Chapter 9
The Humboldt Bay Initiative: Integrating People and Natural Resources in Northern California

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Abstract The case presented in this chapter provides a prototype for using collaborative processes in large-scale conservation. The most important lesson of the chapter is that developing a program that addresses real-world social and environmental problems in ways that truly meet the common interest is both slow and time consuming. The Humboldt Bay Initiative (HBI) is composed of scientists, resource managers, and community members who came together to address the environmental problems of Humboldt Bay and its surrounding lands. The initial impetus for the group's formation was frustration with the existing arena for addressing natural resource issues in the region. The arena featured polarized public discourse, fragmented jurisdictions, and decision making that was insufficiently contextual, both socially and biophysically. In its place, the group adopted an ecosystem-based management approach that is not only rooted in ecological science but also recognizes the importance of using governance mechanisms to solve environmental problems. Its successes to date have relied on strong leadership and robust collaboration among stakeholders. Its future depends on developing an institutional structure that enables it to interface with policy makers despite the fact that the current governance and constitutive structures are not designed to allow an independent group such as HBI to integrate easily into the decision-making processes.

Keywords Large-scale conservation · Prototype · Humboldt Bay Initiative · Collaborative learning · Bridging organization · Action research · Evaluation research · Ecosystem-based management · Conservation Measures Partnership · Climate change

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9.1 Introduction

The Humboldt Bay region on the northern California coast has an economy that was historically dependent on natural resource use, including the timber and fishing industries. In the past, the environmental impacts of management activities like road building and levy construction were not well understood and little thought was given to long-term sustainability. Today the region is dealing with the legacy of past management activities. Additionally, rather than looking at the priorities of the whole ecosystem, the current institutional structures—including governance, knowledge generation, and management—promote a mentality in which each agency pursues projects based on its sometimes narrow and restricted priorities. Ultimately, this undermines our ability to pursue integrative and collaborative solutions.

This chapter explores how the collaborative processes used by the Humboldt Bay Initiative (HBI) can be applied as a prototype for large-scale conservation. We begin the chapter by briefly describing our methods and clarifying our standpoint. Next, we provide a description of over-arching problems that HBI is trying to address and recount the contextual factors that have influenced it. We analyze the strengths of the methods used as well as the challenges that have been encountered and consider some alternatives for improving the organization. Finally, we make recommendations about how the lessons of HBI could be applied in other situations.

9.2 Methods and Standpoint

The analysis in this chapter is based on our participation as members of the HBI. We draw heavily on two project reports, *Humboldt Bay Initiative: Adaptive Management in a Changing World* and *Humboldt Bay Ecosystem Program—Final Report* (Schlosser et al. 2008, 2009).

The HBI[1] is a group of scientists, resource managers, and community members with diverse viewpoints and a broad spectrum of knowledge and expertise. The organization was formed in 2006 in response to a perception that conventional resource management approaches had failed to address many of the bay's environmental problems and will ultimately be ineffective in protecting its ecosystems and natural resources. The organization's approach emphasizes collaborative learning, science-based management, sustainability, ecological health, and, importantly, it views humans as an integral part of the ecosystem (McLeod et al. 2005).

[1] The program was initially termed the Humboldt Bay Ecosystem Based Management Program and eventually renamed the Humboldt Bay Initiative. For the purposes of this chapter, we have generally not differentiated between the two names.

9.2.1 Methods

Our analysis uses action research and evaluation research methods (Berg 2004). Action research is a collaborative research method in which those involved in the program to be studied are both beneficiaries of and active participants in the research itself. Action research and utilization-focused evaluation are intended to produce information that will enlighten and empower participants. These methods are reflexive and intended to produce results that are fed back to the program being studied (Patton 1997; Singleton and Straits 1999). Potential problems of researcher bias in action research can be reduced by employing self-evaluation methods and being transparent about the researchers' standpoints. Before describing our individual standpoints, we must provide an overview of the different levels of participation in the HBI. This overview is expanded in the management and policy problems section of the chapter.

There are three main ways in which individuals participate in HBI. First, the Core Team serves as an executive committee that provides leadership and direction for all HBI efforts. Second, the Project Team is a large group with diffuse membership of > 100 people and numerous organizations that have expressed interest in participating in the program. The Project Team identifies priority issues and develops strategies for addressing the issues. Finally, Work Groups function as subcommittees that take on the work of translating strategies into projects.

9.2.2 Our Standpoint

We have engaged in the project from different disciplinary, professional, and personal standpoints. All three authors are members of the HBI Project Team, have served on various Work Groups, and were actively involved in drafting the organization's strategic plan. Two of the authors, Becky Price-Hall and Susan Schlosser, have been actively engaged in the organization since its inception and are members of the Core Team. Schlosser has been the lead facilitator of the group, convening meetings, reaching out to the general public, working with others in the group to develop agendas and proposals, and overseeing the overall functioning of the group. Becky Price-Hall has served as a meeting facilitator, led working groups, and written grants on behalf of the organization, and serves on the nonprofit board of directors.

Although Price-Hall and Hohl have academic training in natural-resource-related fields, both initially got involved in the project as members of the general public. Price-Hall is a nearly life-long resident of Humboldt County who promotes collaborative approaches to address diverse social and environmental concerns ranging from homeless issues and community development to reducing the impacts of development on the ecosystem and adaptation to climate change. She has been engaged with HBI both as a volunteer and in a professional capacity as a social scientist. Hohl was a relatively recent transplant to Humboldt County when he started

attending meetings. He had a long-standing personal and professional interest in environmental management and its relation to sustainable development. He saw involvement with the project as a way to learn more about the community as well as to contribute his skills in a way that enhanced the well-being of the community. Schlosser developed and undertook the project as part of her professional duties as a California Sea Grant Extension Program advisor. Recently retired, in her professional capacity, she provided science-based knowledge through her education, outreach, and applied research programs. Her work focused, on estuarine ecology, ecosystem-based management (EBM), and coastal habitats, was broadly inclusive, and facilitated collaboration among stakeholders to implement projects.

