OCED

Office of Clean Energy Demonstrations

GUIDANCE ON PREPARATION OF THE ENVIRONMENTAL INFORMATION VOLUME

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Contents

Executive Summary

The U.S. Department of Energy's (DOE) Office of Clean Energy Demonstrations (OCED) has developed new guidance to streamline and accelerate the deployment of clean energy technologies. The purpose of this guide is to provide detailed guidance to recipients of federal funding on the expected content of an environmental information volume (EIV). The EIV is a document produced by the DOE Recipient as part of its detailed project plan and is submitted to DOE to provide comprehensive environmental information on a project. The information will be used by DOE in meeting its obligations under the National Environmental Policy Act (NEPA). NEPA is intended to ensure federal agencies consider the environmental impacts of their actions in the decision-making process. This information will be used to inform DOE's determination on the level of NEPA review required and will provide baseline environmental information to support the NEPA review process. DOE's NEPA review will support DOE decision-making and inform other agencies and the public about the potential environmental impacts of a project. Because this is a critical document in the decision-making process, the OCED has established and is providing this guidance. It contains a brief overview of the key points that should be considered to facilitate the deployment of clean energy technologies. These are later expanded to guide the DOE Recipient through the description of the affected environment and the anticipated impacts of the proposed project on the environment.

Acronym and Abbreviations

ANSI/ANS	American National Standard Institute/American Nuclear Society
APE	Area of Potential Effects
BLM	Bureau of Land Management
BMP	Best Management Practices
CBG	Census Block Group
CDC	Centers for Disease Control and Prevention
CEQ	Council on Environmental Quality
CO_2	Carbon Dioxide
CWA	Clean Water Act of 1972
DOE	Department of Energy
DOT	Department of Transportation
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EIV	Environmental Information Volume
EJ	Environmental Justice
EMF	Electromagnetic Field
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FOA	Funding Opportunity Announcement
FWS	Fish and Wildlife Service
GHG	Greenhouse Gases
GIS	Geographic Information System
IIJA	Infrastructure Investment and Jobs Act
IRA	Inflation Reduction Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act of 1996

NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
SHPO	State Historic Preservation Officer
THPO	Tribal Historic Preservation Officer
USACE	U.S. Army Corps of Engineers
WOTUS	Waters of the United States

Preface

Purpose

This document provides guidance to recipients of federal funding on the preferred format and content of an environmental information volume (EIV) that are submitted as part of detailed project plans for the U.S. Department of Energy (DOE) review. The purpose of this document is to improve the overall quality and consistency of data and analyses submitted by DOE Recipients to facilitate DOE's environmental review process requirements under the National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. § 4321 et seq.).

The purpose of NEPA is to ensure that an agency carefully considers the environmental impacts of a proposed action and reasonable range of alternatives before deciding to take an action. The NEPA process is intended to guarantee that relevant information regarding the potential environmental impacts of a project will be adequately disclosed to the public; relevant federal, state, tribal, and other stakeholders; and DOE decision-makers. This guidance document will help Recipients of clean energy demonstration project funding prepare a complete EIV that covers topics in a uniform fashion, allowing for the most efficient DOE environmental review.

Applicability

This guidance applies to DOE Recipients' preparation of detailed project planning documents to support DOE review of clean energy or climate mitigation project funding, such as projects funded under the Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law (Public Law 117-58, 2021), or the Inflation Reduction Act (IRA) (Public Law 117-169, 2022).

Applicable Legislation and Regulations

- NEPA requires that federal agencies prepare detailed environmental impact statements (EISs) on proposed major federal actions with the potential to significantly affect the quality of the environment (42 U.S.C. § 4321, 1969). In assessing the appropriate level of review, federal agencies may also prepare an environmental assessment (EA) when an action is not likely to have significant effects or the significance of the effects is unknown. A principal objective of NEPA is to require a federal agency to consider in its decision-making process the environmental impacts of each proposed major federal action and alternative actions, including alternative locations.
- The Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA are applicable to and binding on all federal agencies for implementing the procedural provisions of the National Environmental Policy Act (40 CFR Part 1500–1508).
- DOE regulations for DOE's preparation and processing of EISs, EAs, and related documents under Section 102(2)(C) of NEPA are provided in 10 CFR Part 1021 (10 CFR 1021). As stated in 10 CFR 1021.103, DOE adopts the regulations for implementing NEPA published by CEQ in 40 CFR 1500–1508 without conditions.

