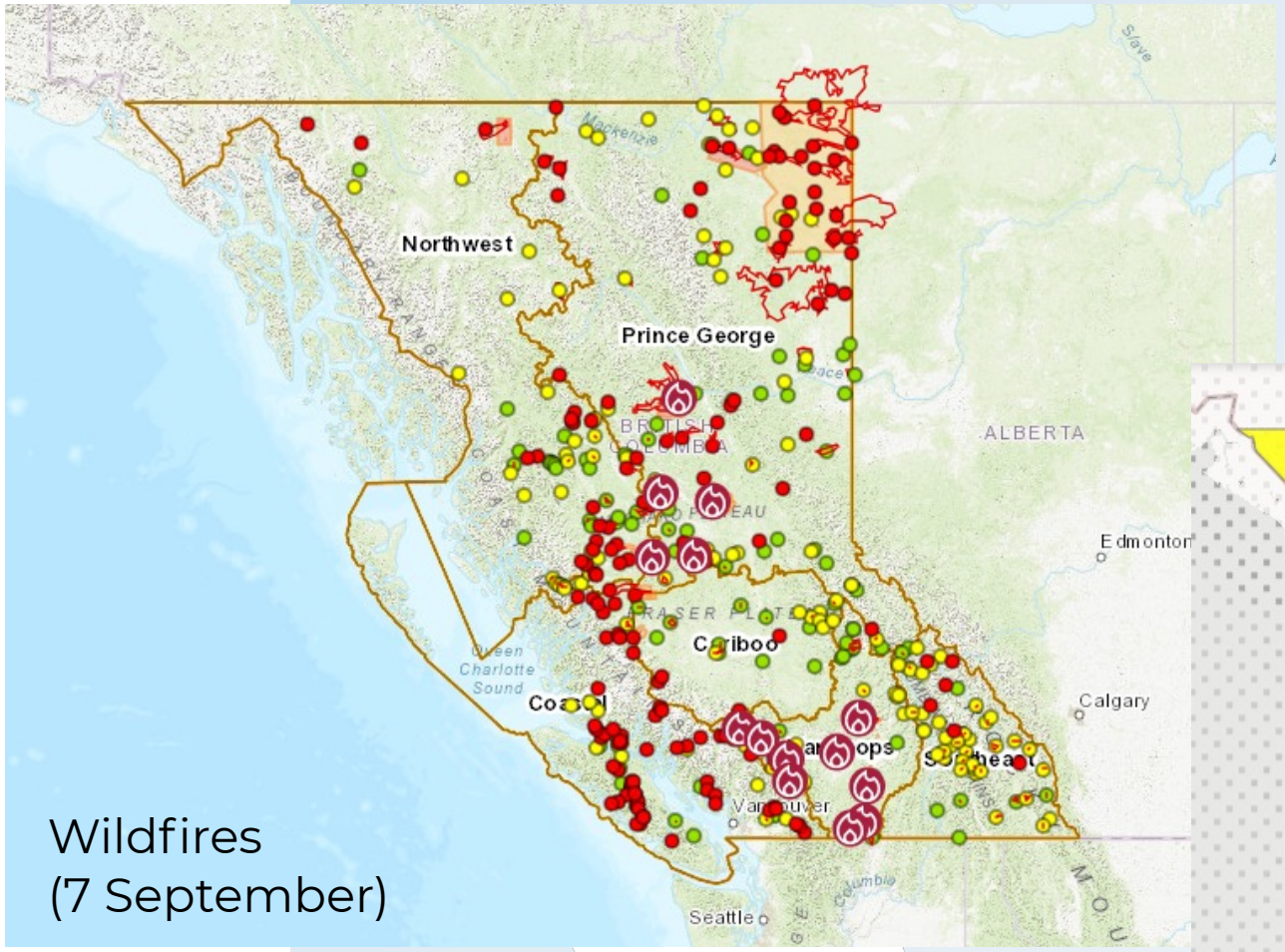
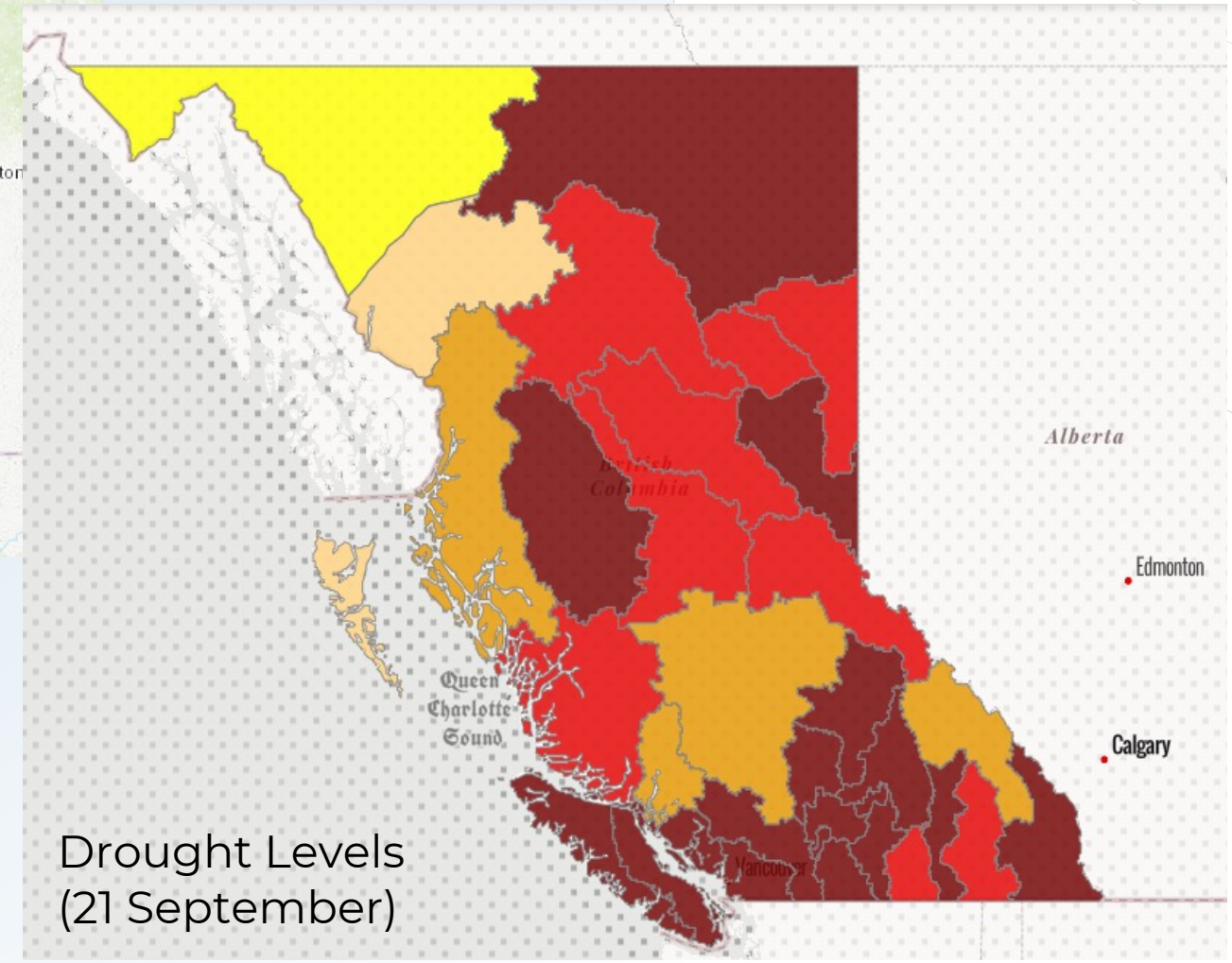
Fisheries and Oceans Canada | Pêches et Océans Canada

