Potential economic effects of climate change on the fisheries of Mexico

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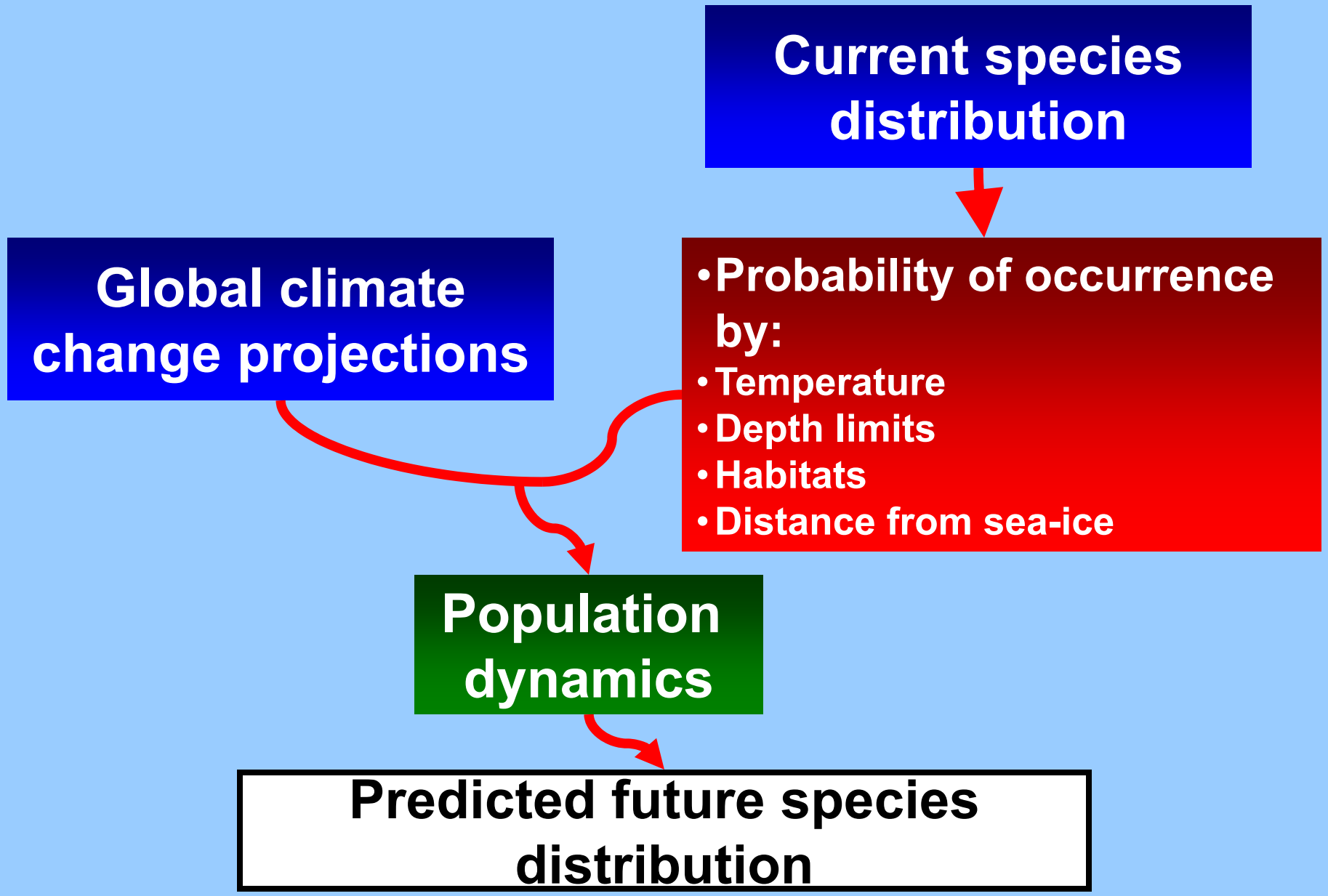
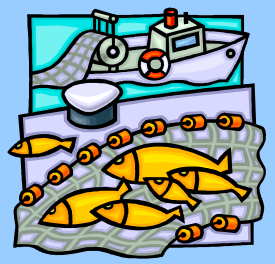
Socioeconomic research questions

- What are the potential climate change impacts on fish biomass distribution?
- How will change in fish biomass distribution affect the kind and amount of fish catch?
- How will the changes above affect (i) gross revenues; (ii) fishing cost; and (iii) profits and its distribution to participants in Mexico's fisheries?

