

**SURREY COASTAL FLOOD ADAPTATION STRATEGY (CFAS)**

# **PRIMER PART I: COASTAL FLOODING IN SURREY**

**CFAS**

**CITY OF  
SURREY**

# PROJECT OVERVIEW



**SURREY IS PREPARING FOR CLIMATE CHANGE AND SEA LEVEL RISE WITH THE DEVELOPMENT OF A COASTAL FLOOD ADAPTATION STRATEGY (CFAS). TO BE DEVELOPED OVER THREE YEARS, THE FINAL STRATEGY WILL IDENTIFY THE CURRENT AND POTENTIAL IMPACTS OF CLIMATE CHANGE-DRIVEN SEA LEVEL RISE ON SURREY'S COASTLINE, AND THE LONG-TERM ADAPTATION OPTIONS AVAILABLE TO ADDRESS THE IMPACTS AND ADAPT TO THE CHANGES CLIMATE CHANGE WILL BRING IN THE FUTURE.**

**M**aking up about 20% of Surrey's entire land area, the coastal floodplain is a large low-lying area that stretches from Boundary Bay and Mud Bay along the Nicomekl and Serpentine Rivers towards Cloverdale and Newton. The area also includes the Campbell River/Semiahmoo Bay area near White Rock and Semiahmoo First Nation. It is home to historic and important neighbourhoods, farms and businesses, critical infrastructure and transportation corridors, and internationally recognized bird and wildlife habitat.

## CFAS TIMELINE

The CFAS project is broken into five general phases that will be completed over the next three years. This Primer is part of Phase 1, but will be used in future phases. It is intended to help build awareness of sea level rise and Surrey's coastal flooding challenge, and to help residents and others stakeholders actively engage in the CFAS project.



▲ Coastal floodplain and study area

### PHASE 1: summer 2016 - spring 2017

**WHAT MATTERS MOST AND WHO IS AFFECTED?**  
Education, awareness building, and community values

### PHASE 2: spring 2017 - summer 2017

**WHAT CAN WE DO?**  
Exploring adaptation options

### PHASE 3: summer

**WHAT IS DEVELOPING?**  
Developing



### Communities and People

- Many residential areas and neighbourhoods, including Crescent Beach, Panorama/Gray Creek, Cloverdale, Inter-River Area, Colebrook, Mud Bay, Nico-Wynd/Crescent Road
- Semiahmoo First Nation
- 1,500+ residents
- Approximately 20% of Surrey's land area

### Local and Regional Economy

- Over 30km<sup>2</sup> of agricultural land in production
- 700+ jobs
- Over \$100 million in annual farm gate revenue
- Over \$1 billion in assessed property value
- Almost \$25 billion annual truck and rail freight traffic

### Parks and Environment

- Regional and City parks, beaches and recreation areas, including Surrey's only public ocean beach
- Significant natural areas with very high biodiversity values, including foreshore, riparian and coastal areas
- Internationally important migratory bird habitat

### Infrastructure

- Over 10km of Provincial Highways
- Over 200,000 vehicle trips a day
- Over 30km of railway (freight and passenger)
- Regional sewer and water lines
- Major power transmission lines
- Natural gas pipelines

2017 - fall 2017

PHASE 4: fall 2017 - spring 2018

PHASE 5: spring 2018

ACCEPTABLE?  
adaptation strategies

HOW WILL WE DO IT?  
Detailing preferred strategies

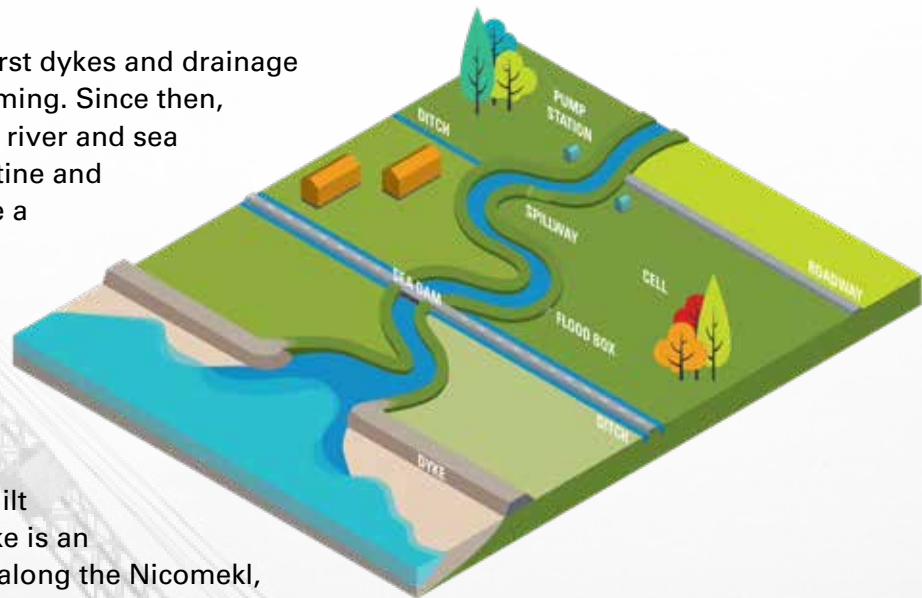
REPORTING BACK  
Final reporting

# SURREY'S COASTAL FLOODPLAIN

AS A NATURAL FLOODPLAIN, THE AREA HAS REGULARLY EXPERIENCED SOME COASTAL FLOODING OVER THE YEARS FROM HIGH TIDES AND STORM SURGES, AND RIVER FLOODS WHICH ARE TYPICALLY CAUSED BY RAIN STORMS AND RAPID SNOW MELT. RIVER FLOODING CAN ALSO BE INFLUENCED BY HIGH TIDES AND STORM SURGES.

## WHAT'S KEEPING US DRY TODAY?

European settlement in the 1890's saw the first dykes and drainage ditches being created to reclaim land for farming. Since then, Surrey has developed a complex network of river and sea dykes along the coast and along the Serpentine and Nicomekl Rivers. Working with the dykes are a system of drainage ditches, spillways and pumps that help move water from behind dykes.



## DYKES

A sea dyke is a long wall or embankment built to prevent flooding from the sea. A river dyke is an embankment built to prevent river flooding along the Nicomekl, and Serpentine Rivers. Most of Surrey's floodplain, both coastal and inland sections, are protected by dykes. Many dykes in Surrey are also popular walking trails and bicycle routes.

- ▶ *Background image: Construction of dyke at Mud Bay, c.1890. Photo courtesy Surrey Archives and Museum.*
- ▼ *Below: Dyke and recreation path at Mud Bay Park today.*



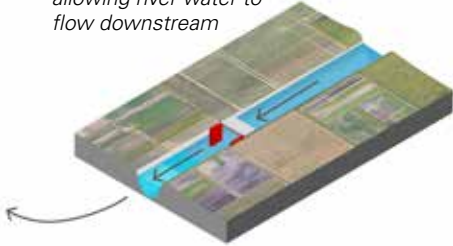
### Wondering why we spell dyke with a 'y'?

In 1912, early settlers to the Municipality of Surrey formed the Surrey Dyking District, using the preferred spelling at that time. While dike is now the preferred spelling, in recognition of the extensive work done to improve drainage by all the dyking districts over the past 100-years, Surrey continues to spell dyke in Old English, when referring to flood control works. In the USA, the term levee is generally used as an alternative to dyke.

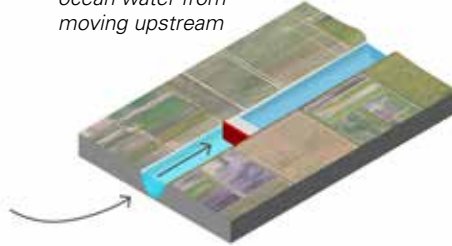
## SEA DAMS

Sea dams are constructed along tidal rivers, like the Nicomekl and Serpentine Rivers, to keep salty ocean water from moving upstream where it could have detrimental effects on agricultural irrigation. Sea dams are tidally influenced and gravity-fed, with the incoming tide pushing their gates closed (B) and the river pushing them open once the tide moves out (A). The Nicomekl and Serpentine sea dams were first built in 1912 and 1913.

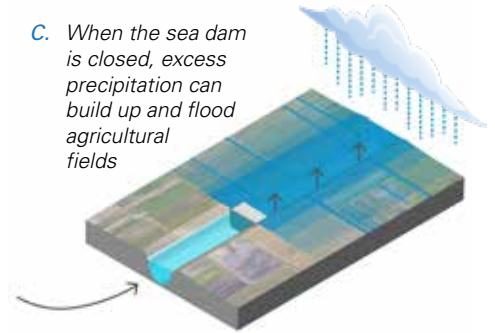
A. The gravity-fed sea dam opens as tides recede, allowing river water to flow downstream



B. The sea dam closes as tides rise, preventing ocean water from moving upstream



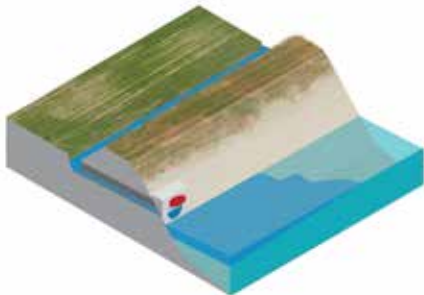
C. When the sea dam is closed, excess precipitation can build up and flood agricultural fields



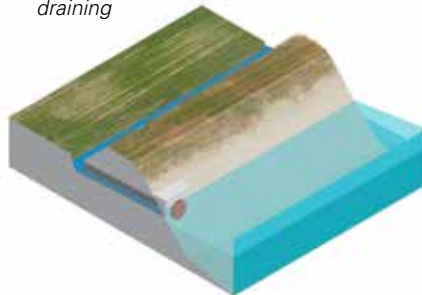
## DITCHES, FLOODBOXES AND PUMPS

Surface water flows into drainage ditches which then direct water through floodboxes located along the river. During low tides and when the river water is low enough, the water drains into the river by gravity-fed flap gates (A). When river levels are higher the flood boxes are submerged and their gates are closed (B). During high tides or when sea dams are closed, electrically powered pumps, like the Maple Pump Station in Crescent Beach, are used to help push the water into the rivers.

