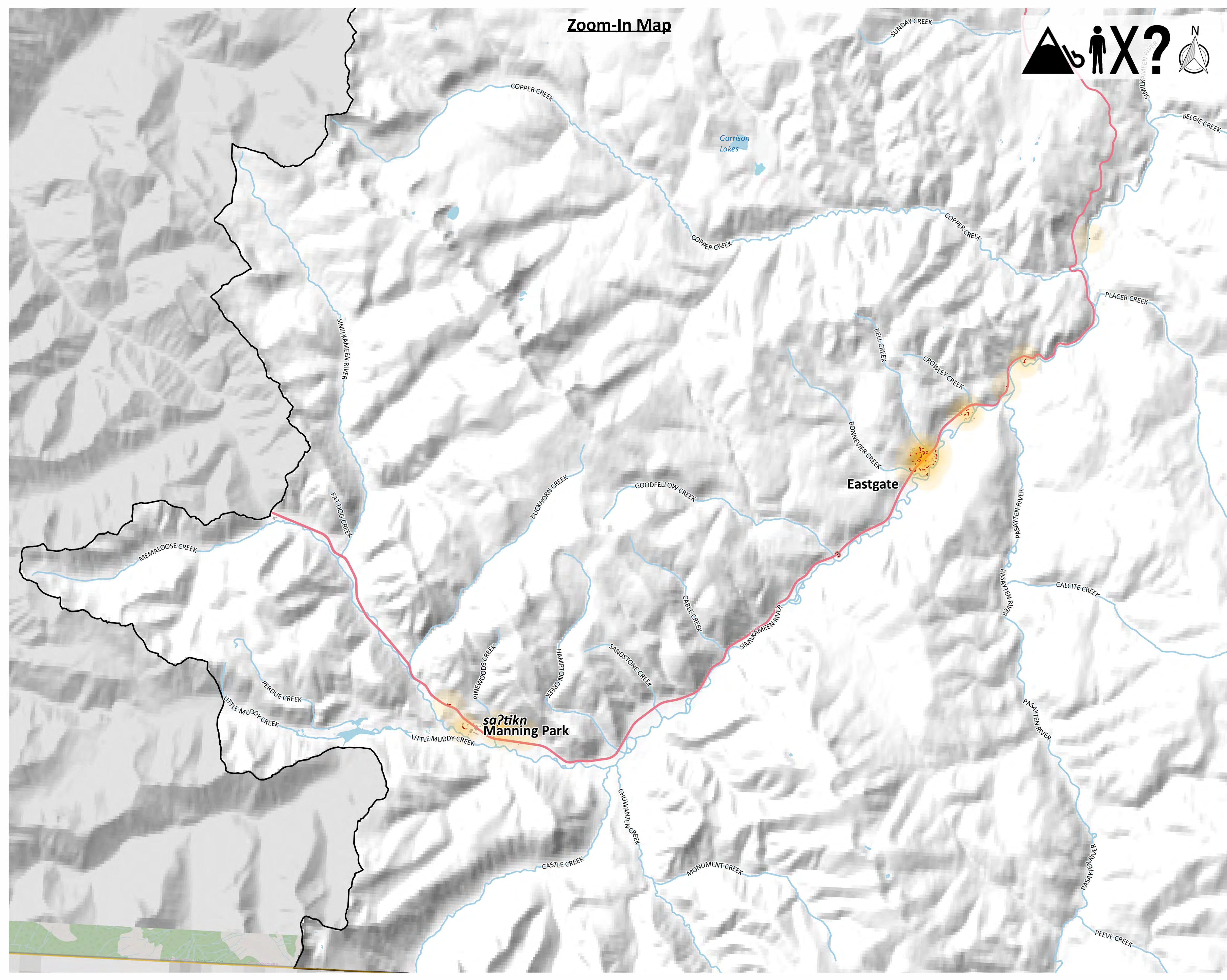


**Legend**

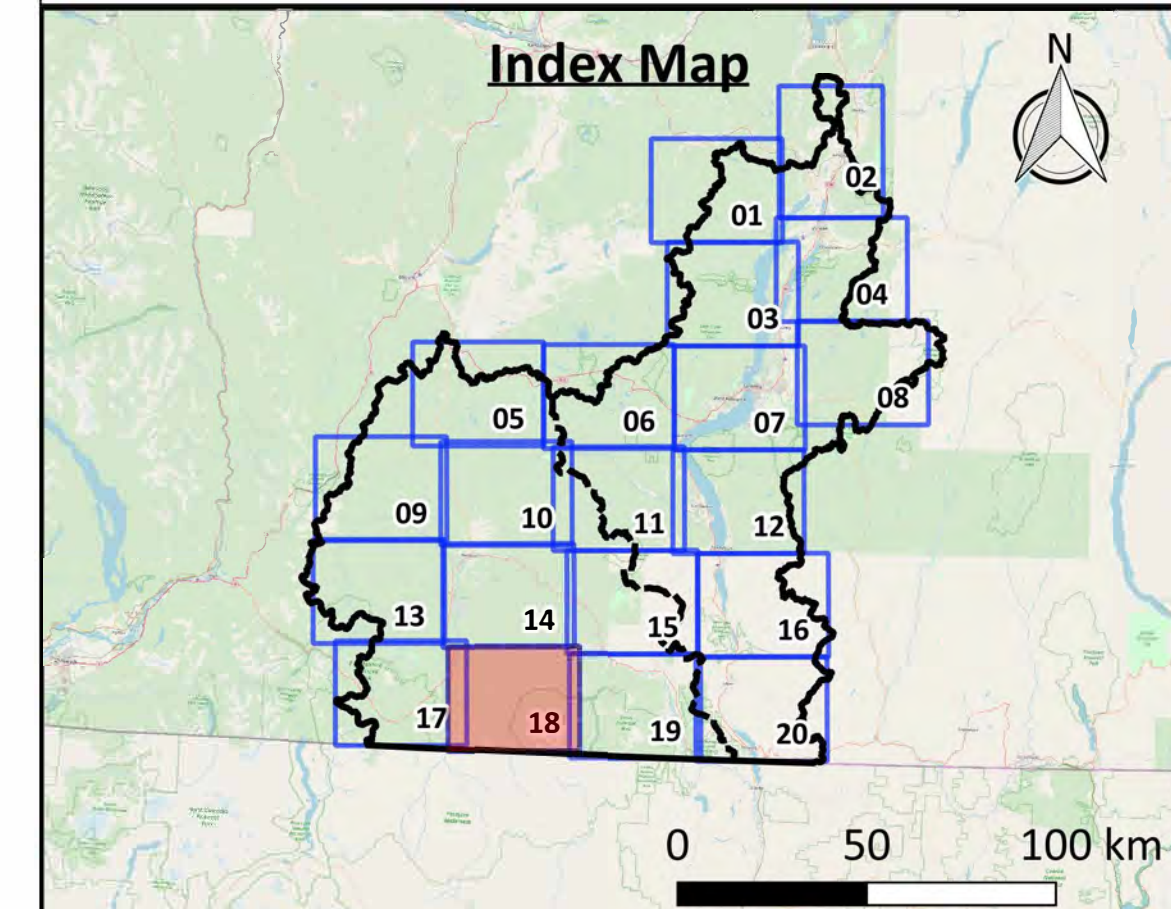
<b>Background</b>	<b>Affected Assets</b>
Watershed Boundary	Building Density
Canada - US Border	Affected Buildings
Reserves	
Building Footprints	
Lakes	
Watercourses	
Highway	
Major Road	
Okanagan - Similkameen Boundary	

Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**



**Zoom-In Map**



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[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

