



Apr 6th, 10:30 AM - 10:45 AM

## Prioritizing management actions for the Fraser River estuary

Laura Kehoe

*Univ. of Victoria, Canada, laurajkehoe@gmail.com*

Jessie Lund

*Univ. of Victoria, Canada, baumlabmanager@gmail.com*

Julia Baum

*Univ. of Victoria, Canada, baum@uvic.ca*

Lia Chalifour

*Univ. of Victoria, Canada, lia.chalifour@gmail.com*

Tara Martin

*Univ. of British Columbia, Canada, tara.martin@ubc.ca*

Follow this and additional works at: <https://cedar.wvu.edu/ssec>



Part of the [Fresh Water Studies Commons](#), [Marine Biology Commons](#), [Natural Resources and Conservation Commons](#), and the [Terrestrial and Aquatic Ecology Commons](#)

---

Kehoe, Laura; Lund, Jessie; Baum, Julia; Chalifour, Lia; and Martin, Tara, "Prioritizing management actions for the Fraser River estuary" (2018). *Salish Sea Ecosystem Conference*. 503.

<https://cedar.wvu.edu/ssec/2018ssec/allsessions/503>

This Event is brought to you for free and open access by the Conferences and Events at Western CEDAR. It has been accepted for inclusion in Salish Sea Ecosystem Conference by an authorized administrator of Western CEDAR. For more information, please contact [westerncedar@wwu.edu](mailto:westerncedar@wwu.edu).

An aerial photograph of a river delta, likely the Fraser River, showing a complex network of water channels and surrounding land. A semi-transparent black rectangular box is overlaid on the upper portion of the image, containing white text. The text is organized into a title and a numbered list of six items, each representing a topic and its associated expert or organization.

# **The Lower Fraser River: A Wildlife Hotspot on the Brink**

- 1. Decision Science** - Laura Kehoe (UVIC)
- 2. People of the River** - Janson Wong (LFFA) with Chief Dalton Silver Sumas First Nations
- 3. Marsh Recession** - Brent Gurd (FLNRO)
- 4. Juv. Chinook** - Dave Scott (Raincoast)
- 5. Coastal Waterbirds** - Karen Devitt (BSC)
- 6. Rethinking Governance** - Deborah Carlson (WCEL)



# Prioritizing Management Actions for the Fraser River Estuary

LAURA KEHOE\*, JESSIE LUND\*, LIA CHALIFOUR\*, JULIA K. BAUM\*, TARA G. MARTIN\*\*  
University of Victoria\*, University of British Columbia\*\*

[laurajkehoe@gmail.com](mailto:laurajkehoe@gmail.com)

[@laurajkehoe](https://twitter.com/laurajkehoe)

[laurakehoe.org](http://laurakehoe.org)

