

Climate Change Impacts to North Pacific Pelagic Habitat are Projected to Lower Carrying Capacity

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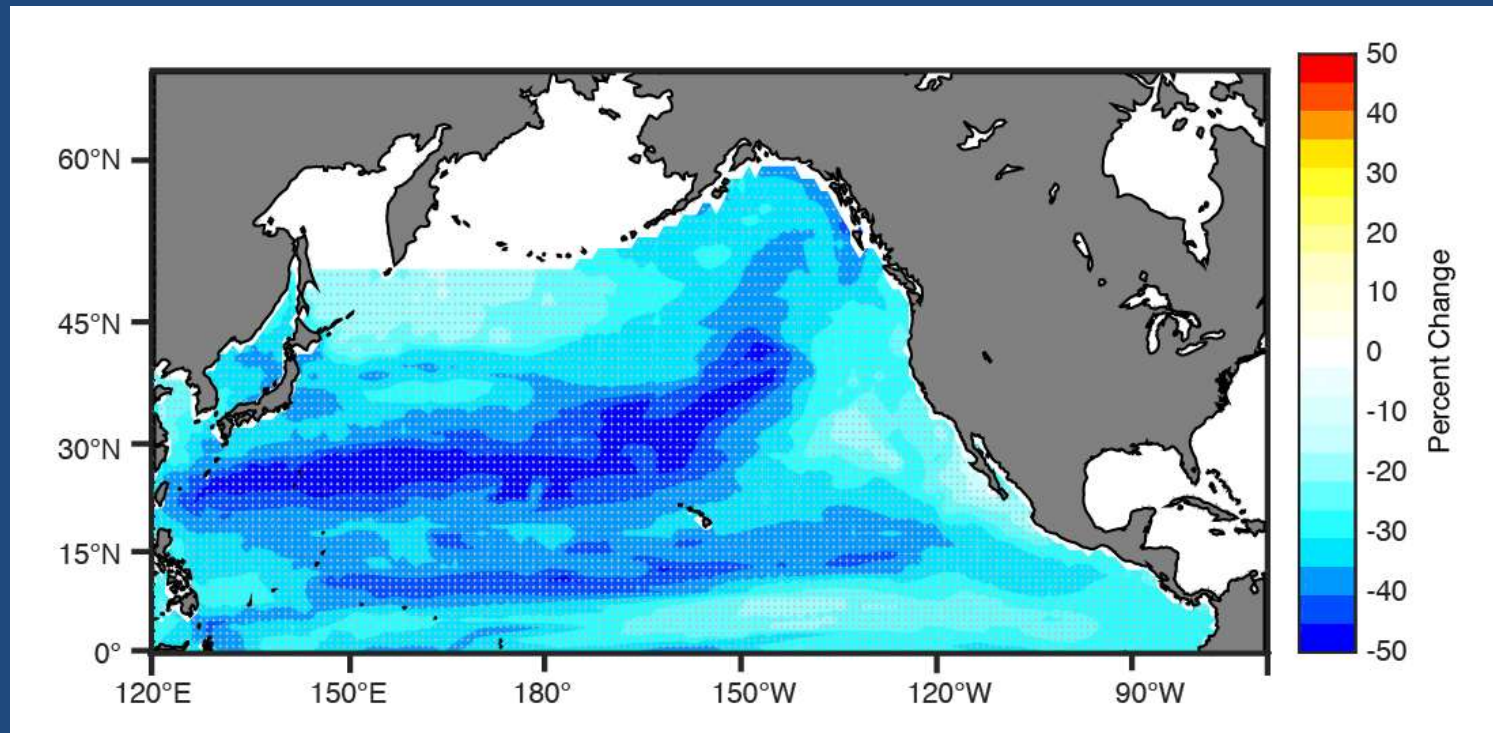
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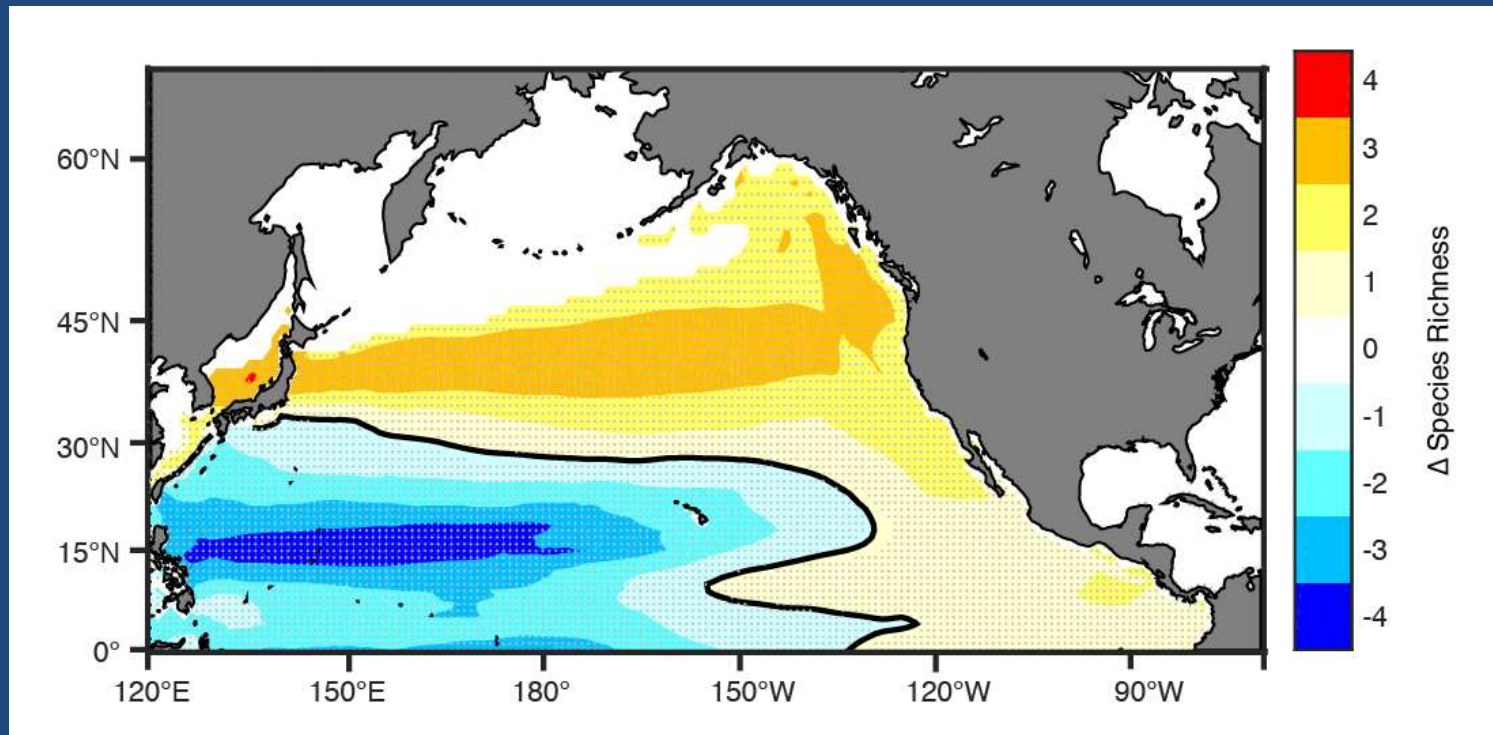
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- Suite of 11 climate models examined, strong model agreement
- Rising upper-ocean temperatures, declining zooplankton densities projected under “business as usual” scenario
- Ecosystem may not be able to support as many large fish: decline of 2 – 5% per decade or 20 – 50% over the 21st century
- Species distribution may shift in response to warming temperatures

