

Map Series 3 of 7:

## **Culture Indicator**



31 December 2019









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

## Acknowledgement

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

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

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

Okanagan Nation Alliance would like to acknowledge Ebbwater for the production of this Map Book, which was completed by Dickon Wells, M. Eng, with support from Silja Hund, Ph.D., Nikoletta Stamatatou, M.Sc., and Robert Larson, M.Sc. Qualitative input for the Map Book is owed to project participants, as well as Erica Crawford (SHIFT Collaborative) and Kelly Terbasket (indigenEYEZ) for leading the workshops. Cory McGregor, GIT and Derek Cronmiller, P.Geo (both of Palmer Environmental Consulting Group Ltd.) provided the information to quantitively 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.

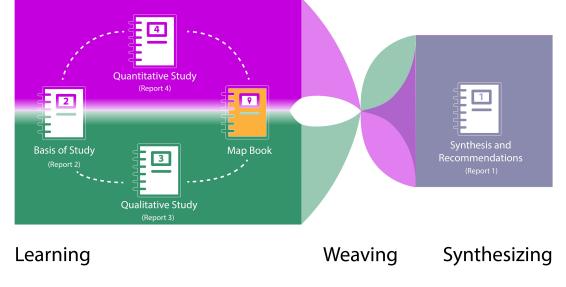
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## Introduction

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.



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 quantitively 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><li>Debris Flow</li><li>Low, Moderate, and High Magnitude Flood</li></ul>
Series 2	Environment Indicator	<ul><li>Qualitative (Impacts)</li><li>Quantitative (Consequences)</li></ul>
Series 3	Culture Indicator	<ul><li>Qualitative (Impacts)</li><li>Quantitative (Consequences)</li></ul>
Series 4	Mortality Indicator	Quantitative (Consequences)
Series 5	Affected People Indicator	<ul><li>Qualitative (Impacts)</li><li>Quantitative (Consequences)</li></ul>
Series 6	Economy Indicator	<ul><li>Qualitative (Impacts)</li><li>Quantitative (Consequences)</li></ul>
Series 7	Disruption Indicator	<ul><li>Qualitative (Impacts)</li><li>Quantitative (Consequences)</li></ul>

## Printing and Document Navigation

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

- Index line items on page 3.
- Blue tiles, watersheds or text, located in the top right-hand corner of the maps, where present.
- Sub-watershed index 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. Syilx 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. Cultural amenities have been identified based on the primary land use description. Properties have been selected which are likely to have a significant social or cultural value and includes parks as well as education, social care, and leisure facilities. While this provides an indication of cultural locations the list is not comprehensive.

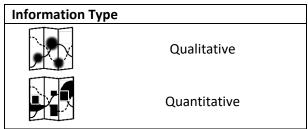
 Indigenous sites have been generalized using available archaeology data. These data are known to be incomplete, outdated, and inaccurate. The data are a limited representation of valued cultural sites; many other sites of cultural importance to Indigenous people are not shown on this map.
 Cultural (exposure) layers were clipped to the moderate flood or debris flow hazard area. The hazard layer is shown in the hazard maps, and was produced by Palmer Environmental Consulting Group Inc. The method used to produce the hazard layer is described in the Quantitative Study.

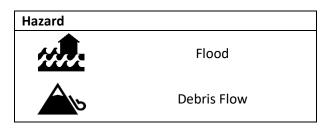
## Data Sources

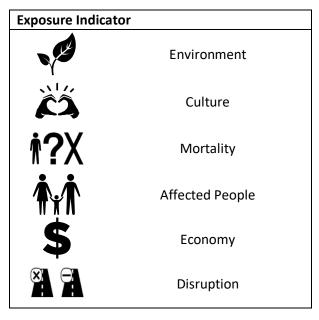
- 1. Lakes, Watercourses, Roads, and Trails: BC Data Catalogue.
- 2. Cultural Buildings: BC Assessment and Westbank First Nation.
- 3. Syilx Place Names: Okanagan Nation Alliance.
- 4. Icons: The Noun Project
- 5. Base Layer: OpenStreetMap data openstreetmap.org (©

OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

### lcons







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## Qualitative Maps

C-Q-001-001	Qualitative Impacts - Culture - Project Area Map
C-Q-001-002	Qualitative Impacts - Culture - Okanagan Map
C-Q-001-003	Qualitative Impacts - Culture - Similkameen Map

## Quantitative Maps

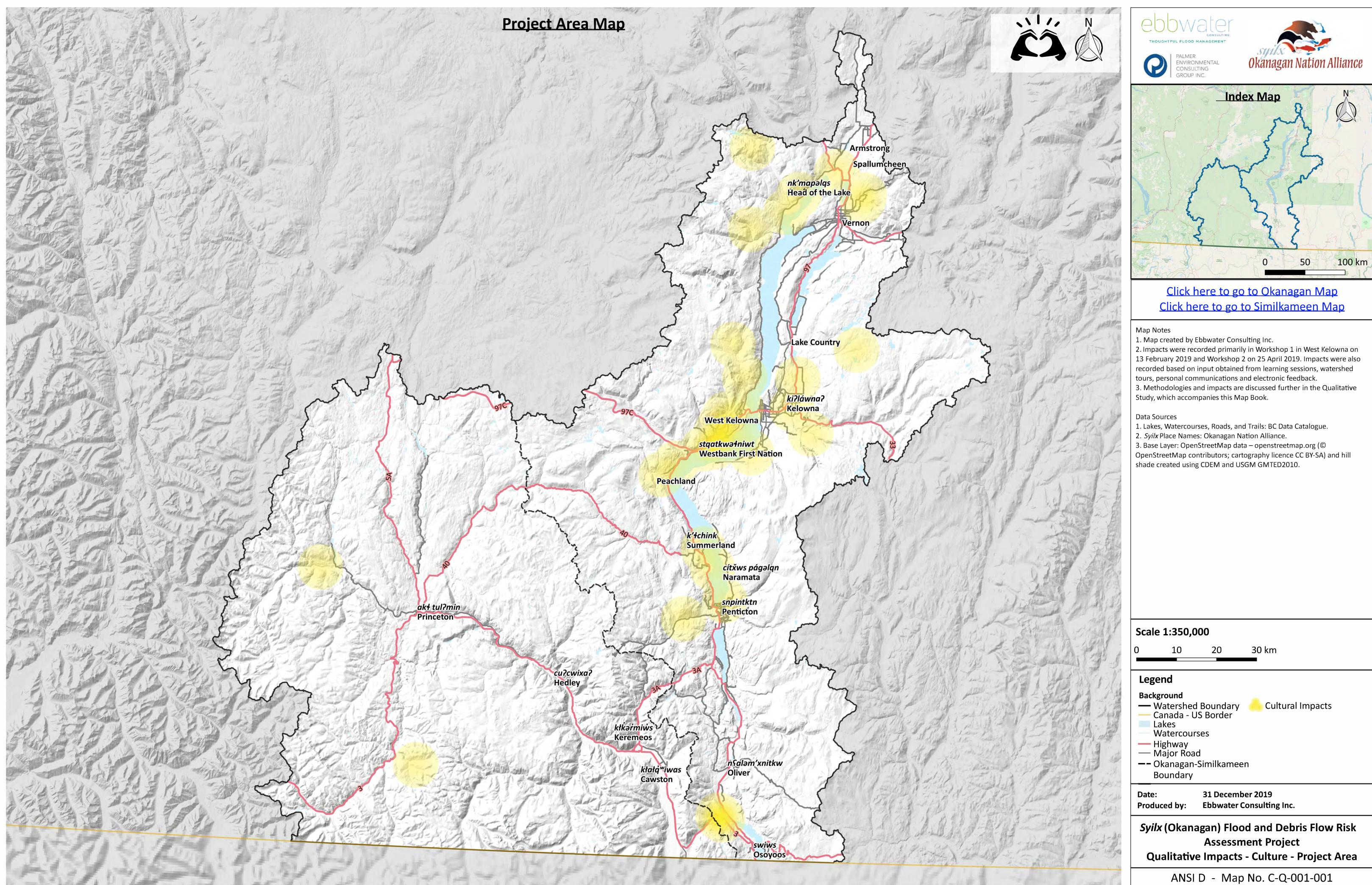
C-F-001-001	Flood - Culture - Sub-watershed Index	C-D-001-001	Debris Flow - Culture - Sub-watershed Index
C-F-002-001	Flood - Culture - Quantitative Project Area Map	C-D-002-001	Debris Flow - Culture - Quantitative Project Area Map
C-F-002-002	Flood - Culture - Quantitative Okanagan Map	C-D-002-002	Debris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

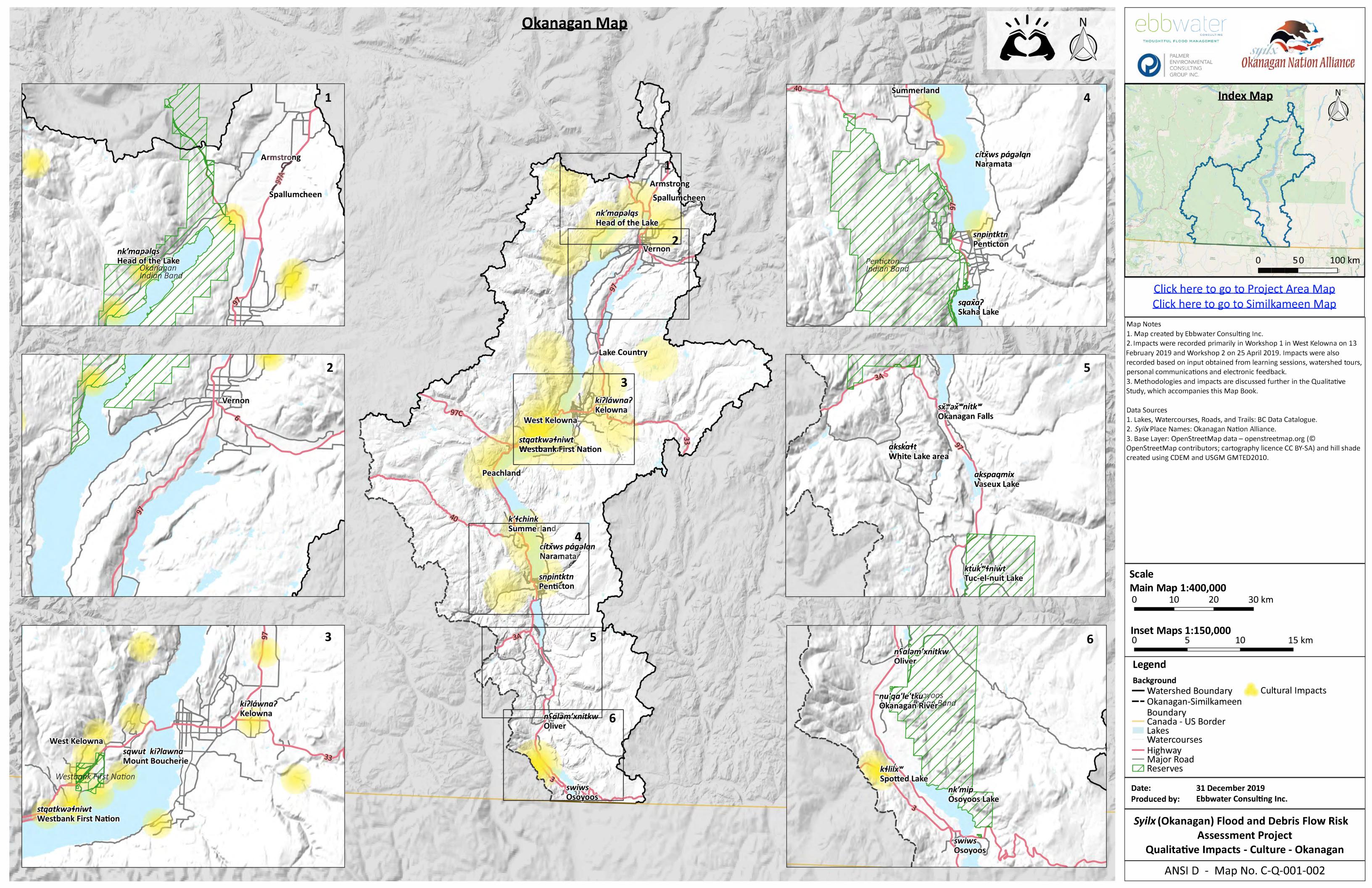
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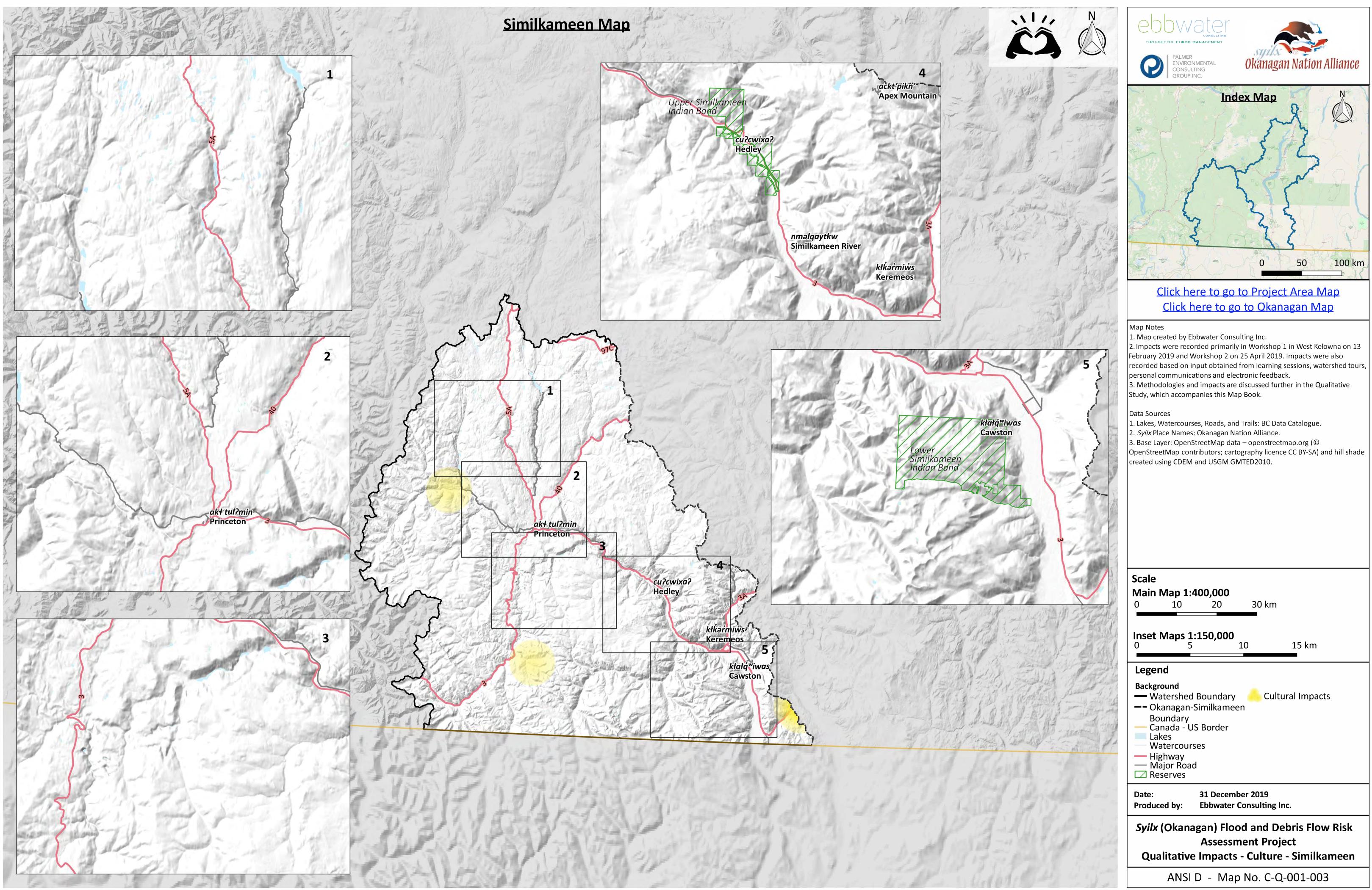


**Qualitative Flood and Debris Flow Impact Maps** 







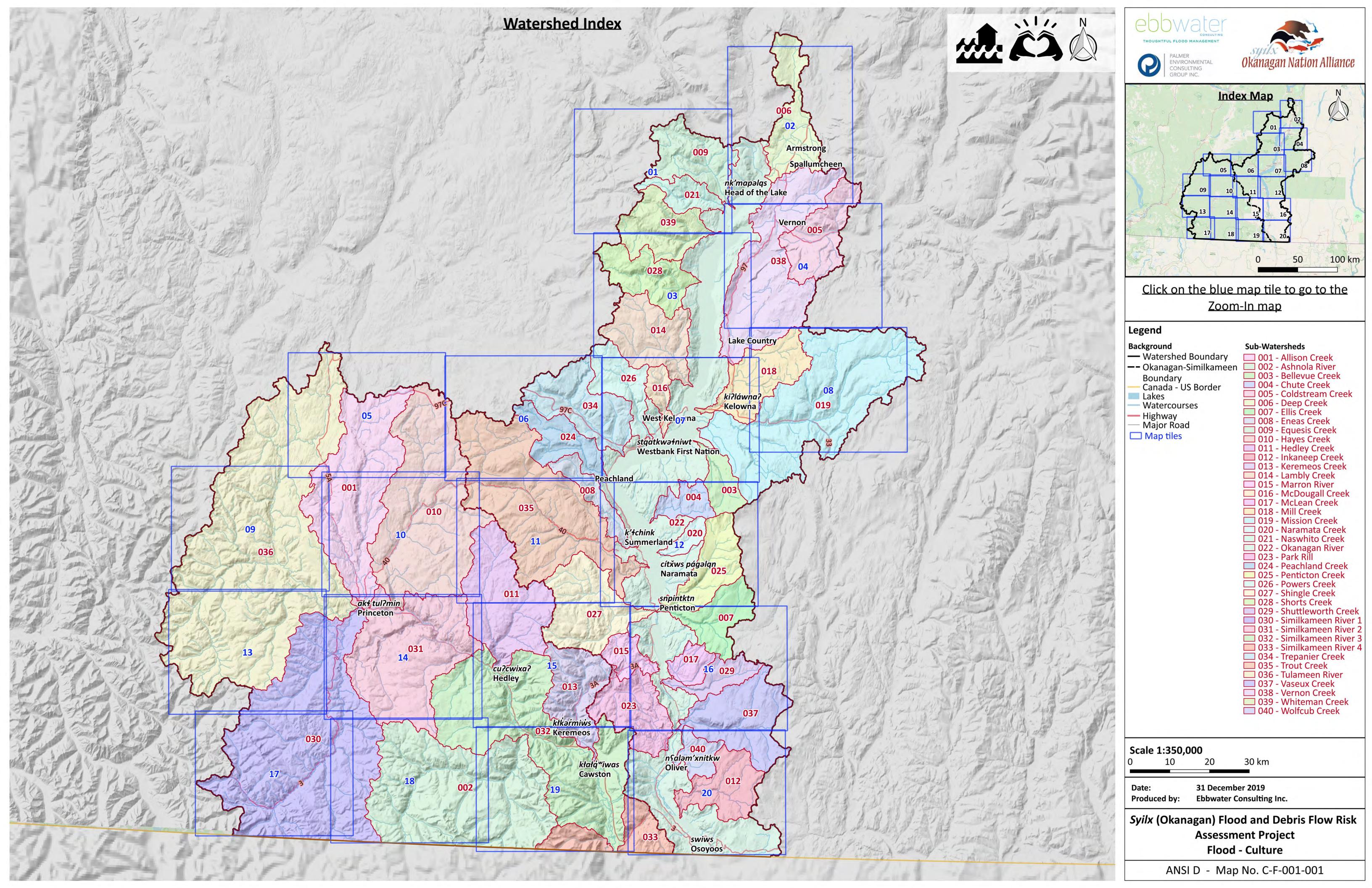


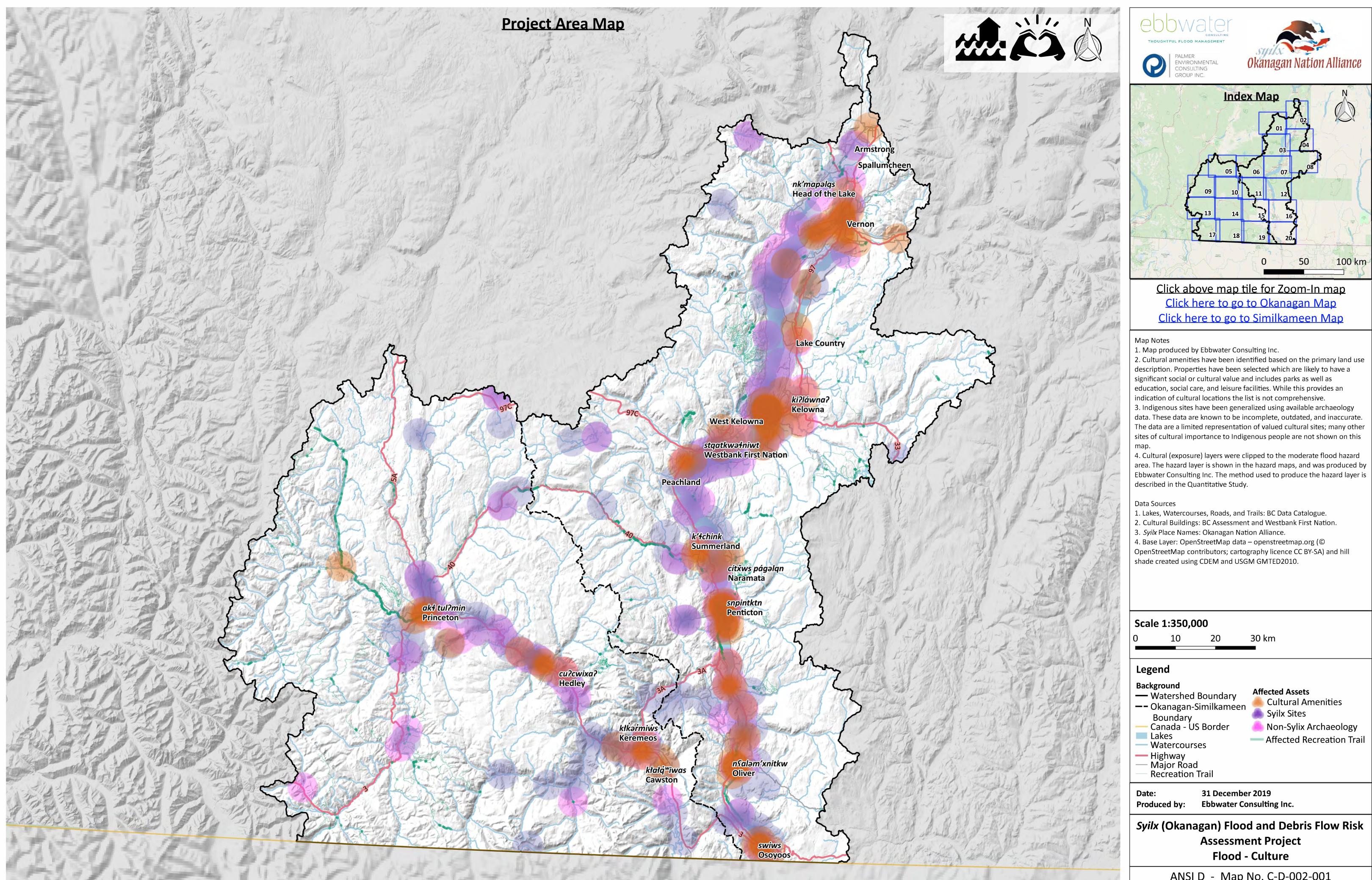
# Syilx Okanagan Flood and Debris Flow Risk Assessment Map Book Map Series 3 of 7: Culture Indicator