# Ecological & Economic Importance



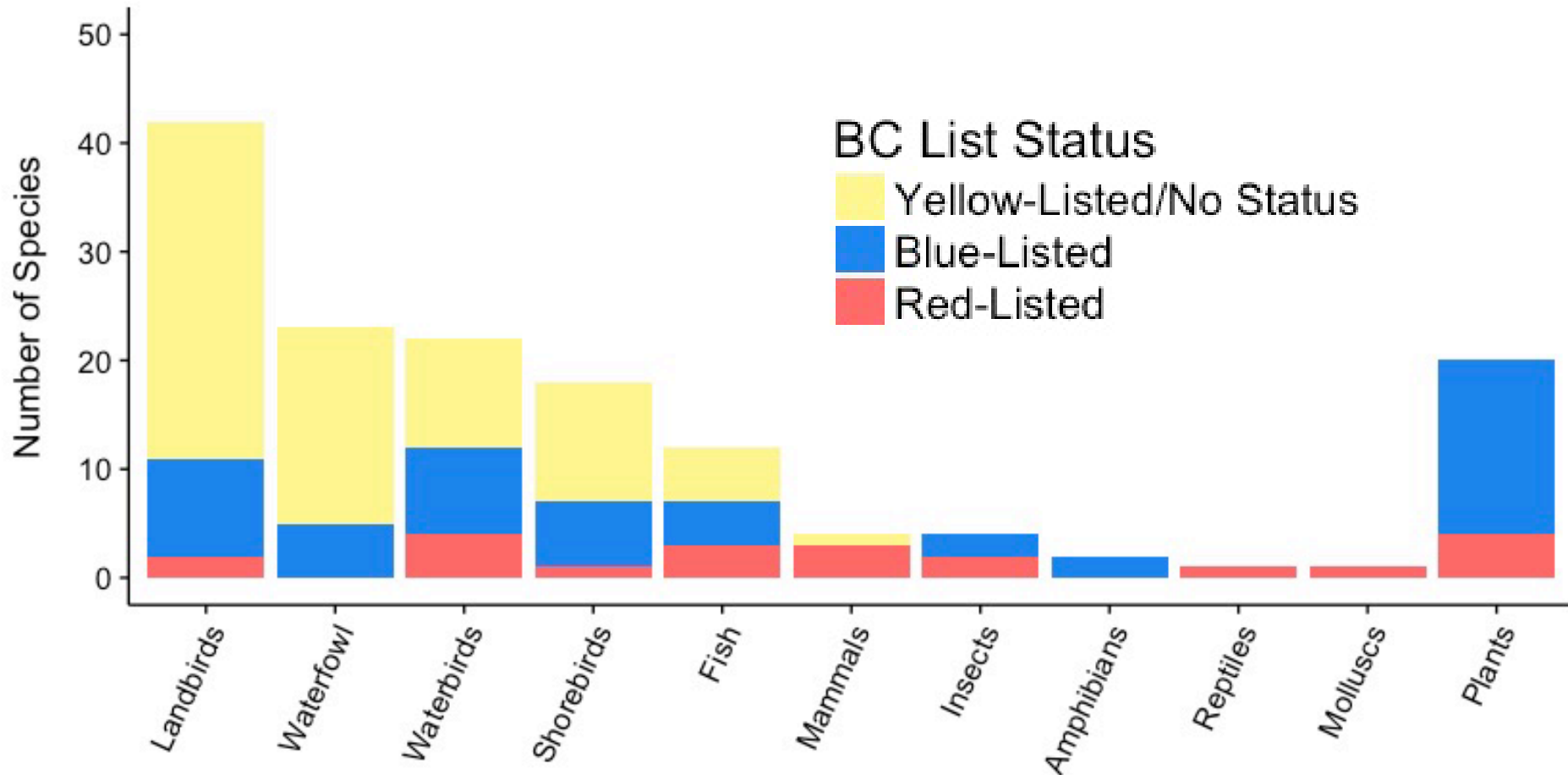
# A Wildlife Hotspot on the Brink



Photo: James Wheeler

# Species of conservation concern

- BC List Status of **Red** or **Blue**, **COSEWIC** or **SARA** status
- Conservation Framework Priority (1-3), Priority Species BCR5
- High Cultural and/or Economic Importance





WEST VANCOUVER

NORTH VANCOUVER

ANMORE

BELCARRA

COQUITLAM

PORT MOODY

BURNABY

PORT COQUITLAM

PITT MEADOWS

MAPLE RIDGE

VANCOUVER

NEW WESTMINSTER

SURREY

RICHMOND

DELTA

LANGLEY CITY

LANGLEY

WHITE ROCK

CANADA

U.S.A.