9.3 Problem Orientation

Whereas the economy of the Humboldt Bay region is more diverse today than it was historically, it still depends on its natural resources. Additionally, the people of the region care deeply about the local environment; many of them were attracted to the region by its natural beauty. Unfortunately, the integrity of the environment is threatened by the past legacy of unsustainable management. In the period leading up to the formation of HBI, several factors essentially threw participants into an uneasy truce. The impact of national and global economic conditions on the regional resource-based economy combined with the declining availability of natural resources made collaboration more tenable. New relationships between industry groups, agency resource managers and regulators, workers, and environmentalists developed. The easing of conflict also provided an opportunity for a more collaborative and integrated approach to resource management. This type of effort, conducted at the community level and directed at multiple issues, goals, and outcomes, was considered an optimal way to build capacity, constituencies, and credibility (Wondolleck and Yaffee 2000; UNEP/GPA 2006). In this section, we will describe the study area, discuss the social and decision process related to natural resource management that led to the formation of HBI, and clarify the specific organizational goals of HBI and the ecosystem-based management goals for the bay.

9.3.1 Humboldt Bay Region

Located 360 km north of San Francisco, the Humboldt Bay region presents a rich physical, biological, and cultural setting (Fig. 9.1). It contains a wealth of aquatic and terrestrial ecosystems that support a diversity of wildlife species, unique Native American cultures, and a network of small communities and towns. Historically, Humboldt Bay was a large complex of wetland, marsh, and slough habitats. Although the bay is technically California's second largest estuary, in the summer

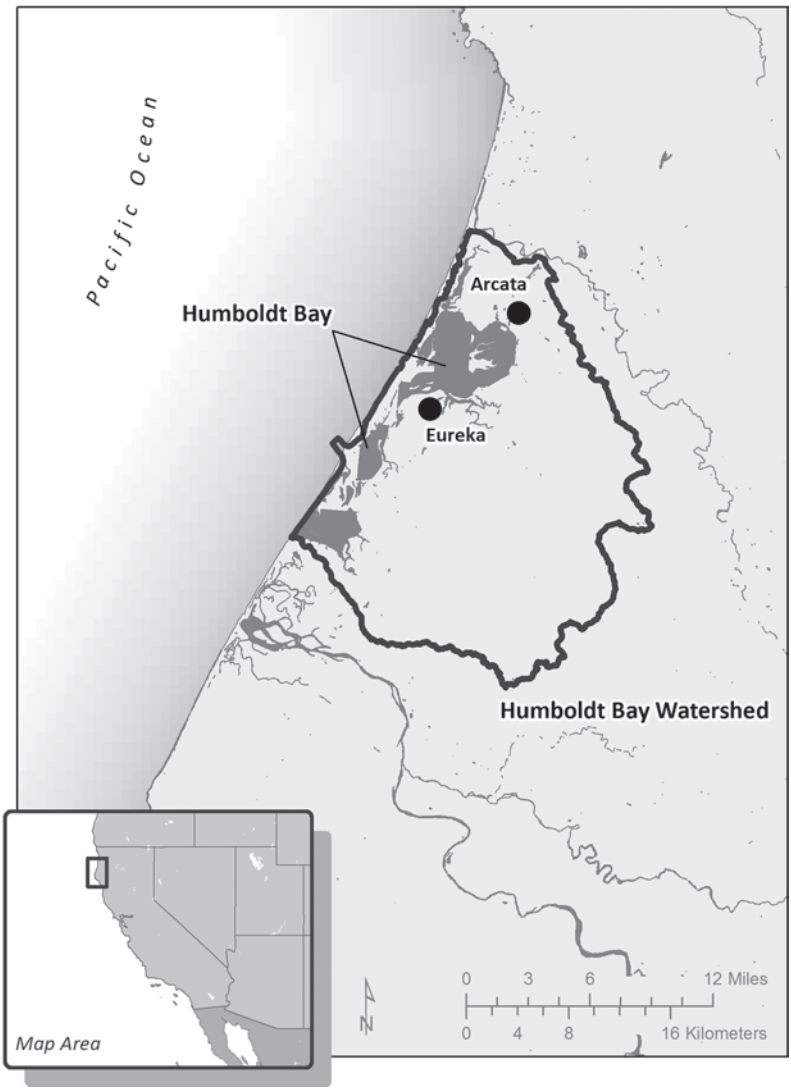

Fig. 9.1 Map of the Humboldt Bay watershed

months, it functions as a marine system with strong tidal influences. More than 40% of the eelgrass (*Zostera marina*) beds in the state occur in Humboldt Bay. The bay is a stopover point on the Pacific flyway and serves as habitat for >200 species of birds as well as juvenile Dungeness crab, rockfish, and salmonids. More than 60% of the oysters sold in the state are grown in Humboldt Bay and 60% of the Pacific brant (*Branta bernicla nigricans*) population uses the bay for foraging, roosting, and staging.

The HBI has assigned the Humboldt Bay Ecosystem to primary, secondary, and tertiary zones to reflect the ecosystem processes that occur on different spatial and temporal scales. All three zones include ecological, social, cultural, and economic processes involving the biological and physical components of the Humboldt Bay Ecosystem. The primary zone includes the bay itself and is defined as waters inside the jetties, its historical tideland area, and all current and historical tidally influenced areas. The waters of the bay are public trust resources that are subject to the regulatory jurisdiction of the Humboldt Bay Harbor, Recreation, and Conservation District, the City of Arcata, the City of Eureka, and numerous state and federal agencies. Currently, existing tidelands and subtidal channels are used for commercial (e.g., oyster farming) and recreational (e.g., boating and birding) activities. Many of the historical tidelands have been converted to highly productive grass lands that are relied on by the local dairy and ranching industries. These areas are owned by public and private entities including federal and state agencies, local governments, land trusts, farmers, ranchers, and others.

The secondary zone includes all of the primary zone, plus the Humboldt Bay Watershed, and the nearshore extending from Trinidad Head to False Cape and out to a maximum of approximately 30 fathoms (55 m). This includes the major urban centers, small communities, and other watershed land uses. This zone encompasses the Eureka littoral cell, as well as coastal areas outside of Humboldt Bay that are affected by human activities within the bay. The waters within the secondary zone are used by the fishing and crabbing industries. The lands within the secondary zone are predominantly privately owned. The valley bottoms closer to the bay are used for residential development, small-scale crop agriculture, and grazing operations. The uplands are largely forested. There are a number of ranches and family forest operations and three major forest products companies that manage land within the secondary zone. Additionally, numerous marijuana grows exist in the zone. The grows frequently occur without the authorization of the landowners and sometimes have detrimental environmental impacts (Greenson 2011, 2012; Mintz 2012; Harkinson 2013; Donahue 2014).

