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SCOPING FOR CUMULATIVE EFFECTS

PRINCIPLES

- Include past, present, and future actions.
- Include all federal, nonfederal, and private actions.
- Focus on each affected resource, ecosystem, and human community.
- Focus on truly meaningful effects.

Expanding environmental impact assessment to incorporate cumulative effects can only be accomplished by the enlightened use of the scoping process. The purpose of scoping for cumulative effects is to determine (1) whether the resources, ecosystems, and human communities of concern have already been affected by past or present activities and (2) whether other agencies or the public have plans that may affect the resources in the future. This is best accomplished as an iterative process, one that goes beyond formal scoping meetings and consultations to include creative interactions with all the stakeholders. Scoping should be used in both the planning and project development stage (i.e., whenever information on cumulative effects will contribute to a better decision).

Scoping information may come from agency consultations, public comments, the analyst's own knowledge and experience, planning activities, the proponent's statements of purpose and need, underlying studies in support of the project proposal, expert opinion, or other NEPA analyses. This information supports all the steps in cumulative effects analysis, including identifying data for establishing the environmental baseline (see Chapter 3) and identifying information related to impact significance (see Chapter 4). Most importantly, however, scoping for cumulative effects should include the following steps:

Step 1	Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.
Step 2	Establish the geographic scope for the analysis.
Step 3	Establish the time frame for the analysis.
Step 4	Identify other actions affecting the resources, ecosystems, and human communities of concern.

IDENTIFYING CUMULATIVE EFFECTS ISSUES

Identifying the major cumulative effects issues of a project involves defining the following:

- the direct and indirect effects of the proposed action,
- which resources, ecosystems, and human communities, are affected, and
- which effects on these resources are important from a cumulative effects perspective.

The proposed action may affect several resources either directly or indirectly. Resources can be elements of the physical environment, species, habitats, ecosystem parameters and functions, cultural resources, recreational opportunities, human community structure, traffic patterns, or other economic and social conditions. In a broad sense, all the impacts on affected resources are probably cumulative; however, the role of the analyst is to narrow the focus of the cumulative effects analysis to important issues of national, regional, or local significance. This narrowing can occur only after thorough scoping. The analyst should ask basic questions such as whether the proposed action will have effects similar to other actions in the area and whether the resources have been historically affected by cumulative actions (Table 2-1). Many significant cumulative effects issues are well known. Public interest groups, natural resource and land management agencies, and regulatory agencies regularly deal with cumulative effects. Newspapers and scientific journals frequently publish letters and comments dealing with these issues.

Not all potential cumulative effects issues identified during scoping need to be included in an EA or an EIS. Some may be irrelevant or inconsequential to decisions about the proposed action and alternatives. Cumulative effects analysis should "count what counts", not produce superficial analyses of a long laundry list of issues that have little relevance to the effects of the proposed action or the eventual decisions. Because cumulative effects can result from the activities of other agencies or persons, they may have already been analyzed by others and the importance of the issue determined. For instance, an agency proposing an action with minor effects on wetlands should not unilaterally decide that cumulative effects on wetlands is not an important issue. Cumulative effects analysis should consider the concerns of agencies managing and regulating wetlands, as well as the regional history of cumulative wetland losses and degradation, and the presence of other proposals that would produce future wetland losses or degradation.

BOUNDING CUMULATIVE EFFECTS ANALYSIS

Once the study goals of the cumulative effects analysis are established, the analyst must decide on the specific content of the study that will meet those requirements. Analyzing cumulative effects differs from the traditional approach to environmental impact assessment because it requires the analyst to expand the geographic boundaries and extend the time frame to encompass additional effects on the resources, ecosystems, and human communities of concern.

