

**Exhibit 3-4. Example of Procedure to Identify Participants
for the Regional Action Team**

- **Assess Nature of Problems**—Attaboy Creek was designated by the Executive Council as a Region of Concern. The state Department of Environment was designated as the lead agency but is sharing responsibility with an existing group, "Friends of Attaboy Creek." The Department of Environment, working closely with Friends of Attaboy Creek leaders, assembled and reviewed all readily available background materials. Reports developed by several State agencies and a local university documented many ways that chemical contamination has affected the aquatic living resources in the Attaboy Creek Region of Concern—straining the fish and shellfish populations, causing physical deformities, and destroying the fishing industries. The background information, supplemented by several conversations with university professors and State officials, suggests that most of the chemical contaminants are heavy metals and organics. Given the land use and industrial base of the area, experts suggest that the identified problems are most directly a result of industrial and manufacturing discharges, shipyard discharges, and nonpoint source runoff from commercial and industrial areas. Preliminary research summarized in the background material also suggests such linkages between problems and sources.
- **Identify Stakeholder Groups to be Represented on the Regional Action Team**—After assessing the background materials, the state Department of Environment and its partner, Friends of Attaboy Creek, objectively identified the groups being harmed by chemical contamination (e.g., fisheries) and the groups contributing to or responsible for sources contributing to chemical contamination (e.g., shipyards, municipal planners responsible for storm water control). The Department of Environment and Friends of Attaboy Creek leaders compiled these stakeholder categories into a table (see Exhibit 3-5) to use as the basis for identifying actual representatives, (i.e., individual names) from the stakeholder groups.
- **Identify Actual Representatives from Generic Stakeholder Group Categories**—The lead agency in consultation with other key groups and/or individuals, analyzes background information to match specific names with stakeholder categories. A review of the literature, but more likely personal knowledge/recommendations from groups and/or individuals already involved in the Region of Concern, will help to identify specific persons associated with each generic stakeholder category. Efforts should be made to identify individuals that represent groups of stakeholders (e.g., an industry association or business group that captures multiple business/industry groups in the Region of Concern). It is important to avoid duplication—there is no need for two or more representatives from any particular stakeholder category; certainly not from the same location/facility/group. For example, John Doe may represent an association of shipyards in the Region of Concern. Because he represents multiple shipyards, he would be a good candidate for the Regional Action Team.

Available sources on potential stakeholders are extensive, including surveys of existing stakeholder groups active in the Region of Concern; the *Chesapeake Bay Program Directory*, published annually by the Chesapeake Bay Program Office; local Chamber of Commerce directories; industry directories; lists of government agencies in the area; lists of individuals who have participated in relevant meetings/hearings organized by agencies (e.g., National Pollutant Discharge Elimination System [NPDES] public hearings on draft permits, Chesapeake Bay Program Tributary Strategy hearings); and lists of members of the environmental and conservation community (e.g., annually published *National Wildlife Federation Conservation Directory*). Local planning documents, environmental impact studies, and directories of local planning and economic development commissions may also be useful sources of

Exhibit 3-5. Example of a Stakeholder Category Table Used to Identify Participants for the Regional Action Team

Stakeholder	Reason for Inclusion
Business/industry	Industry and manufacturing are the primary causes of the toxics problems within the Attaboy Creek Region of Concern. Businesses are affected directly by the success of industry. Involving these interests in the planning process may help to develop a more easily accepted plan and may reduce opposition. The main businesses and industry active in the Attaboy Creek Region of Concern are marinas and shipyards, chemical manufacturing plants, and petroleum refineries.
Citizen/environmental groups	Citizens are affected daily by the conditions in which they live. Environmental organizations exist to protect the interests of the citizens and wildlife affected by the health of the environment. The primary citizens groups are the Rotary Club, Jaycees, local garden clubs, and local Parent Teachers Associations. The most active environmental organizations are the Sierra Club and Friends of Attaboy Creek.
Federal government	Federal Government involvement is beneficial in the implementation of the Regional Action Plan. The government has the ability to create and enforce regulations, if necessary, as well as provide financial support for the effort. The U.S. military plays the largest Federal role in the Attaboy Creek Region of Concern, including the presence of the largest U.S. Naval shipyard. The U.S. Army Corps of Engineers, U.S. Coast Guard, and U.S. Fish and Wildlife Service also have large roles in the Attaboy Creek Region.
State government	State government is important in both the planning and implementation phases of the Regional Action Plan. It has the primary responsibility for developing the Regional Action Plan and also has the authority and financial resources to facilitate implementation.
Fisheries	The fisheries and fishery industries have been the group most severely affected by the chemical contamination problem in the Attaboy Creek Region of Concern. The stress put on the fish populations has been excessive, and it is the most obvious indicator of the problems existing.
Land owners/home owners	Land owners and home owners are financially, physically, and aesthetically affected by the health of Attaboy Creek. They also may be affected by proposed actions to protect the river.
Local government	The local government represents individuals living in proximity to Attaboy Creek. The government has control over zoning regulations and other potential actions. There are four cities and two counties in the Attaboy Creek Region of Concern.
Recreational/tourism	Attaboy Creek is attempting to develop a tourism industry that would greatly benefit from the restoration of Attaboy Creek. Recreational users (i.e., pleasure boaters, sport fisherman, and swimmers) would also benefit from cleaner and healthier waters.
Scientists/educators	Faculty from area colleges and universities may have knowledge and information that would be useful in the development of the Regional Action Plan. They can also assure that decisions are being based on accurate data.

Exhibit 3-6. Overview of Potential Stakeholders Within the Chesapeake Bay Watershed

Potential Problem	Federal Stakeholder Groups													
	US EPA Region III	US EPA CAPD	DOD (including Army, Navy, etc.)	USFWS Chesapeake Bay Field Office	USFWS Paluxy Wildlife Research Center	National Park Service	USGS National Biological Survey	USDA (info about spills, shipping)	USDA Forest Service	USDA Soil Conservation Service	NOAA National Marine Fisheries Service	USFDA	Army Corps of Engineers	Federal Land Owners
Fishkills	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Finfish/shellfish tissue contamination	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Finfish tumors	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Restrictions on shellfish harvesting	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Degradation of benthic community	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Water column toxicity	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Sediment toxicity	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Restrictions on fish and wildlife consumption	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Degradation of fish and wildlife populations	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Degradation of phytoplankton/zooplankton populations	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Bird and/or animal deformities or reproductive problems	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Tainting of fish and wildlife flavor	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Loss of fish and wildlife habitat	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Restrictions on drinking water consumption	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Restrictions on dredging activities	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Sediment contamination	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Water column contamination	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Groundwater contamination	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Added costs to agricultural/industrial water use consumption	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Beach closings	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Aesthetics degradation	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Sediment transport/erosion	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Stormwater runoff/Combined Sewer Overflows	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Urban runoff	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Agricultural runoff	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Atmospheric deposition of contaminants	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Industrial discharges exhibiting acute/chronic toxicity	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Municipal discharges exhibiting acute/chronic toxicity	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Superfund sites	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Hazardous waste transfer/storage facility	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Exhibit 3-6. Overview of Potential Stakeholders Within the Chesapeake Bay Watershed

Potential Problem	State Stakeholder Groups	State Environmental Regulation Agency	Public Works Administration	State Dept. of Agriculture	State Dept. of Conservation (land & water)	State Water Quality Control Board/Comm.	State Comm. on Fisheries (land & water)	Port Authority	Local Stakeholder Groups	County Planning Office	Public Works	Soil and Water Conservation Districts	CBPS Local Govts. Advisory Committee	Metrop. Wash. Council of Govt.	Regional Fishers of Watershed Comm.	Harbor Master of Watershed Comm.	Local Water Quality/Resources Board	County Associates
Fishkills	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Finfish/shellfish tissue contamination	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Finfish tumors	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Restrictions on shellfish harvesting	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Degradation of benthic community	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Water column toxicity	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Sediment toxicity	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Restrictions on fish and wildlife consumption	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Degradation of fish and wildlife populations	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Degradation of phytoplankton/zooplankton populations	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Bird and/or animal deformities or reproductive problems	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Tainting of fish and wildlife flavor	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Loss of fish and wildlife habitat	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Restrictions on drinking water consumption	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Restrictions on dredging activities	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Sediment contamination	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Water column contamination	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Groundwater contamination	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Added costs to agricultural/industrial water use consumption	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Beach closings	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Aesthetics degradation	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Sediment transport/erosion	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Stormwater runoff/Combined Sewer Overflows	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Urban runoff	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Agricultural runoff	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Atmospheric deposition of contaminants	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Industrial discharges exhibiting acute/chronic toxicity	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Municipal discharges exhibiting acute/chronic toxicity	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Superfund sites	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Hazardous waste transfer/storage facility	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Exhibit 3-6. Overview of Potential Stakeholders Within the Chesapeake Bay Watershed

Potential Problem	Chesapeake Bay Commission	Chesapeake Bay Foundation	Chesapeake Bay Stakeholder Groups	General	Chesapeake Research Consortium	University Water Resources Centers	University Sea Grant Programs	Chesapeake Research Consortium	General	Academic Stakeholder Groups	Industrial Group/Councils	Trade and/or Business Associations	Local Watermen's Association	Chambers of Commerce	Private/Community Stakeholders	Local Save Our Streams Chapter	Local Audubon Chapter	Local Ducks Unlimited	Stieria Club	Property Owners Advisory Committee (Residential)	CBPs Citizens Advisory Foundation	Chesapeake Bay Stakeholder Groups	General	Chesapeake Research Consortium	University Water Resources Centers	University Sea Grant Programs	Chesapeake Research Consortium			
Fishkills																														
Finfish/shellfish tissue contamination																														
Finfish tumors																														
Restrictions on shellfish harvesting																														
Degradation of benthic community																														
Water column toxicity																														
Sediment toxicity																														
Restrictions on fish and wildlife consumption																														
Degradation of fish and wildlife populations																														
Degradation of phytoplankton/zooplankton populations																														
Bird and/or animal deformities or reproductive problems																														
Tainting of fish and wildlife flavor																														
Loss of fish and wildlife habitat																														
Restrictions on drinking water consumption																														
Restrictions on dredging activities																														
Sediment contamination																														
Water column contamination																														
Groundwater contamination																														
Added costs to agricultural/industrial water use consumption																														
Beach closings																														
Aesthetics degradation																														
Sediment transport/erosion																														
Stormwater runoff/Combined Sewer Overflows																														
Urban runoff																														
Agricultural runoff																														
Atmospheric deposition of contaminants																														
Industrial discharges exhibiting acute/chronic toxicity																														
Municipal discharges exhibiting acute/chronic toxicity																														
Superfund sites																														
Hazardous waste transfer/storage facility																														

potential stakeholders. Interviewing key stakeholders or community leaders for recommendations is another way to identify stakeholders.

3.1.3 Identifying Regional Action Team Leaders

It is critical to identify and cultivate leaders for a Regional Action Team. The most important role for the team leaders is to work with the lead agency and its partner or designee to determine an overall approach for the regional action planning process, including defining roles and responsibilities for the Regional Action Team and establishing a schedule for completing each step of the process. It is essential that the team leaders understand the goals and objectives of the regional action planning process and are able to convey them to the Regional Action Team. The team leaders are also responsible for running Regional Action Team meetings (e.g., ensuring the meeting agenda is followed and topics are covered in a timely fashion), although they may be supported by other parties (e.g., professional facilitator, lead agency.)

In a consensus-based process, like that envisioned for regional action planning, team leaders should orchestrate, but not dictate, the process. Leaders contribute to the process by providing ideas and information, offering approaches for continued progress, ensuring that the process stays on track and encouraging enthusiastic participation and commitment. They should enjoy respect from the other team members and not show bias when leading meetings, regardless of the interests they represent. In some cases, if the team leader is qualified, he or she may also facilitate the decision-making and/or consensus-building, portions of Regional Action Team meeting. However, if a leader wants to negotiate or otherwise represent his or her interests, then facilitation responsibilities should be given to another team member or outside facilitator.

Leaders for the Regional Action Team can be provided by the lead agency, selected from the Team's membership, or obtained from an outside source. They all should be required to commit substantial time to the process and be enthusiastic about their commitment. Exhibit 3-7 summarizes additional qualities of the team leaders.

To remove any perceptions of bias and to provide objectivity to the planning process, it may be advantageous to use a professional facilitator for the decision-making and/or consensus-building portions of Regional Action Team Meetings (e.g., developing evaluation criteria to select implementation actions). Although some stakeholders may object to a facilitator because of concerns that a facilitator may inhibit team members (e.g., in terms of influencing the process or applying their own leadership skills),

Exhibit 3-7. Team Leader Qualities

- Is a significant stakeholder, but able to remain objective
- Is committed to a consensus-based process, not an autocratic one; is not overly directive in the effort to reach agreement
- Makes time commitment to plan process and goals
- Is organized and energetic to help maintain momentum
- Contributes expertise and skills
- Offers leadership
- Has experience managing and facilitating meetings
- Is willing to contribute resources of organization (may not be possible for each member)

experienced facilitators, involve team members in leading and managing the process. For example, a professional facilitator can periodically assign facilitation responsibilities to a team member. This may give the facilitator a chance to evaluate the approach taken to date and plan the next step in the process.

The facilitator should have experience in applying a consensus-based approach to solving environmental problems. Although specific knowledge of the technical issues regarding watershed restoration is not necessary, the facilitator or facilitation team can also contribute to the process by providing briefings on background information, such as concept papers or fact sheets, and organizing meeting notes. If a team does not have access to a professional facilitator, a facilitator could be chosen from the team or provided by the lead agency. The ideal candidate has leadership abilities, experience successfully facilitating similar meetings, and an understanding of the regional action planning process. If a non-professional facilitator is used (e.g., someone is appointed from the team), it is recommended that the facilitator and as many team members as possible attend a training workshop on consensus-based decision-making. This training should be sponsored by the lead agency.

3.1.4 Obtaining Management Support

The goal of any regional action planning effort is to develop an implementable plan that will effectively reduce and prevent problems associated with chemical contamination in a designated Region of Concern. To be successful in meeting this overall goal, a plan must have a committed management and staff. Individuals believing in the concepts of regional action planning and the proposed implementation approach must exist at all levels, from top management to the staff person(s) who are ultimately responsible for implementing the plan recommendations. The lead agency must provide this level of commitment because it is responsible for initiating the regional action planning process, ensuring

development of the plan, and providing long-term oversight of the implementation actions. Committed management can ensure continued involvement throughout the regional action planning process by directing staff and financial resources; obviously, interest and commitment from the highest levels of management can have the greatest impact. Ideally, the senior agency official responsible for the Regional Action Plan should attend the initial meeting to explain the purpose and importance of the regional action planning activity, the role of the Regional Action Team, and the commitment of the lead agency. Better yet, demonstrated support from elected officials will lend credibility to the process. Team members will be more likely to commit to the planning process if they know that it has the support and commitment from the lead agency's management and/or elected officials. This type of high-level support will lend credibility to the planning process; give team members a heightened sense of purpose that their efforts are important, needed, and will be considered; and may foster greater involvement and cooperation from team members.

Because proposed implementation actions are likely to involve multiple groups (government agencies, affected parties such as industry), management and staff support and commitment from these groups are also critical. Another key role of the lead agency, supplemented by the Regional Action Team, is to provide education and outreach to these groups to ensure that they have a clear understanding of the overall goals of the Regional Action Plan and their roles and responsibilities in implementing proposed actions. The groups should be trained in the importance of the regional action planning process and the implementation actions to which they are charged.

Importance of Government Commitment

Remedial action planning in the Great Lakes' Ashtabula River, Ohio, benefited greatly from demonstrated support from top level agency management and elected officials. After years of perceived inaction addressing severe environmental problems, demonstrated by the lack of actual cleanup actions, the public greeted the first public meeting of the remedial action planning process with cynicism. However, Ohio EPA continued to stress the importance of public involvement at all stages of the planning process. As well, Ohio EPA and Ohio State Senator Robert Boggs invited community members to a meeting to discuss environmental problems of the Ashtabula Area of Concern, the remedial action planning guidelines, and its plan to establish local input at the early stages. The involvement of the well-respected local government official, plus the demonstrated commitment of Ohio EPA, influenced the eventual active participation of many local citizens and community leaders (Letterhos 1992).

In a geographically based approach to chemical contamination prevention and reduction such as that envisioned for Regions of Concern, many different actions, focused on a variety of pollutant types and sources, often occur simultaneously. To ensure smooth, consistent implementation of the plan, it is helpful to have an enthusiastic plan coordinator. The Regional Action Plan coordinator should be

affiliated with the group responsible for writing the final plan and delivering it to the Executive Council (generally this group is the lead agency). An ideal coordinator will be an enthusiastic, organized, and knowledgeable community member, who has the authority to make the recommended changes and who is provided the financial and technical resources to complete his or her job.

3.2 OVERVIEW OF THE REGIONAL ACTION TEAM'S INVOLVEMENT

As described in Section 3.1, the type and level of the Regional Action Team's involvement in the regional action planning process will vary depending on the planning approach selected by the lead agency. If the lead agency chooses to maintain full responsibility for plan development, then the Regional Action Team's role is somewhat limited to reviewing and commenting on material prepared by the lead agency. On the other hand, the lead agency may delegate all authority for plan development to the Regional Action Team. In this scenario, the Regional Action Team is responsible for assembling and evaluating background materials and developing draft chapters of and recommendations for the plan.

The Chesapeake Bay Program recommends an approach of shared responsibility between the lead agency and the Regional Action Team. This type of approach, involving participation of both parties, is successful because it draws upon the technical and financial resources of the lead agency, while still involving stakeholders in decision-making and consensus-building so that buy-in and commitment to the plan is achieved. One way to implement this approach of shared responsibility is to have the lead agency develop relevant background materials and options papers to be used as the foundation for a facilitated consensus-building process involving the Regional Action Team. Background papers provide an overview of the issue, while options papers suggest choices of language for the plan and/or plan recommendations (e.g., implementation actions). Section 3.5 of this chapter describes this process in more detail.

