1.4 Assessing Community Vulnerability

Research Need: Assess the vulnerability of actual and potential HAB-affected communities to sociocultural and economic impacts of HAB events.

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HARRNESS Recommendation: HARRNESS (page 57) establishes the need to identify populations susceptible to public health impacts "based upon physiological traits, behavioral factors, socioeconomic status, and cultural practices." Section 2.4, *Identifying Susceptible Populations*, provides research objectives and an example project to meet this need.

Similarly, identifying groups at increased risk of sociocultural and economic impacts is important to focus prevention and response strategies. This section emphasizes the importance of assessing the vulnerability of groups to sociocultural and economic impacts as part of a comprehensive assessment of community vulnerability. Assessing the vulnerability of communities recurrently or potentially affected by HABs to all impacts – public health, sociocultural, economic, and environmental – is important to focus coordinated prevention and response efforts by federal, state, local, and other (tribal and non-tribal) partners.

Vulnerability refers to the "characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard" such as a HAB event. Key variables explaining variations of impact (to hazards generally) include class, occupation, caste, ethnicity, gender, disability and health status, age and immigration status (whether 'legal' or 'illegal'), and the nature and extent of social networks." Assessing the vulnerability of communities to public health, sociocultural, and economic impacts of extreme natural events, including HABs, is important because these impacts "occur when natural hazards affect vulnerable people" (Wisner et al. 2005). Community vulnerability assessment is a systematic way of focusing prevention and response efforts on critical needs and high-risk segments of populations, and providing a baseline for evaluation of local and regional mitigation strategies.

> **Definition of Vulnerability**
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> "Characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard" such as a HAB event (Wisner et al. 2005).

Assessments of sociocultural and economic vulnerability provide a demographic-based snapshot of the beliefs, attitudes, practices, and other characteristics of individuals and groups that put them at differential risk of sociocultural and economic harms as a result of HAB events and responses. Such characteristics include beliefs about the predictability of coastal hazards such as HABs, attitudes toward resource management and public health agencies, cultural practices tied to potentially affected marine resources, access to HAB-related outreach information and educational programming, and reliance on potentially affected marine resources for subsistence. For example, groups that utilize affected resources such as razor clams for subsistence may not only be at relatively great risk of HAB-related illness (as described in Section 2.4, *Identifying Susceptible Populations*), but may also be especially vulnerable to social disruption (such as stress in family relationships or increased dependence on kin groups or social services for nutrition) when that subsistence base is threatened. Similarly, groups that rely on the existence or use of potentially affected marine resources to retain economic self-sufficiency and cultural autonomy (such as the Makah and the Quinault tribes in Washington) may be especially vulnerable to cultural loss and social conflict during and after HAB events (Olympic Re-

gion Harmful Algal Bloom Partnership, www.orhab.org/impacts/index.html).

Research Objectives

Before providing research objectives, it will help to explain a few premises underlying assessments of community vulnerability to sociocultural and economic impacts. First, the term community can be used to encompass not only geographically and politically delineated areas (such as regions, municipalities and townships), but also stakeholder groups defined by interests or resource uses (such as marina operators and commercial fishermen) and subpopulations (such as social groups defined by culture or immigration status). Second, an assessment of a community's vulnerability does not imply a negative judgment of its demographic profile, cultural beliefs, or other characteristics, but offers a scientific assessment of its capacity to prevent and recover from sociocultural, economic, or other impacts. Third, a broad spectrum of social science research methods are useful for vulnerability assessment. These may include, but are not limited to, surveys, analysis of secondary survey data such as the US census, analysis of narrative and image content (e.g., public health programming materials or mass media communications), rapid ethnographic assessment (such as the example project described in Section 1.2, *Assessing Social Impacts*) and participant observation, photo and video documentation, GIS tracking and mapping, and structured interviews.