Identifying Geographic Boundaries

For a project-specific analysis, it is often sufficient to analyze effects within the immediate area of the proposed action. When analyzing the contribution of this proposed action to cumulative effects, however, the geographic boundaries of the analysis almost always should be expanded. These expanded boundaries can be thought of as differences in hierarchy or scale. Project-specific analyses are usually conducted on the scale of counties, forest management units, or installation boundaries, whereas cumulative effects analysis should be conducted on the scale of human communities, landscapes, watersheds, or airsheds. Choosing the appropriate scale to use is critical and will depend on the resource or system. Figure 2-1 illustrates the utility of using the ecologically relevant watershed boundary of the Anacostia River basin rather than the political boundaries of local governments to develop restoration plans.

A useful concept in determining appropriate geographic boundaries for a cumulative effects analysis is the **project impact zone**.

Table 2-1. Identifying potential cumulative effects issues related to a proposed action

1. What is the value of the affected resource or ecosystem? Is it:
   - protected by legislation or planning goals?
   - ecologically important?
   - culturally important?
   - economically important?
   - important to the well-being of a human community?

2. Is the proposed action one of several similar past, present, or future actions in the same geographic area? (Regions may be land management units, watersheds, regulatory regions, states, ecoregions, etc.) *Examples: timber sales in a national forest; hydropower development on a river; incinerators in a community.*

3. Do other activities (whether governmental or private) in the region have environmental effects similar to those of the proposed action? *Example: release of oxidizing pollutants to a river by a municipality, an industry, or individual septic systems*.

4. Will the proposed action (in combination with other planned activities) affect any natural resources; cultural resources; social or economic units; or ecosystems of regional, national, or global public concern? *Examples: release of chlorofluorocarbons to the atmosphere; conversion of wetland habitat to farmland located in a migratory waterfowl flyway*.

5. Have any recent or ongoing NEPA analyses of similar actions or nearby actions identified important adverse or beneficial cumulative effect issues? *Examples: National Forest Plan EIS; Federal Energy Regulatory Commission Basinwide EIS or EA*.

6. Has the impact been historically significant, such that the importance of the resource is defined by past loss, past gain, or investments to restore resources? *Example: mudflat and salt-marsh habitats in San Francisco Bay*.

7. Might the proposed action involve any of the following cumulative effects issues?
   - long range transport of air pollutants resulting in ecosystem acidification or eutrophication
   - air emissions resulting in degradation of regional air quality
   - release of greenhouse gases resulting in climate modification
   - loading large water bodies with discharges of sediment, thermal, and toxic pollutants
   - reduction or contamination of groundwater supplies
   - changes in hydrological regimes of major rivers and estuaries
   - long-term containment and disposal of hazardous wastes
   - mobilization of persistent or bioaccumulated substances through the food chain
   - decreases in the quantity and quality of soils
   - loss of natural habitats or historic character through residential, commercial, and industrial development
   - social, economic, or cultural effects on low-income or minority communities resulting from ongoing development
   - habitat fragmentation from infrastructure construction or changes in land use
   - habitat degradation from grazing, timber harvesting, and other consumptive uses
   - disruption of migrating fish and wildlife populations
   - loss of biological diversity