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**Scale 1:50,000**



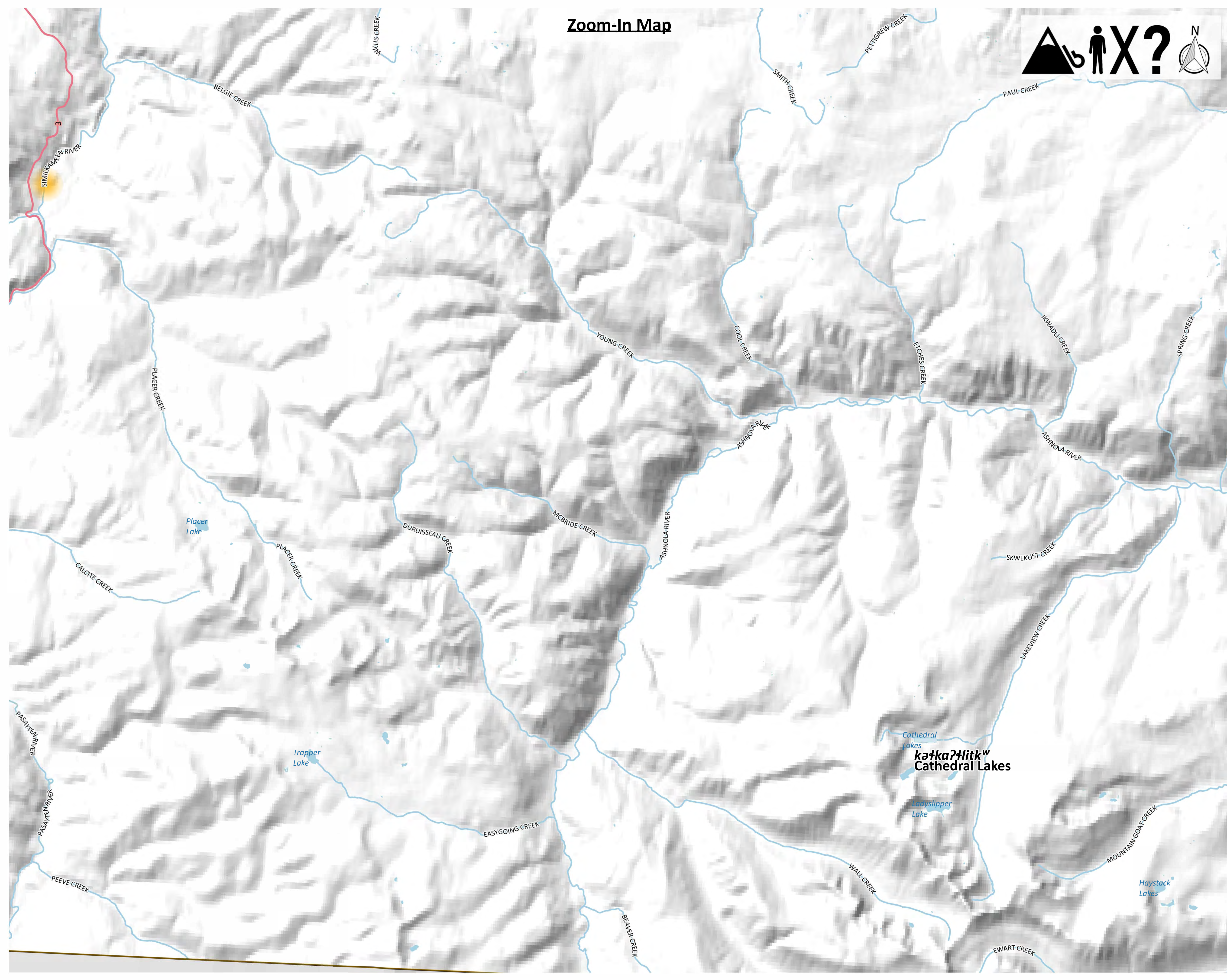
**Legend**

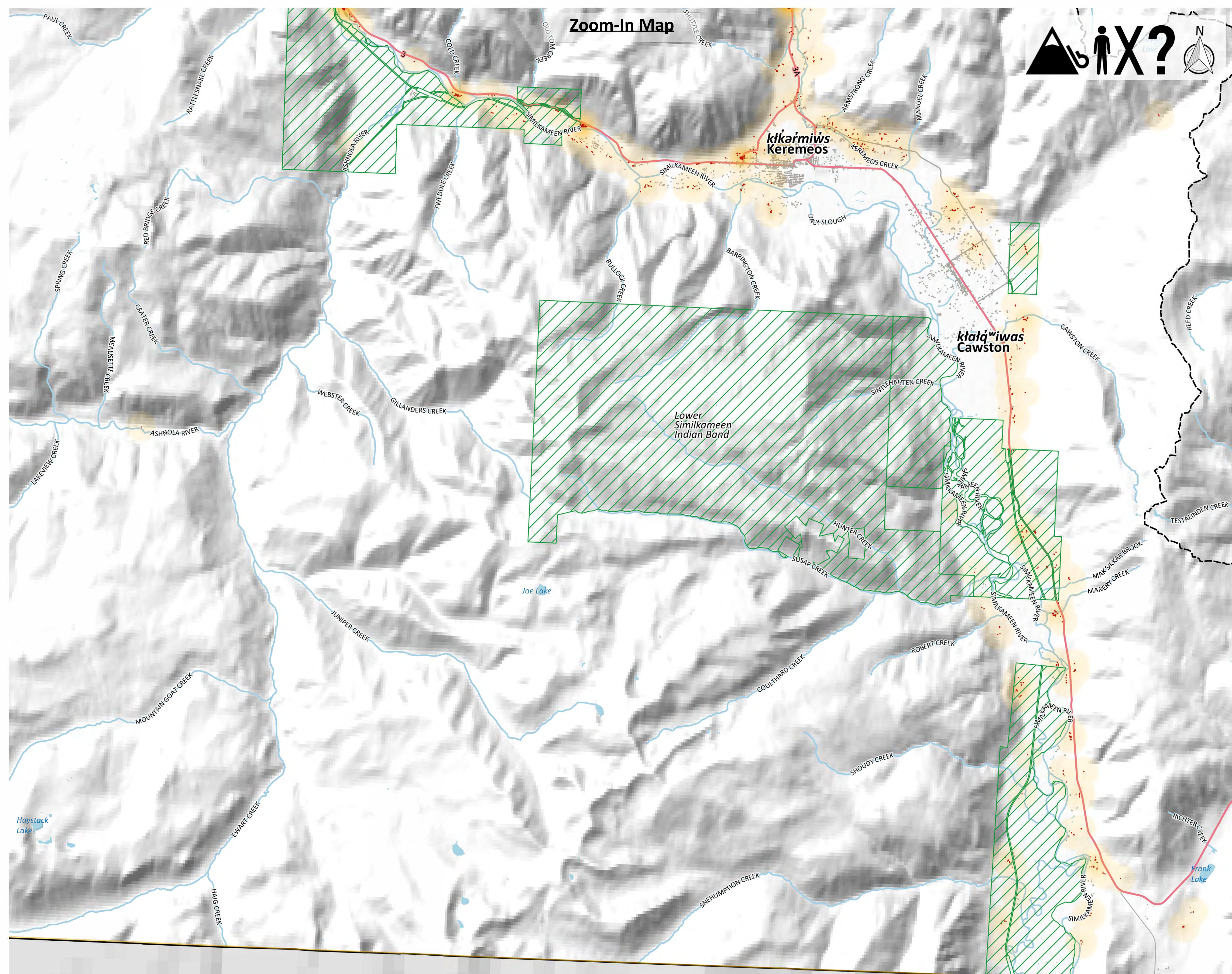
- |                                   |                        |
|-----------------------------------|------------------------|
| <b>Background</b>                 | <b>Affected Assets</b> |
| — Watershed Boundary              | 🔥 Building Density     |
| — Canada - US Border              | 🏠 Affected Buildings   |
| 🟩 Reserves                        |                        |
| 🏠 Building Footprints             |                        |
| 🟦 Lakes                           |                        |
| — Watercourses                    |                        |
| — Highway                         |                        |
| — Major Road                      |                        |
| — Okanagan - Similkameen Boundary |                        |

