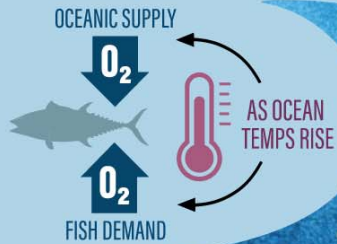


DEOXYGENATION

EFFECTS ON PELAGIC SHARKS BILLFISH TUNA



HABITAT SHRINKAGE SHIFTS SPECIES DISTRIBUTION

High metabolic rates make these species especially susceptible to deoxygenation.

0m
500m
1000m

WITHIN NORTH PACIFIC UPPER WATER COLUMN (above 1000m) OXYGEN CONCENTRATION DECLINES WILL BE MOST DRAMATIC

- MOST AFFECTED SPECIES**
- TUNA**
 - BILLFISH**
 - YELLOWFIN
 - BIGEYE
 - PACIFIC BLUEFIN
 - ALBACORE
 - SWORDFISH

LOW OXYGEN DRIVES HABITAT SHRINKAGE

MARINE LIFE EFFECTS:

- Loss of biodiversity
- Loss of biomass
- Loss of habitat

Stock assessment and management complications. ???

Reduced fish landings.



Lower economic profit. Fishers spend more resources to locate & catch these species.



Smaller scale fisheries and developing nation populations most affected by the change.



Aggregate economic value of tuna, ~US\$9B