It is essential for the Lead Agency and the Regional Action Team to decide early in the planning process how they want to approach development of the Regional Action Plan, including defining appropriate roles and responsibilities for each step of the process. The approach should be mutually decided and understood by all parties in order for the planning process to proceed effectively. Recognizing that the exact approach to conducting the regional action planning process will be unique to each Region of Concern, the Regional Action Team should be involved in the development of the Regional Action Plan at least to the following extent:

- Evaluating background materials
- Providing expertise and input for the plan (e.g., technical materials, recommendations for additional sources of material and contacts)

- Supporting the decision-making process required for effective plan development.

The Regional Action Team's most important role is that of participating in the decision-making process. As discussed throughout this guidance document, the regional action planning process, and final plan, must be streamlined and focused on priority issues so that limited resources are effectively used. Therefore, many of the steps needed to complete the plan involve decision-making about priorities (e.g., What are the most important adverse ambient effects? What chemical contaminant types and sources are the greatest concern? What implementation actions should be pursued first?). The Regional Action Team should be involved in all decision-making aspects of the plan. In fact, many of tasks toward developing the Regional Action Plan should be accomplished in a consensus-building framework, where the affected parties (stakeholders) are represented by the Regional Action Team.

The remainder of this section further describes the anticipated involvement of the Regional Action Team in the planning process. The information is presented in the following subsections:

- Identifying stakeholder interests
- Evaluating environmental problems and establishing goals and objectives
- Evaluating existing management programs
- Determining implementation actions.

3.2.1 Identifying Stakeholder Interests

The interests of stakeholders participating on the Regional Action Team should be identified as soon as possible, perhaps as early as the initial team meeting. The information gained in this process will help team members understand each other's motivations, as well as the interests that lie behind any positions that might be taken in the planning process. This information can foster an open and honest dialogue.

It is important that team members not judge or evaluate interests—every interest represented by a stakeholder should be welcomed and recorded. The interests generally pertain to human health and the environment, as well as to economic and social issues. The team should make every effort to represent non-human environmental interests.

Positions represent a group's or individual's stand or decision about an issue, whereas interests are the underlying concerns that helped form the position. For example, a group's position could be that they want to ban new industries from being allowed to directly discharge to a Region of Concern, while their interest is restoring a viable recreational fishery (Fisher and Ury 1991).

Planning processes can deteriorate at this early stage because people may try to alter or question other stakeholder interests or because they do not have the patience to spend a few hours or a day identifying and understanding interests. If the team moves through this step efficiently, however, participants will have valuable information for later in the process. When negotiating recommendations, for example, it is necessary to consider the relationship between a stakeholder's position and his or her interests. If the position a stakeholder chooses threatens team consensus, team members should consider whether the position is consistent or inconsistent with the stakeholder's interests. If it is inconsistent, team members should ask the stakeholder to consider whether his or her interests can be satisfied in a different way. For example, if a stakeholder's position is that it is necessary to ban new industries from directly discharging to the Region of Concern but their interest is in restoring a recreational fishery, perhaps the interest could be achieved through a means other than a ban (e.g., modification of existing NPDES permit limits to be more stringent). This kind of situation underscores the importance of understanding stakeholder interests early in the process.

During each Regional Action Team meeting, information such as stakeholder interests, common interests, and conflicting interests, as well as the agenda for the next meeting, should be recorded on flip charts and distributed as notes between meetings.

3.2.2 Evaluating Environmental Problems and Establishing a Vision Statement, Goals and Objectives

The early stages of the regional action planning process should focus additional investigations on priority problems. An effective Regional Action Plan will be streamlined and targeted on the primary sources of chemical contamination identified as contributing to priority problems. In order to prioritize problems for

During this initial problem identification stage, the team and lead agency could sponsor activities to educate and seek input from the public at large on the nature and scope of the identified problems. These activities should include public workshops, roundtable discussions, and citizen surveys, such as mail or telephone surveys to assess the public's awareness and perceptions of the issues involved.

action, the Regional Action Team must have a sense of the vision, goals, and objectives it hopes to achieve in the Region of Concern. The process of identifying and prioritizing problems, including sources, and determining a vision statement, goals, and objectives is iterative—as the Regional Action Team develops its information base on problems, goals and objectives might become apparent. Likewise, achievement of goals and objectives might clearly require focus on specific problems and chemical sources.

The Regional Action Team should be involved in all phases of the decision-making processes to identify and prioritize problems, including chemical contaminant types and contributing sources. The team is also integral in establishing the plan's vision statement, goals, and objectives. The results of this process will not only guide plan development, but will provide much of the written portion of the final plan. Early consensus by the team on these topics can be developed from a general understanding of the problem (i.e., why the area was designated as a Region of Concern), supported by readily available information, including written materials (e.g., newspaper articles, research documents, and other technical reports), consultation with individuals familiar with the Region of Concern, and materials acquired and generated by the Chesapeake Bay Program when identifying the particular Region of Concern. This base level of information will provide the necessary background needed to stimulate the team to further characterize the problem and begin establishing goals. In addition to participating in the decision-making, the team is expected to evaluate materials and provide technical support, as necessary. Chapters 4 and 5 of this guidance document provide more detailed information on establishing the plan's vision statement, goals, and objectives (Chapter 4) and evaluating environmental problems (Chapter 5).

3.2.3 Evaluating Existing Management Programs

The most successful actions to reduce the impacts of chemical contamination in Regions of Concern are often developed by evaluating and modifying existing approaches. Therefore, the thorough evaluation of existing management programs, including regulatory and nonregulatory approaches (e.g., NPDES permit compliance, pollution prevention) is an important and essential prerequisite for developing an implementation approach. The Regional Action Team should play an integral role in identifying and evaluating existing management programs.

Chapter 6 of this guidance defines an approach for evaluating existing management programs. The lead agency would likely spearhead these evaluations, supported by Regional Action Team members. The investigations must include an assessment of regulatory and nonregulatory approaches and activities taken by government agencies and non-governmental organizations. A well-selected Regional Action Team could provide the majority of information needed for these investigations. It is expected that Regional Action Team members representing different stakeholder groups (e.g., government, industry, environmental organizations) could report on key programs and/or provide a list of additional contacts for consultation. The Regional Action Team would also determine the criteria to guide the evaluation (i.e., the basis for measuring effectiveness). Once the evaluation is complete, the Regional Action Team would review the results, determine if additional investigations were needed, and consider which existing management measures should be considered as potential implementation actions.

3.2.4 Determining Implementation Actions

The ultimate effectiveness of a Regional Action Plan hinges on developing effective implementation actions. Chapter 7 of this guidance outlines a procedure to identify and select implementation actions. The Regional Action Team plays a critical role in determining these actions. Because of their importance in determining overall plan effectiveness, it is essential that sufficient time be allocated to identify, research, and rank potential implementation actions; generally, the Regional Action Team needs at least 2 full meeting days to evaluate and select implementation actions.

Although the lead agency may assemble the background materials needed to evaluate potential actions, the Regional Action Team will be involved in most steps of the process—brainstorming about potential actions, providing background information, volunteering to conduct additional research if needed, and developing criteria to evaluate the suitability of actions.

One of the first steps involves developing an organized inventory of potential implementation actions. The facilitator/team leader should first poll the team on suggested approaches for organizing actions. To do this, it may be appropriate for the team to review the purpose of the Regional Action Plan and to structure the actions accordingly (e.g., by pollution source category).

Once the team identifies a loose structure for the implementation actions, team members should "brainstorm" to identify actions within each category (e.g., point source actions, nonpoint source actions, actions directed at urban areas, actions directed at marinas). The team should develop as many actions as possible without judging them. When developing actions, it is important for the team to be innovative and creative in attempting to address stakeholder interests. In addition, it is important to carefully evaluate existing management approaches in the Region of Concern, as well as proposing new ones. It is especially important to consider existing laws and policies; a priority of the planning process should be to evaluate compliance and enforcement effectiveness. The team should also identify gaps in existing laws, programs, and policies so that effective new solutions can be developed.

After developing a list of potential implementation actions (this may take a few meetings), the Regional Action Team must further refine and organize these options. The team may want to establish specific criteria, such as technical feasibility, cost, financing, and public acceptability, to determine whether an action is appropriate and, therefore, a candidate for further evaluation (see Chapter 7). The Regional Action Team should work closely with the lead agency to identify evaluation criteria. These criteria must be well understood by all team members. Although each Regional Action Team may

develop its own evaluation criteria, it is important that the selected criteria enable the team to narrow its comprehensive list of potential actions to a manageable size for further consideration.

Regional Action Team members or subgroups/workgroups of the Regional Action Team, working with the lead agency, can be charged with further evaluating and defining promising actions between team meetings. Meetings will be more productive and time efficient if the team members have this background information prior to the meetings.

During this phase, the Regional Action Team should also evaluate implementation actions with respect to identified stakeholder interests. The team should try to move toward the action that best meets its diverse interests, reminding stakeholders that the option is probably better than the alternatives that would result if an agreement could not be reached.

Strong leadership is essential to timely and complete closure on an issue. Closure entails a full and accurate transcription of recommendations and commitments, as well as assurance that each commitment can be fulfilled. Recommendations should be as thorough as possible and should be related to specific evaluation criteria. The Regional Action Team should work with the lead agency and other responsible groups to ensure that final implementation actions are fully described and address the following questions:

- Who is responsible for implementation?
- What actions are necessary to implement the plan?
- Where should the implementation activities be targeted?
- When should actions be taken?
- How should actions be implemented?

The team should organize its final recommendations into the format of the Regional Action Plan. The lead agency (and responsible agencies, if possible) should be prepared to assist the team in compiling the plan. The draft plan, including implementation actions, should be made available to the team for review and comment before submittal to the general public and any governing agency (e.g., Chesapeake Executive Council) for review, comment, and adoption.

3.3 DEVELOPING A WORK PLAN

It is important that the approach to regional action planning and consensus-building be established near the beginning of the planning process, ideally before the first meeting of the Regional Action Team, so that it can be thoroughly described to all participants in the planning process. In addition, the roles and responsibilities of the lead agency, team leaders, team members, and other participants (e.g., a facilitator) should be clarified.

Frequently, planning activities, including stakeholder meetings to build consensus, suffer from a lack of focus and an unspecified game plan. A perception of disorganization and a lack of clearly defined goals and objectives can severely hurt the regional action planning process and the development of an implementable plan. In the early stages of the regional action planning process, it is important to clarify the overall purpose of the planning activities, identify an approach to the planning process, determine a schedule and planning milestones, and define the roles and responsibilities of participants. The lead agency, in conjunction with an existing stakeholder group (if applicable, should the lead agency choose to delegate some or all of its authority to such a group), and Regional Action Team leaders, may want to draft a work plan to guide the planning process. At a minimum, the work plan should:

- Provide an overview of the approach that will be used to conduct the planning process (e.g., use of a professional facilitator, methods used to make decisions and build consensus)
- Identify roles and responsibilities for the planning process
- Outline potential meeting agendas, including anticipated decision points, for the Regional Action Team
- Present a schedule for planning activities (e.g., proposed meetings, draft materials, and plan completion).

A work plan provides the basis, or road map, for the regional action planning process. It ensures that all participants understand the anticipated process from the beginning, and contains a schedule to keep the process moving in a timely manner. The work plan is intended to serve as a guide only—it is not cast in stone, and should be reviewed throughout the process and revised as necessary. Exhibit 3-8 highlights selected activities that should occur during the development of the Regional Action Plan and should be addressed in the work plan. These activities are tied to hypothetical Regional Action Team meetings. The exhibit presents information on proposed agendas for each meeting, as well as suggestions for background materials needed to prepare the Regional Action Team for the meeting and suggestions for products/outcomes to be generated from the meetings. This information is presented as guidance and

Exhibit 3-8. Overview of Activities Comprising the Regional Action Planning Process

Meeting #1
<p>Materials Distributed in Advance</p> <ul style="list-style-type: none"> • Agenda • List of team members • Background materials (summary materials describing planning process, Region of Concern; draft work plan; fact sheet summarizing existing information on problems; draft language on vision statement, preliminary goals and objectives) <p>Suggested Agenda Topics [Responsible Party]</p> <ul style="list-style-type: none"> • Welcome [Lead Agency] • Introductions, including statement of participant's interests, and personal goals and objectives for the process [Team Leaders] • Background Presentations <ul style="list-style-type: none"> - Overview of the Planning Process [Lead Agency] - Roles and Responsibilities [Lead Agency, Team Leaders] - Preliminary assessment of problems [Lead Agency, Invited Speakers] - Overview of existing activities, including assessment of current actions by representative stakeholders (e.g., success stories) [Lead Agency, Invited Speakers] - Meeting ground rules [Lead Agency, Facilitator] • Present work plan and describe approach for Regional Action Team. [Lead Agency, Team Leaders] <ul style="list-style-type: none"> - Procedures (e.g., use of a facilitator; development of background papers) - Roles and responsibilities - Desired final product - Anticipated schedule • Seek agreement on work plan and team approach. [Lead Agency, Team Leaders] • Discuss need for public participation. Seek volunteers to develop public participation strategy. [Lead Agency, Team Leaders] • Review presentations and other existing background information on problems with goal of beginning prioritization. If materials are distributed in advance of meeting (at least one week), it may be appropriate for group to reach facilitated consensus on problem statement and prioritization of problems for consideration. If advance distribution is not possible, use meeting to introduce materials and prepare Regional Action Team for next meeting. [Team Leaders, Facilitator] • Present draft language on vision statement, preliminary goals, and objectives. If distributed in advance of meeting (at least 1 week), it may be appropriate for group to reach facilitated consensus on preliminary goals and objectives. If advance distribution is not possible, use meeting to introduce materials and prepare Regional Action Team for next meeting. [Team Leaders, Facilitator] <p>Products To Be Generated From Meeting</p> <ul style="list-style-type: none"> • Problem definition and prioritization (if materials distributed in advance and adequate time allowed to discuss) • Vision statement, preliminary goals and objectives (if materials distributed in advance and adequate time allowed to discuss) • Summary of participants interests and desired outcomes • Finalized work plan • Meeting evaluation

Exhibit 3-8. Overview of Activities Comprising the Regional Action Planning Process (continued)

Meeting #2
<p>Materials Distributed in Advance</p> <ul style="list-style-type: none"> • Agenda • Meeting highlights • Background materials (background reports on sources of problems, existing management approaches) <p>Suggested Agenda Topics</p> <ul style="list-style-type: none"> • Conclude unfinished business from previous meetings. [Team Leaders] • Seek consensus on problem definition and prioritization. [Facilitator] • Seek consensus on preliminary goals and objectives. [Facilitator] • Present more detailed problem definition, including chemicals of concern and sources of concern. Present evidence, to date, linking sources to problems. If evidence is sufficient, and/or if team has had time to review materials, begin to prioritize sources for action. Develop criteria for identifying priority sources.¹ [Team Leaders, Lead Agency, Facilitator, Invited Speakers] • Present results of evaluation of existing management measures. [Team Leaders, Lead Agency, Facilitator, Invited Speakers] <p>Products To Be Generated from Meeting:</p> <ul style="list-style-type: none"> • Products that must be completed from first meeting: <ul style="list-style-type: none"> - Final problem definition and prioritization - Vision statement, preliminary goals and objectives • Preliminary ranking of priority source categories. • List of action items for next meeting. • Meeting evaluation.
Meeting #3
<p>Materials Distributed in Advance</p> <ul style="list-style-type: none"> • Agenda • Meeting Highlights • Background materials (final report summarizing sources of chemical contamination; preliminary list of implementation actions based on preliminary ranking of source categories). <p>Suggested Agenda Topics</p> <ul style="list-style-type: none"> • Conclude unfinished business from previous meetings. [Team Leaders] • Present additional information linking sources of chemical contamination to priority problems. Discuss sources of chemical contamination. Develop final ranking of sources based on evaluation criteria. [Team Leaders, Lead Agency, Invited Speakers, Facilitator] • Evaluate preliminary goals and objectives. Modify as needed to reflect new information. [Facilitator, Team Leaders]
<p>¹It is important to remember that the Regional Action Plan's ultimate goal is to present an implementation approach for addressing problems caused by chemical contamination in a designated Region of Concern. The analyses conducted for the planning process should always bear this goal in mind so that limited resources can be utilized effectively. It is useful to streamline the planning approach by focusing on priority problems and sources of problems. Once priority problems and sources are identified, further investigations should be focused on those areas.</p>

Exhibit 3-8. Overview of Activities Comprising the Regional Action Planning Process (continued)

Meeting #3 (continued)
<ul style="list-style-type: none"> • Review work plan. Determine if work plan needs to be modified. [Facilitator, Team Leaders] • Report of approach and results for identifying implementation actions.² [Lead Agency, Team Leaders, Invited Speakers] <p>Products to Be Generated from Meeting</p> <ul style="list-style-type: none"> • Final ranking of priority source categories • List of action items for next meeting • Meeting evaluation.
Meeting #4
<p>Materials Distributed in Advance</p> <ul style="list-style-type: none"> • Agenda • Meeting highlights • Background materials (reports presenting comprehensive list of implementation actions by source category, including qualitative information needed to evaluate and prioritize actions) <p>Suggested Agenda Topics</p> <ul style="list-style-type: none"> • Conclude unfinished business from previous meetings. [Team Leaders] • Present research on implementation actions. [Lead Agency, Team Leaders, Invited Speakers] • Select implementation actions to be pursued further. [Lead Agency, Team Leaders, Invited Speakers] <p>Products To Be Generated from Meeting</p> <ul style="list-style-type: none"> • Short list of implementation actions to be evaluated in more detail. • Meeting evaluation
Meeting #5
<p>Materials Distributed in Advance</p> <ul style="list-style-type: none"> • Agenda • Meeting Highlights • Background materials (final report on implementation actions, outline and materials prepared to date for final plan) <p>Suggested Agenda Topics</p> <ul style="list-style-type: none"> • Conclude unfinished business from previous meetings. [Team Leaders] • Review status of implementation actions. Seek implementation commitments. [Team Leaders, Invited Speakers, Facilitators] • Discuss presentation of final plan (it is appropriate throughout the planning process for the lead agency and/or a drafting subcommittee from the Regional Action Team to prepare draft chapters of the plan for distribution, review, and comment). [Team Leaders, Lead Agency] • Determine schedule for additional meetings, if necessary. [Team Leaders] <p>Products to Be Generated from Meeting</p> <ul style="list-style-type: none"> • Approach, including assigned responsibilities, for preparing final plan and securing commitments for implementation actions. • List of remaining action items and next steps. • Meeting evaluation.
<p>²When developing implementation actions, it is important to focus on priority problems and sources. Also, the level of detail needed in the assessment should be limited to that required for sound decision-making (e.g., a qualitative analysis may be all that is needed for the purpose of narrowing list of potential implementation actions to those that should be pursued in more detail for the final plan). Excess analysis should be avoided.</p>

should be modified to suit the unique needs of the Region of Concern. As discussed in more detail in Section 3.4, it is important to set aside sufficient time during the meetings to adequately cover each agenda topic.

