



Comparing ancient midden and present day marine communities to detect long term changes in intertidal community composition

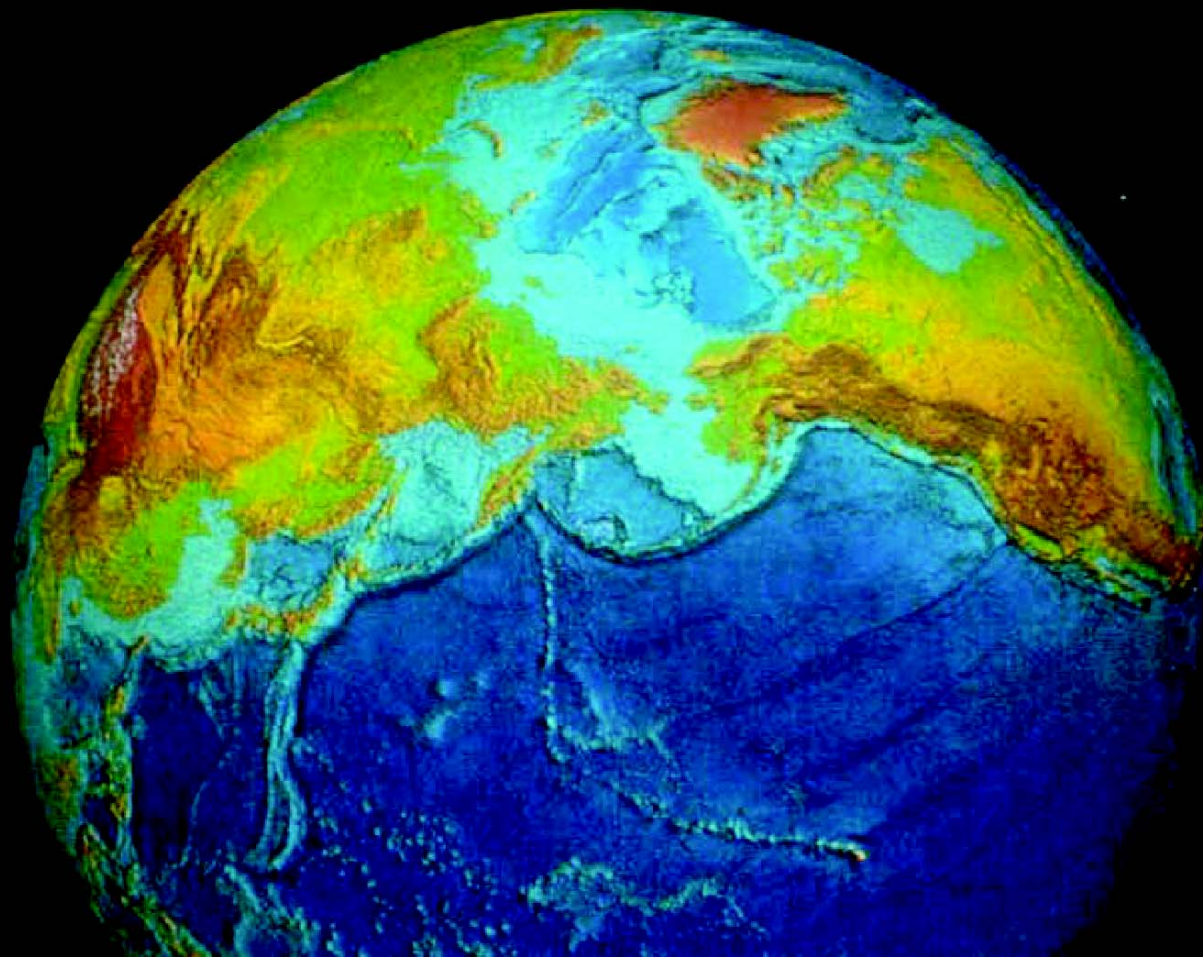
spencer wood [§], amber tews [£] and roly russell [‡]

[§] biodiversity research centre, university of british columbia

[£] department of anthropology, idaho state university

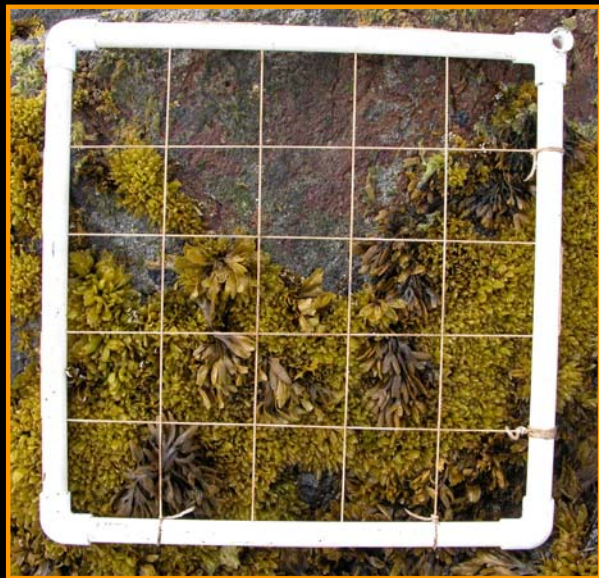
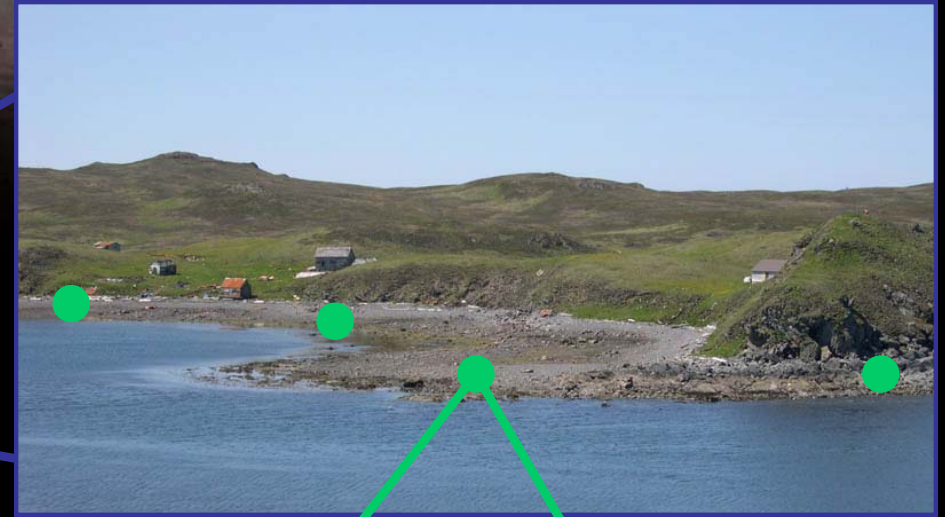
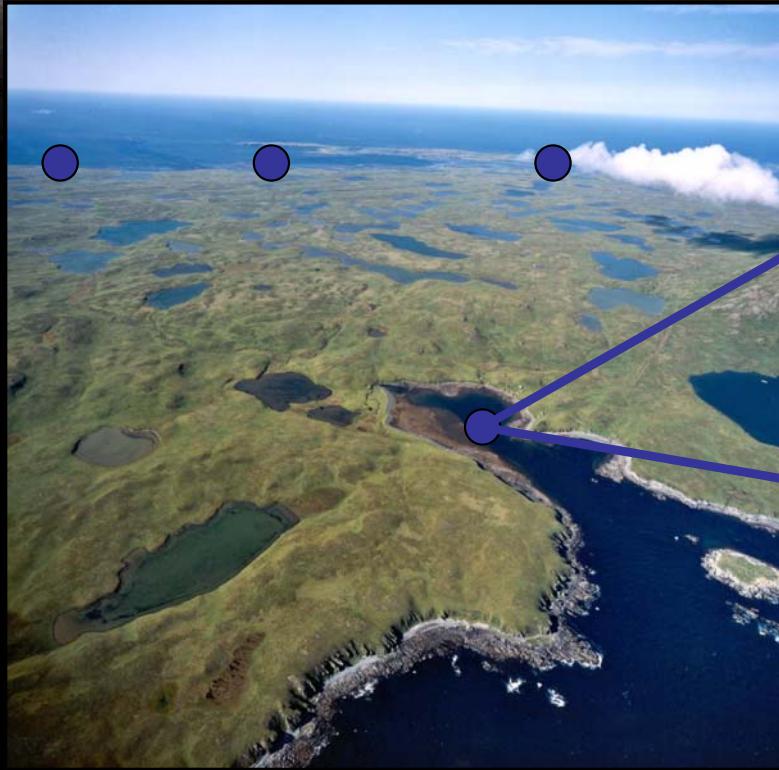
[‡] department of zoology, oregon state university

ancient midden ~ modern intertidal

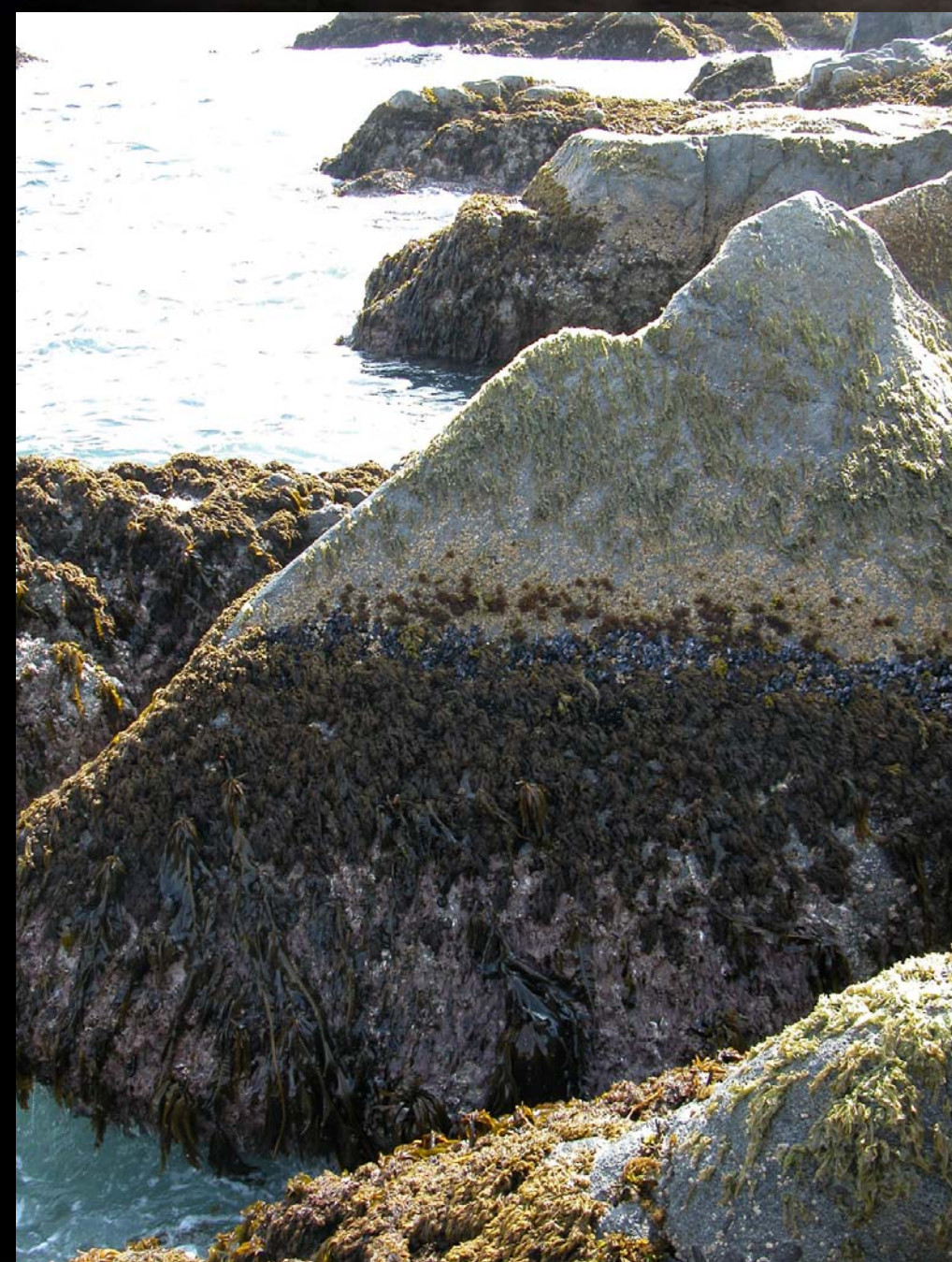




modern intertidal sampling



intertidal zonation



bare rock

barnacles – snails – limpets - ephemerals

mussels - barnacles

turfing algae - chitons

kelps – (urchins)

