Optimizing ecological surveys for conservation

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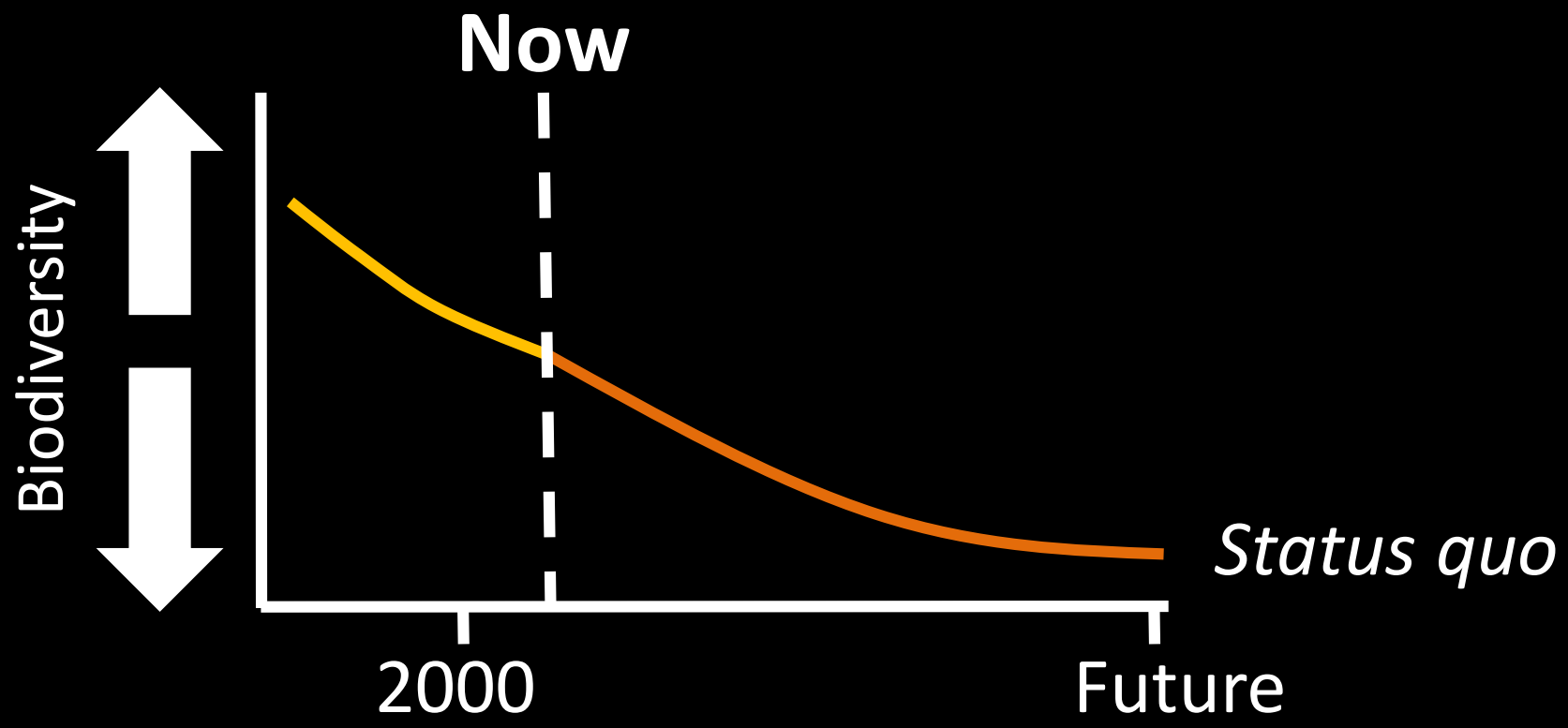