3.4 CONDUCTING EFFECTIVE REGIONAL ACTION TEAM MEETINGS

Successful regional action planning depends largely on effective stakeholder involvement so that parties affected by and contributing to chemical contamination problems in the Region of Concern feel an important part of the process, gain a sense of ownership to the plan, and commit to the proposed implementation actions. Since the Regional Action Team is the main forum for involving stakeholders, it is important to conduct effective Regional Action Team meetings. The efficiency and effectiveness of Regional Action Team meetings depends on an organized approach with clearly defined roles and responsibilities for all participants, a well-planned meeting schedule that accounts for all phases of plan development, and clearly articulated meeting agendas and approaches to developing the plan. Without these elements, the chances of conducting a successful regional action planning process are greatly reduced, as:

- Confusion over roles and responsibilities may result in a duplication of efforts and/or gaps in responsibilities.
- Meetings may lose focus, become rambling discussions, or are side-tracked, so that concrete action items are not developed.
- Participants may become disinterested and discouraged because they feel that they are not accomplishing anything (not a part of the process) or they lose sight of the overall purpose and end goal of the planning process.
- The resulting plan may lack focus and/or may not adequately represent stakeholder groups.

It is important to ensure that the overall meeting schedule, and individual meeting agendas, allow enough time for the consensus-based process to occur. The Regional Action Team must reach consensus on many issues throughout the planning process—vision statement, goals, and objectives; problem definition and prioritization; and implementation action selection. In order for the team to feel a legitimate part of the planning process, it is necessary for them to have time to review background materials, formulate their ideas, and discuss their opinions in a facilitated process. The amount of time needed for these activities varies, depending on the complexity of issues being addressed and the size of the Regional Action Team. In general, a facilitator needs at least 2 to 3 hours per issue (e.g., identifying goals and objectives) to effectively work with the Regional Action Team. The length of each team meeting should

be adjusted to reflect the number of issues being addressed. In many situations, it works well to have the Regional Action Team meeting run from mid-morning to early afternoon (e.g., 10:00 a.m. to 3:00 p.m.), with a break for lunch. This structure enables the morning session to cover background material, gives the team members time to discuss information and formulate opinions during the lunch break, and saves sufficient time for facilitated decision-making in the afternoon. The lead agency and team leaders should work closely with the facilitator to block off appropriate amounts of time for each topic.

The importance of clearly defining meeting roles and responsibilities, in terms of who is responsible for which parts of the meeting and how the meeting will be conducted, cannot be overemphasized. An effective Regional Action Team meeting must have a designated team leader or co-leaders and a balanced and representative group of participants (i.e., team members) representing key stakeholders. In addition, it is recommended that a facilitator conduct portions of the meeting and a meeting recorder provide notetaking and other support for the meeting. The appropriate roles and responsibilities for participants in Regional Action Team meetings (i.e., team leaders, team members, lead agency, facilitator, and recorder) are defined in Exhibit 3-9. The lead agency can remain active in the planning process by providing technical support and/or facilitation expertise, if possible. Frequently, it helps to have an outside facilitator to build trust among all meeting participants, so they do not perceive a hidden agenda. For this reason, it is also advisable that the Regional Action Team leader(s) be someone other than the lead agency. However, the lead agency is a valid stakeholder in the planning process and should appoint a member to the Regional Action Team.

Just as it is important to have clearly defined roles and responsibilities among planning participants, it is also necessary to have clearly articulated meeting agendas and approaches. The lead agency, its partner or designee (e.g., existing groups), team leaders, and the facilitator should work together to develop effective meeting agendas and approaches. Sometimes this process can be guided through the joint development of a work plan to guide the planning process (see Section 3.3). Regional Action Plans are developed from the evaluation of different types of information, as well as substantial input from the Regional Action Team and the general public. To effectively synthesize the information in a timely and efficient fashion and to ensure that all parties are adequately represented requires an organized meeting approach. Without an organized approach, meetings and/or the planning process can get side-tracked, result in time-consuming, unfocused discussions, and potentially not achieve the goals of the planning process.

Exhibit 3-9. Roles and Responsibilities—Regional Action Team Meetings

Team Leader or Co-Leaders
<ul style="list-style-type: none"> • Establish meeting objectives and plans and are responsible for the overall direction of the meeting • Clarify participants' roles and responsibilities • Start meeting on time • Provide introductions, summarize meeting objectives and agenda items, and define roles and responsibilities • Work with facilitator to ensure meeting agenda is followed in a timely manner • Participate as group members • Summarize key decisions and actions
Team Members
<ul style="list-style-type: none"> • Generate ideas, analyze information, provide technical input, make decisions, and implement action plans • Review agenda and other meeting materials before attending meetings • Conduct enough pre-meeting background research to participate effectively in the meeting • Know purpose of meeting ahead of time and do "homework" if necessary to prepare • Confirm attendance and delegate an alternate if cannot attend • Attend meeting on time • Keep an open mind, avoid premature judgment, and try to understand other perspectives • Help facilitator eliminate distractions and encourage active involvement. • Speak up; share useful ideas • Support ground rules and other meeting guidelines • Participate in a timely fashion • Volunteer for tasks only if capable of following through • Agree to participate in consensus-building exercises
Lead Agency
<ul style="list-style-type: none"> • Provides technical and financial support • Schedules meetings • Prepares draft agenda • Provides background materials for the meeting • Participates as a team member
Facilitator
<ul style="list-style-type: none"> • Manages how people work and communicate in the meeting • Is responsible for flow of the meeting • Coordinates with Regional Action Team leaders and lead agency to acquire any needed background or other preparatory information • Reviews planned agenda and action items • Ensures meeting runs smoothly • Reviews team's ground rules • Focuses the group • Monitors and regulates participation • Evaluates effectiveness of process and suggests alternative methods and processes as necessary • Protects people from "attack" and deals with problem people • Remains neutral at all times, particularly during disagreements
Recorder
<ul style="list-style-type: none"> • Keeps track of important information throughout the meeting, prepares flip charts and other necessary visual aids during the meeting, and prepares post-meeting summaries and action items. • Prepares necessary meeting summaries, highlights, and other materials. • Captures ideas visually without editing or paraphrasing. • Checks to ensure that appropriate information has been recorded; obtains clarification from the participant if needed. • Helps leader and facilitator keep track of information. • Produces meeting summaries, highlights, and other materials.

Source: Adapted from Chang and Kehoe (1994)

Many references exist that summarize the elements of productive meetings, including preparing the meeting, conducting the meeting, and evaluating the meeting (Chang and Kehoe 1994; Doyle and Straus 1976; Fisher and Ury 1991). Exhibit 3-10 summarizes some basic considerations for conducting effective meetings in the context of regional action planning.

Exhibit 3-10. Basic Considerations for Conducting Effective Regional Action Team Meetings

- Determine appropriate participants (e.g., subject matter experts, key decision-makers, and affected parties, not unaffected parties and known meeting "disrupters").
- Ensure continual and balanced representation. Primary team member should select alternate if he/she cannot attend.
- Clearly define and reach agreement on roles and responsibilities for all meeting participants, including meeting leaders, meeting facilitator, recorder, Regional Action Team members, and lead agency. Define and maintain roles and responsibilities from the beginning to end of the process.
- Fully consider each stage of meeting development: (1) Preparing for the meeting, (2) Conducting the meeting, and (3) evaluating the meeting. No stage should be ignored or minimized.
- Develop a well-thought out agenda providing the following information: meeting objectives, logistics, anticipated attendee list (defining leader, facilitator, recorder), roles and responsibilities, action items (i.e., list of items that must be covered to achieve meeting objectives), and allocated time.
- Reach agreement on approach to planning process, including meeting schedules, ground rules, and guidelines.
- Distribute necessary background materials to meeting participants sufficiently in advance of the meeting
- Keep meetings focused on priority issues. When making decisions, develop a variety of options from which to prioritize using a consensus-based set of objective evaluation criteria.
- Allow sufficient time to cover the subject adequately and build consensus, if necessary.
- Avoid getting bogged down in details. Investigations are designed to support the development of sound implementation actions. Detail beyond that needed for the purpose of developing implementation actions may be superfluous.
- Ensure open and balanced participation from all participants.
- Strive toward consensus-based decision-making.
- Produce meeting summaries and progress reports to ensure that the overall planning process remains focused toward its end goal.
- Evaluate the meeting to ensure that participants are satisfied with the approach.

Sources: Chang and Kehoe (1994); Fisher and Ury (1991); Chechile and Carlisle (1991); Doyle and Straus (1976)

3.5 APPROACHES TO BUILDING CONSENSUS

An effective Regional Action Plan will be developed using a consensus-based process involving major stakeholders represented through the Regional Action Team. This type of process, which ensures that all parties are heard and the actions are not dictated, but mutually agreed upon, typically leads to a greater sense of ownership to the plan, commitment to its recommendations, and a better chance that it will last over the long run. There are many techniques that can be used to develop plans based on a consensus-approach, depending on the size of the group involved and the particular situation in the Region of Concern. As mentioned previously, the optimal group size for this type of process is no more than 7 to 15 participants; if more people are needed, it may be necessary to break into smaller subgroups.

In an ideal planning situation, a trained facilitator (especially one having some technical familiarity with the issues facing the Region of Concern) will provide the skills needed to guide the Regional Action Team. If it is not possible for the Regional Action Team to have a professional facilitator, the team leader, or someone from the lead agency, could perform these duties if the team agrees to that approach and the chosen facilitator is able to remain objective. Alternatively, the lead agency may want to offer facilitation training as part of its overall technical assistance to the regional action planning process. Many organizations offer facilitation services and/or training. Regardless of the approach used to obtain a facilitator, care should be taken in the selection process because the facilitator has a great deal of influence on the overall success of the planning process. Selection criteria include experience with similar planning situations, familiarity with a variety of approaches used to build consensus, familiarity with the ground rules and procedures to conduct efficient meetings, enough technical background to have some familiarity with Region of Concern issues, experience working with groups of a similar size and composition, and ability to remain neutral (not representing any interests).

While it is beyond the scope of this document to provide a thorough discussion of the consensus-building approach to decision-making, two key elements are essential (Fisher and Ury 1991; Doyle and Straus 1976):

- Generating a wide variety of possibilities and alternatives before making a decision
- Measuring the possibilities against previously agreed upon, objective evaluation criteria to determine final outcome.

When evaluating candidates for the facilitator's role, it would be useful to ensure they have familiarity with this kind of approach.

Facility-based pollution prevention planning provides one example of using this approach. Typically, the facilities determine at the outset of the planning process the environmental problems or issues of greatest concern. Using those priorities as the basis for further investigations, the facilities identify a broad range of pollution prevention opportunities that will address targeted environmental problems. This broad list of opportunities is then compared against predetermined evaluation criteria (e.g., liability, regulatory compliance, implementation considerations, costs, environmental impacts) to determine final choices (Chechile and Carlisle 1991; Gaunt et al. 1994; SAIC 1993). Chapter 7 and Appendix D of this guidance document provide more information on decision-making using evaluation criteria.

In order to provide effective input to the planning process, participants need to have enough background information to form the basis for sound decision-making. Ideally, Regional Action Team members will have some technical familiarity and understanding of the issues concerning a Region of Concern. The preparation of background materials in advance of planned meetings can also help. An approach that was effective in conducting the Chesapeake Bay Program's Nonpoint Source Evaluation Panel (Chesapeake Bay Program 1990) is briefly summarized below and may be applicable to the regional action planning process:

- **Identify topics for investigation**—Overall purpose of the planning process is defined by Lead Agency and Regional Action Team, and discrete topics needing additional information are identified. For example, the Regional Action Team may want to learn more about the effectiveness of existing management approaches.
- **Prepare background and options papers**—Lead agency (or volunteers from the Regional Action Team) prepares background materials (e.g., short overview papers) on identified topics. In addition, options papers, outlining specific choices the group may want to use as the basis for its decision-making process, may be prepared. For example, the background paper would summarize the effectiveness of existing management programs, while the options paper would make suggestions on ways to modify/improve the existing programs. Suggestions made in the options paper could be included by the Regional Action Team as potential recommendations in the final plan. Background and options papers should be distributed to team members in advance of the planned meeting so they can have time to review the information (e.g., at least 1 week). The background and options papers may also be supplemented by a presentation at the meeting.
- **Facilitate decision-making**—Using the background and options papers as the basis for dialogue at the meeting, a facilitator guides the group through a consensus-building process to reach agreement on choices (e.g., which options paper recommendations to include in the final plan).
- **Prepare plan**—Using the decision-points generated from the options papers, supplemented by additional input, the lead agency, or a subcommittee of the Regional Action Team,

prepares sections of the final plan. Each section, and the completed draft plan, are distributed to the group for review, comment, and approval.

The length of time for this process obviously varies depending on the situation. It is necessary to give team members adequate time to review materials before the scheduled meetings, so drafts should be distributed at least a week in advance. As well, it is important to allocate sufficient time at the meetings to fully discuss issues and reach consensus. It may be necessary to discuss some issues over the course of several meetings. As outlined in Exhibit 3-8, the regional action planning process should plan on at least the following schedule (Note: Schedule assumes meetings will be conducted for most of a day [e.g., 10:00 a.m. to 3:00 p.m.]):

- Defining vision, goals, and preliminary objectives—One early meeting, but to be modified and refined throughout the process
- Developing a problem statement—One meeting
- Reviewing the efficacy of existing measures—Half of a meeting to one meeting. Could be coupled with a preliminary overview of proposed implementation actions.
- Developing implementation actions—At least two meetings.

3.6 PUBLIC PARTICIPATION AND EDUCATION

A public participation and education program should be implemented throughout the regional action planning process. The Regional Action Team, in conjunction with the lead agency, should take responsibility for defining a public participation approach. Because the Regional Action Team may be consumed with developing the Regional Action Plan, a subset of the team, or a new group designated by the Regional Action Team and/or lead agency, should take responsibility for involving the public. In addition, the Regional Action Team should include ongoing public participation and education as an implementation action for the Regional Action Plan.

The public participation and education program recommended for regional action planning is different from, and moves beyond, stakeholder involvement on the Regional Action Team. Although specific segments of the public are represented on the Regional Action Team, the extent and level of public participation envisioned for the regional action planning process is much broader than the representation provided by the Regional Action Team. In addition, the roles and responsibilities of the Regional Action Team are very different than what is needed for public participation and education. The Regional Action Team is a small group tasked with developing a Regional Action Plan, whereas the

public participation and education approach is intended to build support for the Plan's implementation by informing and enthusing the general public about the Region of Concern.

The public includes all citizens who live in the area—those represented by specific stakeholder groups (e.g., Regional Action Team, civic groups, business associations, environmental organizations) and citizens who may not be so represented (e.g., homemakers, subsistence fishers). Some examples of specific sectors of the public that should be included in a public participation and education approach are private businesses, homeowners associations, garden clubs, civic groups, schools and colleges, churches, educational nonprofit organizations, and groups that represent racial and ethnic minorities. The broad involvement of these groups is necessary to ensure successful plan implementation. Only when the public understands and embraces the plan, will they be able to support implementation.

The importance of including the general public cannot be overemphasized. Public involvement is a critical link between plan development and implementation. During this era of severe constraints on both government and private sector funding, recognizing the value of the public as a resource is essential to achieving the goals and objectives of Regional Action Plans. Likewise, public involvement in planning will generate more commitment and volunteerism during implementation. An educated and motivated public can provide much of the expertise, time, effort, and leadership needed to protect and monitor the Region of Concern. Two factors are crucial for encouraging public involvement: (1) education about the Region of Concern, including how the individual is a part of the problem and solution, and (2) inclusion in the planning process, even if it is just to be kept informed. People work for that which they understand and are committed, and people are committed to that which they help create. The public's talents, energy, and technical and financial resources can be a cost-effective way of solving many of the Region of Concern's problems.

One of the cornerstones of successful action planning efforts is the building of coalitions among government agencies, parties affected by or contributing to problems in the Region of Concern, and an informed, committed general public. Citizens are important in keeping the regional action planning process focused and moving towards its goals. As well, citizens groups may be active participants in the process—serving as watchdogs, conducting volunteer cleanup and monitoring activities (e.g., schools and churches can sponsor an "adopt a watershed" program, contribute to "Bay or river watch" computer bulletin boards, or help with a speaker's bureau and with periodic conferences and workshops). The resident of a Region of Concern will work harder to secure his or her own future than other, more transient entities (e.g., distant government employees) (Hartig and Zarull 1992; Law and Hartig 1993).

Because the development and implementation of Regional Action Plans is a long-term, ongoing process, continued public involvement and a long-term commitment to regional action planning is essential.

Continued effective involvement can only be maintained, however, if all participants are convinced that the time spent on regional action planning is productive. If the public does not see short-term progress in remediation, they may become disillusioned and abandon the process. Short-term, focused projects must be organized that are of interest to and achievable by the public. Building a record of such successes is one mechanism of sustaining public involvement.

Two important components to any public participation program are to define the elements of effective public participation and to design a public participation program that will produce the support needed for Regional Action Plans. Critical elements to every public participation program are trust, communication, opportunity, and flexibility (Law and Hartig 1993). Trust must be established between those directly involved in the regional action planning process and the public. Although it is the most difficult of the four elements to attain, trust is also the most essential element in a successfully implemented Regional Action Plan. To establish *trust* the following must occur: *communication* must be open between participants, *opportunities* must exist for public input, and *flexibility* must be maintained in the planning process to accommodate both new information and necessary changes in the program.

