



Syilx Okanagan Flood and Debris Flow Risk Assessment Map Book

Map Series 2 of 7: Environment Indicator



31 December 2019



PALMER
ENVIRONMENTAL
CONSULTING
GROUP INC.



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IndigenEYEZ
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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.

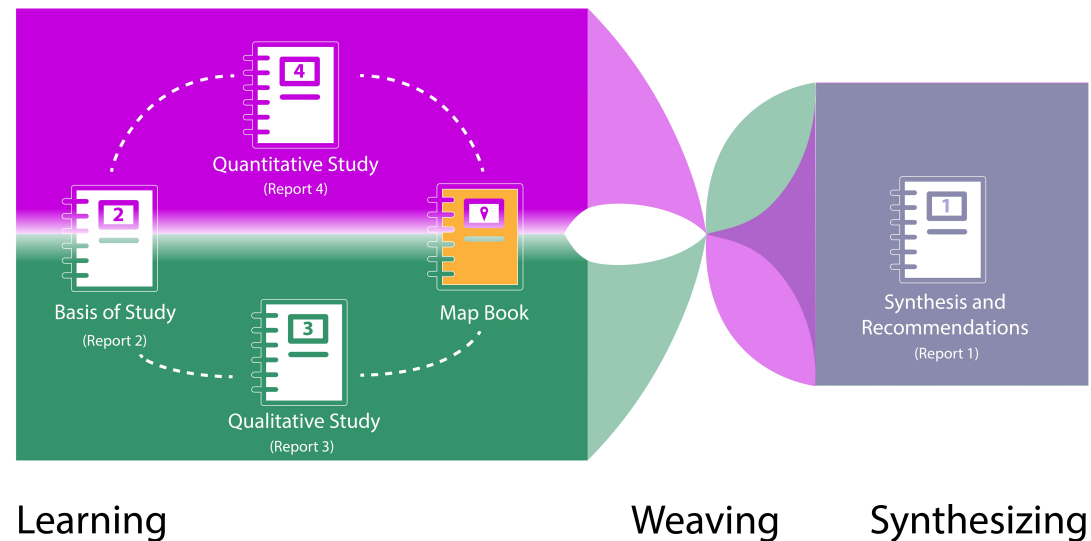


Figure 1: Project reporting diagram, with the Risk Assessment's four distinct outputs (i.e., Map Book, Basis of Study, and the complementary Qualitative and Quantitative studies).

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">• Debris Flow• Low, Moderate, and High Magnitude Flood |
| Series 2 | Environment Indicator | <ul style="list-style-type: none">• Qualitative (Impacts)• Quantitative (Consequences) |
| Series 3 | Culture Indicator | <ul style="list-style-type: none">• Qualitative (Impacts)• Quantitative (Consequences) |
| Series 4 | Mortality Indicator | <ul style="list-style-type: none">• Quantitative (Consequences) |
| Series 5 | Affected People Indicator | <ul style="list-style-type: none">• Qualitative (Impacts)• Quantitative (Consequences) |
| Series 6 | Economy Indicator | <ul style="list-style-type: none">• Qualitative (Impacts)• Quantitative (Consequences) |
| Series 7 | Disruption Indicator | <ul style="list-style-type: none">• Qualitative (Impacts)• Quantitative (Consequences) |

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 maps on pages 12 and 37.
- Hyperlinked Map index on page 7.

Notes to User

Qualitative

1. Impacts were recorded primarily in Workshop 1 in West Kelowna on 13 February 2019 and Workshop 2 on 25 April 2019. Impacts were also recorded based on input obtained from learning sessions, watershed tours, personal communications and electronic feedback.
2. Methodologies and impacts are discussed further in the Qualitative Study which accompanies this Map Book.

Data Sources

1. Lakes, Watercourses, Roads, and Trails: BC Data Catalogue.
2. *Sylix* Place Names: Okanagan Nation Alliance.
3. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

Quantitative











1. Affected assets have been defined in terms of contamination sources (e.g. industrial sites, transport facilities, and septic tanks and sewer systems) and environmental receptors (i.e. fish observations, drinking water wells, and high biodiversity areas).
2. Potential contamination sources were clipped to the moderate flood or 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.
3. Drinking water wells and fish observations are represented by circles of a 1 km radius. These receptors, along with high biodiversity areas were considered “contaminated” where they were within a 2 km radius of a potential contaminant source.

Data Sources

1. Lakes and Watercourses: BC Data Catalogue.
2. Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
3. Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
4. *Sylix* Place Names: Okanagan Nation Alliance.
5. Icons: The Noun Project

6. Base Layer: OpenStreetMap data – 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

Qualitative Maps

| | |
|--------------|--|
| EN-Q-001-001 | Qualitative Impacts - Environment - Project Area Map |
| EN-Q-001-002 | Qualitative Impacts - Environment - Okanagan Map |
| EN-Q-001-003 | Qualitative Impacts - Environment - Similkameen Map |

Quantitative Maps

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

| | |
|--------------|--|
| EN-D-001-001 | Debris Flow - Environment - Sub-watershed Index |
| EN-D-002-001 | Debris Flow - Environment - Quantitative Project Area Map |
| EN-D-002-002 | Debris Flow - Environment - Quantitative Okanagan Map |
| EN-D-002-003 | Debris Flow - Environment - Quantitative Similkameen Map |
| EN-D-003-001 | Debris Flow - Environment - Quantitative Map Tile 1 of 20 |
| EN-D-003-002 | Debris Flow - Environment - Quantitative Map Tile 2 of 20 |
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| EN-D-003-020 | Debris Flow - Environment - Quantitative Map Tile 20 of 20 |

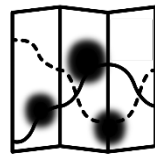
Syilx Okanagan Flood and Debris Flow Risk Assessment

Map Book

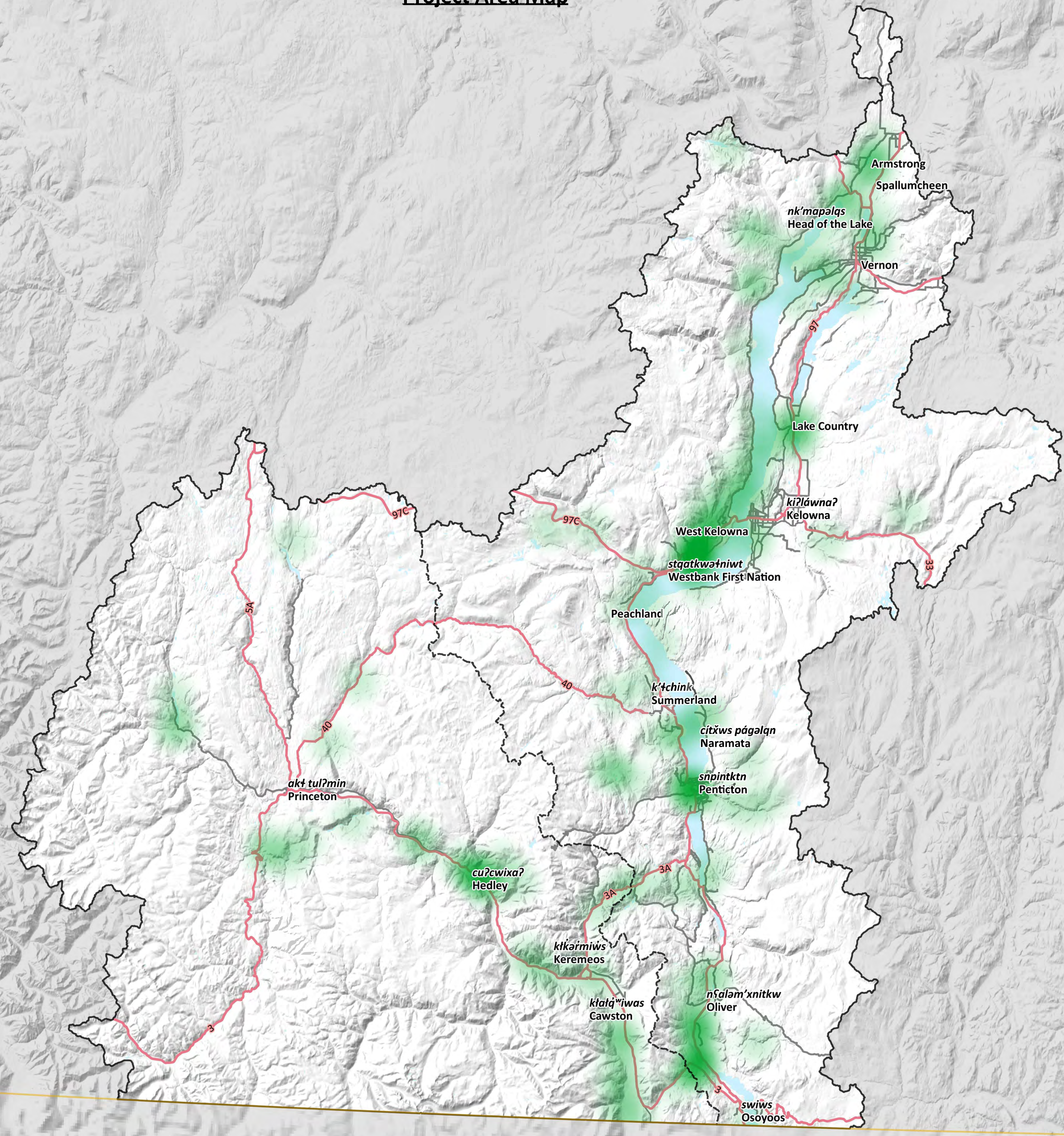
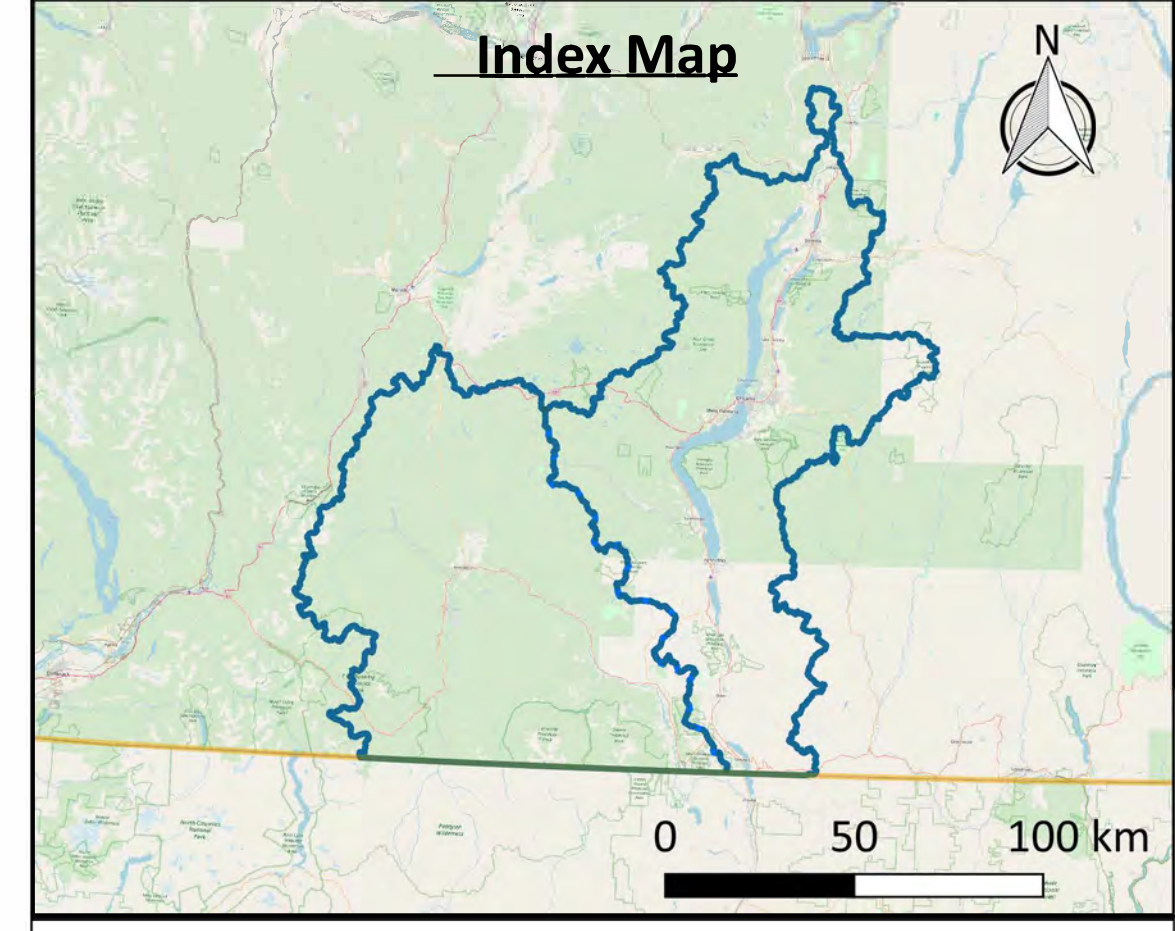
Map Series 2 of 7: Environment Indicator



Qualitative Flood and Debris Flow Impact Maps



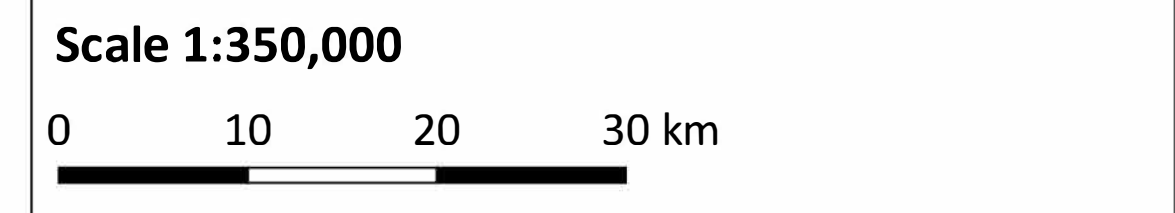
Project Area Map



Click watershed above for watershed map or
[Click here to go to Okanagan Map](#)
[Click here to go to Similkameen Map](#)

Map Notes
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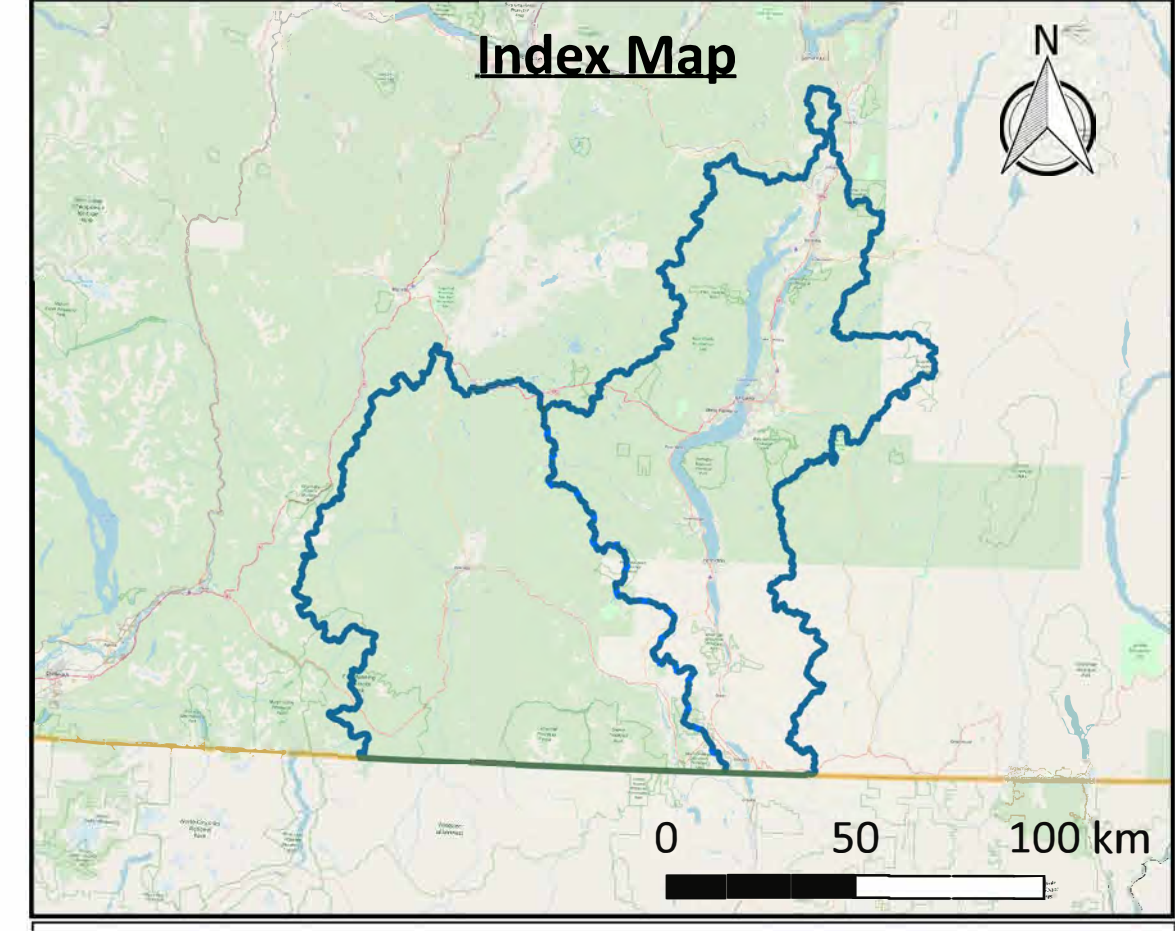
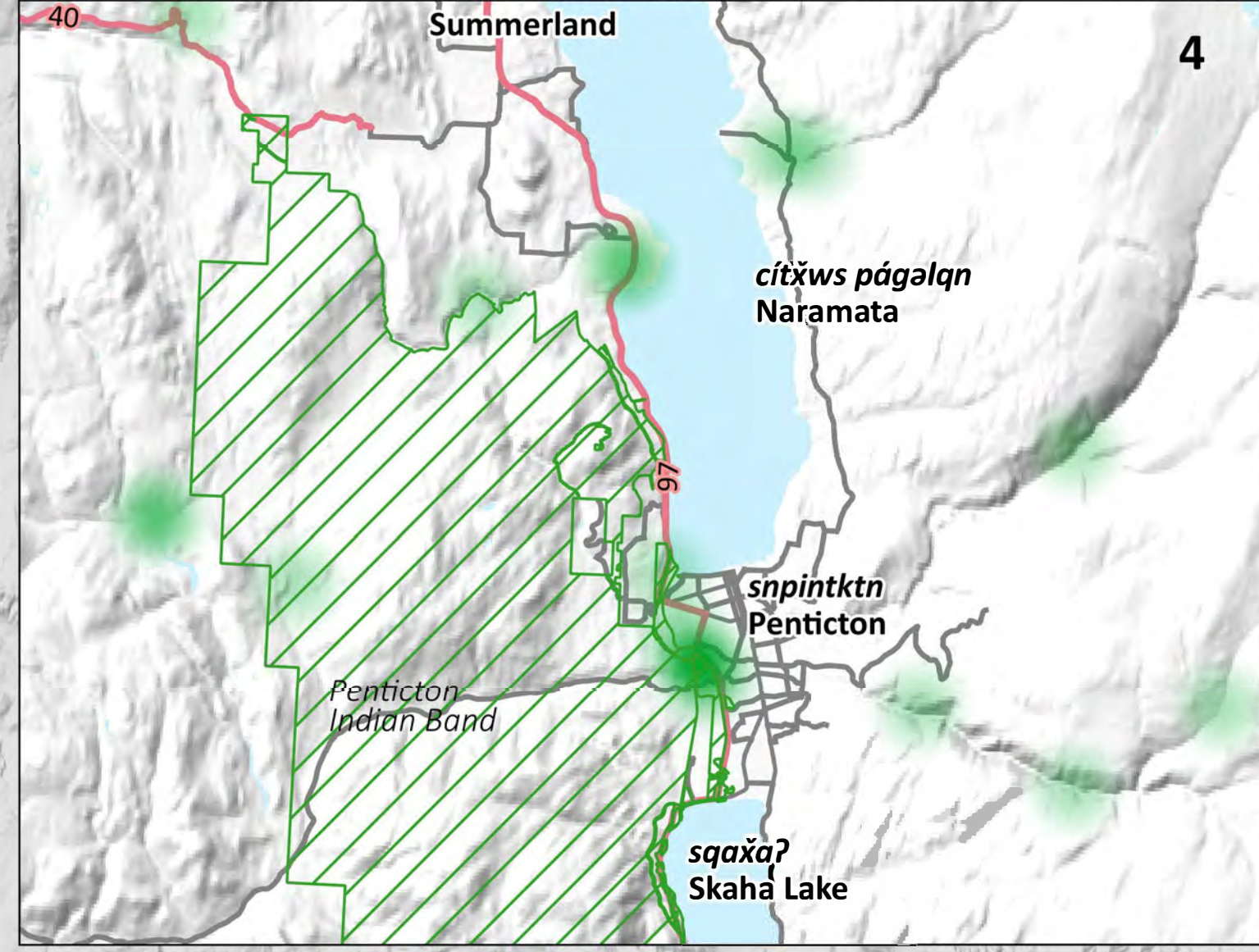
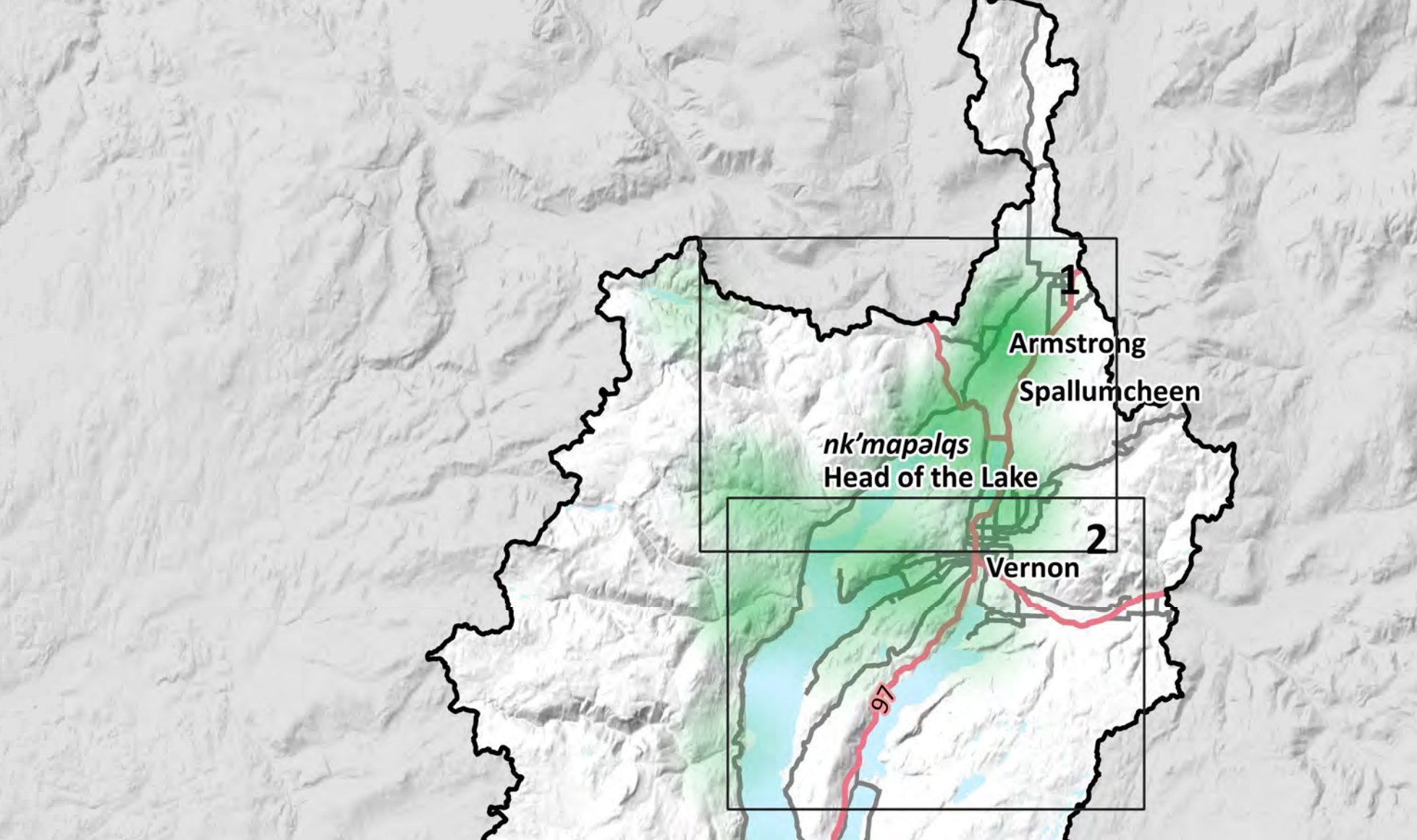
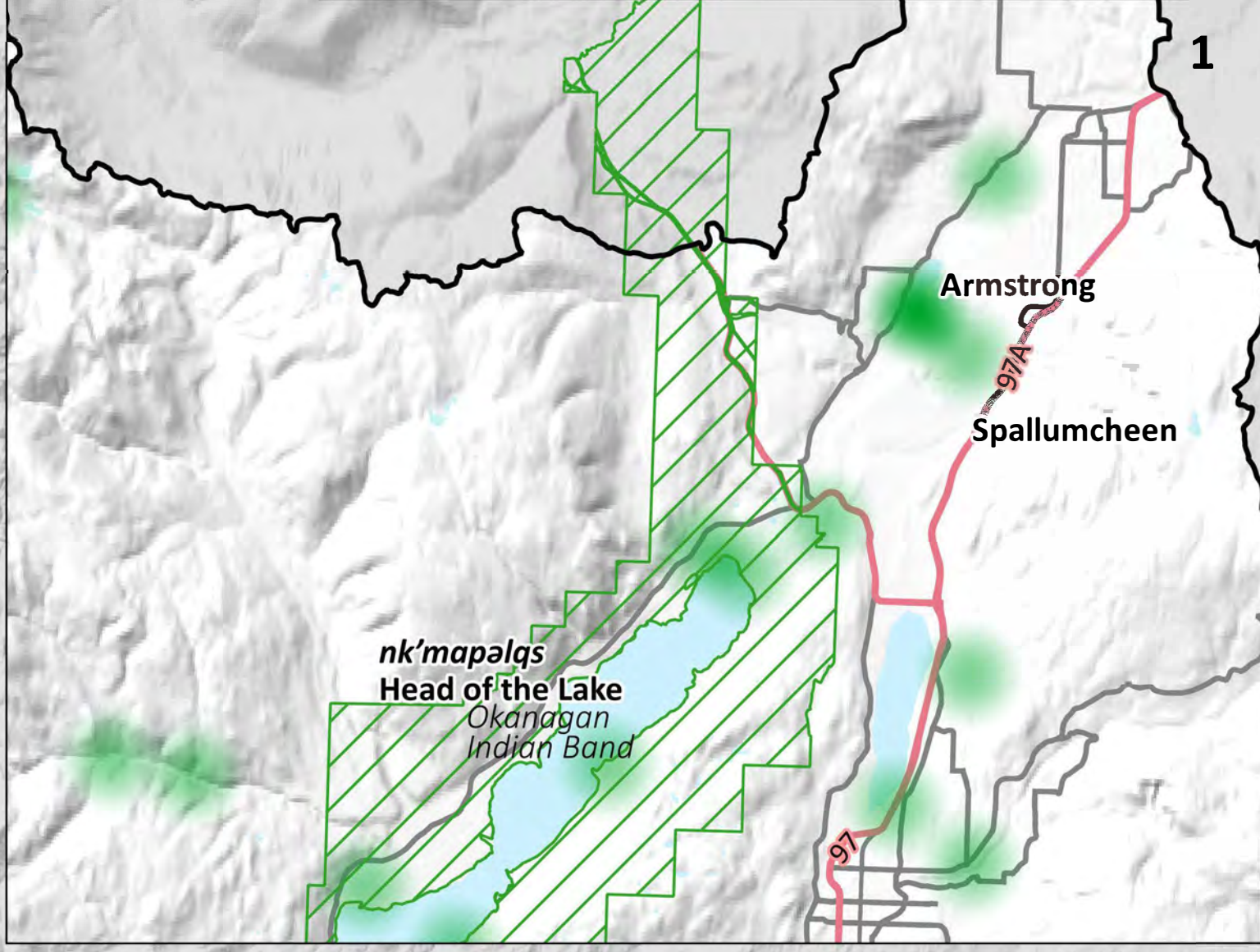
Legend

| | |
|-------------------------------|---------------------|
| Watershed Boundary | Environment Impacts |
| Canada - US Border | |
| Lakes | |
| Watercourses | |
| Highway | |
| Major Road | |
| Okanagan-Similkameen Boundary | |

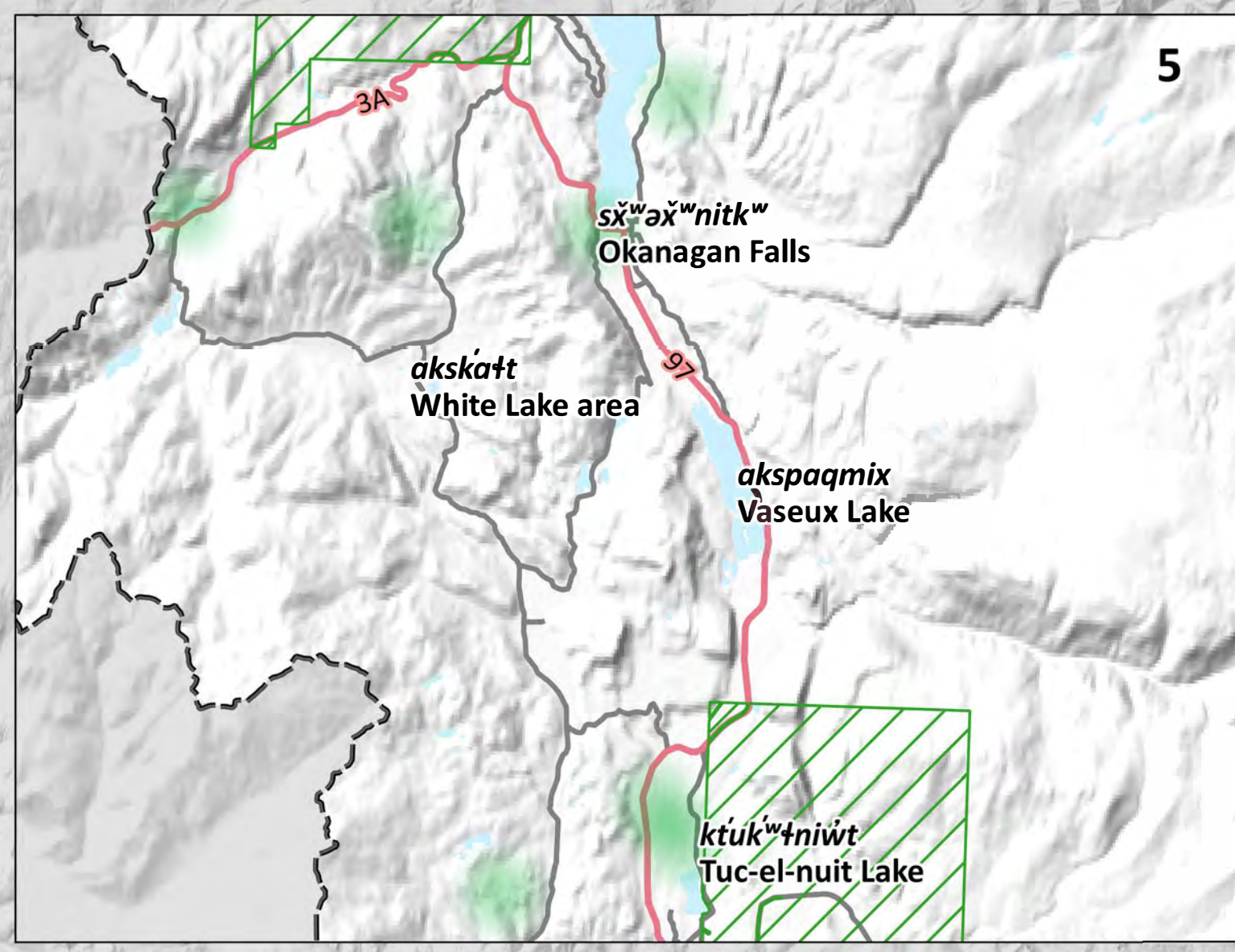
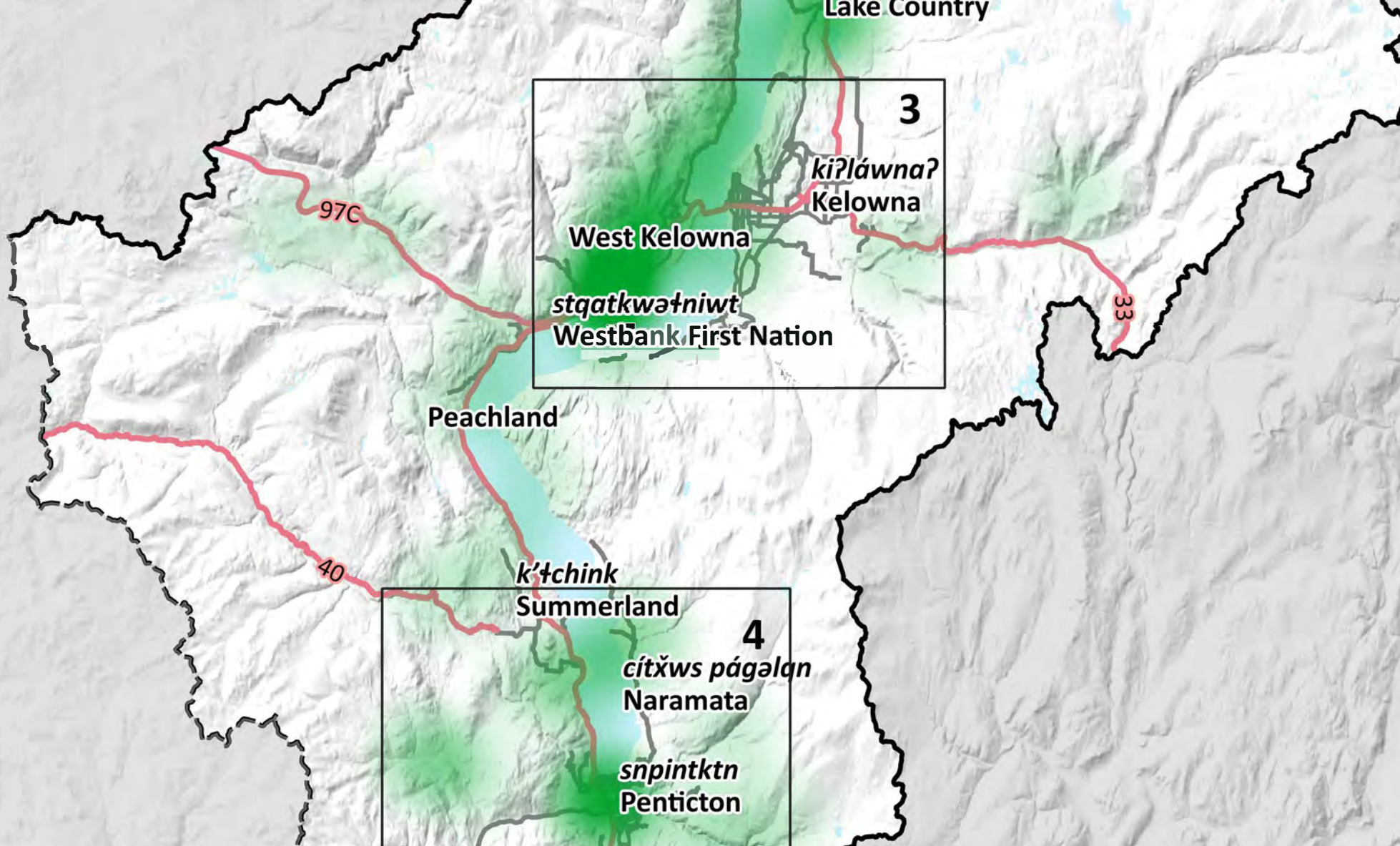
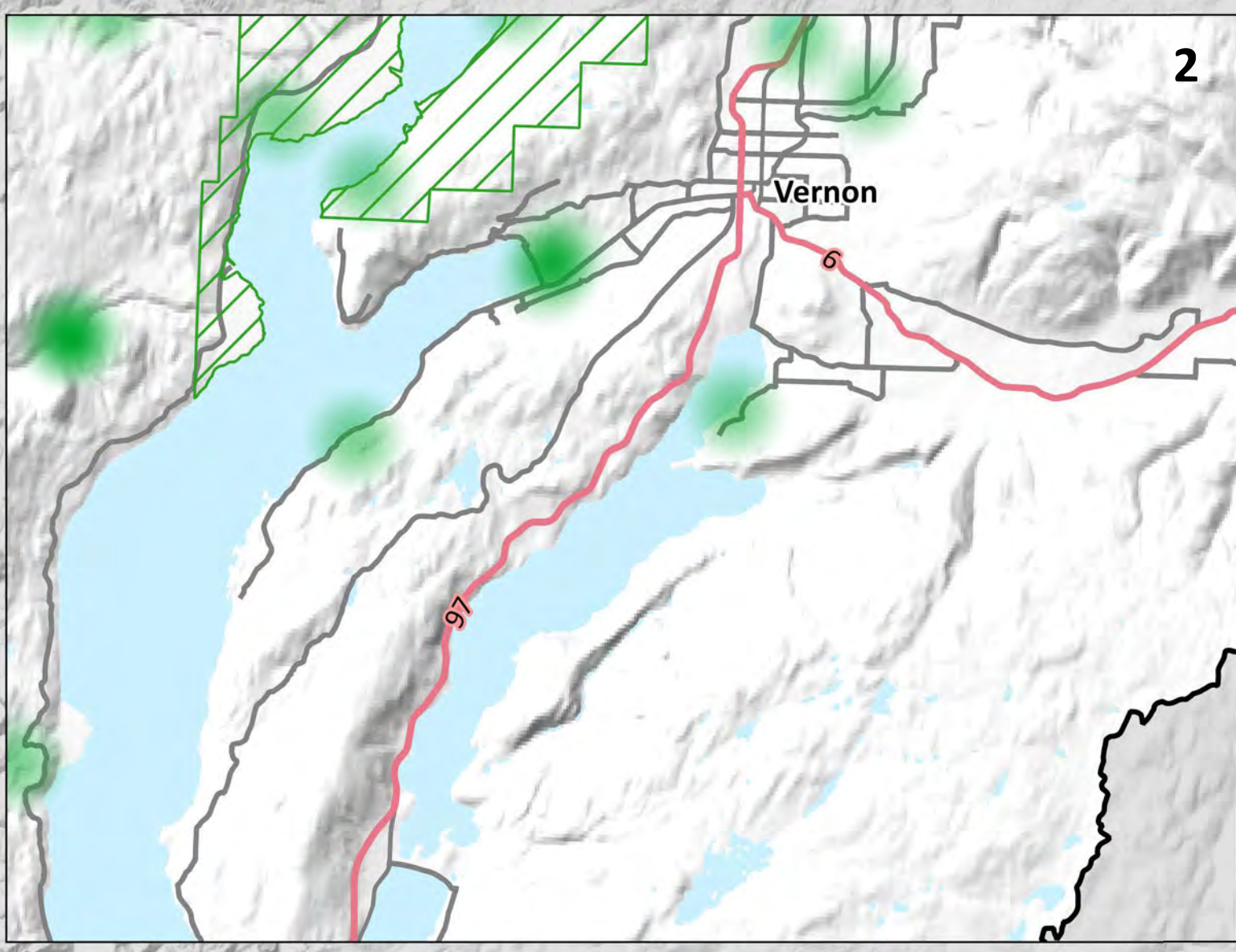
Date: 31 December 2019
Produced by: Ebbwater Consulting Inc.

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Qualitative Impacts - Environment - Project Area

Okanagan Map



Click watershed above for watershed map or
[Click here to go to Project Area Map](#)
[Click here to go to Similkameen Map](#)



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Scale

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

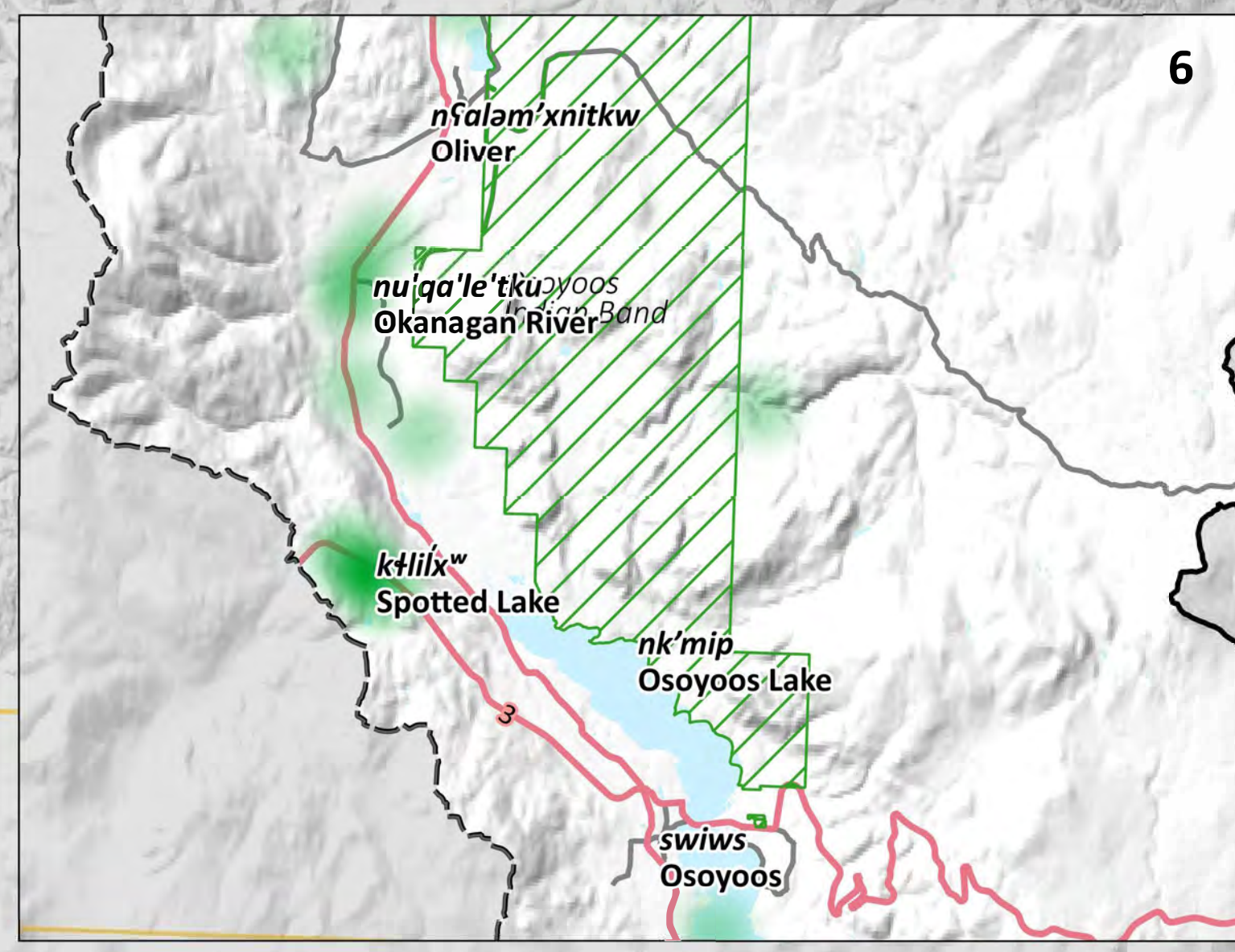
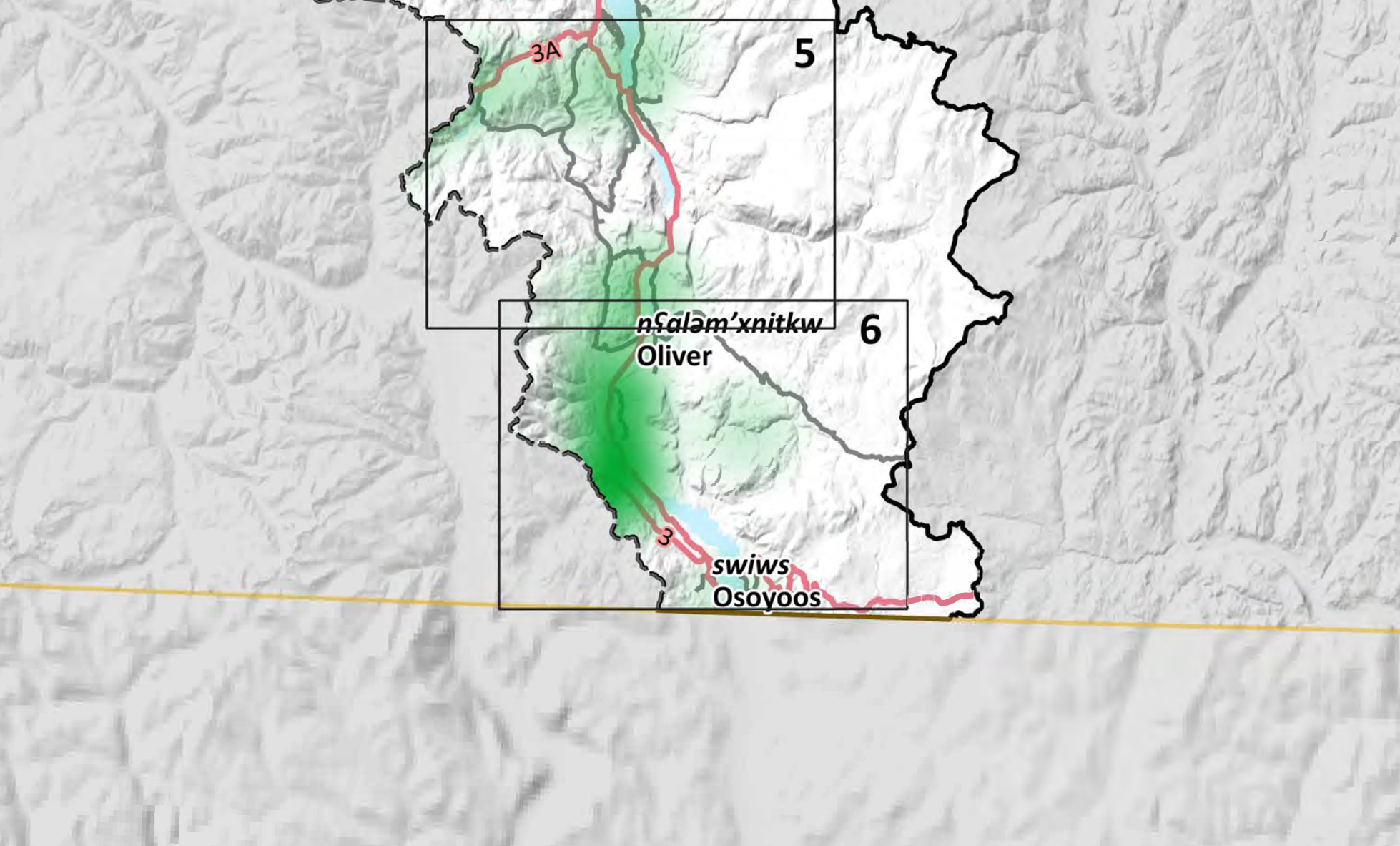
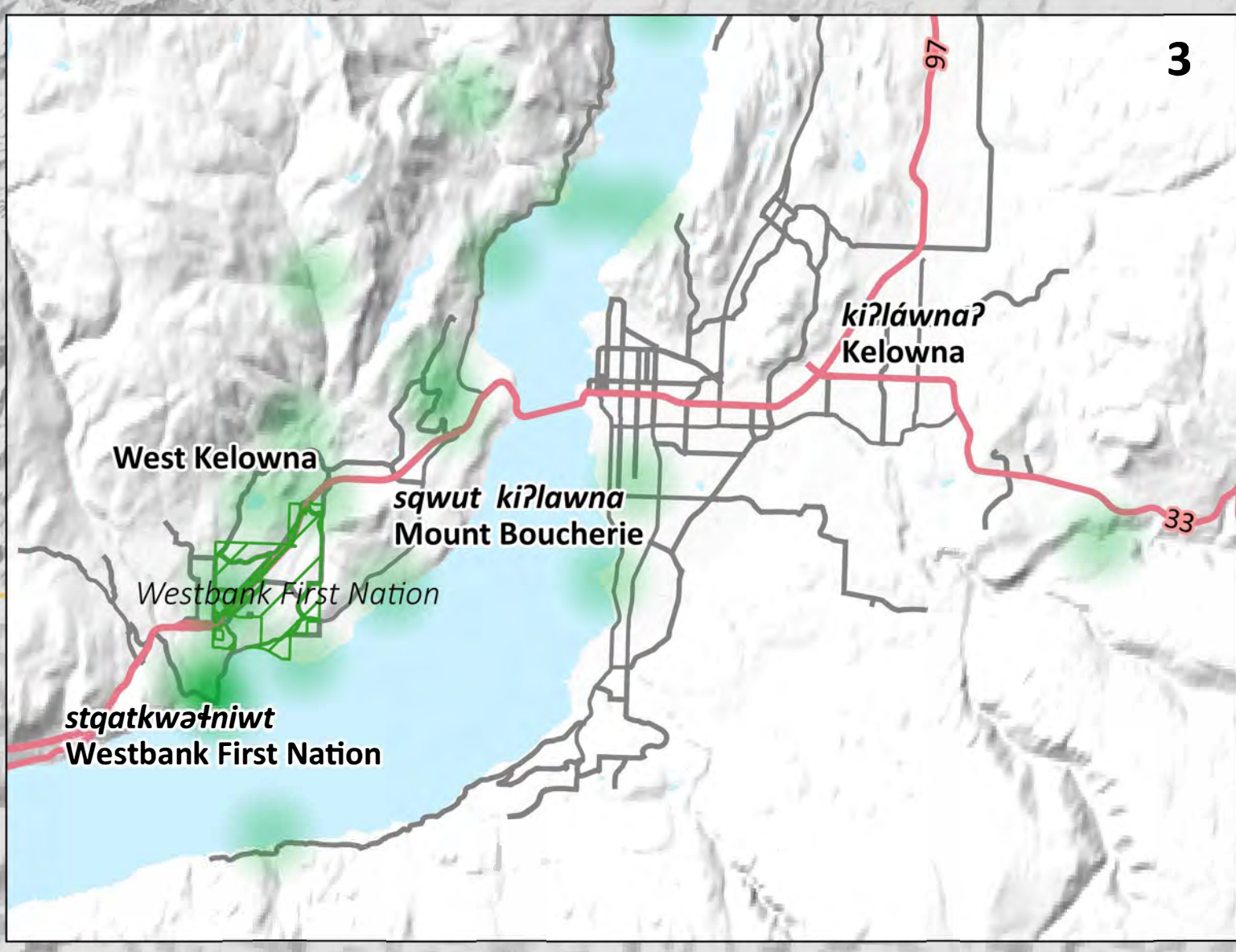
Inset Maps 1:150,000
0 5 10 15 km

Legend

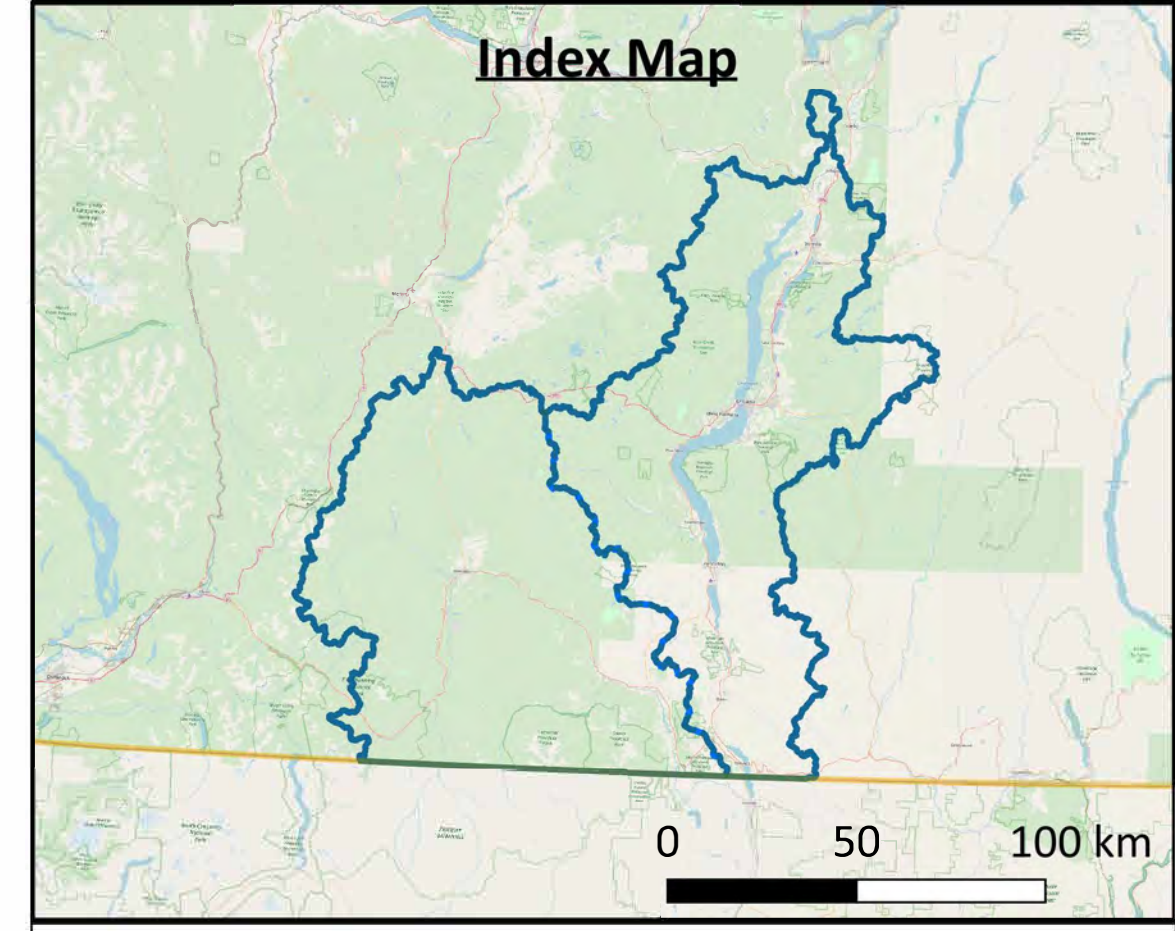
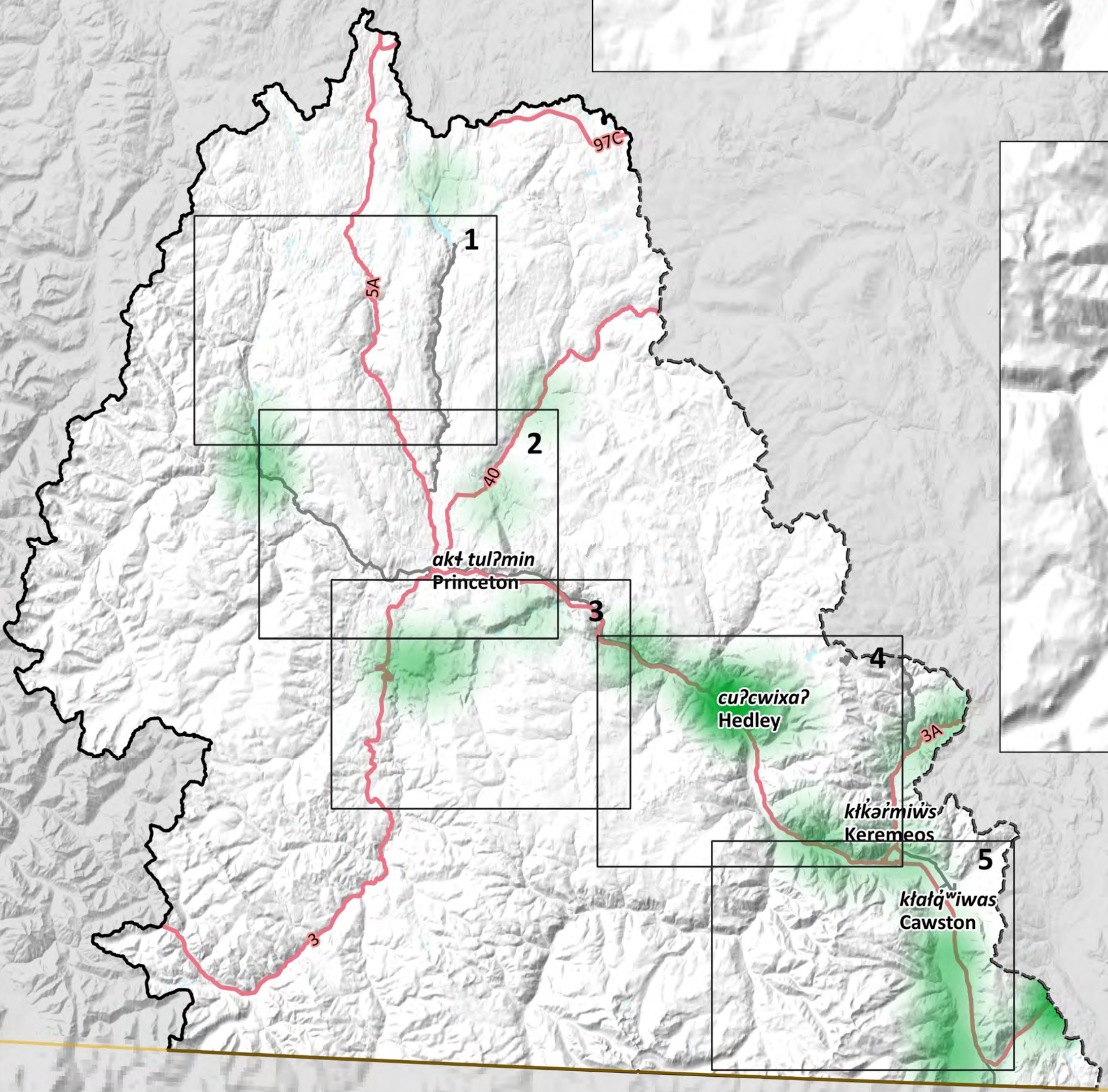
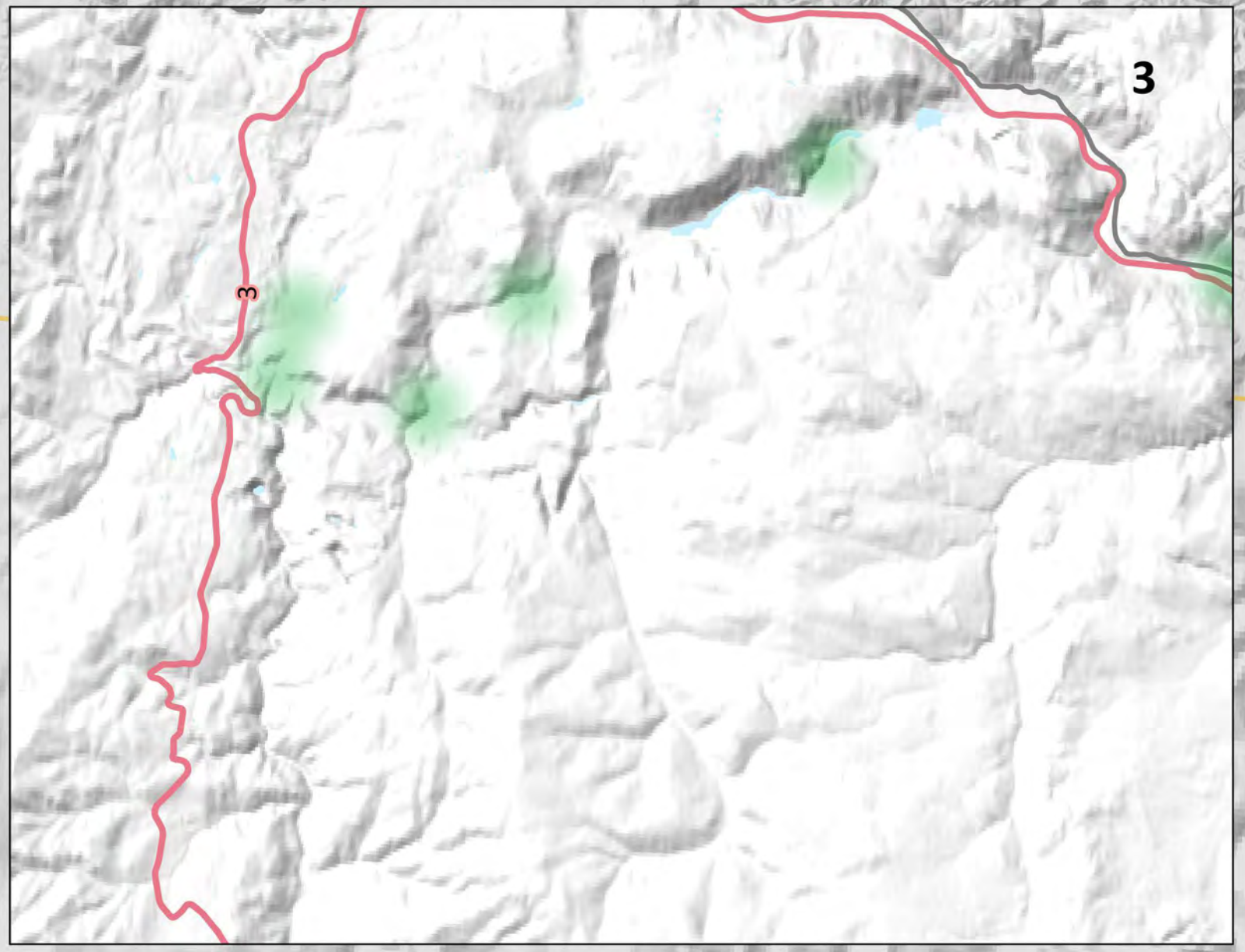
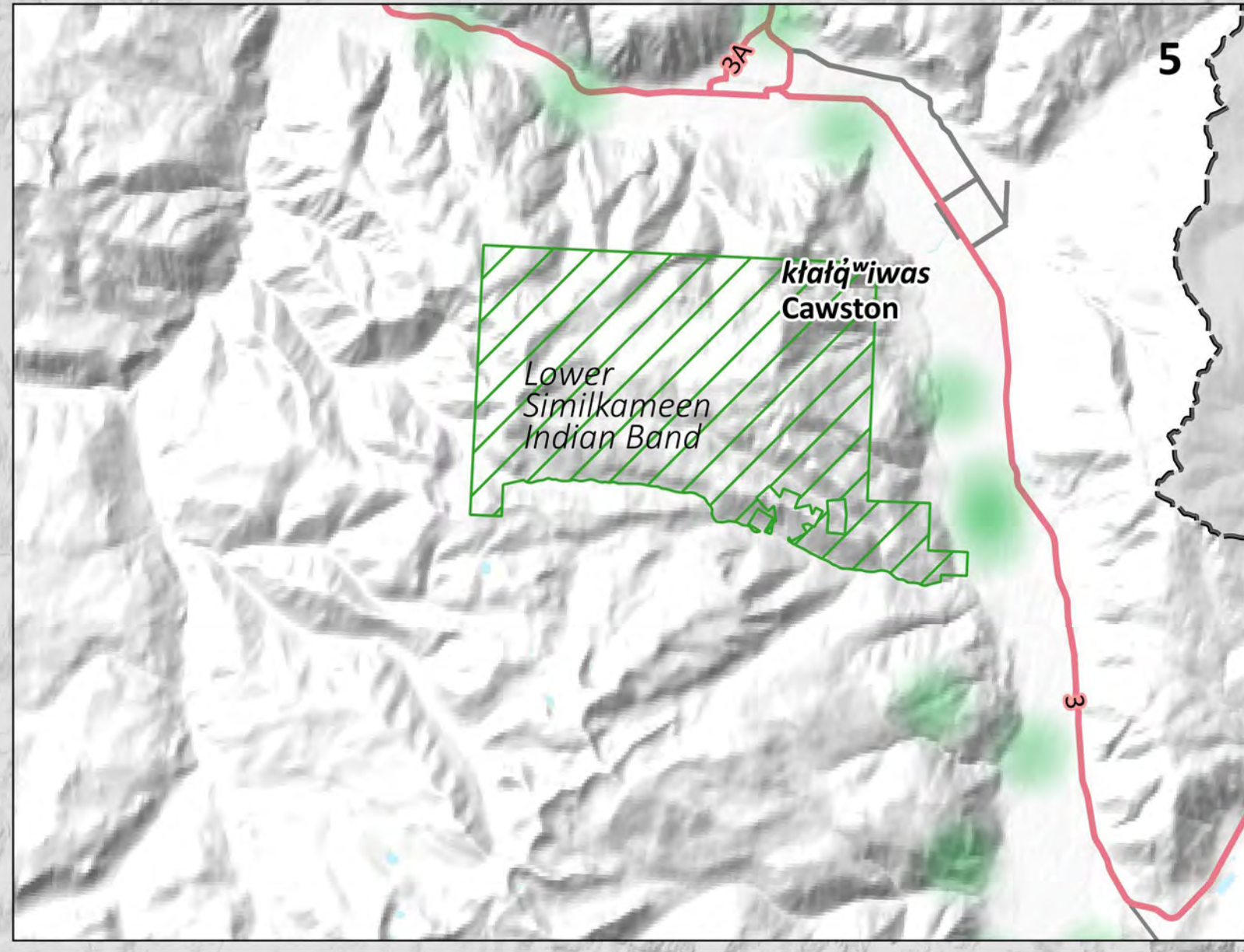
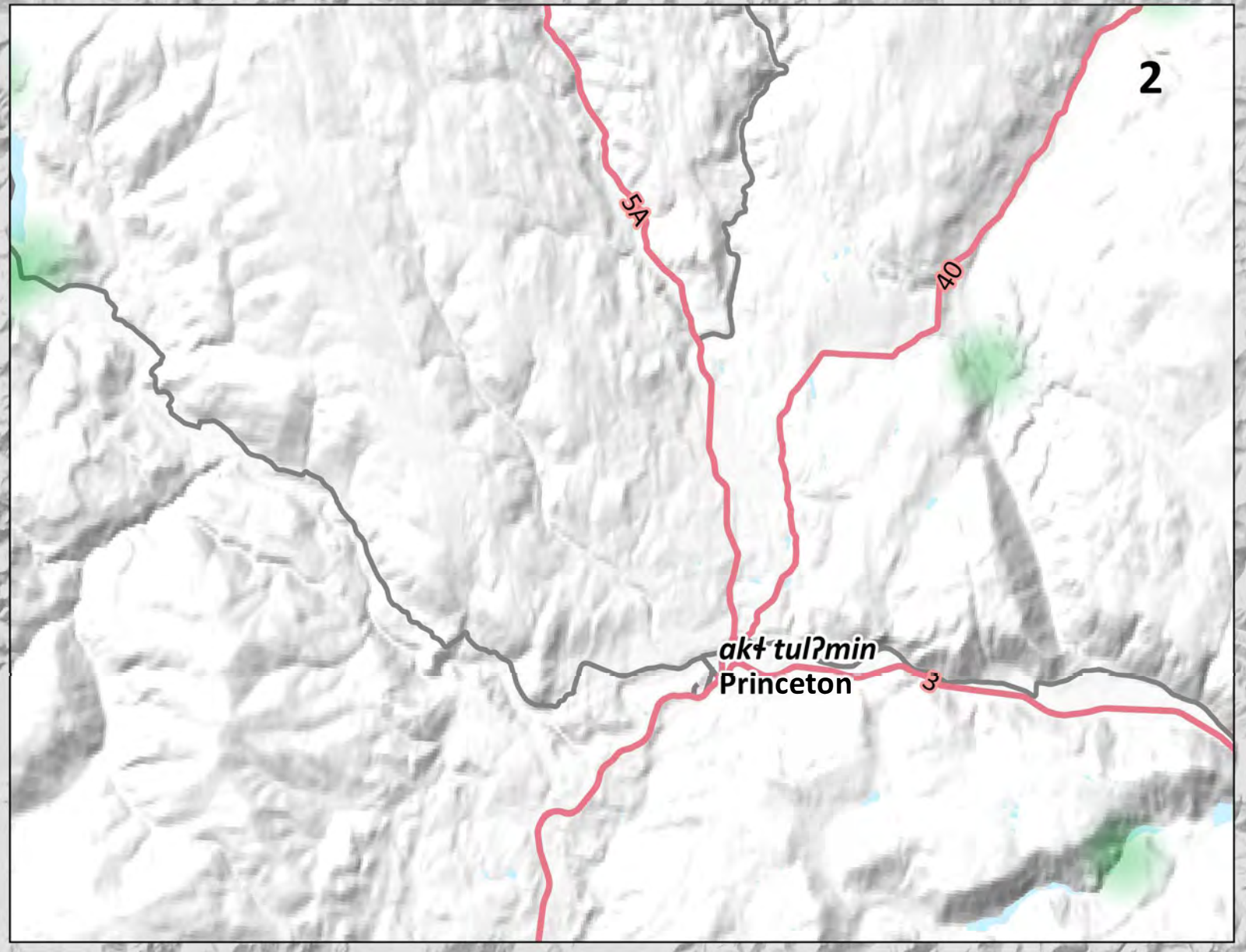
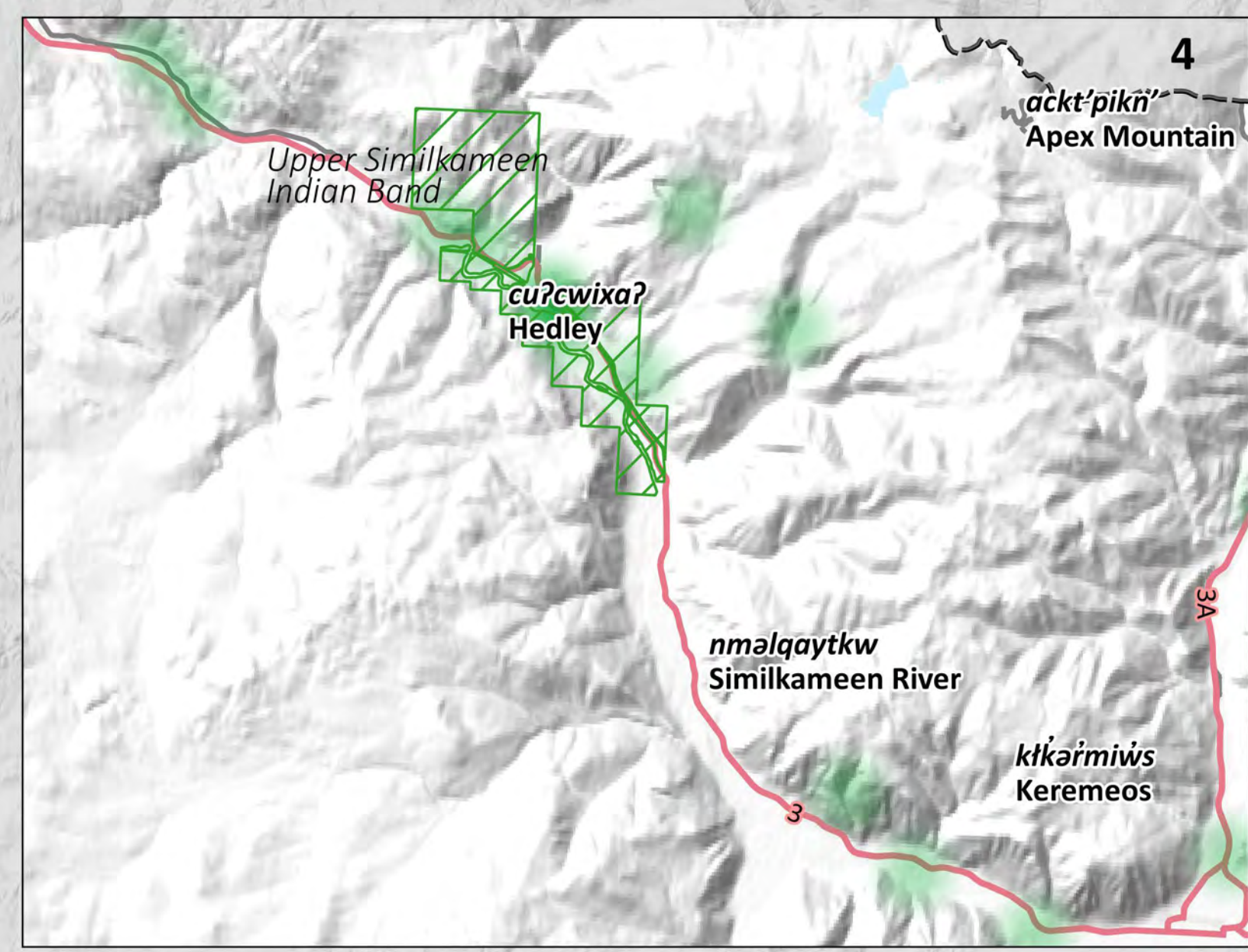
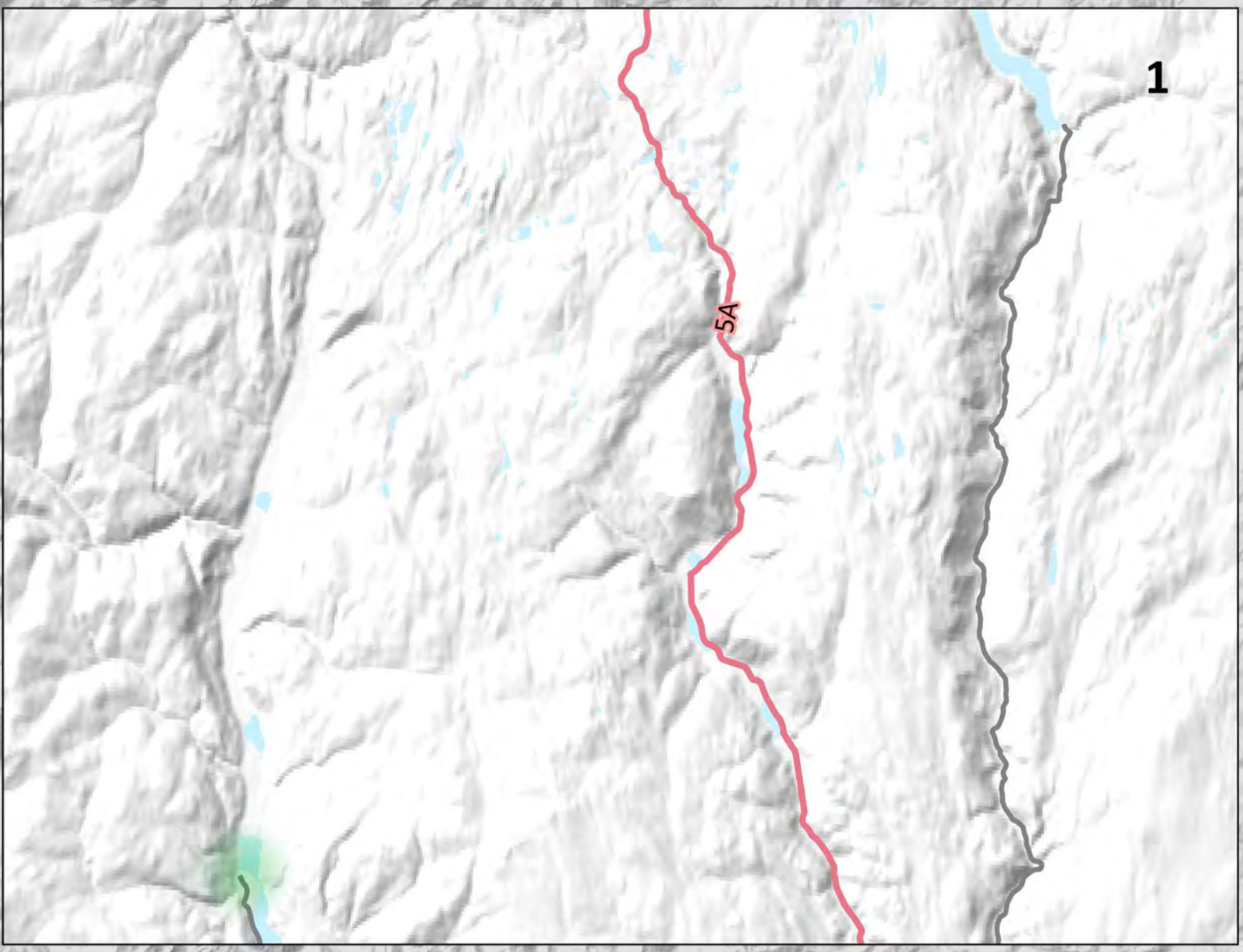
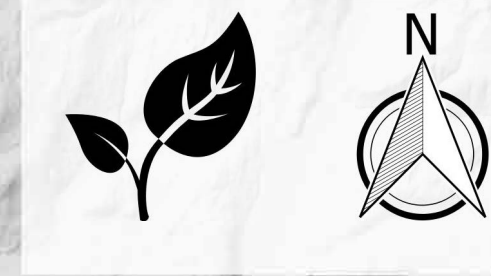
- Background
- Watershed Boundary
- Canada - US Border
- Lakes
- Watercourses
- Highway
- Major Road
- Reserves
- Okanagan-Similkameen Boundary
- Environment Impacts

