Guidance for Preparers of
Cumulative Impact Analysis
Approach and Guidance

Cumulative Impacts

A cumulative impact includes the total effect on a natural resource, ecosystem, or human community due to past, present, and future activities or actions of federal, non-federal, public, and private entities. Cumulative impacts may also include the effects of natural processes and events….Accordingly, there may be different cumulative impacts on different environmental resources.

Source: FHWA, 2003. *Interim Guidance: Questions and Answers Regarding the consideration of Indirect and Cumulative impacts in the NEPA Process.*

Defining Cumulative Impacts

The National Environmental Policy Act (NEPA) and the California Environmental Equality Act (CEQA) require that the direct, indirect, and cumulative impacts of proposed actions be assessed and disclosed. Although NEPA and CEQA define the term *cumulative impact* similarly, their definitions are slightly different.

NEPA Definition

The NEPA definition of a cumulative impact comes from the Council on Environmental Quality (CEQ), which defines a cumulative impact as:

> …the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR §1508.7.)

CEQA Definition

The CEQA definition of cumulative impact comes from the Office of Planning and Research (OPR). Section 15355 of OPR's CEQA Guidelines provides the following context:

> *Cumulative impacts* refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.
>
> (a) The individual effects may be changes resulting from a single project or a number of separate projects.
>
> (b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably

foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

Sustainable Systems

According to EPA, an ecologically sustainable system must:

- Support biological processes;
- Maintain its level of productivity;
- Function with minimal external management; and
- Repair itself when stressed.

Source: U.S. EPA, 1999 Consideration of Cumulative Impacts in EPA Review of NEPA Documents (EPA 315-R-99-002).

In addition to NEPA and CEQA, other regulations call for the consideration of cumulative impacts. Beyond meeting the requirements of NEPA and CEQA, this guidance document will help practitioners to assess potential cumulative impacts on archaeological and historical resources protected by the National Historic Preservation Act (NHPA) (36 CFR 800 or Section 106 Review). The regulations implementing Section 106 of the NHPA also acknowledge that a project's adverse effects include any that are reasonably foreseeable, even if they may occur later in time, are farther removed in distance, or are cumulative. The consideration of indirect and cumulative impacts is required when applying the criteria of adverse effect on historic properties (36 CFR §800.5(a)(1)) and delineating the area of potential effects (APE) (36 CFR § 800.16(d)) as part of the Section 106 process. However, this guidance does not address all components of the adverse effects analysis required by Section 106.

This guidance will also help practitioners to assess potential cumulative impacts on jurisdictional waters of the U.S., including special aquatic sites, protected by Section 404 of the federal Clean Water Act, which are under the jurisdiction of the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency (EPA). For more information, see Section 404 of the Clean Water Act and the 404(b)(1) Guidelines.

This guidance is not intended for cumulative impact analyses for Biological Assessments prepared to comply with Section 7 of the federal Endangered Species Act (ESA); under Section 7, only non-federal actions are included in the cumulative impact analysis.

Part of your document

A cumulative impact analysis is part of the environmental document. It contributes to the analysis of all of your project's impacts. The level of detail is commensurate with the level of detail for the entire environmental document.

Since a cumulative impact is defined in both spatial (geographic) and temporal terms (i.e., timeframes in which to identify past, present, and reasonably foreseeable actions), it is helpful to think in terms of potential impacts on the *health or status of the resource*. Can the resource be described as being in a sustainable state given past, present, and reasonably foreseeable actions? Is the health of the resource declining because of human activity? Have conservation actions or recovery plans identified by agencies or communities reversed a declining trend for the resource and helped it return to a healthy state?

When a Cumulative Impact Analysis is Required

CEQ regulations require all federal agencies to consider the cumulative effects of all proposed agency actions. A cumulative impact analysis is

required whenever an environmental document is prepared (i.e., an Environmental Assessment or Environmental Impact Statement).

The use of a NEPA Categorical Exclusion (or a CEQA Categorical Exemption) for a project indicates your conclusion that the proposed project has no significant impact on the environment. If you have prepared a CE, you have reached the conclusion that impacts, including the cumulative impacts of your project, are not significant. You, therefore, need to consider cumulative impacts when determining whether a CE is the appropriate level of documentation for a proposed project. If a CE is appropriate, a formal cumulative impact analysis is rarely warranted.