Climate change-distribution prediction

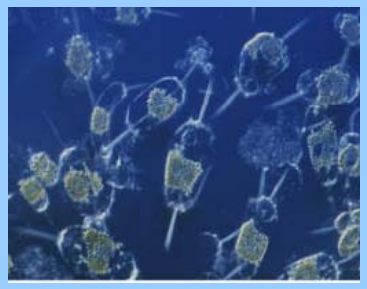


Predicting catch from macroecology



Catch potential

$\propto$



Primary productivity
(e.g. Behrenfeld & Falkowski 1997)

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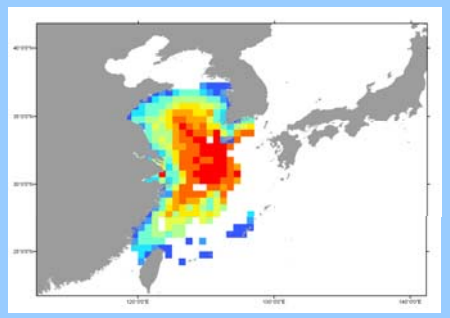


Range area

$$\log_{10} \mathrm{MSY}' = -2.881 + 0.826 \times \log_{10} P' - 0.505 \times \log_{10}(A) - 0.152 \times \lambda + 1.887 \times \log_{10} \mathrm{CT} + 0.112 \times \log_{10} \mathrm{HTC}' + \varepsilon$$

Cheung *et al.* (2008) Mar. Ecol. Prog. Ser. 365: 187-197

Figure 1. Annual average catch for last decade (tonnes) in Mexican EEZ

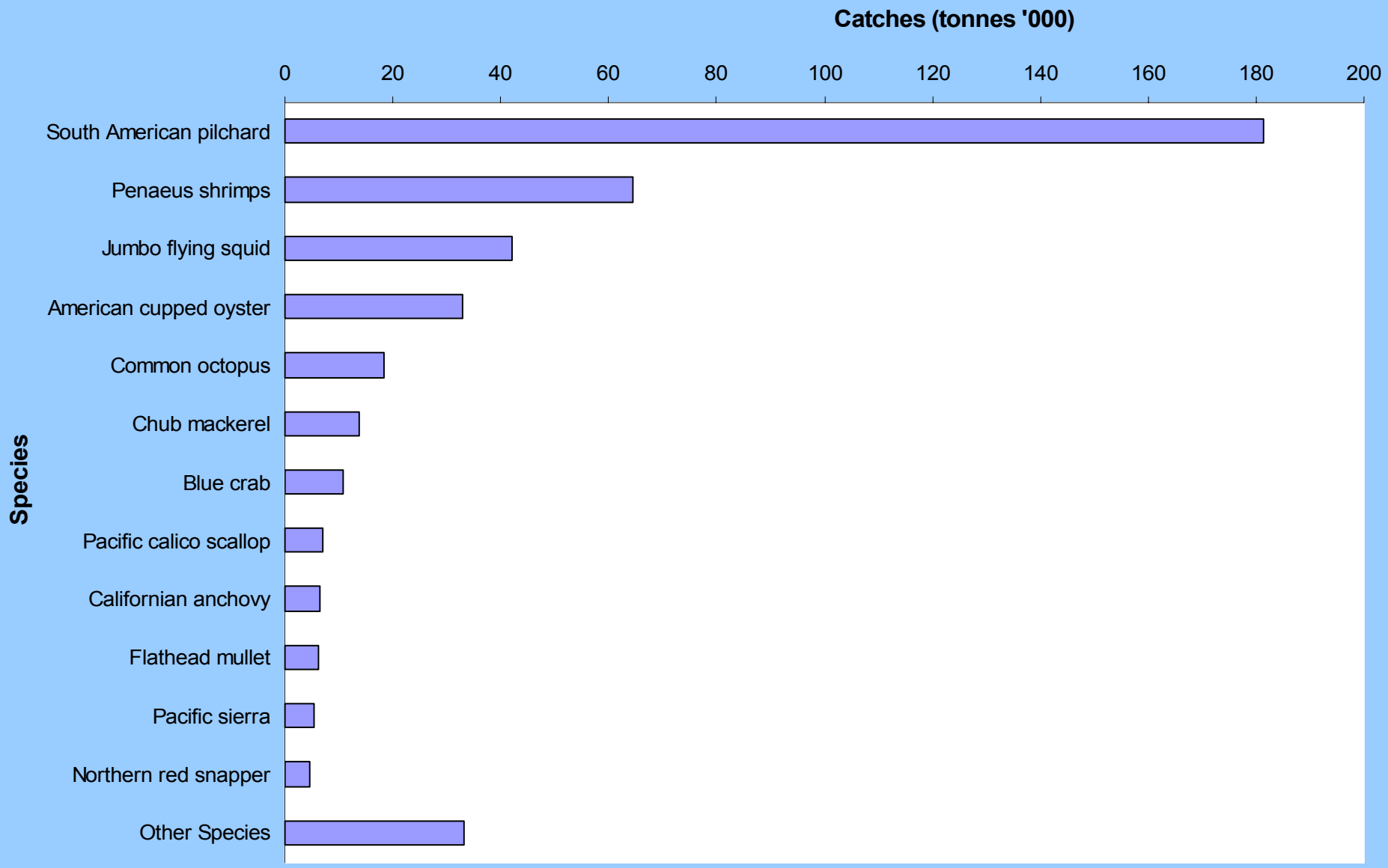


Figure 2. Predicted percentage change in catch (%) in 2050 in Mexican EEZ under a **SEVERE** climate change scenario

