

B

Biology Standard
B.8.a.



Differential Survival of Organisms

California Education and the Environment Initiative

Approved by the California State Board of Education, 2010

The Education and the Environment Initiative Curriculum is a cooperative endeavor of the following entities:

California Environmental Protection Agency
California Natural Resources Agency
California State Board of Education
California Department of Education
Department of Resources Recycling and Recovery (CalRecycle)

Key Partners:

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Lesson 3 Selection Pressures Drive Evolution

None required for this lesson.

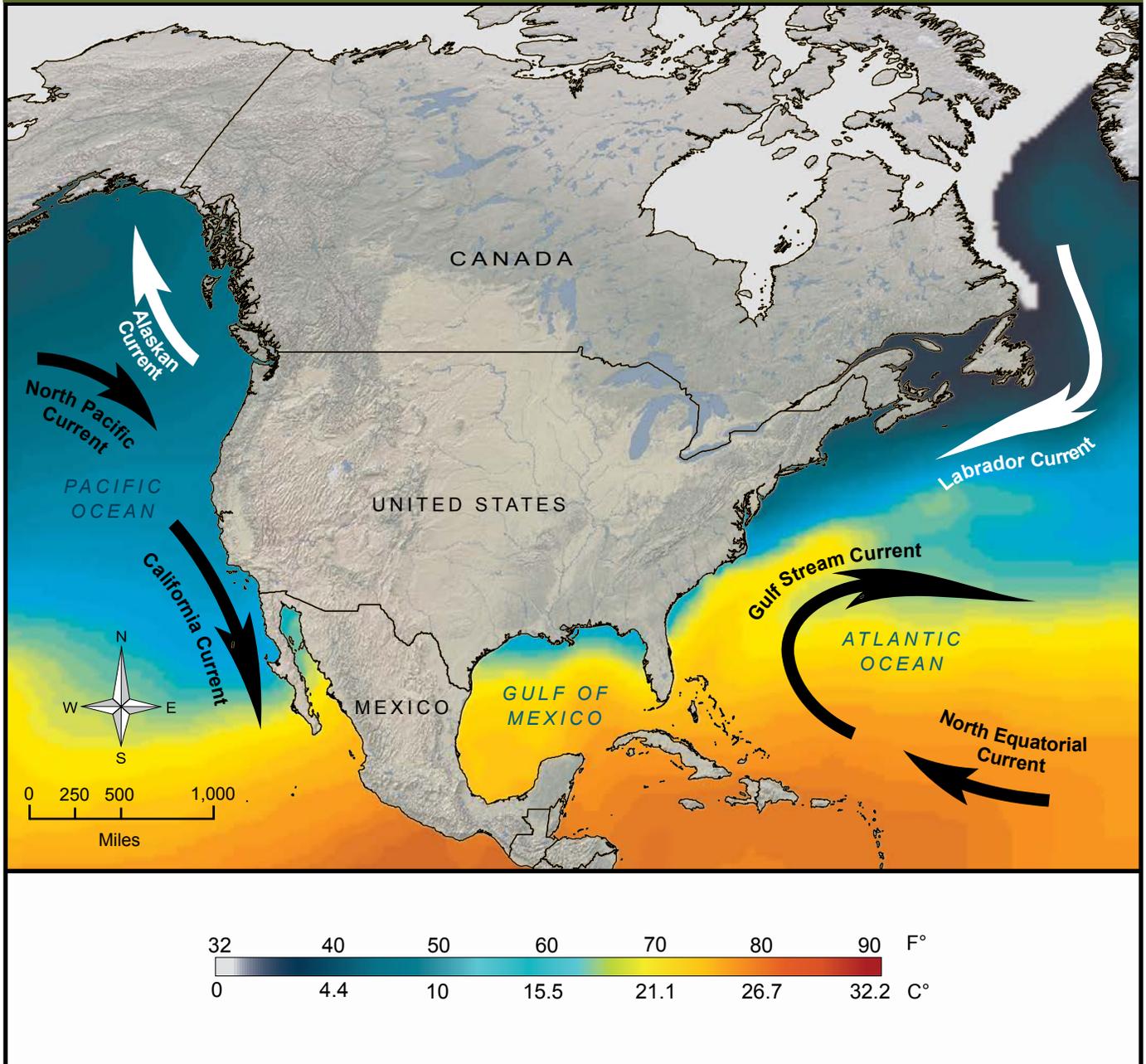
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Lesson 5 Human Activities, Natural Factors, and Differential Survival

