CASE STUDY: Sea Level Rise Adaptation in Delta, BC

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PCIC Stakeholder Needs Workshop
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BC RAC – Delta project

1. Intro: climate projections + political contexts

2. Explaining Impacts; the Damage Report; Assessing Risk

3. Communicating adaptation options using scenarios and visualizations


North Vancouver
Vancouver
New Westminster
VANCOUVER
RICHMOND
LADNER
CORPORATION OF DELTA
BEACH
GROVE
1000 m

1. Climate projections and political contexts

Users and audiences:

- Engineers
- Planning/operations staff
- Decision-makers and citizens

2. Climate change impacts

In Delta: 1.2 meters of sea level rise by 2100

(BC Sea Dike Guidelines, MOE 2011)

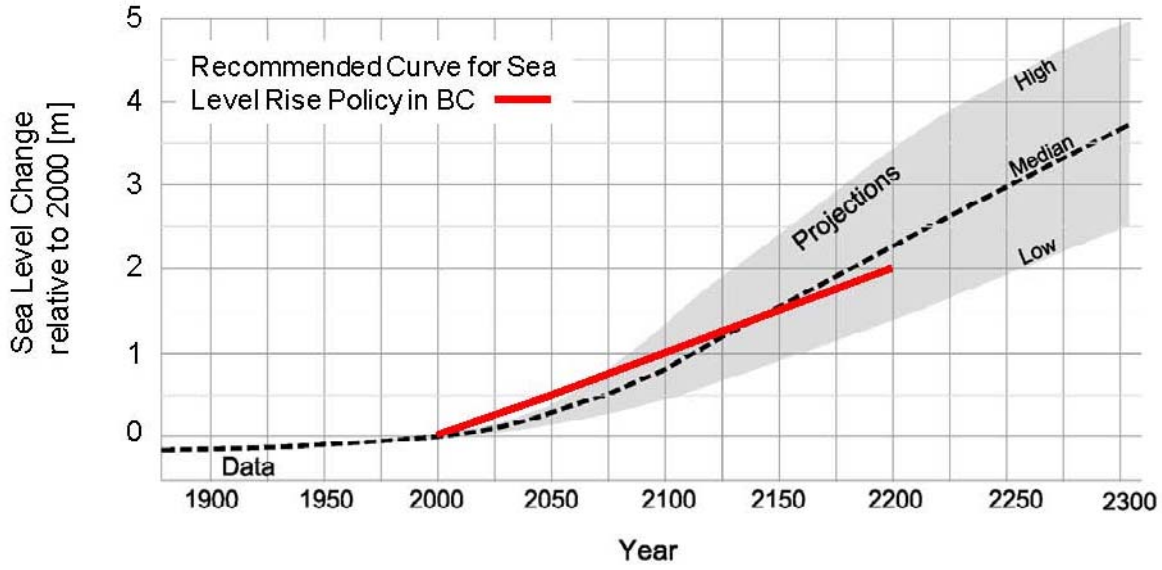
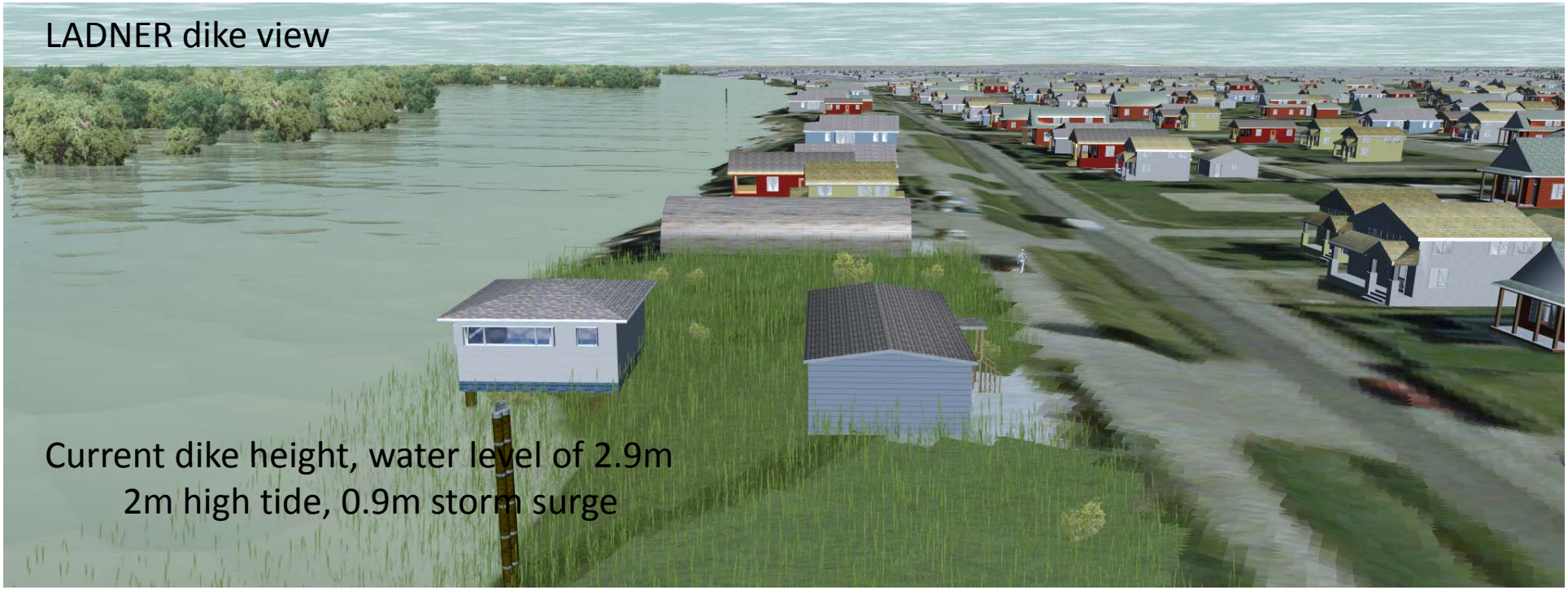
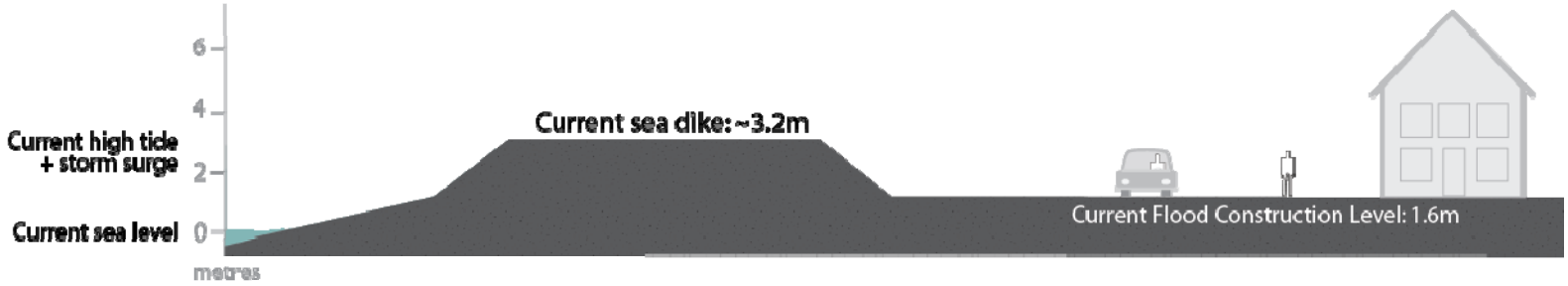