To build broad-based community support, effective public participation in the regional action planning process should be encouraged throughout the entire planning process. Public involvement should be initiated at the outset of the planning process with the distribution of information (e.g., press releases, public meetings) about the planning process, including goals and objectives, approach, and timeframes and milestones. Opportunities for continued public involvement should also be outlined at that time. Actions to inform and involve the public should occur throughout the life of the planning process, especially at critical stages, such as defining the problems, developing goals and objectives, and brainstorming about implementation actions. The public should also be involved in monitoring the Plan's implementation until restoration is complete. It is not intended that the public become part of the Regional Action Team. Rather, the public participation and education approach provides opportunities for the general public to provide input to the Regional Action Team. Such citizen involvement will provide the Regional Action Plan with invaluable local knowledge, the continuous and vigorous public oversight needed to overcome bureaucratic inertia, and the political will accomplish goals and objectives (Hartig and Zarull 1992; Law and Hartig 1993).

To maximize its effectiveness, the public outreach should compliment existing user groups and avoid costly duplication of other groups' efforts. The Regional Action Plan's public participation programs most useful role may be coordinating between and filling gaps in existing programs. There are many ways to achieve these objectives; however, the following scenario is presented for example. First, the Regional Action Team or its public participation subgroup should identify the Regional Action Plan's educational priorities. Second, existing public education and outreach programs in the Region of Concern should be surveyed. This investigation may demonstrate that many public and private groups in the Region of Concern are addressing issues that the Regional Action Plan deems important. Once the list of major education organizations is compiled, the list can be analyzed for specific geographic areas or focus on a specific issue. The Regional Action Plan represents many interests throughout the Region of Concern and may serve a unique role as coordinator of a network of complementary, overlapping interests. Gaps of information can be filled by sharing and disseminating information and resources.

Not all user groups are the same and the Regional Action Plan should determine the audience's level of knowledge and involvement with the Region of Concern. The Regional Action Plan's public participation program should provide a foundation for a true understanding of issues related to the Region of Concern. Accordingly, the public participation program should devise a public education strategy that provides for different levels of involvement. First, the Regional Action Plan may promote existing programs. Second, the Regional Action Plan may seek to change existing programs or broaden their focus to incorporate Regional Action Plan messages. Third, the Regional Action Plan should encourage the creation of new programs when appropriate. For example, if another group is addressing an issue adequately, the Regional Action Plan may help to promote and publicize its efforts. Whereas, if a second group needs financial or logistical assistance, the Regional Action Plan may try to provide the resources necessary for the group to organize its work. As a last resort, if the Regional Action Plan identifies an educational need that no one else is addressing, then the Regional Action Plan should initiate a new program.

Once it defines areas needing additional involvement, the team should implement a range of public participation and education tools. In addition, the team should coordinate with any existing communications activities that support the Chesapeake Bay Program. Throughout the planning process, the public should be given regular updates through newsletters, fact sheets, and press releases. It is important to communicate possible planning options to the public before they are narrowed or selected. It may also be appropriate to publish a newsletter for each Region of Concern. Team members should periodically speak to organizations that represent sectors of the general public. Among other activities,

the team should establish contacts with the media and encourage regular stories and news clips. The media should be encouraged to take responsibility for educating the public at large by contributing staff and other resources to educational video spots and public service announcements, along with other actions. Depending on the public's involvement in the Region of Concern, it may be useful to consider establishing a nonprofit organization that could promote public education and participation during plan development and implementation or to build upon the efforts of an existing organization.

Public Participation and Education Tools

- Public meetings and hearings
- Public workshops and forums
- Public roundtables
- Speakers' bureau
- Outreach to schools, such as teachers' guides and curricula
- Citizen surveys
- Citizen monitoring and/or watchdog groups
- Newsletters, videos, and television programs
- Annual progress reports
- Computer bulletin boards
- Nonprofit educational groups
- Cleanup days and other special events

REFERENCES CITED

- Cechile, R. and S. Carlisle. 1991. *Environmental Decision Making: A Multidisciplinary Perspective*. New York: Van Nostrand Reinhold.
- Chang, R. and K. Kehoe. 1994. *Meetings that Work!* Irvine: Richard Chang Associates, Inc.
- Chesapeake Bay Program. 1990. *Report and Recommendations of the Nonpoint Source Evaluation Panel*. CBP/TRS 56/91.
- Davidson, C. Personal communication with Carla Davidson, Southeast Michigan Council of Governments, in June 1994.
- Doyle, M and D. Straus. 1976. *How to Make Meetings Work!* New York: Berkley Books.
- Fisher, R. and W. Ury. 1991. *Getting to YES: Negotiating Agreement Without Giving In*. New York: Penguin Books.
- Gaunt C., K. Palmer, K. Allman, and G. Childs. 1994. Opportunities for Community-Based Pollution Prevention Planning in the Chesapeake Bay Basin—The TIPPP Example. Prepared for the Chesapeake Research Conference, June 1994.
- Harris, V. Personal communication with Vicky Harris, Wisconsin Department of Natural Resources, in June 1994.
- Hartig, J., N. Law, and G. Wever. 1994. Applying TQM to Remedial Action Planning in the Great Lakes. *E²M*. Spring 1994.
- Hartig, J. and M. Zarull. 1992. *Under RAPs—Toward Grassroots Ecological Democracy in the Great Lakes Basin*. Ann Arbor: University of Michigan Press.
- Law, N. and J. Hartig. 1993. Public Participation in Great Lakes Remedial Action Plans. *Plan Canada*. March 1993.
- Letterhos, J. 1992. *Dredging Up the Past: The Challenge of the Ashtabula River Remedial Action Plan*. In: Hartig, J. and M. Zarull. 1992. *Under RAPs—Toward Grassroots Ecological Democracy in the Great Lakes Basin*. Ann Arbor: University of Michigan Press.
- Schramik, R. Personal communication with Roy Schramik, Michigan Department of Natural Resources, in June 1994.
- Science Applications International Corporation (SAIC). 1993. Fort Eustis/Fort Story Pollution Prevention Program Plan. Prepared for Directorate of Engineering and Housing, Environmental and National Resources Division, U.S. Army Transportation Center-Fort Eustis. AEPI Contract Number DAC 88-92-D-002.
- Shuyler, L. Personal communication with Lynn Schuyler, Chesapeake Bay Program, in June 1995.
- Swiniuch, R. Personal communication with Rich Swiniuch, New York State Department of Environmental Conservation, in June 1994.

CHAPTER 4

**DEFINING THE PLAN'S VISION, GOALS,
OBJECTIVES, AND MILESTONES**

CHAPTER 4

TABLE OF CONTENTS

	Page
4. DEFINING THE PLAN'S VISION, GOALS, OBJECTIVES, AND MILESTONES	4-1
4.1 THE NEED FOR VISION STATEMENTS, GOALS, OBJECTIVES, AND MILESTONES	4-2
4.2 DEVELOPING EFFECTIVE VISION STATEMENTS, GOALS, OBJECTIVES, AND MILESTONES	4-4
4.2.1 Conducting Preliminary Background Research	4-5
4.2.2 Developing a Vision Statement	4-6
4.2.3 Establishing Goals, Objectives, and Milestones	4-11
References Cited	4-15

EXHIBITS

4-1. Overview of Steps Needed to Develop a Vision Statement, Goals, Objectives, and Milestones	4-4
4-2. Example of a Relatively Specific Vision Statement for the Citizens' Desired State of the Lower Green Bay and Fox River Ecosystem	4-7
4-3. Example of a General Vision Statement and Associated Goals Developed for the Comprehensive Conservation and Management Plan for the San Francisco Bay	4-8
4-4. Common Vision Sketch of the Desired Future State for the Chesapeake Bay Basin	4-10
4-5. Example Questions for a Citizen Survey	4-11
4-6. Regional Action Plan Example—Vision Statement, Goals, Objectives, and Milestones	4-13

CHAPTER 4. DEFINING THE PLAN'S VISION, GOALS, OBJECTIVES, AND MILESTONES

The successful development and implementation of Regional Action Plans depends, in part, on having an overall vision and clearly defined and measurable goals and objectives. Many comprehensive planning efforts, such as Great Lakes remedial action planning, have found that establishing an articulated long-term vision statement at the beginning of the planning process is an important prerequisite for the subsequent definition of goals and objectives (Hartig et al. 1994; Hartig and Zarull 1992). Once an overall vision for a Region of Concern is determined and agreed upon by all significant stakeholders (represented by the Regional Action Team), the process of establishing goals, objectives, and milestones becomes more clear. Establishing milestones throughout the planning process is an effective way to maintain momentum in plan development and implementation, especially with regards to measuring progress.

Regional action planning is a hierarchical process that proceeds from a general, all-encompassing vision statement to more specific goals, objectives, and milestones for achieving the vision. Each step is an important link in the process and a necessary prerequisite for the next aspect of the planning effort. As a general rule, the steps should be completed sequentially to ensure that actions completed later in the process are consistent with the vision statement and goals. However, many parts of the regional action planning process are iterative, and the plan should be flexible to accommodate change as more knowledge is gained about the Region of Concern. Goals, and especially objectives, are likely to be refined or otherwise modified as the information base grows.

This chapter addresses the importance of using stakeholders and the general public to develop a vision statement, goals, objectives, and milestones. This chapter also provides suggested techniques for establishing vision statements, goals, and objectives and presents a variety of examples. Drawing in part on the experiences of planning efforts in other areas of the United States, this chapter summarizes some key considerations in developing effective goals. Specifically, the chapter addresses:

- The Need for Vision Statements, Goals, Objectives, and Milestones
- Developing Effective Vision Statements, Goals, Objectives, and Milestones.

Developing a vision statement and corresponding goals is a crucial early phase of the planning process that focuses the additional investigations needed to develop an effective implementation approach.

This chapter defines objectives as more specific, often measurable, subparts of goals. Preliminary objectives and milestones may be prepared early in the planning process but are likely to be revised and expanded as more information is generated throughout plan development. Milestones, in particular, are likely to evolve from general to specific as the planning process progresses. Initial milestones will be developed as general targets associated with a goal, while later milestones will be more specific to address each step of an implementation action.

4.1 THE NEED FOR VISION STATEMENTS, GOALS, OBJECTIVES, AND MILESTONES

The most important task in developing a Regional Action Plan is arguably the formulation of a vision statement and corresponding goals and objectives. The vision statement identifies the stakeholders' common purpose for the Region of Concern and provides the glue for holding the other components of the Regional Action Plan together. Empowering stakeholders to develop and reach consensus on the Regional Action Plan's vision statement, goals, and objectives is absolutely necessary to design an effective implementation approach. Working toward a unified vision and goals also focuses the planning process, thereby increasing the opportunity for efficient resource use.

Definitions and Examples of Vision Statement, Goals, Objectives, and Milestones*

- **Vision Statement**—A very general statement identifying the desired future state of a Region of Concern that provides overall direction for the regional action planning process.

Example: *A healthy river and Bay environment providing the quality of water and habitat needed for indigenous species and recreational fishing.*

- **Goals**—Statements more specific than the vision statement, but still general, that describe a desired condition rather than a carefully defined end-point. Goals, when taken together, will move toward achieving the vision for the Region of Concern. Goals can be both short- and long-term and must be realistic. It is important to develop a mix of goals that are easy to implement/achieve early in the process (this will help build commitment/buy-in) and goals that may be more difficult (but are still realistic) to implement/achieve.

Example: *Return a sustainable recreational fishery in the river.*

- **Objectives**—More specific subsets of goals. Objectives can be used to guide the selection of concrete implementation actions and to judge proposed actions for funding priorities. They must be realistic, time-oriented, and sufficiently quantifiable to allow measurement of the plan's success.

Example: *Reduce ambient toxicity in the water and sediments in the Region of Concern so as to eliminate fish consumption advisories.*

- **Milestones**—Relate objectives to specific schedules. Again, it is useful to have both short-term and long-term objectives.

Example: *Reduce ambient toxicity in the water and sediments in the Region of Concern so as to eliminate fish consumption advisories by the year 2000.*

* Examples are listed for illustrative purposes only.

The planning process is likely to be much more productive if early Regional Action Team consensus is achieved on the vision statement and goals. Such consensus establishes a common purpose and focus for the Regional Action Team. Operating without a clear vision statement and goals is like

traveling without a destination. Loosely defined objectives and milestones will fail to give the Regional Action Team the roadmap needed to measure progress during implementation. Stakeholder groups (e.g., Regional Action Team), including the lead agencies, often do not spend the time necessary to define properly a vision, goals, objectives, and milestones. Frequently, water resources planning efforts default to the Clean Water Act goal of "restoring beneficial uses" to the Region of Concern. While this is an admirable goal, it does not provide the level of specificity needed to guide the regional action planning process or to develop a measurable implementation approach. Stakeholder groups should be encouraged to think beyond a default regulatory goal to more broadly consider whether additional, more specific (and possibly less regulatory) goals should be developed.

Vague and undefined goals, objectives, and milestones cause problems in both developing and implementing Regional Action Plans. For instance, proposed implementation actions may be debated to a greater extent during plan development if the Regional Action Team did not build a consensus on goals and objectives earlier in the process. The process of developing a vision statement and goals can unify stakeholders. Developing an early consensus, however, does not guarantee that the group will agree on an implementation approach. Traditionally, these decisions, which incorporate economic, political, and social issues, are much harder to reach because they more directly affect stakeholders.

Undefined goals, objectives, and milestones can also erode plan implementation because they create a situation that weakens the accountability of parties responsible for implementing the plan. For instance, it is very difficult to measure success or to hold responsible parties, including public agencies, accountable if the plan's goals and objectives are not specific or measurable. Unclear goals and objectives can also reduce the value of a monitoring program because it is difficult to measure the results.

Securing commitments from elected officials to the goals and objectives will often increase the political accountability and impetus for the Regional Action Plan. In fact, commitment from top level management is often critical to a plan's success. Frequently, this level of buy-in may provide the needed authority (including regulatory) and financial resources required to improve plan development and implementation. Elected officials on the local and state level can also embrace the goals as political objectives.

Goals and objectives will evolve and change as the planning process moves forward. As more is learned about the Region of Concern, the goals and objectives may need to be modified to reflect better

the current state of knowledge. A successful regional action planning effort must be iterative, with the incorporation of re-evaluation steps and opportunities for plan adjustment.

4.2 DEVELOPING EFFECTIVE VISION STATEMENTS, GOALS, OBJECTIVES, AND MILESTONES

This section describes the steps that the Regional Action Team should take in developing a Regional Action Plan that links a vision statement, goals, objectives, and milestones to problems and implementation actions. Although the process is iterative, the steps described in Exhibit 4-1 should generally be followed. The remainder of this section describes some of these steps in the following subsections:

- Conducting preliminary background research (Step 1)
- Developing a vision statement (Step 2)
- Establishing goals, objectives, and milestones (Steps 3, 5, and 6).

The subsections provide an overview of the process, including recommended methodologies, that could be applied when developing a vision statement, goals, objectives, and milestones. Information related to further problem definition (Step 4) is presented in Chapter 5 of this document.

Exhibit 4-1. Overview of Steps Needed to Develop a Vision Statement, Goals, Objectives, and Milestones

1. **Conduct preliminary background research**—Gather and synthesize readily available information to prepare a general overview of chemical contaminant-related problems that are affecting the Region of Concern. Coordinate and, if applicable, integrate Regional Action Team efforts with existing plans and efforts (e.g., the Anacostia Watershed Restoration Committee and its six-point plan).
2. **Develop vision statement**—Use the background research to stimulate Regional Action Team development of a vision statement.
3. **Identify preliminary goals and objectives**—Use the background research, problem overview, and vision statement to facilitate Regional Action Team decision-making on preliminary goals and objectives.
4. **Further define problems**—Use the process presented in Chapter 5 of this document to further define problems in the context of the vision statement, goals, and objectives.
5. **Refine goals and objectives**—Modify preliminary goals and objectives and/or develop new ones, as necessary, as more is learned about the Region of Concern throughout the planning process, especially as problems become better understood.
6. **Develop milestones**—As the information base on the Region of Concern grows, it is possible to begin developing milestones for identified goals and objectives. Milestones will range from the general (e.g., achieving a goal by a certain year) to the specific (e.g., schedule for implementing each step of a proposed action).

Throughout the regional action planning process, technical experts and the scientific community should review the team's recommendations and supporting information to ensure that stakeholders have access to the most recent technical approaches and information and to provide an opportunity for balancing stakeholder interests with scientific information, as appropriate. Periodically, the team's progress should also be presented to the general public for their review and contributions. Section 3.6 of Chapter 3 provides more information on the importance of public participation.

4.2.1 Conducting Preliminary Background Research

It is important to have a general understanding of the problems facing the Region of Concern before a vision statement and preliminary goals and objectives can be established effectively. The reason for this is obvious—it is not expedient to have the Regional Action Team spend time and resources developing goals and objectives for problems that are not of concern. In later stages of the planning process, a much more detailed definition of the problems is needed to develop an effective, targeted implementation approach. Chapter 5 describes how to refine the understanding of problems by acquiring and interpreting information on the nature, extent, and sources of chemical contamination contributing to the problem. It is not practical nor desirable to complete these more detailed investigations before preliminary goals and objectives are established. Rather, goals and objectives should be used to focus the specific investigations needed to define problems so that a well-designed implementation approach can be developed.

The lead agency can use existing materials (e.g., reports, journal and newspaper articles, and fact sheets) and can contact groups or individuals familiar with the Region of Concern to build a basic understanding of issues and problems in the Region of Concern. The lead agency should present these background investigations for the Regional Action Team as a short paper or fact sheet summarizing the problems and other relevant information on the Region on Concern. Background materials prepared by the lead agency and distributed to the Regional Action Team in advance of its planned meeting for establishing a vision statement and preliminary goals and objectives, supplemented by presentations at the meeting and by Regional Action Team input, should provide the foundation needed to establish consensus on a preliminary problem definition and corresponding vision statement, goals, and, possibly, objectives. Because objectives are more quantifiable, they may be best developed later in the planning process. While it is necessary to focus the planning process by identifying key problems and corresponding goals, it is important not to focus too narrowly in these early planning stages, or other important problems could be excluded. The regional action planning process is a challenging one—

although it is necessary to focus the study to effectively use limited resources, it is also important to maintain an open mind and flexibility so that modifications can be made as more information is gathered.