The following community profile approach illustrates the basic information critical to assess the vulnerability of a generic community to sociocultural and economic impacts associated with HAB events. For more information on community vulnerability assessment to support hazard mitigation planning, the H. John Heinz III Center for Science, Economics, and the Environment (2000) provides a general framework for assessing physical, sociocultural, economic, and environmental vulnerability at the community level. NOAA's Coastal Services Center developed a methodology for community vulnerability assessment and case study based on this framework (http://www.csc.noaa.gov/products/nchaz/htm/prodes.htm).

1. *Develop a community profile describing:*

   a. *Demographic attributes such as age, gender, racial structure, occupations, income level, family size, education levels, and primary languages*. Profiles of communities recurrently or potentially affected by HABs will inform future monitoring efforts by establishing a demographic baseline against which to track changes resulting from HAB events or responses. Tracking such changes is an important part of longitudinal studies seeking to understand how long-term historical changes in impacts of HAB events correlate with demographic changes over time. For example, historical changes in family structure and the employment of women in the workforce may have a significant impact on the extent to which HAB-triggered underemployment in commercial fishing, an industry predominantly employing males, contributes to economic hardship and social disruption for families.

   b. *In-group and wider community social networks and relationships that may influence the vulnerability of segments of the community to sociocultural and economic impacts of HABs*. Understanding how social networks and relationships (such as church-based support groups and multigenerational extended family structures) reduce or amplify the socioeconomic risks of HABs throughout a community (e.g., through pooling resources) is critical to inform mitigation efforts. Such networks and relationships include political, economic, religious, family, and ethnic or racial affiliations and associations. For example, a church community that is recognized by the larger community as a source of food donations during emergencies could be an important resource to help local officials reach families affected by HAB events to provide them with public assistance and other forms of relief.

   c. *Activities of community members and others that may influence vulnerability during or after a HAB event*. Understanding the behavior of community members (and the behavior of non-community members with connections to community members) is an important part of assessing the vulnerability of different groups to HAB events. For example, recreational activities in marine environ-

ments during a HAB event increase vulnerability to illnesses that may, in turn, increase absenteeism at work, decrease worker productivity, and thereby result in economic losses and social conflict. Assessments of sociocultural vulnerability should describe such risk-amplifying activities and map their occurrence to inform resource management agencies, government assistance programs, tribal leaders, and other decision makers of the multiple activities that place communities at greater socioeconomic risk.

d. *Attitudes and beliefs (knowledge) of community members that may influence vulnerability to sociocultural and economic impacts of HABs*. For example, risk-relevant beliefs include judgments about areas where exposure to toxins during HAB events is likely, mechanisms of exposure, symptoms and treatment of HAB illnesses, and the predictability of coastal hazards such as HABs. Relevant attitudes include the level of trust in coastal resource management agencies. For example, an individual who believes that HABs are unpredictable may be less likely to comply with beach closures and thus more likely to be exposed to HAB toxins while swimming or engaging in other recreational activities. Understanding attitudes and beliefs of potentially affected community members related to HAB events is necessary to identify the root causes and motivations for behaviors that increase the risk of sociocultural, economic, or health-related impacts. Only by accommodating or modifying such behaviors through prevention strategies (e.g., monitoring, education, warning information, and closures) can risks be avoided. Scientific documentation of attitudes and beliefs that influence community vulnerability is critical to enable decision makers to focus prevention and mitigation strategies on underlying causes of impacts.

Example Project

Assessing Latin American Immigrant Community Vulnerability to Sociocultural and Economic Impacts of HABs in the Chesapeake Bay Watershed

Description: Latin American immigrants are an increasing segment of the population in and around the Chesapeake Bay. Drawn to the area for work primarily in the agriculture (e.g., chicken processing) and service (e.g., construction) industries, many are members of families with small children, live dispersed across the rural Maryland, Delaware, and Virginia countryside, face language barriers (many are monolingual Spanish speakers), and are relatively unfamiliar with the public health infrastructure of the US. The short-term nature of their employment, lack of access to public services, and other factors may make Latin American immigrants especially vulnerable to sociocultural and economic impacts during and as a result of HAB events.