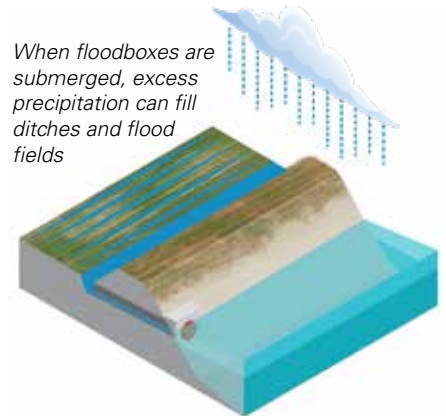
A. When river levels are low, ditches drain through floodboxes



B. When river levels are high, submerged floodboxes prevent ditches from draining



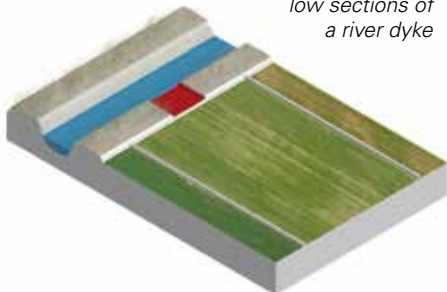
C. When floodboxes are submerged, excess precipitation can fill ditches and flood fields



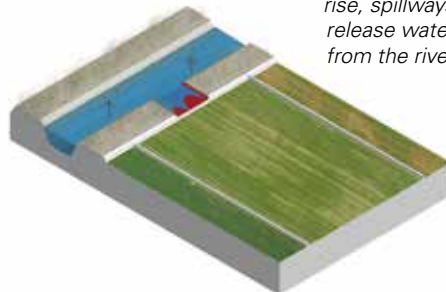
## SPILLWAYS

A spillway is a low section of a river dyke (A) where, during floods, water can spill over into a holding area called a cell (B&C). These cells are located on agricultural fields and typically only used in winter months when the fields are fallow. Once the flood event has ended and river level returns to normal, water stored in the cells will drain back into the river through floodboxes or with the assistance of pumps.

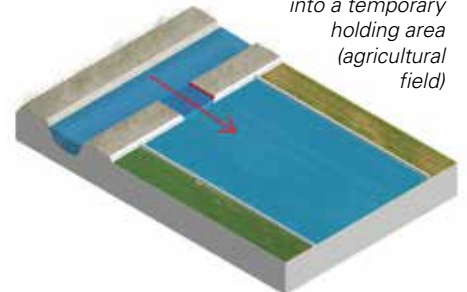
A. Spillways are low sections of a river dyke



B. As water levels rise, spillways release water from the river



C. The water spills over into a temporary holding area (agricultural field)



**THE CHANGING CLIMATE MEANS THAT THE HISTORIC CONTROLS THAT HAVE BEEN PUT IN PLACE WILL LIKELY NOT PERFORM WELL IN THE FUTURE WITH RISING SEA LEVELS, MORE FREQUENT STORM SURGES, AND INCREASED PRECIPITATION. WITH SEA LEVEL RISE, THE DURATION THAT RIVERS CAN FREELY DRAIN WILL BE SHORTER.**

# CLIMATE CHANGE, CLIMATE HAZARDS, AND COASTAL FLOODING

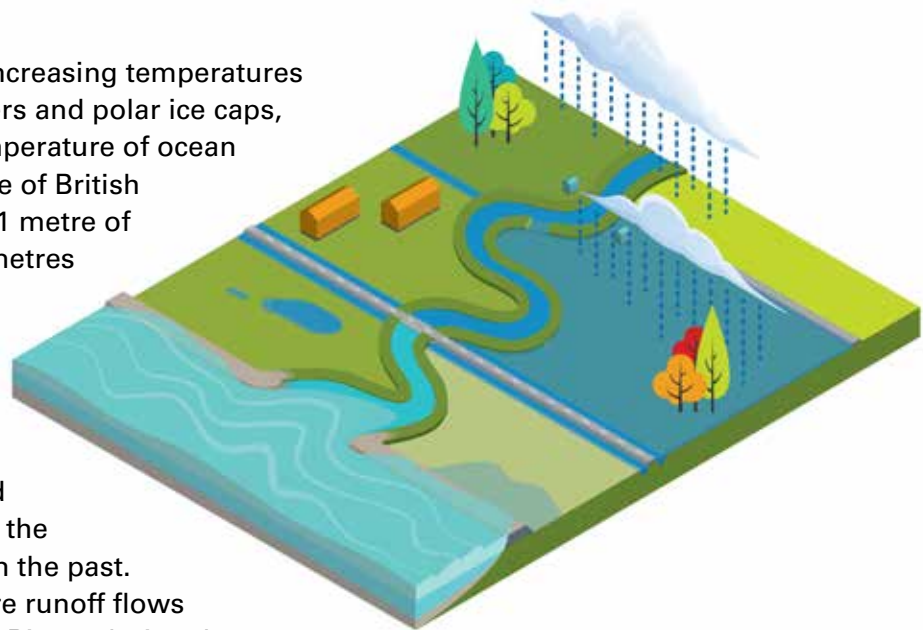
AS WITH MANY COASTAL FLOODPLAINS AROUND THE WORLD, THE TWO PRINCIPAL CAUSES OF INCREASED FLOODING IN SURREY'S COASTAL FLOODPLAIN ARE SEA LEVEL RISE AND INCREASED MAGNITUDE AND INTENSITY OF RAIN. THE EFFECTS OF SEA LEVEL RISE ARE GREATER THAN THOSE OF RAINFALL IN SURREY'S COASTAL FLOODPLAIN.

## SEA LEVEL RISE

Global sea level is rising. This is a result of increasing temperatures throughout the world that are melting glaciers and polar ice caps, and that are also increasing the average temperature of ocean waters causing them to expand. The Province of British Columbia advises municipalities to plan for 1 metre of sea level rise over the next 80 years, and 2 metres by 2200.

## INCREASED RAINFALL

With the changing climate, we can expect more extreme weather conditions. For example, in Surrey, winters are expected to have fewer wet days, but on the wet days the rainfall amounts will be much greater than in the past. This will result in increased flooding, as more runoff flows into the Nicomekl, Serpentine and Campbell Rivers during these storm events. The frequency and intensity of storm events with heavy precipitation are also expected to increase.



Projected impacts for Surrey's coastal area include higher sea levels, increased frequency and intensity of storms and storm surges (when water is pushed ashore by wind and waves), more erosion of the coastline, impacts on infrastructure, loss of beaches and coastal ecosystems, soil salinization, and groundwater pooling.

## FLOOD HAZARD IMPACTS



### OCEAN FLOOD HAZARDS

**TODAY** ..... **FUTURE**

- *High tides*
- *Storm surges*

- *High tides*
- *Storm surges*
- *Sea level rise*

### IMPACTS

- *Breach or overtopping of dykes*
  - *Temporary inundation*
  - *Coastal erosion*
  - *Potential injuries or loss of life*
  - *Damage to residential, commercial & other development*
  - *Infrastructure & transportation damage & disruption*
  - *Business disruptions*
  - *Agricultural losses (livestock, crops)*
  - *Habitat loss & impacts (with associated impacts to species)*
  - *Cultural & social losses*
  - *Longer duration of sea dam closures, which creates more water backing river, reduced fish passage, and water quality problems*
- *Long-term inundation*
  - *Salination*
  - *Coastal squeeze*
  - *Same as TODAY but more frequent and more severe consequences*



### RIVER FLOOD HAZARDS

**TODAY** ..... **FUTURE**

- *Long duration and intense rainfall or rain-on-snow event*

- *Increased and more intense rainfall and runoff*
- *Reduced sea dam capacity due to sea level rise*

### IMPACTS

- *Activation of spillways and inundation of floodplain*
  - *Sea dams inadequate for drainage*
  - *Potential injuries*
  - *Damage to residential and commercial development*
  - *Business/transportation disruptions*
  - *Some agricultural losses*
  - *Some cultural and social losses*
- *Frequent activation of spillways and longer-term inundation of fields*
  - *Floodboxes closed for longer periods (combined with higher runoff and longer dam closures)*
  - *Limited land-use potential*
  - *Frequent or permanent transportation disruptions*
  - *Same as TODAY but more frequent and more severe consequences*

# COASTAL AND RIVER FLOODING

1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990

## Major Coastal and River Flood Events

### A Changing Shoreline

In 1890, dyking of Mud Bay begins. Shortly afterwards, dyking and damming of the Serpentine and Nicomekl Rivers begins. By 1953, a timber sea wall at Crescent Beach is constructed.

Since then, residents of Surrey's Coastal Floodplain have relied on a system of dykes and sea dams to protect themselves from ocean and river flooding.