## **Quantitative Flood Consequence Maps**

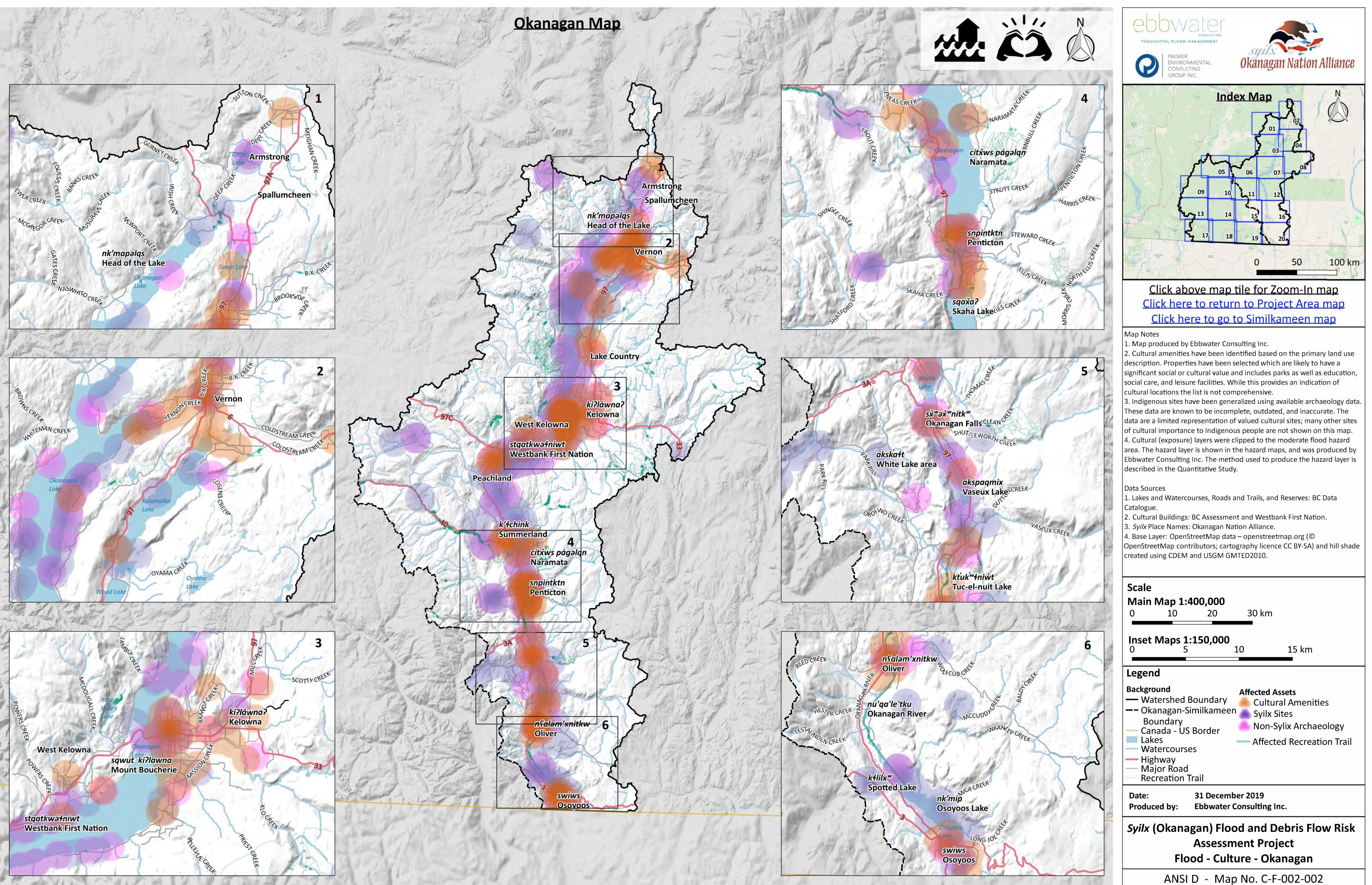




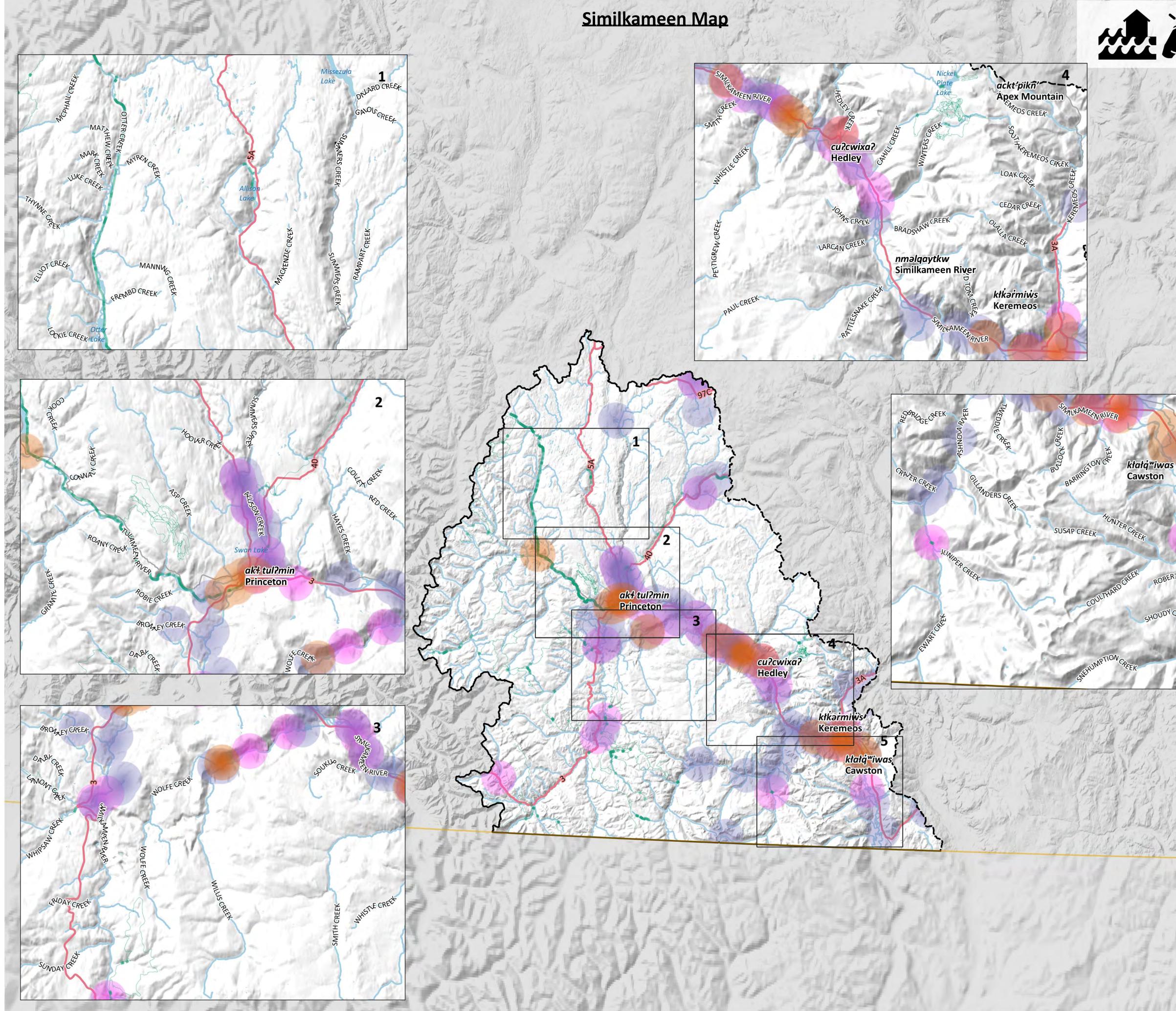


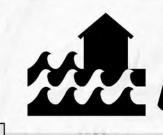
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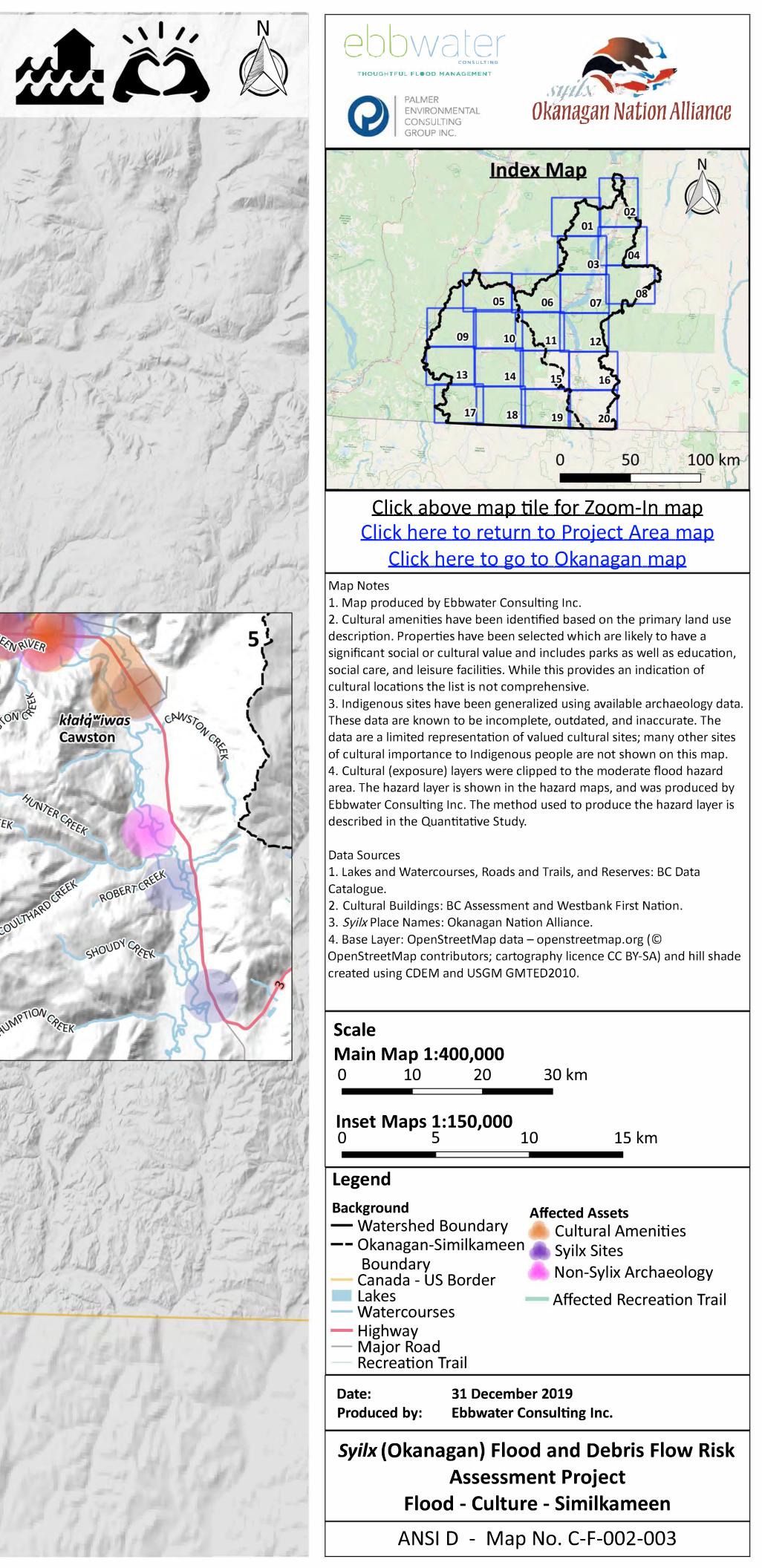
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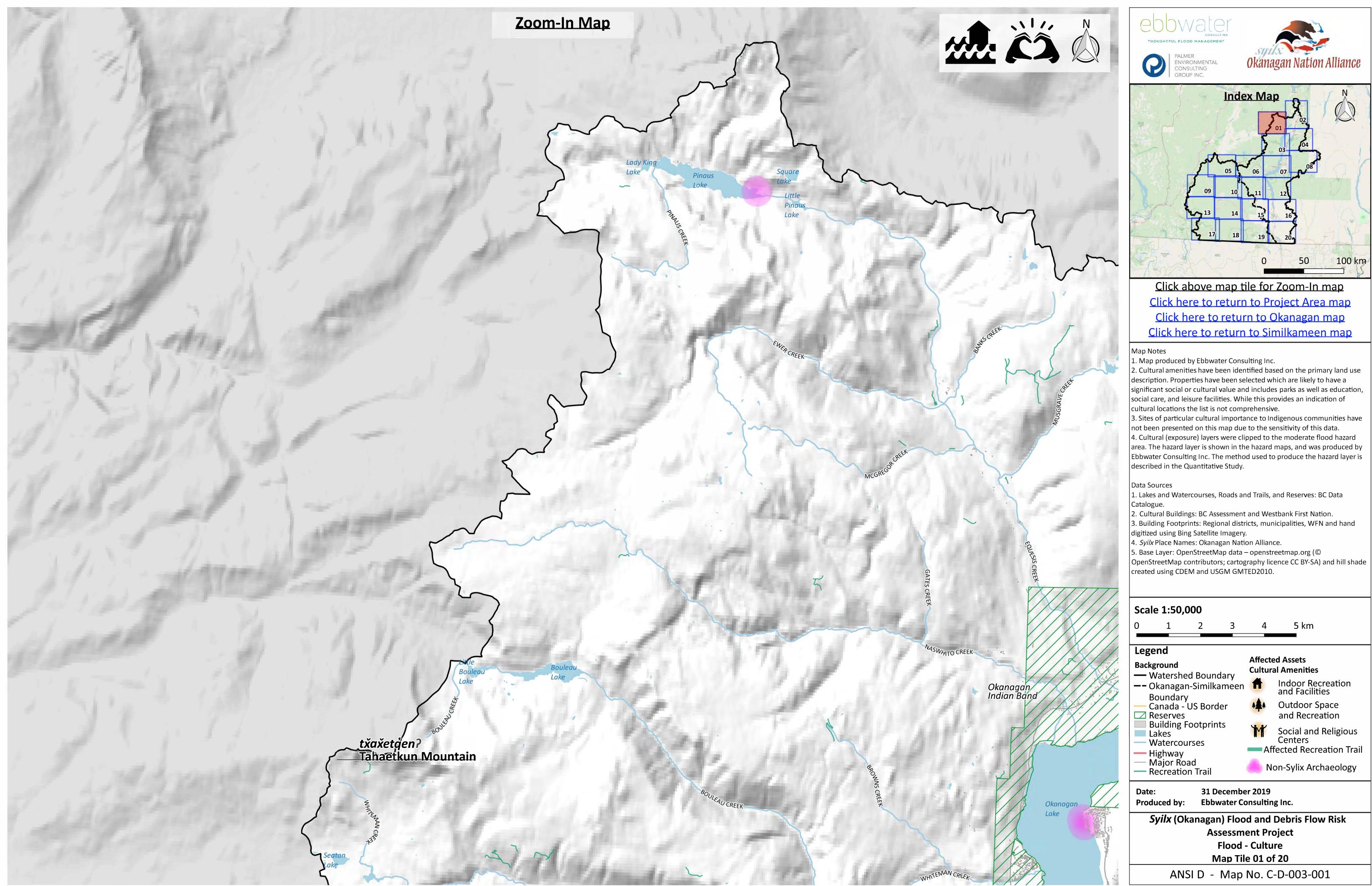


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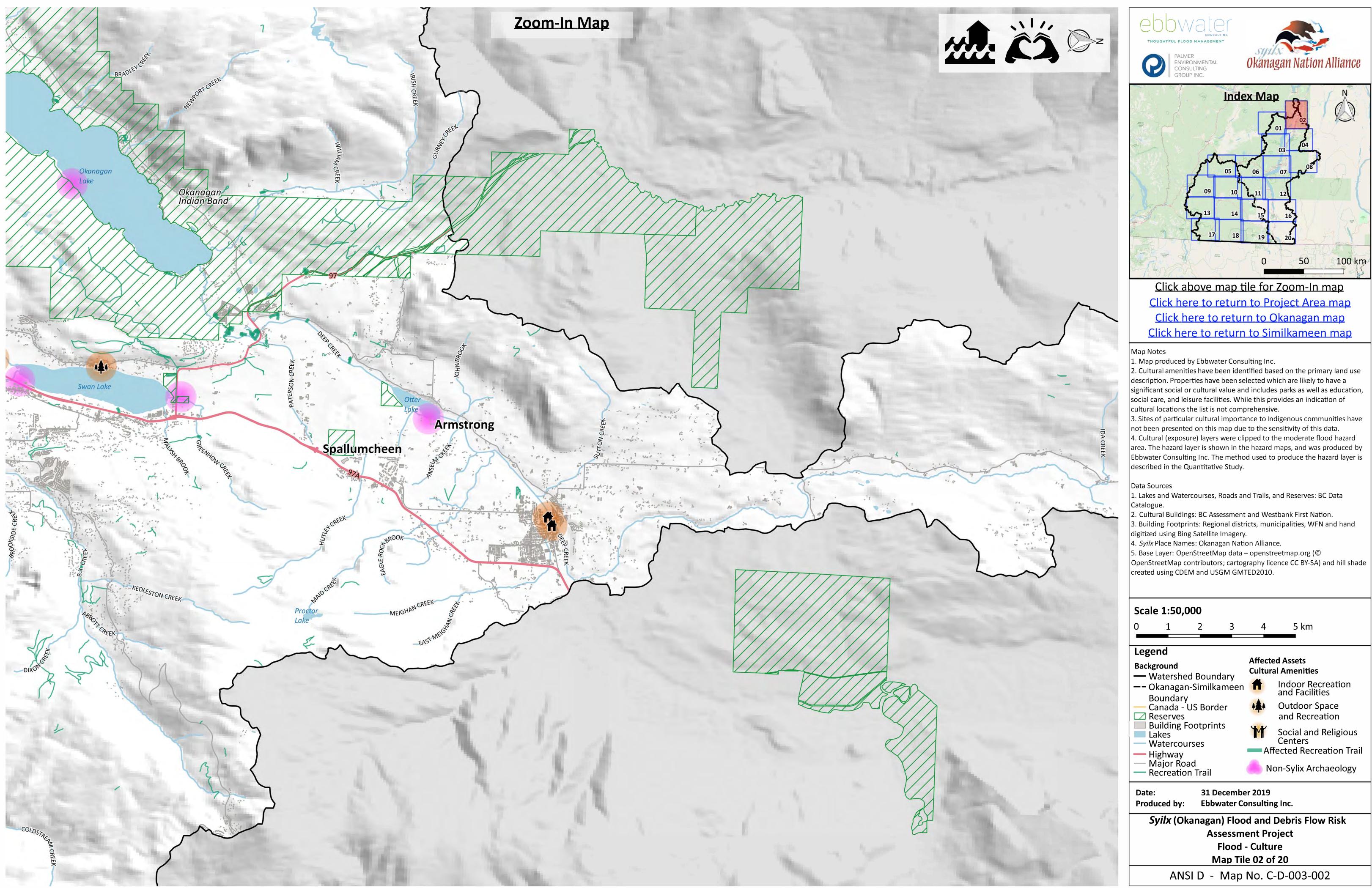




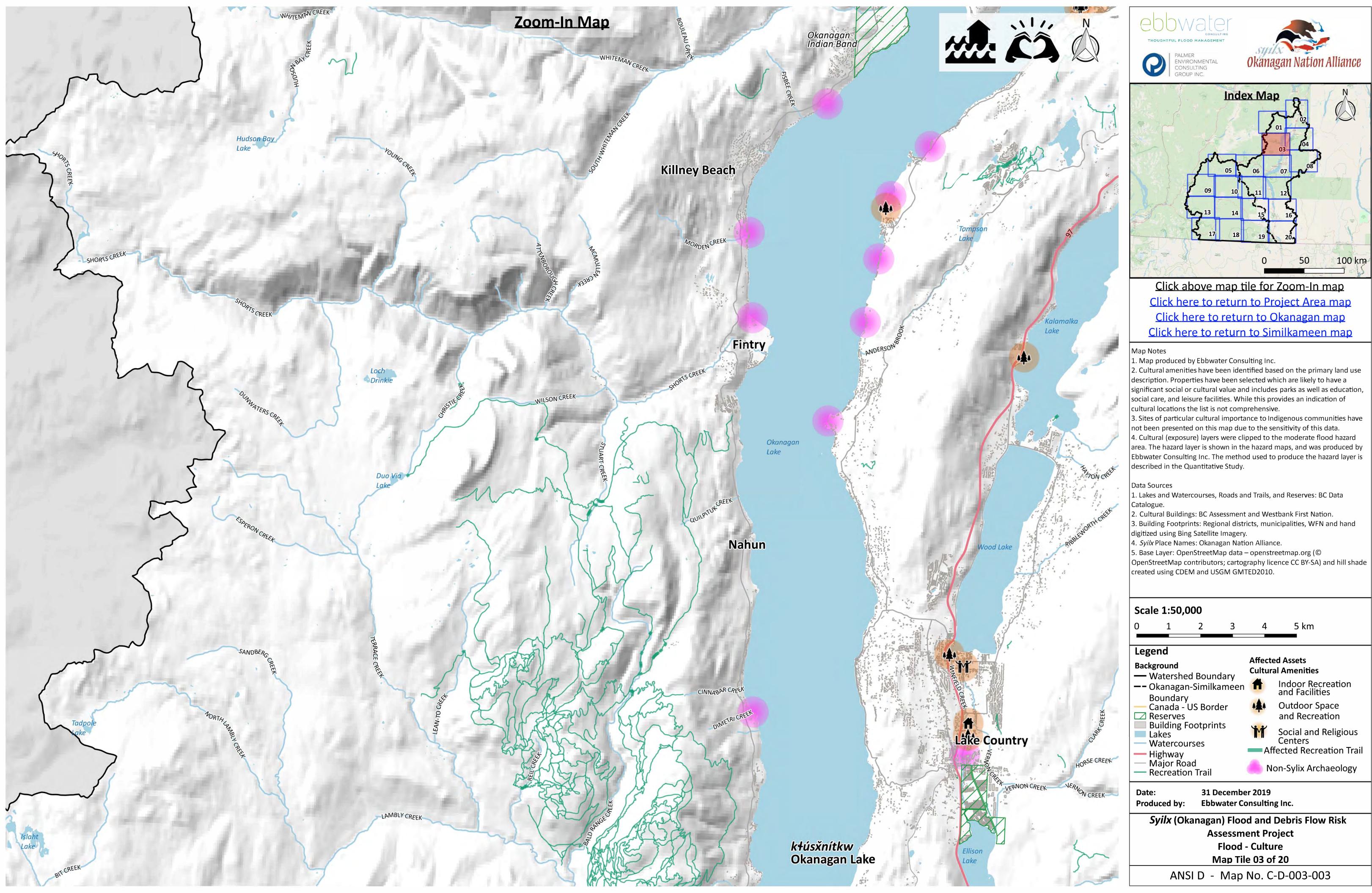




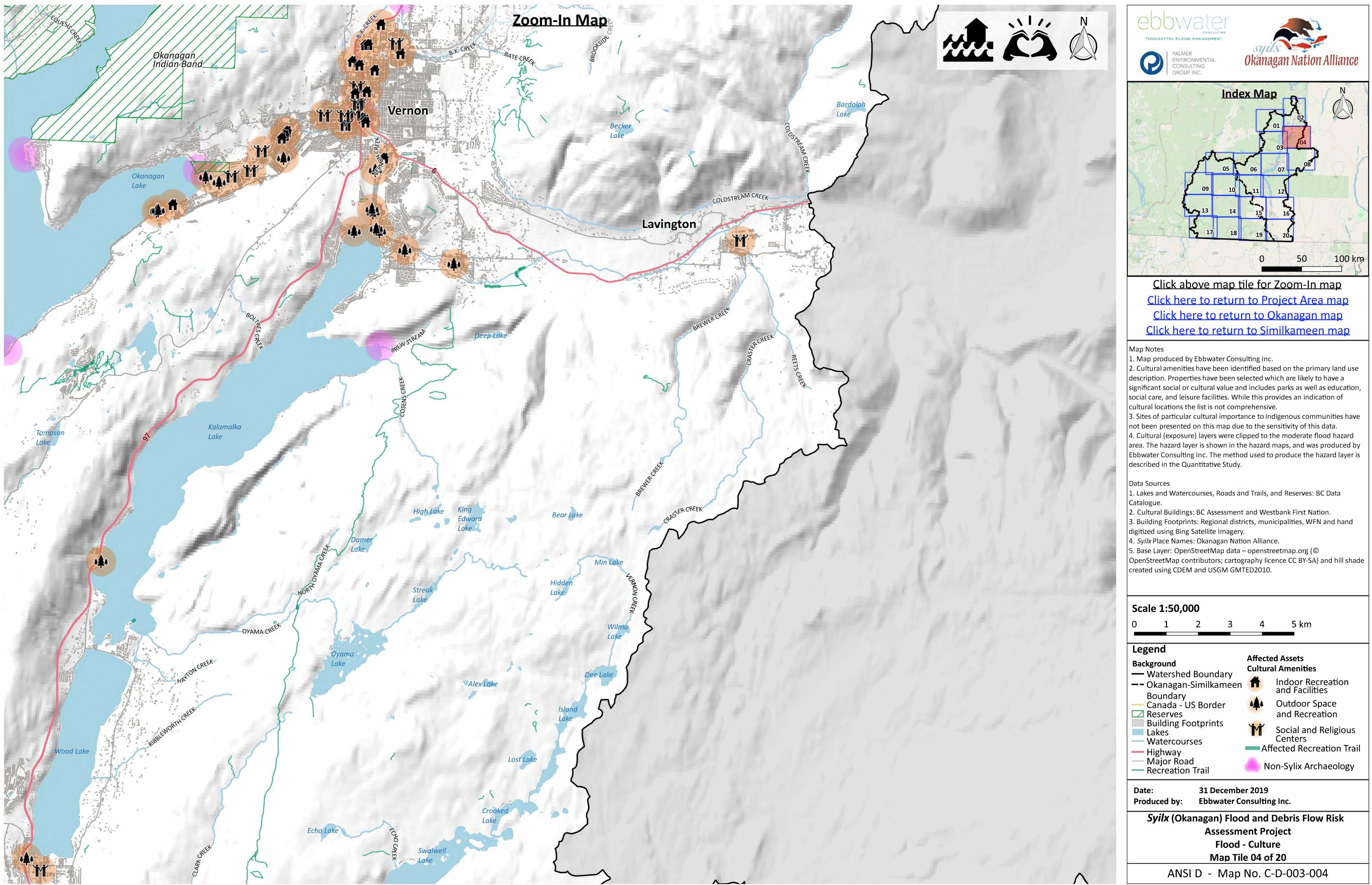
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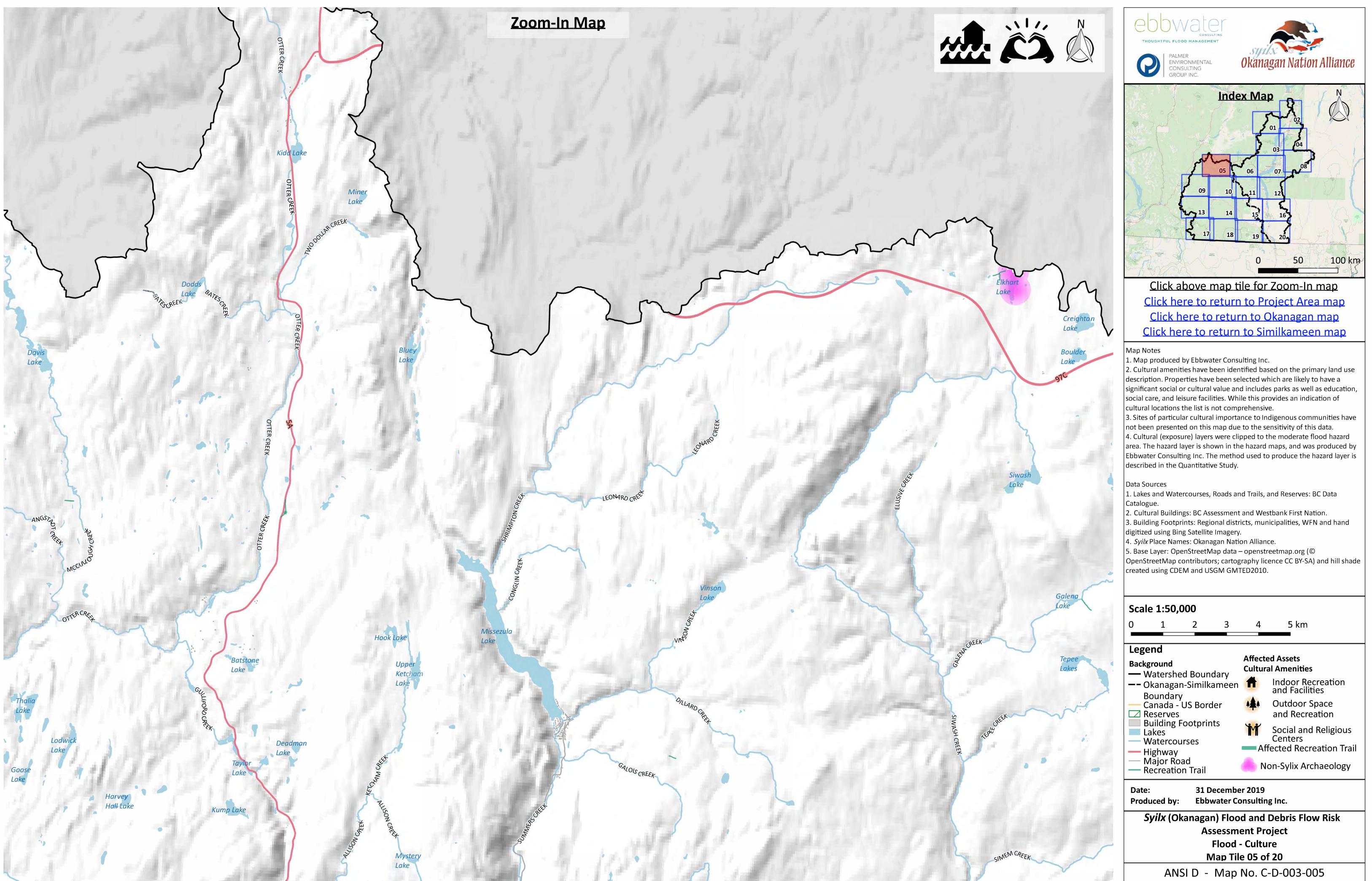
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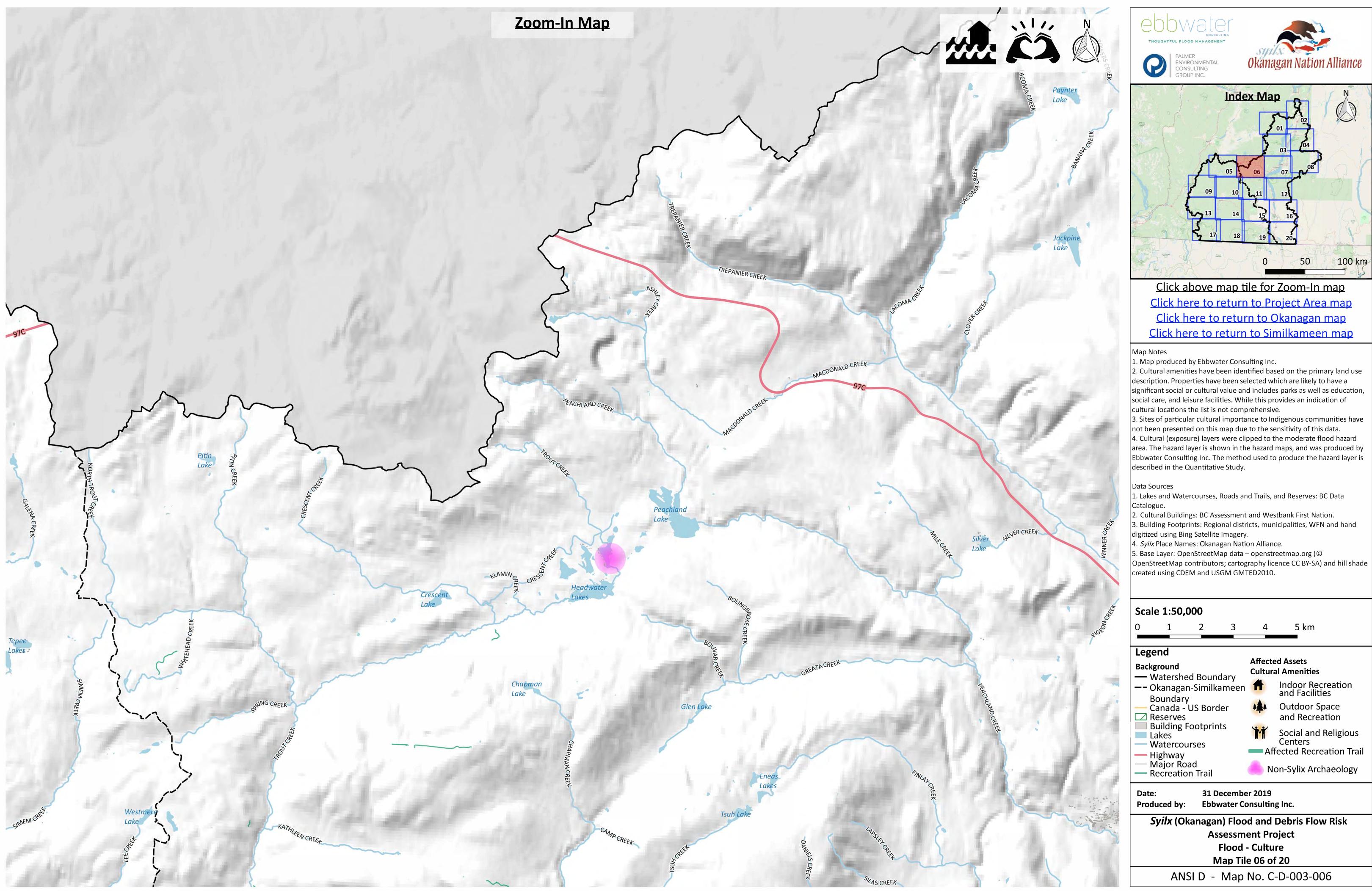