**Date:** 31 December 2019  
**Produced by:** Ebbwater Consulting Inc.

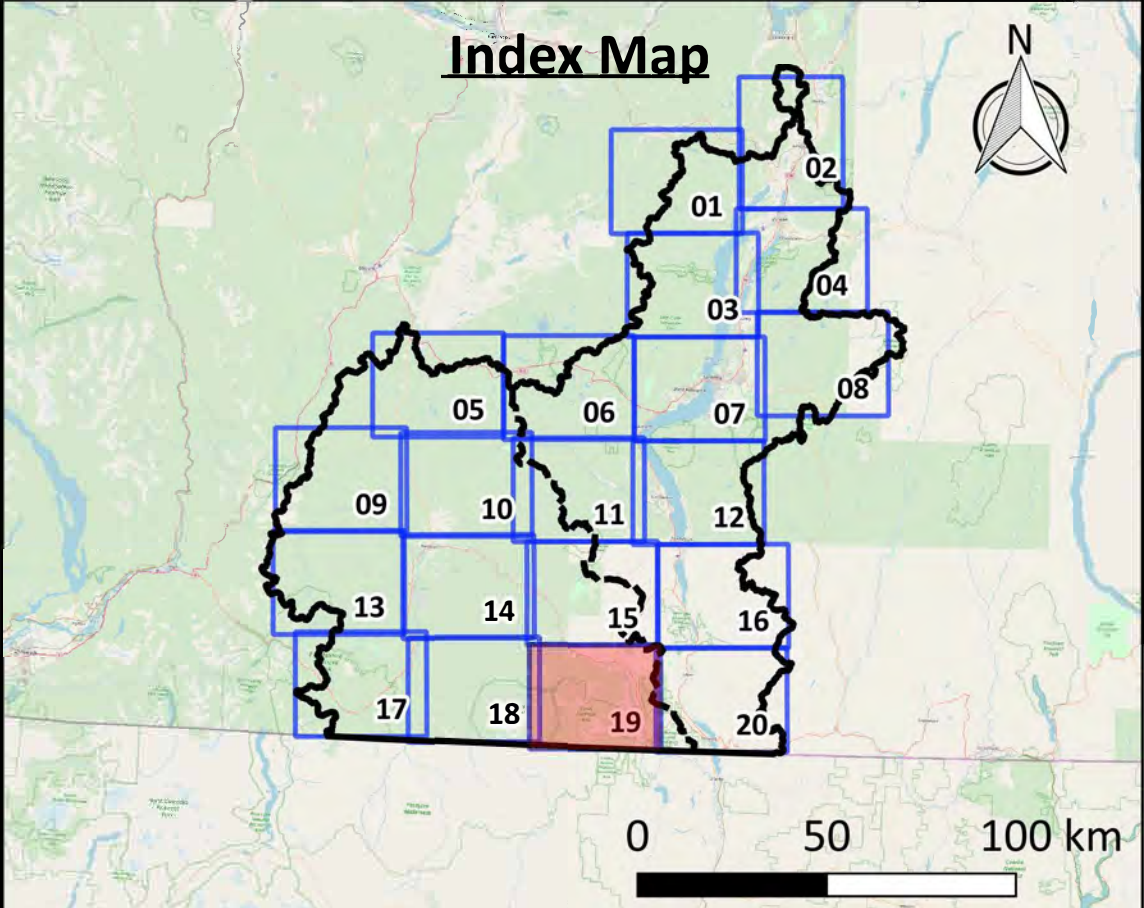
**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**

ANSI D - Map No. M-D-003-018





**Zoom-In Map**



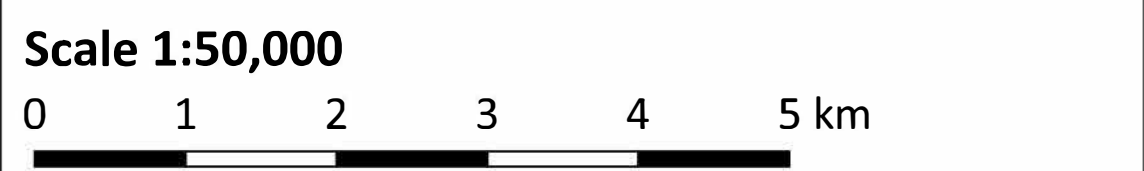
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[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