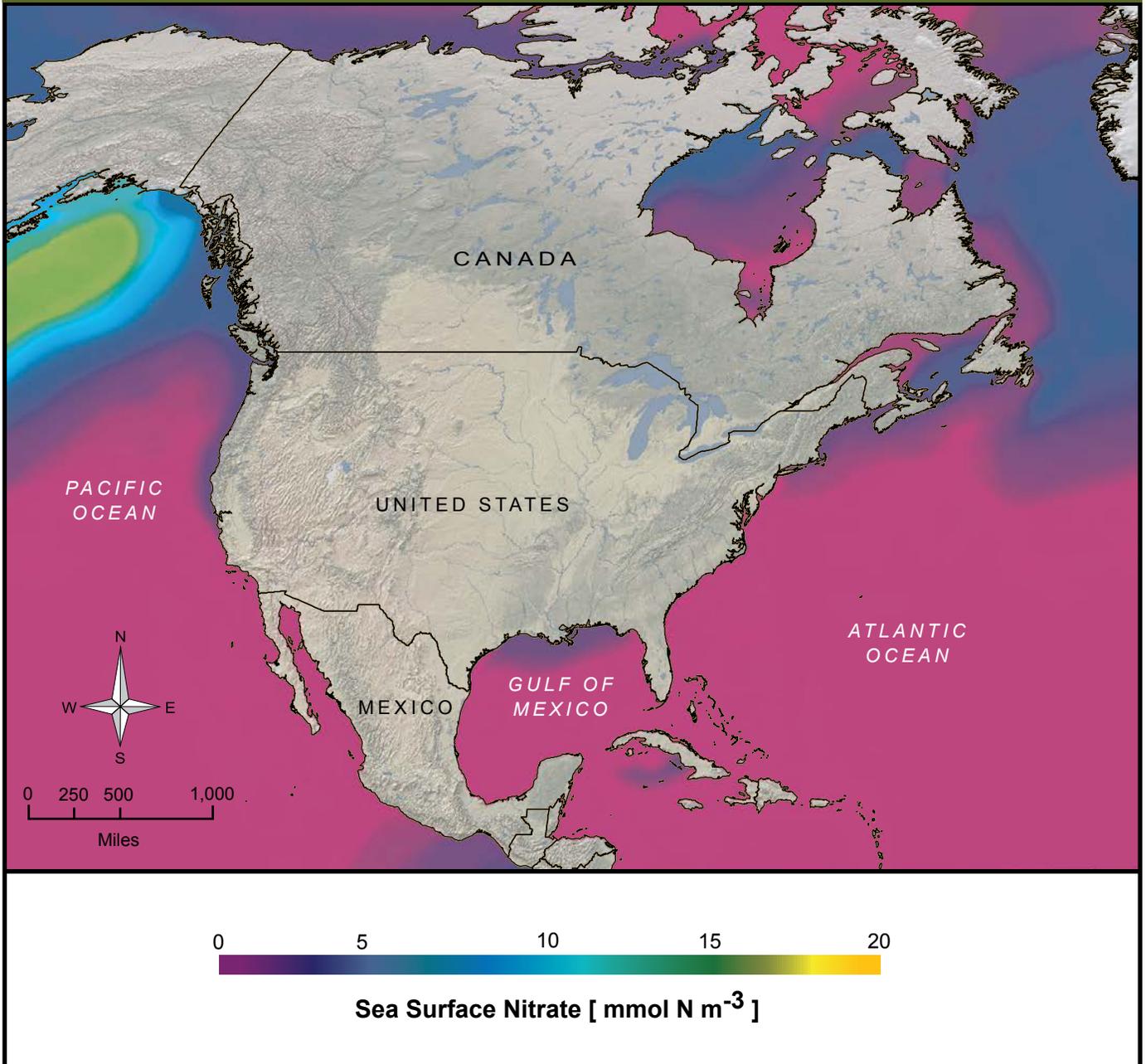
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VA #1 Sea Surface Temperatures—North America