Figure 3-1: Projections of Sea Level Rise
source: Policy Discussion Paper (2010)

Climate change impacts





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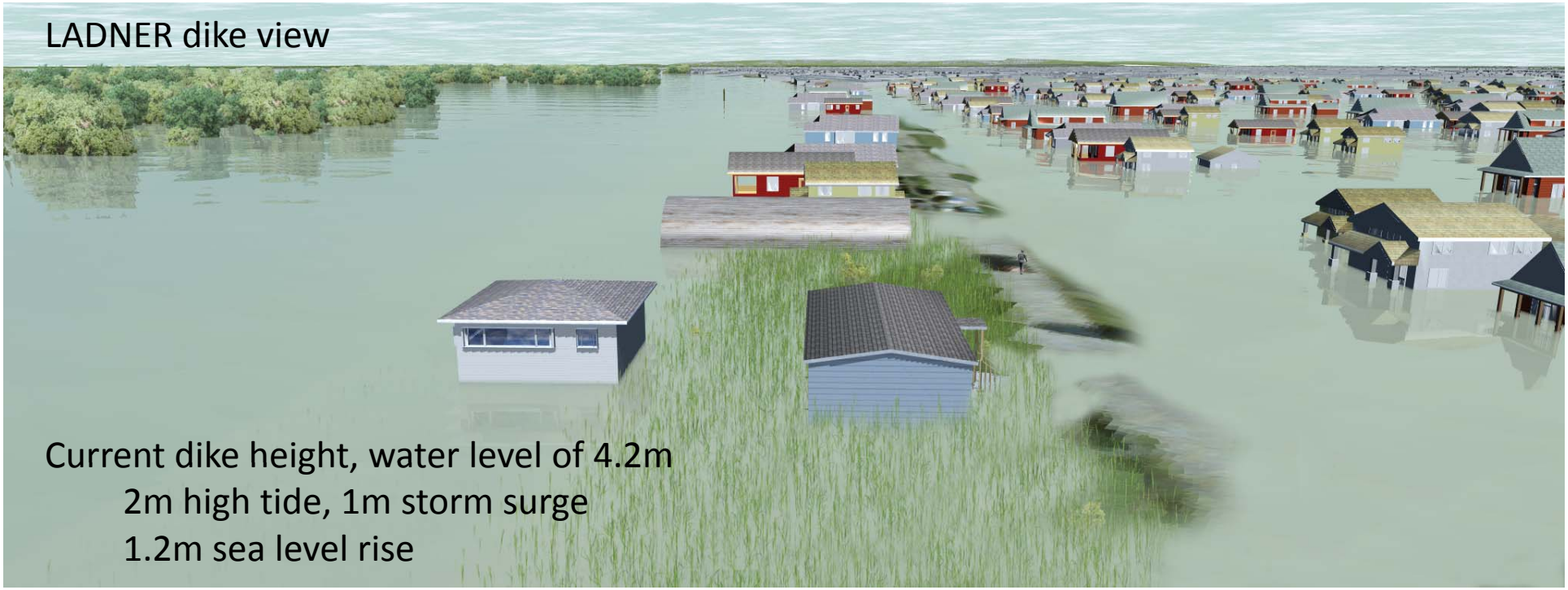
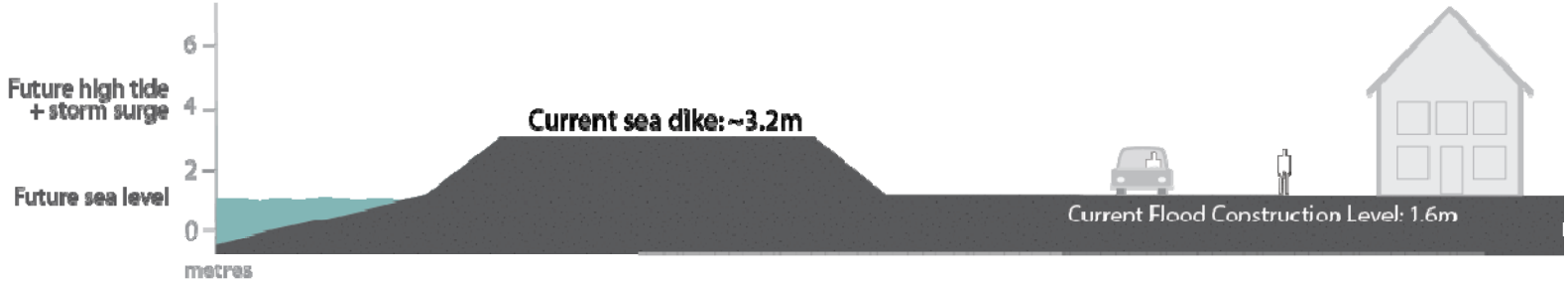




