

Making better decisions about where to put stuff

David L Miller

NOAA Northeast Fisheries Science Center, Woods Hole, MA

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Disclaimer: this talk is about birds

Background

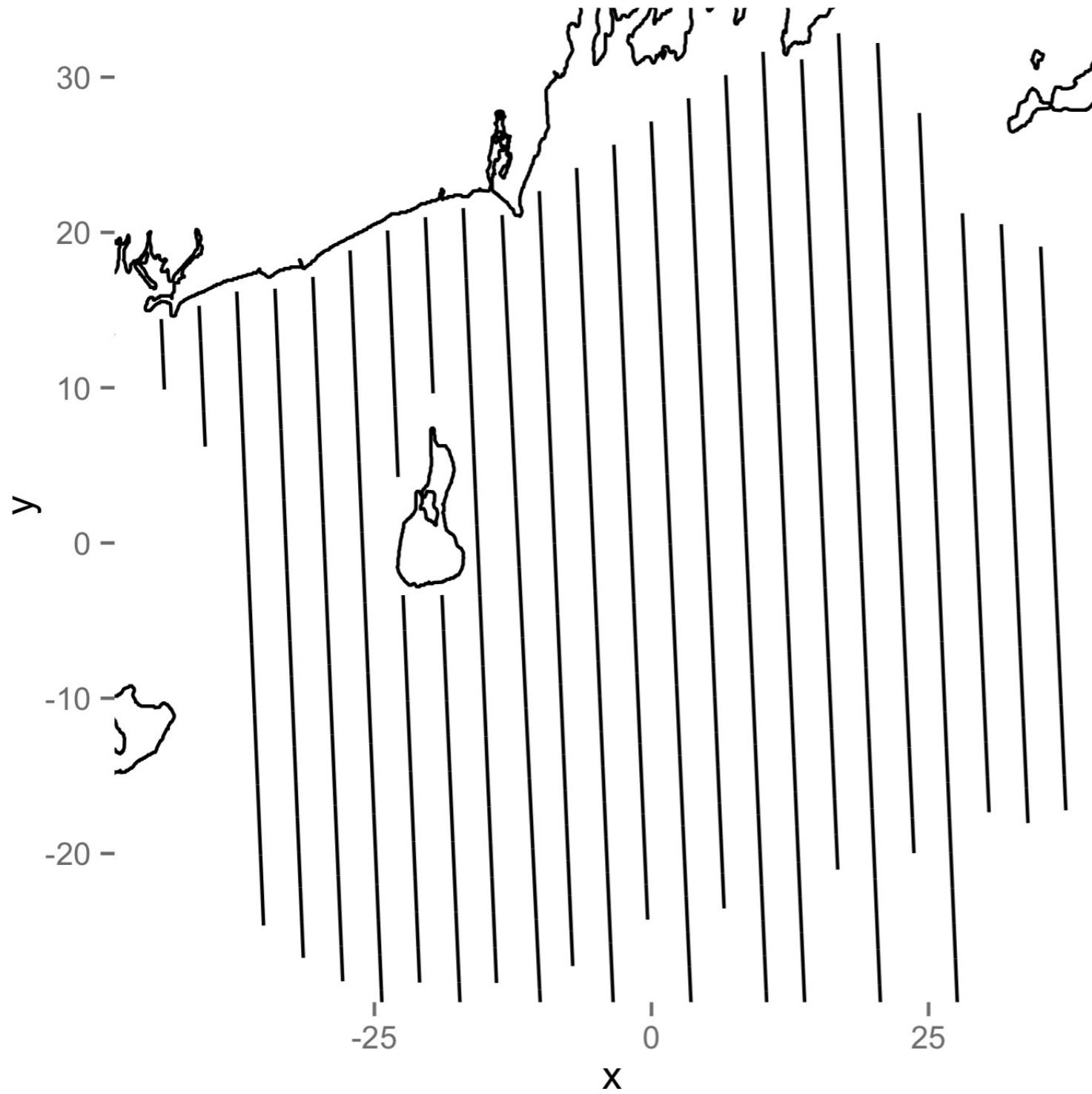
- RI wanted to know what was in it's waters
 - *Offshore energy development (windfarms)*
 - *Block Island development*
 - “*Area of mutual interest*” w/ MA
- OSAMP
 - *Ocean Special Area Management Plan*
 - NC/MA/NJ etc all have one
- Basic question
 - “*where should we build a windfarm?*”