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

Siylx (Okanagan) Flood and Debris Flow Risk Assessment Project
Qualitative Impacts - Environment - Okanagan



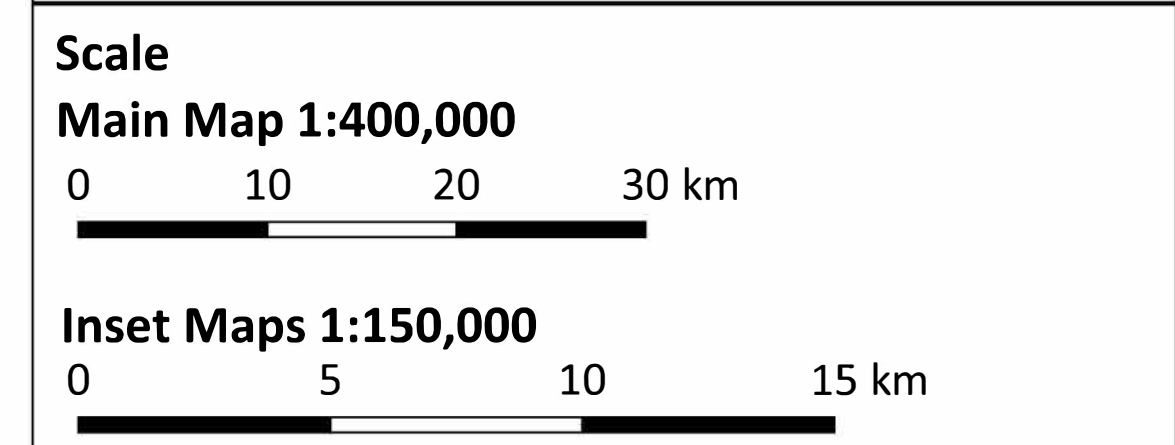
Similkameen Map



Click watershed above for watershed map or
[Click here to go to Project Area Map](#)
[Click here to go to Okanagan Map](#)

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Legend

| |
|-------------------------------|
| Environment Impacts |
| Watershed Boundary |
| Canada - US Border |
| Lakes |
| Watercourses |
| Highway |
| Major Road |
| Reserves |
| Okanagan-Similkameen Boundary |

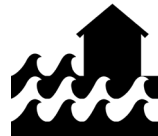
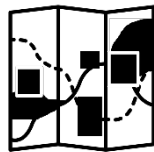
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Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Qualitative Impacts - Environment - Similkameen

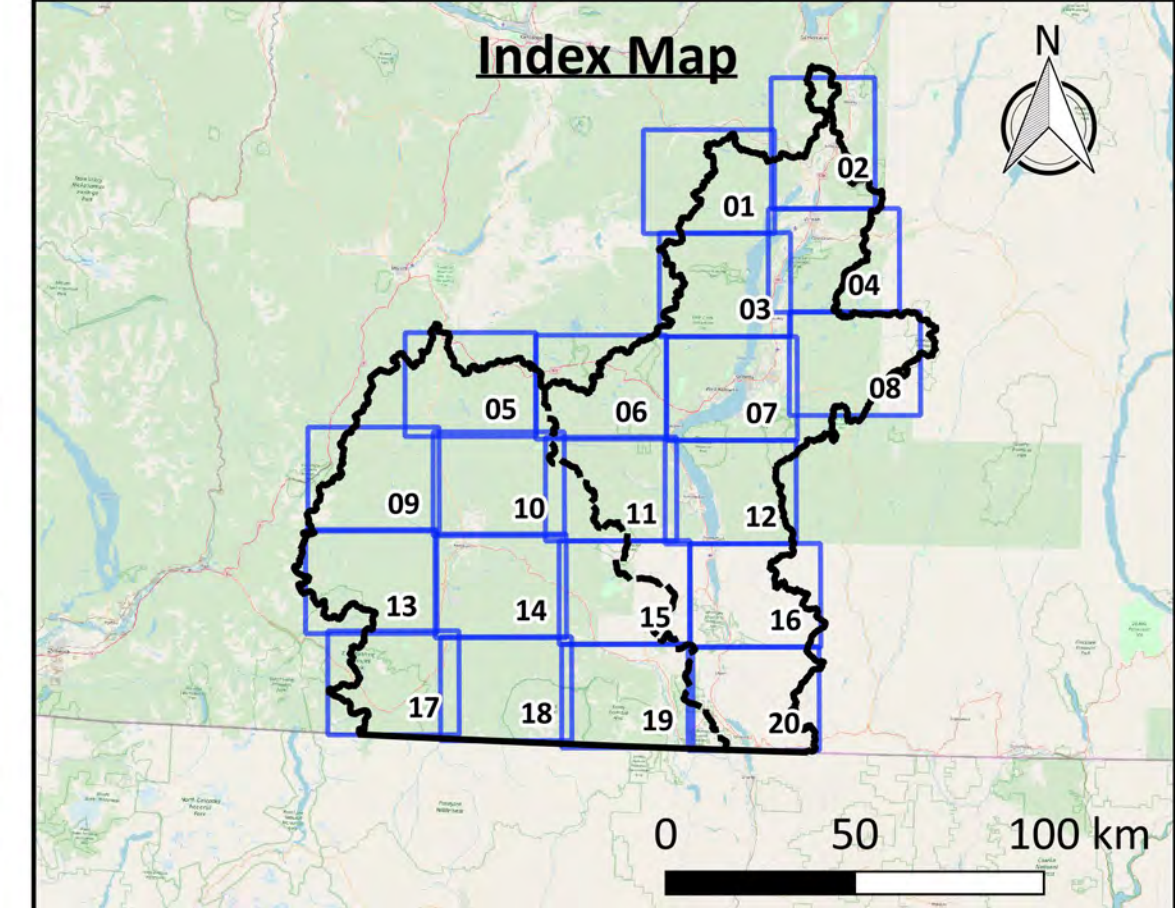
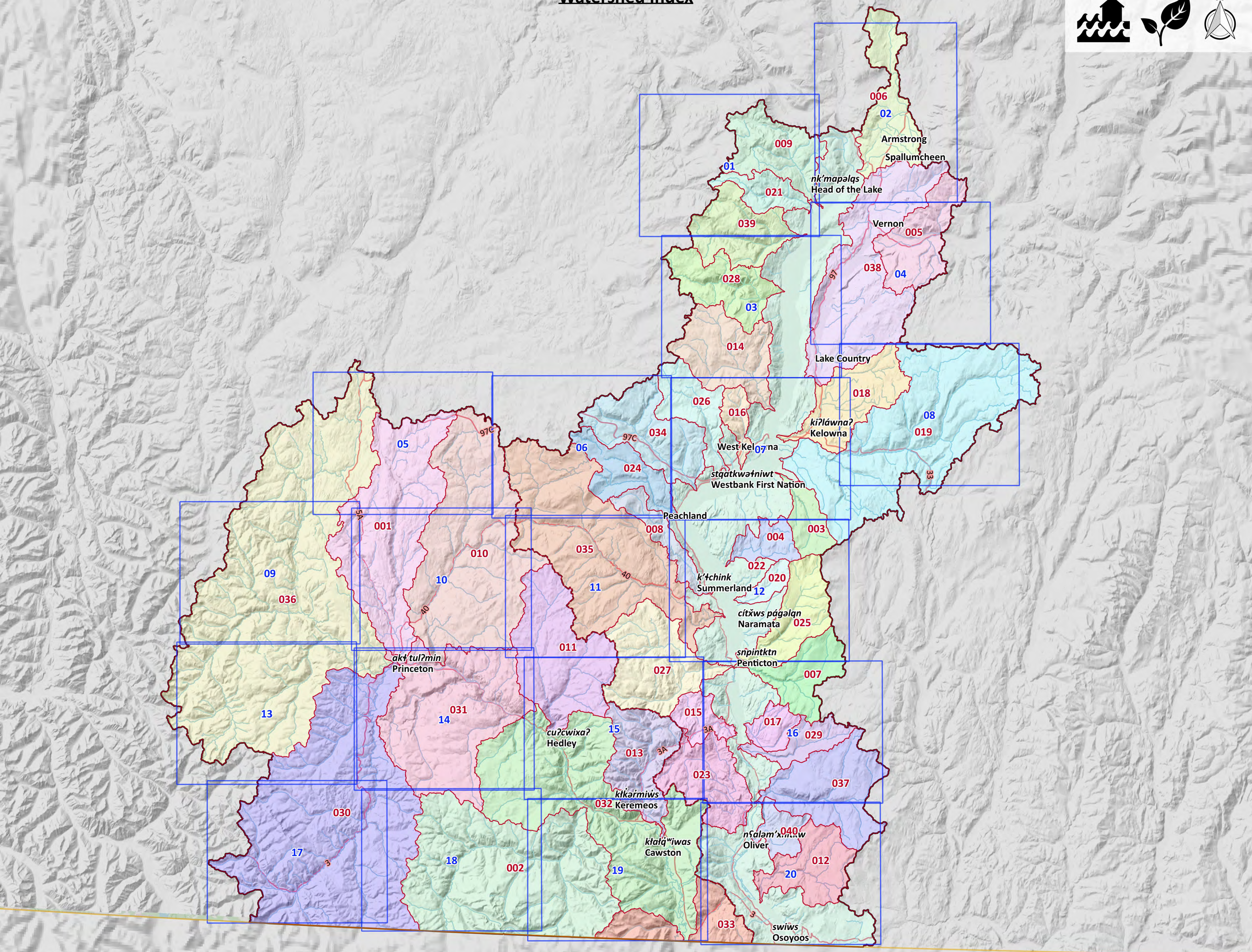
Sylix Okanagan Flood and Debris Flow Risk Assessment Map Book Map Series 2 of 7: Environment Indicator



Quantitative Flood Consequence Maps



Watershed Index



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

Legend

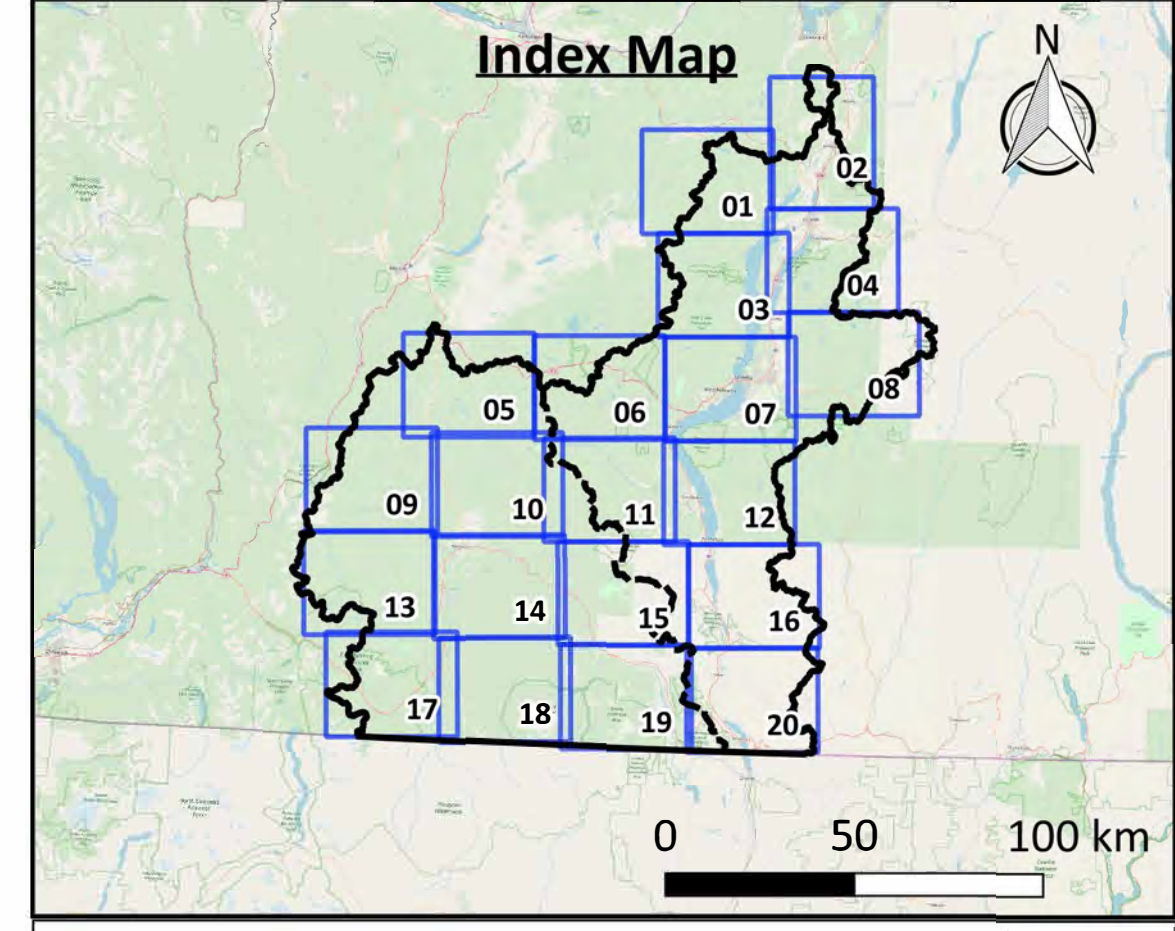
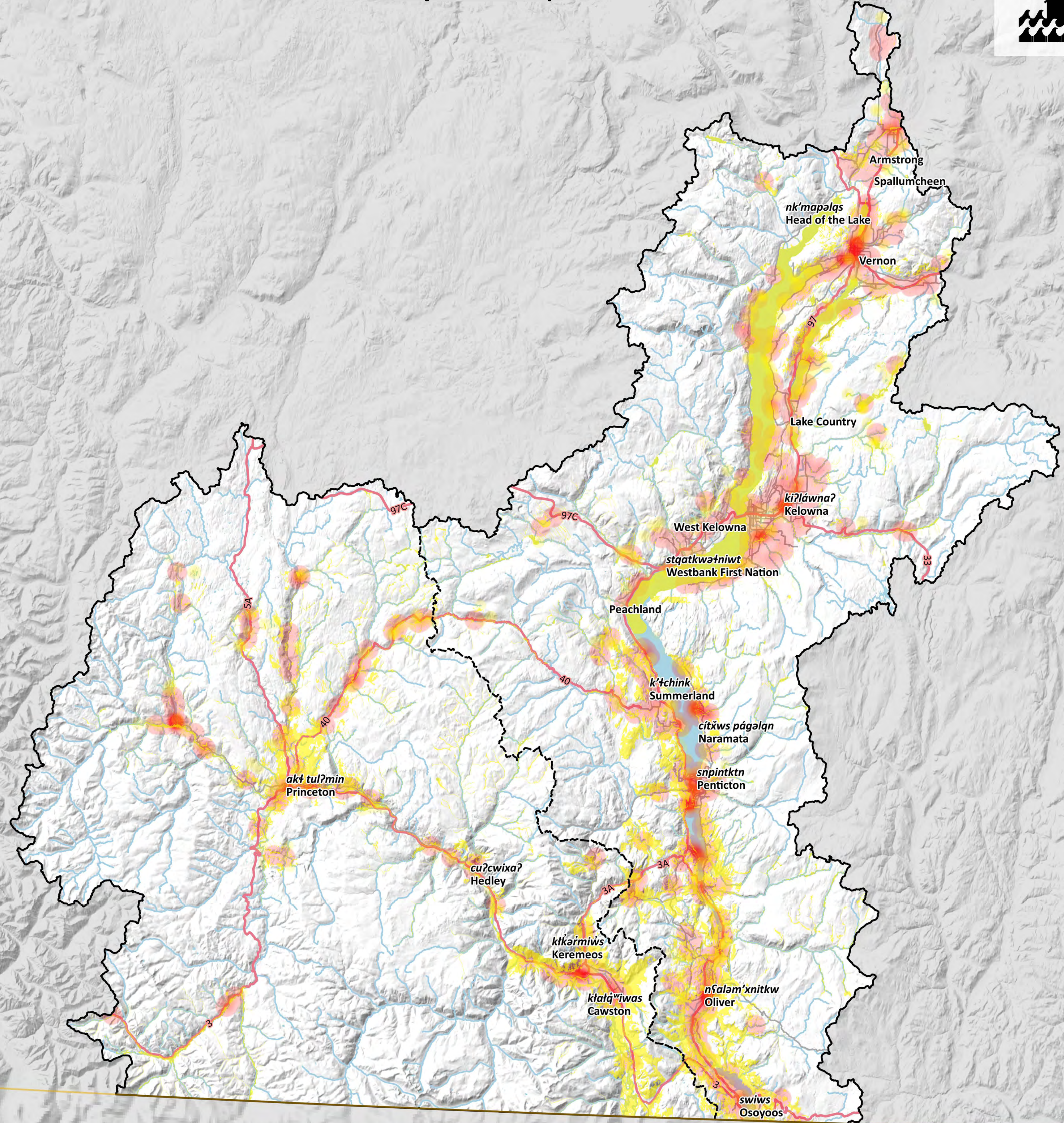
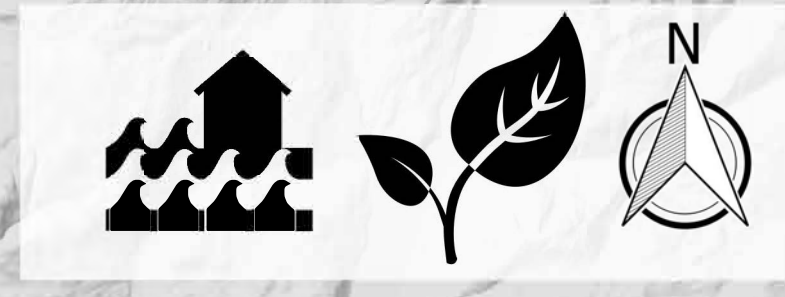
- | | |
|-----------------------------------|---------------------------|
| Background | Sub-Watersheds |
| — Watershed Boundary | 001 - Allison Creek |
| --- Okanagan-Similkameen Boundary | 002 - Ashnola River |
| — Canada - US Border | 003 - Bellevue Creek |
| — Lakes | 004 - Chute Creek |
| — Watercourses | 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 |

Scale 1:350,000
0 10 20 30 km

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

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

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

1. Map produced by Ebbwater Consulting Inc.
2. Affected assets have been defined in terms of contamination sources (e.g. industrial sites, transport facilities, and septic tanks and sewer systems) and environmental receptors (i.e. fish observations, drinking water wells, and high biodiversity areas).
3. Potential contamination sources were clipped to the moderate flood hazard area. The hazard layer is shown in the hazard maps, and was produced by Ebbwater Consulting Inc. The method used to produce the hazard layer is described in the Quantitative Study.
4. Drinking water wells and fish observations are represented by circles of a 1 km radius. These receptors, along with high biodiversity areas were considered "contaminated" where they were within a 2 km radius of a potential contaminant source.

Data Sources

1. Lakes and Watercourses: BC Data Catalogue.
2. Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
3. Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
4. Sylix Place Names: Okanagan Nation Alliance.
5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

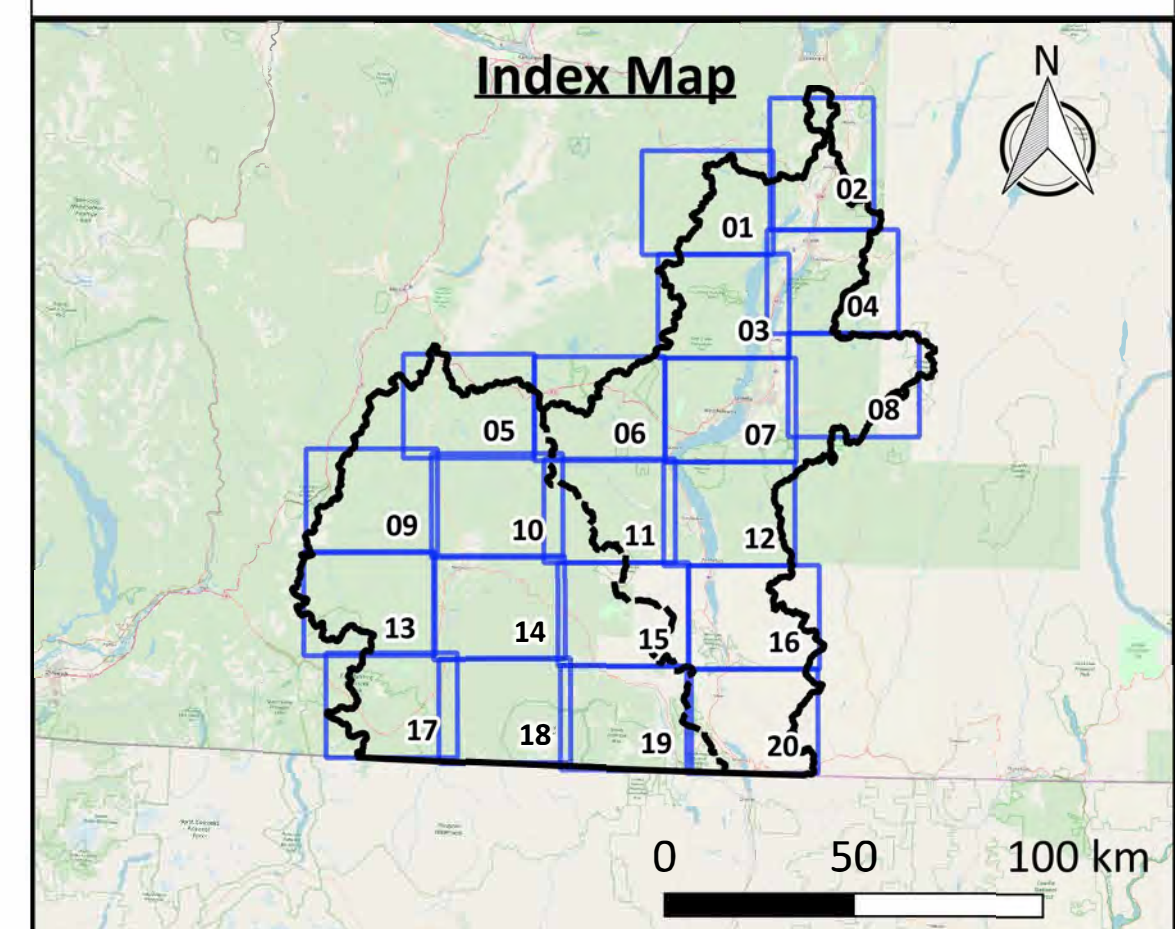
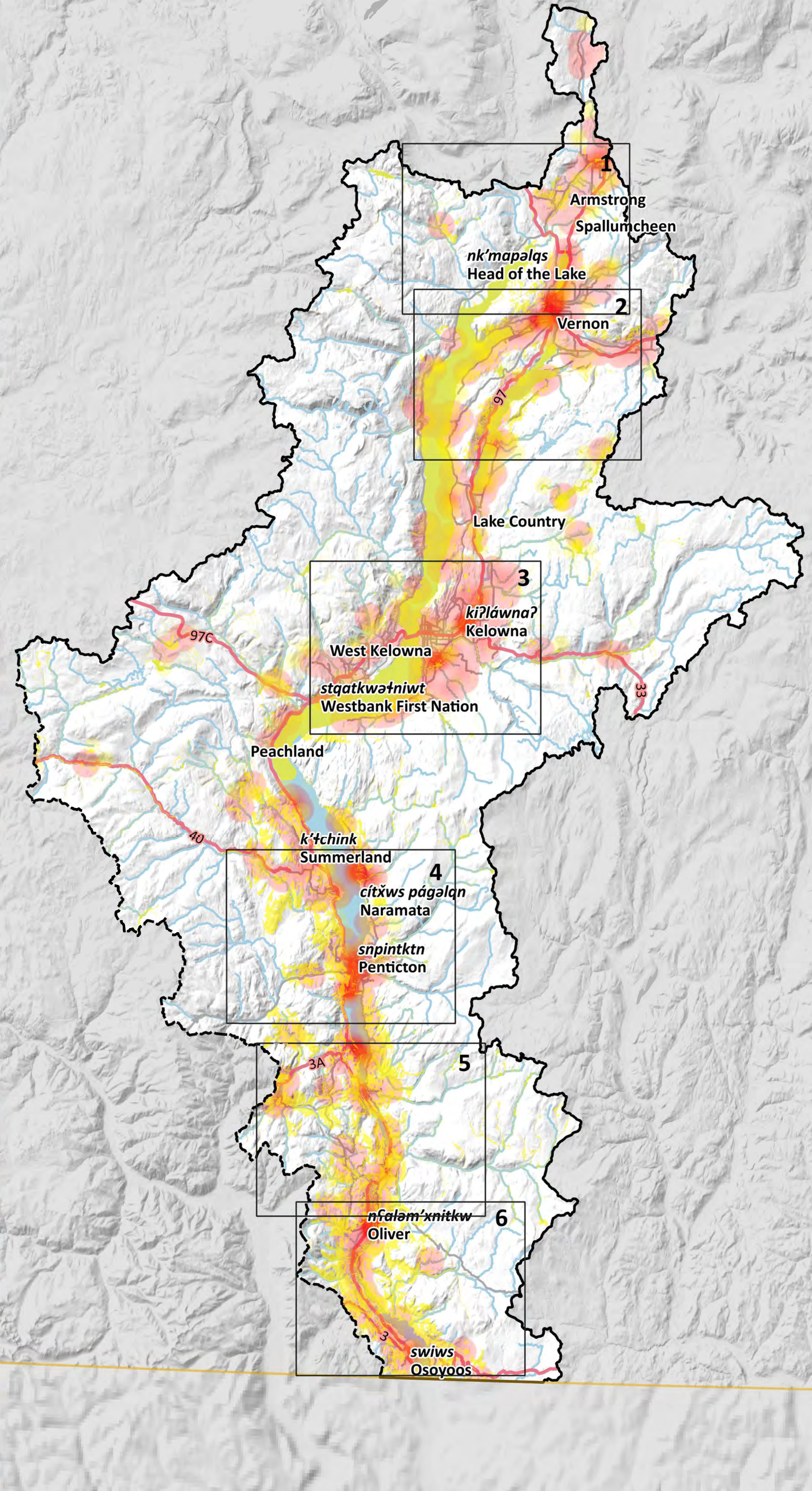
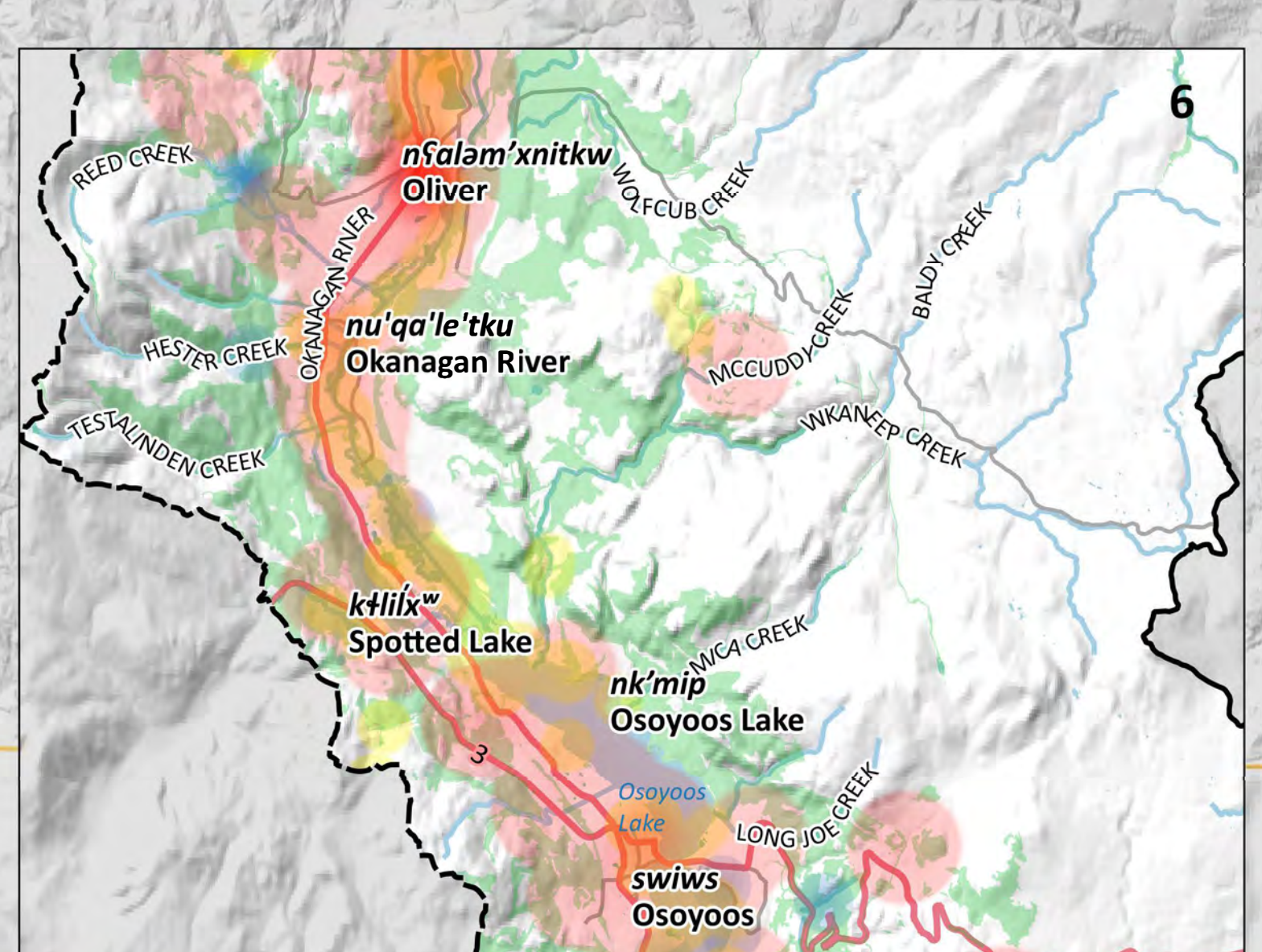
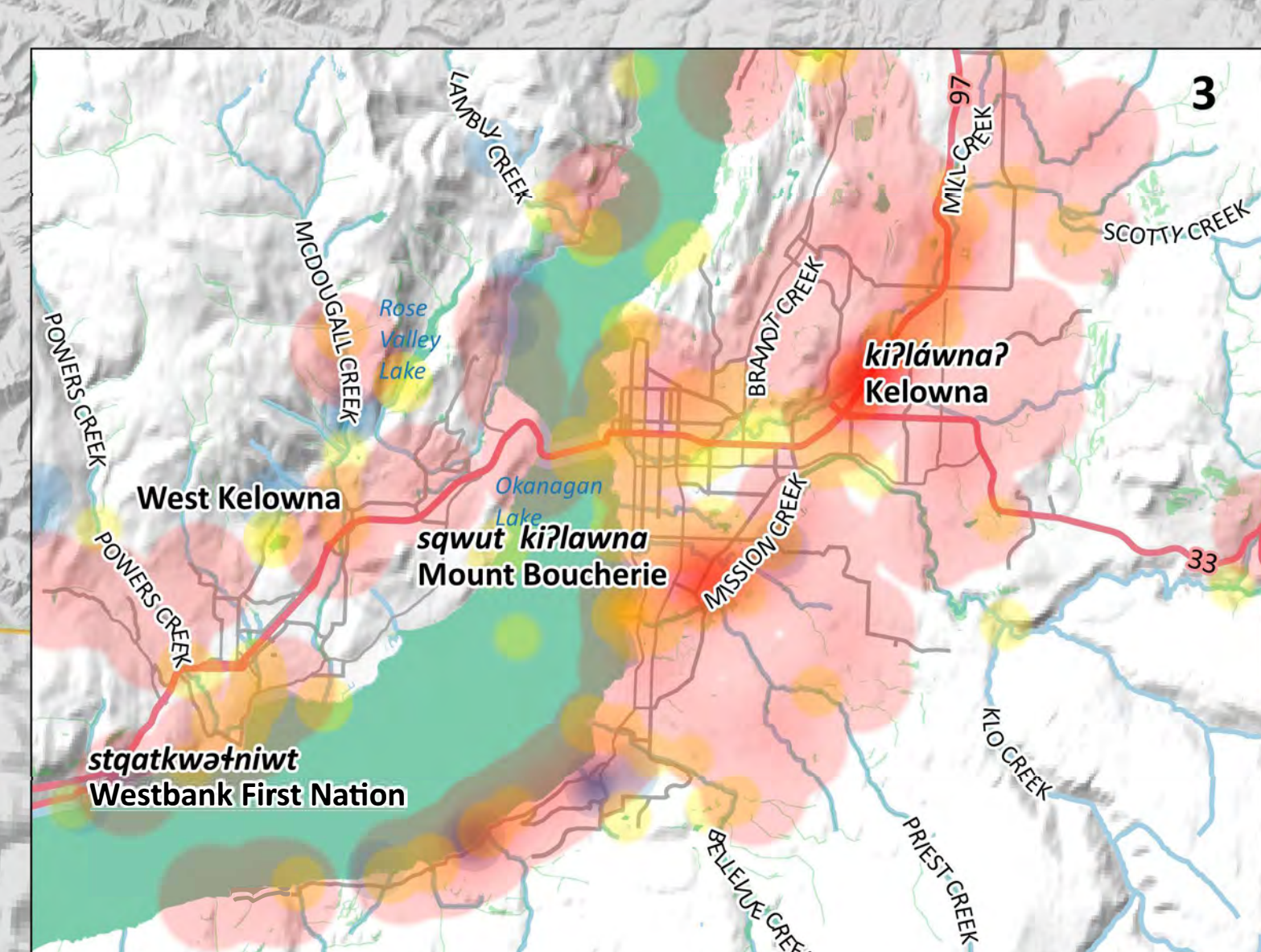
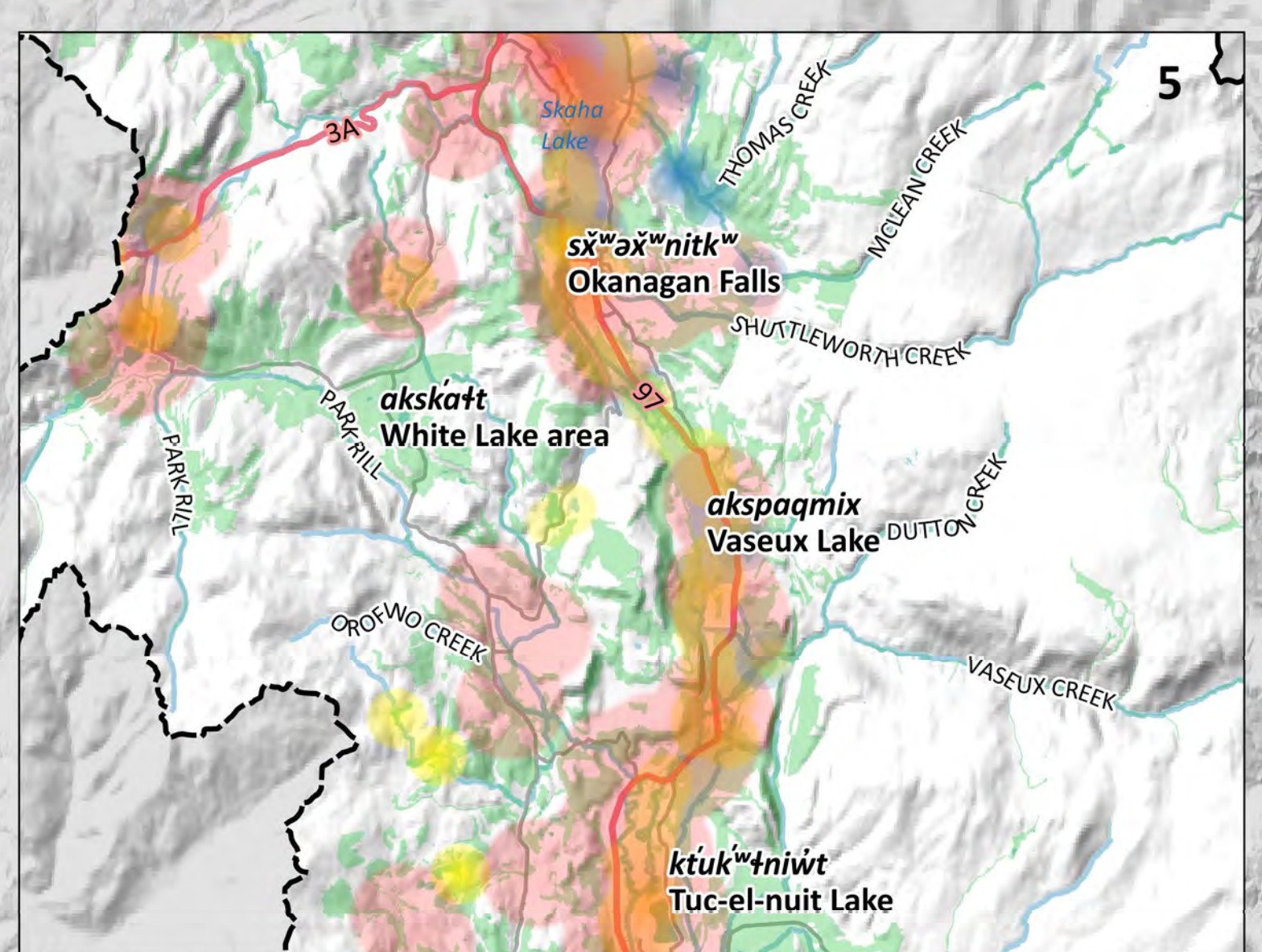
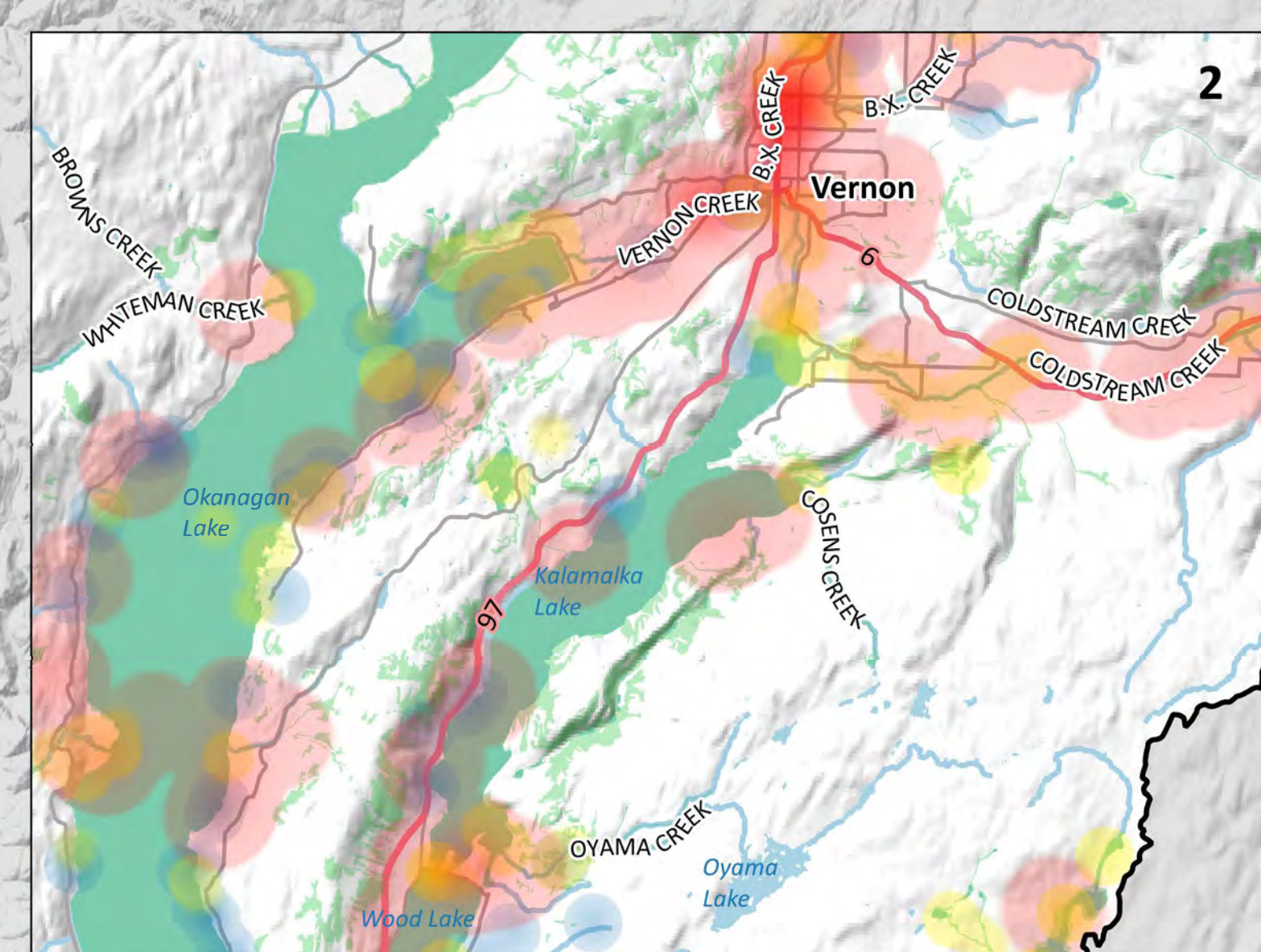
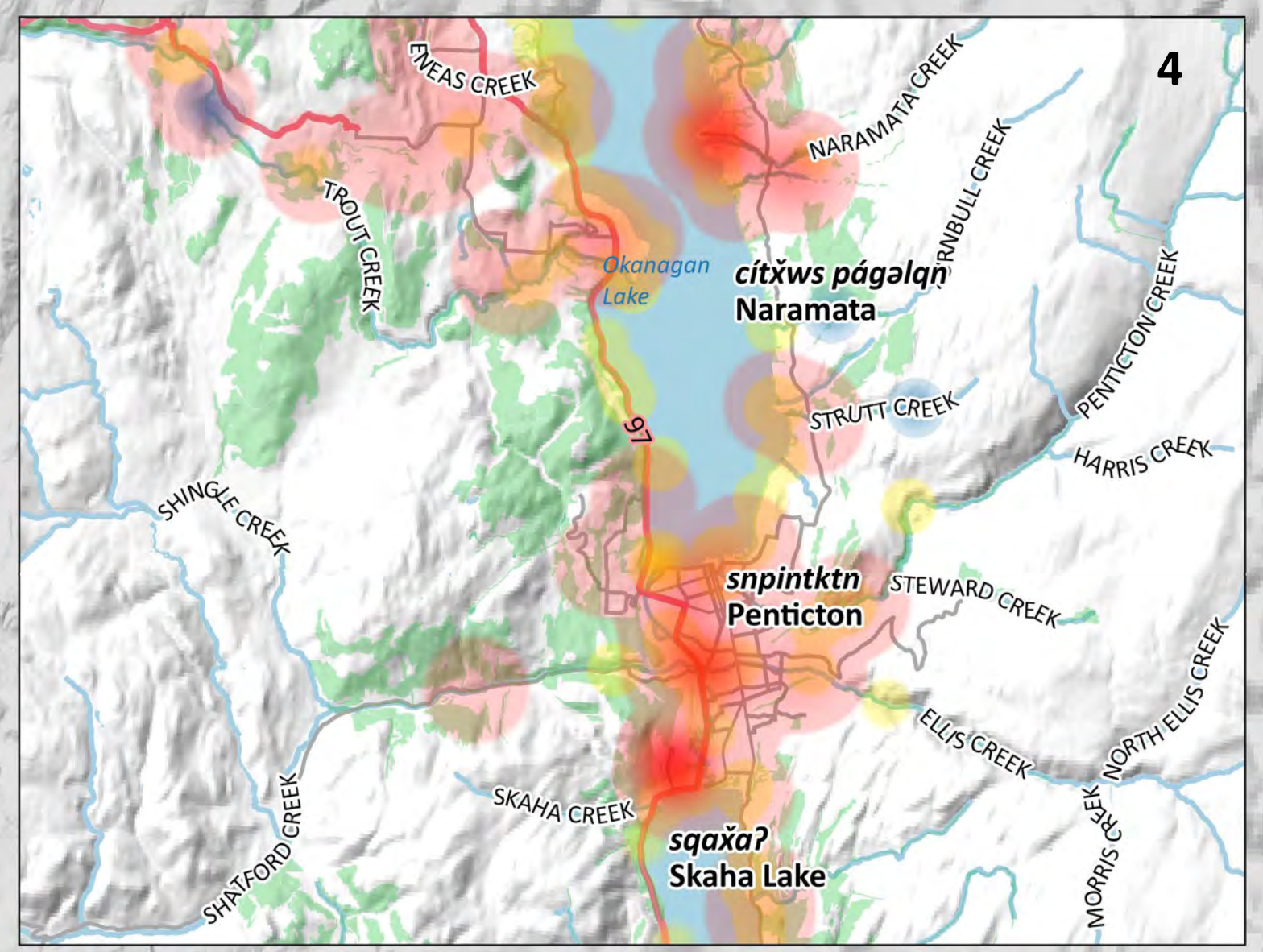
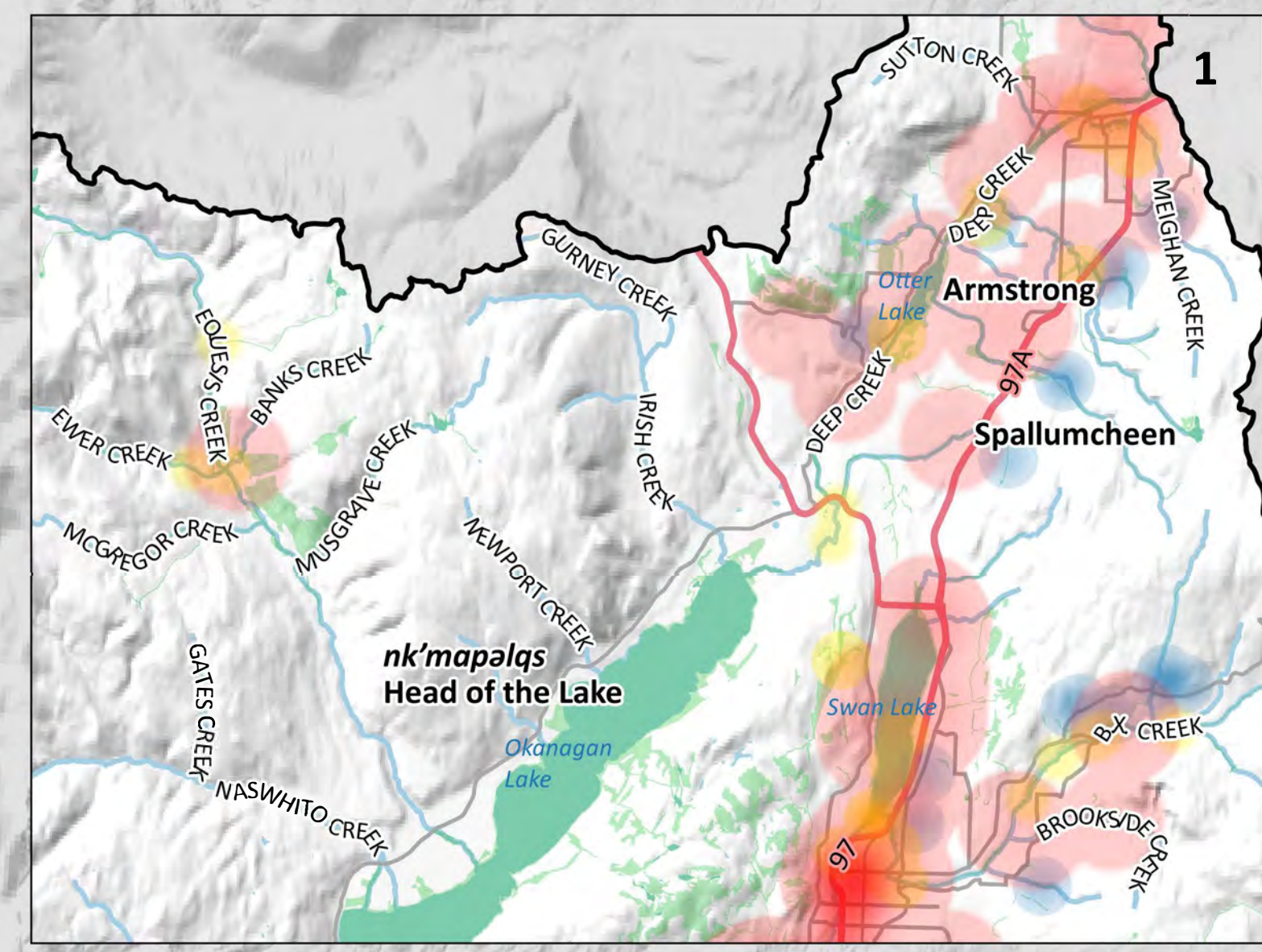
Scale 1:350,000
 0 10 20 30 km

| Legend | |
|--------------------|---------------------------------|
| Background | Contamination Sources |
| Watershed Boundary | Environmental Receptors |
| Canada - US Border | 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
Flood - Environment - Quantitative Project Area

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

- Map produced by Ebbwater Consulting Inc.
- Affected assets have been defined in terms of contamination sources (e.g. industrial sites, transport facilities, and septic tanks and sewer systems) and environmental receptors (i.e. fish observations, drinking water wells, and high biodiversity areas).
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Data Sources

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

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

| | |
|-------------------------------|-------------------------|
| Watershed Boundary | Contamination Sources |
| Canada - US Border | Environmental Receptors |
| Lakes | |
| Watercourses | |
| Highway | |
| Major Road | |
| Okanagan-Similkameen Boundary | |