Evaluation of Climate Change Effects on Contamination at Multiple DFO Sites across BC

Adrienne Ducharme and Jari Eikenaar, WSP Canada



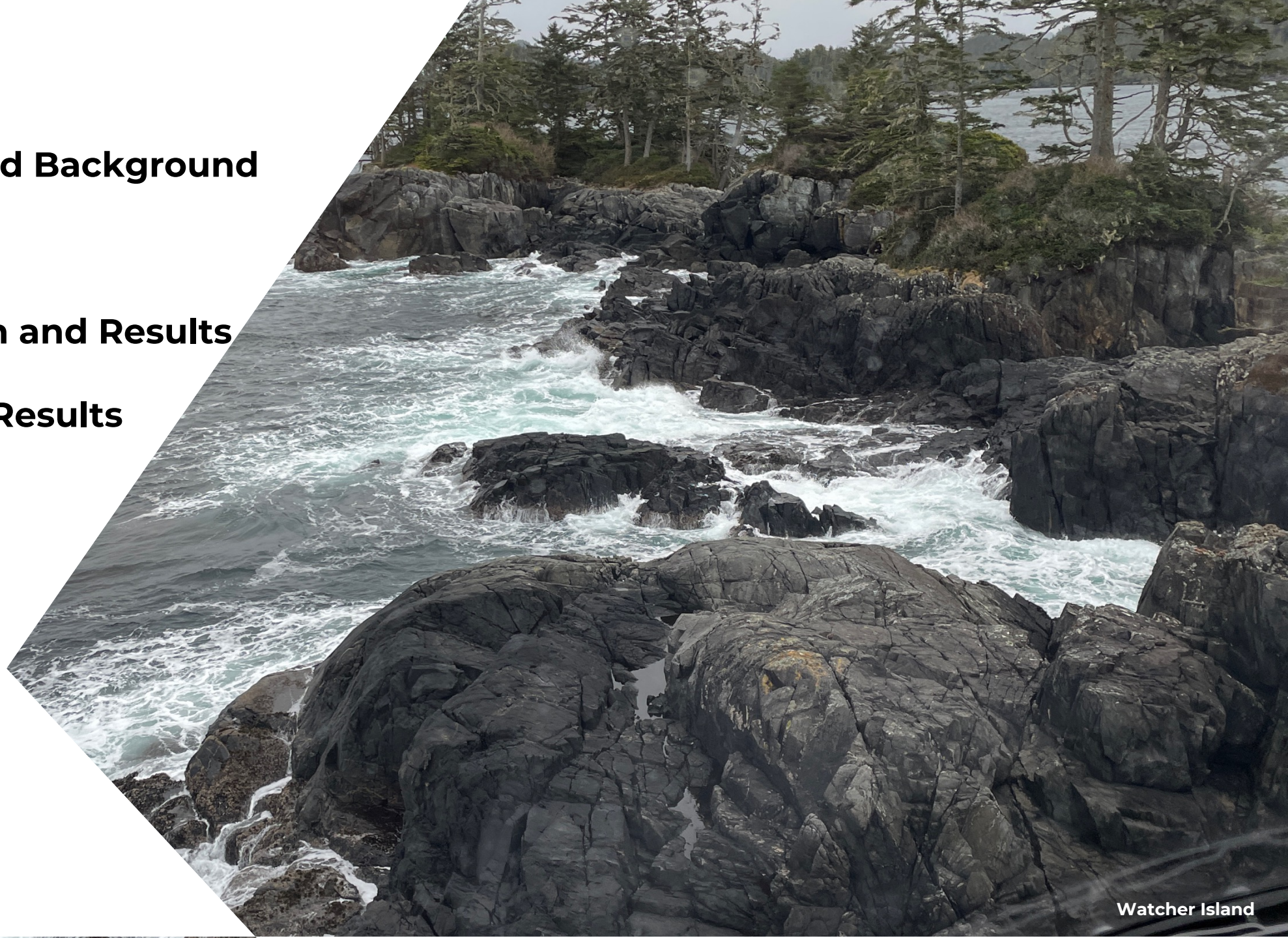
Wildfires
(7 September)



Drought Levels
(21 September)

Outline:

- Introduction and Background
- Methodology
- Study Approach and Results
- Bigger Picture Results
- Case Study
- Questions



