Conservation Challenges, Successes, and Lessons Learned in the Fraser River Estuary

Presented by:

Daniel Stewart | MSc, RPBio
Asarum Ecological Consulting

daniel.stewart@asarum.org

@asarum.ecological

danjstew

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Introduction

- BSc in Ecological Restoration (BCIT, 2015)
- Asarum Ecological Consulting (2014)
- MSc in Forestry (UBC, 2021)
- Specializing in:
  - Wetland plant ecology
  - Ecological restoration
  - Invasive species
  - Species at risk
  - Tidal marshes


Photo: Alex Harris

Overview

1. Applying a multi-species approach to restoration

2. Defining contemporary restoration targets

3. Re-examining our role in an urban estuary

Applying a multi-species approach to restoration

Vancouver Island beggarticks

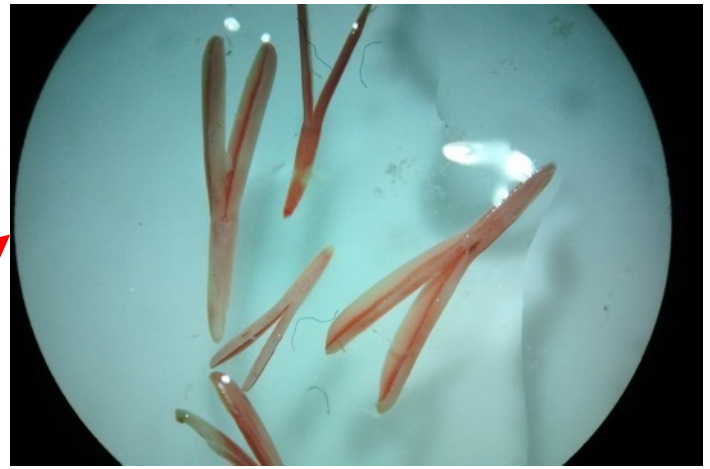
Bidens amplissima

COSEWIC: Special Concern

BC STATUS: Blue, S3

- Annual herb, often branching, 0.5-1.0 m height
- Yellow, daisy-like ray flowers
- Occurs in brackish to fresh water marshes, ephemeral ponds and lake edges
- Seeds have barbed awns that allow them to latch on to waterfowl (and field crews)

Achene (top left), tripartite leaf (bottom left), and flower (right) of *Bidens amplissima.*