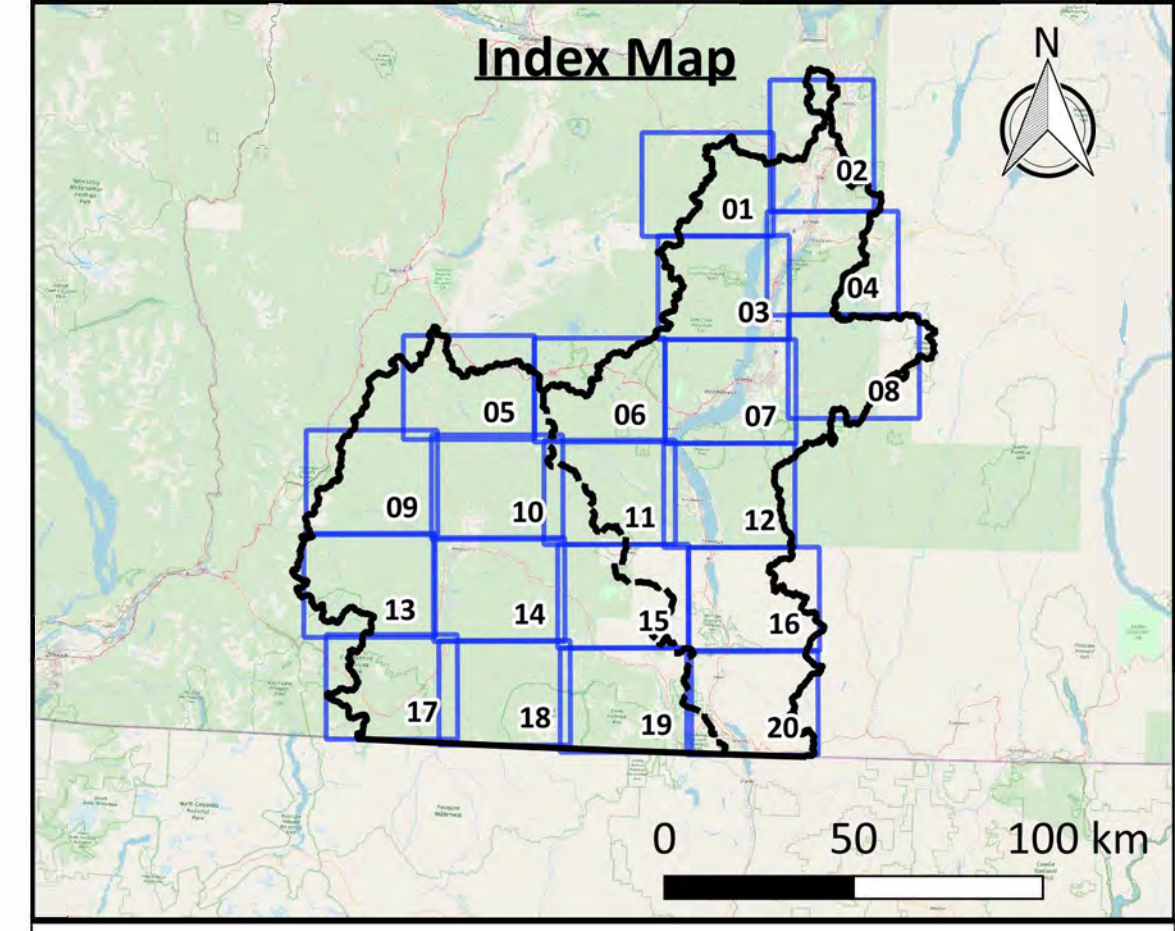
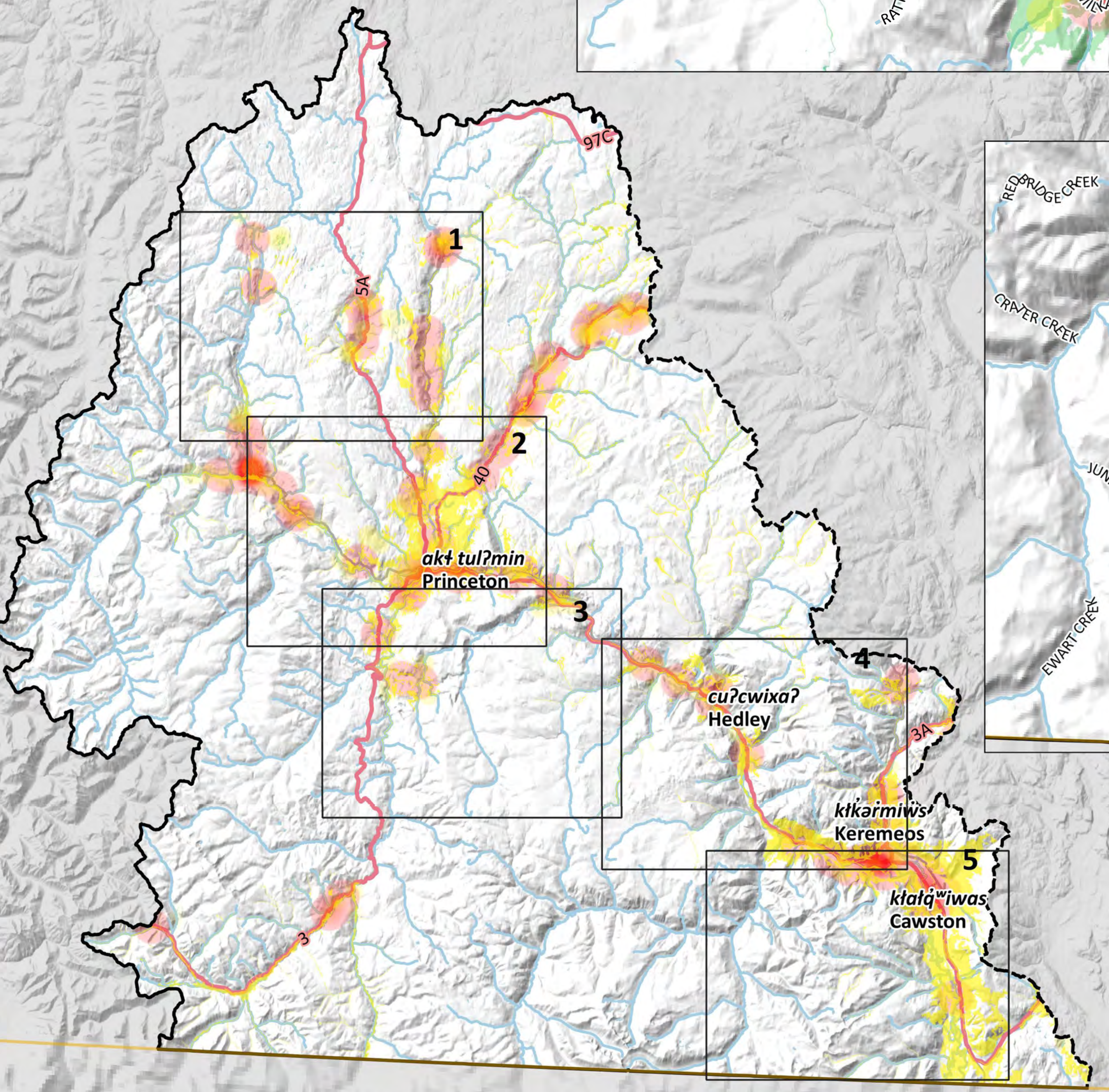
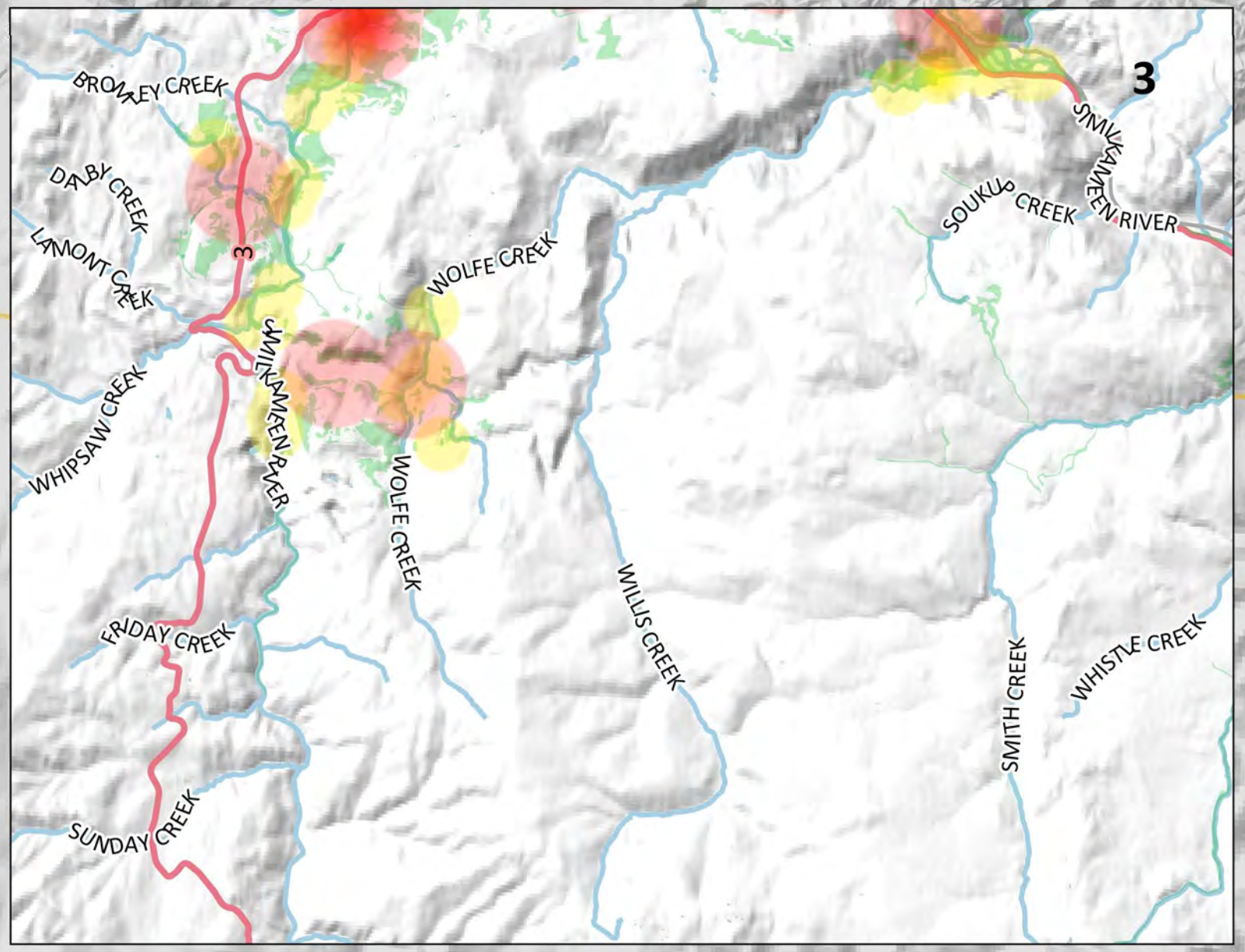
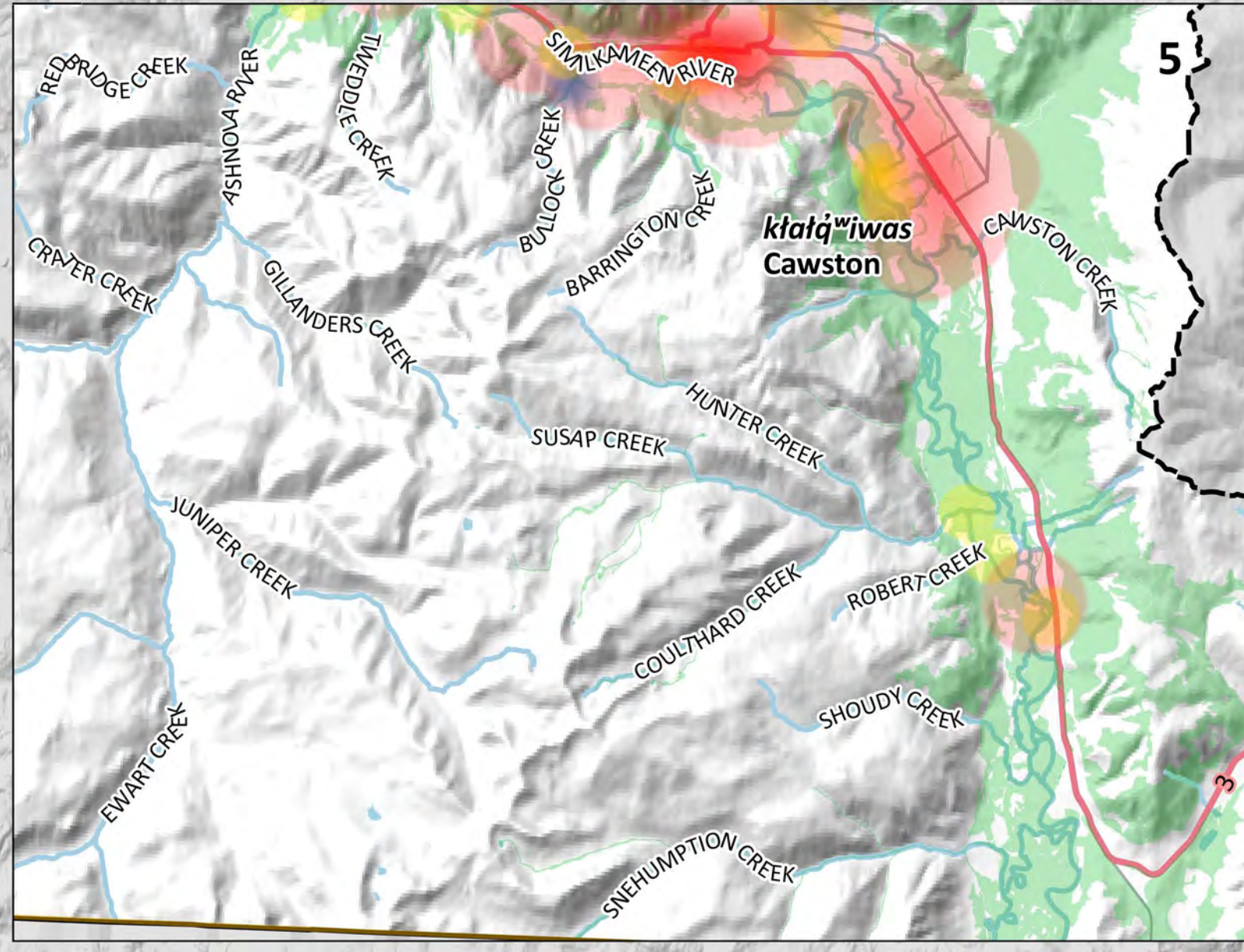
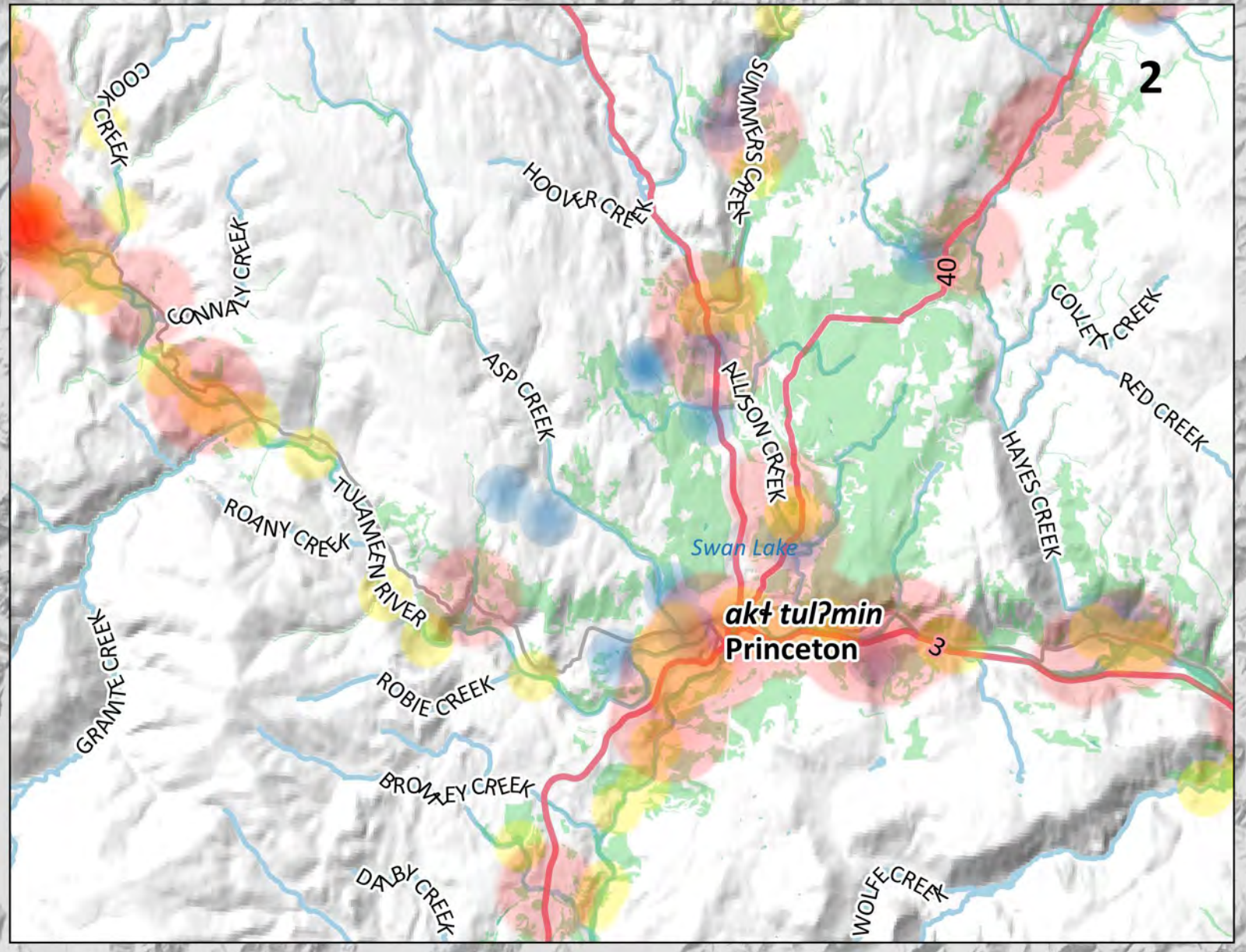
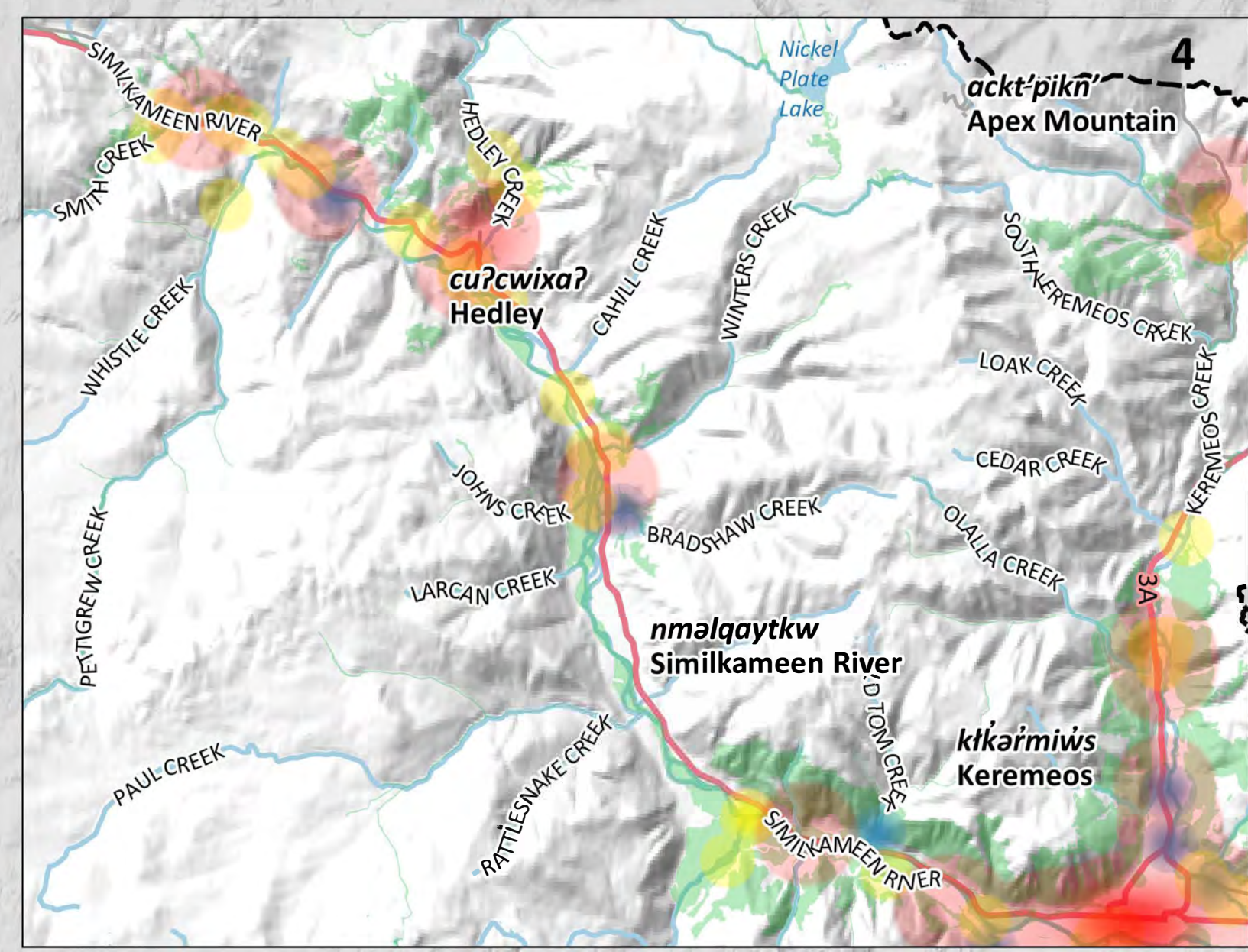
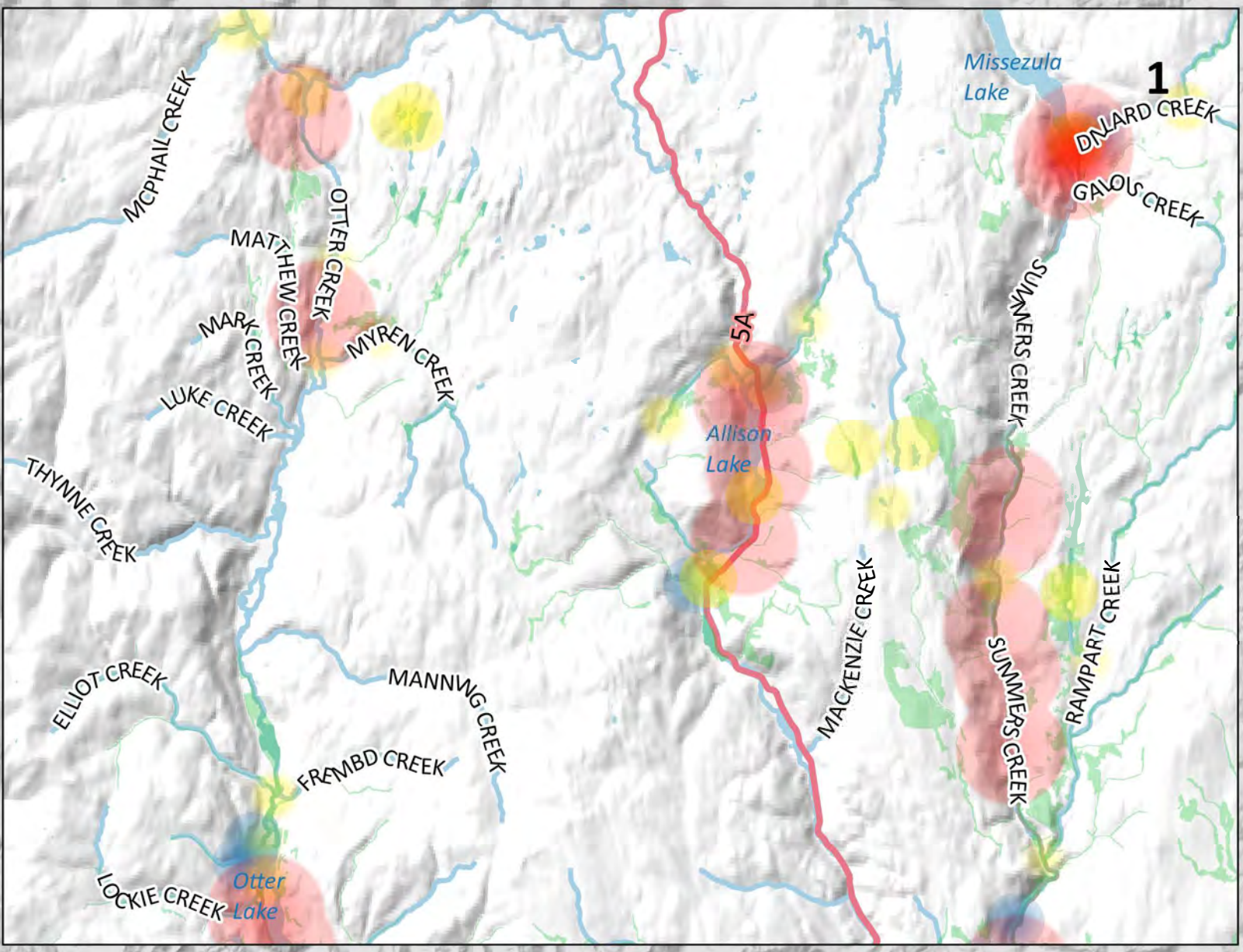
Inset Maps 0 5 10 km
Scale 1:150,000
Legend (Additional Features Only)

| | |
|-----------------------|------------------------|
| Contamination Sources | High Biodiversity Area |
| Fish Observations | |
| Drinking Water Wells | |

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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative Okanagan
 ANSI D - Map No. EN-F-002-002

Similkameen Map



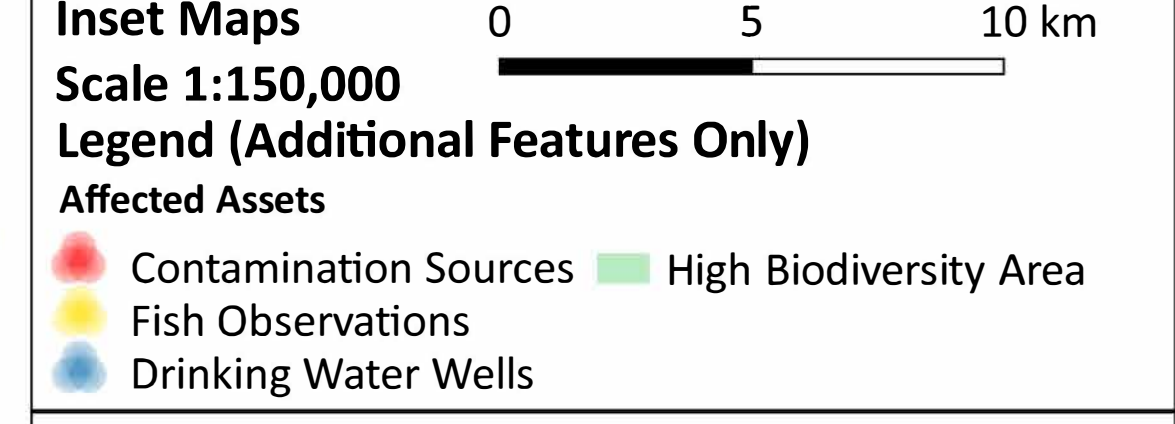
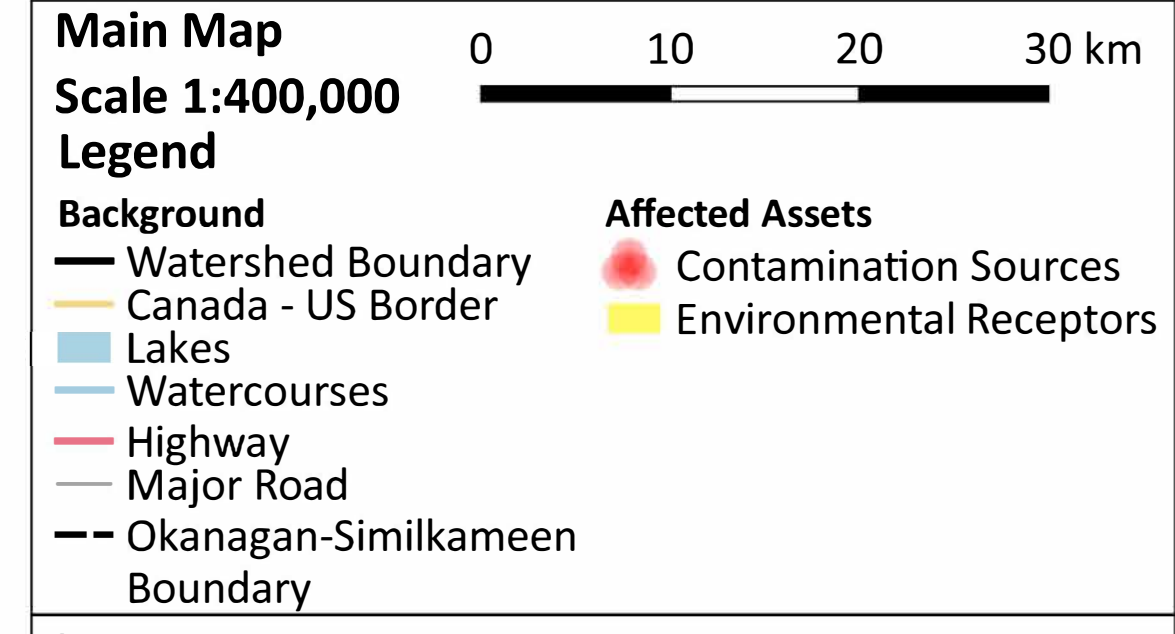
Click above map tile for Zoom-In map
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Map Notes

- Map produced by Ebbwater Consulting Inc.
- Affected assets have been defined in terms of contamination sources (e.g. industrial sites, transport facilities, and septic tanks and sewer systems) and environmental receptors (i.e. fish observations, drinking water wells, and high biodiversity areas).
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Data Sources

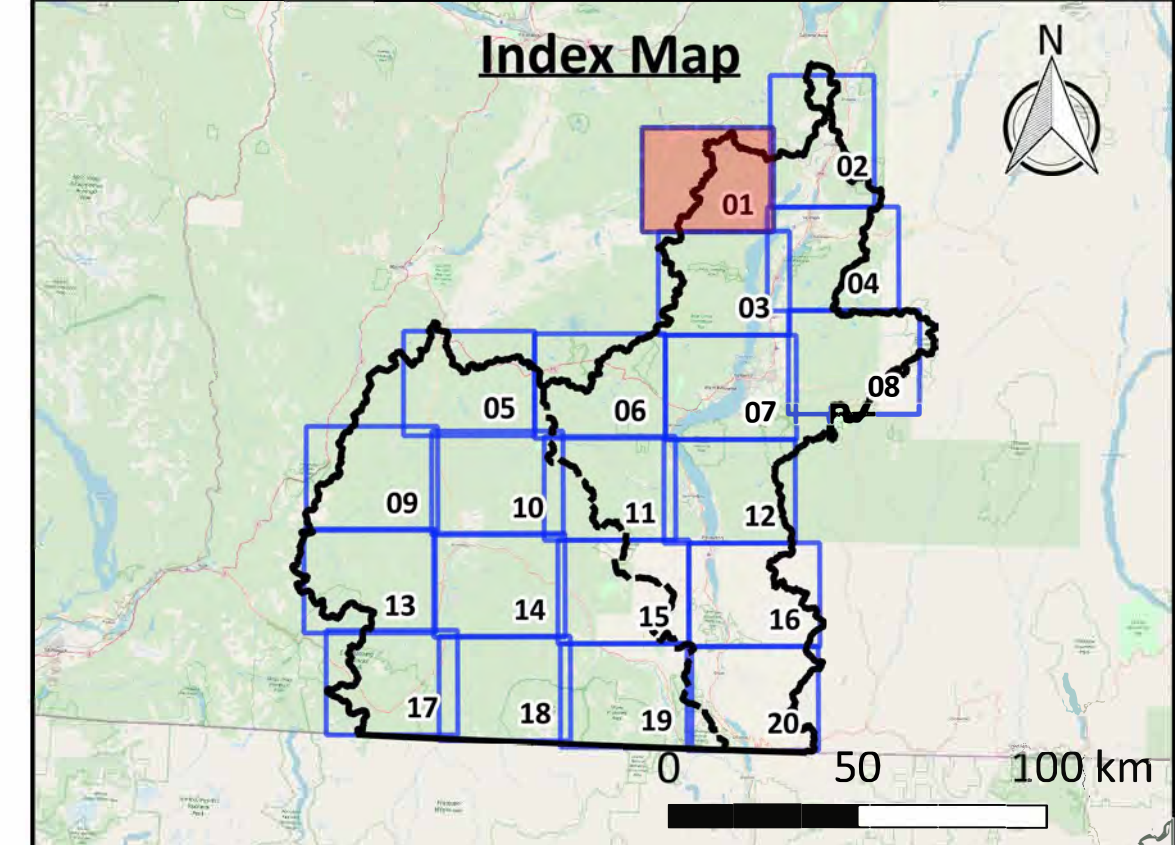
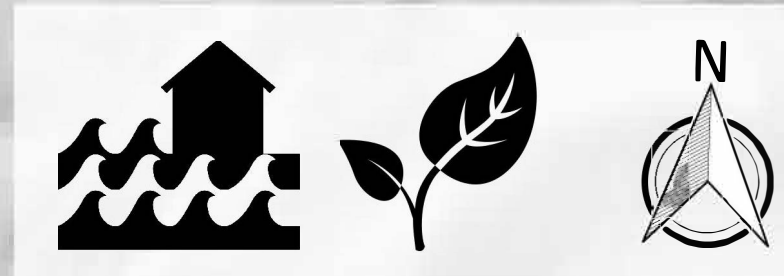
- Lakes and Watercourses: BC Data Catalogue.
- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.



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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative Similkameen

Zoom-In Map



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

Map Notes

- Map produced by Ebbwater Consulting Inc.
- Affected assets have been defined in terms of contamination sources (e.g. industrial sites, transport facilities, and septic tanks and sewer systems) and environmental receptors (i.e. fish observations, drinking water wells, and high biodiversity areas).
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- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY SA) and hill shade created using CDEM and USGM GMTED2010.

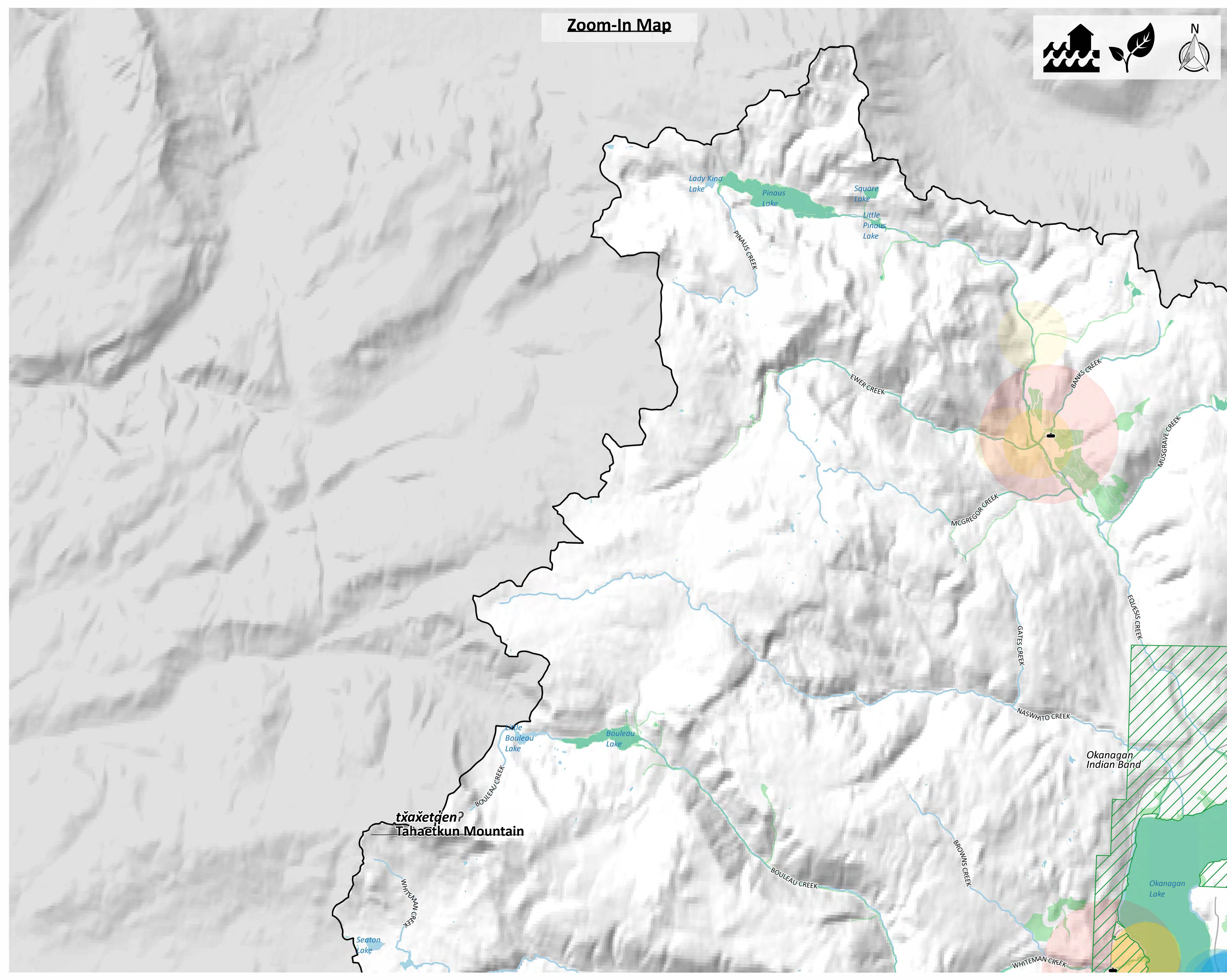


| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🗑 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

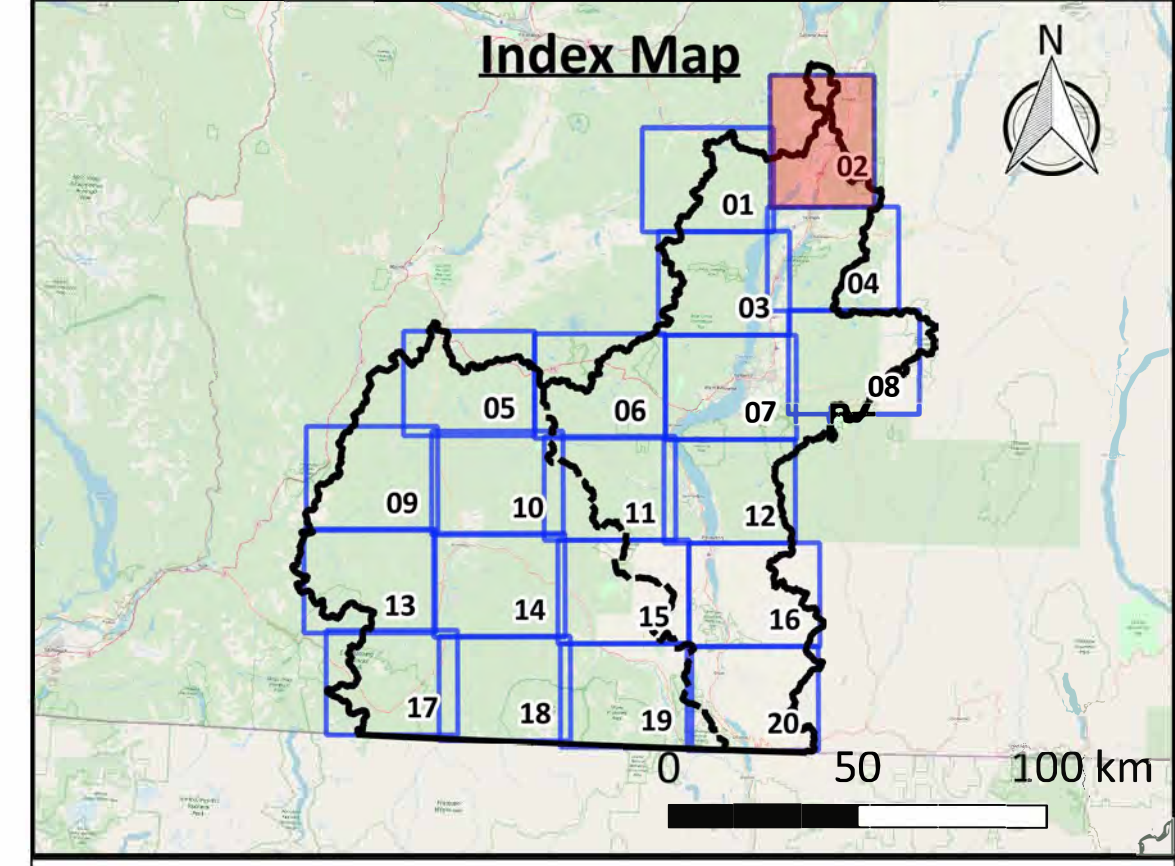
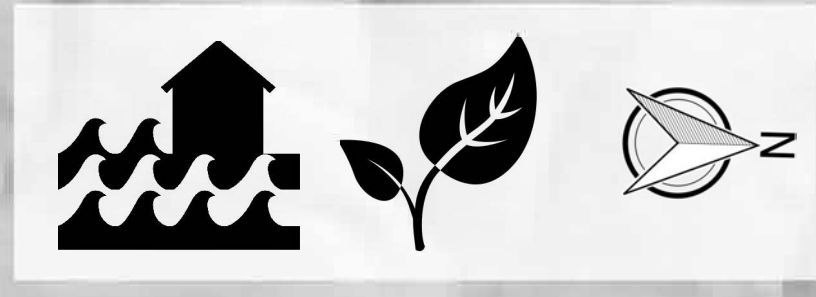
Date: 31 December 2019
Produced by: Ebbwater Consulting Inc.

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
Map Tile 01 of 20

ANSI D - Map No. EN-F-003-001



Zoom-In Map



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Map Notes

- Map produced by Ebbwater Consulting Inc.
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Data Sources

- Lakes and Watercourses: BC Data Catalogue.
- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
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- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY SA) and hill shade created using CDEM and USGM GMTED2010.

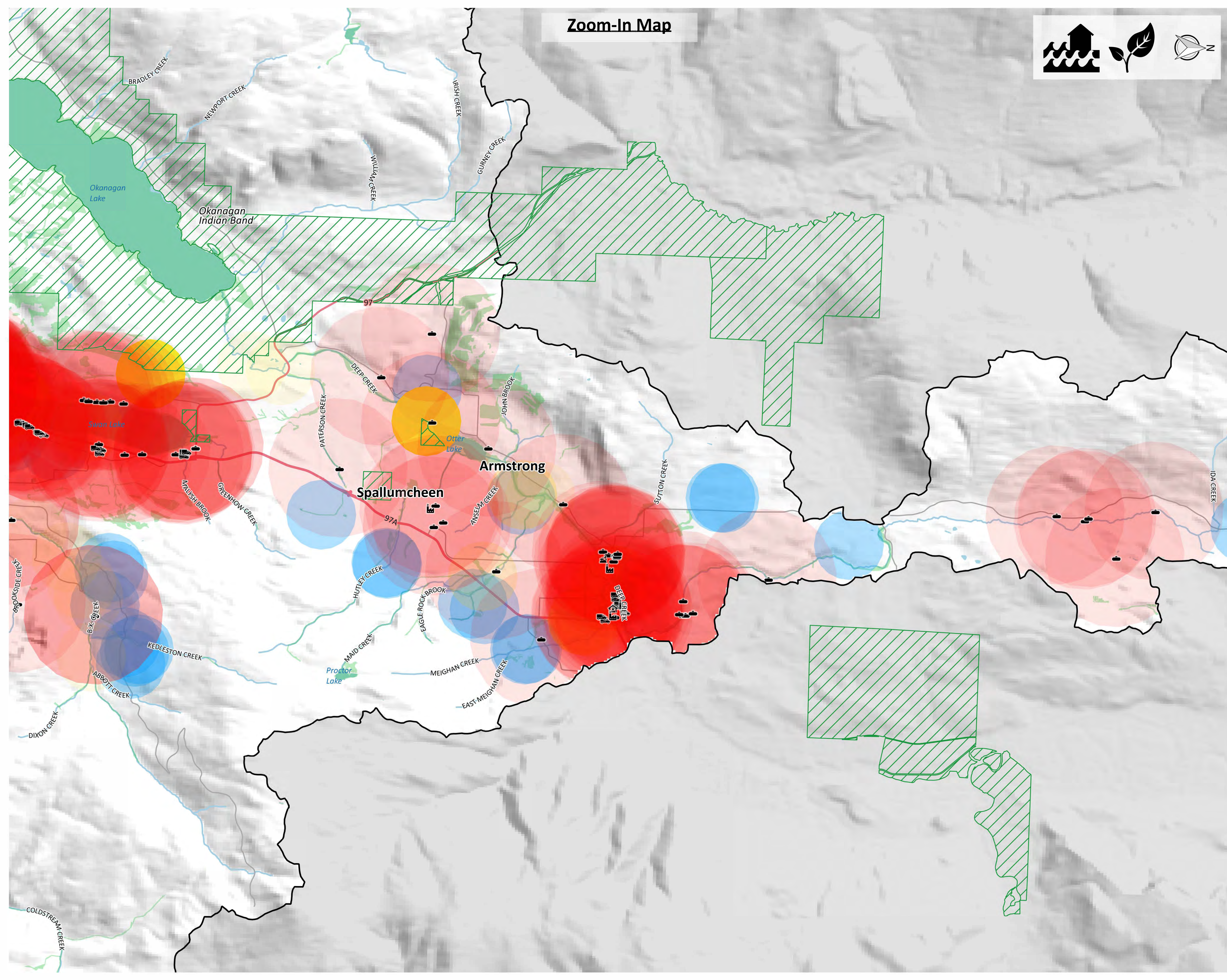


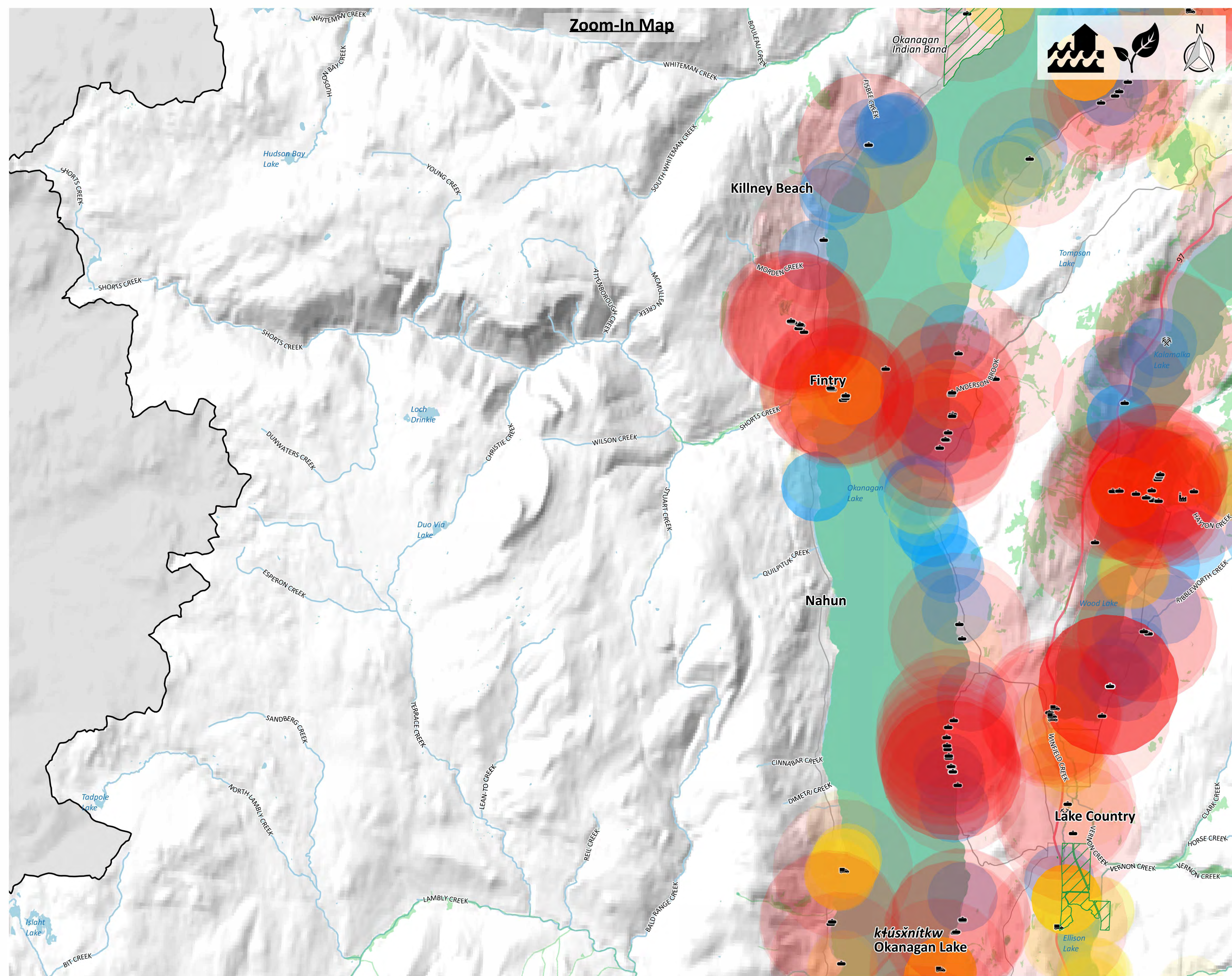
| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ● Lakes | ● High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🗑 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

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

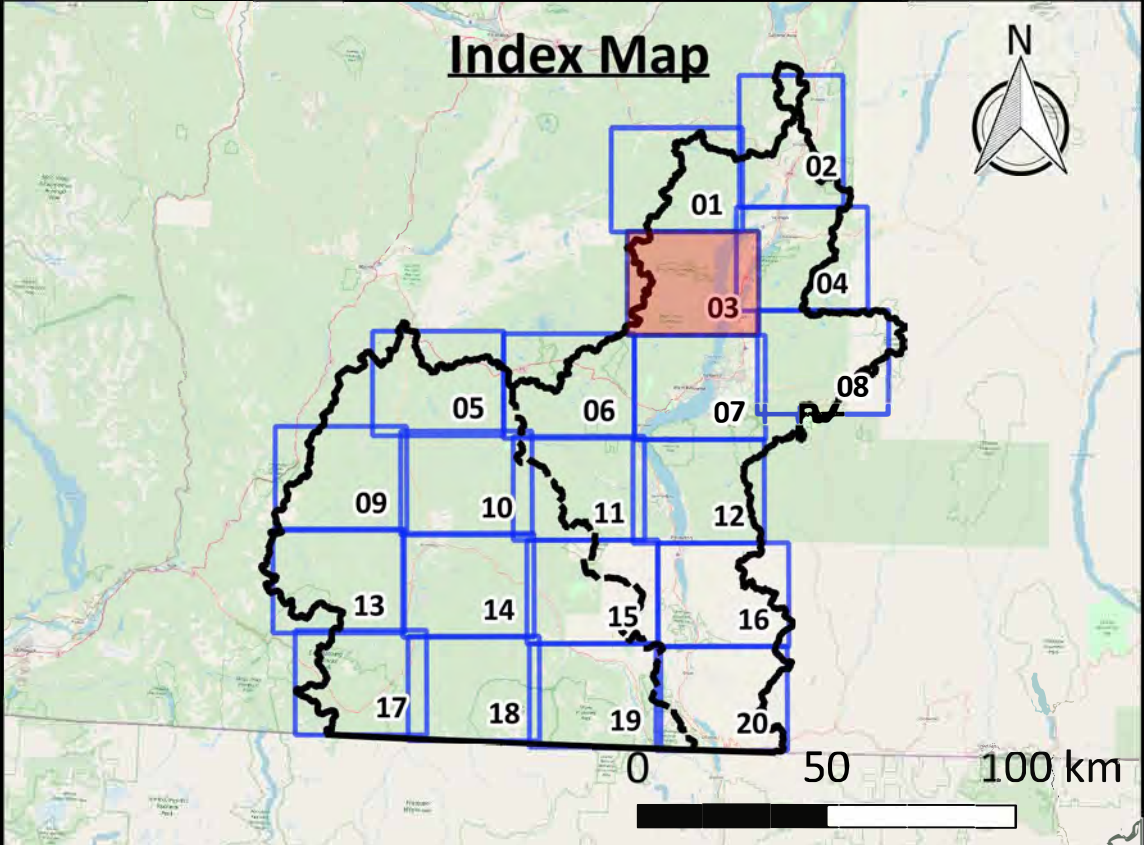
Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
Map Tile 02 of 20

ANSI D - Map No. EN-F-003-002





Zoom-In Map



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Map Notes

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Data Sources

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- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY SA) and hill shade created using CDEM and USGM GMTED2010.

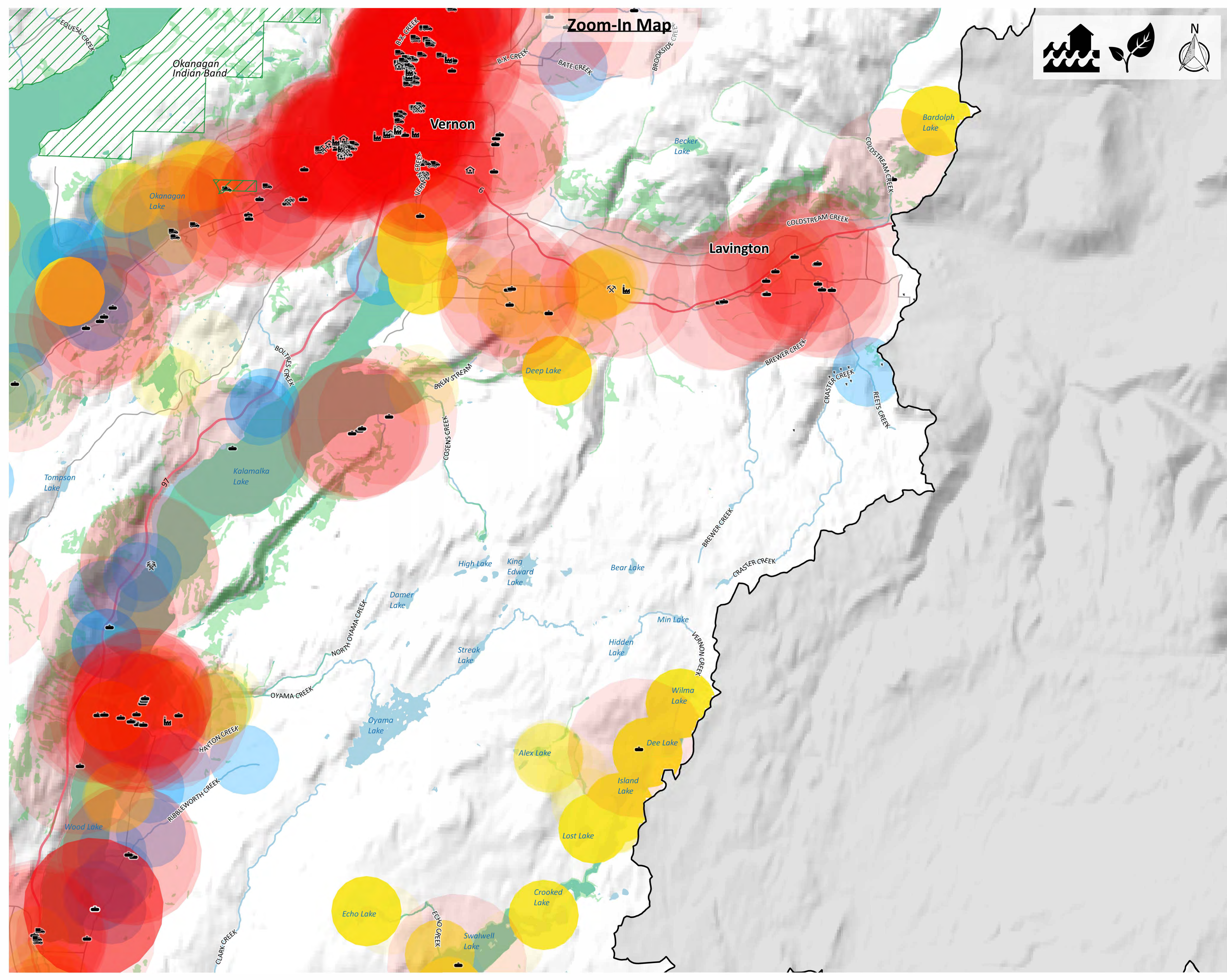


| Legend | |
|---------------------------------|----------------------------------|
| Background | Affected Assets |
| Watershed Boundary | Contamination Sources |
| Canada - US Border | Fish Observations |
| Reserves | Drinking Water Wells |
| Lakes | High Biodiversity Area |
| Watercourses | Contamination Source Type |
| Highway | Heavy industry and mining |
| Major Road | Manufacturing (inc. food) |
| Okanagan - Similkameen Boundary | Septic and sewer systems |
| | Storage |
| | Transport |
| | Waste and landfill |

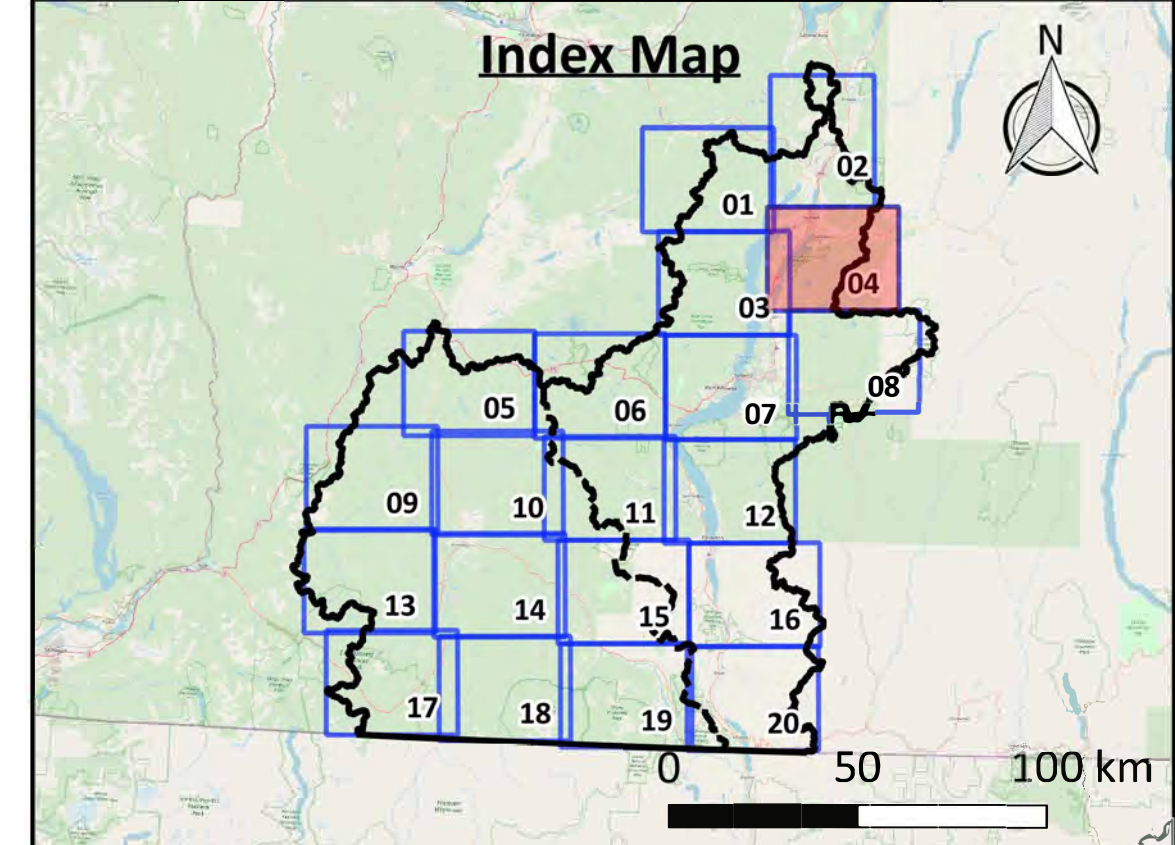
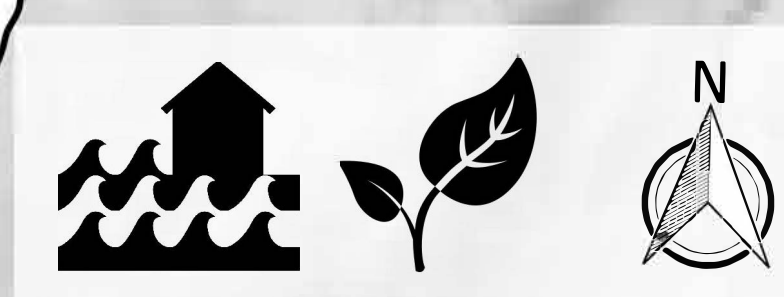
Date: 31 December 2019
Produced by: Ebbwater Consulting Inc.

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
Map Tile 03 of 20

ANSI D - Map No. EN-F-003-003



Zoom-In Map



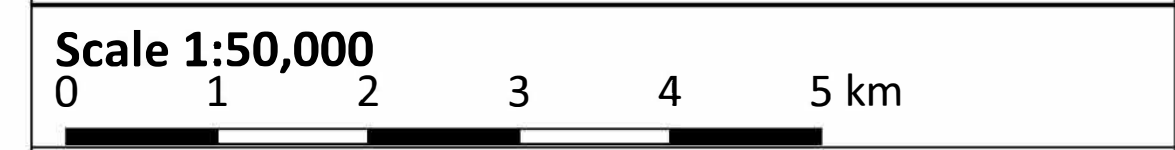
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[Click here to return to Similkameen map](#)

Map Notes

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Data Sources

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- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.



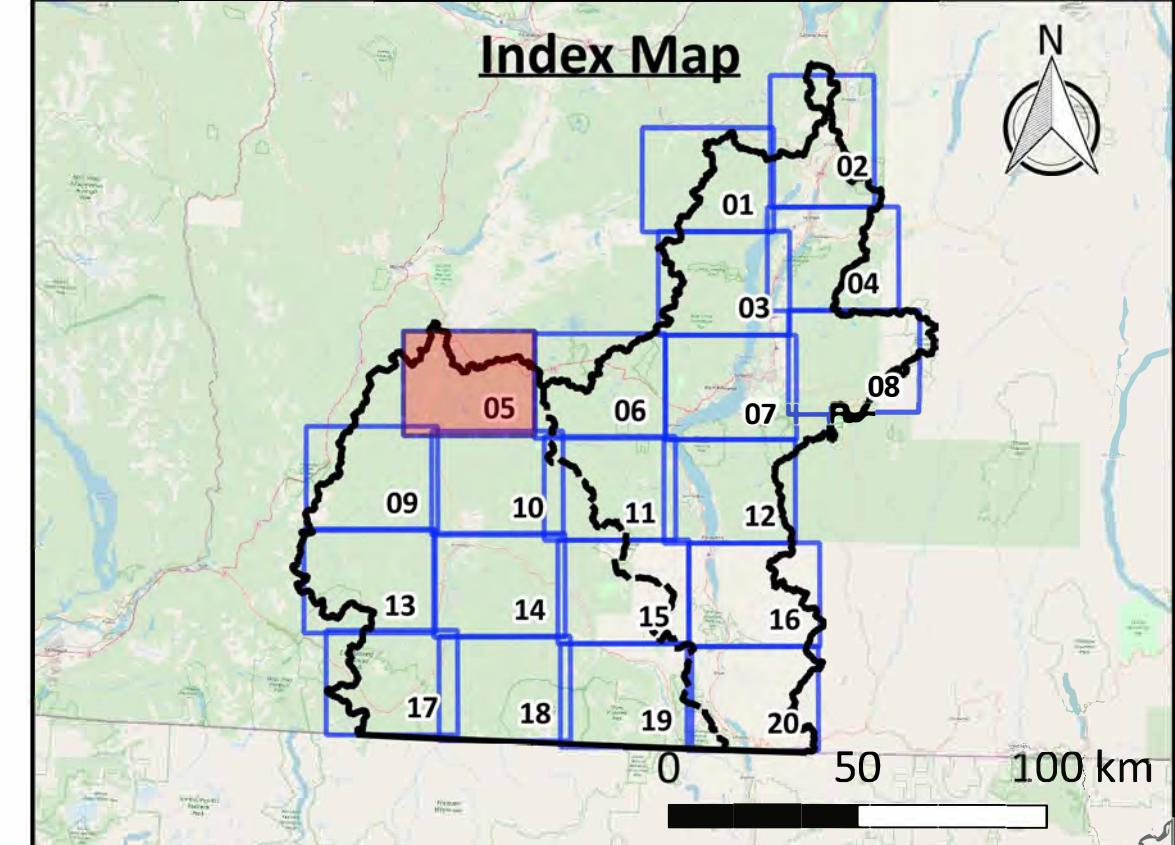
| Background | | Affected Assets | |
|------------|---------------------------------|-----------------|---------------------------|
| — | Watershed Boundary | ● | Contamination Sources |
| — | Canada - US Border | ● | Fish Observations |
| ▨ | Reserves | ● | Drinking Water Wells |
| ■ | Lakes | ■ | High Biodiversity Area |
| — | Watercourses | ⚙ | Contamination Source Type |
| — | Highway | ⚙ | Heavy industry and mining |
| — | Major Road | 🏭 | Manufacturing (inc. food) |
| — | Okanagan - Similkameen Boundary | 🏠 | Septic and sewer systems |
| | | 🚚 | Storage |
| | | 🚚 | Transport |
| | | 🗑️ | Waste and landfill |

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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
Map Tile 04 of 20

ANSI D - Map No. EN-F-003-004

Zoom-In Map



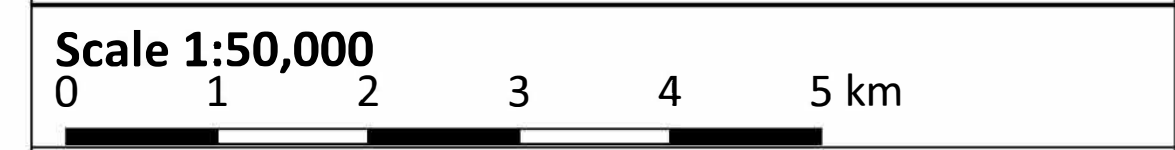
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[Click here to return to Okanagan map](#)
[Click here to return to Similkameen map](#)

Map Notes

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Data Sources

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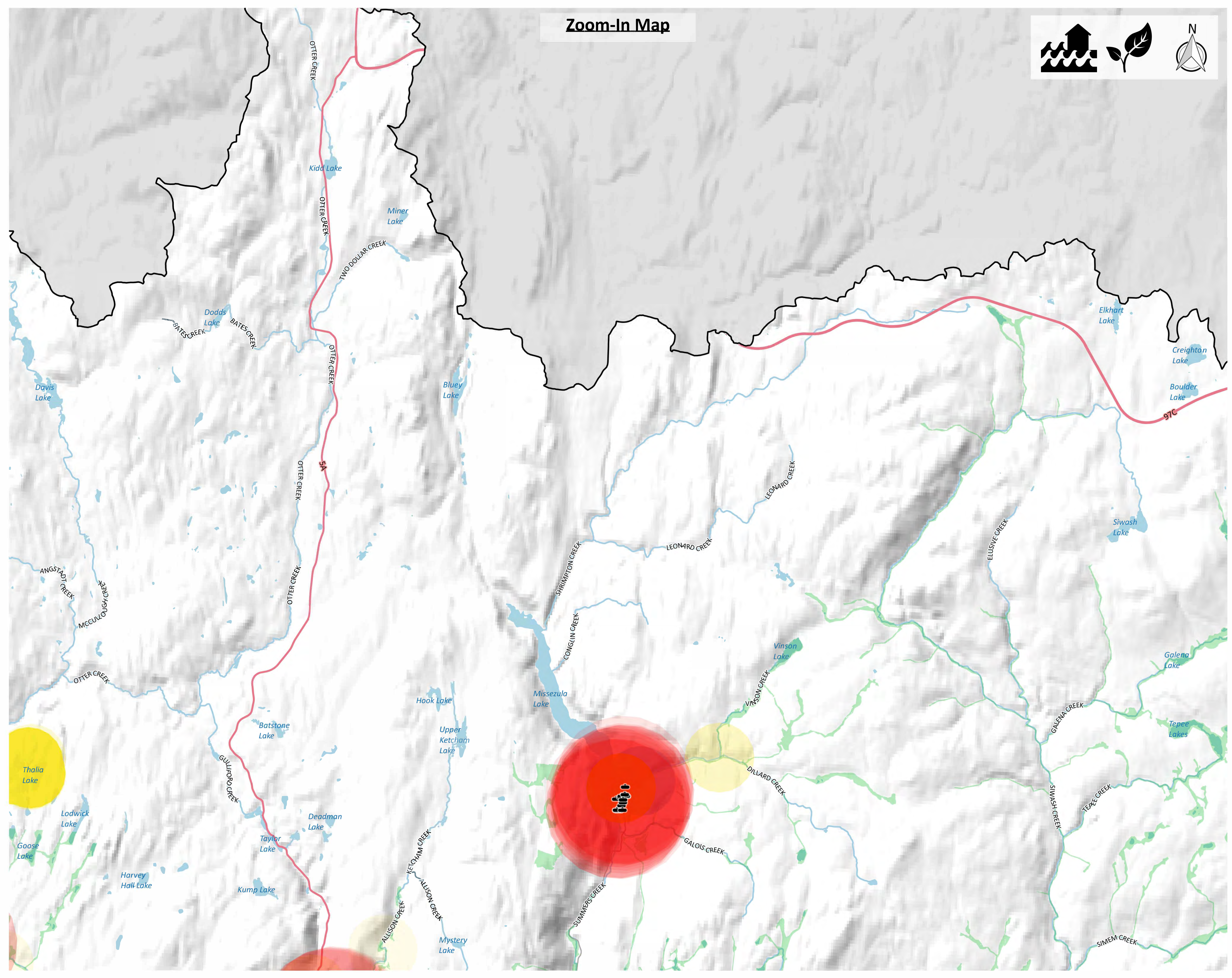


| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▭ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | |
| — Highway | Contamination Source Type |
| — Major Road | ⌘ Heavy industry and mining |
| — Okanagan - Similkameen Boundary | ⌘ Manufacturing (inc. food) |
| | ⌘ Septic and sewer systems |
| | ⌘ Storage |
| | ⌘ Transport |
| | ⌘ Waste and landfill |

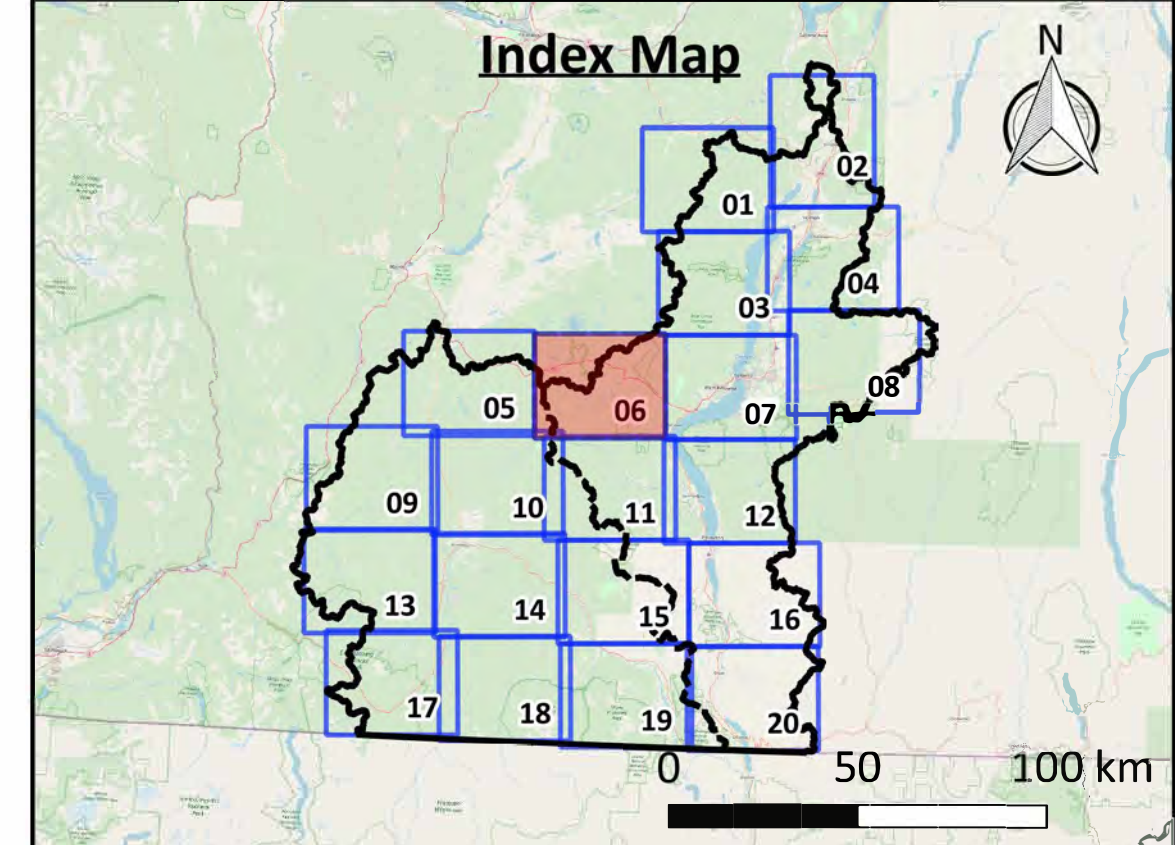
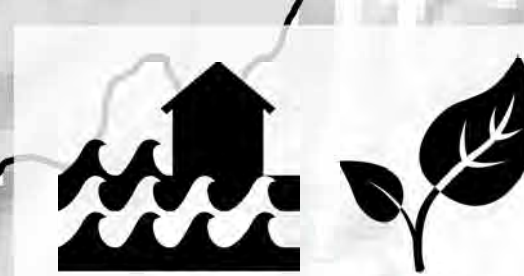
Date: 31 December 2019
Produced by: Ebbwater Consulting Inc.