The Damage Report

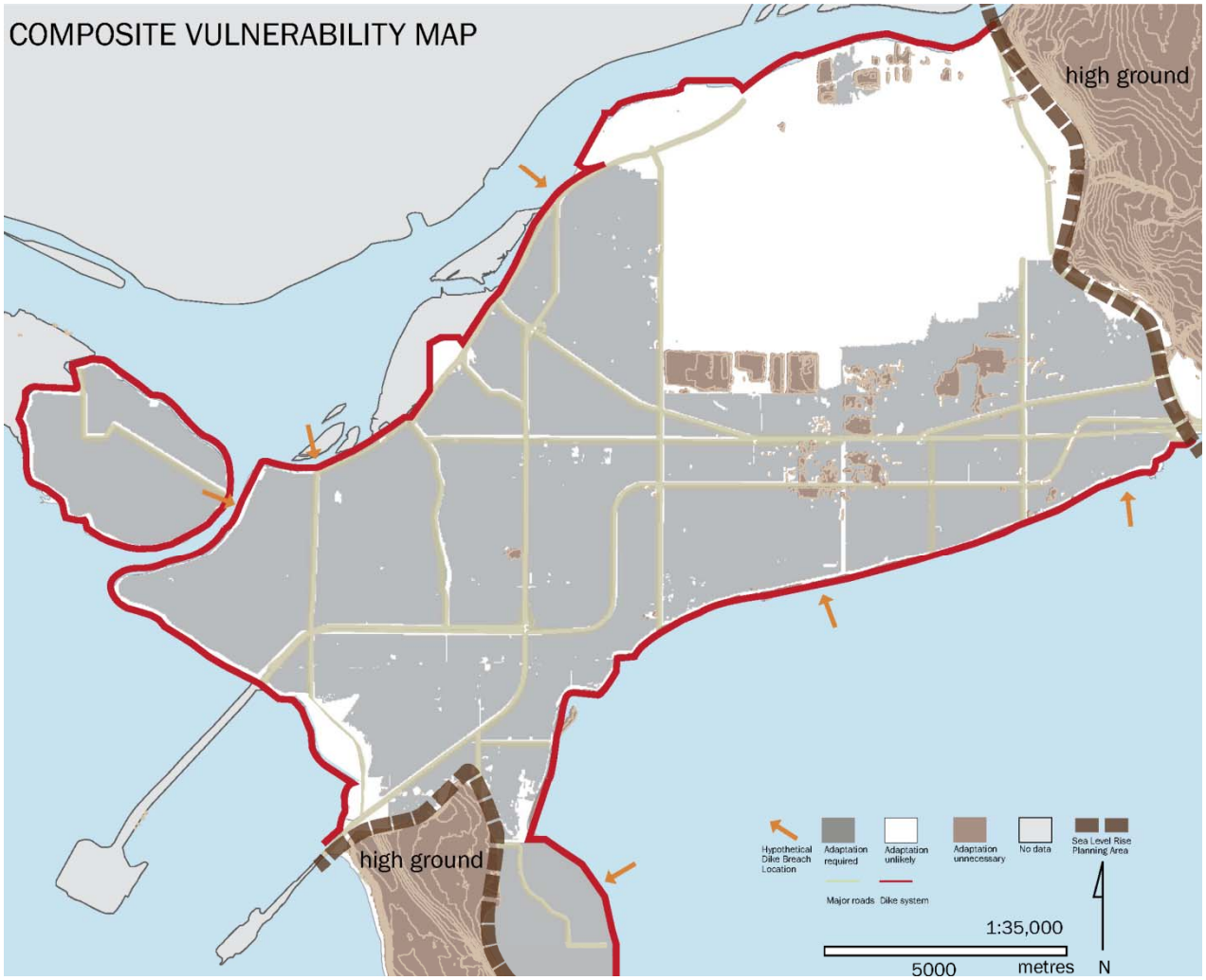
Current conditions with high tide + storm surge

The Damage Report

Future conditions with 1.2 m SLR, high tide + storm surge and DIKE BREACH

Data source: Delcan Technical Memo 2011

Sea level rise planning area



Based on hydrological modeling of multiple dike breach scenarios(KWL 2007; Delcan 2010 + 2011)

Why Adapt?