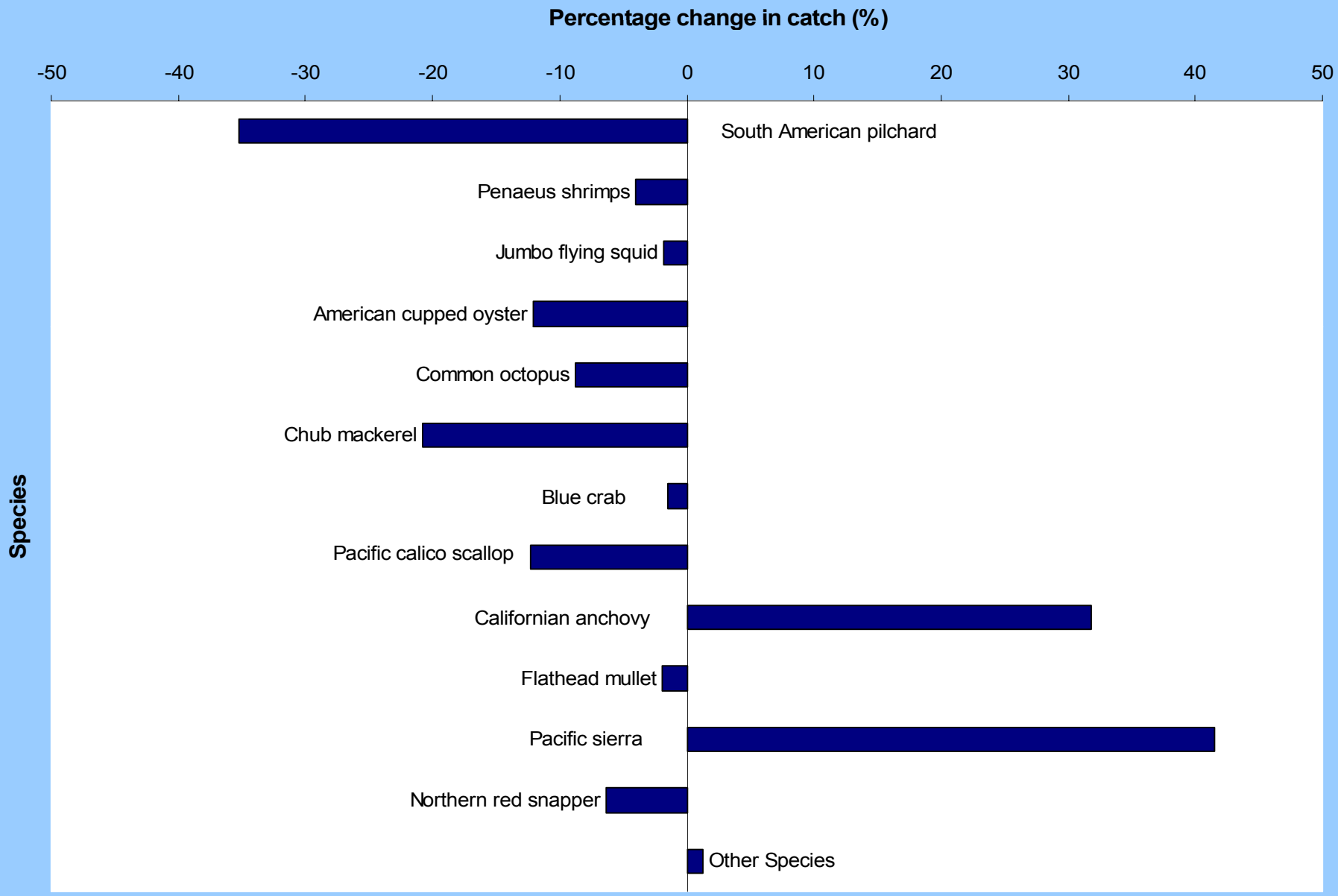


Figure 3. Predicted percentage change in catch (%) in 2050 in Mexican EEZ under a **MILD** climate change scenario