The tertiary zone of influence includes the watersheds of Trinidad, Little River, Mad River, Humboldt Bay, Eel River and Bear River, and the nearshore ocean from Trinidad Head to Cape Mendocino. This tertiary zone is meant to encompass large-scale processes where effects on the Humboldt Bay ecosystem are less well understood. Onshore and offshore uses are generally similar to those in the secondary zone.

The bay and its ecosystems presently experience stresses from both its geological setting and the anthropogenic activities that sustain our local economies. The watersheds contributing to the bay are geologically young with a high rate of tectonic activity that contributes to a high rate of sedimentation. The marijuana industry is unregulated and, though the extent of its impacts is hard to qualify, the industry has been linked to problems such as spills of diesel and other chemicals into waterways, use of rodenticides impacting sensitive species, and excessive withdrawals of water from streams during the dry season (Humboldt County 2012). Although improved environmental management practices have been adopted by the agricultural and

forest products industries, especially with respect to the ongoing maintenance of road networks and the management of habitat for endangered species, a legacy of unsustainable land management practices contribute to additional environmental stresses (Five Counties Salmonid Conservation Program 2005, 2010). Streams and rivers in the region have been impacted by sediment runoff from surfaced and unsurfaced roads, and three of the four major tributaries to Humboldt Bay are now on the California Clean Water Act Section 303(d) list as impaired because of excessive sediment (North Coast Regional Water Quality Control Board 2009). Industrial waste has contaminated areas in and adjacent to the bay, and Humboldt Bay is considered impaired because of dioxin and PCB contamination. Habitat loss and modification are widespread in terrestrial and marine environments. More than 90 species of plants and animals have been accidentally or intentionally introduced into Humboldt Bay (Boyd et al. 2002).

9.3.2 Social and Decision Process

The HBI was formed because of a frustration among local scientists and government agency staff with the previous way in which natural resource issues had been addressed around the bay. There had been several decades of polarized public discourse in Humboldt County about natural resource management and who was to blame for environmental and socioeconomic problems. The most vociferous, and at times violent, confrontations were between timber companies (notably Pacific Lumber Company) and environmentalists and were centered on the management of old growth redwood timberlands. In fact, the period starting in the late 1980s and running through the 1990s is referred to as the Timber Wars (Chase 2001; Widick 2009). The acrimony and distrust between environmental groups and the timber industry sometimes spilled over onto those whose jobs it was to regulate, study, and manage natural resources, as well as workers employed in the timber-dependent industries. While the issues that motivated the founders of HBI centered on the bay and had not involved the same level of scrutiny and controversy as forest management, participants were certainly aware of the degree of acrimony that natural resource management could engender. The model of the Timber Wars is not one they wished to follow.

The HBI is an expression of sustained community effort and support. In the period leading up to the formation of HBI, a succession of groups formed to address bay-related resource issues on a technical level. The HBI Project Team and project partners have sought to build on several completed and ongoing planning and policy efforts (Fig. 9.2).

Early in the period, the Science and Technology Alliance of North Coast Estuaries (STANCE) met regularly to share information and to discuss an ecosystem approach to resource management in the Humboldt Bay region. Two bay-related management plans were developed concurrently between 2002 and 2006. The *Humboldt Bay Watershed Salmon & Steelhead Conservation Plan* was developed

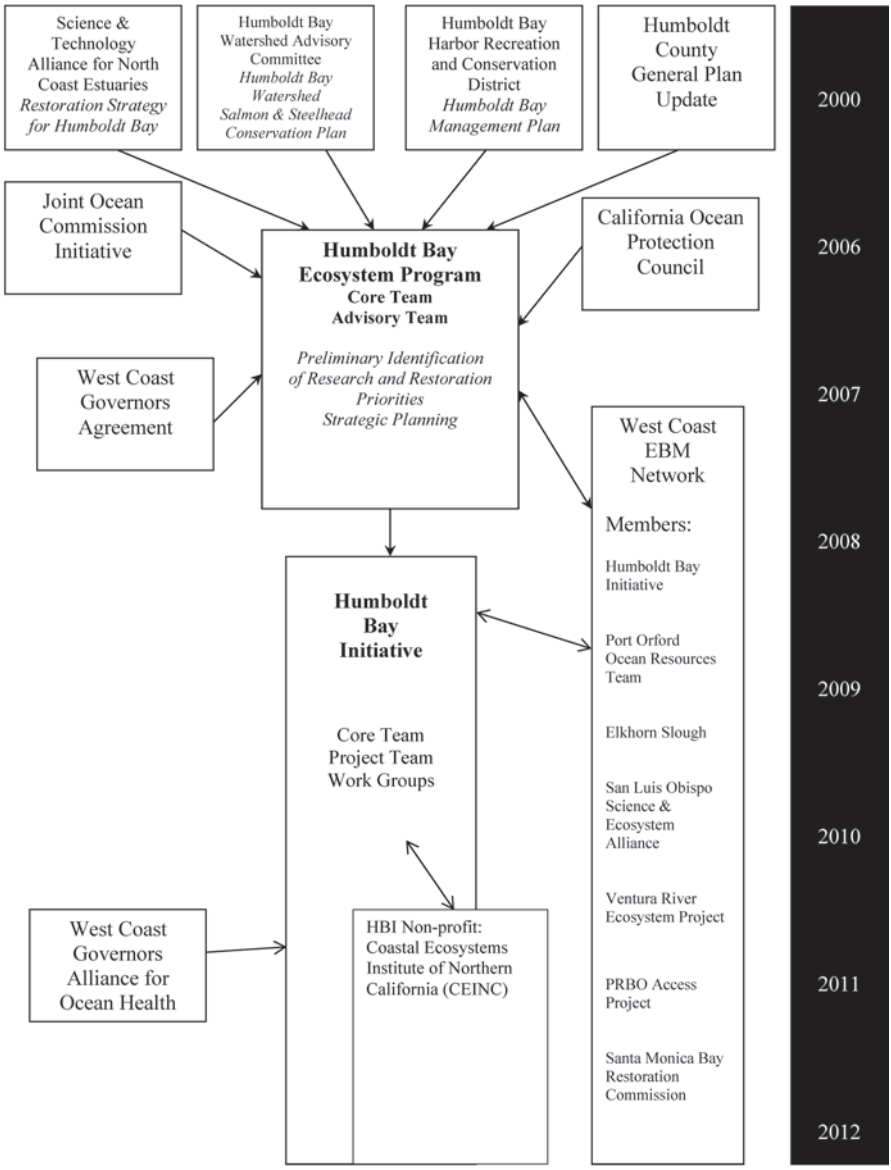

Fig. 9.2 Development of the Humboldt Bay initiative

by an ad hoc, community-based collaboration called the Humboldt Bay Watershed Advisory Council. The collaboration aimed to improve the bay watersheds, anadromous salmonid populations, and related resources while considering regional ecological and socioeconomic needs (Humboldt Bay Watershed Advisory Council and RCAA National Resources Service 2005). At the same time, the Harbor, Recreation