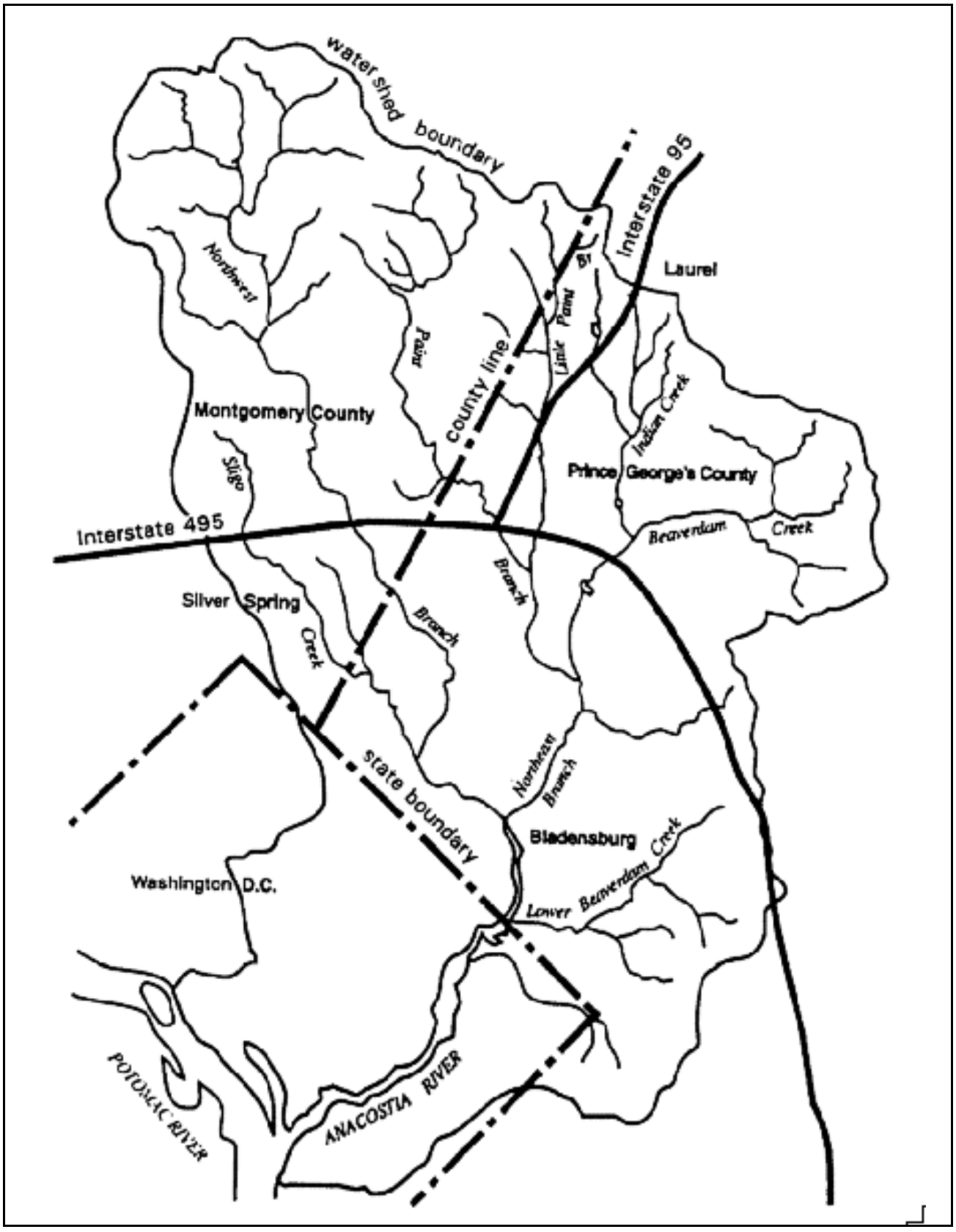

Figure 2-1. Juxtaposition of natural and political boundaries surrounding the Anacostia River

For a proposed action or reasonable alternative, the analysts should

- Determine the area that will be affected by that action. That area is the project impact zone.
- Make a list of the resources within that zone that could be affected by the proposed action.
- Determine the geographic areas occupied by those resources outside of the project impact zone. In most cases, the largest of these areas will be the appropriate area for the analysis of cumulative effects.
- Determine the affected institutional jurisdictions, both for the proposing agency and other agencies or groups.

Project impact zones for a proposed action are likely to vary for different resources and environmental media. For water, the project impact zone would be limited to the hydrologic system that would be affected by the proposed action. For air, the zone may be the physiographic basin in which the proposed action would be located. Land-based effects may occur within some set distance from the proposed action. In addition, the boundaries for an individual resource should be related to the resource's dependence on different environmental media. Table 2-2 provides some possible geographic boundaries for different resources. This list is *not* inclusive. The applicable geographic scope needs to be defined case by case.

