Climate Adaptation in Surrey

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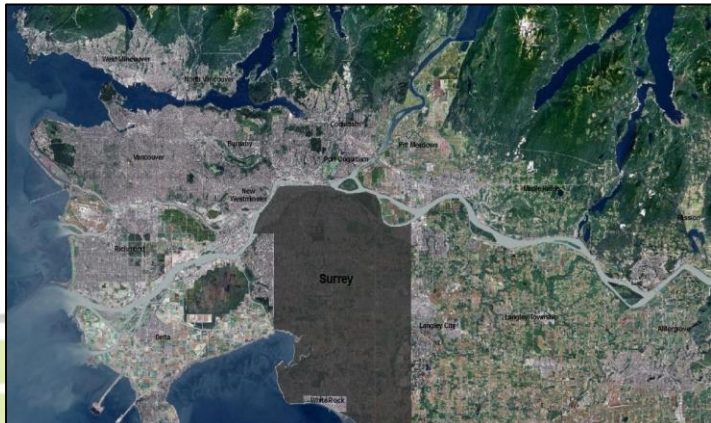
SCCP Conservation Connections 2019
October 16, 2019

Surrey Context




- 2nd largest city in BC
- Population ~550,000
- Large land area: 316 km^2 (Vancouver: 115km^2)
- Urban, suburban, rural
- 1/3 agricultural land
- Major rivers and ocean boundary



Sustainability Charter 2.0

- Overarching policy document for the City
- High-level, with a long term vision (still 2058)
- Focused on community outcomes
- Guides more granular City plans and decision-making by identifying goals
- Also guides corporate sustainability

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Sustainability Charter — Community Themes

Ecosystems: Healthy, protected and well-maintained ecosystems and biodiversity.

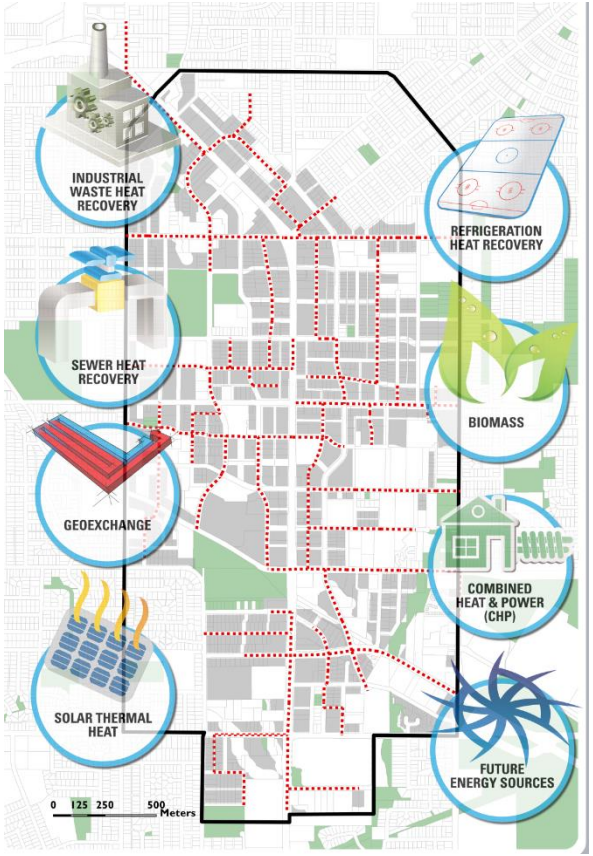
Mitigation

Mitigating the release of GHG emissions to **minimize future climate change**

Adaptation

Adapting or **preparing for the unavoidable impacts** of climate change

Climate Change Mitigation



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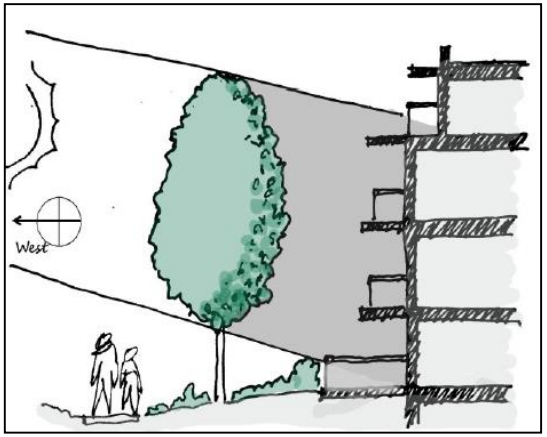
Climate Change Adaptation Priorities



Sea level rise analysis

- Evaluate long-term options
- Regional coordination

Quality and quantity of habitat

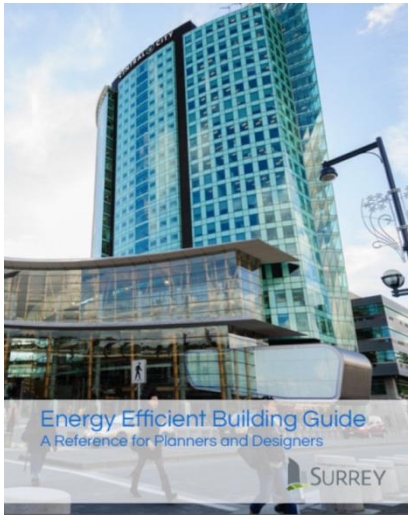
- Resilient tree species
- Canopy and root space

- Passive building design
- Data collection and monitoring
- Education and capacity