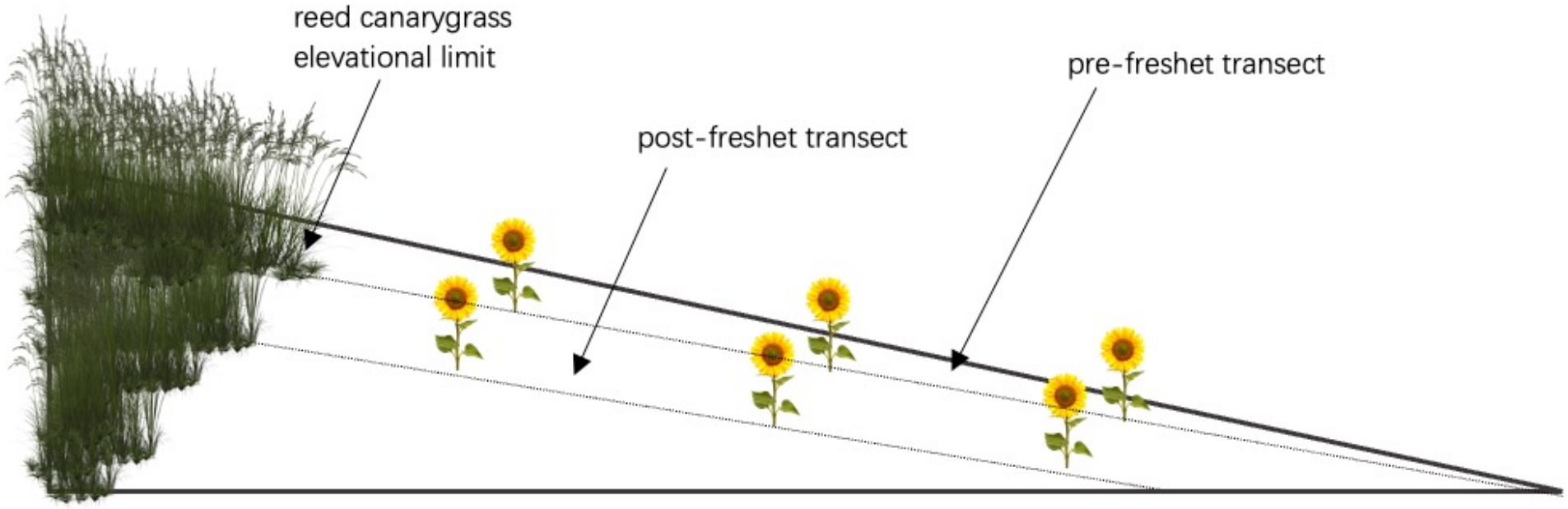


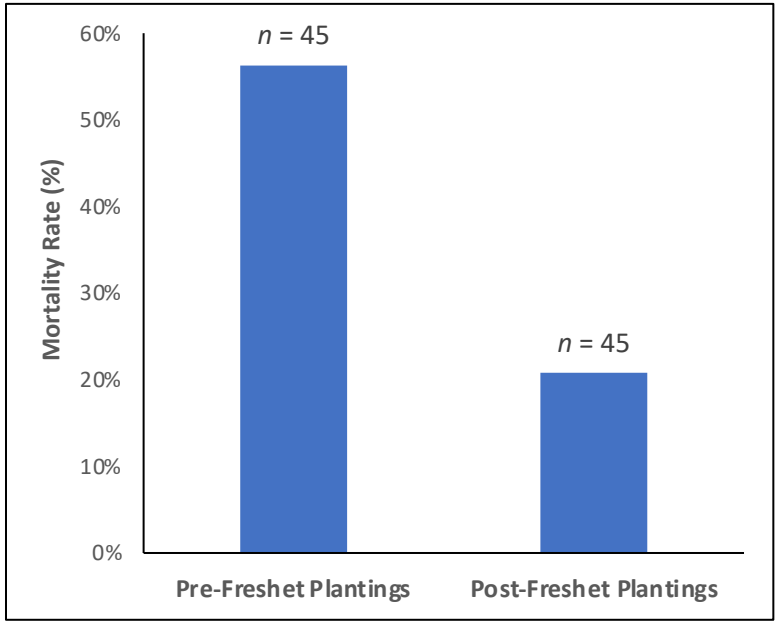

WTP - R
WTP - UR
NB - UR
NB-R

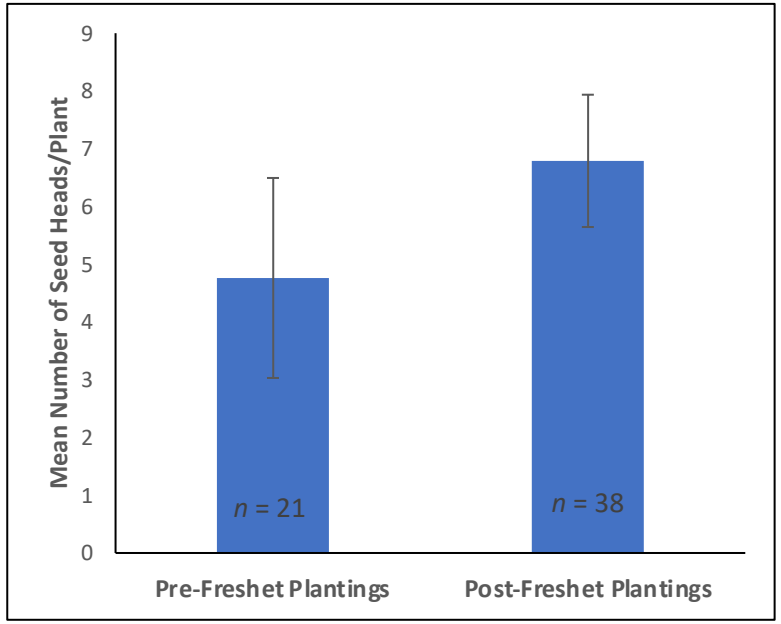
Beggarticks Findings

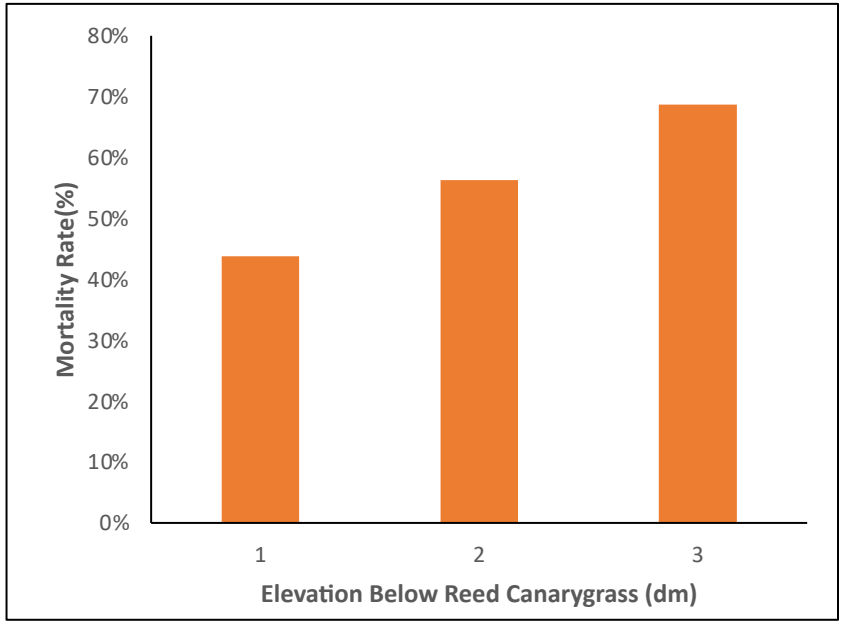
- populations occur in a variety of soil types, hydrological regimes
- appeared to be sensitive to competition
- germination rates were highest in saturated soils, planted at surface
- reproduction is not limiting

Why is it rare?

