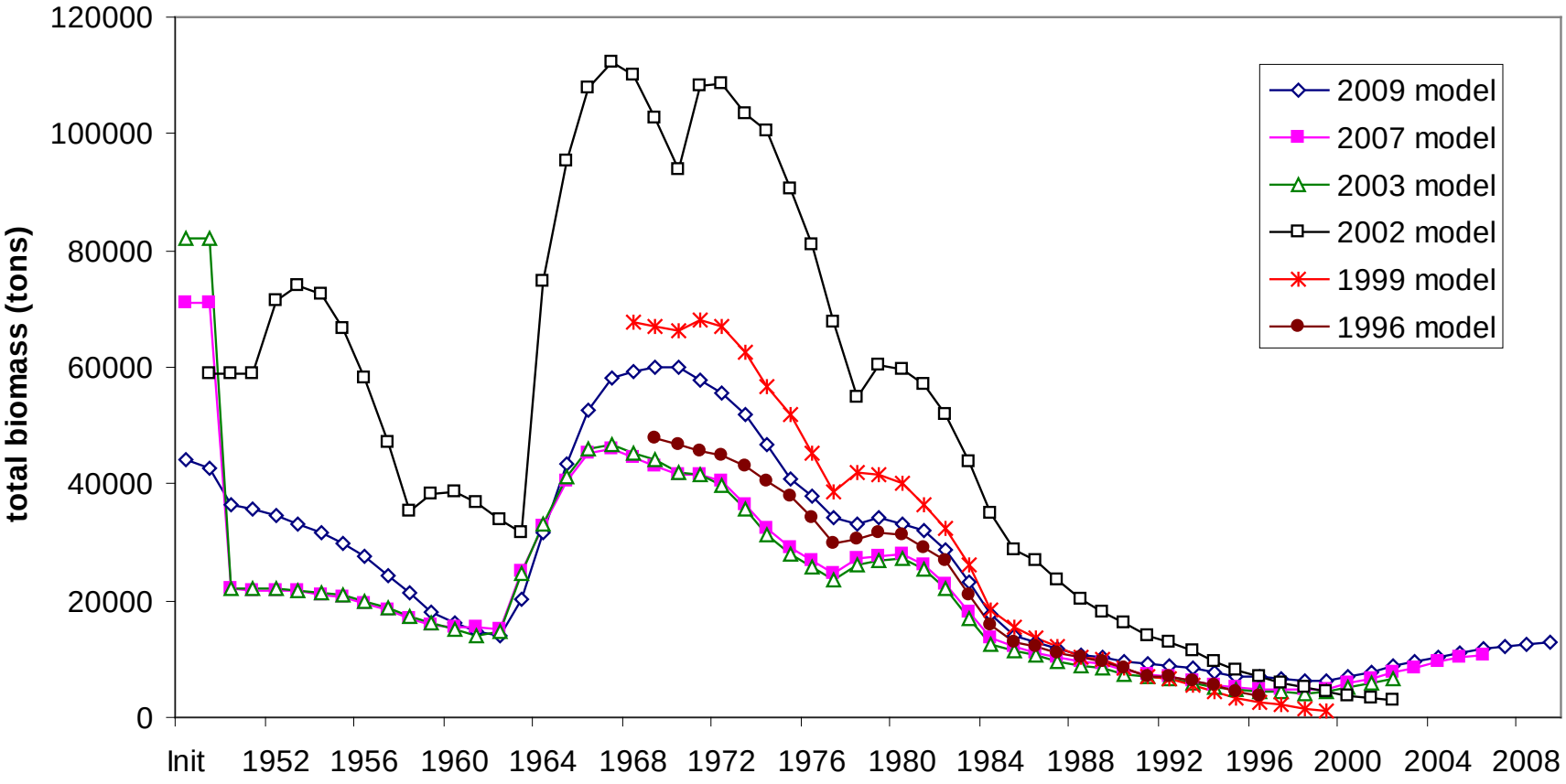
Expressing Scientific Uncertainty in PFMC Groundfish Stock Assessments

Two Key Assertions

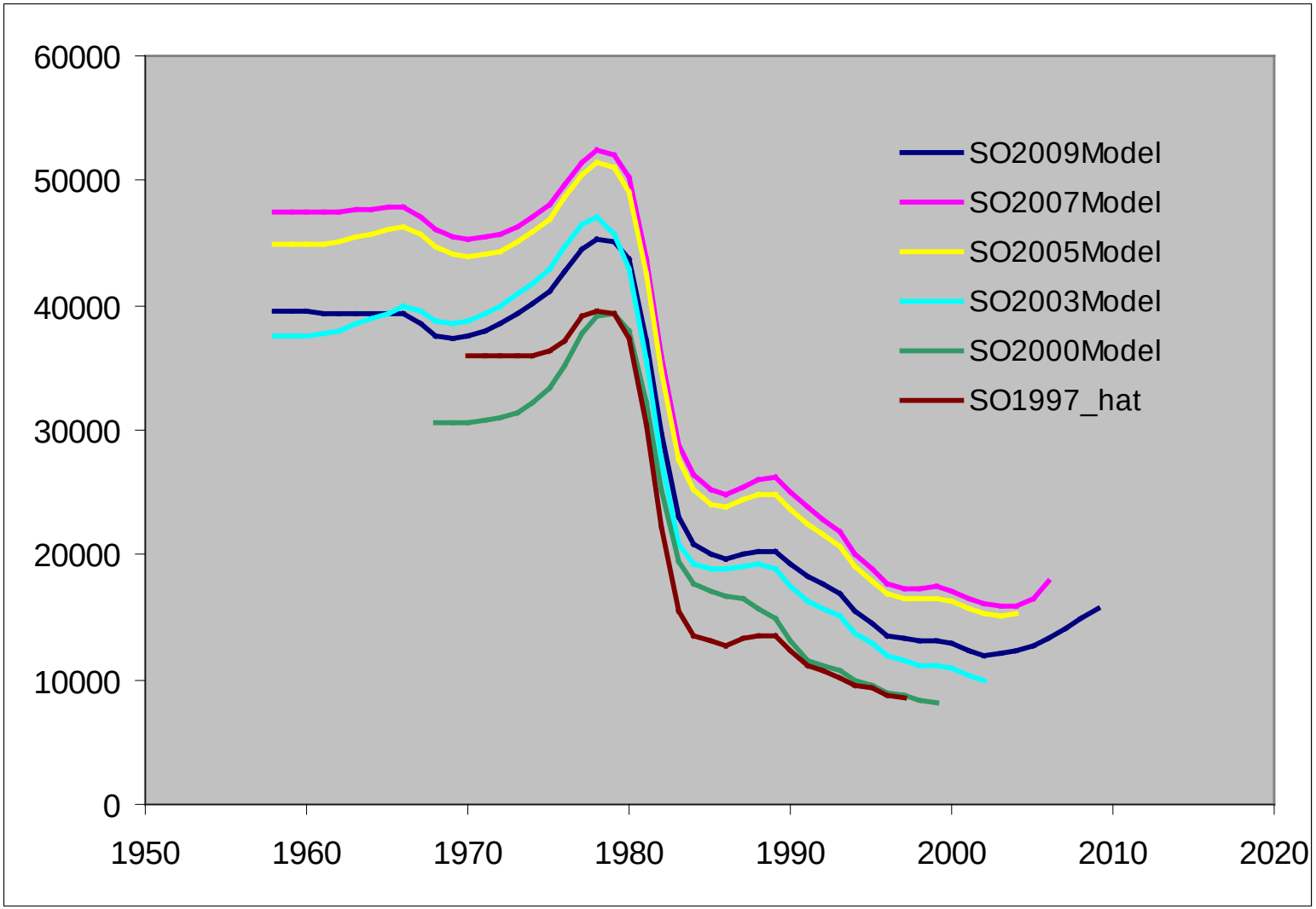
- Data-poor assessments cannot be more certain than data-rich assessments
- Variation "among" stock assessments captures a wide variety of sources of uncertainty, including:
  - Data used (e.g., NWFSC combined trawl survey)
  - Model software (e.g., SS1 vs. SS3)
  - Model specification (dome-shaped or asymptotic)
  - Parameter priors (e.g., Dorn prior on ***h***)
  - STAT team composition
  - STAR panel composition