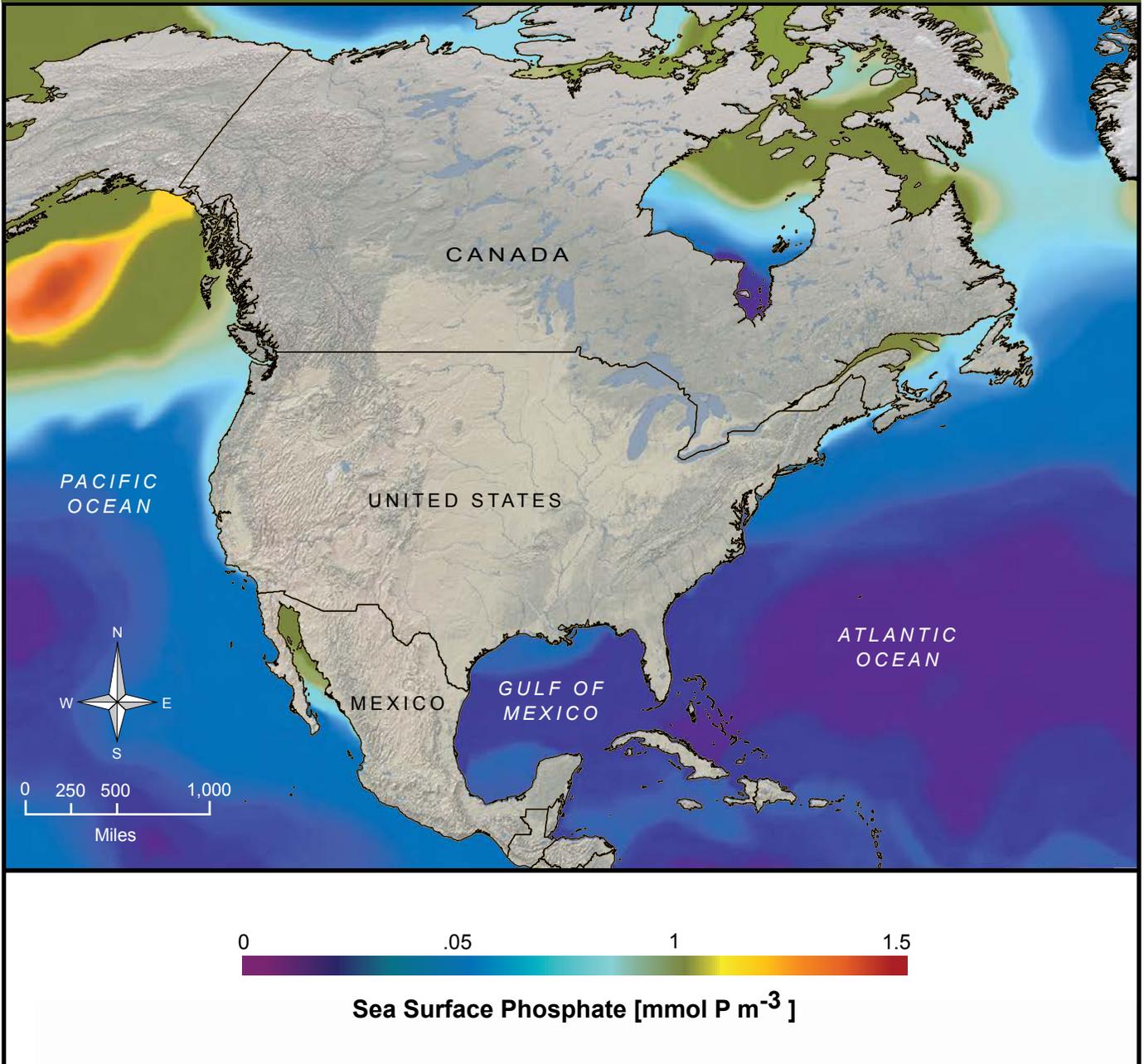
Source: National Oceanic and Atmospheric Administration (NOAA)/National Environmental Satellite, Data, and Information Service (NESDIS)

