



CEC Flood Costing Project Preliminary Findings

2nd CEC Virtual Expert Workshop

Common Challenges for flood economic cost data collection
in Canada, Mexico, and the United States



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22-23 October 2020



Overall Approach for Application of the CEC Method

➤ The CEC Flood-costing Methodology development: major activities

2019

May

September

Commence

The 1st CEC Expert Workshop, Vancouver, Canada

- | | |
|--|---|
| <input type="checkbox"/> Defined 3 damages | <input type="checkbox"/> Defined 4 categories |
| 1) Direct damages | 1) Social sector |
| 2) Indirect effects | 2) Infrastructure |
| 3) Losses & additional costs | 3) Economic sector |
| | 4) Emergency assistance |

In total 103 damage indicators

2020

March

July

September

The Operational Handbook
Extreme Events Economic
Impact Database

The Indigenous Perspective on
Flood Damage Workshop (Virtual) *

A paper related to the CEC flood-costing
methodology was published.

Established a relational database

Added a new category and sub-categories to capture Indigenous communities' damages in the database: videos, pictures, or text, and economic costs.

Added 2 new damage indicators

In total 105 damage indicators



Data Collection Process and Analysis

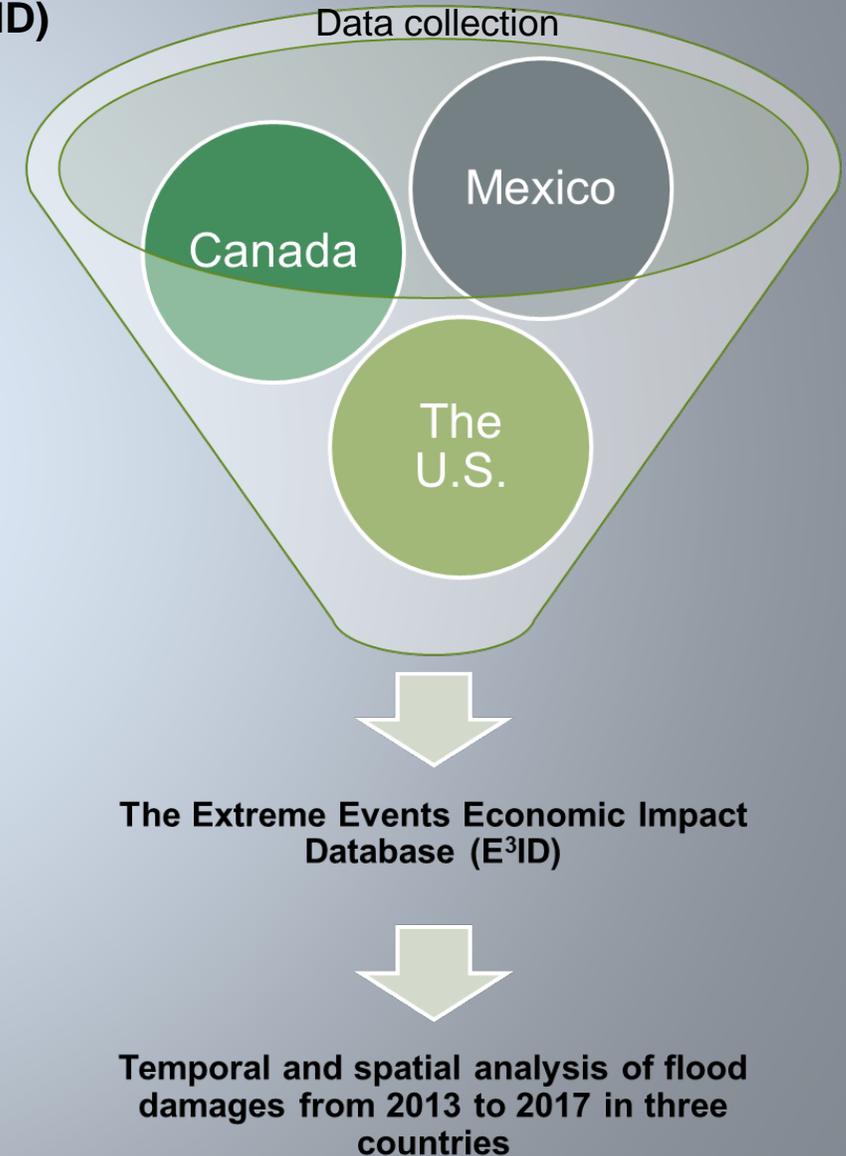
➤ Database design - The Extreme Events Economic Impact Database (E³ID)