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
Map Tile 05 of 20

ANSI D - Map No. EN-F-003-005



Zoom-In Map



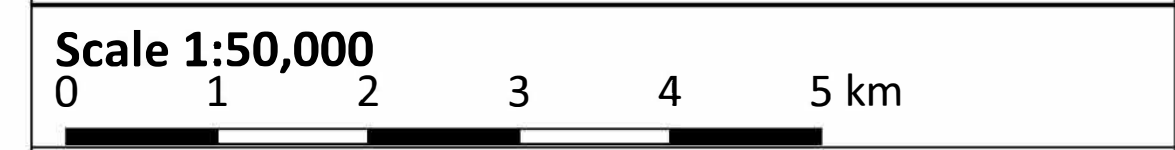
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[Click here to return to Similkameen map](#)

Map Notes

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Data Sources

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- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY SA) and hill shade created using CDEM and USGM GMTED2010.

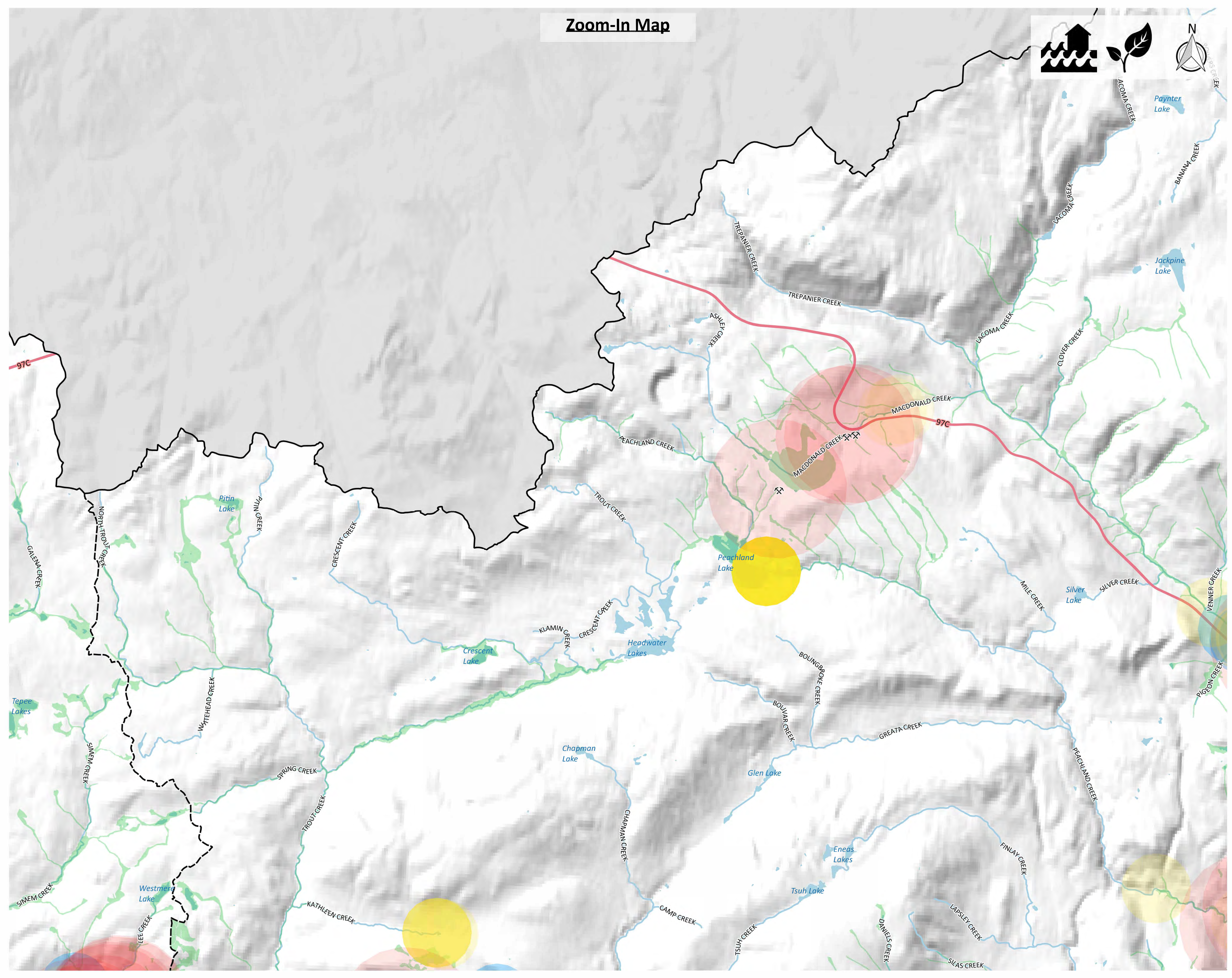


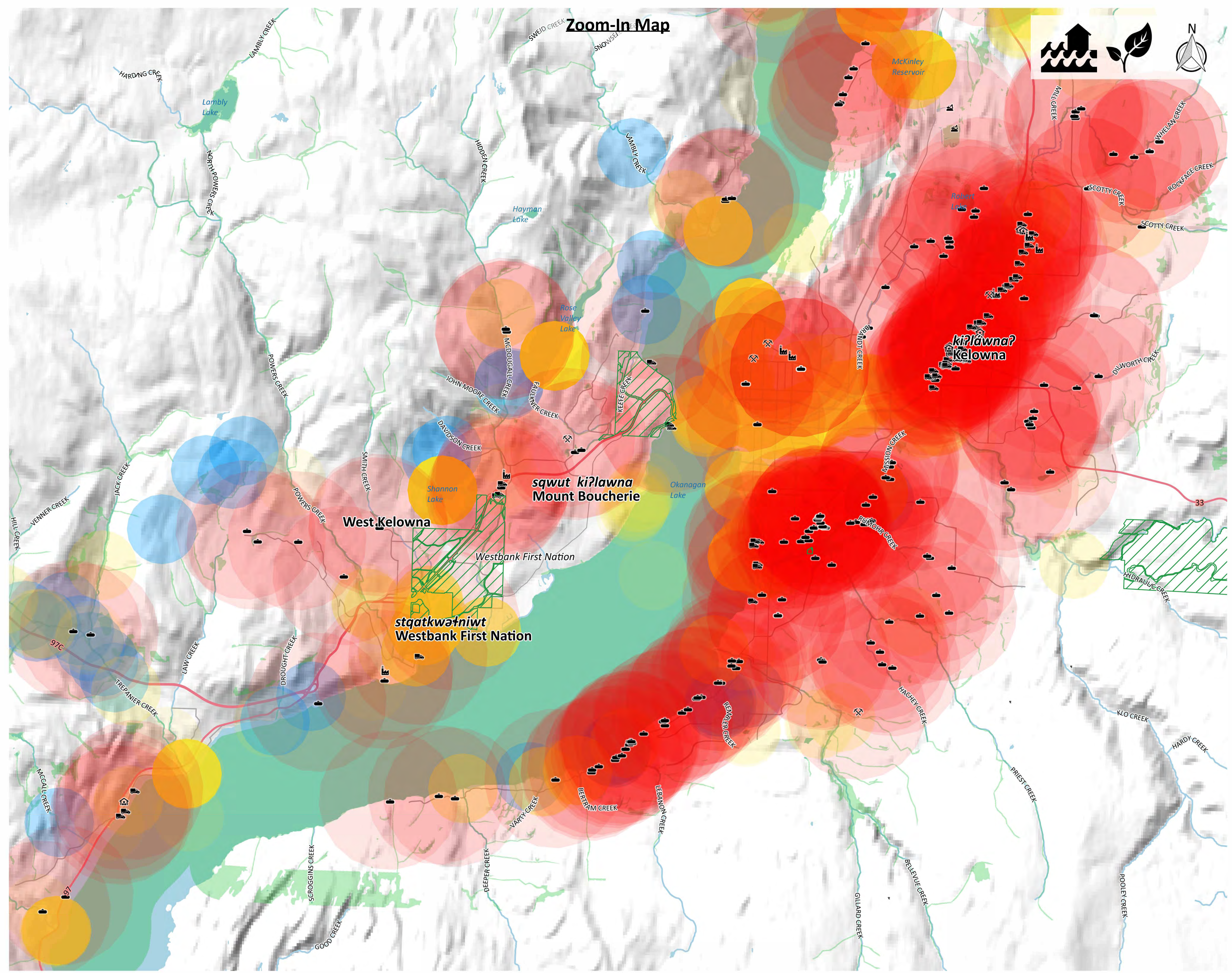
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|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▭ Reserves | ● Drinking Water Wells |
| ▭ Lakes | ▭ High Biodiversity Area |
| ▭ Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🗑 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

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

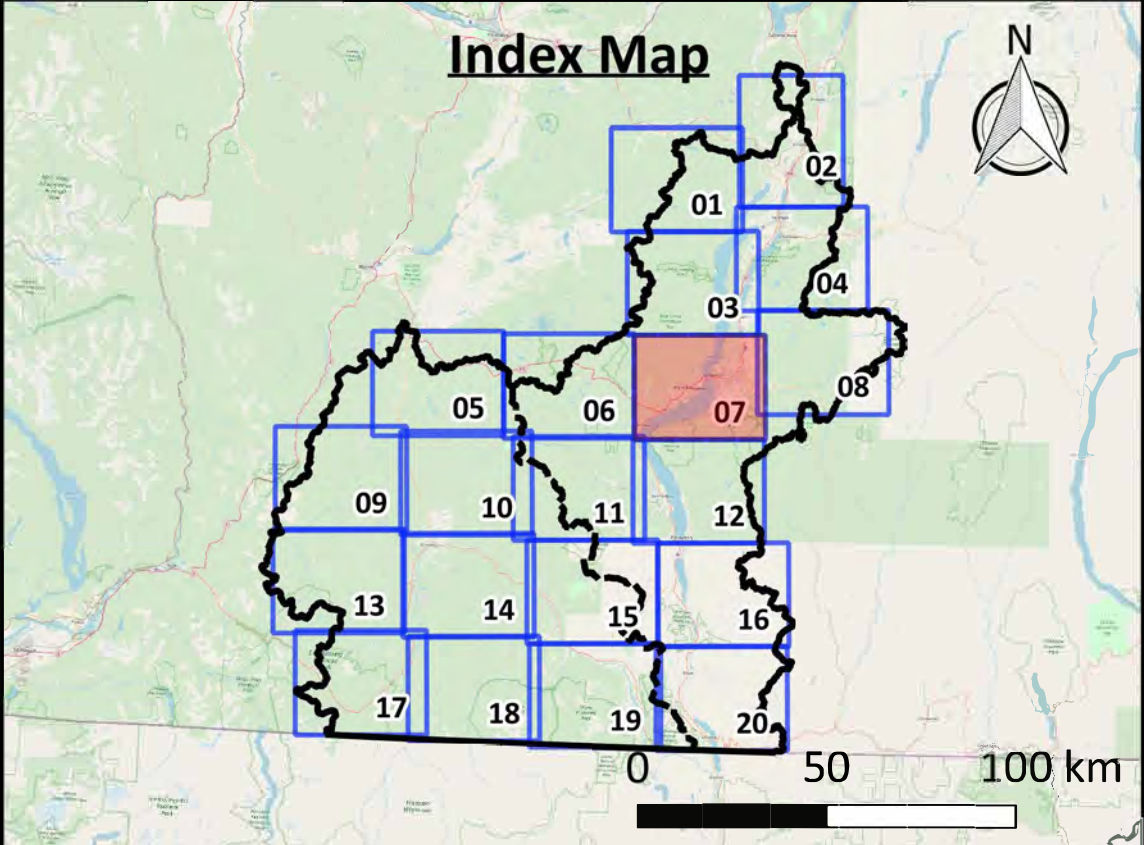
Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
Map Tile 06 of 20

ANSI D - Map No. EN-F-003-006





Zoom-In Map



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Map Notes

- Map produced by Ebbwater Consulting Inc.
- Affected assets have been defined in terms of contamination sources (e.g. industrial sites, transport facilities, and septic tanks and sewer systems) and environmental receptors (i.e. fish observations, drinking water wells, and high biodiversity areas).
- Potential contamination sources were clipped to the moderate flood hazard area. The hazard layer is shown in the hazard maps, and was produced by Ebbwater Consulting Inc. The method used to produce the hazard layer is described in the Quantitative Study.
- Drinking water wells and fish observations are represented by circles of a 1 km radius. These receptors, along with high biodiversity areas were considered "contaminated" where they were within a 2 km radius of a potential contaminant source.

Data Sources

- Lakes and Watercourses: BC Data Catalogue.
- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY SA) and hill shade created using CDEM and USGM GMTED2010.

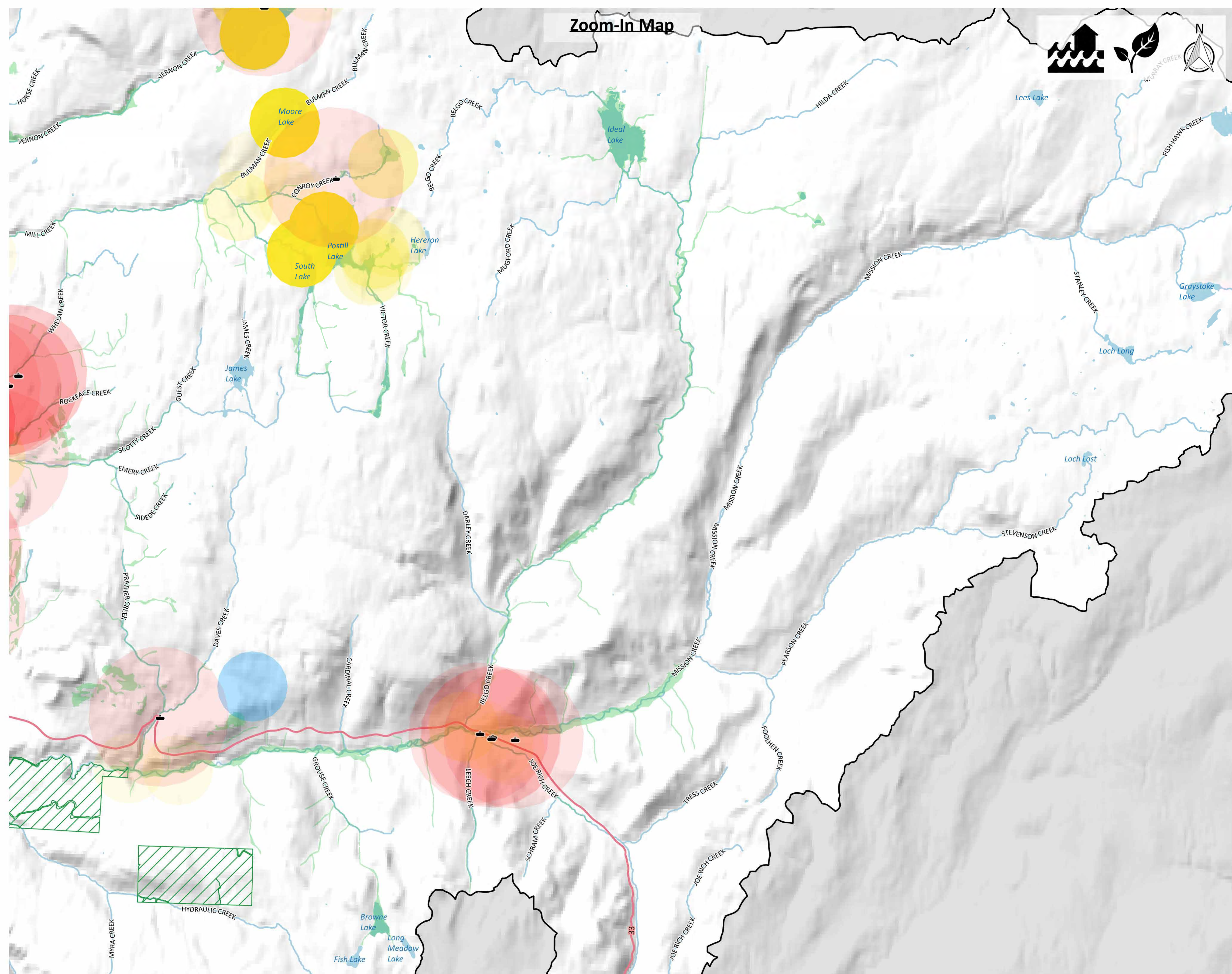


| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🗑 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

Date: 31 December 2019
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Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
Map Tile 07 of 20

ANSI D - Map No. EN-F-003-007



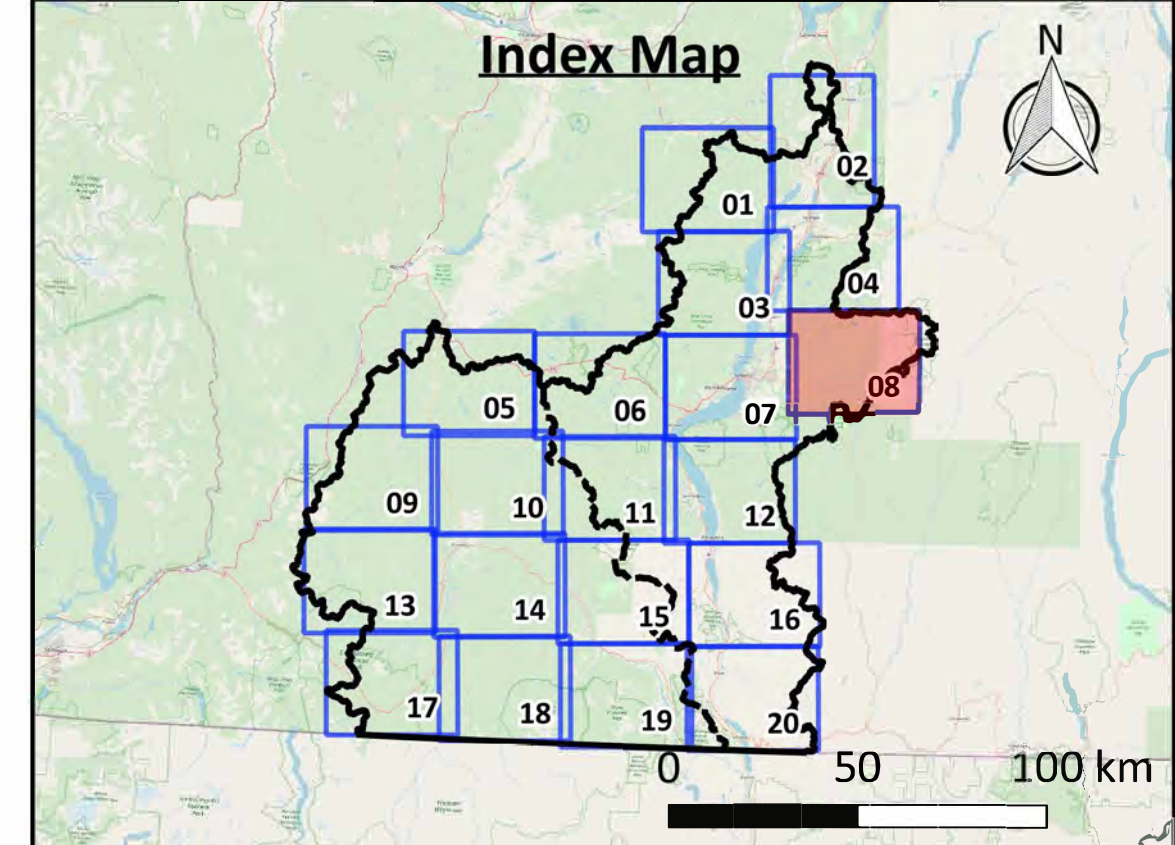
Zoom-In Map



ebbwater CONSULTING
THOUGHTFUL FLOOD MANAGEMENT

Palmer Environmental Consulting Group Inc.

Sylix Okanagan Nation Alliance



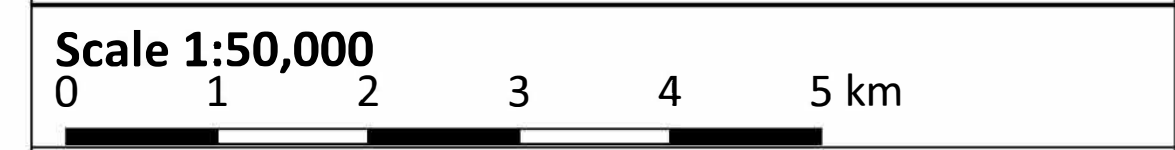
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Map Notes

- Map produced by Ebbwater Consulting Inc.
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Data Sources

- Lakes and Watercourses: BC Data Catalogue.
- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.



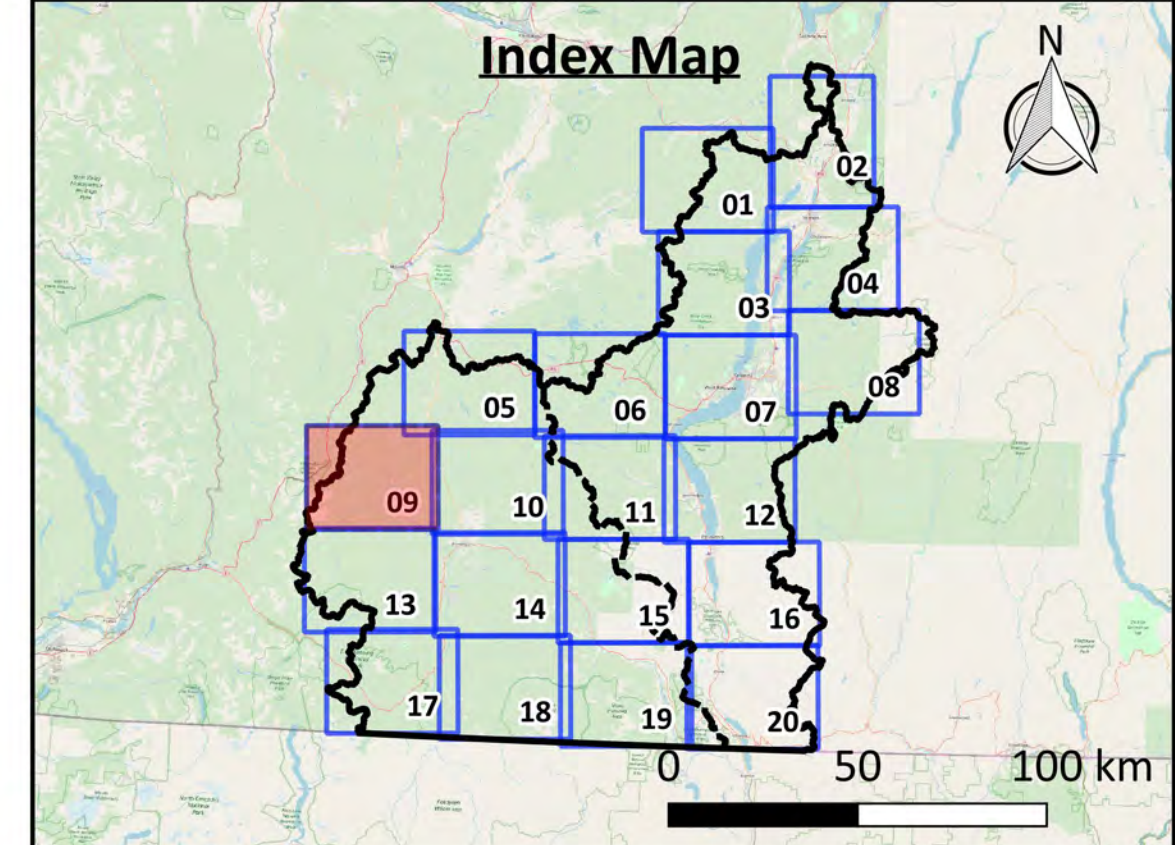
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|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🚽 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

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Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
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ANSI D - Map No. EN-F-003-008

Zoom-In Map



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Map Notes

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Data Sources

- Lakes and Watercourses: BC Data Catalogue.
- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

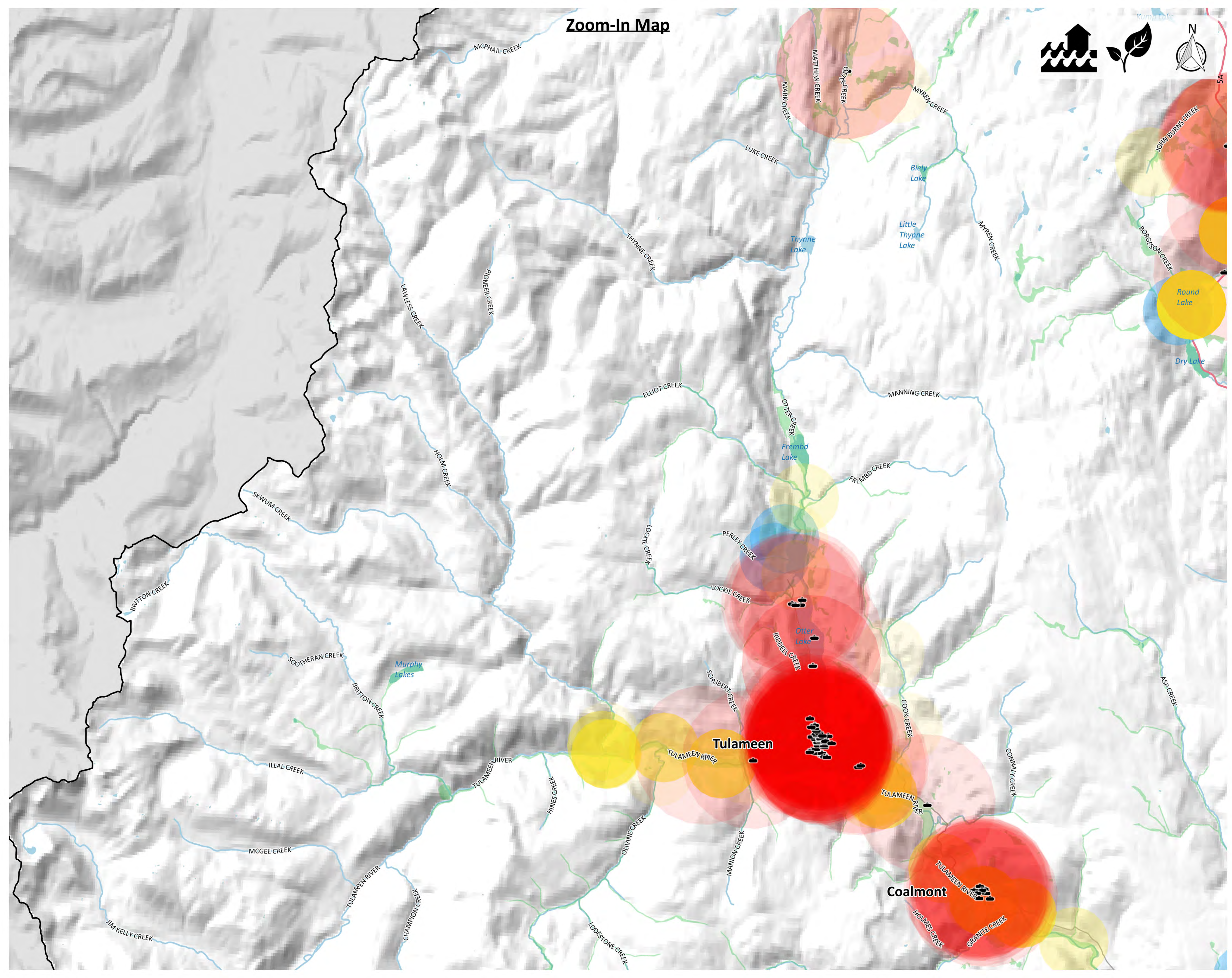


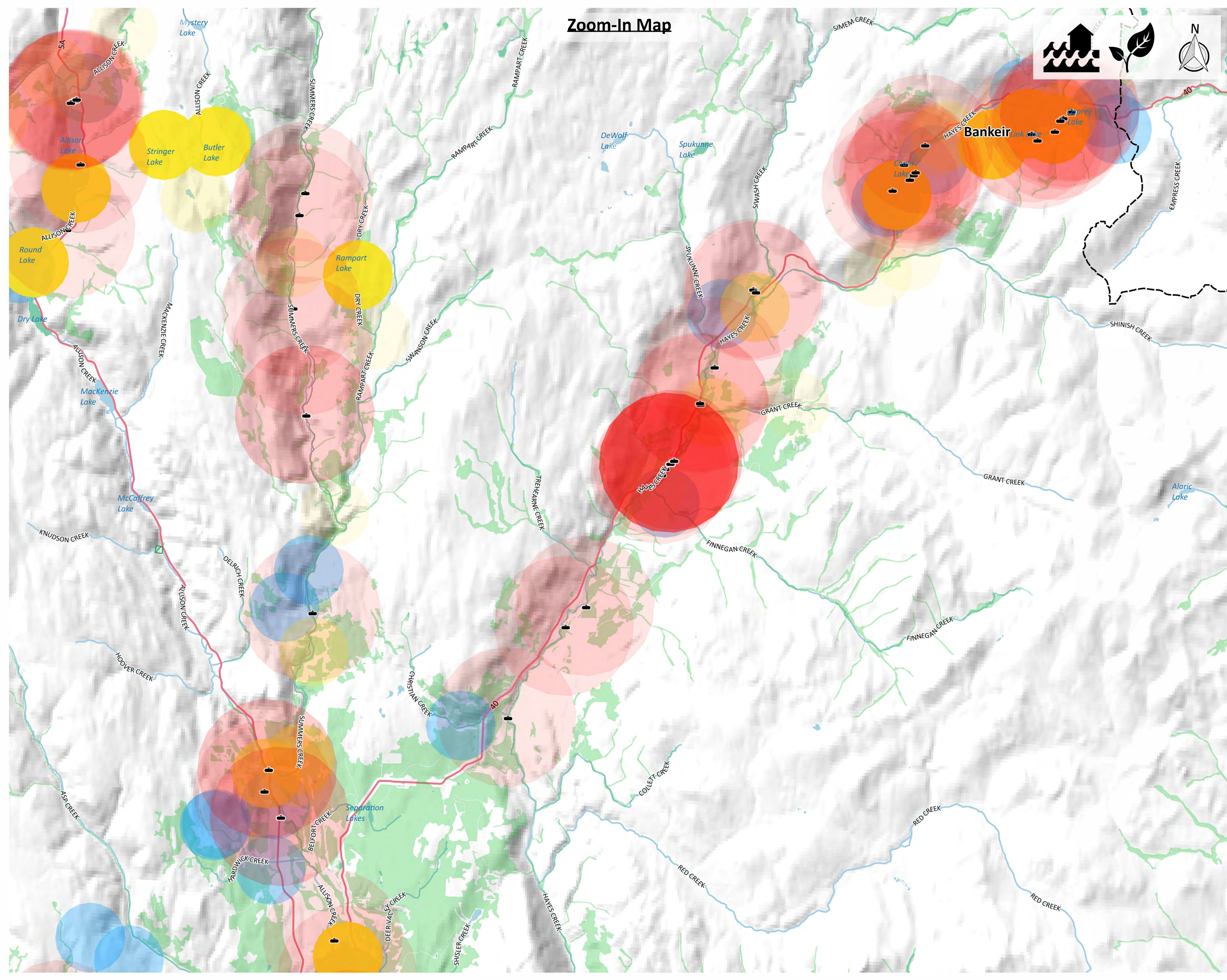
| Legend | |
|---------------------------------|----------------------------------|
| Background | Affected Assets |
| Watershed Boundary | Contamination Sources |
| Canada - US Border | Fish Observations |
| Reserves | Drinking Water Wells |
| Lakes | High Biodiversity Area |
| Watercourses | Contamination Source Type |
| Highway | Heavy industry and mining |
| Major Road | Manufacturing (inc. food) |
| Okanagan - Similkameen Boundary | Septic and sewer systems |
| | Storage |
| | Transport |
| | Waste and landfill |

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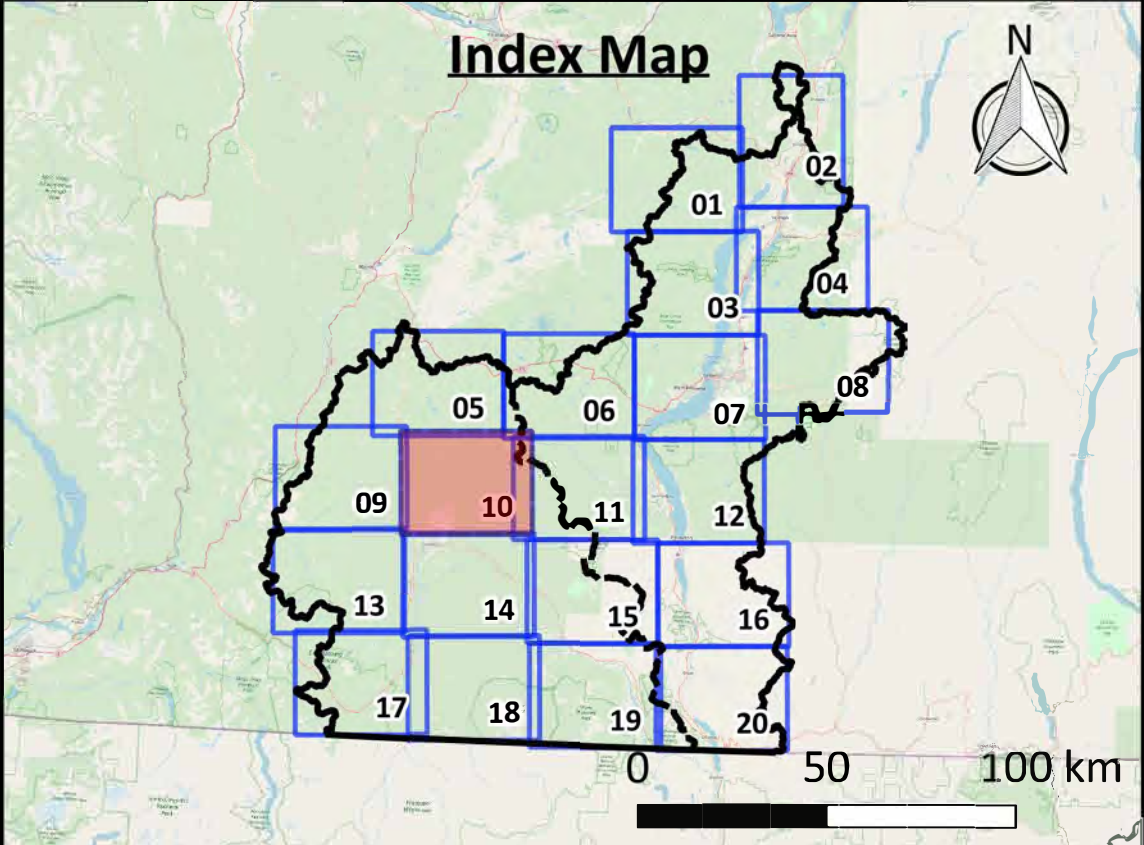
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Flood - Environment - Quantitative
Map Tile 09 of 20

ANSI D - Map No. EN-F-003-009





Zoom-In Map



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Map Notes

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Data Sources

- Lakes and Watercourses: BC Data Catalogue.
- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY SA) and hill shade created using CDEM and USGM GMTED2010.

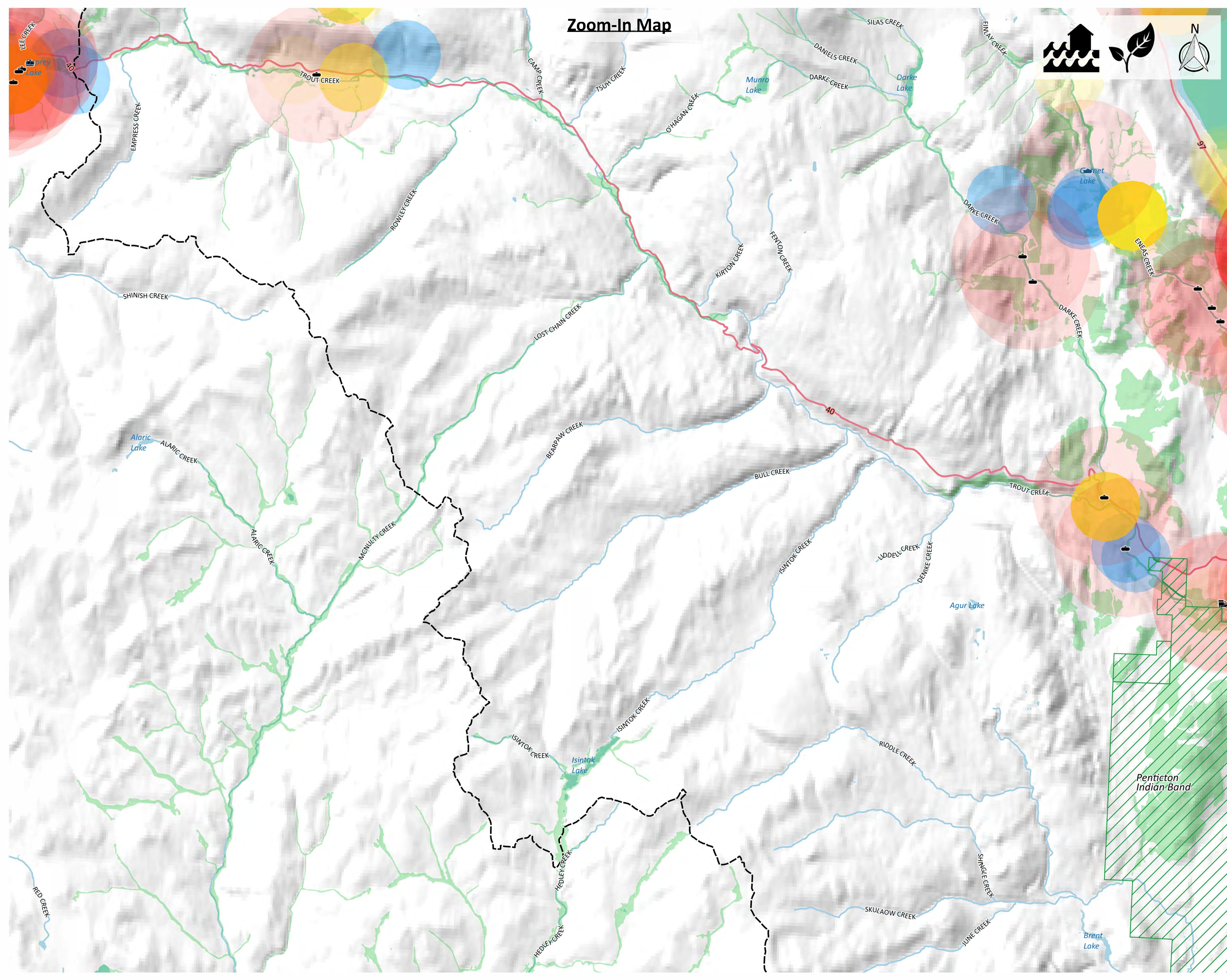


| Background | | Affected Assets | |
|--------------------|---------------------------------|---------------------------|---------------------------|
| Watershed Boundary | Contamination Sources | Fish Observations | Drinking Water Wells |
| Canada - US Border | Lakes | High Biodiversity Area | Heavy industry and mining |
| Reserves | Watercourses | Manufacturing (inc. food) | Septic and sewer systems |
| Lakes | Highway | Storage | Transport |
| Watercourses | Major Road | Waste and landfill | |
| Highway | Okanagan - Similkameen Boundary | | |

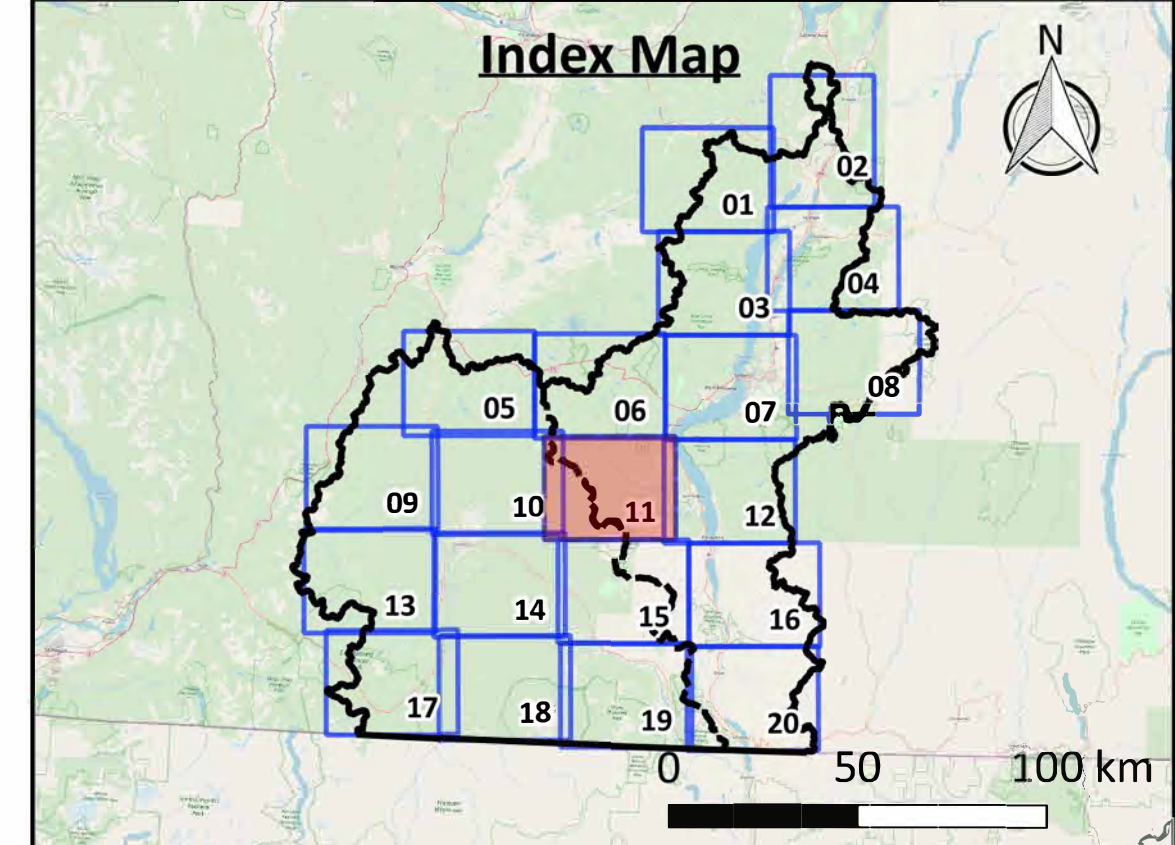
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Flood - Environment - Quantitative
Map Tile 10 of 20

ANSI D - Map No. EN-F-003-010



Zoom-In Map



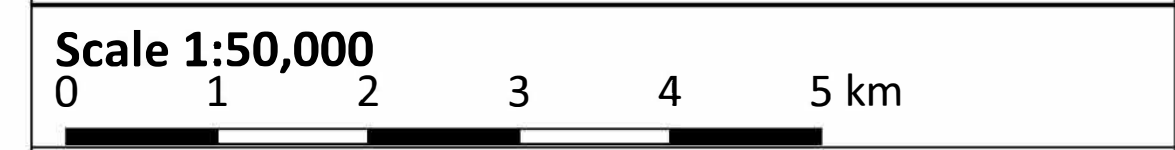
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Map Notes

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Data Sources

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- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY SA) and hill shade created using CDEM and USGM GMTED2010.



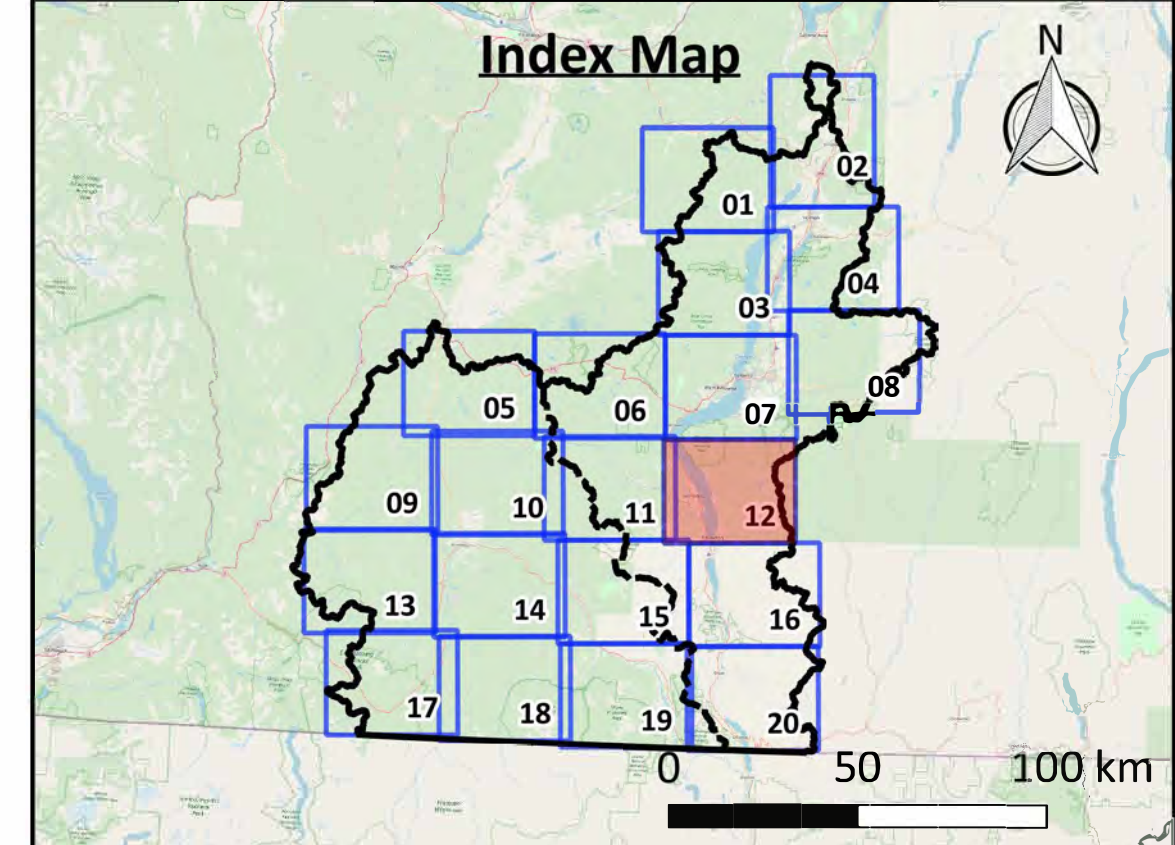
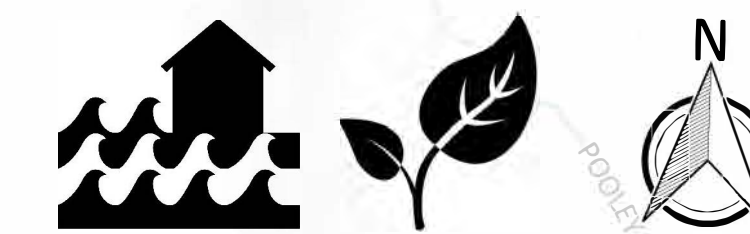
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|-------------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| --- Okanagan - Similkameen Boundary | 🗑 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
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ANSI D - Map No. EN-F-003-011

Zoom-In Map



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Map Notes

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Data Sources

- Lakes and Watercourses: BC Data Catalogue.
- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY SA) and hill shade created using CDEM and USGM GMTED2010.

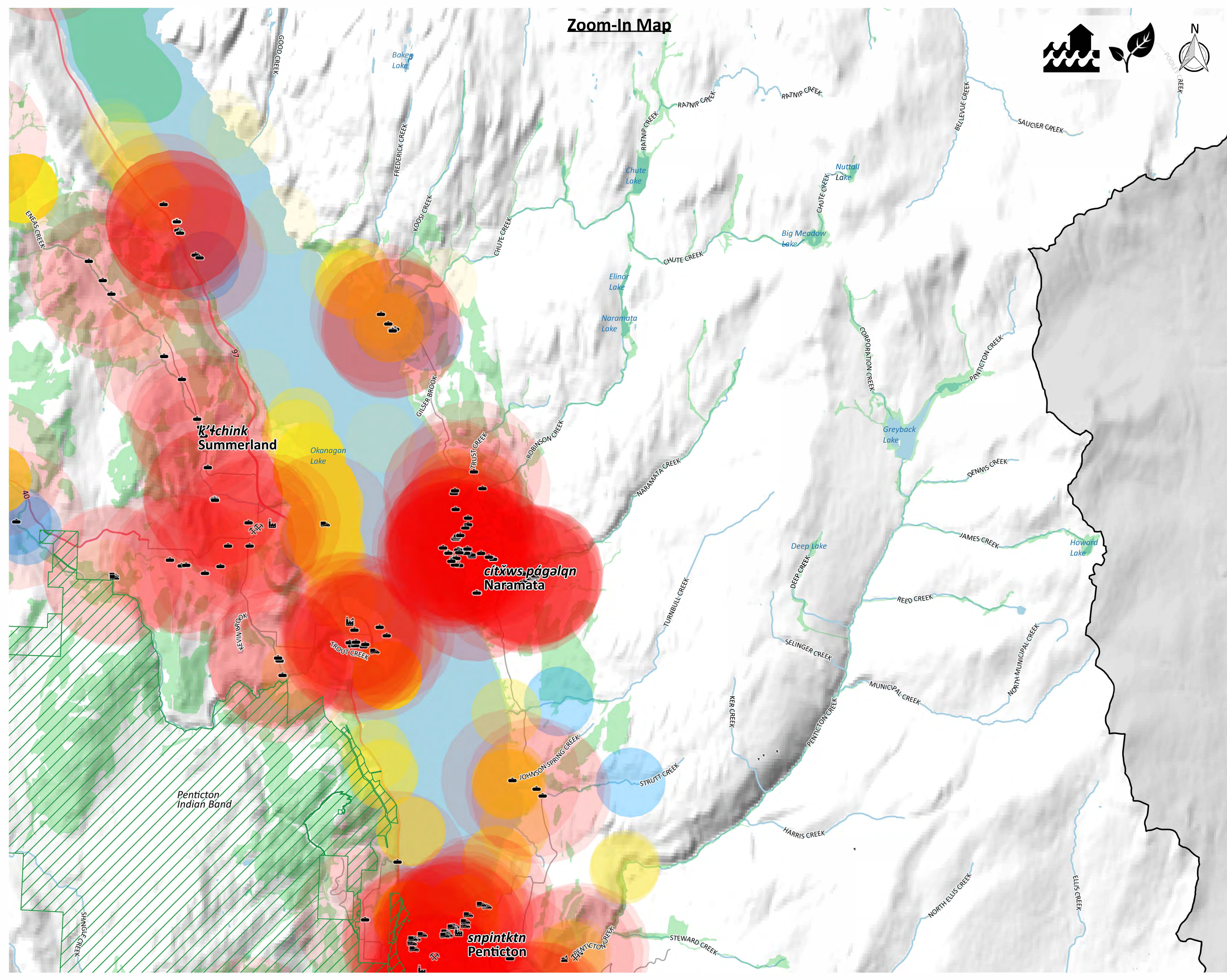


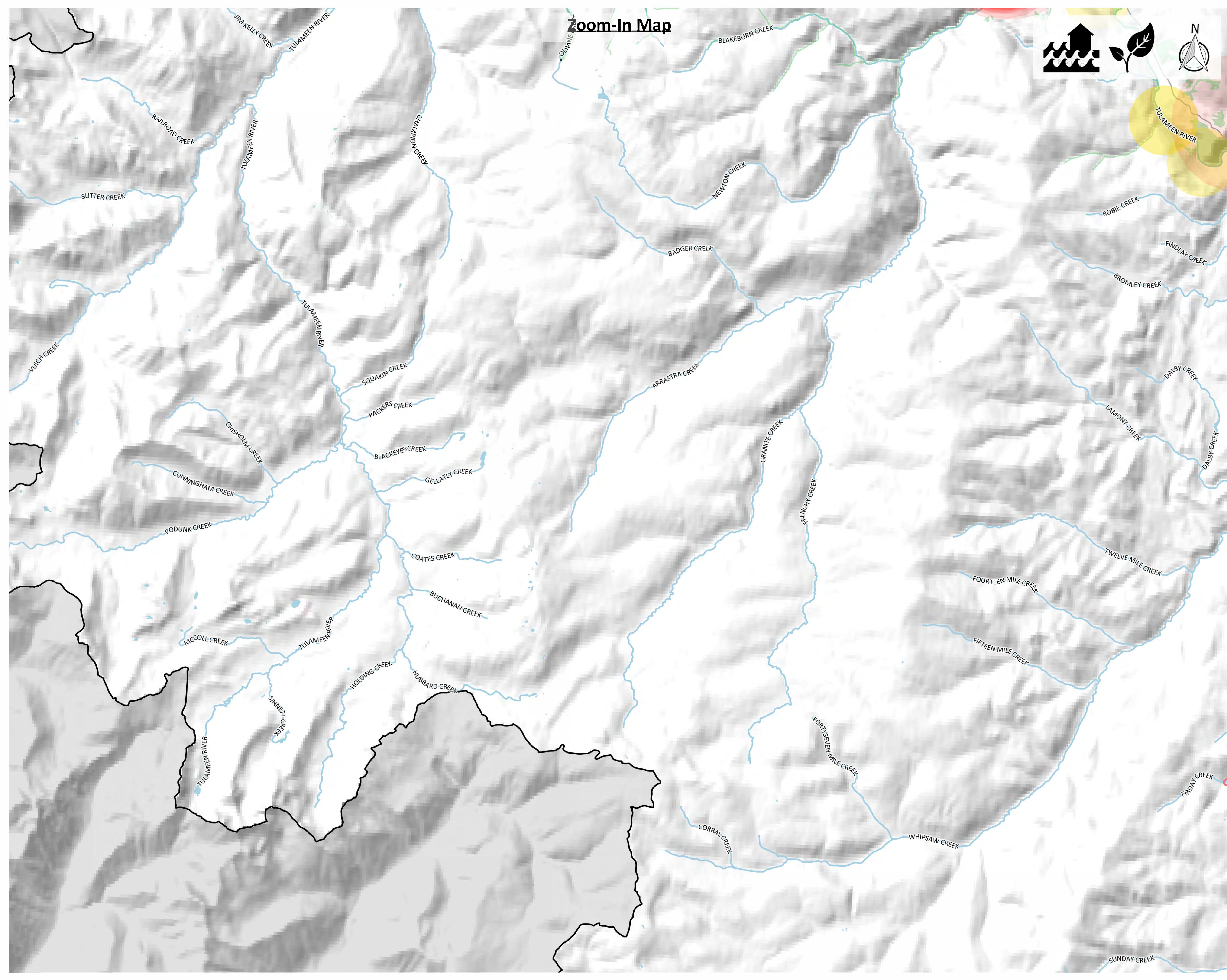
| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🗑 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

Date: 31 December 2019
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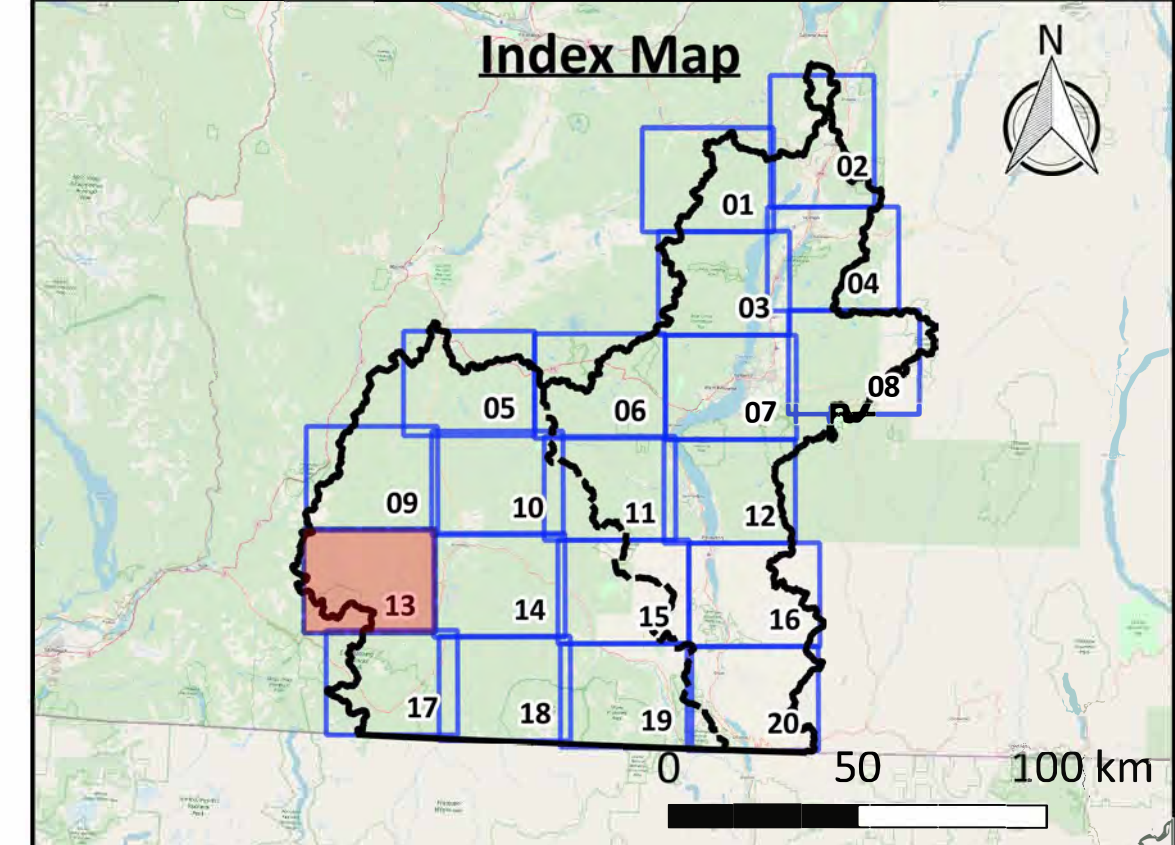
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Flood - Environment - Quantitative
Map Tile 12 of 20

ANSI D - Map No. EN-F-003-012





Zoom-In Map



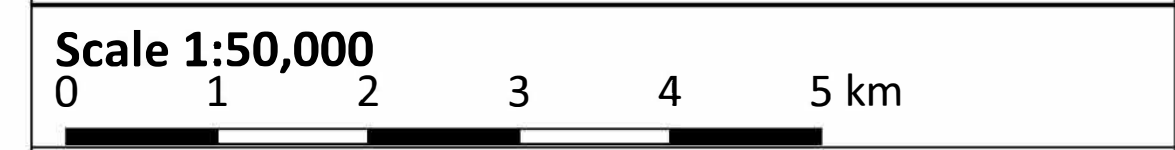
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Map Notes

1. Map produced by Ebbwater Consulting Inc.
2. Affected assets have been defined in terms of contamination sources (e.g. industrial sites, transport facilities, and septic tanks and sewer systems) and environmental receptors (i.e. fish observations, drinking water wells, and high biodiversity areas).
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Data Sources

1. Lakes and Watercourses: BC Data Catalogue.
2. Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
3. Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
4. Sylix Place Names: Okanagan Nation Alliance.
5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY SA) and hill shade created using CDEM and USGM GMTED2010.

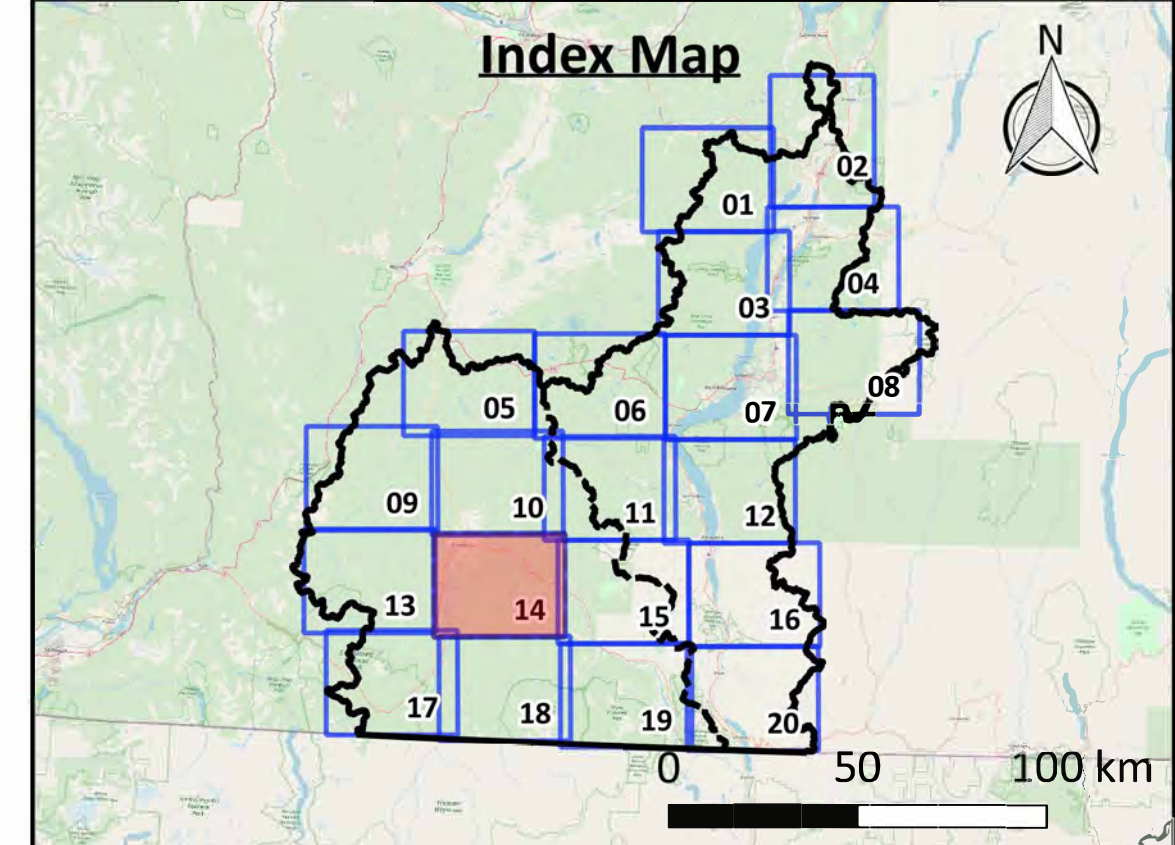
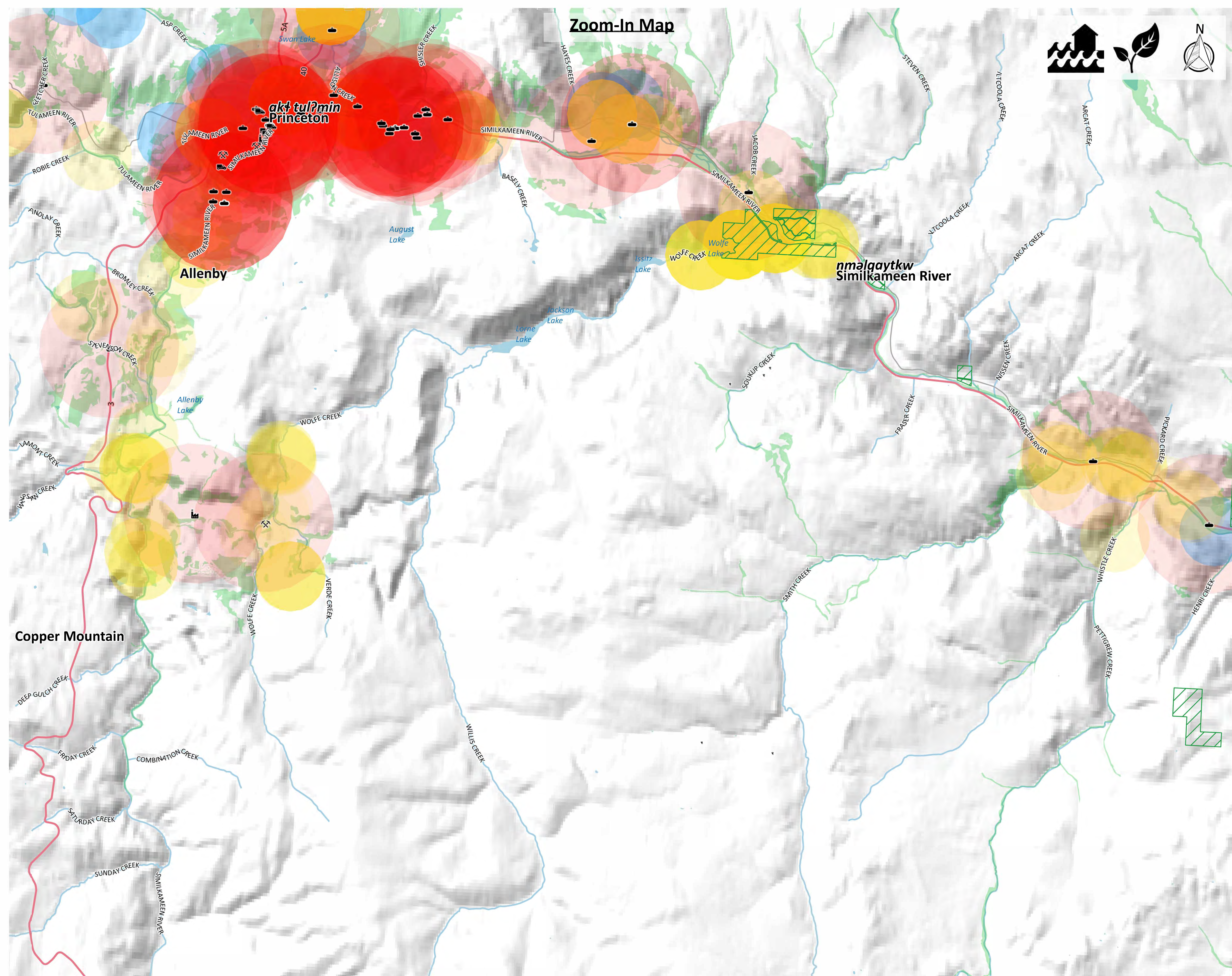


| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▭ Reserves | ● Drinking Water Wells |
| ● Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚡ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🗑️ Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑️ Waste and landfill |

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

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Flood - Environment - Quantitative
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ANSI D - Map No. EN-F-003-013



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Map Notes

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Data Sources

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- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY SA) and hill shade created using CDEM and USGM GMTED2010.



