

R for the Planet

New York R Conference

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About our impact on the planet ...

Yes, it's real.

Yes, it's bad.

Yes, it's us.

No, it's not too late.

No, it isn't just climate change.

About our impact on the planet ...

More on climate

IPCC report, FAQs answered, a docu-series, a YouTube channel, a bunch of podcasts

Climate scientists to follow

Jonathan Foley, Ed Hawkins, Katharine Hayhoe, Leah Stokes

Environmental journalists to follow

Juliet Eilperin, Robinson Meyer, Kendra Pierre-Louis, Hiroko Tabuchi

What I do

Why R?

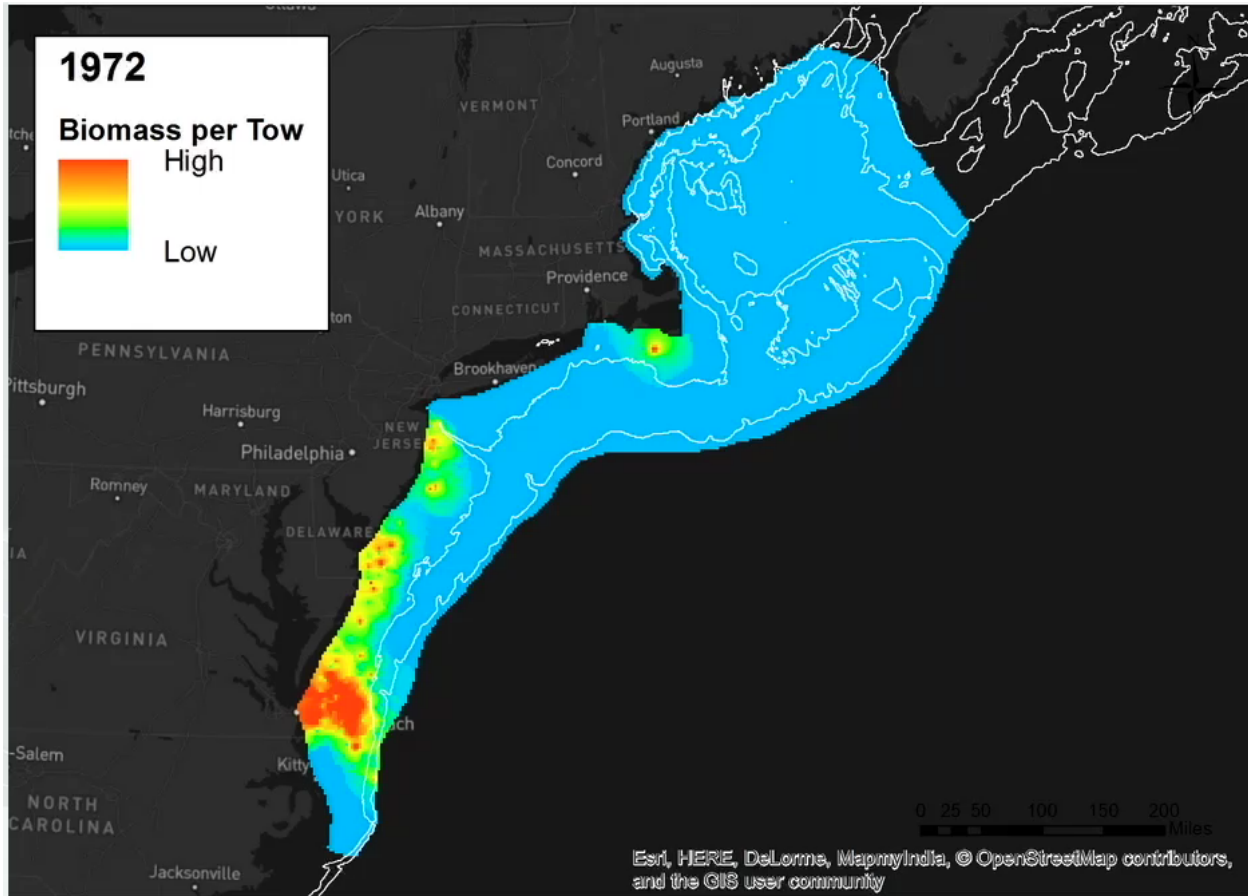
Really good at statistics

Facilitates transparency and reproducibility

The R ecosystem (R + RStudio + GitHub + RMarkdown + ...) enables us to **do better science in less time**
(*email me for a PDF*)

Plus: Spatial data analysis, handling netcdf files, "soup to nuts" analytical workflows, ...