Table 2-2. Geographic areas that could be used in a cumulative effects analysis

Resource	Possible Geographic Areas for Analysis
Air quality	Metropolitan area, airshed, or global atmosphere
Water quality	Stream, watershed, river basin, estuary, aquifer, or parts thereof
Vegetative resources	Watershed, forest, range, or ecosystem
Resident wildlife	Species habitat or ecosystem
Migratory wildlife	Breeding grounds, migration route, wintering areas, or total range of affected population units
Fishery resources	Stream, river basin, estuary, or parts thereof; spawning area and migration route
Historic resources	Neighborhood, rural community, city, state, tribal territory, known or possible historic district
Sociocultural resources	Neighborhood, community, distribution of low-income or minority population, or culturally valued landscape
Land use	Community, metropolitan area, county, state, or region
Coastal zone	Coastal region or watershed
Recreation	River, lake, geographic area, or land management unit
Socioeconomics	Community, metropolitan area, county, state, or country

One way to evaluate geographic boundaries is to consider the distance an effect can travel. For instance, air emissions can travel substantial distances and are an important part of regional air quality. Air quality regions are defined by the EPA, and these regions are an appropriate boundary for assessment of the cumulative effects of releases of pollutants to the atmosphere. For water resources, an appropriate regional boundary may be a river basin or parts thereof. Watershed boundaries are useful for cumulative effects analysis because (1) pollutants and material released in the watershed may travel downstream to be mingled with other pollutants and materials; (2) migratory fish may travel up and down the river system during their life cycle; and (3) resource agencies may have basin-wide management and planning goals. For land-based effects, an appropriate regional boundary may be a "forest or range," a watershed, an ecological region (ecoregion), or socioeconomic region (for evaluating effects on human communities). Which boundary is the most appropriate depends both on the accumulation characteristics of the effects being assessed and an evaluation of the management or regulatory interests of the agencies involved.

Identifying Time Frames

The time frame of the project-specific analysis should also be evaluated to determine its applicability to the cumulative effects analysis. This aspect of the cumulative effects analysis may at first seem the most troublesome to define. CEQ's regulations define cumulative effects as the "incremental effect of the action when added to other past, present, and reasonably foreseeable future actions" (40 CFR § 1508.7). In determining how far into the future to analyze cumulative effects, the analyst should first consider the time frame of the project-specific analysis. If the effects of the proposed action are projected to last five years, this time frame may be the most appropriate for the cumulative effects analysis. The analyst should attempt to identify actions that could reasonably be expected to occur within that period.

There may be instances when the time frame of the project-specific analysis will need to be expanded to encompass cumulative effects occurring further into the future (Figure 2-2). For instance, even though the effects of a proposed action may linger or decrease slowly through time, the time frame for the project-specific analysis usually does not extend beyond the time when project-specific effects drop below a level determined to be significant. These project-specific effects, however, may combine with the effects of other actions beyond the time frame of the proposed action and result in significant cumulative effects that must be considered.

IDENTIFYING PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

As described above, identifying past, present, and future actions is critical to establishing the appropriate geographic and time boundaries for the cumulative effects analysis. Identifying boundaries and actions should be iterative within the scoping process.

A schematic diagram showing the area in which the proposed action is located, the location of resources, and the location of other facilities (existing or planned), human communities, and disturbed areas can be useful for identifying actions to be included in the cumulative effects analysis (Figure 2-3). A geographic information system (GIS) or a manual map overlay system can be used to depict this information (see Appendix A for a description of map overlays and GIS). Such a diagram is is useful for determining project-specific impact zones and their overlap with areas affected by other nonproject actions.