1.2 m SLR = **increased probability** of infrastructure failure (if no adaptive action is taken)

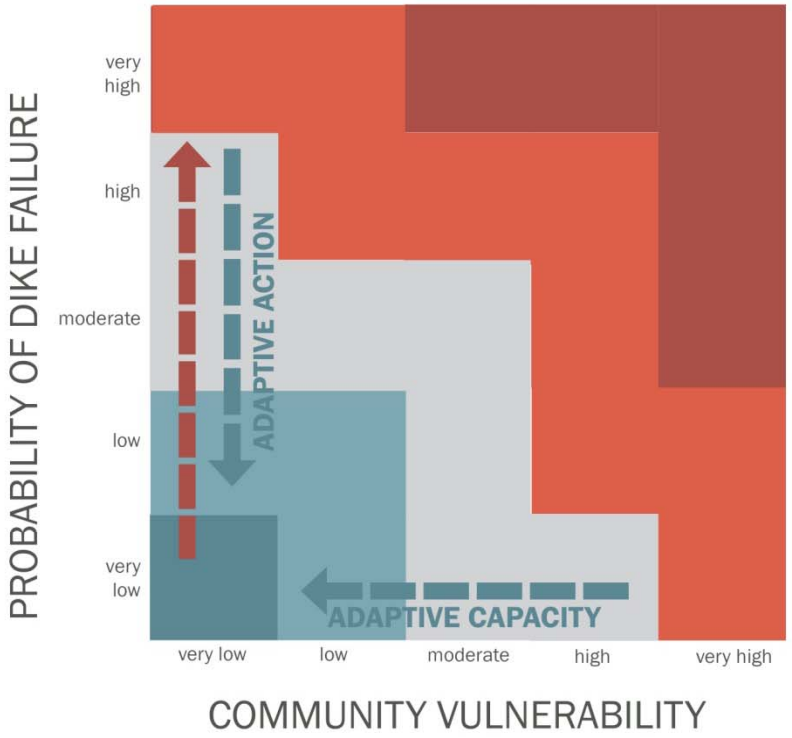
FUTURE

CURRENT

Understanding Risk and Responses

Risk Matrix

Sea level rise can increase the probability of dike and seawall failure, which increases the risk of an inundation event.

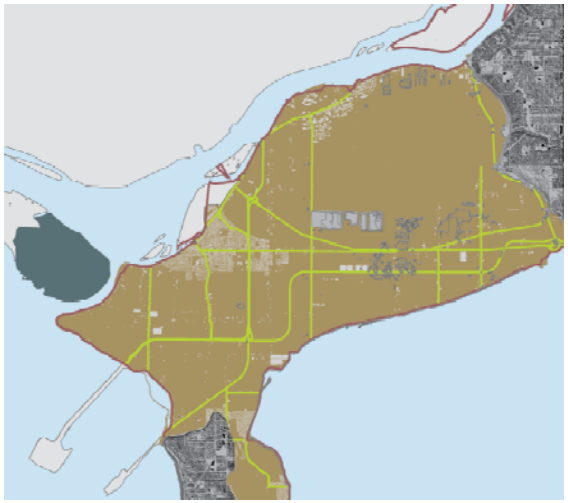


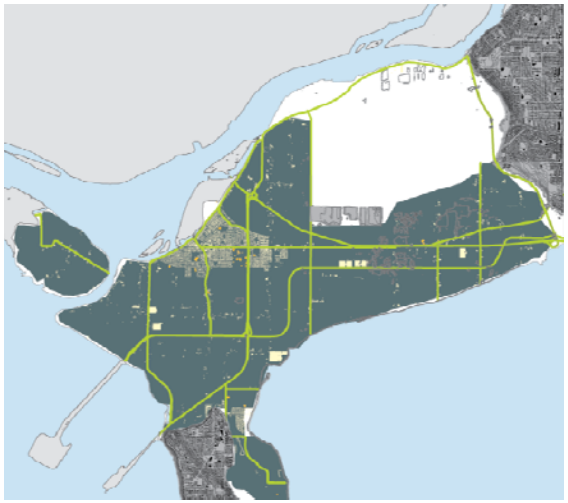
ADAPTIVE ACTION to improve protective infrastructure reduces the probability of infrastructure failure, moving inundation risk back down.

Increasing the community's ADAPTIVE CAPACITY reduces the consequences of a flood event, reducing risk from inundation.