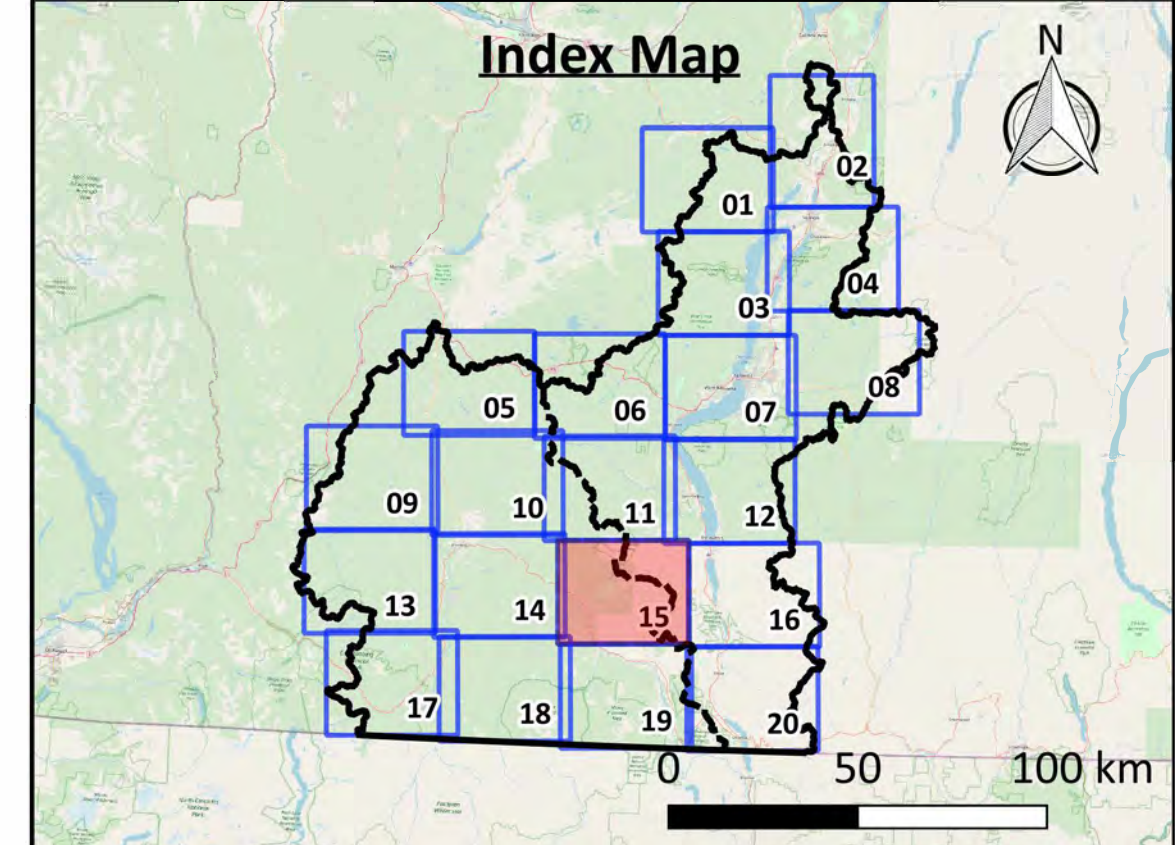
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| — Canada - US Border | ● Fish Observations |
| ▭ Reserves | ● Drinking Water Wells |
| ● Lakes | ● High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⊠ Heavy industry and mining |
| — Major Road | ⊠ Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | ⊠ Septic and sewer systems |
| | ⊠ Storage |
| | ⊠ Transport |
| | ⊠ Waste and landfill |

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

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Flood - Environment - Quantitative
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ANSI D - Map No. EN-F-003-014

Zoom-In Map



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Map Notes

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Data Sources

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- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY SA) and hill shade created using CDEM and USGM GMTED2010.

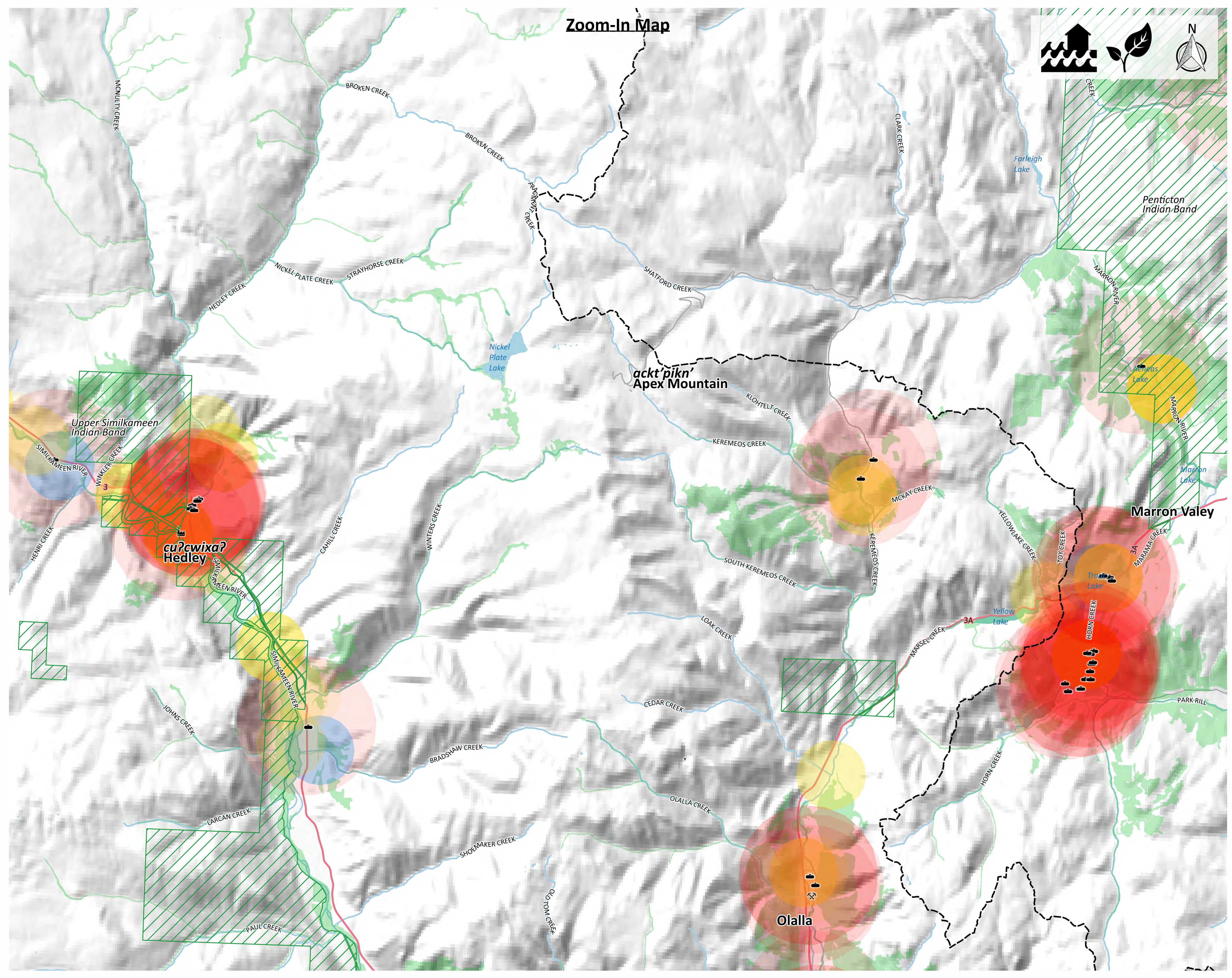
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| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ● Lakes | ● High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🚰 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

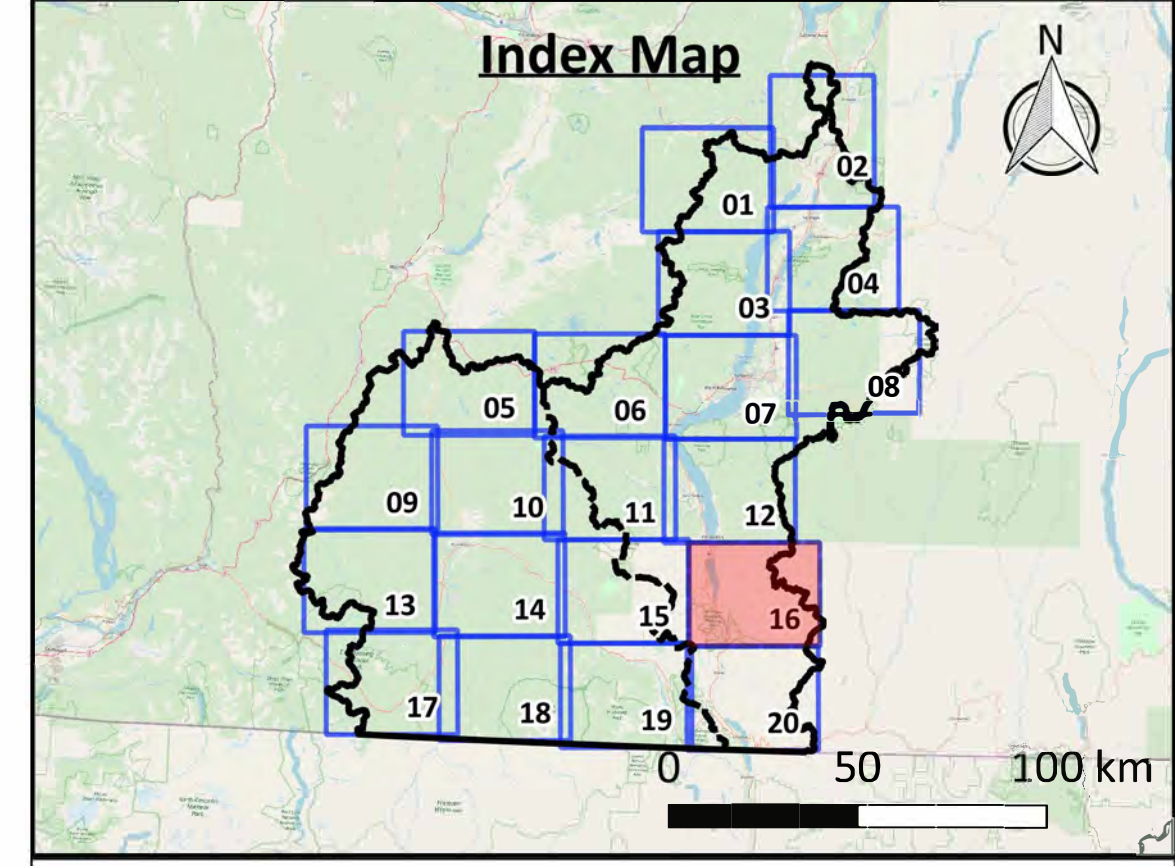
Date: 31 December 2019
Produced by: Ebbwater Consulting Inc.

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Flood - Environment - Quantitative
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ANSI D - Map No. EN-F-003-015



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Map Notes

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- Sylix Place Names: Okanagan Nation Alliance.
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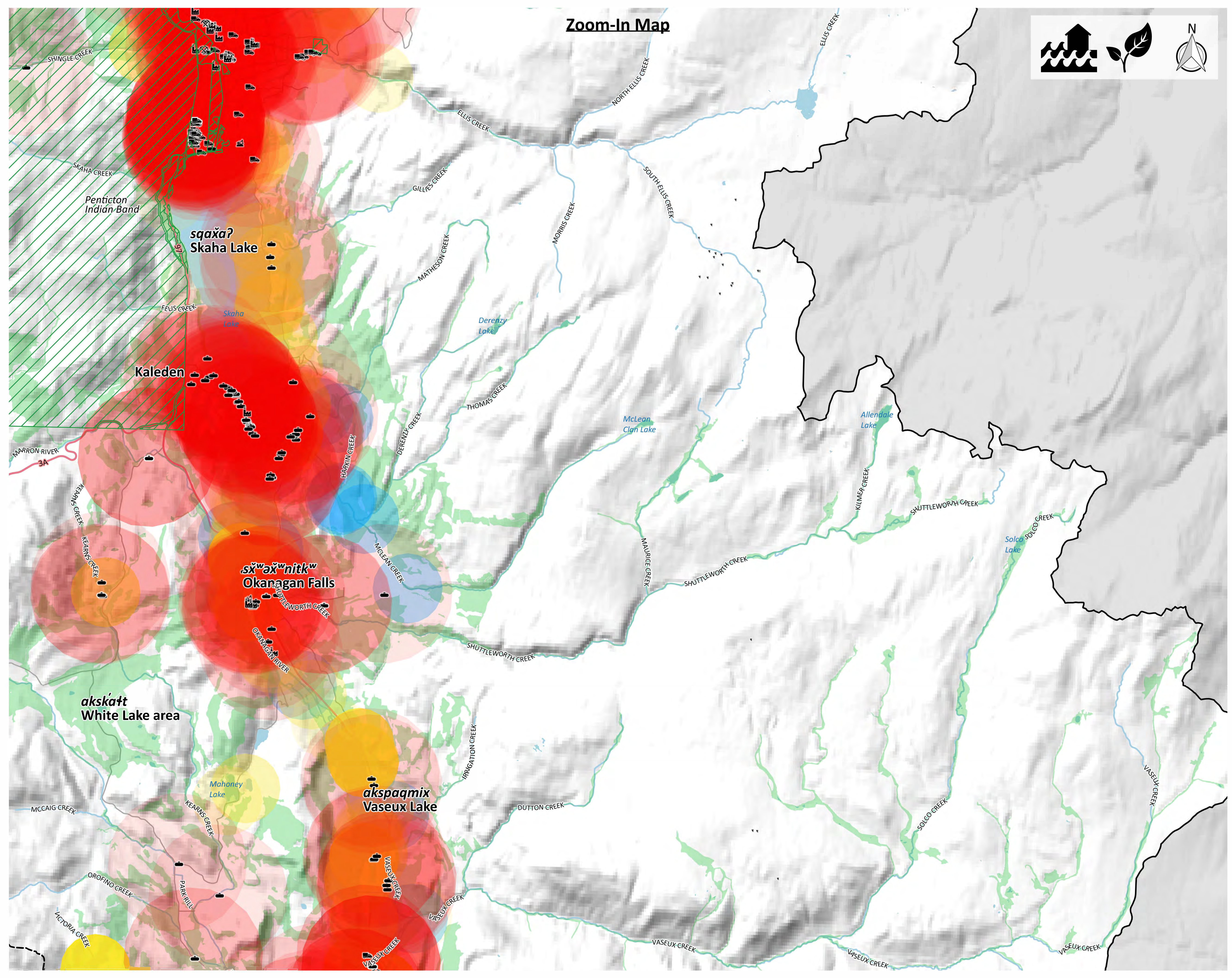


| Legend | |
|---------------------------------|----------------------------------|
| Background | Affected Assets |
| Watershed Boundary | Contamination Sources |
| Canada - US Border | Fish Observations |
| Reserves | Drinking Water Wells |
| Lakes | High Biodiversity Area |
| Watercourses | Contamination Source Type |
| Highway | Heavy industry and mining |
| Major Road | Manufacturing (inc. food) |
| Okanagan - Similkameen Boundary | Septic and sewer systems |
| | Storage |
| | Transport |
| | Waste and landfill |

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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
Map Tile 16 of 20

ANSI D - Map No. EN-F-003-016



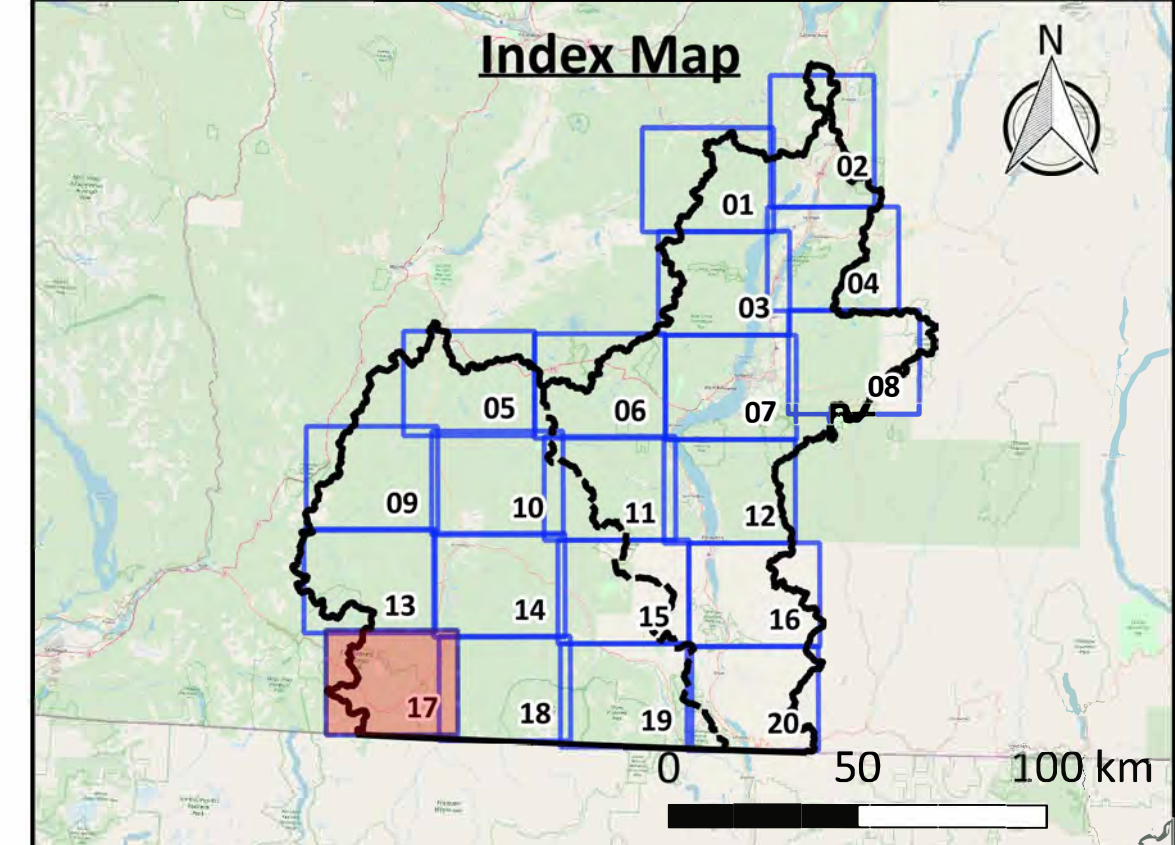
Zoom-In Map



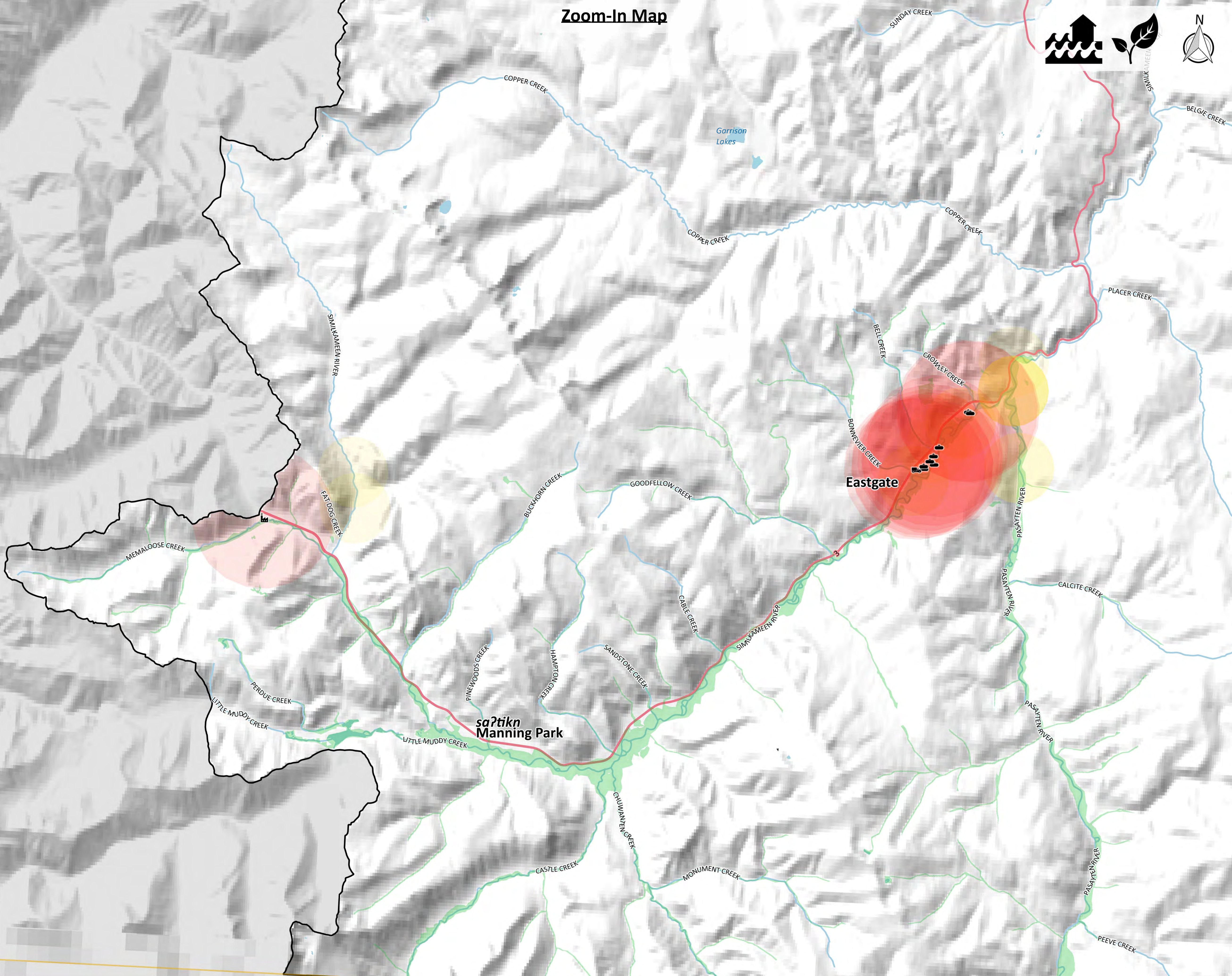
ebbwater CONSULTING
THOUGHTFUL FLOOD MANAGEMENT

Palmer Environmental Consulting Group Inc.

Sylix Okanagan Nation Alliance



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



Map Notes

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| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▭ Reserves | ● Drinking Water Wells |
| ● Lakes | ● High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🗑 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
Map Tile 17 of 20

ANSI D - Map No. EN-F-003-017

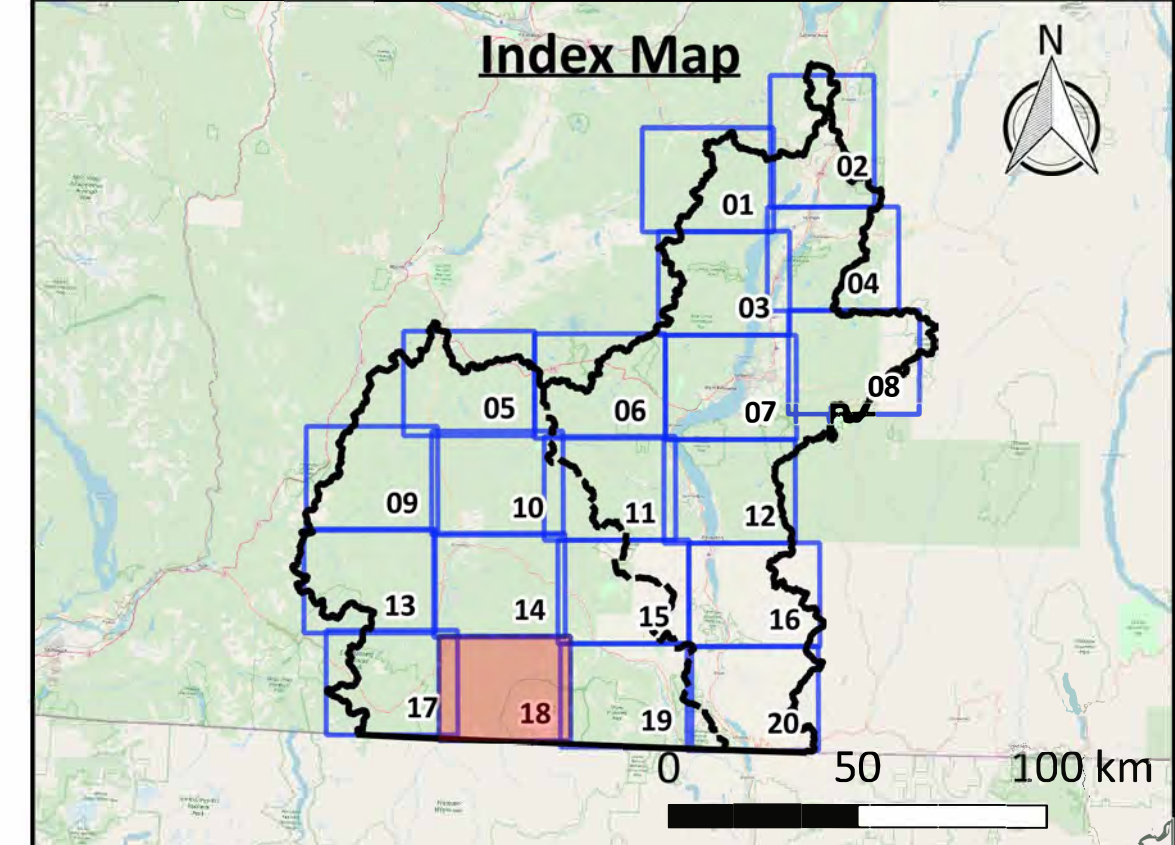
Zoom-In Map



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THOUGHTFUL FLOOD MANAGEMENT

sylix
Palmer Environmental Consulting Group Inc.

Okanagan Nation Alliance



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

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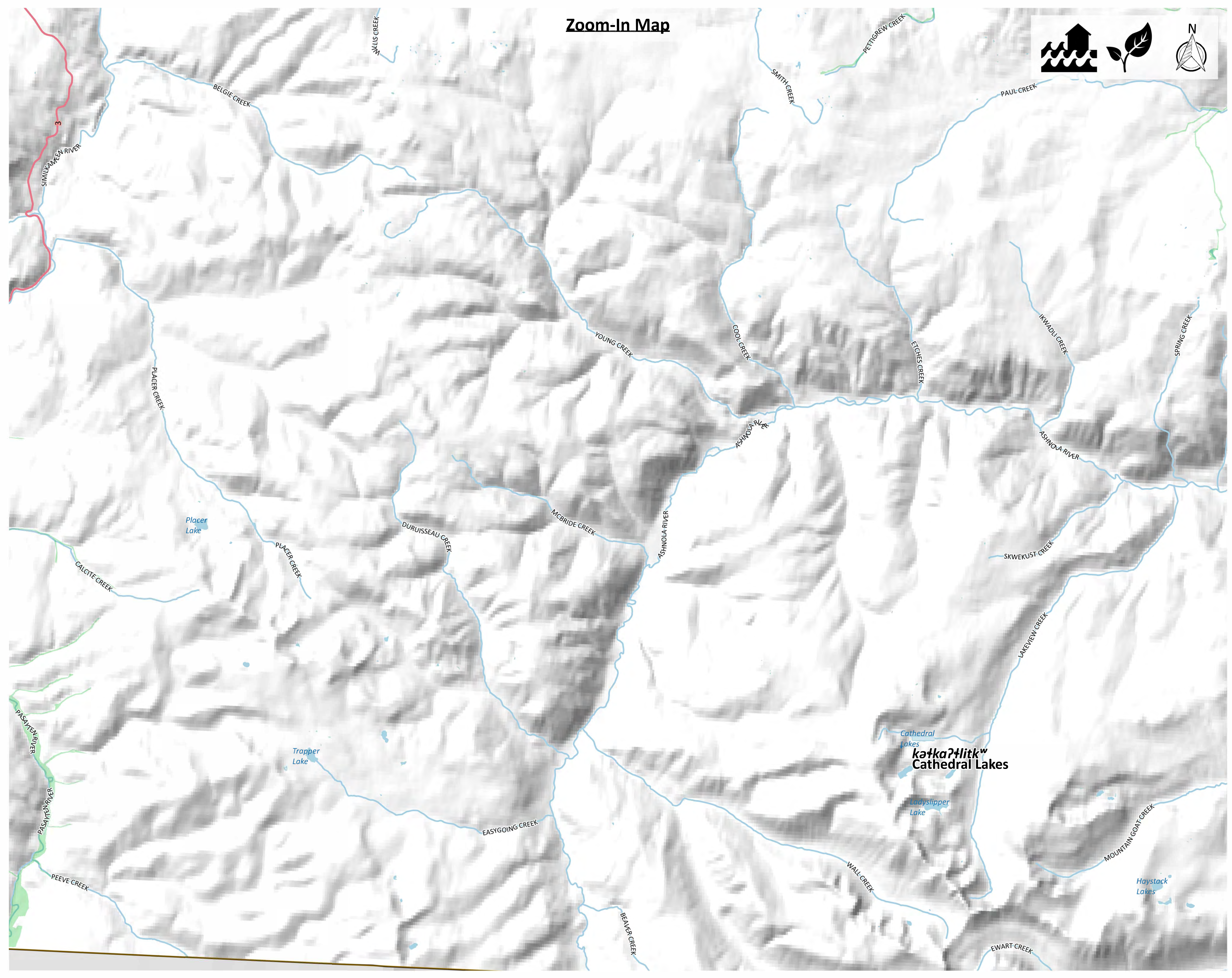


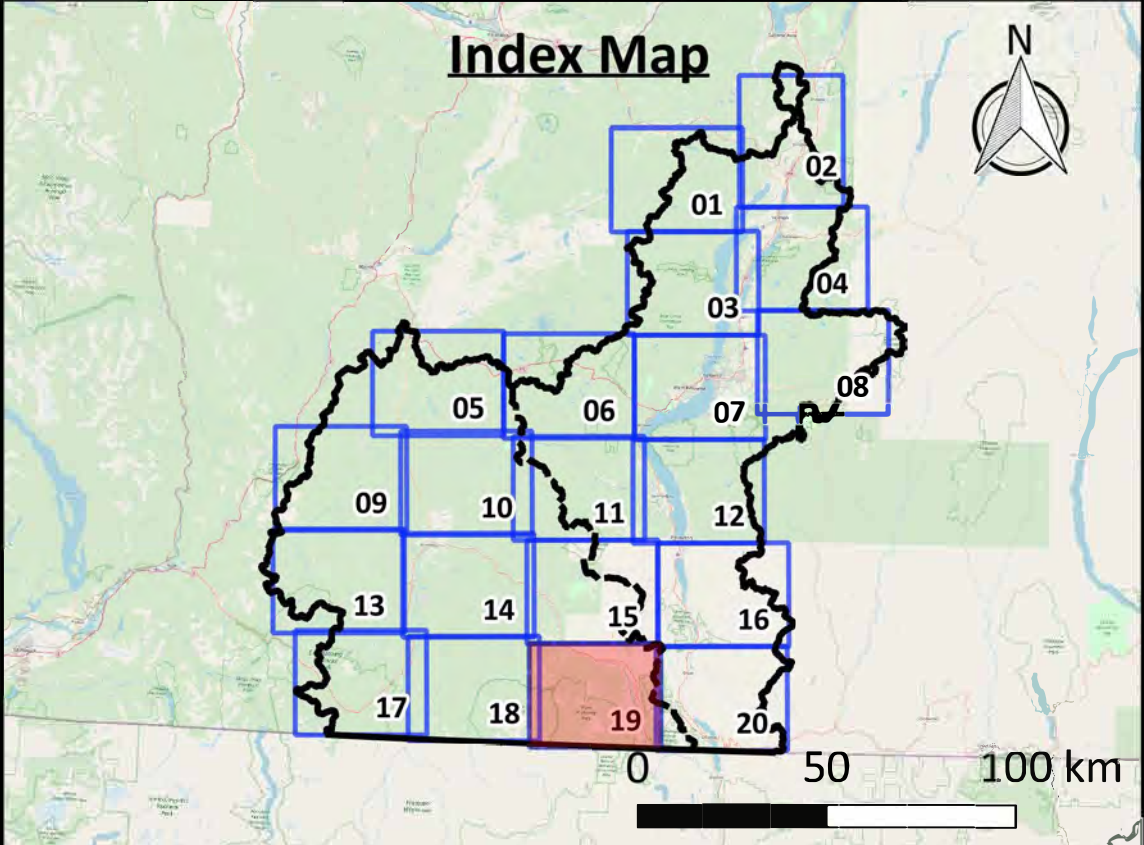
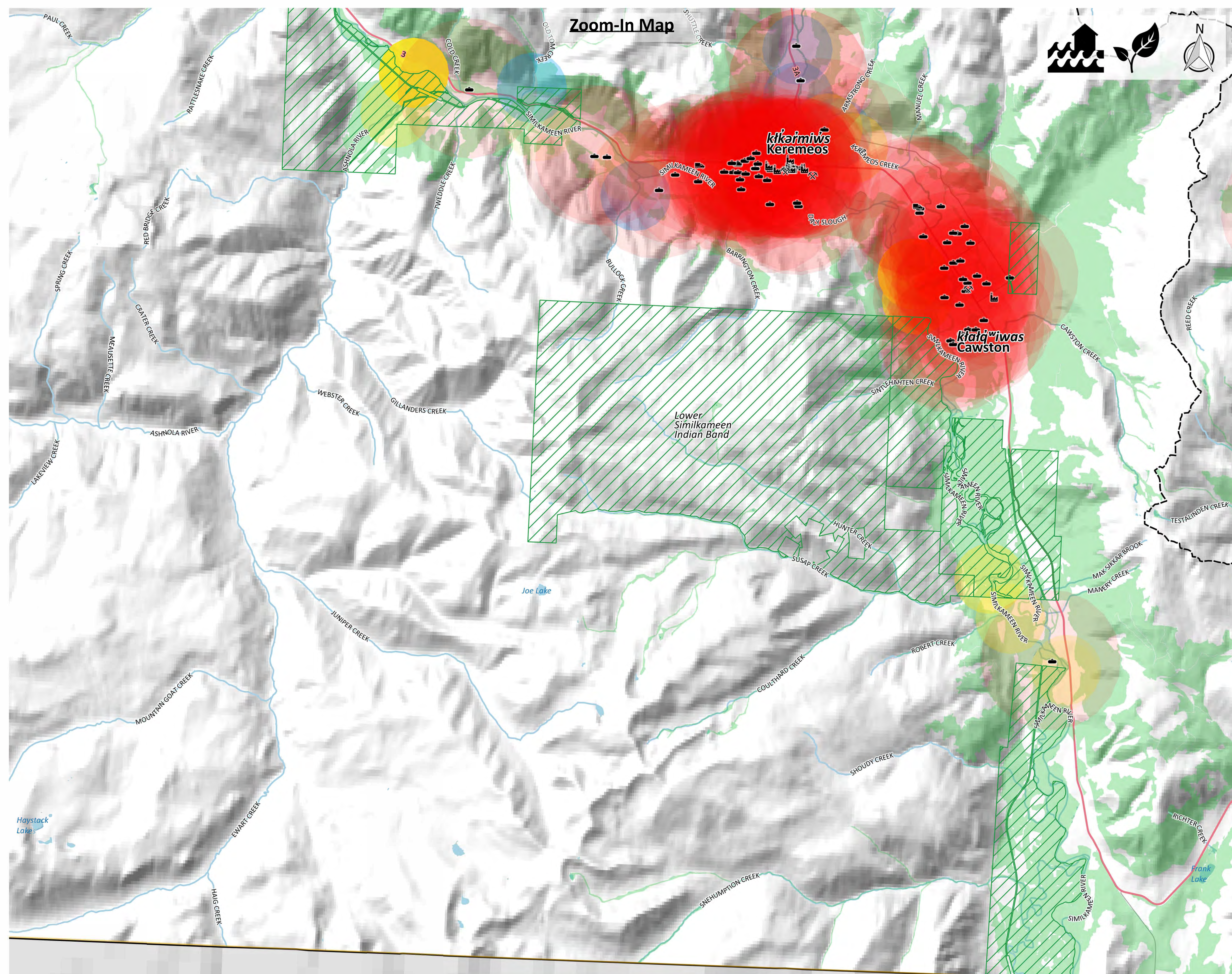
| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▭ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙️ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🚰 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑️ Waste and landfill |

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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
Map Tile 18 of 20

ANSI D - Map No. EN-F-003-018





Click above map tile for Zoom-In map
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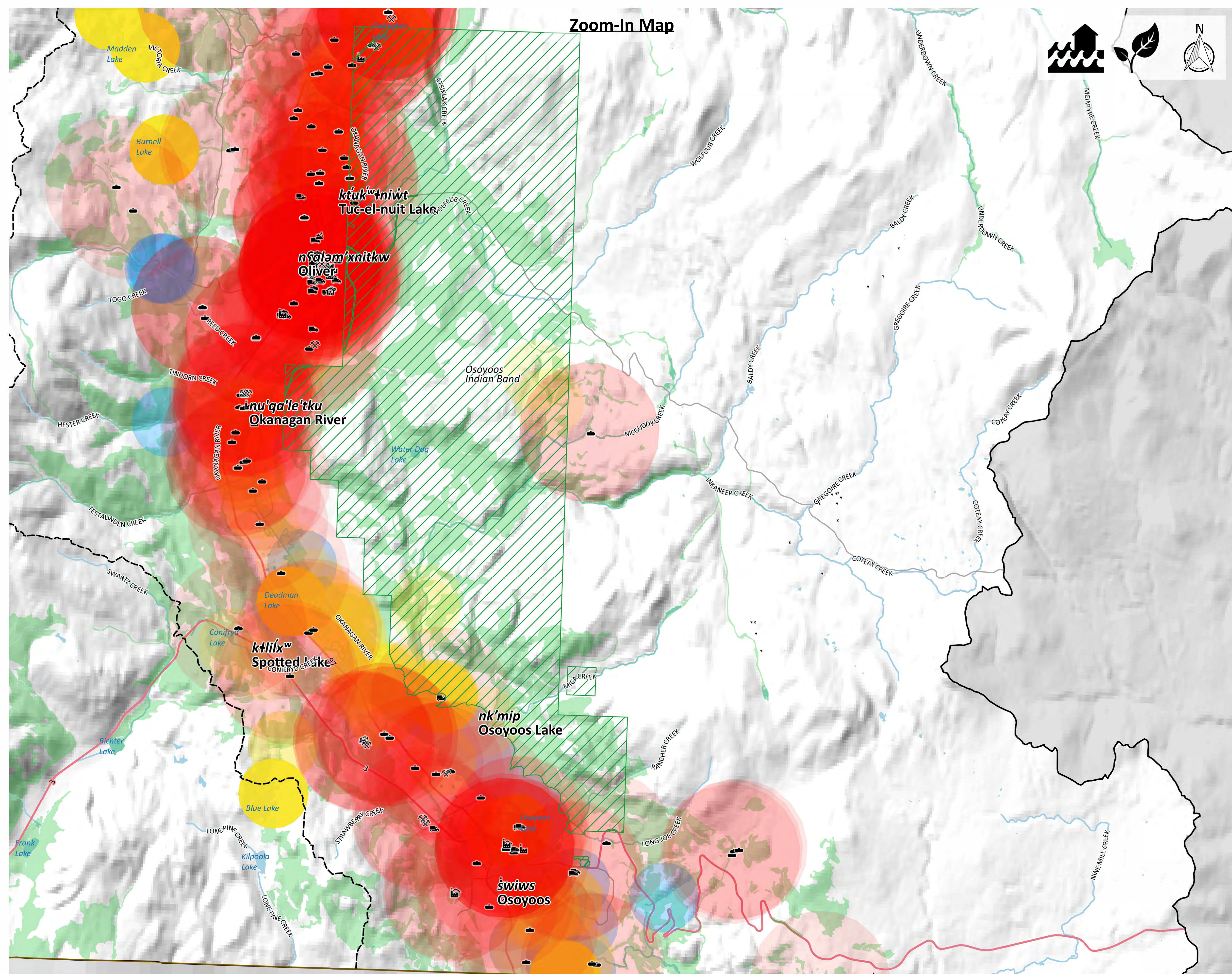


| Background | | Affected Assets | |
|---------------------------------|---------------------------|---------------------------|---------------------------|
| Watershed Boundary | Contamination Sources | Fish Observations | Drinking Water Wells |
| Canada - US Border | High Biodiversity Area | Contamination Source Type | Heavy industry and mining |
| Reserves | Manufacturing (inc. food) | Septic and sewer systems | Storage |
| Lakes | Transport | Waste and landfill | |
| Watercourses | | | |
| Highway | | | |
| Major Road | | | |
| Okanagan - Similkameen Boundary | | | |

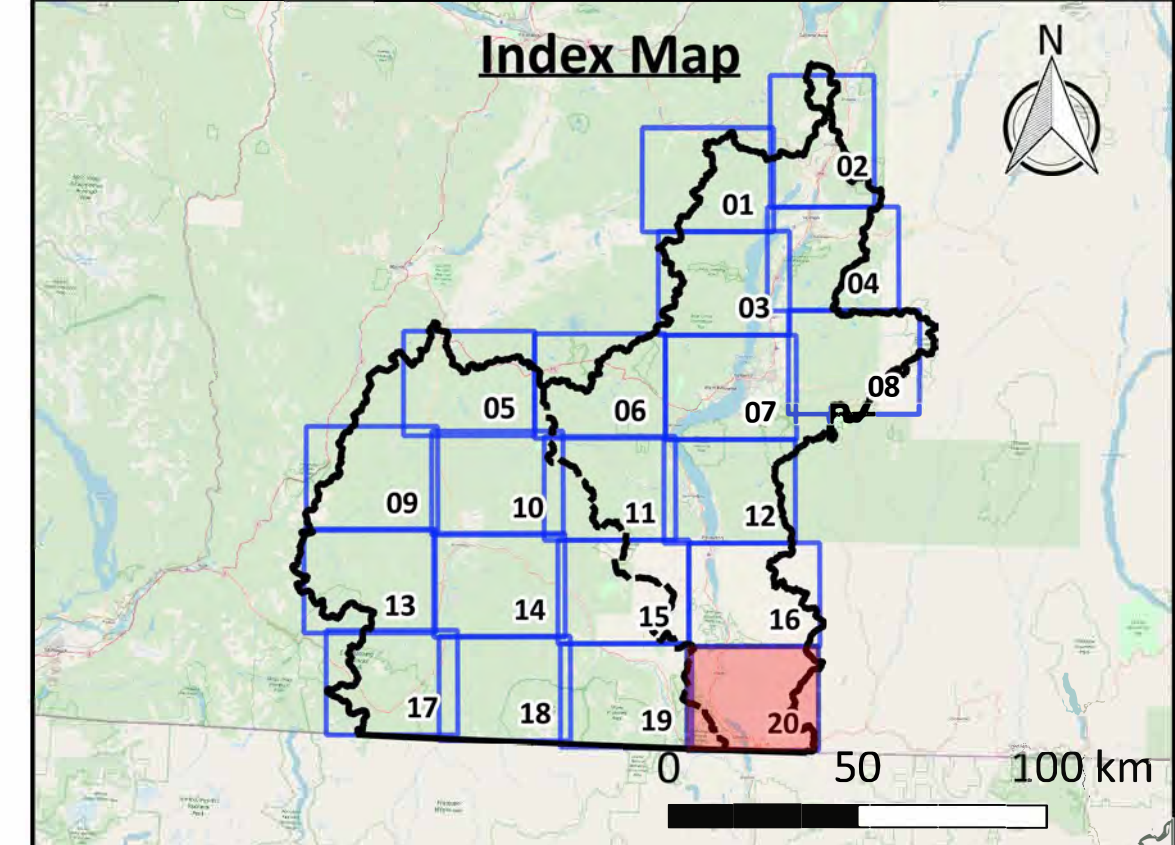
Date: 31 December 2019
Produced by: Ebbwater Consulting Inc.

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
Map Tile 19 of 20

ANSI D - Map No. EN-F-003-019



Zoom-In Map



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

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Scale 1:50,000
 0 1 2 3 4 5 km

| Legend | |
|---------------------------------|--|
| Background | Affected Assets |
| Watershed Boundary | Contamination Sources |
| Canada - US Border | Fish Observations |
| Reserves | Drinking Water Wells |
| Lakes | High Biodiversity Area |
| Watercourses | Contamination Source Type |
| Highway | Okanagan - Similkameen Heavy industry and mining |
| Major Road | Manufacturing (inc. food) |
| Okanagan - Similkameen Boundary | Septic and sewer systems |
| | Storage |
| | Transport |
| | Waste and landfill |

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

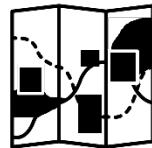
Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Flood - Environment - Quantitative
Map Tile 20 of 20

ANSI D - Map No. EN-F-003-020

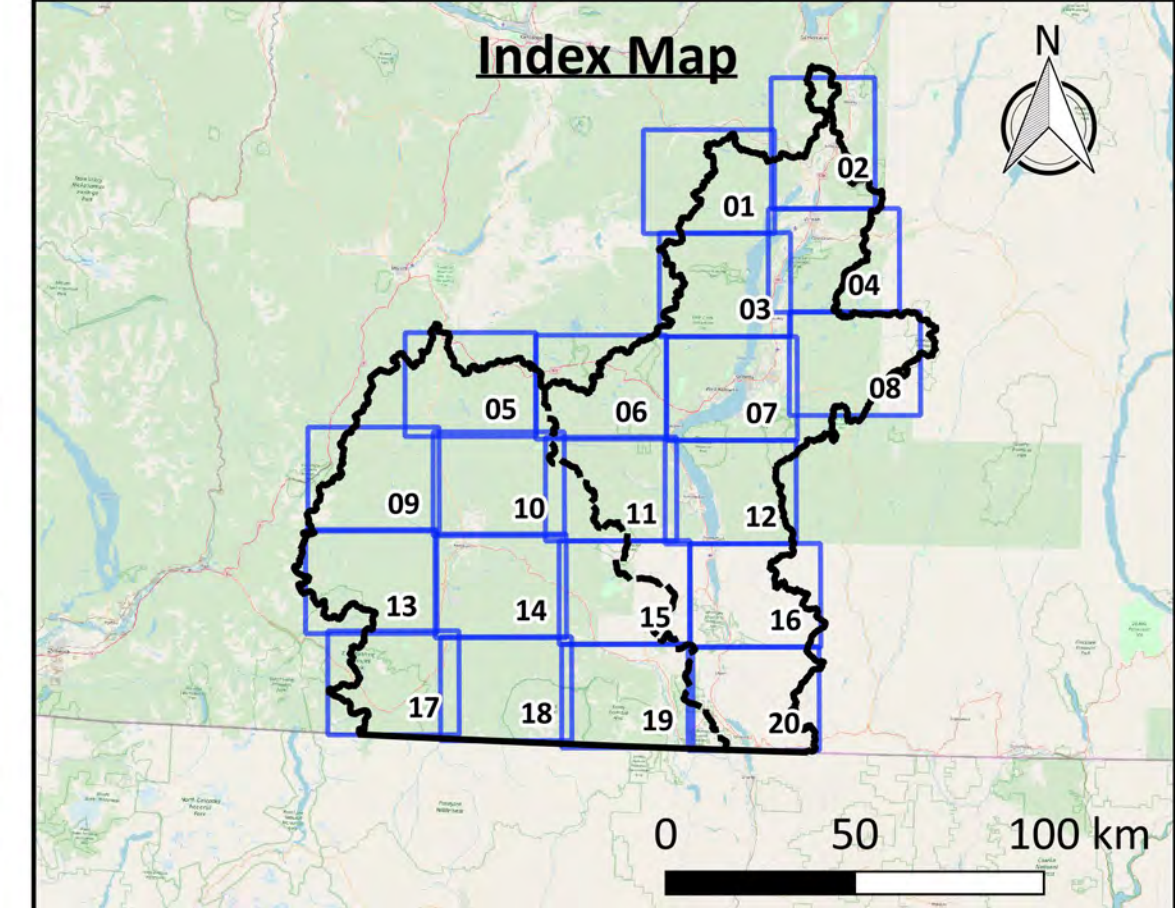
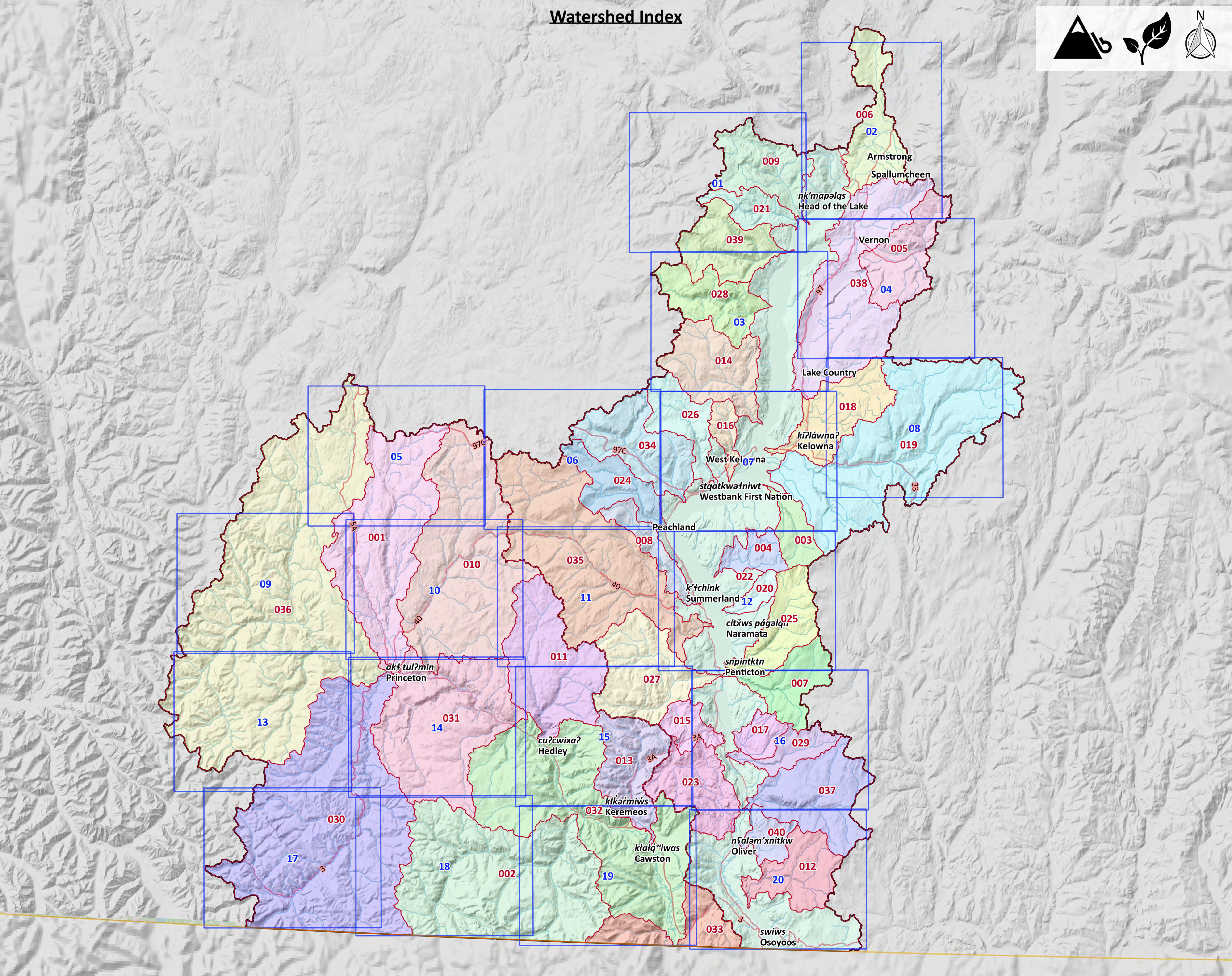
Syilx Okanagan Flood and Debris Flow Risk Assessment Map Book Map Series 2 of 7: Environment Indicator



Quantitative Debris Flow Consequence Maps



Watershed Index



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

Legend

- | | |
|-----------------------------------|---------------------------|
| Background | Sub-Watersheds |
| — 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 |

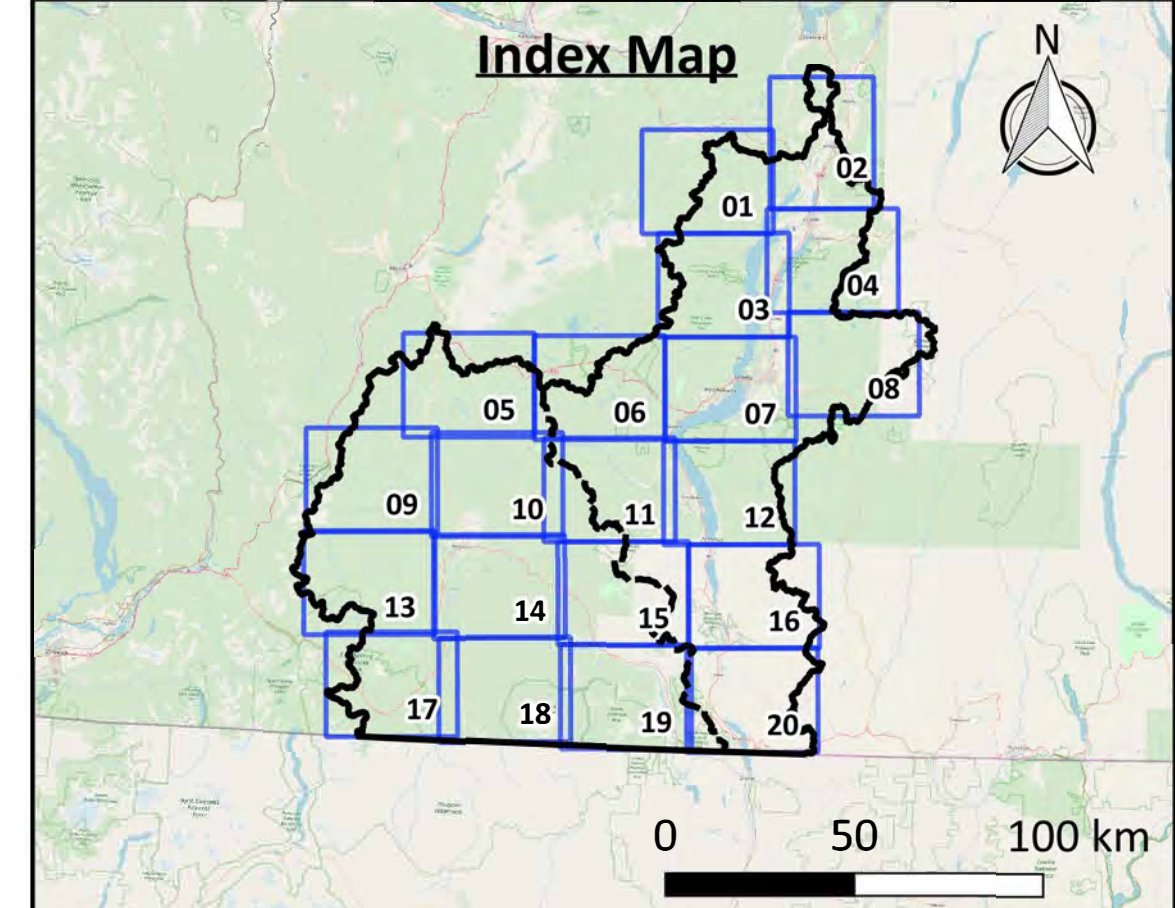
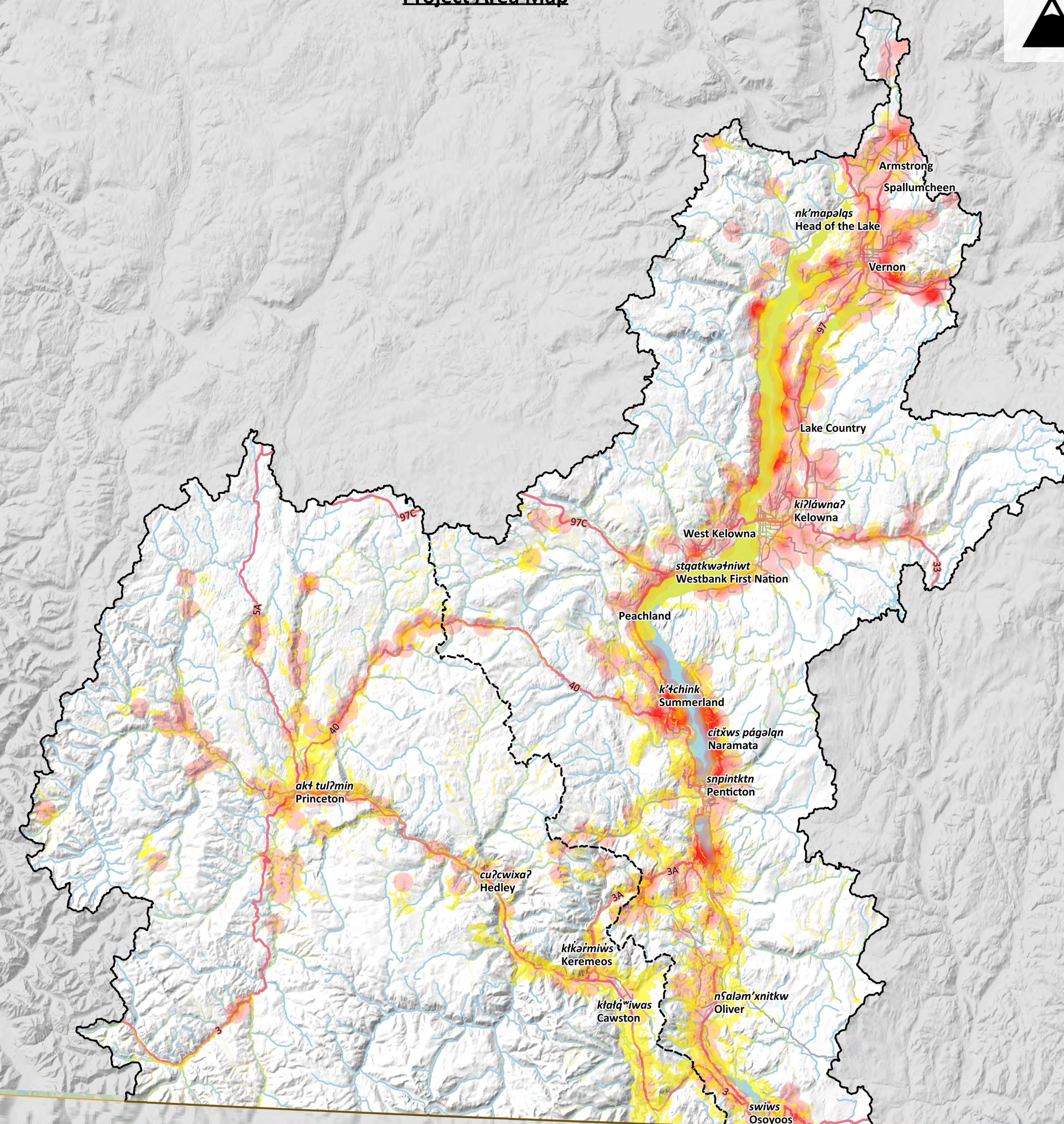
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Date: 31 December 2019
Produced by: Ebbwater Consulting Inc.