Establishing specific goals and objectives based on an adequate general understanding of the environmental problems early in the planning process can minimize conflict and arguments about specific actions later on. For example, it may be clearer to an industry representative why stormwater plans and monitoring are necessary in a particular location within the Region of Concern if the stakeholder group establishes goals and objectives relating to the control of chemical contaminants from stormwater early in the process.

4.2.2 Developing a Vision Statement

Stakeholders should develop a vision statement as a way of creating a framework for more specific goals, objectives, and milestones. A vision statement should be a broad representation of stakeholder values, both human and non-human. The statement should convey a desired state for the Region of Concern. Stakeholders should consider the vision statement their overall mission. The vision should be a practical statement based on the physical, social, and political conditions in the Region of Concern. The vision statement, and the related goals and objectives, should recognize the current and expected land uses in the watershed surrounding the Region of Concern. In Baltimore Harbor or the Elizabeth River, for example, restoring water bodies to pristine conditions for aquatic life is not practical because of the current levels of chemical contamination and the expectation that most of the land will remain in urban and industrial use. A realistic vision statement could include restoring recreational fishing for species currently found in these Regions of Concern. Vision statements developed by stakeholders involved in regional action planning in several areas, including the Lower Green Bay area in Wisconsin and the San Francisco Bay in California, vary in their level of detail (San Francisco Estuary Project Management Committee 1993; Wisconsin Department of Natural Resources 1987; Wisconsin Department of Natural Resources and Green Bay Remedial Action Plan Public Advisory Committee 1993). Most statements, however, are broad-based and general, such as ensuring a healthy river and bay ecosystem.

As an example of a relatively specific vision statement, Exhibit 4-2 summarizes the citizens' desired state of the Lower Green Bay and Fox River Ecosystem that was developed by the Lower Green Bay Remedial Action Plan Citizens Advisory Committee (Wisconsin Department of Natural Resources and Green Bay Remedial Action Plan Public Advisory Committee 1993). This vision statement relates closely to the goals and objectives. For instance, the stakeholders who developed this statement obviously

Exhibit 4-2. Example of a Relatively Specific Vision Statement for the Citizens' Desired State of the Lower Green Bay and Fox River Ecosystem

1. A healthy river and Bay environment providing water quality and habitat for balanced and productive wildlife and plant communities including a well-balanced, sustainable, and edible sport and commercial fishery.
2. Water-based recreation opportunities including:
 - a. Accessible local swimming beaches on the Bay; and
 - b. Adequate boating areas and facilities,
3. Fox River and Lower Green Bay water quality that protects human health and wildlife from effects of contaminants and meets water quality standards which could provide for drinkable water after standard treatment.
4. Balanced public and private shoreline usage including park, agricultural, commercial, residential, and industrial lands.
5. An economical transportation network including both water and land-based systems which minimizes adverse environmental effects.
6. Point and nonpoint discharges and runoff consistent with the maintenance of the desired water quality future state.

Source: Wisconsin Department of Natural Resources and Green Bay Remedial Action Plan Public Advisory Committee (1993).

believed that a specific vision statement was necessary to guide plan development and to communicate a vision effectively to the public. The statement includes elements that other planning efforts, including the San Francisco Estuary Project, would include as goals and even objectives. For example, the element that involves point and nonpoint discharge and runoff control could be an appropriate objective. Developing a more specific vision statement may be possible if there is broad understanding of the problem and a general consensus on appropriate solutions early in the planning process. Also, as stated previously, the incorporation of vision statements and goals from planning documents that already exist for the Region of Concern or similar areas, such as watershed management plans, may allow for the development of a more specific vision statement.

Exhibit 4-3 provides an example of a general vision statement used as a preface for more specific goals. More than 100 stakeholders contributed to the vision statement, which was developed for the Comprehensive Conservation and Management Plan for the San Francisco Bay Estuary Project (San Francisco Estuary Project Management Committee 1993). The Estuary Project example, like the one for the Lower Green Bay, offers a vision that incorporates an ecosystem approach, not only concern about protecting human health and the environment from chemical contaminants.

Exhibit 4-3. Example of a General Vision Statement and Associated Goals Developed for the Comprehensive Conservation and Management Plan for the San Francisco Bay

Vision Statement: "We, the people of California and the San Francisco Bay-Delta Region, believe the San Francisco Bay-Delta Estuary is an international treasure and that our ongoing stewardship is critical to its preservation, restoration and enhancement. Acknowledging the importance of the estuary to our environmental and economic well-being, we pledge to achieve and maintain an ecologically diverse and productive natural estuarine system."

Goals:

- Restore and protect a diverse, balanced, and healthy population of fish, invertebrates, wildlife, plants, and their habitats, focusing on indigenous species.
- Assure that the beneficial uses of the Bay and Delta are protected.
- Improve water quality, where feasible, by eliminating and preventing pollution at its source, while minimizing the discharge of pollutants from point and nonpoint sources and remediating existing pollution.
- Manage dredging and waterway modifications to minimize adverse environmental impacts.
- Effectively manage and coordinate land and water use to achieve the goals of the Estuary Project.
- Increase our scientific understanding of the Estuary and use that knowledge to better manage the Estuary.
- Develop and expand nonregulatory programs, such as public-private partnerships and market incentives, in conjunction with regulatory programs, to achieve the goals of the Project.
- Preserve and restore wetlands to provide habitat for wildlife, improve water quality, and protect against flooding.
- Assure an adequate freshwater flow as one of the essential components to restore and maintain a clean, healthy, and diverse Estuary.

Source: San Francisco Estuary Project Management Committee (1993).

Although this guidance document focuses on chemical contaminants, the Regional Action Team may want to establish a vision statement and goals within the framework of a more holistic approach concerned about restoring a broader desired state (e.g., ecosystem restoration) for the Region of Concern. This can be accomplished by gathering information from stakeholder groups addressing other concerns, such as wetlands and wildlife, and planning goals, including public access and recreation.

Several methods, some more elaborate than others, can be used to develop vision statements. The methods include using visual preference or community image surveys, verbally characterizing a vision, and employing citizen surveys. A useful and creative way to develop a vision statement is to perform a visual preference survey of the stakeholders' images or visions of the desired future state of the watershed. Stakeholders (e.g., the Regional Action Team) are shown a series of photographic slides that illustrate possible visions for the watershed. The slides, taken from existing areas, should provide

a range of visions, representing ideal and current conditions, of the various qualities of a desired future state (e.g., fishing, other recreation, public access, wildlife, riparian habitat). As few as 40 slides can be used. The group should rank the slides on a scale of 1 to 5, with 1 being the preferred vision. The purpose of this exercise is to create a common vision of the Region of Concern. If appropriate, after the group establishes the vision, a local artist (perhaps a community college art teacher or another person interested in watershed protection that could volunteer his or her time) could visit the group and draw a sketch based on the shared understanding. Exhibit 4-4 provides an example of a common vision sketch based on the environmental indicators program of the Chesapeake Bay Program. The use of pictorial images to convey a vision is gaining popularity in the design of community land use and development plans and is appropriate for identifying a vision for the uses and qualities of a watershed (Nelessen 1994).

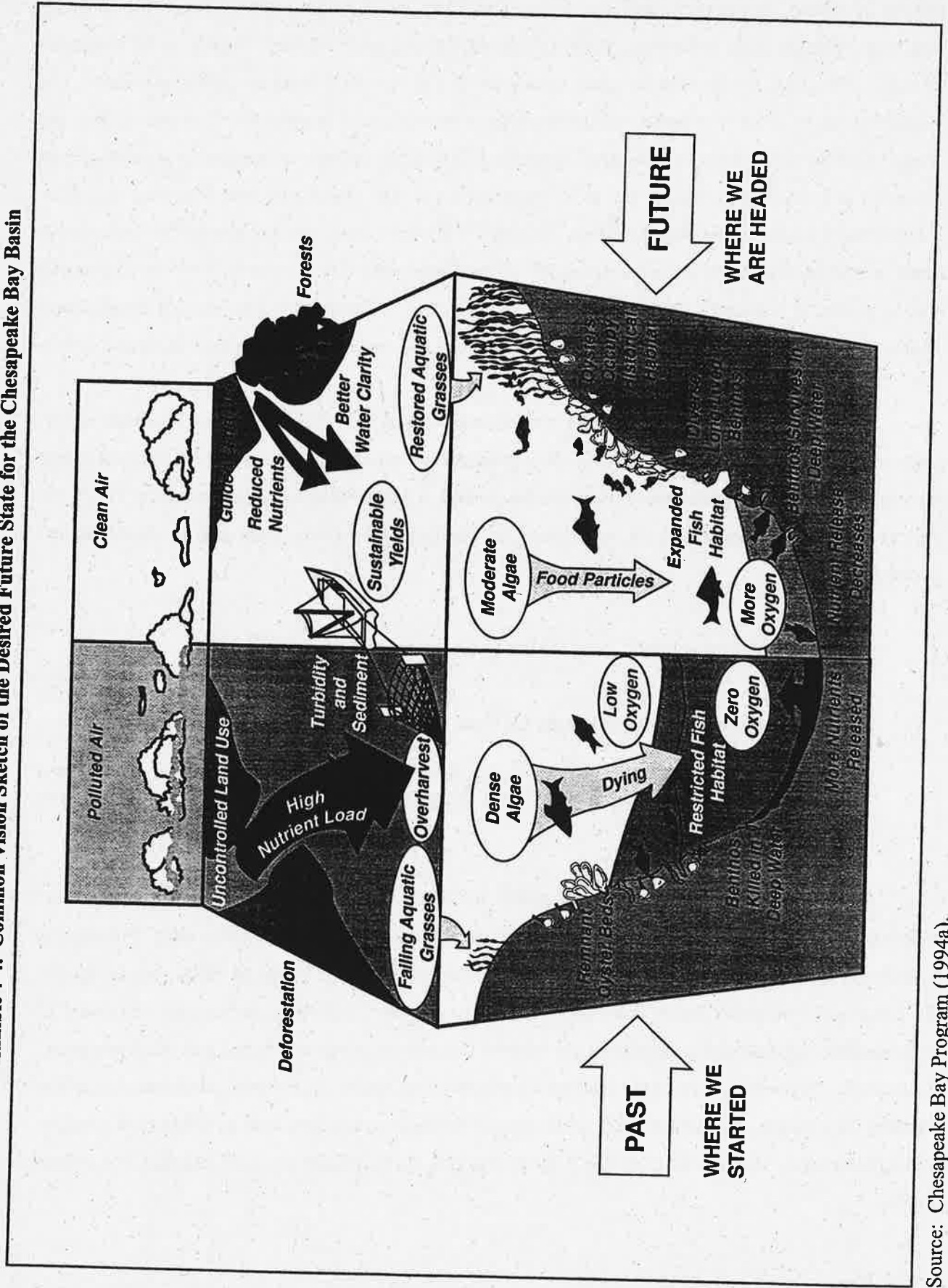
The general public can also provide input for establishing the vision statement. When the vision, goals, and objectives are being established, large meetings and workshops should be held to invite public participation. A visual preference survey can be given at a public meeting, or the common vision, as well as possible alternative visions, established by the Regional Action Team can be displayed and discussed.

Other ways of getting public input for the vision-setting process include:

- Asking students to develop images for class projects
- Videotaping images of the watershed (perhaps based on another area that is already at a "desired future state") and showing these images on local news programs and to community and business groups.

Citizen surveys, either by mail or telephone, to determine public perceptions of the problems and images for a desired future state provide another technique for developing a vision statement. Preferences or tradeoffs between different values, such as aquatic habitat and public access to rivers, can be gauged and numerically weighted during these surveys or focus groups. Preference surveys are often used in environmental management to determine the relative importance of environmental and other attributes. For example, this technique has been used extensively in siting studies for industrial facilities. Using the resulting information, stakeholders and public agency decision-makers can craft solutions that consider public preferences. Exhibit 4-5 provides a list of example questions that could be included in a citizen survey.

Exhibit 4-4. Common Vision Sketch of the Desired Future State for the Chesapeake Bay Basin



Source: Chesapeake Bay Program (1994a).

Exhibit 4-5. Example Questions for a Citizen Survey

1. What role or interests do you have in the Region of Concern?
2. What do you see as the major problems (associated with chemical contamination) in the Region of Concern?
3. Has chemical contamination in the Region of Concern caused you to stop doing or do less of the things you used to do for recreation (e.g., fishing, boating, sightseeing)?
4. Has chemical contamination in the Region of Concern affected you in any other ways?
5. Do you think that the current water quality in the Region of Concern makes it very safe for swimming, somewhat safe, somewhat unsafe, or very unsafe?
6. Do you think that the current water quality in the Region of Concern makes it very safe to eat fish and other seafood from the Region of Concern, somewhat safe, somewhat unsafe, or very unsafe?
7. Do you think that the current water quality in the Region of Concern makes it very safe for fish and other aquatic life that live in the Region of Concern, somewhat safe, somewhat unsafe, or very unsafe?
8. What do you think the highest priority should be for the Region of Concern (e.g., to make it safe for swimming, safe to eat seafood from, safe for fish and other aquatic life)?
9. Can you think of any other improvements, with regards to problems associated with chemical contamination, that you would like to see in the Region of Concern?
10. What is your primary goal for addressing chemical contamination issues in the Region of Concern?
11. What method or techniques should be used to involve citizens in the development of the Regional Action Plan (e.g., newsletters, workshops)?

Sources: Chesapeake Bay Program (1994b); Lane Council of Governments (1995).

4.2.3 Establishing Goals, Objectives, and Milestones

Specific goals, objectives, and milestones must be developed to realize the vision established for the Regional Action Plan. They should be clearly stated and supported by a realistic assessment of the problem and the feasibility of resolution. The goals should encourage physical change in the watershed, such as restoring fish and wildlife populations. Goals should also be established for improving scientific understanding and public education, as well as for developing management approaches, such as regulatory and nonregulatory programs (e.g., public-private partnerships).

Objectives are even more specific than goals. They can establish quantitative measures, such as a percentage reduction in a particular chemical contaminant or the attainment of a particular water quality standard. Building a capital improvement project, such as a retention basin for combined sewer

overflows, or creating a public education center are other examples of objectives. Achieving high profile and easy to implement objectives, such as public education centers and improved public access to the Region of Concern, early in the plan's implementation can create momentum and public support for more complex and expensive objectives, such as the establishment of a stormwater retention basin. Preliminary objectives can be developed early in the planning process, at the same time goals are being established. Because they contain more specific information than goals, however, objectives will probably be developed and refined throughout the process as the information base expands.

Milestones should relate objectives to a specific end-point (e.g., product) and schedule. For example, an appropriate milestone could be to reduce polychlorinated biphenyl concentrations in sediment in a particular stream section by 40 percent by the year 2000.

Exhibit 4-6 shows the relationship among the vision statement, goals, objectives, and milestones. As shown in this exhibit, goals and objectives should be measurable. Consequently, milestones provide timetables for monitoring and tracking progress towards achieving goals and objectives. The Regional Action Team also may choose to add comments reflecting possible opportunities and challenges associated with the goals and objectives. For example, objective I.A.3 simply notes that the milestones would necessitate nearly a "... 30 percent reduction from current levels." The exhibit formats are useful models for Regional Action Plans in the Chesapeake Bay area.

If the process to establish goals and objectives adequately accounts for the interests of stakeholders, it should be possible to get volunteers (e.g., members of the Regional Action Team) to marshal specific implementation actions. As a backup strategy, the lead agency may want to give the goals and objectives more clout by incorporating them into the Clean Water Act regulatory framework. The process would formally establish a goal as a regulatory standard so that it becomes a designated use for the Region of Concern or a segment of this area. This procedure must be performed in accordance with applicable water quality regulations (40 *CFR* 131).

In certain Regions of Concern, plans and programs related to watershed restoration have been developed and are being implemented. For example, a six-point action plan has been developed for the Anacostia River watershed (Anacostia Restoration Team and MWCOC 1991). As mentioned previously in this chapter, the Regional Action Team should review existing plans and programs already developed for the Region of Concern and similar locations when establishing goals, objectives, milestones, and specific implementation actions. The team should, for example, review other Regional Action Plans,

Exhibit 4-6. Regional Action Plan Example—Vision Statement, Goals, Objectives, and Milestones*

Vision Statement	Goals	Objectives	Milestones	Comments
<p>I. Water quality that protects human health and wildlife from the effects of chemical contaminants and meets water quality standards that could provide drinkable water after standard treatment</p>	<p>I.A. Achieve and maintain water quality that protects the ecosystem from the adverse effects of chemical contaminants on shoreline and aquatic vegetation, fish, aquatic life, and wildlife utilizing the aquatic resources and that protects human health</p>	<p>I.A.1 Reduce chemical contaminants in the water column to levels that meet the most stringent state and/or federal fish consumption advisory levels and protect human health, wildlife, and fish and aquatic life, as well as their reproductive success¹</p>	<p>Achieve by the year 2000</p>	
		<p>I.A.2 Reduce chemical contaminants in fish tissue to levels that protect the humans, birds, and animals that consume them and that protect reproductive success¹</p>	<p>Achieve by the year 2000</p>	
		<p>I.A.3 Reduce chemical contaminants in wildlife tissue to levels that protect human and wildlife health and do not impair reproductive success (i.e., Food and Drug Administration Action Level of $2.0 \times 10^3 \mu\text{g}/\text{kg}$)¹</p>	<p>Achieve by the year 2000</p>	<p>30-percent reduction from current levels</p>
		<p>I.A.4 Reduce chemical contaminants in sediment or the release from sediment to levels that are not acutely or chronically toxic to fish and aquatic life or humans and wildlife that consume them¹</p>	<p>Achieve by the year 2005</p>	

* Items are listed for illustrative purposes only and are not intended to be an exhaustive list. They are partly based on the *Lower Green Bay Remedial Action Plan, 1993 Update* (Wisconsin Department of Natural Resources and Green Bay Remedial Action Plan Public Advisory Committee 1993).

¹ Specific contaminants include polychlorinated biphenyls, dioxin, DDT, ammonia, mercury, and lead.

area-wide water quality management plans (e.g., 208 plans, 319 plans, tributary strategies), sewer service area plans, wastewater facility plans, and other specific watershed plans. Proceeding from this review, the group can incorporate ongoing initiatives into the Regional Action Plan. For instance, if an existing plan establishes goals for stormwater management (e.g., development of municipal stormwater management plans), these goals should be incorporated, as appropriate, into the Regional Action Plan rather than developing new goals. It is also important to ensure that goals, objectives, and milestones developed for the Regional Action Plan are not in conflict with ongoing planning efforts.