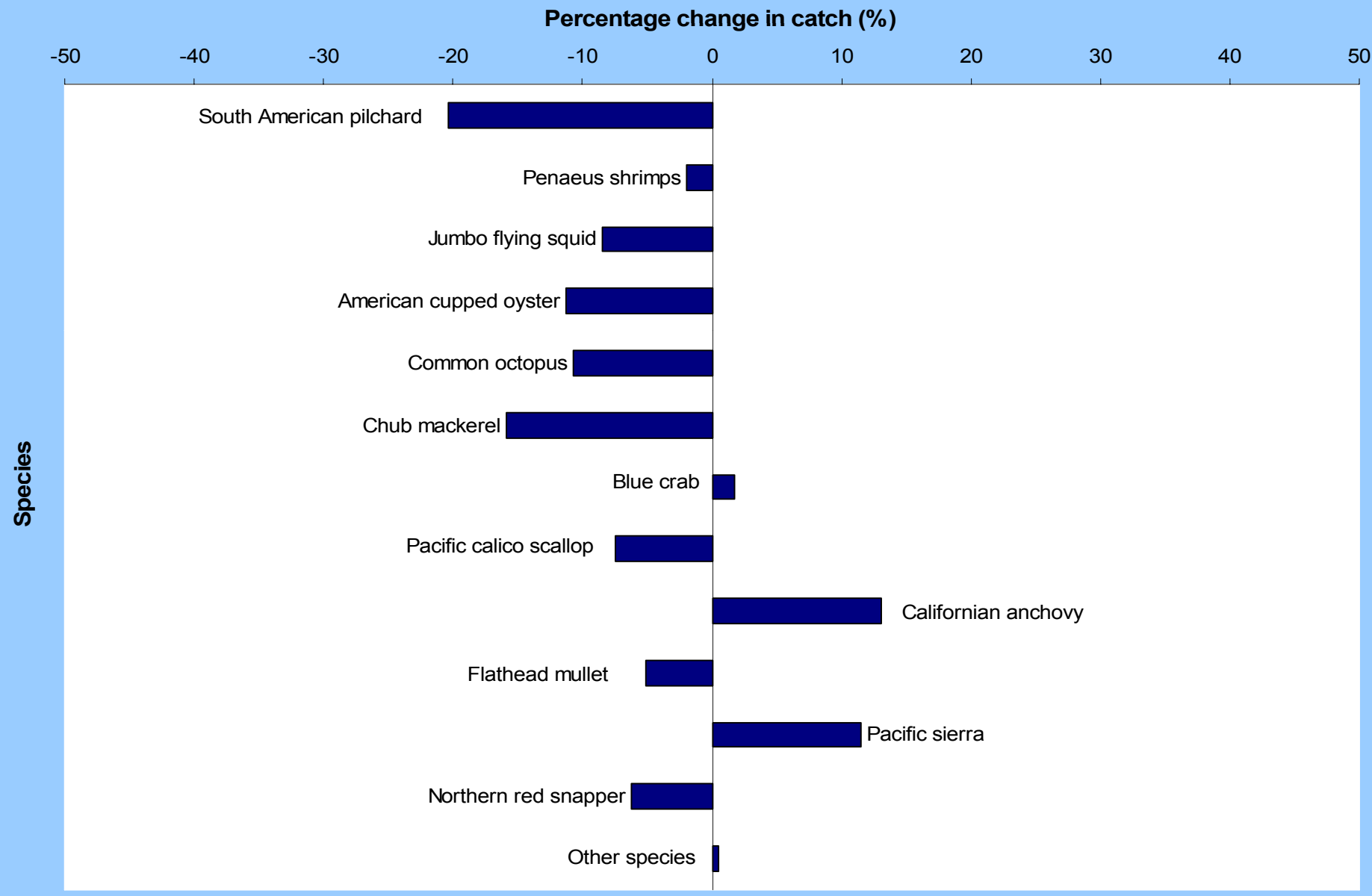


Figure 4. Average annual real 2000 value (US$) for last decade in Mexican EEZ

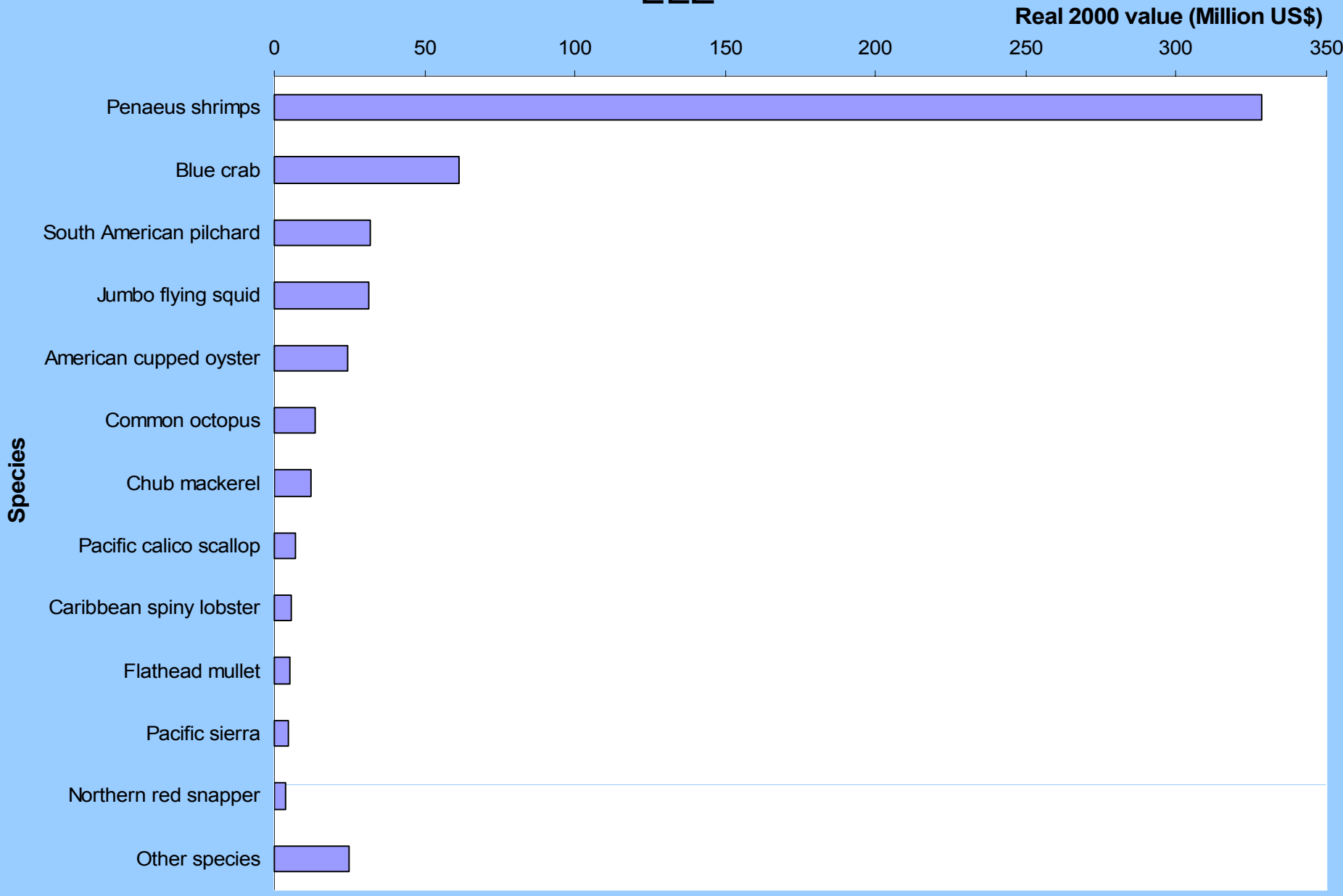


Figure 5. Predicted percentage change in average real 2000 value (%) in 2050 in Mexican EEZ under a **SEVERE** climate change scenario

