

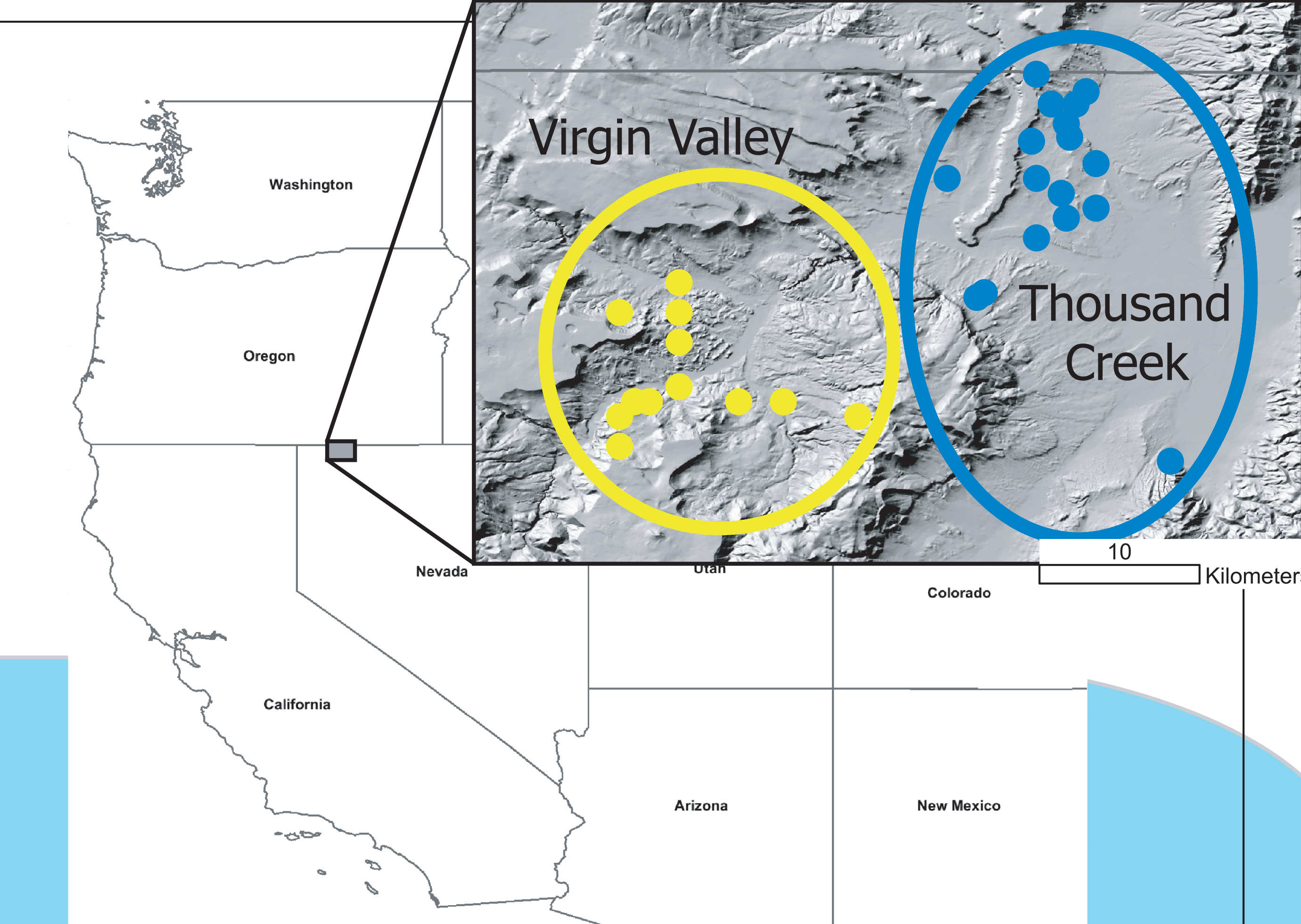
What effect does publication bias have on fossil mammal diversity estimates?

We examined the diversity of two Miocene mammal paleofaunas from northern Nevada: Virgin Valley (~16Ma) and Thousand Creek (~8Ma). Comparisons of both species diversity and rarefied diversity, based on published fossils, indicate an increase in diversity from Virgin Valley to Thousand Creek times. Disparity in the number of publications between the two localities (7 for Virgin Valley, 18 for Thousand Creek) led us to hypothesize that the change in diversity could be explained by publication bias. Here we compare specimens from the UC Museum of Paleontology localities to published faunal data.