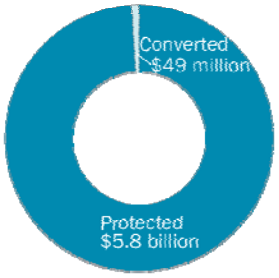
How to Adapt? Three Scenarios

- Hold the line
- Build Up
- Managed Retreat

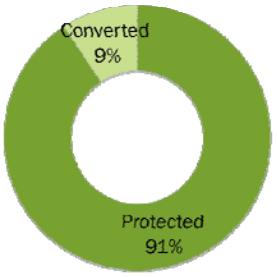




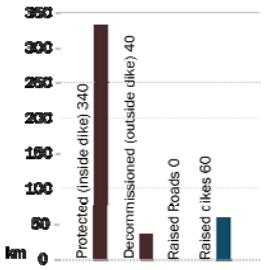
Hold the Line



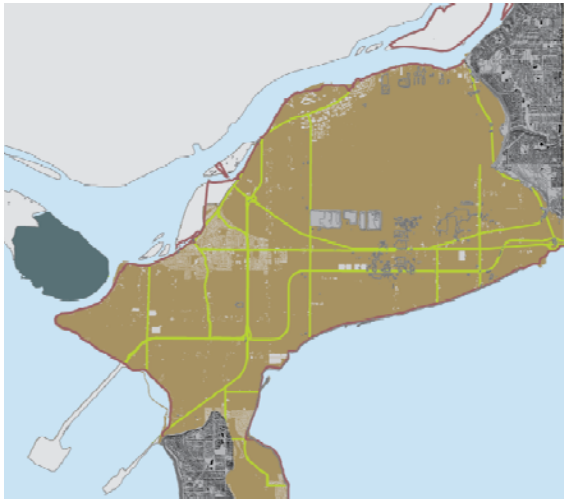
Value of Land & Buildings



Agricultural Land Area



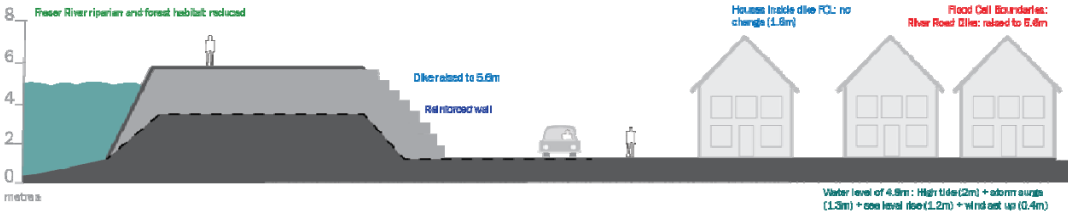
Road & Dike Length



Ladner Aerial View

1.2 m Sea Level Rise, Year ~2100

Hold the Line



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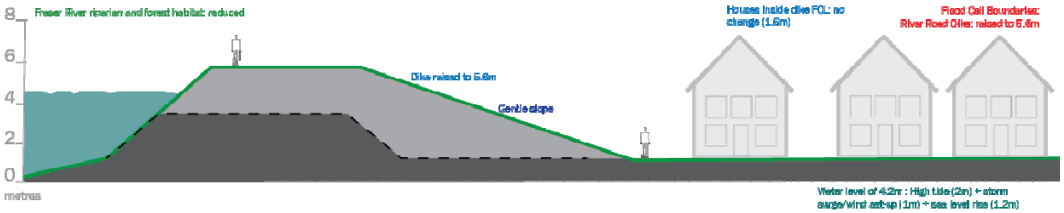

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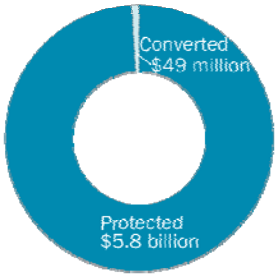

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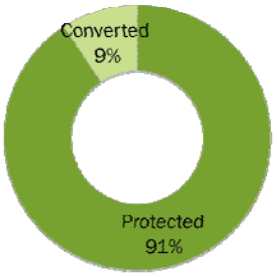

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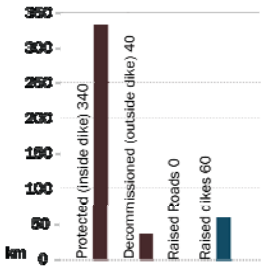

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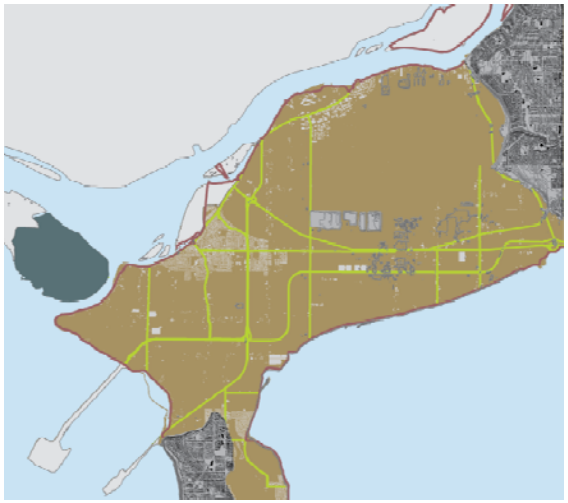