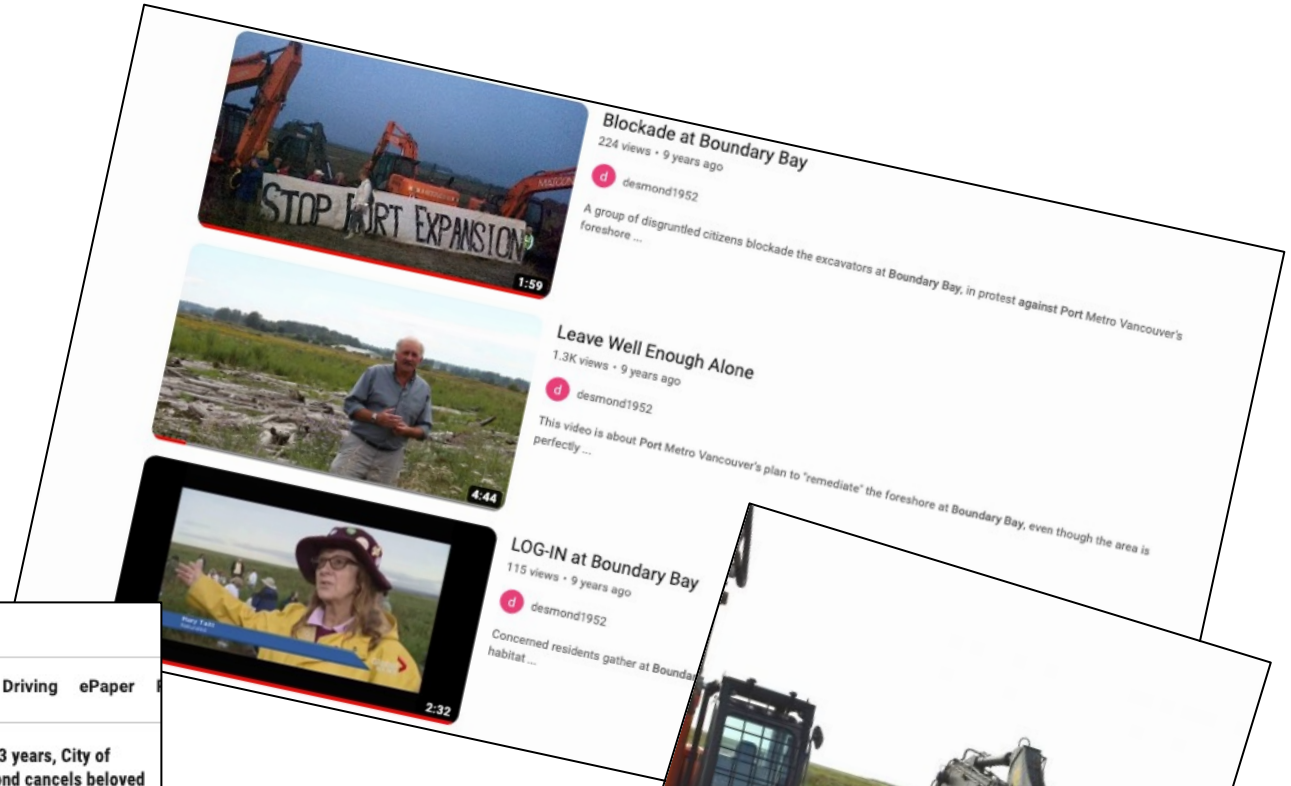

reed canarygrass
elevational limit
post-freshet transect
pre-freshet transect


60%
50%
40%
30%
20%
10%
0%
Mortality Rate (%)
n = 45
n = 45
Pre-Freshet Plantings
Post-Freshet Plantings


9
8
7
6
5
4
3
2
1
0
Mean Number of Seed Heads/Plant
n = 21
n = 38
Pre-Freshet Plantings
Post-Freshet Plantings


80%
70%
60%
50%
40%
30%
20%
10%
0%
Mortality Rate(%)
1
2
3
Elevation Below Reed Canarygrass (dm)

Defining contemporary restoration targets



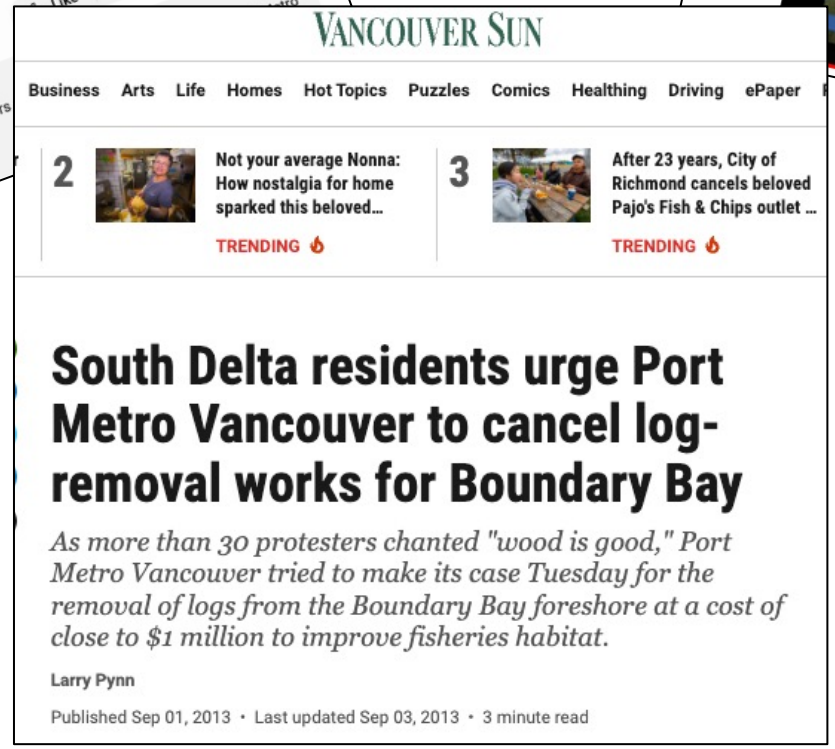


Photo: Murray Bush

Opposition

1. Logs have always been abundant
2. Logs are a natural part of marsh ecosystems
3. Works will be disruptive to marsh ecosystem
4. Won’t the logs just come back?
5. Credit for damage elsewhere?

1. Logs have always been abundant

2. Logs are a natural part of marsh ecosystems

"[the] shoal continues along the coast to the distance of seven or eight miles from the shore, on which were lodged, and especially before these [river] openings, logs of wood, and stumps of trees innumerable" (Roberts et al. 1998) - George Vancouver at Point Grey (1792)

"The course of the Fraser is full of dangers and difficulties... the river is as full of 'snags' and 'sawyers' as the Mississippi" (Boddam-Wetham 1874)

Thomas, Patty. 'Wood Debris Removal from British Columbia's Lower Fraser River Marshes: An Analysis of a Complex Restoration Issue', 2002.

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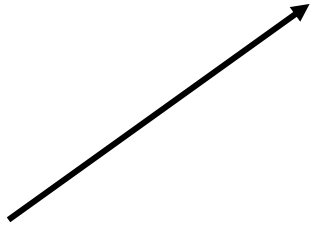


Marsh was also more abundant

GRASS AND GRASSLIKE PLANTS

- **sg sw s** — **Salt marsh:** saltgrass(sg), saltwort(sw), sedge(s).
- **br s ct** — **Tidal marsh:** bulrush(br), sedge(s), cattails(ct).
- **ct** — **Freshwater marsh:** cattails(ct).
- **g** — **Prairie*:** grass(g).
- **g Wh hh ca** — **Prairie grass with shrubs:** grass(g), Willow(W), hardhack(hh), crabapple(ca).

SHRUBS

- **ca** — **Crabapple**(ca).
- **W** — **Willow**(W).
- **W ca hh r** — **Mixed shrubs:** Willow(W), crabapple(ca), hardhack(hh), rose(r).