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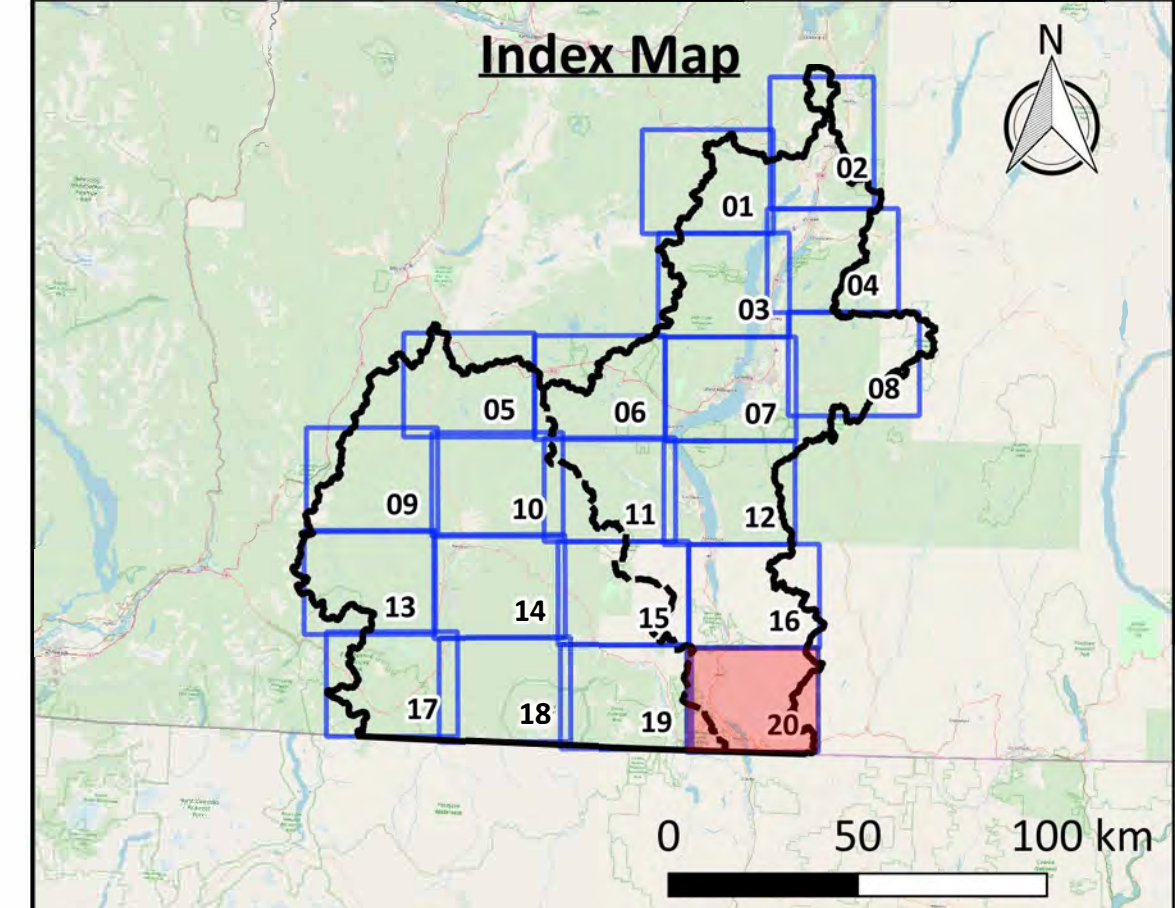
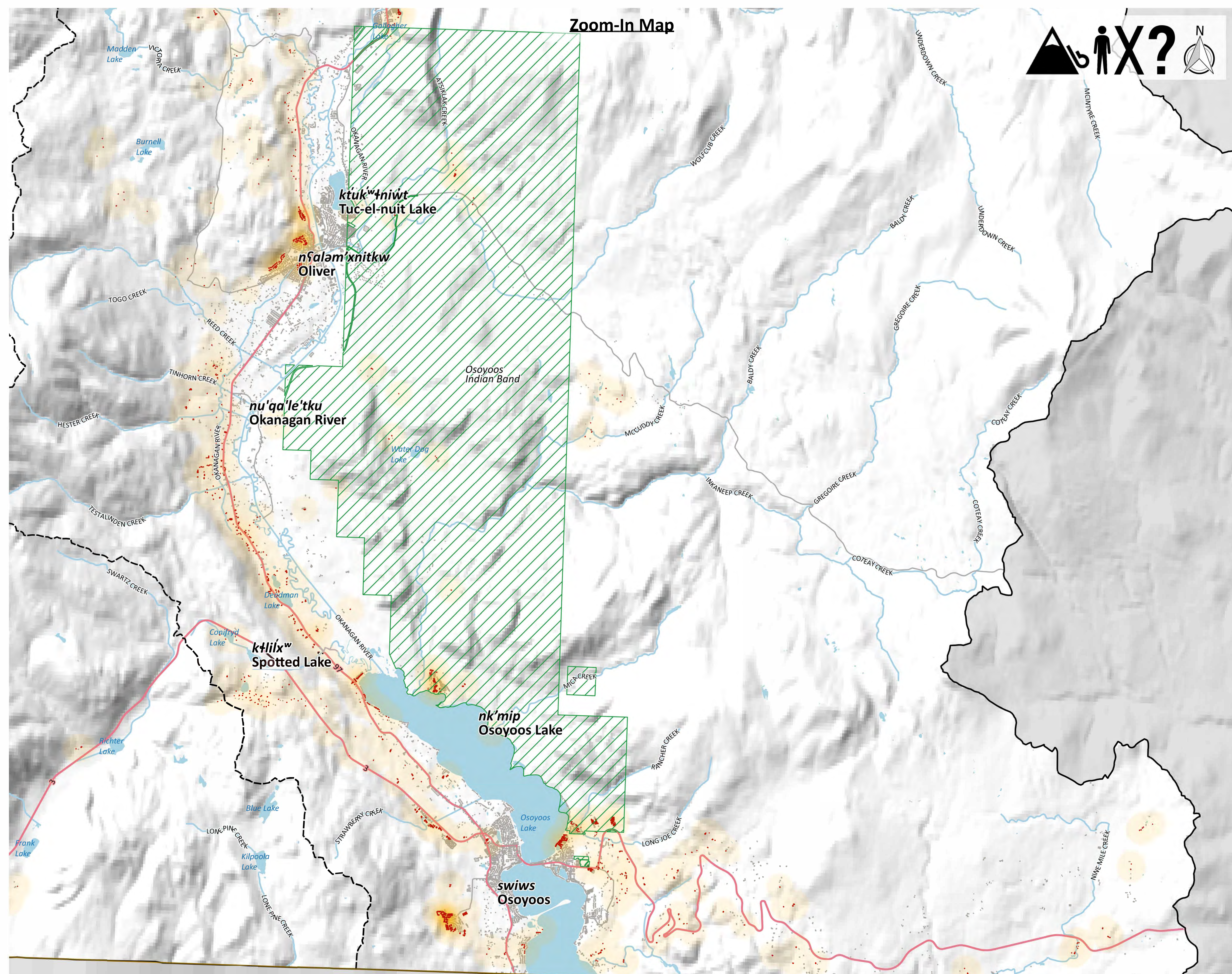
**Legend**