Eight-Step Approach for Developing a Cumulative Impact Analysis

1. Identify Resources to Consider in the Cumulative Impact Analysis
2. Define the Study Area for Each Resource
3. Describe the Current Health and Historical Context for Each Resource
4. Identify Direct and Indirect Impacts of the Proposed Project that Might Contribute to a Cumulative Impact
5. Identify Other Reasonably Foreseeable Actions that Affect Each Resource
6. Assess Potential Cumulative Impacts
7. Report the Results
8. Assess the Need for Mitigation

Developing a Cumulative Impact Analysis

No single formula is available for determining the appropriate scope and extent of a cumulative impact analysis. Ultimately, the practitioner must determine the methods and extent of the analysis based on the size and type of the project proposed, its location, potential to affect environmental resources, and the health of any potentially affected resource.

The cumulative impact analysis builds upon information derived from the direct and indirect impacts analyses. This makes it tempting to postpone the cumulative impact analysis until the direct and indirect impact analyses are well under way. However, CEQ recommends that potential cumulative impacts be considered as early as possible, preferably during scoping, to identify potential direct and indirect effects. Such early consideration of cumulative impacts may also facilitate the design of alternatives so as to avoid or minimize impacts. Therefore, do not defer the consideration of cumulative impacts. Instead, as you begin to coordinate with Caltrans environmental specialists about potential direct and indirect impacts, ask for their input about potential cumulative impacts as well. Then expect the process to be iterative. As more information about direct and indirect impacts becomes available, use it to further refine the cumulative impact analysis.

The following eight steps serve as guidelines for identifying and assessing cumulative impacts:

1. Identify the resources to consider in the cumulative impact analysis by gathering input from knowledgeable individuals and reliable information sources. This process is initiated during project scoping and continues throughout the NEPA/CEQA analysis.
2. Define the geographic boundary or Resource Study Area (RSA) for each resource to be addressed in the cumulative impact analysis.

3. Describe the current health and the historical context of each resource.
4. Identify the direct and indirect impacts of the proposed project that might contribute to a cumulative impact on the identified resources.
5. Identify the set of other current and reasonably foreseeable future actions or projects and their associated environmental impacts to include in the cumulative impact analysis.
6. Assess the potential cumulative impacts.
7. Report the results of the cumulative impact analysis.
8. Assess the need for mitigation and/or recommendations for actions by other agencies to address a cumulative impact.

These steps provide a framework for practitioners rather than a formula. The level of detail required at each step will vary based on the type of the project.

Step 1: Identify Resources to Consider in the Cumulative Impact Analysis

The first step in performing the cumulative impact analysis is to identify which resources to consider in the analysis. List each resource area for which the project could cause direct or indirect impacts. If a project will not cause direct or indirect impacts on a resource, it will not contribute to a cumulative impact on that resource. The cumulative impact analysis should focus only on: 1) those resources significantly impacted by the project; or 2) resources currently in *poor or declining health* or *at risk* even if project impacts are relatively small (less than significant).

"The resources subject to a cumulative impact assessment should be determined on a case-by-case basis early in the NEPA process, generally as part of early coordination or scoping" (FHWA 2003 Guidance).

Step 2: Define the Study Area for Each Resource

Cumulative impacts are considered within spatial (geographic) and temporal boundaries. By defining a Research Study Area (RSA) for each resource, you will identify the geographic boundaries for each resource to be included in the cumulative impact analysis.

Caltrans resource specialists (biologists, archaeologists, architectural historians, landscape architects and environmental engineers) can help to identify appropriate RSA boundaries for each resource in the cumulative impact analysis based on their knowledge of the resources and regulatory

mandates. Public agency representatives and interested citizens may also offer input during the scoping process.

Define a unique study area for each resource rather than a single, consolidated study area.

To clearly understand the health of a resource, you must view the resource in its appropriate geographical context. A study area large enough to provide context for water quality impacts (e.g., an entire watershed) might be unnecessarily large for consideration with another resource, such as historic structures.