Repeats of the bocaccio stock assessment



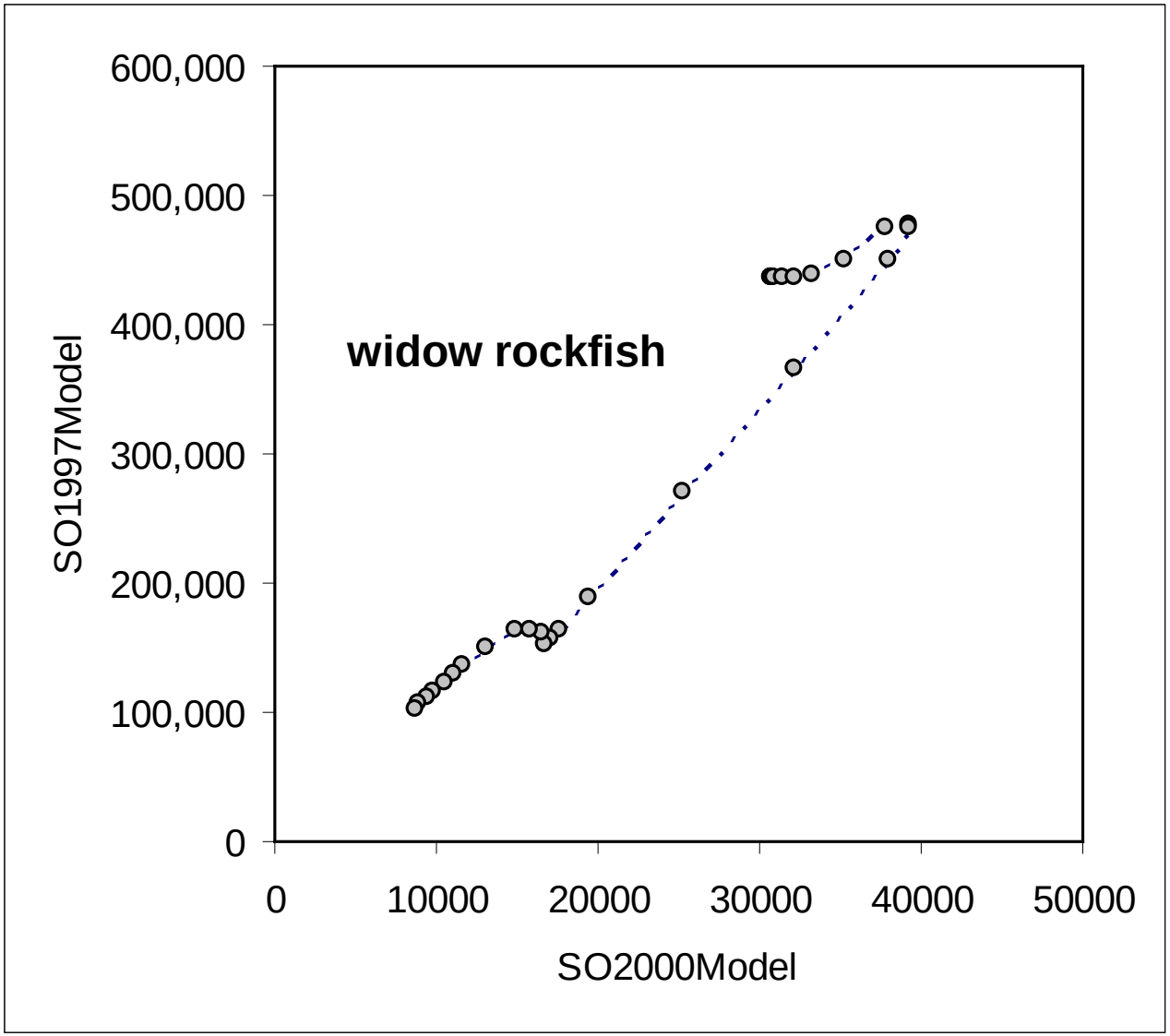
thanks to John Field

Repeats of the widow rockfish assessment