A windfarm



Data and models

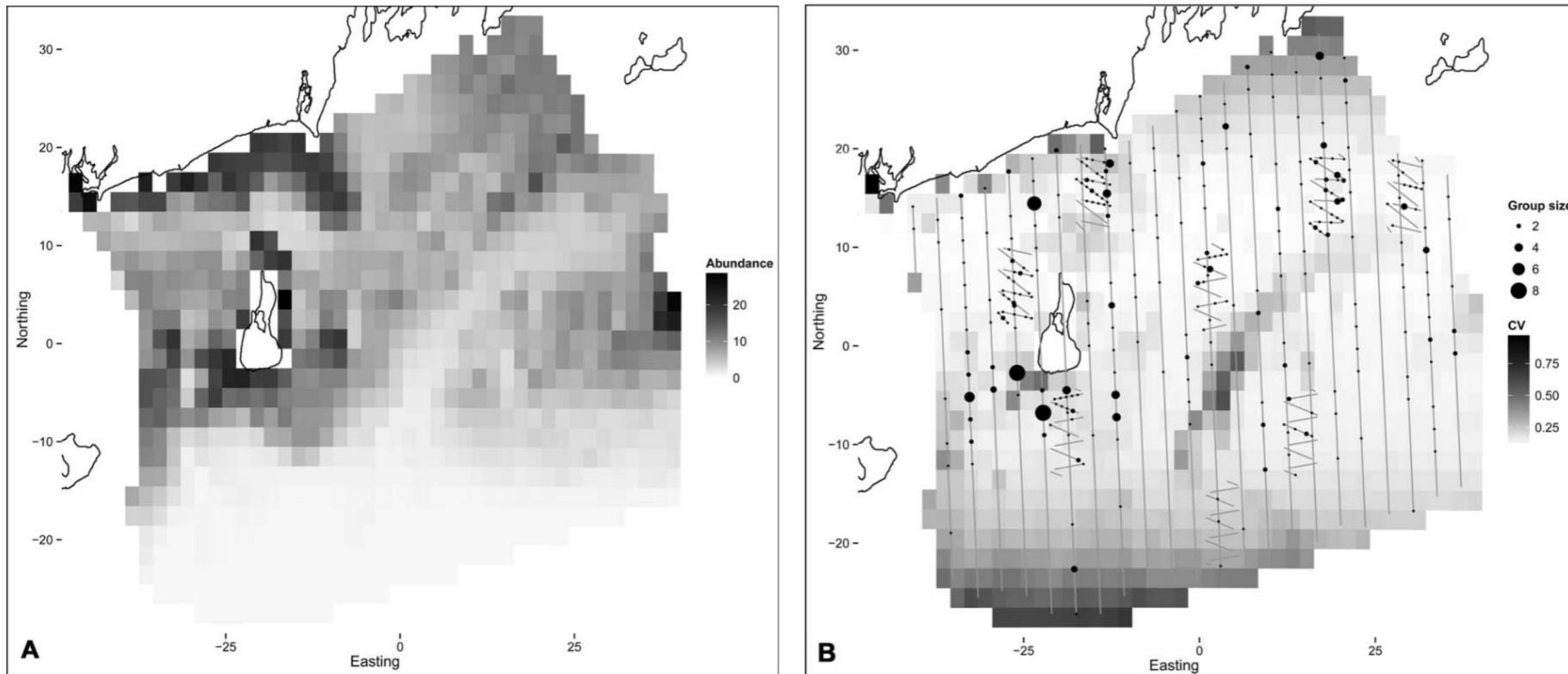
Aerial line transect surveys