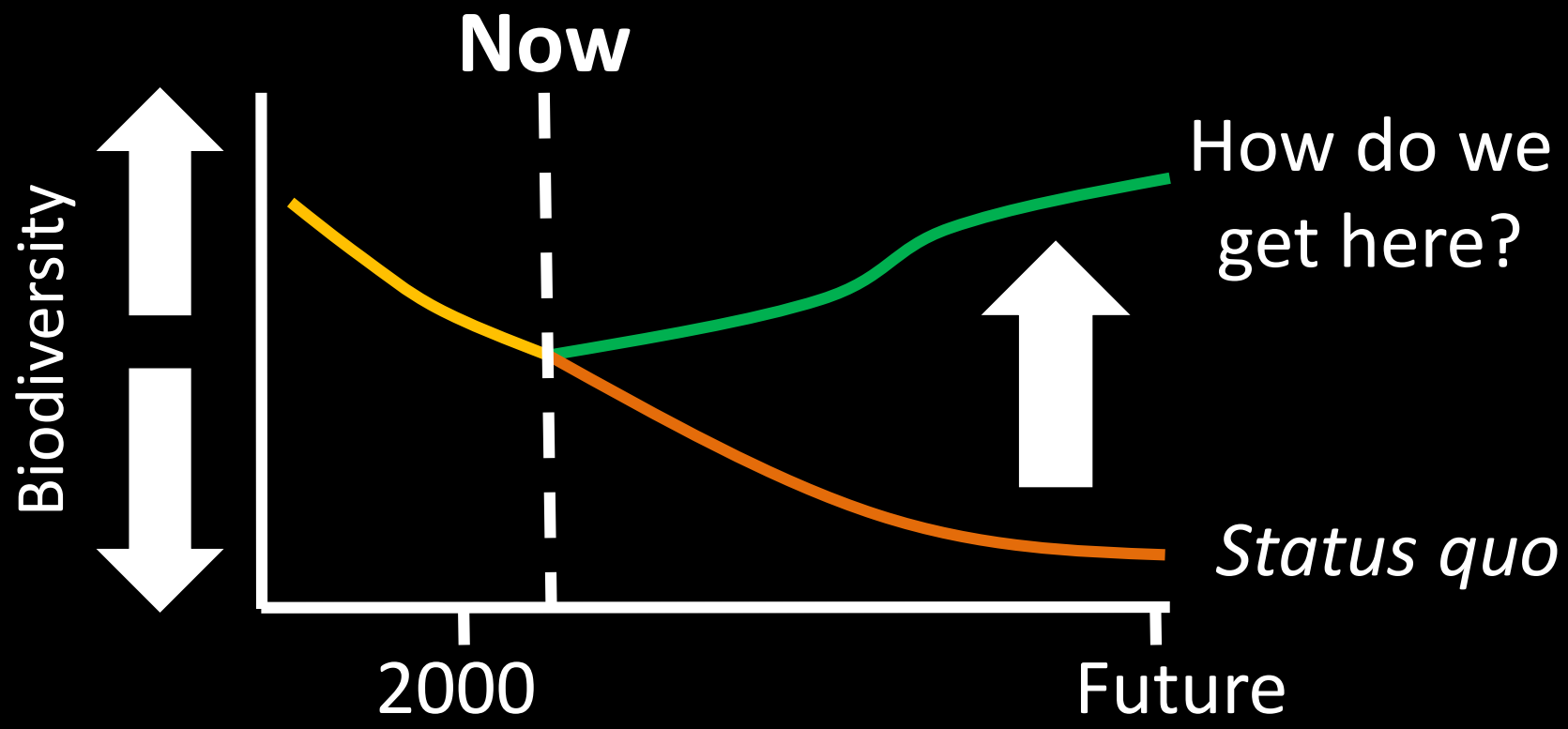
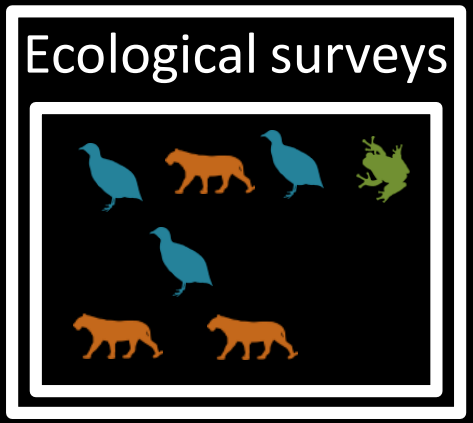
Environment and Climate Change Canada