REFERENCES CITED

- Anacostia Restoration Team and Metropolitan Washington Council of Governments (MWCOG). 1991. *A Commitment to Restore Our Home River—A Six Point Action Plan to Restore the Anacostia River*. Washington, DC: Metropolitan Washington Council of Governments. Publication Number 91708.
- Chesapeake Bay Program. 1994a. Environmental Indicators Presentation—Photographic Slides and Speaker's Notes.
- Chesapeake Bay Program. 1994b. *Chesapeake Bay Attitudes Survey*.
- Hartig, J. and M. Zarull. 1992. *Under RAPs—Toward Grassroots Ecological Democracy in the Great Lakes Basin*. Ann Arbor: University of Michigan Press.
- Hartig, J., N. Law, and G. Wever. 1994. Applying TQM to Remedial Action Planning in the Great Lakes. *E²m* (Spring 1994).
- Nelessen, A. 1994. *Visions for an American Dream*. Chicago: American Planning Association.
- San Francisco Estuary Project Management Committee. 1993. *San Francisco Bay Comprehensive Conservation and Management Plan*. San Francisco: San Francisco Estuary Project.
- Wisconsin Department of Natural Resources. 1987. *Lower Green Bay Remedial Action Plan: First Annual Progress Report*. Madison: Wisconsin Department of Natural Resources.
- Wisconsin Department of Natural Resources and Green Bay Remedial Action Plan Public Advisory Committee. 1993. *Lower Green Bay Remedial Action Plan, 1993 Update*. Madison: Wisconsin Department of Natural Resources.
- Lane Council of Governments. 1995. *How the McKenzie Watershed Council Got Started*. Eugene: Lane Council of Governments.

CHAPTER 5
DEFINING THE PROBLEM

CHAPTER 5

TABLE OF CONTENTS

	Page
5. DEFINING THE PROBLEM	5-1
5.1 IDENTIFYING AND RANKING ADVERSE AMBIENT EFFECTS	5-5
5.1.1 Identifying Adverse Ambient Effects	5-5
Using Regions of Concern Information	5-6
Reviewing Additional Sources of Information	5-7
5.1.2 Ranking Adverse Ambient Effects	5-12
5.2 IDENTIFYING AND RANKING CHEMICAL CONTAMINANTS AND THEIR SOURCES	5-14
5.2.1 Identifying Chemical Contaminants	5-15
5.2.2 Identifying Contaminant Sources	5-23
5.2.3 Ranking Chemical Contaminants and Sources	5-26
Ranking Chemical Contaminants	5-27
Ranking Sources of Chemical Contaminants	5-30
References Cited	5-35

EXHIBITS

5-1. Description of the Steps Required for Defining the Problems in a Regional Action Plan	5-3
5-2. Potential Sources of Information	5-9
5-3. Example Goals/Beneficial Uses and Associated Impairments	5-13
5-4. Summary Checklist of Factors To Be Considered During Initial Data Reviews	5-18
5-5. Example Calculation for Estimating Receiving Water Concentrations	5-22
5-6. Sample Evaluation to Determine Chemical Contaminants of Concern	5-28
5-7. Example Prioritization for Chemicals To Be Addressed in a Region of Concern	5-31

CHAPTER 5. DEFINING THE PROBLEM

The overarching objective when defining problems in the context of regional action planning is to assemble and evaluate sufficient information to develop a sound, defensible, and targeted implementation approach for the Regional Action Plan (see Chapter 7 of this document for information on developing an implementation approach). This requires identifying adverse ambient effects, linking them to elevated concentrations of chemical contaminants, and identifying sources of contamination contributing to the elevated concentrations. The approach further requires focusing on priorities established by the Regional Action Team so that limited resources can be used most efficiently and investigations can be completed in a timely fashion. As described later in this chapter, the investigations needed

to define problems in the Region of Concern will move from the general to more specific, although the following three tasks are critical to the process:

1. Identifying and prioritizing adverse ambient effects associated with chemical contamination
2. Identifying and prioritizing chemical contaminants causing or contributing to the adverse ambient effects
3. Identifying and prioritizing sources of chemical contaminants.

Although described separately, many of the activities to complete these investigations are similar, especially when evaluating chemical contaminants and their sources, and may be conducted simultaneously. These investigations are also dynamically related to the development of the Regional Action Plan's vision statement, goals, and objectives. As described in Chapter 4 of this guidance, a preliminary overview of problems is used by the Regional Action Team to develop a vision statement,

Defining Problems for the Regional Action Plan

Regions of Concern are designated when available data show evidence for a causal relationship between adverse ambient effects (i.e., effects) and elevated concentrations of chemical contaminants above thresholds associated with adverse effects (i.e., stressors) (Chesapeake Bay Program 1994). Therefore, the problem definition portion of the Regional Action Plan must identify adverse ambient effects (e.g., water column and sediment toxicity, impaired ecological community structures, fish and shellfish tissue contamination) and link them to elevated levels of chemical contamination. Further, to develop an implementation approach for the Regional Action Plan, the problem definition must also include an assessment of the sources contributing to the elevated levels of chemical contamination. The investigations should be geared toward defining the linkages between adverse ambient effects, elevated levels of chemical contamination, and sources of the elevated levels of chemical contamination.

To streamline the planning process, all investigations must be prioritized. The problem definition should prioritize adverse ambient effects in order of preference for future actions. The types of chemical contaminants causing the adverse effects, and their sources, should be similarly prioritized.

and initial goals and objectives. The vision statement, and initial goals and objectives, are used, in turn, to focus further, more specific, investigations needed to define problems (e.g., providing more detail on chemical stressors and their sources).

It is crucial to keep the problem definition investigations focused. Not only should the investigations target priorities established by the Regional Action Team, but existing information (e.g., technical reports) should be used whenever possible. Additional analyses (e.g., evaluating and/or integrating environmental data bases, calculating waste load allocations) should only be conducted if the existing materials do not provide sufficient background information for sound decision-making. Original investigations, such as developing and implementing a monitoring program, are beyond the scope of the Regional Action Plan, but could be proposed as an implementation action in the plan.

Exhibit 5-1 summarizes an approach that will help focus problem definition investigations for the Regional Action Plan. This chapter describes available sources of information relevant to conducting the investigations and provides an overview of techniques that can be used for ranking and decision-making. Chapter 4 describes how to develop a vision statement and define preliminary goals and objectives using available information on problems. The chapter presents information in the following two sections:

- Identifying and Ranking Adverse Ambient Effects
- Identifying and Ranking Chemical Contaminants and Sources.

As shown in Exhibit 5-1, the lead agency, supported by existing groups, and/or subject matter experts, will usually initiate this process by providing an overview of the problems (including a summary of adverse ambient effects and associated chemical contaminants and their sources), based on readily available information, to the Regional Action Team at one of its first meetings. This general background information is used by the Regional Action Team to facilitate development of a vision statement, and preliminary goals and objectives (see Chapter 4). The vision statement and preliminary goals and objectives are necessary to guide the planning process and focus further investigations. The Regional Action Team will also use this background information, in conjunction with the vision statement and preliminary goals and objectives, to begin prioritizing the adverse ambient effects according to level of importance for future action. The Regional Action Team may feel that the available materials provide sufficient information to prioritize ambient effects, or it may request additional investigations. It is important that the Regional Action Team complete its prioritization of adverse ambient effects as early in the planning process as possible, because this information will guide most subsequent investigations.

Exhibit 5-1. Description of the Steps Required for Defining the Problems in a Regional Action Plan**• Prepare Overview of Problems**

The lead agency (and/or its partner or designee) will assemble readily available background information to prepare an overview of problems for consideration by the Regional Action Team. Information should be evaluated to summarize what is readily known about adverse ambient effects, elevated levels of chemical contaminants, and sources of the chemical contaminants. Three main sources of information should be evaluated at this stage:

- Results of Regions of Concern identification process
- Other available, documented information (e.g., technical reports)
- Consultation with subject matter experts.

• Develop Vision Statement, and Preliminary Goals and Objectives (see Chapter 4)

The lead agency (and/or its partner or designee) will present the overview of problems (e.g., visual presentation, fact sheets) to Regional Action Team and obtain input from the team on the completeness of the definition and to further identify problems and additional sources of information. The information on problems will be used as the foundation for developing a vision statement and preliminary goals and objectives.

• Prioritize Adverse Ambient Effects

After developing the vision statement, and preliminary goals and objectives, the Regional Action Team will rank adverse ambient effects according to priority for action. If the Regional Action Team feels they do not have adequate information to prioritize, additional investigations may be conducted. Sources of information for additional investigations include:

- Clean Water Act authorities
- Environmental data bases
- More extensive literature reviews and consultation with subject matter experts.

• Conduct Additional Investigations to Identify and Prioritize Chemical Contaminants and Their Sources

The lead agency (and/or its partner or designee) and the Regional Action Team will conduct investigations needed to identify chemical contaminants causing or contributing to the adverse ambient effects and link chemical contaminants to their sources. The following investigations might be appropriate depending on the required level of detail:

- Review existing materials
- Analyze environmental data bases (including geographic information systems)
- Perform modeling.

After developing a vision statement, goals and objectives, the Regional Action Team will conduct more detailed investigations to further define the problem (i.e., identifying and prioritizing chemical contaminants and their sources) so that sufficient information is available to develop the implementation approach for the plan. Generally, these more detailed investigations ask who, what, when, where, and how questions, such as:

- What is causing the problem? (e.g., investigations into contaminant types, such as oily wastes)
- Who is contributing to the problem's cause? (e.g., investigations into contaminant sources, such as petroleum storage facilities)
- When does the problem occur? (e.g., investigations into time and frequency, such as low volume leaking on a continuous basis)
- Where does the problem occur? (e.g., investigations into which portion of the Region of Concern is affected, such as the lower half-mile of the river)
- How does the problem occur? (e.g., investigations into the exact cause of the problem, such as leaking tanks and insufficiently treated storm water runoff).

Although these questions do not have to be answered in any particular order, the Regional Action Team should seek this type of information, to the extent possible, to have an adequate basis of understanding for developing the implementation approach.

The more detailed investigations needed to develop the implementation approach should always be conducted in the context of the vision statement, and preliminary goals and objectives defined by the Regional Action Team. This type of focused, or targeted, investigation is necessary to keep the planning process on track and to efficiently and effectively utilize limited resources. Too often, planning efforts suffer because they take on too much, become diffuse and unfocused. For example, after several years of remedial action planning in the Great Lakes, planners found that the process had become "very complex, time consuming, and cumbersome" because the focus of the remedial action planning process had become "development of detailed, voluminous documents rather than identification and implementation of actions to address priority environmental issues in the Areas of Concern (Klemans 1993)." As a result, the remedial action planning process was revised through a series of conferences and workshops in 1993 to streamline the plans in two key ways (Klemans 1993):

- Agree on a long-term "vision" and short-term goals/objectives
- Prioritize environmental issues and focus activities on the highest priorities first.

This guidance acknowledges the lessons learned in the Great Lakes and promotes an approach that requires prioritizing information for action. The approach described in this chapter presents the full range of potential activities that could be accomplished when defining problems in the Region of Concern. Remembering that the overarching consideration when defining problems is to limit investigations to the

level of detail needed to develop a sound implementation approach, the more complicated and time-consuming procedures described in this chapter should only be pursued if they are needed to clarify areas of uncertainty. If readily available background information (e.g., technical reports) summarizes adverse environmental effects, stressors, and sources of the elevated levels of chemical contaminants, the Regional Action Team may not need to pursue more detailed investigations. Expending limited resources on marginally useful data collection and analysis is not cost-effective.

Overarching Considerations When Evaluating Information on Problems

- Start with readily available information and conduct additional investigations as needed. Use existing, and readily available, sources of information as much as possible.
- Focus investigations on those areas needed to achieve the plan's vision statement, goals, and objectives.
- Do not overanalyze information. Limit the level of detail to that needed by the Regional Action Team to make informed decisions regarding an implementation approach (see Chapter 7 of this document for more information).
- Ensure that adequate resources are saved to complete later stages in the planning process (e.g., developing implementation actions). Avoid over-characterizing and overanalyzing information (e.g., when defining problems) in the early planning stages.

5.1 IDENTIFYING AND RANKING ADVERSE AMBIENT EFFECTS

Adverse ambient effects must be identified and ranked in order to focus the regional action planning process. A basic understanding of adverse ambient effects provides the foundation for developing the Regional Action Plan's vision statement, goals, and objectives. This, in turn, provides the focus for prioritizing adverse effects and further defining the problem to identify and prioritize chemical contaminants and their sources. This section of the guidance describes the process of assembling and evaluating information to identify and rank adverse ambient effects. It describes available sources of information and provides an overview of approaches that could be used to rank the adverse environmental effects in order of priority for action.

5.1.1 Identifying Adverse Ambient Effects

There are many sources of information that can be tapped by the lead agency to identify adverse ambient effects. The lead agency should begin its investigations by gathering readily available information and then, if necessary, assemble additional sources. The lead agency should first contact the Toxics Subcommittee's Region of Concern Workgroup and/or the Chesapeake Bay Program Office's Toxics Coordinator to determine the availability of information as a result of the Regions of Concern identification process. The extent of data accumulated and synthesized for this process will determine whether additional investigations are needed. Published reports and other written materials (e.g., journal

articles, white papers) are other good sources of information. Input from the Regional Action Team and subject matter experts should also be solicited.

Researchers and managers outside of the immediate Chesapeake Bay Program agencies and institutions may also be working in some of the Regions of Concern. They may be able to contribute additional information and expertise and identify local experts who are more familiar with some of the areas. It may also be possible to obtain relevant technical reports, published papers, and hard copy or electronic data from these sources.

The remainder of this section describes the types of information that might be available from the Regions of Concern identification process and identifies potential, additional sources of information.

Using Regions of Concern Information

When an area is designated as a Region of Concern, it has usually undergone a fairly intensive data analysis procedure using written materials assembled by the Toxics Subcommittee's Regions of Concern Workgroup and information contained in the Chesapeake Bay Program's Toxics Data Base. The Toxics Subcommittee's Regions of Concern Workgroup evaluates information to determine if an area qualifies as a Region of Concern. The process comprises the following steps (see Appendix A):

1. Initial identification of areas where there is reason to believe a chemical contaminant-related problem is present
2. Compilation of evidence for the presence of chemical contaminant-related problems
3. Classification into one of four categories using a matrix of exposure and effects indicators with quantitative thresholds and professional judgment.

The third step of the Regions of Concern identification process is the most data intensive and involves examining the data against some measure of severity (e.g., thresholds or standards). The data requirements for the Regions of Concern identification protocol are very specific and include an evaluation of contaminants in water and/or sediment and effects data (e.g., toxicity, fish tissue contamination). Factors examined in Step 3 include (see Appendix A for more detail):

- Water column contamination
- Bottom sediment contamination
- Water column toxicity

- Bottom sediment toxicity
- Benthic community structure
- Finfish tumors
- Finfish and shellfish tissue contamination.

From the investigations conducted for the Regions of Concern identification process, especially Step 3, information on problems, chemicals, and sources will begin to be synthesized. To designate a Region of Concern using the identification protocol, adequate data must exist; otherwise, the area is characterized as having insufficient data and designation is postponed pending further investigation. In some cases, areas may be named as Regions of Concern without going through the formal identification protocol (e.g., Anacostia River, Baltimore Harbor, and Elizabeth River). However, this is more the exception than the rule. Areas being considered as potential Regions of Concern are usually subject to the protocol outlined in Appendix A. Therefore, an excellent foundation for the problem characterization phase of the Regional Action Plan development may exist in many cases.

Reviewing Additional Sources of Information

If additional data are needed to identify adverse ambient effects, other sources can be accessed. The Clean Water Act prescribes that the states adopt water quality standards recognizing the value of our Nation's waters for "...their use and value as public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes, and also taking into account their use and value for navigation" (CWA 303(c)(2)(a)). As a result, the states in the Chesapeake Bay Basin have adopted water quality standards for all waters, establishing a list of beneficial uses often on a segment-specific basis. By consulting state water quality standards (which include a list of designated uses for all segments in their jurisdiction), the Regional Action Team can develop a list of desired beneficial uses for the Region of Concern. By assessing the attainment of these beneficial uses, additional information regarding problems in the Region of Concern can be gathered. It may be necessary to consult numerous sources to determine the status of use attainment, including direct consultation with the state agency responsible for preparing the following reports mandated by the Clean Water Act:

- **Section 305(b)**—Provides data on whether uses are being supported and what sources/pollutants are barring attainment of uses
- **Section 304(l)**—Identifies all surface waters not achieving water quality standards due to the discharge of toxic conventional and nonconventional pollutants

- **Section 319**—Identifies waters adversely affected by nonpoint sources
- **Section 303(d)**—Identifies waters not meeting/not expected to meet water quality standards in the absence of water quality-based control measures.

In addition, a well-selected and representative Regional Action Team should be able to supplement the list of information sources, if necessary. Numerous readily accessible data bases may also provide information pertinent to identifying problems and impaired uses. These data bases may provide information on chemical contaminants and sources as well. Exhibit 5-2 lists problems or impaired uses potentially present in a Region of Concern and identifies relevant information sources. Appendix C provides more detail on these sources and additional tools that can be used to obtain information (e.g., other federally compiled data bases). The sources in Appendix C are listed alphabetically. The Regional Action Team will need to consider, as appropriate for the specific Region of Concern, some of the following use impairments or other indicators and evidence of environmental and biological health:

- Advisories on fish and wildlife consumption
- Tainting of fish and wildlife flavor
- Degradation of fish and wildlife populations
- Presence of fish tumors or other deformities
- Bird and/or animal deformities or reproductive problems
- Degradation of benthos
- Restrictions on dredging activities
- Restrictions on drinking water consumption, including taste/odor problems
- Beach closings
- Aesthetics degradation
- Added costs to agricultural/industry water use consumption
- Degradation of phytoplankton/zooplankton populations
- Loss of fish and wildlife habitat.