Sea Level Rise



0 2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100 2100



**1  
Metre**

100 cm  
80 cm  
60 cm  
40 cm  
20 cm  
0 cm

**TODAY**

### An Evolving Future

As our climate continues to change and sea levels continue to rise over the coming years, it is anticipated that the frequency and intensity of major coastal and river floods will also increase.

The Province has directed municipalities to plan for at least 1m sea level rise by 2100. In Surrey, and elsewhere in the Lower Mainland, most drainage systems are not designed for projected changes.

# AGRICULTURE AND FARMING

AGRICULTURE AND FARMING SECTOR PLAYS A SIGNIFICANT ROLE IN SURREY'S ECONOMY. WITH OVER 1/3 OF SURREY'S LAND BASE IN THE PROVINCIAL AGRICULTURAL LAND RESERVE (A PROVINCIAL ZONE IN WHICH AGRICULTURE IS RECOGNIZED AS THE PRIORITY USE), THE SECTOR GENERATES ABOUT A QUARTER OF TOTAL GROSS ANNUAL FARM RECEIPTS IN METRO VANCOUVER, OR ABOUT \$170 MILLION IN 2010. THE SECTOR ALSO EMPLOYS HUNDREDS, INCLUDING FARM FAMILIES AND SEASONAL WORKERS. THE PROJECT STUDY AREA IS A LARGE AND IMPORTANT PART OF SURREY'S AGRICULTURAL SECTOR.

## FACTS

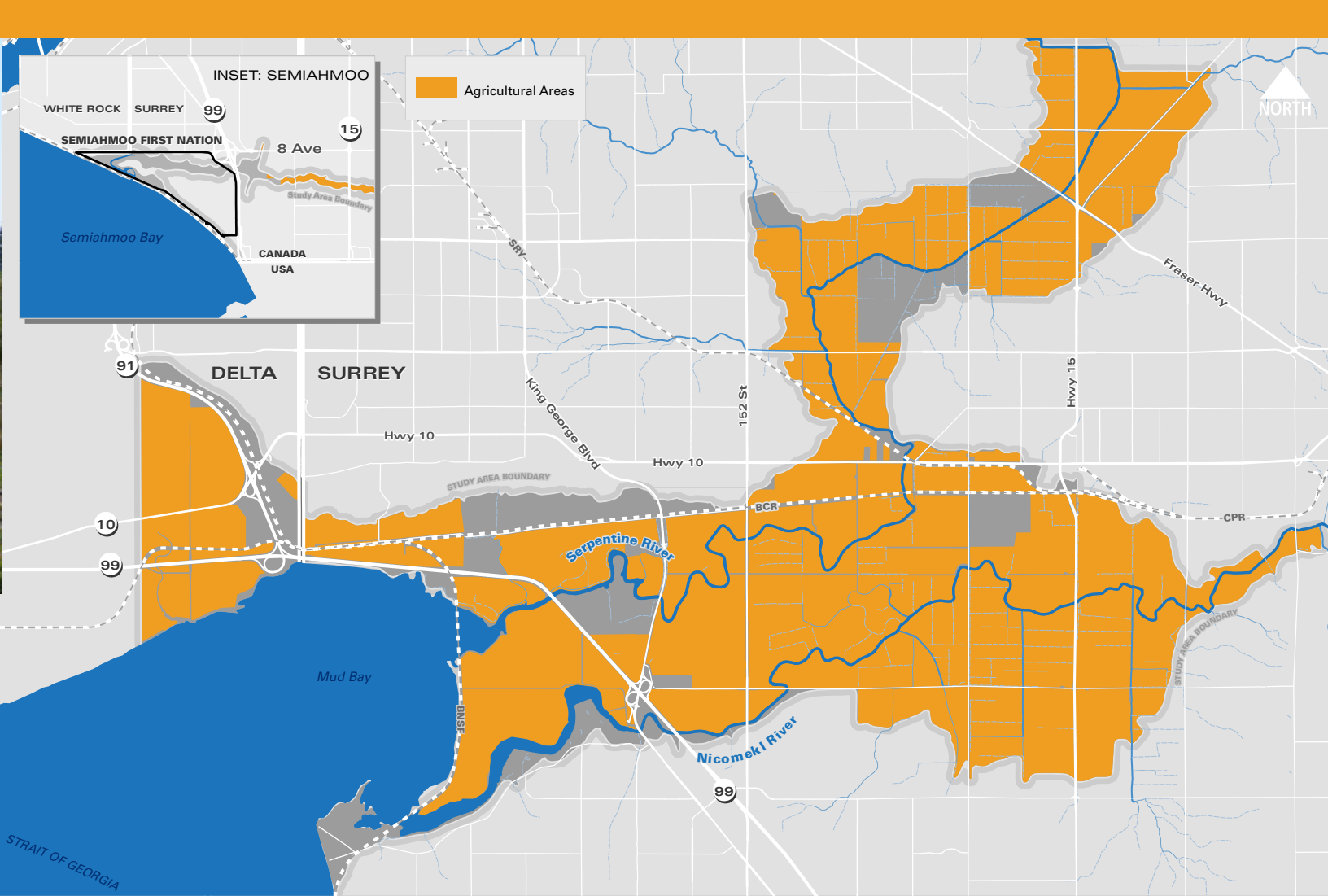
- *Over 30km<sup>2</sup> of Agriculture Land in production*
- *Over \$100 million in annual farm gate revenue (or about 60% of Surrey's total farm gate revenue)*
- *Diversified crops and production – dairy, berries, field crops, mushrooms*

◀ *Background image: Farmer rescuing pumpkins floating in a flooded field, c.1955. Photo courtesy Surrey Archives and Museum.*



## CLIMATE CHANGE IMPACTS

- *Increased flooding (from higher, climate change-driven precipitation and river levels)*
- *Poor and reduced field drainage (pumps and drainage system impeded by increased flooding)*
- *Increased risk to coastal areas from coastal flooding (seawater inundation leaves residues of salts, such as sodium, on the soil – high concentrations of which can damage soil structure for years)*
- *Increased precipitation, storm frequency and intensity can delay or impact field crop planting, growing season, and harvesting*



# COMMUNITY AND RESIDENTIAL

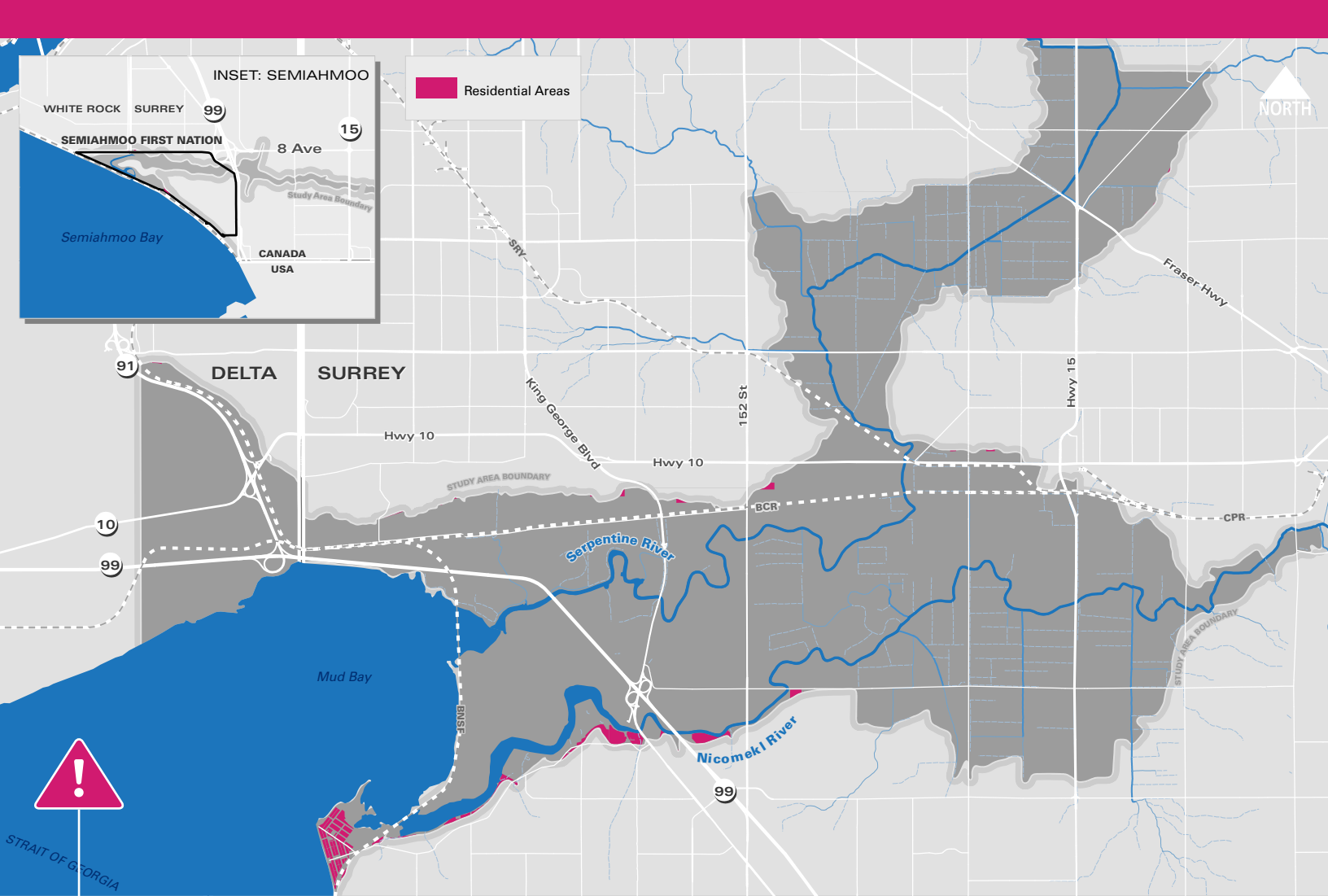
WHILE THE STUDY AREA IS LARGELY AGRICULTURAL, IT IS STILL HOME TO SEVERAL SMALLER RESIDENTIAL DEVELOPMENTS AND THE LARGER, HISTORIC COMMUNITY OF CRESCENT BEACH. BEGINNING AS COTTAGE COMMUNITY, CRESCENT BEACH IS ONE OF SURREY'S BEST KNOWN AND BEST LOVED NEIGHBOURHOODS. HOME TO ABOUT 1,200 PEOPLE AND 400 HOMES, THE COMMUNITY IS ALSO HOME TO SEVERAL COMMERCIAL BUSINESSES AND RESTAURANTS, ALEXANDRA NEIGHBOURHOOD HOUSE AND THE CRESCENT BEACH SWIM CLUB.