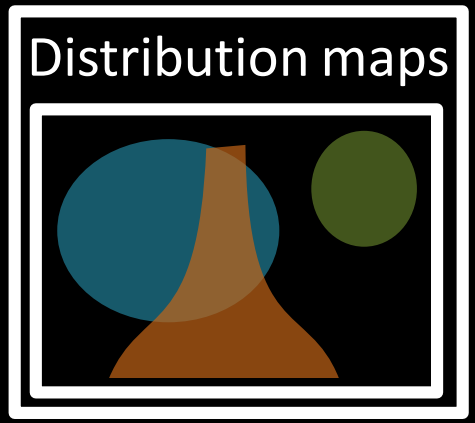
NSERC CRSNG

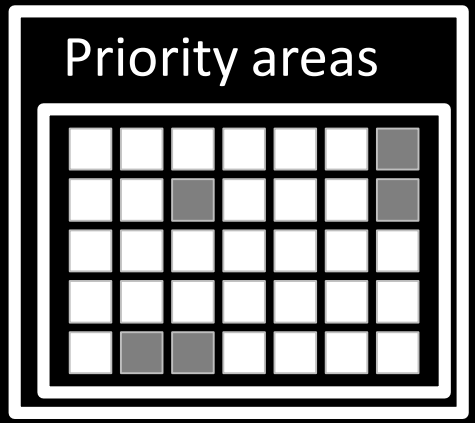
NATURE CONSERVANCY CANADA

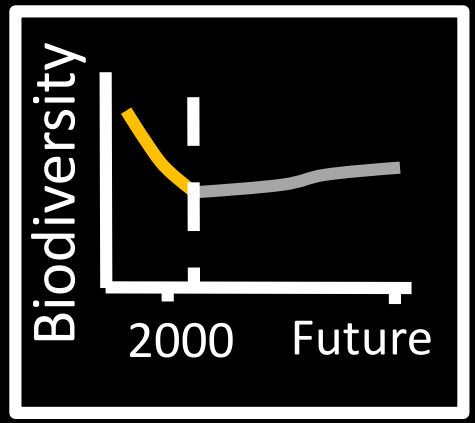

Now
Biodiversity
Status quo
2000
Future


Now
Biodiversity
How do we get here?
Status quo
2000
Future



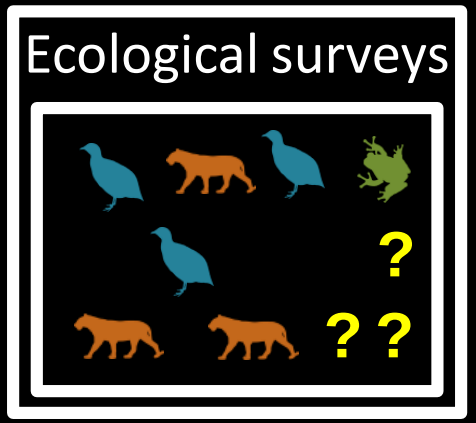


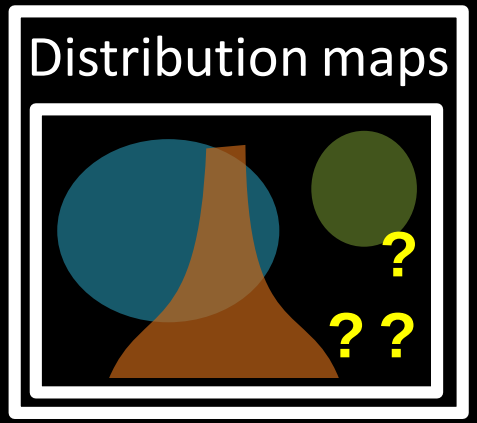


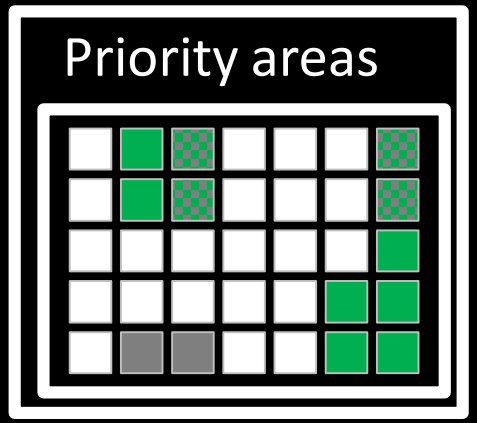


