Regression to the mean

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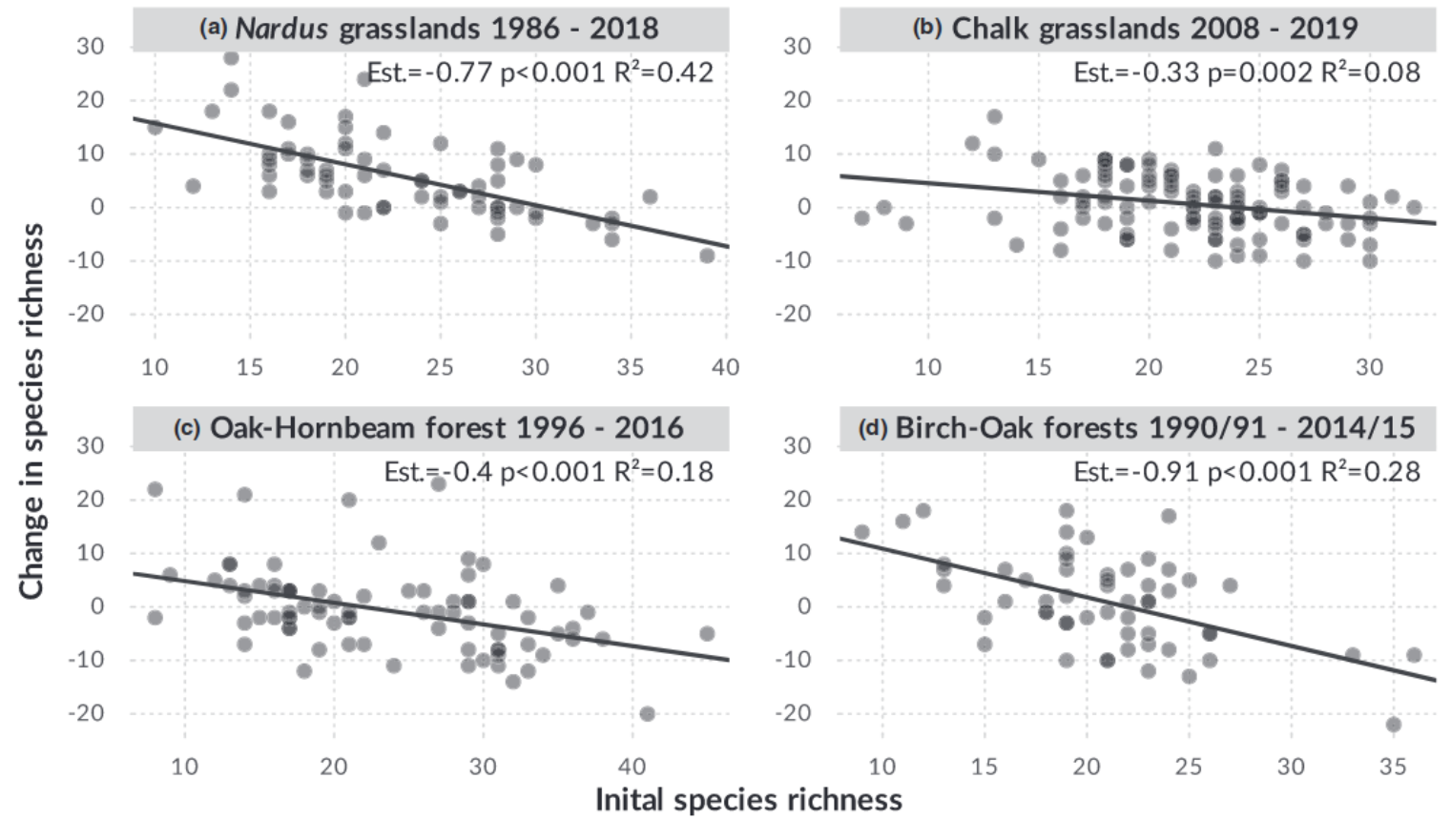
https://frodriguezsanchez.net

The most biodiverse sites are losing more species

WHY??



Mazalla & Diekmann 2022

Most biodiverse sites are losing more species. Why?