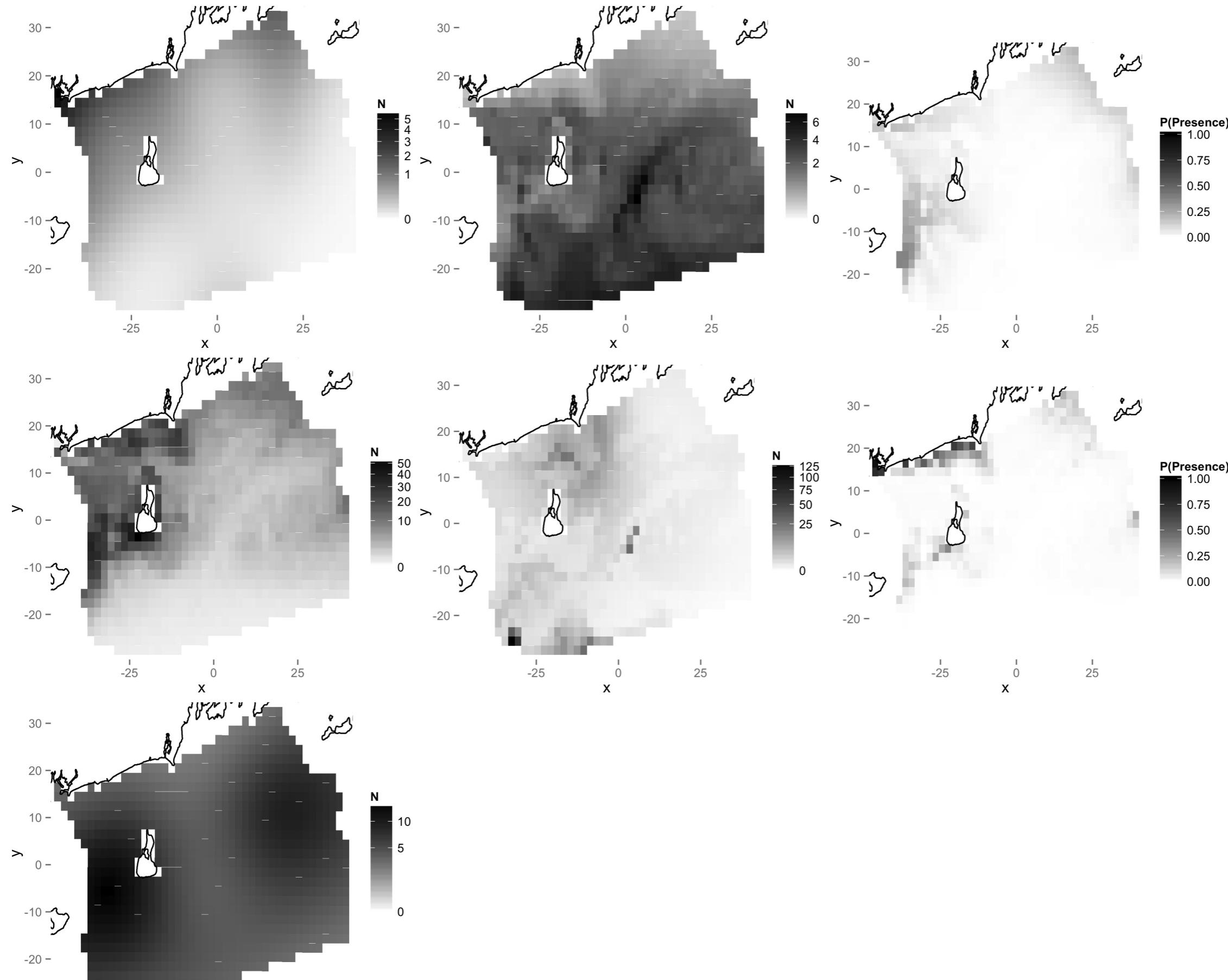
More species, more models
(More problems)