- Percent change in potential number of large fish ecosystem can support (carrying capacity)
- Declines result from combination of higher temperatures and reduced zooplankton densities
 - At higher temperatures, fish require more food
 - Lower zooplankton densities mean less food may be available

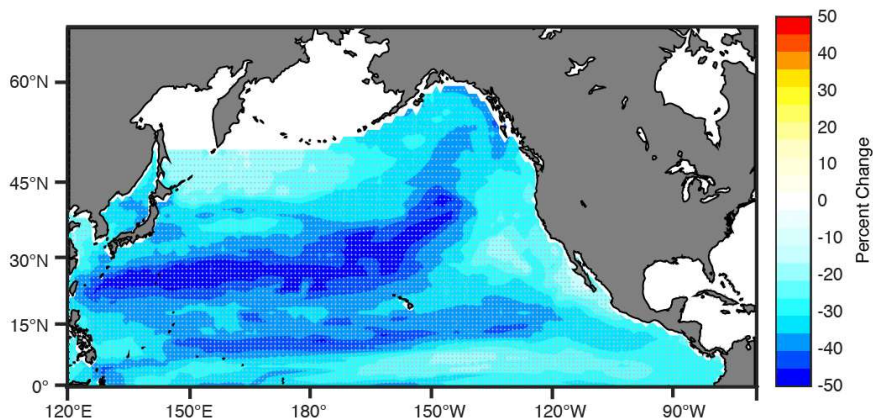


- Change in number of tuna and billfish species present (species richness)
- Changes result from warming temperatures
 - Species prefer specific temperature ranges
 - Will relocate to stay within preferred conditions

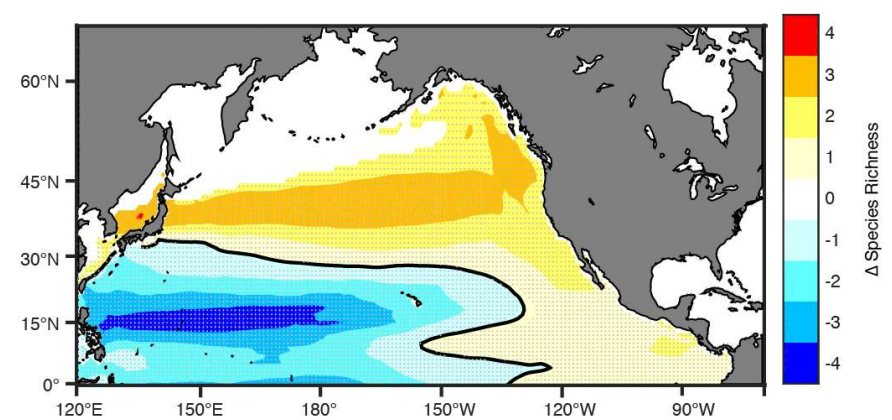


- Potential impacts on fisheries:
 - Catch may decline by 2 – 5% per decade, or 20 – 50% over the 21st century
 - Geographic distribution of catch may shift
 - Subtropics may be especially hard hit by changes

Change in Potential Carrying Capacity



Change in Tuna and Billfish Species Richness



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