Many approaches are available to define a study area for a cumulative impact analysis. The following examples describe ways to identify the RSA for a few specific resources:

- **Wetlands and water quality.** Identify the drainage basin (watershed) or sub-basins in which the project would be located. If necessary, consult with Caltrans specialists to discuss potential RSAs.
- **Archaeological resources.** Identify prehistoric and/or historic archaeological sites in the project vicinity. Determine the geographic context for the type of archaeological resources being affected. This is most efficiently done by consulting with cultural resource professionals and the project's historic property survey report. A context will be described in this document, typically including a discussion of geographic range or distribution of sites.
- **Historic architectural resources.** Identify historic districts and neighborhoods with affected buildings or structures. Project-specific historical resource analyses typically define the geographic context needed to understand the historic significance of a structure (e.g., period of significance and neighborhood, community, or resource type).
- **Threatened and endangered species.** Determine the local population of individual species and a general study area by considering the range, sub-range, or population distribution for the species, as well as information provided in the Natural Environment Study and Biological Assessment for the proposed project. Consult biologists specializing in particular species for assistance in defining reasonable RSAs. (As mentioned previously, this guidance is for NEPA compliance only; it is not intended for cumulative impact analyses associated with the Biological Assessments prepared to comply with Section 7 of the ESA.)
- **Community disruption/displacement.** Consult the project's community impact assessment to identify neighborhood or community boundaries or potential environmental justice populations using census tract or other data. General plans and specific or subarea plans will also suggest study area boundaries. Local websites can identify the boundaries for local neighborhood associations.

For more information on determining the appropriate geographic boundaries associated with an individual resource, refer to the issue paper entitled Defining Resource Study Areas.

Health of a Resource

The health of a resource refers very broadly to its overall condition, stability, or vitality. For a species, health could refer to sustainability. For archaeological resources, health could refer to their continued ability to convey important information about the past. In the case of a community, health could refer to its ability to retain its character despite changes to neighborhood connectivity, types of businesses, or the number of residences.

Step 3: Describe the Current Health and Historical Context for Each Resource

The purpose of Step 3 is to begin to "tell the story of the resource" by: A) describing the current health, condition, or status of the resource within the RSA; and B) providing historical context for understanding how the resource got to its current state. The product in this step will summarize the current health of the resource and its historical context. Once the health and historical context of these resources are described, the effects of future actions on these resources will be assessed (Steps 4 and 5).

A. Describe the Current Health of the Resource

"Health," as it is used here, refers very broadly to the overall condition, stability, or vitality of a resource, regardless of whether it is natural (e.g., a species or a wetland), cultural (e.g., an archaeological site) or social (e.g., a community). There are a variety of ways to determine the current health or status of the resource within the RSA. The practitioner may rely on his or her professional expertise, consult the technical specialists on the project team, consult other resource specialists, access data sources, review other environmental documents near the project, or use any combination of methods to gather information. The information in the "Affected Environment" section of the proposed project's environmental document can provide a useful starting point for the assessment. However, rather than using the project study area for the geographic boundary, use the RSA determined in Step 2. The Data Gathering issue paper provides excellent resources to help with this task.

The health or status of the resource should include a description of recent trends affecting it. These recent trends are meant to help complete the picture of the current condition of the resource. (Recent trends are distinct from the more long-range historical context that will be considered below, in part B.) Many kinds of circumstances might indicate a trend that could affect the resource. Examples include: government decisions (e.g., a recent zoning change or preparation of a Habitat Conservation Plan), community preferences (e.g., passage of a Measure to protect a historical downtown neighborhood), demographic changes (e.g., a shift in population growth rate), or natural phenomena (e.g., changes resulting from an earthquake, flood, or fire).

These trends may indicate whether the health of the resource is improving, stable, or in decline. This is valuable to the analysis in two ways: first, it will help the practitioner to focus the cumulative impact analysis more closely on the resources that are in decline; and second, it

may help the practitioner to propose more effective mitigation later, in Step 8 of the analysis.

In some cases it is clear that a resource is in good health. For example, if a historic district consists of multiple buildings that have retained their original character, this would indicate that the health of the historic district is good or excellent. In some cases it is also clear that a resource is in poor health, such as when a species is listed as Threatened or Endangered, or when major streams within the proposed project's RSA are listed on the 303(d) list of impaired waters.