- Stronger competition

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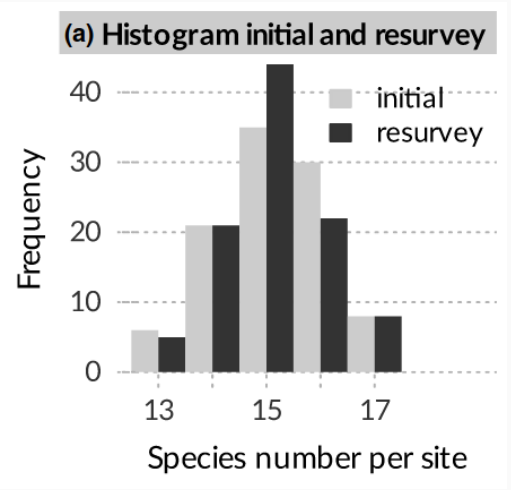
Most biodiverse sites are losing more species. Why?

- Stronger competition
- Humans destroying most species-rich sites
- Establishment of new species favoured in poor sites

- No ecological cause, but stochastic variation (**regression to the mean**)

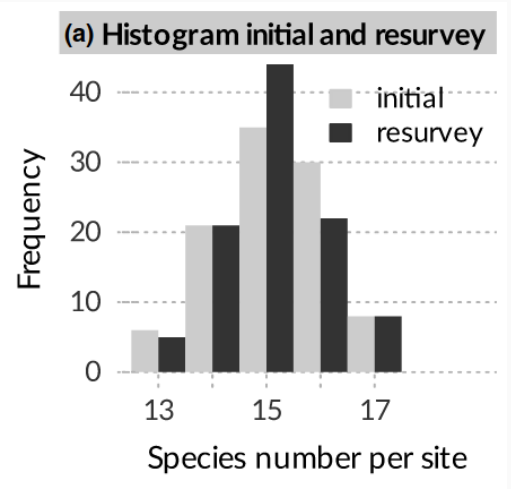
A simulation for 100 sites

- Simulate initial number of species:



A simulation for 100 sites

- Simulate initial number of species:
  - `rnorm(n = 100, mean = 15, sd = 1)`



A simulation for 100 sites

- Simulate initial number of species:
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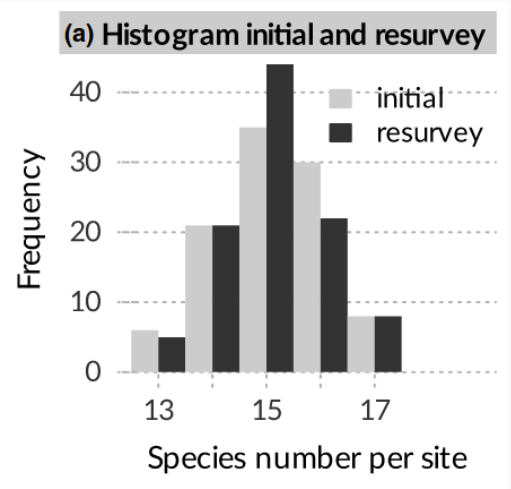
- Simulate number of species at resurvey:



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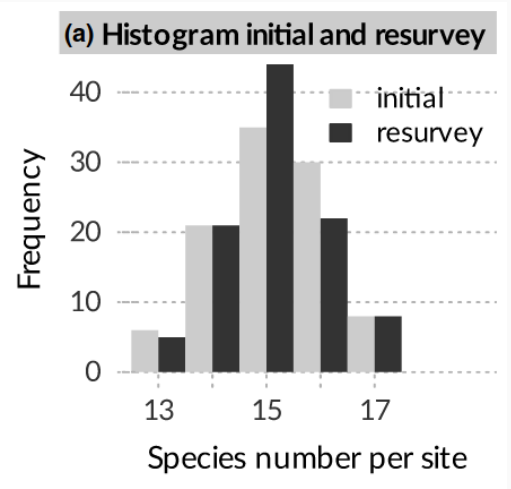
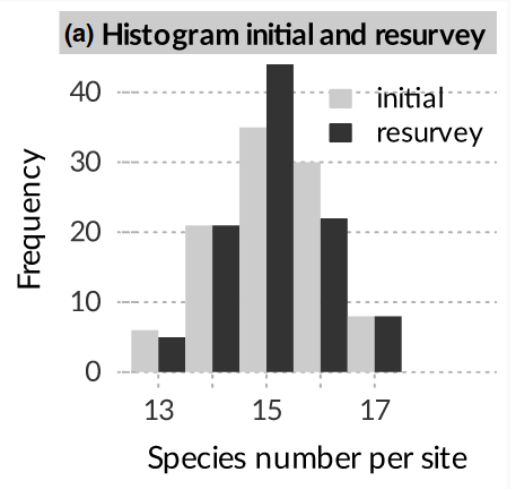