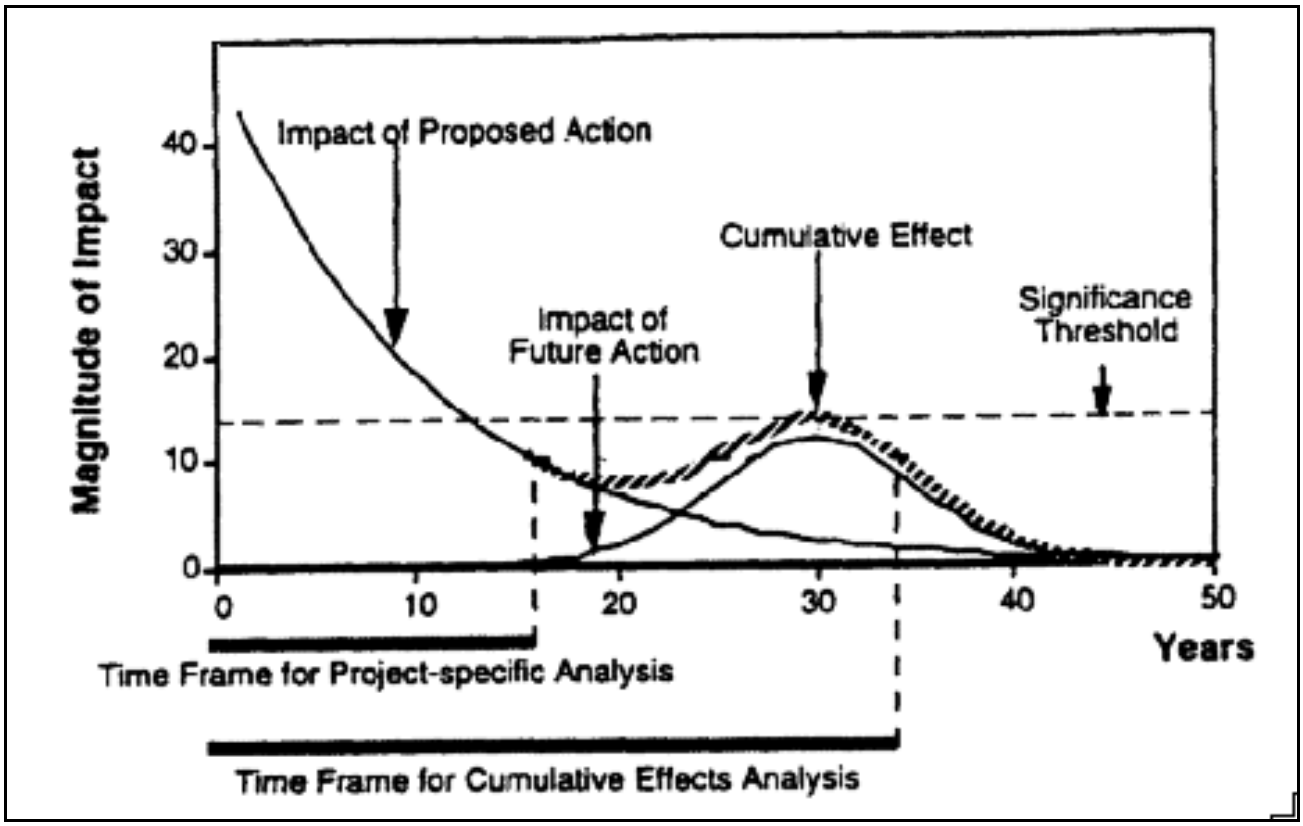

Figure 2-2. Time frames for project-specific and cumulative effects analyses

By examining the overlap of impact zones on the areas occupied by resources, it should be possible to refine the list of projects or activities (past, present, or future) to be included in the analysis. Proximity of actions may not be sufficient justification to include them in the analysis. In the example shown in Figure 2-3, the cumulative effects analysis for trout should consider the effects of the existing mine and the planned logging activity, because these activities would have either present or future effects on the trout spawning area below the proposed power plant facility. Although an agricultural area is nearby, it can be excluded from the analysis because its sediment loading effects occur downstream of the trout spawning area. Proximity of other actions to the proposed action is not the decisive factor for including these actions in an analysis; these actions must have some influence on the resources affected by the proposed action. In other words, these other actions should be included in analysis when their impact zones overlap areas occupied by resources affected by the proposed action.