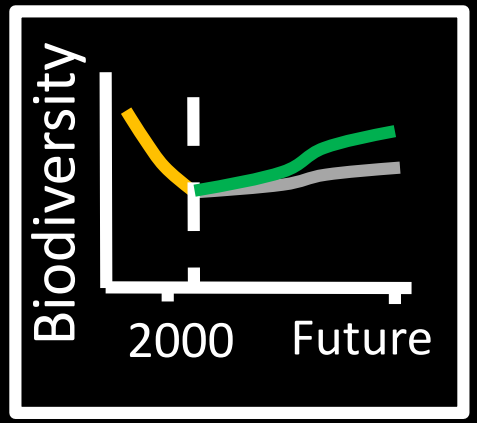
Data → Information → Plan → Outcome

Objectives Constraints









Data → Information → Plan → Outcome

More surveys

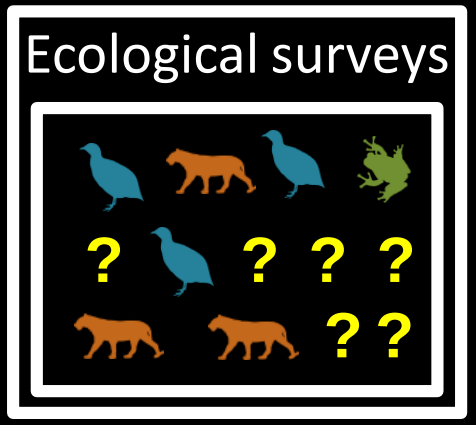
Better models

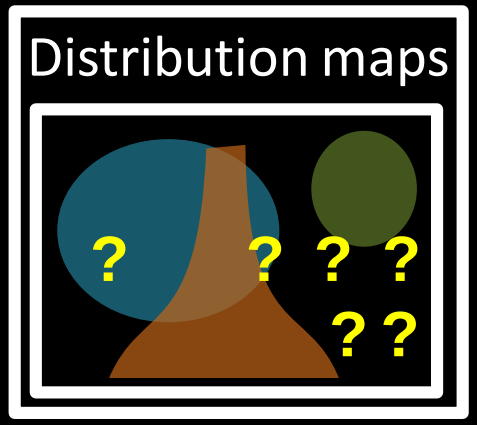
Better management

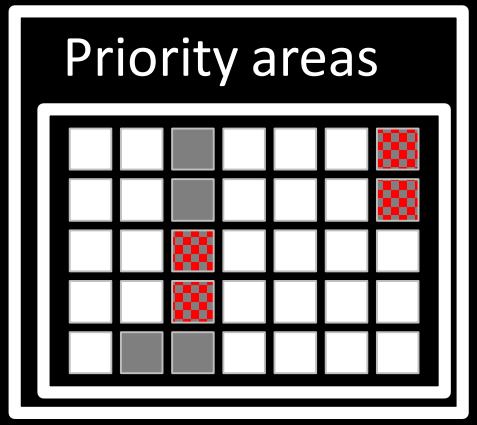
Better outcome

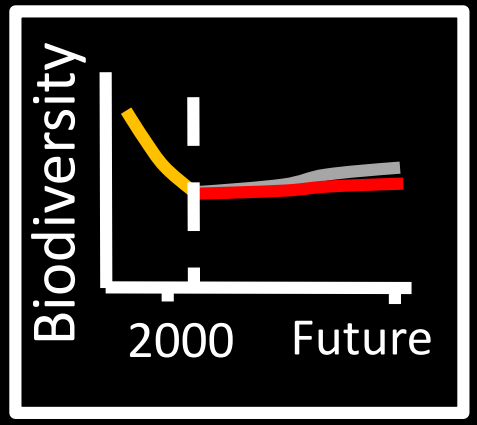
Objectives

Constraints