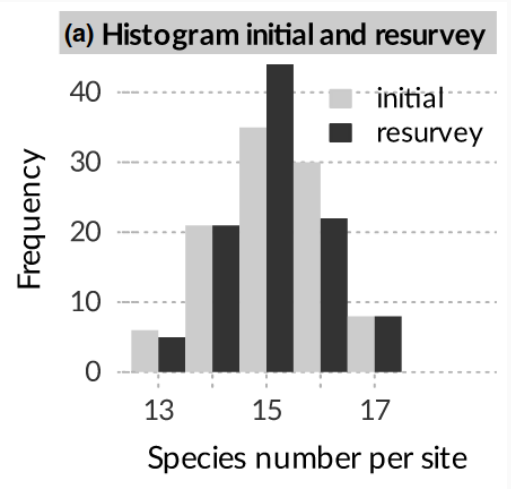
A simulation for 100 sites

- Simulate initial number of species:
  - `rnorm(n = 100, mean = 15, sd = 1)`
- Simulate number of species at resurvey:
  - `rnorm(n = 100, mean = 15, sd = 1)`
- No real change at all!



A simulation for 100 sites

- Simulate initial number of species:
  - `rnorm(n = 100, mean = 15, sd = 1)`
- Simulate number of species at resurvey:
  - `rnorm(n = 100, mean = 15, sd = 1)`
- **No real change at all!**
- (only stochastic variation)