Completing the geographic or schematic diagram depending on applying cause-and-effect models that link human actions and the resources or ecosystems. This too is an iterative process. Identifying other activities contributing to cumulative effects could result in the addition of new effect pathways to the cause-and-effect model. In the example, addition of an existing mine to the cumulative effects analysis could require adding a pathway for the effects of chemical pollution on trout. Chapters 4 and 5 and Appendix A discuss cause-and-effect modeling and network analysis.

The availability of data often determines how far back past effects are examined. Although certain types of data (e.g., forest cover) may be available for extensive periods in the past (i.e., several decades), other data (e.g., water quality data) may be available only for

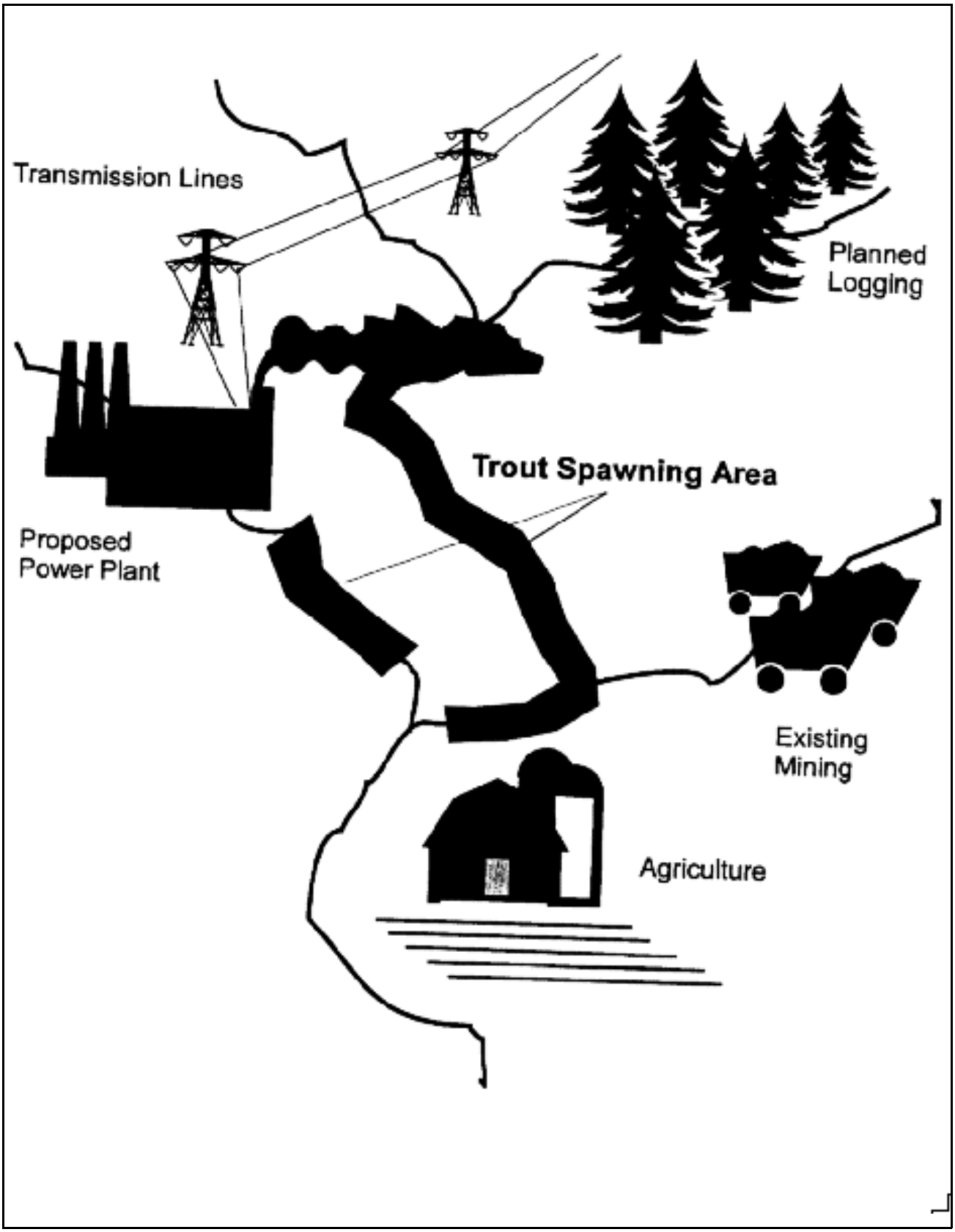

Figure 2-3. Impact zones of proposed and existing development relative to a trout population

much shorter periods. Because the data describing past conditions are usually scarce, the analysis of past effects is often qualitative.

Identifying similar actions presently underway is easier than identifying past or future actions, but it is by no means simple. Because most of the analytical effort in an environmental impact assessment deals with the proposed action, the actions of other agencies and private parties are usually less well known. Effective cumulative effects analysis requires close coordination among agencies to ensure that even all present actions, much less past and future actions, are considered.

The first step in identifying future actions is to investigate the plans of the proponent agency and other agencies in the area. Commonly, analysts only include those plans for actions which are funded or for which other NEPA analysis is being prepared. This approach does not meet the letter or intent of CEQ's regulations. It underestimates the number of future projects, because many viable actions may be in the early planning stage. On the other hand, some actions in the planning, budgeting, or execution phase may not go forward. To include all proposals ever considered as other actions would most likely overestimate the future effects of cumulative effects on the resources, ecosystems, and human