Similarly, in some cases it will be easy to determine the effect of recent trends on the health of a resource. If a historic district includes many abandoned historic buildings, and the local City Council has recently approved building permits that will demolish some of them and construct new high-rise buildings in their place, these trends would indicate that the condition of the historic district is declining. If an organization funded and implemented a plan to clean up a polluted stream, including protecting riparian habitat, providing an appropriate buffer, and committing to long-term monitoring and adaptive management, this might lead to an improvement in the stream's water quality.

B. Describe the Historical Context of the Resource

The goal of the historical context is to give the reader (decision-maker) a reasonable explanation of how the resource got to its current state. Providing historical context is not the same as providing a list of every project or action that has affected the resource over time. It is not realistic or necessary to provide an exhaustive "laundry list" of projects throughout the years. Rather, the historical context should identify key historical patterns or activities that have contributed to the current condition of the resource.

To describe the historical context of a resource, begin by identifying key patterns or activities in the past that have influenced it. These will often be notable changes to the region's land use or demographic patterns. Then characterize the nature of the influence that these patterns or activities have had on the resource.

To focus the inquiry about past patterns or activities, a timeframe is chosen. There is no predetermined timeframe for establishing this historical context. The timeframe may be short, looking back a few years or decades, or it may be long, looking back many decades. In general, the practitioner will rely on his or her professional judgment or consult with technical specialist colleagues or other resource experts to determine appropriate timeframes for different resources. The idea is to use a timeframe that goes back far enough to provide a reasonable

historical context, i.e., tell the story, about the current state of the resource.

Counting what counts

"A cumulative effects analysis should 'count what counts', not produce superficial analyses or a long laundry list of issues that have little relevance to the effect of the proposed action or the eventual decisions." (CEQ, 1997)

To describe the historical context, use historical information. This information may be quantitative, qualitative, or both. Quantitative information is useful for determining trends over time, but it is not always available. A qualitative description can also be useful in providing historical context. The goal is to tell the story about the resource. If there is not enough quantitative data, then use qualitative information. Conversely, even if a lot quantitative information is available, it may not all be relevant to the analysis. Unless it is useful to the analysis, do not include it. For each resource, the practitioner uses his or her professional judgment to decide how to best communicate the historical context.

These examples show that the historical context, current health and trends of a resource can be described with a few sentences. It is not necessary to write volumes – this is only part of a larger environmental document. You only need to use enough data or words to tell the story about each resource.

Three Examples of Historical Context

Example 1: Community Cohesiveness
Your project has the potential to affect a low-income community that was established in the late 1800s. Until the 1960s, this community was cohesive. Since the late 1960s, several construction projects have physically divided the community and disrupted neighborhood cohesion. To establish the historical context, you would briefly reference the founding of the community in order to tell the story about its cohesiveness; but you would focus on the notable changes since the 1960s, rather than discussing all the changes since the community was founded.

Example 2: Vernal Pool Species
A brief historical context for vernal pool species in California's Central Valley could read as follows: Prior to large-scale farming operations in the Central Valley, vernal pool complexes existed throughout the valley and provided habitat for species such as vernal pool fairy shrimp. Since large-scale farming operations and recent suburban development began in the Central Valley, the trend has been to remove vernal pools, and there has been subsequent loss and fragmentation of vernal pool habitat. As a result, some native species residing in vernal pools have become threatened, endangered, or candidate species. Only a fraction of pre-development habitat remains in 2005. Much of the remaining habitat is fragmented. This resource is considered to be in poor health.

Example 3: Peregrine Falcon Populations
A brief historical context for peregrine falcon populations could read as follows; notice that this describes both longer-term history and current trends, and that it uses both quantitative and qualitative information: Peregrine falcons began to experience a substantial decline in the 1940s as a result of the use of the pesticide DDT. By the 1970s populations in the west were reduced by 80 to 90 percent. A survey in 1970 identified only two pairs nesting successfully in California; they were listed as an endangered species that year. DDT was banned in 1972. Since then, the peregrine falcons' numbers have increased. Scientists estimate there are now approximately 250 breeding pairs in California. In 1999 they were removed from the federal threatened and endangered species list; they remain listed as endangered at the state level in California.