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

ANSI D - Map No. EN-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](#)

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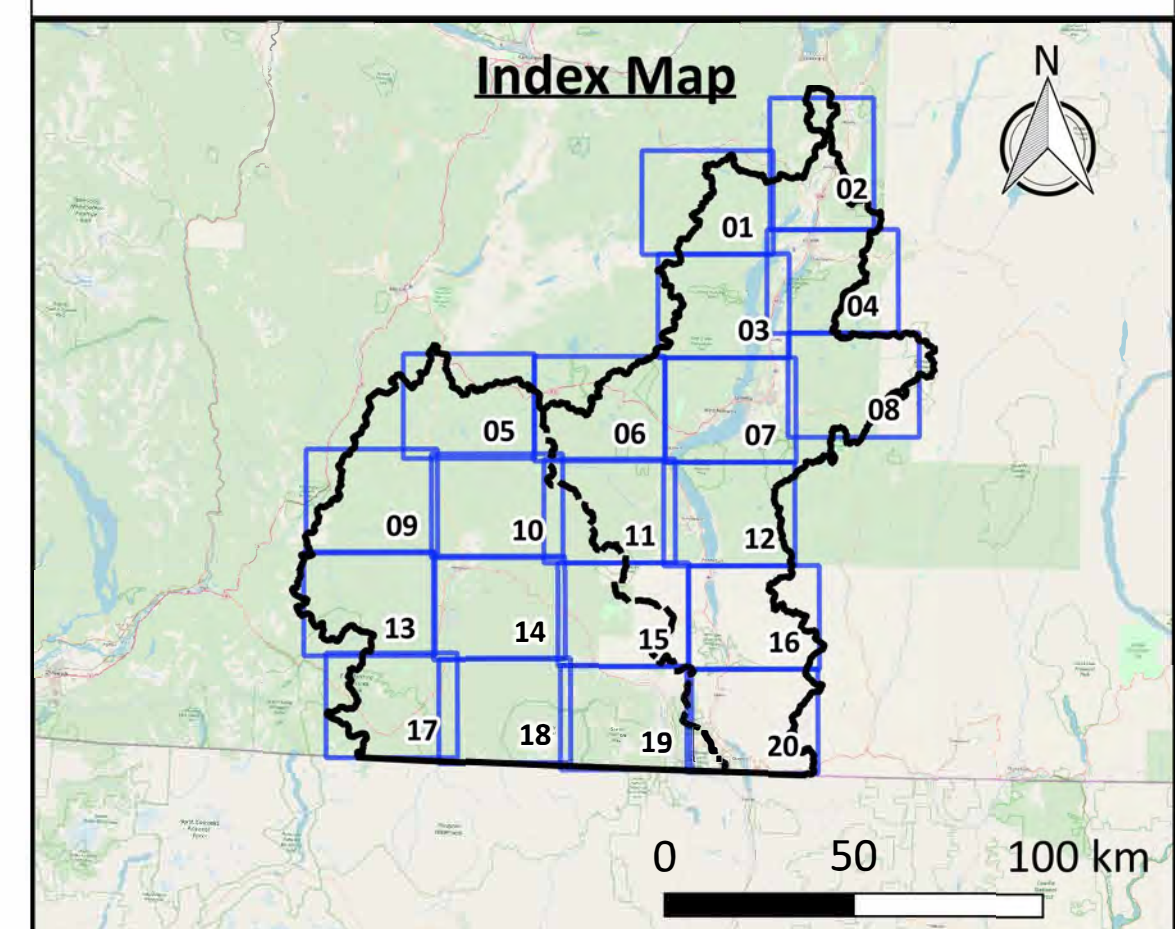
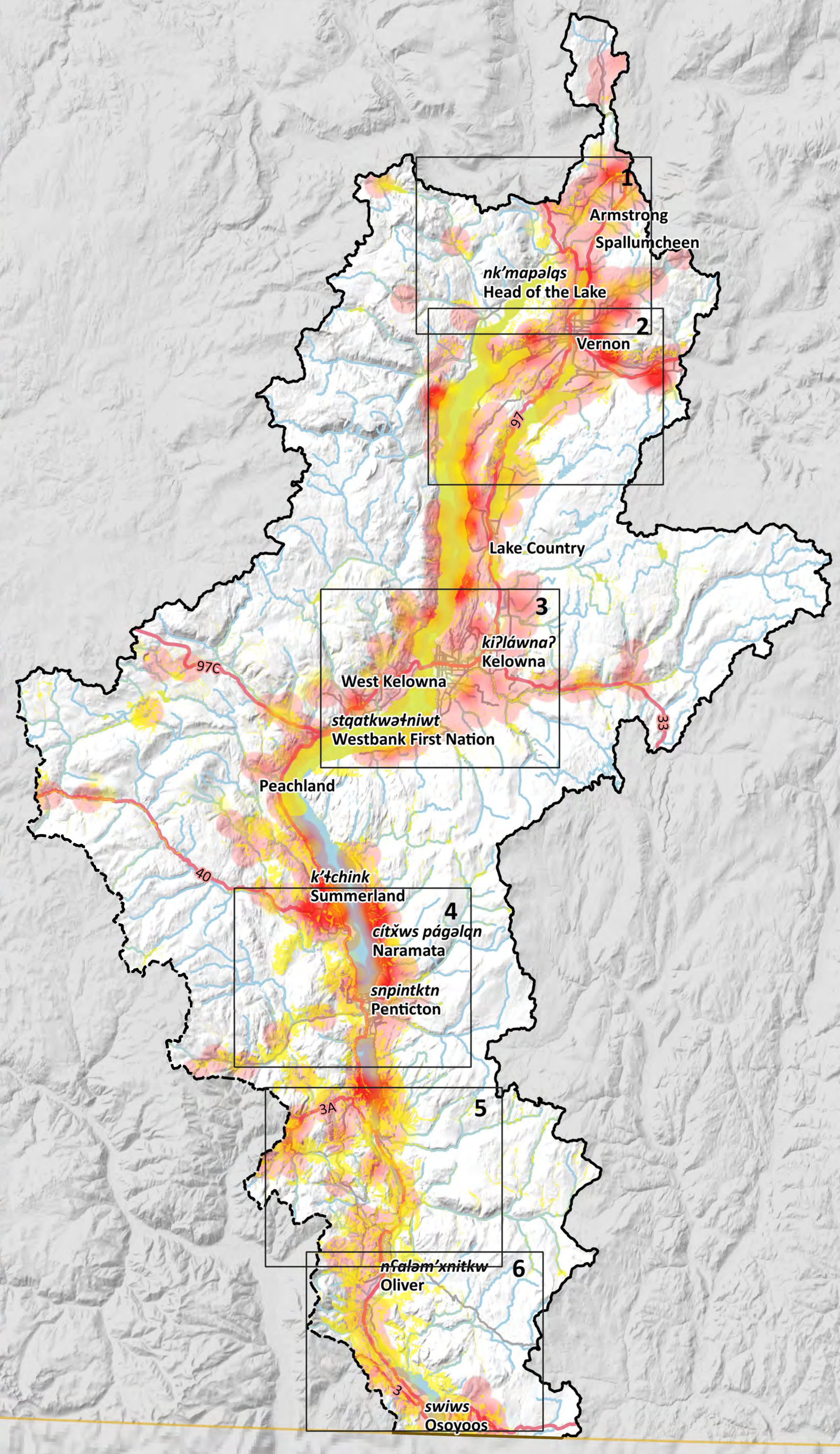
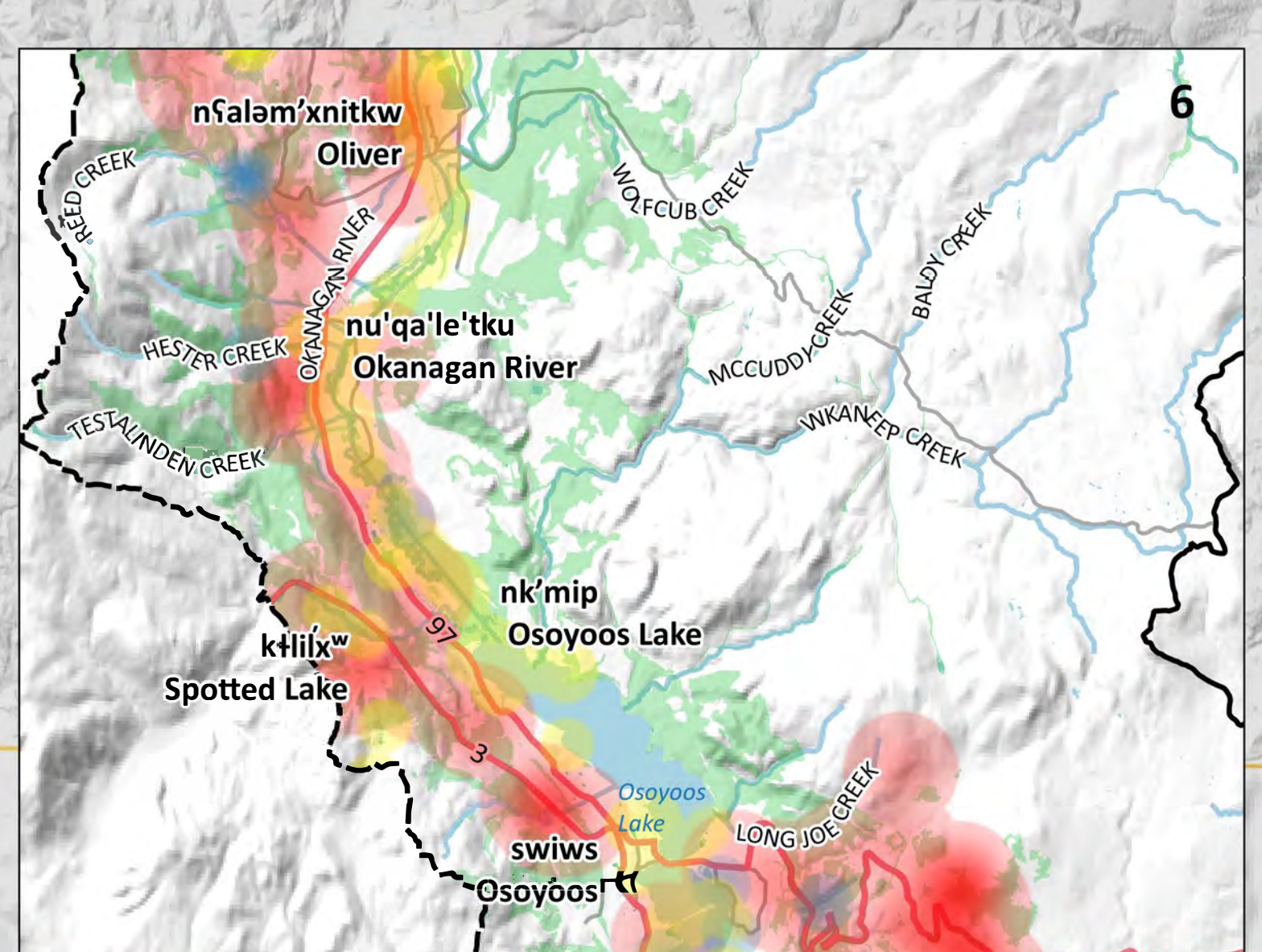
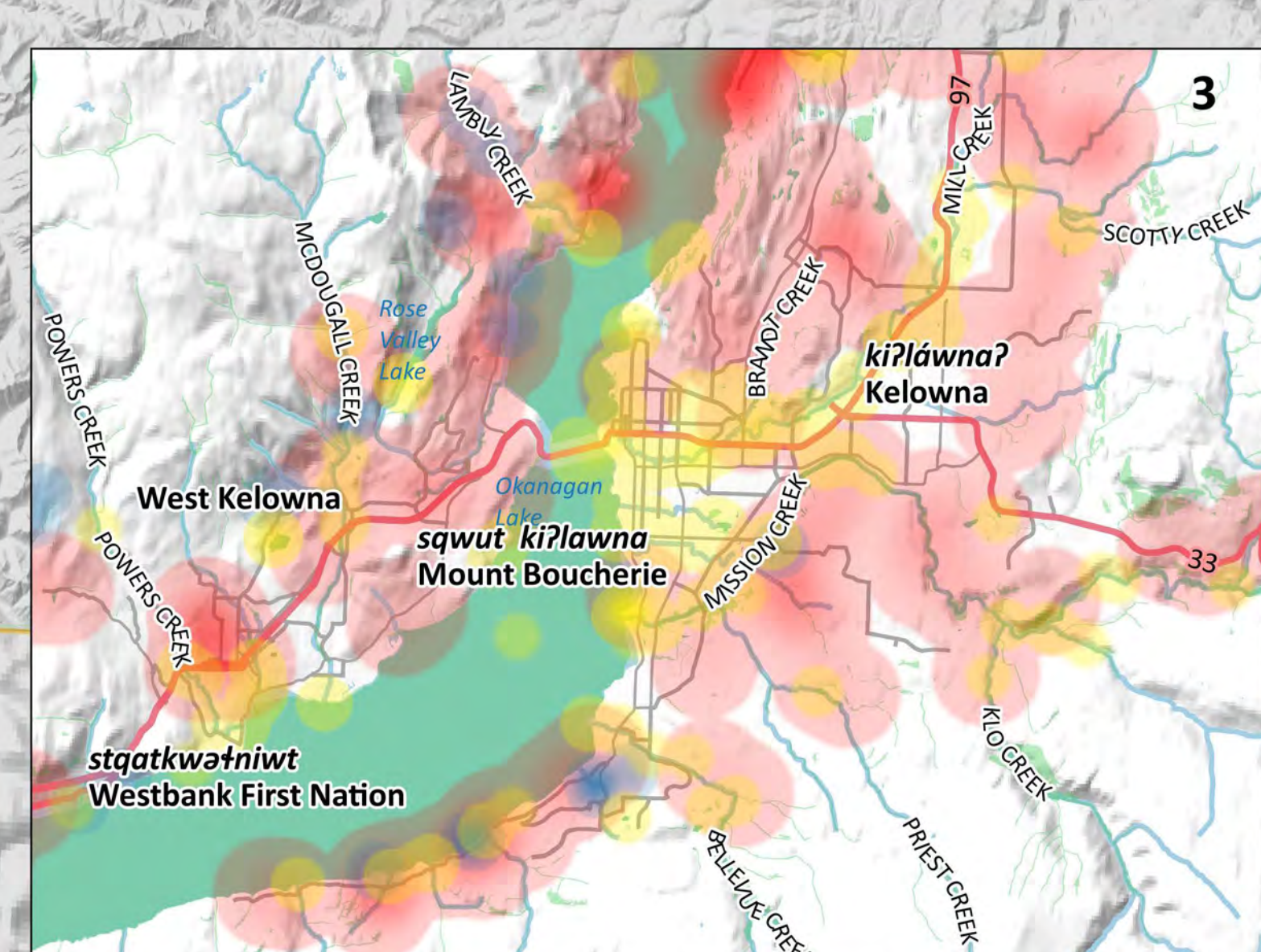
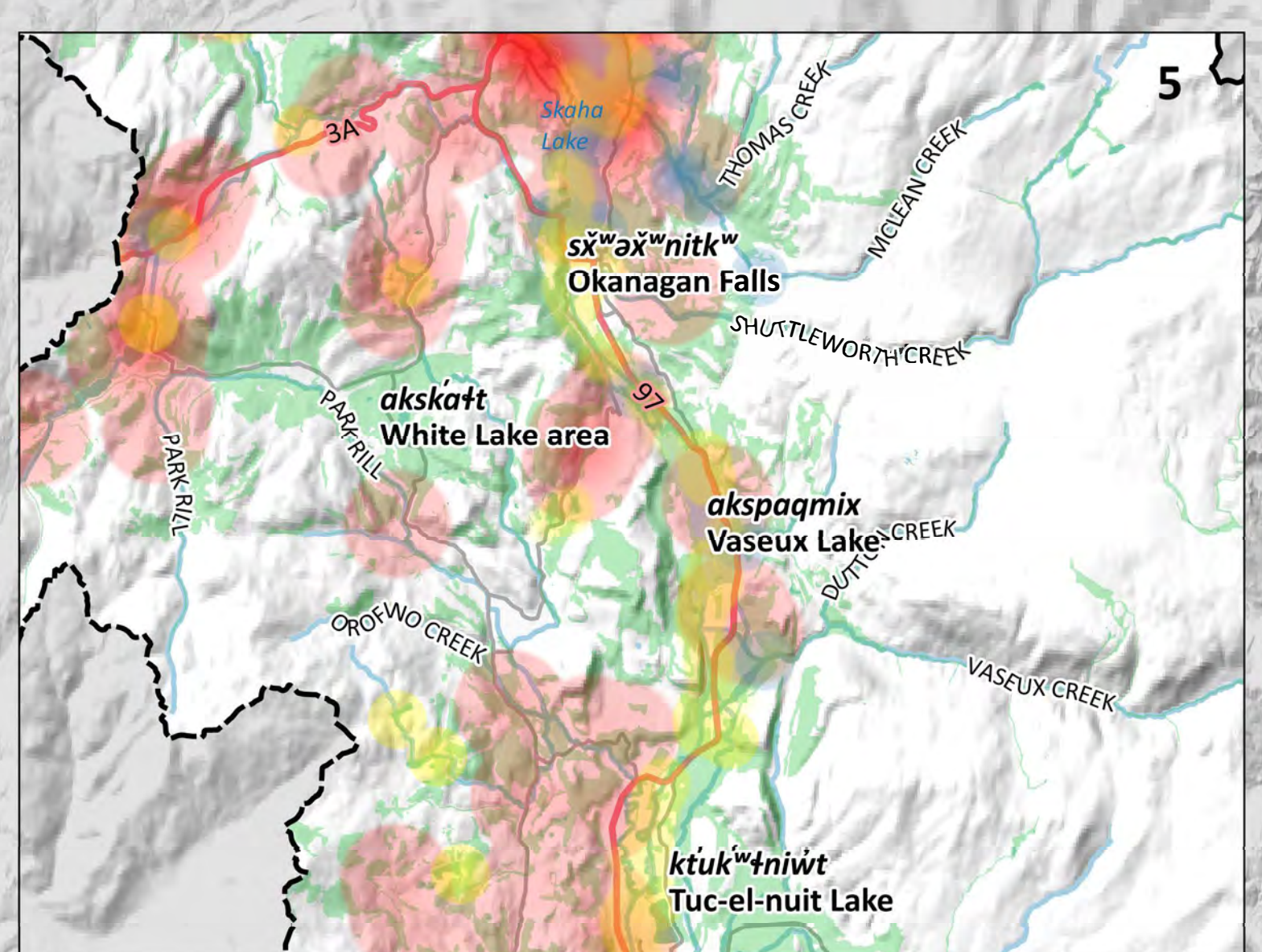
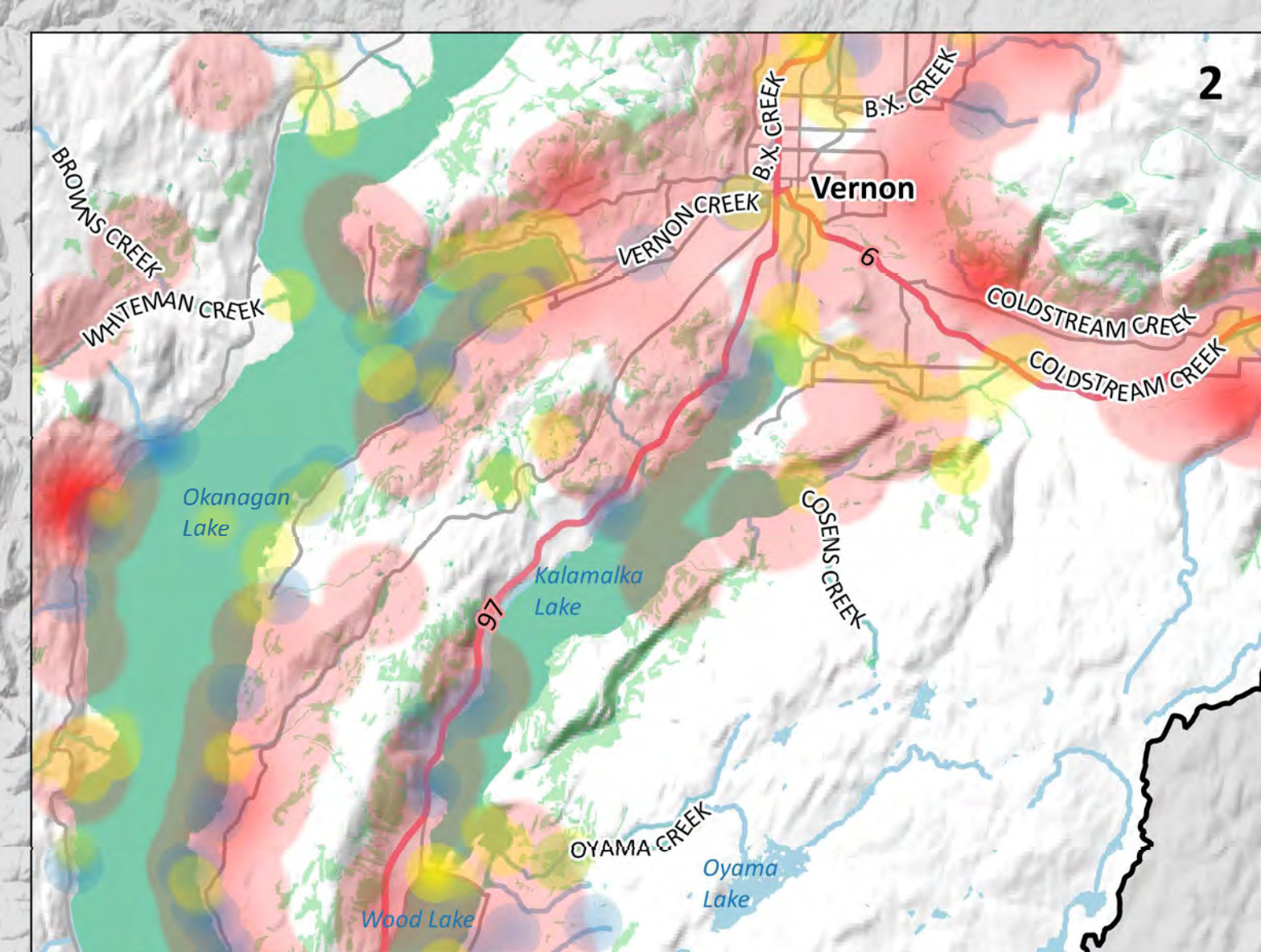
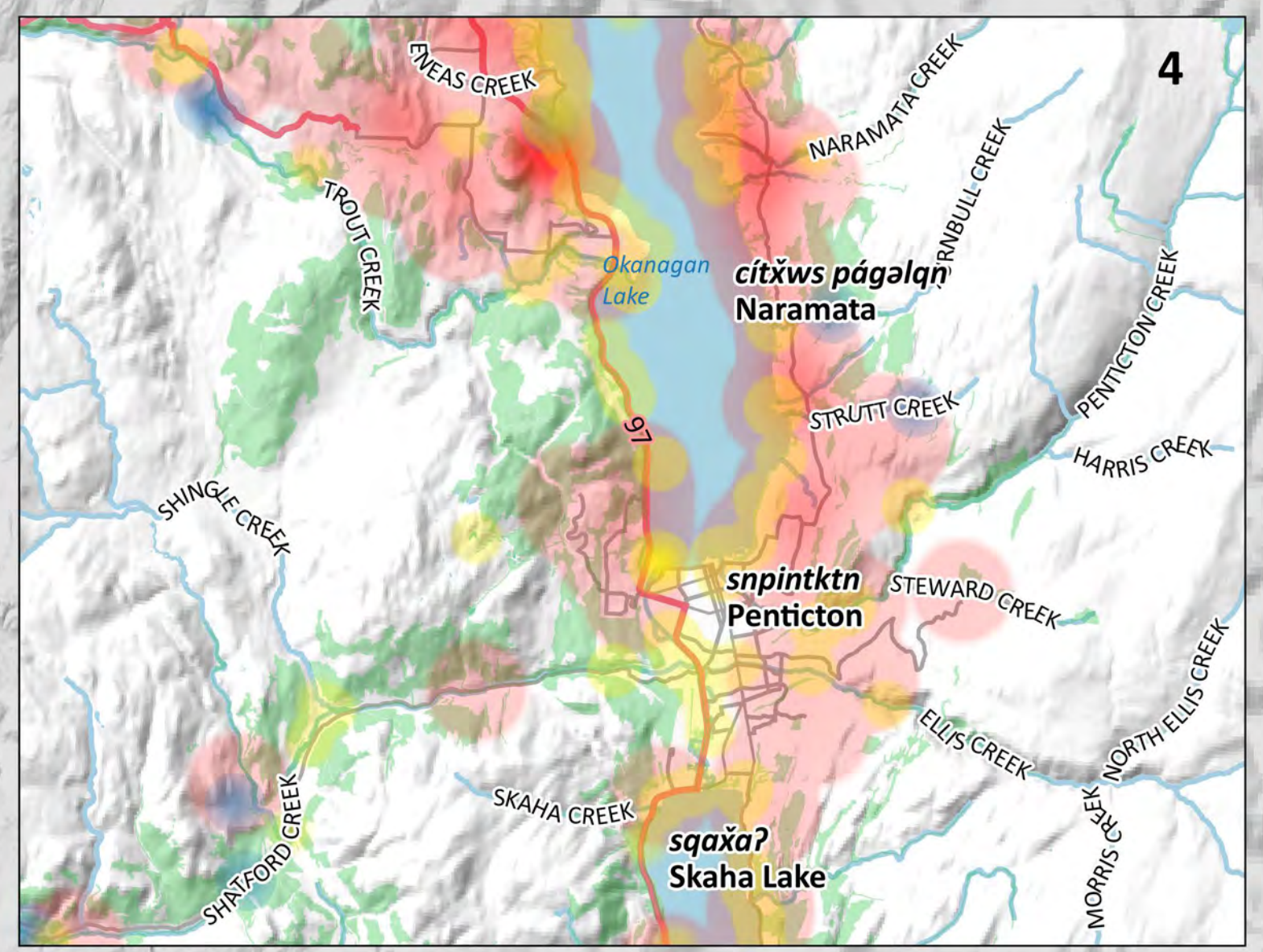
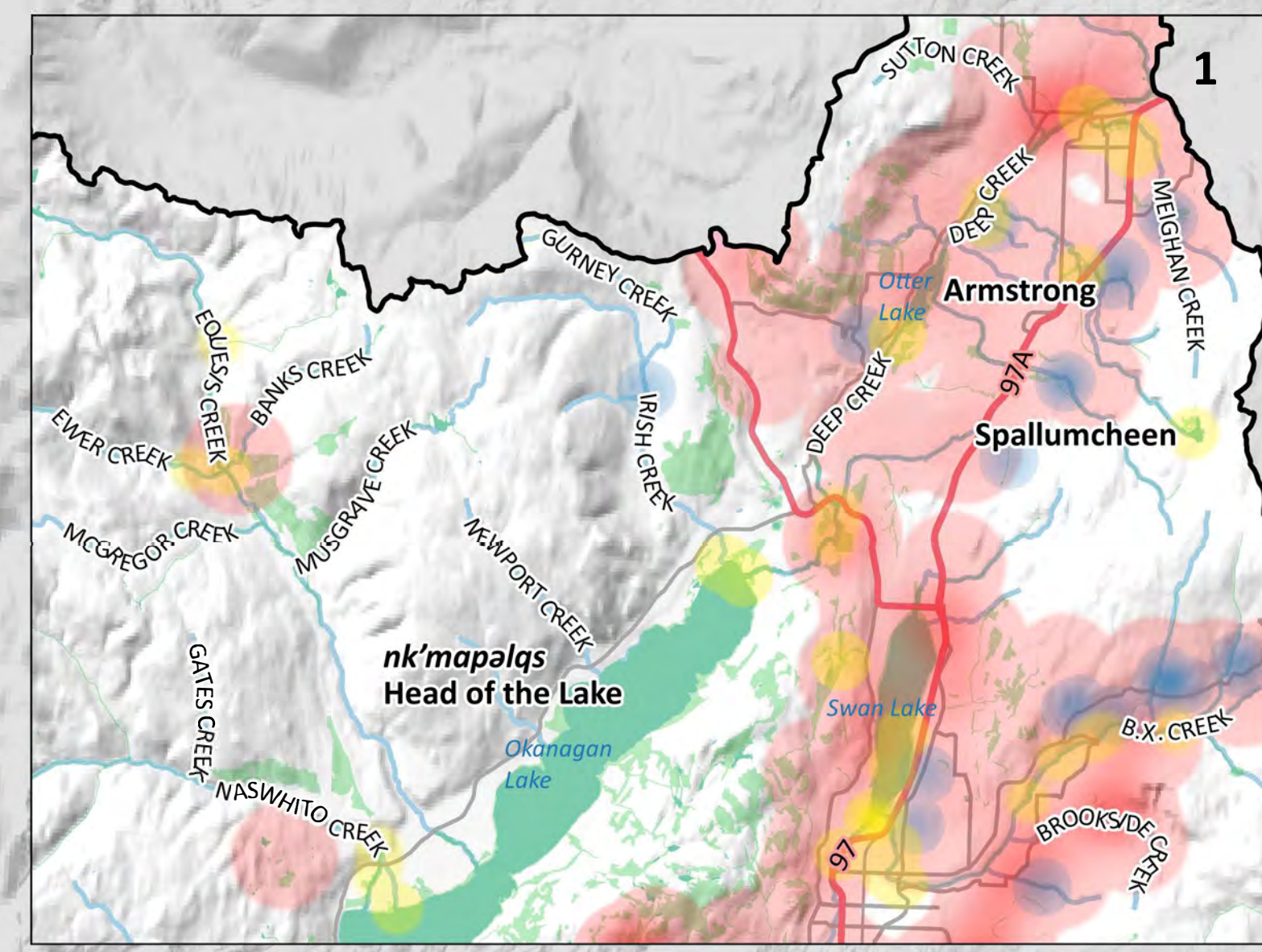
Scale 1:350,000
 0 10 20 30 km

| Legend | |
|---------------------------------|-------------------------|
| Background | Contamination Sources |
| Watershed Boundary | Environmental Receptors |
| Canada - US Border | |
| 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 - Environment - Quantitative Project Area

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](#)

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Main Map
 Scale 1:400,000

Legend

| | |
|-----------------------------------|---------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Environmental Receptors |
| — Lakes | |
| — Watercourses | |
| — Highway | |
| — Major Road | |
| --- Okanagan-Similkameen Boundary | |

Inset Maps
 Scale 1:150,000

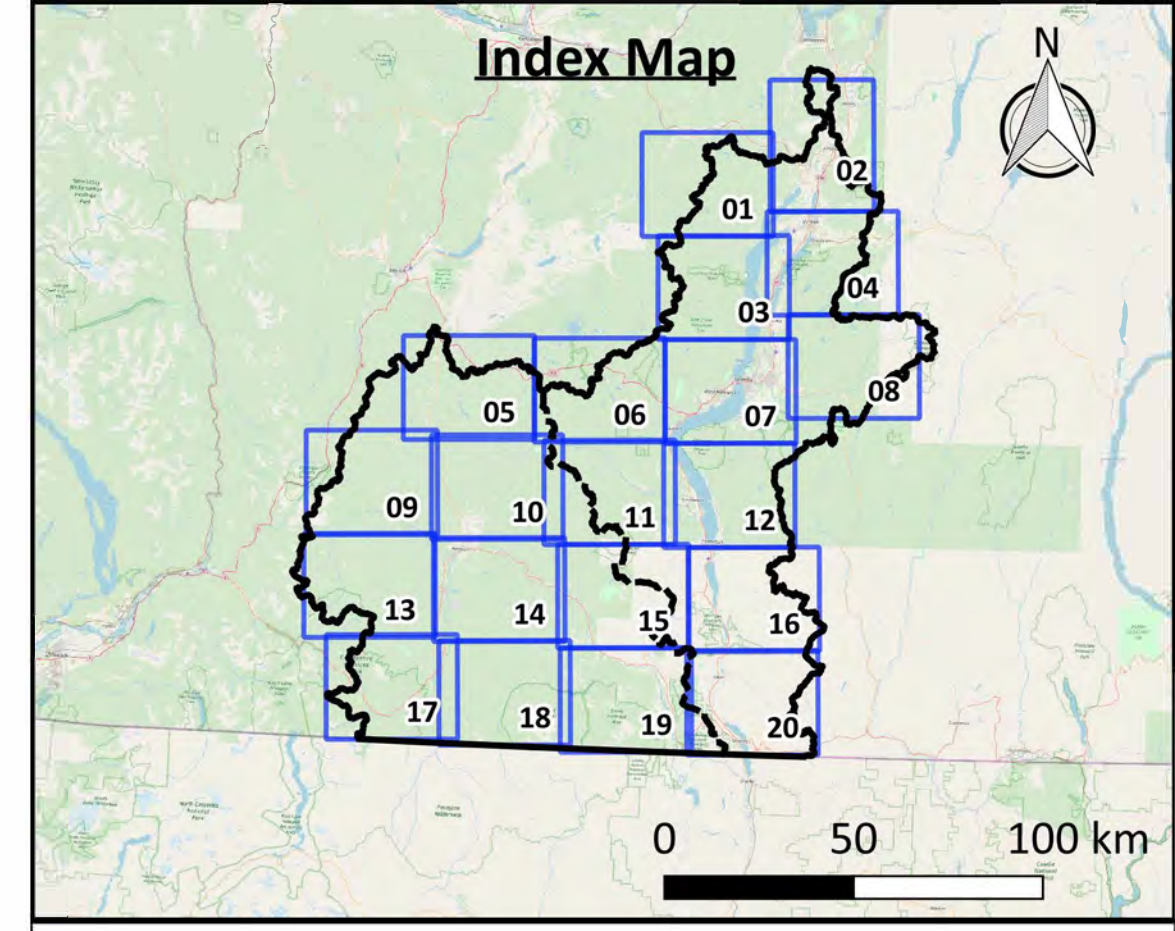
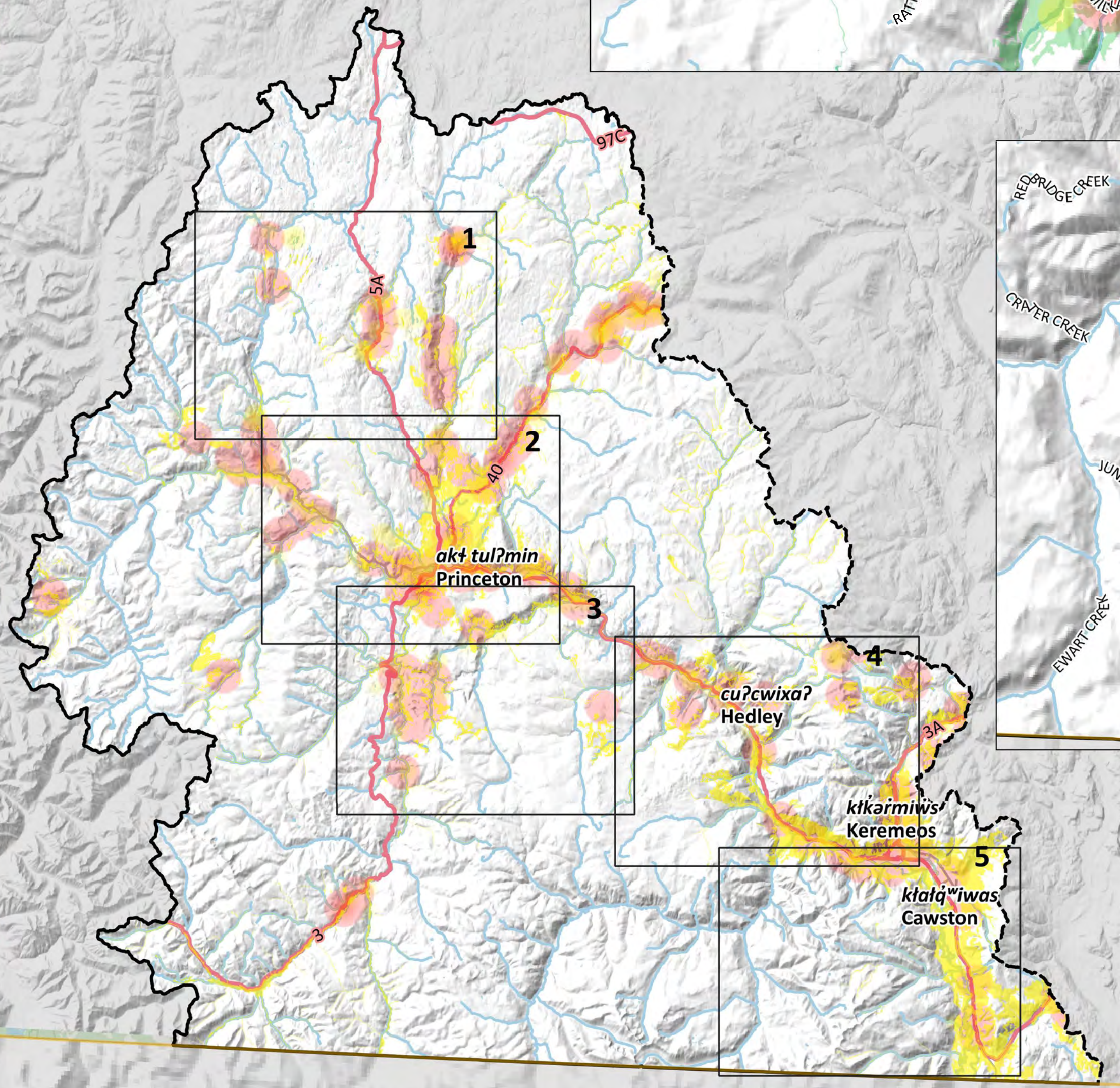
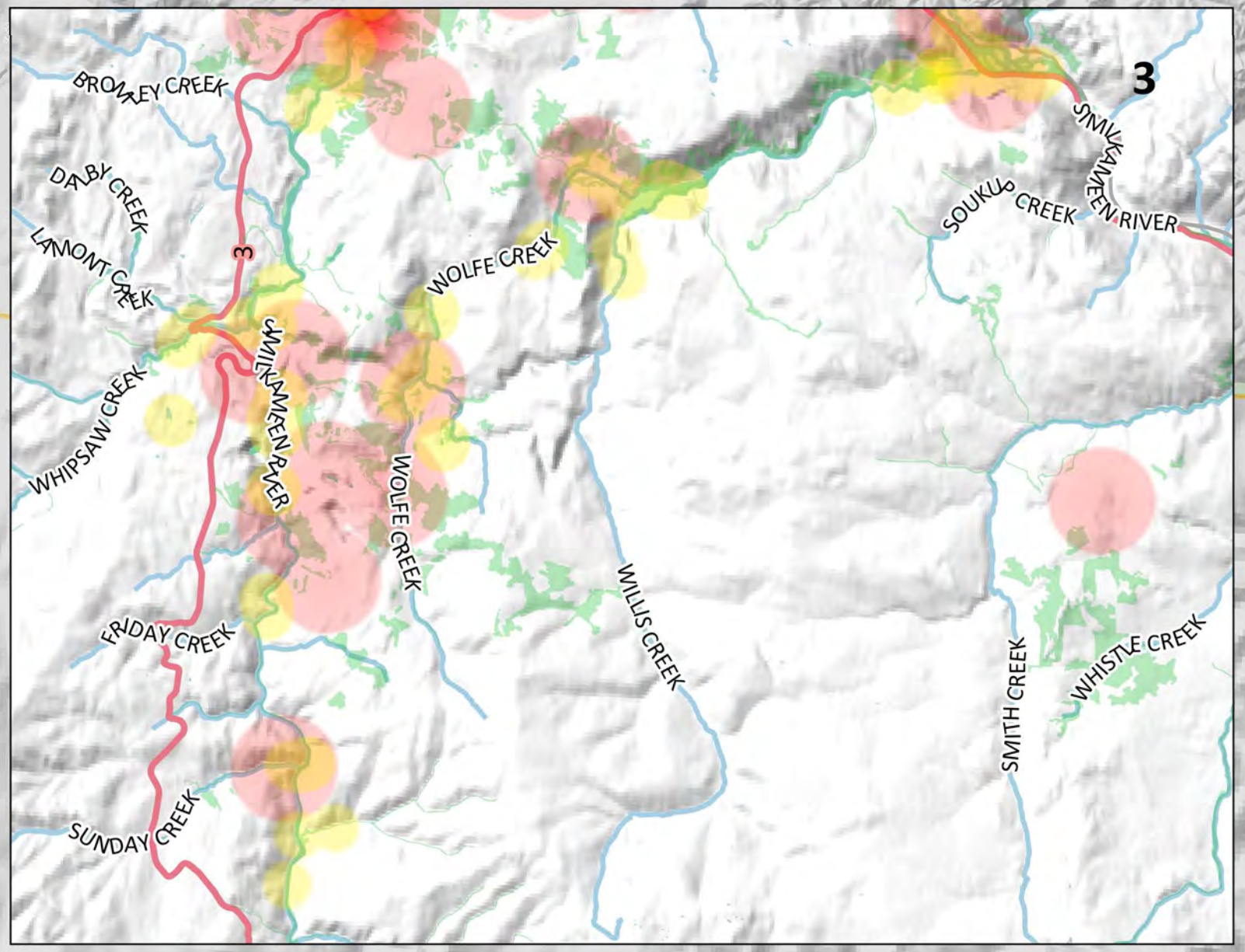
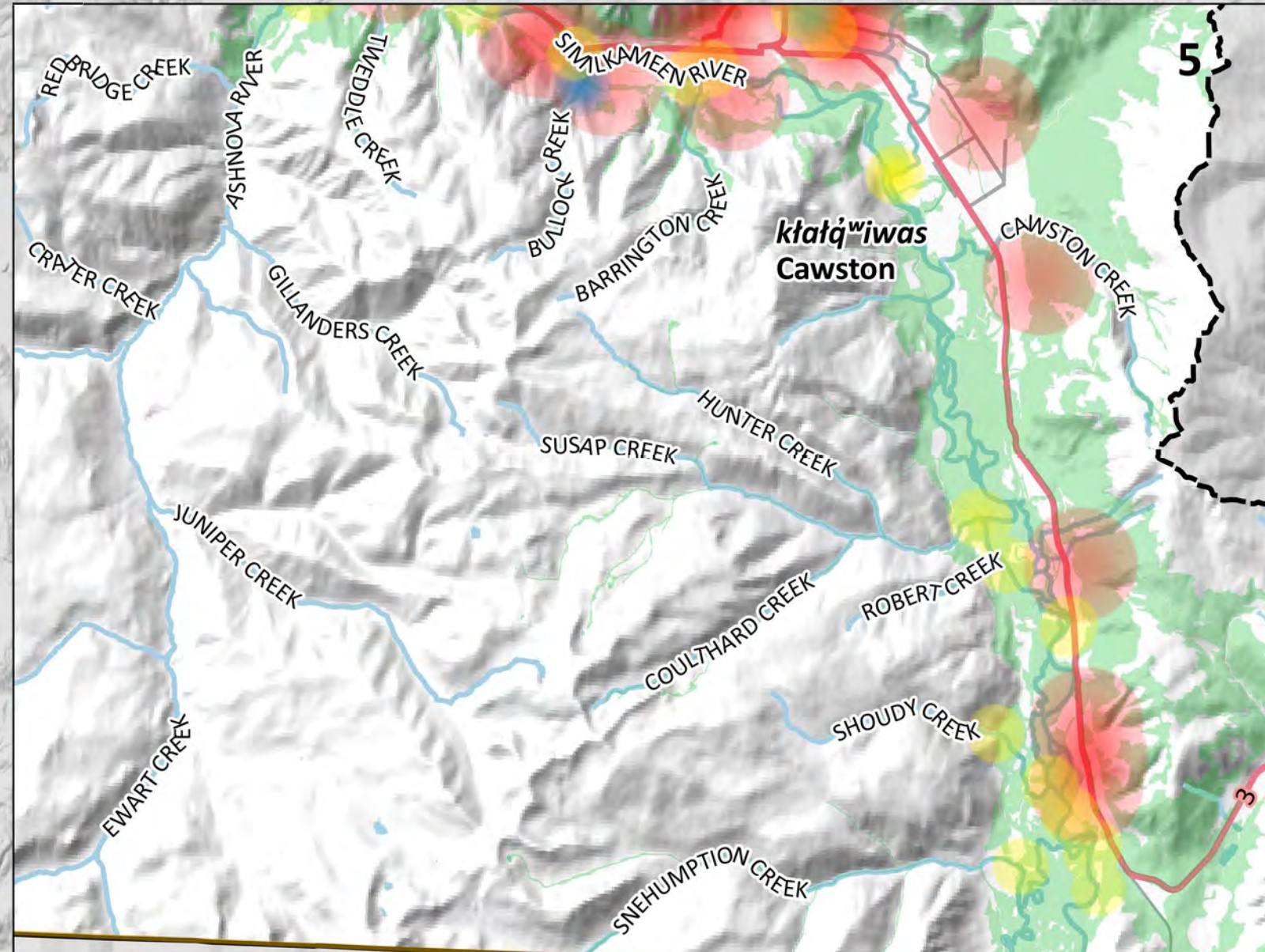
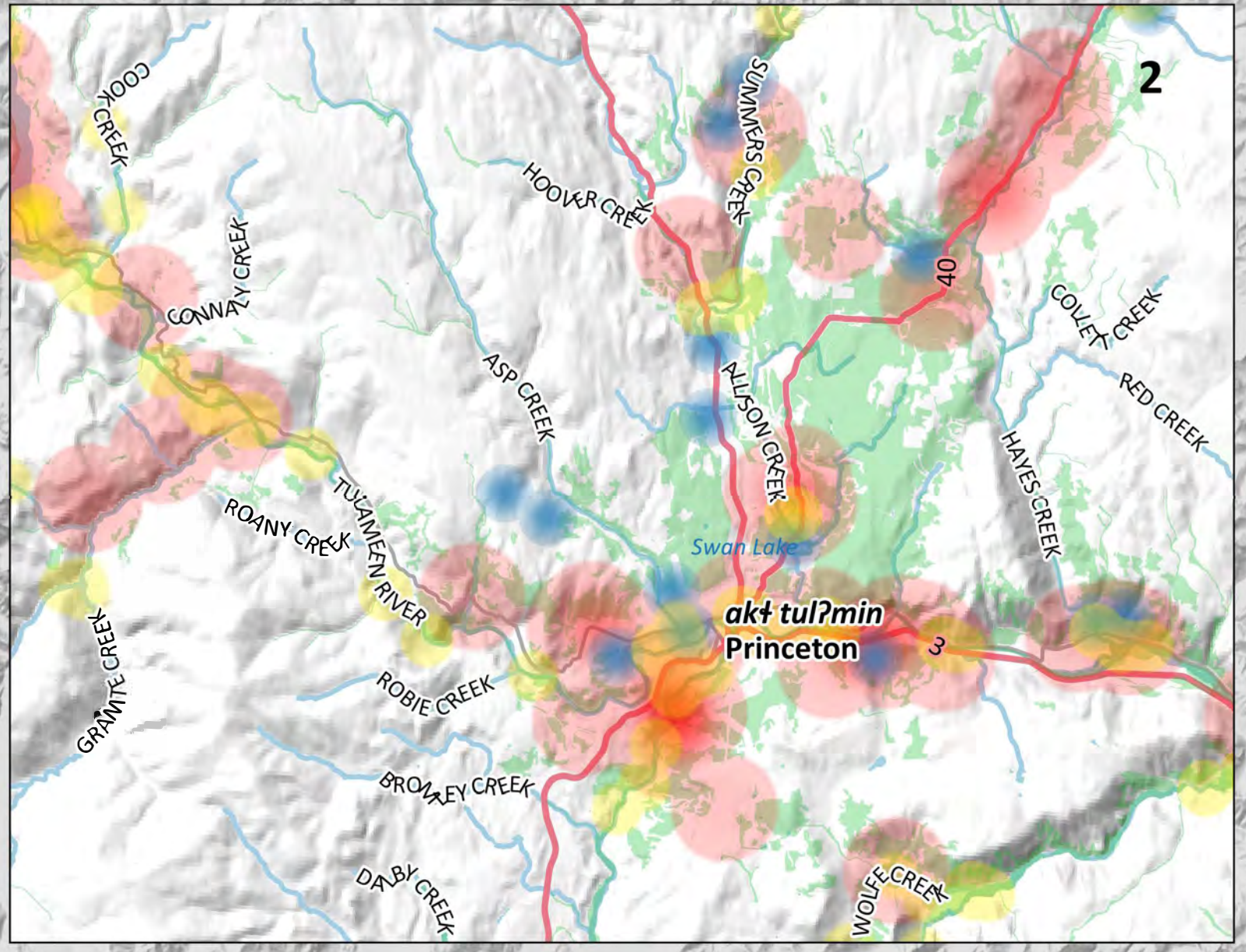
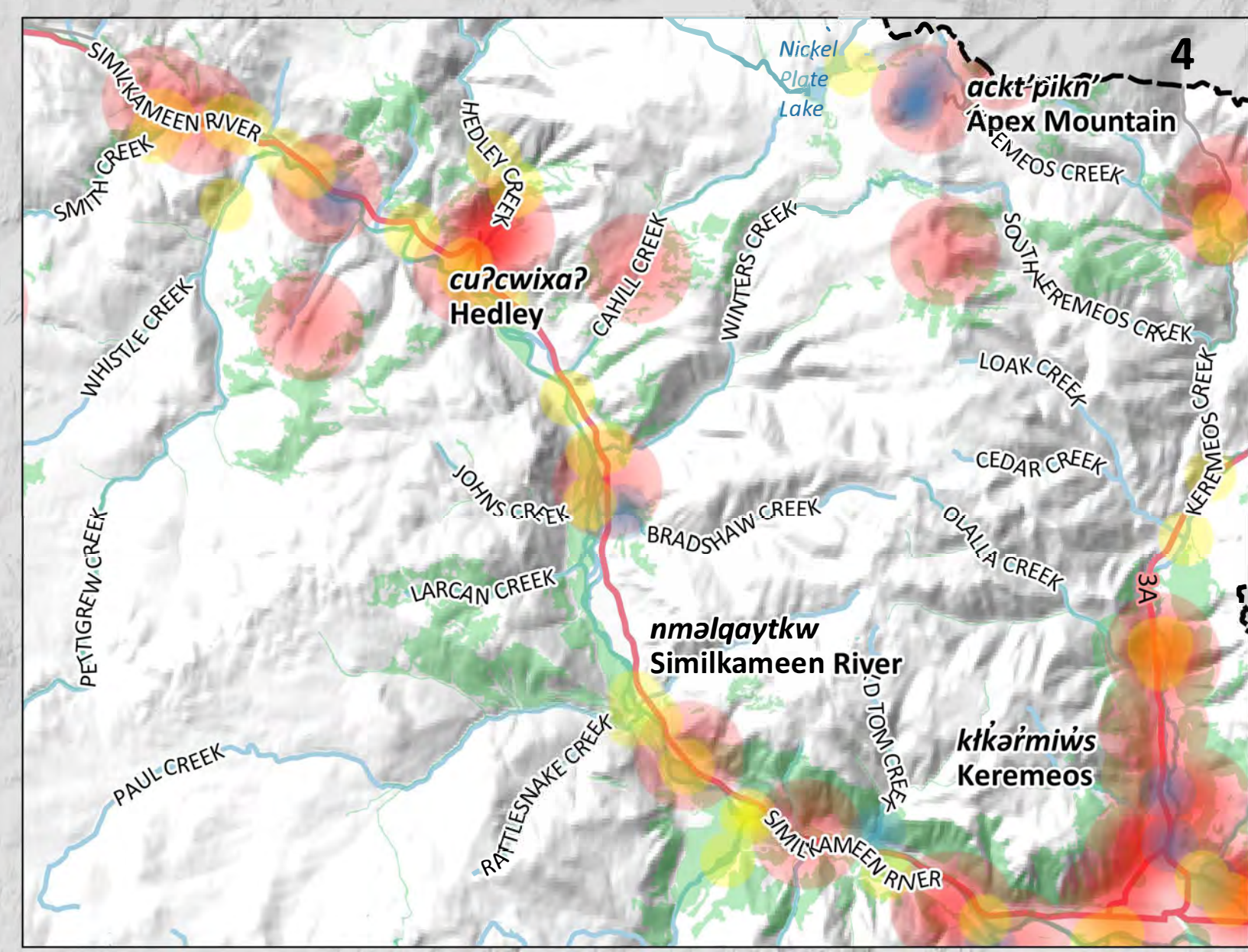
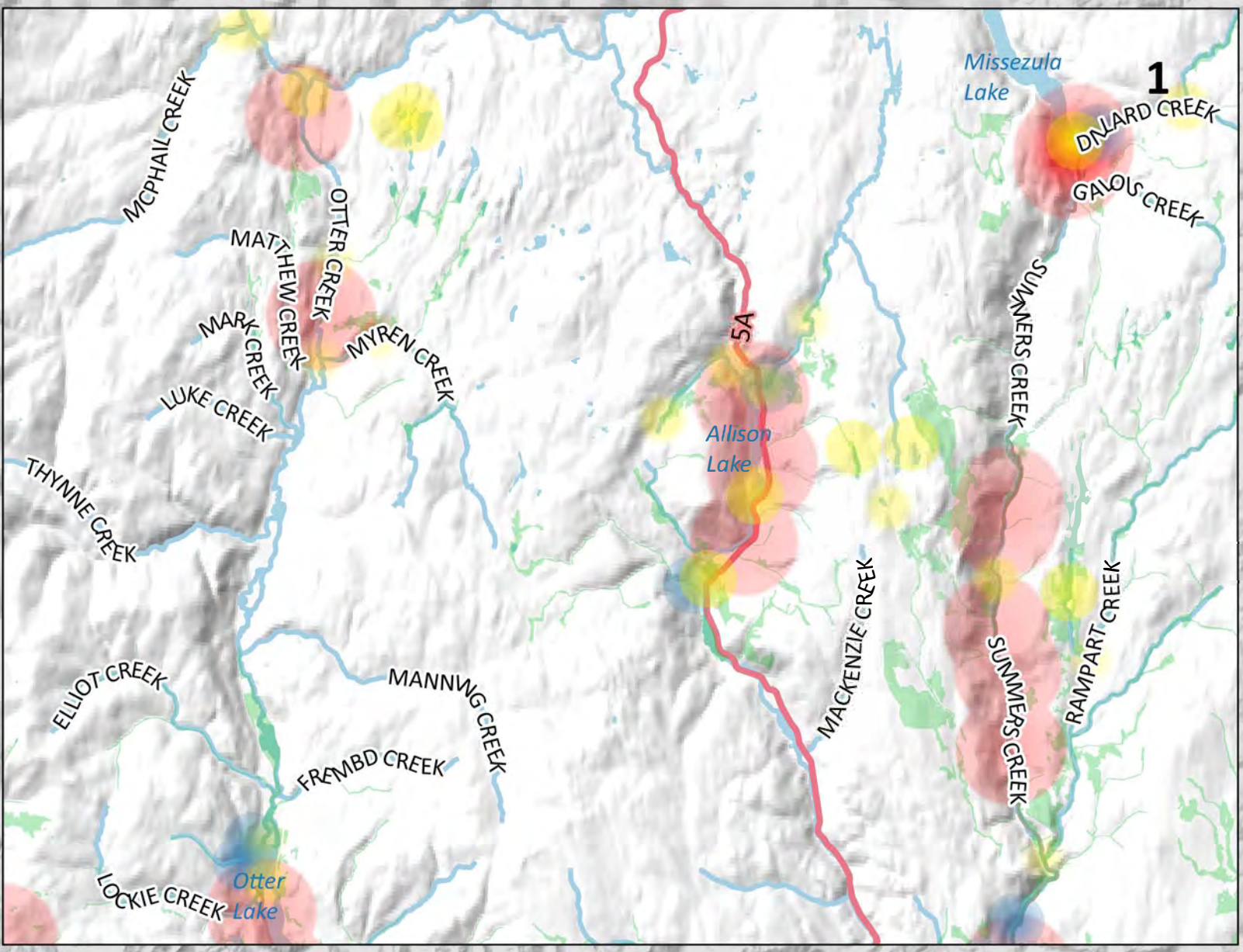
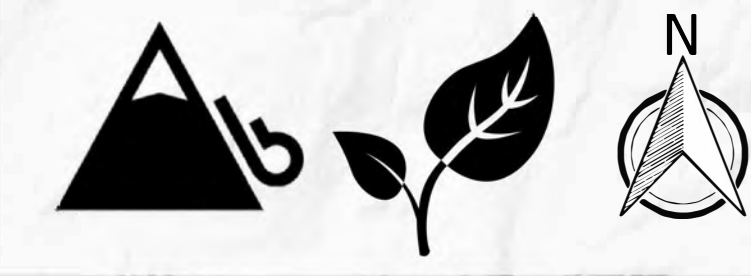
Legend (Additional Features Only)

| | |
|-------------------------|--------------------------|
| ● Contamination Sources | ■ High Biodiversity Area |
| ● Fish Observations | |
| ● Drinking Water Wells | |

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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative Okanagan

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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Main Map
 Scale 1:400,000

Legend

| | |
|---------------------------------|---------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Environmental Receptors |
| — Lakes | |
| — Watercourses | |
| — Highway | |
| — Major Road | |
| — Okanagan-Similkameen Boundary | |

Inset Maps
 Scale 1:150,000

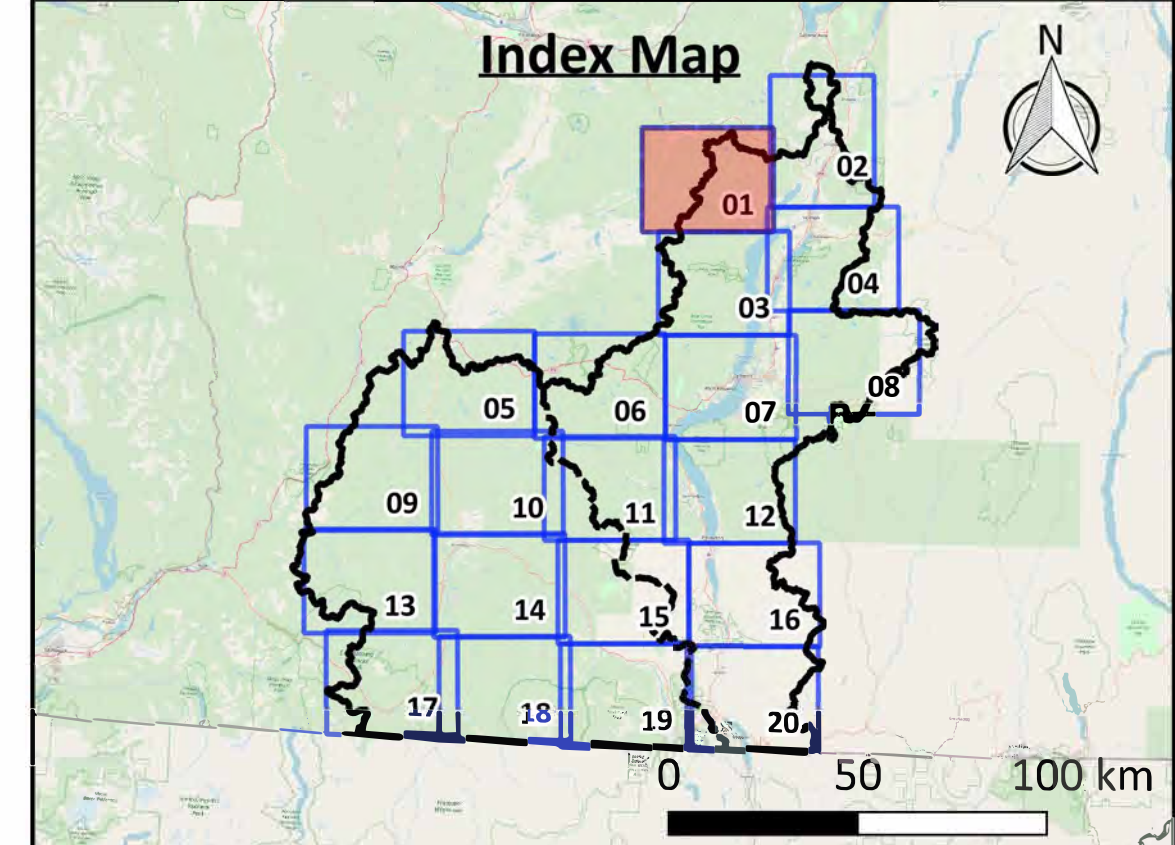
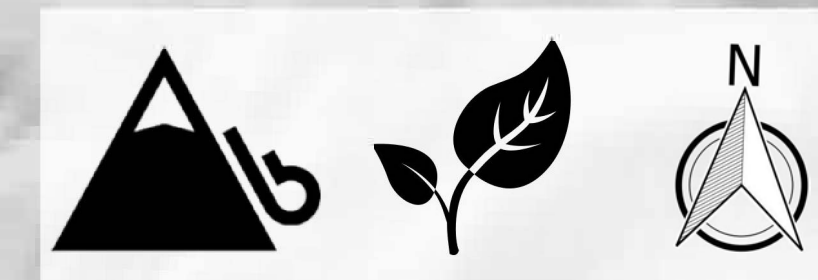
Legend (Additional Features Only)

| | |
|-------------------------|--------------------------|
| ● Contamination Sources | ■ High Biodiversity Area |
| ● Fish Observations | |
| ● Drinking Water Wells | |

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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
 Debris Flow - Environment - Quantitative Similkameen

Zoom-In Map



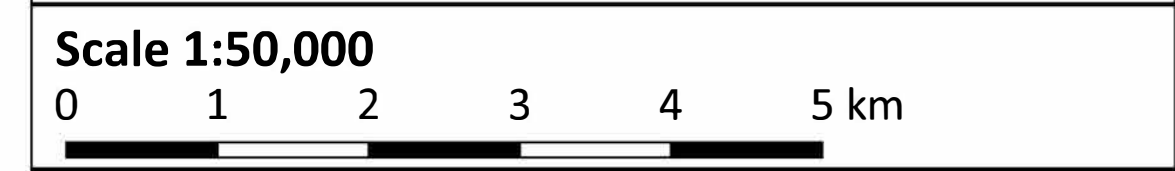
[Click above map tile for Zoom-In map](#)
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[Click here to return to Similkameen map](#)

Map Notes

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Data Sources

- Lakes and Watercourses: BC Data Catalogue.
- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

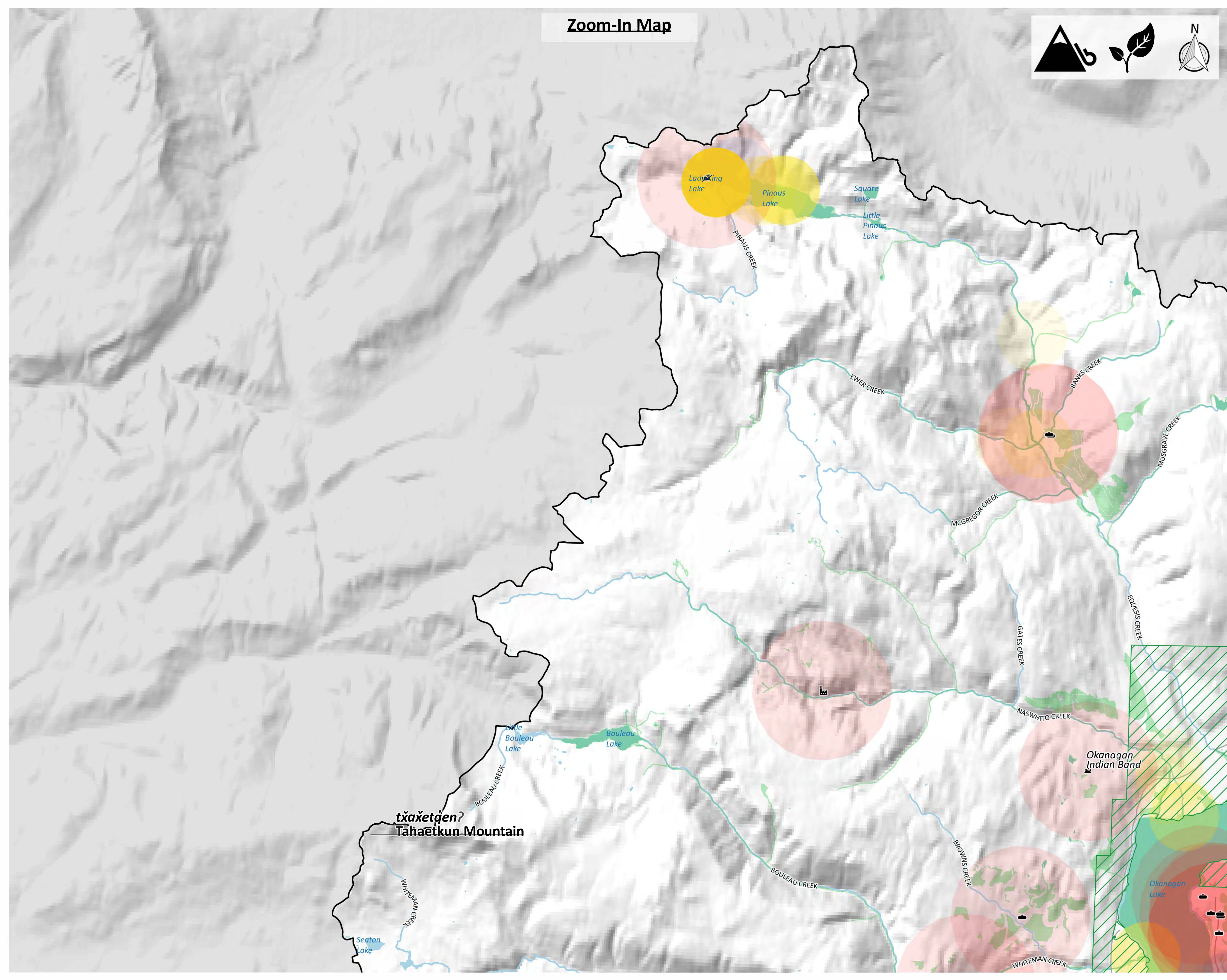


| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚡ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🗑️ Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑️ Waste and landfill |

Date: 31 December 2019
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Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
Map Tile 01 of 20

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

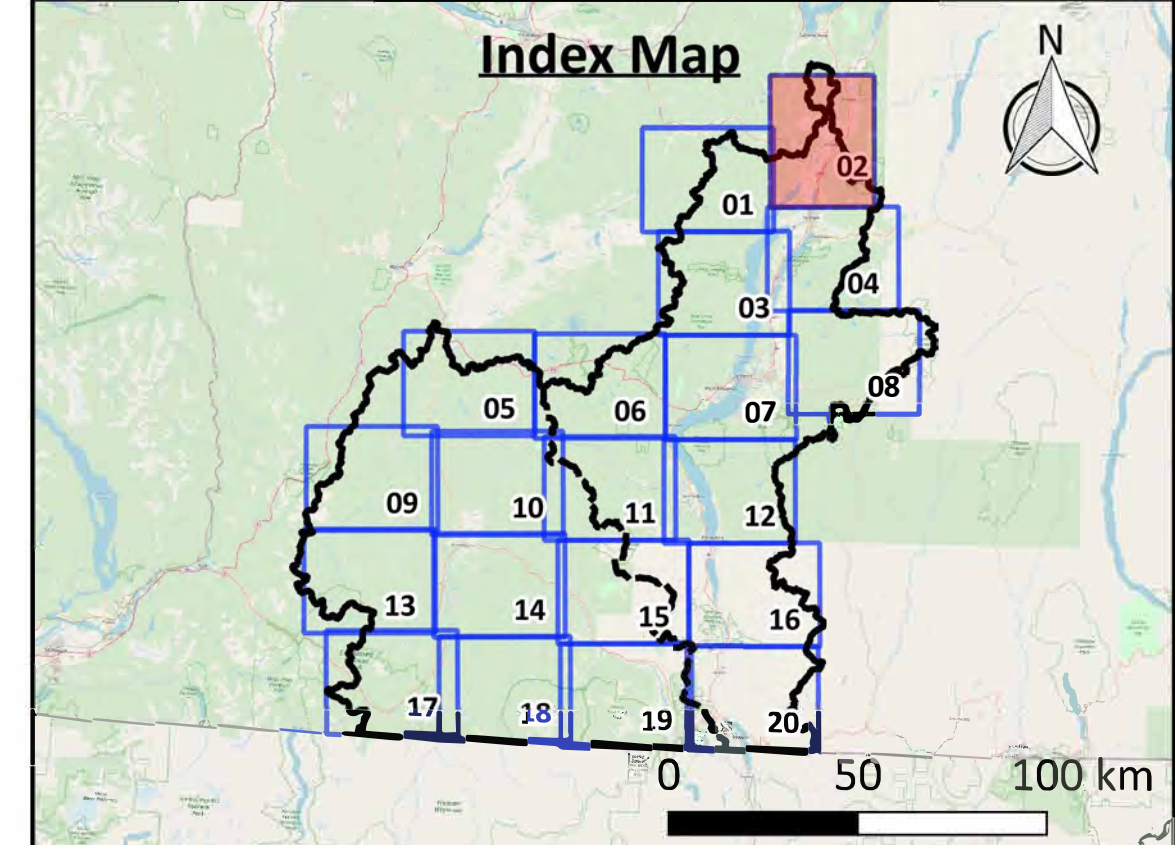
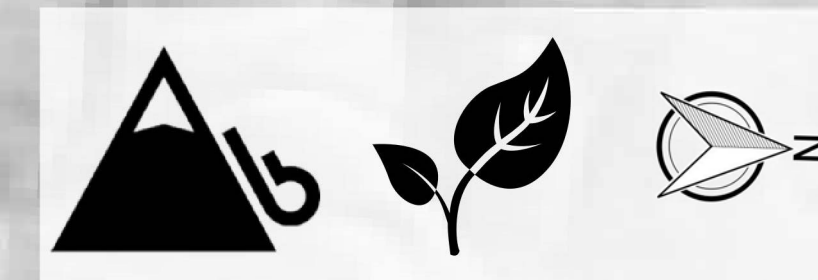


tx̣ə̣ṭə̣n?
Tahaetkun Mountain

Okanagan Indian Band

Okanagan Lake

Zoom-In Map



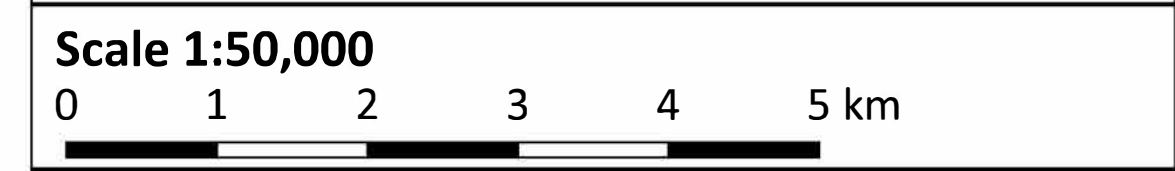
Click above map tile for Zoom-In map
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[Click here to return to Similkameen map](#)

Map Notes

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Data Sources

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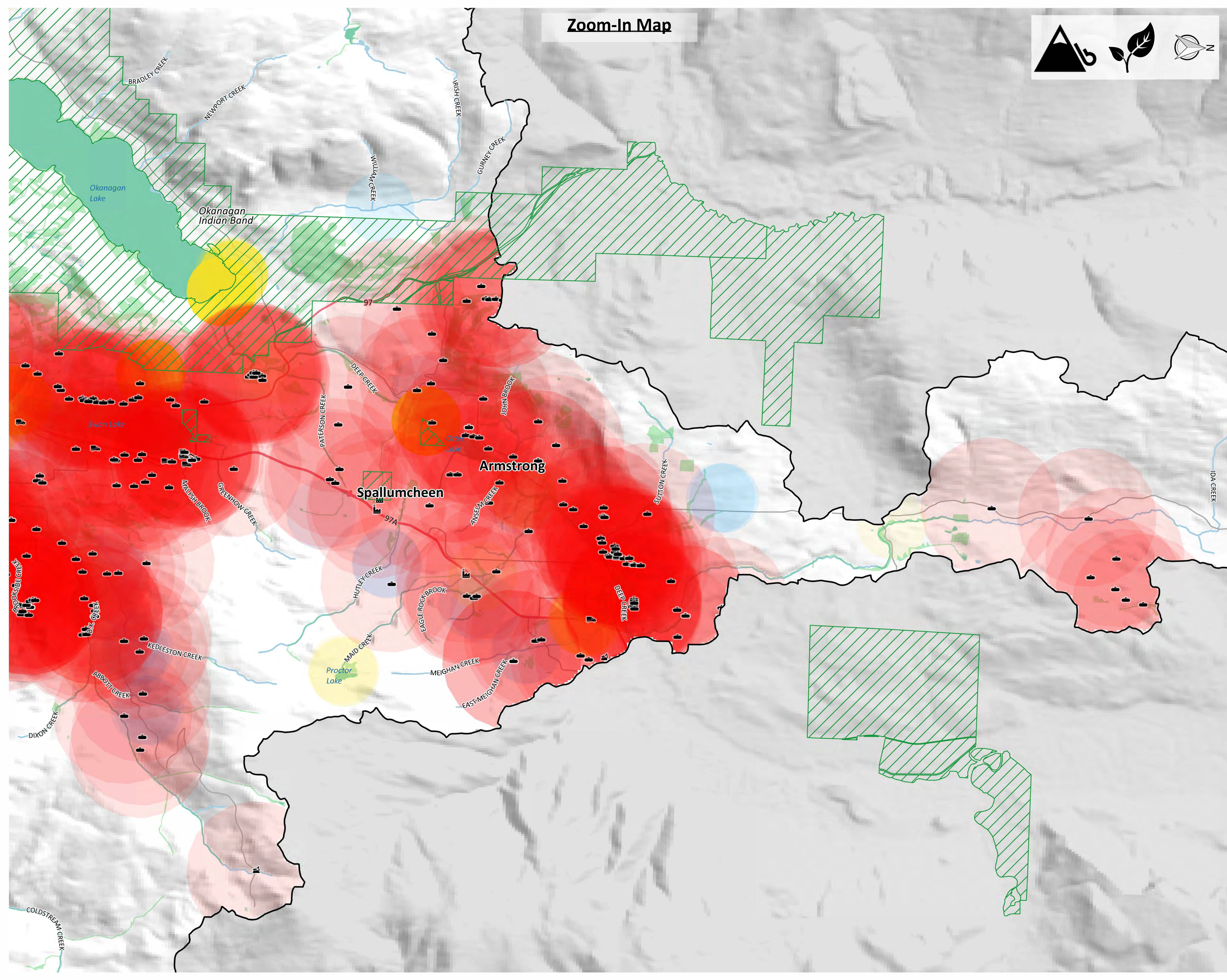