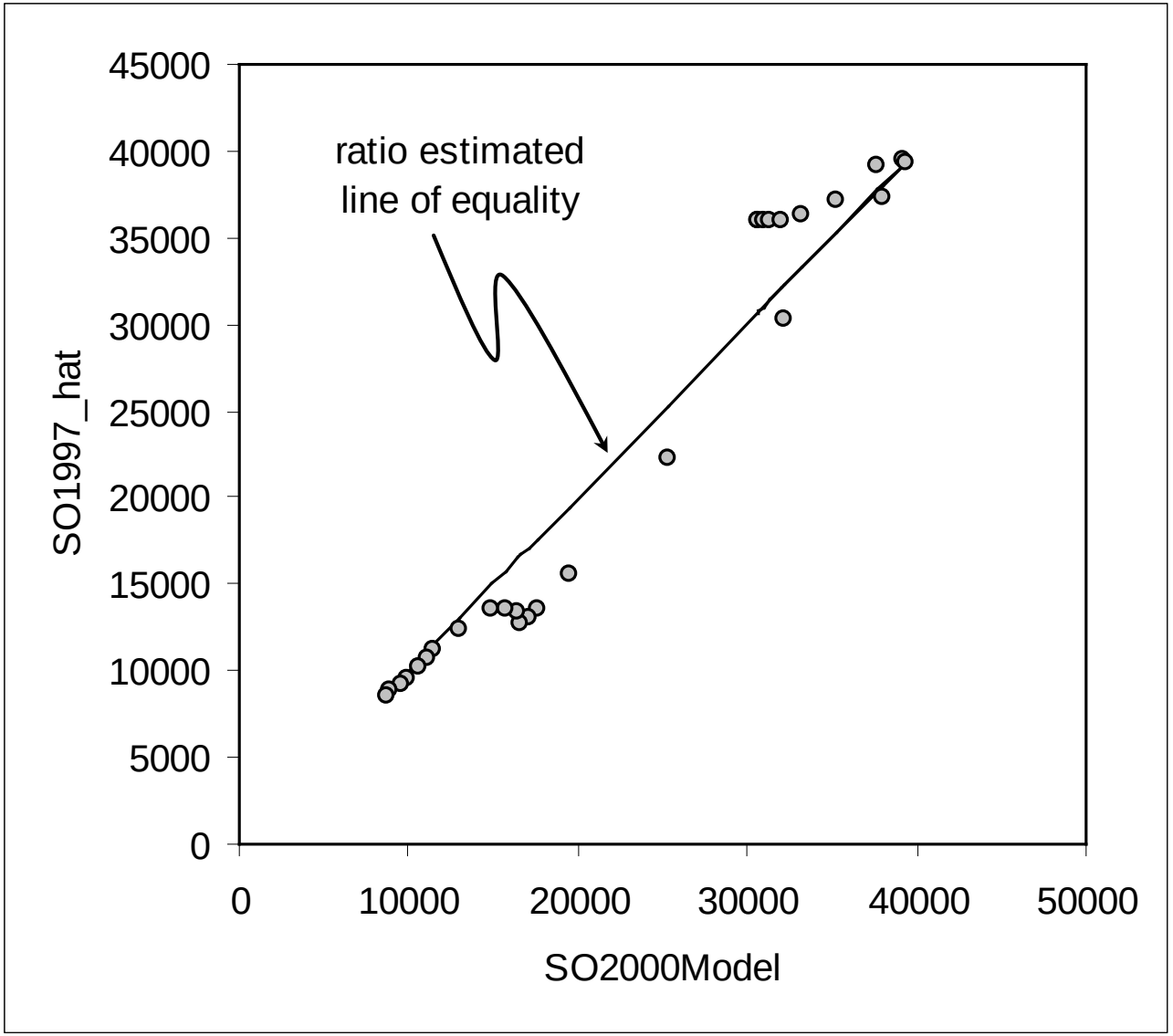


thanks to Xi He

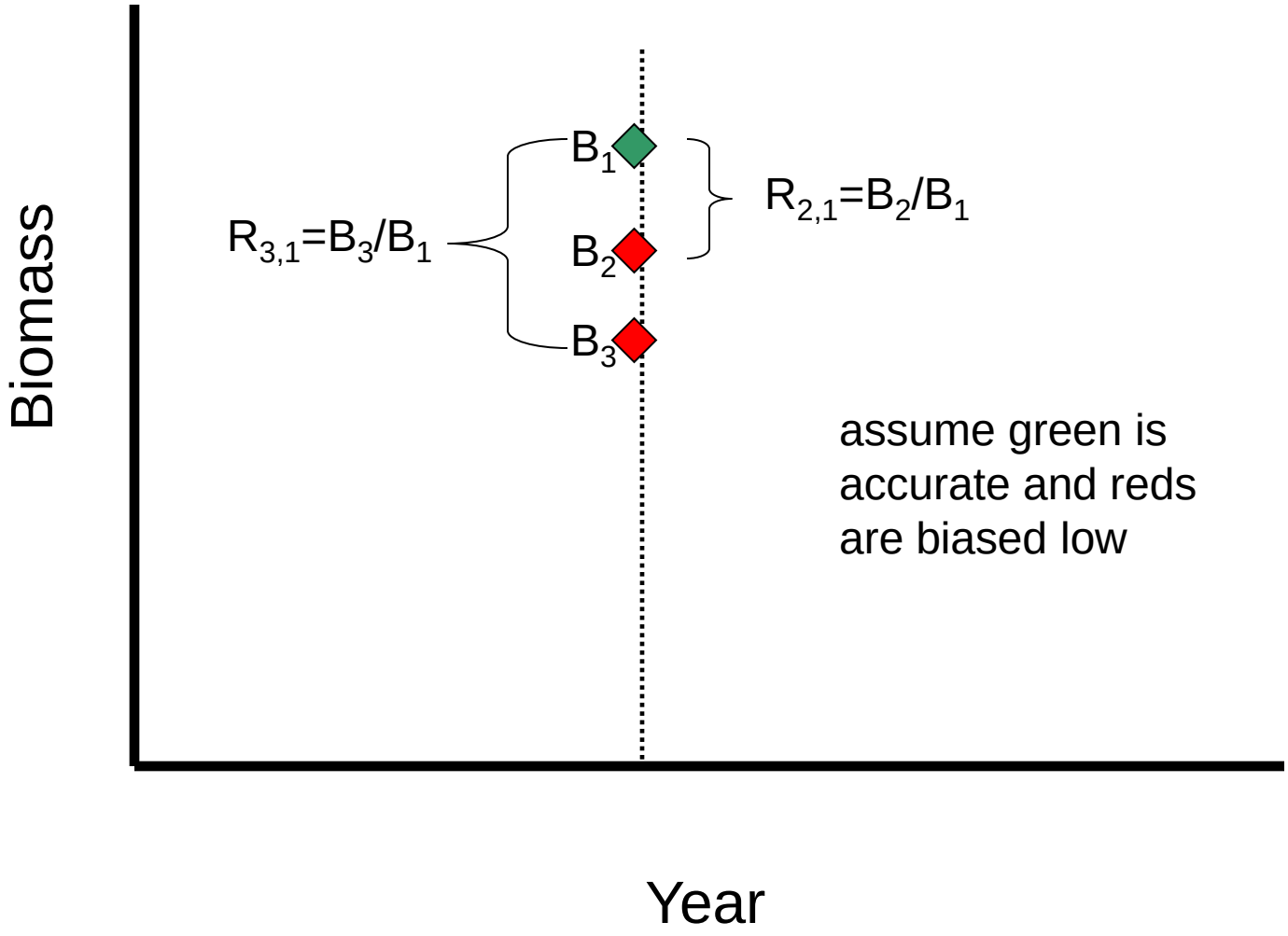
Sometimes biomass metrics change from one assessment to the next