- Additional direction is provided in Executive Order 11514 “Protection and Enhancement of Environmental Quality” (EO 11514, 1970), as amended by Executive Order 11991 “Environmental Impact Statements” (EO 11991, 1977).
- Requirements for DOE’s compliance with floodplain and wetland environmental review are provided in 10 CFR Part 1022 (10 CFR 1022).
- The IIJA established mechanisms to provide funding for pilot- and demonstration-scale clean energy technologies (Public Law 117-58, 2021).
- Requirements for ensuring that 40 percent of overall benefits of certain federal investments, including investments in clean energy technology, flow to disadvantaged communities (the Justice40 Initiative) are provided in Executive Order 14008 “Tackling the Climate Crisis at Home and Abroad” (EO 14008, 2021).
- 2 CFR Part 200, as amended by 2 CFR Part 910, provides requirements for DOE financial assistance, including issuance of grants, procurement plans, cost sharing arrangements, and audits.

Related Guidance

A table providing links to other guidance and requirement documents that may be useful in the NEPA process is provided on DOE’s Office of NEPA compliance website at https://www.energy.gov/nepa/guidance-and-requirements-table. Some of the related documents offer guidance in the development of reference sources that may be useful in the development of an EIV, but unlike this guidance document, none is specifically intended to offer guidance directly pertinent to preparing the EIV itself.

Chapter 1 – General Guidance

1.0 Introduction

This chapter summarizes general guidance for DOE Recipients' preparation of an EIV as part of detailed project planning for funding clean energy or climate mitigation demonstration projects, such as projects funded under the IIJA (Public Law 117-58, 2021) or the IRA (Public Law 117-169, 2022). The following chapters outline the format and content of an EIV. DOE Recipients may use the same chapters and sections/subsections in their EIV.

General guidance in this chapter includes information related to stakeholder outreach; consultations; federal, state, tribal, and local permits and approvals; impact findings; and mitigation of adverse impacts. This chapter also provides general guidance related to the presentation of referenced material or other information in the EIV sufficient to support the U.S. DOE developing an EIS, an EA, or a categorical exclusion determination.

DOE Recipients should review the following to familiarize themselves with DOE's current environmental review process and practices:

- Applicable DOE and CEQ regulations discussed in the Preface.
- The most recent versions of applicable regulatory guidance.
- Recent EISs and EAs prepared and issued by DOE.
- DOE NEPA guidance contained in "Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements, Second Edition," dated December 2004.

In addition, DOE Recipients are encouraged to confer with DOE staff as early as possible in the project planning process before submitting environmental information in accordance with 10 CFR 1021.215, "Applicant Process," and as described in applicable funding opportunity announcements (FOAs). Recipients are also encouraged to use the information from the Cooperative Agreement, to the extent possible, for the project narrative, timelines, and anticipated schedules for the sake of consistency and to avoid unnecessary repetitive work. Interactions in advance of submitting detailed project plans can improve the environmental review process for complex projects or those anticipated to involve significant public interest. The pre-submittal process is intended to increase predictability and reduce risk by allowing proactive interaction between the DOE Recipients(s), DOE staff, other agencies, potentially affected landowners, and other stakeholders. Additionally, the process is intended to identify and address issues during the project planning phase before detailed project plans are submitted.

Because each project is unique, it is not possible to provide guidance that applies to all possible scenarios. Some of the guidance in this document may not be appropriate for the scope of a specific project. The guidance in this document is not intended to provide an exhaustive description of the potential environmental impacts of clean energy or climate mitigation demonstration projects.

DOE Recipients should evaluate the specific issues, impacts, and public and agency comments relevant to their projects and adjust the content and analyses of their EIV accordingly. Project DOE Recipients are also required to meet the filing requirements of applicable DOE FOAs. The level of detail and scope of the EIV should be proportional to the complexity of the project. Recipients should provide a single EIV that encompasses all proposed activities even if a sub-recipient may be undertaking certain portions of the proposed action.

1.1 Stakeholder Outreach

DOE is responsible for conducting public and other stakeholder outreach as part of its environmental review to support its decision on whether to issue funding for a clean energy or climate mitigation demonstration project. Regardless of whether DOE Recipients' stakeholder outreach is specifically directed by individual FOAs, early outreach represents a best practice as it should streamline DOE's environmental review process. This document focuses on guidance related to NEPA; however, please note that DOE will conduct meaningful, two-way engagement with communities and other stakeholders throughout the life of the project. This engagement is separate from, but complementary to, DOE's NEPA responsibilities.