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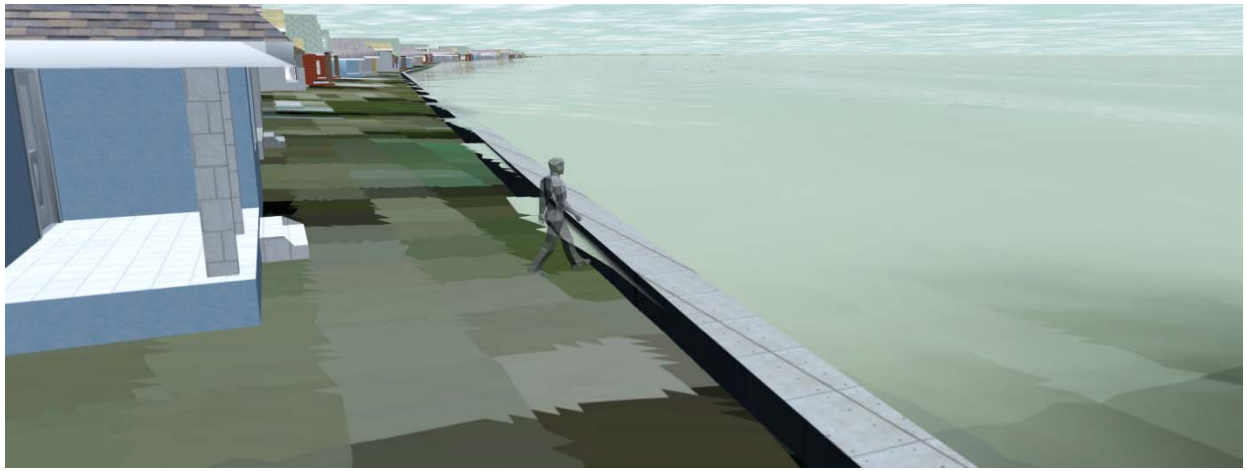
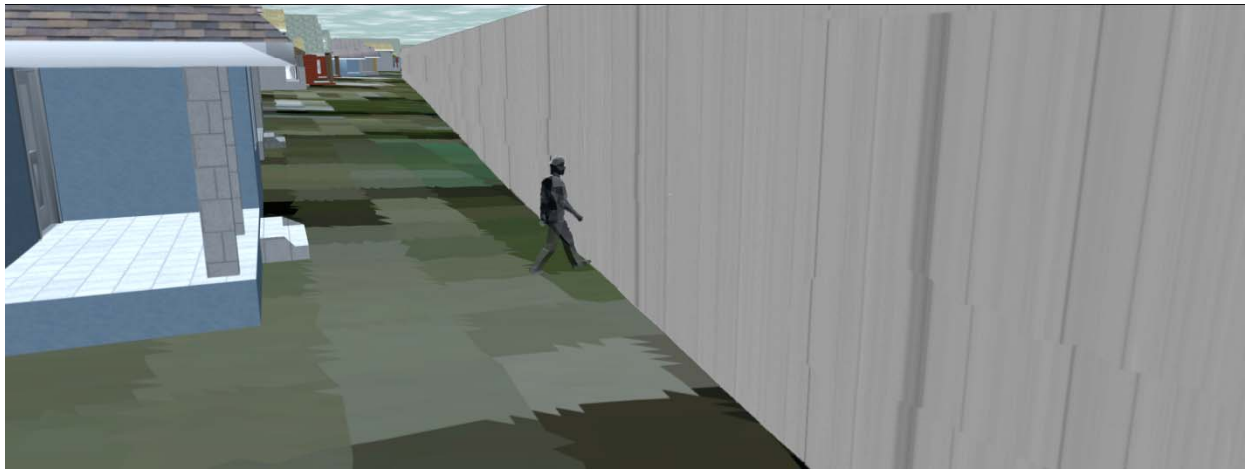
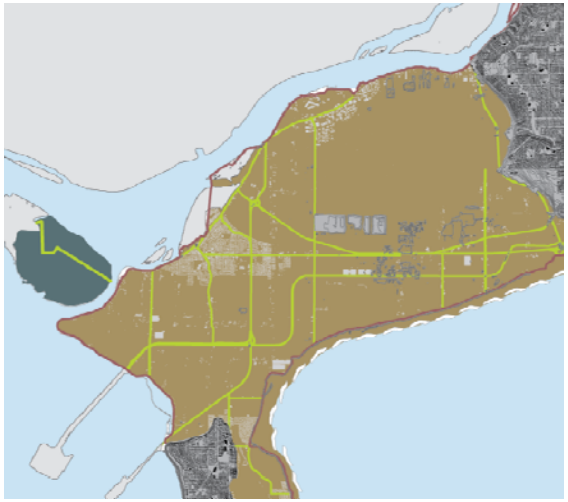
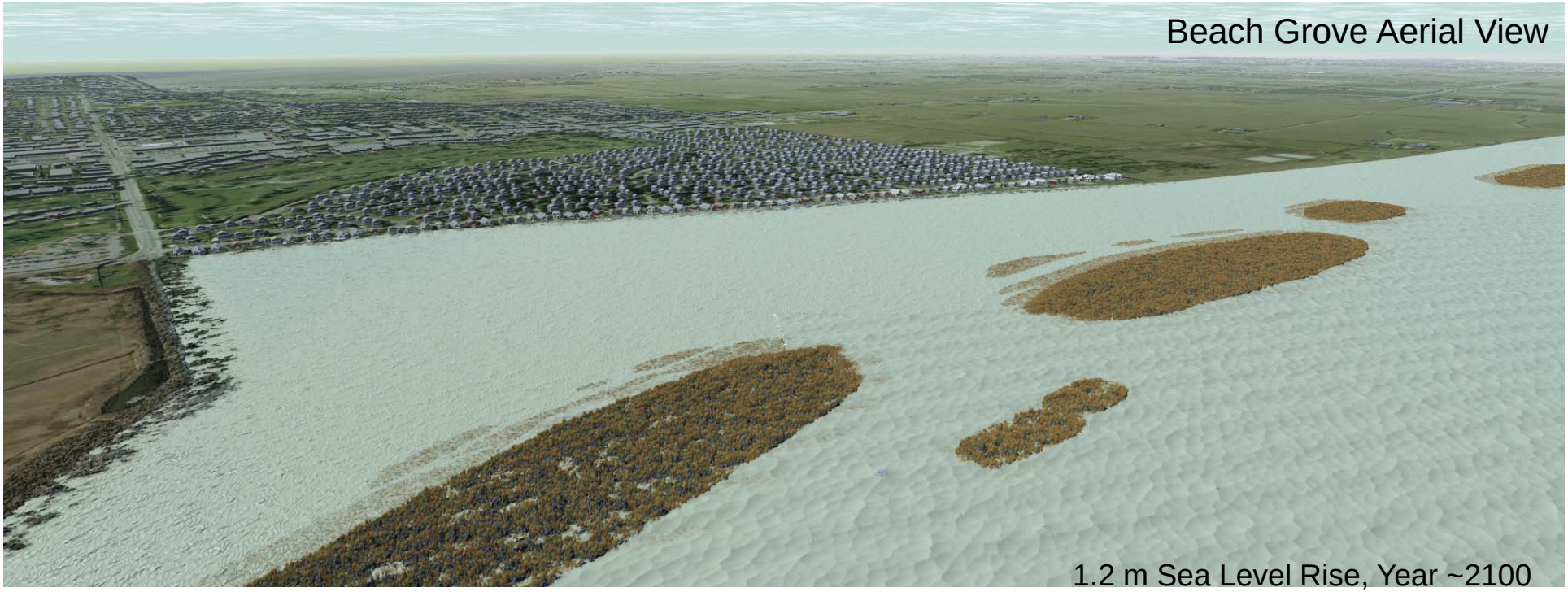