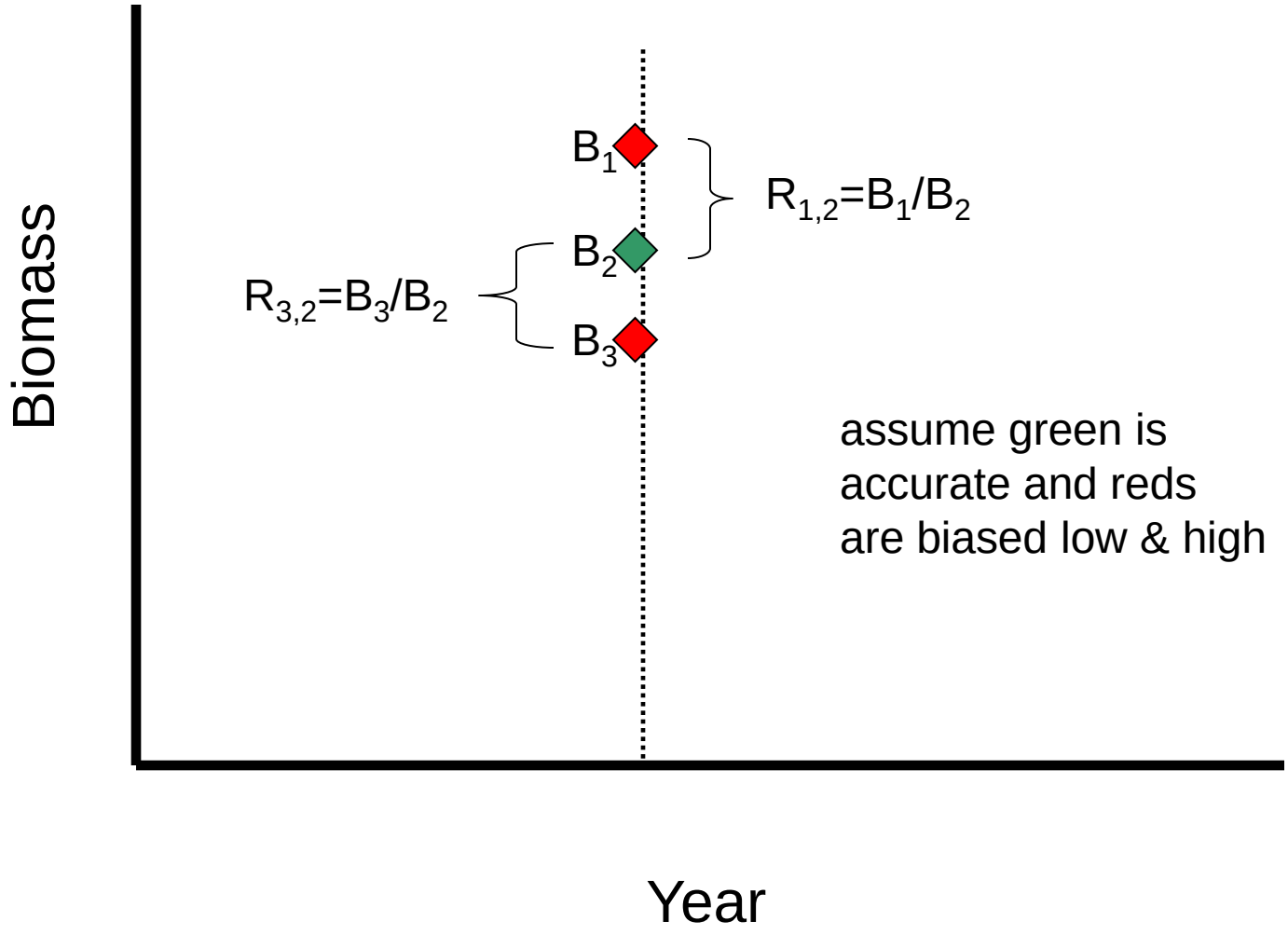
Standardize using ratio estimator



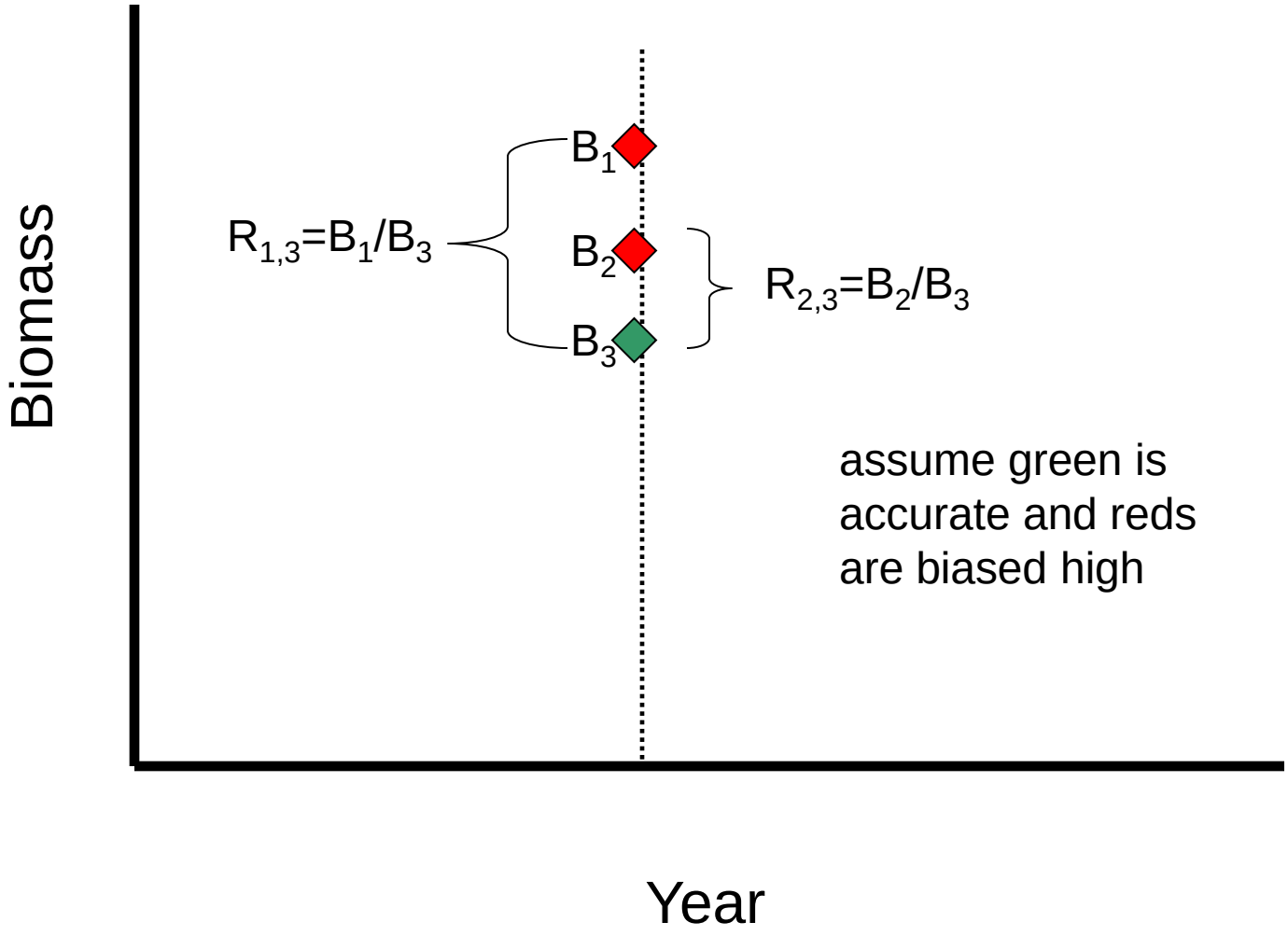
Form ratios of all possible permutations of biomass estimates in a year