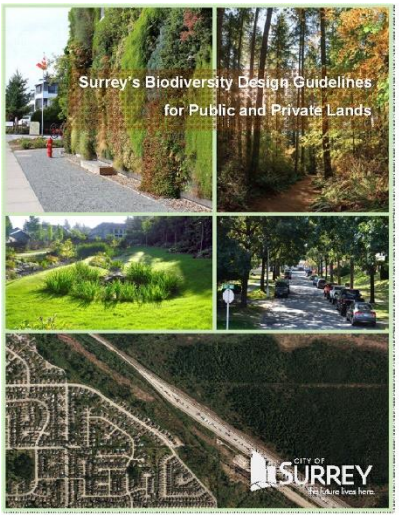
Climate Change Adaptation Actions

Streamside Setbacks & Sensitive Ecosystems DPA

Enhanced Shade Tree Management Practices

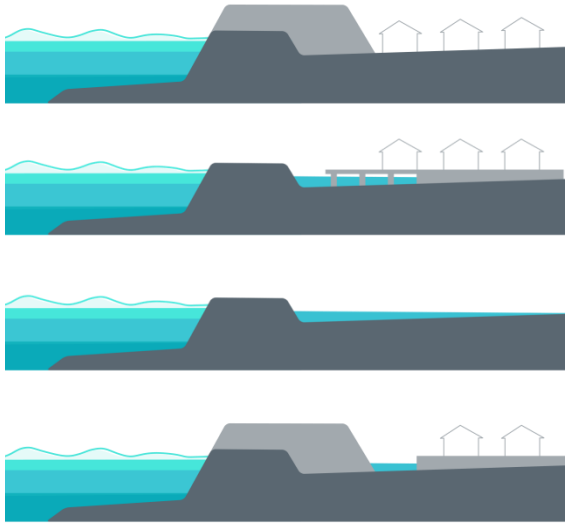


Passive Design & Heat Management



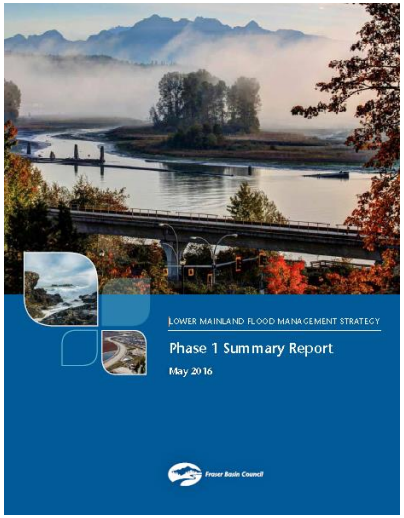
Draft Biodiversity Design Guidelines

Climate Change Adaptation Actions



Coastal Flood Adaptation Strategy (CFAS)

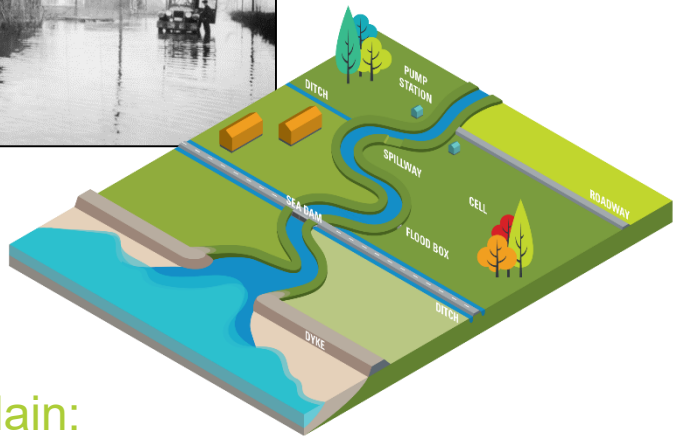
Future-proofing infrastructure



Regional Coordination

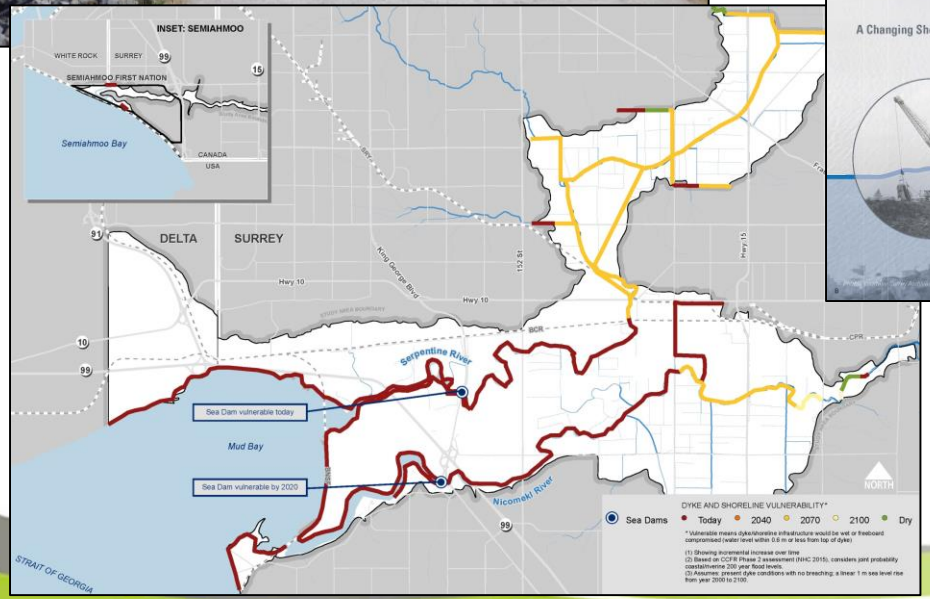
Coastal Flood Adaptation Strategy (CFAS)