DOE Recipients should make a good faith effort to notify potentially affected landowners, towns, communities, and local, state, tribal, and federal governments and agencies that may be involved in or affected by the project. DOE Recipients should also make an effort to include other stakeholders with a potential interest in the project, such as environmental and community-based organizations, particularly vulnerable groups, and/or groups that are impacted but often not prioritized in outreach plans or which have barriers to inclusion. DOE Recipients may wish to consult the *Directory of Potential Stakeholders for DOE Actions under NEPA*, prepared by the Office of NEPA Policy and Compliance, to aid in identifying contacts in organizations that may be potentially interested in DOE NEPA reviews (DOE, 2022). Effective stakeholder outreach can minimize delays in the environmental review process. DOE Recipients should seek to identify and engage with communities that are particularly vulnerable, such as groups with existing environmental burdens or non-English speaking individuals. For effective community engagement strategies, refer to the guidance on community benefits plans that is included with the applicable FOA.

As much information as possible about the proposal should be included in notifications to all potentially interested stakeholders. This includes a description of the DOE Recipient(s) and the project; planned facility locations and connected infrastructure corridors (including general location maps); potential environmental impacts and community concerns; the project's purpose; and the anticipated timing of the project.

The Federal Energy Regulatory Commission (FERC) has developed a document entitled *Suggested Best Practices for Industry Outreach Programs to Stakeholders*, which is available on the FERC website (FERC, 2015). This document presents common practices and highlights tools that can be used to effectively engage stakeholders in the siting, construction, and operation of energy infrastructure projects.

The U.S. Department of Transportation (DOT) developed *Promising Practices for Meaningful Public Involvement in Transportation Decision-Making*, which is available on the DOT website (U.S. DOT, 2022). The DOT document provides a shared definition of meaningful public involvement and promising practices to help address barriers to inclusion in transportation decision-making. These resources may be useful to DOE Recipients to supplement guidance on community engagement strategies included in applicable DOE FOAs.

1.2 Consultations and Coordination

When appropriate, DOE is responsible for conducting consultations under certain federal laws concurrently with its NEPA review. These laws include the Endangered Species Act of 1973 (ESA) (16 U.S.C. § 1531 et seq.), the Magnuson-Stevens Fishery Conservation and Management Act of 1996 (16 U.S.C. § 1801), and the National Historic Preservation Act of 1966, as amended. These examples are illustrative, not all-inclusive. The information that DOE suggests a DOE Recipient provide as part of its EIV will help DOE meet its responsibility to consult with other federal, state, and tribal agencies under these and other federal laws; therefore, the DOE Recipient should provide sufficient information to facilitate necessary consultations. (Additional information related to consultations is found in Appendix A of this guidance.)

In addition, there are laws and executive orders that may require coordination between DOE and other federal and state agencies before granting a license or a permit. One example is the Fish and Wildlife Coordination Act, enacted in 1934 to make sure water resource development projects do not conflict with the conservation of fish and wildlife resources (16 U.S.C. § 661–667). Under the Fish and Wildlife Coordination Act, federal agencies must consult with the U.S. Fish and Wildlife Service (FWS), the National Marine Fisheries Service (NMFS), and the state agency exercising administration over fish and wildlife resources when any body of water is proposed or authorized, permitted, or licensed to be modified by any public or private agency under a federal permit or license. Although coordination with other federal agencies is the responsibility of DOE, the proponent of the action (the DOE Recipient) should provide sufficient information to enable DOE to complete the coordination process.

1.3 Other Permits and Approvals

DOE must comply with NEPA and related requirements as discussed below prior to authorizing the use of federal funds. DOE Recipients are required to comply with all applicable federal and state environmental and other statutes. Applicable federal and state-issued licenses, permits, and/or other approvals required for a project depend on the proposed activities.

Examples of federal and state statutes and associated permits that may apply to a project include the following:

- The Clean Water Act of 1972 (CWA), was enacted to preserve and restore the quality of surface waters in the United States (33 U.S.C. §§ 1251 et seq.). Section 401 of the CWA requires that an applicant for a federal license or grant that may result in a discharge of regulated pollutants into waters of the United States (WOTUS) must obtain and provide to the federal licensing or funding agency (i.e., DOE) a Section 401 water quality certification from the state, interstate agency, or authorized tribe with jurisdiction over the discharge. The DOE Recipient is required to comply with applicable federal, state, and local laws and regulations for all work performed under a DOE funding award. The recipient is required to obtain all necessary federal, state, and local permits, authorizations, and approvals for all work performed under a DOE funding award. The DOE Recipient is required to have received a permit(s) or waiver prior to initiating construction activities. Conditions in the Section 401 certification become conditions of the funding grant. Additionally, DOE cannot issue funding to support initiation of project construction activities if certification has been denied by the state, an interstate agency, or the Environmental Protection Agency (EPA) administrator.
- Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) permit program to regulate point source discharges of pollutants into WOTUS. An NPDES permit sets specific discharge limits for point sources discharging pollutants into WOTUS and establishes monitoring and reporting requirements as well as special conditions. The EPA is charged with administering the NPDES permit program, but it can authorize states to assume many of the permitting, administrative, and enforcement responsibilities of the NPDES permit program. Authorized states are prohibited from adopting standards that are less stringent than those established under the federal NPDES permit program, but they may adopt or enforce standards that are more stringent than the federal standards if allowed under state law.
- Section 404 of the CWA requires a permit to discharge dredged or fill material into wetlands and WOTUS. The U.S. Army Corps of Engineers (USACE) and the EPA are responsible for administering and enforcing Section 404. States and tribes can administer the Section 404 permit program in certain non-navigable waters that are within their jurisdiction.
- In January 2023, the USACE and the EPA finalized a rule redefining the interpretation of WOTUS pursuant to the CWA (33 CFR Part 328 and 40 CFR Part 120, respectively). Under this rule, the USACE and the EPA interpret WOTUS to include traditional navigable waters, the territorial seas, and interstate waters; impoundments of WOTUS; and tributaries to traditional navigable waters, the territorial seas, interstate waters, or impoundments of WOTUS when the tributaries meet either the relatively permanent standard or the significant nexus standard (as defined in the January 2023 rule).
- In addition, under this revised rule, certain wetlands qualify for federal regulations: wetlands adjacent to traditional navigable waters, the territorial seas, and interstate waters; wetlands adjacent to and with a continuous surface connection to relatively permanent impoundments; wetlands adjacent to tributaries that meet the relatively permanent standard; and wetlands adjacent to impoundments or jurisdictional tributaries when the wetlands meet the significant nexus standard (jurisdictional adjacent wetlands).

- The Clean Air Act of 1970 (42 U.S.C. §§ 7401 et seq.) and its amendments define the EPA's responsibility for protecting and improving the nation's air quality. Projects that include emission of air pollutants regulated by the EPA (or applicable state or tribal government) must receive all applicable air quality permits. These permits are typically issued by individual states or tribes and must conform with the state (or tribal) implementation plan, as approved by the EPA. The Act also requires federal agencies to work with state, tribal, and local governments in certain defined air quality areas to ensure that federal actions conform to the air quality plans established in the applicable implementation plan.
- The Coastal Zone Management Act of 1972 requires federal agency activities that are reasonably likely to affect coastal zones to be consistent with any applicable state-approved coastal management program to the maximum extent practicable (16 U.S.C. § 1451). DOE Recipients must submit a certification to both DOE and the state showing that the proposed activity complies with the enforceable policies of the state's program. If the Coastal Zone Management Act applies to the project, DOE cannot issue funding to support initiation of project construction activities until the state has concurred with the DOE Recipient's certification of a coastal consistency determination.
- The Natural Gas Act of 1938 was enacted to regulate the natural gas industry (15 U.S.C. § 717). The Act authorized the Federal Power Commission, and later FERC, to regulate the interstate transportation and sale of natural gas. FERC approval is required to site, construct, modify, and operate interstate natural gas infrastructure.
- The Atomic Energy Act of 1954 (42 U.S.C. § 2011) and the Energy Reorganization Act of 1974, as amended (15 U.S.C. § 717), govern the regulation of the uses of nuclear materials and facilities in the United States. The U.S. Nuclear Regulatory Commission has responsibility for granting permits and licenses for nuclear power plants and other facilities under these acts.

These examples are illustrative, not all-inclusive. A DOE Recipient should understand the permitting requirements, processes, and schedules of applicable agencies when completing detailed project plans for funding for a clean energy or climate mitigation demonstration project. This guide does not contain guidance for preparing permit applications for submission to other agencies.

Such guidance should be obtained from the applicable agencies. The DOE Recipient should include a list of any permits already received or applied for, as well as a list of known permits that are required for the proposed project, as discussed in Chapter 5 of this guidance.