Density surface models

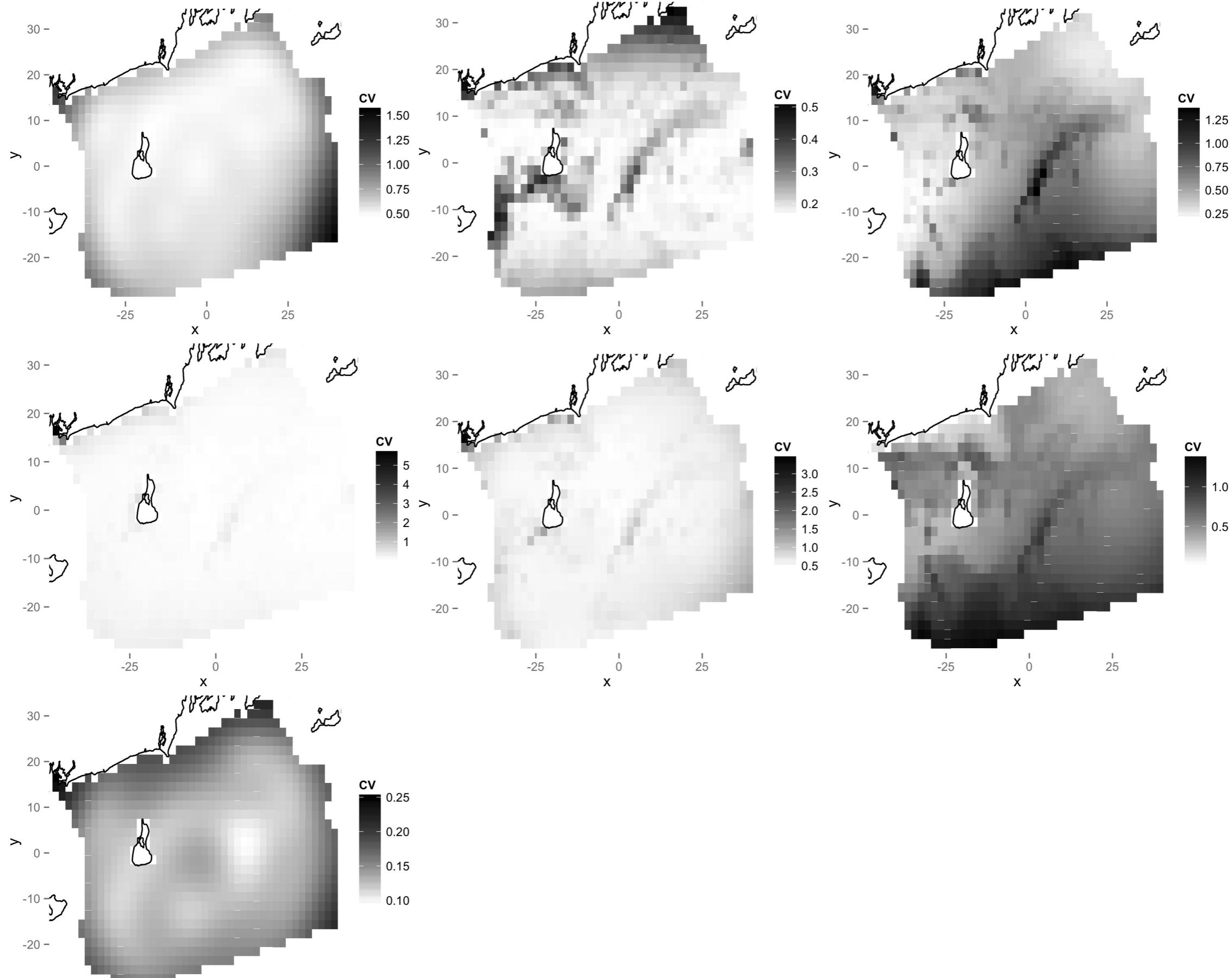
- Modelling approach as SWFSC folks showed
- Relate abundance or presence to smooth functions of covariates
- Includes detectability, availability corrections
- Produces spatially-explicit abundance estimates



Some predictions



Some uncertainty (CV)



Okay, so what do we do?