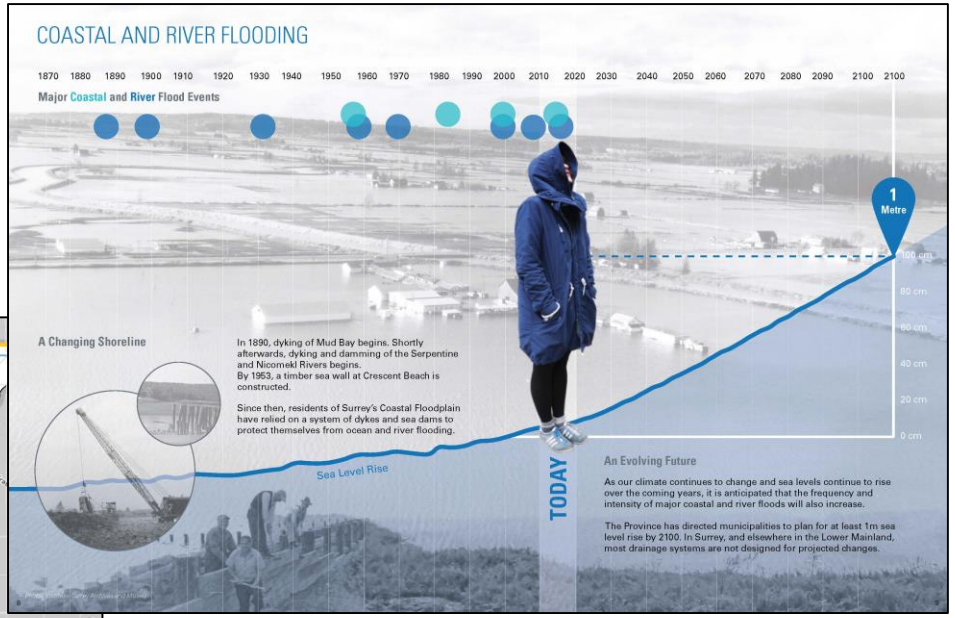
www.surrey.ca/coastal



Surrey's Coastal Floodplain:

- A natural floodplain (20% of Surrey)
- Regularly experiences coastal flooding
- Mostly agricultural lands (ALR)
- Ocean-driven flooding (storm surges, king tides)
- River-driven flooding (rain storms, rapid snow melt)





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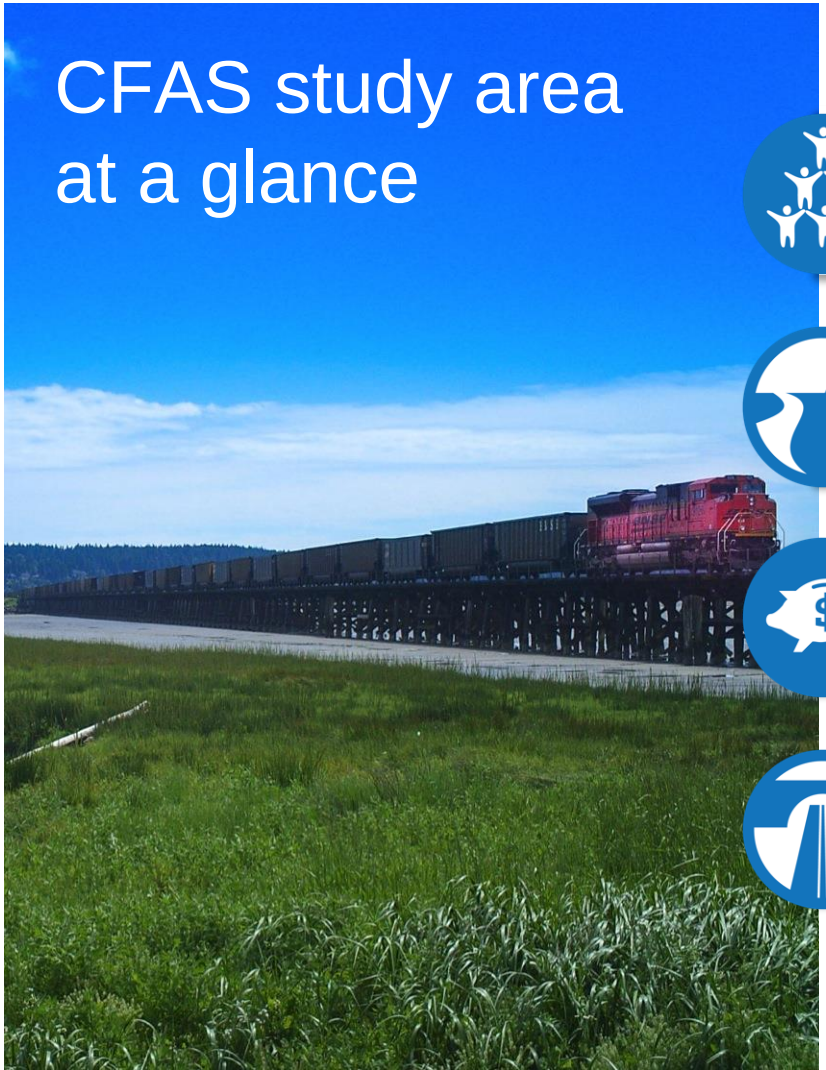
The Purpose of CFAS