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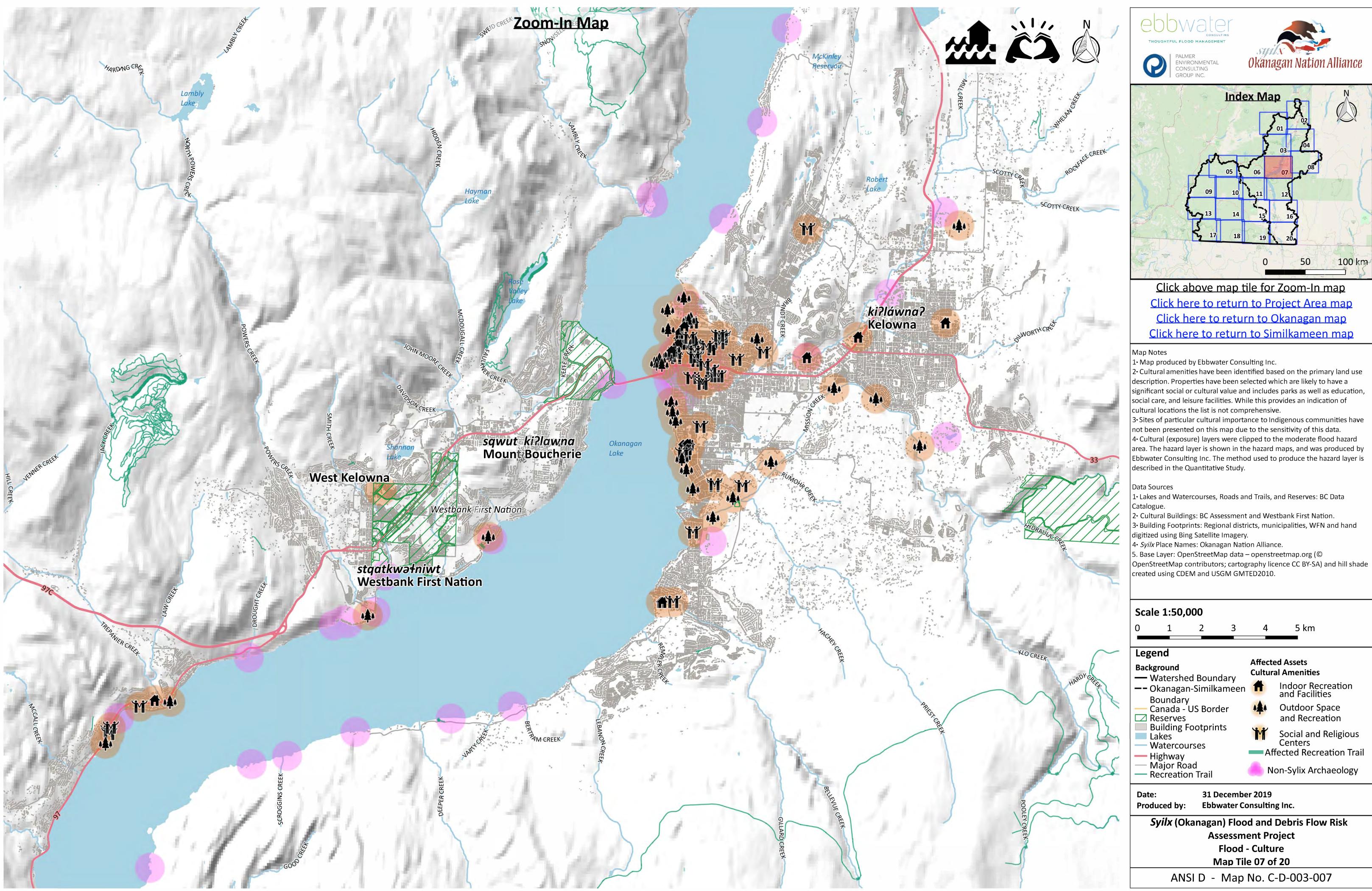
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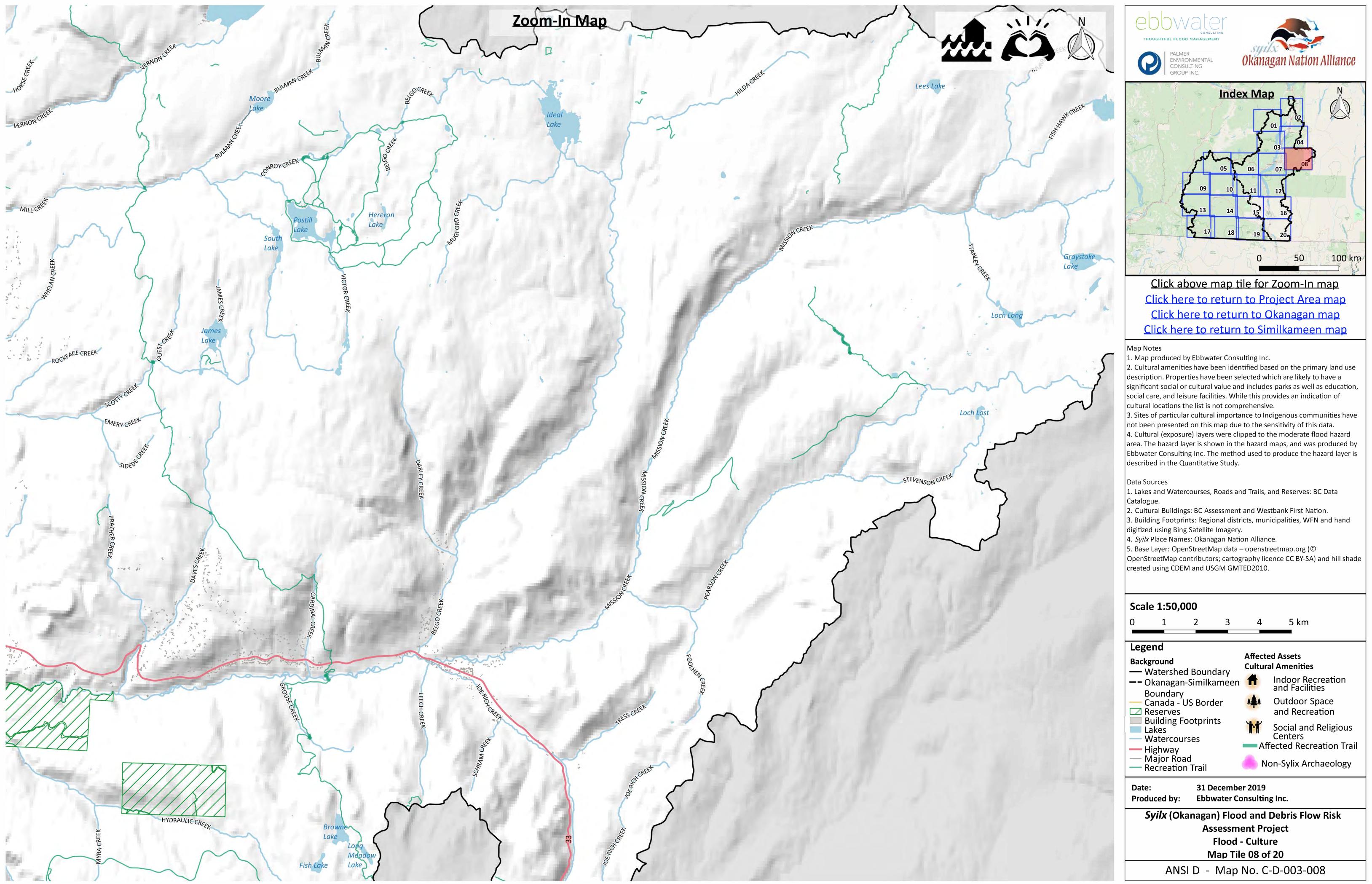


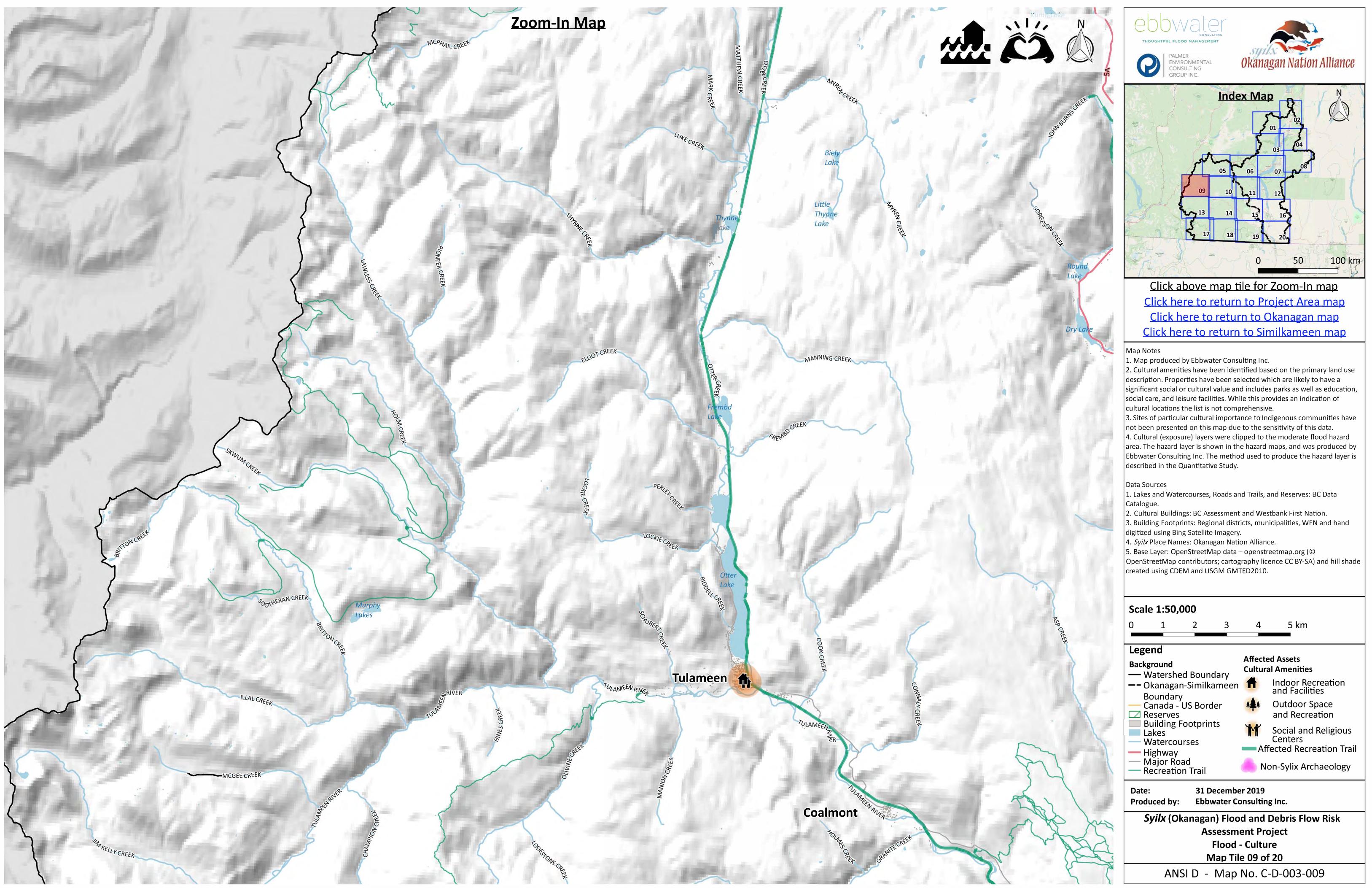


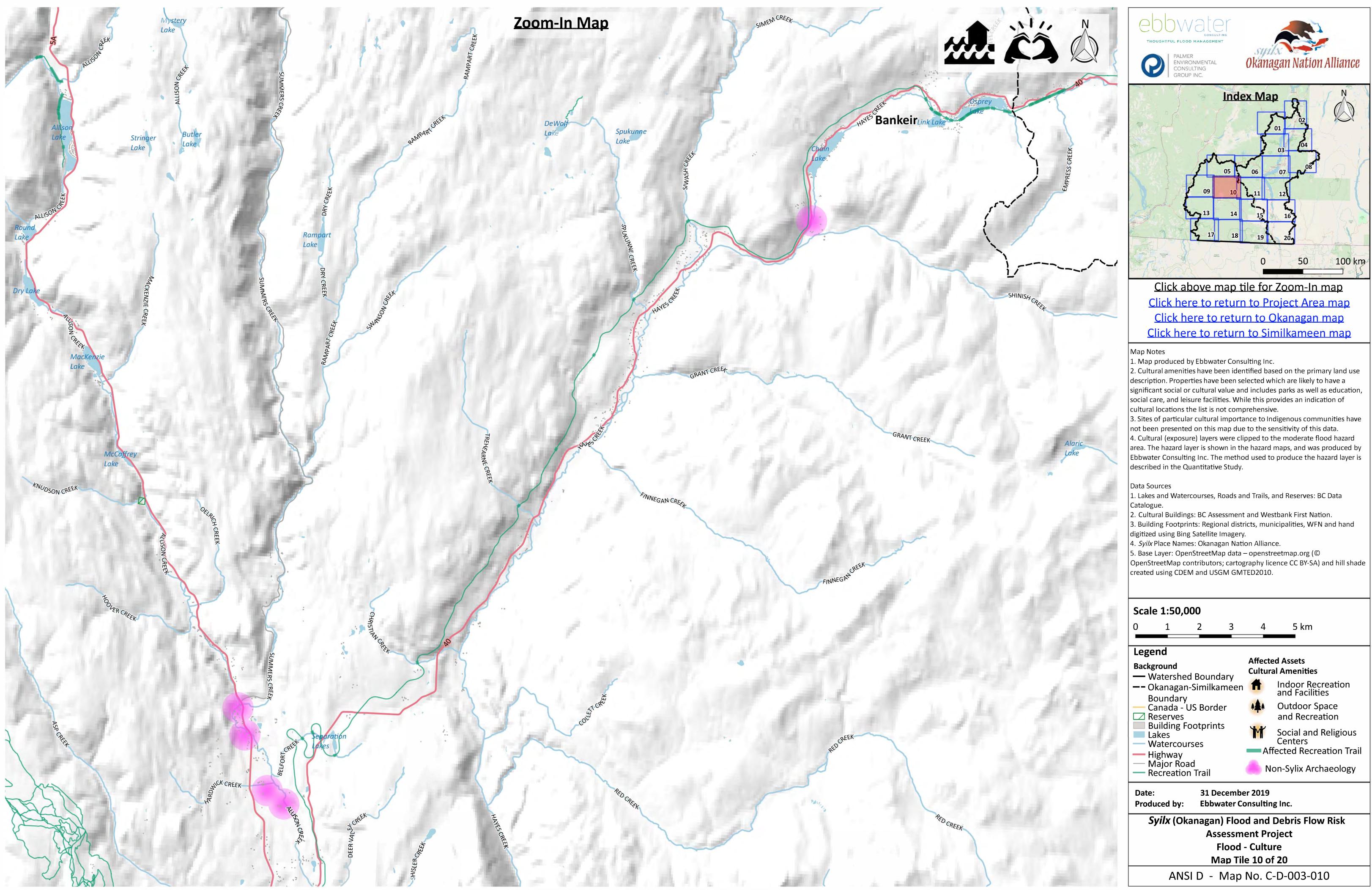
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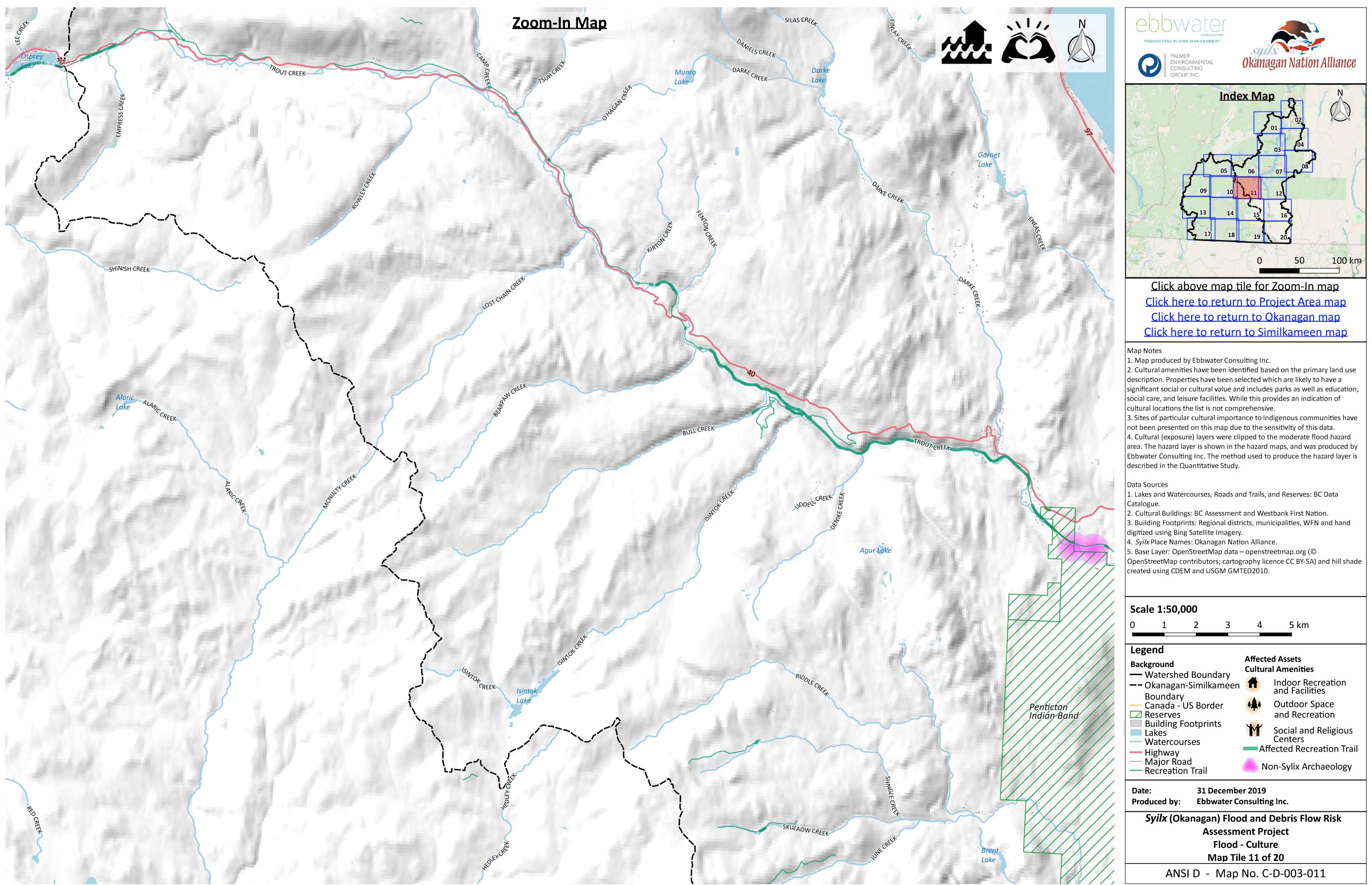
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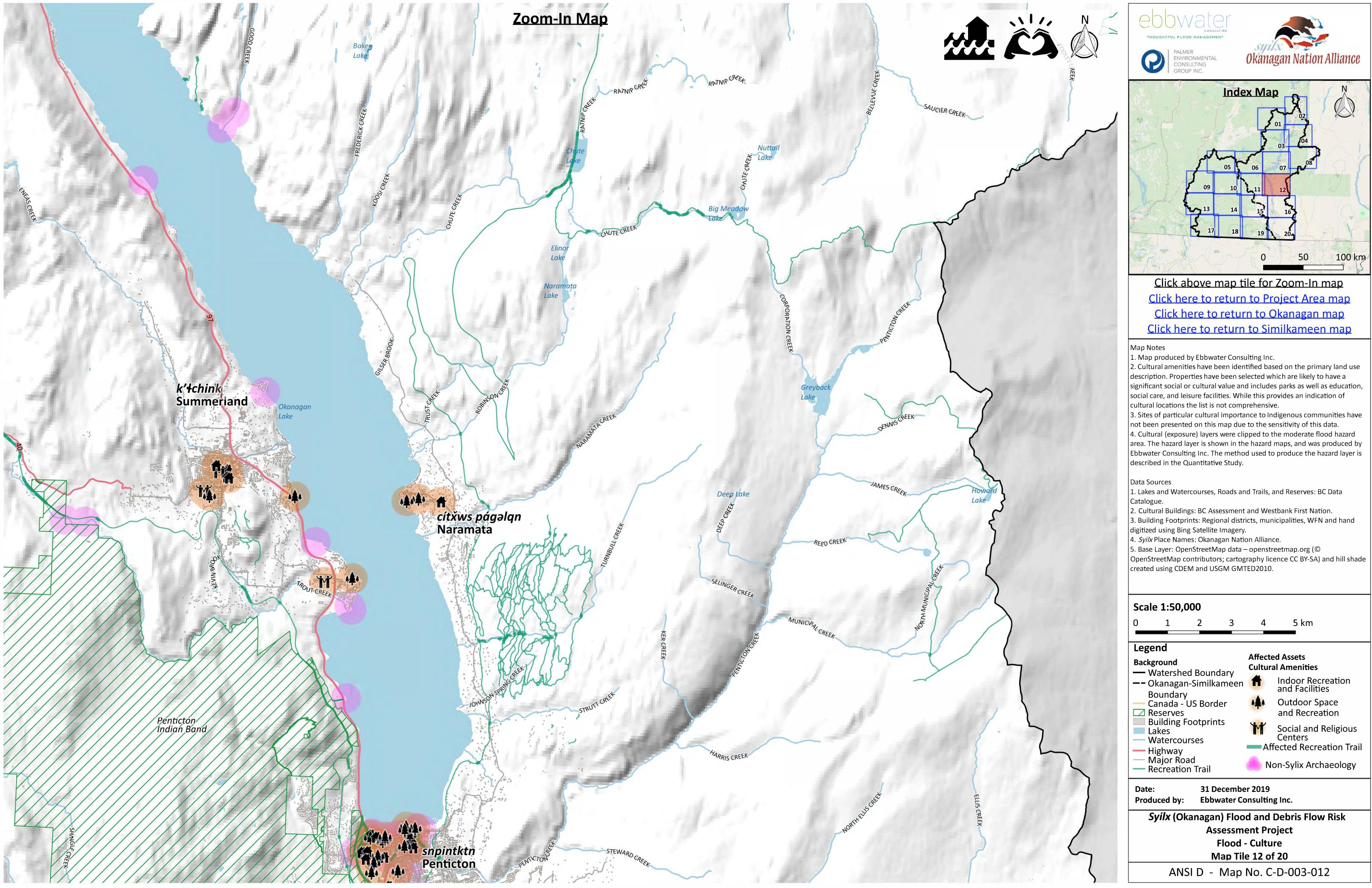