THE CAMPBELL RIVER AREA IS HOME TO SEMIAHMOO FIRST NATION, WHOSE MAIN RESERVE IS ON THE MOUTH OF THE RIVER.

## FACTS

- *About 1,500 residents in total in study area.*
- *Semiahmoo First Nation is home to about 50 members*
- *Alexandra Neighbourhood House started out as a camp for orphaned children from Vancouver in 1916 and has since grown into a diversified community service agency.*
- *There are three strata developments in the study area - Nico Wynd, SouthPort, and Anderson Walk – which together include about 250 residences*
- *Surrey developed a comprehensive stormwater management strategy for Crescent Beach to help prepare the community for increased flooding behind its protective dykes*

◀ *Background image: Alexandra Orphanage Camp, c.1926. Photo courtesy Surrey Archives and Museum.*



## CLIMATE CHANGE IMPACTS

- Catastrophic flooding will become frequent (without future improvements)
- Surface ponding and so-called nuisance flooding may become near permanent over time in Crescent Beach
- Increased chance of road closures and lengthy detours from flooding and overtopping during storm surges
- Property damage – residential and commercial
- Business interruptions



# ENVIRONMENTAL AND RECREATION

THE CFAS PROJECT AREA IS HOME TO SEVERAL POPULAR SURREY AND METRO VANCOUVER PARKS THAT INCLUDE SEVERAL KILOMETRES OF SHORELINE TRAILS WITH INCREDIBLE VIEWS OF BOUNDARY BAY. DIVERSE WILDLIFE HABITATS, INCLUDING EELGRASS MEADOWS, MUD FLATS, SALT MARSH AND OLD FIELDS, MAKE IT ONE OF THE BEST WILDLIFE VIEWING AREAS IN SURREY. IT IS ALSO HOME TO PROVINCIAL AND FEDERALLY PROTECTED WILDLIFE AREAS AND THE SPECIES AT RISK THAT LIVE THERE (SEE BELOW). THOUSANDS OF MIGRATORY BIRDS USE MUD BAY AND THE LARGER AREA AS A REST STOP AS THEY TRAVEL ALONG THE PACIFIC FLYWAY, WHICH IS A 'HIGHWAY IN THE SKY' STRETCHING FROM ALASKA AND THE CANADIAN ARCTIC TO CENTRAL AND SOUTH AMERICA.

## FACTS

- Almost 100,000 visitors a year walk, jog, wheel and bike the trails at Mud Bay Park and along Colebrook Dyke trail
- Internationally recognized wildlife area - Migratory Bird Sanctuary (federal), National Wildlife Area (federal), Provincial Wildlife Management Area, Ramsar Site (Wetland of International Significance), Western Hemisphere Shorebird Reserve Network

- Several Red Listed and Blue Listed species at risk, including birds, animals, fish and plants



**AT RISK!**  
Rough-legged Hawk



Red-tailed Hawk



Anise Swallowtail



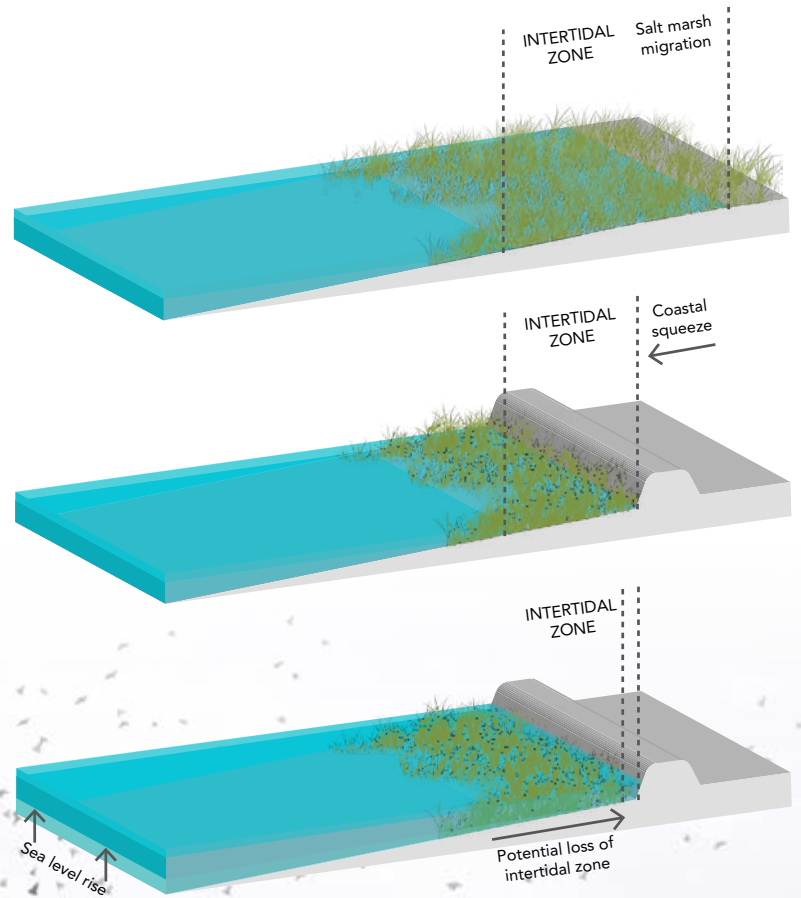
Coho Salmon



## COASTAL SQUEEZE

Coastal habitats are being trapped and “squeezed” between dykes and rising sea levels, reducing the amount of the important foreshore and coastal habitat over time.

- Thousands of migratory birds use Mud Bay as a rest stop as they travel along the Pacific Flyway, which is a ‘highway in the sky’ stretching from Alaska and the Canadian Arctic to Central and South America