Assessing Mammalian Paleofaunal Diversity: Comparing published and museum collection data for the Miocene of northwestern Nevada, USA



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Location of Virgin Valley & Thousand Creek collecting areas



View towards Virgin Valley Beds, Sheldon National Wildlife Refuge, NV

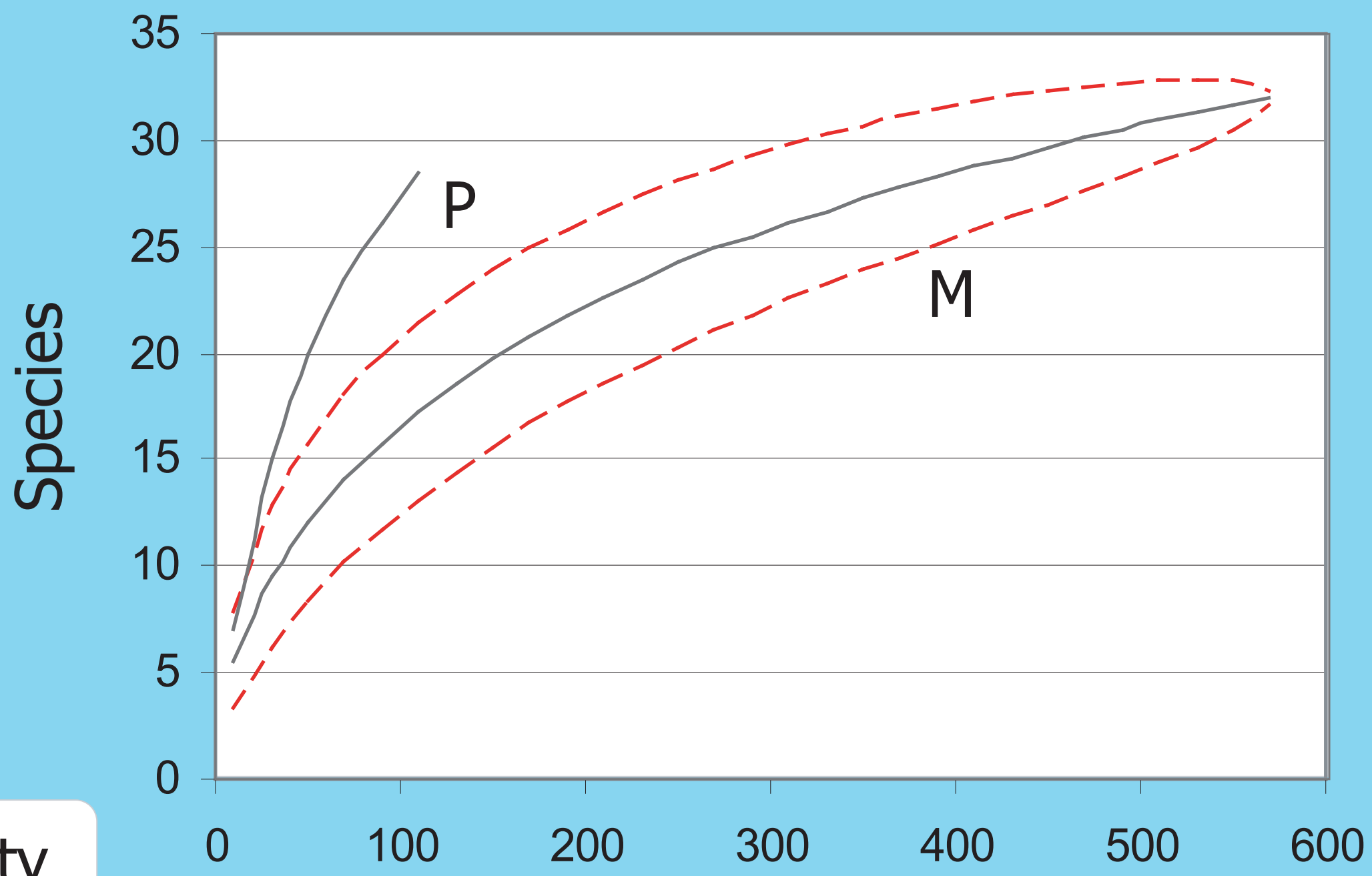
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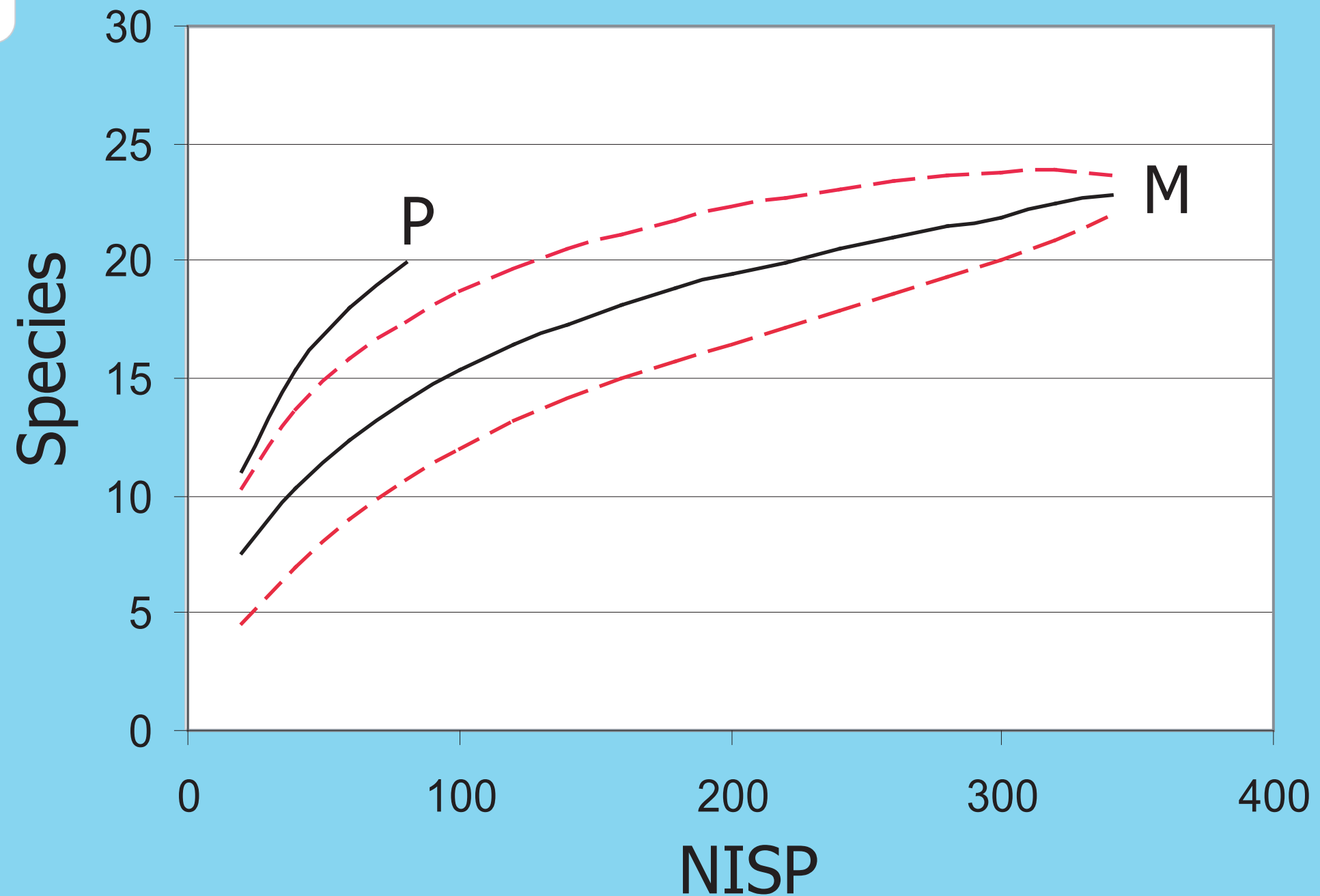
Body Mass Data

