# Regression to the mean

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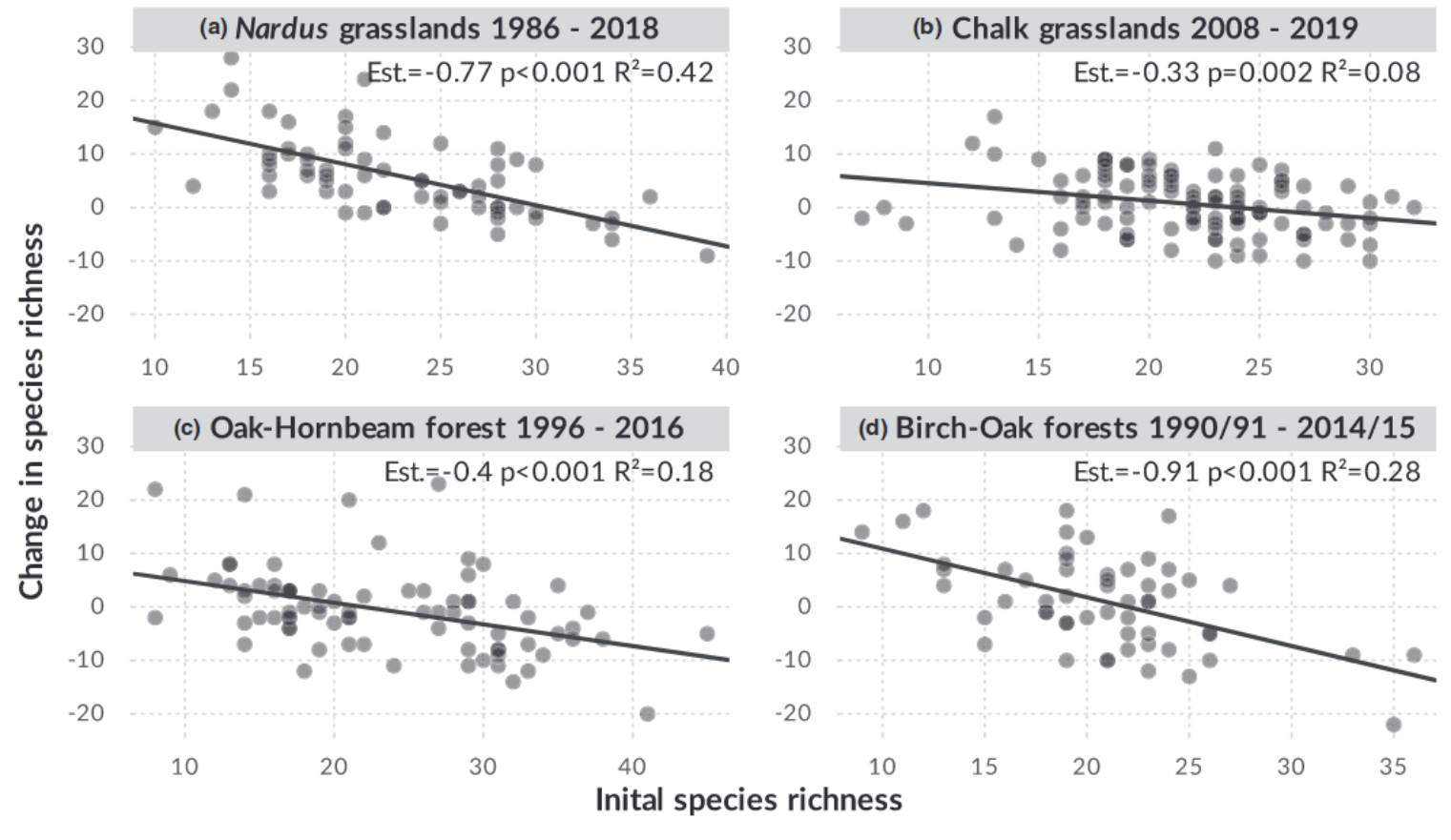
# Most biodiverse sites are losing more species

WHY??