communities; therefore, the analyst should develop guidelines as to what constitutes "reasonably foreseeable future actions" based on the planning process within each agency. Specifically, the analyst should use the best available information to develop scenarios that predict which future actions might reasonably be expected as a result of the proposal. Such scenarios are generally based on experience obtained from similar projects located elsewhere in the region. Including future actions in the study is much easier if an agency has already developed a planning document that identifies proposed future actions and has commutilated these plans to other federal agencies and governmental bodies in the affected region.

When identifying future actions to include in the cumulative effects analysis, reasonably foreseeable actions by private organizations or individuals are usually more difficult to identify than those of federal or other governmental entities. In many cases, local government planning agencies can provide useful information on the likely future development of the region, such as master plans. Local zoning requirements, water supply plans, economic development plans, and various permitting records will help in identifying reasonably foreseeable private actions (see Chapter 3 for other sources of information). In addition, some private landowners or organizations may be willing to share their plans for future development or land use. These plans can be considered in the analysis, but it is important to indicate in the NEPA analysis whether these plans were presented by the private party responsible for originating the action. Whenever speculative projections of future development are used, the analyst should provide an explicit description of the assumptions involved. If the analyst is uncertain whether to include future actions, it may be appropriate to bound the problem by developing several scenarios with different assumptions about future actions.

In general, future actions can be excluded from the analysis of cumulative effects if

- the action is outside the geographic boundaries or time frame established for the cumulative effects analysis;
- the action will not affect resources that are the subject of the cumulative effects analysis; or
- including of the action would be arbitrary.