SHRUB/MOSS

- **lt cb P** — **Labrador tea:** labrador tea(lt), cranberry(cb), salal, Pine(P).
- **cb P** — **Cranberry marsh*:** cranberry(cb), Pine(P).
- **m P** — **Moss with scrub pine:** sphagnum (m), scattered Pine (P), Hemlock, Spruce.

WOODLAND

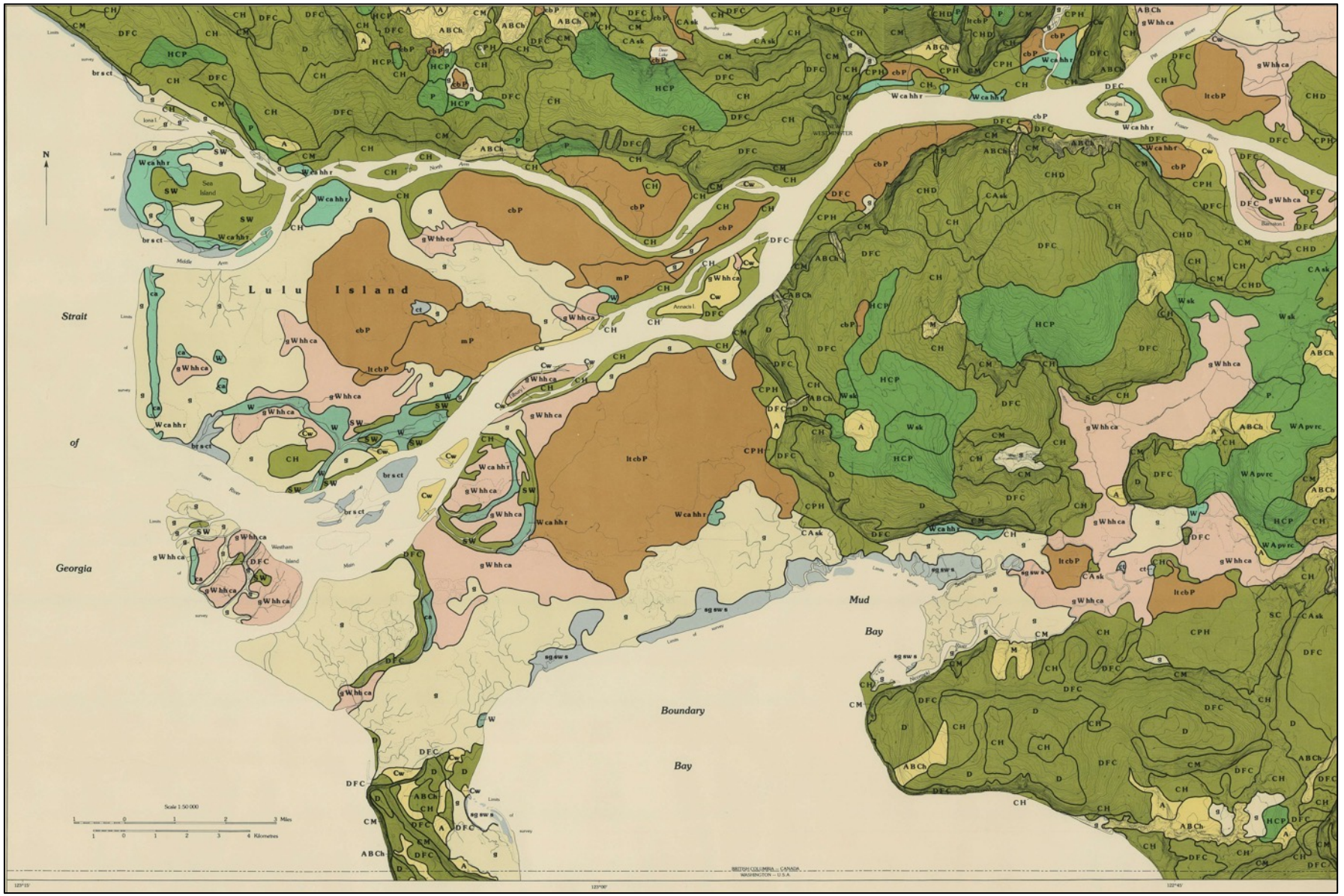
- **M** — **Maple bottom*:** Broadleaf Maple(M), vine maple, ferns, [Cedar].
- **A** — **Alder bottom*:** Alder(A), Willow, ferns, [Cedar], [Hemlock], [Spruce].
- **Cw** — **Mixed woodland:** Cottonwood(Cw), Alder, Willow, crabapple.
- **A B Ch** — **Mixed deciduous regeneration forest:** Alder(A), Birch(B), Cherry(Ch), Willow, [Cottonwood], crabapple, ferns with Cedar, Hemlock, Douglas fir regeneration.

SCRUB FOREST

- **W sk** — **Willow scrub*:** Willow(W), Alder, [Cedar], skunk cabbage(sk).
- **W A pv rc** — **Scrub with herbs:** Willow(W), Alder(A), Hazel, [Plum], [Cherry], ferns, pea vine(pv), red clover(rc).
- **P** — **Pine scrub*:** Pine species(P).
- **H C P** — **Mixed scrub:** Hemlock(H), Cedar(C), Pine species(P), [Douglas fir], Alder, Cherry, Hazel, vine maple, ferns.

CONIFEROUS FOREST

- **C P H** — **Mixed coniferous forest on organics:** Cedar(C), Pine(P), Hemlock(H), Spruce, [labrador tea], [cranberry], moss.
- **C A sk** — **Cedar swamp*:** Cedar(C), Alder(A), Willow, hardhack, skunk cabbage(sk).
- **C H** — **Mixed wet:** Cedar(C), Hemlock(H), Spruce, Alder, [Cottonwood], Willow, Yew, [crabapple], ferns.
- **S W** — **Spruce:** Spruce(S), Willow(W), Alder, crabapple, vine maple, briars.
- **S C** — **Spruce:** Spruce(S), Cedar(C), [Hemlock], Broadleaf Maple, [Alder], [Cottonwood].
- **C H D** — **Mixed coniferous:** Cedar(C), Hemlock(H), Douglas fir(D), Alder, Willow, vine maple.
- **C M** — **Slope:** Cedar(C), Broadleaf Maple (M), Hemlock, [Douglas fir], Alder, vine maple, ferns.
- **D F C** — **Mixed coniferous:** Douglas fir(D), Grand fir(F), Cedar(C), [Hemlock], [Pine], [Spruce], Alder, Dogwood, vine maple, briars.
- **D** — **Douglas fir:** Douglas fir(D), [Cedar], salal, oregon grape, [hawthorn].