Estimates from three sources:
a) John Alroy's NAFMSD;
b) Published m1 measurements
c) Collection m1 measurements

Thousand Creek Rarefaction



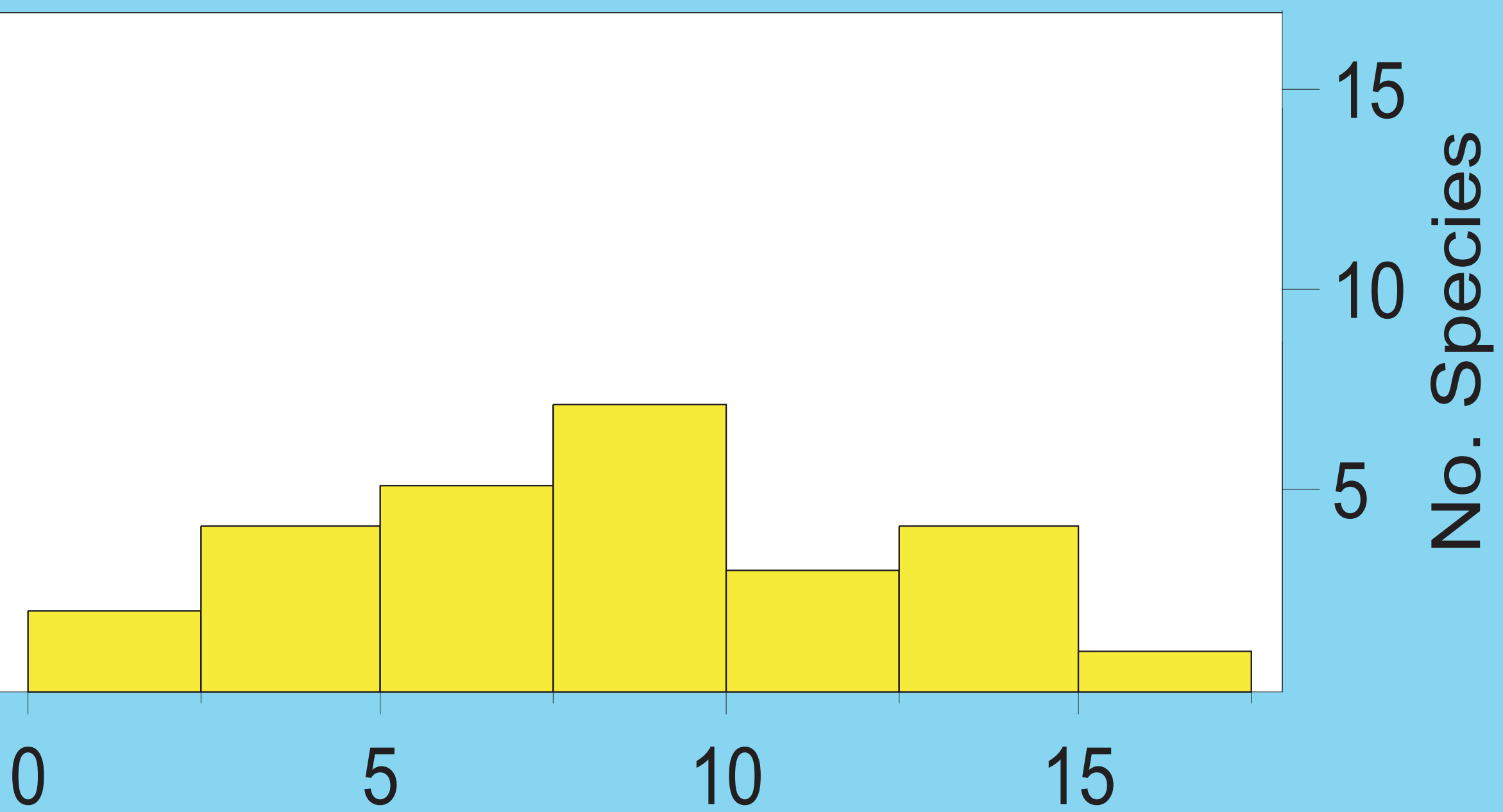
Virgin Valley Rarefaction



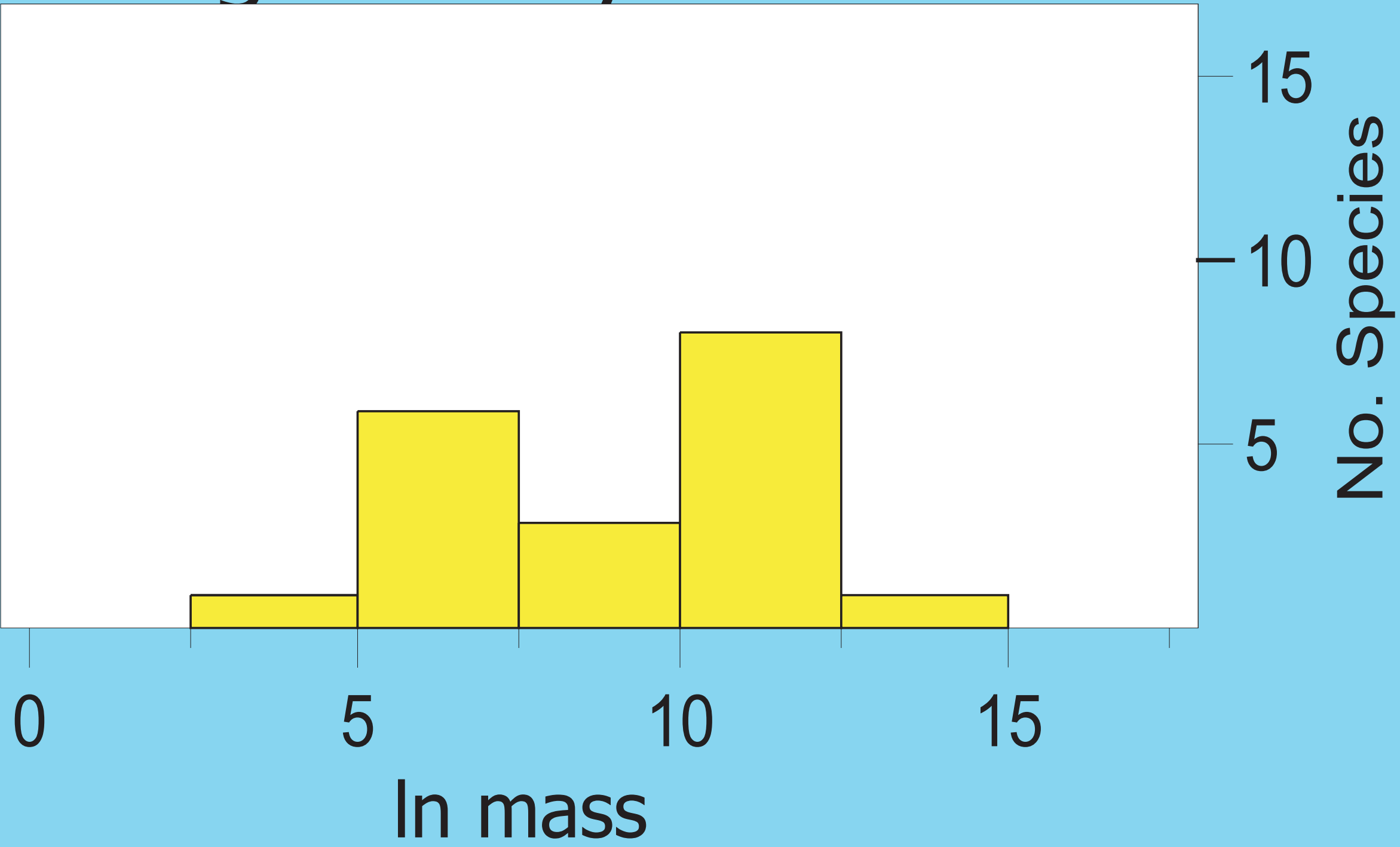
1. Rarefaction:

Museum collection data (M) are significantly less diverse than published data (P) for the same number of specimens.

Thousand Creek Published



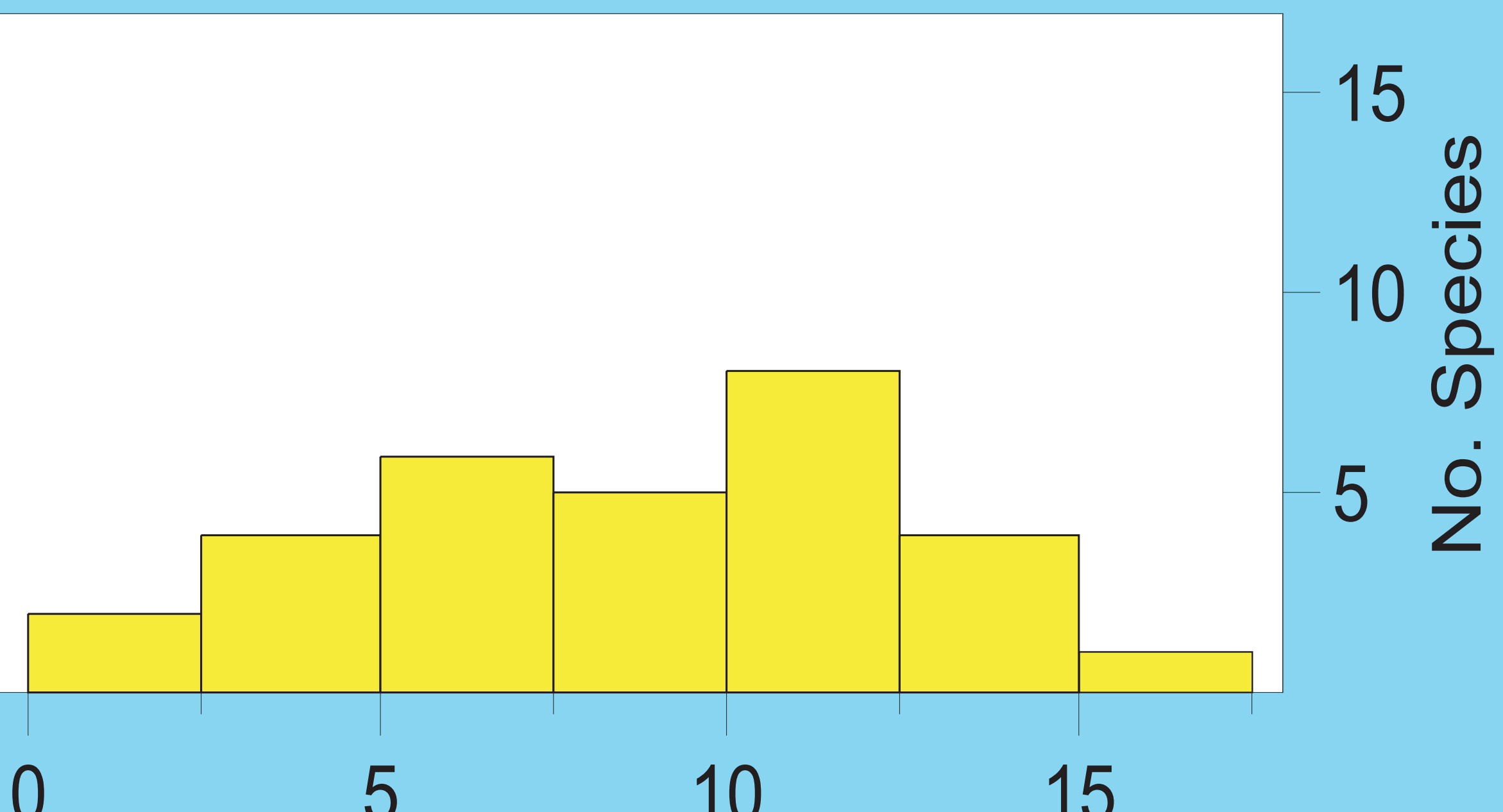
Virgin Valley Published