When developing final problems and goals statements, the Regional Action Team may choose to further specify preliminary assessments of problems (use impairments) and goals (beneficial uses) to establish a solid framework for subsequent regional action planning analyses. For example, rather than having a goal of "maintaining a recreational fishery," the Regional Action Team may want to refine the goal to "improving the fishery for striped bass at the X pier." Further definition of the desired goals for the Region of Concern, both in definitional and geographic/spatial terms, will focus on analyses directed

Exhibit 5-2. Potential Sources of Information¹

Problem/Impaired Uses	Potential Information Source
Atmospheric Deposition of Contaminants	Aerometric Information Retrieval System (AIRS) Database - Data on airborne pollution
Superfund Sites	Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Database - Data on all aspects of cleanup and inventory of sites Record of Decision System (RODS) Database - Tracks history of cleanup sites, response actions, and remedies Facility Index System (FINDS) Database - Basic and specific information on regulated facilities
Hazardous Waste Generator or Transfer/Storage Facility	Biennial Reporting System (BRS) Database - RCRA data on waste generation, management, and minimization Resource Conservation and Recovery Information System (RCRIS) Database - Tracks permit application status and compliance monitoring
Agricultural Runoff of Pesticides	Pesticide Monitoring Inventory (PIN) - Inventory on pesticide monitoring Agricultural Waste (AgWaste) Database - Data on management, disposal, and productive use of agriculture waste Pesticide Action Network Updates Service (PANUPS) - Variety of information on integrated pest management and pesticide use
Water Column Contamination	Ocean Data Evaluation System (ODES) Database - Data on sewage discharges, NPDES, ocean dumping, and industrial discharges Storage and Retrieval (STORET) Database - Files on CWA, TSCA, RCRA, drinking water, and solid waste STORET-Water Quality System (WQS) File - Contains information from monitoring sites Water Pollution Control Act Section 305(b) Reports - Data on each state's surface water and groundwater quality Water Body System (WBS) Database - Data on water body specific assessments per 305(b) Aquatic Toxicity Information Retrieval (AQUIRE) Database - Data on the effects of toxics on aquatic organisms
Contaminated Sediments	National Sediment Inventory (NSI) - Data on nature, extent, and causes of sediment contamination Ocean Disposal Database (ODD) - Data on ocean disposal of sediments from U.S. Corps of Engineer Projects Accumulation Factor Database (AFD) - Data on concentrations of organic chemicals in sediments and organisms Contaminants Database - Data on sediment and tissue residue levels of dioxins, furans, PAHs, and PCBs AQUIRE Database - Data on the effects of toxins on aquatic organisms
Urban/Stormwater Runoff	Stormwater Bulletin Board - Information shared between users, including special studies and compliance monitoring

Exhibit 5-2. Potential Sources of Information¹ (continued)

Problem/Impaired Used	Potential Information Source
Fish Consumption Advisories	Fish Advisory Bulletin Board National Fish Tissue Data Repository - National repository on potential risks of chemical contaminants
Water Column Toxicity	AQUIRE Database - Data on the effects of toxics on aquatic organisms
Industrial Discharges/ Municipal Discharges	Toxic Release Inventory (TRI) Database - Data on chemical releases, offsite waste transfers, and waste treatment Permit Compliance System (PCS) Database - Information on NPDES facilities STORET Database - Files on CWA, TSCA, RCRA, drinking water, and solid waste FINDS Database - Basic and specific information on regulated facilities Industrial Facilities Discharge (IFD) Database - Information on 1,200 NPDES discharges Complex Effluent Toxicity Information System (CETIS) - Provides whole effluent toxicity data
Restrictions on Drinking Water	Federal Reporting Data System (FRDS) Database - Information on public drinking water supplies STORET - Files on CWA, TSCA, RCRA, drinking water, and solid waste
Groundwater Contamination	FRDS Database - Information on public drinking water supplies
Fish Kills	STORET Fish Kill - Files on fish kills Water Pollution Control Act Section 305(b) Reports - Data on each state's surface water and groundwater quality
Degradation to Benthos, Fish, and Zoo/Phytoplankton Populations	STORET-Biological Data System (BIOS) - Data on community structure and habitat of organic organisms
Degradation to Habitat	STORET-BIOS - Data on community structure and habitat of organic organisms STORET-Daily Flow System (DFS) - Data on stream flow and water quality standards
Water Quality	Chesapeake Bay Water Quality Standards (CBWQS) Database - Data on water quality standards and aquatic life criteria Integrated Risk Information System (IRIS) - Data on chemical health risks and regulatory summaries
Habitat Loss/Land Use	Land Use and Data Analysis (LUDA) Database - Data on land use types and locations for entire United States National Wetlands Inventory (NWI) - Computerized mapping of wetlands
Restriction on Shellfish Harvesting	State Public Health Departments - Contact directly for reports and bulletins U.S. Food and Drug Administration (USFDA) - Contact directly for reports and warnings

Exhibit 5-2. Potential Sources of Information¹ (continued)

Problem/Impaired Used	Potential Information Source
Bird/Animal Deformities	State Resource Protection Agency National Wildlife Federation
Restrictions on Dredging	State Port Authority Army Corps of Engineers
Beach Closings	State Health Departments
Other Information	
Mapping the Region of Concern	Geographic Resources Information Data System (GRIDS) Database - Commonly needed geographic data products National Wetlands Inventory (NWI) - Computerized mapping of wetlands
General Information	Information Systems Inventory (ISI) Database - Information on more than 500 EPA systems Online Library System (OLS) Database - Bibliographic citations from EPA and other agencies U.S. Geological Survey, Mapping Earth Science Information Center U.S. Geological Survey, National Water Information Clearinghouse
Pollution Prevention	EnviroSense (formerly Pollution Prevention Information Exchange System) - Provides pollution prevention, regulatory, case study, research data, and funding information Small Business Ombudsman Clearinghouse - Regulatory activities information for small communities/business
Hazardous/Solid Waste	Clean-Up Information BBS (CLU-IN) - Bulletin board on hazardous waste remediation and corrective action
Pesticides	National Pesticides Information Retrieval System (NPIRS) - Information on registered pesticides National Pesticide TeleCommunications Network (NDTN) - Impartial information on pesticides
Nonpoint Sources	Nonpoint Source (NPS) Information Exchange - Information on nonpoint source water pollution

¹ Appendix C contains more detailed information on the information sources, including contacts.

at identifying chemical contaminants of concern and on the identification and evaluation of implementation actions. Refinement of the goals may proceed throughout the regional action planning process in an iterative fashion. Chapter 4 of this guidance document provides more information on developing goals. To enhance the implementation of the Regional Action Plan, it is important to clearly define measurable goals.

Adverse effects can be compiled on a segment or sub-segment basis within the Region of Concern. Exhibit 5-3 presents one way of organizing this information. The Regional Action Team will use its initial assessment of adverse ambient effects as a starting point for analysis. As the analyses unfold, an iterative process will develop, where potential, and actual adverse effects are added, subtracted, and modified from the original list. Regional Action Plan developers should continually review the original list of possible adverse effects by asking some of the following questions:

- Is it a complete list of possible adverse effects?
- Have all stakeholders been consulted, or do additional members of the stakeholder community (e.g., subsistence fisherman) need to be contacted to verify and/or expand the list?
- Are adverse effects not associated with elevated levels of chemical contaminants included?
- Can adverse effects be identified as acute, chronic, or sporadic/episodic?

The Regional Action Team should develop as complete an inventory of potential adverse ambient effects as possible, even if the adverse effects have not been fully documented. For example, if recreational fisherman are not using public access point A, which is upstream from restricted site B, then this "impairment" should be noted for further study even though fishing is not restricted at point A. If past studies have documented that submerged aquatic vegetation degradation is correlated with elevated turbidity levels due to nonpoint source runoff, the Regional Action Team may want to explore the possibility that pesticide runoff might also contribute to the problem in this localized area. Potential adverse effects should not be removed from the list too early; further investigation of existing chemical contaminant data may reveal that past studies missed elevated contamination levels of chemical constituents as a contributing cause to the adverse effect.

5.1.2 Ranking Adverse Ambient Effects

Information gathered for the Regions of Concern identification protocol provides an excellent starting point for evaluating and ranking adverse ambient effects. The protocol provides a decision-making framework for ranking the relative "severity" of problems by providing thresholds for comparison with contaminant and/or effects data. This information, coupled with input from stakeholders on their priorities (e.g., stakeholders can be used to develop evaluation criteria against which adverse effects can be weighed—see Appendix D on ranking and decision-making procedures), provides the base to prioritize and rank adverse effects for action.

Exhibit 5-3. Example Goals/Beneficial Uses and Associated Adverse Effects

Goal/Beneficial Use	Adverse Ambient Effects	Location
Anacostia River¹		
Restore fishery to historic species abundance and diversity.	Elevated concentrations of chemical contaminants in water column and sediments are prohibiting species diversity and reproduction.	Particularly in Sligo Creek and Lower Beaverdam Creek.
Restore recreational subsistence fishery for catfish, carp, and eels.	Elevated concentrations of PCBs and chlordane in sediments are reflected in bottom feeder tissue, resulting in fishing advisories.	Lower Anacostia: Kingman Lake, North East Boundary combined sewer overflow, 11th Street and South Capitol Street bridges, Buzzards Point Marina, and Washington Ship Canal.
Improve aquatic life habitat in Anacostia River.	Sediment loads altering natural habitats.	High in lower Northwest Branch, Point Branch, and Lower Indian Creek.
Elizabeth River²		
Improve aquatic species abundance and diversity.	Sediments and water are contaminated with organic compounds and metals, which is reducing species diversity and abundance. Occasional fish kills also occur.	Highest levels in southern and western branches of the Elizabeth River.
Alleviate the potential for adverse impacts on biota, such as skin lesions, cataracts, and fin rot. Restore public confidence in recreational fishery.	Sediments contaminated with polycyclic aromatic hydrocarbons (PAHs) are causing finfish abnormalities.	Southern and western branches of the Elizabeth River.
Restore shellfish fishery.	PAH-contaminated sediments are impairing shellfish fishery.	Hampton Roads area.
Baltimore Harbor³		
Provide recreational fishery for catfish, carp, and eels.	Elevated concentrations of chlordane resulted in a consumption advisory for catfish, carp, and eels.	Baltimore Harbor and Back River.
Improve species diversity and abundance.	Point and nonpoint source loadings of lead and chromium are contributing to reductions in species diversity and abundance.	Baltimore Harbor, Patapsco River, and Back River.

¹ Sources: CBP 1992; MWCOG 1990
² Sources: CBO 1991; CBP 1993; ACB
³ Sources: ACB; BRCOG 1992

If information was not assembled as part of the Regions of Concern identification procedure, the Regional Action Team will have to gather and analyze data in order to determine priorities for action. However, the evaluation criteria presented in the Chesapeake Bay Program's Chesapeake Bay Regions of Concern identification protocol (see Appendix A) provides a good starting point from which to analyze new data for the ranking characterization. Although the Regional Action Team can select any prioritization procedure, it may be prudent to follow the existing Regions of Concern identification protocol as closely as possible to ensure consistency and resource efficiency. Again, this process should be supplemented with input from the stakeholders (e.g., have they noticed any problems not covered by the Regions of Concern identification process).

If the Regional Action Team decides it does not want to follow the Chesapeake Bay Program's Regions of Concern identification protocol, then it can establish its own ranking procedure. The art and science of ranking and decision-making analysis is a growing field, described in many textbooks, journal articles, and academic courses. Broadly stated, ranking and decision-making analysis is a process to identify the best solution to a problem or to select preferred options (priorities) from multiple choices using predetermined evaluation criteria. The discipline of ranking and decision-making analysis is too broad to discuss in detail in this guidance document; however, Appendix D provides an overview of some of the main techniques used in environmental decision-making. Two additional sources provide more information on these techniques: *Environmental Decision Making: A Multidisciplinary Perspective* (Chechile and Carlisle 1991) and *Geographic Targeting: Selected State Examples* (EPA 1993a). References on facilitating meetings, described in Chapter 3 of this guidance, provide additional background.

5.2 IDENTIFYING AND RANKING CHEMICAL CONTAMINANTS AND THEIR SOURCES

After gaining a sense of which adverse ambient effects are priorities for the Regional Action Plan, it is necessary to identify chemical contaminants, and their sources, that cause or contribute to the adverse effects. For the purposes of developing the plan's implementation approach, it is most important to determine the linkages between sources of chemical contaminants and adverse ambient effects. Most actions proposed in the implementation approach will be targeted at contaminant sources (e.g., urban stormwater runoff, direct discharges from certain industries)—investigations into the types of chemical contaminants should be conducted only to the level of detail needed to credibly identify contributing sources. In some situations, sources of chemical contamination may be obvious from the available background information. In other instances, it may be necessary to carefully identify contaminant types

so that linkages to sources can be made. The level of detail required for this part of the problem definition process will vary on a case-by-case basis.

As described in Section 5.1, the process of identifying an area as a Region of Concern and refining adverse ambient effects has probably involved compiling and assimilating a large volume of information. Some of this information may provide a good starting point for identifying and prioritizing chemical contaminants and sources contributing to the adverse effects. This section describes selected approaches for identifying and prioritizing chemical contaminants and sources so that sufficient information will exist to develop an effective implementation approach. Specifically, this section discusses ways to:

- To verify the nature, extent, relevance, and quality of chemical data available for the Region of Concern
- To associate, but not necessarily statistically correlate, the presence of chemical concentrations with the (possible) adverse ambient effects
- To evaluate the spatial distribution of concentrations of each chemical contaminant
- To identify and target sources of chemical contamination.

To accomplish each of these steps, the Regional Action Team will need to review available ambient (physical, chemical, biological) data on chemical constituents and compare chemical concentrations to standard references, including criteria, standards, and laboratory-generated toxicity data, to provide a measure of contamination severity. The Regional Action Team will also have to compare the relative extent and magnitude of sources using a variety of information and techniques. Prior to initiating any analysis, however, the quality and relevance of available ambient chemical data must be assessed.

5.2.1 Identifying Chemical Contaminants

Information and data to support the identification of chemical contaminants and sources in the Region of Concern may be in a variety of forms. As in the case of assessing adverse ambient effects, a logical starting point for this investigation is to determine what information was assimilated and analyzed as part of the Regions of Concern identification process. Information may also be contained in other data bases (see Appendix C) or in written reports and other technical documents. In some cases, data may not be available, or sufficiently available, to characterize ambient concentrations of all chemical contaminants. In these cases, the Regional Action Team may model theoretic concentrations of these

chemical contaminants using, for example, National Pollutant Discharge Elimination System (NPDES) effluent, modeled nonpoint source, or Toxicity Release Inventory data. This section describes how to (1) assess chemical contaminant data availability/quality and (2) generate "secondary" sources of data, as necessary.

The first activity in developing an information base for chemical contaminants is to determine whether the existing data are sufficient to support the development of Regional Action Plans. The Regional Action Team must assess whether enough data exist to provide the base needed to develop well-conceived strategies to reduce chemical contamination within the Region of Concern. This initial compilation of available chemical data should be undertaken with the objective of quickly identifying key characteristics of the data to enable analysts to assess the extent and coverage of chemical information. The data do not need to be extensive to provide a first-cut overview of data quality, relevance, and sufficiency. Additional data will be gathered throughout the regional action planning process.

This initial data evaluation should be exploratory in nature, offering a broad characterization of the data. The Regional Action Team should be prepared to answer the following key questions:

- Are ambient chemical data available for all toxics of concern?
- Are the data available for one or more exposure routes, water column, sediment, and fish tissue?
- What were the detection limits used in measuring the data? Will data comparability emerge as an issue as a result of differing detection limits?
- How recent are the data? What is the period of record?
- What is the geographic scope of the available data? Does it represent a portion of the Region of Concern or the entire Region of Concern?
- What is the time period associated with the data?
- How many observations were noted for each chemical constituent?
- Were accepted analytical methods used?

The Regional Action Team will face two distinct situations in this early stage. The first situation is when a Region of Concern has been established with little prior data collection to support its designation. The second is when a Region of Concern has been established with prior data collection and analysis as part of the Region of Concern identification process. In each situation, the types of

information necessary to assess data sufficiency are similar. The level of detail needed to develop the final Regional Action Plan, including implementation approaches, however, is more demanding. If the Regional Action Team has data from the Region of Concern identification process, then the level of effort needed to assemble initial data should be reduced greatly.

All data sets should be screened for relevance, extent of coverage, and quality. Exhibit 5-4 provides an example format for organizing the initial data review. Although not necessary to complete the plan, this format summarizes the crucial data elements needed to characterize the extent of chemical contamination within a Region of Concern. By summarizing data in this manner, data quality issues will also be easier to evaluate. While these minimum requirements provide sufficient information to evaluate whether the data exist for a specific chemical contaminant, judging data quality requires further review.

After assembling this basic information and conducting some simple analyses to summarize the data (e.g., distribution, means, medians, ranges, number of nondetects, outliers), the Regional Action Team should have adequate information to identify data gaps and determine geographic areas for which additional data are needed. The preliminary review and analysis also provides the basis for designing additional information collection programs in the field or from other sources. Some judgment and management discretion are required. It is important to remember that the purpose of any additional data collection in the context of the regional action planning effort is to develop a plan for reducing chemical contamination in a specific location. Therefore, extensive surveys and monitoring efforts should not be necessary at this stage. Severe data quality issues should be addressed as part of the Regional Action Plan, however.

The Regional Action Team must evaluate two essential data considerations:

- **Geographic Coverage**—The Regional Action Team should review and evaluate available data to determine whether information is sufficient to characterize and describe the entire Region of Concern. The key objective at this stage is to determine if data gaps exist that will preclude linking problems with contaminants in parts of the Region of Concern.
- **Temporal Coverage**—The Regional Action Team needs to determine whether data are sufficient to describe patterns of chemical contamination over time. Long-term and evolving problems need to be distinguished. This is a crucial component of the ranking process that will assist in determining which chemicals to address in the Regional Action Plan. A good guideline is that the data should cover a sufficient time period to assess seasonal and long-term patterns of chemical contamination.

