American Samoa Pelagic Fish

Climate Change Vulnerability Assessment Summary

An Important Note About this Document: *This document represents an initial evaluation of vulnerability for pelagic fish based on workshop input and existing information. The aim of this document is to expand understanding of species vulnerability to changing climate conditions, and to provide a foundation for developing appropriate adaptation responses.*

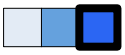
Species Description


Photo NOAA Fishwatch.gov

Pelagic fish species in the region are managed through the Western and Central Pacific Fisheries Commission and include migratory tunas such as the bigeye (*Thunnus obesus*), yellowfin or asiasi (*T. albacares*), albacore or apakoal (*T. alalunga*), dogtooth or tagi (*Gymnosarda unicolor*) and skipjack or atu (*Katsuwonus pelamis*).[1] Other important species include billfish (*Tetrapturus auda, Makaira mazara, Xiphias gladius),* dolphinfish (*Coryphaena hippurus, C. equiselas)* and wahoo (*Acanthocybium solandri*).[1] Most pelagic fish prefer open ocean area and seldom come close to shore; occasionally the dogtooth tuna is seen along reef areas. Although American Samoa has a large tuna packing cannery industry (Chicken of the Sea), tuna is not particularly abundant in the region and most of the tuna canned locally use fish caught in other areas.[2]

Species Vulnerability

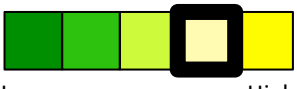
Moderate Vulnerability

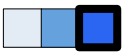


Commercially valuable pelagic fish species were evaluated to be moderately vulnerable by workshop participants due to changes in temperature, ocean circulation, and ocean acidification. Common migratory pelagic tunas have already shown responses to increased temperatures and changes in circulation patterns during El Niño Southern Oscillation (ENSO) events.[3,4] Future changes in distribution and abundance of migratory species might result due to changes increased temperature and changes in currents affecting prey availability and thermal tolerance.

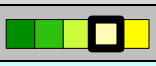
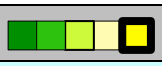
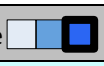
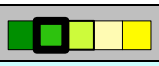
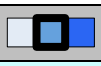
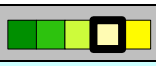
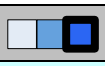
Sensitivity

Moderate-High Sensitivity



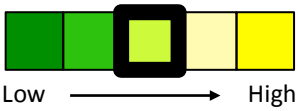


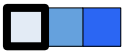
Pelagic fish have moderate to high sensitivity to climatic and non-climatic factors. Increases in sea surface temperature and currents can impact distribution and migratory pathways.

SENSITIVITY FACTORS AND IMPACTS*	
CLIMATE STRESSORS	Moderate-high sensitivity  Moderate confidence 
FACTOR	**IMPACT**
Sea surface temperature	• Potential changes in distribution and migratory pathways
Currents/ stratification	• Causing changes in distribution and abundance of migratory, possible range expansion.
DISTURBANCE REGIMES	High sensitivity  High confidence 
FACTOR	**IMPACT**
ENSO	• Increased temperature and changed in circulation and upwelling have already shown changes in distribution.
DEPENDENCIES	Low-moderate sensitivity  Moderate confidence 
FACTOR	**IMPACT**
Habitat Prey/forage dependency/ Generalist or specialist	• Low dependency on sensitive habitats • High dependency on specific prey • Mostly generalist species assemblage
NON-CLIMATE STRESSORS	Moderate-high sensitivity  High confidence 
FACTOR	**IMPACT**
Harvest	• Targeted both commercially and recreationally.

Exposure†

Moderate Exposure





Low Confidence

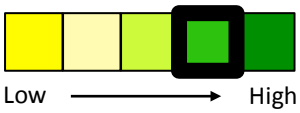
Pelagic fish will experience moderate exposure to increased sea surface temperature that will cause changes in currents and stratification.

PROJECTED CLIMATE AND CLIMATE-DRIVEN CHANGES‡	
CLIMATE STRESSORS	**PROJECTED CHANGES**
Sea surface temperature/ Currents	Sea surface temperatures will increase +1.1-1.7°F by 2030. • Species assemblage strongly affected by shifts in temperature and ocean conditions.

* Factors presented are those ranked highest by workshop experts.
† Relevant references for regional climate projections can be found in the Climate Impacts Summary Table.
‡ Factors presented are those ranked highest by workshop experts, scoring 3 or above.

Adaptive Capacity[§]

Moderate-High Adaptive Capacity



Pelagic fishes have moderate-high adaptive capacity due to relative long-range dispersal migratory ability to be able to move to more favorable areas.

ADAPTIVE CAPACITY FACTORS AND CHARACTERISTICS	
FACTOR	**SPECIES CHARACTERISTICS**
Extent, status, & dispersal ability High adaptive capacity High confidence	• Some species are highly threatened such as billfishes and Bluefin tuna • Long range dispersal ability
Intraspecific/life history diversity High adaptive capacity Moderate confidence	• High diversity and plasticity
Resistance Moderate adaptive capacity High confidence	• Exhibit moderate resistance to climatic and non-climatic impacts
Management potential Moderate-high adaptive capacity High confidence	• Highly valuable species assemblage for both food source, recreation, and culturally important • Quota changes in fisheries management regulations

Literature Cited

[1] Craig, P. Editor. Natural History Guide to American Samoa. 3rd Edition. 2009. National Park of American Samoa, Department Marine and Wildlife Resources and American Samoa Community College.

[2] U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries. 2012. Fagatele Bay National Marine Sanctuary final management plan/final environmental impact statement. Silver Spring, MD. Available from http://sanctuaries.noaa.gov/management/mpr/mpr-nmsam-2012.pdf.

[3] Leong, J.-A., J.J. Marra, M.L. Finucane, T. Giambelluca, M. Merrifield, S.E. Miller, J. Polovina, E. Shea, M. Burkett, J. Campbell, P. Lefale, F. Lipschultz, L. Loope, D. Spooner, and B. Wang. 2014. Ch. 23: Hawai'i and U.S. Affiliated Pacific Islands. Climate Change Impacts in the United States: The Third National Climate Assessment, J.M. Melillo, T.C. Richmond, and G.W. Yohe, Eds., U.S. Global Change Research Program, 537-556.

[4] Keener, V.W., J.J. Marra, M.L. Finucane, D. Spooner, and M.H. Smith (Eds.). 2012. Climate Change and Pacific Islands: Indicators and Impacts. Report for The 2012 Pacific Islands Regional Climate Assessment. Island Press, Washington, D.C.

[§] Please note that the color scheme for adaptive capacity has been inverted, as those factors receiving a rank of "High" enhance adaptive capacity while those factors receiving a rank of "Low" undermine adaptive capacity.