



YUROK TRIBE CLIMATE CHANGE ADAPTATION PLAN FOR WATER AND AQUATIC RESOURCES

All sub-populations who consume shellfish are at increased risk of illness.

SHELLFISH POISONS



TRIBAL POPULATION GROUPS

Infants and Children



Pregnant Women



Adults



Elders



Subsistence / Commercial Fishers



Gatherers



Ceremonial Participants



ENVIRONMENTAL & INSTITUTIONAL FACTORS

Traditional shellfish harvest timing will be impacted by climate change.

Availability of traditional aquatic foods may continue to decrease under a changing climate.

Traditional harvesting occurs during months of heightened toxin risk.

Toxins are currently present in some traditional aquatic foods.

CLIMATE CHANGE IMPACTS

Warming ocean temperatures
Changes in coastal ecological processes
Warming stream and river temperatures
Heavier downpours and increasing run-off
More intense period of droughts

EXPOSURE PATHWAY

Subsistence harvesting of shellfish is culturally and nutritionally important but will increase Yurok Tribal members' exposure to marine and freshwater toxins.

Shellfish contaminated with marine and freshwater toxins are already ingested by Tribal members.

Marine and freshwater toxin growth may expand range, increase in abundance, and change timing when shellfish that are eaten by Tribal members are toxic.

Consumption of toxic marine mussels, surf fish, and crab who feed on marine HABs are the key exposure routes for Yurok Tribal members.

INDIVIDUAL & SOCIAL CONTEXT

Tribal consumption of shellfish can be 3 to 10 times higher than the national average.

Yurok Tribal members have high exposure to marine and freshwater toxins as shellfish are key components of their traditional diet.

Dependence on the land to meet food, medicinal, and spiritual needs may increase harvesting efforts for shellfish and increase exposure to marine toxins.

Stress and worry about safety of shellfish may decrease exposure to marine and freshwater toxins.

HEALTH OUTCOME

Climate change may increase shellfish contaminated by marine and freshwater toxins, causing vomiting and diarrhea, dizziness, headache, disorientation, seizures, paralysis, and in extreme cases, death.



SHELLFISH POISONS

Marine and freshwater Harmful Algal Blooms, or HABs, can cause health risks for those who eat contaminated shellfish. Marine HABs cause paralytic shellfish poisoning (PSP) and Amnesic Shellfish Poisoning (ASP) when algae build up in shellfish. PSP and ASP can cause vomiting, diarrhea, dizziness, headache, disorientation, seizures, paralysis, and in extreme cases, death. Freshwater HABs make anatoxins and microcystins which are neurotoxic and liver toxic and cause a range of similar health symptoms. Eating marine or freshwater mussels, surf fish and crab, which feed on marine or freshwater HABs, are the key exposure routes of concern.



ADAPTATION STRATEGIES

Listed below are strategies that can be implemented to reduce the risk of shellfish poisons among Tribal members.

Institutional

Continue to conduct and enhance toxin notification and alert system, including posting signs in key fishing and recreational locations, in Yurok newspaper, on the Tribe's website, and through the Yurok Environmental Observer network.

Continue to partner with the State Department of Public Health for laboratory quantification of toxins, public health alerts, and closures response to biotoxin events.

Continue public education on the risk of marine toxins and the appropriate response to public health warnings.

Increase interdepartmental communication and coordination to enhance outreach and education services to Tribal members.

Continue access negotiation with the National Parks Service and other sites, to harvest in areas that might be less influenced by HABs.

Individual

Connect to the Yurok Environmental Observer network to stay informed about marine toxins.

Ensure that marine mussels and other foods have not been gathered during high toxicity times before consuming.

Eat shellfish for health protective nutrients when it is confirmed they are not toxic.

"Shellfish toxins that result in Paralytic Shellfish Poisoning in recent years have been unprecedented and need to be better understood."

— YTEP Staff