Form ratios of all possible permutations of biomass estimates in a year

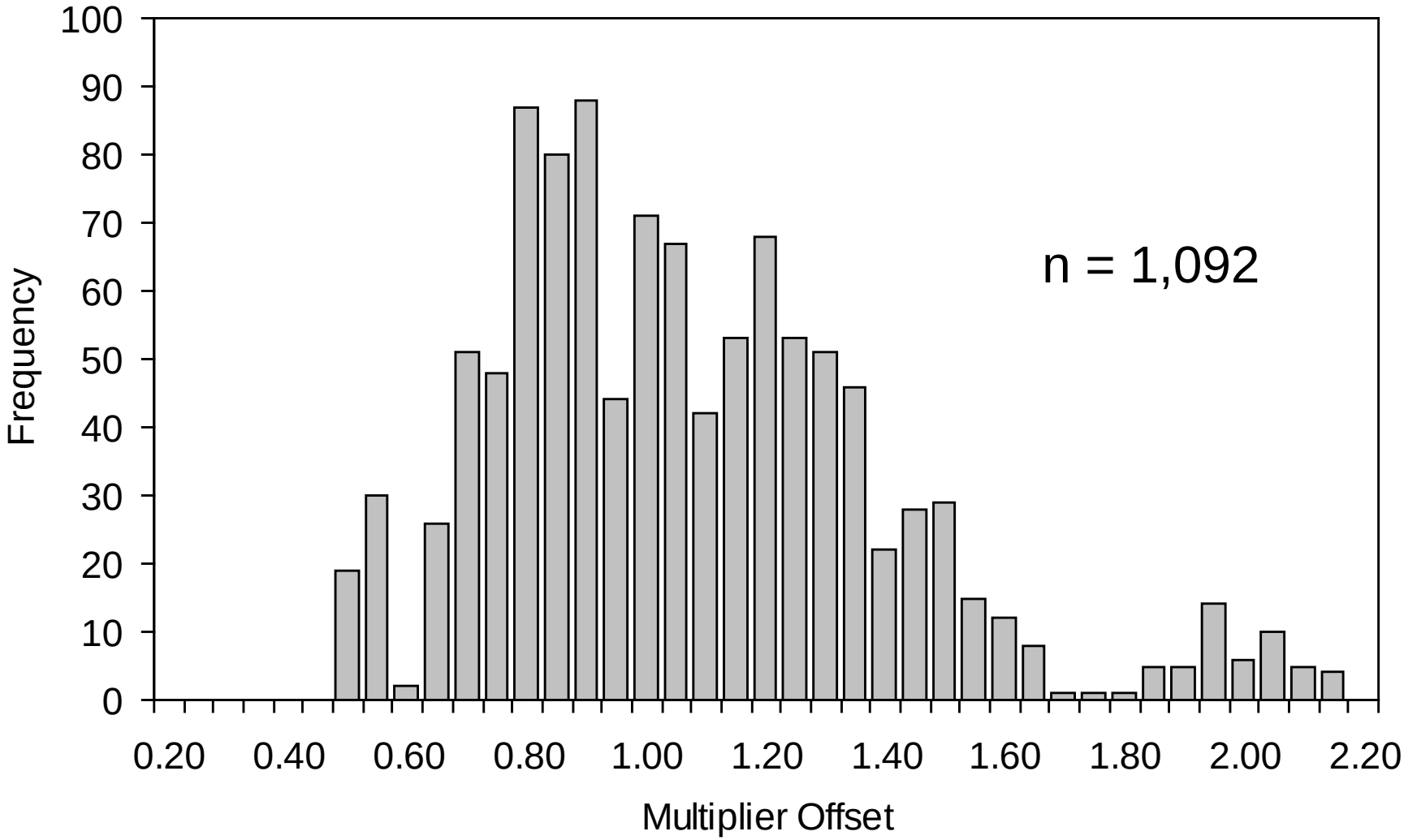


There are six different permutations of ratios for three observations of biomass in a year