Burrard Inlet

Capilano River

Seymour River

Indian Arm

Coquitlam River

Pitt River

Alouette River

Brunette River

Fraser River

North Arm

South Arm

Serpentine River

Nicomekl River

Campbell River

Sea Island

Lulu Island

Annacis Island

Barnston Island


Sturgeon Bank

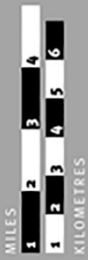
Westham Island

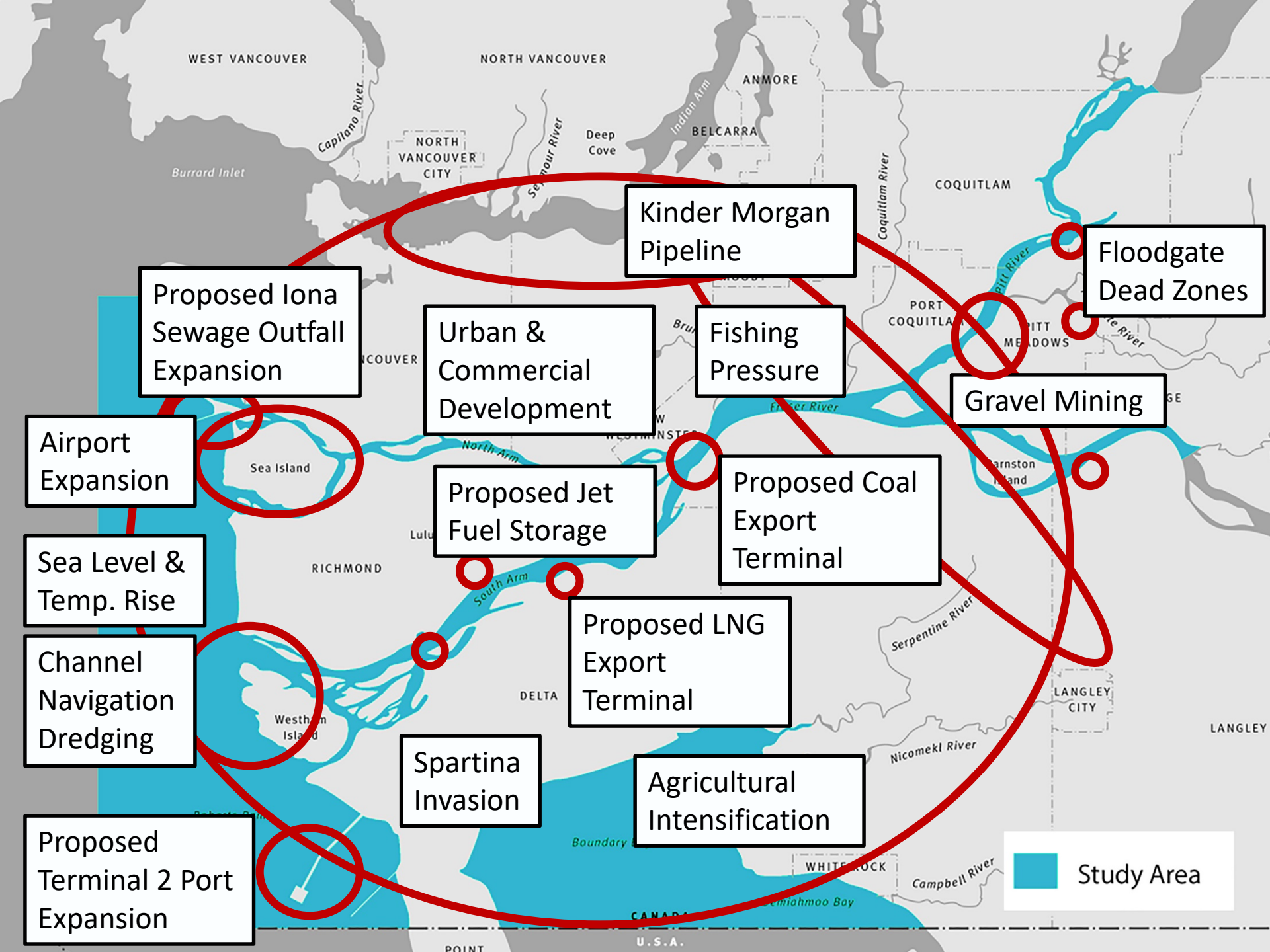
Roberts Bank

Boundary Bay

Semiahmoo Bay

 Study Area





Proposed Iona Sewage Outfall Expansion

Airport Expansion

Sea Level & Temp. Rise

Channel Navigation Dredging

Proposed Terminal 2 Port Expansion

Urban & Commercial Development

Proposed Jet Fuel Storage

Spartina Invasion

Kinder Morgan Pipeline

Fishing Pressure

Proposed Coal Export Terminal

Proposed LNG Export Terminal

Agricultural Intensification

Floodgate Dead Zones

Gravel Mining

Study Area



# Knowledge to date

- Significant investment in understanding threats
- Less work focussed on identifying the *management actions* to abate these threats
- A *priority threat management* framework can fill this gap
  - Participatory approach using expert knowledge



# Q's Priority Threat Management can answer

Which actions are most cost-effective (save most species per \$ spent)?

How many species can be saved for a given budget?

Which species and ecosystems:

1. will be lost without management?
2. are unable to be saved, irrespective of management?



# How do we prioritize conservation actions?

- (1) Define **objectives**
- (2) State **constraints**
- (3) List **biodiversity assets**
- (4) **Weight** assets
- (5) List **management actions**
- (6) Calculate the:
  - **costs**
  - **benefits**
  - **feasibility**
- (7) Employ cost-effectiveness analysis to **rank actions**