VA #2 Ocean Nitrates—North America



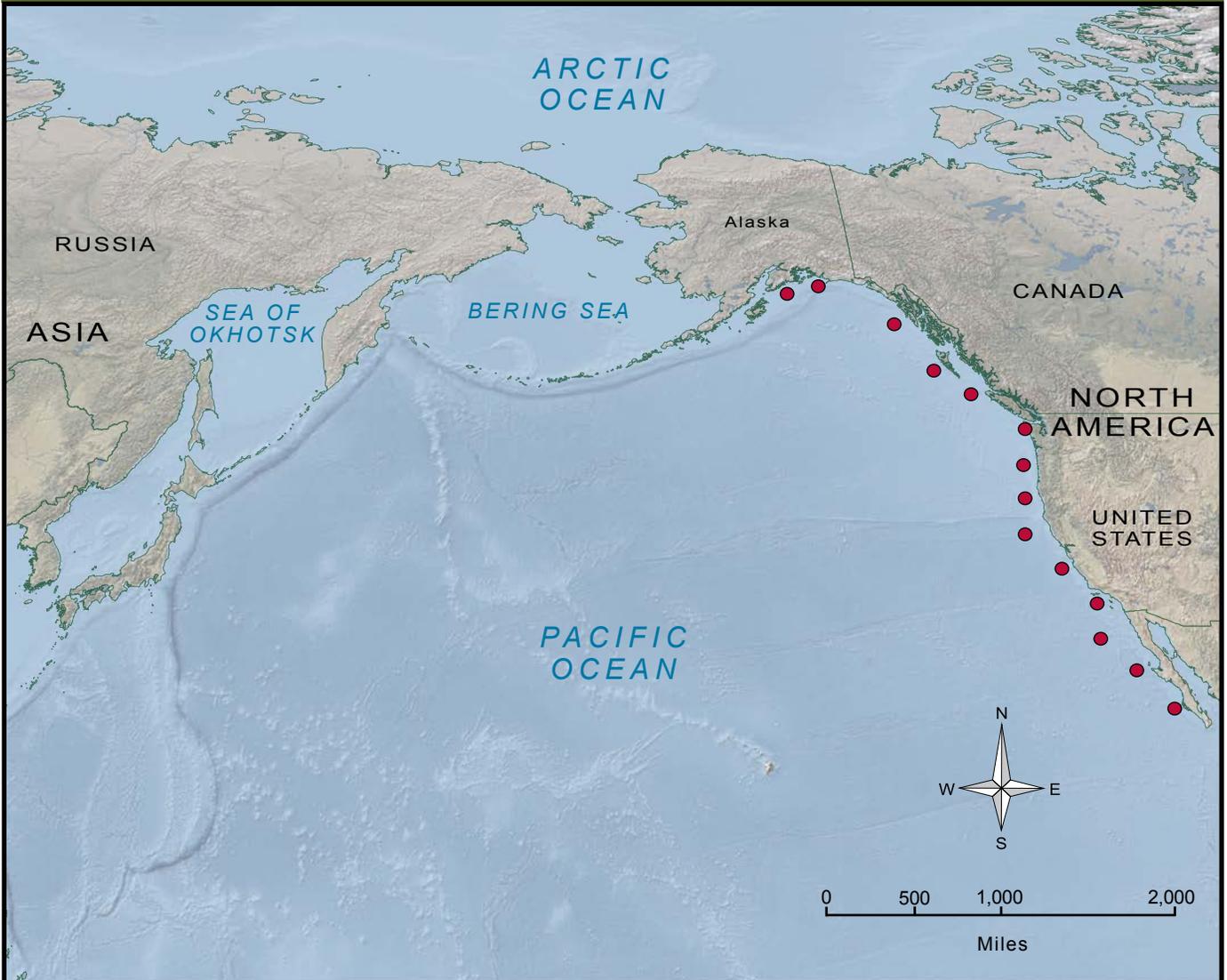
Source: National Oceanic and Atmospheric Administration (NOAA)/National Environmental Satellite, Data, and Information Service (NESDIS)

VA #3 Ocean Phosphates—North America



Source: National Oceanic and Atmospheric Administration (NOAA)/National Environmental Satellite, Data, and Information Service (NESDIS)