Combining information

- Ecology and management are multidimensional
- Not usually just one species to deal with
- How can we combine information on multiple species?
- Really want one number or one map to show folks

Spatial prioritisation

- “Where can we put stuff?”
- Take grid cells, say which are of “high value”
- Use model output (predictions) get “value” of areas
- Many options (Wintle, 2008 review)

Zonation

- Put (prediction) maps together
- Rank proportion of species lost per cell
 - Maximise *biodiversity rank*
 - Can weight by “conservation value”
 - Can weight for connectivity
- Software from Helsinki U (Moilanen et al, 2005)
- <http://cbig.it.helsinki.fi/software/zonation/>
- Maps don't have to use the same model “types”

CONSERVATION DECISION-MAKING

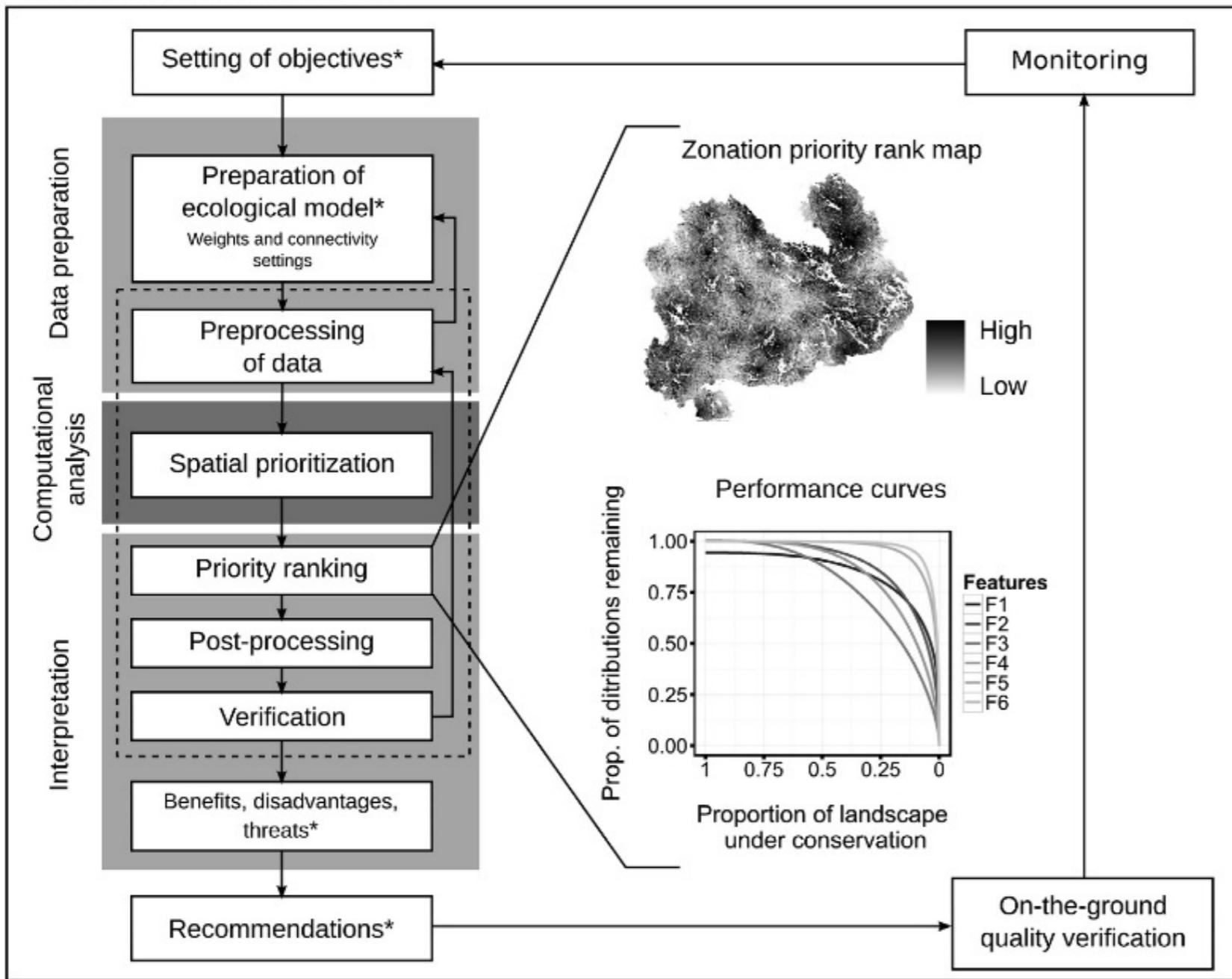


Figure 1 from Lehtomäki and Moilanen (2013) CC-BY 3.0

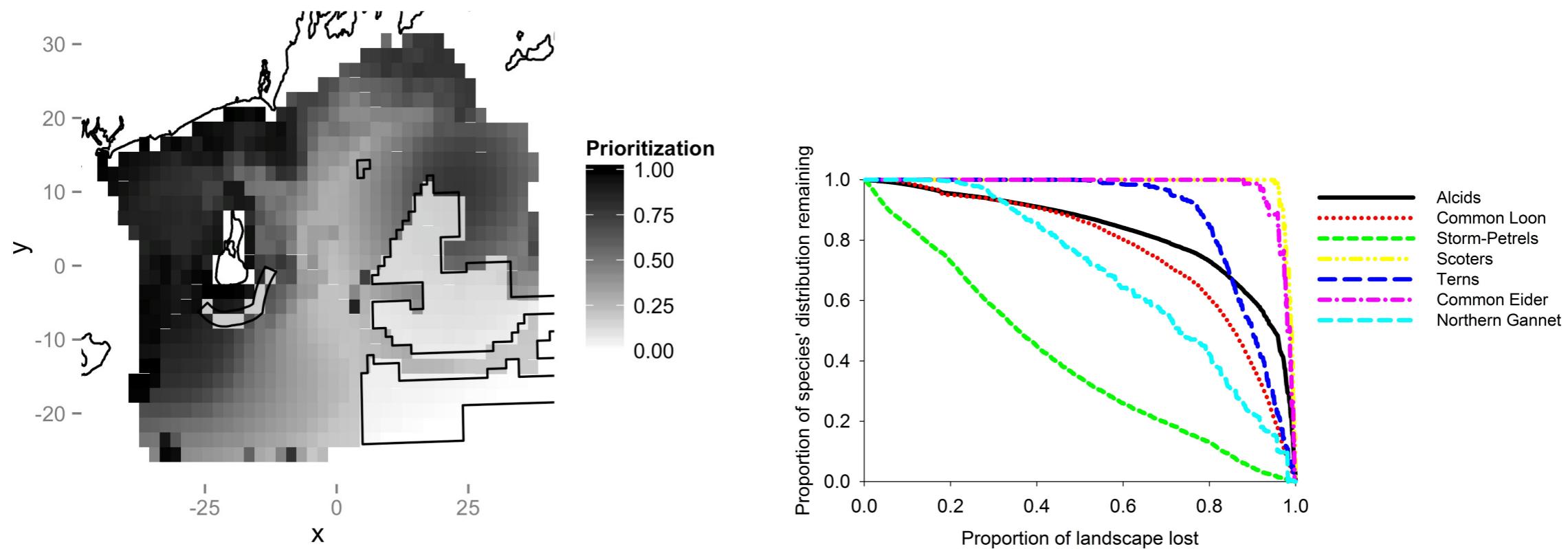
Zonation can answer the question:

“*where* should we do *this*? ”