North, M.E.A., Dunn, M.W., Teversham, J.M. 'Vegetation of the Southwestern Fraser Lowland: 1858 - 1880', 1977.

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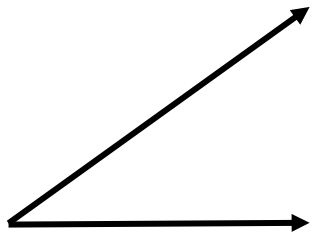


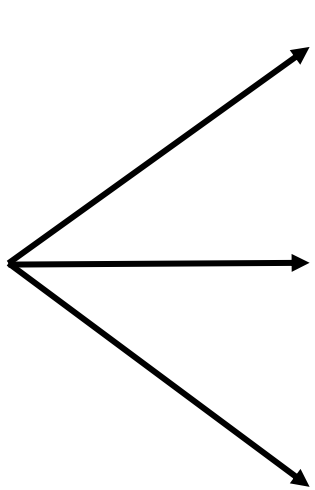
Marsh was also more abundant

Are all logs the same?

VS.

1. Logs have always been abundant

2. Logs are a natural part of marsh ecosystems



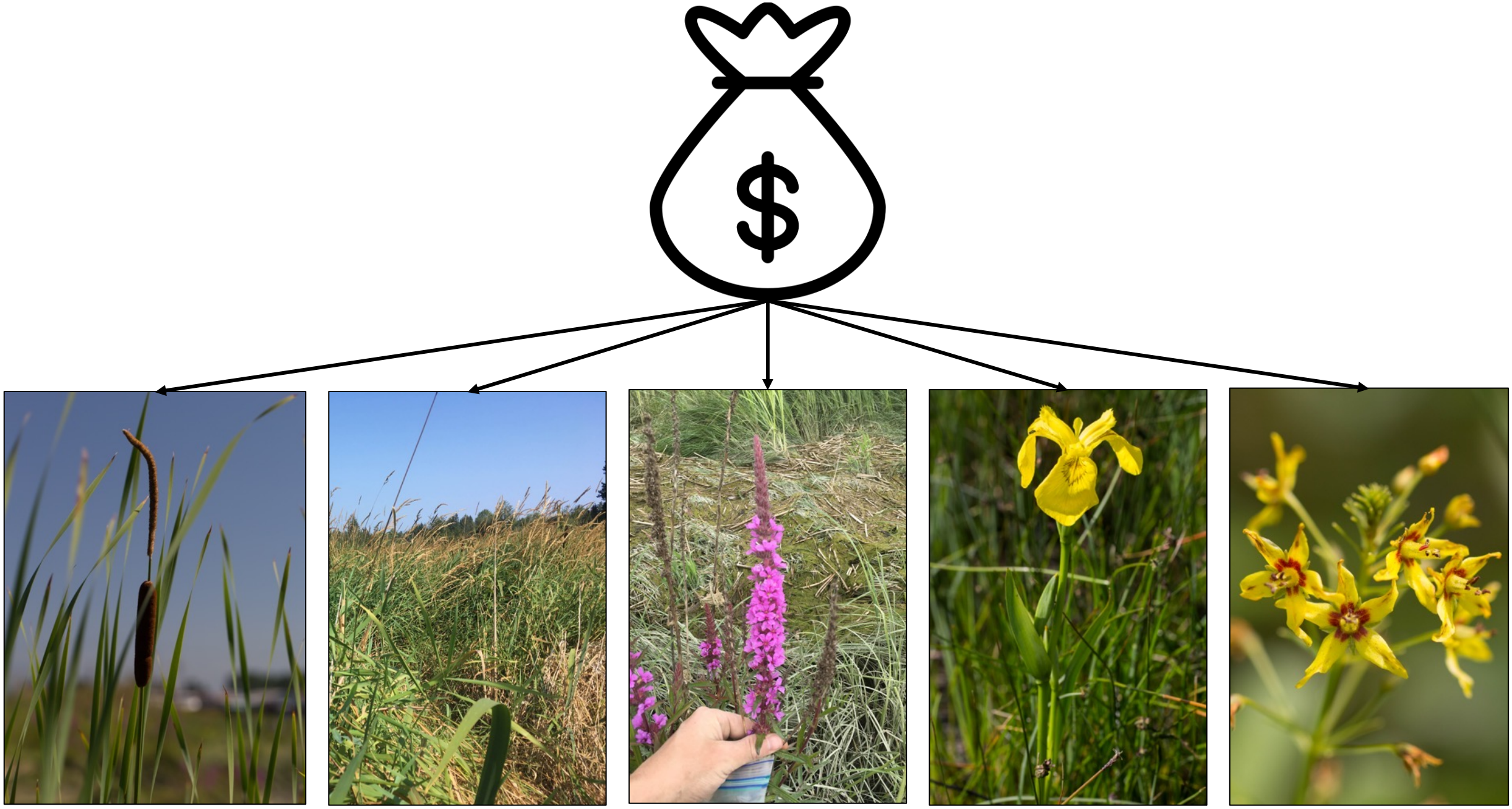
Marsh was also more abundant