& Conservation District was working on the *Humboldt Bay Management Plan*, which provided a comprehensive framework for balancing and integrating conservation goals with economic opportunities (Humboldt Bay Harbor, Recreation and Conservation District 2007). Dozens of workshops, public meetings, syntheses of historical information, and hundreds of pages of written comments were incorporated into the two plans.

Many community members collaborated on both plans, and one result of these efforts was to highlight the need to use an integrated approach to address watershed and bay issues. It became apparent, first, that many environmental issues within the bay itself were driven by land-use decisions and activities in terrestrial environments around the bay and, second, that multiple jurisdictions and regulatory agencies would need to be involved if durable solutions to the environmental problems were to be developed. Traditional natural resource management is limited by management and regulatory structures that divide responsibilities along disciplinary lines, have authority within political boundaries, and often ignore ecological processes. Currently, most management jurisdictions and laws apply to a small segment of that ecosystem, and the impacts of management decisions on other parts of the ecosystem are not always considered. The institutional structures make it difficult to address ecosystem function and services, natural events, and unintended consequences that are part of most natural resource issues (Fiorino 2001).

9.3.3 Goal Clarification

The HBI is simultaneously pursuing two types of goals: substantive goals related to improving the bay ecosystem and supporting the local socioeconomic system, and procedural goals related to human dignity and political participation. Defining these goals has been an iterative process. We will first look at the goals of EBM in a general sense and then address how the specific goals articulated for HBI have changed over time based on ongoing conversations among participants in the process.

EBM, as embraced by HBI and the larger coastal and marine conservation community, is similar to ecosystem management except it has focused on the conservation of coastal and ocean ecosystems (e.g., Morro Bay Estuary, Marine Life Protected Areas off the coast of California) rather than terrestrial ecosystems. EBM approaches ecosystem conservation from the perspective of ecological science, but also recognizes that governance mechanisms are required to translate concepts into practice (Slocomb 1993). In brief, ecosystem management is understood to require groups and management institutions that engage in the collection and sharing of various sources of information among stakeholders, use monitoring to anticipate systemic change, and build adaptive capacity (Olsson et al. 2004).

Early in the formation of the Humboldt Bay Ecosystem Program, the Project Team read articles and identified a set of principles that were considered essential elements or criteria for EBM projects. Ultimately, the team crafted the following definition of EBM: “The Humboldt Bay Ecosystem-Based Management Program

is a collaborative approach to encourage and support human activities that promote the sustainable coexistence of productive and resilient biological resources and human communities. Ecosystem-based management seeks to balance ecological, economic, and social considerations in a science-based management approach so that ecosystem integrity and human well-being are maintained and improved. The Humboldt Bay Ecosystem-based Management Program considers multiple external influences, cumulative effects, ecosystem dynamics, trends and variability at multiple scales. This acknowledges that our understanding of ecosystem processes and human interactions is incomplete and inherently limited. We recognize the constraints of resource policies and governance structure to implementation of ecosystem-based management and strive to enable coordinated management in the Humboldt Bay Ecosystem" (Schlosser et al. 2008).

We turn now to how the general goals of EBM fit into the specific context of HBI. Both substantive and procedural goals are encapsulated in the organization's original vision and mission statements that were crafted by the Project Team and incorporated in the Humboldt Bay Ecosystem Program report. They were initially approved during an April 2008 meeting. The vision statement states: "Our vision is a vibrant, thriving, and resilient Humboldt Bay ecosystem that supports the well-being of our human and natural communities." The mission statement expanded on the vision statement and made an initial attempt to operationalize the vision: "The mission of the Humboldt Bay Initiative is to increase our scientific understanding of the Humboldt Bay ecosystem and to create an integrated framework for resource management and community-wide collaboration that links the needs of people, habitats and species to ensure a healthy future for Humboldt Bay's natural and human communities."

The following year, as part of a strategic planning process proposed and funded by the David and Lucille Packard Foundation, the Project Team developed a more detailed description of the HBI's proposed program and specific strategies the organization would use to accomplish its goals. The organization proposed to address stresses to the ecosystems resulting from human activities, climate change, excessive sediment, and invasive species. As a result of the strategic planning process, it was decided that rather than continuing to operate as an ad hoc organization, a nonprofit would be established. The nonprofit organization could undertake specific roles that were not feasible or appropriate for existing entities or partners in the project area. Essentially, it was hoped that HBI could serve as a bridging organization, that is, a network of collaborators that lowers the cost of collaboration and is able to draw on the diverse knowledge of various members to come up with a common understanding of problems and strategies for solving those problems (Folke et al. 2002). The roles for the nonprofit included: (1) Developing, integrating, and disseminating the information necessary for taking an ecosystem approach in community planning, economic development, and restoration efforts. HBI strategies have identified specific information needs. HBI will take responsibility to maintain and update the conceptual model with new information to facilitate adaptive management. (2) Promoting effective, efficient coordination mechanisms between local, state, and federal government agencies for better planning, implementation,

regulation, and monitoring. (3) Facilitating collaboration among government agencies, industry, and community groups to pursue shared goals for improving ecosystem and community well-being.

9.4 Management and Policy Problems

Our experience suggests that just as large-scale conservation problems are messy and complex, the process of developing a program designed to manage large-scale conservation problems is equally as complex. The HBI has involved a variety of entities and phases as it has developed. In this section, we describe the developments that led to the formation of the HBI.

9.4.1 Developing EBM in Humboldt Bay

The US Commission on Ocean Policy and the Pew Oceans Commission completed ocean policy plans in 2003 and 2004. Both of these plans recommended taking an EBM approach to coastal and ocean management. In response to these plans, California passed the Ocean Protection Act in September 2004. The West Coast Governor's Agreement on Ocean Health, which was signed in September 2006, identified EBM among its priorities and organizing concepts. The agreement is a partnership between California, Oregon, and Washington to protect coastal and ocean resources and the economies they support. These regional, state, and federal plans support and encourage EBM.