Watcher Island

Climate Change and FCSAP

Federal Contaminated Sites Action Plan (FCSAP)

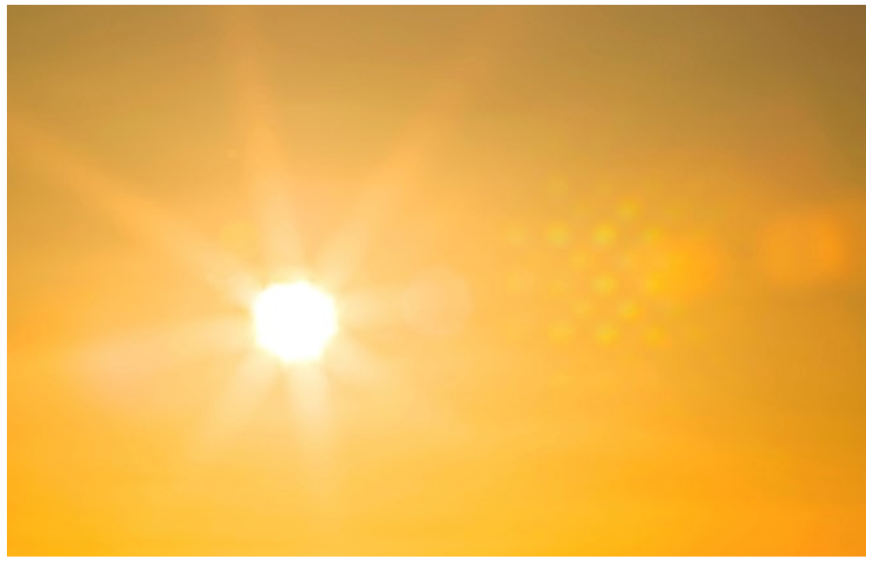
Integrating Climate Change Adaptation Considerations into Federal Contaminated Sites Management

Version 1.0

Reference No (publications.gc.ca)

Hazards and Impacts

Climate Change Hazards



Hazards and Impacts

Climate Change Impacts

DFO Sites in British Columbia

WSP was contracted by Fisheries and Oceans Canada to consider climate change for all Site Investigation and Risk Assessment projects.