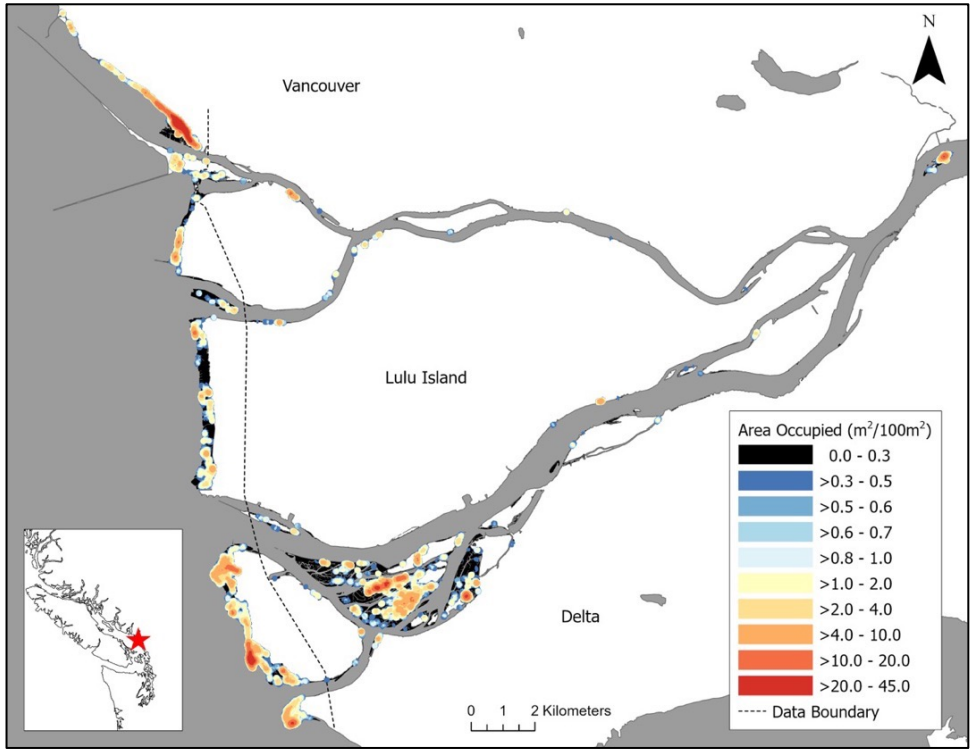
Are all logs the same?

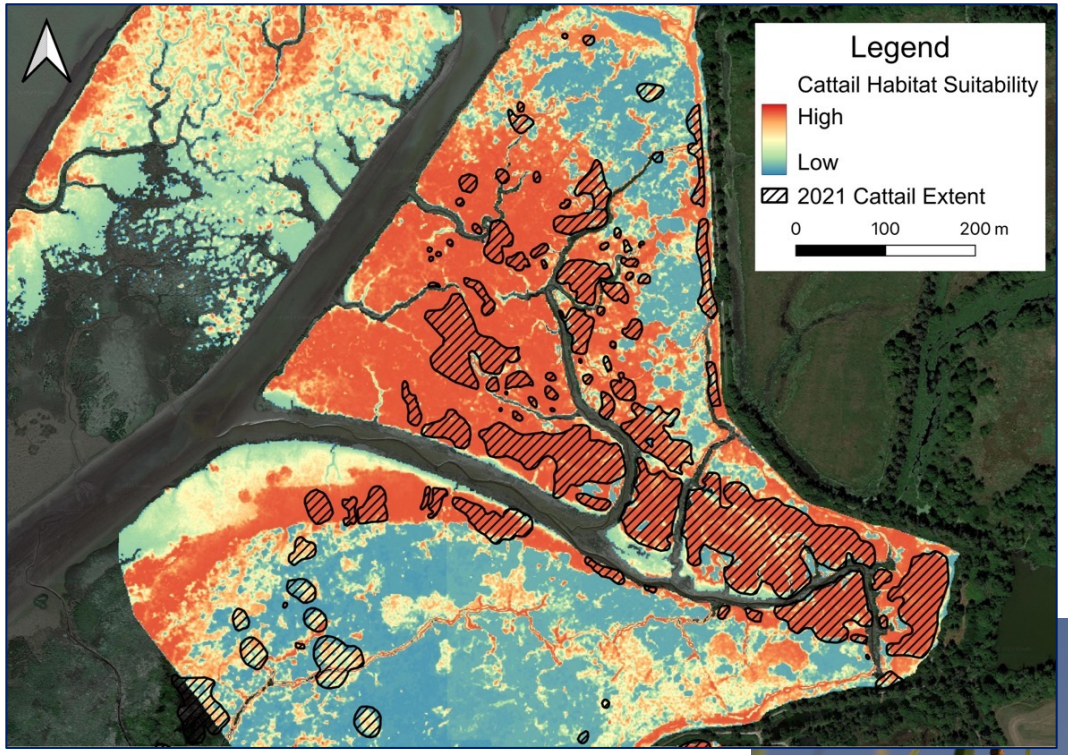
Is this target still attainable and applicable to the present?

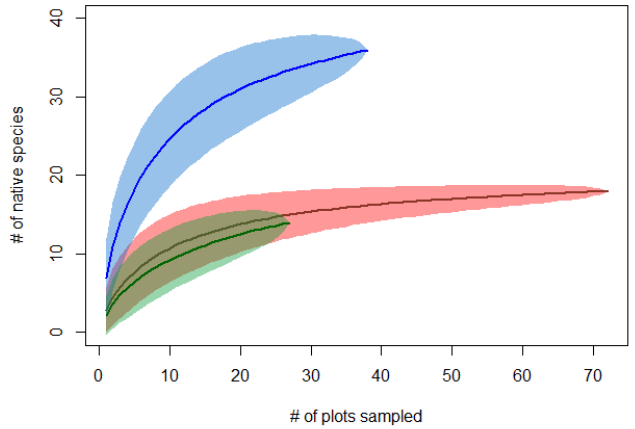

Photo: City of Richmond


Boundary Bay Tidal Marsh
Restoration Project









Stewart, Daniel, W. Gregory Hood, and Tara G. Martin. 'Undetected but Widespread: The Cryptic Invasion of Non-Native Cattail (Typha) in a Pacific Northwest Estuary'. *Estuaries and Coasts*, 27 January 2023.