**AT RISK!**  
Great Blue Heron



Littleneck Clam



Western Sandpiper



INSET: SEMIAHMOO

WHITE ROCK SURREY 99

SEMIAHMOO FIRST NATION

8 Ave

15

Study Area Boundary

Semiahmoo Bay

CANADA  
USA

Parks, Open Space and Natural Areas

Trails

91

DELTA

SURREY

Hwy 10

King George Blvd

10

99

STUDY AREA BOUNDARY

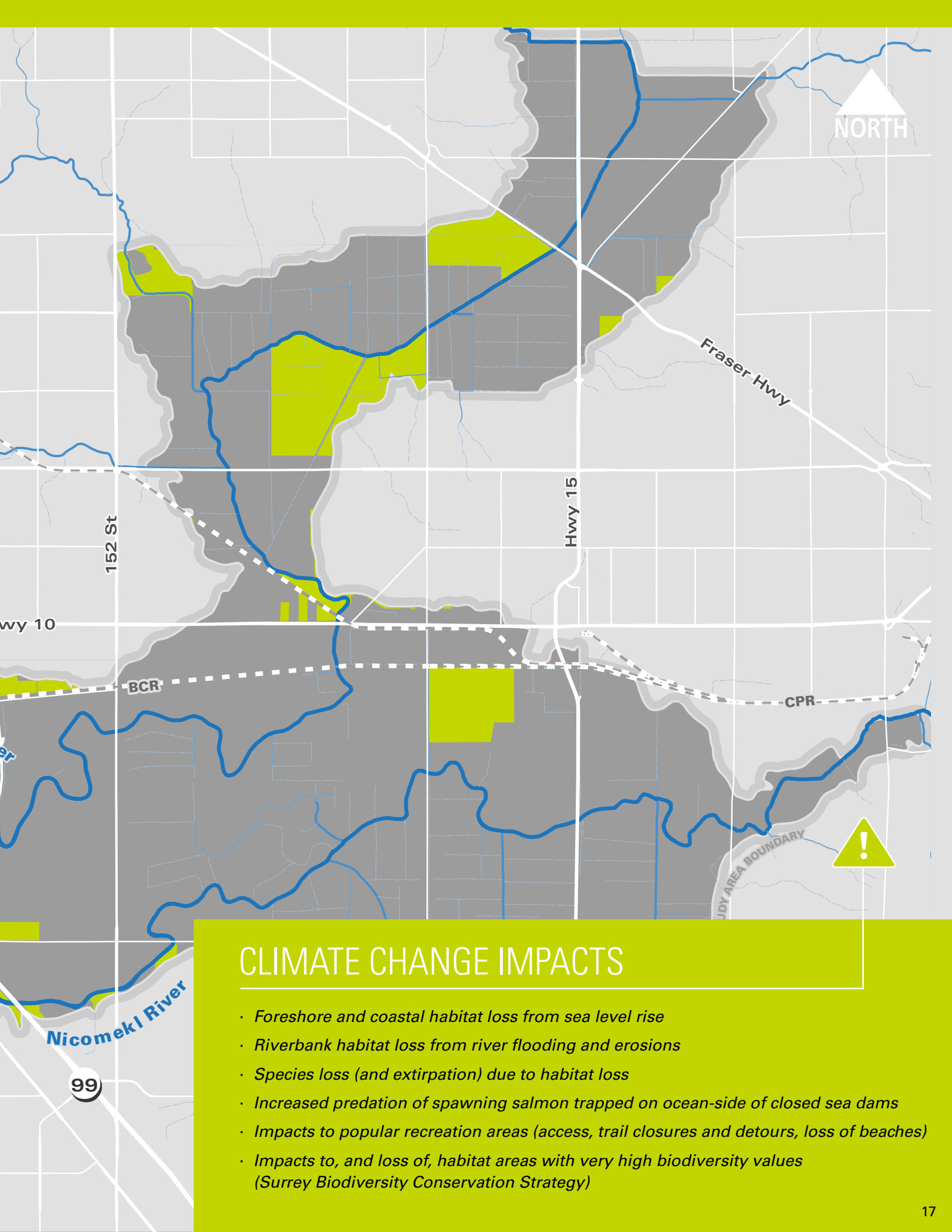
Serpentine River

Mud Bay

BNSF

STRAIT OF GEORGIA





## CLIMATE CHANGE IMPACTS

- *Foreshore and coastal habitat loss from sea level rise*
- *Riverbank habitat loss from river flooding and erosions*
- *Species loss (and extirpation) due to habitat loss*
- *Increased predation of spawning salmon trapped on ocean-side of closed sea dams*
- *Impacts to popular recreation areas (access, trail closures and detours, loss of beaches)*
- *Impacts to, and loss of, habitat areas with very high biodiversity values (Surrey Biodiversity Conservation Strategy)*

# TRANSPORTATION AND INFRASTRUCTURE

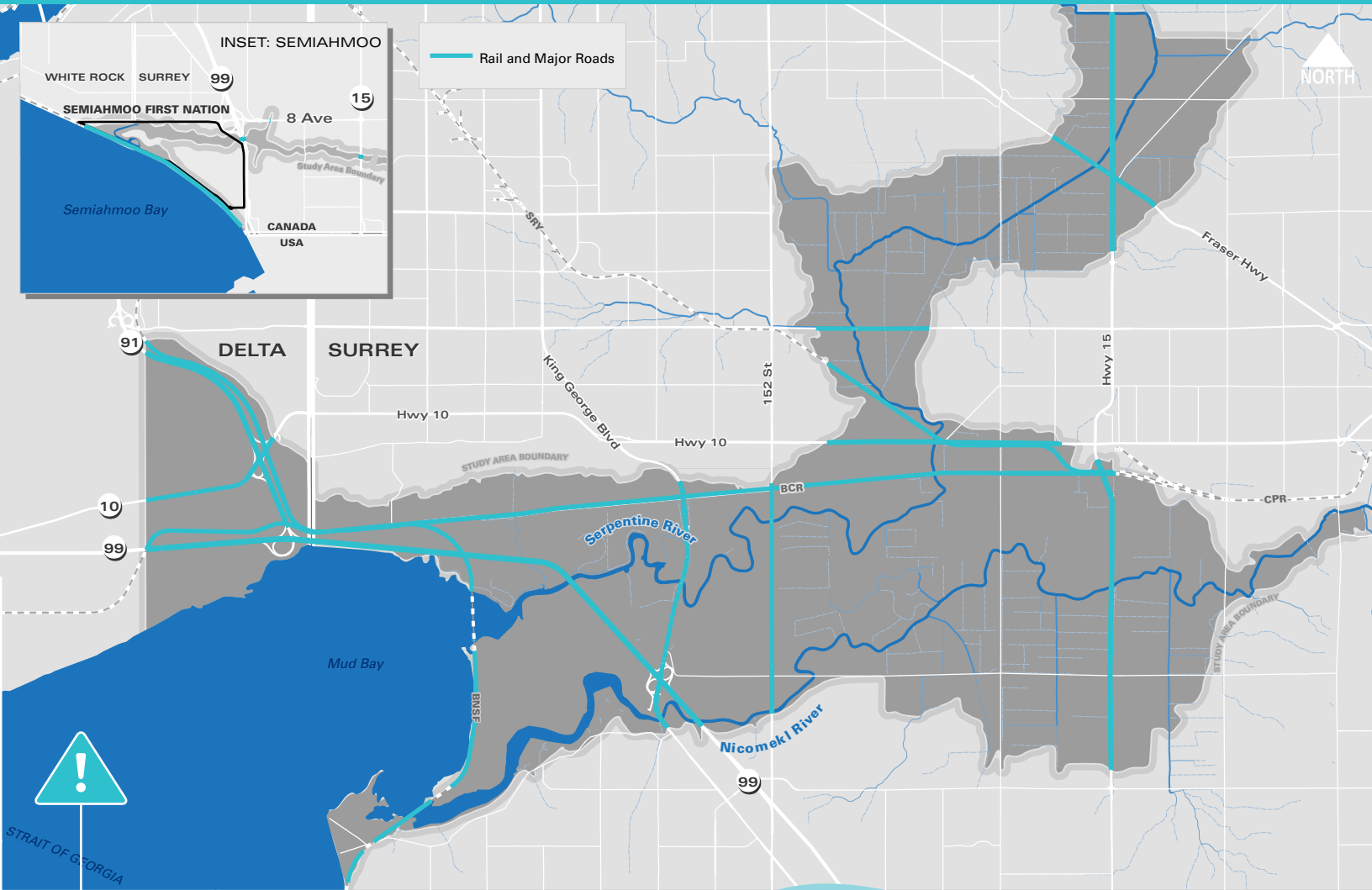
**MAJOR INFRASTRUCTURE, INCLUDING RAIL LINES, HIGHWAYS AND UTILITY CORRIDORS, ALL PASS THROUGH THE CFAS PROJECT AREA. IN ADDITION TO EXISTING INFRASTRUCTURE, THE CITY OF SURREY IS CURRENTLY IN THE MIDDLE OF A \$25 MILLION COMPREHENSIVE STORMWATER MANAGEMENT STRATEGY FOR CRESCENT BEACH TO HELP PROTECT AND PREPARE THE COMMUNITY FOR INCREASED COASTAL FLOODING AND CLIMATE CHANGE WHICH INCLUDES A NEW PUMP STATION (MAPLE PUMP STATION), NEW STORM SEWERS, AND A PLAN TO RAISE KEY ROADS ~0.3M METRES AS A FIRST STEP IN A LONG-TERM ROAD RAISING STRATEGY.**

Surrey has also embarked upon a \$15 million project with support from the Province to upgrade and raise about 8 kilometres of dyke along Colebrook Road from King George Boulevard to Delta and along Mud Bay. The area is considered one of the Surrey's most vulnerable areas for flooding because of its sinking soils, low-level dykes, wind and wave exposure and king tides.