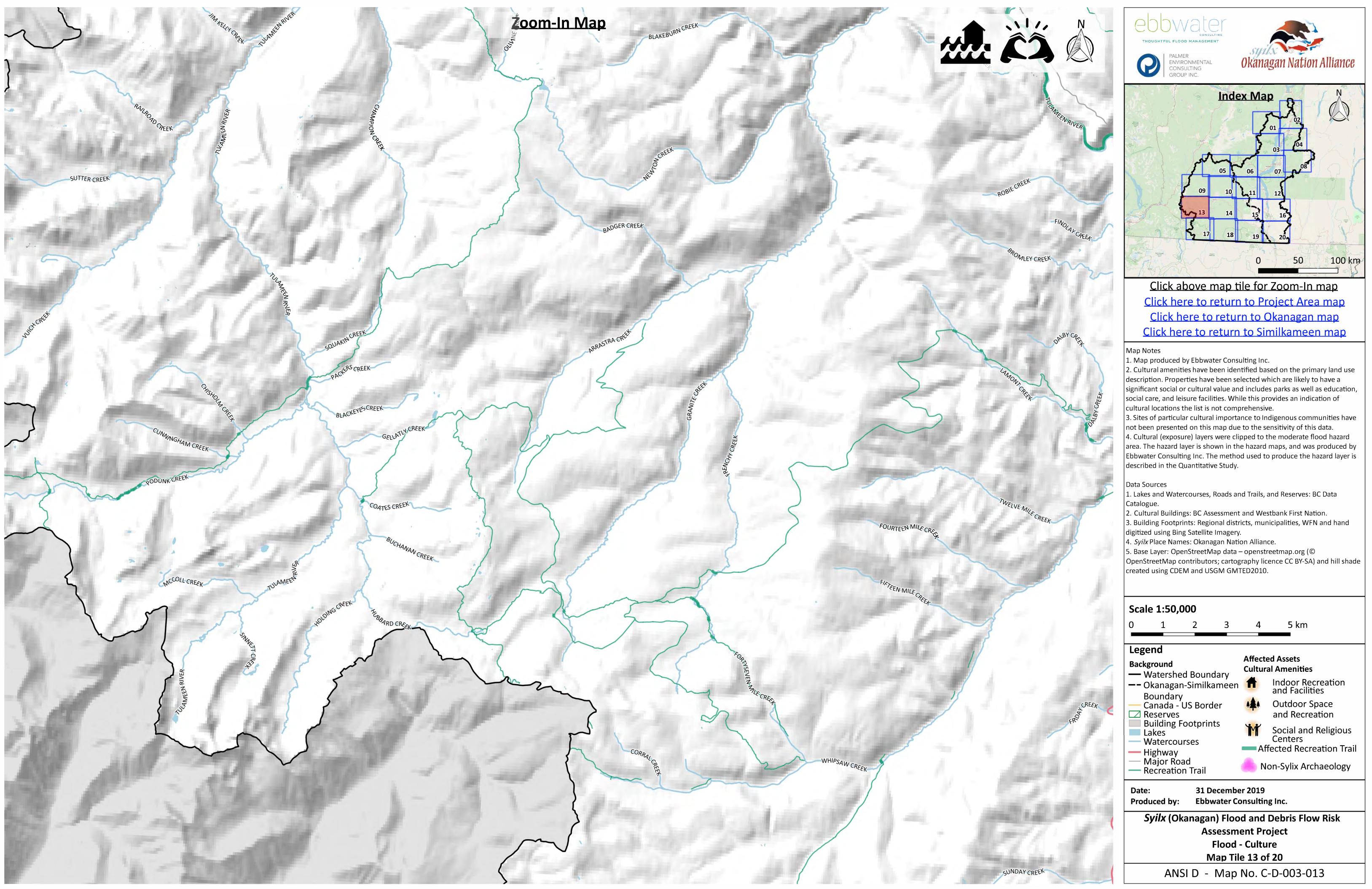


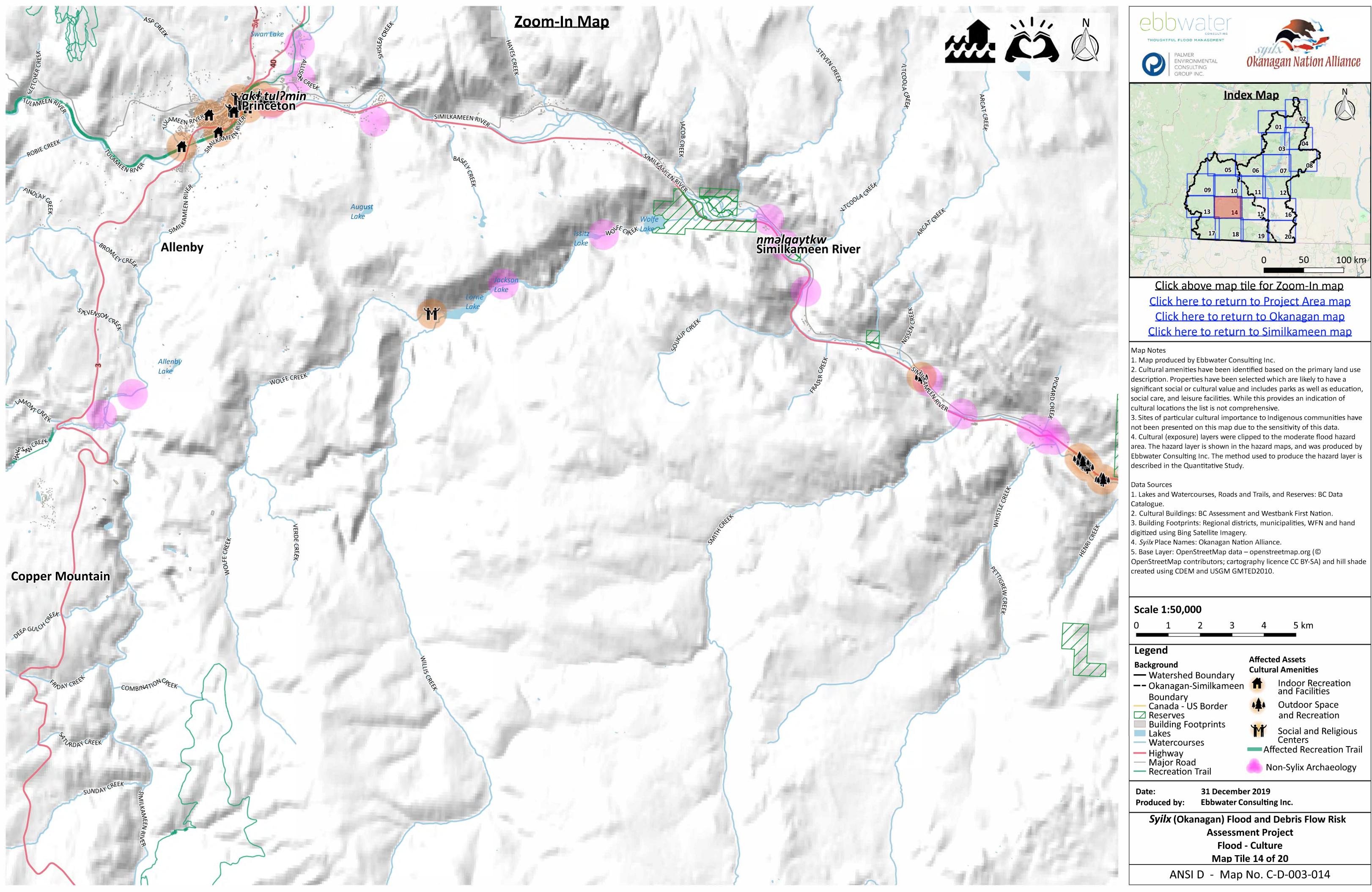




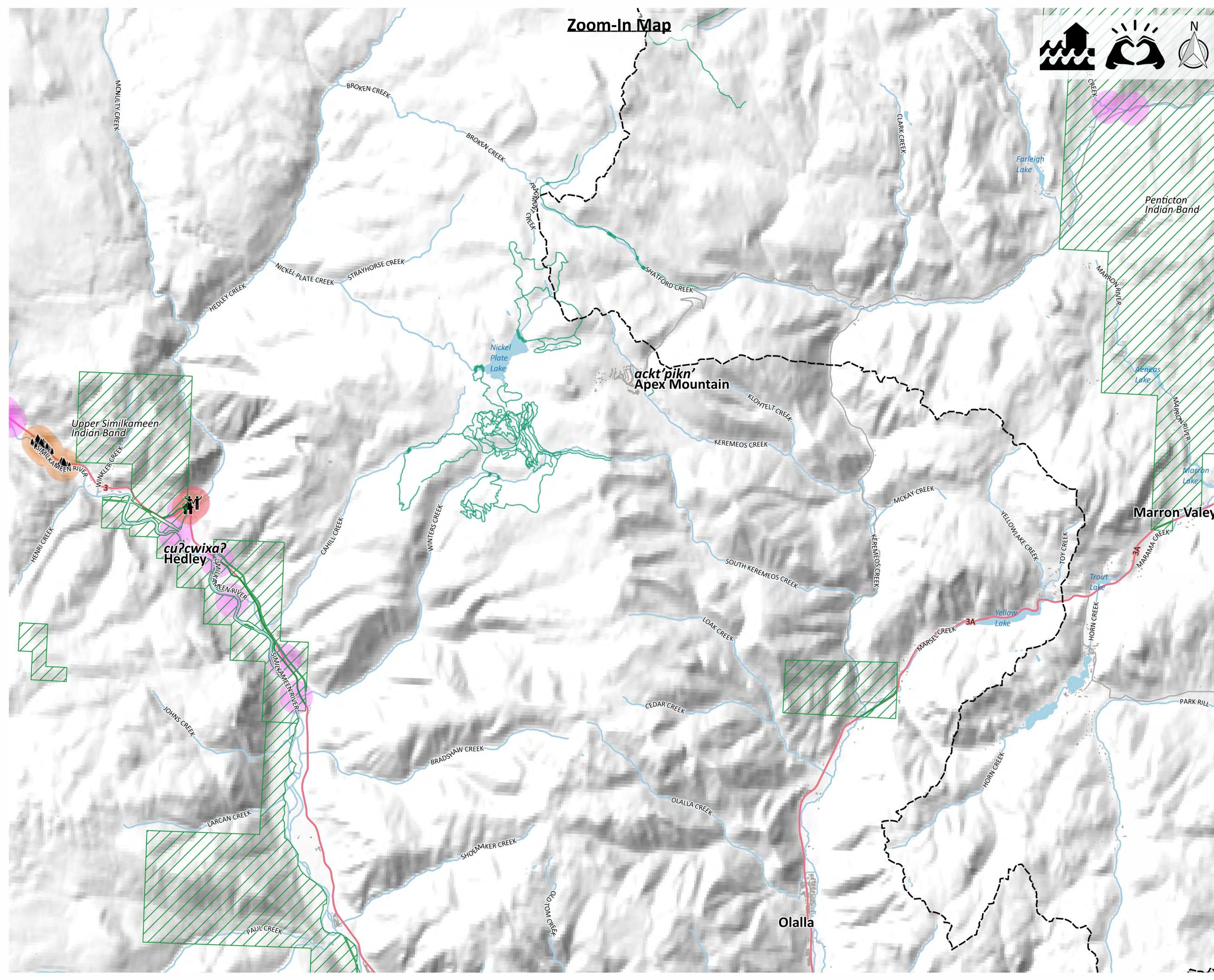


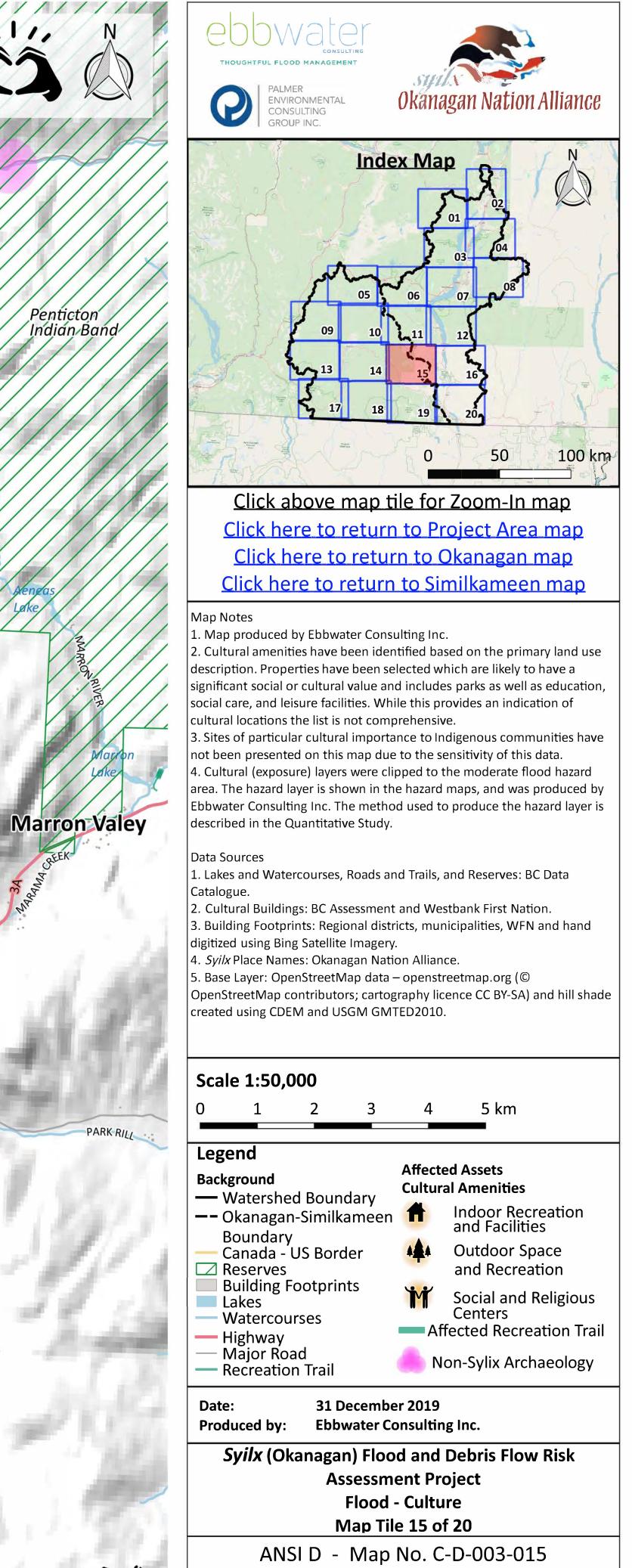
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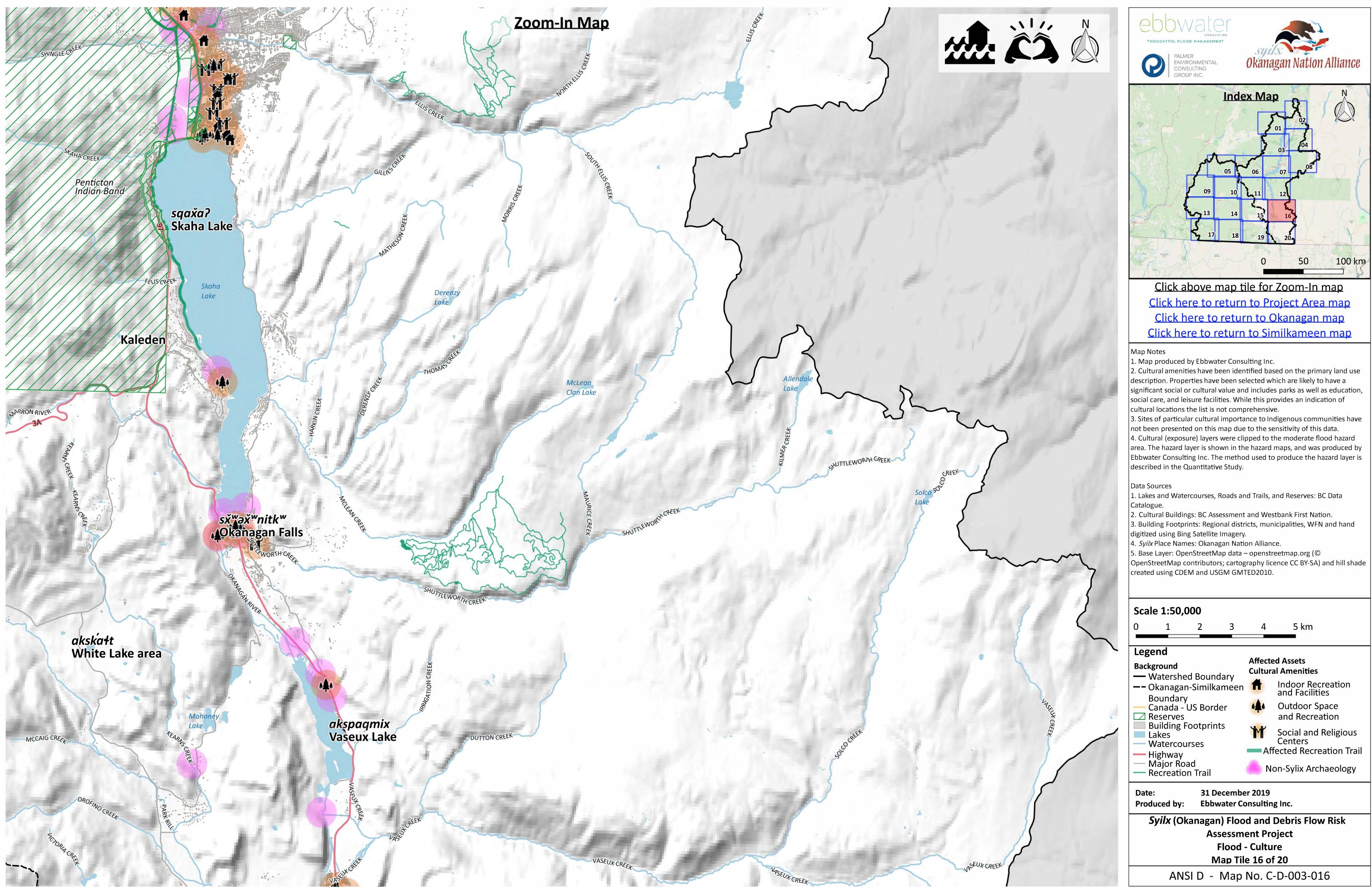


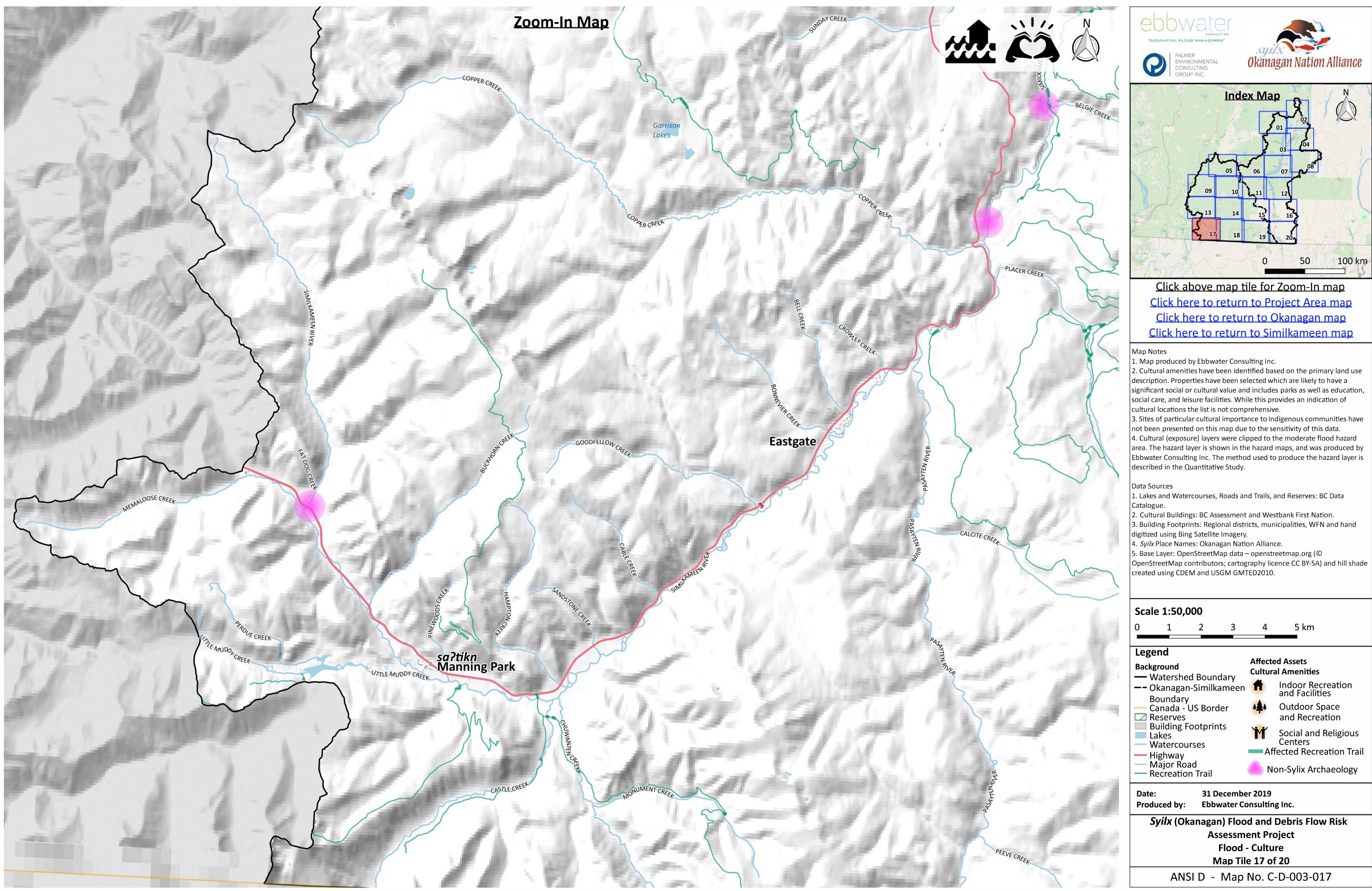


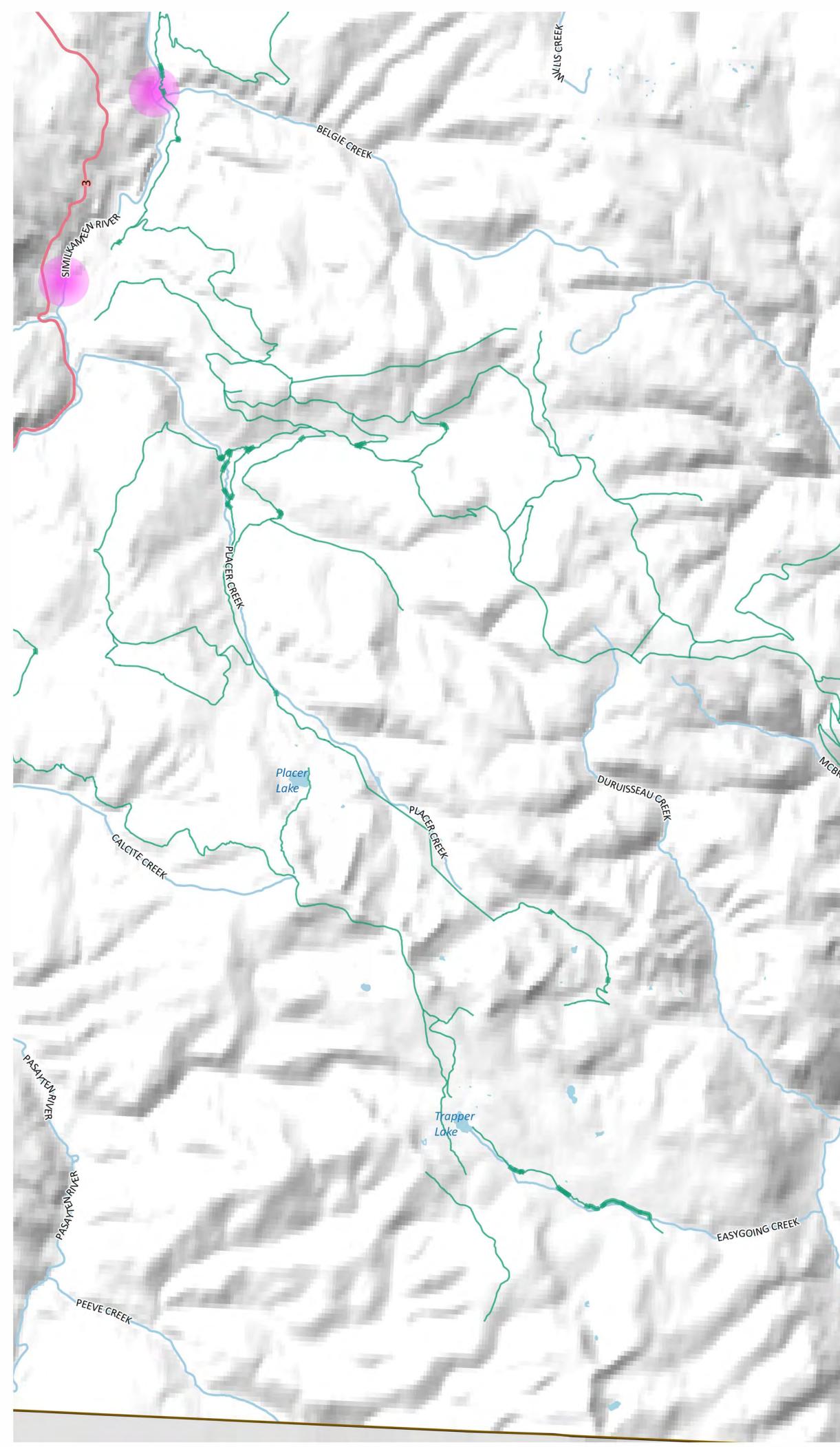
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<ul> <li>Major Road Recreation Trail</li> <li>Non-Sylix Archaeology</li> <li>Date: 31 December 2019 Produced by: Ebbwater Consulting Inc.</li> <li>Syilx (Okanagan) Flood and Debris Flow Risk Assessment Project Flood - Culture</li> </ul>							









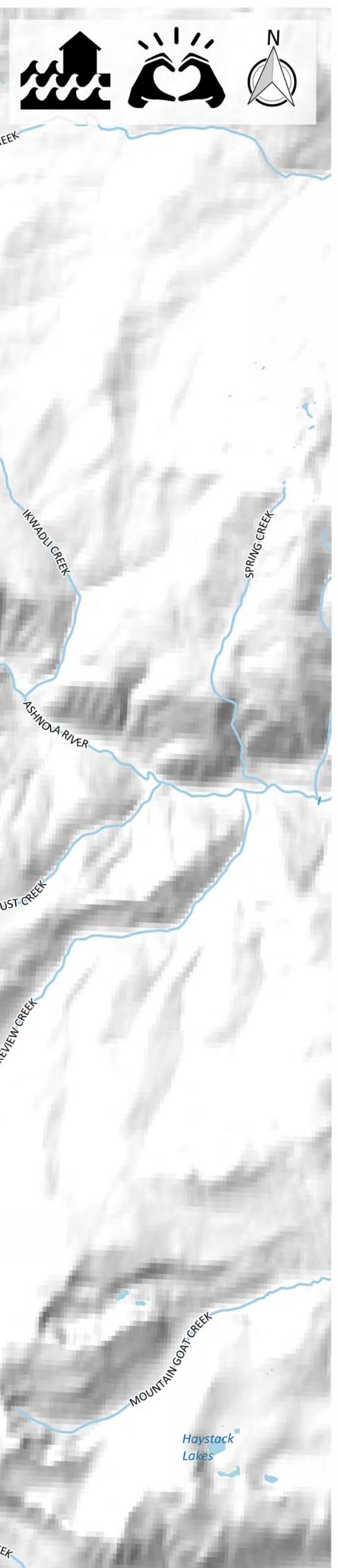


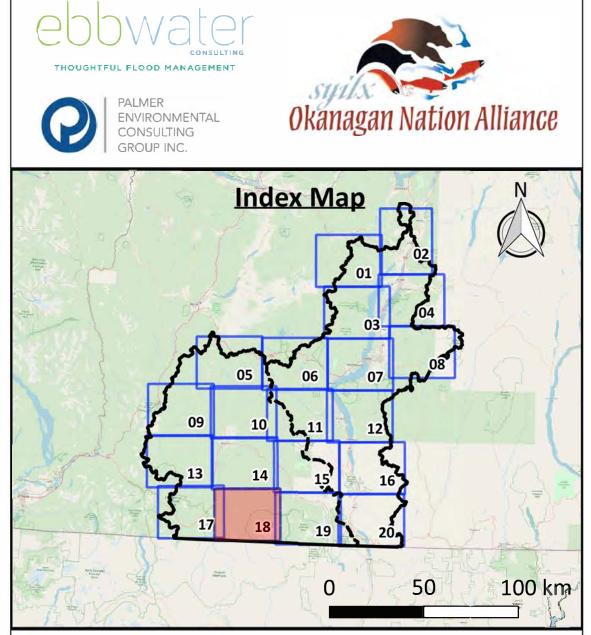






SKWEK





## Click above map tile for Zoom-In map <u>Click here to return to Project Area map</u> <u>Click here to return to Okanagan map</u> <u>Click here to return to Similkameen map</u>

## Map Notes

1. Map produced by Ebbwater Consulting Inc.

2. Cultural amenities have been identified based on the primary land use description. Properties have been selected which are likely to have a significant social or cultural value and includes parks as well as education, social care, and leisure facilities. While this provides an indication of cultural locations the list is not comprehensive.