Watershed Boundary	Building Density
Canada - US Border	Affected Buildings
Reserves	
Building Footprints	
Lakes	
Watercourses	
Highway	
Major Road	
Okanagan - Similkameen Boundary	

Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

**Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**





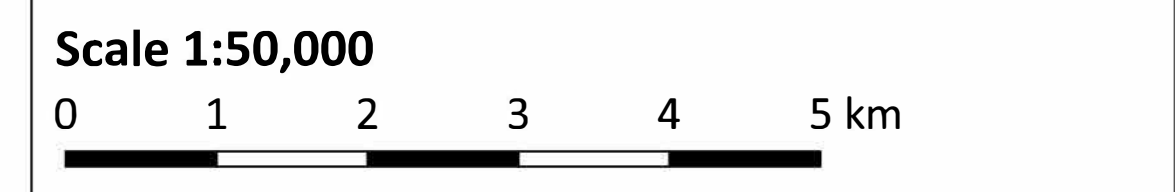
Click above map tile for Zoom-In map  
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[Click here to return to Okanagan map](#)  
[Click here to return to Similkameen map](#)

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**Legend**

<b>Background</b>	<b>Affected Assets</b>
— Watershed Boundary	🔴 Building Density
— Canada - US Border	🔴 Affected Buildings
🟩 Reserves	
🟤 Building Footprints	
🟦 Lakes	
🟦 Watercourses	
🟩 Highway	
— Major Road	
--- Okanagan - Similkameen Boundary	

Date: 31 December 2019  
 Produced by: Ebbwater Consulting Inc.

**Siylx (Okanagan) Flood and Debris Flow Risk Assessment Project**  
**Debris Flow - Missing and Mortality**

ANSI D - Map No. M-D-003-020