To prepare for a changing climate and increase resilience of our coastal communities

CFAS study area at a glance



COMMUNITIES AND PEOPLE

Many residential areas and neighbourhoods
Semiahmoo First Nation
1,500+ residents
Approximately 20% of Surrey's land area

PARKS AND ENVIRONMENT

Destination regional and City parks
Beaches and recreation areas
Critical foreshore, coastal, and riparian areas

LOCAL AND REGIONAL ECONOMY

700+ jobs
Over $100M in annual farm gate revenue
Over $1B in assessed property value
Almost $25B annual truck and rail freight traffic

INFRASTRUCTURE

Over 10km of Provincial Highways
Over 200,000 vehicle trips a day
Over 30km of railway (freight, passenger)

Values Criteria

RESIDENTS:
Are people permanently displaced?

AGRICULTURE:
Is there permanent loss of agriculture land?

ECONOMY:
Is there a permanent loss of business?

RECREATION:
Is there a diversity of recreational activities (positive & negative)?

ENVIRONMENT:
Are there impacts (positive & negative) to wetland habitats, freshwater fish habitat & riparian areas?

INFRASTRUCTURE:
Is service/transportation infrastructure made vulnerable?

CULTURE:
Are there Semiahmoo First Nation cultural impacts that could be expected?

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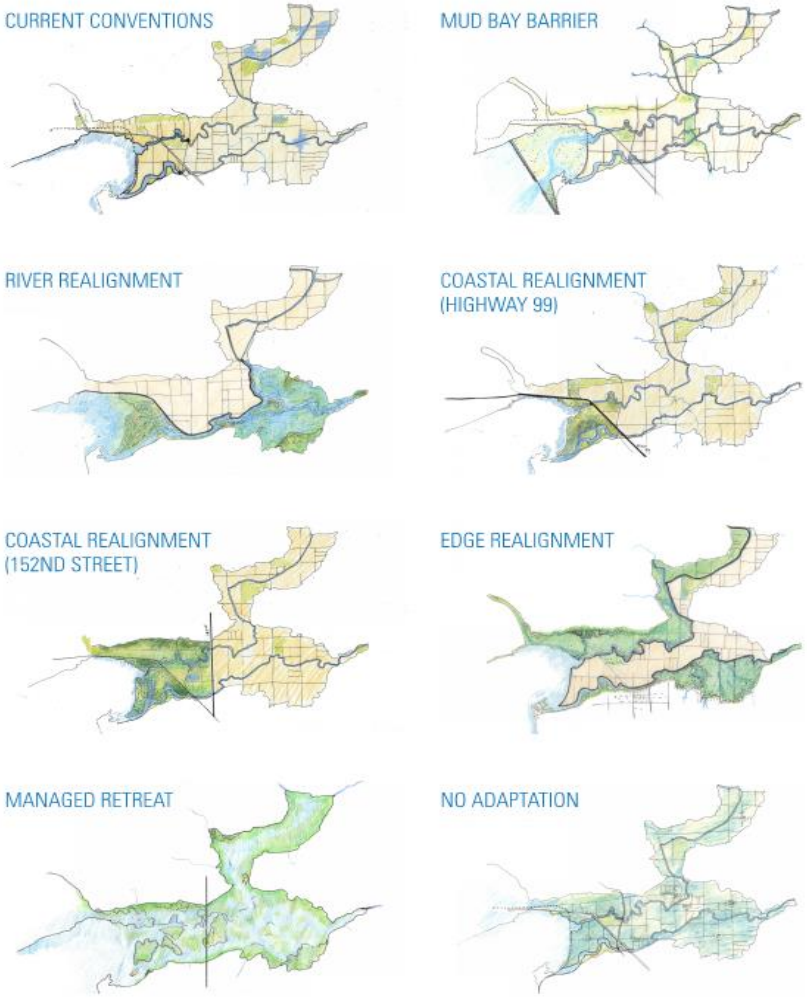
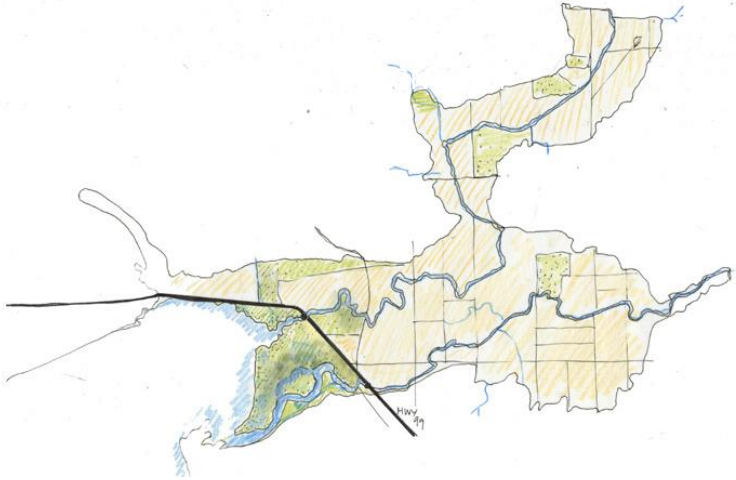
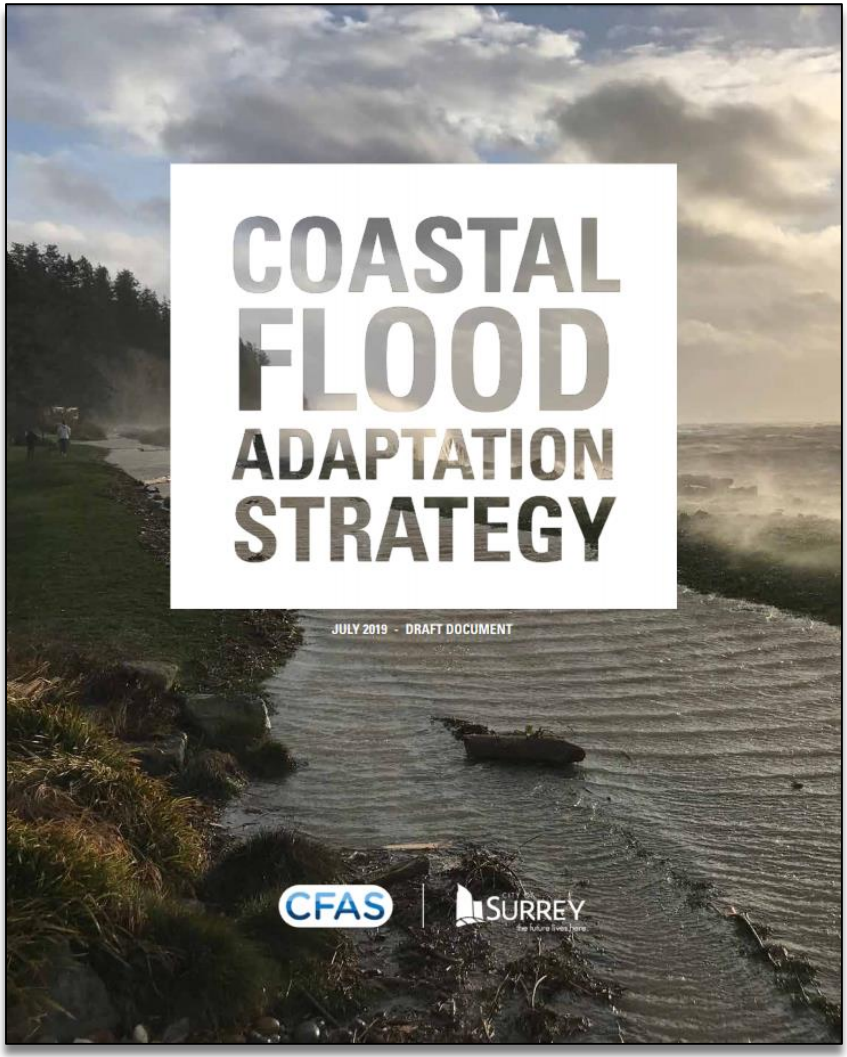
Adaptation Options