3. Sites of particular cultural importance to Indigenous communities have not been presented on this map due to the sensitivity of this data. 4. Cultural (exposure) layers 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.

## Data Sources

1. Lakes and Watercourses, Roads and Trails, and Reserves: BC Data Catalogue.

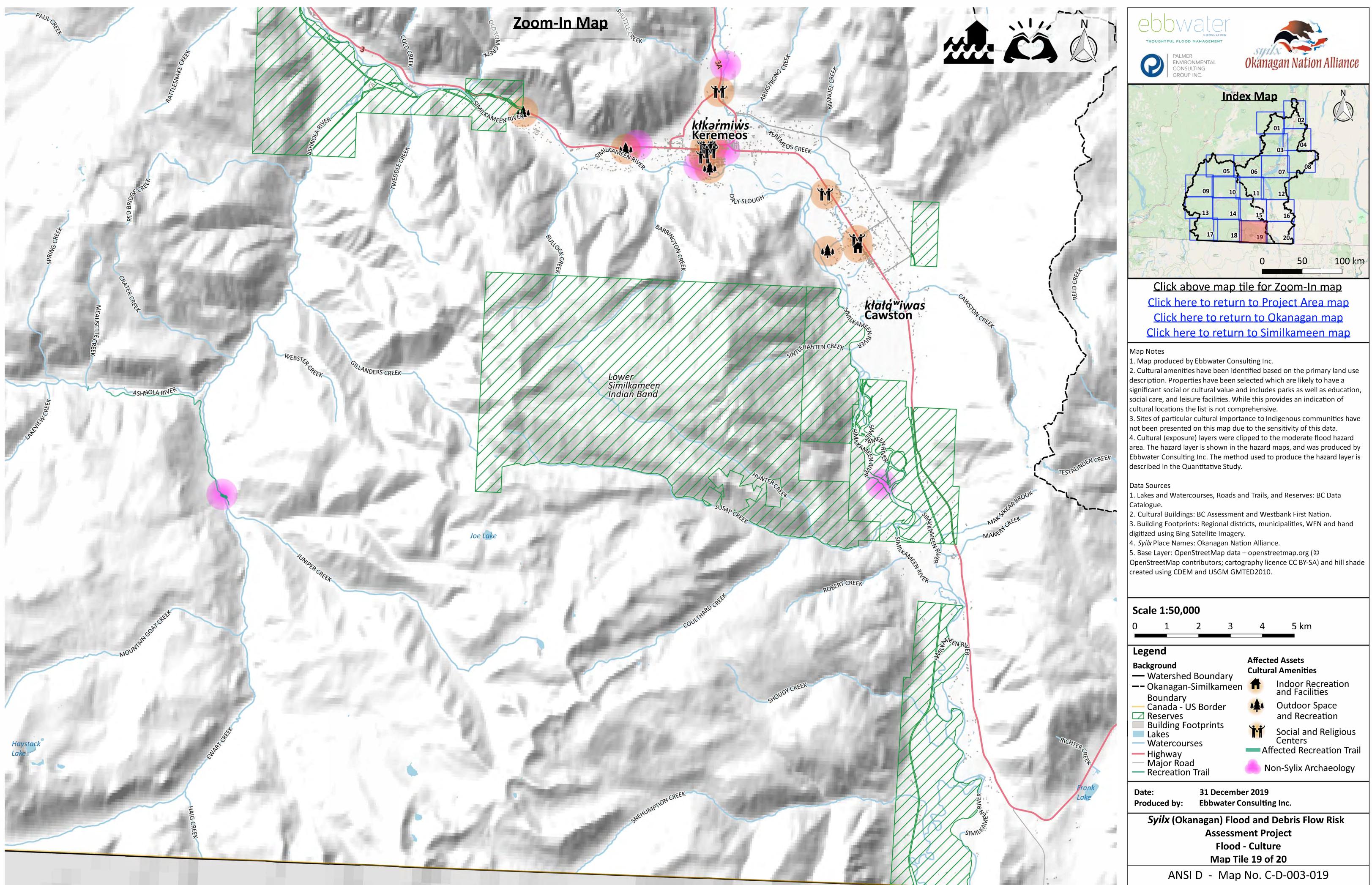
2. Cultural Buildings: BC Assessment and Westbank First Nation.

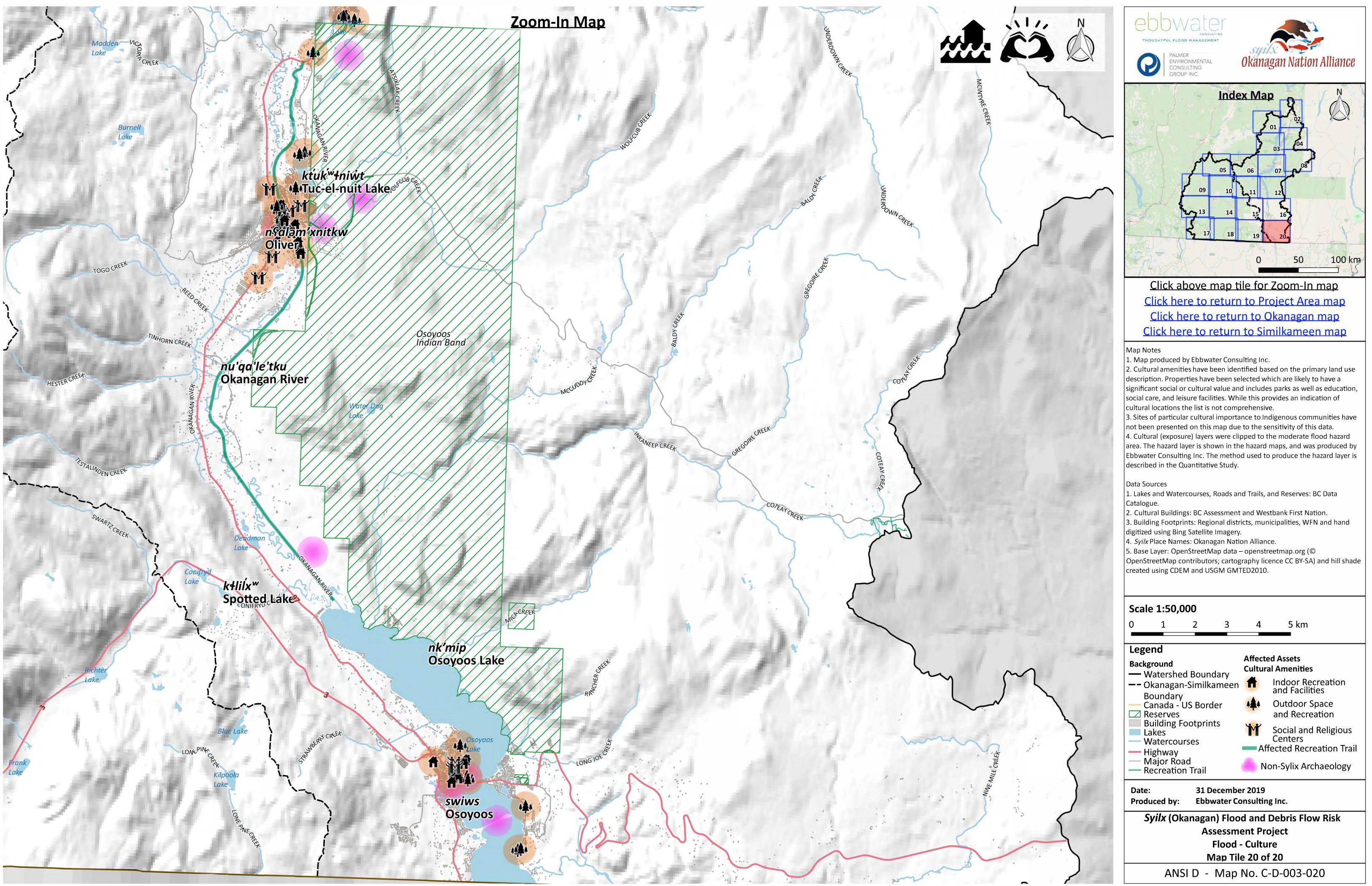
3. Building Footprints: Regional districts, municipalities, WFN and hand digitized using Bing Satellite Imagery.

4. Syilx Place Names: Okanagan Nation Alliance.

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

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<ul> <li>Okanagan-Similkameen Boundary</li> <li>Canada - US Border</li> <li>Reserves</li> <li>Building Footprints</li> <li>Lakes</li> <li>Watercourses</li> <li>Highway</li> </ul>					Indoor Recreation and Facilities	
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Date:31 December 2019Produced by:Ebbwater Consulting Inc.						
Syilx (Okanagan) Flood and Debris Flow Risk						
Assessment Project Flood - Culture						
Map Tile 18 of 20						
ANSI D - Map No. C-D-003-018						



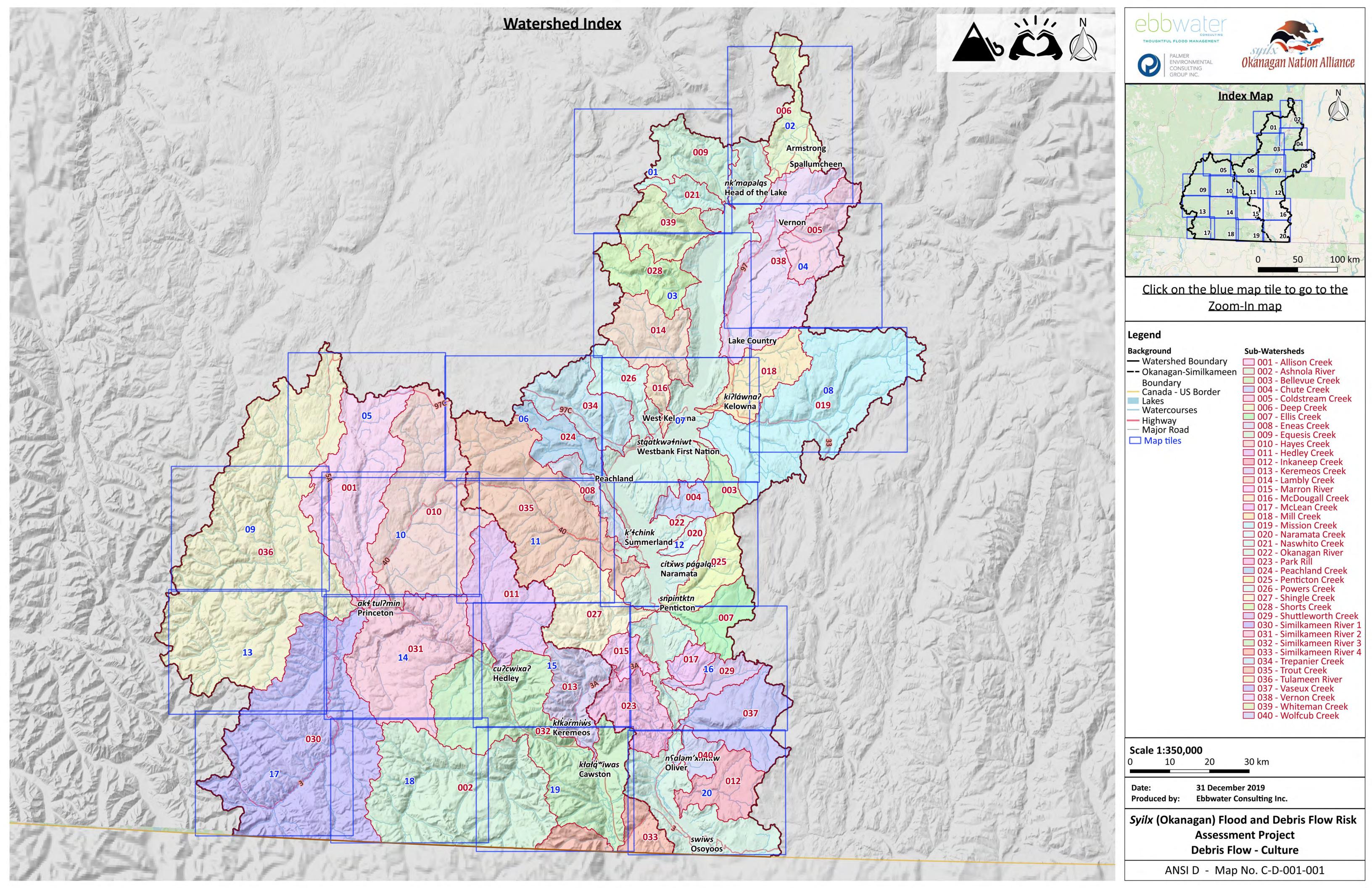


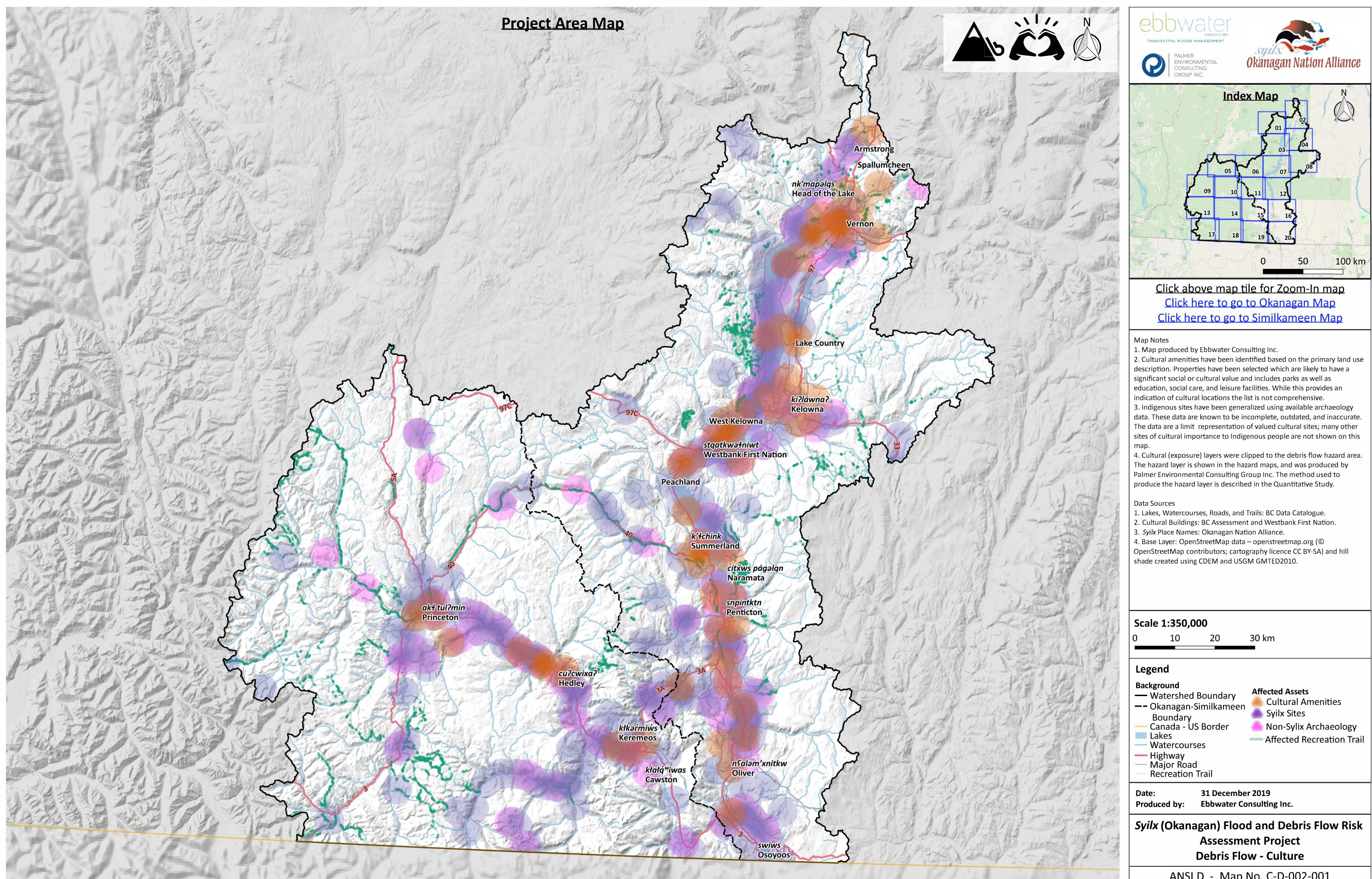
Syilx Okanagan Flood and Debris Flow Risk Assessment Map Book Map Series 3 of 7: Culture Indicator



## **Quantitative Debris Flow Consequence Maps**

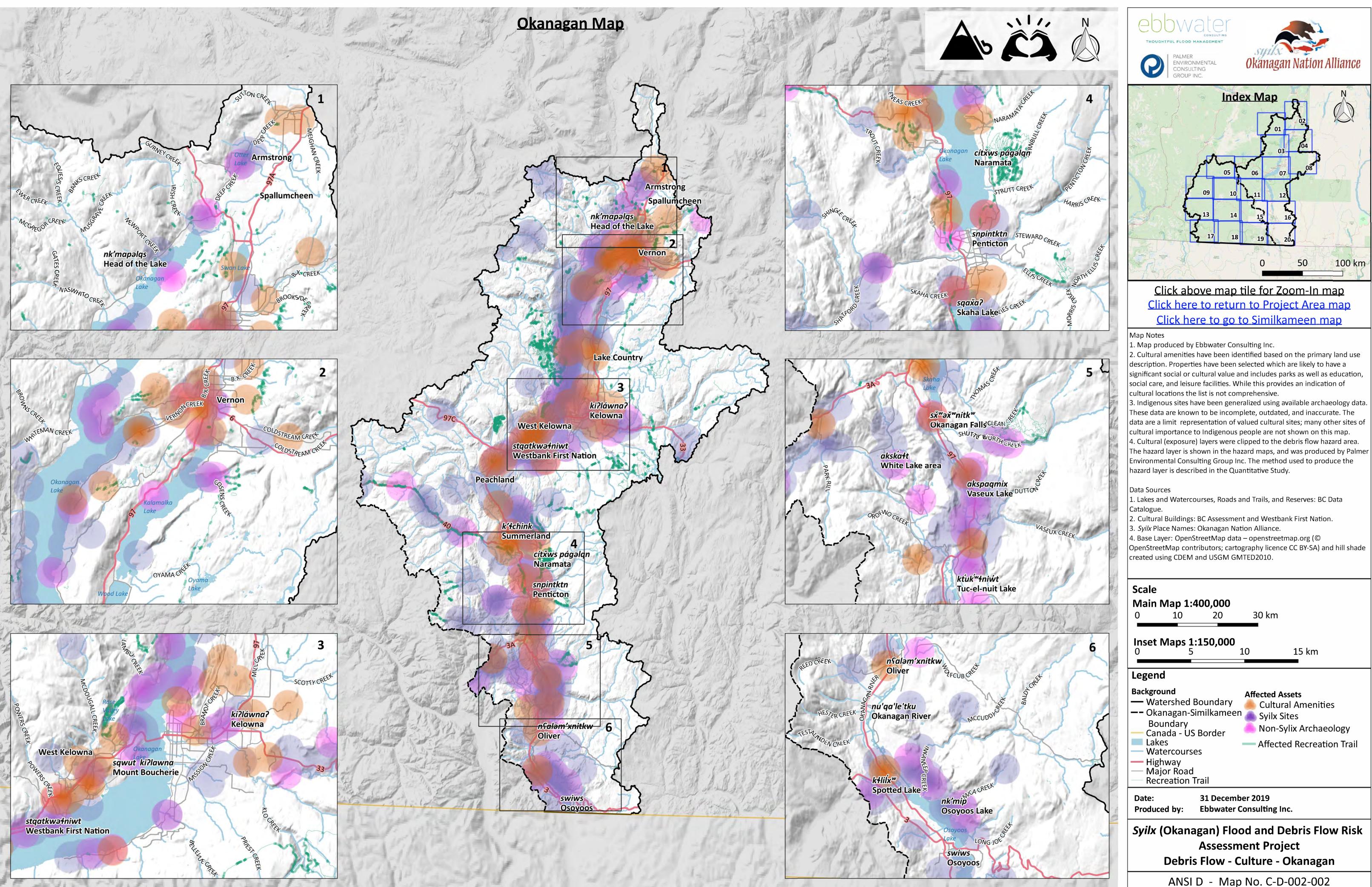




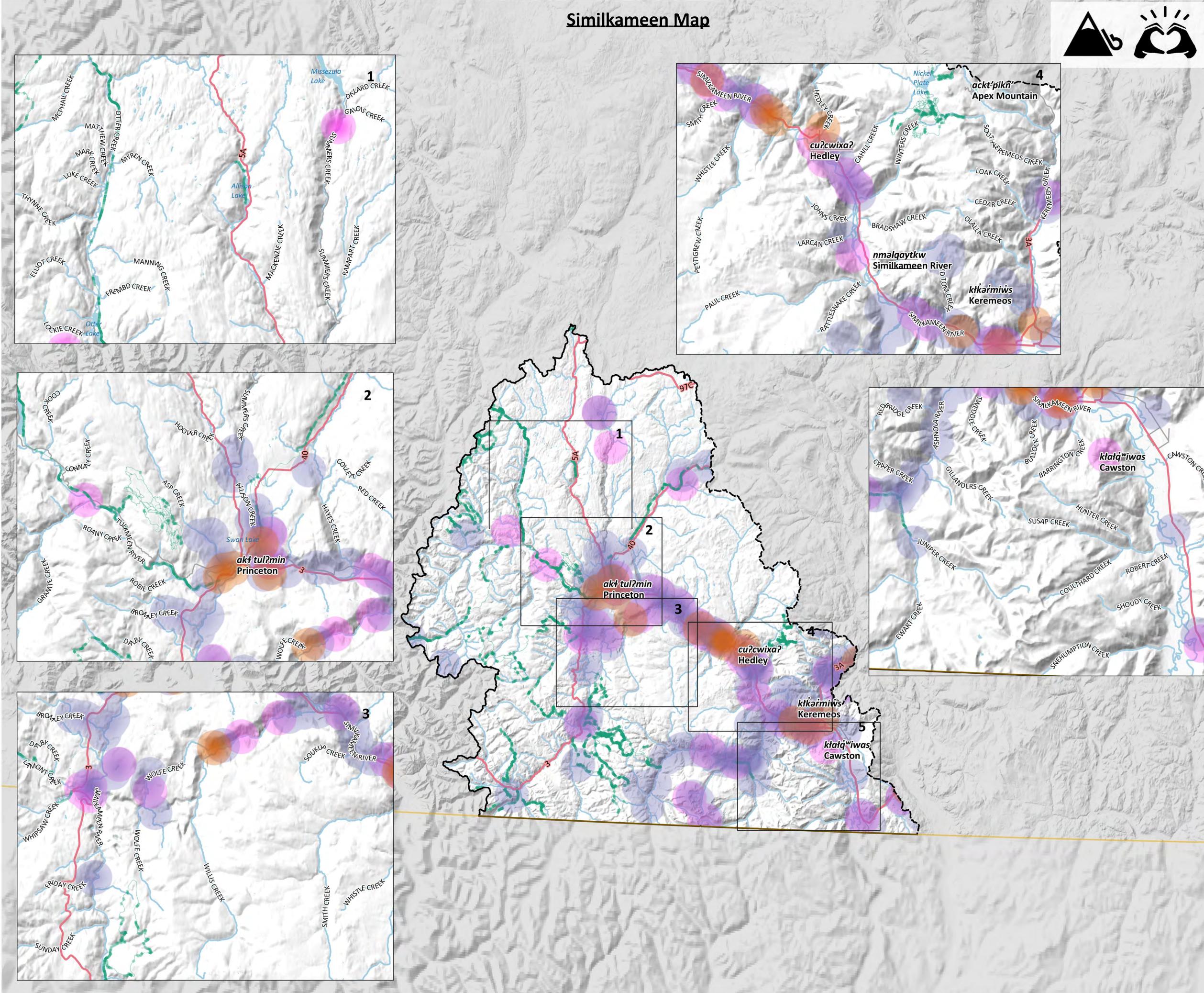


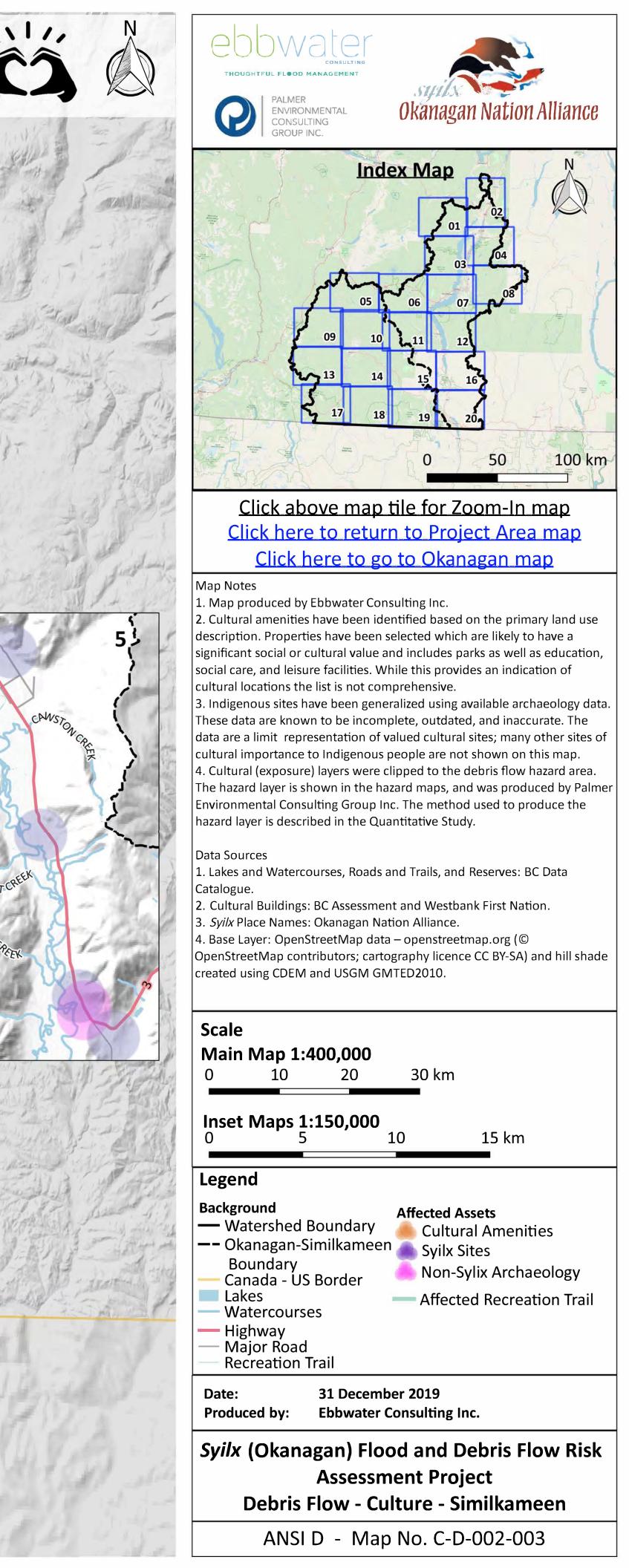
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Date: Produced by:		31 December 2019 Ebbwater Consulting Inc.				
<i>Syilx</i> (Okanagan) Flood and Debris Flow Risk Assessment Project Debris Flow - Culture						