VA #4 Pacific Ocean Upwellings



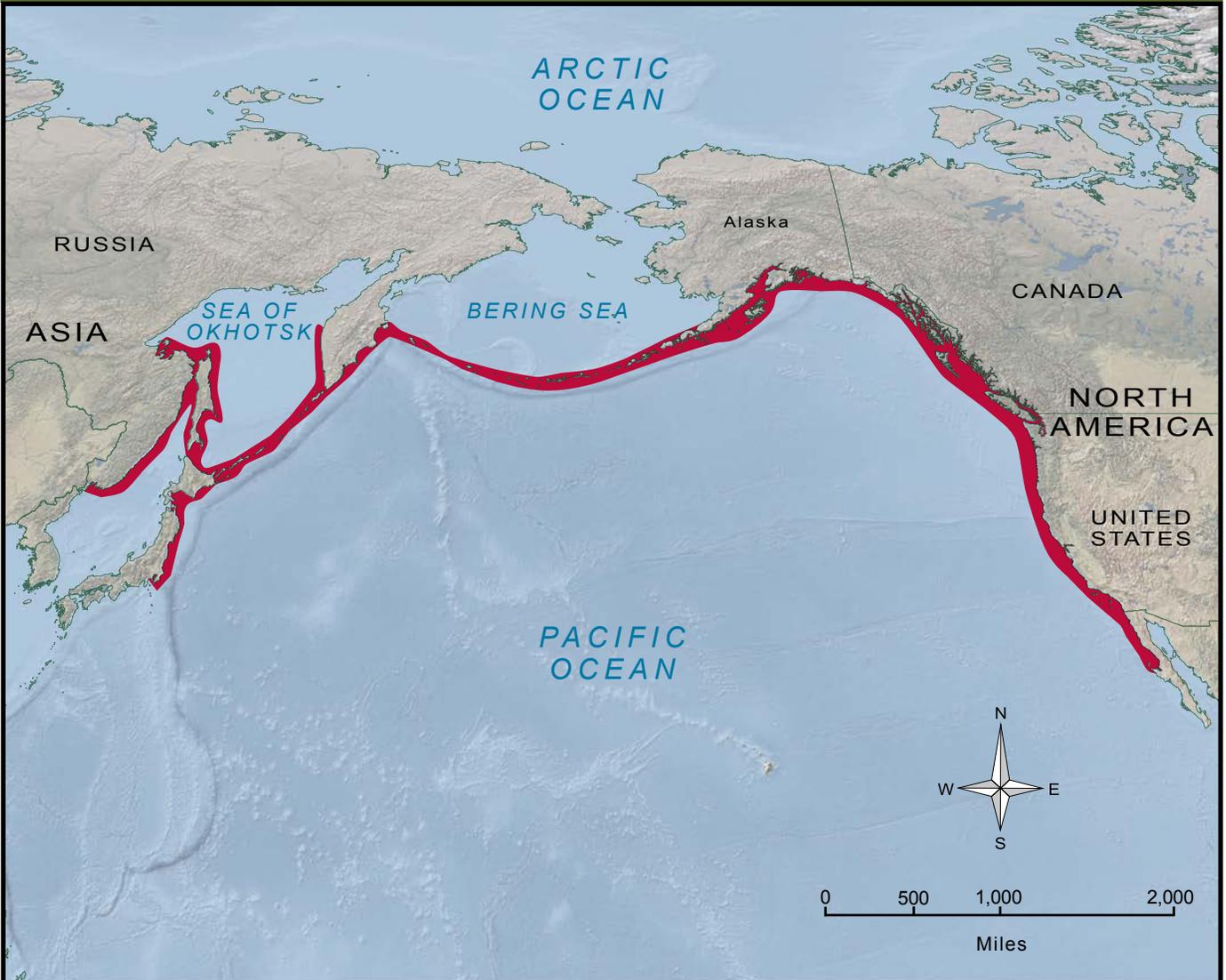
● Locations of ocean upwellings

VA #5 Kelp Forests



 Distribution of kelp forests

VA #6 Historical Distribution of Sea Otters



 Historical distribution of sea otters

VA #7 Phenotype Variation in Rock Pocket Mice

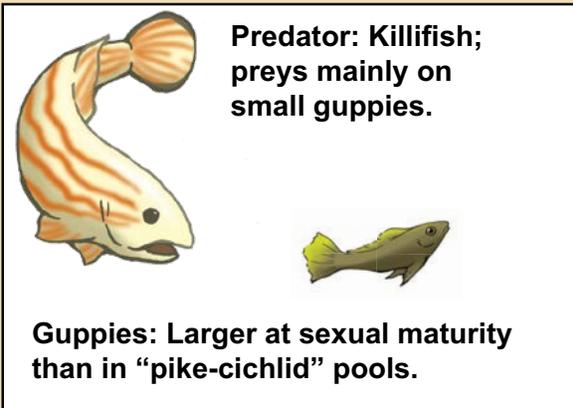


Light and dark rock pocket mice (*Chaetodipus intermedius*) from the Pinacate area of Arizona on light and dark substrate (rocks).