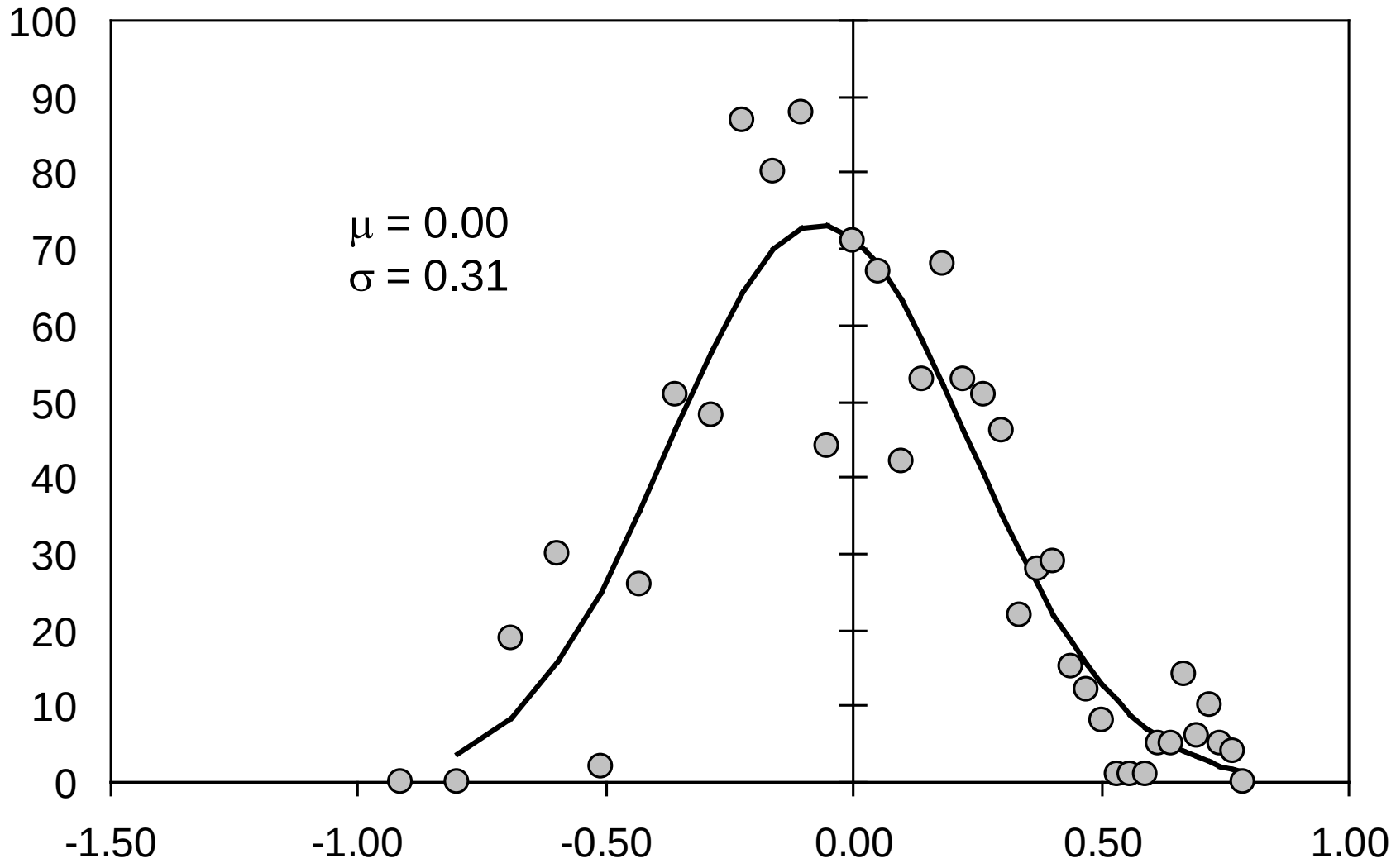


In general the number of permutations of ***”n”*** objects taken ***”r”*** at a time is:

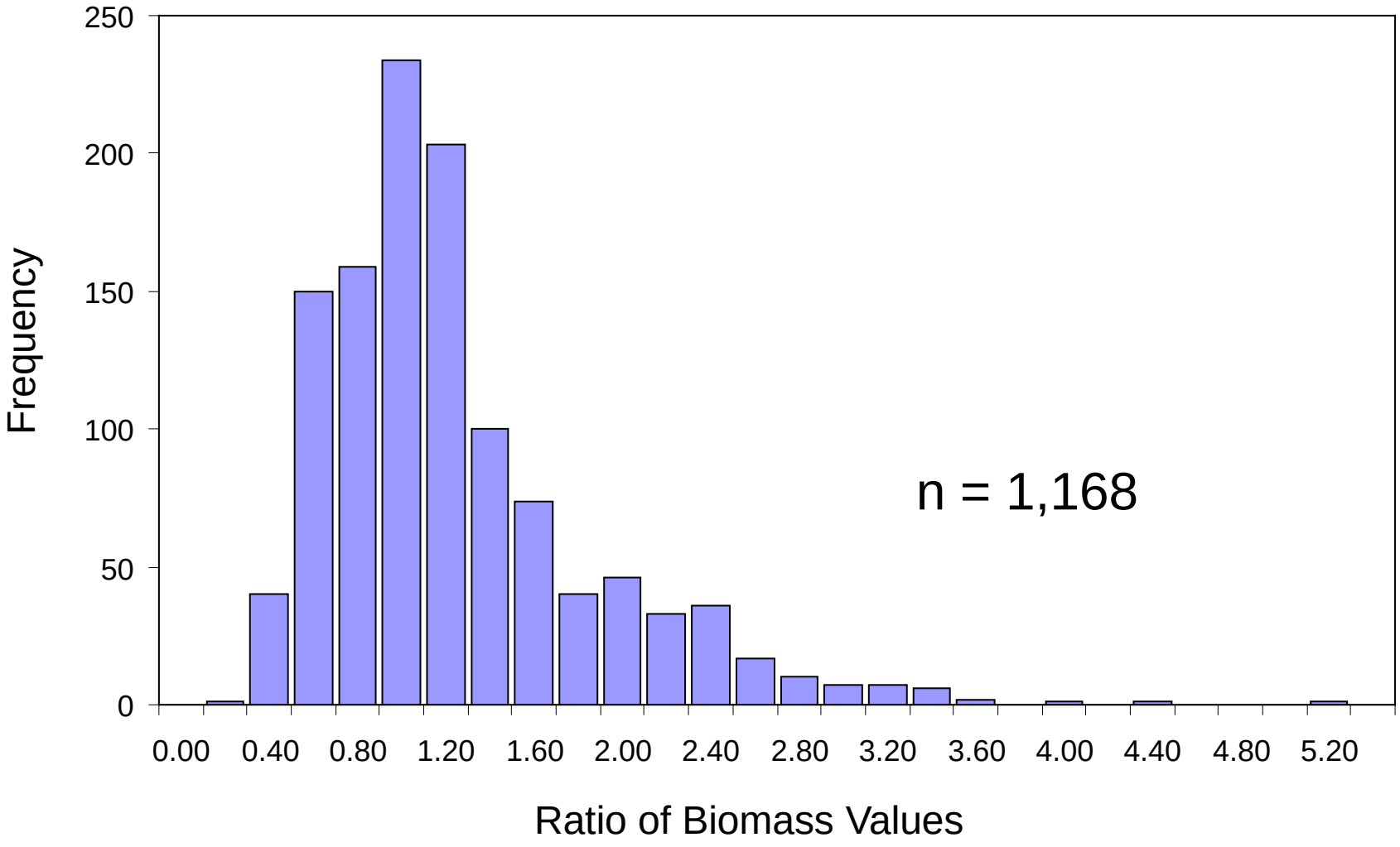
$$\text{Permutations} = \frac{n!}{(n-r)!} = \frac{n!}{(n-2)!}$$


