

## 2.4 Identifying Susceptible Populations

**Research Need:** Identify susceptible populations based on characteristics such as physiological traits, behavioral factors, socioeconomic status and cultural practices.

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**HARRNESS Recommendation:** Same (HARRNESS, 57).

Toxins in the marine environment pose significant threats to human as well as ecosystem health. HABs are a source of toxins in the world's oceans, and are increasingly reported in coastal waters throughout the US. One significant route of human exposure to HABs is the consumption of contaminated seafood. There is a critical need to determine the potential human health threat posed by consumption of HAB-contaminated seafood and to develop socio-culturally appropriate means for reducing that exposure.

Several recent seafood consumption studies document relatively high consumption levels and exposure to pollutants among certain socio-culturally and economically defined groups of anglers (e.g., West et al. 1992, Allen et al. 1996, Connelley et al. 1996, Asian Pacific Environmental Network 1998, San Francisco Estuary Institute 2000). The Office of Environmental Health Hazard and Assessment (2001) provides a review of many of these studies. However, little has been done to determine consumption patterns of seafood contaminated with naturally occurring toxins produced by some phytoplankton species that cause HABs. Identifying susceptible populations by investigating specific risk factors such as physiological traits, behavioral factors, socioeconomic status and cultural practices (such as species harvested and methods of food preparation) are critical to enable public health and fisheries officials to focus exposure prevention strategies and outreach efforts.

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### Research Objectives

The primary objective is to develop and field test a methodology that utilizes ethnographic and survey field research to identify:

- subpopulations at increased risk of exposure to HAB toxins;
- the social, cultural, and economic networks through which potentially contaminated seafood is distributed for consumption;
- the social, cultural, economic, and nutritional values attached to the consumption of these species (especially when prepared in ways that retain the toxin); and
- the mechanisms and institutions through which members of at-risk subpopulations exchange information.

Ultimately, it is hoped that this methodology can be adapted to different exposure scenarios, e.g., those that do not involve consumption of seafood, but nevertheless expose certain groups to HAB toxins.

### Example Project

#### Identifying Populations Susceptible to HABs and their Impacts through their Consumption of Contaminated Seafood

**Description:** This project uses a combination of ethnographic and field survey research methods to identify and characterize socio-culturally and economically distinct subpopulations whose consumption patterns (i.e., species targeted and preparation techniques) of angler-caught fish puts them at greater risk for exposure to HAB toxins.

Hypotheses to be tested include:

- Fishing and consumption patterns will differ among socially-, culturally-, and economically-defined subpopulations of anglers.

- The fish consumption patterns of some of these subpopulations will put them at greater risk of exposure to HAB toxins than anglers overall.
- The high risk of exposure to HAB-related toxins will occur also among family and friends of anglers from these subpopulations.

**Methods:** Preliminary archival and ethnographic research will define the social, cultural, and ecological context of fishery and community structures of potentially at-risk subpopulations in the selected region. Intercept surveys will collect data from anglers on their social, cultural, and economic characteristics; their fish catch, disposition, and consumption patterns; and their motivations for catching and consuming species known or likely to be HAB toxin vectors. An evaluation component will compare the seafood consumption survey sample to population estimates from other sources (e.g., Marine Recreational Fisheries Statistical Survey and US Census) to determine the representativeness of the sample and enable inferences about risk of exposure to the larger angling population.

**Outcomes:**

- Identification of the relevant social, cultural, and economic risk factors of subpopulations that have a potential for high of exposure to HABs and their toxins;
- An inventory of salient social and economic relationships between community groups that can be used as a resource for monitoring, communicating, and exchanging HAB-related information; and
- Field testing of a method for identifying susceptible subpopulations, which can be adapted based on exposure pathway.

**Challenges:** A key challenge will be achieving effective cross-cultural communication with individuals and groups that may be wary of, or sensitive to, questioning of their activity patterns. Gaining their trust and cooperation might require time. In addition, it is essential to avoiding causing alarm among anglers and the larger public, especially if it leads to unnecessary avoidance of fish as a source of nutrition. Given the likely low level of exposure to the population as a whole, but the possible high level exposure by some groups, considerable data collection effort and careful statistical work will be required to insure the robustness of the data and analyses.

**Expertise Needed:**

- Sociocultural anthropologist or sociologist
- Team of interviewers fluent in the target language(s) and culture(s)
- Biological oceanographer or fisheries biologist knowledgeable of potentially contaminated species
- Statistician to assist with sampling design and analysis of complex multivariate survey data
- Community education and outreach specialist

**Timeline:** Two years

**Estimated Cost:** \$120,000 for a single port area (i.e., up to 6 discrete fishing locations).

**Potential Partners:**

- Sea Grant
- Public and private universities
- Local community groups
- State health department
- State departments of fish and game
- NOAA National Marine Fisheries Service
- Philanthropic organizations that support research on women's, children's and/or under-served populations' nutritional and general health, environmental justice, etc.
- EPA

**Additional Projects:** Follow-on projects could include:

- a) identifying and characterizing subpopulations of non-anglers who consume potentially contaminated fish sold, bartered or shared by anglers,
- b) determining social, cultural and economic motivations for and dependence on consuming HAB-affected species,
- c) identifying social networks, and opportunities and constraints to collecting exposure and impact information from, and disseminating information to, those subpopulations.