Saunders Creek MSL


Squamish Terminal


Shoal Bay SCH


Hunter Point


Oona River SCH


Solander Island MSL

Remedial Options

Results of Completed Projects

Main Climate Hazards

Temperature

Precipitation

Extreme weather events

Freeze/thaw cycles and number of frost days

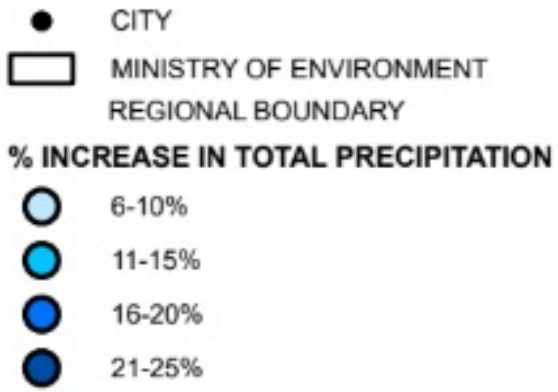
Relative sea level change

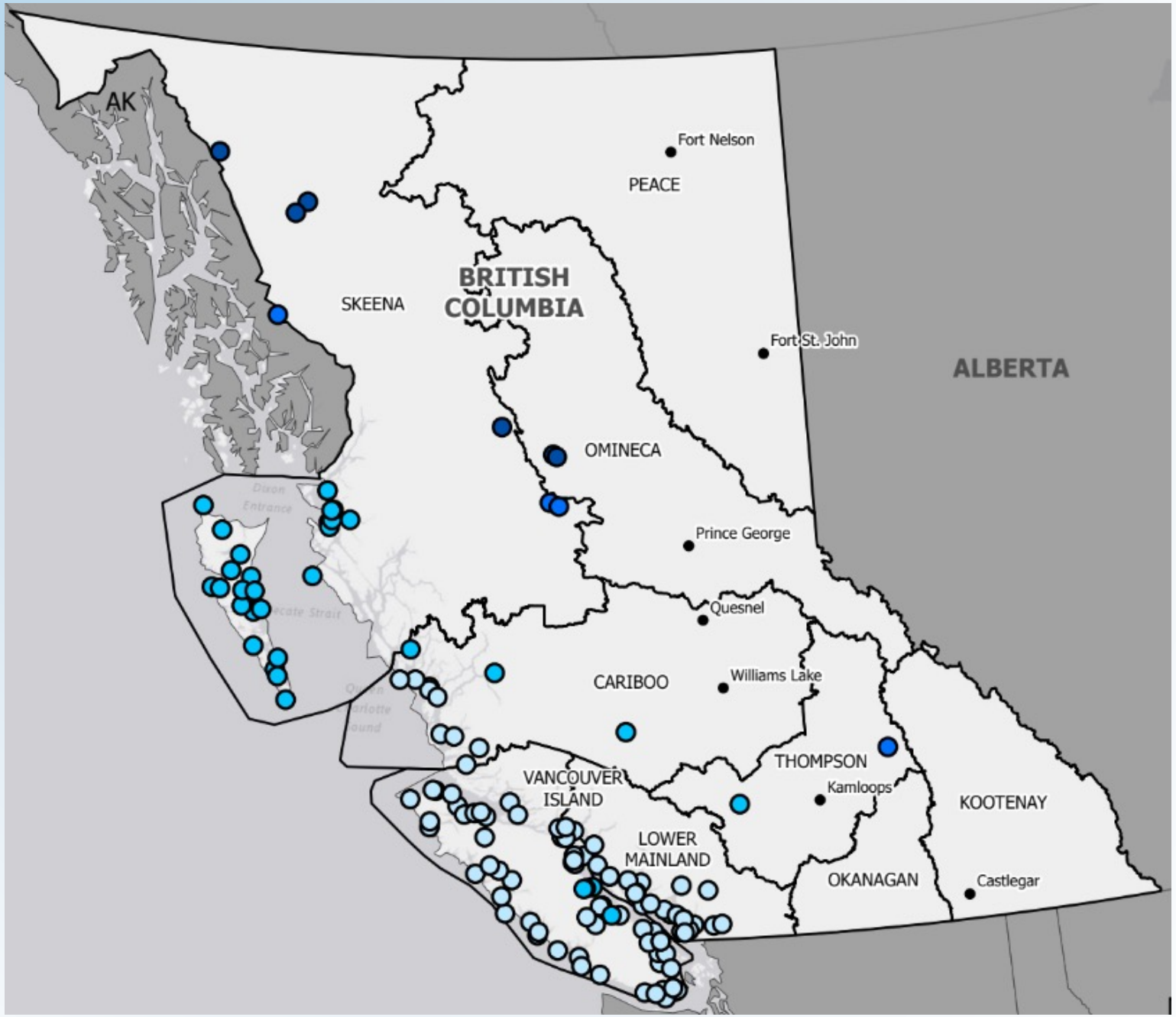
Approach

- Filtered FCSI climate change data for DFO Sites
- Site were organized by Site Type
- Percent Change or a Total Increase/Decrease was calculated
  - Compared Historical values vs. Projected values

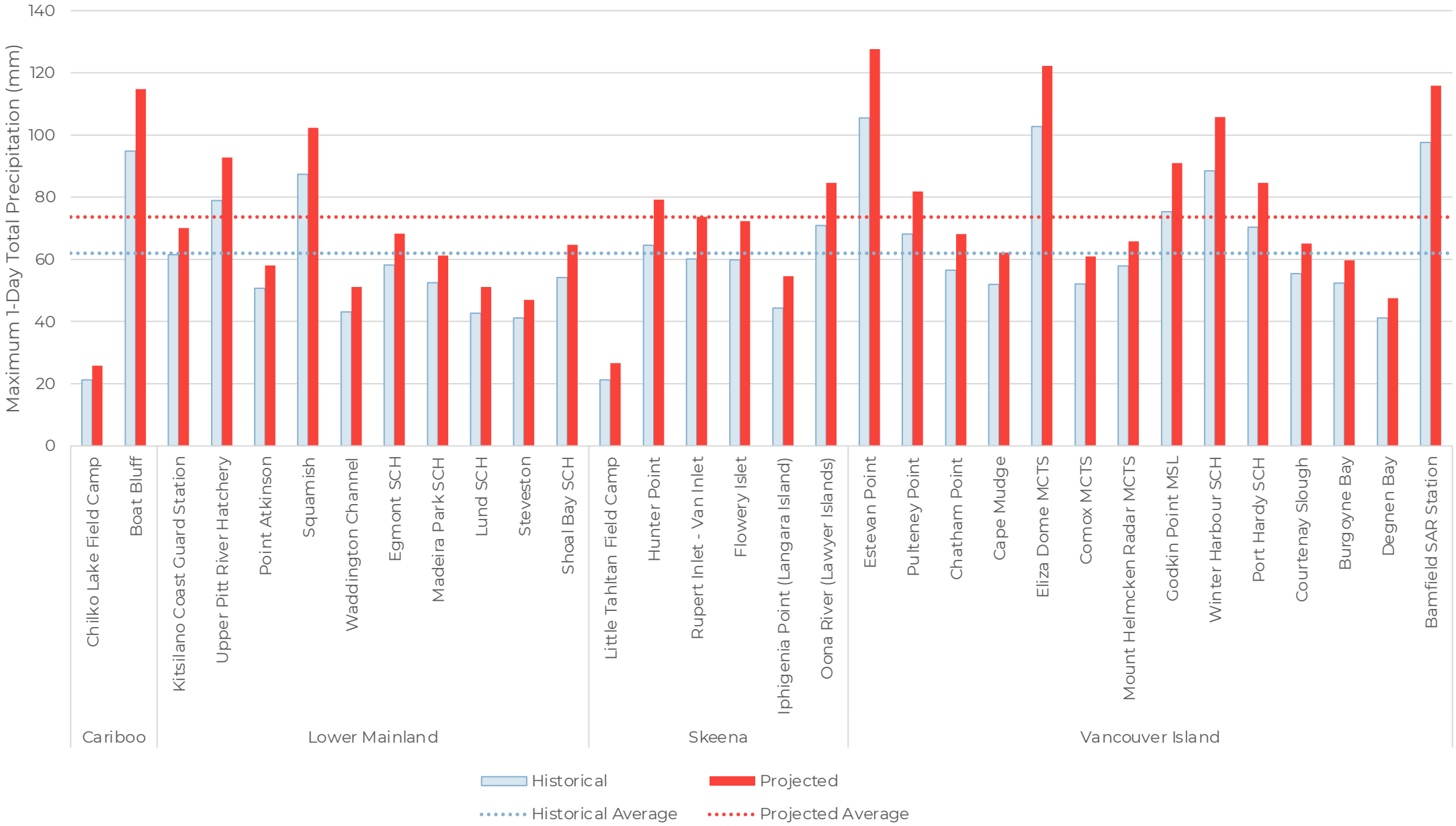
- Data based on the high emissions scenario (RCP 8.5)
- Historical data: Range from 1900-2010
- Projected data: Range from 2071-2100