At the same time, NEPA litigation [*Scientists' Institute for Public Information, Inc., v. Atomic Energy Commission* (481 F.2d 1079 D.C. Cir.1073)] has made it clear that "reasonable forecasting" is implicit in NEPA and that it is the responsibility of federal agencies to predict the environmental effects of proposed actions before they are fully known. CEQ's regulations provide for including these uncertainties in the environmental impact assessment where the

foreseeable future action is not planned in sufficient detail to permit complete analysis. Specifically, CEQ's regulations state

> [w]hen an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, ... [that] cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known,... the agency shall include... the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community (40 CFR § 1502.22).

Even when the decisionmaker does not select the environmentally preferable alternative, including the cumulative effects of future actions in the analysis serves the important NEPA function of informing the public and potentially influencing future decisions.

AGENCY COORDINATION

Because the actions of other agencies are part of cumulative effects analysis, greater emphasis should be placed on consulting with other agencies than is commonly practiced. Fortunately, when federal agencies adopt the ecosystem approach to management (espoused by the Interagency Ecosystem Management Task Force) such consultation probably will be enhanced (see box). During scoping, periodic coordination with other agencies may enhance the cumulative effects analysis process. As described above, a cumulative effects analysis might

- include an assessment of another agency's proposed action,
- include an assessment of the effects of another agency's completed actions,
- evaluate another agency's resource management practices and goals, or
- evaluate another agency's future plans.

Ecosystem Management

Vice President Gore's National Performance Review called for the agencies of the federal government to adopt "a proactive approach to ensuring a sustainable economy and a sustainable environment through ecosystem management." The Interagency Ecosystem Management Task Force (IEMTF 1995) was established to carry out this mandate. The ecosystem approach espoused by IEMTF and a wide range of government, industry, and private interest groups is a method for sustaining or restoring natural systems in the face of the cumulative effects of many human actions. In addition to using the best science, the ecosystem approach to management is based on a collaboratively developed vision of desired future conditions that integrates ecological, economic, and social factors. Achieving this shared vision requires developing partnerships with nonfederal stakeholders and improving communication between federal agencies and the public. Many ecosystem management initiatives are underway across the United States. The lessons learned from these experiences should be incorporated into the scoping process under NEPA to address cumulative effects more effectively. The IEMTF specifically recommends that agencies develop regional ecosystem plans to coordinate their review activities under NEPA. These ecosystem plans can provide a framework for evaluating the environmental status quo and the combined cumulative effects of individual projects.

The success of any of these activities is enhanced by coordination with the affected agency. At a minimum, the analyst should establish an ongoing process of periodic consultation and coordination with other agencies early in the scoping process whenever there are significant cumulative effects issues. Where appropriate, the lead agency should pursue cooperating agency status for affected agencies to facilitate reviewing drafts, supplying information, writing sections of the document, and using the

document to support more than one agency's programs.

SCOPING SUMMARY

Scoping for cumulative effects analysis is a proactive and iterative process. It involves a thorough evaluation of the proposed action and its environmental context. During the scoping process, the analyst should

- consult with agencies and other interested persons concerning cumulative effects issues;
- evaluate the agency's planning as well as the proposed action and reasonable alternatives (including the no-action alternative) to identify potential cumulative effects;
- evaluate the importance of the cumulative effects issues associated with a proposed action to identify additional resources, ecosystems, and human communities that should be included in the EA or EIS;
- identify the geographic boundaries for analysis of the cumulative effects on each resource, ecosystem, and human community;
- identify a time frame for the analysis of the cumulative effects on each resource, ecosystem, and human community; and
- determine which other actions should be included in the analysis and agree among interested parties on the scope of the data to be gathered, the methods to be used, the way the process will be documented, and how the results will be reviewed.

At the end of the scoping process, there should be a list of cumulative effects issues to be assessed, a geographic boundary and time frame assigned for each resource analysis, and a list of other actions contributing to each cumulative effects issue. In addition, during scoping the analyst should obtain information and identify data needs related to the affected environment (Chapter 3) and environmental consequences (Chapter 4) of cumulative effects, including resource capabilities, thresholds, standards, guidelines, and planning goals.