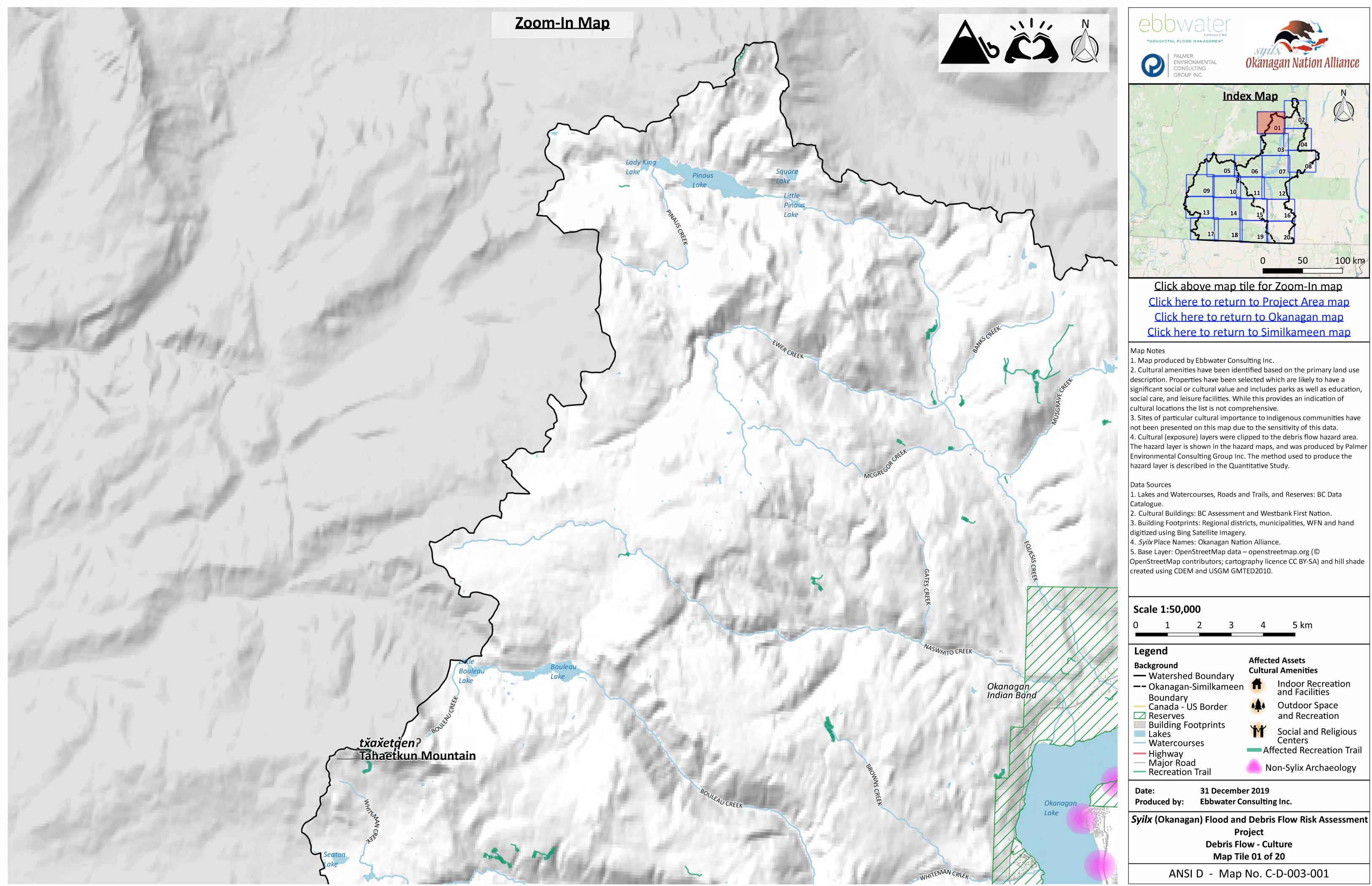
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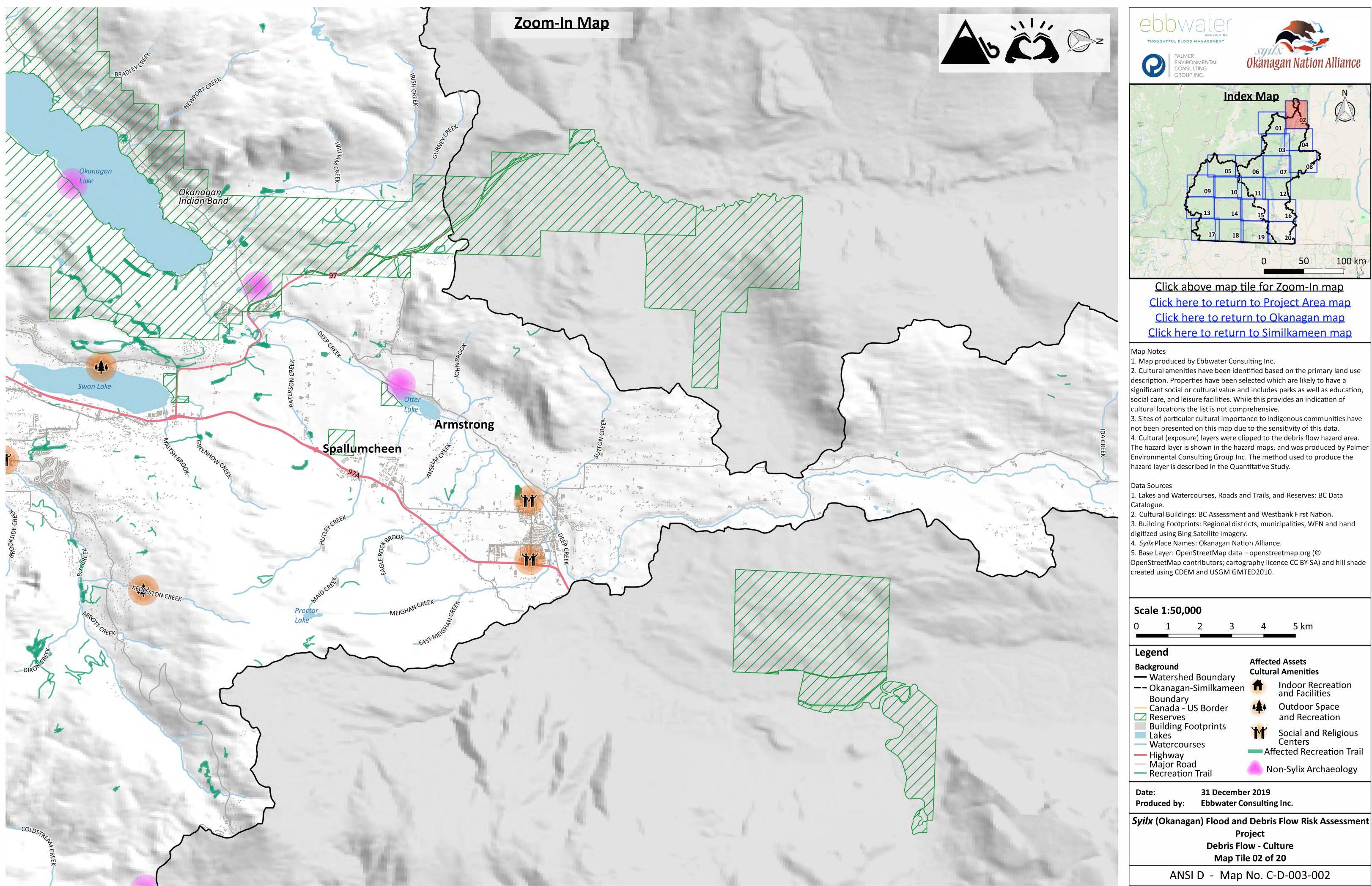
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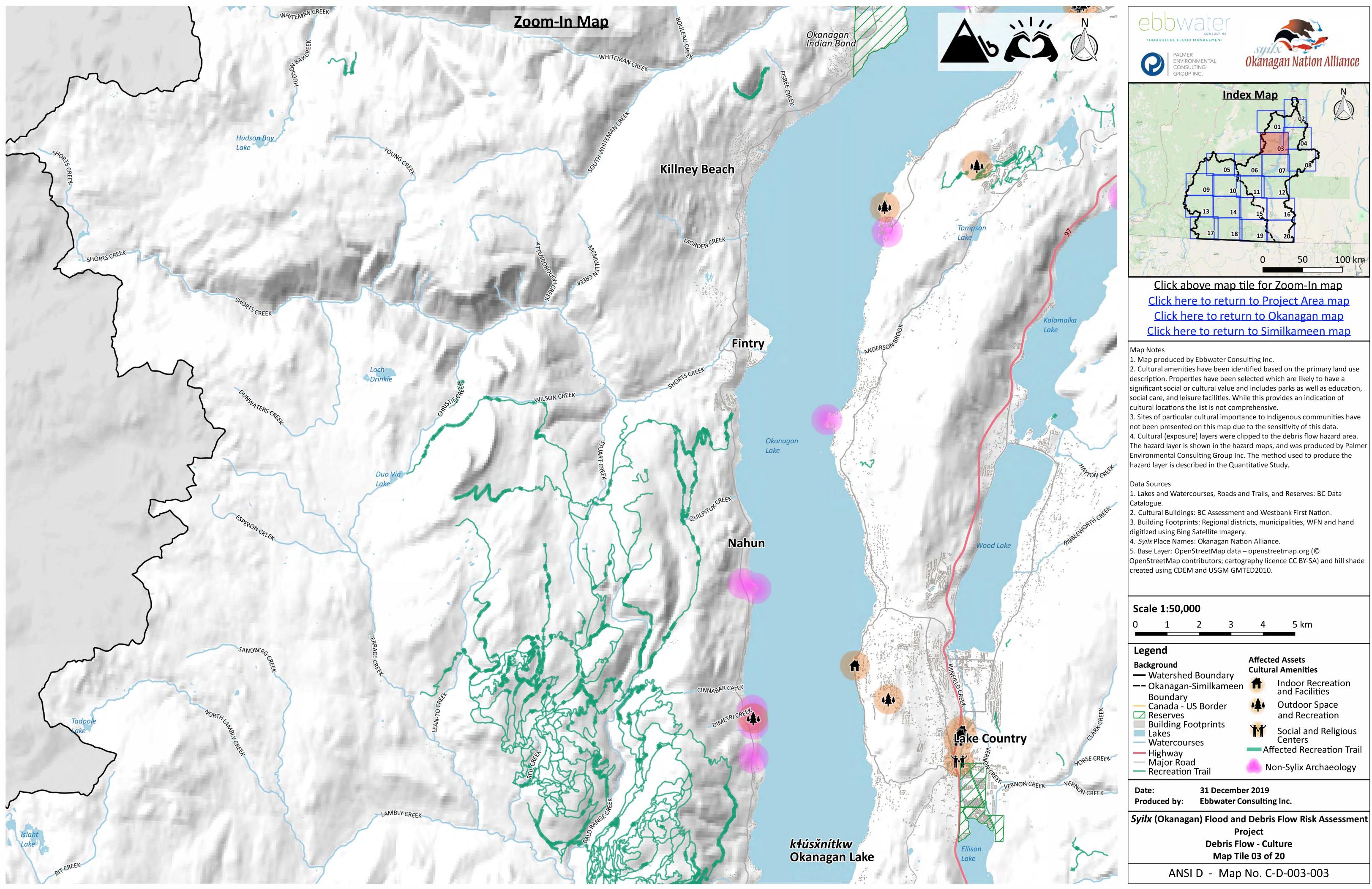




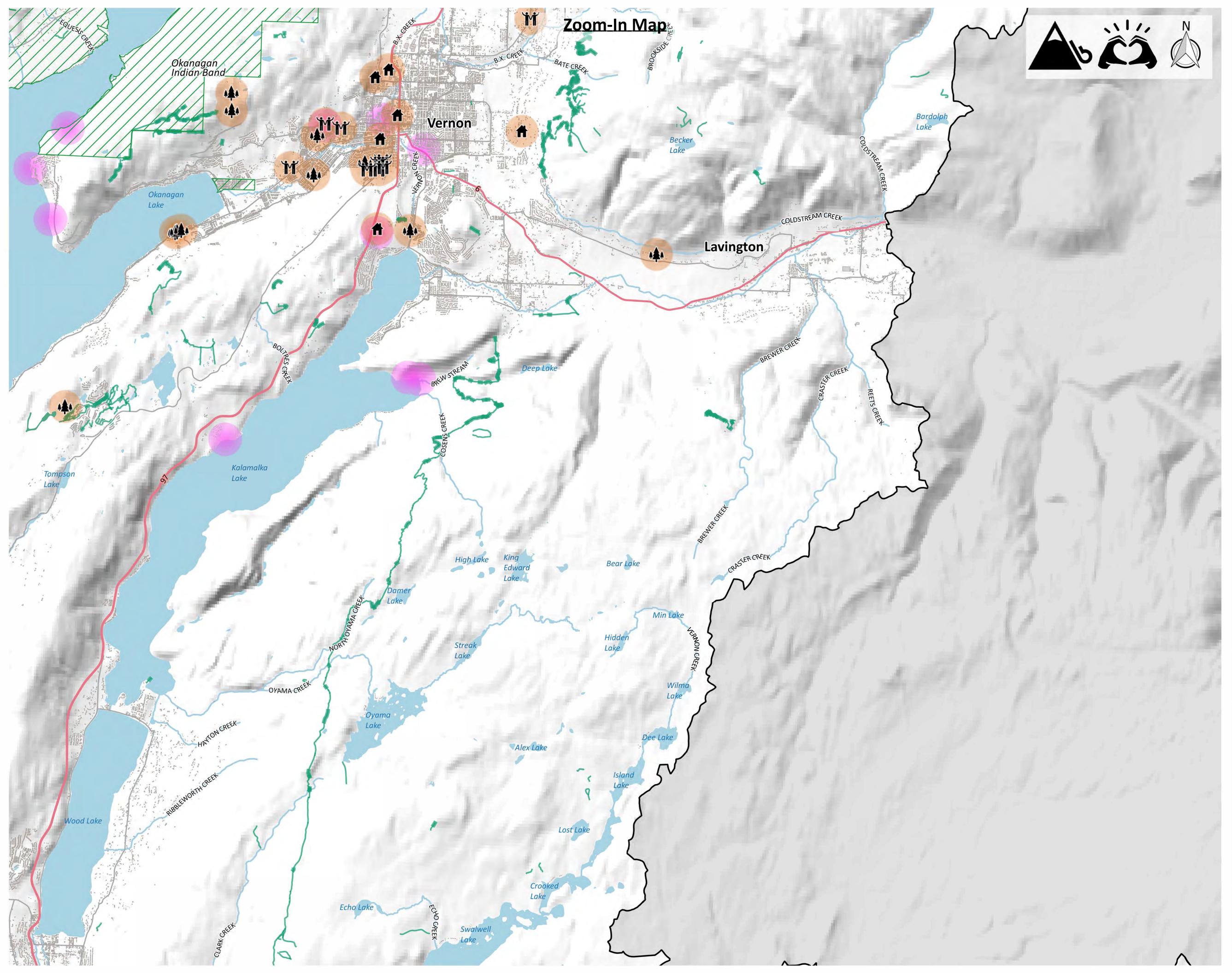
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Date:31 December 2019Produced by:Ebbwater Consulting Inc.Syilx (Okanagan) Flood and Debris Flow Risk Assessment Project Debris Flow - Culture Map Tile 01 of 20								

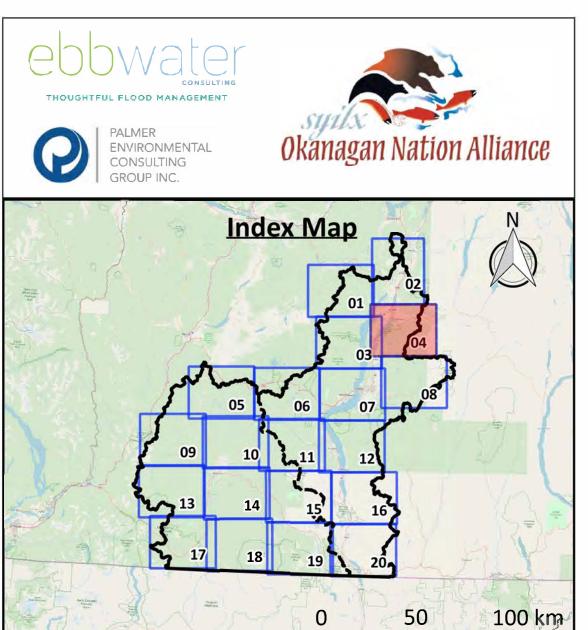


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Project Debris Flow - Culture Map Tile 02 of 20								
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Pro	Date:31 December 2019Produced by:Ebbwater Consulting Inc.						
<i>Syilx</i> (Okanagan) Flood and Debris Flow Risk Assessment Project							
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# Click above map tile for Zoom-In map Click here to return to Project Area map Click here to return to Okanagan map Click here to return to Similkameen map

### Map Notes

1. Map produced by Ebbwater Consulting Inc.

2. Cultural amenities have been identified based on the primary land use description. Properties have been selected which are likely to have a significant social or cultural value and includes parks as well as education, social care, and leisure facilities. While this provides an indication of cultural locations the list is not comprehensive.

3. Sites of particular cultural importance to Indigenous communities have not been presented on this map due to the sensitivity of this data.
4. Cultural (exposure) layers were clipped to the debris flow hazard area.
The hazard layer is shown in the hazard maps, and was produced by Palmer Environmental Consulting Group Inc. The method used to produce the hazard layer is described in the Quantitative Study.

Data Sources

1. Lakes and Watercourses, Roads and Trails, and Reserves: BC Data Catalogue.

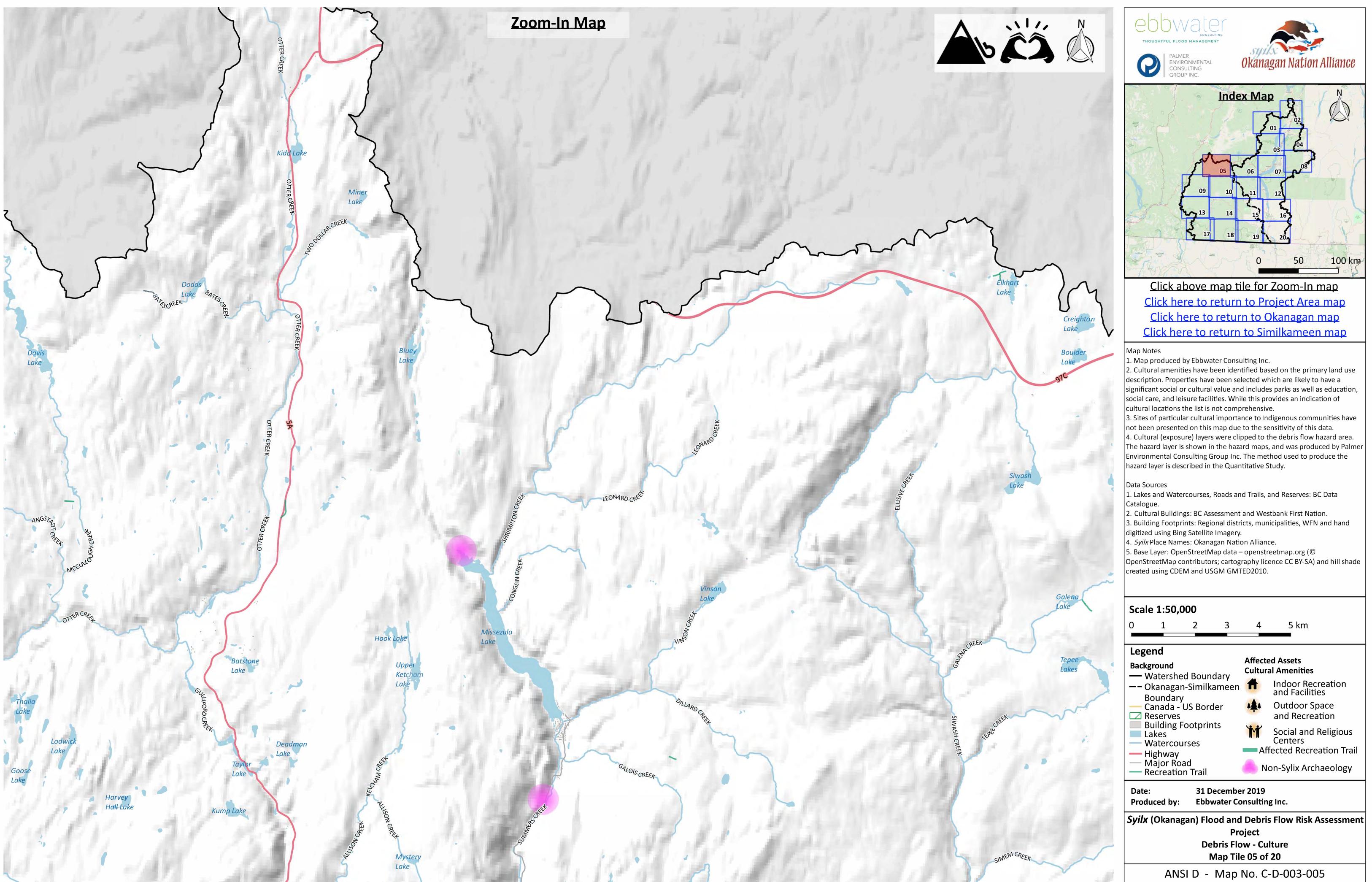
2. Cultural Buildings: BC Assessment and Westbank First Nation.

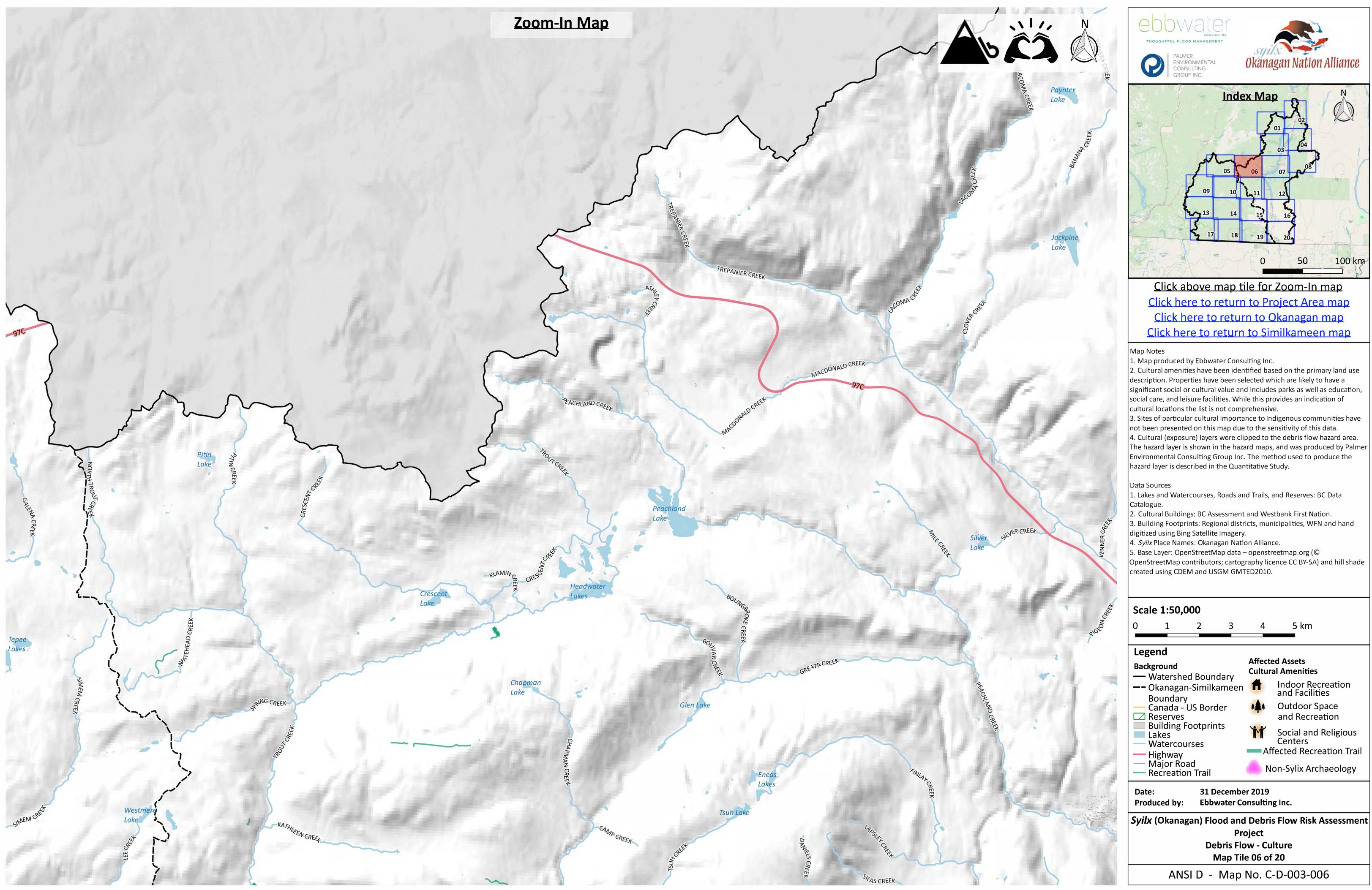
3. Building Footprints: Regional districts, municipalities, WFN and hand digitized using Bing Satellite Imagery.