Step 4: Identify Direct and Indirect Impacts of the Proposed Project that Might Contribute to a Cumulative Impact

A cumulative impact analysis must look at the impacts of a proposed project in combination with the impacts of other past, present, and reasonably foreseeable projects identified within an RSA. Step 4 helps to identify the direct and indirect impacts from each of the proposed project alternatives on the resources identified in Step 1. If the environmental impacts of the project alternatives are similar, the discussion of project impacts may be represented by one alternative. However, if impacts vary substantially between alternatives, it is important to differentiate each alternative's potential to contribute to cumulative impacts.

Use the information in Step 4 in two ways:

- Combine it with the impacts of other reasonably foreseeable actions (Step 5) in order to perform the cumulative impact analysis (Step 6); and
- Use it to support the project's CEQA determination (Step 7).

Step 5: Identify Other Reasonably Foreseeable Actions that Affect Each Resource

Evaluate Available Data

Steps 1 and 2 of this guidance identified the resources to consider in the cumulative impact analysis and the geographic area to be considered for each resource (RSA). The procedures set forth in Step 3 help with describing the health of the resource by discussing the historic context and current trends affecting the sustainability of each resource. Step 4 identifies direct and indirect project impacts that could contribute to a cumulative effect. The purpose of Step 5 is to identify other current and reasonably foreseeable projects to be considered in the cumulative impact analysis.

First, identify current and reasonably foreseeable transportation and non-transportation projects within the RSA for each resource in the cumulative impact analysis. Keep in mind that CEQ regulations, as reflected in Federal Highway Administration (FHWA) guidance, require cumulative and indirect impact analyses to focus on actions "that are likely or probable, rather than those that are merely possible" (FHWA,

2003). When identifying reasonably foreseeable actions, it will be necessary to evaluate each project or action on the project list to determine whether it is probable enough to be evaluated or too speculative to warrant consideration. For example, while a general plan is an excellent starting point to identify reasonably foreseeable local development projects, it may be necessary to consult other sources and experts to refine the cumulative impact assessment. Not all projects presented in a general plan or master plan may be constructed, and including all of the projects identified in these plans in the cumulative impact analysis could overestimate the potential cumulative impacts of local development. On the other hand, there may be projects that are not included in the general plan (particularly if it has not been updated recently) that, if left out of the analysis, might underestimate cumulative impacts.

Similarly, including only plans that have been funded (financially constrained) could underestimate potential project cumulative impacts, because many viable projects may be in the early planning stage. CEQ advises practitioners to consult with the staff of an appropriate agency to identify reasonably foreseeable future actions based on that agency's planning process. Project scoping can provide an opportunity for these agency discussions. For further information, refer to chapter 2 of CEQ's guidance document, *Considering Cumulative Impacts* and to the Data Gathering Issue Paper.

Once a list of projects has been developed, determine whether it would have a direct or indirect impact on the resource. Table 1 provides a sample summary of future actions and their impacts for a hypothetical transportation project.

Choosing a method

There are a variety of methods or analytic tools available. Select a method, with appropriate input as needed, that makes sense considering the condition of and anticipated impacts to the resource, the type and amount of available information, and the type and size of the proposed project.

Qualitative and Quantitative Data

Quantitative data are preferable, and they should be used whenever relevant data are available. However, quantitative data are not applicable to all analyses (e.g., visual change or community disruption). The use of quantitative data and analysis is especially valuable when Section 404 resources or biological resources are involved, because such data can be critical to identifying avoidance and mitigation measures and preparing permit applications. If quantitative data are not available, consult with appropriate agencies as soon as possible.

Incomplete or Unavailable Information

Use the best data you have available. In cases where data are incomplete or unavailable, FHWA encourages practitioners to communicate with project participants and cooperating agencies as soon as possible, because such communication can lead to additional opportunities for data collection and help all participants reach an understanding concerning the availability and acceptability of relevant information.

When preparing an Environmental Impact Statement where there is incomplete or unavailable information for a reasonably foreseeable significant adverse effect, refer to CEQ's guidance at 40 CFR 1502.22. It lays out principles regarding what to say about the incomplete or unavailable information, and when to obtain additional information.