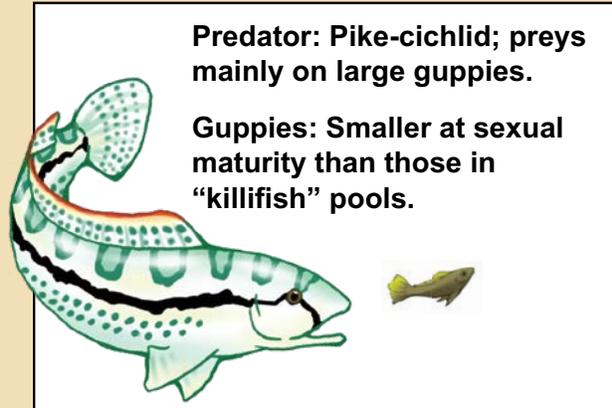


VA #8 Predation and Guppy Body Size

Pool 1–Killifish and Guppies

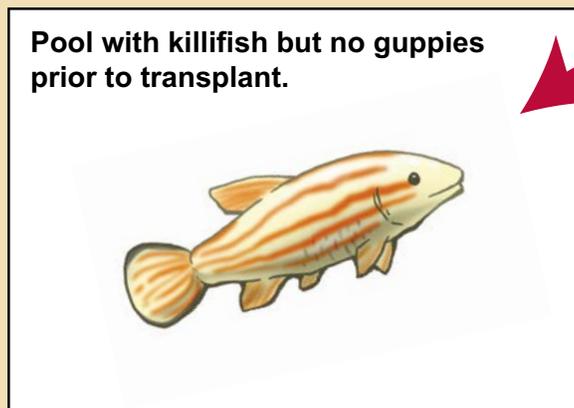


Pool 2–Pike-cichlid and Guppies

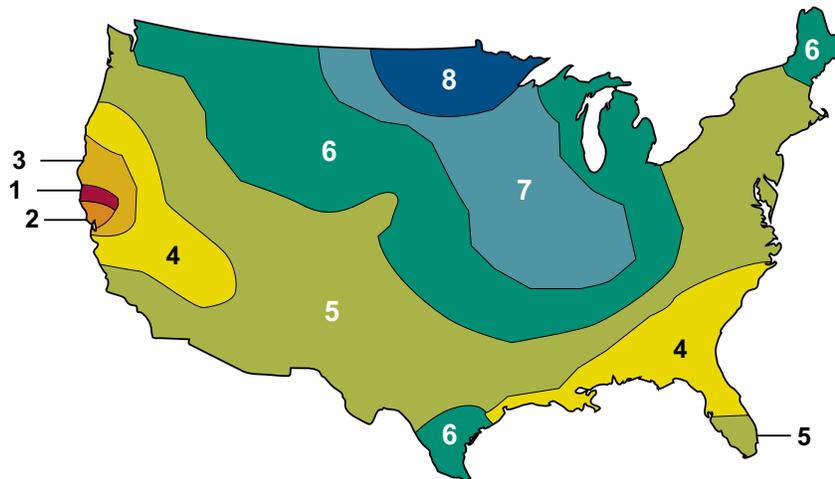