Widow Rockfish
n = 1,092
Frequency
Multiplier Offset
0
10
20
30
40
50
60
70
80
90
100
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
1.80
2.00
2.20

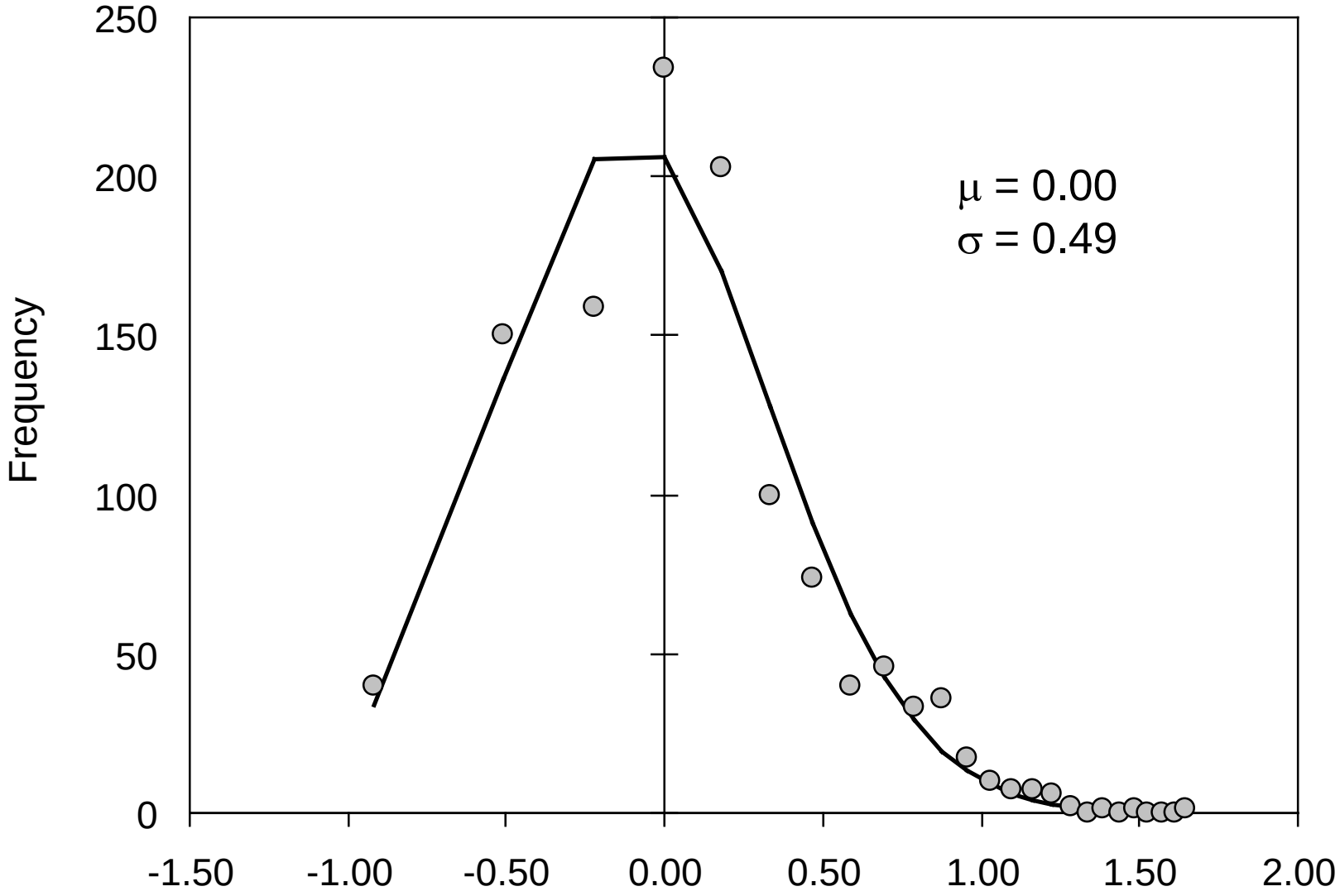
Widow rockfish – normal fit to log-transformed data