The data used in this database are **secondary data** that had been gathered previously by another person or entity

Secondary data: **Economic, time-saving, and efficient.**

General principles:

- | | |
|------------------------------|---|
| 1) Method of data collection | e.g., questionnaires and surveys, observations, or documents and records. |
| 2) Level of data aggregation | e.g., average, minimum, maximum, sum, or count. |
| 3) Data format | e.g., excel or PDF. |
| 4) Missing data | -999 is used as "Missing data" or "No data". |
| 5) No impact/damage value | zero (0) is used as "No impact/damage". |





Data Collection Process and Analysis

➤ Database design - The Extreme Events Economic Impact Database (E³ID)

- ❑ Spatial coverage: Canada, Mexico, and the United States
- ❑ Spatial resolution: municipal level
- ❑ Temporal scale (test window): 2013 to 2017 (short-term)
- ❑ Platform: Microsoft Access (a relational database)
- ❑ Contents: 8 Tables

Primary key: location ID

Location table:

locations where are affected by flooding

Flood event table:

floods by year, start and end dates.

Flood event location

attributes: support information about location (e.g., population).

Data source table:

data source and data range (e.g., average or max data)

Direct damage table:

direct damages caused by floods, including **55** indicators.

Indirect effect table:

indirect effects caused by floods, including **15** indicators.

Additional cost table

additional costs caused by floods, including **35** indicators.

Indigenous communities flood damage table:

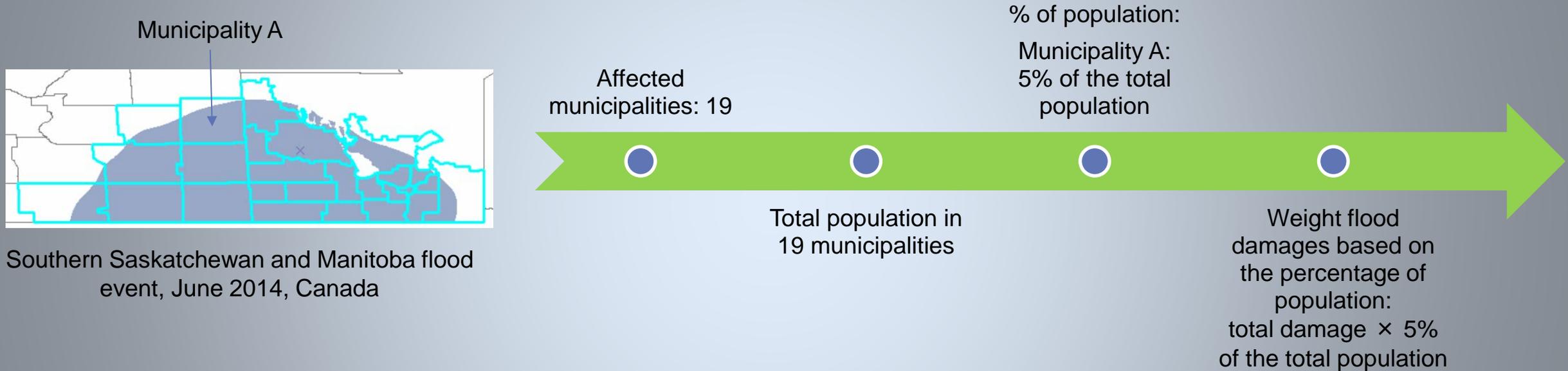
damages caused by floods in Indigenous communities, including the intangibles and tangibles damages with different data types



Data Collection Process and Analysis

➤ A population-based weighting method to estimate flood economic costs at the municipal level