HWY 99


COASTAL
FLOOD
ADAPTATION
STRATEGY
JULY 2019 - DRAFT DOCUMENT
CFAS
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the future lives here

Outcomes of CFAS

- Increased awareness of the impacts of sea level rise
- Stakeholder buy-in
- Partnerships
- High level actions to advance long term strategic directions
- Awards and funding commitments

CFAS and Infrastructure Canada Funding

Implementation of foundational projects that are required no matter what long-term adaptation direction is chosen.

SURREY DISASTER MITIGATION AND ADAPTATION FUND PROJECT OVERVIEW

CFAS | SURREY
www.surrey.ca/coastal
#SurreyCoastal

#	Component	Asset Type	Hazard Mitigation	Community Co-benefits	Values Protected	Partnership Opportunities
1	Colebrook Dyke Upgrades	Coastal Dyke	flood	Recreation, bird watching, food security	economy, environment, communities	British Columbia
2	Colebrook Drainage Pump Station Replacement	Drainage Pump Station	flood, seismic	Increased agricultural productivity and food security	economy, infrastructure, environment, communities	
3	Sea Dam – Serpentine River	Sea Dam (drainage and irrigation)	flood, seismic, drought	Agriculture irrigation, fish passage, worker safety	economy, infrastructure, environment, communities	
4	152 St Road Upgrades and Raising	Transportation Network	flood	Congestion relief, transportation safety, accommodate growth, cycling, pedestrian	economy, infrastructure, environment, communities	TRANS LINK, FORTIS BC
5	Nicomekl Riverfront Park - Phase 1	Flood Storage	flood, drought	Recreation (blue way), nature trails, wetlands, culture, open space	environment, communities	
6	King George Boulevard Bridge and Nicomekl River Sea Dam Replacement	Arterial Bridge	flood, seismic, drought	Congestion relief, transportation safety, accommodate growth, cycling, pedestrian, integrated to Nicomekl Park, fish passage, agriculture irrigation	economy, infrastructure, environment, communities	metrovancouver, British Columbia Ministry of Transportation and Infrastructure
7	Crescent Beach Storm Sewer System Upgrades - Perforated Piping	Flood Protection	flood	Street beautification/ road improvements, transportation safety	economy, infrastructure, communities	
8	Dyking - Lower reaches of Nicomekl and Serpentine	Flood Protection	flood	Food security and transportation flood safety	economy, infrastructure, communities	
9	Serpentine SRY Rail Link Bridge Replacement and Dyking	Flood Protection	flood, seismic, drought	Economy (freight and heritage railway), worker safety and goods movement	economy, infrastructure, communities	SRY Rail Link (Southern Railway of BC)
10	Burrows Drainage Pump Station Upgrade	Drainage Pump Station	flood, seismic, drought	Increased agricultural productivity and food security	economy, infrastructure, communities	
11	Stewart Farm Sanitary Pump Station Coastal Flood Proofing	Sanitary Sewer Network	flood	Sanitation, worker safety and water quality	economy, infrastructure, environment	
12	Campbell River Pedestrian and Emergency Access Bridge Replacement	Transportation Network	flood, seismic	Emergency access, Multi Use Path	infrastructure, communities	Semiahmoo First Nation
13	Foreshore Enhancements	Flood Control	flood	Wetlands (birds, fish, clams) and food security	economy, infrastructure, environment	Delta