Data → Information → Plan → Outcome

More surveys

Better models

Poorer management

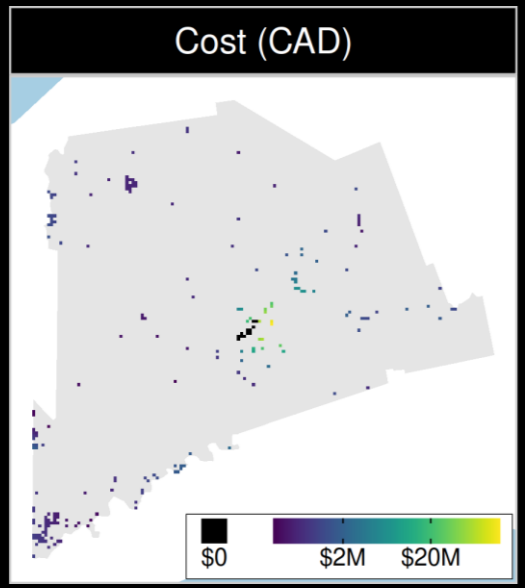
Worse outcome

Objectives

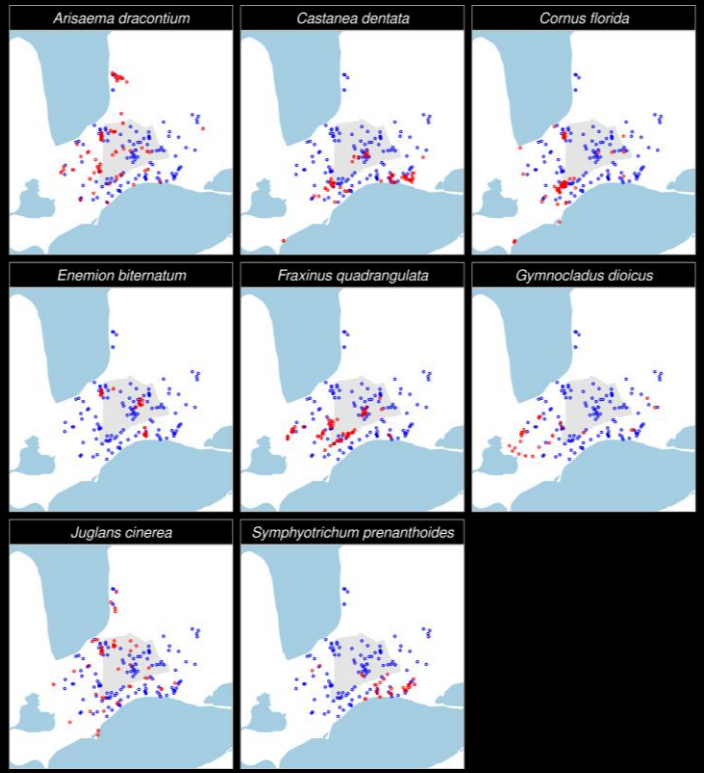
Constraints

Less funding

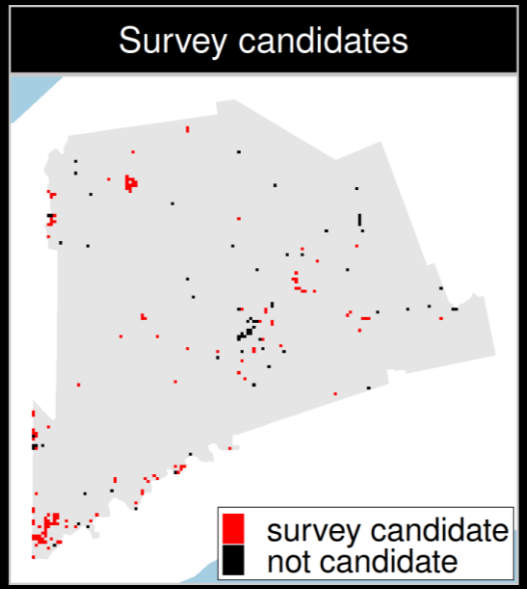
Study system: Middlesex country, Canada



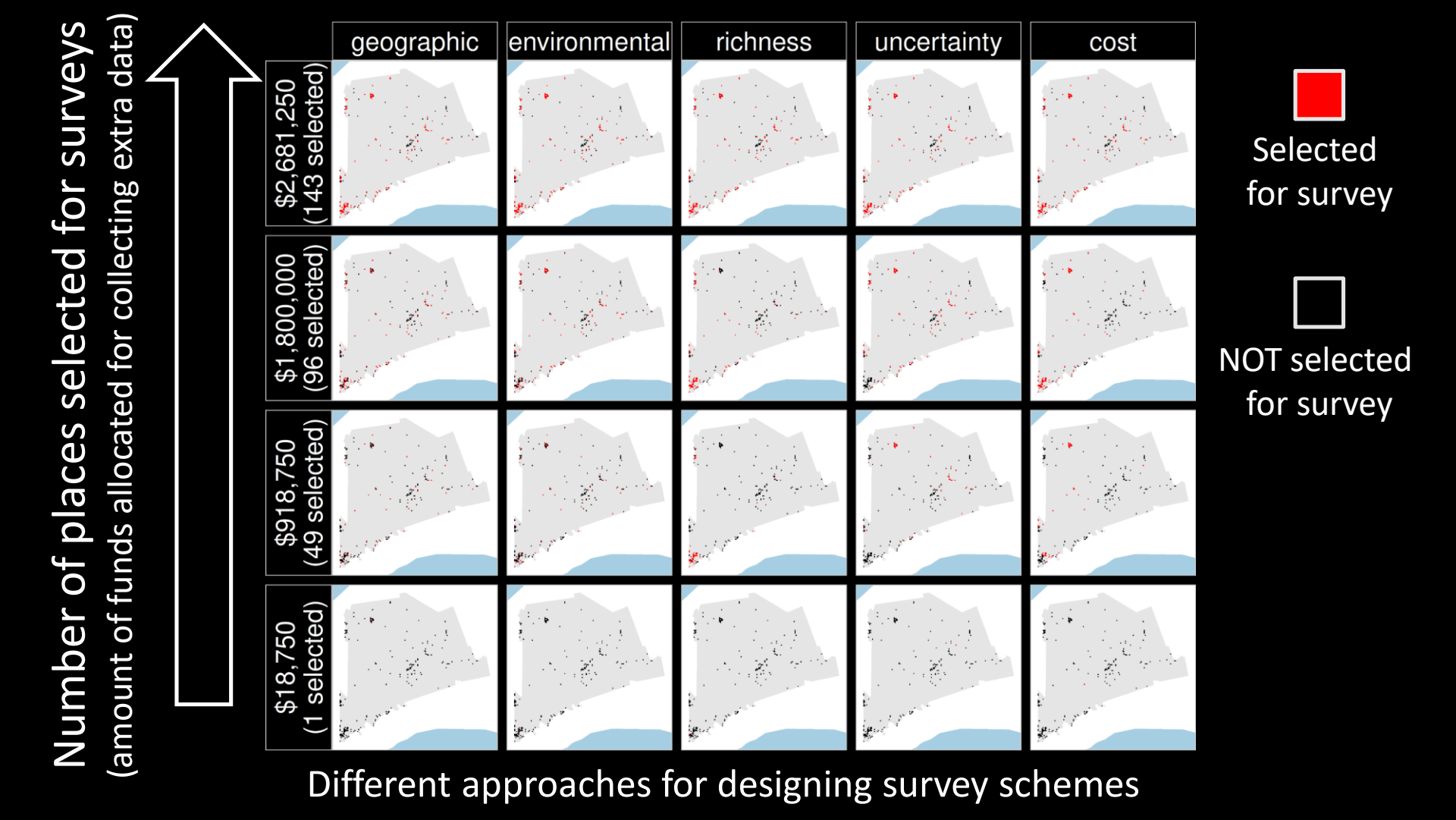
199 places that could potentially be acquired for protected area establishment