In a local response to these conditioning factors, the idea of a Humboldt Bay Ecosystem Program was presented at a workshop wrapping up the *Humboldt Bay Watershed Salmon & Steelhead Conservation Plan* program in November 2006. It was suggested that a local EBM program was possible, desirable, and could potentially enhance resource management for the Humboldt Bay region. The proponents included representatives from local cities, federal and state agencies, private restoration businesses, the local California Sea Grant office, and the harbor district. The Humboldt Bay ecosystem program was designed to conduct a scientific and management review of the watershed and bay plans and to develop an ecosystem approach to natural resource management issues important to the community.

This initial group of self-selected project proponents led by Schlosser, a California Sea Grant Marine Advisor, drafted a work plan to develop an EBM program for Humboldt Bay. The project proponents became the Core Team for initiating and steering the process. One of the initial steps was to create a larger group of experts and representatives from a range of viewpoints and disciplines. The Core Team contacted >60 local scientists, managers, and community members between January and April 2007 to invite them formally to participate in the Humboldt Bay Ecosystem Program and to make a commitment that included a monthly 3–4-hour meeting and 1–2 hours of reading and study. These scientists, resource managers, business

representatives, tribes, local government staff, and elected officials agreed to form a 32-person Project Team. The Core Team met monthly to develop meeting agendas and prepare presentations and meeting materials for Project Team meetings.

Participants in the Project Team meetings and workshops deliberate on various aspects of the technical and governance problems identified by participants and review relevant planning and informational documents.

The Humboldt Bay Ecosystem program, initially funded by the California Coastal Conservancy, was administered through the University of California Sea Grant Program in Eureka. Three meetings in 2007 were facilitated by a professional facilitator. The professional facilitator helped the Project Team build an understanding of EBM, jointly develop vision and mission statements, and develop procedures for analyzing issues and articulating goals. For subsequent Project Team and Work Group meetings, the Sea Grant Marine Advisor (Schlosser) or a Project Team member facilitated or led meetings. Detailed meeting notes taken by Sea Grant office staff were circulated via e-mail to the Project Team for review before posting to the program website. Meetings were public and were announced through e-mail, the program website, and outreach events.

9.4.2 The Process of Clarifying the Organization's Purpose and Goals

Initially, the Core Team used literature reviews to identify and provide key EBM papers and reports to Project Team members. The development of the program as a learning organization was critical for the Project Team. Learning is central to establishing a well-informed constituency and to developing local capacity (Gunderson and Holling 2002). The learning process helped the Project Team establish ground rules, a decision-making process, geospatial boundaries, an ecosystem conceptual model, criteria for watershed and bay plan analysis, and written descriptions of ecosystem issue concepts. Work Groups were formed to develop proposals that would take the first steps toward addressing the priority issues using EBM principles. The initial EBM Program proposals included a conceptual model for physical, ecological, and social processes; modeling sediment dynamics and circulation in the bay; developing ecosystem indicators; developing a socioeconomic process model; and developing a Humboldt Bay "EBM Entity." Ultimately, these proposals were combined into a "unified proposal," which served as the action plan for the program.

Formal decisions on specific goals have been documented and publicly available throughout the process. However, outreach to the larger community during the initial year of the program was limited, and this was soon recognized by the Core Team as a limitation to the effectiveness of the program. Consequently, in the second year of the program, Schlosser and other members of the group were involved in significant and extensive community outreach. Presentations were given to city councils, county supervisors, industry associations, community groups, nonprofits, academic boards, other small EBM groups (e.g., other projects in the West Coast

EBM Network), and at professional society meetings. The HBI has been featured at each of the Humboldt Bay Symposia held since 2008. Outreach efforts have been important not only to inform the public about what the organization was trying to accomplish but also because EBM relies on a critical analysis of ecosystem issues by the community and needs community support.

At the same time, HBI participants were reaching out to the local community, the organization was getting recognition from outside organizations. The California Ocean Protection Council recognized HBI as an example of a local EBM project in 2007, leading to its inclusion as part of the West Coast Ecosystem Based Management Network (EBM Network), created as a result of the West Coast Governors' Agreement on Ocean Health (now the West Coast Governors' Alliance). The HBI Core Team members have presented each year to the West Coast EBM Network annual meeting. The network produced a guidebook for EBM practitioners based on these discussions (West Coast EBM Network 2010).

The HBI was also contacted by representatives of the David and Lucille Packard Foundation and the Resources Legacy Fund Foundation in April 2008. The Packard Foundation representatives recommended and funded a formal strategic plan using Open Standards for Conservation developed by the Conservation Measures Partnership (Conservation Measures Partnership 2007). The Conservation Measures Partnership is a group of national and international conservation organizations that have adopted a unified adaptive management framework for developing, implementing, and monitoring conservation projects. They lay out specific, iterative, and interactive steps for conceptualizing the project vision and context, planning actions and monitoring, implementing actions and monitoring, analyzing data and using the results to adapt the project, and capturing results and sharing what has been learned. Fundamental to the Open Standards strategic planning process was the use of a specialized decision support software system, Miradi, to facilitate the process of developing diagrams and conceptual models that provide visible, tangible, and adaptive learning tools.

The HBI leaders chose to accept the Packard funding. Participants felt that engaging in the strategic planning process would help to focus funding efforts. The Open Standards planning process is meant to capitalize on participants' knowledge of the study area in question in developing site-specific conservation strategies. Members of HBI saw this as an opportunity to use local expertise to meet the vast knowledge and scientific requirements of EBM. Additionally, the Project Team recognized that this process met an important element for the ecosystem approach, specifically, articulating the issues and outcomes that people of the Humboldt Bay ecosystem care about deeply.

In preparation for this strategic planning workshop, the Project Team conducted a stakeholder analysis and developed a list of individuals to invite to the Strategic Planning Workshop. Stakeholder participation nearly doubled, increasing the Project Team from 30 to 58. Following several months of preparatory work and consultation with an outside facilitator, the 5-day Strategic Planning Workshop took place from January 12 to 16, 2009. During the workshop, HBI brought together >40 people from > 30 organizations to envision the desired future state of Humboldt Bay

ecosystem, understand past, current, and future conditions, identify priority threats, and chart a course toward a more sustainable future.