Example



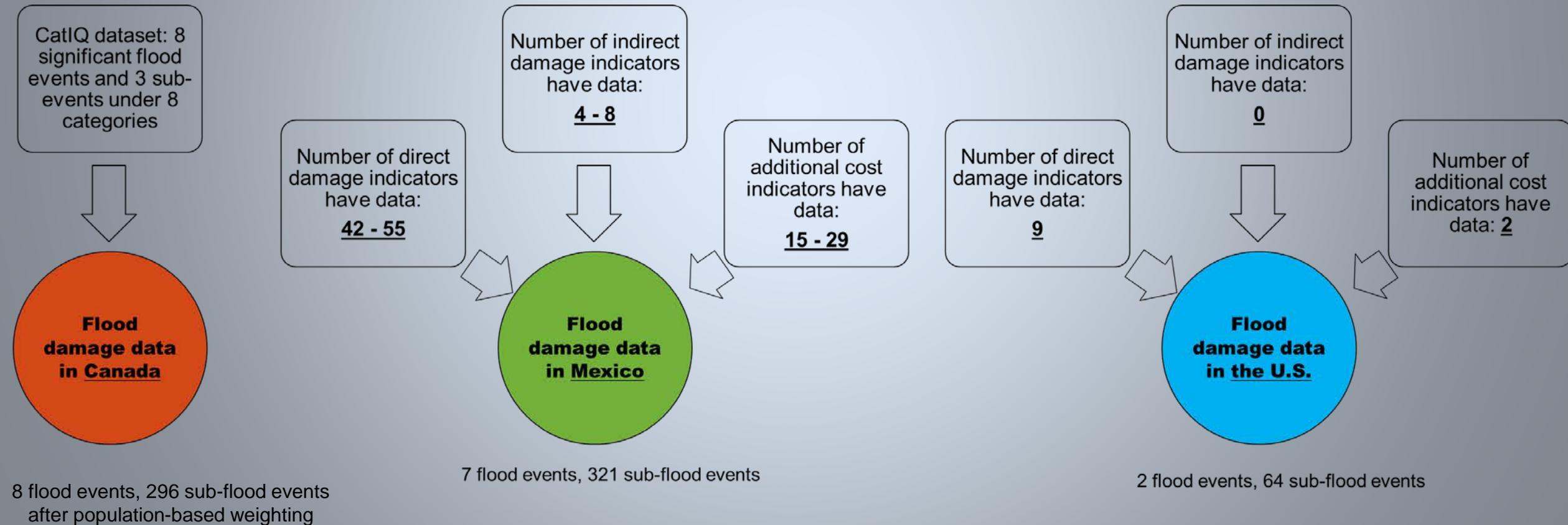
➤ A standard currency conversion method





Summary Overview of the Data in three countries

- Flood damage data collection in **Mexico shows the best data completeness** among the three countries.
- Most economic flood damage assessment focuses on the evaluation of **direct damages** in three countries.
- Flood economic cost data at the municipal level are easily accessible in **Mexico and the United States**.