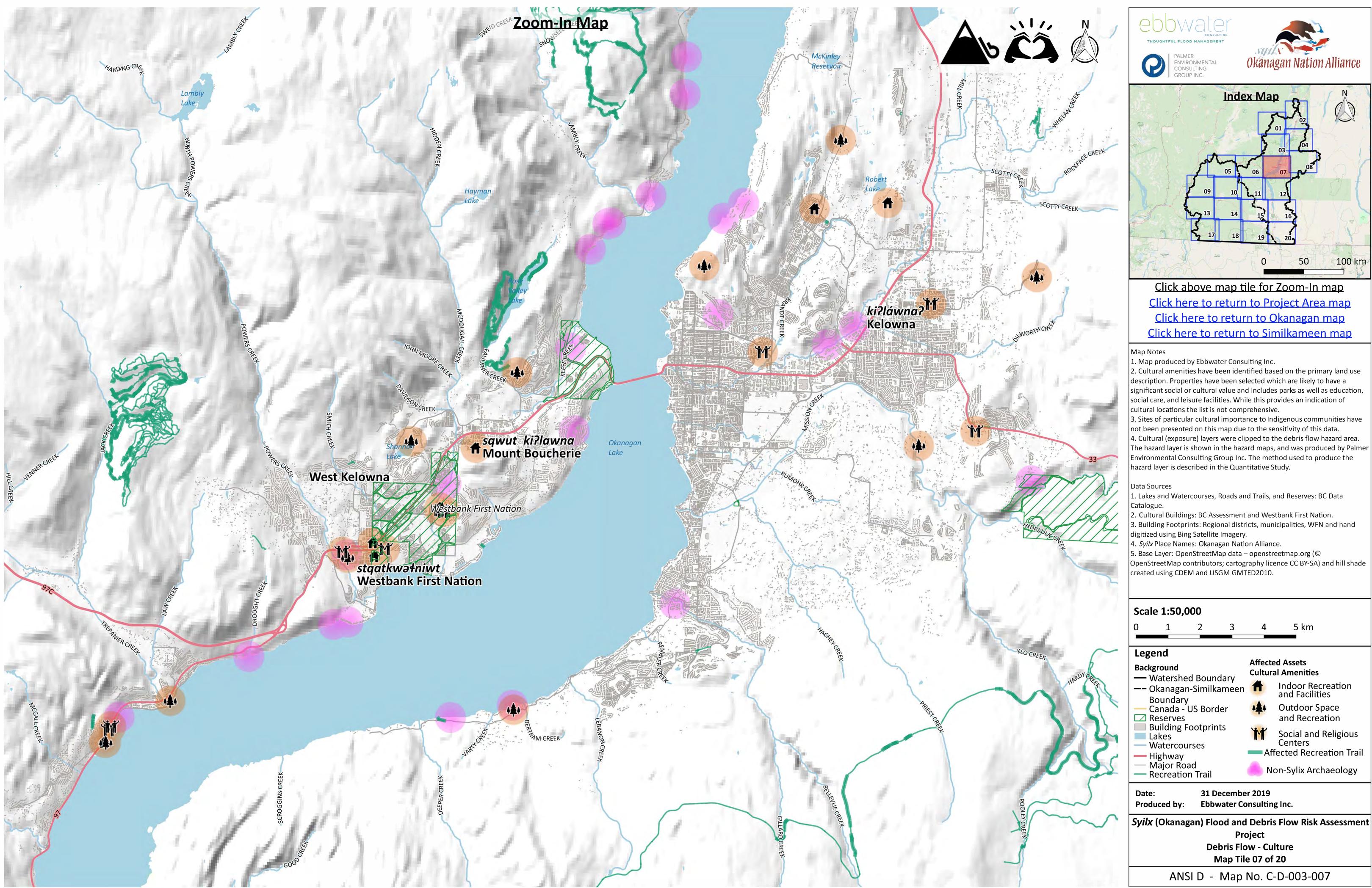
4. Syilx Place Names: Okanagan Nation Alliance.

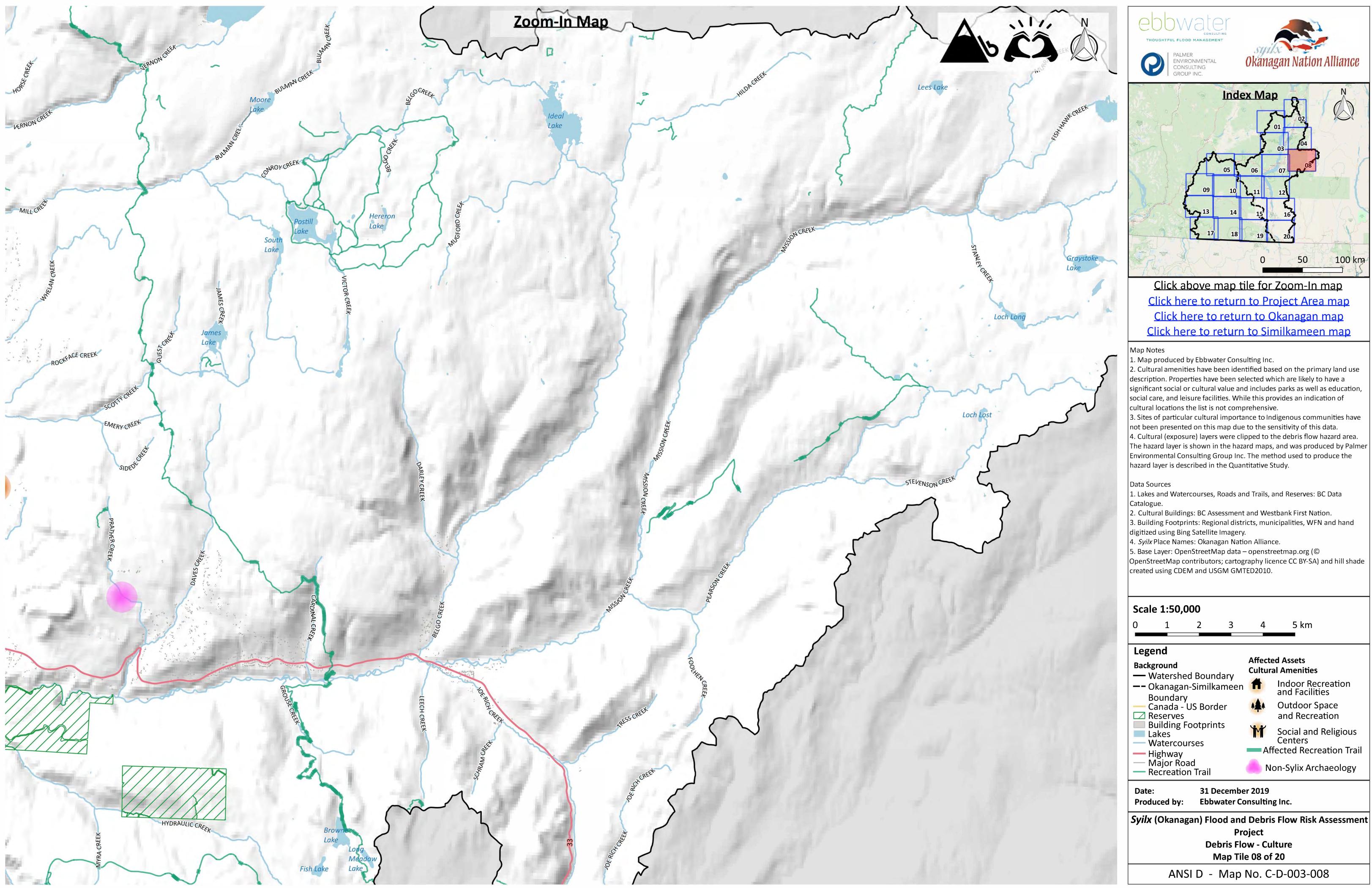
5. Base Layer: OpenStreetMap data – openstreetmap.org (© OpenStreetMap contributors; cartography licence CC BY-SA) and hill shade created using CDEM and USGM GMTED2010.

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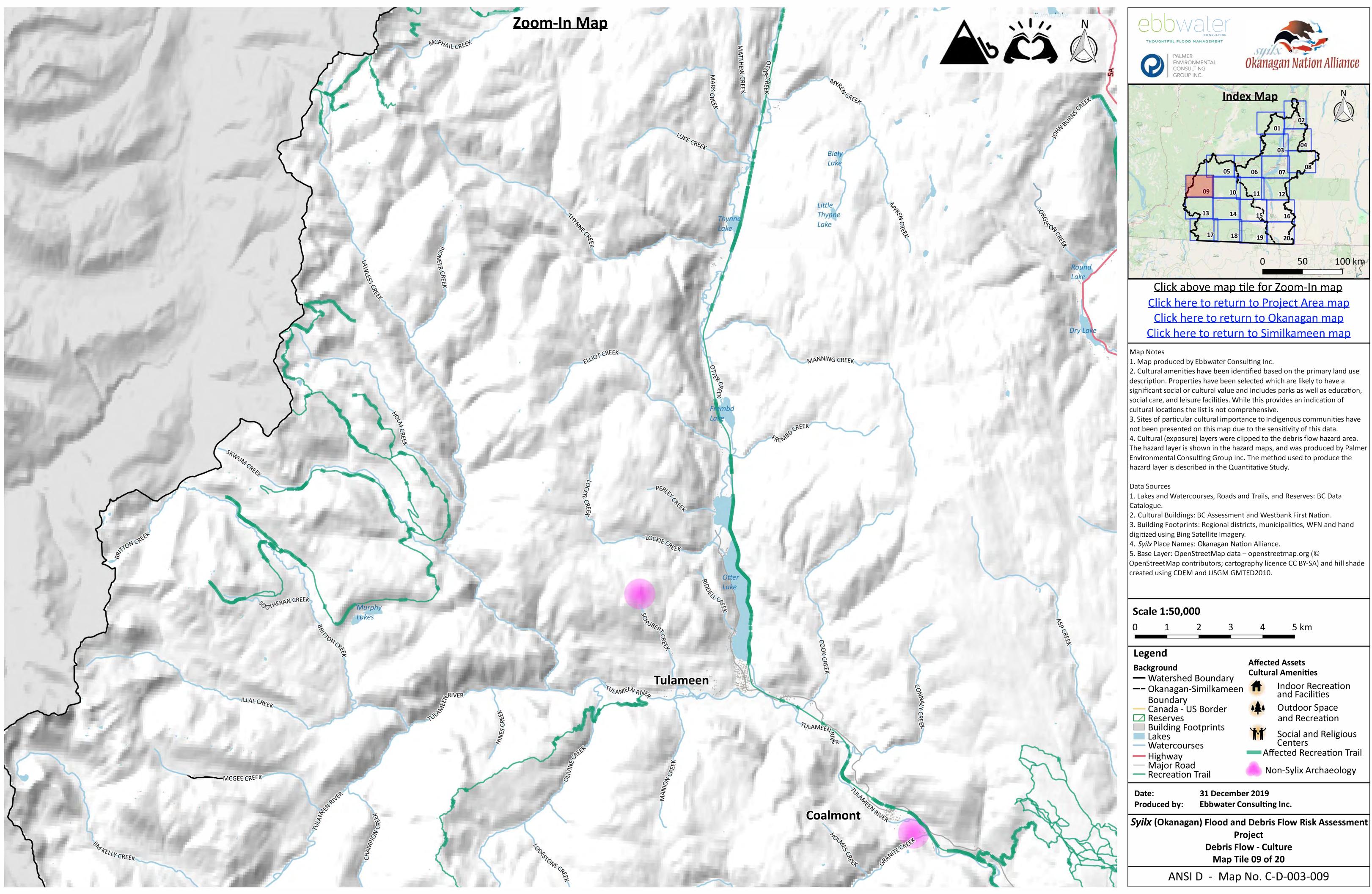




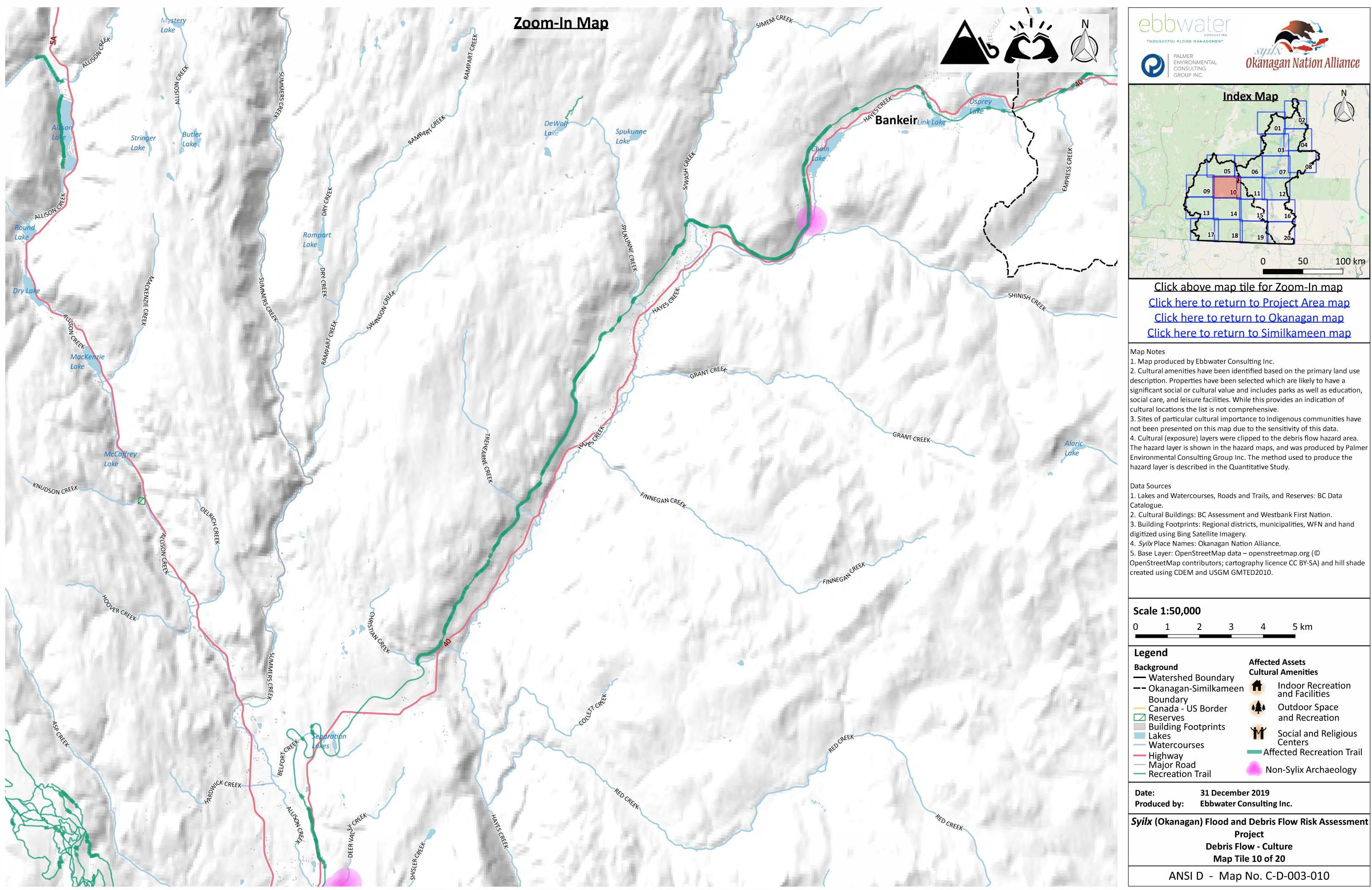




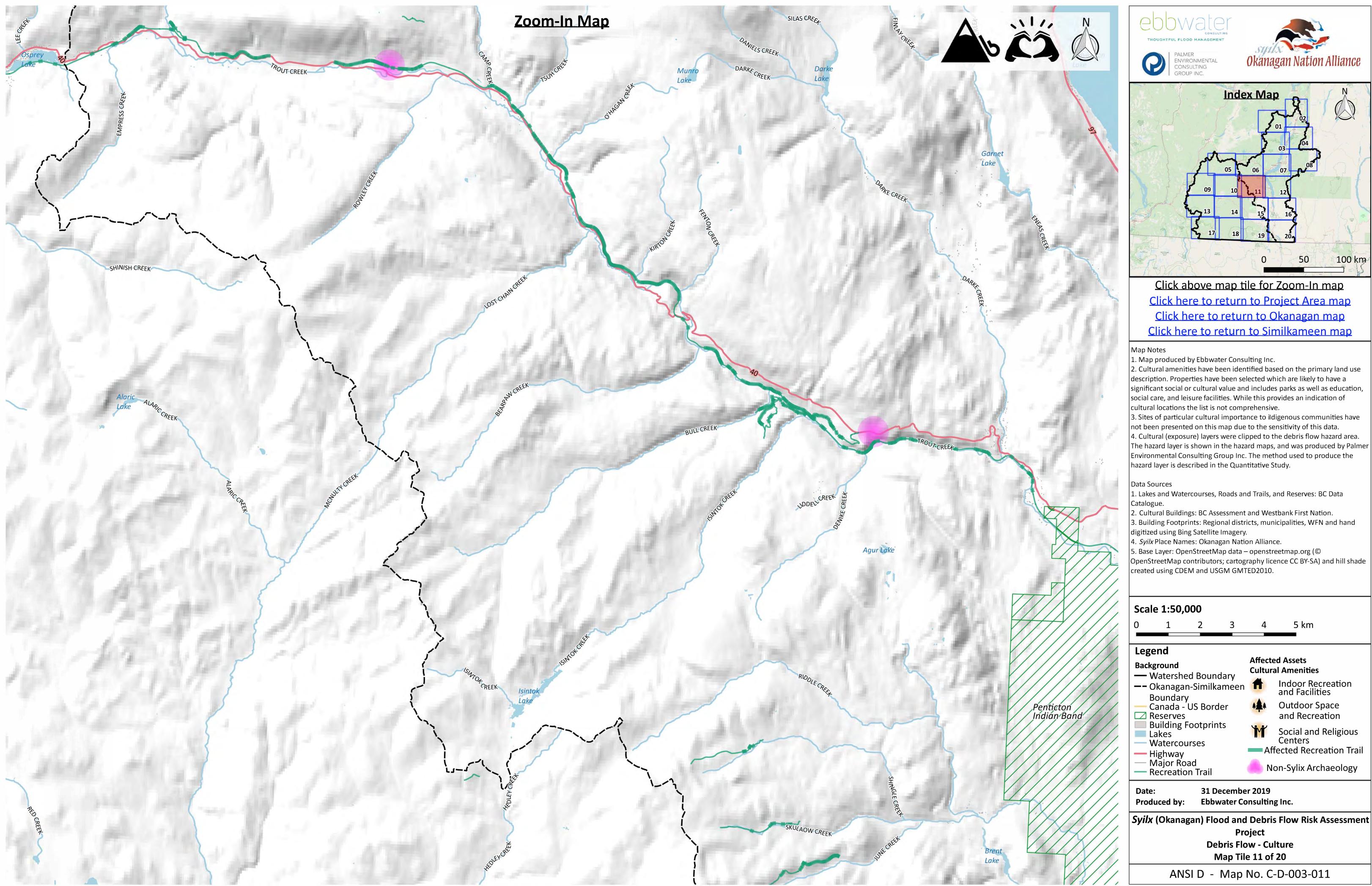
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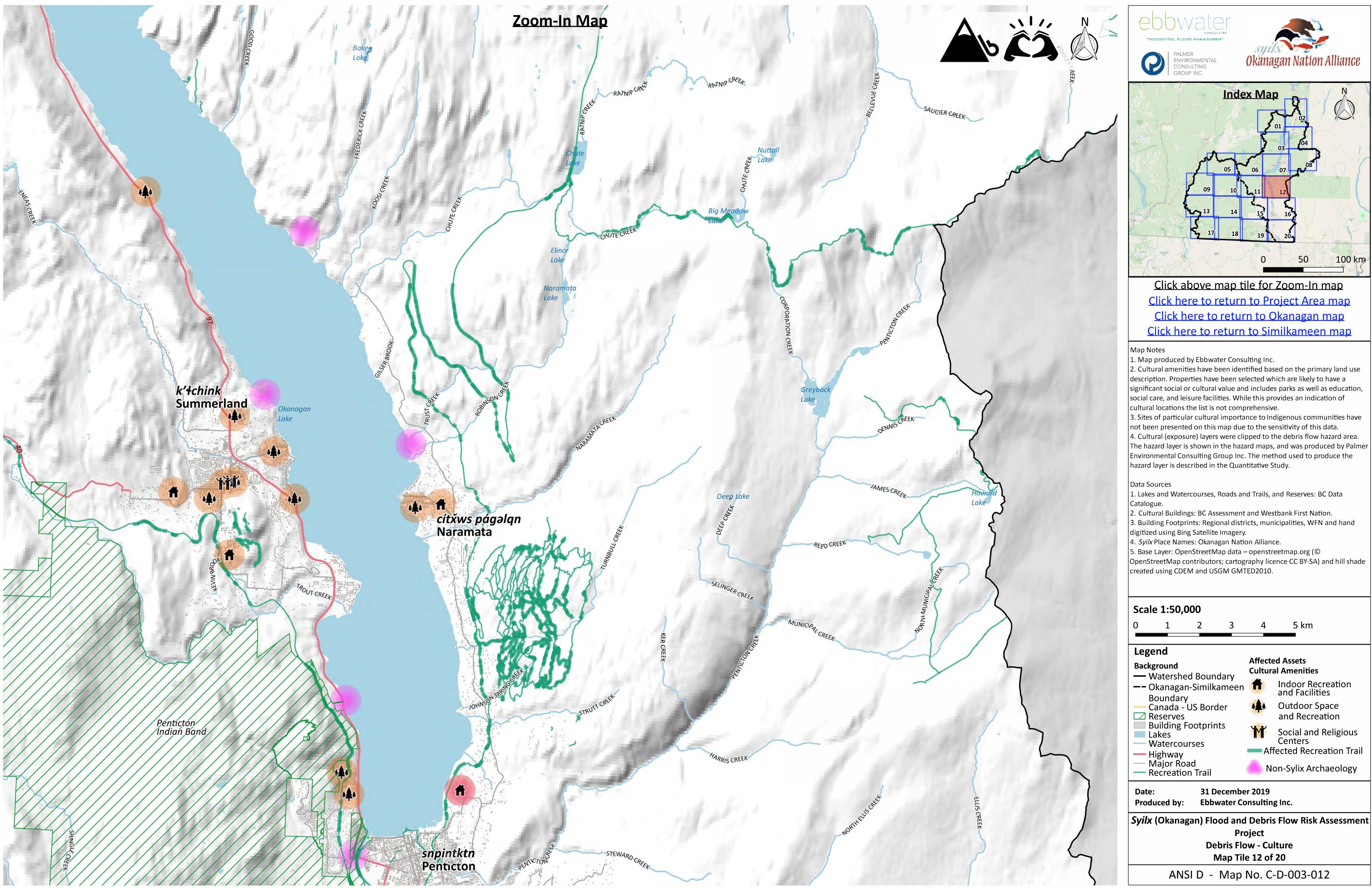