Percent Increase in Total Precipitation

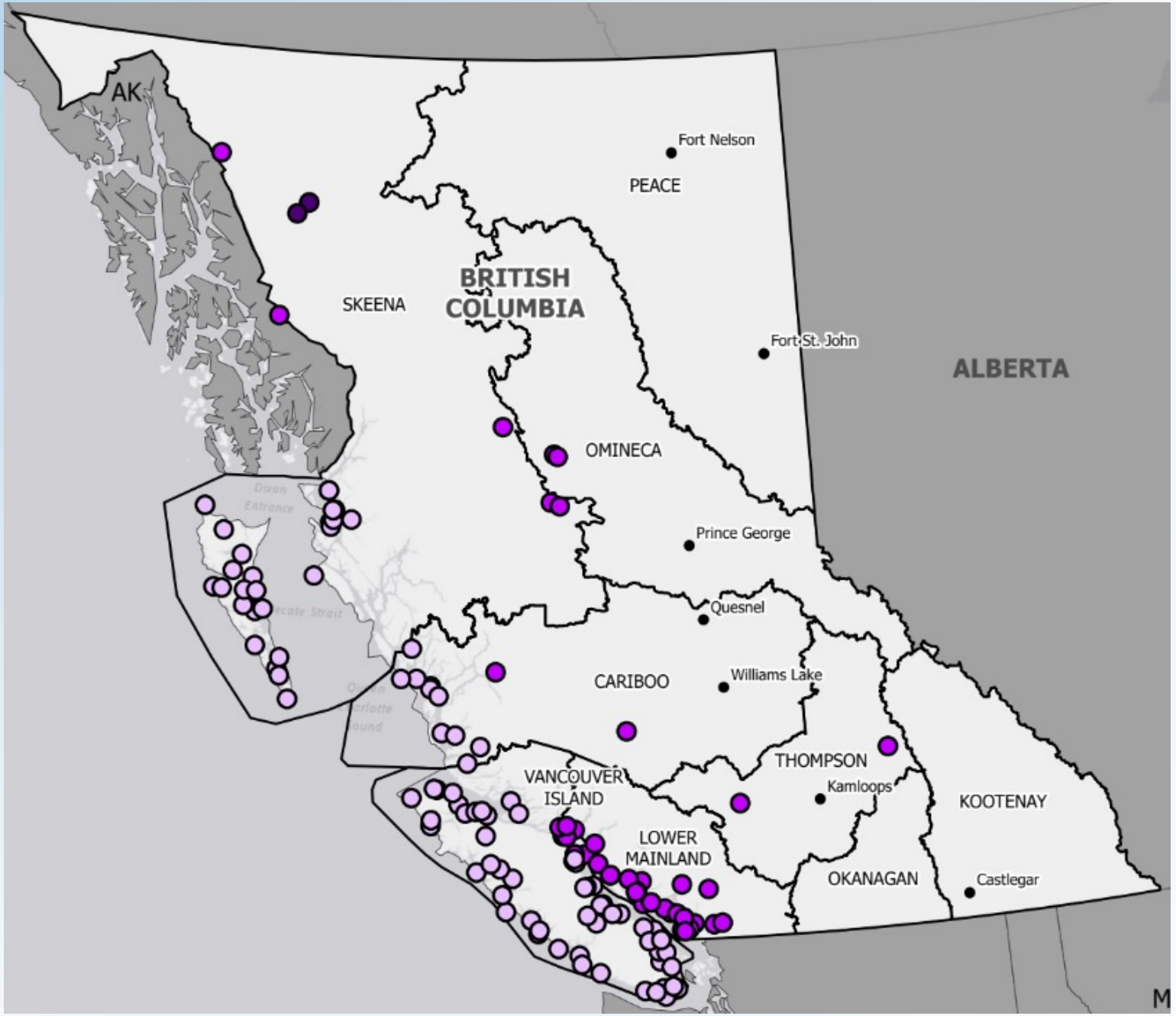




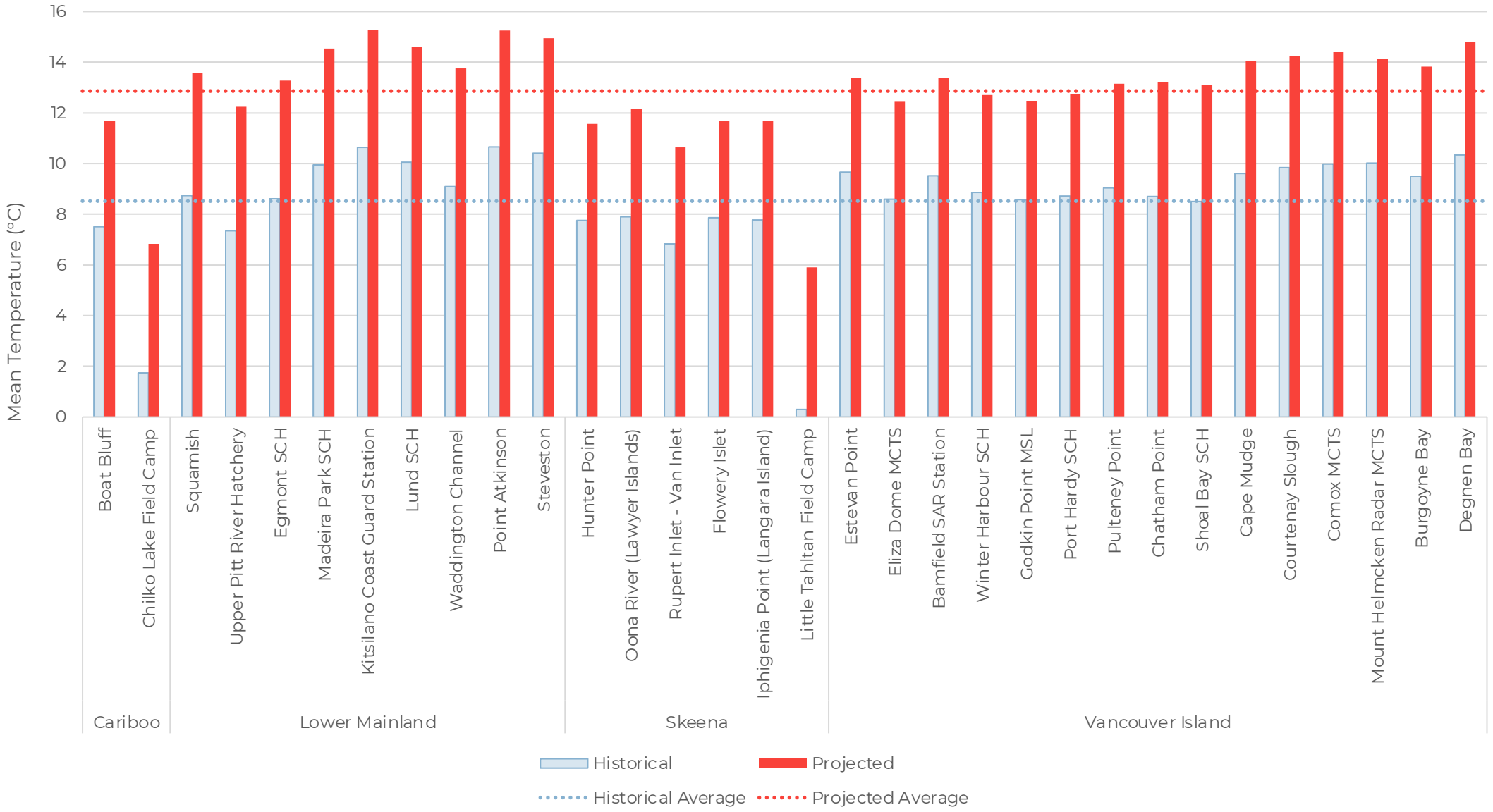
Wettest day of the year



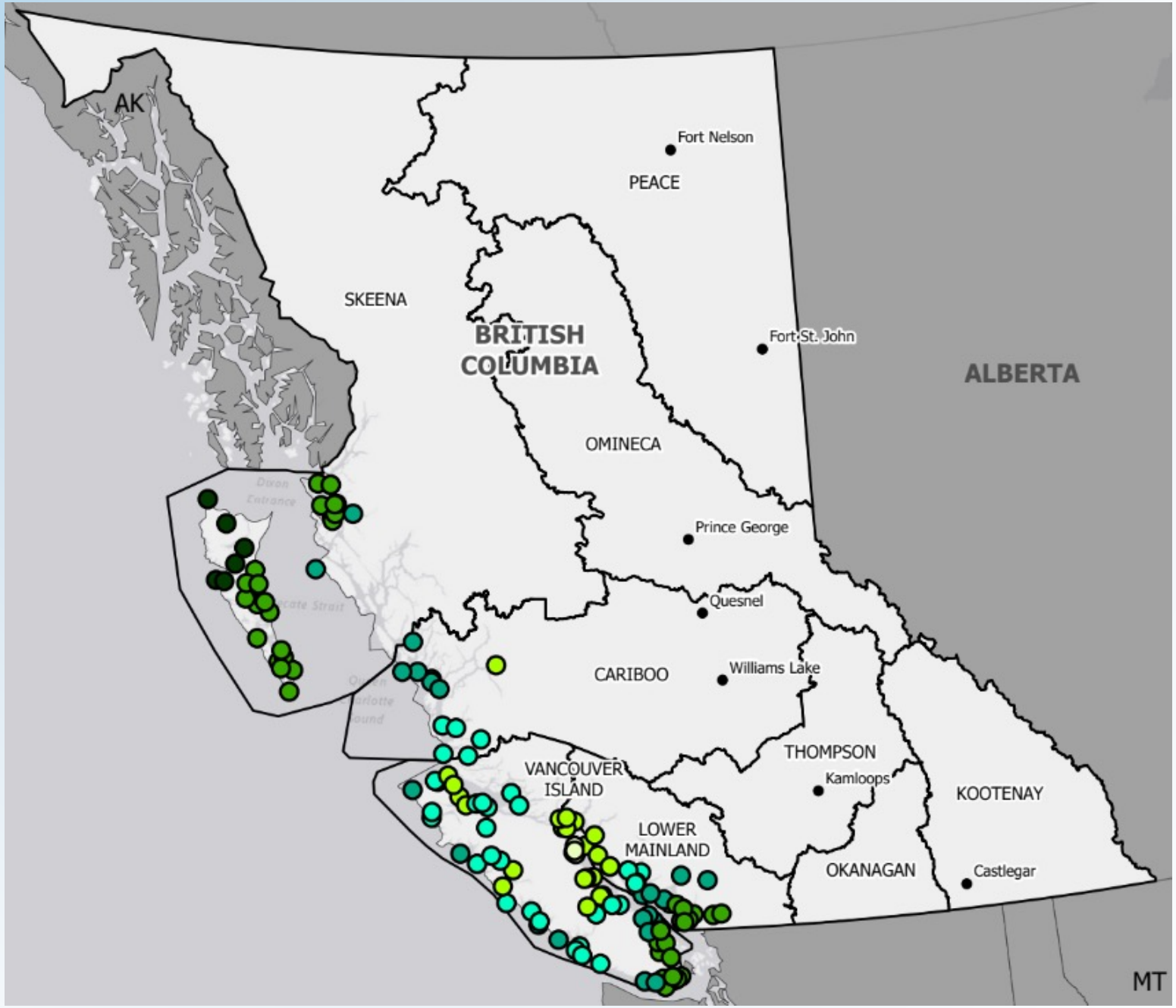
Mean Temperature Increase



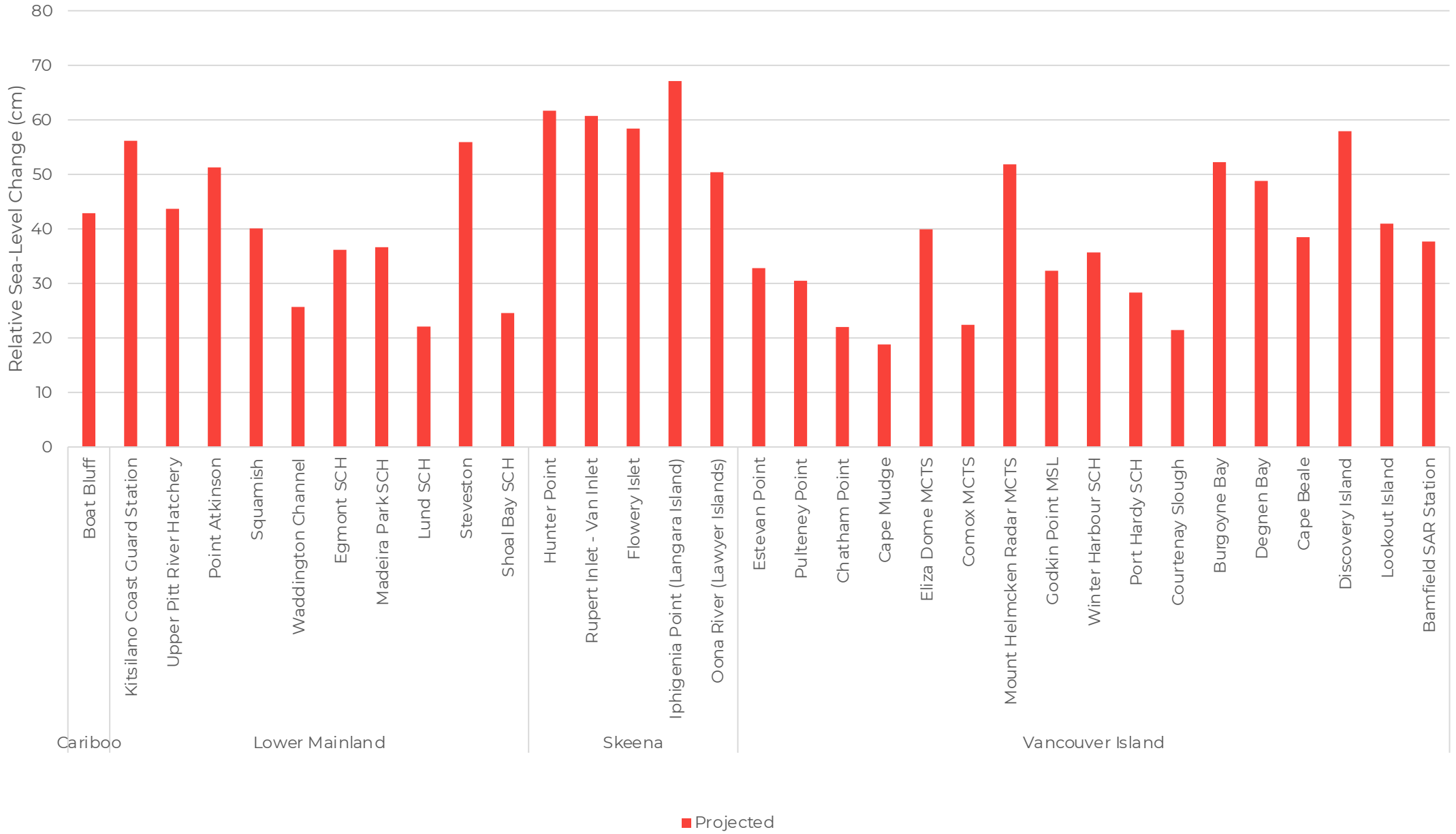
Mean Temperature Increase



Relative Sea Level Rise



Relative Sea Level Change



Climate Hazards at DFO Sites

Recent results at DFO Sites:

- Increase in precipitation
- Increase in temperature
- Relative sea level change

Consider compounding effects of climate hazards

Sloop Islet MSL

Case Study

Location:
Vancouver Island

Site Type:
Small Craft Harbour

Case Study

Media	Contaminants of Concern
Soil	Metals, Phenols
Groundwater	Metals
Sediment	Metals, PAHs, TBT
Porewater	Metals
Benthic Tissue	Metals