Hazard Mitigation: flood, seismic, drought

Values Protected: economy, infrastructure, environment, communities

www.surrey.ca/CoastalTakingAction

Nicomekl Riverfront Park

DMAF DISASTER MITIGATION ASSETS & VALUES PROTECTED

Disaster Mitigation Assets

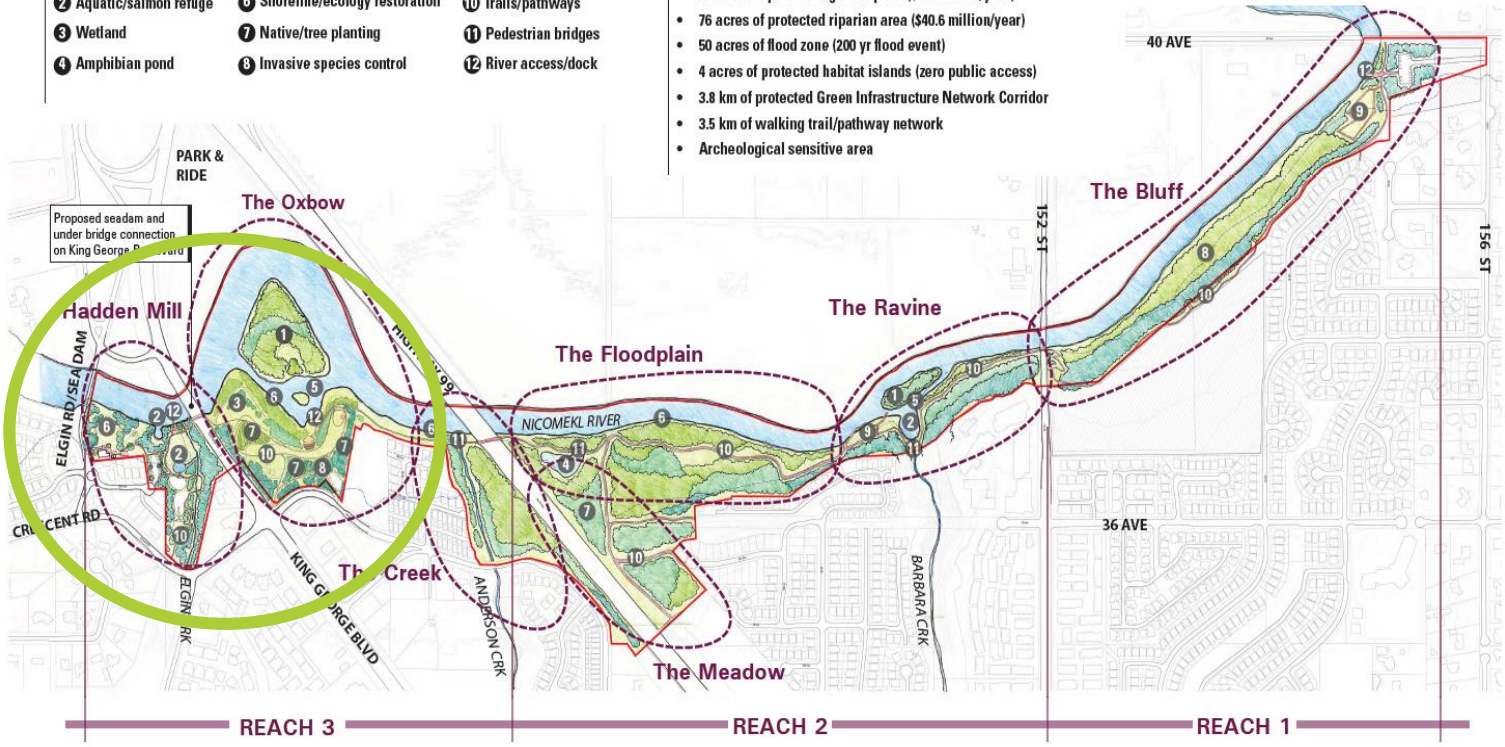
1. Habitat island
2. Aquatic/salmon refuge
3. Wetland
4. Amphibian pond
5. Flood channel
6. Shoreline/ecology restoration
7. Native/tree planting
8. Invasive species control
9. Boardwalk
10. Trails/pathways
11. Pedestrian bridges
12. River access/dock

Values Protected ENVIRONMENT & COMMUNITY

84 acres / 3km of protected parkland:

- 82 acres of protected green space ($9.1 million/year)
- 76 acres of protected riparian area ($40.6 million/year)
- 50 acres of flood zone (200 yr flood event)
- 4 acres of protected habitat islands (zero public access)
- 3.8 km of protected Green Infrastructure Network Corridor
- 3.5 km of walking trail/pathway network
- Archeological sensitive area

https://www.surrey.ca/culture-recreation/24604.aspx



The 3km linear riverfront park spans several character zones defined by unique ecologies, topgraphic conditions, adjacencies and histories.

