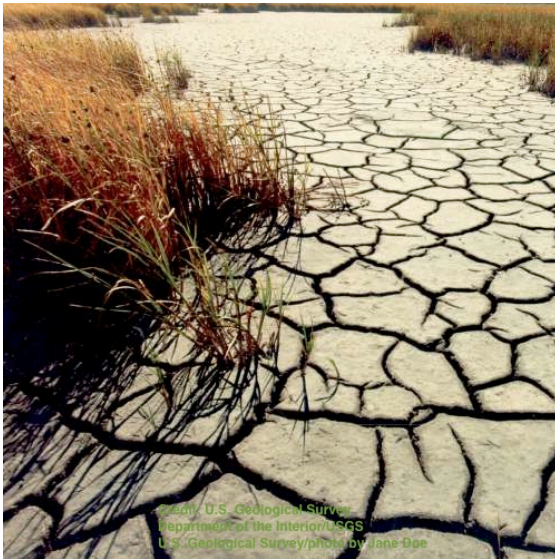


Following the water: Herptile¹ range shift in New England

What is range shift?

A species' range is the geographical area where that species can be found; ranges are determined by geographical features, available resources, inter-species competition, and climatic conditions. A range shift is when the range of a species changes. In some cases, the range will simply expand or contract, and in other cases, the entire range will shift in a particular direction – north, south, uphill, etc. – as the range expands at one extremity and contracts at another.



Why does it happen?

Range shifts due to climate change are driven, primarily, by temperature and water. If a species has been unable to survive in an area because of low temperatures, a warmer climate may be enough to allow that species to expand into new territory. If water is the limiting factor, an increase in water may allow some amphibians to survive in new areas, and a decrease may drive them away from other areas. An increase in rainfall, in forested areas, if it leads to more rapid succession, could also result in a decline in vernal pool availability, limiting the reproductive options of some amphibians, and forcing them out of an area.

There are also more complicated factors that can come into play for a particular species when other species are considered. If a competitor, predator, or pathogen moves into a new area, other species may be forced to move more towards an area that's less hospitable for the encroaching species in order to avoid the difficulties or dangers presented by the new arrivals.

Is it happening now?

To date, while there are clear indications of range shifts in other groups, such as butterflies, there is no indication of range shifts in New England herptiles due to climate change, but in other parts of the world, ranges are shifting, particularly in alpine regions, and in New

¹ "Herptile" is a convenient term for "reptiles and amphibians"

England other groups, like butterflies, have shown clear evidence of changes in their ranges.

Why is this of concern?

Changes in range can mean that a species survives; However, that is only if they are able to move in response to loss of habitable ecosystems. Human infrastructure often forms impassable barriers to this form of movement, compounding the impacts of human-caused



climate change. The movement of species into new territories can also cause problems for those species already living there. If, for example, bullfrogs move into a region they had not previously inhabited, their tadpoles could have a devastating effect by eating the larvae of other local amphibian species. As was previously mentioned, this sort of range shift can force other species to change their range as they are forced out by predation.

What's the outlook?

For amphibians, the future looks tough. Pollution, climate change, and habitat destruction are all contributing to a world-wide decline in amphibians. It is possible that the array of problems could result in populations or whole species dying out, rather than shifting their range.

Reptiles are likely to do fairly well, on the whole, with a warmer world, but the chaos of a changing climate means that it's difficult to tell what the future will hold. The rise in temperature thus far has meant that in the summer, some species have had to spend more time seeking out shade than in the past, and the resulting decline in reproductive activity could lead to a range shift towards cooler climes, or some other response (see Brief #1).