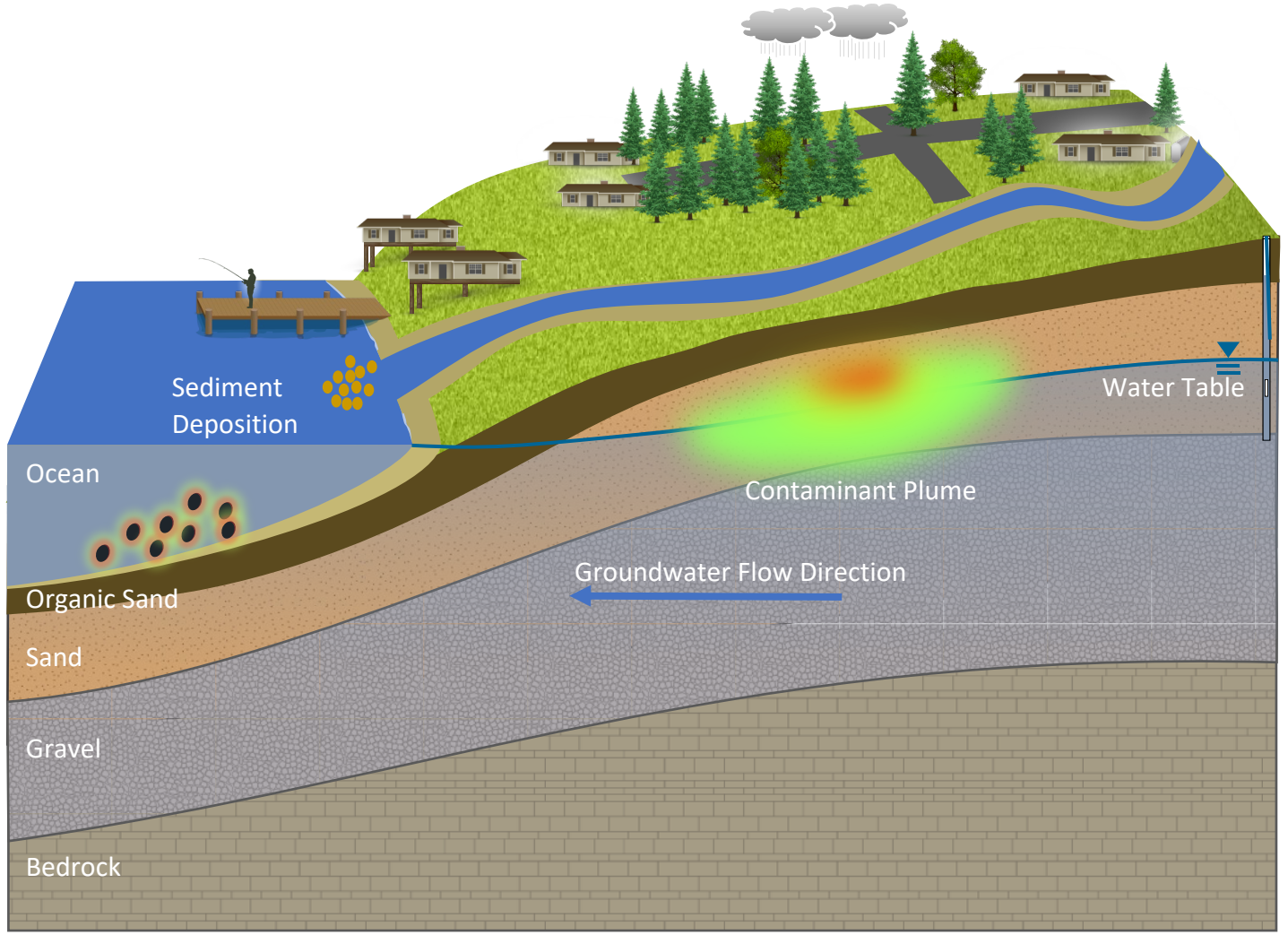
Source: Google Earth 2023

Step 1 – Identify Climate Hazards

Step 2 – Identify Effects of Climate Hazards on Contamination

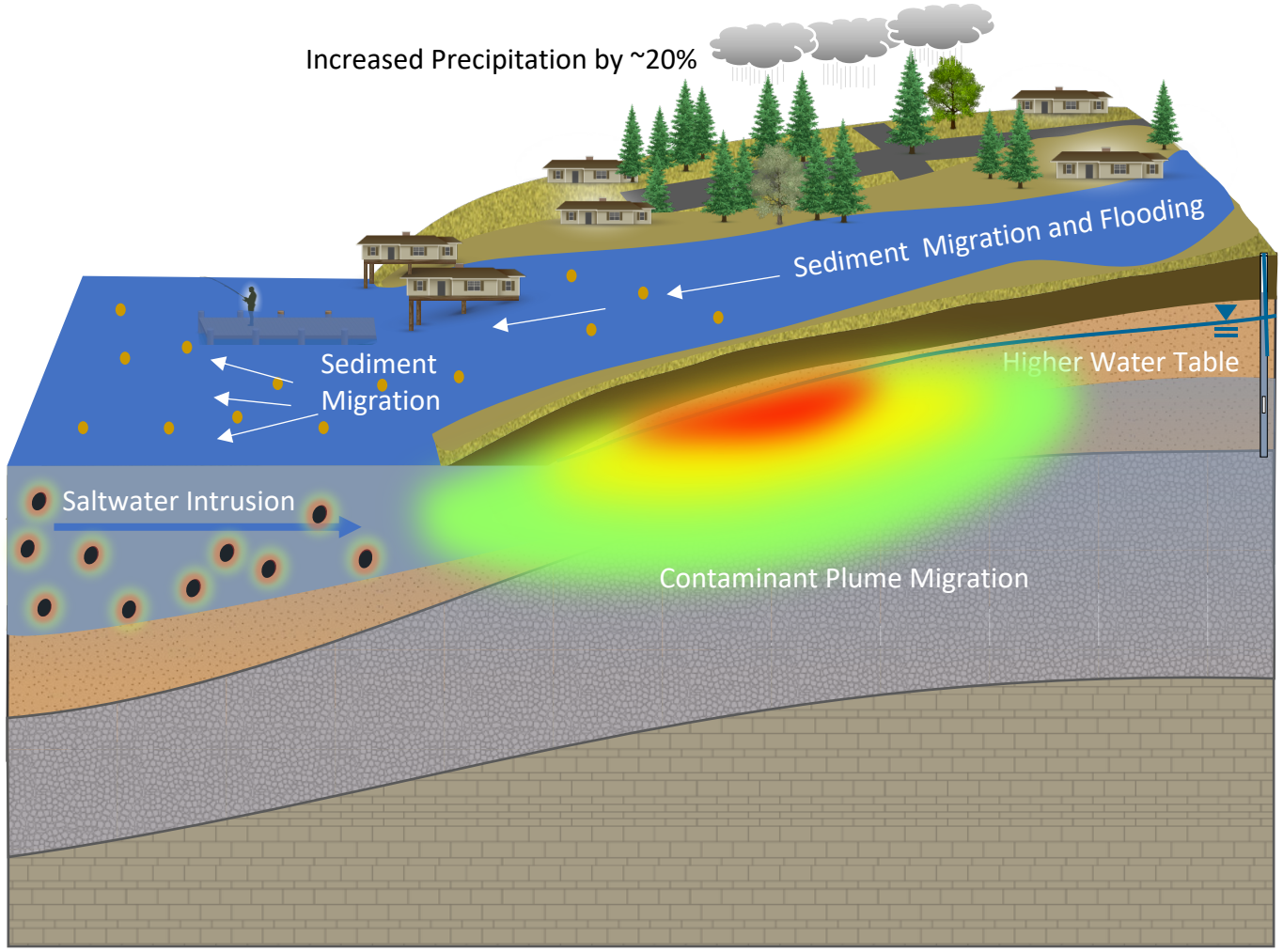
Step 3 – Develop Conceptual Site Model

Current Conditions



Step 3 – Develop Conceptual Site Model

Future Conditions:
Potential Impacts to Contamination Conditions from Climate Change




Area below water level
Source: Climate Central 2021
Image © 2023 CNES / Airbus

Step 4 – Remediation/Risk Management Options

- Four key remediation options
- Recommendations
- Remediation options should consider climate change
- Preferred option for the future based on climate change projections

Conclusions

- There is guidance available for incorporating climate change into project
- Climate hazards and impacts
- Conceptual Site Models
- Considerations when developing assessment and remediation strategies

Questions


Graham Reach – Inside Passage
Fisheries and Oceans Canada
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