rocky shores



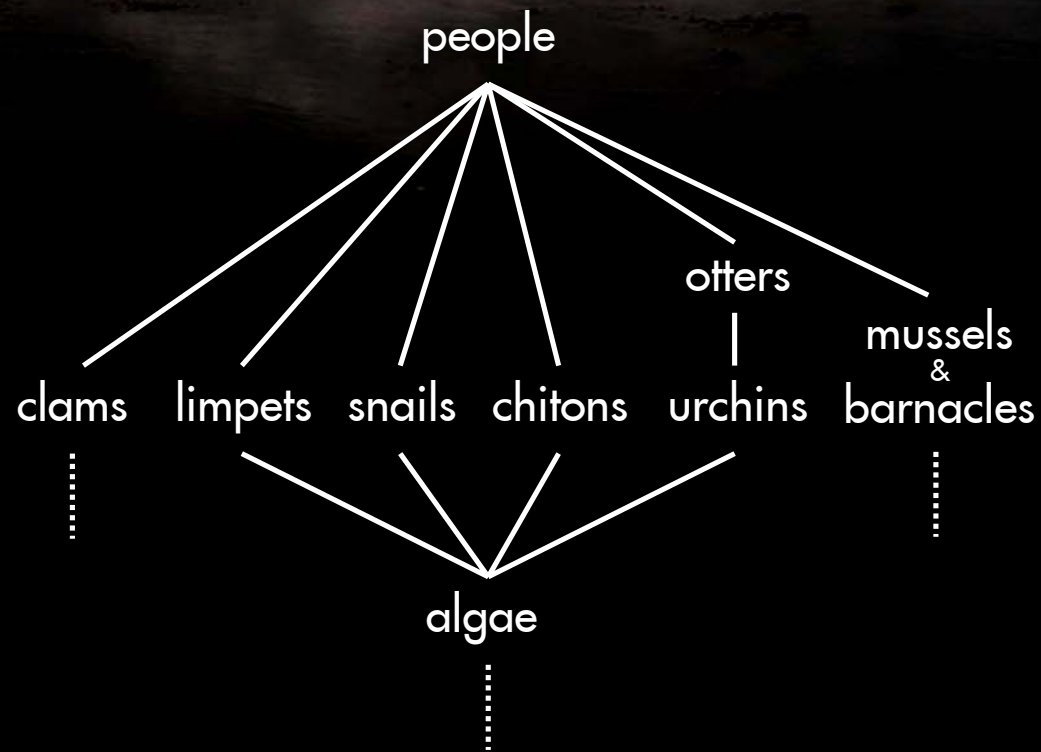
rocky shores



rocky shores



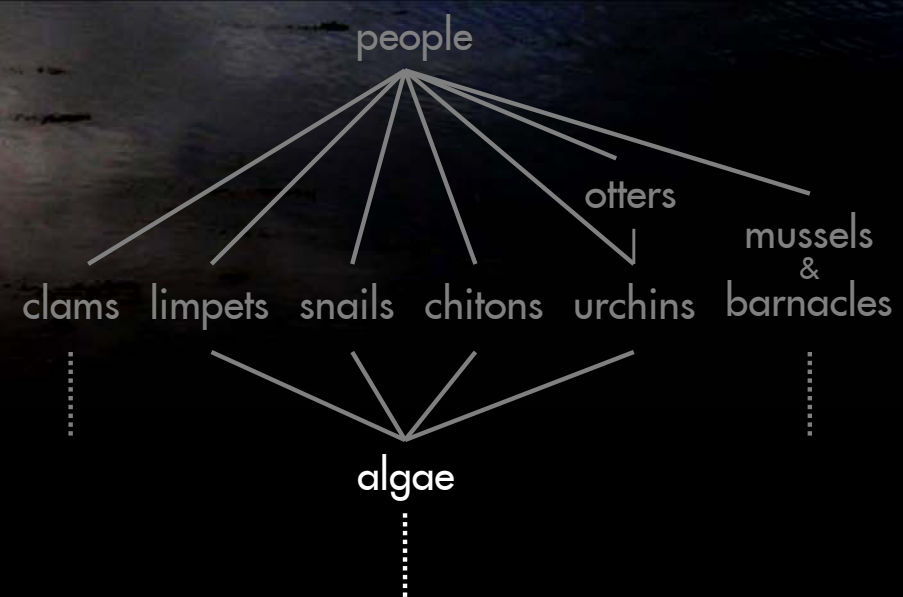
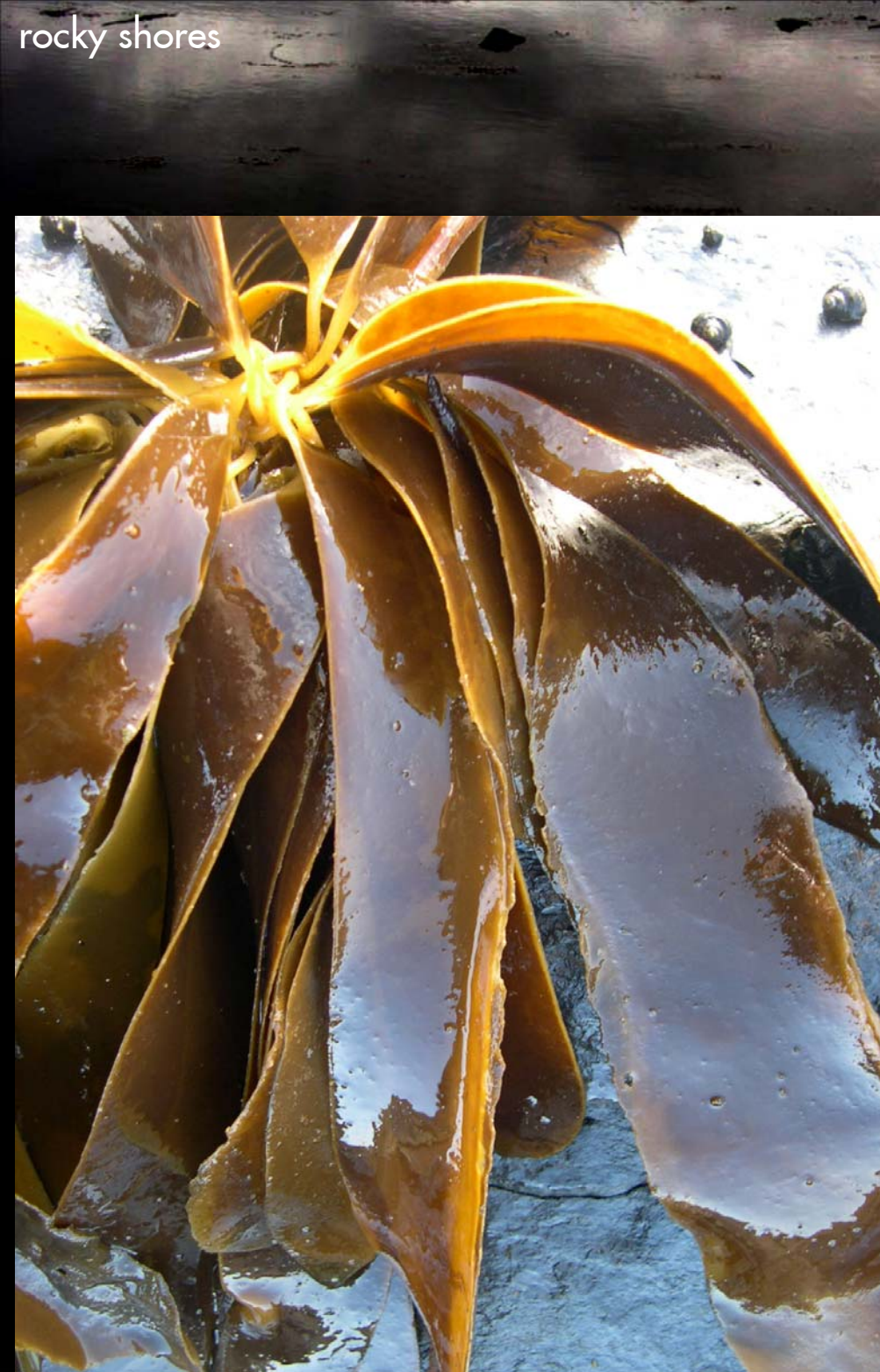
intertidal food web