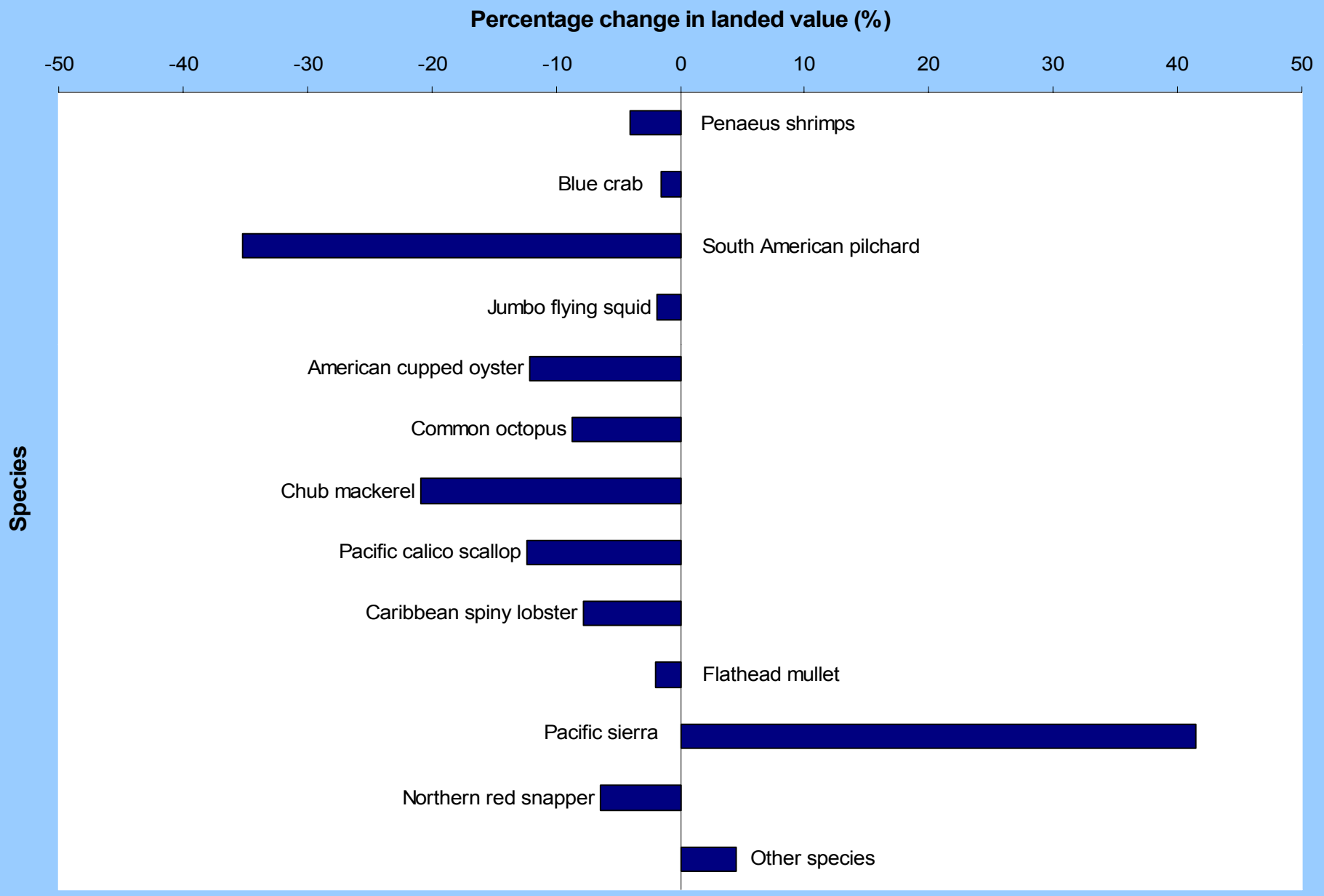
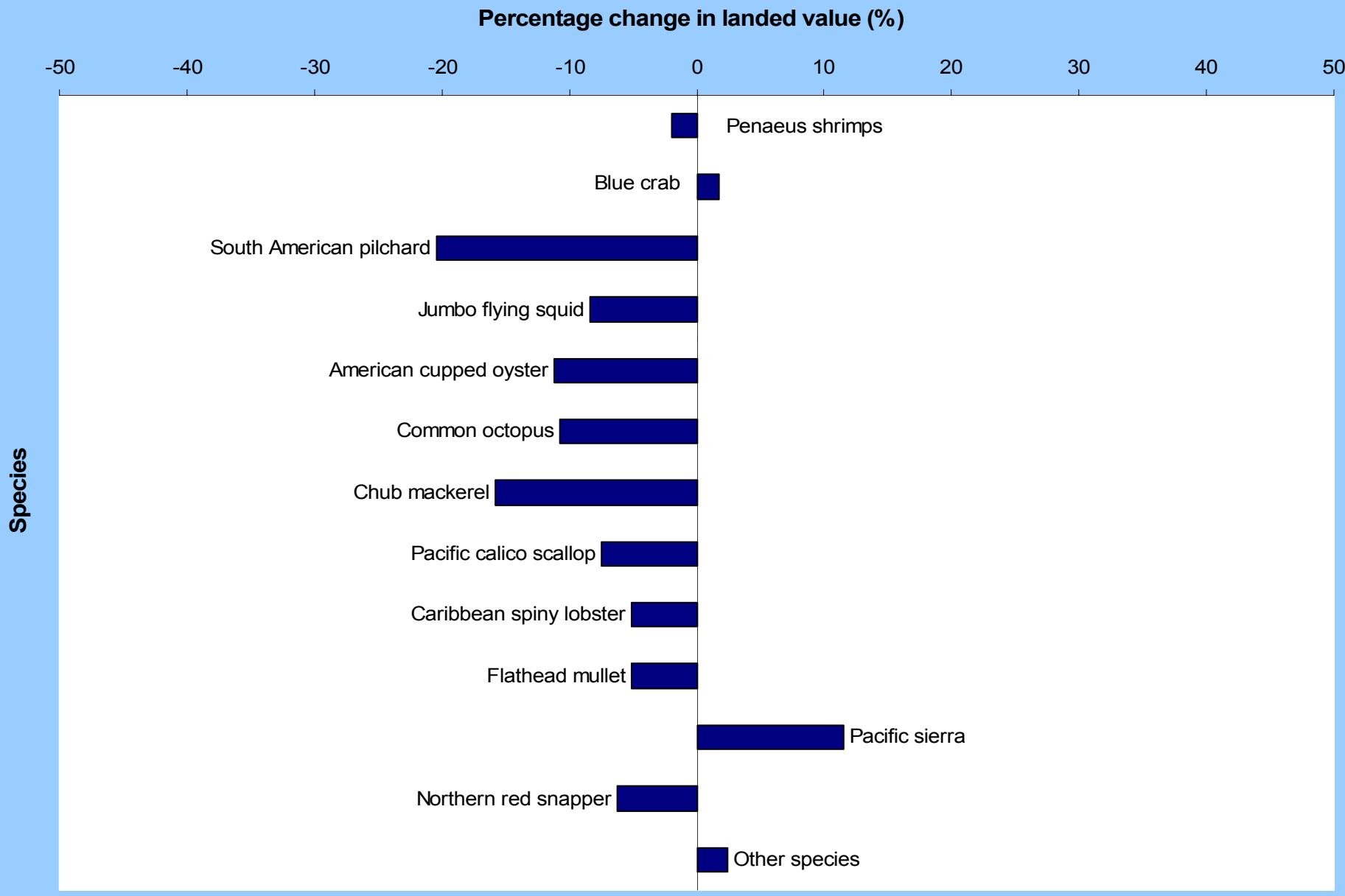