## FACTS

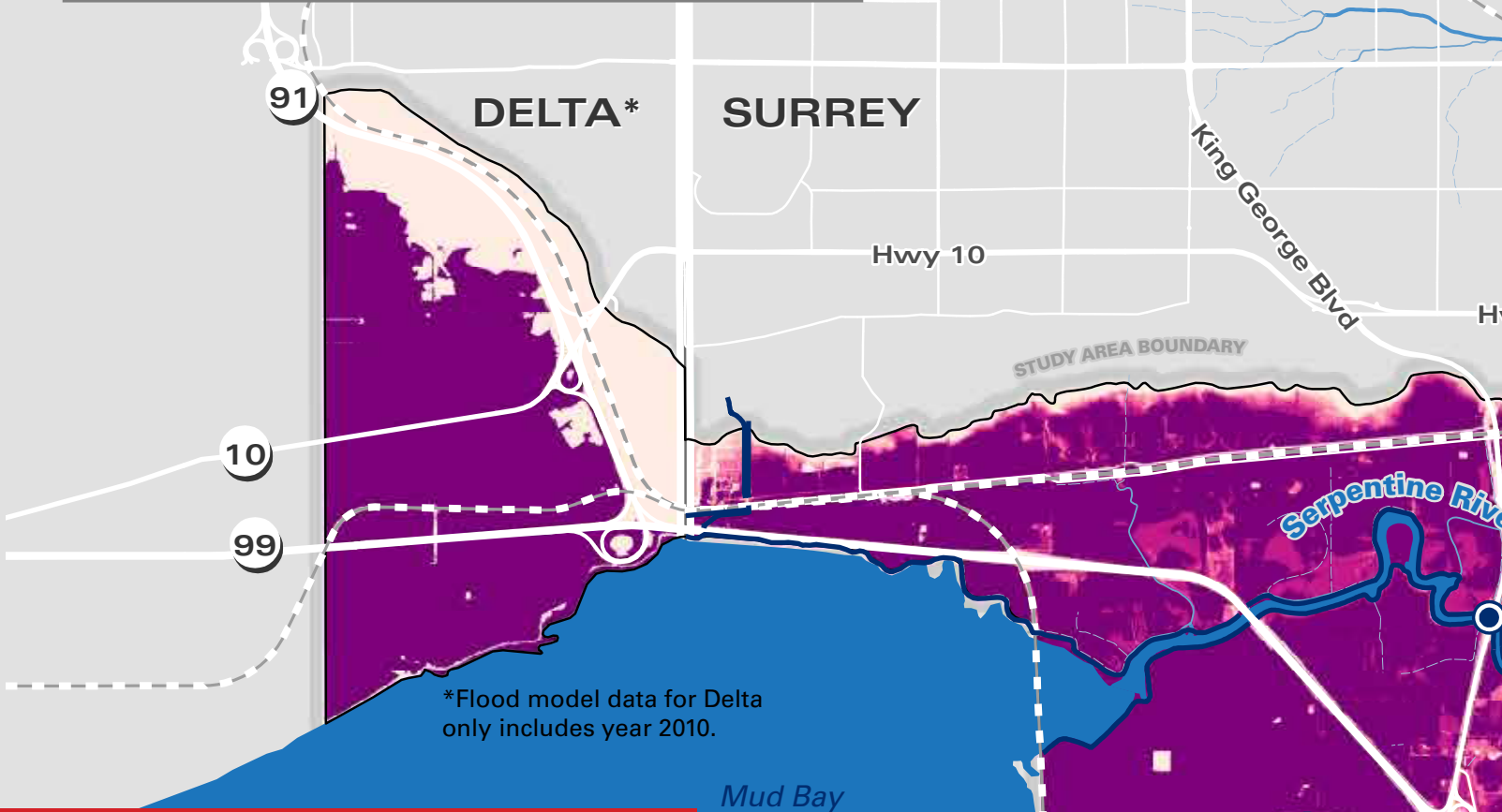
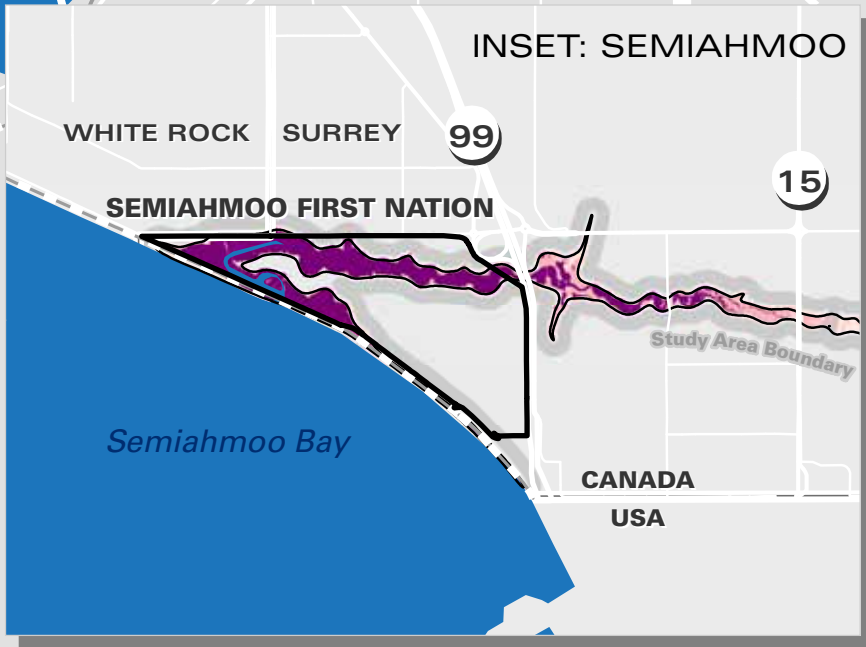
- Major international utility corridors – BC Hydro and Fortis
- Major regional utilities – Metro Vancouver water supply and sewage lines
- Over 10 km of Provincial Highways
- Over 200,000 vehicle trips a day
- Over 30 km of railway (BNSF freight and Amtrak passenger)
- Almost \$25 billion annual truck and rail freight traffic





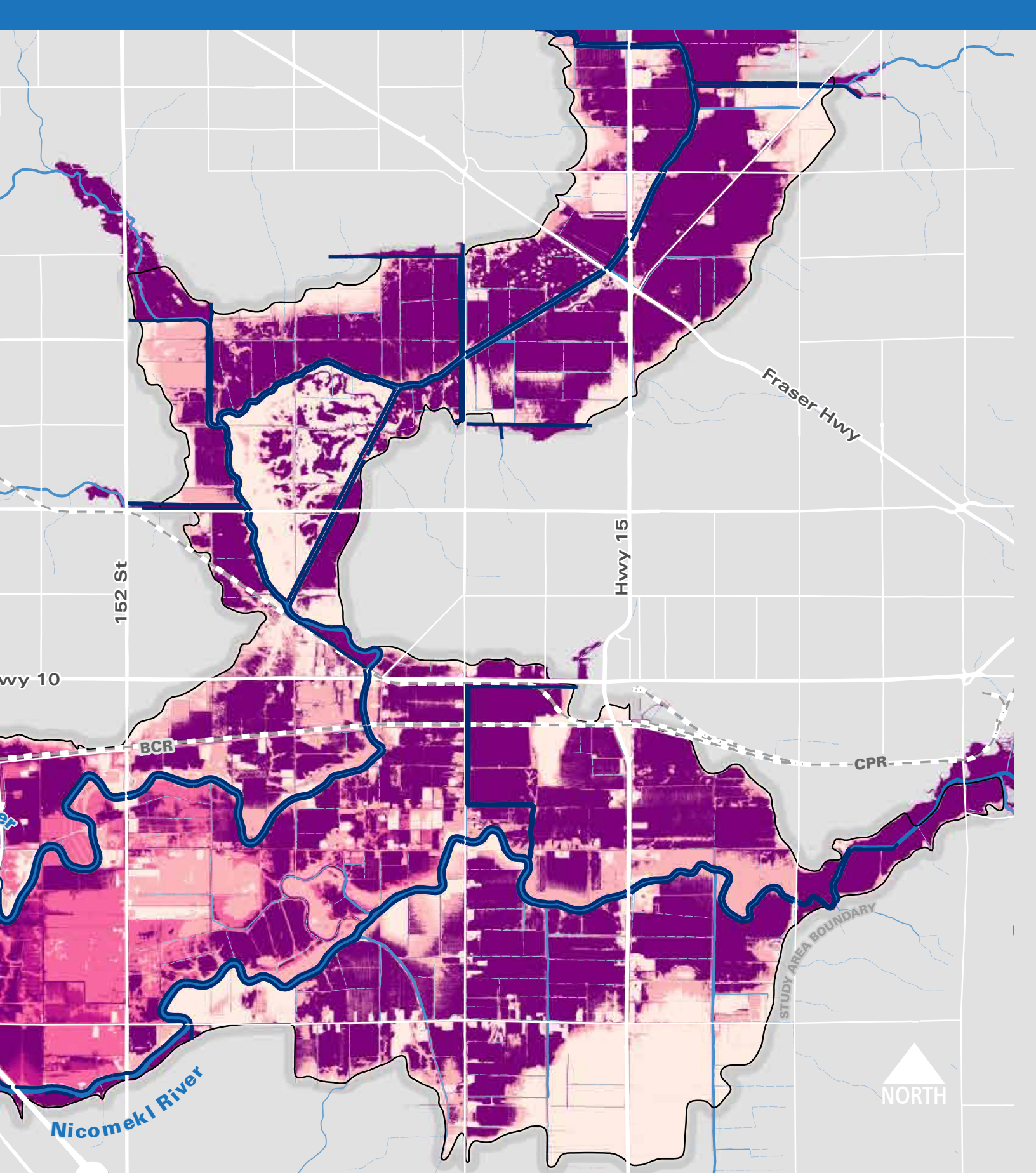
## CLIMATE CHANGE IMPACTS

- *Serpentine and Nicomekl dykes are not high enough to protect against anticipated 2100 flood levels*
- *Serpentine sea dam is not seismically sound*
- *Few of the Serpentine and Nicomekl River dykes will meet the Provincial 200-year standard by 2020.*
- *By 2070, it is expected that all dykes will be overtopped multiple times per year, with overtopping likely resulting in dyke failure.*
- *At present, under the 200-year flood condition, a portion of Highway 99 would be inundated, including bridge decks at three locations*
- *Erosion, interruption of railway operations and goods movement*