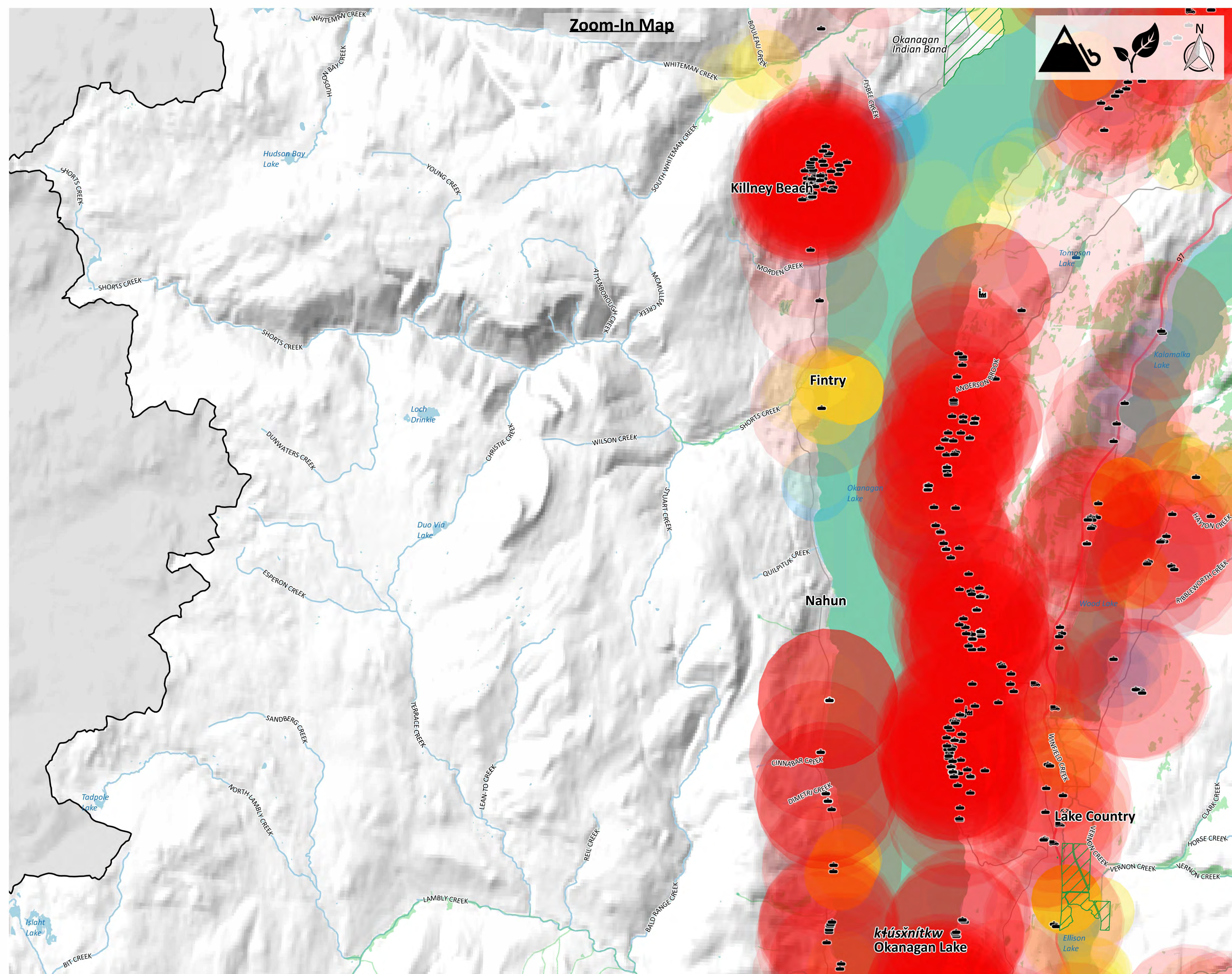
| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🏠 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

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

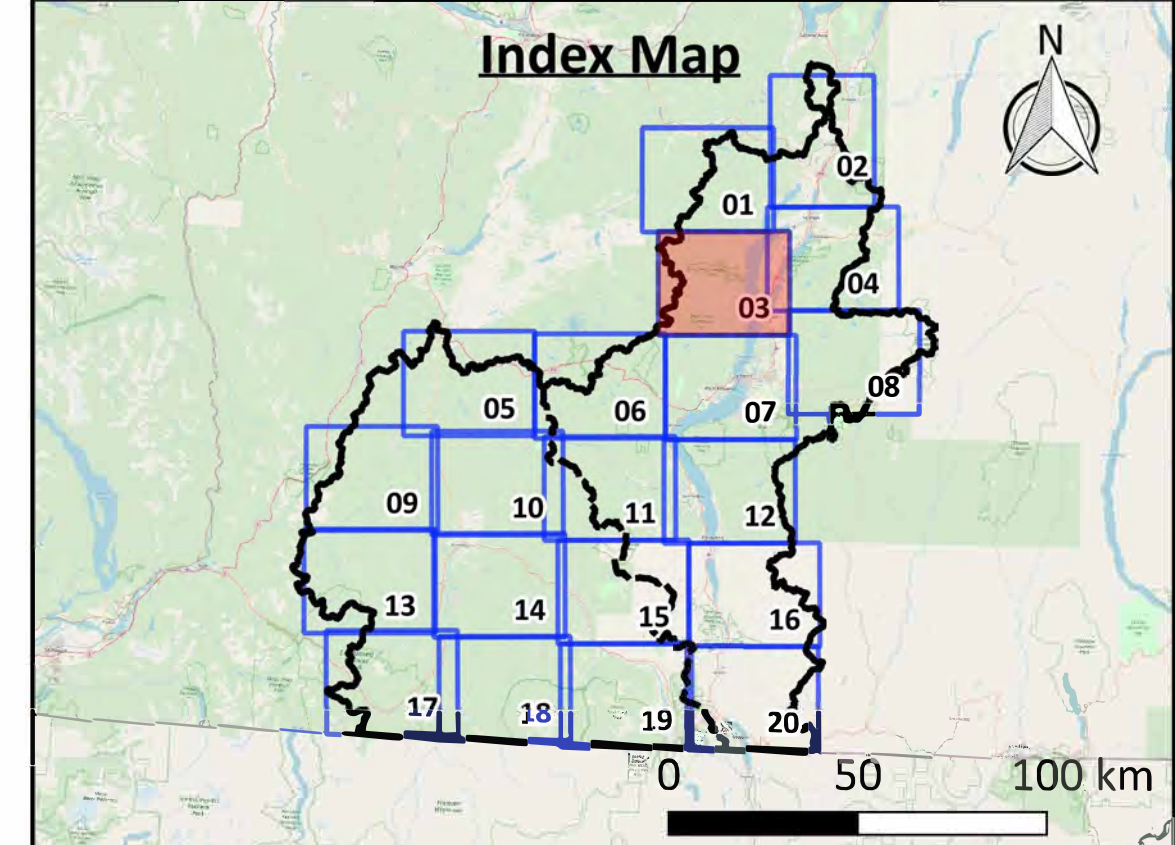
Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
Map Tile 02 of 20

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





Zoom-In Map



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Map Notes

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Data Sources

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- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

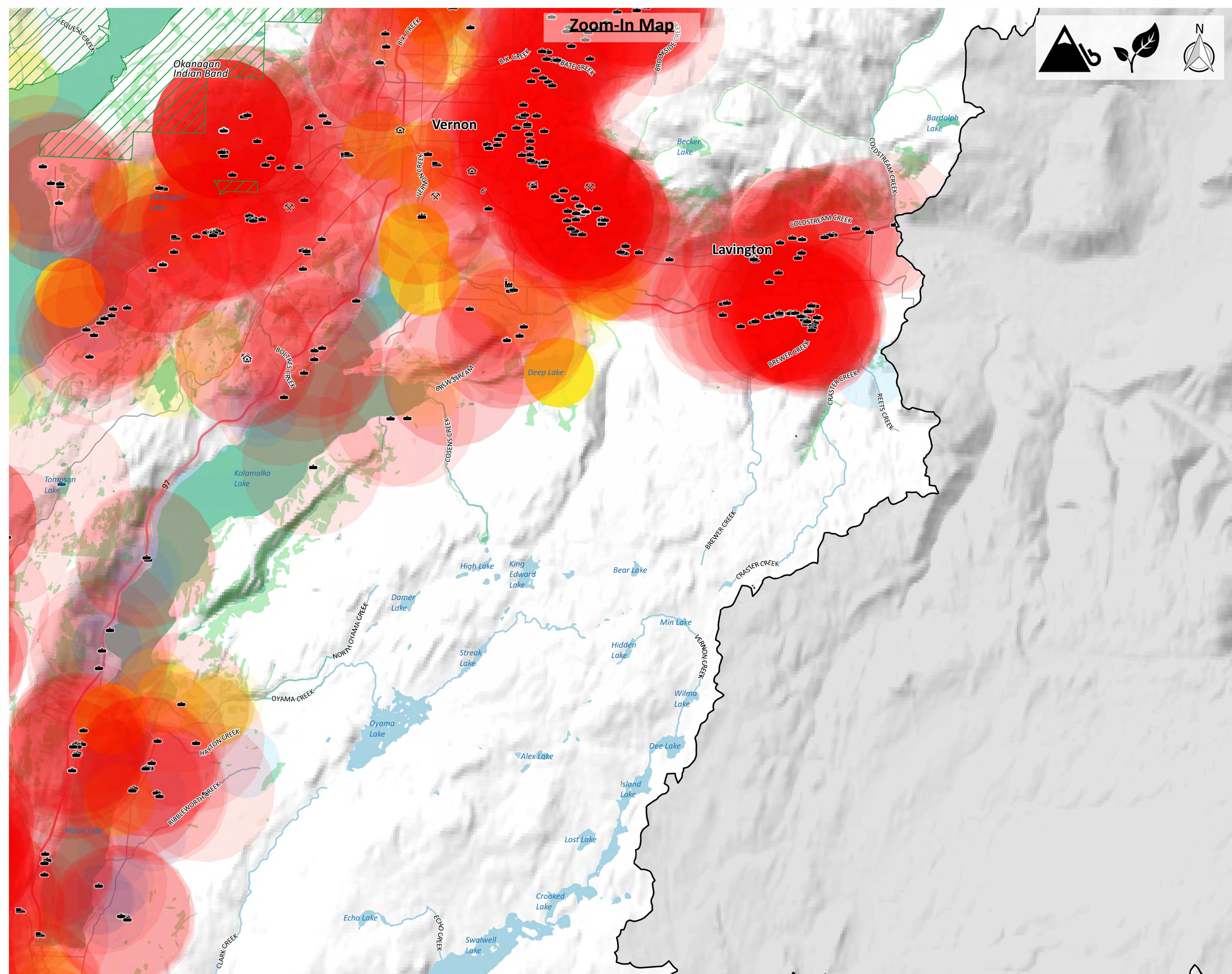
Scale 1:50,000
 0 1 2 3 4 5 km

| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▭ Reserves | ● Drinking Water Wells |
| ▭ Lakes | ▭ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🏠 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

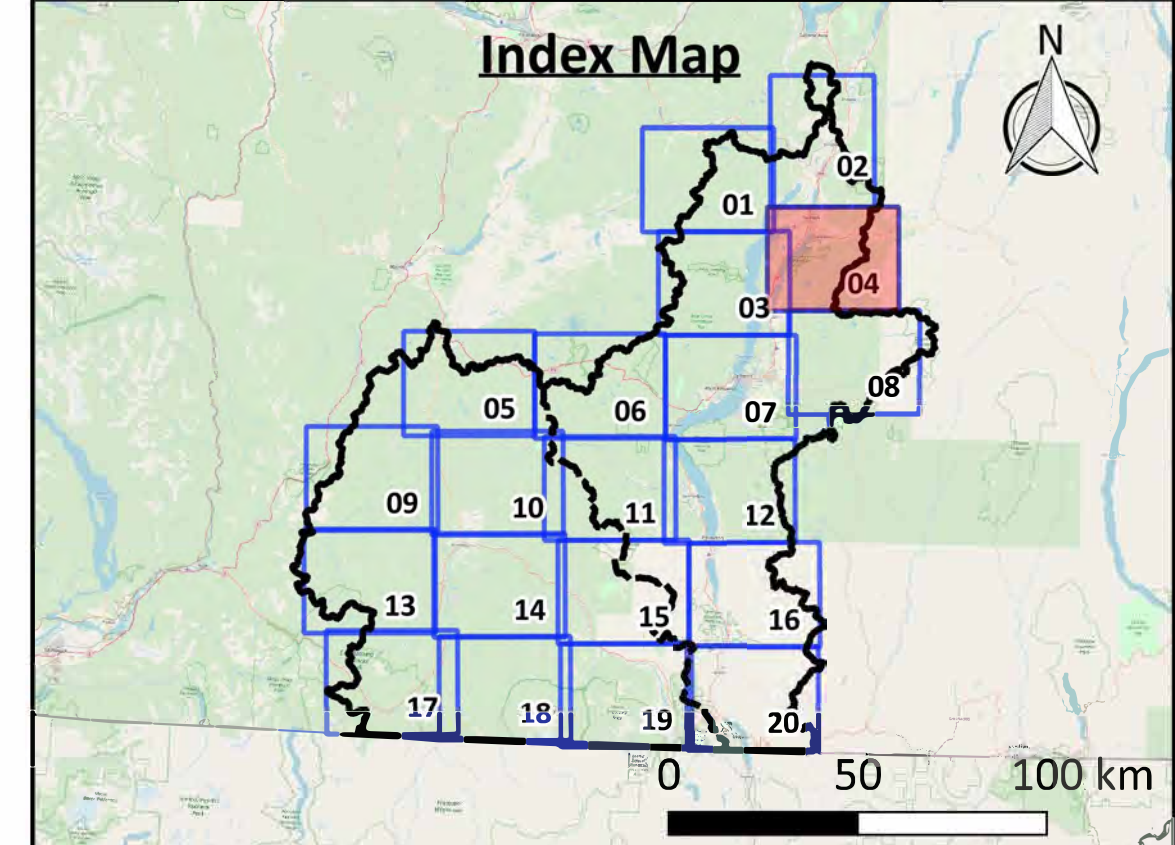
Date: 31 December 2019
Produced by: Ebbwater Consulting Inc.

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
Map Tile 03 of 20

ANSI D - Map No. EN-D-003-003



Zoom-In Map



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Map Notes

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Data Sources

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Scale 1:50,000
 0 1 2 3 4 5 km

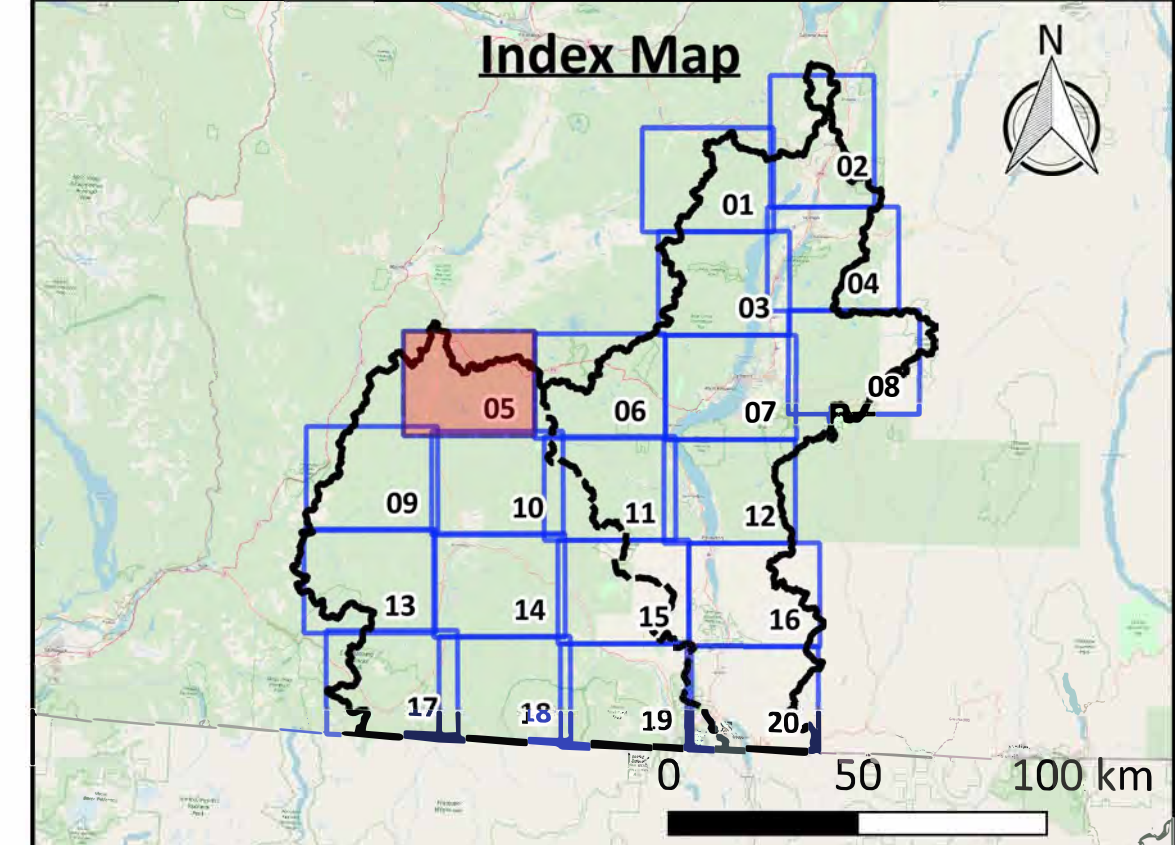
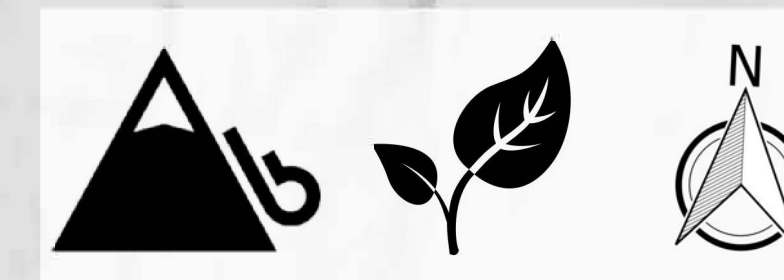
| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🏠 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
Map Tile 04 of 20

ANSI D - Map No. EN-D-003-004

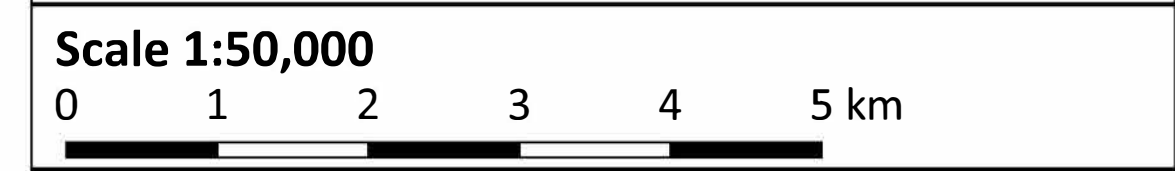
Zoom-In Map



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- Map Notes**
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- Data Sources**
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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.



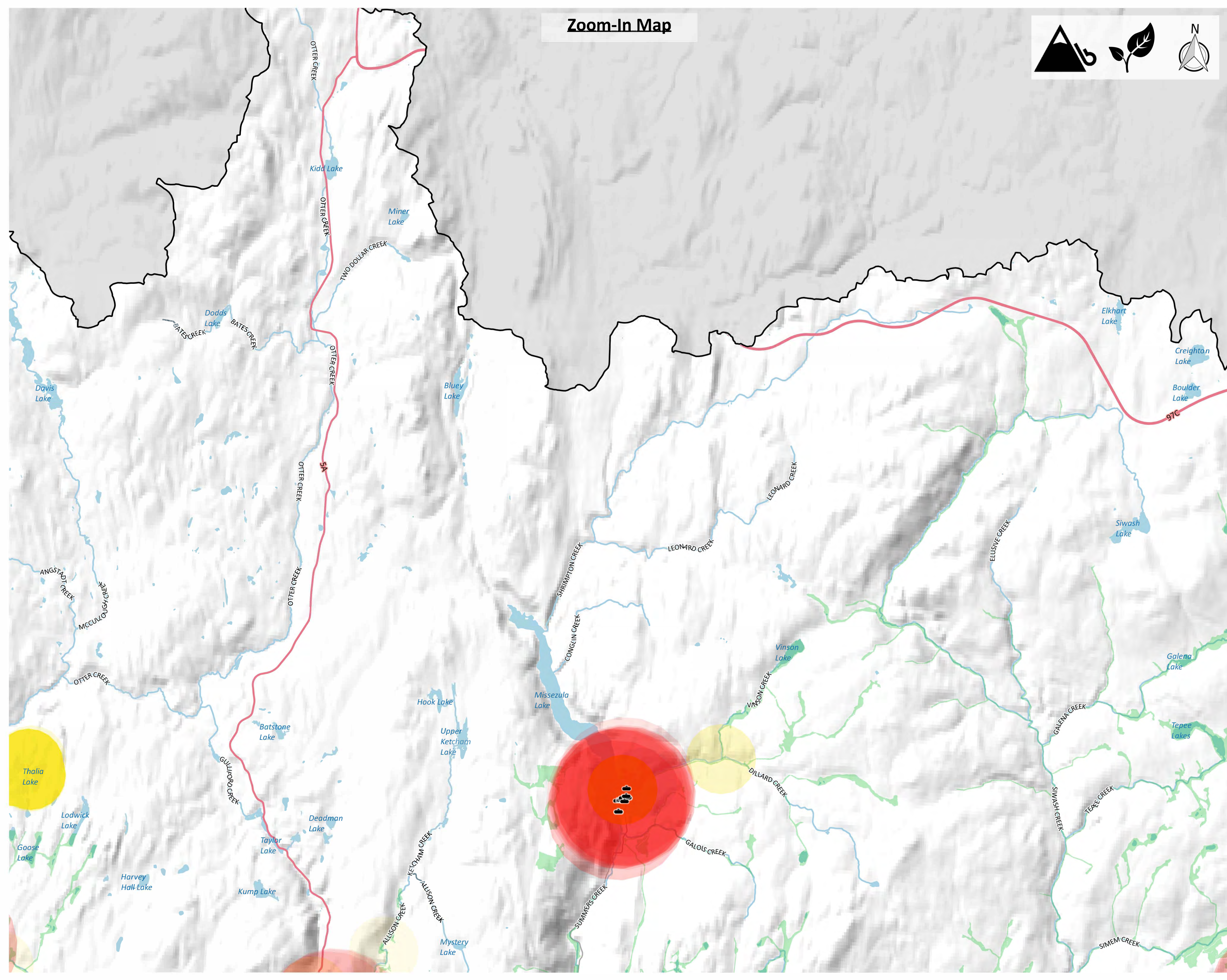
Legend

| | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🗑 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

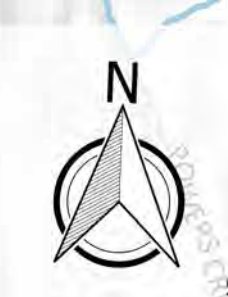
Date: 31 December 2019
Produced by: Ebbwater Consulting Inc.

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
Map Tile 05 of 20

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



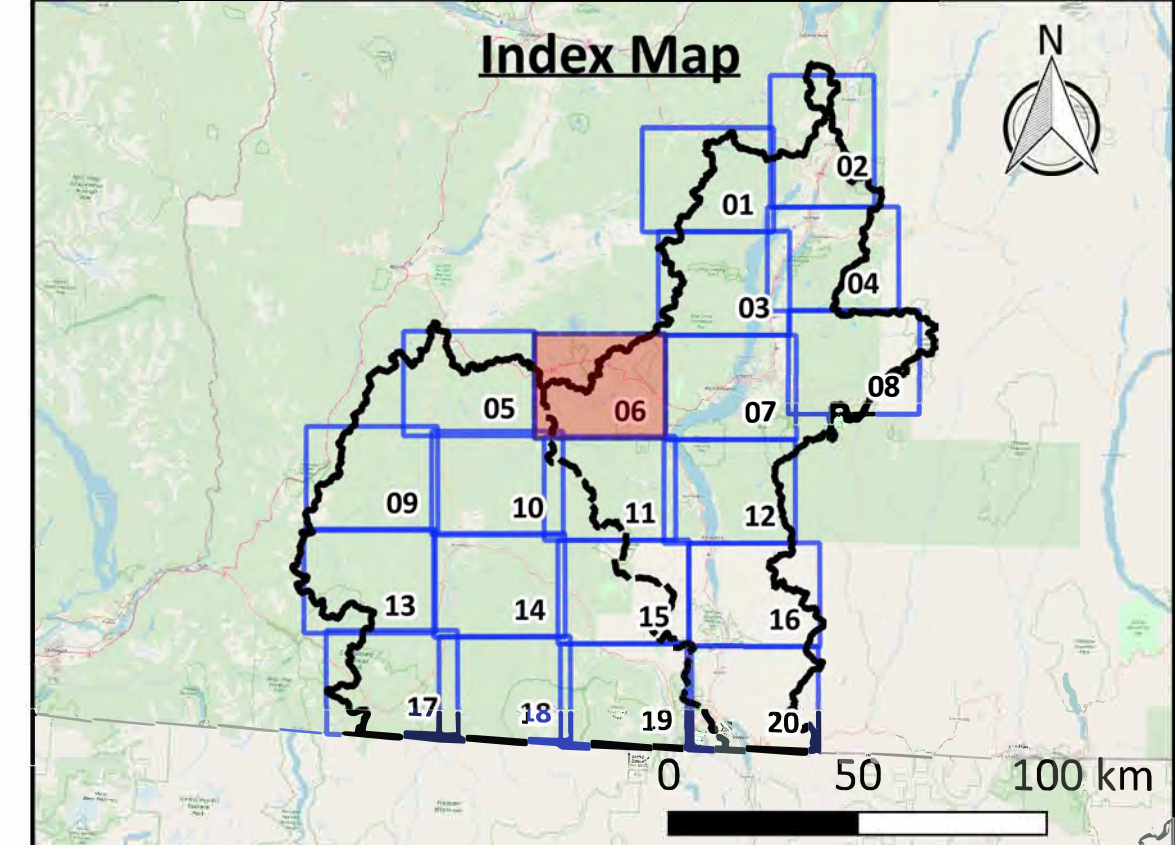
Zoom-In Map



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Palmer Environmental Consulting Group Inc.

Sylix Okanagan Nation Alliance



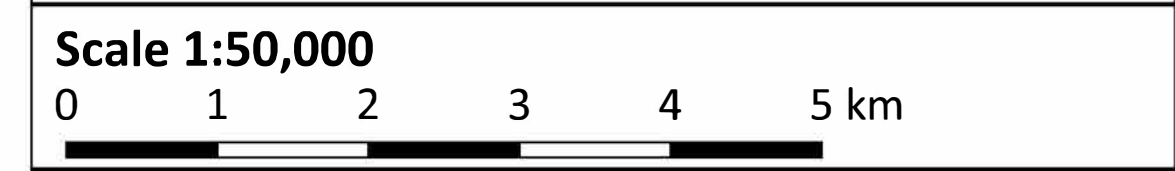
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Map Notes

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Data Sources

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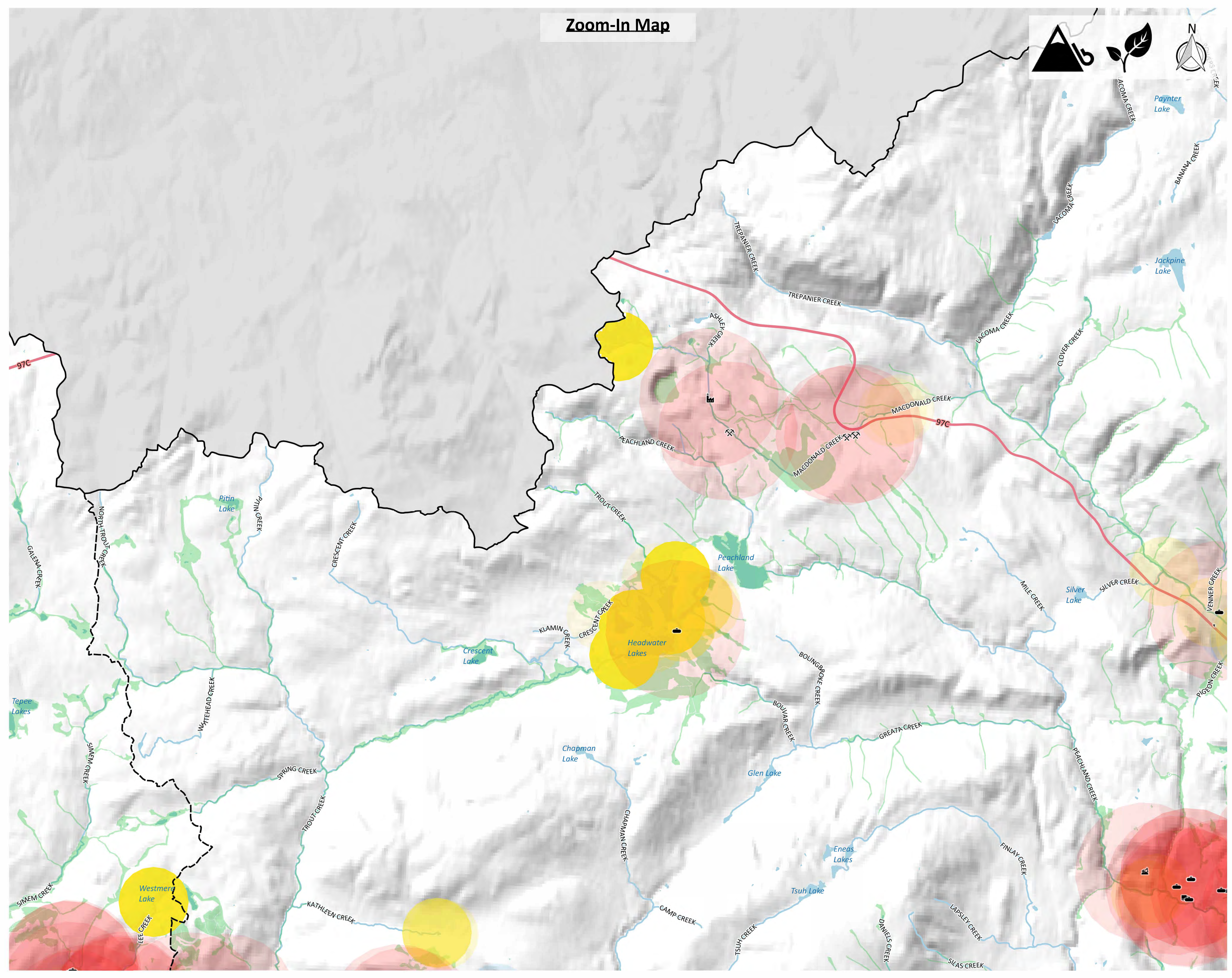


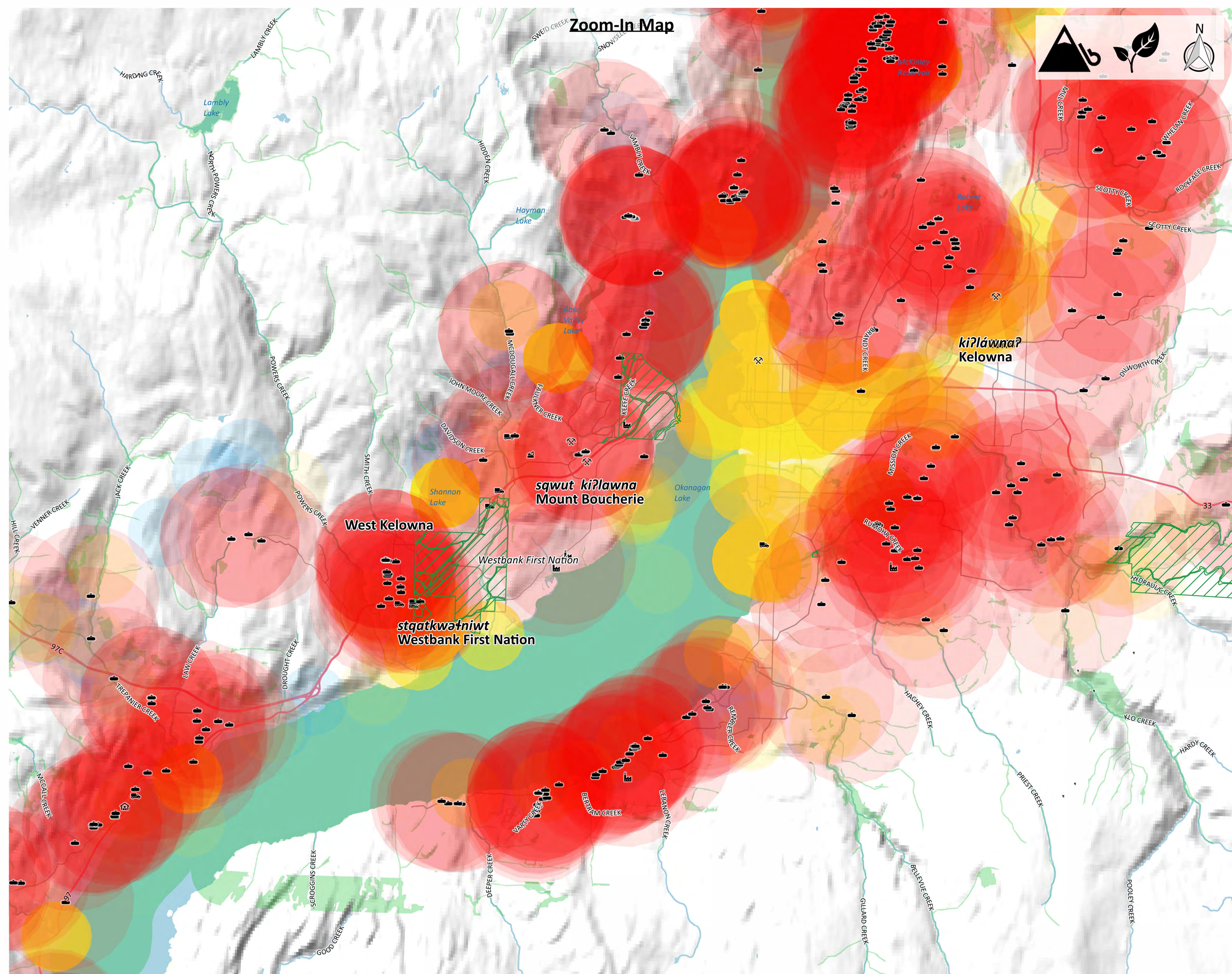
| Legend | |
|-------------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚡ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| --- Okanagan - Similkameen Boundary | 🗑️ Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑️ Waste and landfill |

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

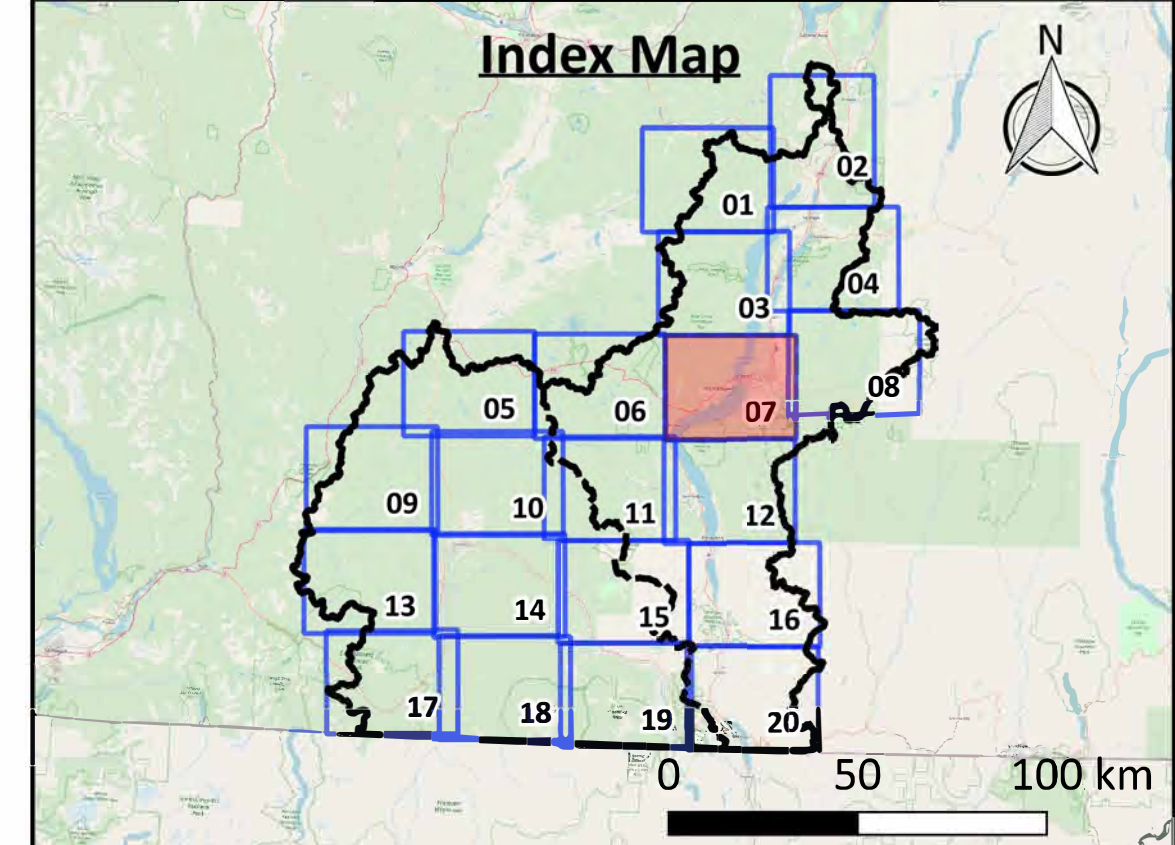
Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
Map Tile 06 of 20

ANSI D - Map No. EN-D-003-006





Zoom-In Map



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Data Sources

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- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
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Scale 1:50,000
 0 1 2 3 4 5 km

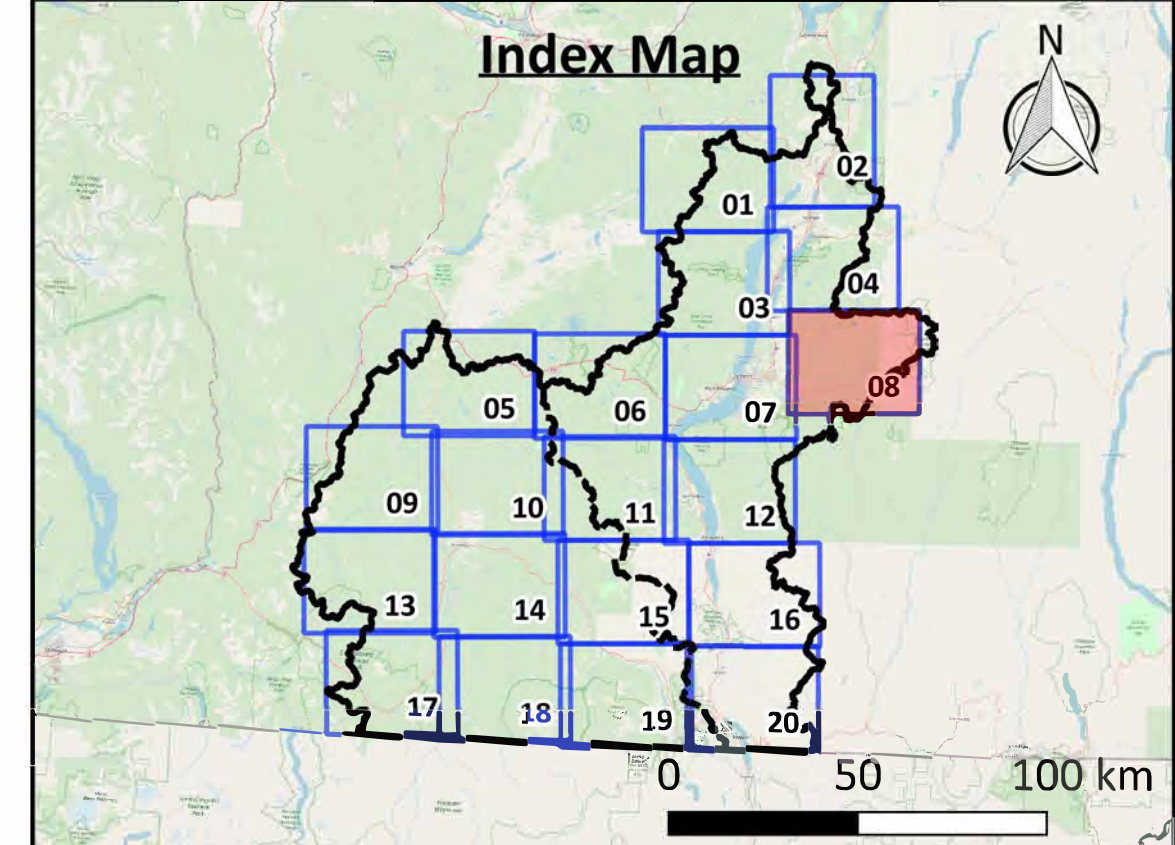
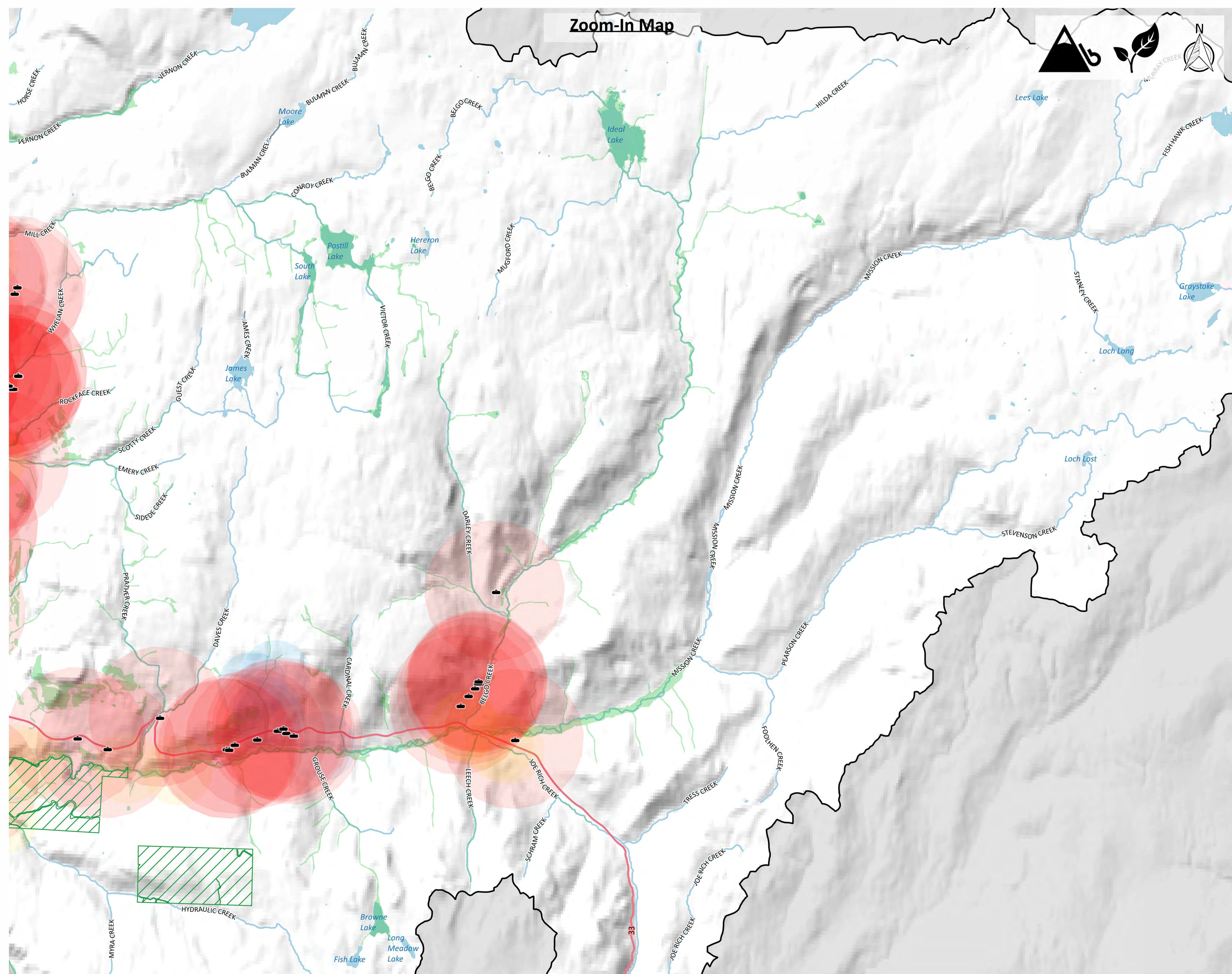
Legend

| | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚡ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🏠 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑️ Waste and landfill |

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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
Map Tile 07 of 20

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



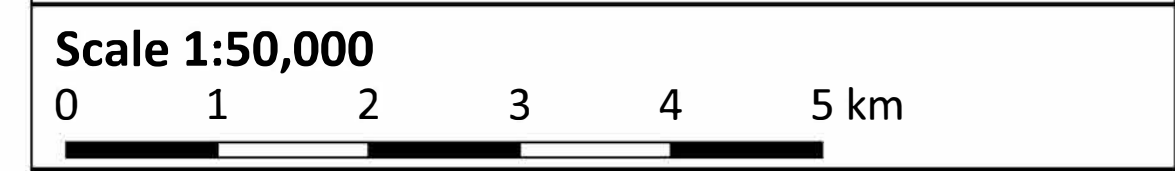
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Map Notes

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Data Sources

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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

| | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🗑 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
Map Tile 08 of 20

ANSI D - Map No. EN-D-003-008

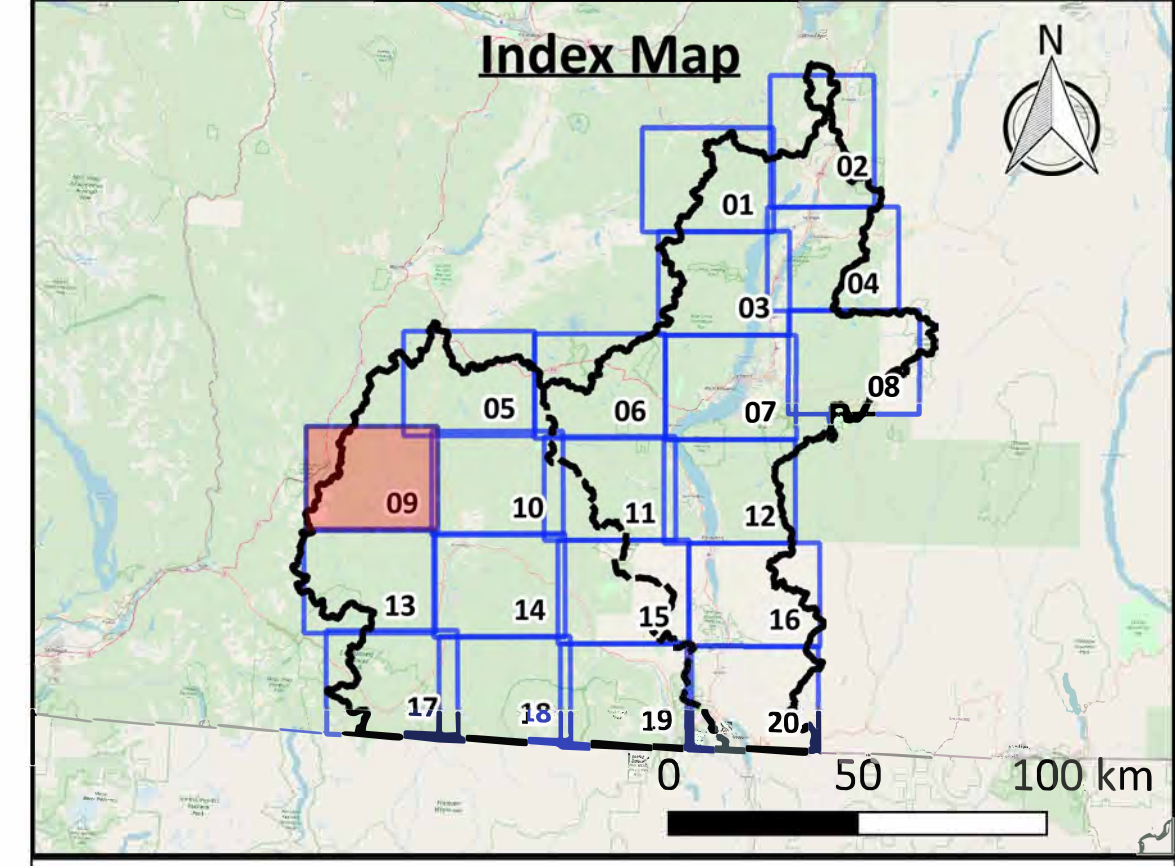
Zoom-In Map



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THOUGHTFUL FLOOD MANAGEMENT

sylix
PALMER ENVIRONMENTAL CONSULTING GROUP INC.

Okanagan Nation Alliance



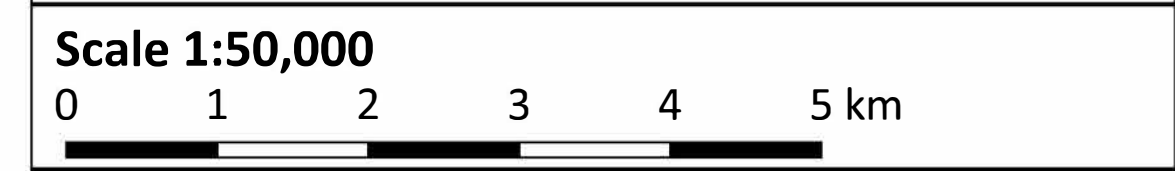
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[Click here to return to Similkameen map](#)

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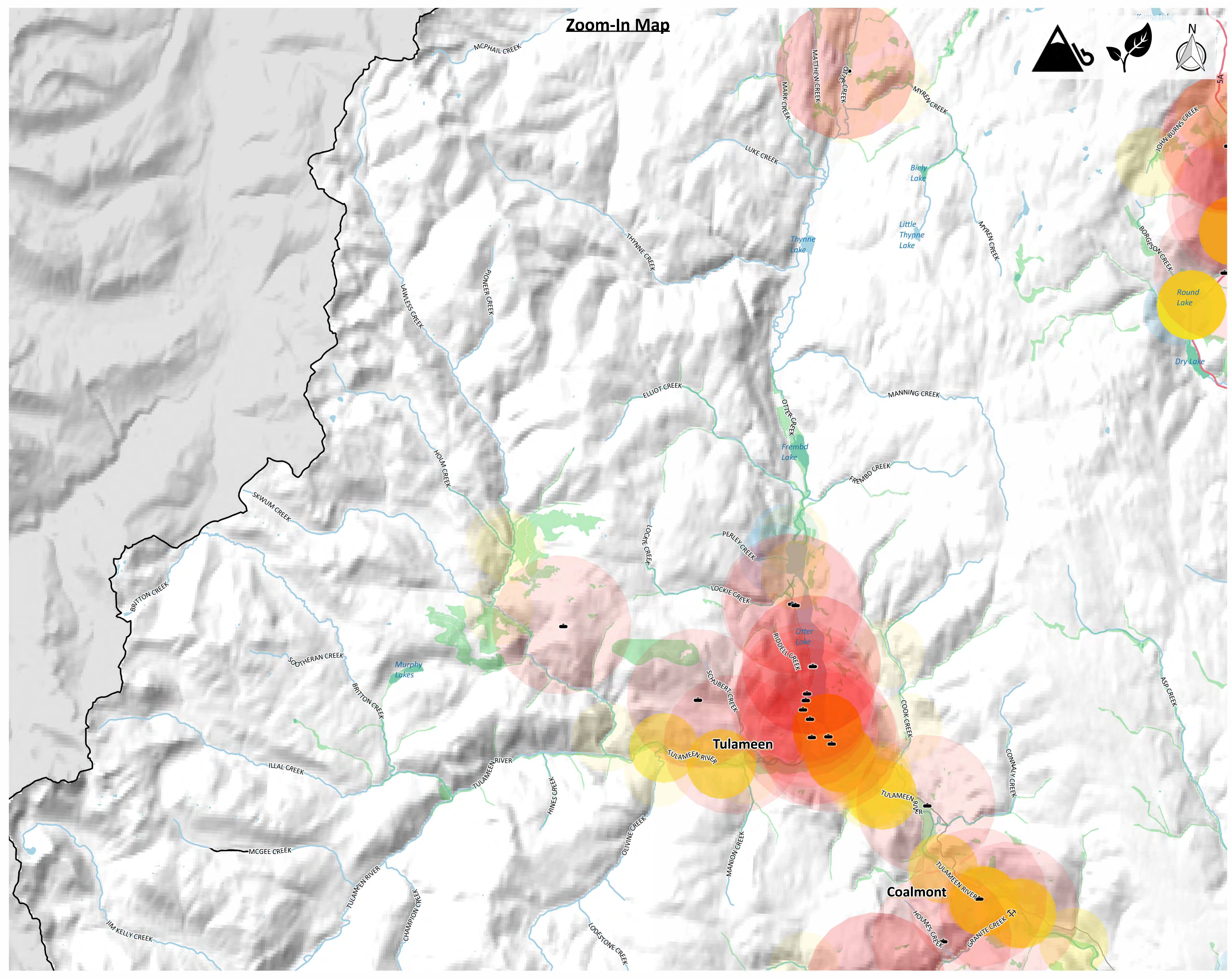


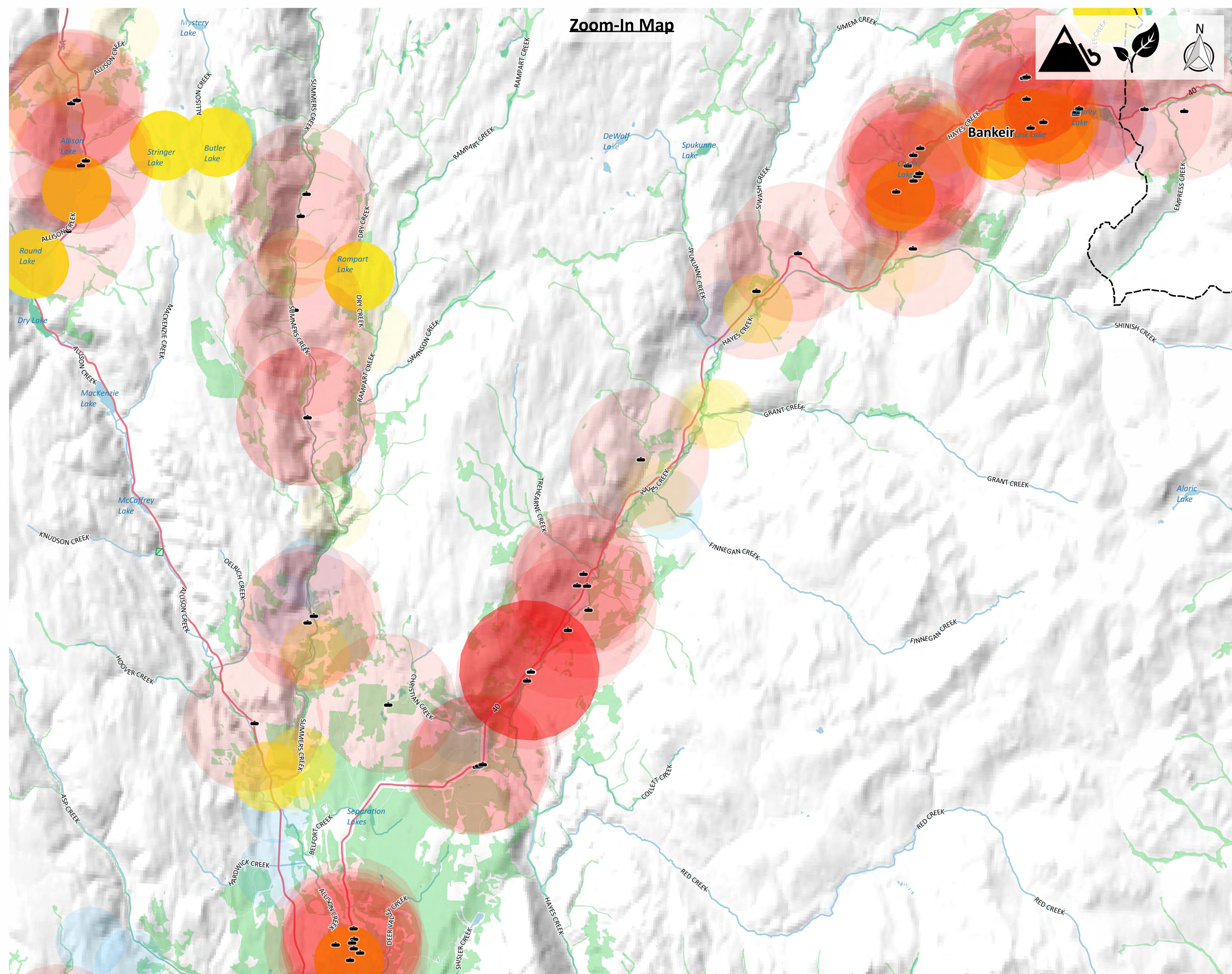
| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🗑 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

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

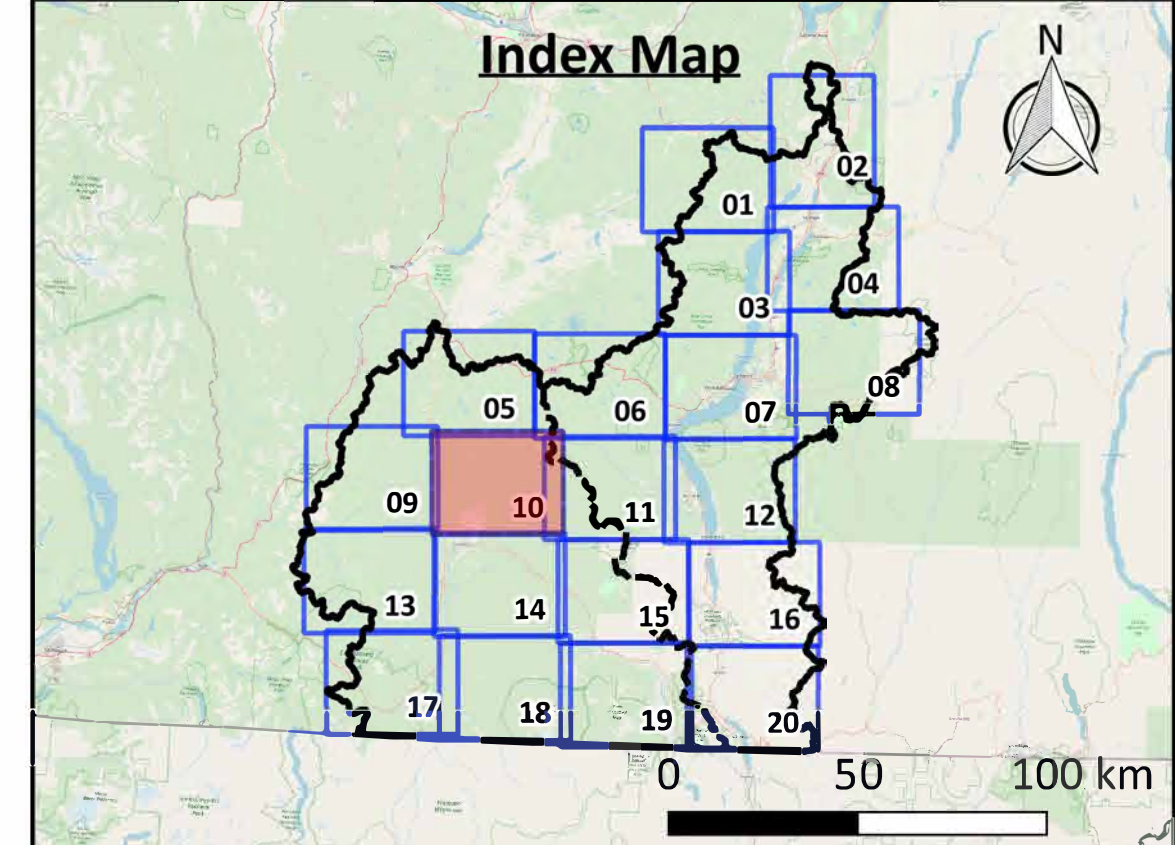
Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
Map Tile 09 of 20

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





Zoom-In Map



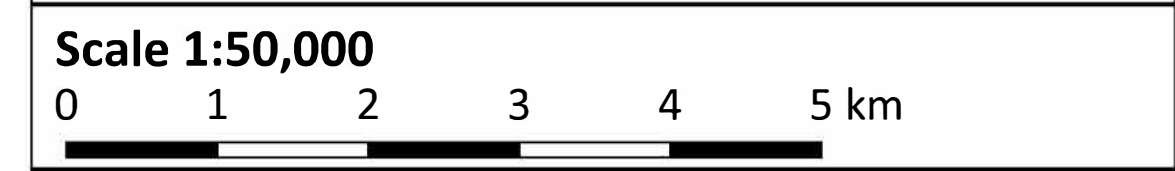
[Click above map tile for Zoom-In map](#)
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[Click here to return to Similkameen map](#)

Map Notes

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Data Sources

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- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.