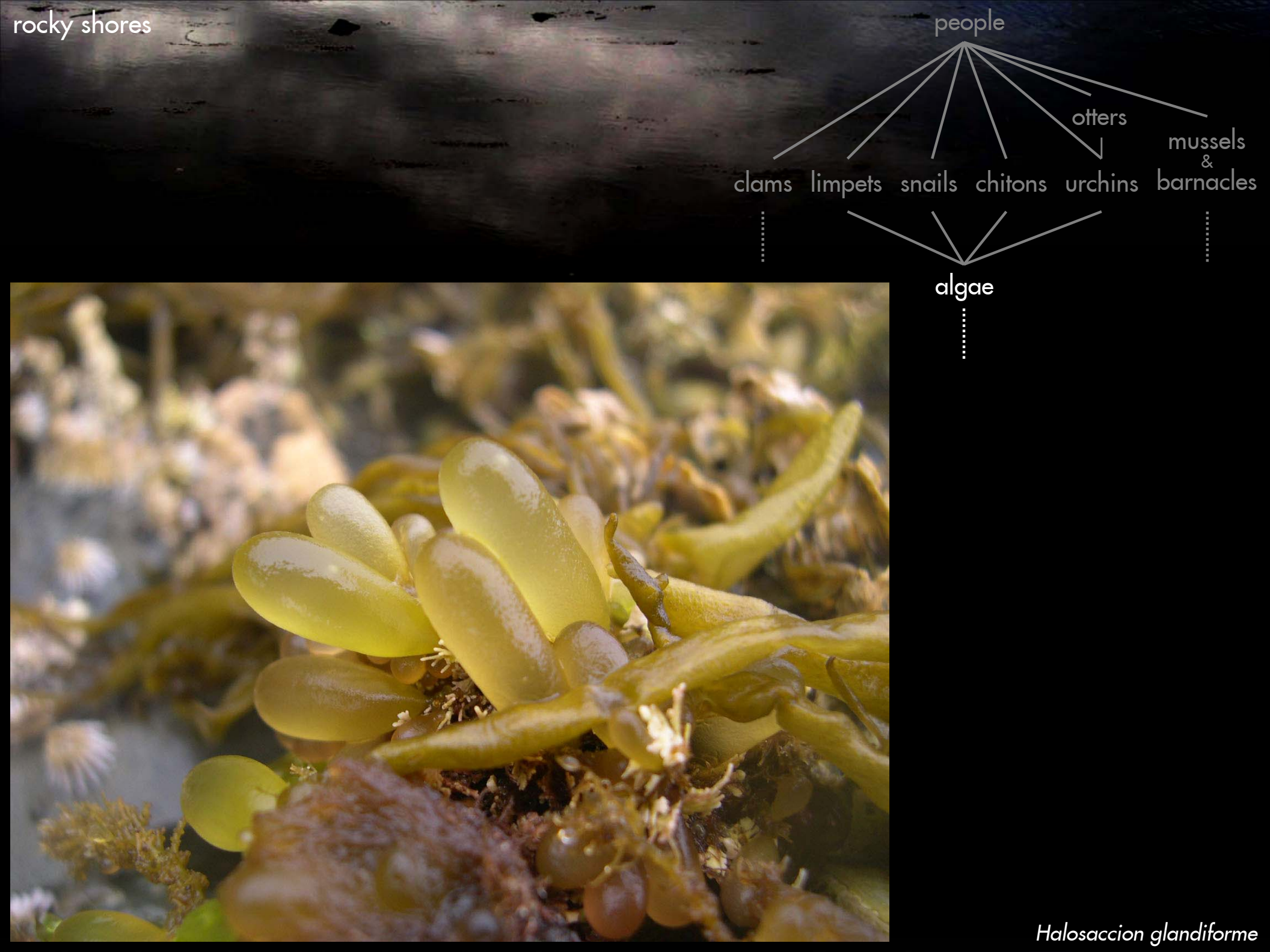
rocky shores



Laminaria saccharina



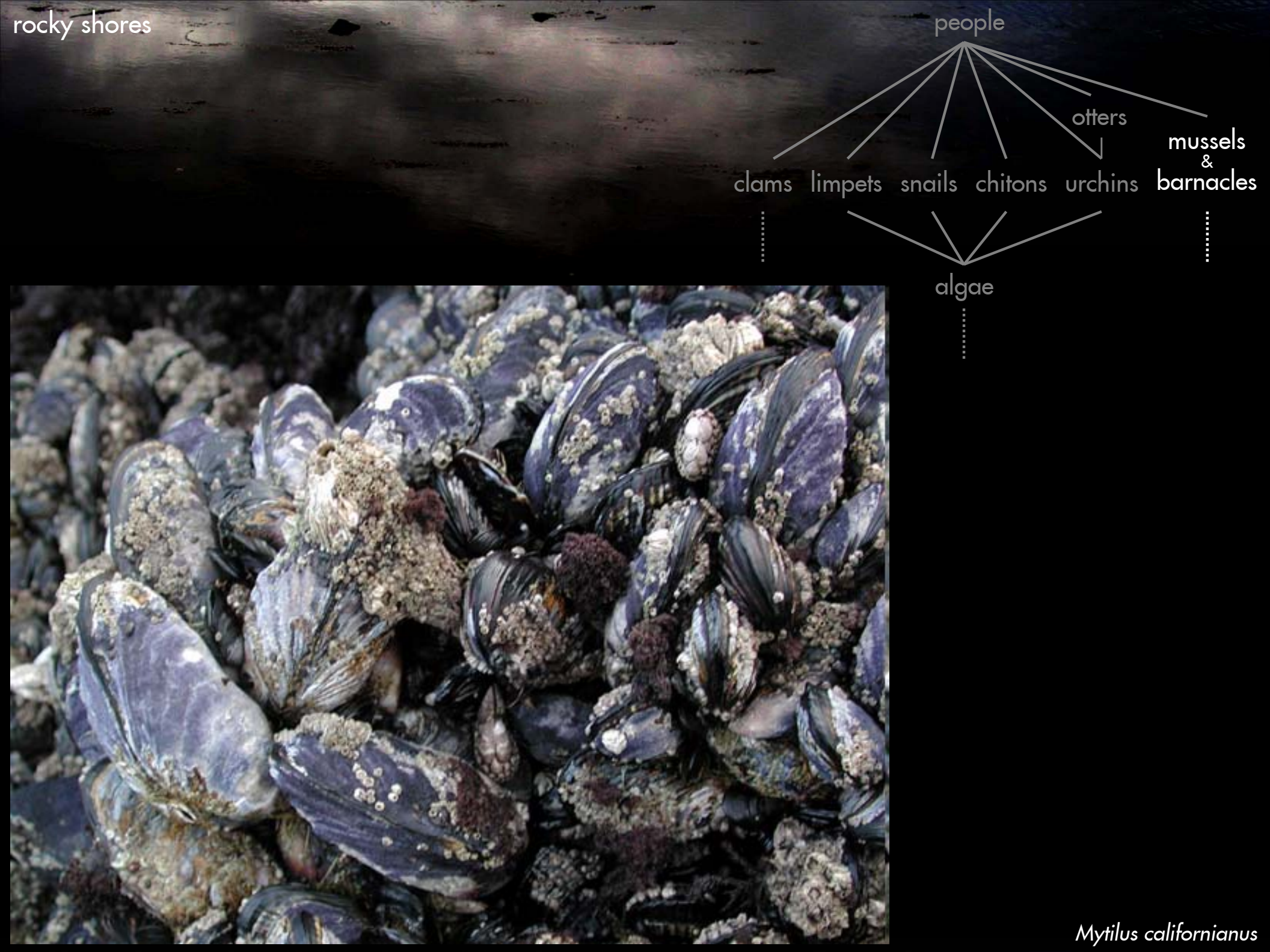
Alaria fistulosa



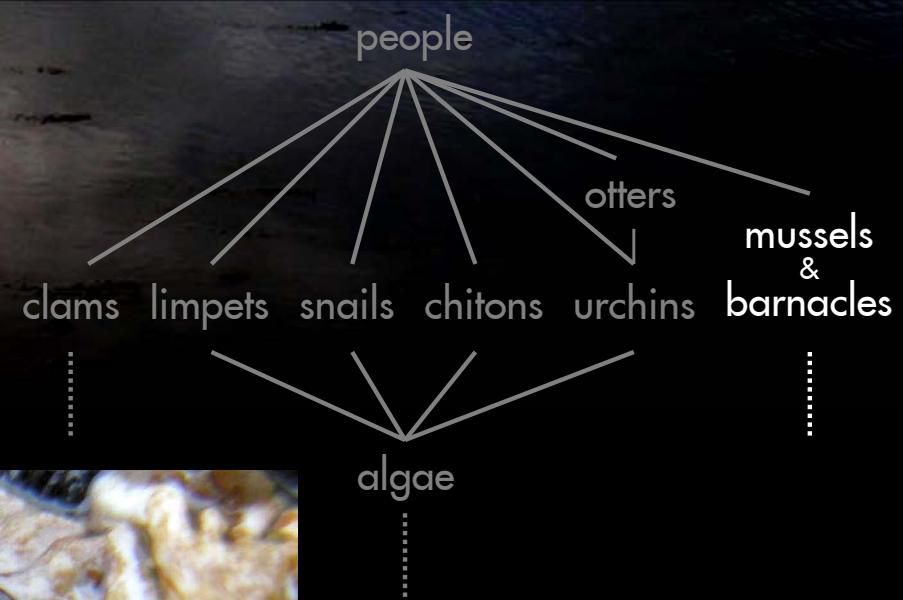
rocky shores



Halosaccion glandiforme



rocky shores



Chthamalus dalli





Tectura scutum

rocky shores



Tectura scutum



rocky shores



Littorina sitkana

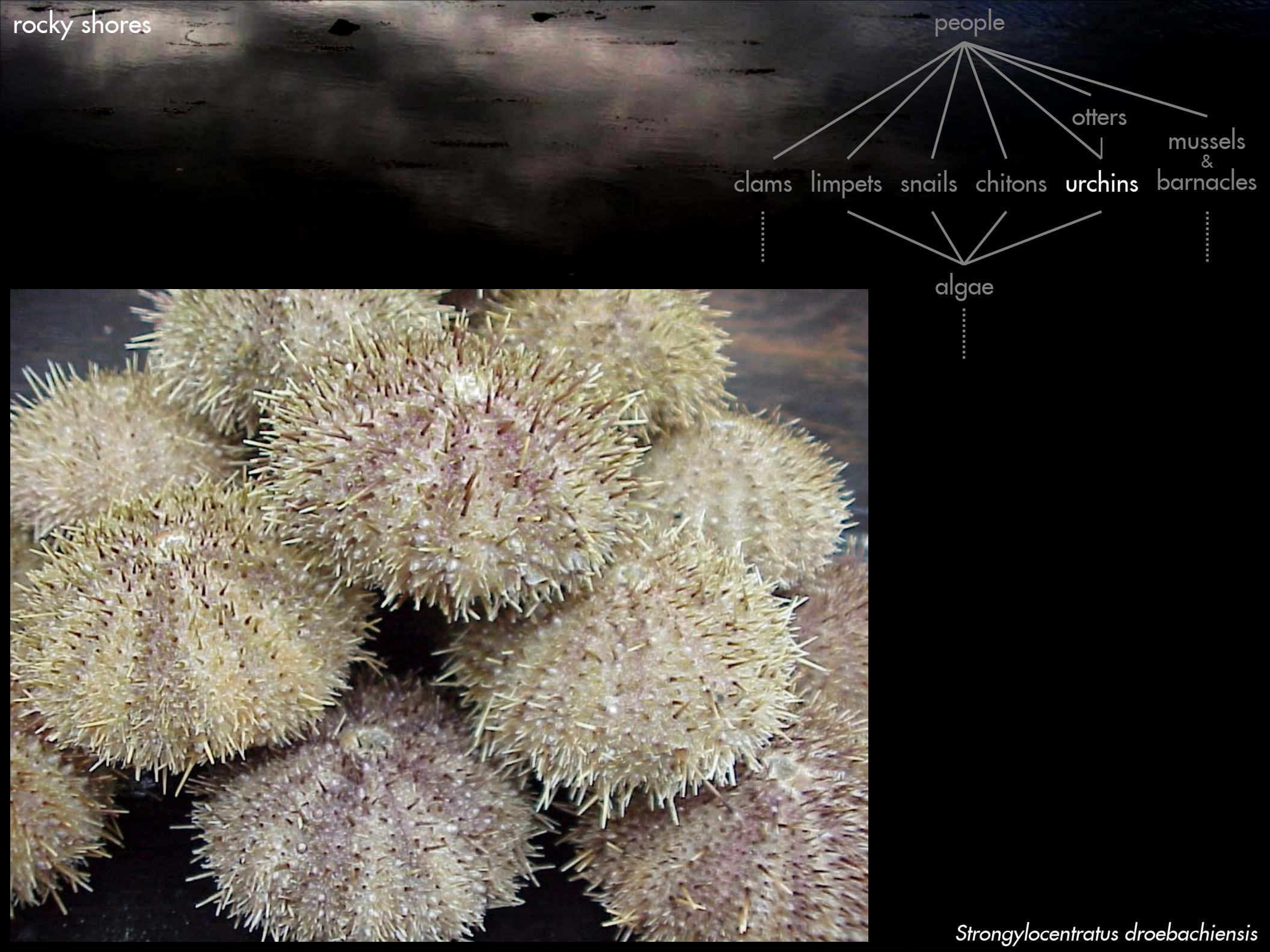


Tonicella lineata

rocky shores



Cryptochiton stelleri



boulder shores



boulder shores



Halichondria panicea

boulder shores



Laminaria longipes

boulder shores



Mopalia sp.