# Three main components to rank actions

$$\text{Cost effectiveness} = \frac{B * F}{C}$$

B = Benefits of the action

F = Feasibility of action

C = Costs of action

# K-RACE

Problematic Species Management

Aquatic Disease Control

Pollution Control

Transport Regulation

Population Augmentation



K-RACE



K-RACE



K-RACE





**K-RACE**

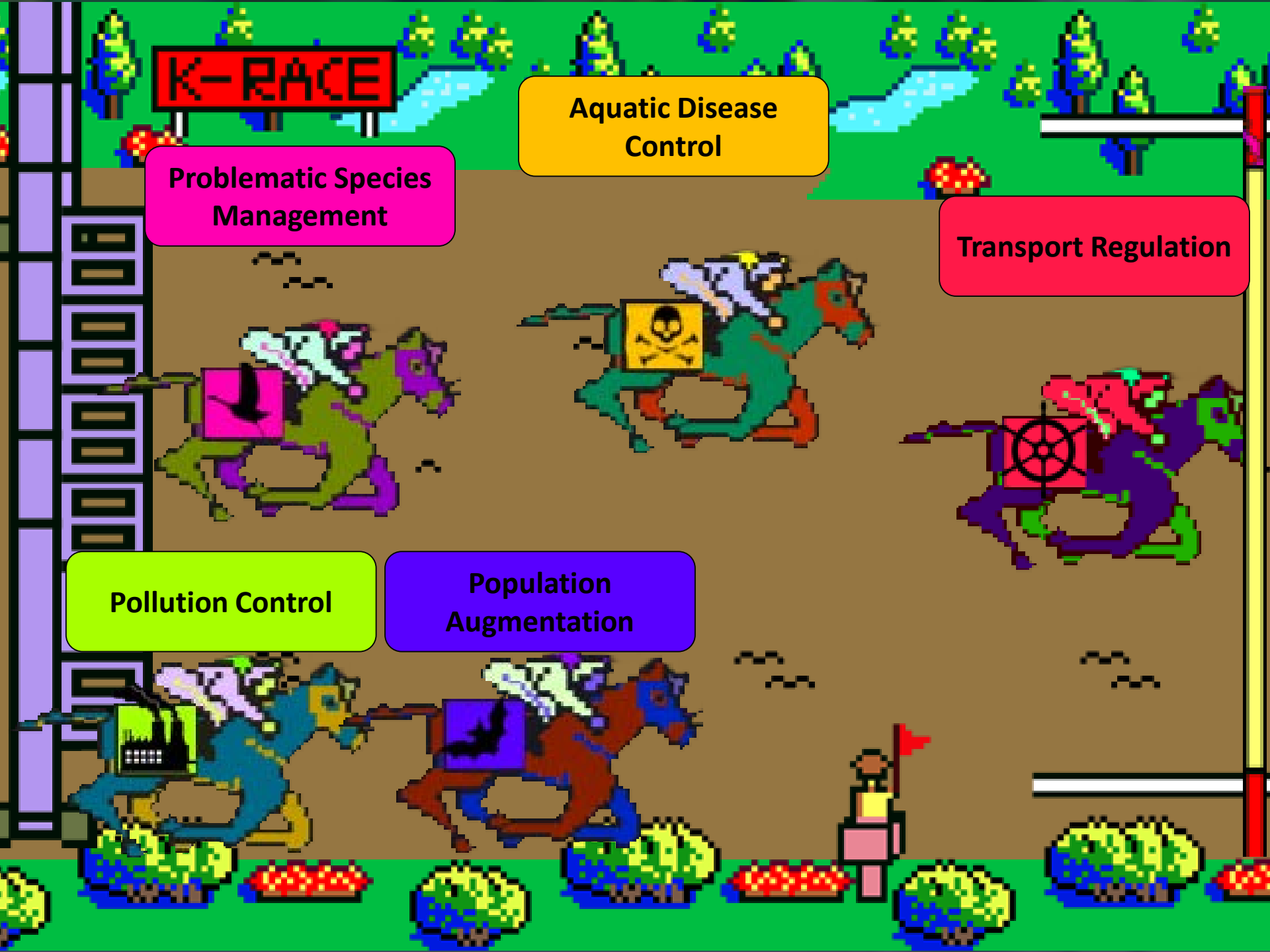
**Aquatic Disease Control**

**Problematic Species Management**

**Transport Regulation**

**Pollution Control**

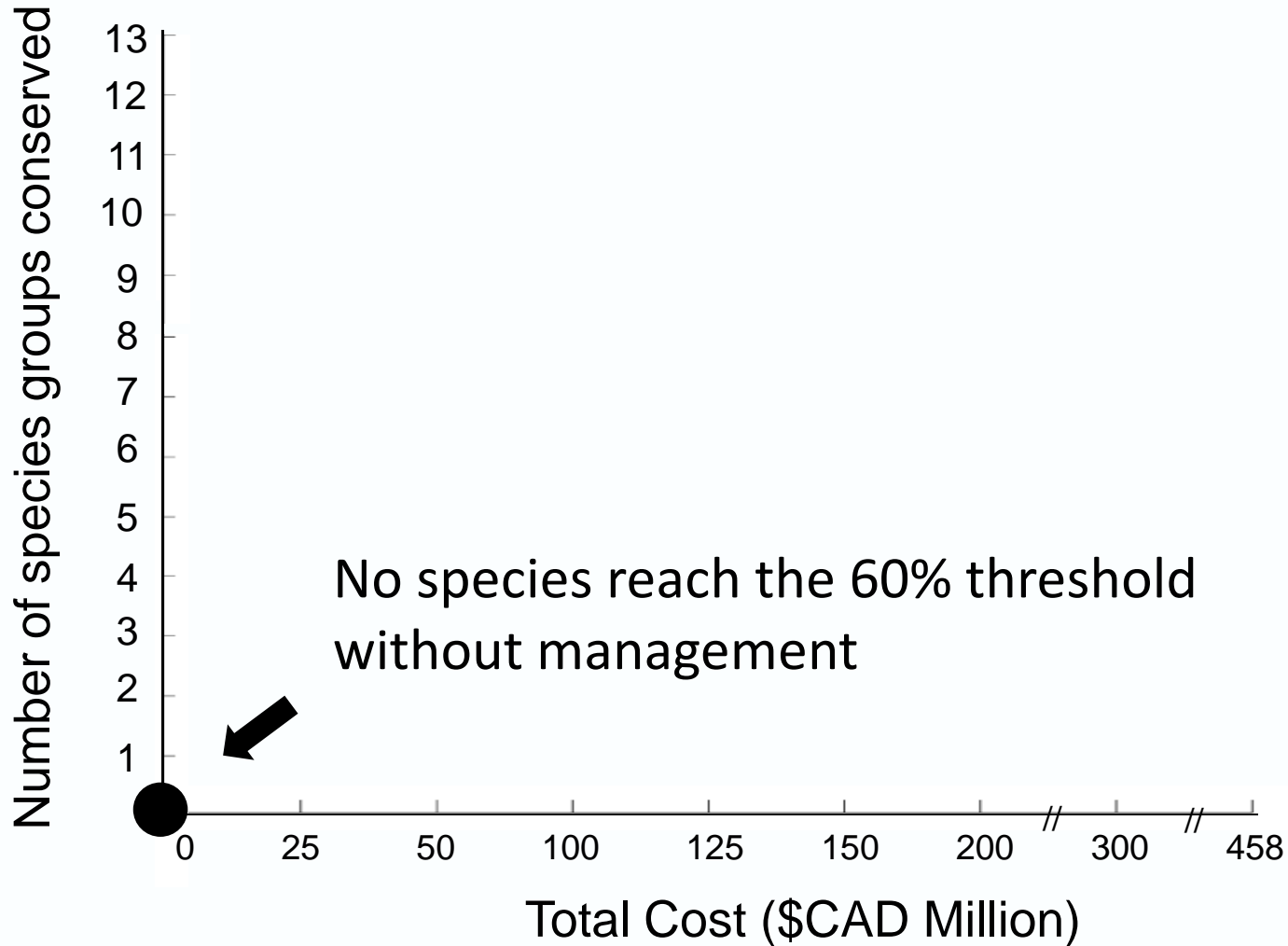
**Population Augmentation**



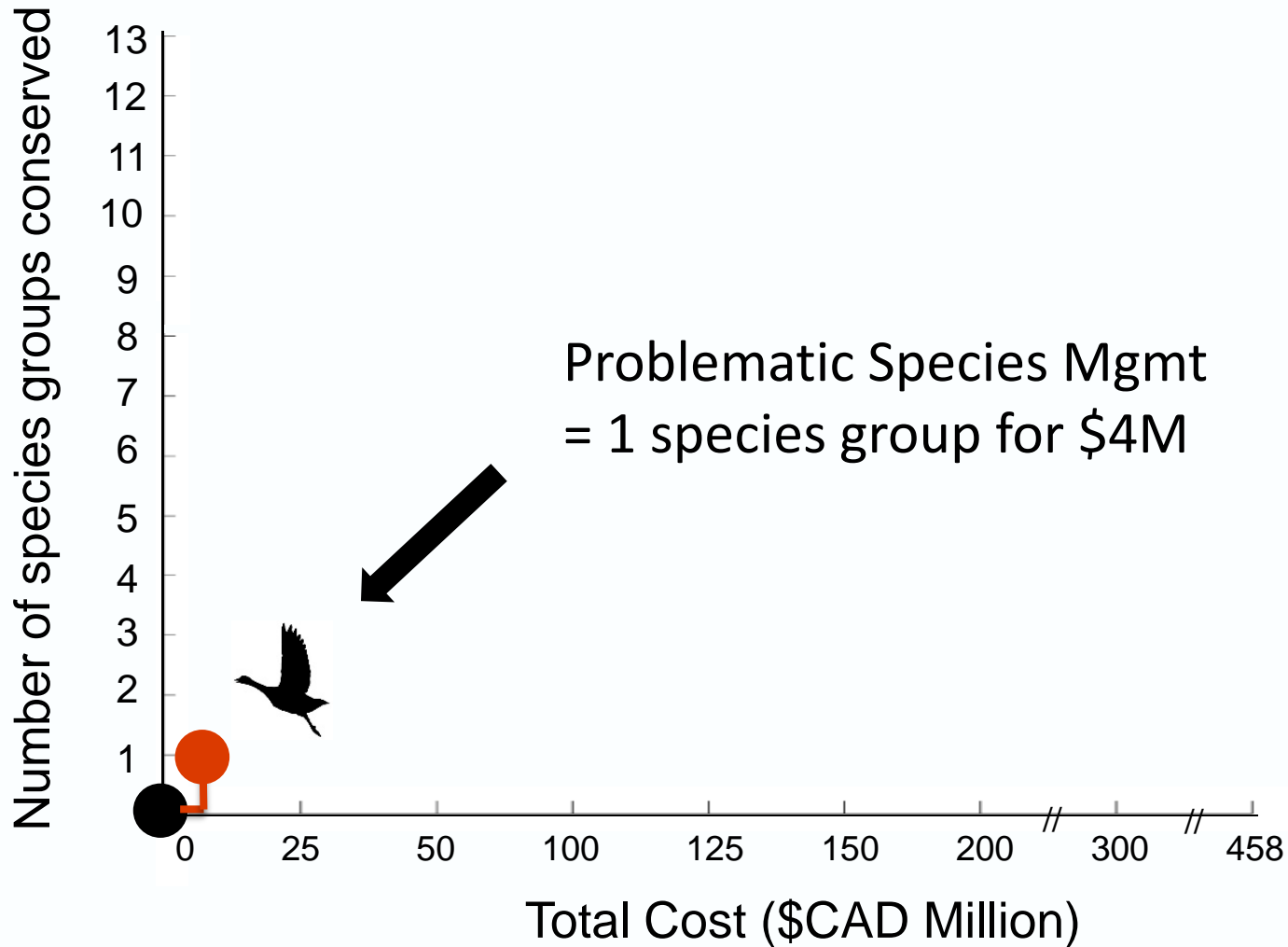
GOOD NEWS,  
EVERYONE!!