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# Most biodiverse sites are losing more species. Why?

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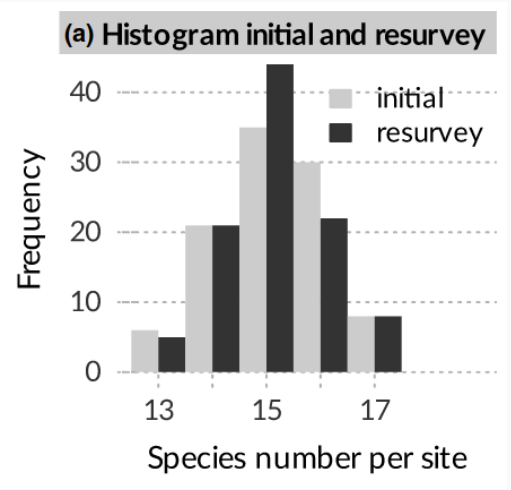
- Establishment of new species favoured in poor sites

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

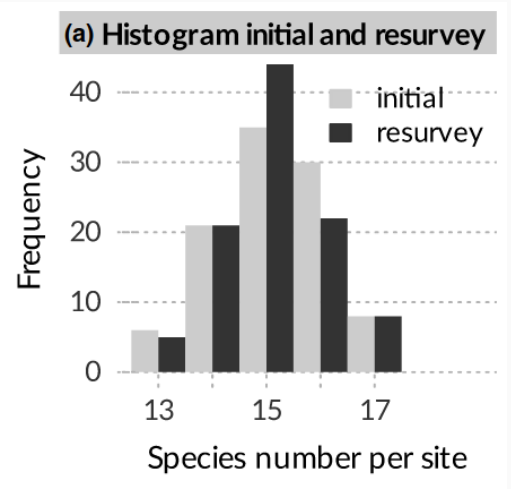
# A simulation for 100 sites

- 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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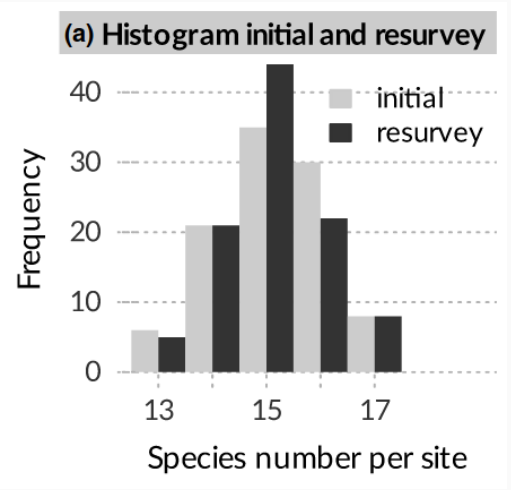
- Simulate number of species at resurvey:



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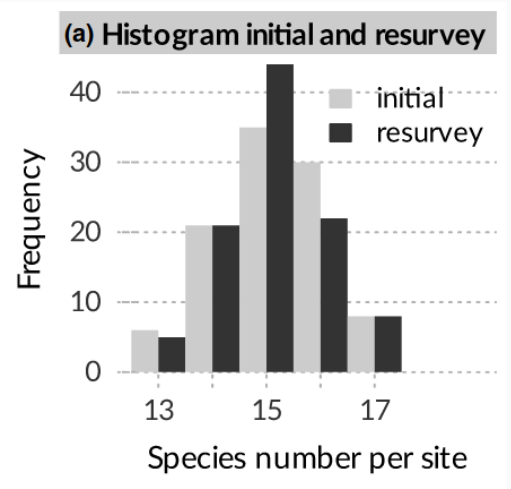