The number of observations or data points necessary to meet these data quality objectives cannot be fixed. It is important to note, however, that the confidence the Regional Action Team can assign to the problem definition and characterization of chemical contamination relates directly to the available data. The type and variability of summary statistics that will be used to describe the data are calculated, in part, using the number of observations. In addition, the analytical method used to detect and to quantify levels of chemical contamination is a key factor in assessing the accuracy and precision of the reported levels. Because evaluating data quality and analyzing data and information for Regional Action Plans involve so many considerations, it is important that the Regional Action Team contain, or have access to, individuals familiar with using and interpreting data. An ideal candidate, for example, would include a statistician or chemist.

If additional data are needed beyond that which were assimilated for the Regions of Concern identification process (e.g., if the Regions of Concern identification process was incomplete or not done at all), it is recommended that this analysis begin with a review of the Chesapeake Bay Program's Toxics Data Base. As described in Appendix C, this data base contains a significant amount of information on ambient concentrations, including water column and surface microlayer, sediments, finfish, and shellfish. The Regional Action Team may choose to initiate this exploratory data analysis on a location-specific basis, dividing the Region of Concern, for example, by segment codes and/or other location-specific parameters available in the Toxics Data Base.

As a result of data quality conventions established by the Chesapeake Bay Program, many of the common problems encountered in using water quality data have already been addressed in the Toxics Data Base. For example, the detection limits used in all analyses have been recorded. The minimum data elements described previously are standard items in this data base.

In some cases, the Toxics Data Base may not provide sufficient data to support the regional action planning process. For example, data for a specified chemical contaminant may never have been collected or it may not have been collected at location A with sufficient frequency to support a valid analysis. In these cases, the Regional Action Team should develop alternative strategies for building a more inclusive data base. Pooling the data from more than one location, while reducing the site-specific analyses available to the Regional Action Team, may provide a more useful data base for the entire Region of Concern. The Regional Action Team should always consider combining data from a variety of sources to fill data gaps. In other words, the Regional Action Team must use data from a variety of studies, sources, and programs conducted over time and throughout the Region of Concern to build an adequate

information base to develop a strategy to reduce chemical contamination. A well-selected Regional Action Team could be instrumental in providing information. In addition, a number of readily accessible data bases, listed in Appendix C, may provide additional information.

The Regional Action Team may also want to consider accessing and integrating environmental data bases (e.g., Toxics Release Inventory, Permit Compliance System) that are available through the U.S. Environmental Protection Agency (EPA). One available EPA tool is the Environmental Data Display Manager (EDDM), which accesses selected federal data bases to provide information for a number of potential investigations (e.g., identifying river reach segments that are not meeting water quality standards and evaluating the causes for use impairment), performs a number of different analyses, and displays results in several formats (e.g., summary tables or on maps) (see Appendix E).

If ambient data for specific chemical contaminants are not sufficient for conducting further investigations (e.g., comparing ambient data to reference data), the Regional Action Team may choose to supplement the data set with modeled ambient concentrations. Modeling chemical contaminant concentration data should be performed to fill data gaps only where absolutely necessary to support the decision-making process for determining implementation actions. Depending on the level of sophistication, modeling efforts can be very resource intensive. It is important to use this tool only as necessary and to avoid falling into the data analysis trap. Rather than modeling in the chemical contaminant identification and characterization phase of the Regional Action Plan, it may be more appropriate to initiate it later in the planning process or to recommend it as a potential implementation action (see Chapter 7).

If modeling is needed to assess chemical contaminants, many types of input information may be needed, including loadings data (e.g., data from NPDES permit files and the Toxic Release Inventory), and less "direct" information (e.g., procedures for estimating urban runoff, atmospheric deposition, sediment release rates). Again, the Toxics Data Base is a repository for some of this information and includes such data as EPA's Permit Compliance System loadings data for NPDES point source dischargers, extrapolations (by county) of urban runoff loadings of specified chemical contaminants, extrapolations (by basin) of atmospheric deposition loadings, and pesticide usage by county/basin.

Additional information may be available from other federal, state, and local sources. For example, state NPDES files (e.g., NPDES application forms) may provide more complete information on the chemical contaminants contained in a particular discharger's effluent than presented in the NPDES

permit. Knowledge of a particular publicly owned treatment work (POTW) within an industrial user community may enhance the Regional Action Team's understanding of possible contaminants detected in the effluent. Similarly, an understanding of the community's industrial/commercial base should enhance efforts to model runoff quality.

Exhibit 5-5 provides an example for modeling information to determine chemical concentrations. The following materials, among others, provide more information on these procedures:

- *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water—Part I (Revised 1985)* (EPA 1985)
- *Technical Support Document for Water Quality-Based Toxics Control* (EPA 1991a)
- *Technical Guidance Manual for Performing Wasteload Allocations. Book 2, Streams and Rivers* (EPA 1984)
- *Technical Guidance Manual for Performing Wasteload Allocations. Book 4, Lakes, Reservoirs, and Impoundments* (EPA 1986a)
- *Draft Technical Guidance Manual for Performance Wasteload Allocations. Book 3, Estuaries* (EPA 1989)
- *Technical Guidance Manual for Performing Wasteload Allocations. Book 6, Design Conditions* (EPA 1986b)
- *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 1991b)
- *Superfund Exposure Assessment Manual* (EPA 1988).

Modeling approaches for both point and nonpoint sources that are more sophisticated than the example presented in Exhibit 5-5 are available. In the early stages of the regional action planning process, it is presumed that the Regional Action Team would use the "simple method," which is documented in *Controlling Urban Runoff: A Practical Manual For Planning and Designing Urban BMPs* (MWWOG 1987). During later stages, as implementation actions are prioritized, more advanced models may be appropriate to ensure that the most cost-effective controls are adopted. The type of model to be used will depend, in part, on the hydrologic characteristics of the water body, the types and sources of pollutants, and the desired degree of sophistication of the modeling effort (e.g., simple dilution models, steady state models, or dynamic models). The EPA Center for Exposure Assessment Modeling distributes and supports the use of 21 simulation models and data bases, many of which could be applied to the Regional Action Plan area analyses. *Access EPA* (EPA 1993b) contains information on the center and the 21 models it supports.

Exhibit 5-5. Example Calculation for Estimating Receiving Water Concentrations

The following example provides a simple method for approximating pollutant concentrations in a water body based on information available for the pollutant sources to the water body. For purposes of the example, we are estimating the pollutant concentration in a river, downstream of the pollutant sources. The example is based on the following simplifying assumptions:

- No provisions are made for the environmental fate of the pollutant; it is assumed to be conservative in the environment and reduced only by the dilution of the receiving water.
- Atmospheric deposition and agricultural runoff do not contribute to the pollutant loading.

Step 1. Source Scenarios and Load Calculations

Source A - Urban Development

Using the Simple Method (MWWCOG 1987):

$$L = [(P)(P_j)(R_v)/12](C)(A)(2.72)$$

Where:

- L = Annual storm pollutant load (lbs/year)
- P = Rainfall depth (inches)
- P_j = Correction factor for storms that produce no runoff
- R_v = Runoff coefficient
- C = Flow-weighted mean concentration of pollutant (mg/L)
- A = Area of site development (acres)

Example Calculation

$$L = [(40 \text{ in})(0.9)(0.30)/12](0.25 \text{ mg/L})(500 \text{ acres})(2.72)$$

$$L = 306 \text{ lbs/year}$$

Source B - Industrial Point Source

$$L = (C)(Q)(8.34)(D)$$

Where:

- L = Annual pollutant load (in lbs/year)
- C = Long-term average discharge concentration (mg/L)
- Q = Long-term average flow (MGD)
- D = Number of operating days per year

Example Calculation

$$L = (0.05 \text{ mg/L})(20 \text{ MGD})(8.34)(350 \text{ days/year})$$

$$L = 2,919 \text{ lbs/year}$$

Source C - Municipal Point Source

$$L = (C)(Q)(8.34)(D)$$

Where:

- L = Annual pollutant load (in lbs/year)
- C = Long-term average discharge concentration (mg/L)
- Q = Long-term average flow (MGD)
- D = Number of operating days per year

Example Calculation

$$L = (0.03 \text{ mg/L})(5 \text{ MGD})(8.34)(365 \text{ days/year})$$

$$L = 457 \text{ lbs/year}$$

Step 2: Estimating Ambient Concentration in Receiving Water

$$\begin{aligned} \text{Total Load} &= (\text{Source A Load} + \text{Source B Load} + \text{Source C Load}) \\ &= 306 \text{ lbs/year} + 2,919 \text{ lbs/year} + 457 \text{ lbs/year} \\ &= 3,682 \text{ lbs/year} \\ &= 10 \text{ lbs/day} \end{aligned}$$

$$C_s = (\text{Total Load})(1/Q_s)(1/8.345)$$

Where:

- C_s = Receiving water effluent concentration (mg/L)
- Q_s = Receiving water flow (MGD)
- C_s = (10 lbs/day)(1/40 MGD)(1/8.345)
- C_s = 0.03 mg/L

5.2.2 Identifying Contaminant Sources

A Region of Concern can be affected by various potential sources of chemical contamination, including point sources (e.g., industrial dischargers, POTWs, combined sewer overflows), nonpoint sources (e.g., agricultural and urban runoff, contaminated sediments, atmospheric deposition), and hazardous and solid waste disposal facilities (active and inactive). At a minimum, the Regional Action Plan should address the possible sources of each chemical contaminant and the method used to identify the source. If the sources can be quantified, the basis of the quantification and the associated rationale should be identified.

Through its efforts to summarize adverse ambient effects and chemical contaminants, the Regional Action Team will probably identify a preliminary list of potential sources of contaminant(s). For example, where ambient chemical information is not widely available and where such data are modeled using point and/or nonpoint source data, the team will come into contact with information on chemical contaminant sources. Using this list as a starting point, the Regional Action Team may review, if necessary, additional information to identify other potential contaminant sources. As a result of regulatory control and planning efforts over the last several decades, a significant amount of information on chemical sources is available to the Regional Action Team. Moreover, many of these data are readily accessed through computerized data bases (see Appendix C).

This section describes information that may be available on potential sources of chemical contaminants according to the following topics:

- NPDES point source discharges
- POTW and combined sewer overflow (CSO) discharges
- Availability of total maximum daily load (TMDL) calculations and waste load allocations (WLAs)
- Use of the EDDM to evaluate point source information
- Active and inactive hazardous and solid waste sites
- Information contained in EPA's Integrated Data for Enforcement Analysis (IDEA) system
- Nonpoint sources of pesticides

- Contaminated sediments
- Urban runoff.

NPDES point source discharges: Past regulatory efforts have focused on point source discharges and, consequently, a significant amount of data is available on the chemical contaminants released by these dischargers. NPDES permit files provide the loadings and concentrations of effluent regulated pollutants. In addition, more comprehensive information, addressing pollutants not limited by the NPDES permit, are also available in the NPDES permit file. Many NPDES dischargers (both industrial and municipal) have whole effluent toxicity testing or effluent toxicity limits in their permits. Some permittees have conducted intensive toxicity identification evaluations. Background information on industrial processes, such as that contained in effluent guidelines development documents, may also indicate different chemical contaminants that may be associated with industrial waste streams.

POTW and CSO discharges: In addition, contaminants discharged from POTWs may include chemical contaminants detected in industrial, commercial, and residential discharges. While pretreatment POTWs generally have an excellent understanding of significant industrial users discharging to their systems, less is generally known about other users. Nonetheless, many POTWs have developed estimates of industrial, commercial, and "other" flows, which are generally associated with the regulatory requirements to develop local limits. Commercial and residential users may be significant sources of chemical contaminants, especially as POTWs exercise increasing control of industrial users through the application of local limits designed to protect worker health, water quality, and sludge quality. Indeed, many POTWs indicate that the residential sector is providing a greater proportion of remaining loads of certain chemical contaminants. As a result, household hazardous waste programs are often considered a potentially cost-effective alternative to additional chemical contaminant control. Commercial users, including service stations and photo finishing shops, are also viewed with increasing scrutiny. Information on contaminants detected in CSOs, while more variable than that detected in more "traditional" point source discharges, should also be obtained. With EPA's increased emphasis on CSO discharges, POTWs are continually generating increasing amounts of information on contaminants detected in these discharges as a result of revised NPDES permit requirements.

TMDLs and WLAs: State agencies may have already made significant gains in assessing the relative contributions of various point and nonpoint sources to the Region of Concern. As a result of longstanding Clean Water Act requirements, TMDL calculations and wasteload allocations (WLAs) may have been initiated or completed. If the Region of Concern encompasses Section 304(l)-listed water

bodies, such water quality studies probably exist. These data should be used to the maximum extent possible.

Environmental Data Display Manager: Point source data on industrial and municipal dischargers can be accessed either directly from the Permit Compliance System or through EDDM. Using EDDM, specific water quality segments can be targeted and the system can be searched for point source discharges up or downstream of the discharge within specified distances. In addition, EDDM enables the user to locate hazardous waste sites and public drinking water intakes within specified distances of the water quality segment of concern. Appendix E provides more information on EDDM.

Active and inactive hazardous and solid waste sites: Active and inactive hazardous and solid waste sites are another potential source of chemical contaminants. As a result of Comprehensive Environmental Response, Compensation, and Liability Act remedial action studies and Resource Conservation and Recovery Act (RCRA) corrective action studies, a significant body of information exists on chemical contaminants released from these sources. Of particular note are the RCRA facility assessment reports completed at active RCRA treatment, storage, and disposal facilities. These reports summarize potential releases to surface and ground waters from active and inactive units. Information on hazardous waste sites can be gathered from state and EPA files. EPA's Resource Conservation and Recovery Information System and Biennial Reporting System files provide information on the types of hazardous wastes handled at waste sites. This information can be accessed on a state, locality, latitude/longitude, or ZIP code basis.

Integrated Data for Enforcement Analysis: The Regional Action Team can review non-enforcement sensitive data from EPA's IDEA system to support the source identification procedure. Through IDEA, multiple EPA compliance data bases can be accessed to identify regulated parties (e.g., Clean Air Act; Clean Water Act; Federal Insecticide, Fungicide, and Rodenticide Act; and Toxic Substances Control Act) within the Region of Concern. Using sorting techniques, for example, all regulated parties within designated ZIP codes that release more than some specified mass of chemical contaminants of concern can be identified. IDEA can be accessed through EPA's Office of Enforcement and Compliance Assurance.

Nonpoint source pesticides: Nonpoint sources of contaminants have long been recognized as a source of chemical contaminants. Pesticides are detected in both agricultural and suburban runoff. Golf courses and other recreational activities involving intensive turf management are a potentially

significant source of pesticides. As noted previously, the Chesapeake Bay Program's Toxics Data Base includes estimates of pesticide application by county/basin. Similarly, atmospheric deposition estimates are available from the Toxics Data Base.

Contaminated sediments: Another nonpoint source of chemical contaminants is contaminated sediments. By developing models on a site-specific basis, contaminant releases from these sediments can be estimated. As noted earlier, the U.S. Army Corps of Engineers and port authority studies can serve as important data sources for this information. In addition, the Chesapeake Bay Program's Toxics Data Base includes significant data on contaminated sediments.

Urban runoff: Urban runoff is another potential source of chemical contaminants. Recent Clean Water Act regulations offer a significant control alternative for this source. The NPDES stormwater regulations, issued in November 1990, require municipalities with populations greater than 100,000 to obtain NPDES permits for their stormwater discharges (55 *FR* 48062). More than 20 municipalities are regulated in the Chesapeake Bay watershed, including large cities (e.g., Baltimore, Maryland, Washington, D.C., and Richmond, Virginia) and suburban counties (e.g., Montgomery County, Maryland, and Fairfax County, Virginia). State permitting authorities are issuing permits to these municipalities with requirements to implement a comprehensive stormwater management plan that may include both structural and nonstructural best management practices. Industrial activities, including activities on military installations, are also required to obtain NPDES permits for their stormwater discharges. Permits require that these facilities prepare and implement stormwater pollution prevention plans and, in some cases, submit monitoring data. These monitoring data, as well as other information submitted as part of the NPDES application and permitting process, may contain information useful in preparing the Regional Action Plan. State permitting authorities can be contacted to obtain access to this information.

5.2.3 Ranking Chemical Contaminants and Sources

After assembling and analyzing chemical contamination data, it is essential to measure the relative severity or contribution of each chemical and source to adverse ambient effects. This analysis will provide a base level of information needed to prioritize chemicals and sources for the Regional Action Plan's implementation approach.

Ranking Chemical Contaminants

In some cases, available information may clearly identify chemical contaminants, provide information on severity, and link the contaminant to a particular adverse effect and/or contaminant source. If such background information is available, it may be relatively easy to evaluate the chemical contaminant. For example, the weight of evidence presented in available technical reports may clearly link chemical contamination from a particular chemical/source to the identified problem. If a link can be made, then comparisons of ambient concentrations of water quality or sediment quality data to prescribed threshold or reference levels may not be necessary. If "indisputable" data are not available, however, but the inventory of available and modeled ambient data indicates the presence of chemical contaminants, then inventory data should be compared to threshold/reference data to assess potential toxicity. Exhibit 5-6 demonstrates this procedure by comparing concentration data to available reference points using protocols similar to those defined for the Regions of Concern identification protocol.

Reference criteria are directly available, or can be derived, from a number of sources. The most obvious sources are the applicable state water quality standards, although other reference levels are being developed (in some locations) for sediments and fish/shellfish tissue. The Chesapeake Bay Program has developed three data bases as part of its overall Toxics Data Base development that summarize the following threshold or reference levels:

- **Chesapeake Bay Water Quality Standards Data Base**—Summarizes water quality standards from each state in the Chesapeake Bay Basin and EPA Region III. The data base also summarizes Chesapeake Bay Program habitat requirements (CBP 1991).
- **Sediment Quality Threshold Compendium**—Contains a comprehensive compilation of federal and state sediment threshold values used to evaluate the toxicity of contaminated sediments.
- **Compendium of Fish/Shellfish Tissue Human Health Protection Values**—Compiles U.S. Food and Drug Administration and other available fish/shellfish action levels.

The Chesapeake Bay Program has also developed habitat requirements for key living resources (CBP 1991). The habitat requirements present numeric guidelines, or thresholds, for selected contaminants and species. The numeric habitat requirement guidelines were developed through an extensive literature review and represent the geometric means of literature values for acute toxicity and chronic or sublethal toxicity to target species. In addition to being published in report format (CBP 1991), the habitat requirements are also included in the Chesapeake Bay Water Quality Standards Data Base.