1.2 m Sea Level Rise, Year ~2100

Hold the Line – Reinforce and Reclaim

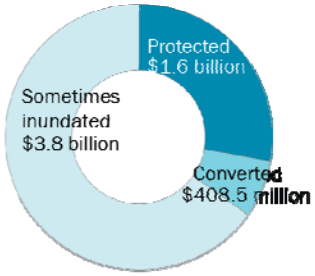




Beach Grove Aerial View

1.2 m Sea Level Rise, Year ~2100

Build Up



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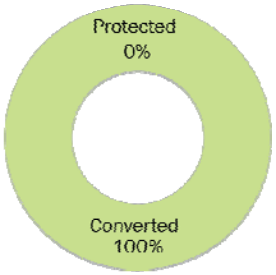

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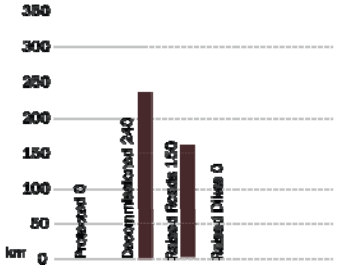

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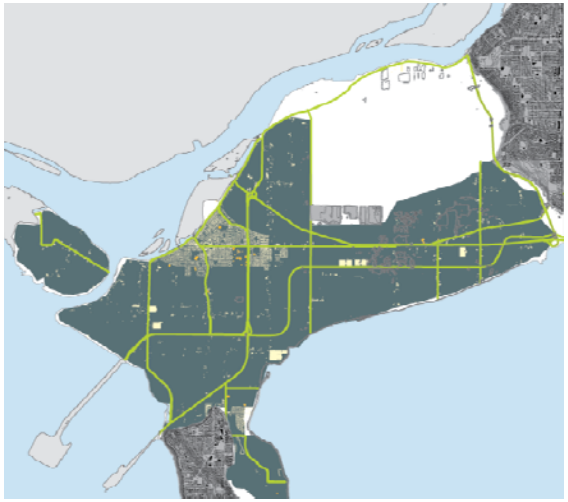

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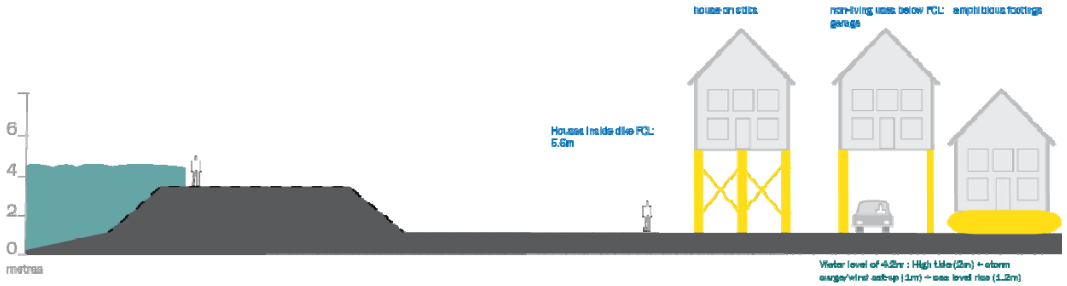
6
4
2
0
metres
House inside dike FCL: 5.6m
house on stilts
non-living uses below FCL: amphibious footings garage
Water level of 4.2m : High tide (2m) + storm surge/wind set-up (1m) + sea level rise (1.2m)

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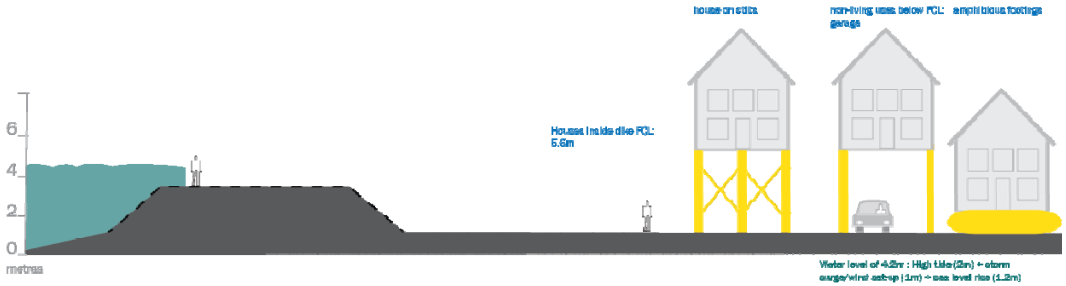
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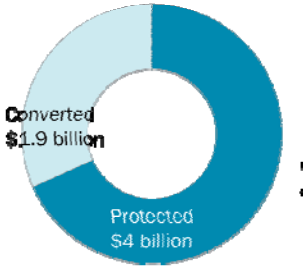
Managed Retreat