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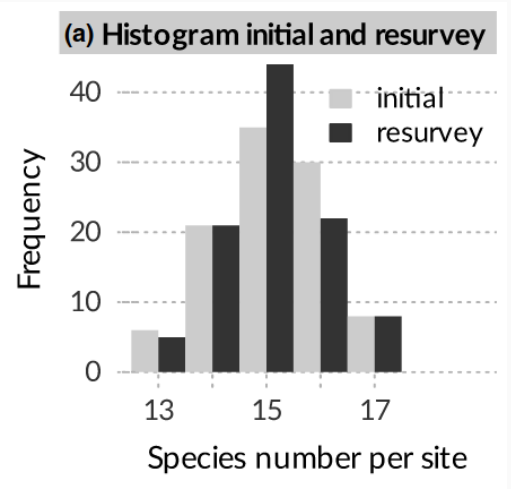
- Simulate initial number of species:
  - `rnorm(n = 100, mean = 15, sd = 1)`
- Simulate number of species at resurvey:
  - `rnorm(n = 100, mean = 15, sd = 1)`
- **No change at all!**

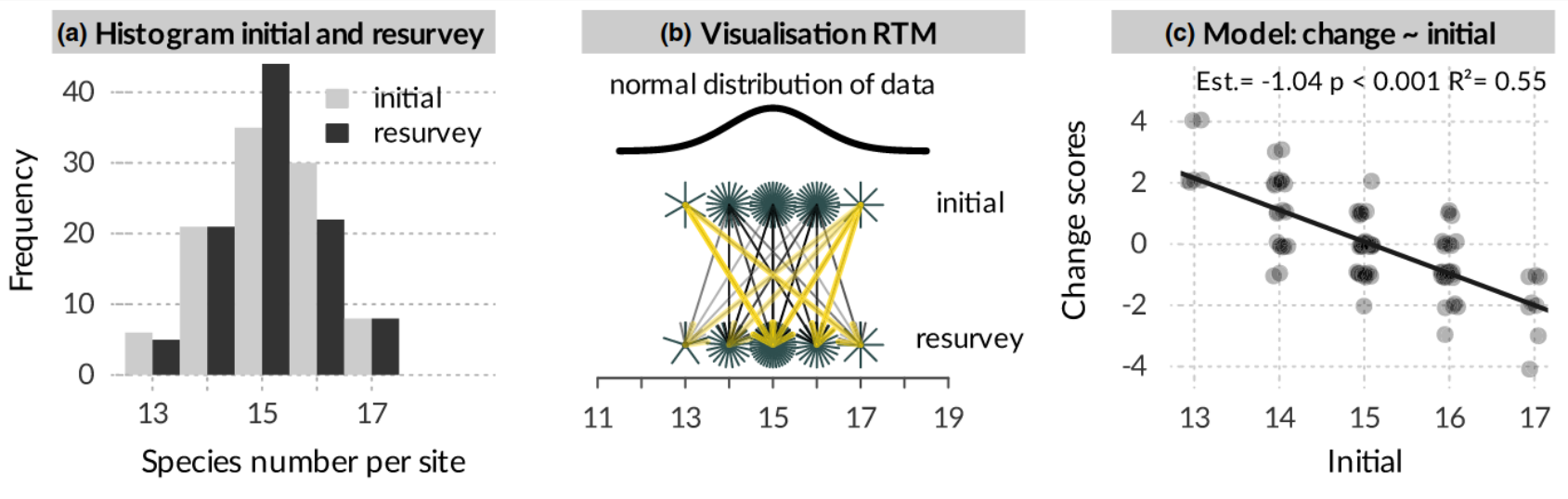


# Regression to the mean

Species-rich sites lose more species

Species-poor sites gain more species

Negative trend against baseline