Document Data Sources

Be sure to document the assumptions and methods used to identify projects included in the analysis, the agencies and experts consulted, and any other research. It may not be necessary to identify the sources that were consulted in the final document, but it is important to maintain a record of methods, assumptions, and analyses. This is especially important when data are scarce.

Step 6: Assess Potential Cumulative Impacts

After the RSAs have been identified for each affected resource (Step 2), the health of the resources has been assessed and put into historical context (Step 3), the direct and indirect impacts of the proposed project have been identified (Step 4), and the direct and indirect impacts of other reasonably foreseeable actions have been assessed (Step 5), the information is now ready for analysis. In Step 6, the information is reviewed and analyzed.

Review the Information Gathered

The information gathered to define the RSA and to define the context for the resource should provide a sense of the health of the resource. Developing the list of actions to include in the cumulative impact analysis will also provide insight into the prospective changes within the RSA, and how those changes will affect resources. This review will also provide a sense of the amount and quality of data that will be available to conduct the cumulative impact analysis. Table 2 provides an example of one way to compile the summary information by resource.

Assess the Cumulative Impacts

The proposed project's cumulative impacts can be assessed using a variety of methods and tools that are suited to different levels of analysis. The practitioner, with appropriate input as needed, will select the methods(s) and tool(s) on a case-by-case basis for each resource being analyzed. Chapter 5 of CEQ's *Considering Cumulative Effects* describes a variety of methods or tools – both qualitative and quantitative – for evaluating cumulative impacts. These range from simpler methods that may require less time and financial resources, such as matrices or

mapping overlays, to data-intensive methods such as modeling or trends analysis. Table 5-3 on pages 56-57 of the CEQ Guidance describes these methods, as well as their strengths and weaknesses.

The method(s) used may vary depending on the resource considered, the type of available information, and the scale of the proposed project. More than one method can be used to assess cumulative impacts on a single resource. For example, the cumulative analysis of a species could combine Geographic Information Systems (GIS) mapping and consultation with species experts. The GIS would show historical and anticipated changes in the size and location of species habitat, and the consultation would provide information on the condition of the species, and the species' ability to adapt to anticipated biological stressors.

Other Considerations: Cumulative Impacts and "No Net Loss"

No net loss does not necessarily mean *no cumulative impacts*. A practitioner may determine that each action contributing to a cumulative impact to wetlands will be mitigated, and that no net loss of jurisdictional wetlands will occur. However, a conclusion of *no net loss* can still result in notable cumulative impacts to a resource. The cumulative impact analysis for wetlands should also address:

- The loss of locally important wetlands functions and values.
- The potential for successful compensatory mitigation, particularly with artificially constructed wetlands.
- The time required for compensatory wetlands to achieve functions and the related *temporary loss* of wetlands.
- The potential for increased habitat fragmentation.
- The potential to reverse a trend for systematic wetlands or related ecosystem restoration within the RSA.
- The potential for cumulative impacts to wetlands to affect other resources, such as animal or plant species that depend on healthy wetland habitat.

Drawing Conclusions

In previous steps, the practitioner collected data and information and applied a method(s) to analyze this information. Based on that analysis, the practitioner now draws conclusions about the cumulative impacts to resources by applying professional judgment to the results, and by coordinating with technical experts as warranted.

First, the practitioner answers the question, "Is there a cumulative effect?" If the results of the analysis indicate that the proposed project,

in combination with other actions, would affect the health of the resource or a trend associated with a resource, the practitioner can conclude that the proposed project will contribute to a cumulative effect (either beneficial or adverse).

Next, the practitioner uses the results of the analysis to characterize the severity or magnitude of the cumulative effect. Consider the following question: "What do decision-makers need to know about the status of this resource within the RSA?" The practitioner should document the following for each resource:

- The health, status or condition of the resource as a result of past, present and reasonably foreseeable impacts.
- CEQA Documentation. The contribution of the proposed project to the overall cumulative impact to the resource, in support of a significance determination.
- Avoidance and Minimization. Any project design changes that were made, or additional opportunities that could be taken, to avoid and minimize potential impacts in light of cumulative impact concerns.