DISASTER MITIGATION ADAPTATION FUND

1500 RESIDENTS ENGAGED TO-DATE

#surreyparks www.surrey.ca/newparks

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Project #13. Foreshore Enhancements

- Nature-based solution for coastal squeeze and coastal flooding
- “Living Dyke” concept is the recruitment of **vegetation to encourage natural process to occur in front of legislated dykes**:
  - Adding sediment to mimic natural marsh formation, resulting in a gentle vegetated slope, increased elevation
  - Include marsh islands and tidal channels
  - Adapt to Sea Level Rise of up to 1m

Existing salt marsh at risk from coastal squeeze in Boundary Bay

Steering Committee Oversight:
- Lower Fraser Fisheries Alliance,
- West Coast Environmental Law,
- FLNRORD,
- First Nations,
- DFO,
- Canadian Wildlife Service; and
- BC Municipalities

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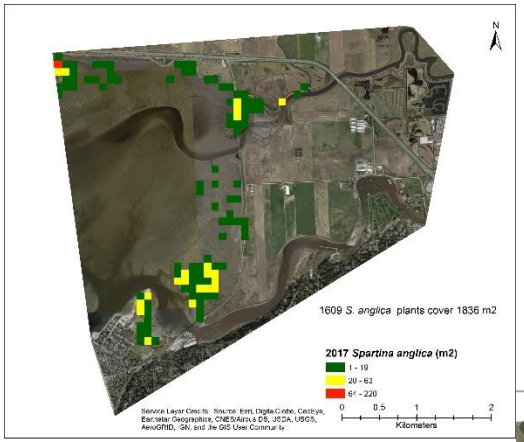
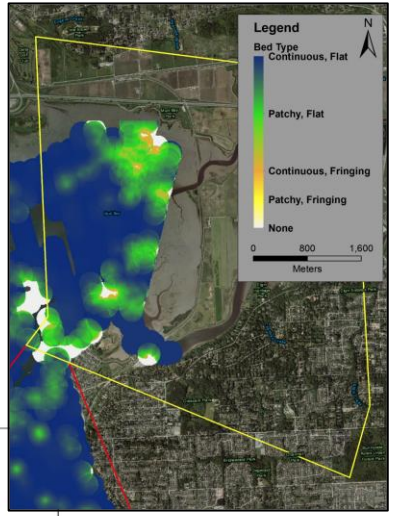
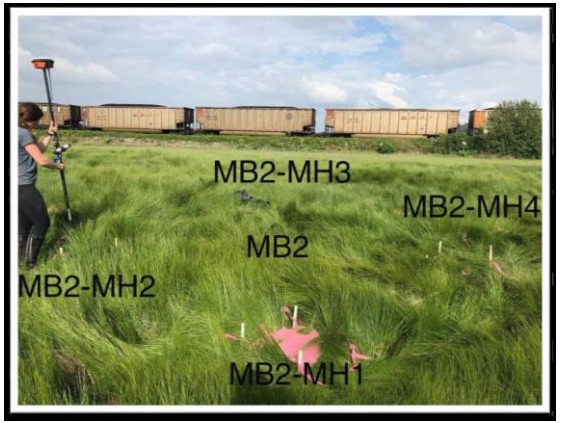
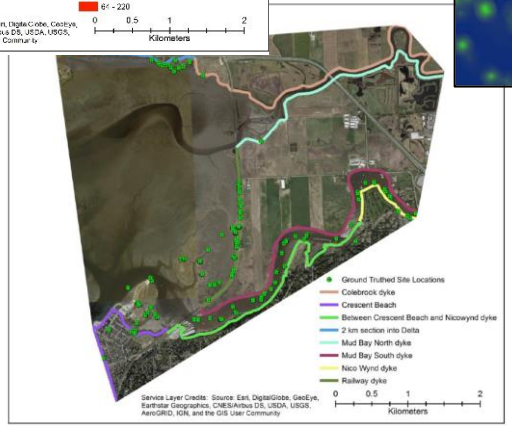
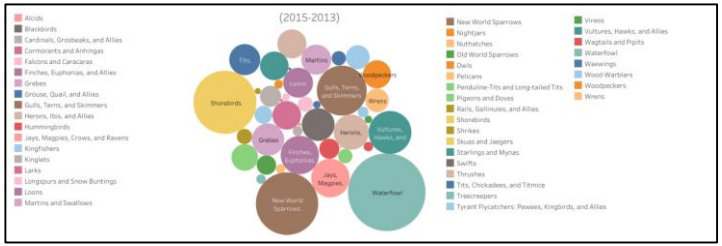
Prioritizing Infrastructure and Ecosystem Risks in Mud Bay (PIER)