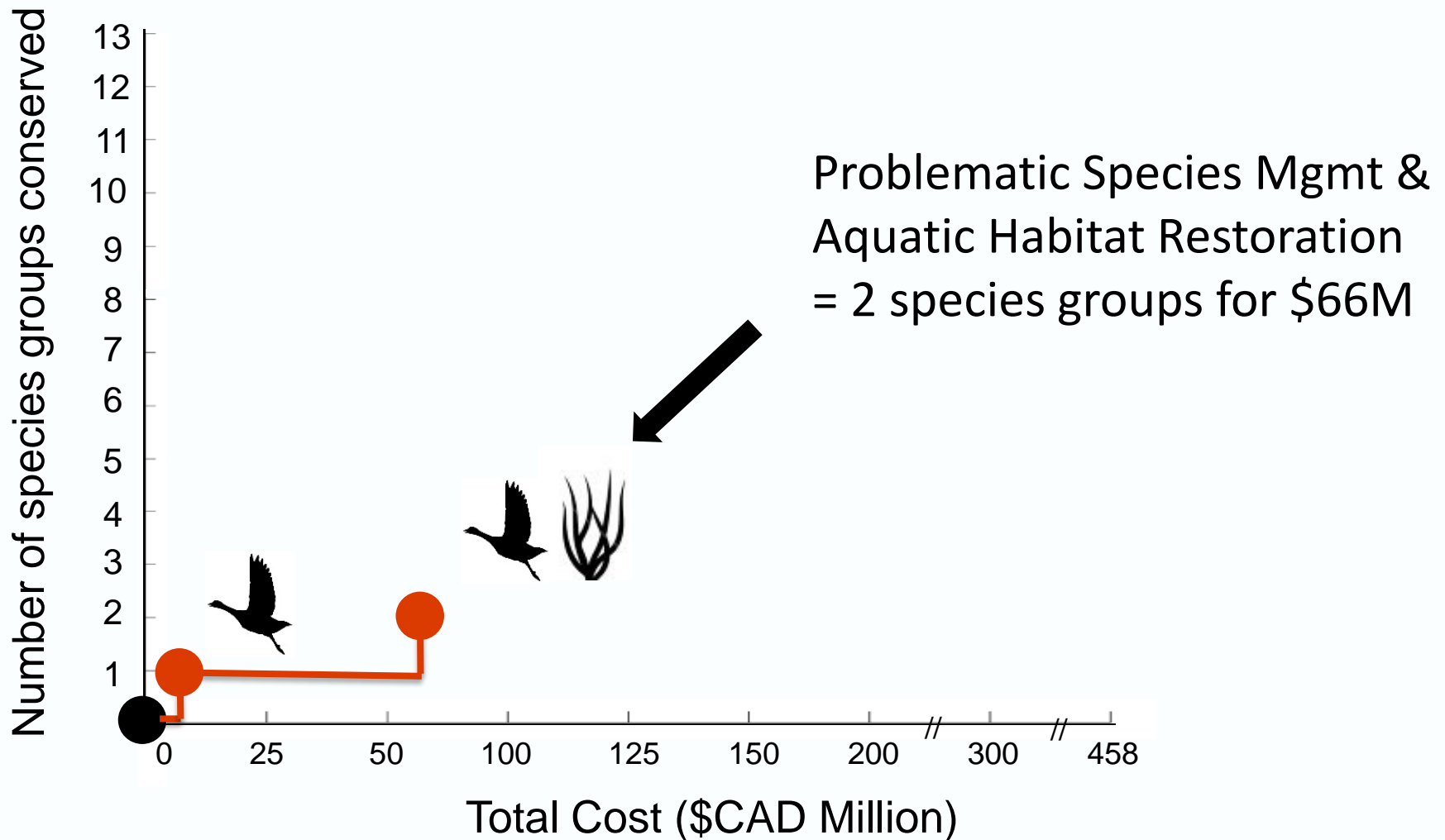
# Conserving the most species / \$



# Cheapest option

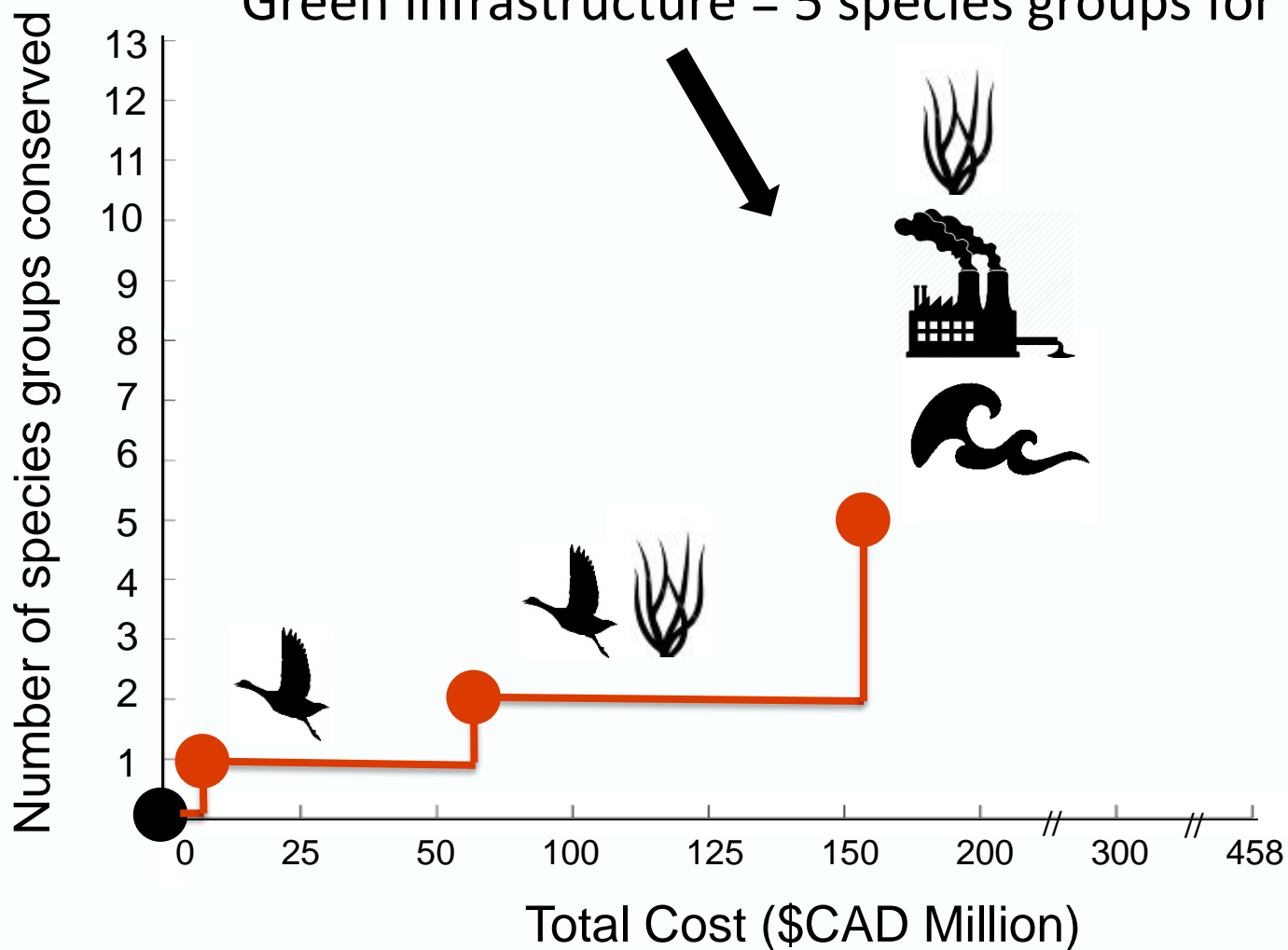


# Complementary sets of strategies