In practice, we found that the Miradi software had limitations for an EBM approach that acknowledges and accommodates the community's place in the ecosystem, including resource-dependent activities. The region's history of intractable natural resource conflicts required that the participants use sensitivity in how they described problems since the entities and groups seen by some as having caused the problems were key stakeholders in the strategic planning process. During the process, there was general agreement about the conservation issues facing the region, but there was not much interest in analyzing and assigning blame for why the problems exist. The focus was on prioritizing the issues and threats and developing strategies to address them and the sources of the problems. The Miradi software's use of the term "threat" was off-putting for some participants in the process. For example, while timber management activities can cause adverse effects on the environment and fishing can reduce salmon stocks, HBI participants felt that these activities were also crucial to the well-being of the human communities. Rather than referring to such activities pejoratively as "threats" some participants preferred to identify them as "human factors" that needed to be managed appropriately. This more neutral vocabulary was adopted in order to avoid language that promoted polarization and division or could have resulted in participants withdrawing from the process.

9.4.3 Institutional Structure

The final day of the strategic planning workshop was devoted to the question of what type of institutional structure would be appropriate for HBI. The planning participants heard presentations from two institutes with similar missions, the San Francisco Estuary Institute and the Southern California Coastal Water Research Project. These institutes both have dual legal status as a nonprofit and with an associated Joint Powers Authority. A Joint Powers Authority is a public entity formed jointly by agencies and local municipalities. The participants then began facilitated deliberations about potential arrangements for an institute for HBI. Based on the discussion during the last day of the workshop, a work group for "establishing the HBI" began to research what type of more formal entity was needed and feasible. The "HBI Institution" work group met a number of times during the year following completion of the strategic plan and considered a number of possible organizational structures.

The HBI strategic plan generally envisioned two mechanisms for achieving its ecological goals in each strategy, a "regulatory" and a "nonregulatory" path. The regulatory path involves HBI providing information and technical assistance to the regulatory and land use authorities to develop standards and policies that provide a better "return on governance." The nonregulatory path engages nongovernment stakeholders and the public through education and outreach and provides technical assistance that addresses stakeholder needs while providing ecological and conservation benefits. Issues not conducive to resolution through these two paths fall by

default to the relevant government authorities. The use of the term "governance" in this chapter refers to government, market, or social pressure on actors intended to result in conservation or other desired outcomes (Olsen et al. 2006). Therefore, HBI's regulatory and nonregulatory paths would both be considered forms of governance. The authors would like to point out, however, that many HBI participants equate "governance" with government and so would not consider the nonregulatory paths to be governance mechanisms.

Because of the range of perspectives embodied in HBI, there is no "ideal" structure. One of the bargains we make when we accept a stakeholder-driven process is that there may be a divergence between what the literature and "experts" consider ideal and what is chosen by consensus based on the local participants' knowledge and experience. The HBI institutional structure is developing to meet the needs of the group and adapting in response to the resources available. Prior to the strategic planning process, the consensus ideal was for the agencies with management authority to enter into a memorandum of agreement to work toward taking an EBM approach to resource management. The goal was to have every relevant agency sign on to this agreement. The first major adaptation in the program occurred when the effort to reach an agreement fell flat and the group was unsuccessful in getting their initial EBM proposals funded.

The program participants then modified their structure in response to the Packard Foundation funding for the strategic planning process. When the strategic planning effort was completed and the implementation proposals were again not funded, the group again refined the HBI structure: They chose to pursue the strategies on a less ambitious timeline based on specific funding opportunities. In June 2010, the "HBI Institution" work group recommended the formation of a nonprofit institute. Coincidentally, the Work Group was presented with the opportunity to take on an existing, inactive watershed research and education nonprofit corporation. In this way, the Coastal Ecosystems Institute of Northern California became the "official" HBI entity. The decision by the Project Team to create a nonprofit did not rule out the establishment of other potential legal entities, such as a Joint Powers Authority. However, it provided the program with a formal entity to secure funding and accomplish the other work outlined in the strategic plan.

9.5 Lessons Learned and Recommendations

In the previous sections, we defined some of the important social and environmental problems facing the Humboldt Bay region, articulated the goals of EBM and of HBI as an institution, and described the developmental trajectory of HBI. We now turn our attention to the future. In this section, we will summarize what we have learned about large-scale conservation projects during the development of HBI, make recommendations about how to further facilitate the implementation of EBM in the Humboldt Bay ecosystem, and identify the lessons that can be applied to other large-scale conservation projects.

Perhaps the most important lesson we have learned in working on EBM in the Humboldt Bay region is that developing a program that addresses the real-world social and environmental problems in ways that truly meet the common interest is both slow and time consuming. A long-term commitment is essential to success and sustainability. The problems we are trying to address are complex in terms of the value dynamics at play, the scientific and technical information needed to understand them, and the multiple, overlapping governance systems that apply. All of this points to the need for collaboration and participatory processes. Collaboration involves the interaction between different knowledge systems (e.g., different sciences, lay vs. expert), interaction between different values (e.g., use vs. conservation), and interaction between stakeholders (e.g., scientists, government agencies, industries, community members, environmental groups, resource users, etc.). In EBM, participatory processes should center on deliberative discussions that include the full range of stakeholders. Furthermore, discussions should be based on the exchange of information, ideas, and arguments between coequal partners. This contrasts with some versions of participatory processes in which high-status participants (e.g., scientific or governmental elites) dominate the discussions. Given, first, that decision-making authority is disjointed under the current governance system and, second, that the constitutive regime favors the fragmentation of knowledge and interest groups, we feel that the key resource necessary for implementing large-scale conservation is good leadership. Consequently, our lessons and recommendations are organized under three major themes of leadership, collaboration, and governance.

9.5.1 Leadership

There are multiple levels of leadership in the HBI. In the following discussion, we focus on two types of leadership, namely, the focused leadership provided by the recognized project leader and the more diffuse leadership provided by members of the Core Team and Project Team.