Henricia leviuscula

soft shores

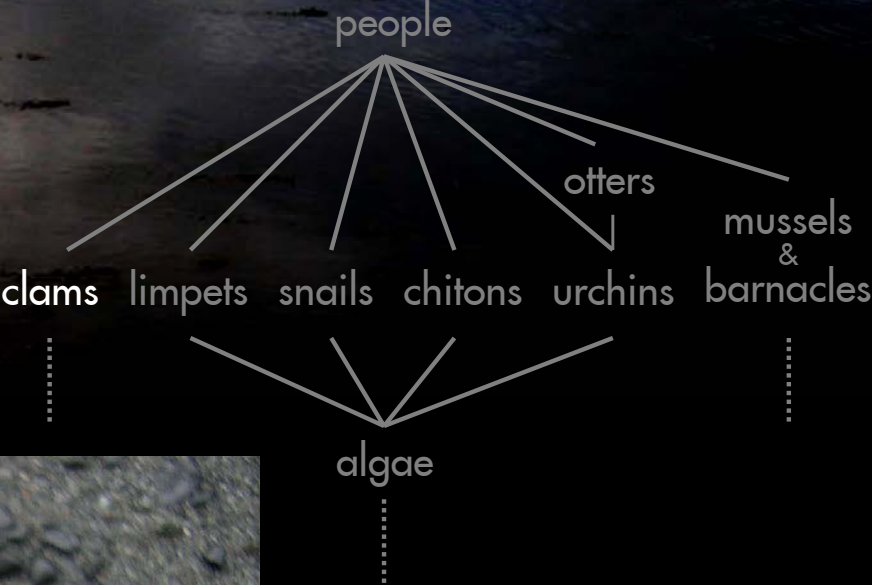


soft shores

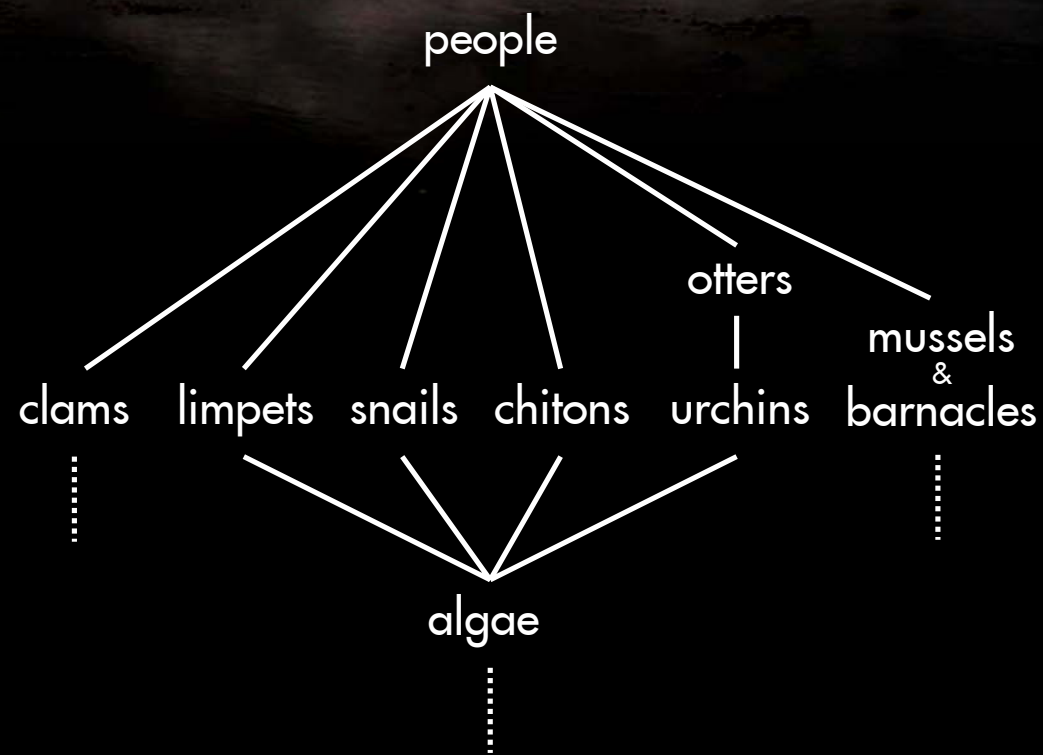


Zostera marina

soft shores

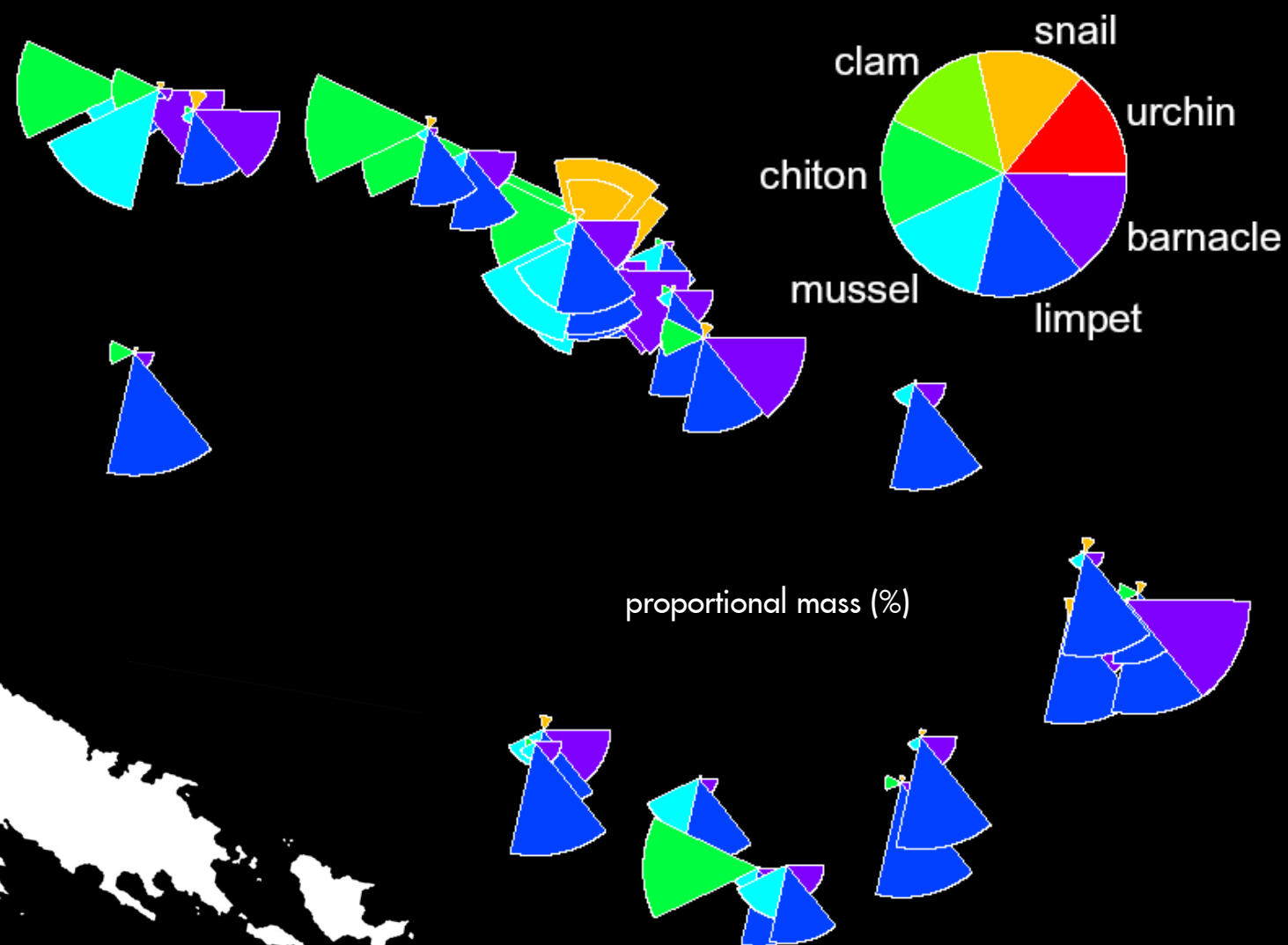


Clinocardium nuttallii



a simplified model

modern abundances



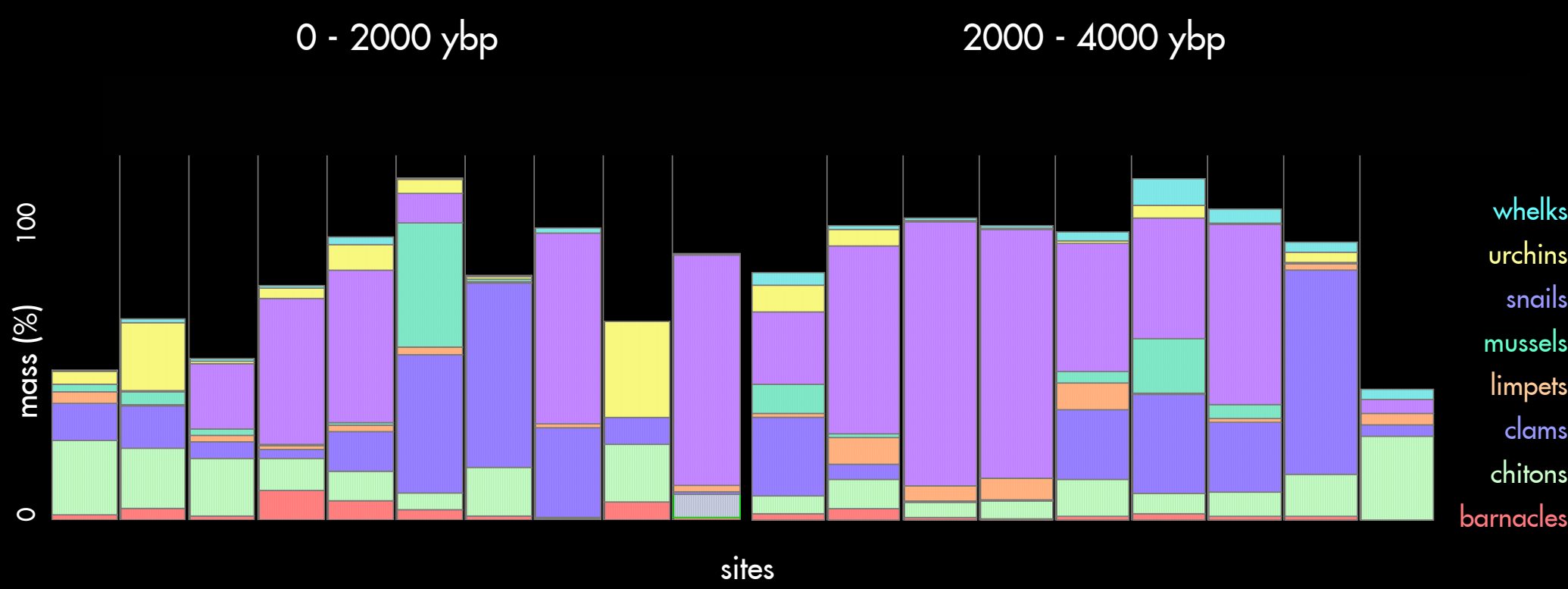
midden sampling



midden sampling



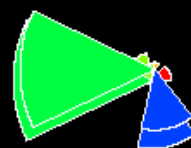
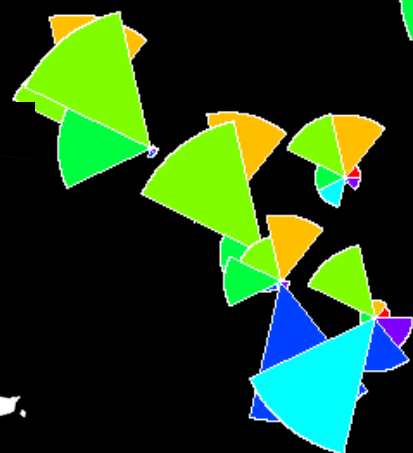
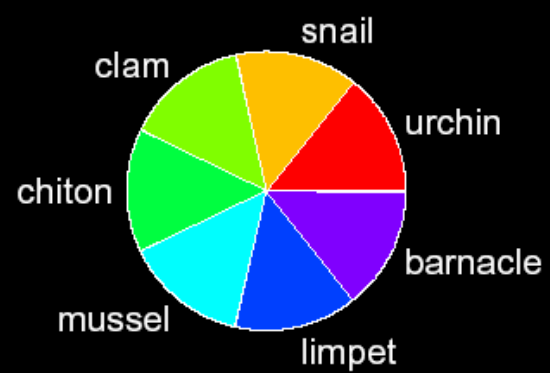
ancient abundances



ancient abundances



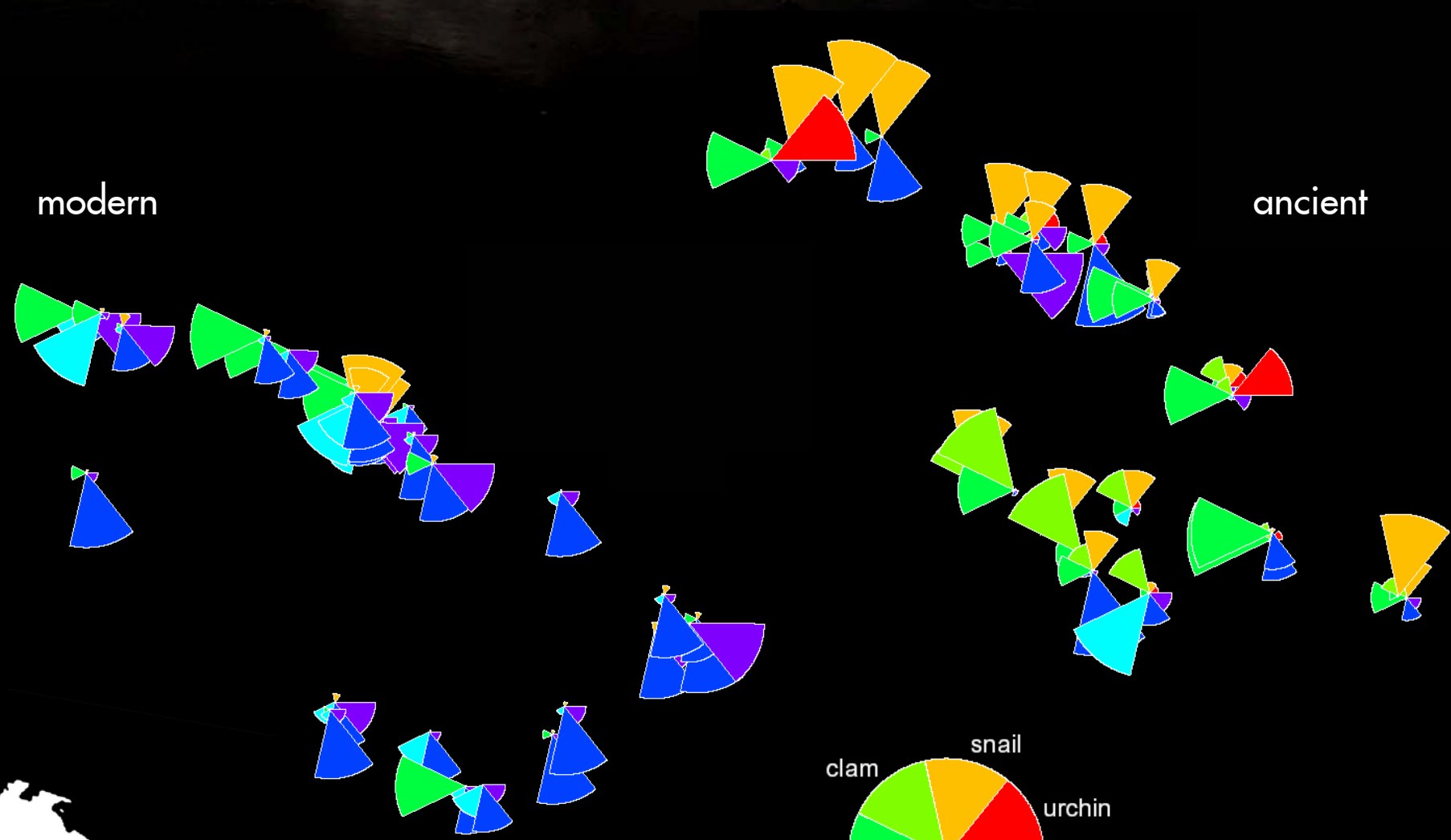
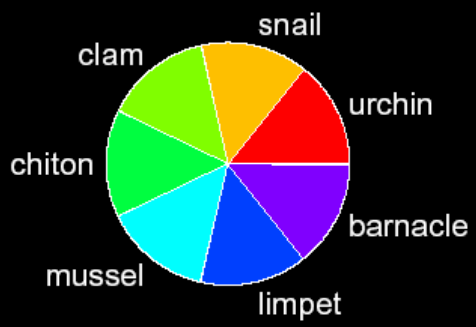
proportional mass (%)