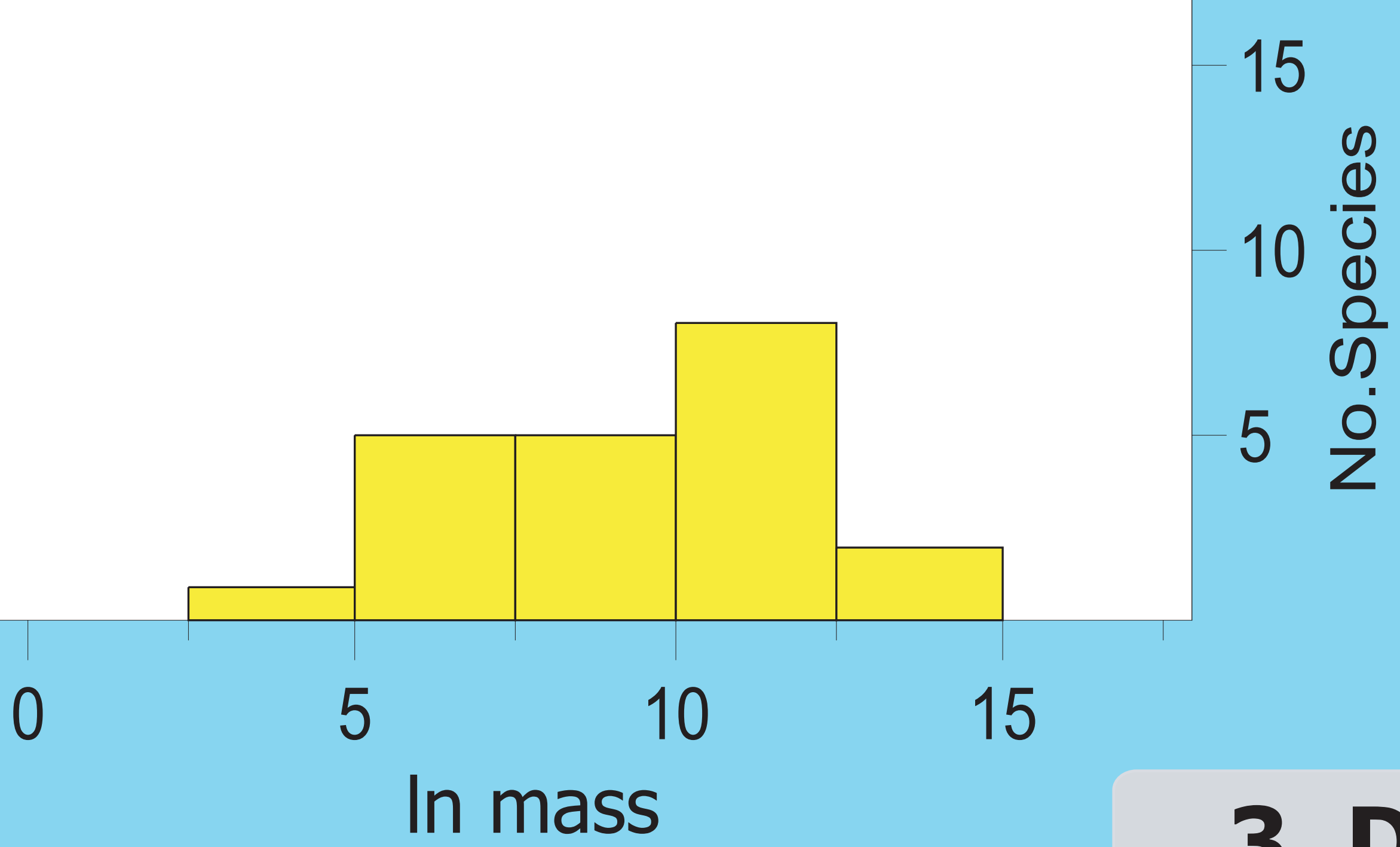
2. In mass distributions:

Comparisons of In mass distributions indicate a larger spread of masses in Thousand Creek for both the published and museum collections.