**Experimental
transplant of
guppies**

Pool 3–Killifish with no Guppies



VA #9 Map of Sparrow Body Size Variations



AVERAGE MALE SPARROW SIZE

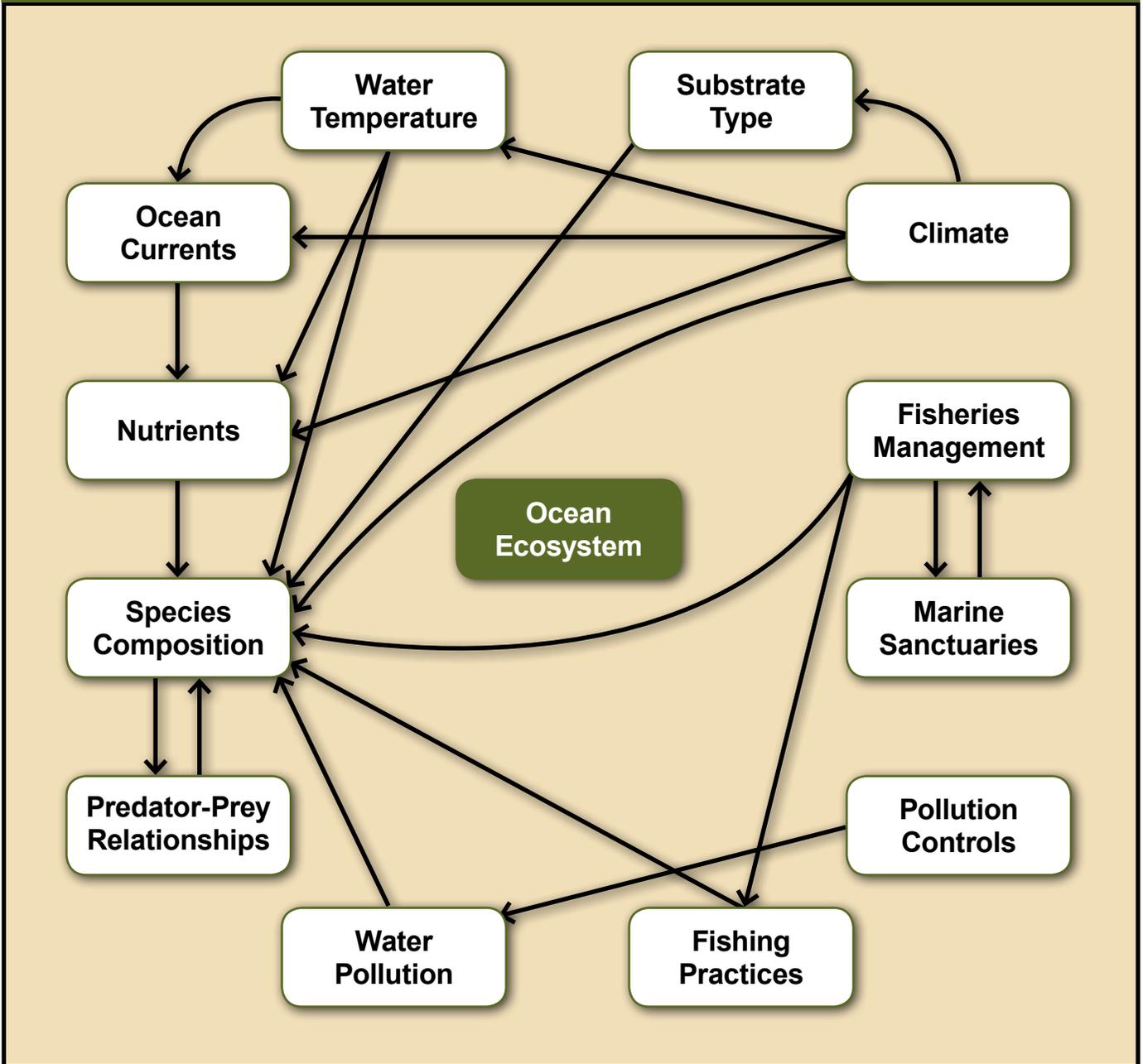
smallest **1** **2** **3** **4** **5** **6** **7** **8** largest

