

Ocean Ecosystems and Marine Resources

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Key Message 10.1

Unprecedented Climate Impacts Threaten Ecosystems and Human Well-Being

Climate change is significantly altering US marine ecosystems at a pace, magnitude, and extent that is unprecedented over millennia (*very high confidence*). Changes in species locations, productivity, and seasonal timing are cascading through ecosystems, threatening critical connections between people and the ocean (*high confidence*), especially for Indigenous Peoples (*very high confidence*). Risks to marine ecosystems and the people connected to them will be greater under higher scenarios (*likely, very high confidence*) and will depend on the ability of ecological and social systems to adapt to the pace of climate change (*very high confidence*). Continued climate change, particularly under higher scenarios, is projected to push many systems toward novel conditions and critical tipping points (*very high confidence*), beyond which the risk of significant impacts to marine ecosystems, including collapse, is high, adaptation may be insufficient, and human well-being is threatened (*high confidence*).

Key Message 10.2

Climate Change Is Altering Marine-Related Economic Activities

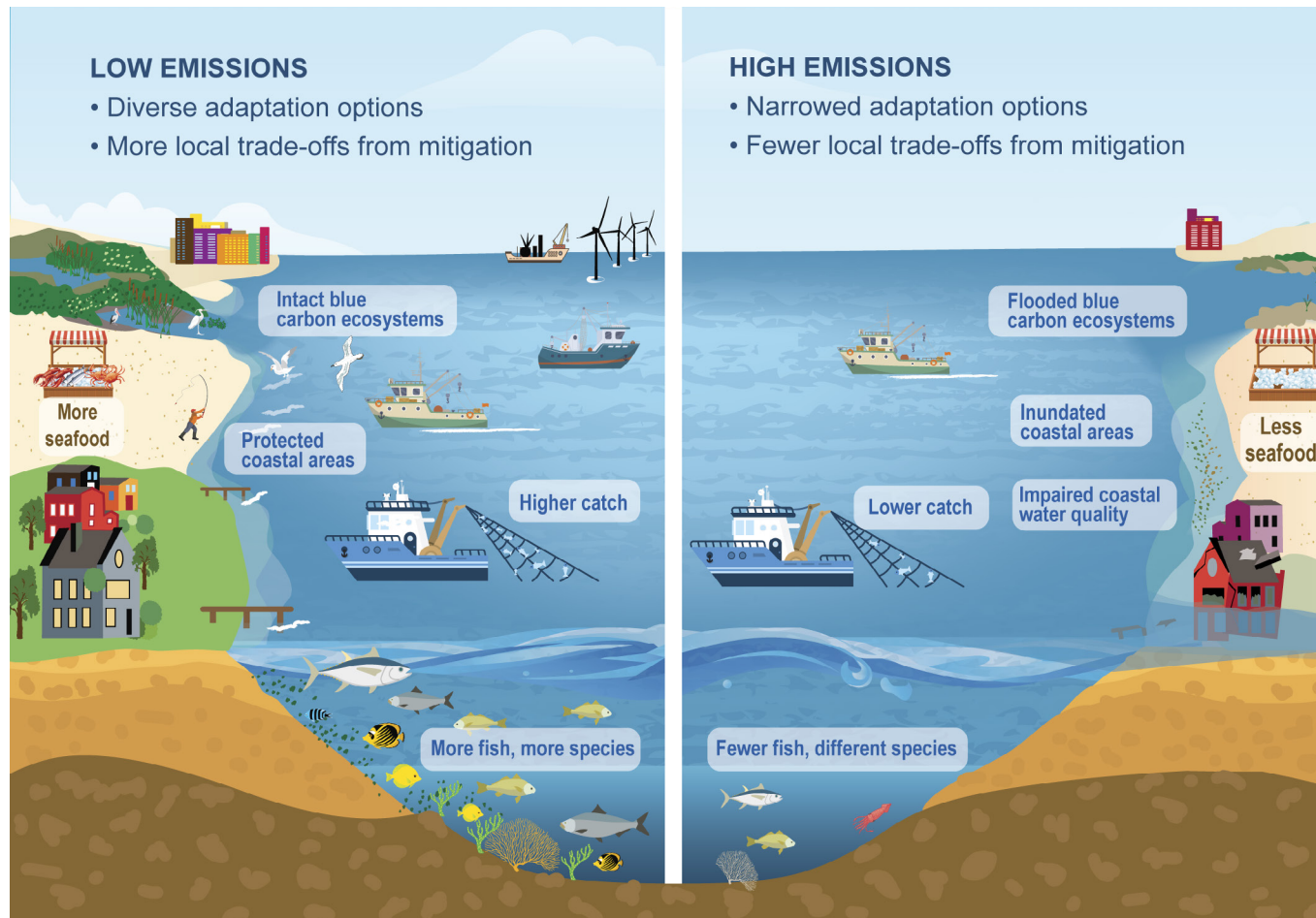
Climate change poses a substantial risk to ocean-related industries and economic activities such as fisheries, tourism, recreation, transportation, and energy (*high confidence*). As climate change continues, economic and cultural impacts are expected to become larger and more widespread, especially under higher scenarios and in communities that are highly dependent on ocean resources (*very high confidence*). A range of approaches can facilitate adaptation to some degree of climate change (*medium confidence*), but higher levels of climate change will limit the success of adaptation measures and markedly increase climate risk to marine-related economic activities (*high confidence*).

Key Message 10.3

Our Future Ocean Depends on Decisions Today

Future risks to marine ecosystems, ocean resources, and people will be substantially reduced by implementing adaptation and mitigation actions now (*very high confidence*). Responding swiftly to climate change will improve outcomes, reduce costs, promote resilience and equity, and allow the widest possible suite of adaptation solutions (*very high confidence*). Impacts will continue to be uneven across communities, with more harmful outcomes in communities that are highly ocean-reliant and historically marginalized, unless equitable adaptation and mitigation efforts are implemented (*high confidence*).

Ocean Conditions and Activities Under Two Climate Scenarios



Future ocean conditions and activities will depend on emissions levels and mitigation strategies.

Figure 10.5. Future marine ecosystems and human activities will differ under low versus high greenhouse gas emissions scenarios. This figure is a simplified depiction of major predicted changes as a result of climate change. Under low scenarios (**left**), more adaptation options remain available, and ocean services such as food provision and coastal protection are maintained, but trade-offs between ocean-based activities will escalate. Under high scenarios (**right**), ecosystems will be altered, fewer adaptation options will be available, and losses of services are expected across diverse sectors. Figure credit: Center for American Progress and Gulf of Maine Research Institute.

Recommended Citation

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