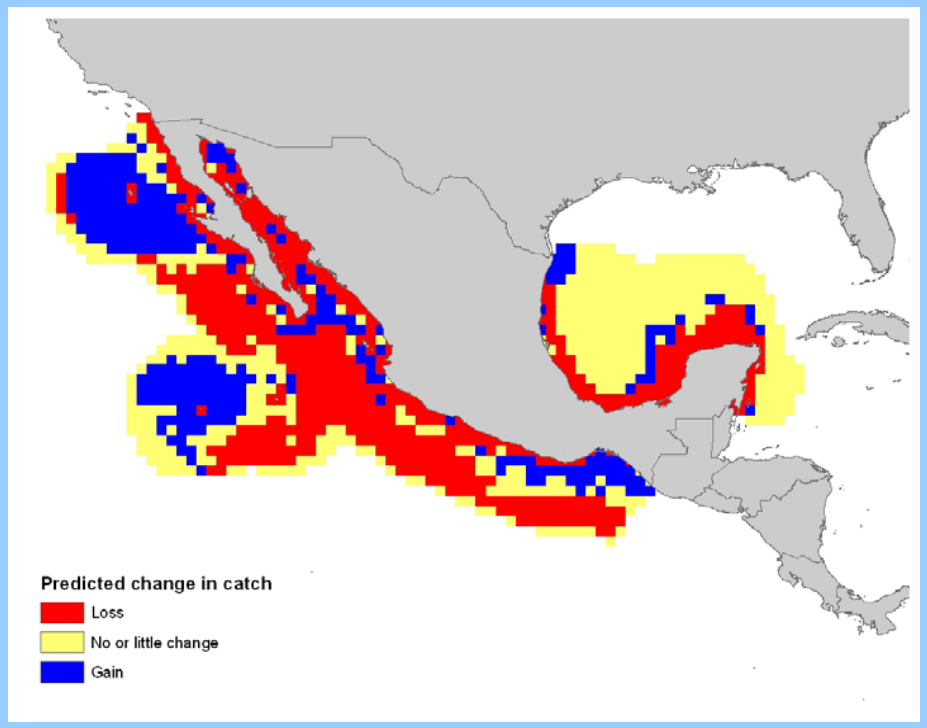