Sparrow Size

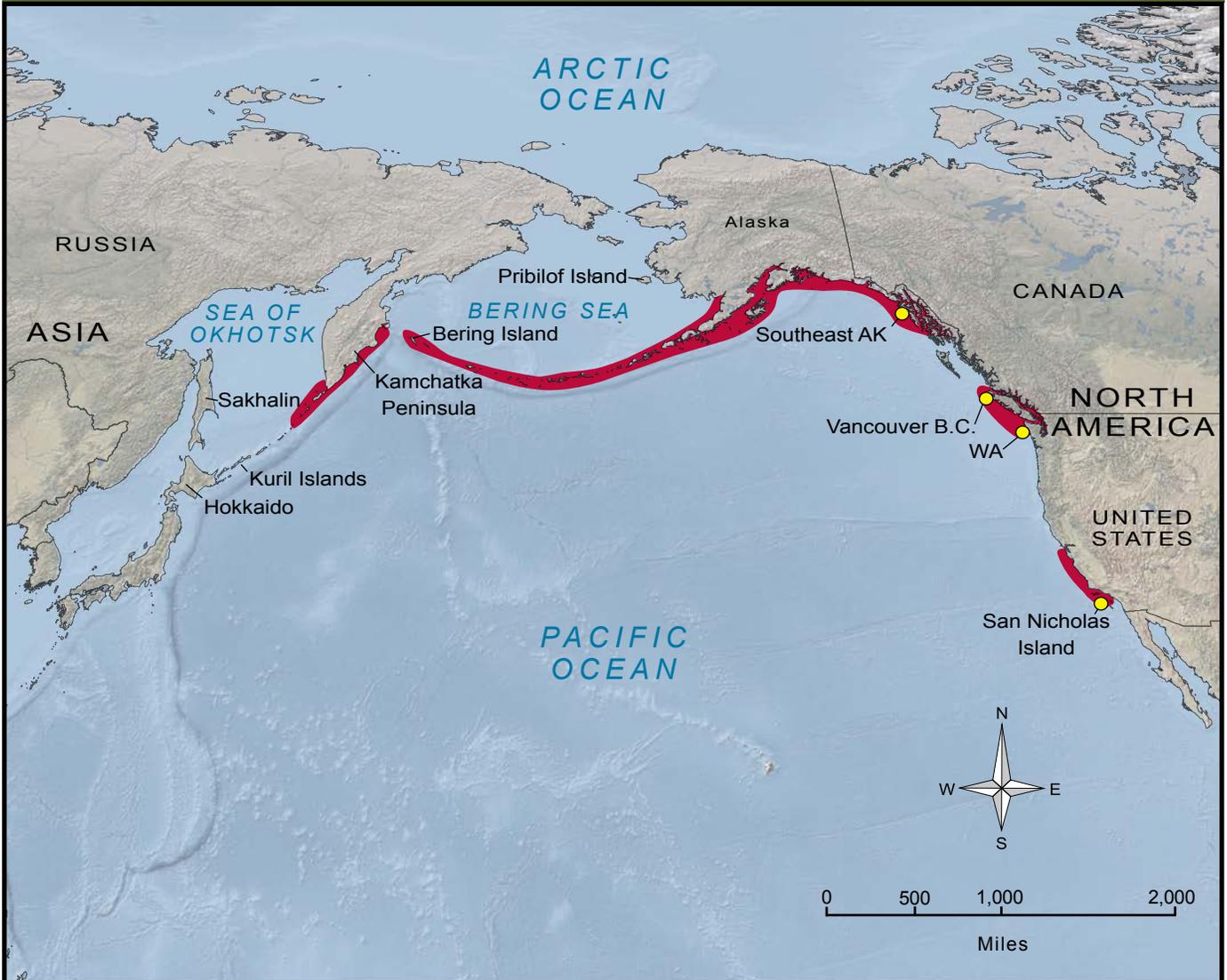
This map shows how body size of house sparrows varies across North America according to climate. Larger sparrows live in colder areas because their smaller surface-area-to-volume ratios help them retain heat.

As this map shows, sparrows in colder places tend to grow larger than sparrows in warmer locales. These differences likely represent microevolutionary change, meaning that populations descended from the same ancestors display different average phenotypes.

VA #10 Ocean Systems Diagram



VA #11 Current Sea Otter Distribution



- Current distribution of sea otters
- Successful translocations

VA #12 Effects of Human Activities on Sea Otters

Human Activity	Effects on the Survival of Sea Otters	Adaptations That Might Increase Sea Otter Survival
Habitat degradation		
Water pollution		
Boating (Trauma from human activity)		
Legislation		



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