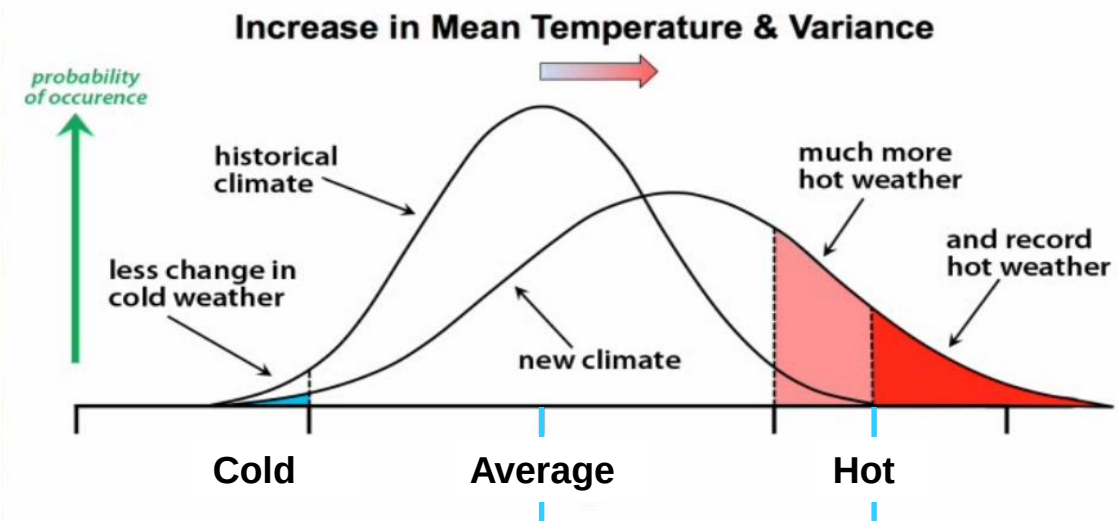






https://www.surrey.ca/files/CFASPIERPhase1Report31Mar2018.pdf
https://www.surrey.ca/files/CFASPIERPhase2Report%2031Mar2019.pdf

Local Risks - Rising Temperatures

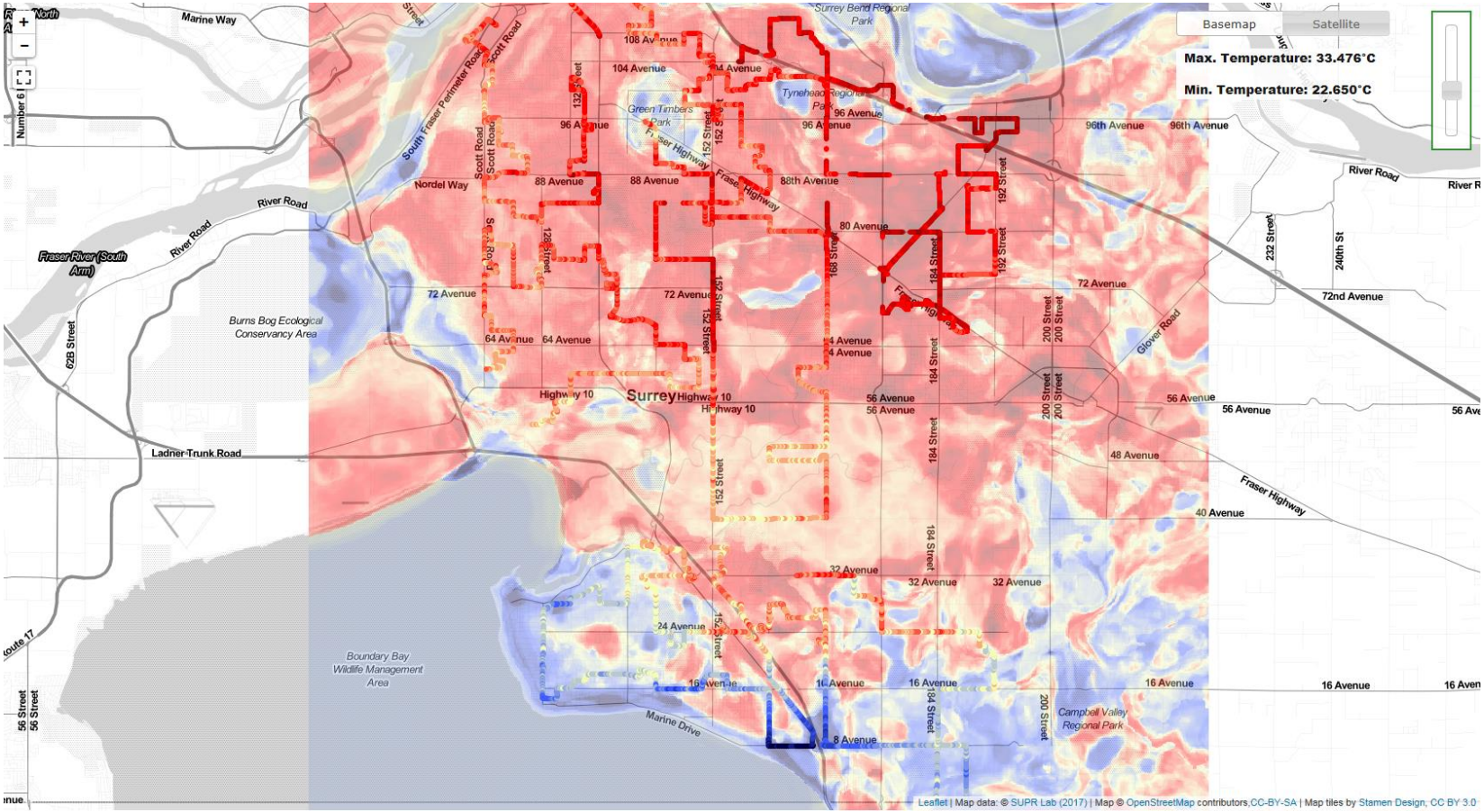


Summer Temperature Projections for Metro Vancouver

2080 Daytime Average: 27.9°C

2080 “Hottest Day”: 37°C

Mapping Urban Heat




Questions?
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www.surrey.ca/sustainability