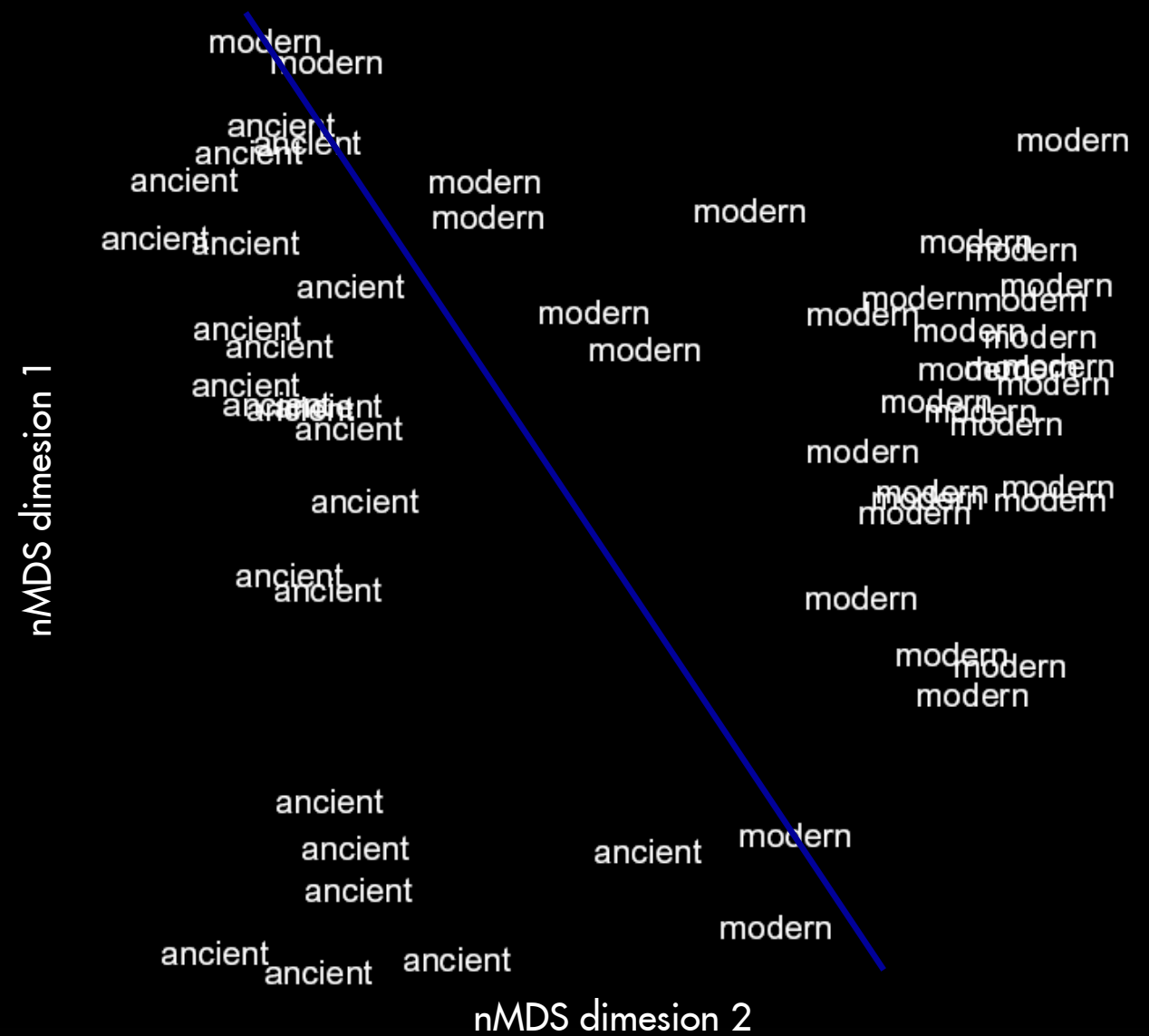
modern vs ancient

modern

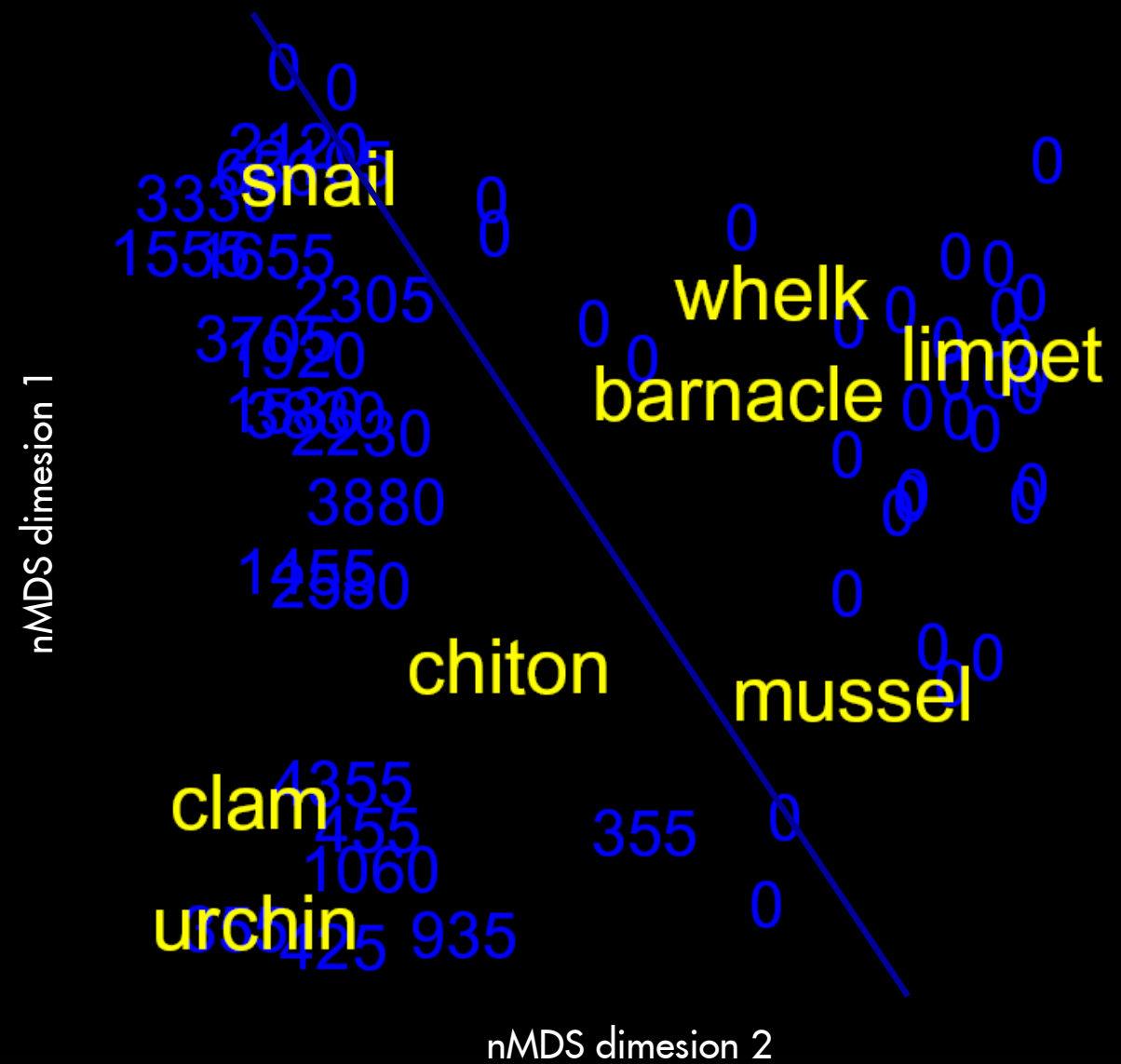
ancient



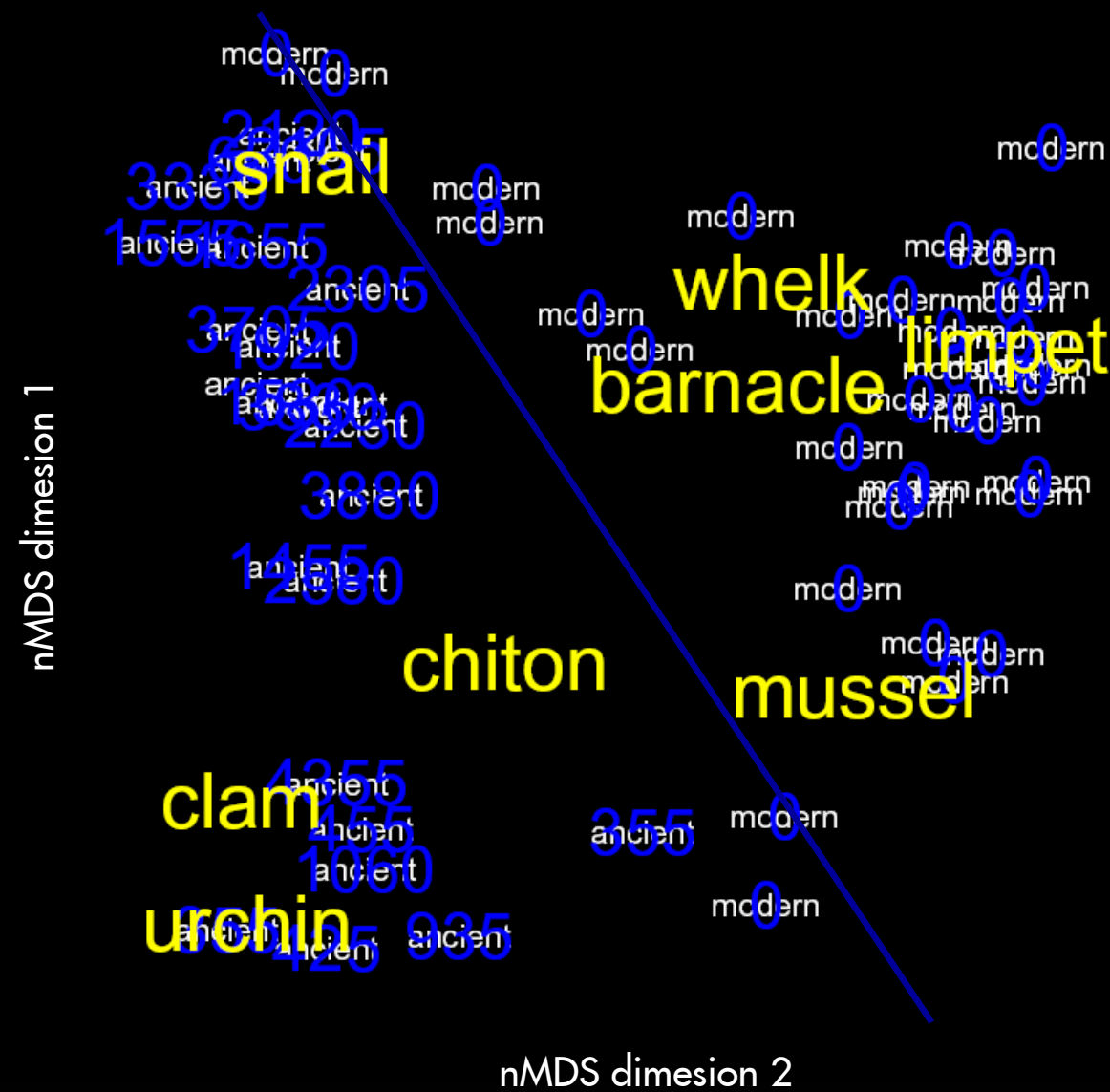
modern vs ancient



modern vs ancient

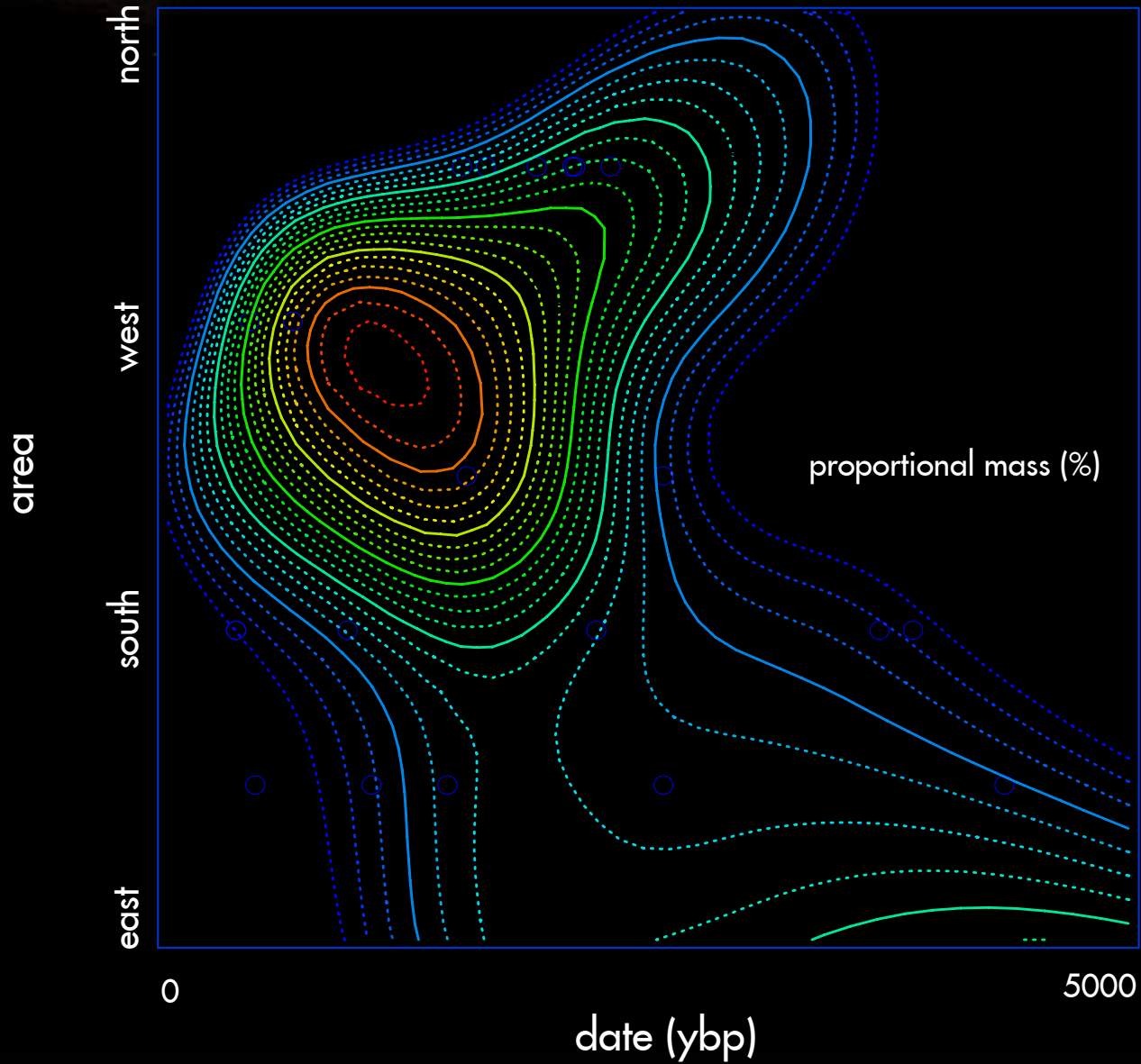


modern vs ancient