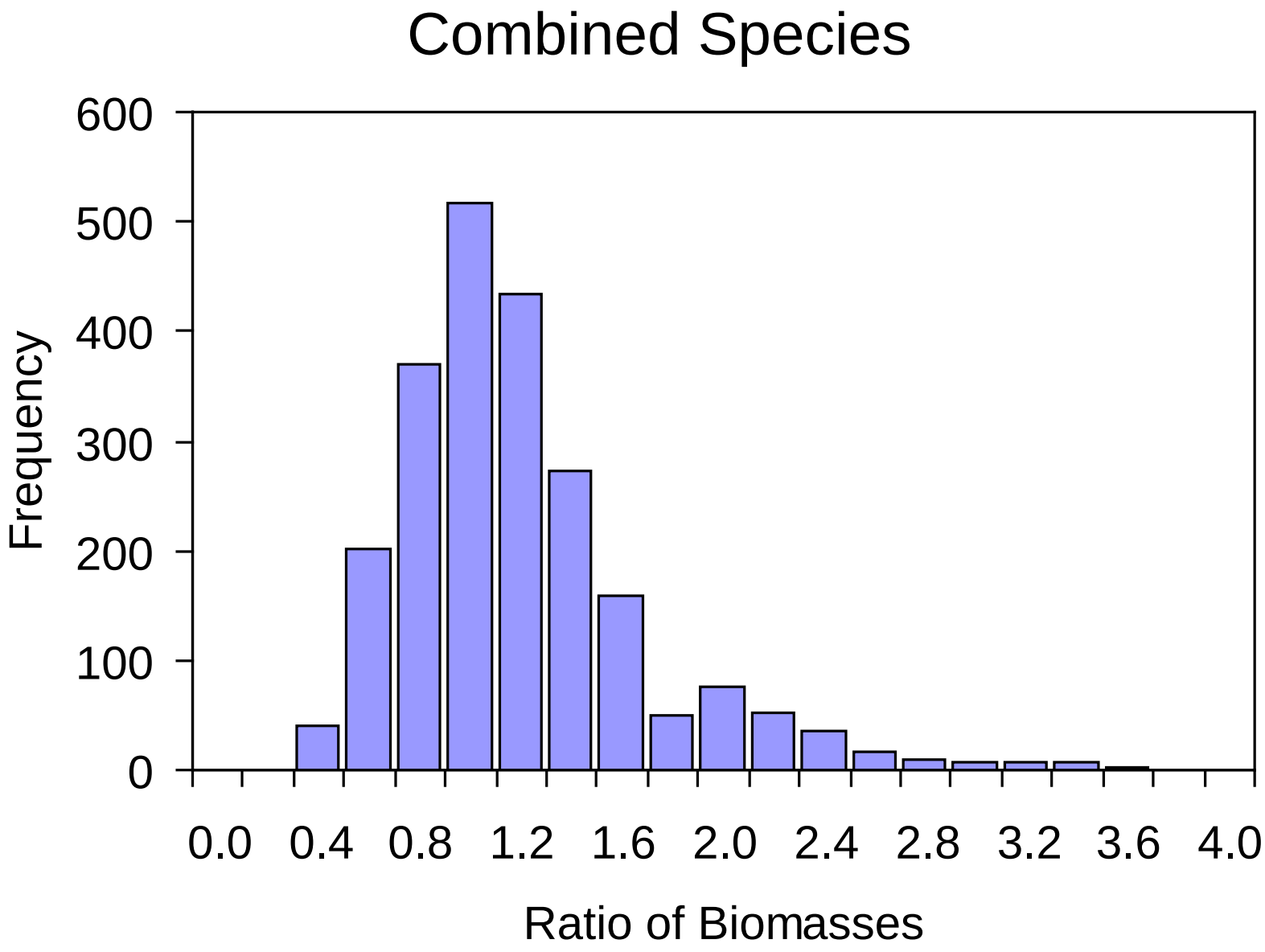


Bocaccio

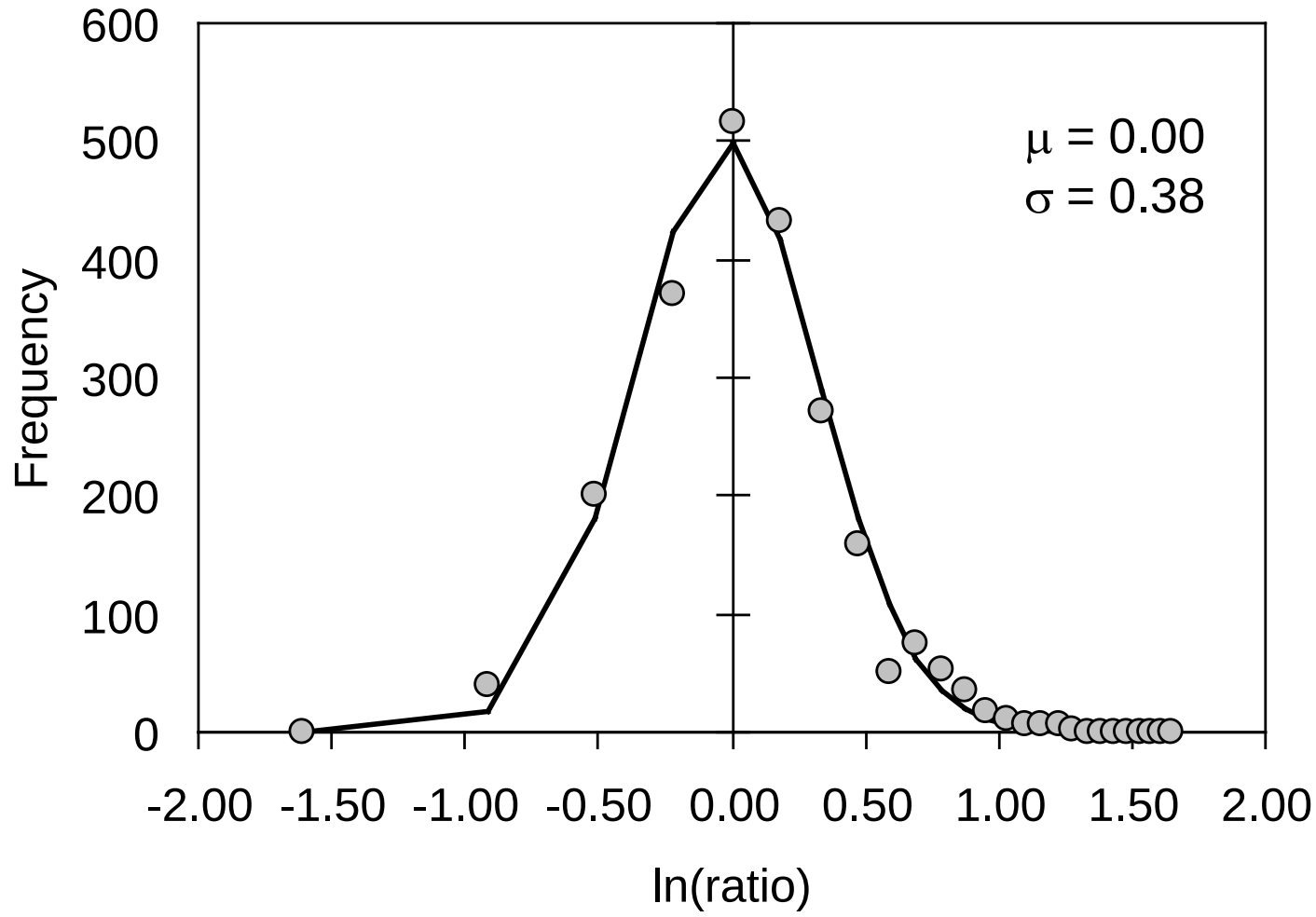

250
200
150
100
50
0
Frequency
n = 1,168
0.00
0.40
0.80
1.20
1.60
2.00
2.40
2.80
3.20
3.60
4.00
4.40
4.80
5.20
Ratio of Biomass Values

Bocaccio – normal fit to log-transformed data




Combined Species
Frequency
600
500
400
300
200
100
0
0.0
0.4
0.8
1.2
1.6
2.0
2.4
2.8
3.2
3.6
4.0
Ratio of Biomasses

Combine stocks – normal fit to log-transformed data



Create a Lookup Table