The organization needs to be aware of several issues related to the project leader as it moves forward. First, despite the collaborative nature of the project, someone needs to coordinate project activities and provide overall communication. While this person should not make decisions for the group, he or she does need to be able to articulate what decisions have been made and provide a path to implementation. Throughout the existence of the program, Susan Schlosser served as the recognized project leader. As part of her job responsibilities at California Sea Grant, she was able to facilitate development of the EBM program that ultimately became the HBI. She served in both transactional and transformative roles. As a transactional leader, she organized and facilitated meetings, took the lead on drafting reports, took the lead in presenting HBI to the larger community, and was the primary point of contact for anyone interested in learning more about HBI. Basically, she kept the group moving and chipping away at ecosystem-based problems. Her transactional leader-

ship has been important because, although other members of the Project Team have the skills to be transactional leaders, few have the time to devote to these functions. Equally important, however, is the transformational leadership she provided in getting the program started. As a transformational leader, she was instrumental in helping to articulate the vision of HBI and encouraging the new members of the Project Team to adopt that vision. She took responsibility for garnering resources for the project, from contributions of meeting space and staff time to funding. Between 2009 and 2012, two projects in the Coordinated Response to Climate and Coastal Change strategy projects were completed. Projects to develop a local climate model and a project to develop specific climate adaptation strategies are in progress.

Second, it may not be sustainable in the long term to have the project leader be a California Sea Grant employee. It will probably continue to be advantageous for HBI to be associated with Sea Grant. Because of its status as a university-based program, California Sea Grant is seen as a credible source of nonbiased information, but does not advocate for particular decisions. If HBI is to continue, community support and other organizational structures should be considered. It is partially for this reason that HBI has formed a nonprofit. It is hoped that eventually there will be funding for an executive director who can oversee HBI-related activities. While it has the same limitations as California Sea Grant in terms of management authority, formation of a nonprofit would not preclude forming a joint powers authority or other type of agreement between relevant agencies giving the resulting group joint authority. Two such dual nonprofit/JPA entities in California, the San Francisco Estuary Institute and the Southern California Coastal Water Research Project would be appropriate models for HBI to consider in the next phases of its development.

Finally, when the next project leader emerges, the incumbent will need to have a particular set of skills. First and foremost, he or she will need to be able to instill broad-based cooperation in decision making by everyone interested or concerned with the bay (e.g., scientists, conservationists, users, agency personnel, and decision makers). This may require developing formal agreements with well-organized partner organizations, but it will also require working with diffuse interests groups. It will also necessitate someone who is adept at capacity building—pulling together the people as well as funding and other resources needed to establish a sustainable program.

While it is important to have a program leader, that person is not and should not be the sole leader in the group. Members of the Core Team and Project Teams should also provide leadership. In fact, members of these groups have provided key leadership in addressing technical and scientific issues. For example, members of the Core and Project Teams have been providing guidance and support for taking on elements of HBI's Climate Change Adaptation strategy. However, the Core Team and Project Team members are participating on a semi-voluntary basis. Typically, their employers are aware of their involvement and, to the degree that their HBI activities fall within their job descriptions, are supportive of that involvement up to a point. However, many of the integration and implementation tasks require moving beyond a particular set of job responsibilities. For example, a timber company

employee noted at the strategic planning workshop that she would need to make the case to her boss that engaging with the group (HBI) would be beneficial for her company.

Additionally, the Core and Project Teams provide collaborative leadership. The HBI program leaders regularly reflect on the quality of collaboration. We believe substantial, meaningful, and successful collaboration requires planning and managing for interactions between diverse sectors and disciplines, a high degree of information sharing, synthesis, and dissemination of the information in a format usable to specific audiences. The HBI participants are dedicated to providing resources to improve the public's knowledge of the biophysical environment and to increase availability of the best available scientific and technical information about the Humboldt Bay ecosystem to support decision making by elected officials and other authorities.

The authors feel that the Core Team and Project Team leadership structure is working well, but program participants will need to continue to refine their roles and the scope of their responsibilities. Ideally, the Core and Project Team will be closely involved with selecting a new project leader, coming to a consensus about where that leader should be based (i.e., at the HBI nonprofit, the Humboldt Bay Harbor, Recreation & Conservation District, etc.), and defining the job description and desired attributes of that leader.

9.5.2 Collaboration

Integrating the information, values, and viewpoints of diverse stakeholders is an important part of EBM because diverse perspectives are needed to understand and develop solutions to complex issues. The multifaceted perspective it engenders is useful because it helps elucidate various views on what is important, and it supports the incorporation of various forms of knowledge that are indispensable to understanding the ecosystem dynamics and socioeconomic considerations. During the strategic planning process, a lot of effort was made to find regional consensus on the situation, natural resource management issues, and solutions to those issues. One of the benefits was that by including local, technical, and scientific knowledge and at the same time identifying examples of joint gains, we were able to develop innovative strategies.

One of the important lessons of HBI is that it is difficult to get the right people at the table. Schlosser and other members of HBI have made extensive and sustained outreach efforts that have included presenting at public meetings, radio and print media interviews, public service announcement to local media, and word of mouth invitations. The outreach efforts have had variable success. The HBI has had good participation from scientific/technical community and the staff of natural resource management agencies. In fact, one of the successes of HBI is that it has developed a network of knowledgeable professionals who can provide the scientific and technical information needed to address many ecosystem issues.

The network is important because although HBI can serve as a forum for prioritizing issues, agencies and organizations other than HBI will be taking on direct conservation activities such as restoration projects, adopting legislation, implementing policies, enforcing regulations, and managing critical infrastructure. Additionally, HBI has demonstrated that this social capital can be quickly leveraged to develop a project when an opportunity arises. Ultimately, this should improve compliance with regulation and should produce more effective responses to environmental problems. The HBI can achieve cost efficiencies through pooling (rather than duplication) of its member agencies' efforts and resources.

There are clearly costs associated with collaboration, including the cost of cross sector communication, coordination, and participation. For example, collaboration and engaging stakeholders are expected to widen the scope of issues addressed (Thompson 1998; Weber 2003). In HBI's case, these costs were primarily in the form of thousands of hours contributed per year devoted to meeting preparation, attendance, and follow-up. In fact, working collaboratively may increase costs in the short term. However, it is our hope that in the long run the collaborative approach will reduce costs associated with reaching agreement on the solutions for addressing priority conservation and development issues (Hanna 1995).