The CEQ Guidance discusses using the concepts of context and intensity in making impact conclusions. Consider the context and intensity of the proposed project's cumulative impacts. This will help the practitioner to make conclusions about the severity of these impacts. Chapter 4 of CEQ's *Considering Cumulative Effects* provides additional information on assessing the magnitude and significance of cumulative impacts. For most resources, the NEPA cumulative impact analysis conclusion will not require a description of the severity of impact (e.g., substantial, moderate, minor, significant) unless the method specifically reports results in such terms. However, noise and air quality impacts must be categorized using specific criteria. For example, noise impacts are described as *severe* if they exceed certain decibel levels and result in levels much higher than existing conditions.

In contrast with NEPA, CEQA requires a conclusion of significance for each impact identified. For example, a significance determination regarding a hypothetical project's cumulative impacts to wetlands might say:

> Based on this analysis and review, under CEQA, no significant contributions to cumulative impacts to wetlands and waters resources would result from the proposed Route 466 Widening Project.

Reality check

Compare the results of the cumulative impact analysis with the analysis of the direct and indirect impacts of the proposed project.

Once the cumulative impact analysis is complete, do a "reality check": compare the results of the cumulative impact analysis with the results of the direct and indirect impact analyses of the proposed project. This comparison can test the soundness of the conclusions about each resource. For example, if the direct project impacts would result in a 0.2-acre loss of wetland habitat in an RSA that contains more than 100 acres of similar habitat, a severe cumulative impact would not be anticipated. However, recognize that if this same 0.2-acre impact happens to affect an extremely rare or limited resource, the cumulative impact may be substantial.

Step 7: Report the Results

The purpose of Step 7 is to document the results of the step-wise cumulative impact analysis process. The audience for the information presented in this step is decision-makers and interested members of the public. The product of Step 7 will typically be the information included in the NEPA/CEQA document. It is a summary of the analysis approach and conclusions. This summary should include the identification of resources considered in the analysis, the RSA for each resource, and the conclusions concerning the health and historical context of understanding the resource (Steps 1 through 3). Step 7 also presents project impacts that might contribute to a cumulative impact (Step 4), other reasonably-foreseeable actions considered in the cumulative impact analysis (Step 5), and the conclusions of the analysis as outlined in Step 6.

The information presented in Step 7 is a summary, consistent with NEPA and CEQA disclosure requirements, to present information to decision-makers and the interested public. Therefore, it is important for the practitioner to clearly state the conclusions of the analysis. Include information about the methods and assumptions underlying the analysis.

Describe the Analytical Method(s) or Process(es) Used

Briefly state how the impact analysis was conducted. For example, you may have plotted GIS overlays of proposed actions (developments) and known locations of an endangered plant species. Briefly explain this approach and include any of the figures or data used to draw conclusions if they provide illustration or clarification. Provide references or footnotes as needed to document sources.

Explain Any Assumptions Used to Conduct the Analysis

Explain any limitations that were faced in conducting the analysis. Reviewers will need to know how conclusions were reached in situations

for which there were data gaps, scarce information, or limitations or obstacles associated with obtaining the data (e.g., data were cost prohibitive). If models were used, summarize the assumptions on which the models are based.

For the purposes of NEPA disclosure, the cumulative effects discussion should compare the cumulative impacts of each project alternatives. A typical statement might say, "Alternative A would adversely affect 0.4 acre of valley sink scrub in the Resource Study Area. Alternative B would not affect valley sink scrub. Alternative A, in combination with other actions, contributes to an adverse cumulative impact to the valley sink scrub community type. Alternative B does not contribute to a cumulative impact to this resource."

Where to Place the Cumulative Impact Analysis in the Environmental Document

FHWA and Caltrans have developed outlines for formatting various types of environmental documents. In developing these outlines, they have agreed that a cumulative impact analysis can be put in either of two places in the environmental document. Cumulative impacts may be discussed under each individual resource, or they may be discussed together in a section at the end of the "Affected Environment" chapter. If cumulative impacts have not been discussed under each resource section, then discuss them at the end of the chapter.

Step 8: Assess the Need for Mitigation

FHWA's NEPA implementing regulations call for the consideration of mitigation for all adverse impacts. Mitigation should be considered for any impact disclosed in the environmental document — direct, indirect, or cumulative. For more information about presenting mitigation, see CEQ's discussion of mitigation in *NEPA's Forty Most Asked Questions*, nos. 19a and 19b.