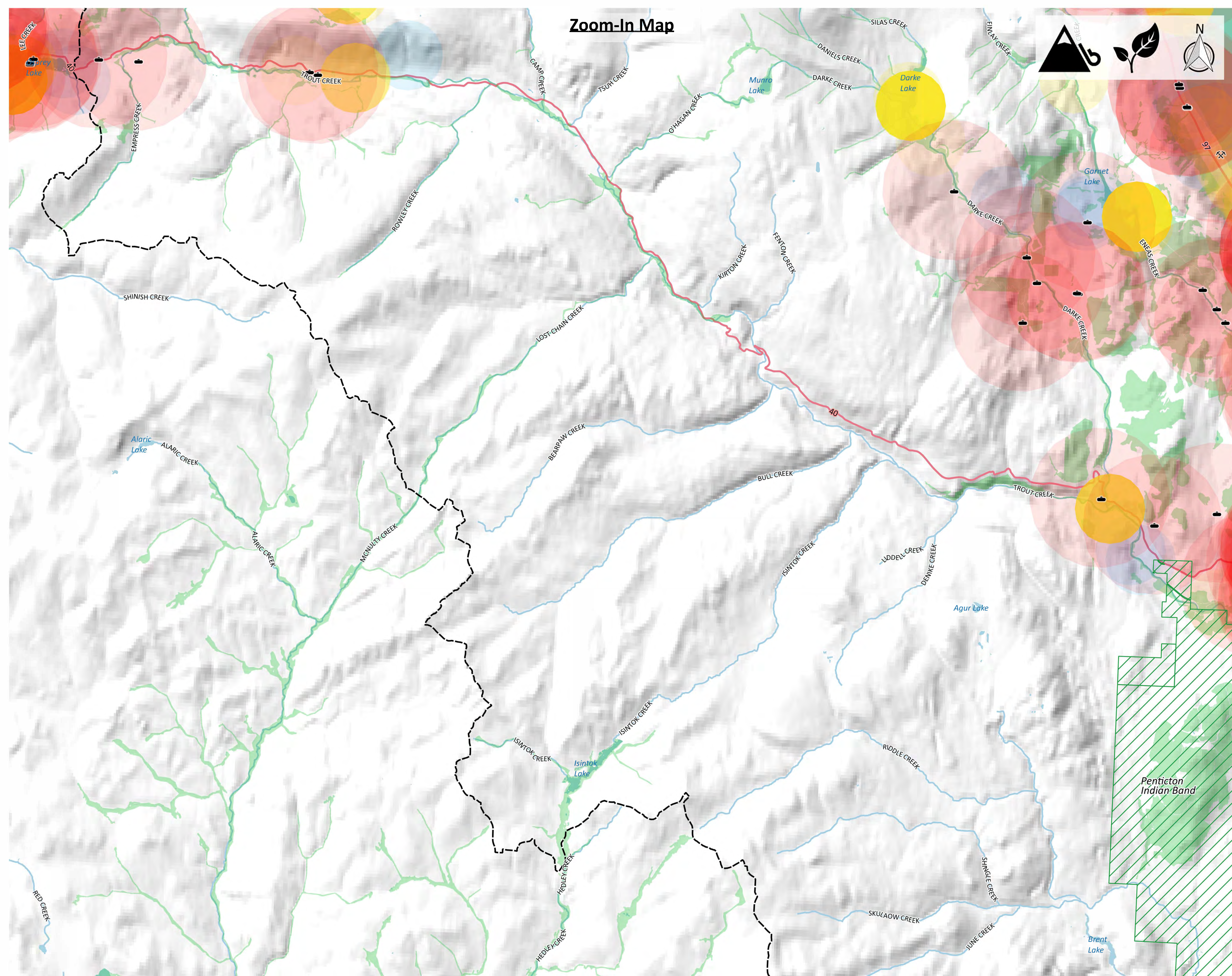
Legend

| | |
|-------------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▭ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| --- Okanagan - Similkameen Boundary | 🏠 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

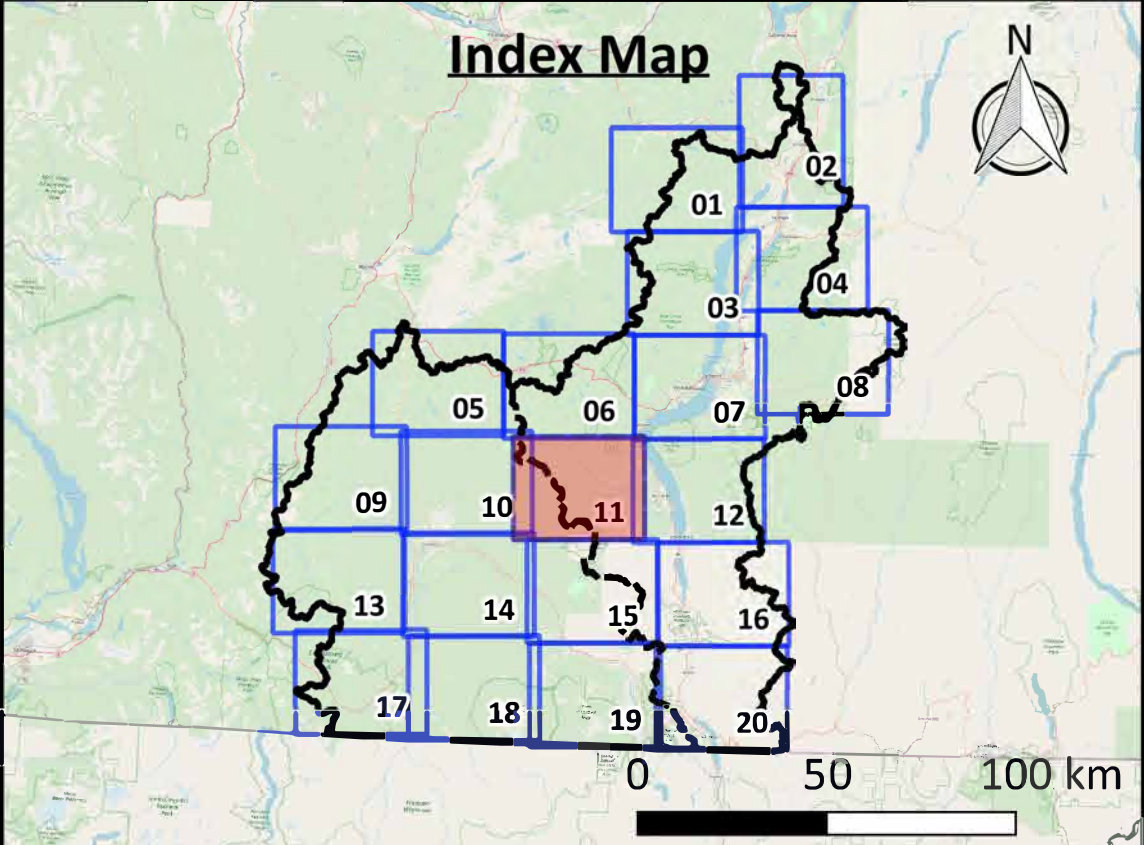
Date: 31 December 2019
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Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
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ANSI D - Map No. EN-D-003-010



Zoom-In Map



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Map Notes

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Data Sources

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- Sylix Place Names: Okanagan Nation Alliance.
- 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
 0 1 2 3 4 5 km

Legend

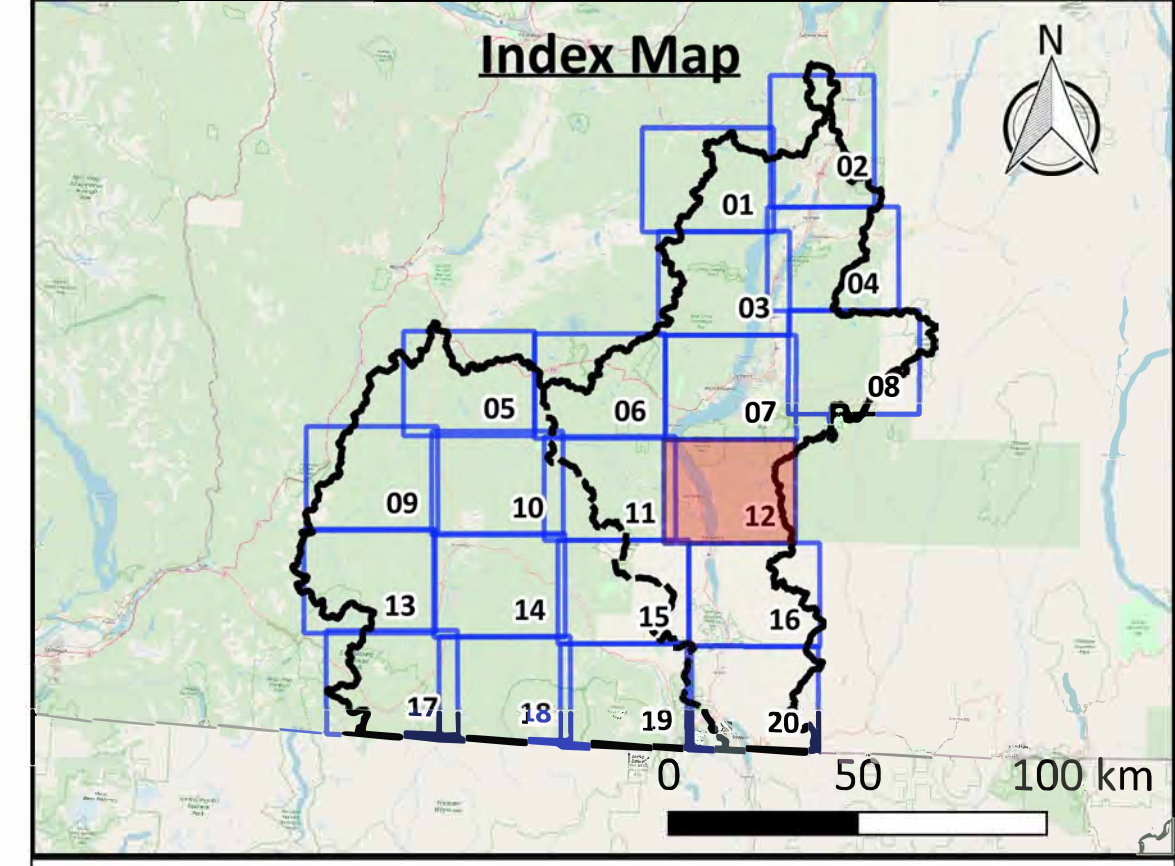
| | |
|-------------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| --- Okanagan - Similkameen Boundary | 🗑 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

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Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
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ANSI D - Map No. EN-D-003-011

Zoom-In Map



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Map Notes

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Data Sources

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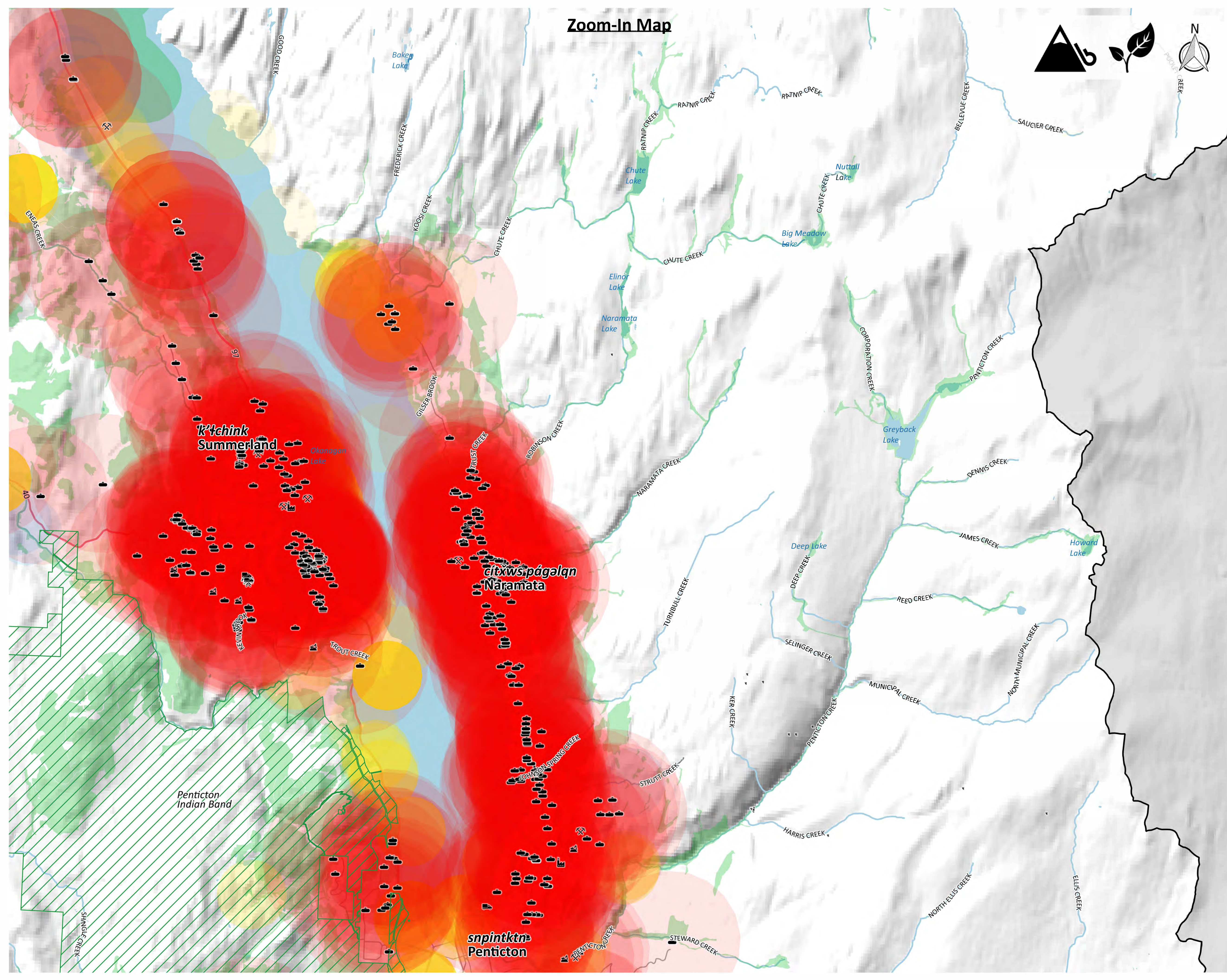
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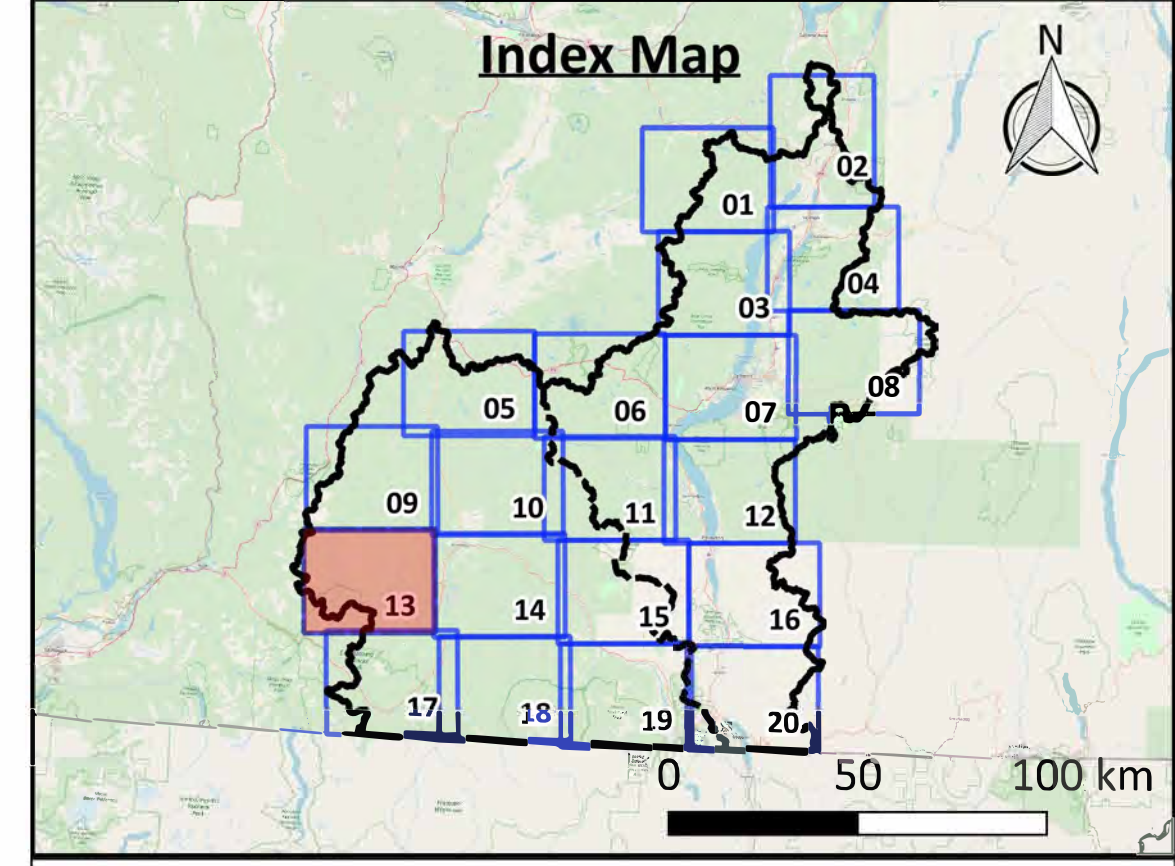
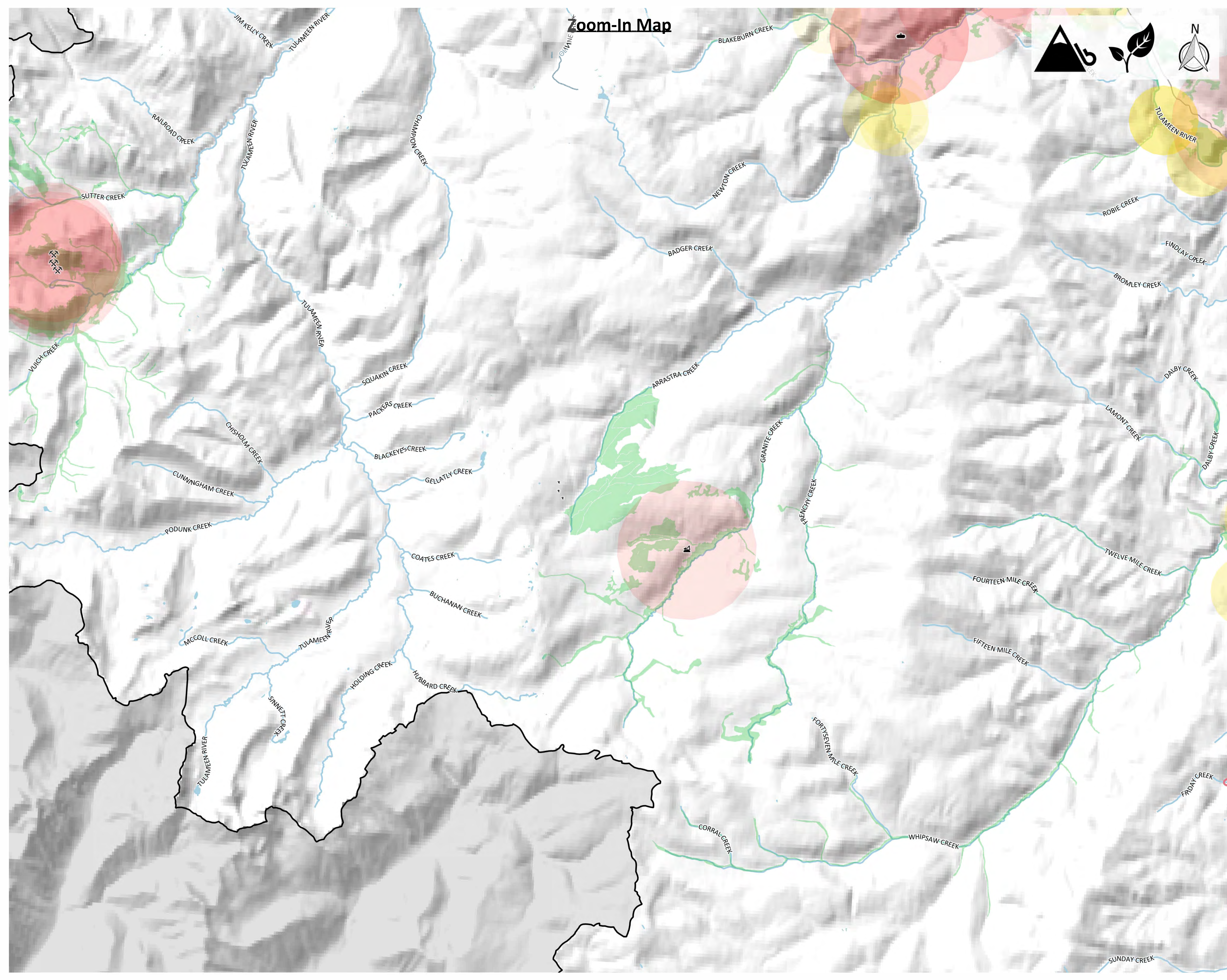
| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🏠 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

Date: 31 December 2019
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Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
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ANSI D - Map No. EN-D-003-012





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Map Notes

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Data Sources

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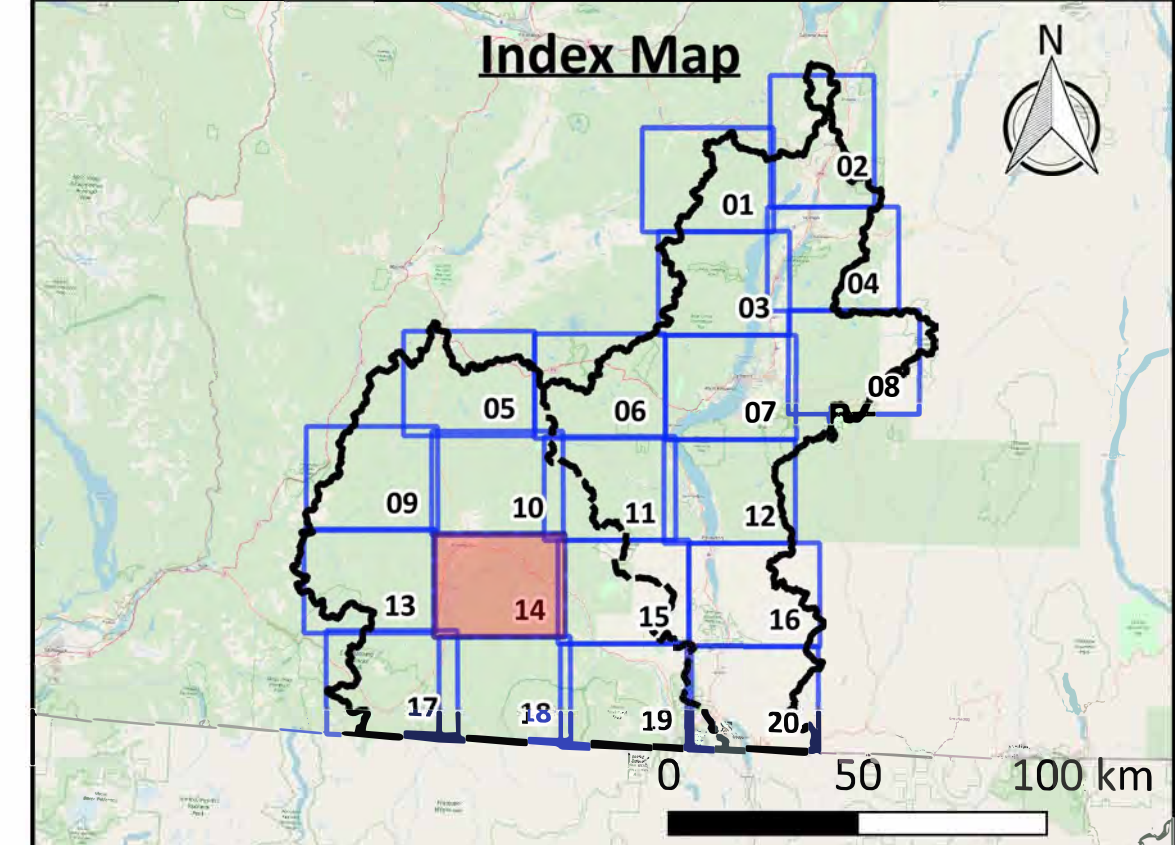
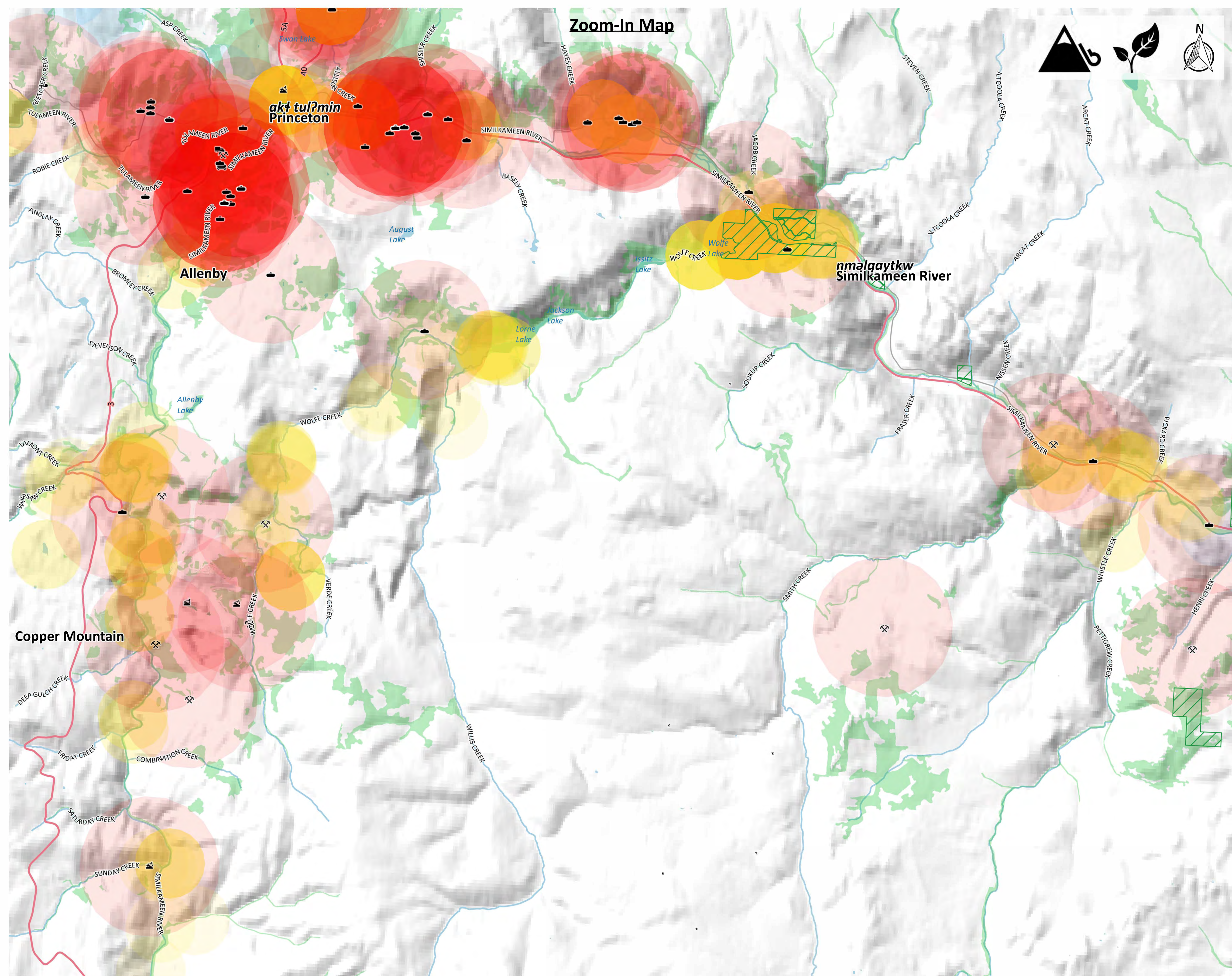
Scale 1:50,000
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| Legend | |
|-------------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▭ Reserves | ● Drinking Water Wells |
| ▭ Lakes | ▭ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⊗ Heavy industry and mining |
| — Major Road | ⊗ Manufacturing (inc. food) |
| --- Okanagan - Similkameen Boundary | ⊗ Septic and sewer systems |
| | ⊗ Storage |
| | ⊗ Transport |
| | ⊗ Waste and landfill |

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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
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ANSI D - Map No. EN-D-003-013



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Map Notes

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Data Sources

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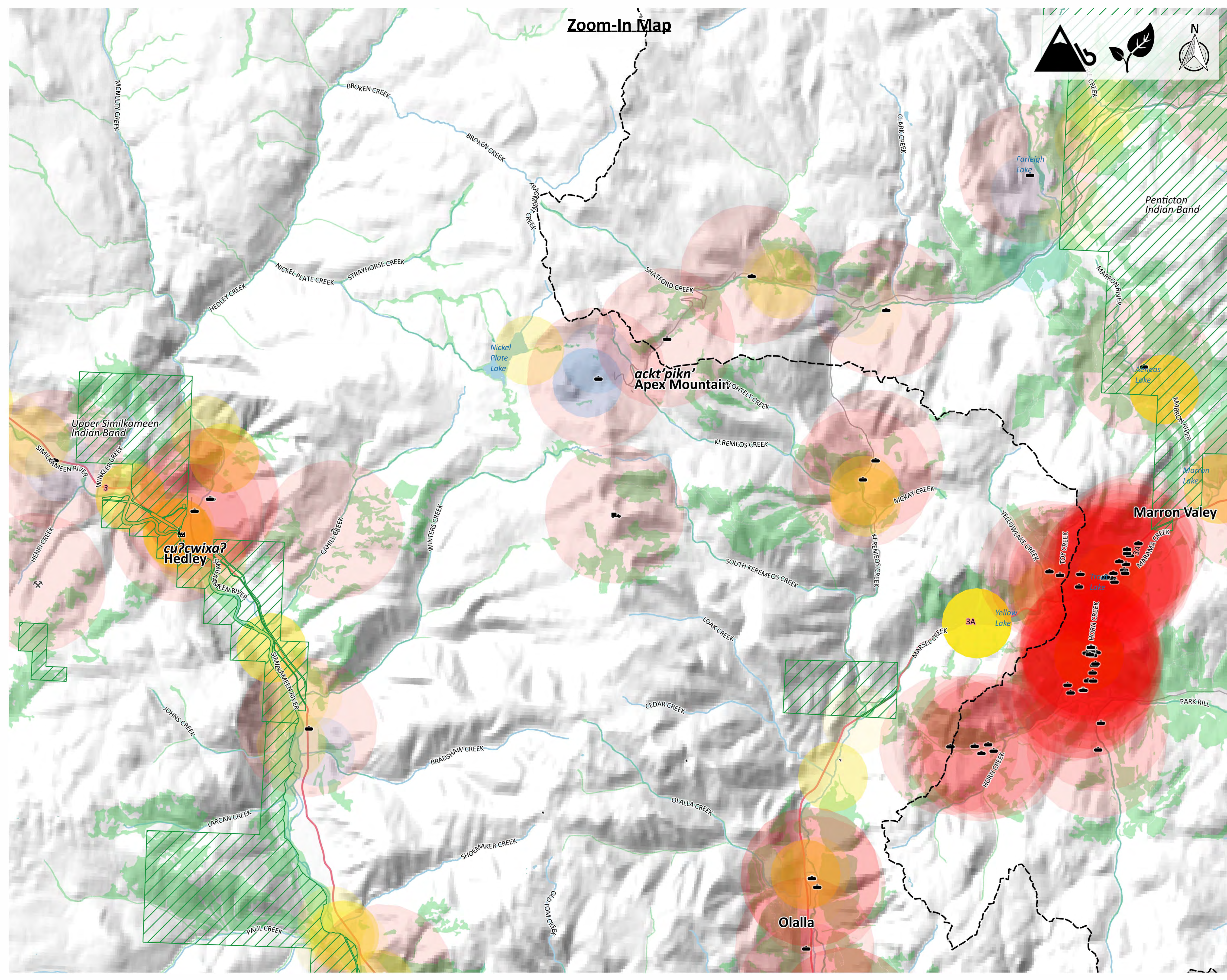
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| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▭ Reserves | ● Drinking Water Wells |
| ▭ Lakes | ● High Biodiversity Area |
| ▭ Watercourses | Contamination Source Type |
| — Highway | ⊠ Heavy industry and mining |
| — Major Road | ⊠ Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | ⊠ Septic and sewer systems |
| | ⊠ Storage |
| | ⊠ Transport |
| | ⊠ Waste and landfill |

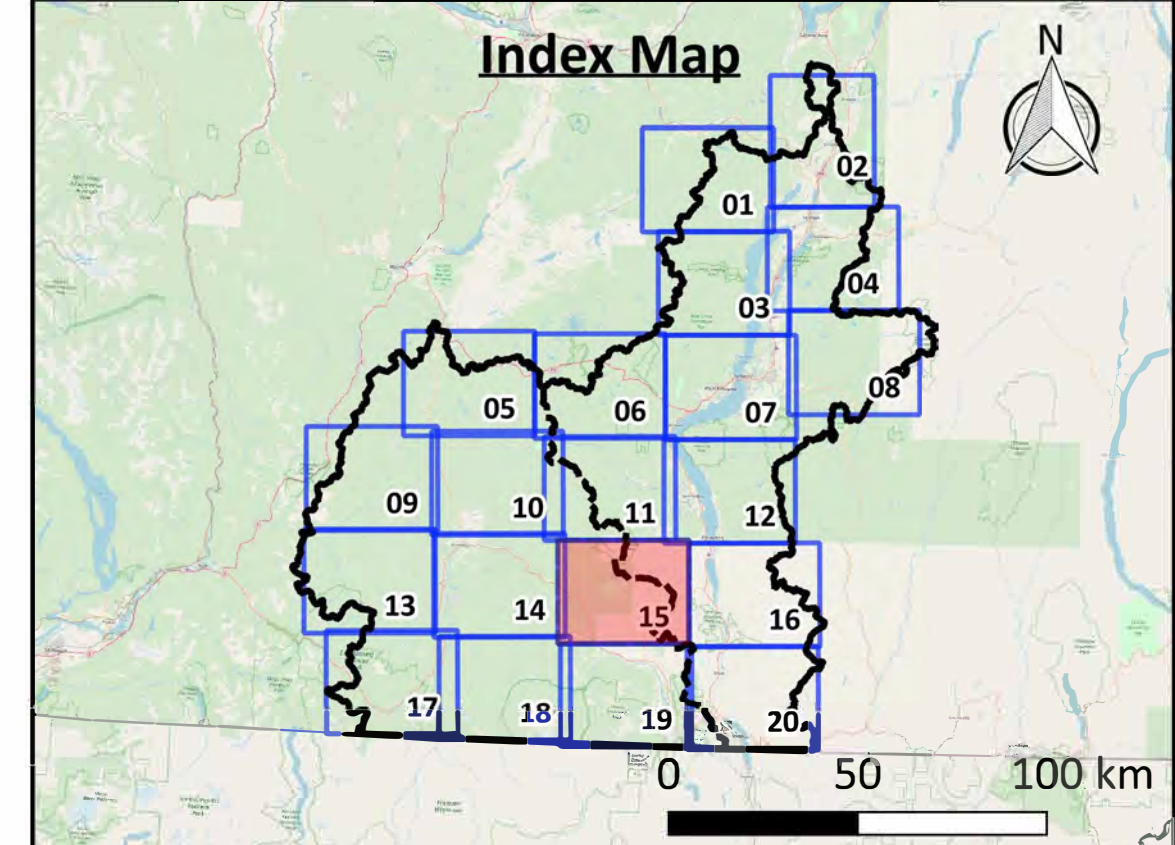
Date: 31 December 2019
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Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
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ANSI D - Map No. EN-D-003-014



Zoom-In Map



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Map Notes

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Scale 1:50,000
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Legend

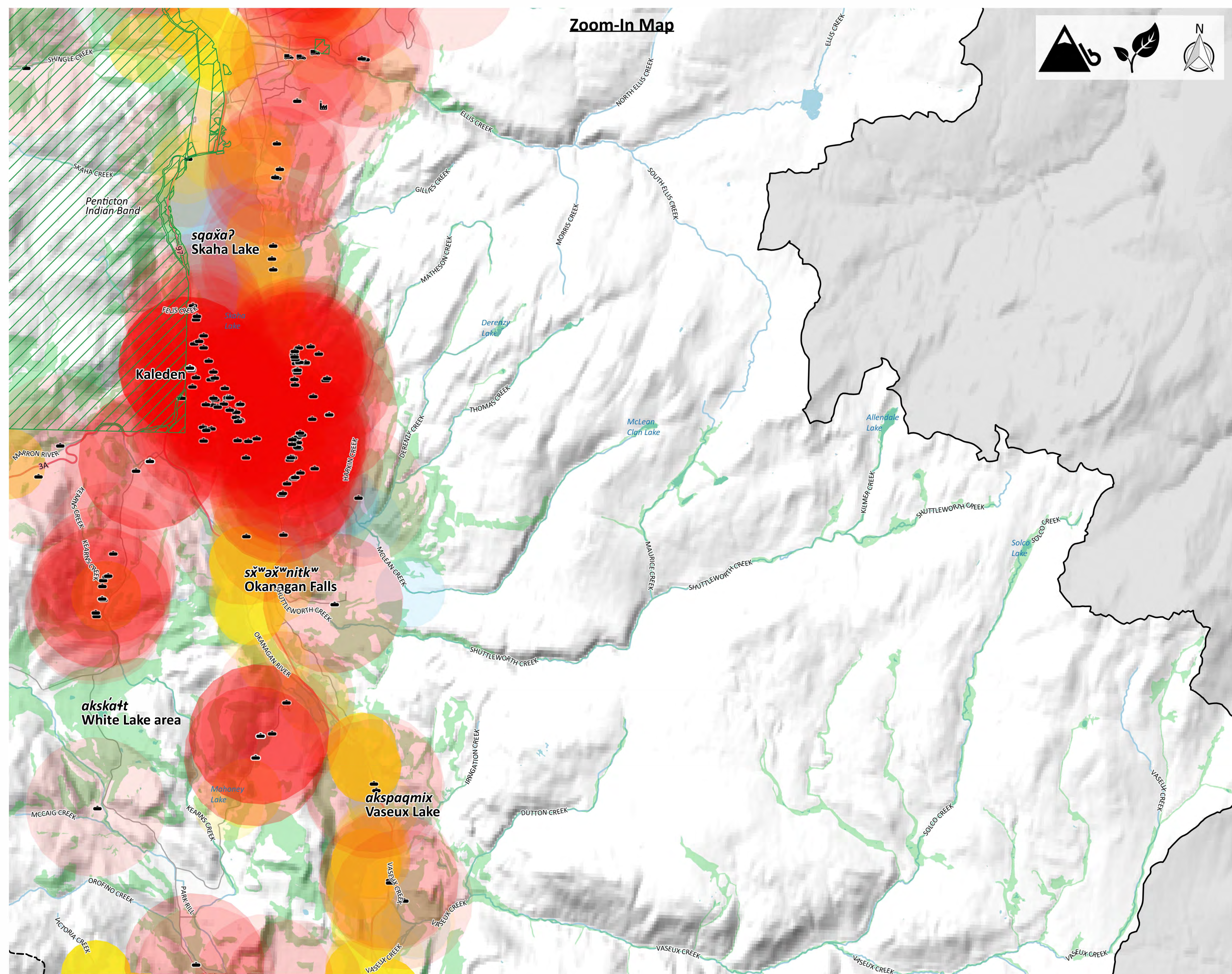
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|-------------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ● Lakes | ● High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| --- Okanagan - Similkameen Boundary | 🚰 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

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Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
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Zoom-In Map



ebbwater CONSULTING
THOUGHTFUL FLOOD MANAGEMENT

Palmer Environmental Consulting Group Inc.

Sylix Okanagan Nation Alliance

Index Map

0 50 100 km

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

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Scale 1:50,000

0 1 2 3 4 5 km

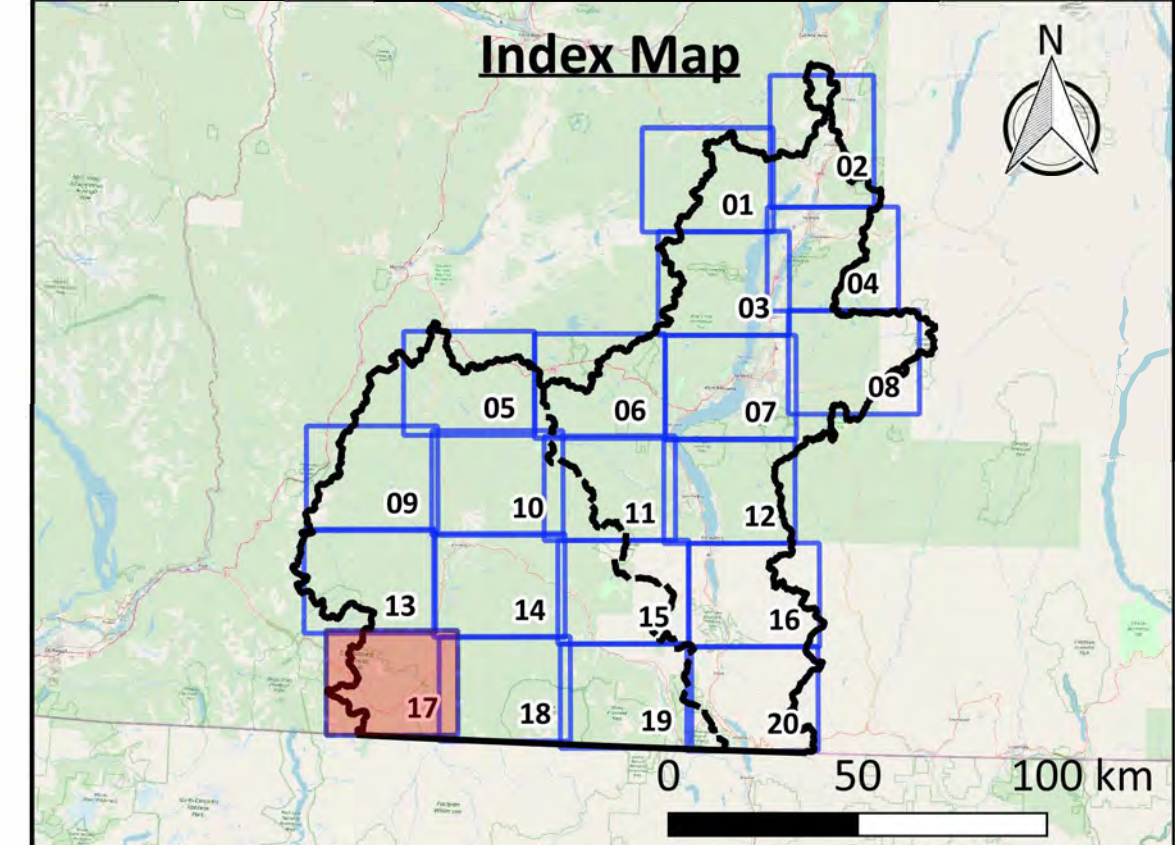
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| | |
|-------------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⊗ Heavy industry and mining |
| — Major Road | ⊗ Manufacturing (inc. food) |
| --- Okanagan - Similkameen Boundary | ⊗ Septic and sewer systems |
| | ⊗ Storage |
| | ⊗ Transport |
| | ⊗ Waste and landfill |

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Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
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ANSI D - Map No. EN-D-003-016

Zoom-In Map



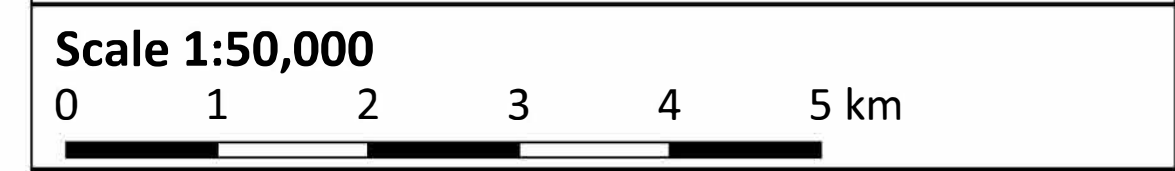
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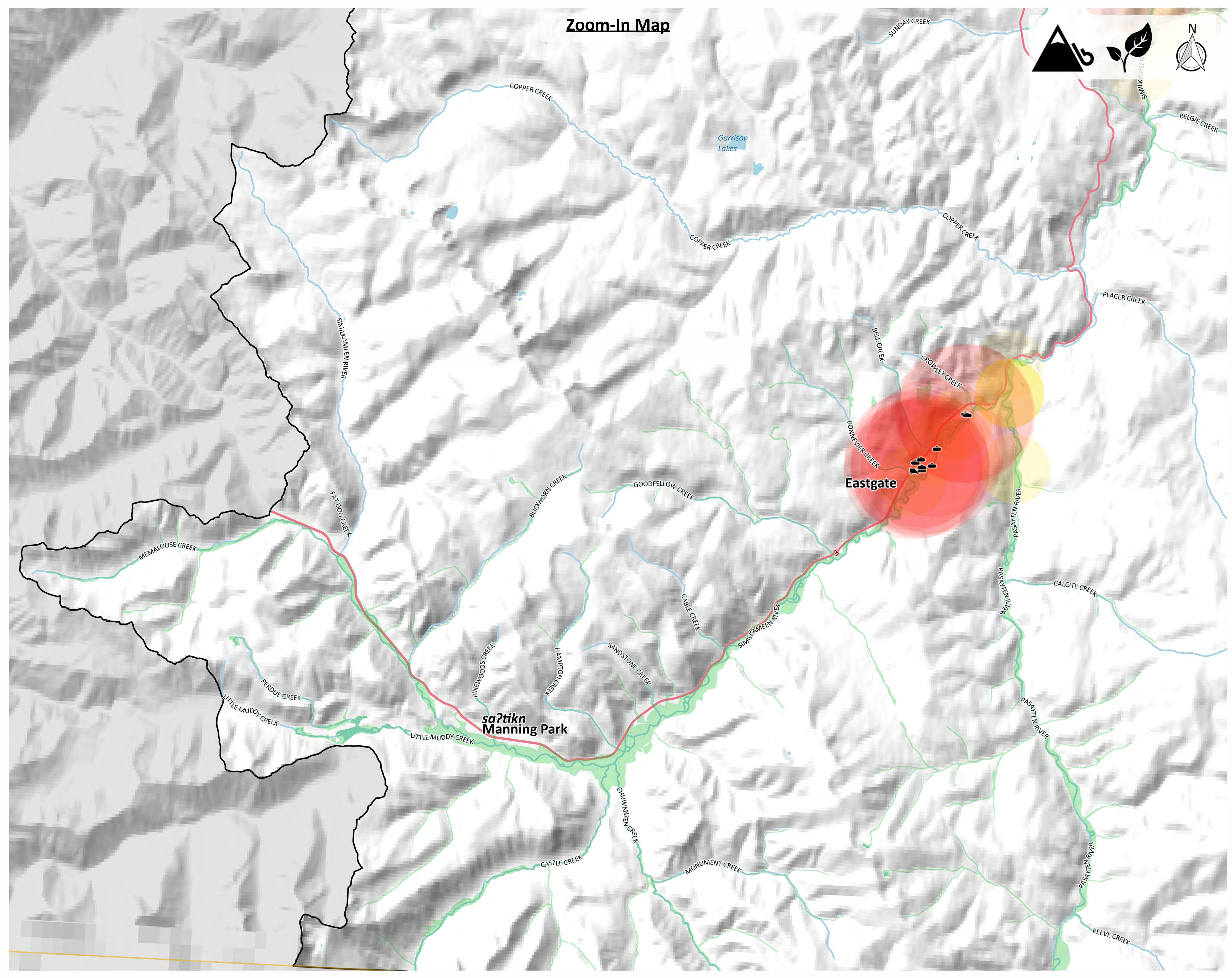


| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▭ Reserves | ● Drinking Water Wells |
| ● Lakes | ● High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🗑 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

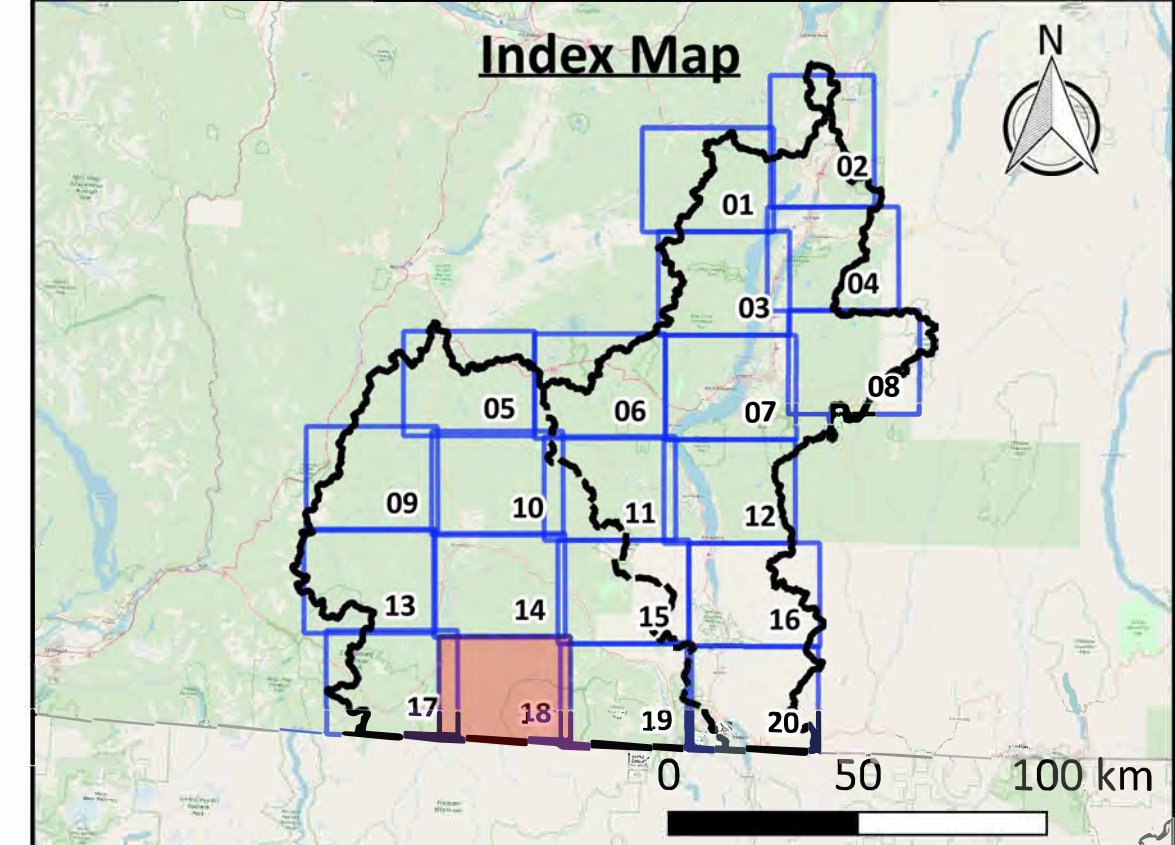
Date: 31 December 2019
Produced by: Ebbwater Consulting Inc.

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
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ANSI D - Map No. EN-D-003-017



Zoom-In Map



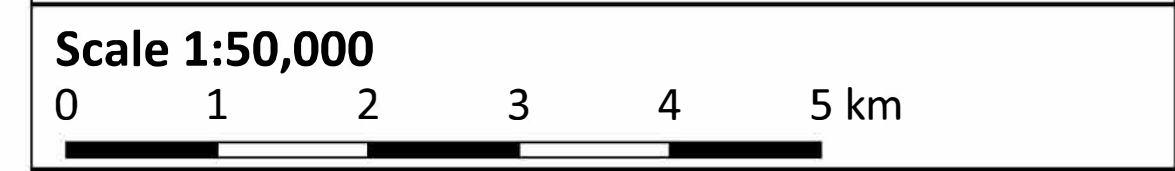
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[Click here to return to Okanagan map](#)
[Click here to return to Similkameen map](#)

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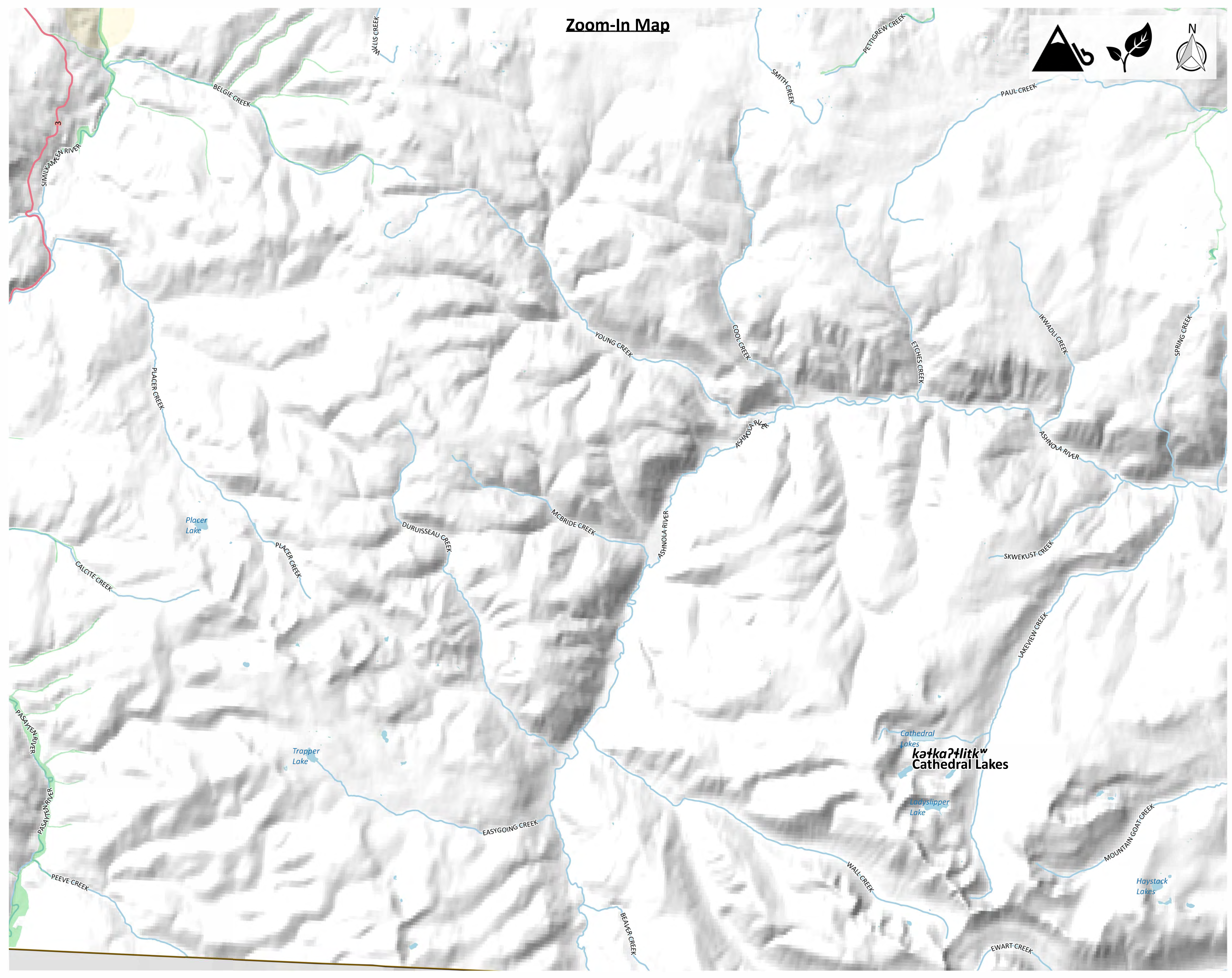


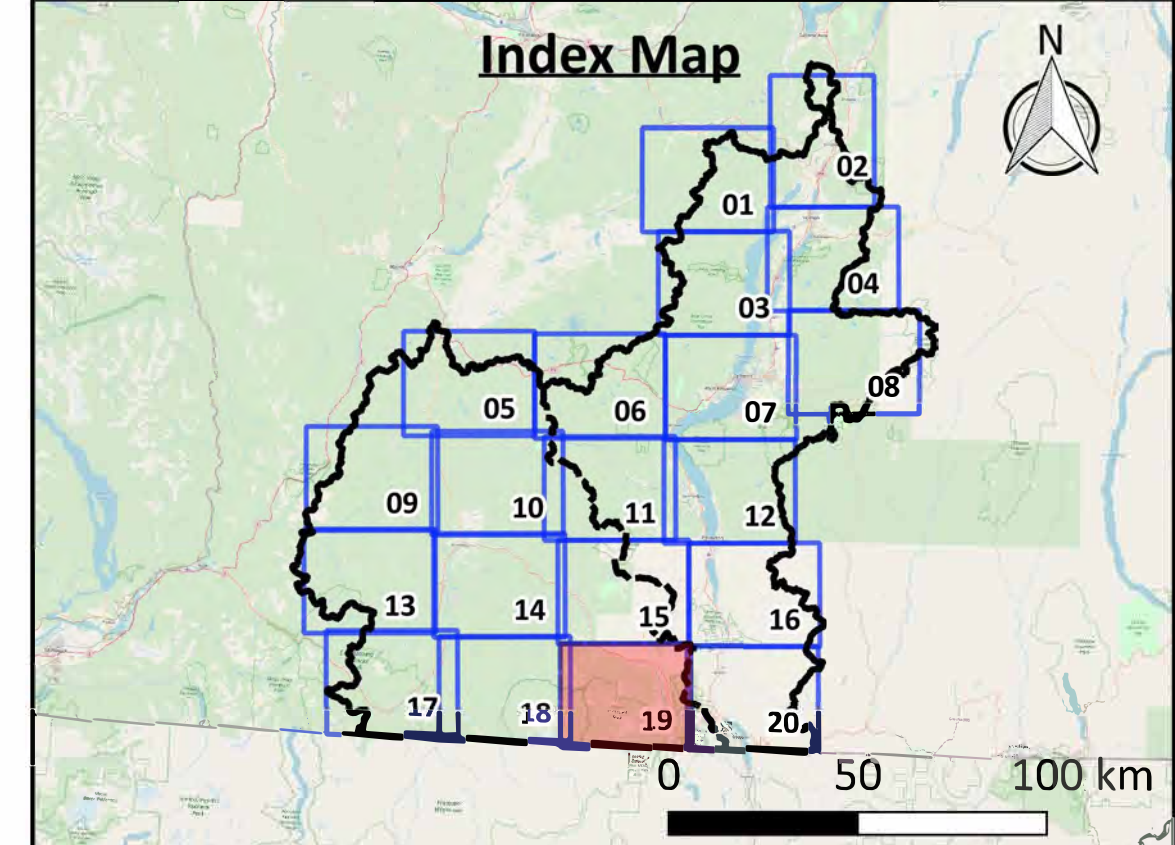
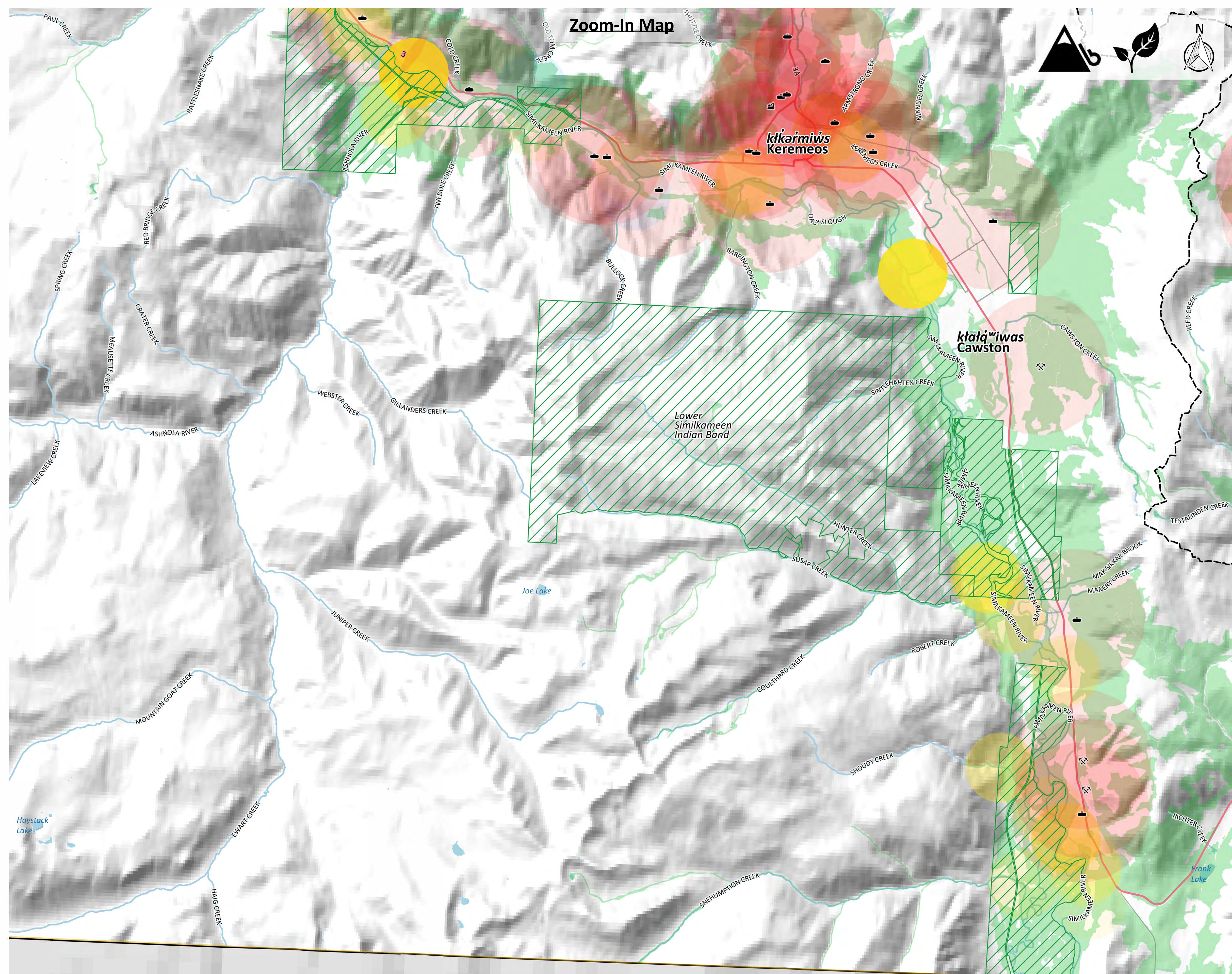
| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▭ Reserves | ● Drinking Water Wells |
| ▭ Lakes | ▭ High Biodiversity Area |
| ▭ Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🗑 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |

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

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
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ANSI D - Map No. EN-D-003-018





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Map Notes

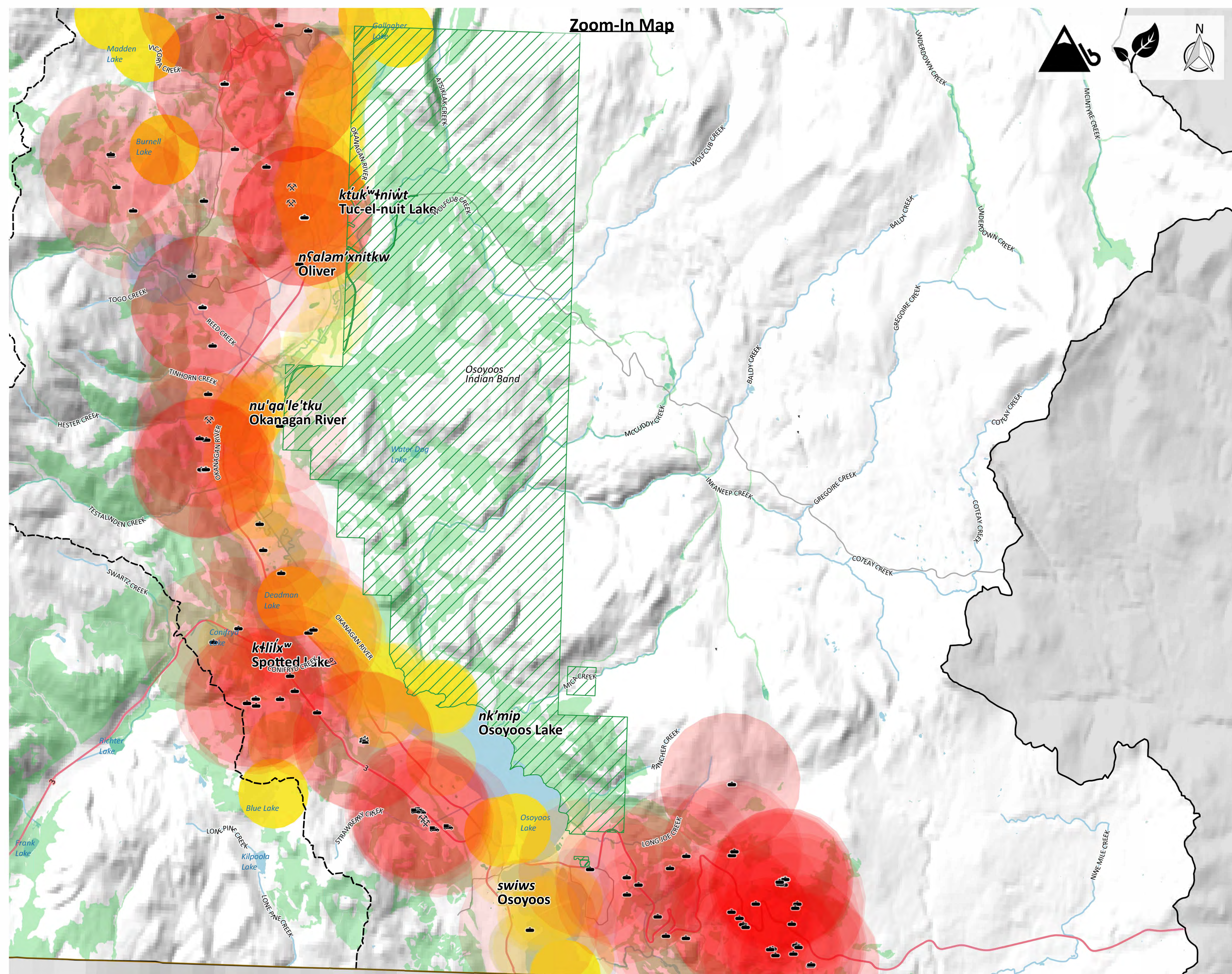
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- Sylix Place Names: Okanagan Nation Alliance.
- Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

Scale 1:50,000
 0 1 2 3 4 5 km

| Legend | |
|-----------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
| — Watercourses | Contamination Source Type |
| — Highway | ⚙ Heavy industry and mining |
| — Major Road | 🏭 Manufacturing (inc. food) |
| — Okanagan - Similkameen Boundary | 🏠 Septic and sewer systems |
| | 🏠 Storage |
| | 🚚 Transport |
| | 🗑 Waste and landfill |



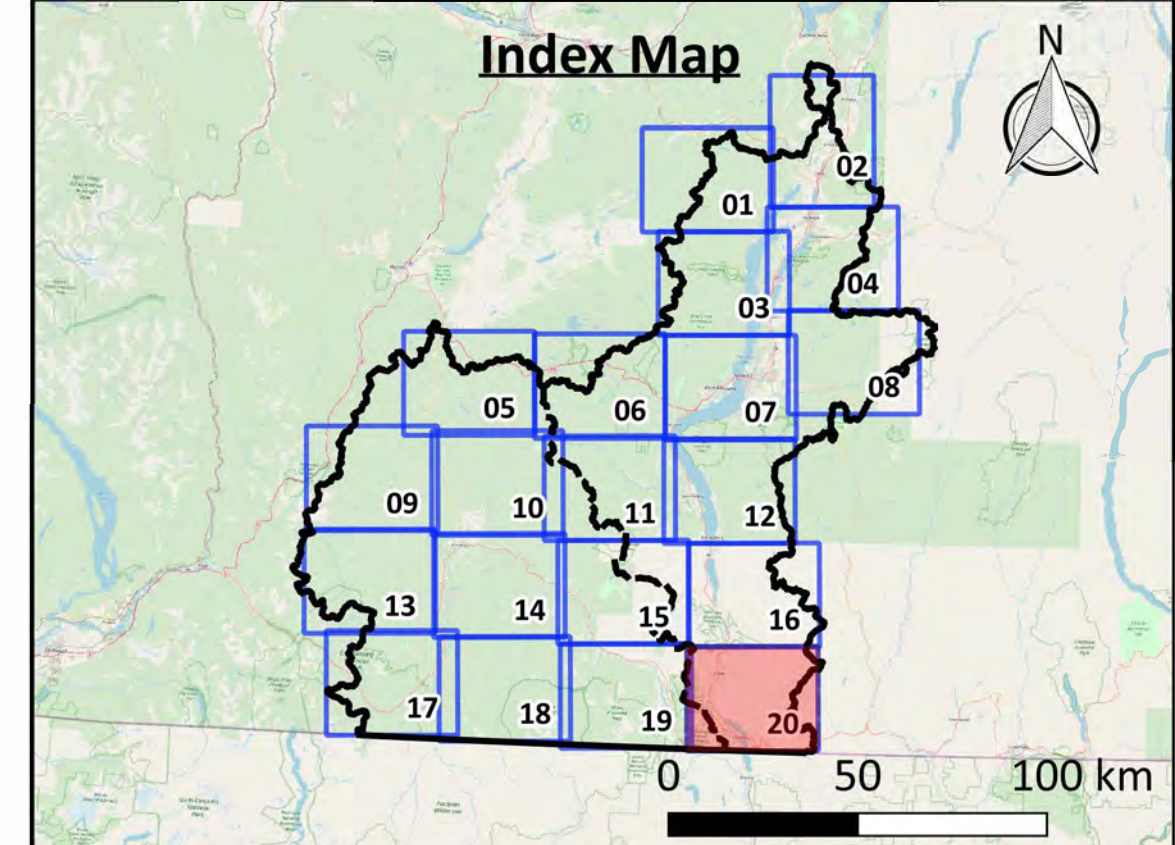
Zoom-In Map



ebbwater CONSULTING
THOUGHTFUL FLOOD MANAGEMENT

Palmer Environmental Consulting Group Inc.

Sylix Okanagan Nation Alliance



[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

- Map produced by Ebbwater Consulting Inc.
- Affected assets have been defined in terms of contamination sources (e.g. industrial sites, transport facilities, and septic tanks and sewer systems) and environmental receptors (i.e. fish observations, drinking water wells, and high biodiversity areas).
- Potential contamination sources were 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.
- Drinking water wells and fish observations are represented by circles of a 1 km radius. These receptors, along with high biodiversity areas were considered "contaminated" where they were within a 2 km radius of a potential contaminant source.

Data Sources

- Lakes and Watercourses: BC Data Catalogue.
- Contamination Sources: BC Environmental Management System (EMS), BC Assessment and Interior Health.
- Environmental Receptors: BC fish observations and BC fish distribution, and drinking water wells from BC Data Catalogue. High biodiversity areas from the Okanagan Collaborative Conservation Program.
- Sylix Place Names: Okanagan Nation Alliance.
- 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
 0 1 2 3 4 5 km

| Legend | |
|-------------------------------------|----------------------------------|
| Background | Affected Assets |
| — Watershed Boundary | ● Contamination Sources |
| — Canada - US Border | ● Fish Observations |
| ▨ Reserves | ● Drinking Water Wells |
| ■ Lakes | ■ High Biodiversity Area |
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Date: 31 December 2019
Produced by: Ebbwater Consulting Inc.

Sylix (Okanagan) Flood and Debris Flow Risk Assessment Project
Debris Flow - Environment - Quantitative
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ANSI D - Map No. EN-D-003-020