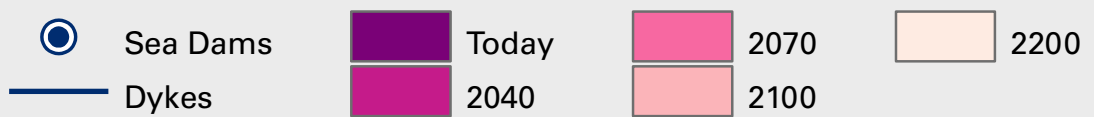


**FLOODING HAZARD:  
OUR NEED TO PREPARE**

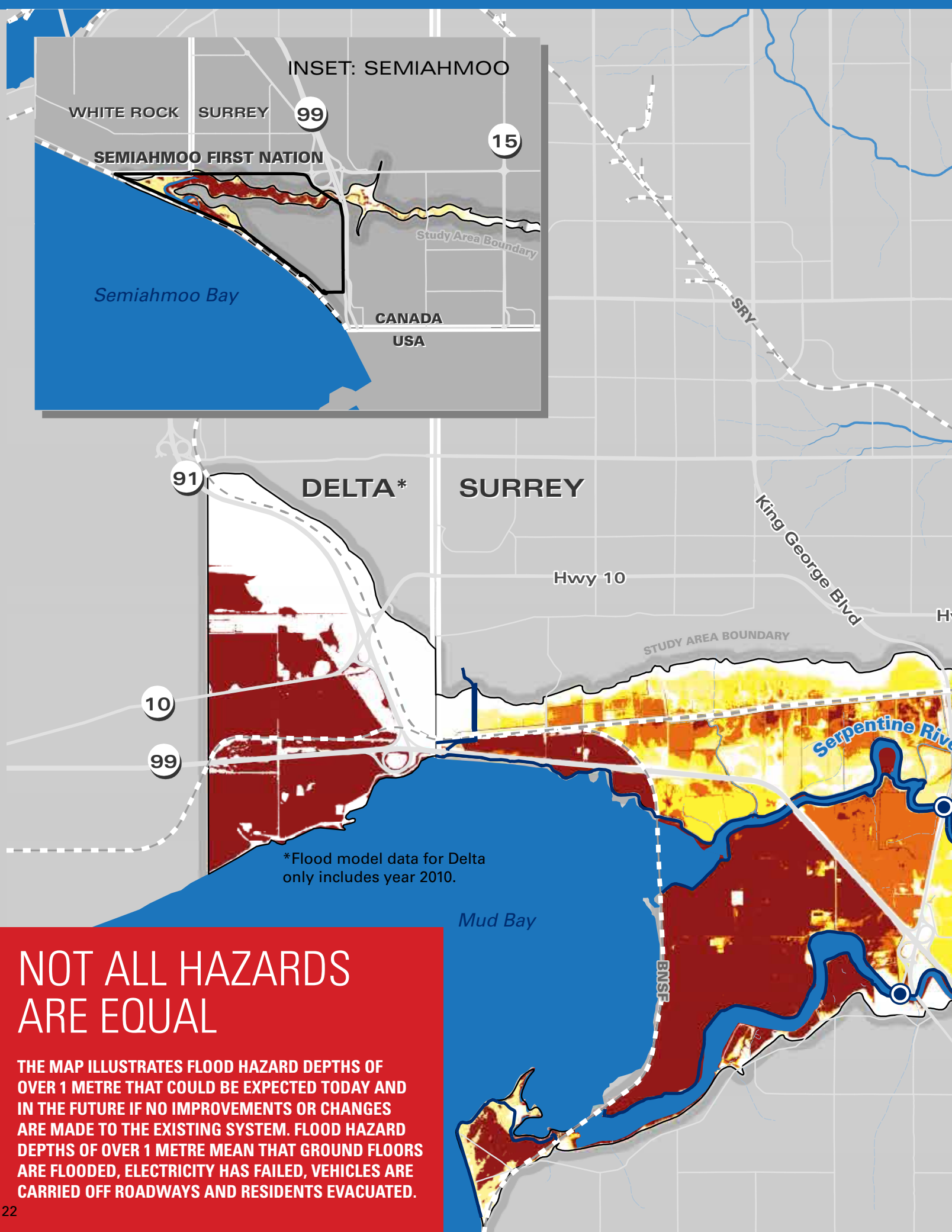
**OUR CHANGING CLIMATE MEANS THAT THE HISTORIC CONTROLS THAT HAVE BEEN PUT IN PLACE TO LIMIT FLOODS WILL NOT WORK AS WELL IN THE FUTURE. THE MAP ILLUSTRATES THE EXTENT OF FLOODING THAT COULD BE EXPECTED TODAY AND IN THE FUTURE IF NO IMPROVEMENTS OR CHANGES ARE MADE TO THE EXISTING SYSTEM.**



**FLOOD HAZARD AREAS, EXTENT OF ALL FLOODING**



- (1) Showing incremental increase over time
- (2) Potential 200-year inundation extents from coastal dyke breach or riverine flooding
- (3) Coastal flooding assumes coastal dike breaching, riverine flooding assumes riverine dikes remain intact.



**INSET: SEMIAHMOO**

WHITE ROCK SURREY 99

SEMIAHMOO FIRST NATION

Semiahmoo Bay

CANADA  
USA

Study Area Boundary

15

91

DELTA\*

SURREY

Hwy 10

King George Blvd

10

99

STUDY AREA BOUNDARY

Serpentine River

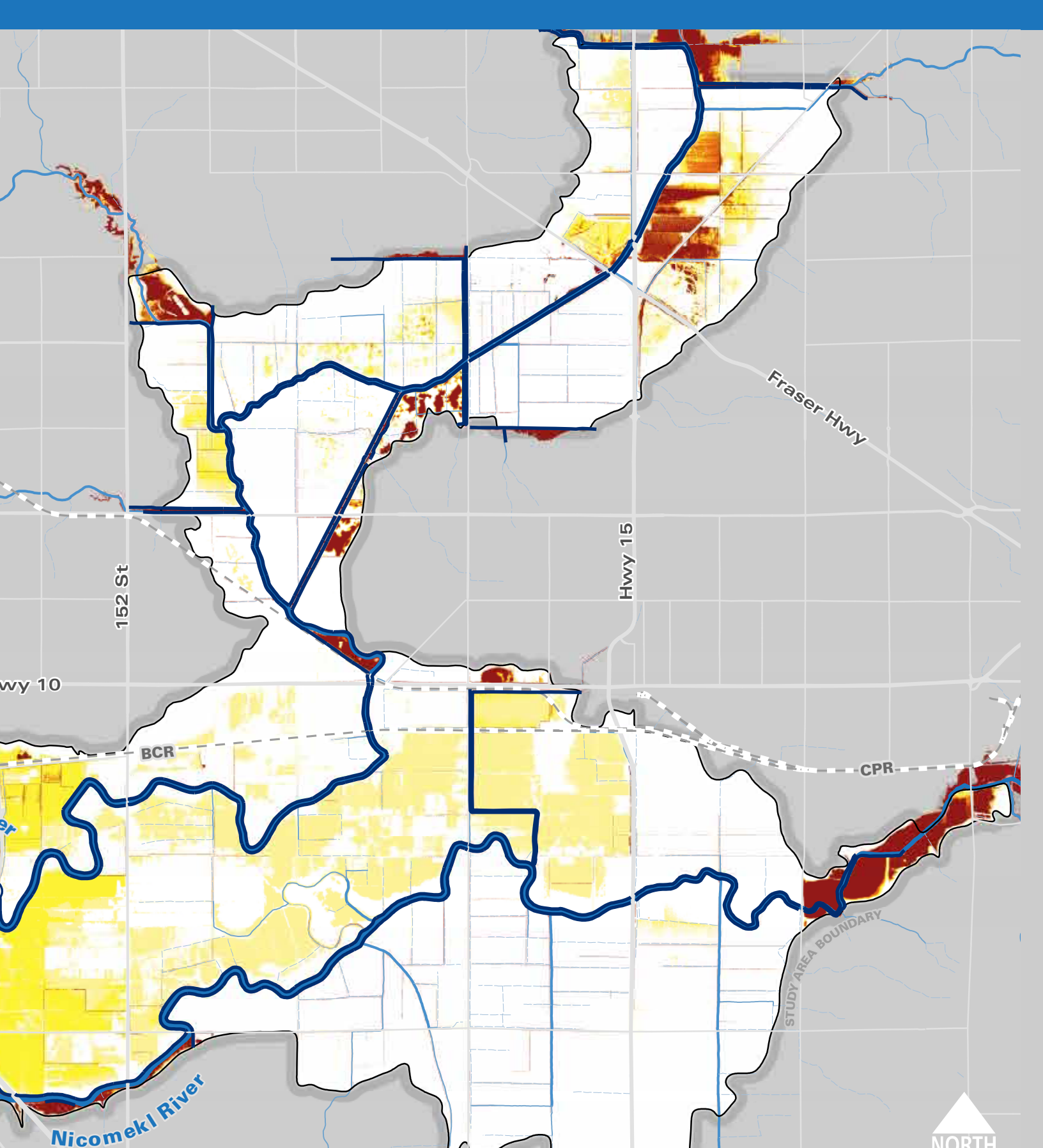
\*Flood model data for Delta only includes year 2010.