Species on the move



Species on the move

2022?

Species on the move

Explaining the past \neq predicting the future

Ecosystems are very, very complex

My work

Goal: simulating near-term shifts in species' distributions in response to temperature

Problem: our only data are annual surveys of where fish were found, and how many

Solution: fit mechanistic models to historical data to estimate process rates and simulate the future

The finer details

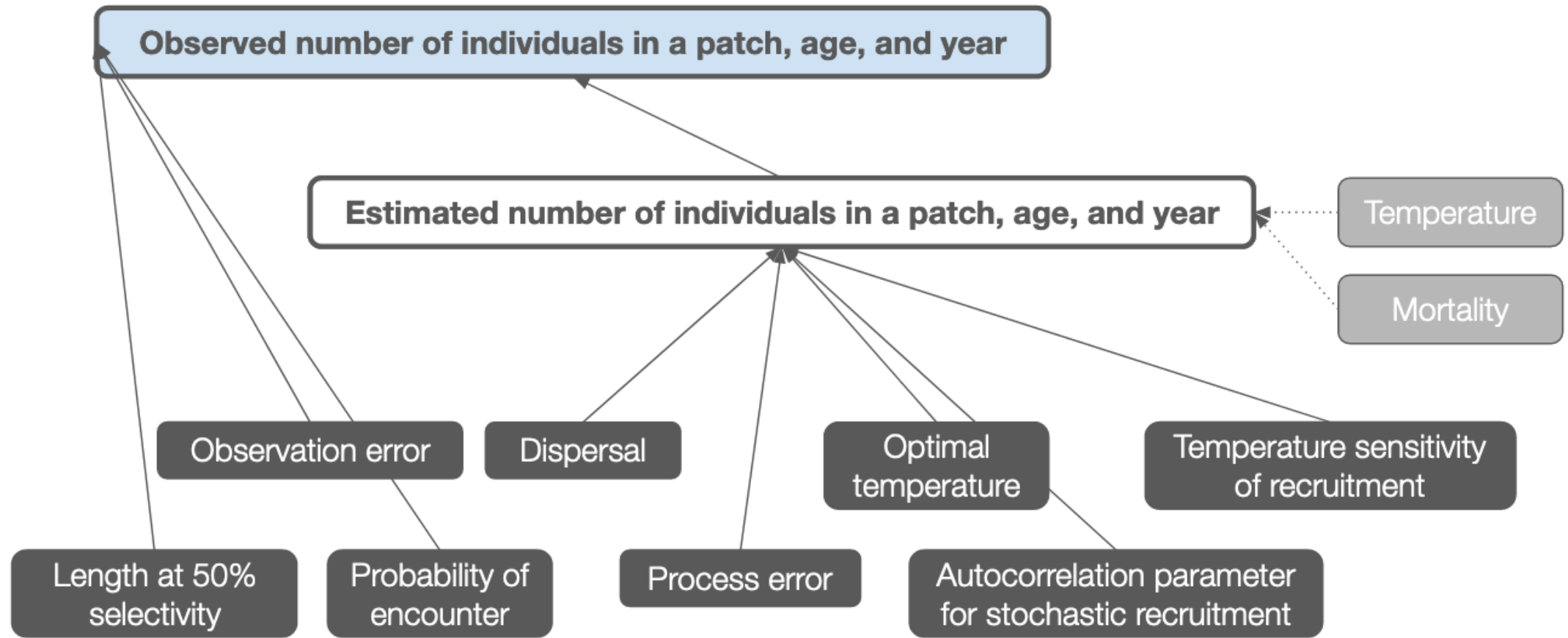
Fitted as a hierarchical Bayesian model using Stan

Packages: rstan, rstanarm, tidybayes

Core model features

- Spatially structured: 1° patches along a coastline
- Age structured: adults reproduce, cohorts move through ages
- Most process rates estimated in model
- One process rate (reproduction, movement, or mortality) is temperature-dependent
- *Only fitted to historical data on abundance and distribution*
- Fitting 1972-2005, testing 2006-2015
- Competing annual forecast against different model types

Bayesian network



Fitting models to data

R, the planet, and you

Data about issues that matter to you is at your fingertips...

... **But use it with caution!**

Domain knowledge matters

We're friendly. Just ask!

Thanks!

Slides created via the R packages:

xaringan and xaringantheme

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