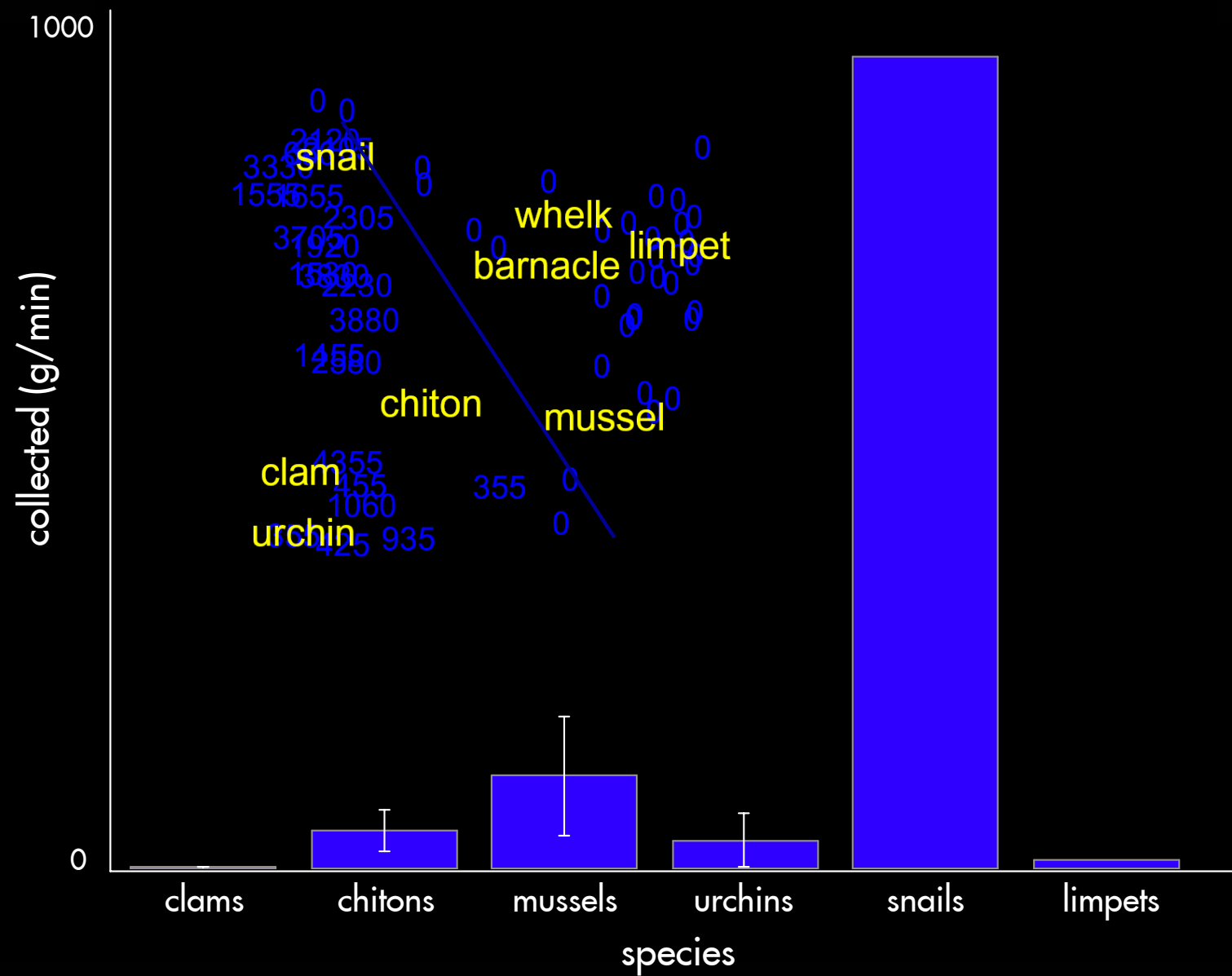


snails

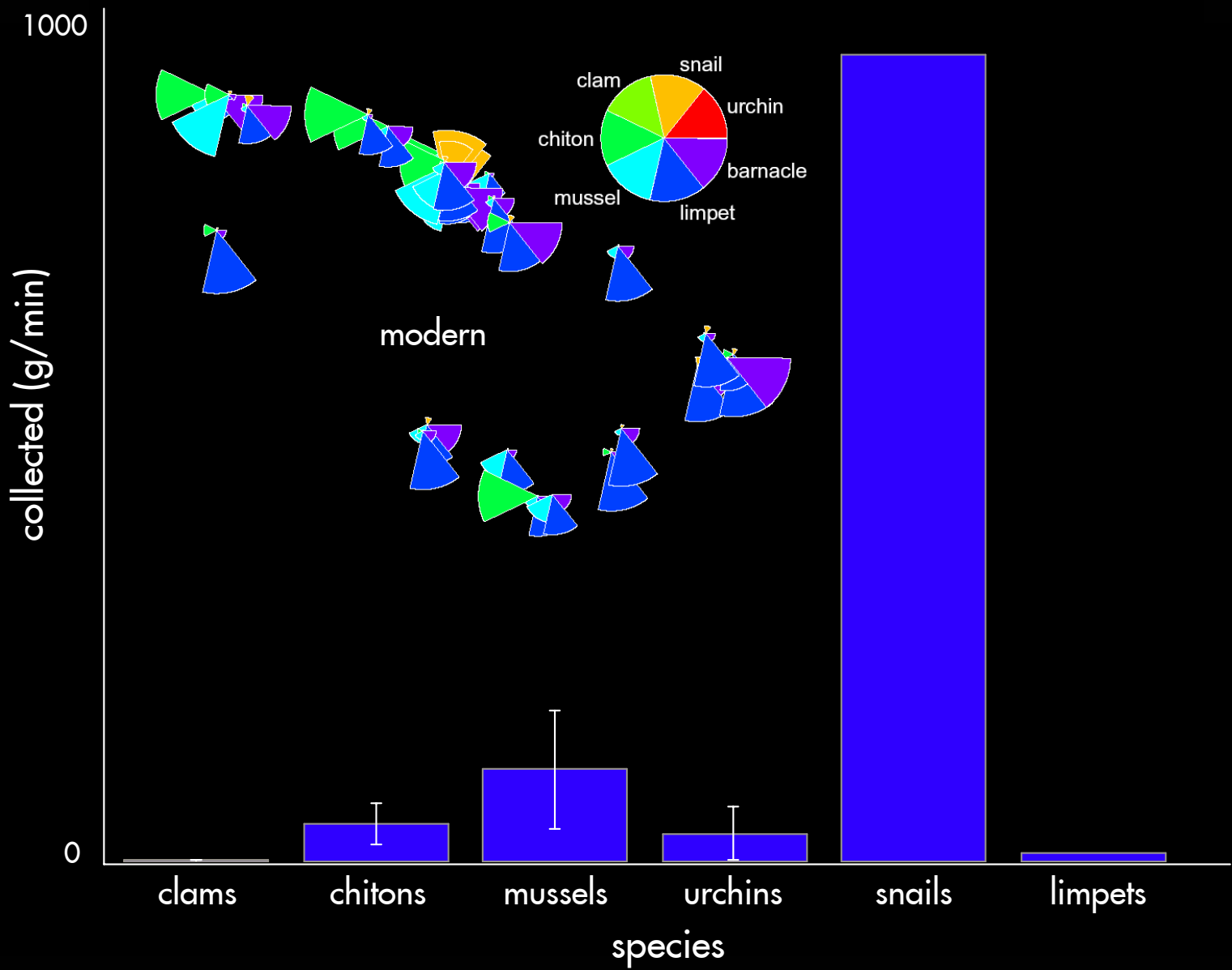




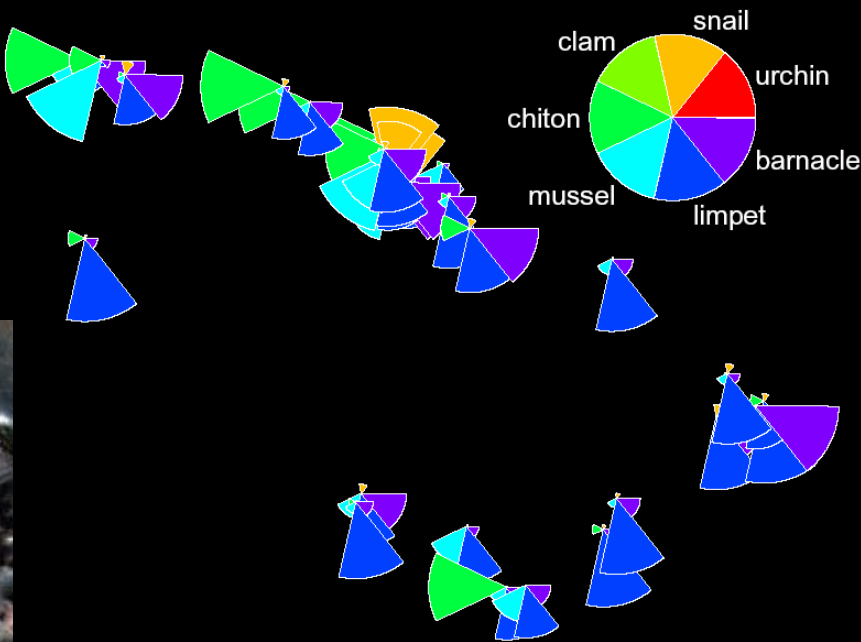
modern collections



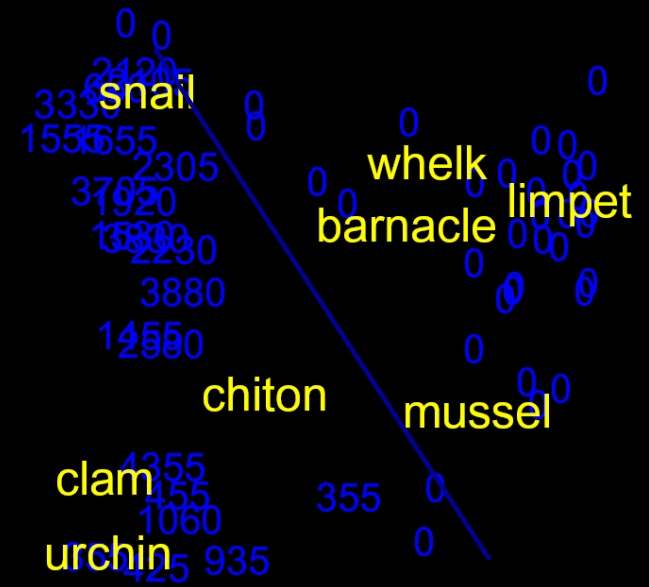
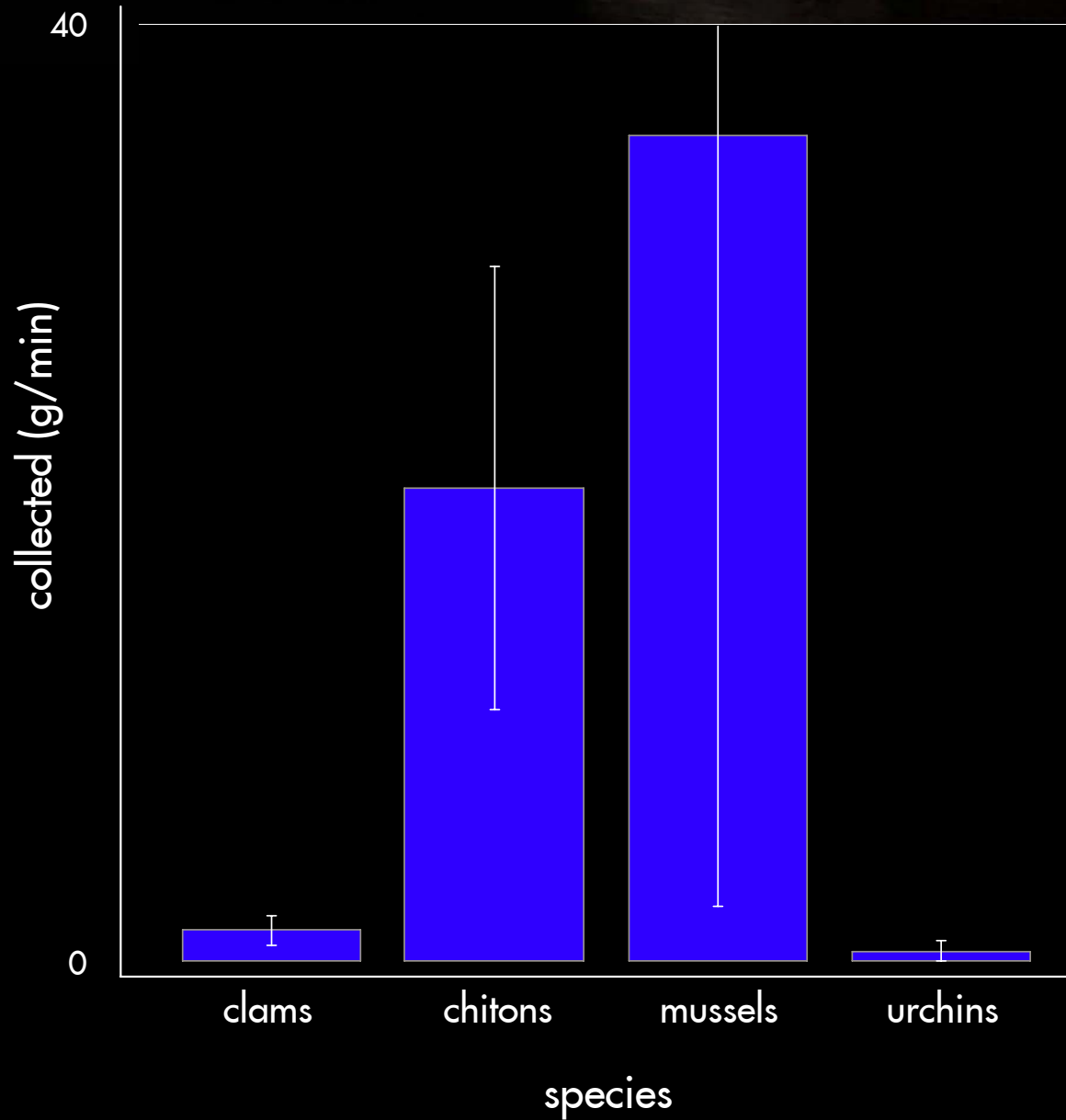
modern collections