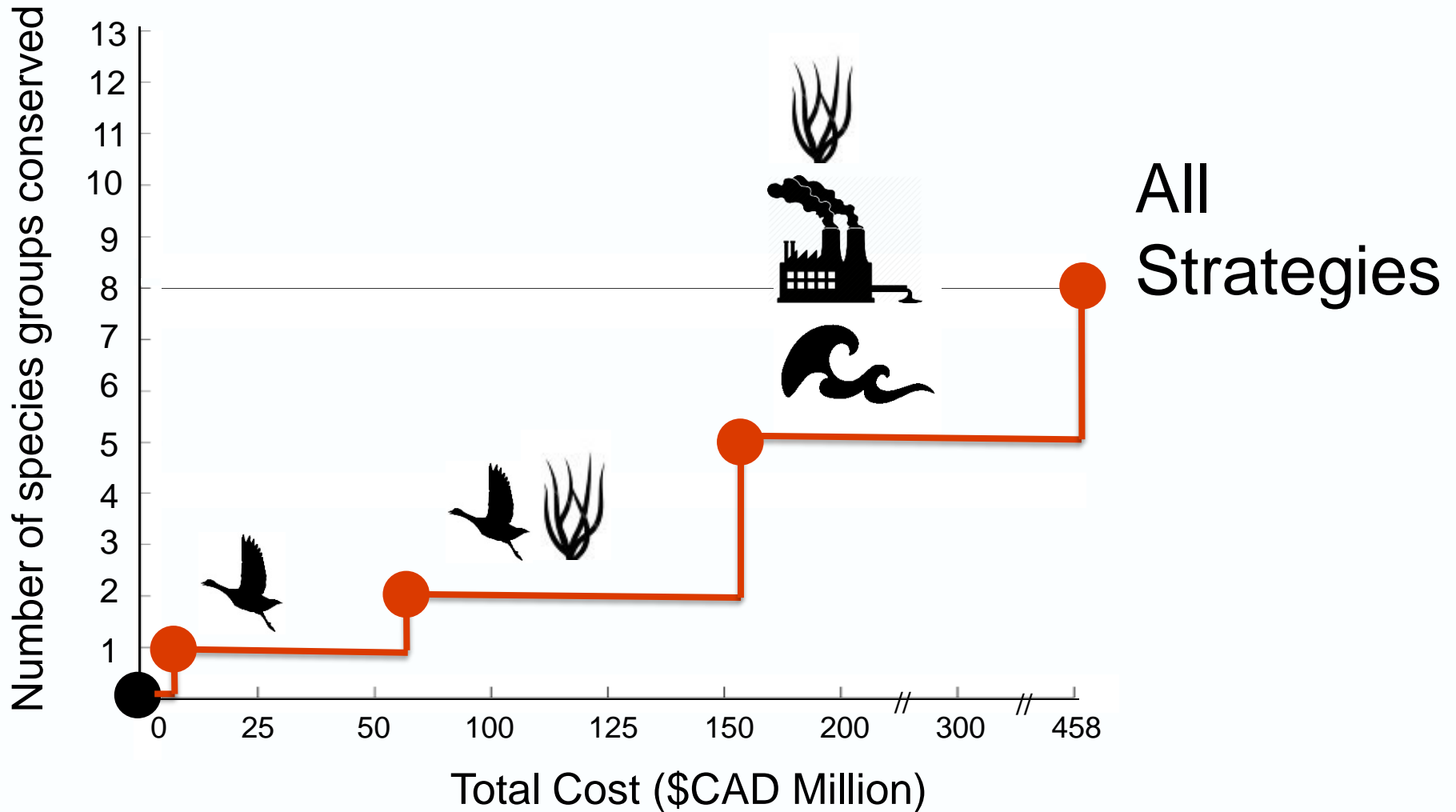


# Complementary sets of strategies

Aquatic Habitat Restoration & Pollution Control & Green Infrastructure = 5 species groups for \$167M