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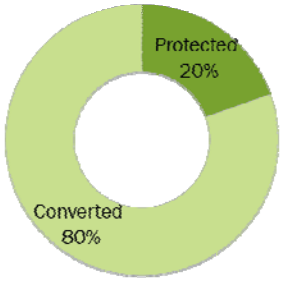

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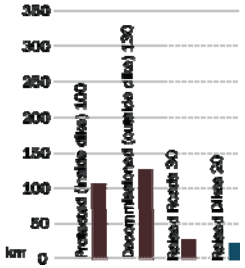


Road & Dike Length

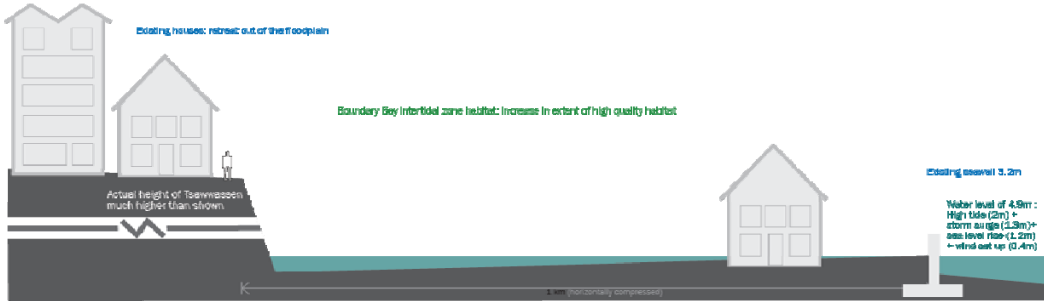
Managed Retreat

UBC

CALP

Managed Retreat

Managed Retreat



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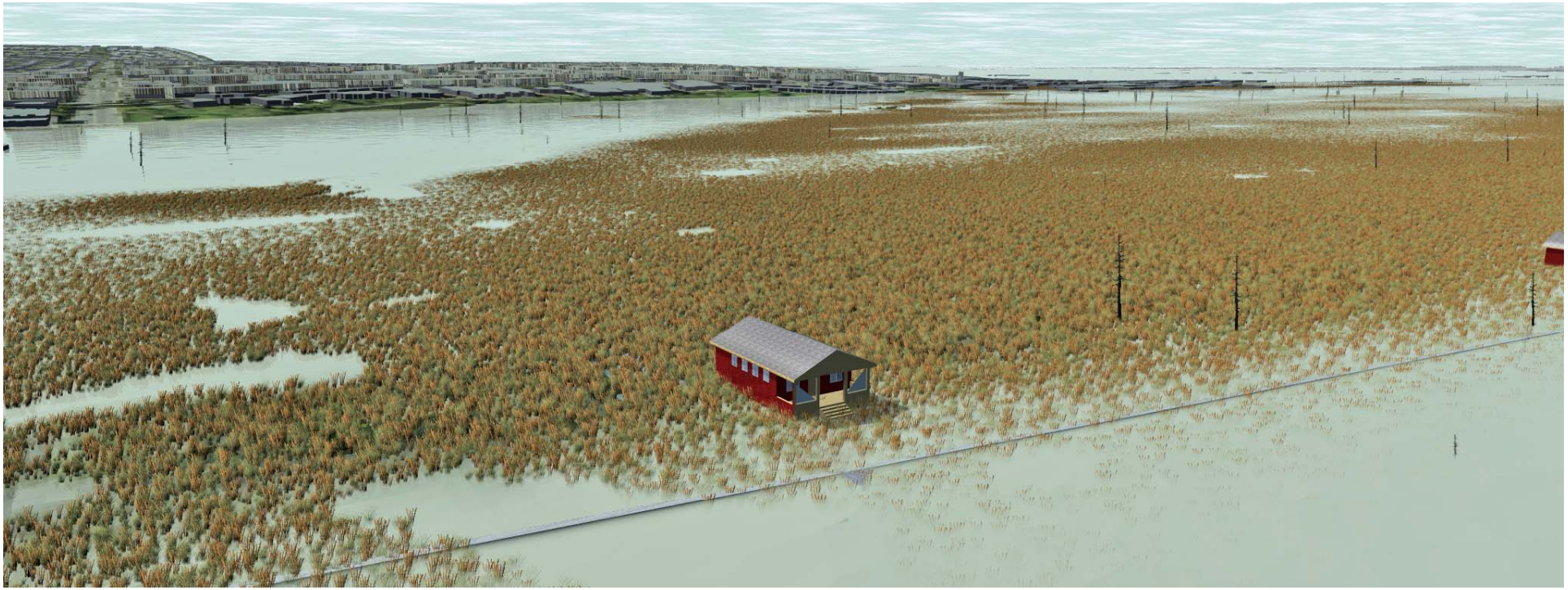

1.2 m Sea Level Rise, Year ~2100

Findings to date

- A few key climate projections can begin the adaptation conversation
- Scenarios + viz engender good discussions; policy implications
- Managed retreat is on the table

Thank you!

Ellen Pond

epond@mail.ubc.ca