Re-examining our role in an urban estuary

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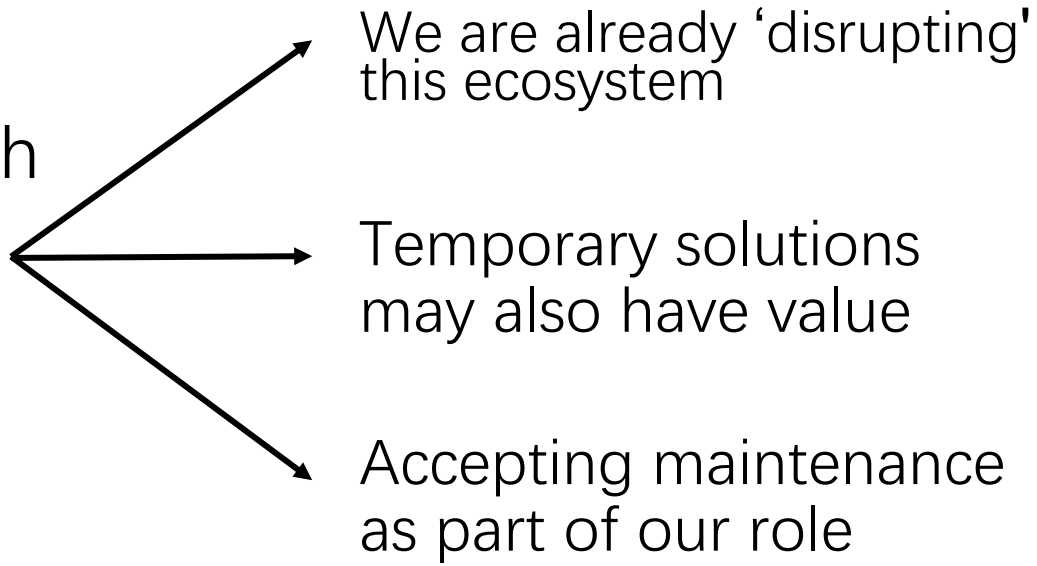