This project will provide a baseline assessment of a narrow and poorly understood range of behaviors and knowledge of the Chesapeake Bay Latin American immigrant community in relation to HAB events. It focuses on the sociocultural and economic implications of recreational fishing on the Eastern Shore of Maryland on the Delmarva Peninsula from Kent Island South to Taylor's Island (from approximately the Bay Bridge south to the Blackwater National Wildlife Refuge) and associated consumption of fish and seafood. Very little is known about the recreational behaviors of Latin American immigrant populations in general and still less is known about how those recreational behaviors focused on marine environments may put them at risk to suffer sociocultural and economic hardships as a consequence of a HAB event. Additionally, very little is known about the degree to which recreational fishing articulates with informal economic activities and the degree to which seafood caught by recreational fishermen is distributed and consumed by other segments of the community, and in other areas, through family relationships, ties to informal businesses, and other social networks.

The project is divided into four phases:

- Phase 1 includes (a) a review of existing survey data provided by the US census to describe demographic characteristics of the Latin American immigrant community combined with (b) rapid ethnographic assessments of known recreational fishing areas along Maryland's Eastern Shore as described above. (The term "ethnographic research" refers to a variety of field-based techniques such as interviews and surveys to study a culture).

- Phase 2 emphasizes the collection of survey and key informant interview data describing Latin American immigrant recreational fishing activities and knowledge at select locations (ideally, at least one seafood collection and fishing area each in the Eastern Bay, Choptank and Little Choptank).
- Phase 3 traces connections between recreation activities at those select locations and the consumption of seafood within the Latin American immigrant community as well as connections to the wider community, including the circumstances under and ways in which seafood caught by immigrants is purchased and consumed.
- Phase 4 focuses on the interpretation of data, including statistical analysis, mapping by geographic area and activity, and content analysis of interview transcripts.

Methods: Surveys, interviews, participant observation, rapid ethnographic assessment, photo and video documentation, GIS mapping and imaging.

Outcomes:

- An assessment of recreational fishing and consumption patterns in the Latin American immigrant community of the Delmarva Peninsula that influence their vulnerability to sociocultural and economic impacts of HAB events.
- A profile of the demographic characteristics of the Latin American immigrant community that engages in recreational fishing (as well as of groups of people who consume the fish they catch).
- Description/map of where, and how, seafood caught/collected along a significant segment of Maryland's Eastern Shore enters the informal and/or formal economy and is purchased and consumed throughout the wider community.
- Snapshot of where and how Latin American immigrants currently practice recreational fishing (i.e., their behavior).
- Description of the beliefs and knowledge of Latin American immigrant recreational fishermen.

Challenges: Because many recent Latin American immigrants are undocumented and live relatively mobile lives, there are special challenges associated with this project. For instance, there is a growing anti-immigrant sentiment throughout the US (especially of undocumented, Spanish-speaking immigrants from Latin America). As a result, immigrants may be less likely or less willing to talk with investigators, making it challenging to access the community and establish the trust and rapport necessary to collect data. This challenge is likely to be aggravated by the population's mobility because individuals on the move will be unlikely to provide information about their whereabouts with community members and/or research teams.

Expertise Needed:

- Some combination of demographers, ethnographers, and sociologists with Spanish language abilities, knowledge of the history and culture of Latin America and the history of Latin American immigration to the US, and familiarity with statistical packages (e.g., SPSS) and GIS software (e.g., ARCVIEW).
- Marine biologists capable of identifying seafood caught/gathered.

Timeline: Since recreational fishing activities in and around the Chesapeake Bay are seasonal, research will take place over a multi-year period (minimally 2 years) in order to account for variation in the behavior and use of resources.

Estimated Cost:
Phase 1: $40,000
Phases 2 and 3: $65,000- $175,000 (depending on the number of localities)
Phase 4: $15,000

Additional Projects: Ideally, similar follow-up projects would be conducted throughout the Chesapeake. Bay watershed and include urban areas (such as Baltimore, Annapolis, and Virginia Beach).