Thousand Creek Museum

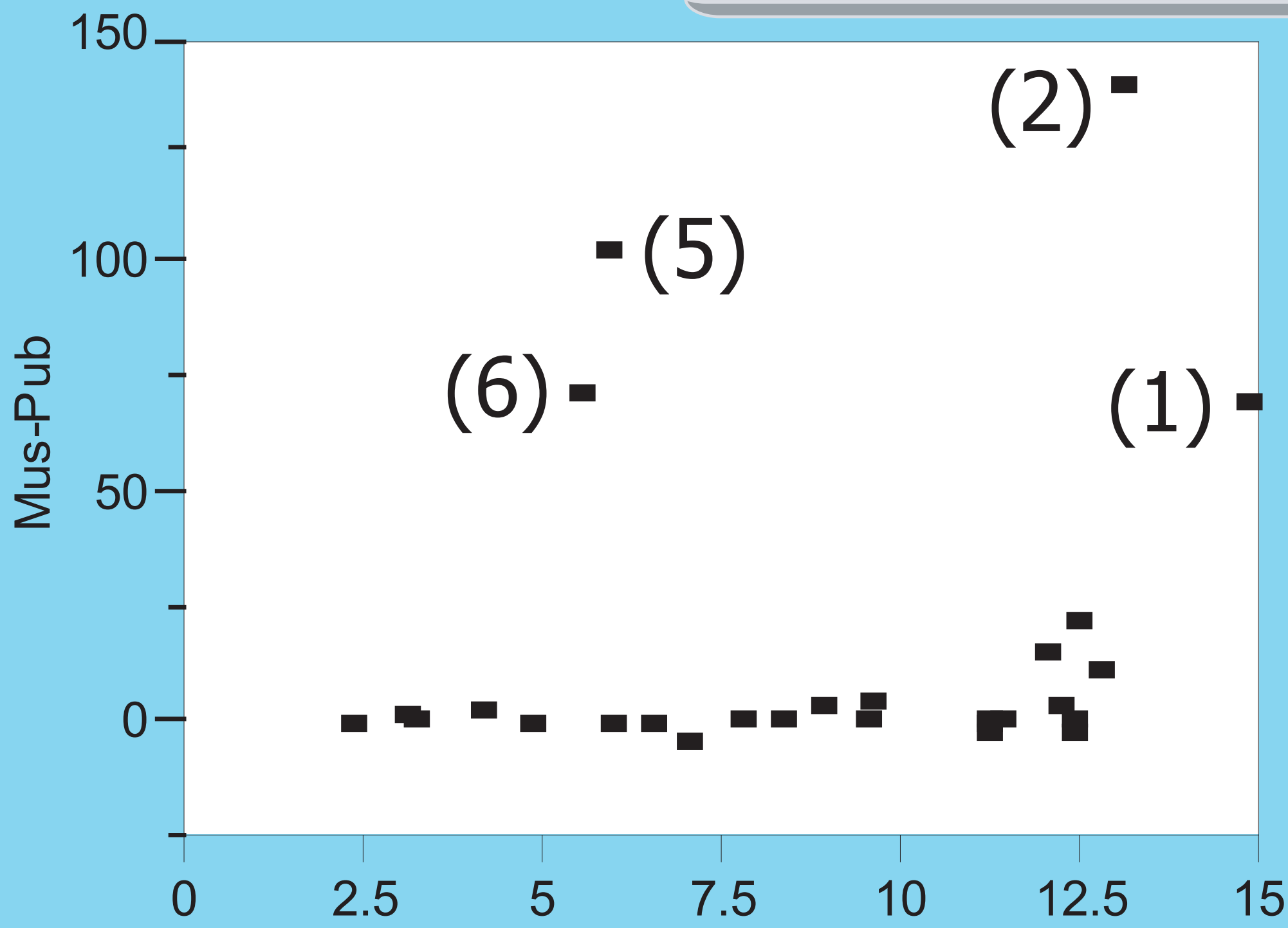


Virgin Valley Museum

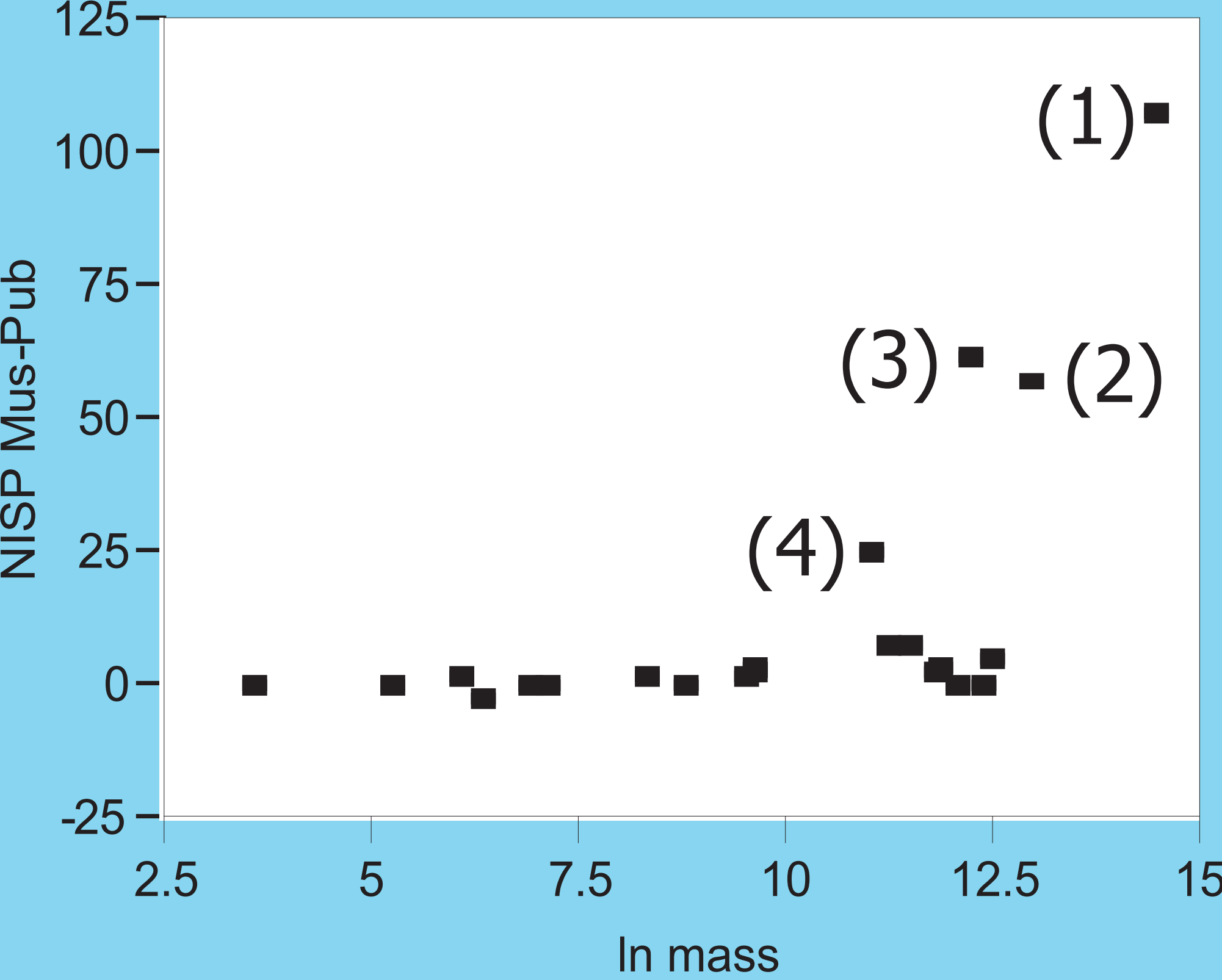


The museum collections capture more species in the middle range of mass, but do not change the shape or extent of the distributions.

Thousand Creek:



Virgin Valley:



3. Difference in NISP by mass:

The differences between the number of identified specimens (NISP) in museum and published collections are driven by 1) rhinoceroses, 2) camels, 3) *Dromomeryx* sp., 4) *Moropus merriami*, 5) *Hypolagus vetus*, and 6) *Liodontia furlongi*

Bias affects relative abundance most

Published faunas are more even than museum collections, as shown by the steeper rarefaction curves: random resampling finds more of the same species in museum data.

Body mass distributions are robust

The published faunas sample the entire range of body sizes present. Adding museum data does not dramatically change the shape of the distributions, adding species to the middle range.

Publication bias does not explain the increase in diversity

Although this census of UCMP collections has revealed an effect on relative abundance, the increase in sampled diversity from Virgin Valley to Thousand Creek times is real.