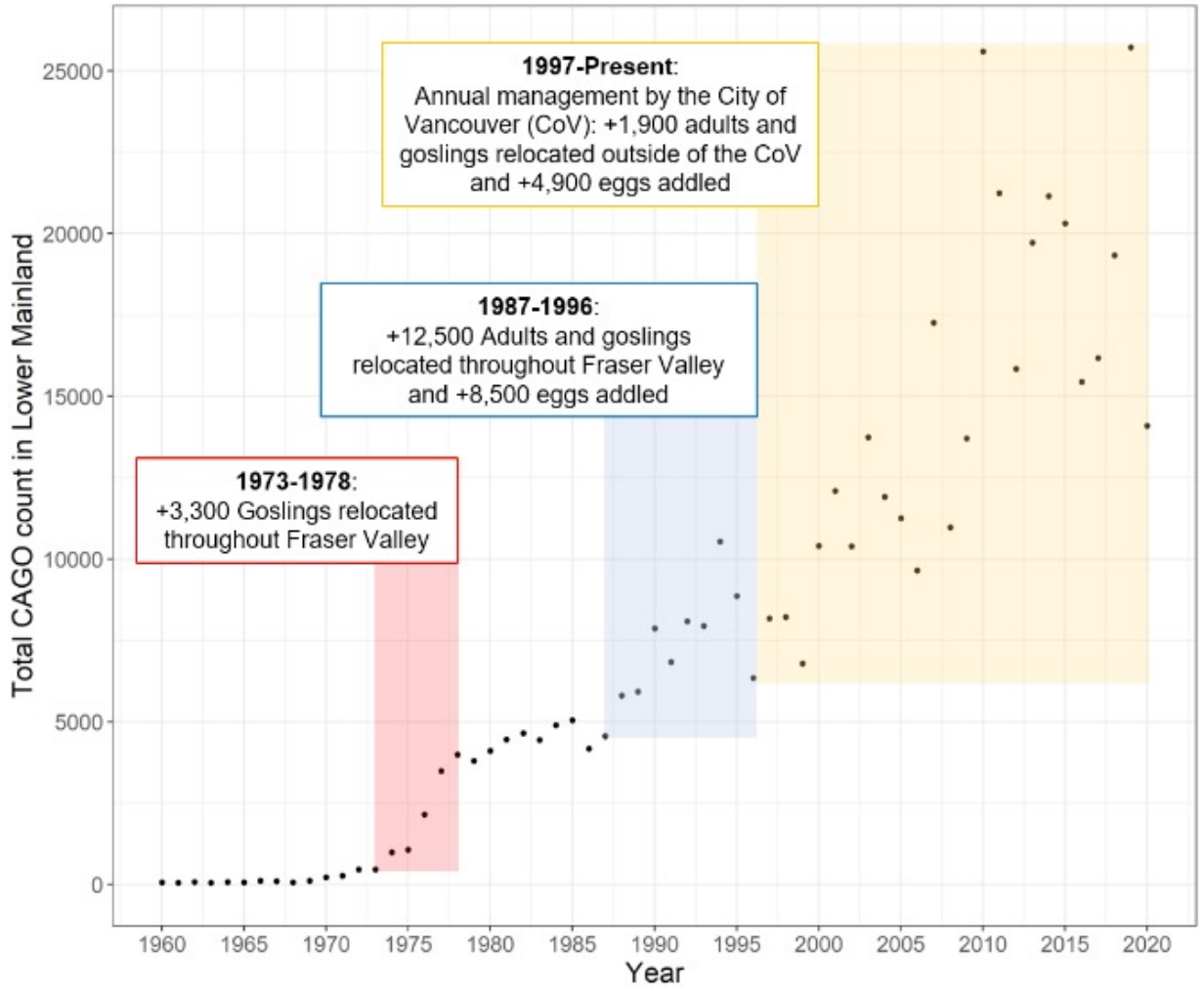
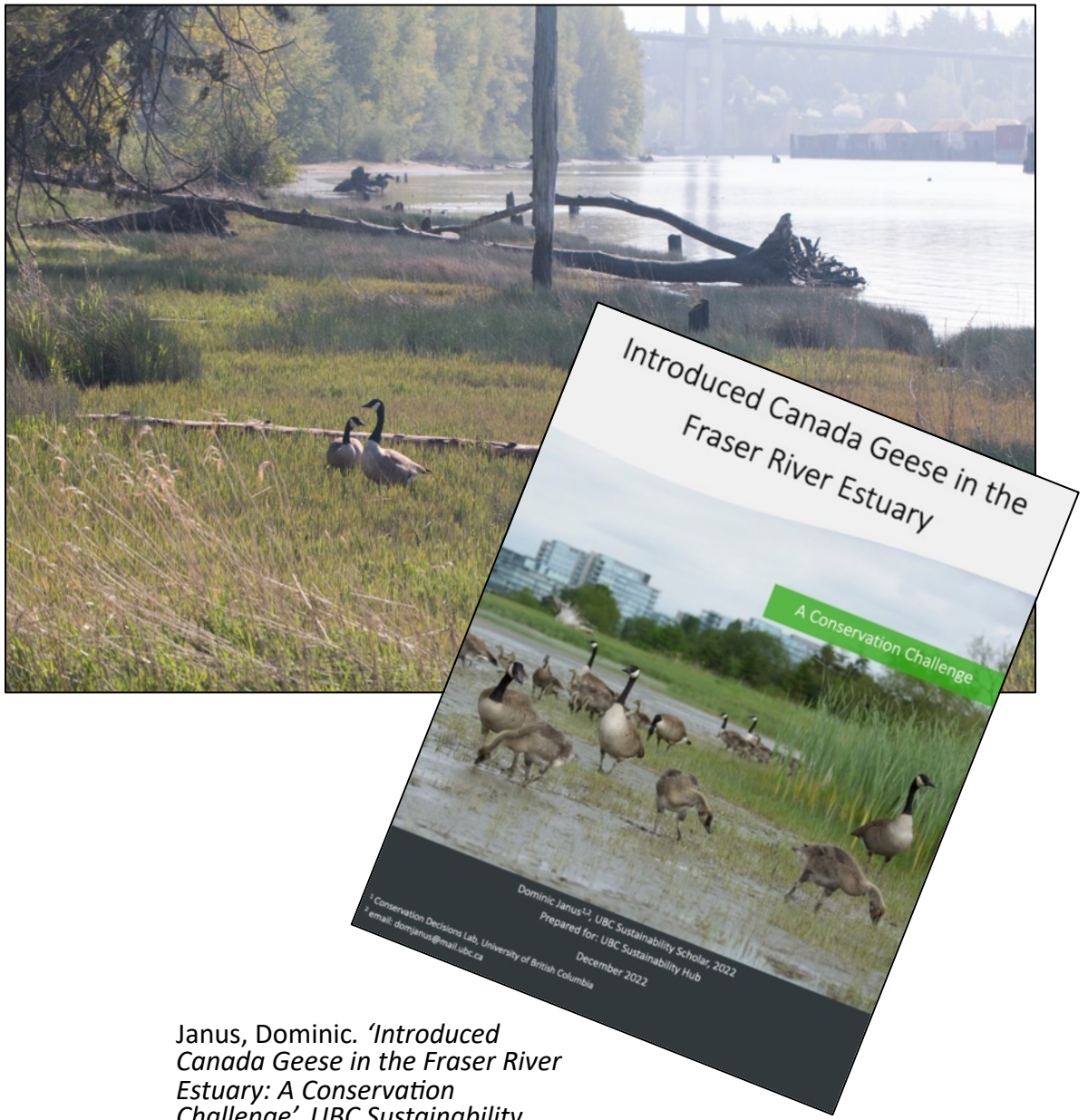
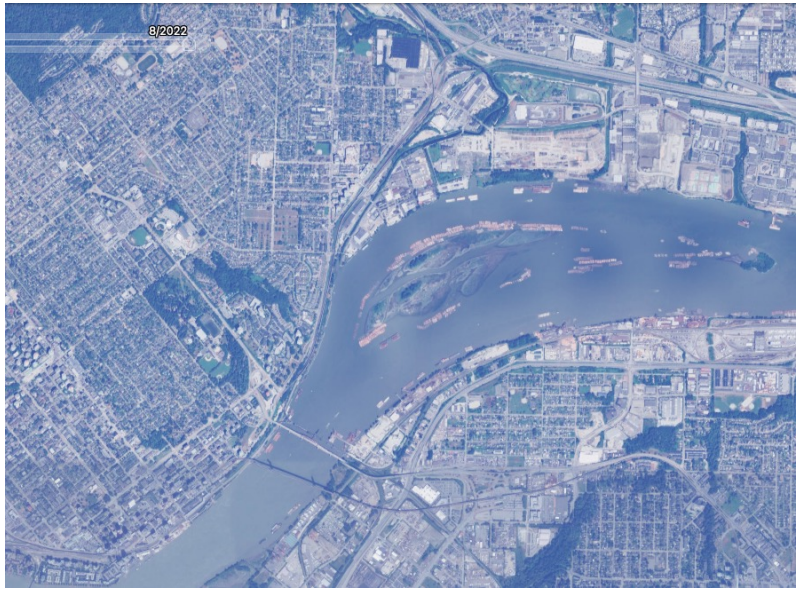


Figure 3. *Increasing abundance of wintering CAGO in the Lower Mainland based on Christmas Bird Counts (CBC; National Audubon Society, 2020), past management actions from 1960 to 1995 (Smith, 2000), and more recent management in the City of Vancouver (Pierce, 2016; K. Lauer, unpublished data, Sept 12, 2022). The Lower Mainland total count comprises data from the CBC count areas of Vancouver, Langley, Pitt Meadows, White Rock-Surrey-Langley, Abbotsford-Mission, Chilliwack, and Harrison River. For years where data were missing for CBC areas, the mean of the closest prior and later years with data were used.*



Janus, Dominic. *'Introduced Canada Geese in the Fraser River Estuary: A Conservation Challenge'. UBC Sustainability Hub. Vancouver, B.C.: University of British Columbia, 2022*

1952



2022

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Thank you!

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