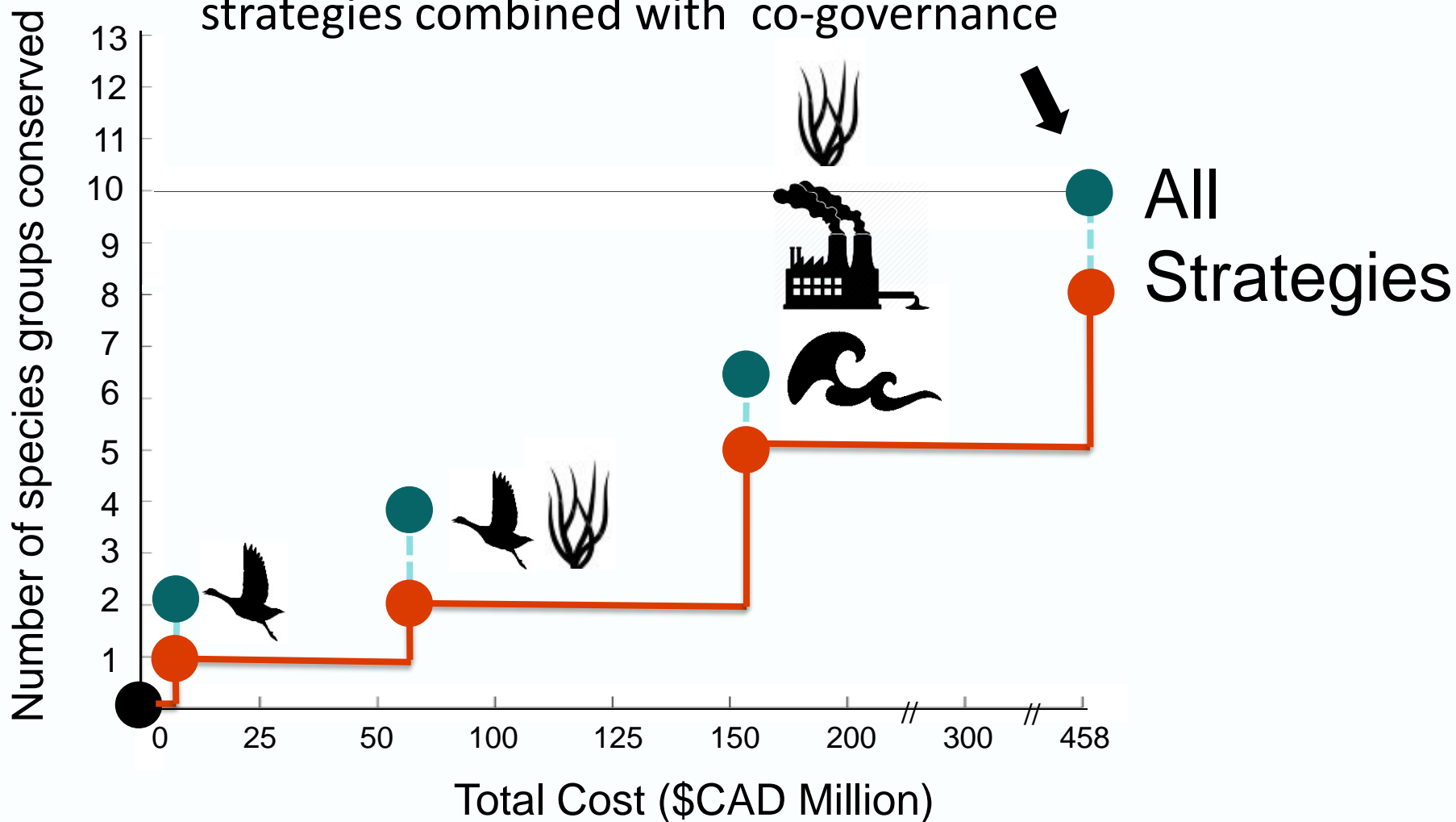


# Complementary sets of strategies



# Complementary sets of strategies

10 species groups can be conserved with strategies combined with co-governance





# Closing thoughts

- Successful prioritization in New Zealand and over half of Australia now spreading across North America!
- Conservative governments like this approach – economically rational
- Prioritize other assets e.g. sites of cultural significance
- Include the co-benefits of actions e.g. carbon sequestration, tourism, livelihood
- With the input of knowledgeable experts, areas with data scarcity & complex governance can be prioritized using this technique



# From knowledge to action

We now have the tools to develop conservation plans for multiple species in complex regions

We must *act* on this knowledge while we still have time



THE  
UNIVERSITY OF  
BRITISH  
COLUMBIA



Fisheries and Oceans  
Canada

# Thanks for your attention

Special thanks to my supervisors, research assistant & collaborators



Dr. Tara Martin  
taramartin.org



Dr. Julia Baum  
baumlab.weebly.com



Jessie Lund



get in touch:  
[laurajkehoe@gmail.com](mailto:laurajkehoe@gmail.com)

## Key References:

Carwardine et al. 2012. Prioritizing threat management for biodiversity conservation. *Conservation Letters* 5:196-204.

Martin et al. 2012. Eliciting expert knowledge in conservation science. *Conservation Biology* 26:29-38

Photo: Robert Sisson