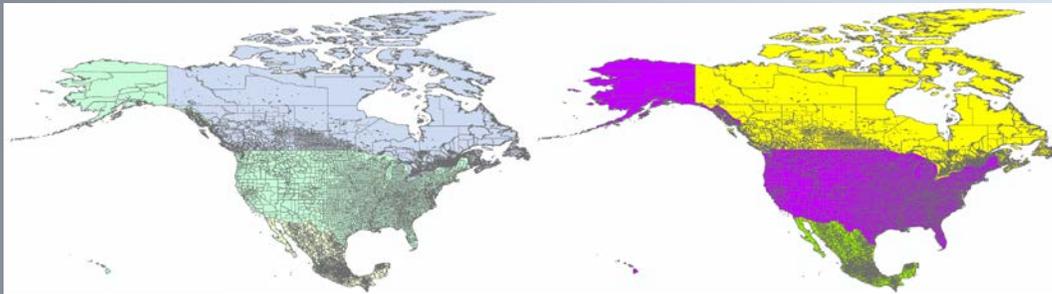




Summary Overview of the Data in three countries

➤ Examples: temporal and spatial analysis

☐ Annual flood damage at the municipal level

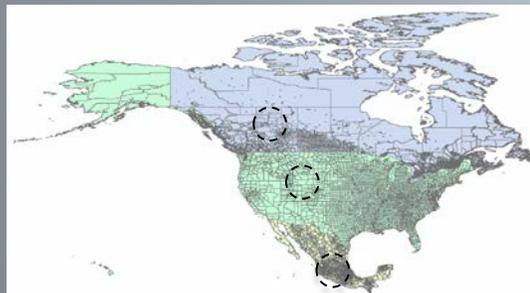


2013

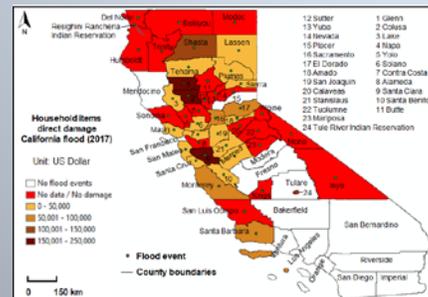
2017

☐ Case studies

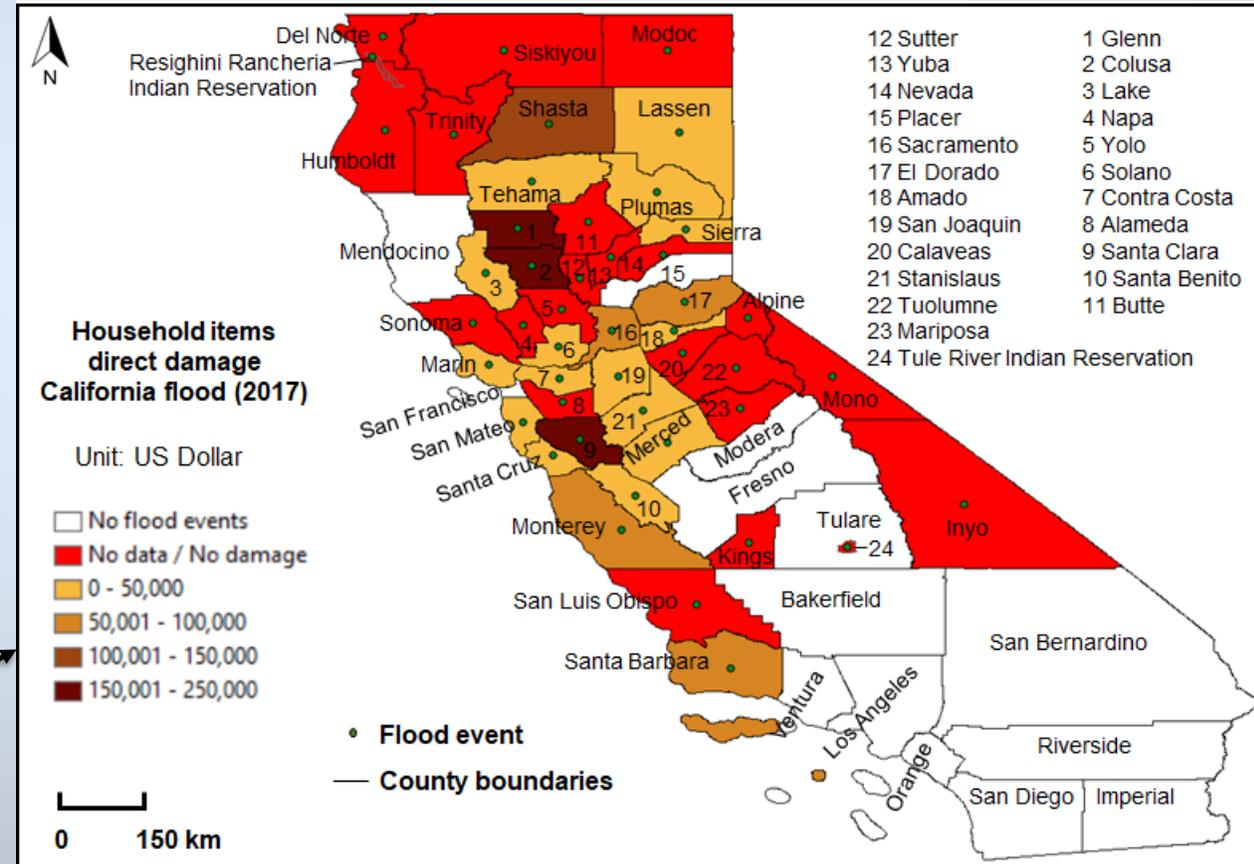
☐ Damage categories and indicators



Cascading hazards (study site)



House items direct damages caused by California flood, February 2017



Examples



Common Challenges for flood economic cost data collection

➤ **Uncertainties of using secondary datasets**

- ❑ The existing data set does not always contain measures of the CEC flood-costing categories / indicators.
- ❑ (In some cases) It is difficult to accurately link the damages and losses to the CEC flood-costing categories / indicators.
- ❑ The existing data sets require analytic techniques or the use of software that can properly incorporate these data.
- ❑ A lack of available and accessible data from other research, federal, provincial/state, or local programs.
- ❑ Missing data or no data:
 - Data do not exist - data gap;
 - We cannot access the specific data sources, but data exist;
 - It is unclear if there are additional data for flood damage that are not reflected in the current data sources;
 - Existing datasets partially fit with our indicators, but we are not sure how to weight/assign;
 - Multiple data sources exist, but we are not sure if it is double counting;
 - No damage / impacts; and
 - Other possibilities.



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- *2nd CEC Virtual Expert Workshop*

Thank you for your attention

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