8 imperilled plant species

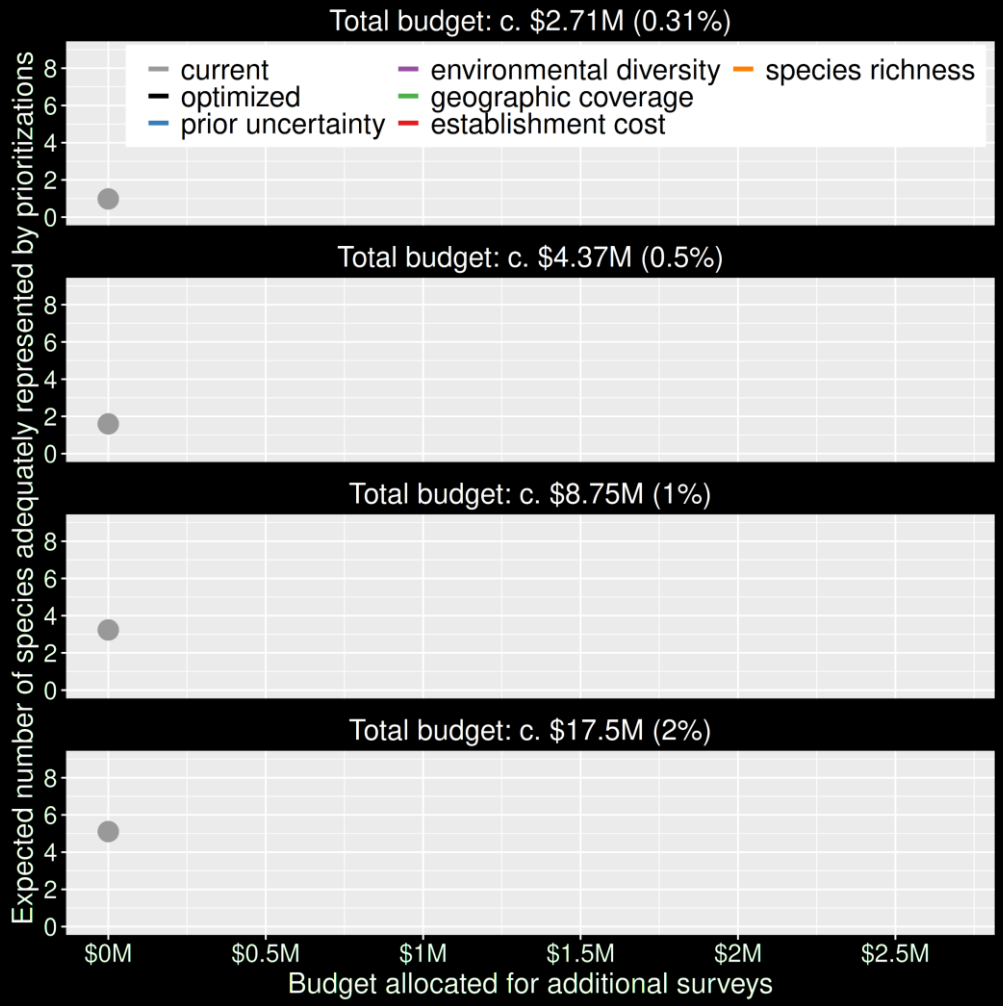


143 places that could potentially be surveyed to improve existing data


Number of places selected for surveys
(amount of funds allocated for collecting extra data)
geographic
environmental
richness
uncertainty
cost
$2,681,250
(143 selected)
$1,800,000
(96 selected)
$918,750
(49 selected)
$18,750
(1 selected)
Selected
for survey
NOT selected
for survey
Different approaches for designing survey schemes