The HBI has had more limited participation by resource user groups (e.g., fisheries and ranchers) and people whose interests are more focused on economic development. This is unfortunate because it is clear that resource user groups have a practical role in bringing the knowledge and experience needed to discuss management options including how particular policy decisions are affecting both them and the environment they are familiar with. We recognize we will never have complete scientific knowledge, but local knowledge is important and can help address uncertainties found in the ecosystem approach. Engaging diverse stakeholders can enrich the knowledge base, create a positive social dynamic, and bring greater legitimacy for the project as a whole. Conducting research, monitoring and management efforts in collaboration with stakeholders can improve the sustainability of a management regime. For example, a number of creek and wetland restoration projects have been carried out on public and privately owned grazing land around the bay. Owners and operators have been supportive of these efforts because they recognize their dependence on the environment (Cejnar 2011).

While the outreach efforts did garner a fairly broad-based group to participate in the strategic planning process, some groups were not represented. One notable example of why this might have occurred is that the strategic planning workshop was scheduled during crabbing season and so one should not have expected large participation by crabbers. Attendance at the ongoing meetings is less inclusive. In part, this probably reflects the timing and location of the meetings, typically weekday mornings in a government agency meeting room. Those who show up are those who are able to be there at that time and comfortable in that kind of environment. A different venue and time for meetings may be necessary to accommodate a larger diversity of participants.

Additionally, most meetings have been technically focused and their relevance may not be clear to many nontechnical stakeholders. It is expected that as HBI

moves from a phase of learning about the problems and compiling scientific information to a phase of engaging with the solutions, the relevance will become clear to groups likely to be affected. Further development of an outreach and media strategy could yield additional benefits in terms of reaching a wider audience and promoting inclusion of additional participants. If integration is going to occur, a way must be found to engage leadership from other sectors of society.

9.5.3 Governance

One recognized limitation of traditional science-based resource management is that there is a tendency for technical experts to come up with what they see as optimal solutions and leave it up to policy makers to implement that solution (Clark 2002). The authors believe that the organizational leadership in EBM efforts must be aware of the governance and constitutive aspects of EBM and large-scale conservation. The HBI has very strong science and management perspectives. However, there could be a great benefit in analyzing options for how to pursue and implement collaborative, adaptive governance mechanisms for a variety of EBM issues.

A major challenge to HBI and EBM in general is that the current governance and constitutive structures are not designed to allow an independent group such as HBI to integrate easily into the decision-making processes. There are numerous agencies with responsibilities in the watershed and bay and their areas of authority often overlap. Because state and federal hierarchies are difficult to interface with, it may be more productive to interface with city and county decision-making bodies and subsequently enlist local officials to champion the proposals at higher levels. The HBI has engaged with local stakeholders including government agencies. Deliberating on solutions to Humboldt Bay issues at HBI meetings and during the Strategic Planning workshop has sometimes caused discomfort to local planners, regulators and managers, as well as other stakeholders because the engagement occurred in a process outside of the official authority structures for natural resource regulations and management. While representatives from local agencies are present at meetings in these venues, neither the group nor the representatives are in a position to make changes to policies that are in place in their respective agencies.

In contrast, stakeholders seemed less sensitive to discussion of specific ecosystem issues. The HBI provides a good example of multi-governmental, multi-stakeholder deliberation about potential approaches to resolve those issues. The HBI is seen by the participants as a good option for joint regional activities and finding resources for regional projects. Adoption of policies and incorporation into planning documents remains in the purview of the agencies at the local level. Recent sea level rise adaptation planning efforts by the municipalities, the county, and several resource agencies may result in changes to how governance issues are viewed by the involved parties, potentially leading to shifts in the governance structure. Addressing some of the potential infrastructure and inundation problems caused by sea level rise, for instance, will require collaboration between the cities, county, and

other agencies, as the issues are not confined to the boundaries of a given jurisdiction. In fact, some type of interagency agreement or mechanism will be needed to jointly implement solutions to these issues.

As discussed above, neither the ad hoc HBI nor the Coastal Ecosystems Institute (the HBI nonprofit) will have any sort of management authority, which implementing EBM will ultimately require. Formation of a Joint Powers Authority or a legal agreement of some sort would be viable options for the government agencies associated with HBI. The groundwork for such arrangements has been laid, with establishment of collaborative working relationships, clarification of purpose and goals, and understanding that taking an ecosystem perspective will require shared authority in addressing bay-wide issues such as sea level rise.

Governance changes at the state and federal levels have been and will continue to be much more of a challenge. The HBI and the Coastal Ecosystems Institute maintain their neutral, nonadvocacy position locally, although HBI participants occasionally advocate for legislation, funding, and other types of support at the state and federal level. Continuing to advocate jointly with the seven other place-based EBM projects that form the West Coast EBM Network provides a broader base of support and experience for the higher-level policy advocacy that will be needed to enact the legislation and policies to truly enable EBM to be implemented.

9.6 Conclusion

The HBI was formed because current management strategies were not adequately meeting the needs of society or the environment in the Humboldt Bay region. The crises caused by the faltering of the global economy in conjunction with the biological and policy constraints on the use of natural resources opened a window of opportunity to change the local constitutive and governance regimes in the region. The initial proponents of HBI felt that adopting EBM would help to better solve the complex social and environmental problems faced by the region. They also recognized that there was a place for a bridging organization that could facilitate collaboration between stakeholders. Within this organization, previous "opponents" in this rural regional economy have found reason to work collaboratively to confront external threats such as cumbersome and ineffective state and national regulations, international competition, and other global economic drivers.

EBM, whether in Humboldt Bay or elsewhere, cannot succeed if project participants only recognize technical problems and think that they can be solved using technical expertise alone. Ecosystem problems are embedded in a larger constitutive and governance regime. Restoration experts may identify a way to enhance the functioning of a wetland by replacing tide gates and breaching levees. However, such projects will not go forward on a large scale without reformulating the current governance structures. Reducing the large loads of sediment introduced to streams by poorly constructed logging roads required not only better road design but also a timber industry that was willing to admit the poor practices of the past and a public

that was no longer willing to allow blatant disregard of the environmental impacts of unsustainable practices. In other words, it required a constitutive change in how the timber industry and the general public viewed their relationship with the environment. Similarly, it is unlikely that the ongoing environmental damage caused by marijuana grow operations to headwater streams will change while marijuana growers are able to get away with causing the damage and externalizing the costs of that damage.

There is a tacit agreement that the participants have all turned the page on the timber wars and other environmental disputes in order to move forward collaboratively. The process of developing HBI has been slow, but the organization continues to work toward its vision of "a vibrant, thriving, and resilient Humboldt Bay ecosystem that supports the well-being of our human and natural communities."

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