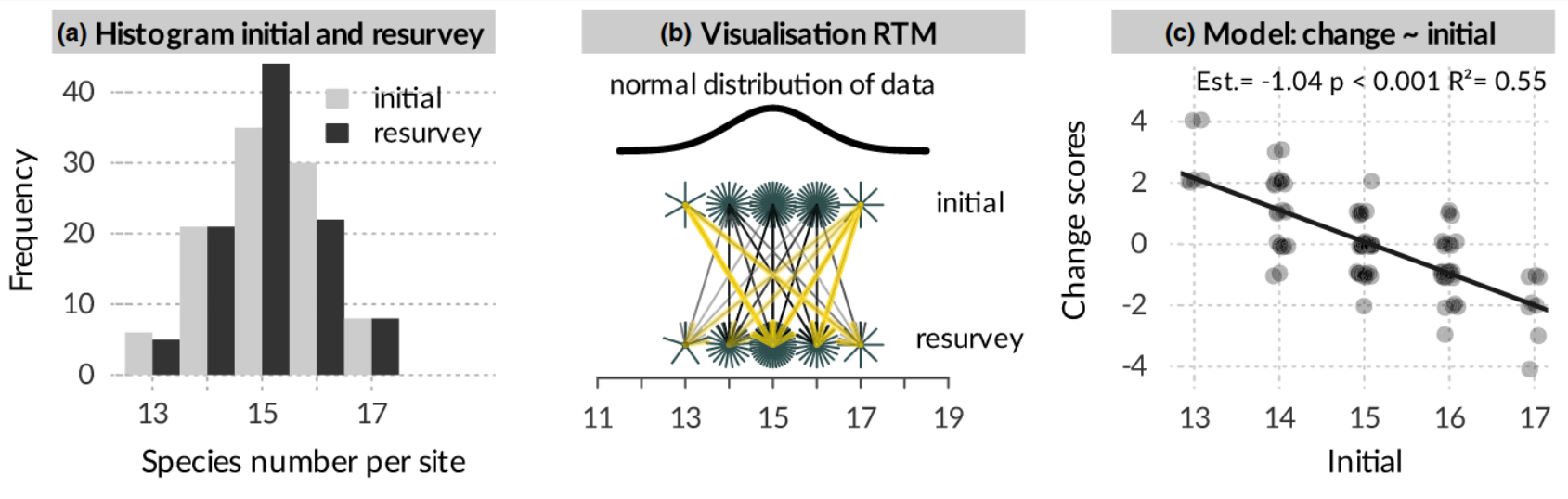


Regression to the mean

Species-rich sites lose more species

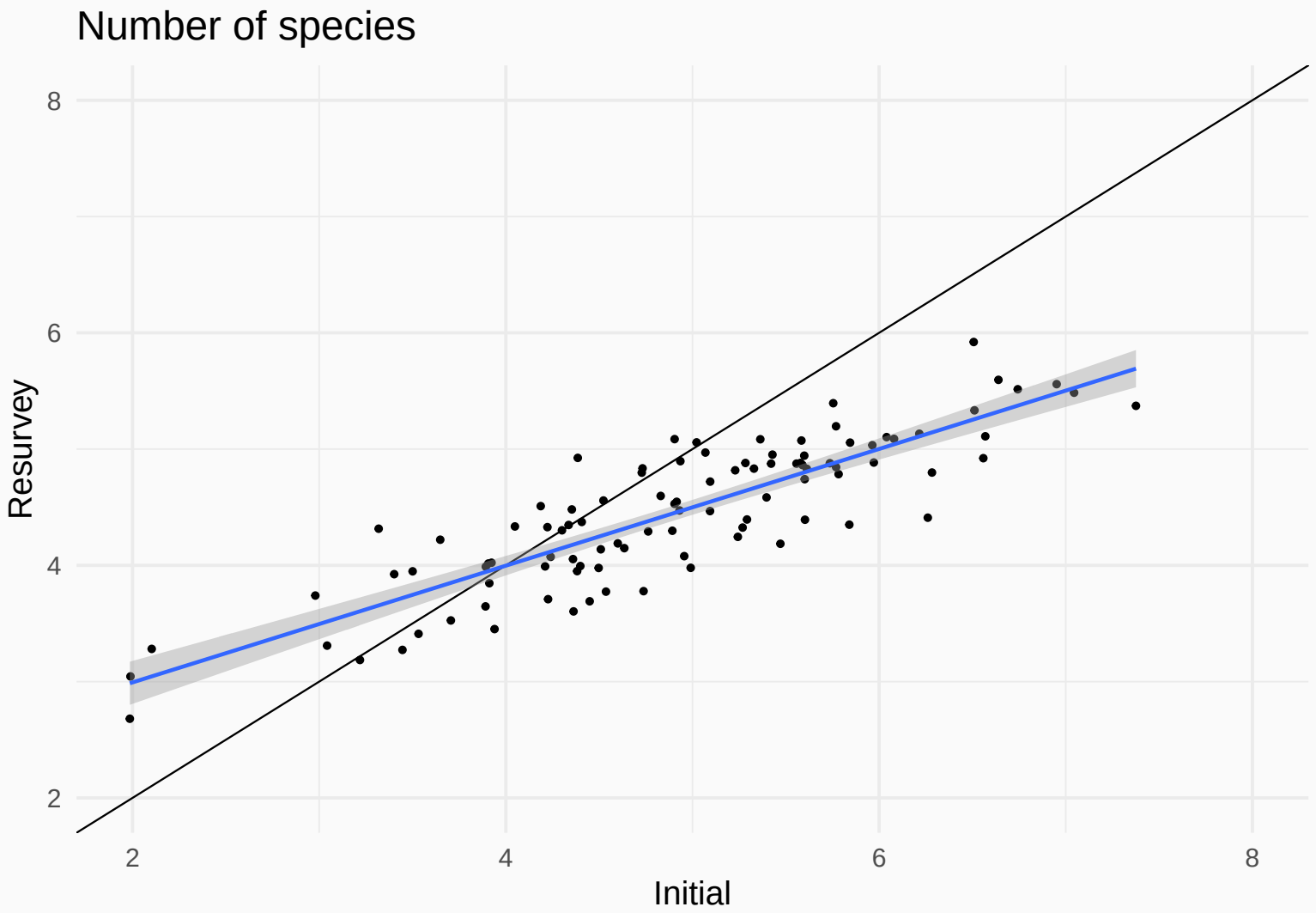
Species-poor sites gain more species

Negative trend against baseline



Mazalla & Diekmann 2022

Whenever two sets of measurements are not perfectly correlated there will be regression towards the mean



What to do?

- Model outcome ~ baseline

What to do?

- Model outcome ~ baseline
- If modelling Change, include baseline as predictor

To learn more

- Mazalla & Diekmann 2022

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- Mazalla & Diekmann 2022
- Kelly & Price 2005