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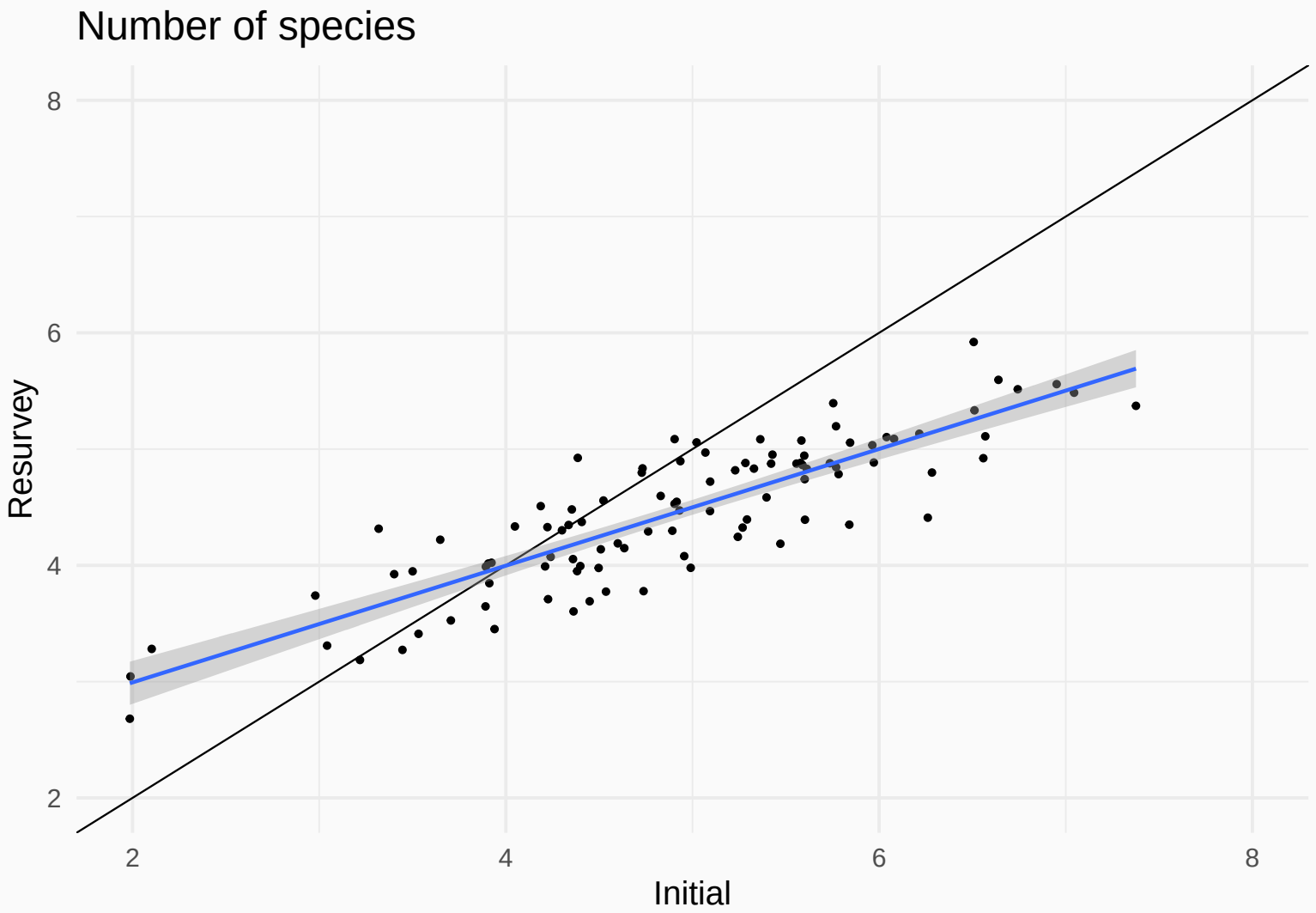
Whenever two sets of measurements are not perfectly correlated there will be regression towards the mean



# What to do?

- Model outcome ~ baseline

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- Include baseline as predictor

# To learn more

- Mazalla & Diekmann 2022

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- Mazalla & Diekmann 2022
- Kelly & Price 2005