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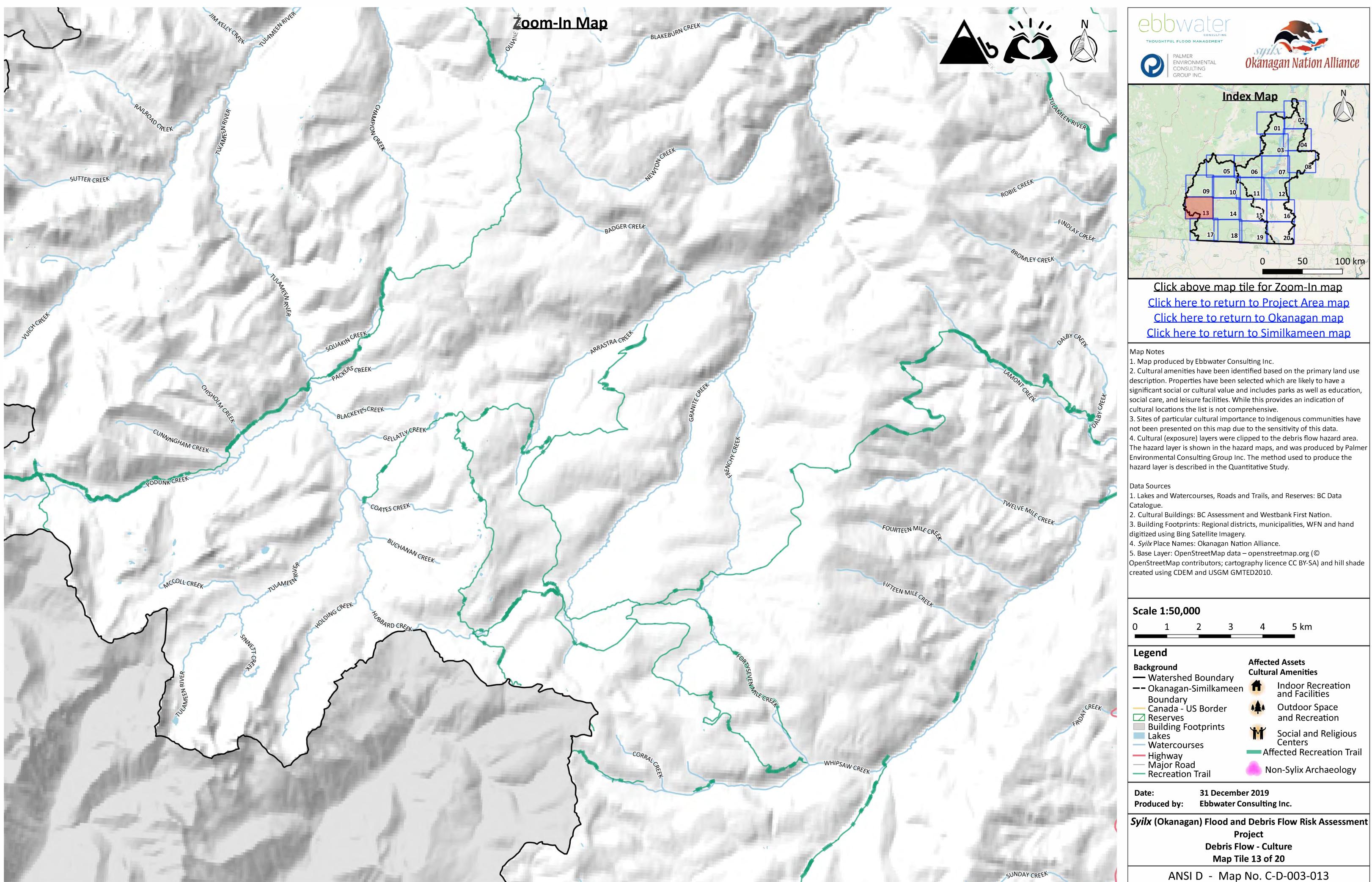
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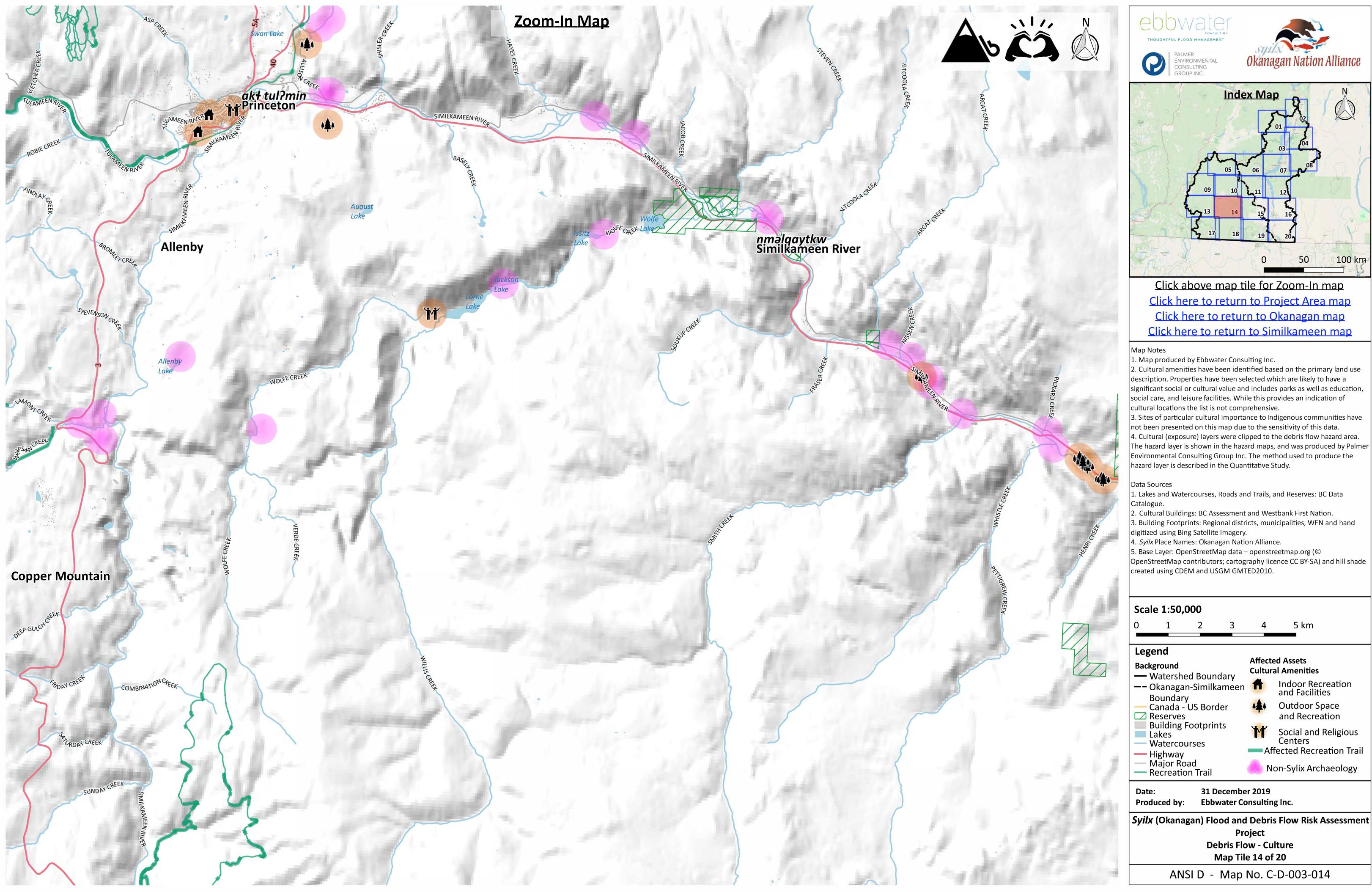




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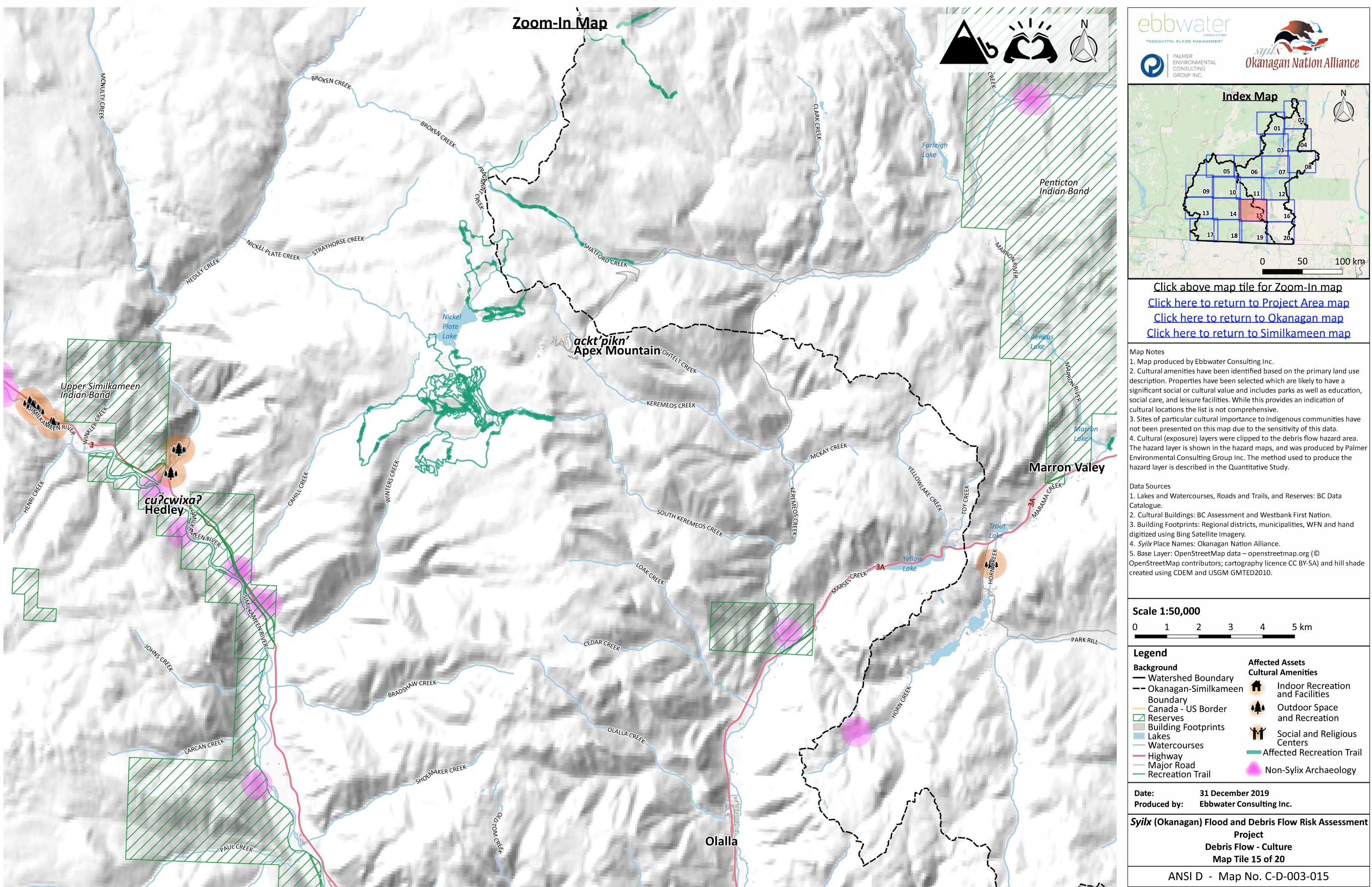


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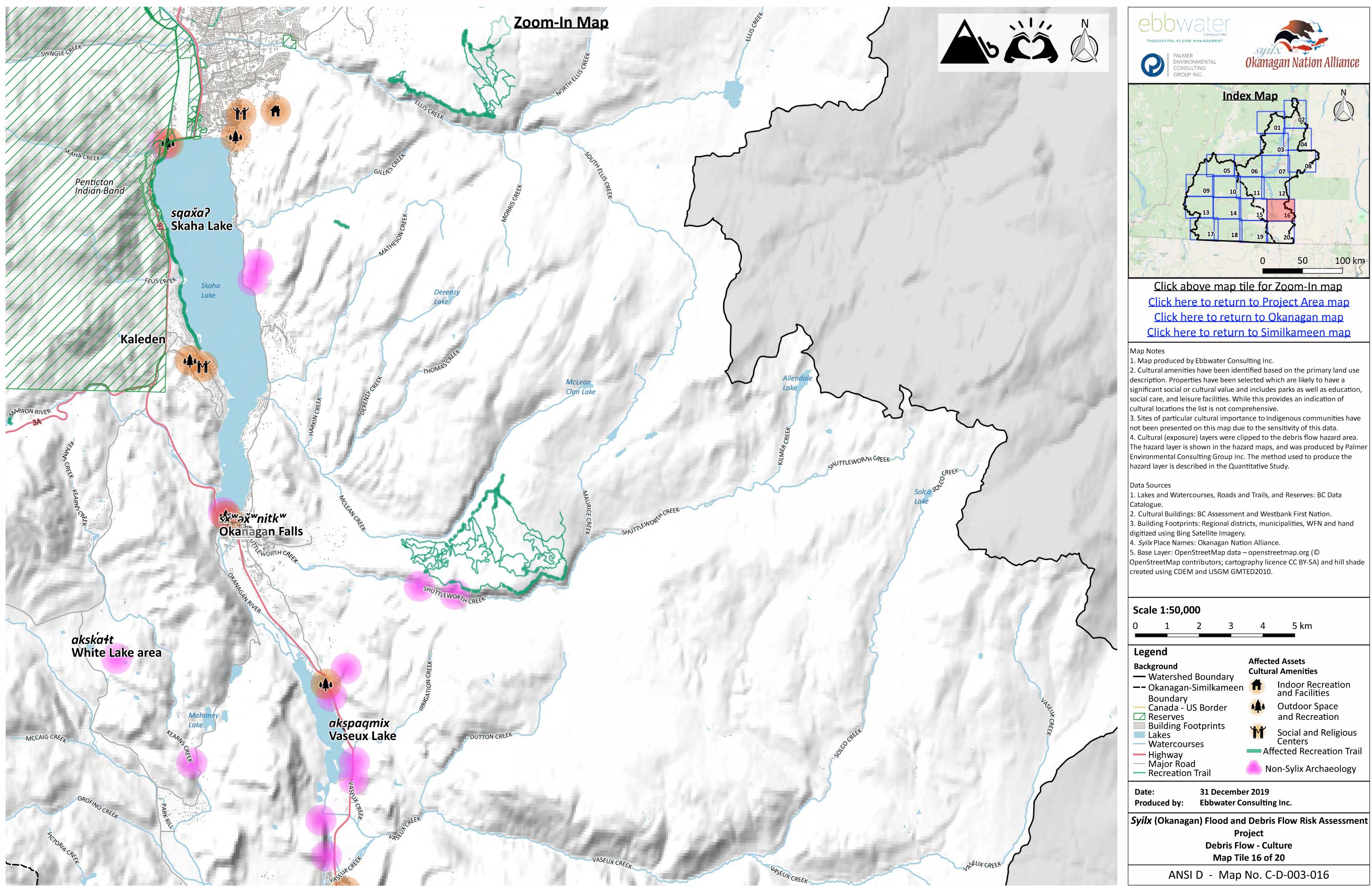




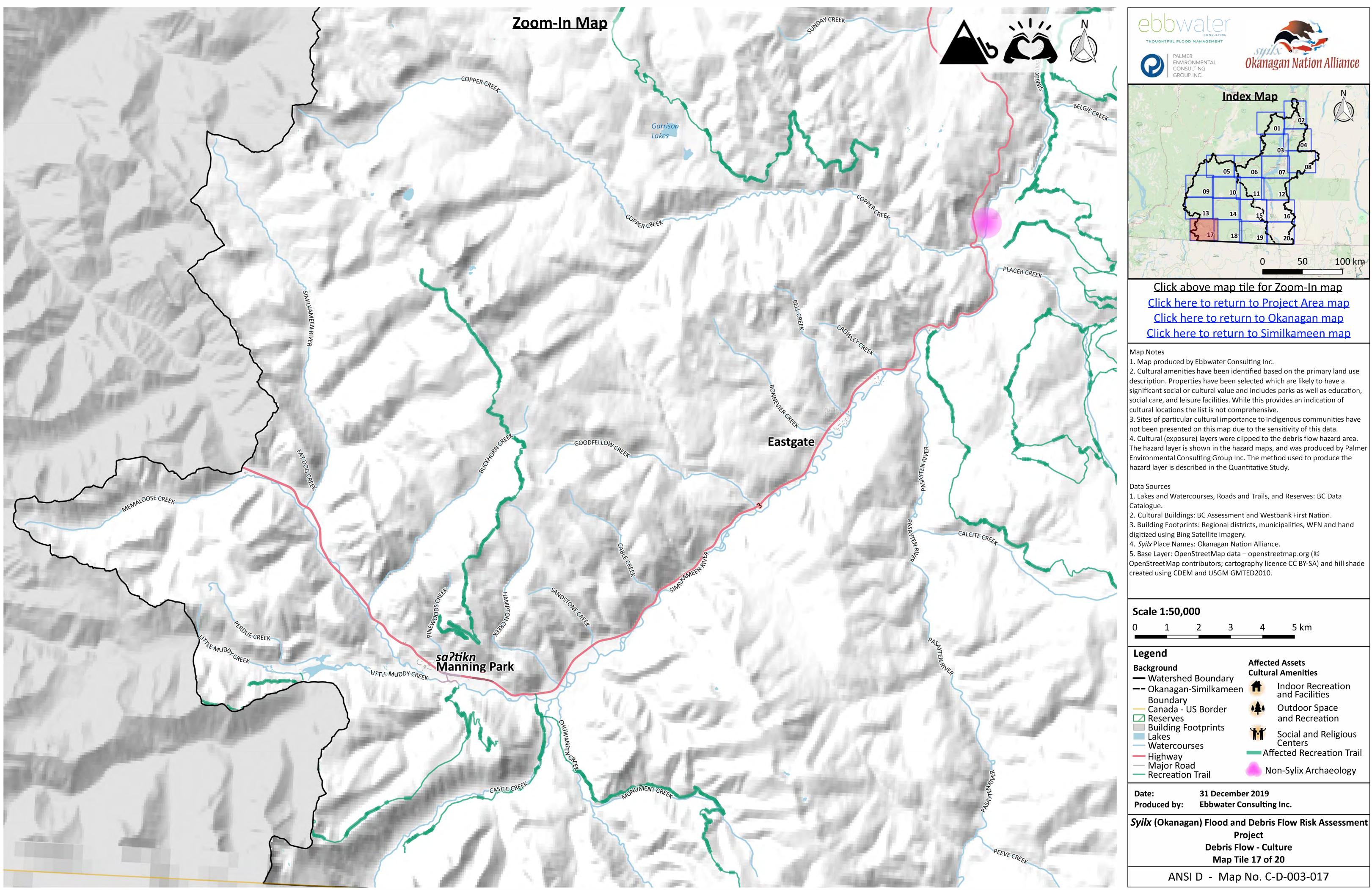
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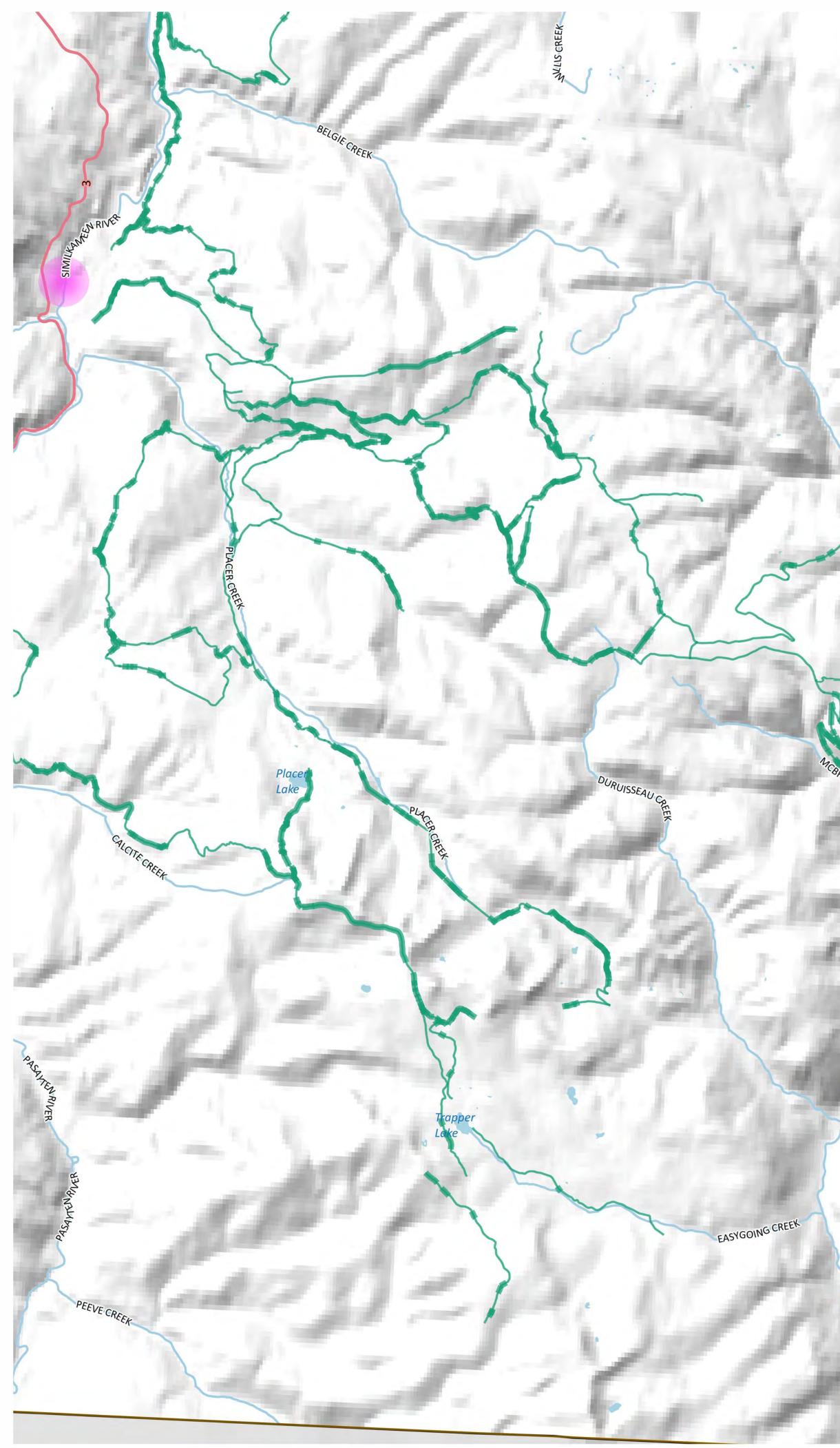


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Date:31 December 2019Produced by:Ebbwater Consulting Inc.				
Syilx (Okanagan) Flood and Debris Flow Risk Assessment				
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Map Tile 16 of 20				





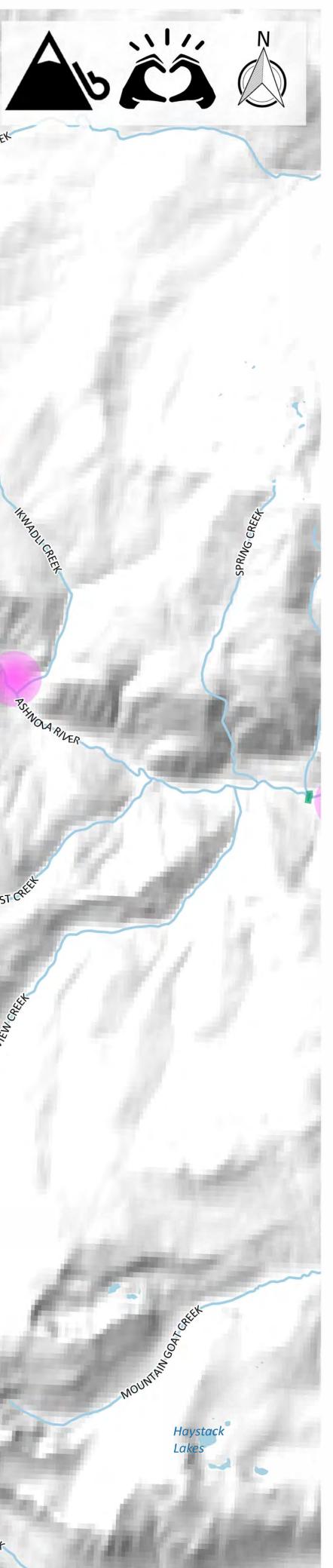


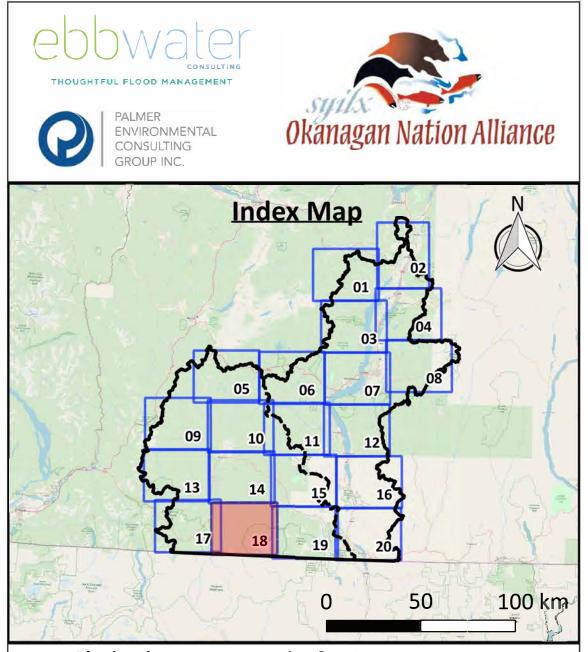




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## <u>Click above map tile for Zoom-In map</u> <u>Click here to return to Project Area map</u> <u>Click here to return to Okanagan map</u> <u>Click here to return to Similkameen map</u>

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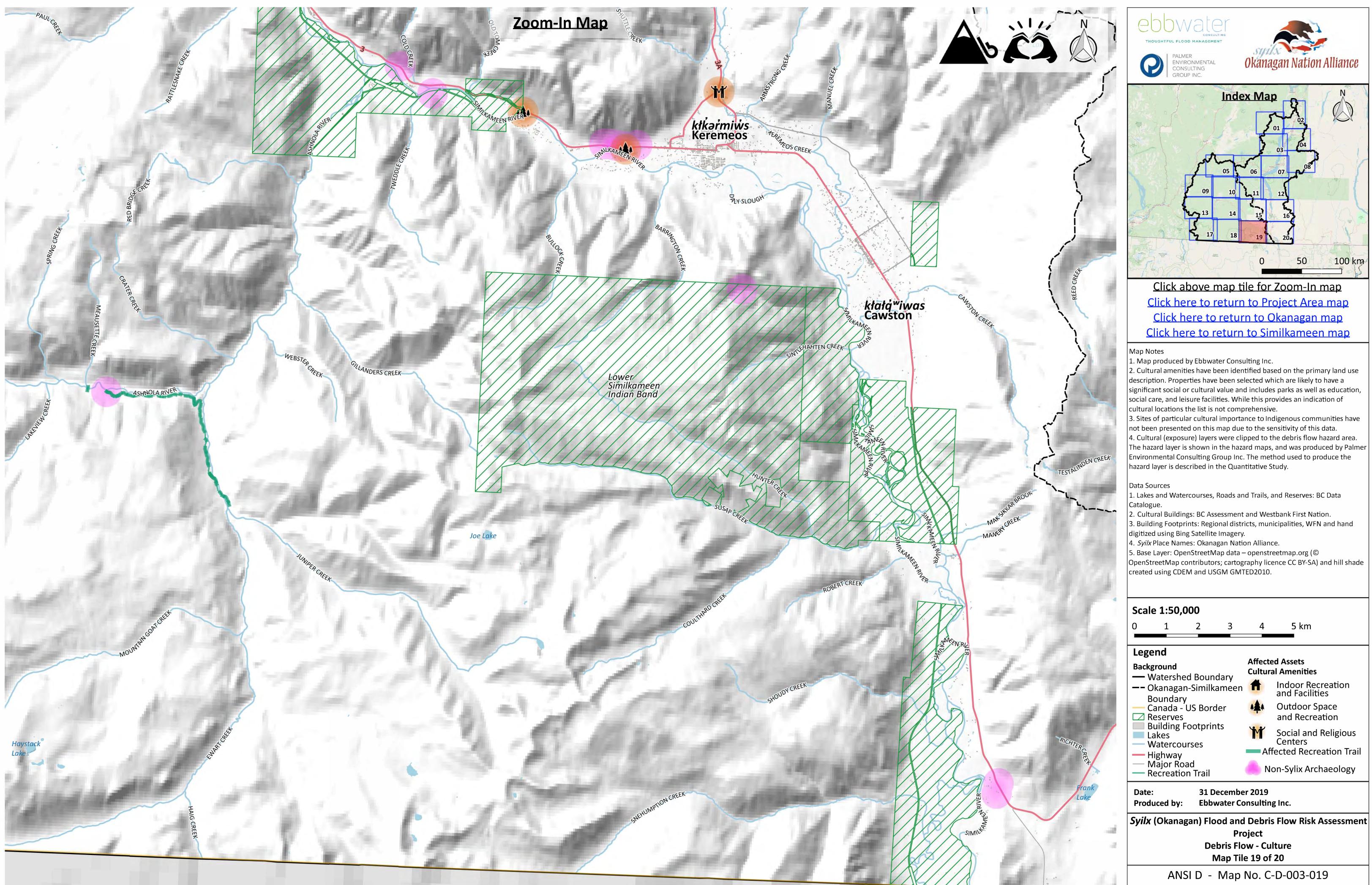
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4. *Syilx* Place Names: Okanagan Nation Alliance.

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

### Scale 1:50,000 5 km 3 4 Legend Affected Assets Background **Cultural Amenities** — Watershed Boundary Indoor Recreation and Facilities -- Okanagan-Similkameen T Boundary Canada - US Border **Mathe State** Outdoor Space ReservesBuilding Footprints and Recreation M Social and Religious Lakes Centers Watercourses Affected Recreation Trail – Highway Major Road Recreation Trail Non-Sylix Archaeology 31 December 2019 Date: Produced by: Ebbwater Consulting Inc. Syilx (Okanagan) Flood and Debris Flow Risk Assessment Project **Debris Flow - Culture** Map Tile 18 of 20 ANSI D - Map No. C-D-003-018



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