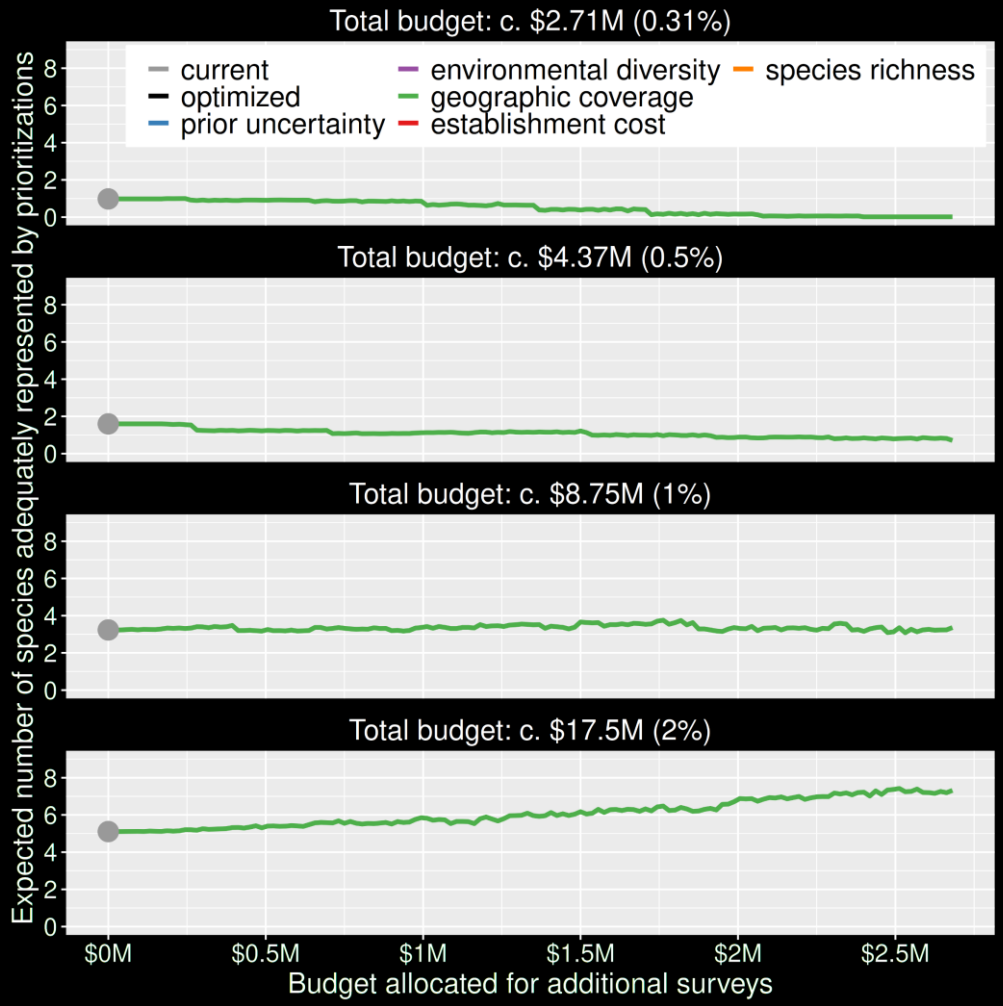
Value of information

- Existing data leads to positive outcomes
- More budget means better outcomes



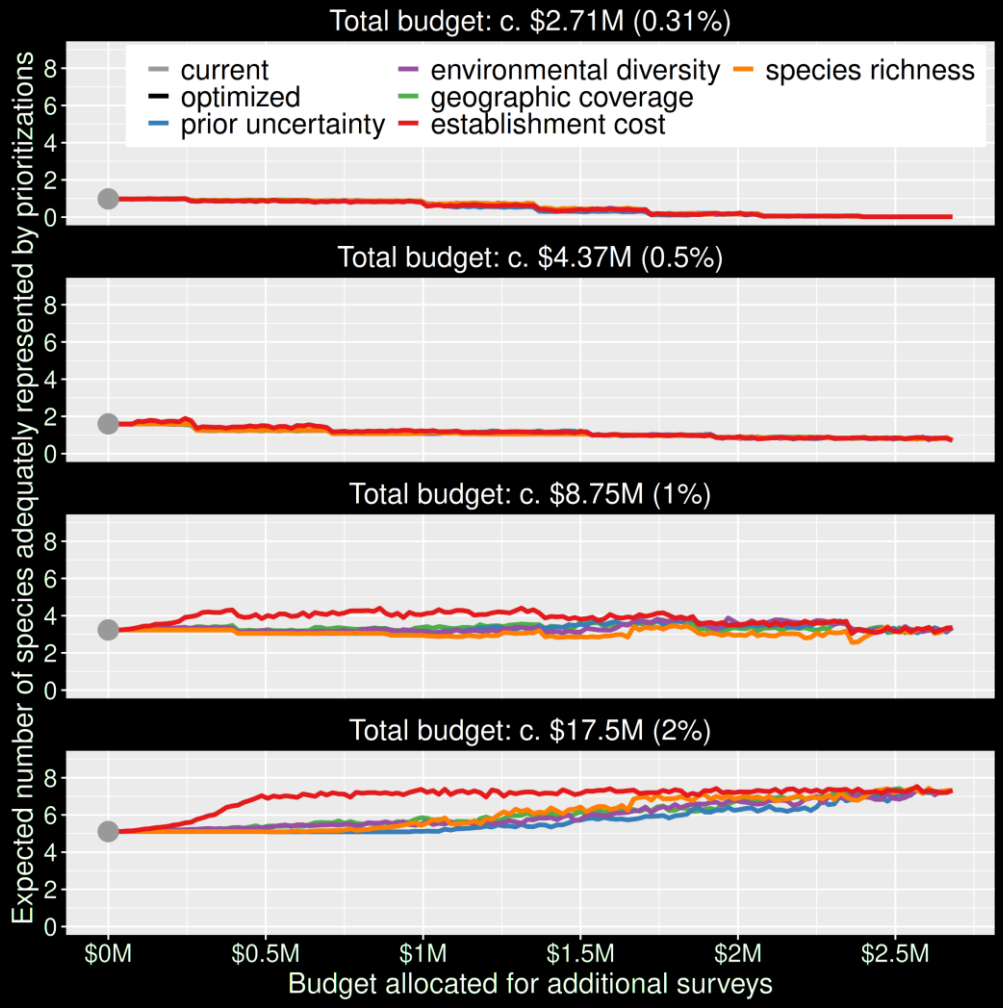
Value of information

- Allocating funds for gathering more data can mean worse outcomes
- Allocating funds for gathering more data can mean better outcomes too