Determining the feasible mitigation measures for a cumulative impact can be difficult. In many cases, a cumulative impact results from the combined actions of numerous agencies and private entities. The requirement to implement a potential mitigation measure to address a cumulative impact is often beyond the jurisdiction of FHWA, Caltrans, or NEPA cooperating agencies. For example, successful mitigation measures for air quality impacts might require numerous local communities to modify their general plans to reduce the amount of planned development and reduce the number of vehicle miles traveled within the geographic study area. Caltrans and FHWA do not have the authority to implement the necessary planning decisions, obtain local legislative approvals, or change the regional distribution of future development. Therefore, disclosure of mitigation for cumulative impacts

is not based on or limited to specific mitigation measures that can be implemented by the lead agency.

However, a project may provide opportunities for the project proponent to propose innovative cumulative impacts solutions. Working in collaboration with resource and land use agencies, FHWA and Caltrans have supported and implemented innovative solutions to enhance environmental stewardship and ecosystem sustainability. FHWA's Exemplary Ecosystem Initiatives provide examples of successful ecosystem and habitat conservation strategies. California's Multiple Project Conservation for Species of Concern is another example of innovative collaboration between FHWA, Caltrans and local agencies.

If it was not possible to identify a mitigation measure, the discussion may consist of listing the agencies that have regulatory authority over the resource and recommending actions those agencies could take to influence the sustainability of the resource. By doing so, the needed mitigation would be disclosed to the public and reviewing agencies even though it could not be implemented by the Lead Agency. Once disclosed, the information could be used to influence future decisions or to help identify opportunities for avoidance and minimization when other projects are proposed. For more information about mitigation by others, see CEQ's discussion of mitigation in NEPA's 40 Most Asked Questions, number 19b.

Using the 8-Step Approach: A Hypothetical Example

To assess the potential for cumulative impacts, the practitioner determines the potential for past trends and current and reasonably foreseeable future actions, in combination with the proposed project, that affect the health of the resource.

Below is a brief outline of how to use the steps, with a hypothetical example for wetlands:

Step 1: The project will have direct or indirect impacts to wetlands; therefore, it is included in the resources to consider for cumulative impacts assessment.

Step 2: Based on consultation with Caltrans biologists and wetlands specialists, you determine that the relevant resource study area (RSA) is the drainage basin.

Step 3: The context: Currently the area is being used for farming, and has relatively intact wetland complexes. Current acreage: 5,000 acres. Historically (pre-settlement), the area contained abundant wetland resources. The resources have been disturbed by agricultural activities

over the past 150 years. Innovative rice farming techniques have helped maintain wetland function in some areas. In recent years, urban development and deep ripping activities associated with vineyards have increased the pace of wetland loss. The trend: Rapid development is continuing, and is expected to accelerate over the next 20 years.

Step 4: This project will have 7 acres of direct and indirect impacts to wetlands in the RSA.

Step 5: You have identified reasonably foreseeable actions in the wetlands RSA, and the associated impacts to wetlands. These reasonably foreseeable actions include 5 new housing developments, 2 new business parks, and several transportation improvements. Based on available environmental documents, discussions with wetlands experts, and other information you have collected about these actions, you estimate that 1,000 acres of wetlands will be adversely affected by reasonably foreseeable actions.

Step 6: You employed a trends method to analyze the cumulative effect on the wetlands over time. You also consulted with Caltrans biology staff and regulatory experts to analyze the effect of cumulative stresses (fragmentation, pollution, sedimentation) to the values and functions of wetlands in the RSA.

Step 7: You concluded that there will be substantial cumulative impacts to wetlands within the RSA given past, current, and reasonably foreseeable actions. Your analysis shows that that your project will account for 7 acres of the 1,000 acres of potential cumulative impacts to wetlands. You conclude that the wetland impacts associated with your project will be cumulatively minor in comparison to the impacts of other current and reasonably foreseeable projects.

Step: 8: Based on your analysis of the status of wetlands in the RSA, you recognize an opportunity to promote wetland health by building upon the existing wetland conservation efforts in the RSA. You recommend that any compensatory mitigation required for the project impacts be located proximate to existing wetland mitigation areas or wildlife refuges.