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

**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.

**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.

**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.
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.

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

— YTEP Staff

To view full report: http://www.yuroktribe.org/departments/ytep/com_eco_reports.htm