Mud Bay







BNSF

# NOT ALL HAZARDS ARE EQUAL

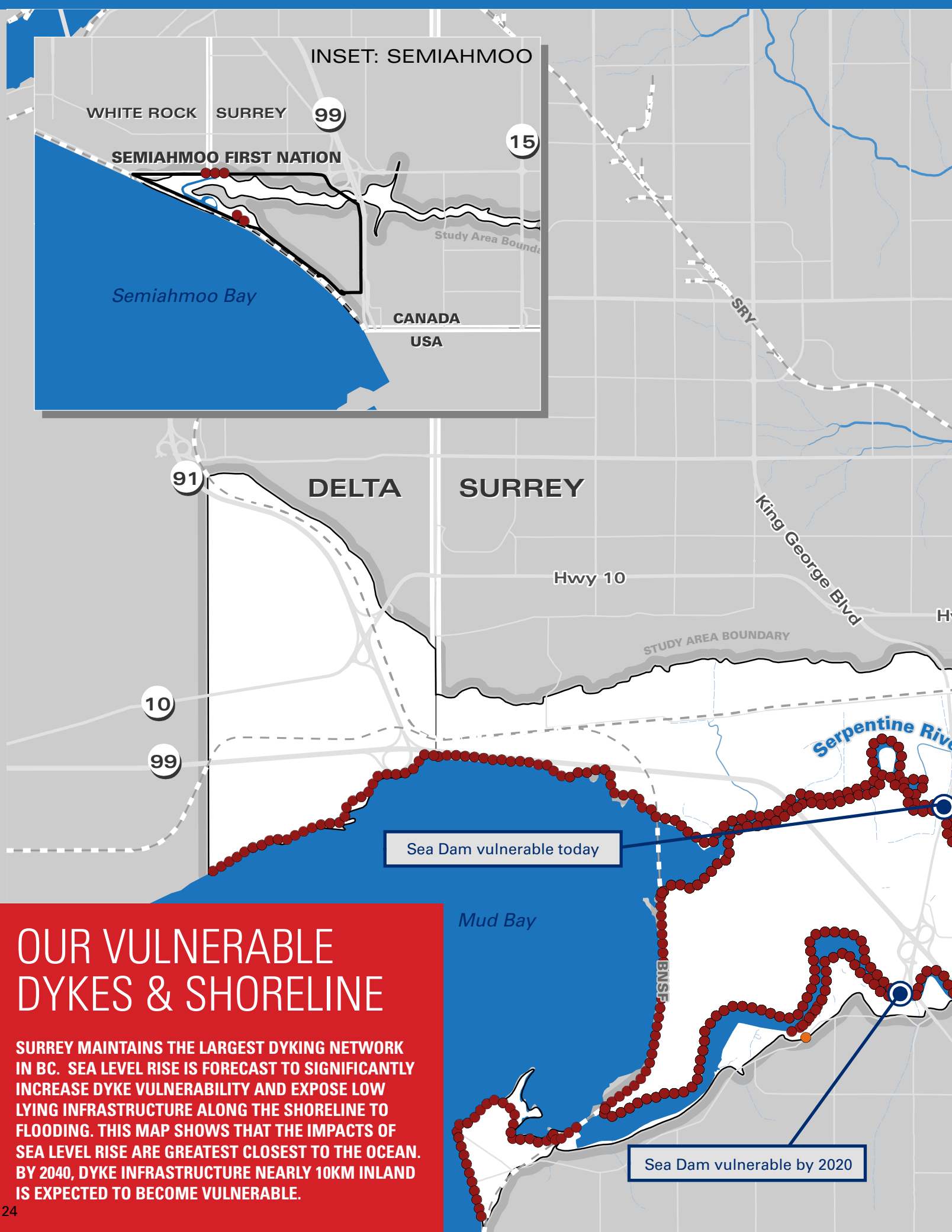
THE MAP ILLUSTRATES FLOOD HAZARD DEPTHS OF OVER 1 METRE THAT COULD BE EXPECTED TODAY AND IN THE FUTURE IF NO IMPROVEMENTS OR CHANGES ARE MADE TO THE EXISTING SYSTEM. FLOOD HAZARD DEPTHS OF OVER 1 METRE MEAN THAT GROUND FLOORS ARE FLOODED, ELECTRICITY HAS FAILED, VEHICLES ARE CARRIED OFF ROADWAYS AND RESIDENTS EVACUATED.



**FLOOD HAZARD AREAS,  
FLOOD DEPTHS OVER 1 METRE**

	Sea Dams		Today		2070
	Dykes		2040		2100

- (1) Showing incremental increase over time
- (2) Potential 200-year inundation from coastal dike breach or riverine flooding
- (3) Coastal flooding assumes coastal dike breaching, riverine flooding assumes riverine dikes remain intact.



INSET: SEMIAHMOO

WHITE ROCK SURREY 99

SEMIAHMOO FIRST NATION

Semiahmoo Bay

CANADA  
USA

DELTA SURREY

Hwy 10

King George Blvd

STUDY AREA BOUNDARY

Serpentine River

Sea Dam vulnerable today

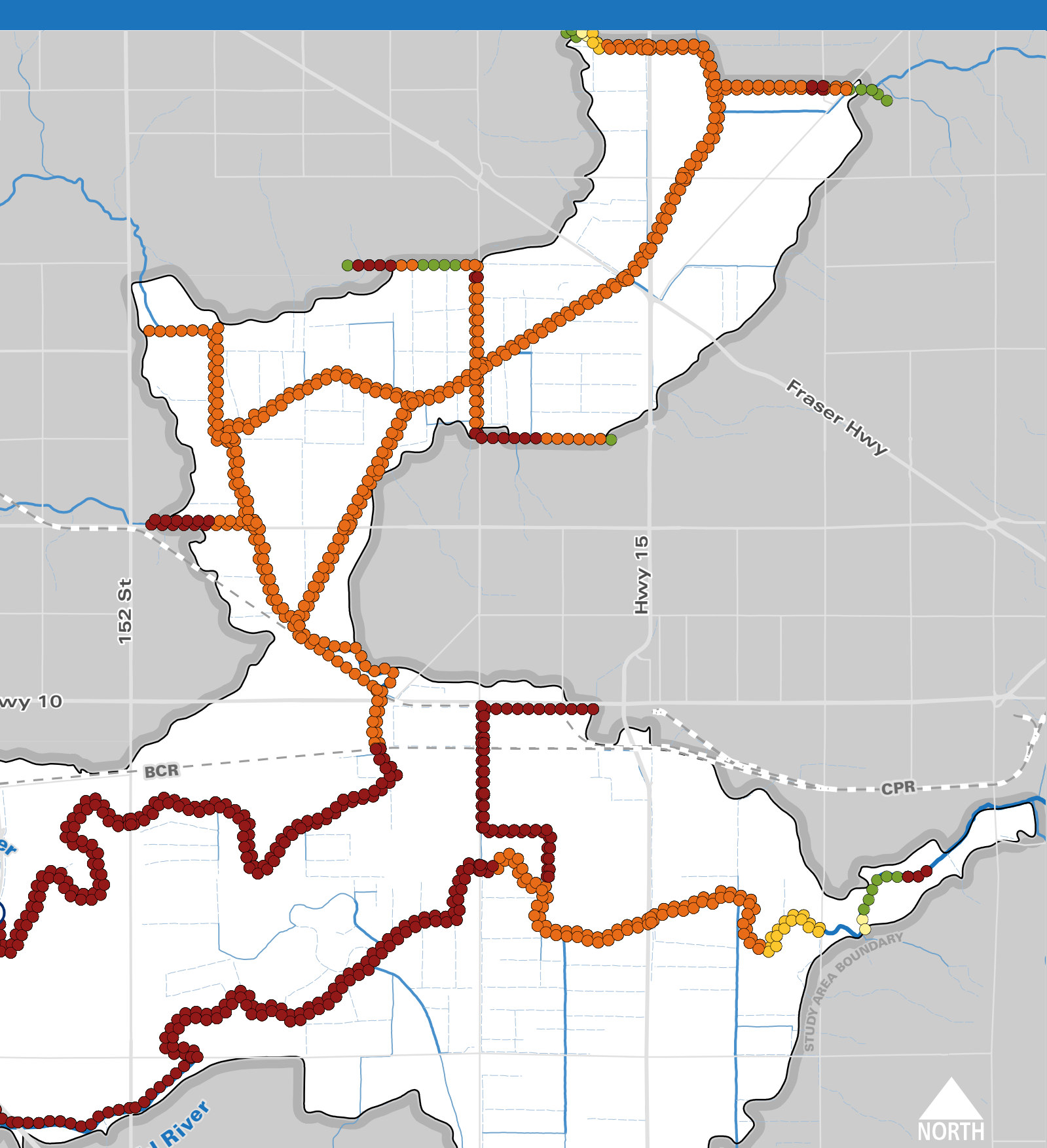
Mud Bay

Sea Dam vulnerable by 2020







# OUR VULNERABLE DYKES & SHORELINE

SURREY MAINTAINS THE LARGEST DYKING NETWORK IN BC. SEA LEVEL RISE IS FORECAST TO SIGNIFICANTLY INCREASE DYKE VULNERABILITY AND EXPOSE LOW LYING INFRASTRUCTURE ALONG THE SHORELINE TO FLOODING. THIS MAP SHOWS THAT THE IMPACTS OF SEA LEVEL RISE ARE GREATEST CLOSEST TO THE OCEAN. BY 2040, DYKE INFRASTRUCTURE NEARLY 10KM INLAND IS EXPECTED TO BECOME VULNERABLE.





**DYKE AND SHORELINE VULNERABILITY\***

-  Sea Dams
-  Today
-  2040
-  2070
-  2100
-  Dry

\* Vulnerable means dyke/shoreline infrastructure would be wet or freeboard compromised (water level within 0.6 m or less from top of dyke)

- (1) Showing incremental increase over time
- (2) Based on CCFR Phase 2 assessment (NHC 2015), considers joint probability coastal/riverine 200 year flood levels.
- (3) Assumes: present dyke conditions with no breaching; a linear 1 m sea level rise from year 2000 to 2100.





# WHAT'S NEXT?

*Engagement with residents, stakeholders, and other project partners is paramount to the success of the CFAS project. A range of stakeholder engagement activities and opportunities for feedback and participation will be provided throughout the multi-year process. If you or your organization are interested in learning more about the project, or are interested in a presentation, let us know (see contact information).*

*All project information, including dates for upcoming presentations and events, and all CFAS project materials (videos, information materials, reports) will be posted on the project website. This Primer is also available on the website.*

**[www.surrey.ca/coastal](http://www.surrey.ca/coastal)**

*There will be a second round of feedback sessions later this spring to present back what was heard at the kick-off Focus Groups.*

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# CONTACT US

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