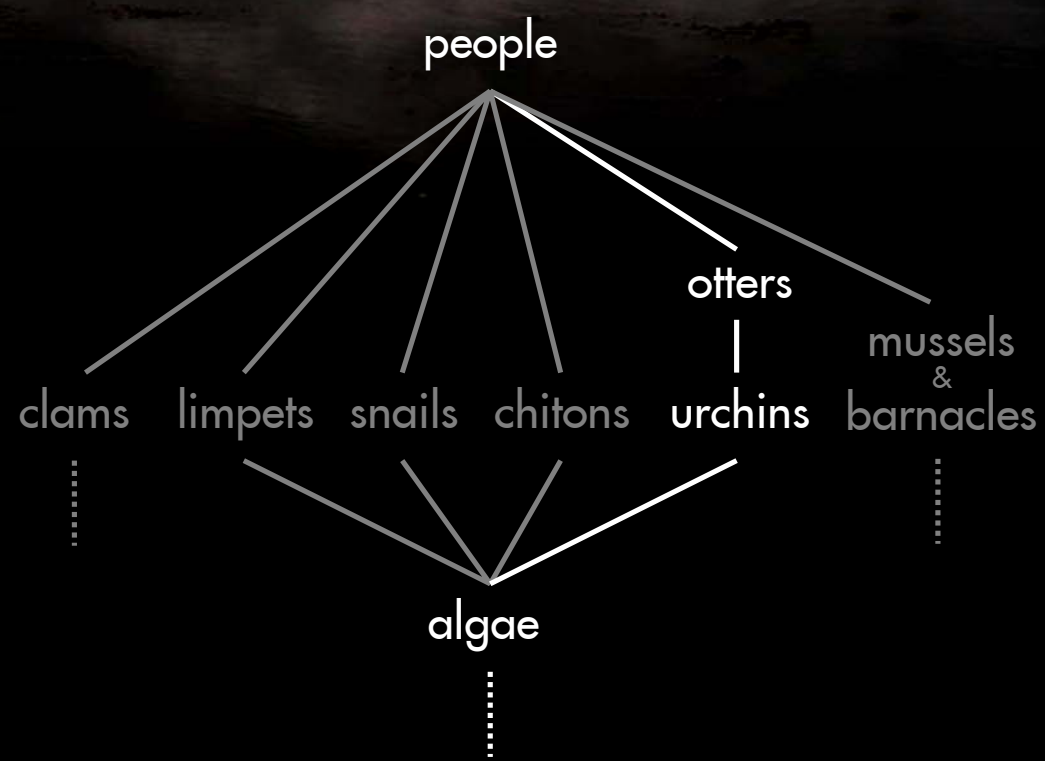
modern collections



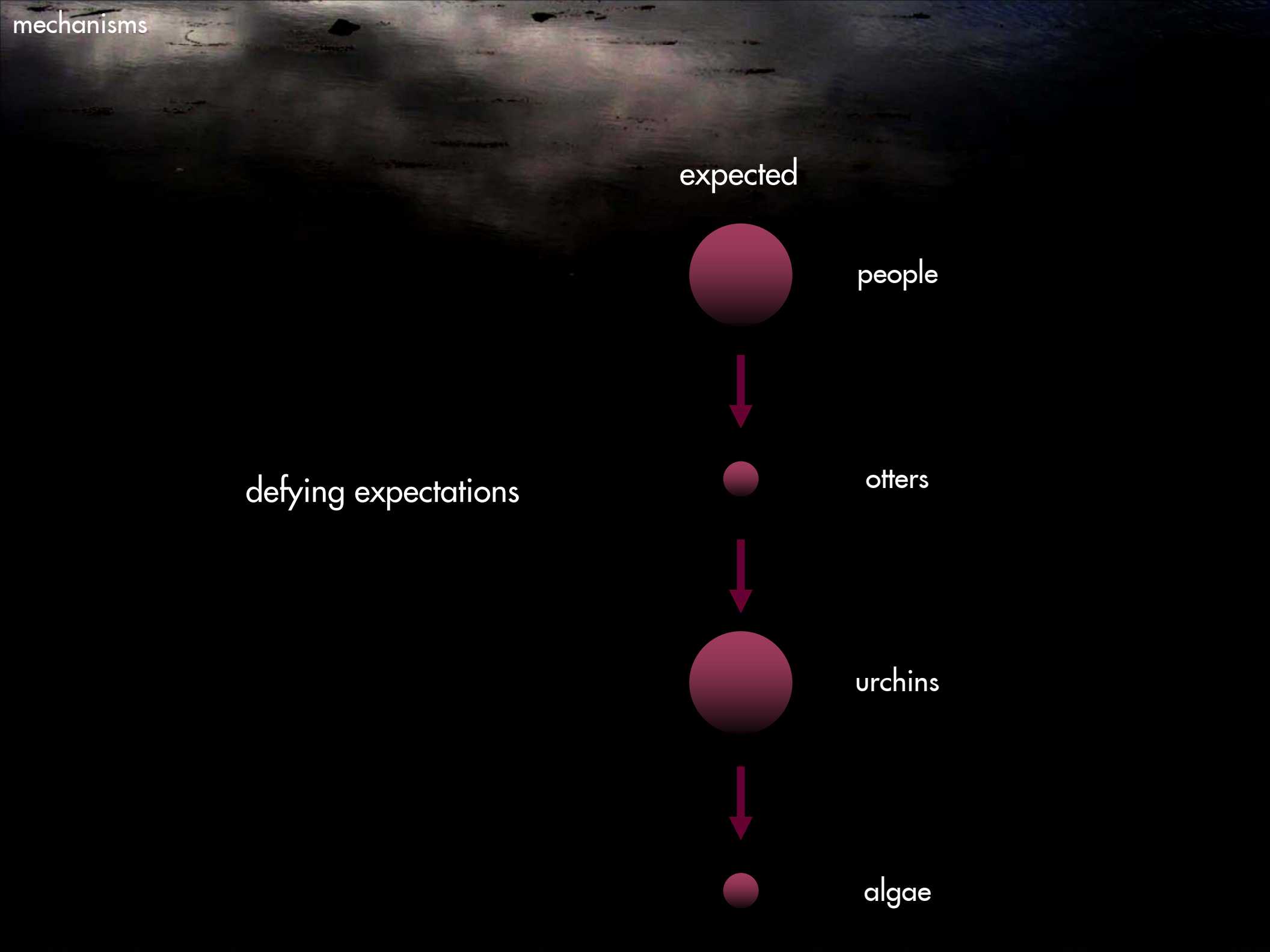
modern collections



intertidal food web

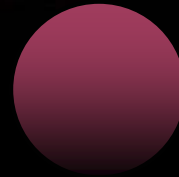


perturbations cascade through web



mechanisms

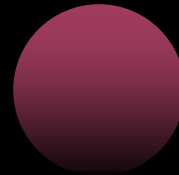
expected



people



otters

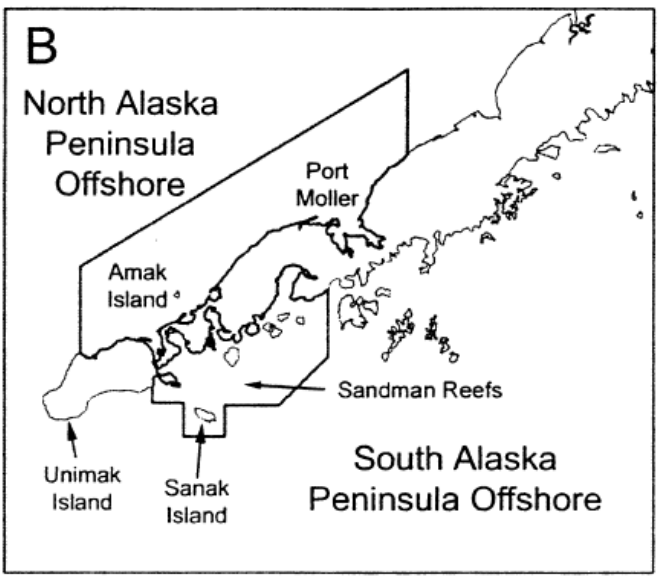
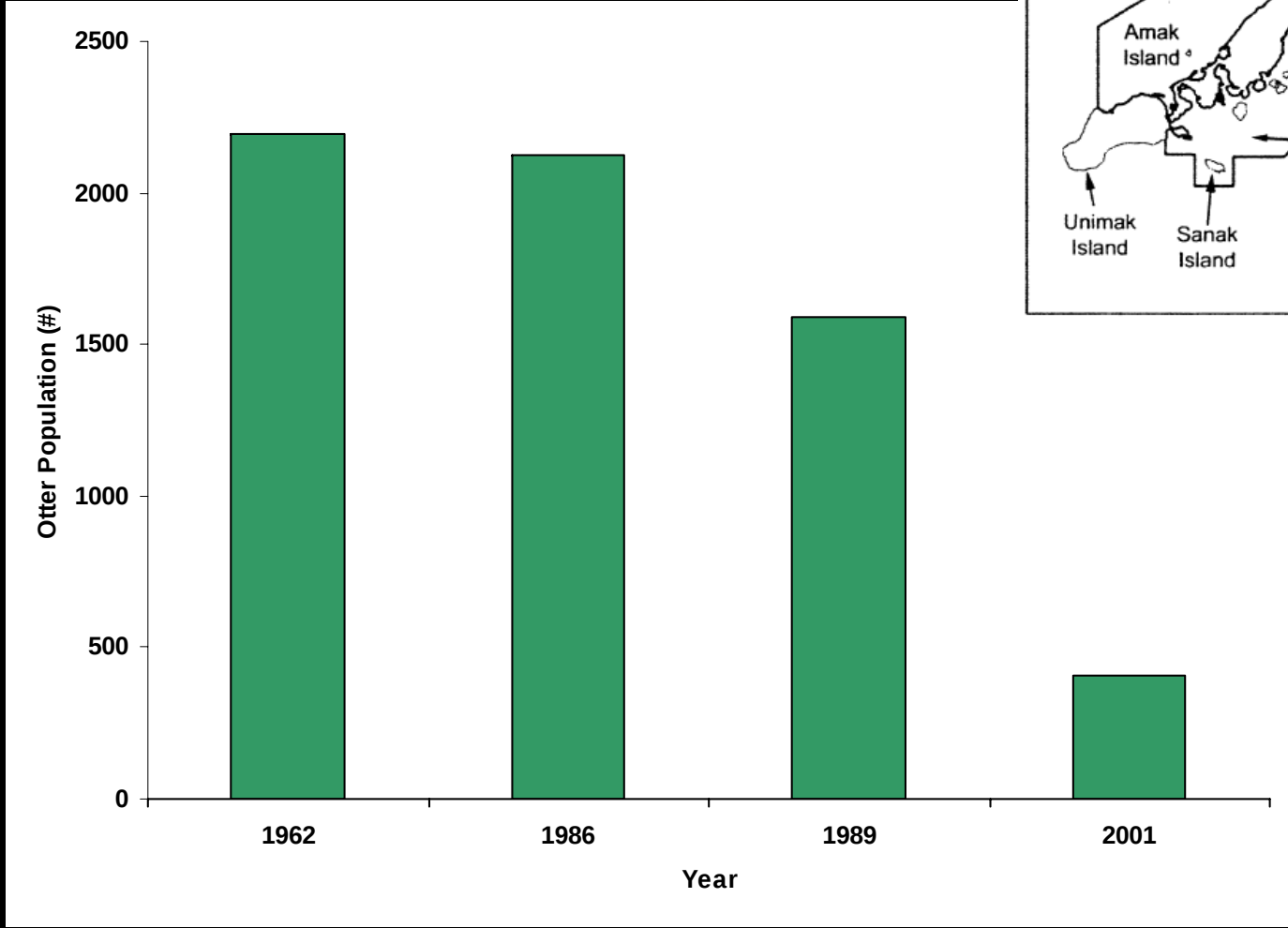


urchins



algae

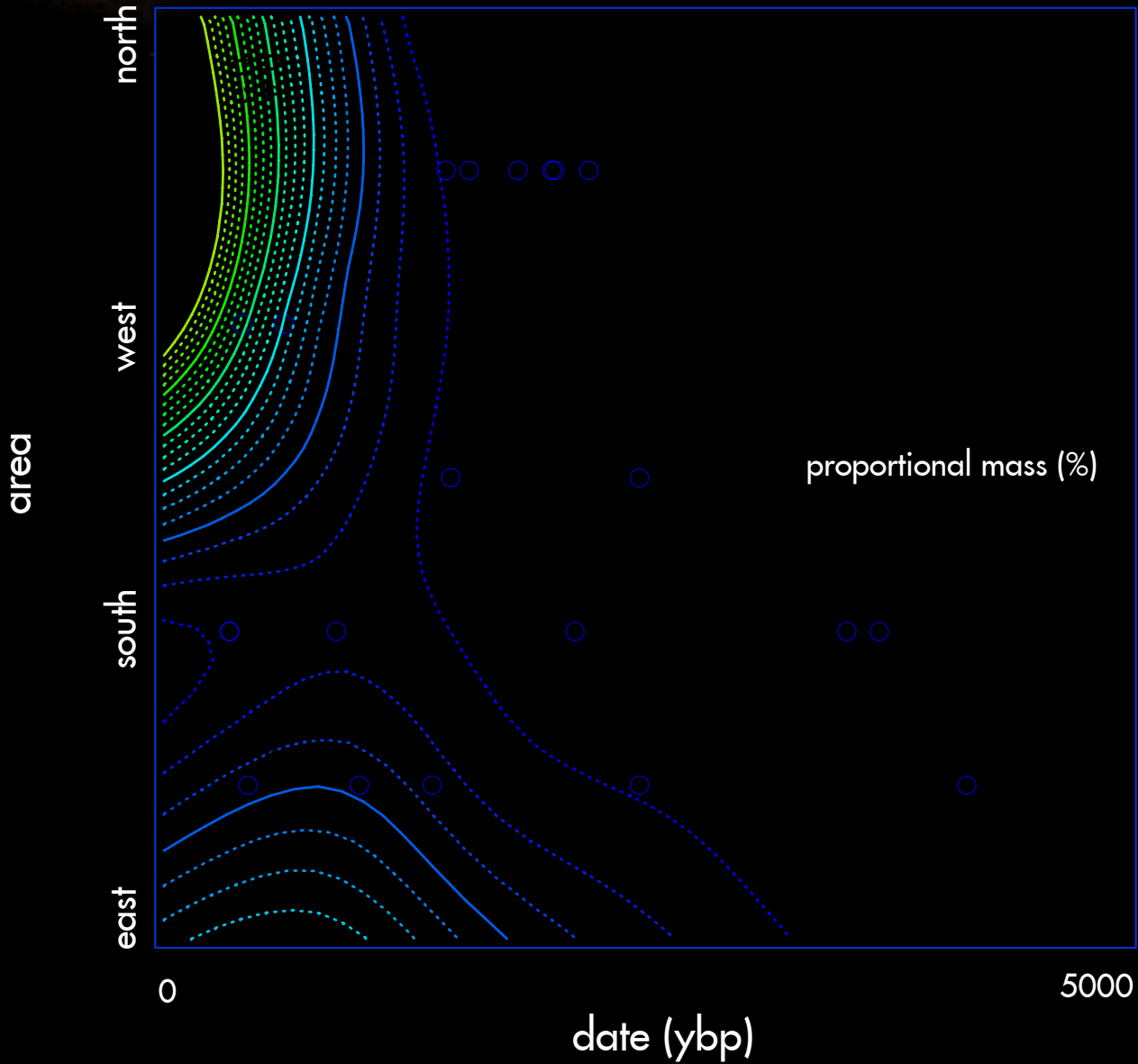
defying expectations

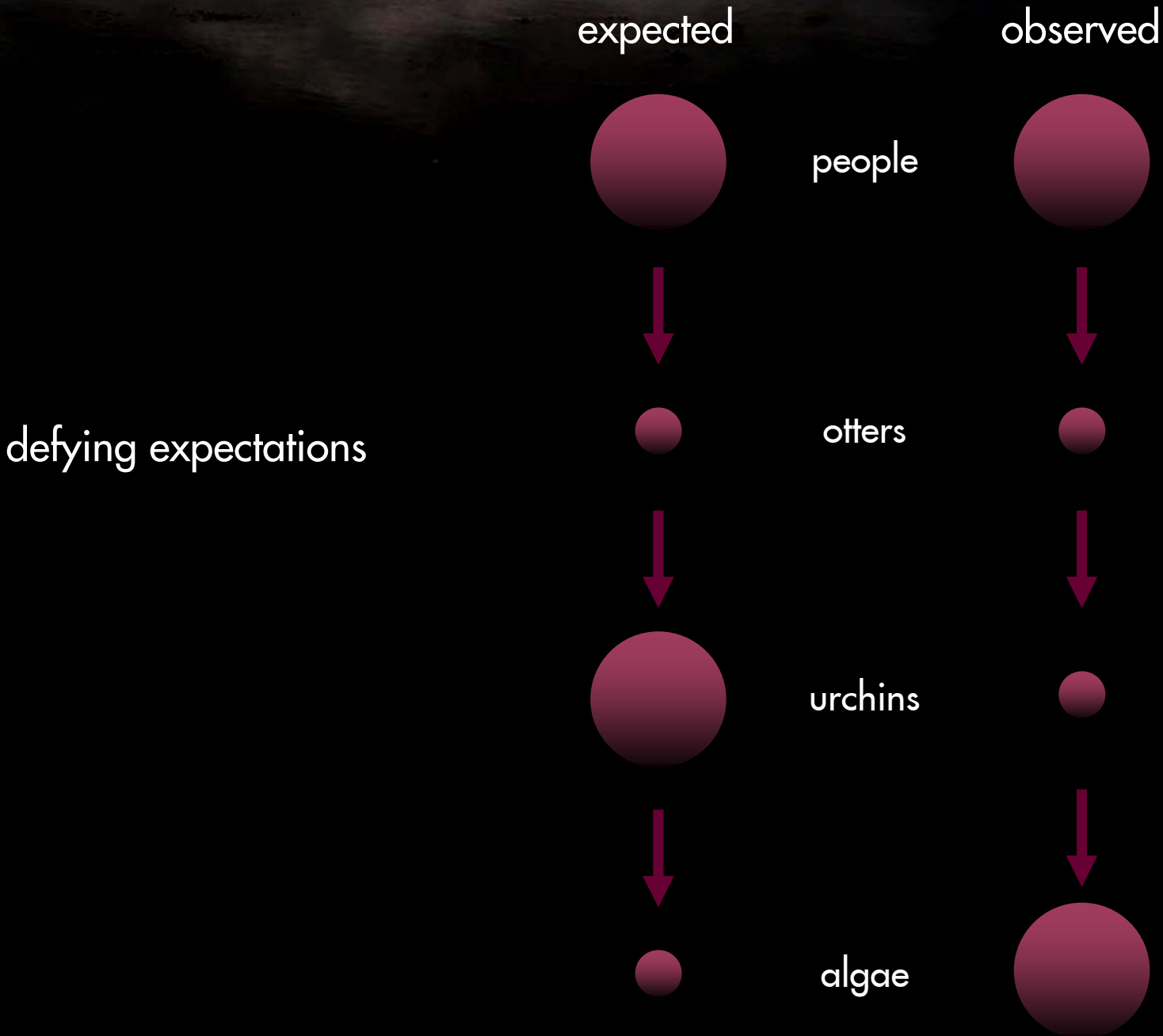


mechanisms



urchins





manifestation of web complexities ?

direct and indirect interactions between species ?



scales of variation

differences between modern and ancient communities

anthropogenic influences

acknowledgements



bruce finney
kim gilliland
nancy huntly
jim jordon
garrett knudsen
jon knudsen
liza mack
sean mack
herb maschner
nicole misarti
kate reedy-maschner
tim nelson
diana oroczuk
carla tews
rusty tews
krystal williams
krista williams

national science foundation (USA)
ubc graduate research fellowship (canada)