Figure 6. Predicted percentage change in average real 2000 value (%) in 2050 in Mexican EEZ under a **MILD** climate change scenario

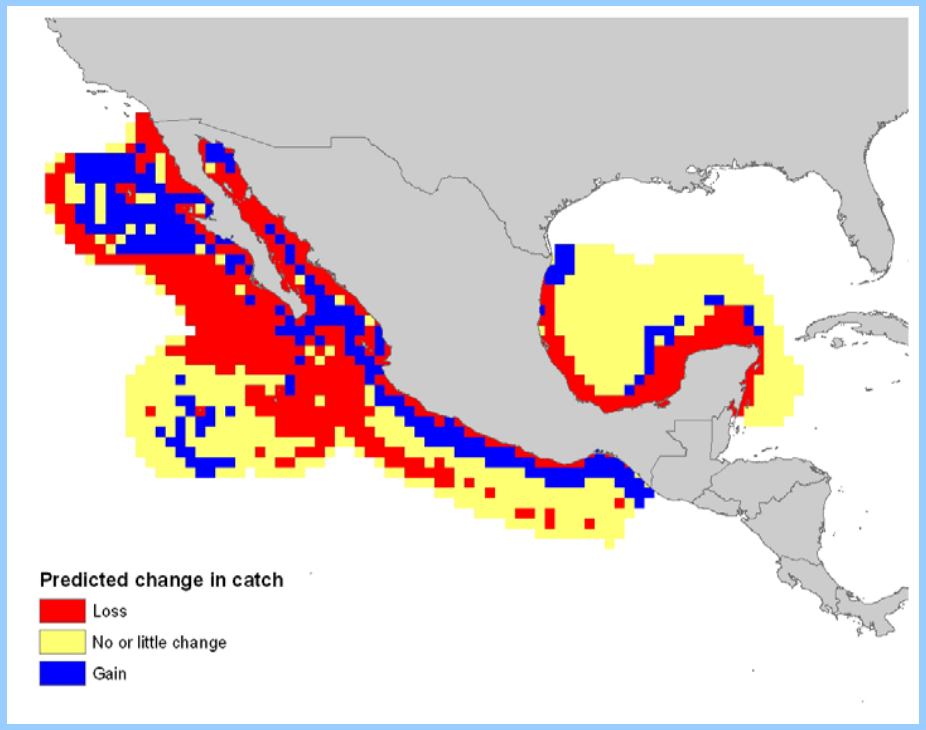


Predicted change in fish catch in Mexican EEZ

SEVERE climate change scenario

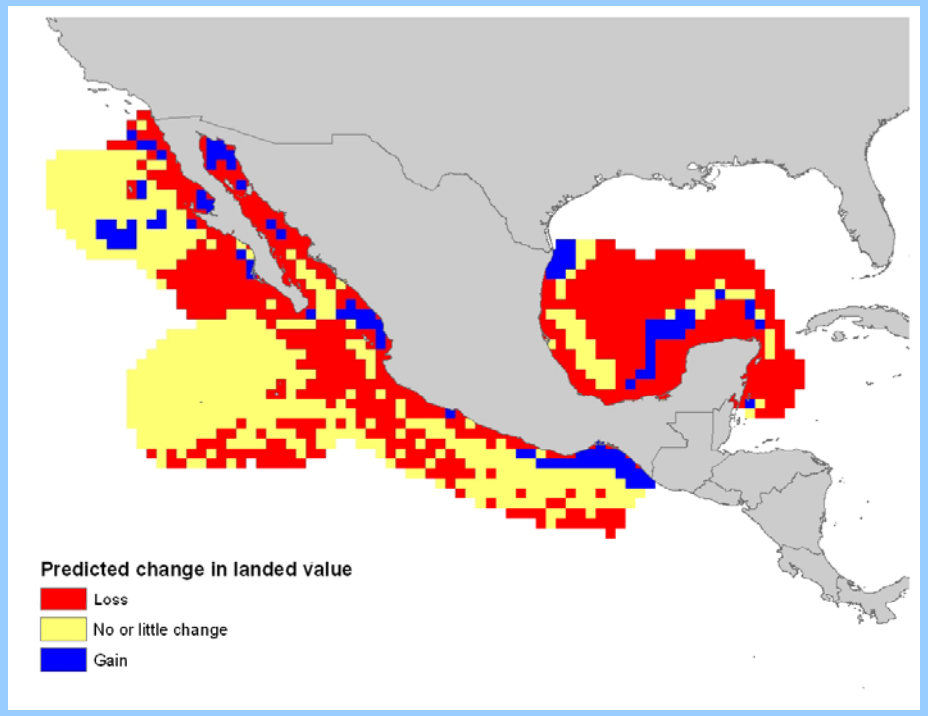


MILD climate change scenario

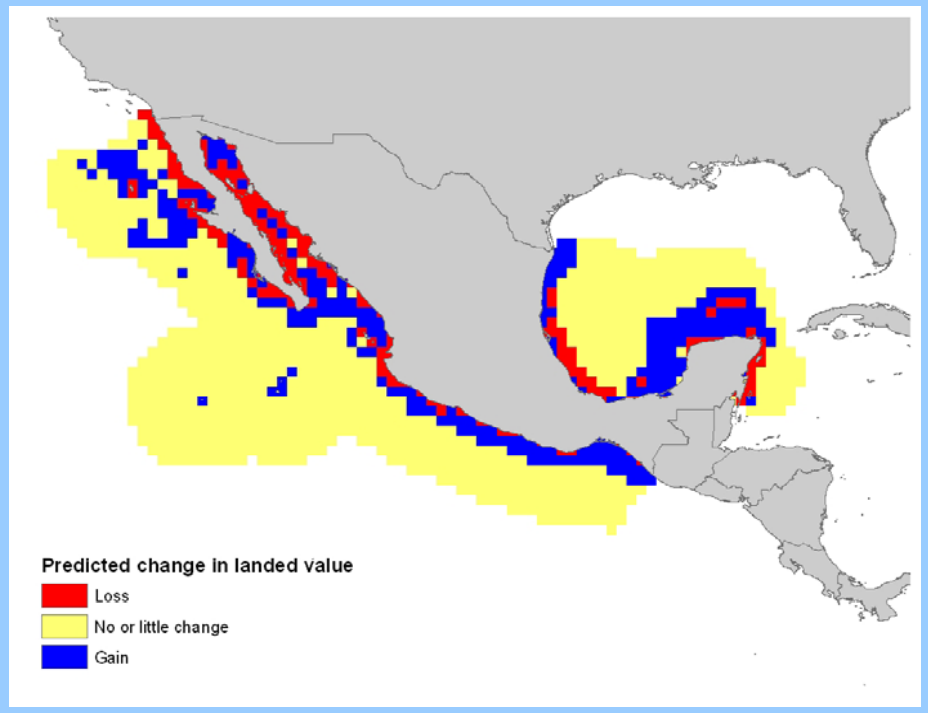


Predicted change in fish landed value in Mexican EEZ

SEVERE climate change scenario



MILD climate change scenario



Final remarks

- We need to explore the potential climate change impacts on fish biomass distribution;
- We need to understand how changes in fish biomass distribution affect fish catch;
- We need to determine the economic and social effects of anticipated changes due to climate change.

Thanks for your attention

Photo by Asep, TNC