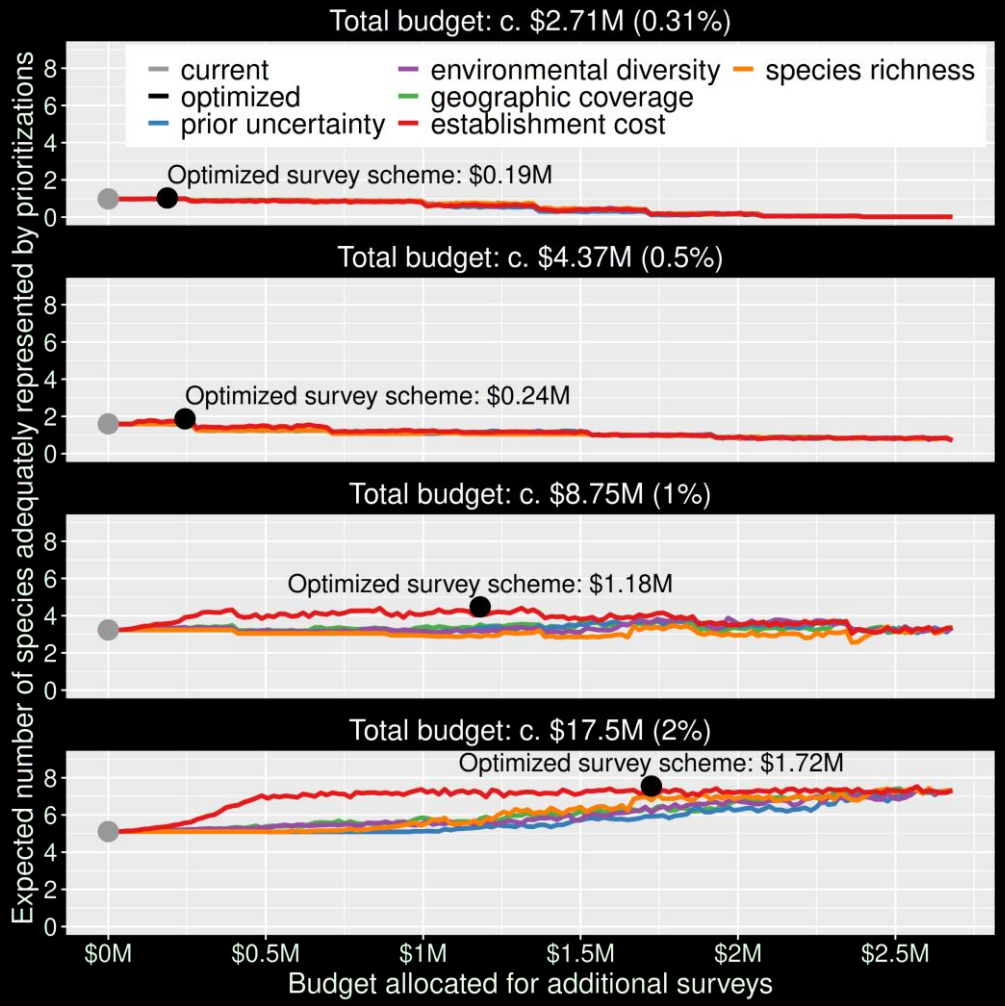
Value of information

- Conventional approaches for gathering additional evidence have different performance
- Performance of these approaches depends on available funds
- All of them could lead to lead to worse outcomes



Value of information

- Directly maximizing return on investment is best method for additional data
- This considers objectives and constraints that underpin conservation plans and their success



Take home messages

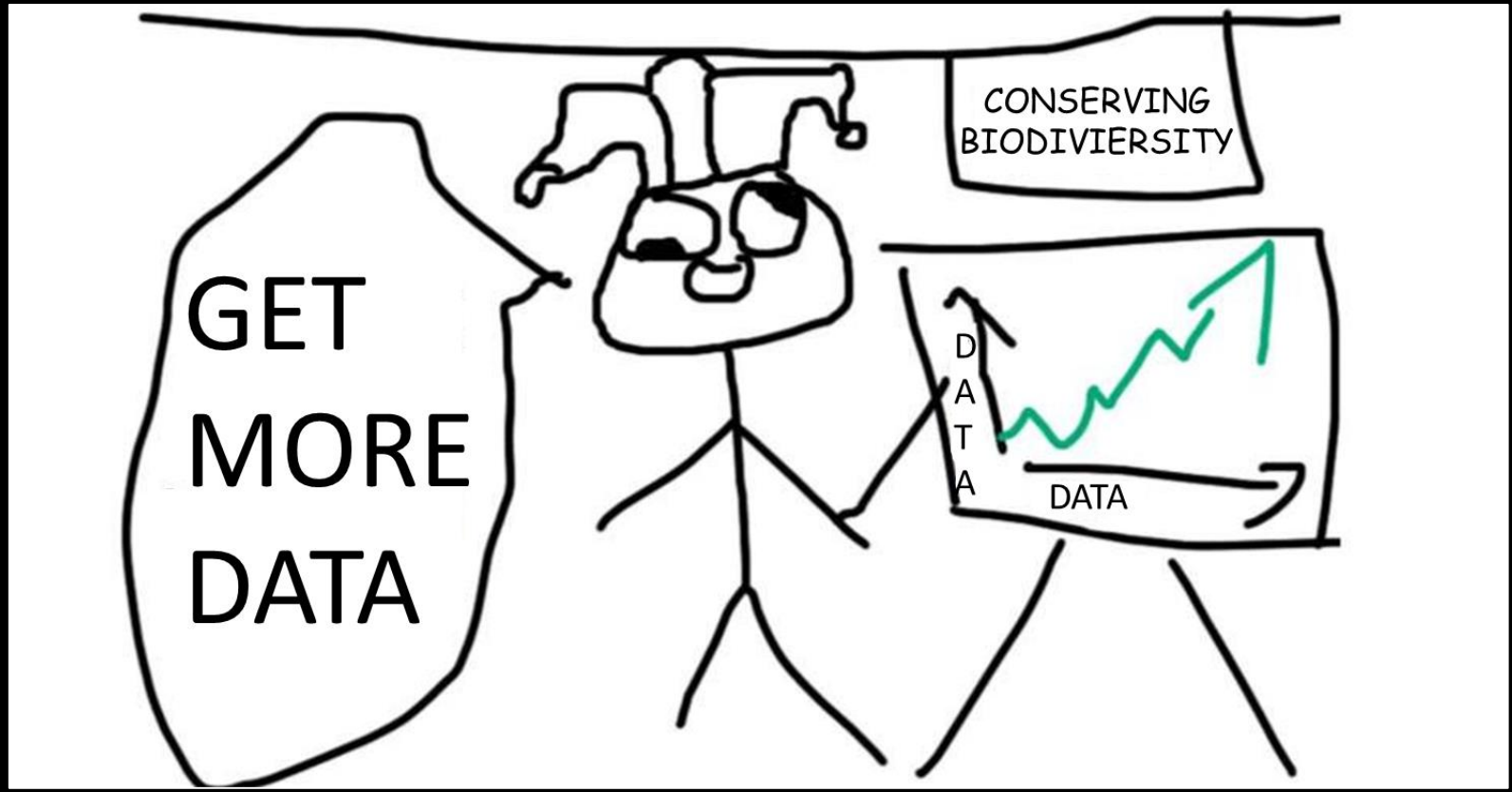
1. Don’t spend too much on data collection

2. Survey designs that might be great for improving knowledge can be terrible for conservation

3. Value of information analysis can optimize data collection to improve management outcomes

4. surveyvoi R package at https://prioritizr.github.io/surveyvoi

More data is not always better



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