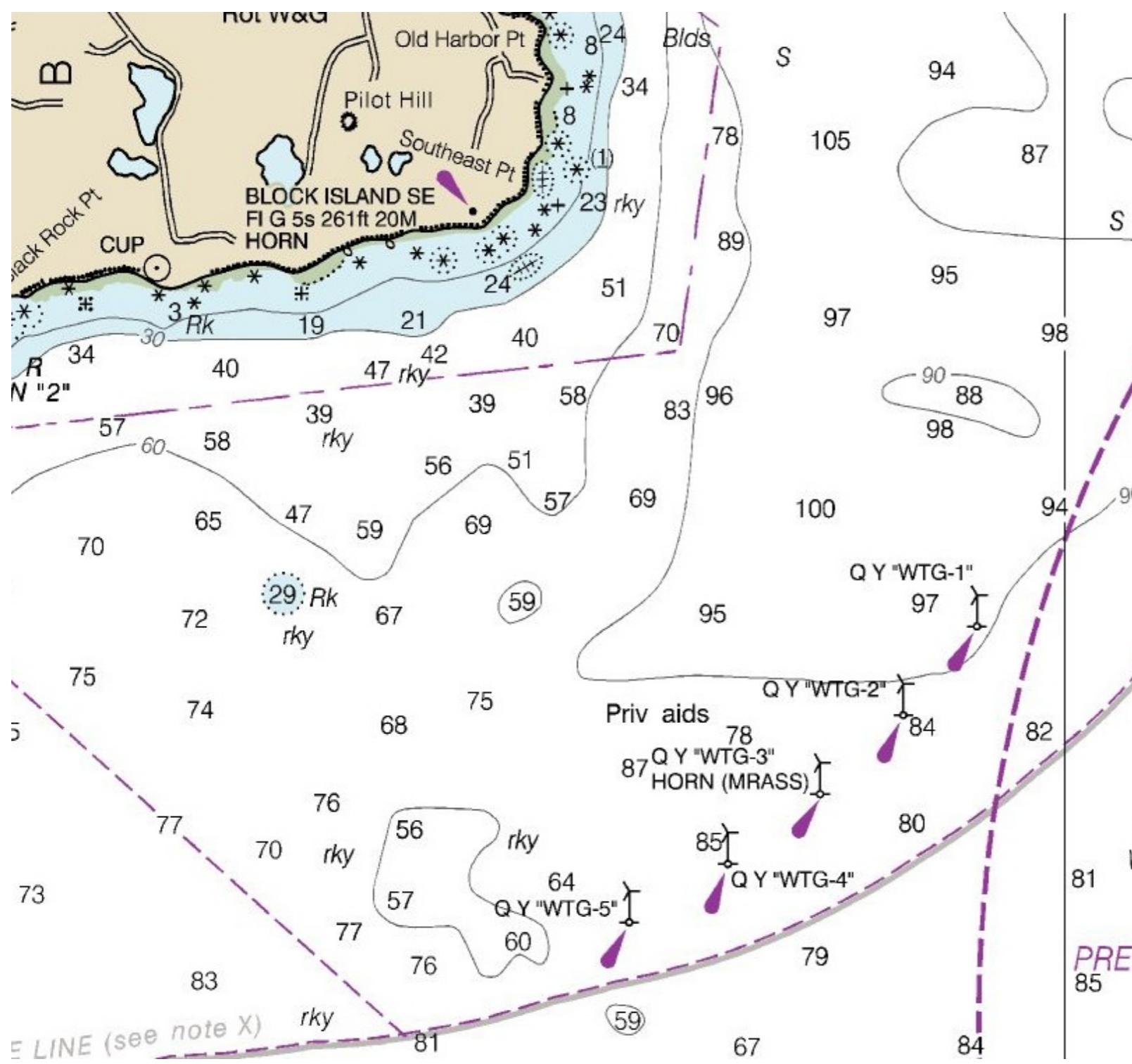
rather than just

“*what happens if* we do *this here*? ”

Prioritization (weighted)



NOAA map I3205



<http://www.charts.noaa.gov/OnLineViewer/I3205.shtml>

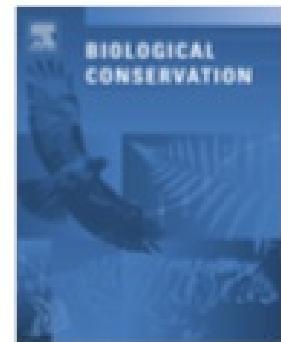


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A spatial conservation prioritization approach for protecting marine birds given proposed offshore wind energy development

Kristopher J. Winiarski ^{*}, David L. Miller, Peter W.C. Paton, Scott R. McWilliams

Department of Natural Resources Science, University of Rhode Island, 1 Greenhouse Road, Kingston, RI 02881, United States



Shortcomings

- If your model is garbage, your prioritization will be too
- Abundance gives the most information
 - *Detection and availability corrected*
- Seasonal variation
- No dynamics
- Southern hemisphere competitor
 - MARXAN: <http://www.uq.edu.au/marxan/index.html>
 - *Listed on the NOAA Digital Coast tools site*

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