In addition, DOE Recipients for DOE funding should be aware that other federal agencies may cooperate with DOE in preparing an EA or EIS related to a proposed clean energy or climate mitigation demonstration project. NEPA allows for agencies to cooperate on EAs or EISs so that one EA or EIS can satisfy the NEPA requirements for all agencies. This cooperation improves the efficiency of the process. However, the DOE Recipient should engage with the other federal agencies to ensure that any applications to the other agencies meet those agencies' requirements and that information provided in the DOE Recipient's EIV is sufficient to enable effective cooperation on DOE's preparation of the EA or EIS.

During detailed project planning interactions, DOE Recipients of funding for clean-energy or climate-mitigation projects should inform DOE staff if they plan to apply for project coverage under Title 41 of the Fixing America's Surface Transportation Act (Title 41, 2015). This law is intended to increase efficiency, transparency, and consultation in infrastructure projects being reviewed by the federal government.

1.4 Impact Findings

DOE is ultimately responsible for determining potential impacts associated with the project. The information provided in the EIV will inform DOE's independent analysis. DOE will independently verify and rely on information provided in an EIV submitted as part of a detailed project plan.

The EIV should describe the anticipated environmental impacts and consequences from the project and alternatives. The impacts should be evaluated in terms of the potential impacts on the existing environment from construction, operations, and the ultimate disposition of the project structures, sites, and connected infrastructure. All direct, indirect, short-term, and long-term impacts resulting from project activities should be clearly identified. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are reasonably foreseeable effects caused by an action that occur later in time or farther in distance (40 CFR 1508.1(g)).

In conducting its reviews under NEPA, DOE often uses a sliding-scale approach. The sliding-scale approach to NEPA analysis applies generally to all of the recommendations in this document. This approach recognizes that proposals can be characterized as falling somewhere on a continuum with respect to environmental impacts.

This approach implements CEQ's instruction that in EISs, agencies "focus on significant environmental issues and alternatives" (40 CFR 1502.1) and discuss impacts "in proportion to their significance" (40 CFR 1502.2(b)). Note that under CEQ's regulations and judicial rulings, the degree to which environmental effects are likely to be controversial with respect to technical issues is a factor in determining significance.

When applying the sliding-scale approach to NEPA analysis, DOE Recipients should analyze issues and impacts in the level of detail commensurate with their importance. "Scale" refers to the spectrum of significance of environmental impacts.

Proposals with clearly small environmental impacts usually require less depth and breadth of analysis to either identify alternatives or analyze their impacts (though the analysis still must satisfy all NEPA requirements).

Additionally, resources can be dismissed from a detailed impact analysis in an EA or EIS if there is no potential for there to be an impact. Conversely, as proposals fall increasingly closer to the high end of the continuum of potential environmental impacts, the depth and breadth of analysis will increase.

Section 3.2 discusses identification of reasonable alternatives to the project. Major categories of alternatives include alternative technologies, project facility configurations, and project facility locations. Once reasonable alternatives have been identified, the EIV should evaluate the potential environmental impacts of all the alternatives, including the proposed project, and compare these impacts on the environmental baseline and each other.

CEQ regulations also require consideration of cumulative impacts (40 CFR 1508.1(g)). Guidance on evaluating cumulative impacts is provided in Section 4.11 of this document. The evaluation of the cumulative impacts at the alternative sites should be similar to that for the proposed sites, except that reconnaissance-level information may be used for the alternative sites in lieu of detailed surveys. If, however, the initial review appears to indicate that one or more alternative sites may be environmentally preferable, or even obviously superior, to the proposed project sites, then additional reconnaissance-level information should be gathered to further assess whether the alternative sites are obviously superior.

1.5 Mitigation of Adverse Effects

DOE Recipients should consider alternatives available for reducing or avoiding adverse effects. In addition, DOE Recipients should identify in their EIV any ongoing or planned mitigation for other permit-related activities and discuss the potential need for additional mitigation. Mitigation alternatives should be considered in proportion to the significance of the impact. In 40 CFR 1508.20, "Mitigation," the CEQ identifies five types of mitigative actions:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

A DOE Recipient should identify in the EIV all relevant, reasonably foreseeable mitigation measures that could reduce or avoid adverse effects, even if they are outside the jurisdiction of DOE. This approach is consistent with CEQ's response documented in question 19b of its "Forty Most Asked Questions" on CEQ's NEPA regulations (46 FR 18026, 1981).

The DOE Recipient should provide reasons why mitigation measures are considered reasonably foreseeable. For example, a mitigation measure can be considered reasonably foreseeable if it is 1) required by DOE as a condition of the grant of funding, 2) required or likely to be required by another regulatory agency (e.g., USACE), or 3) it is a mitigation that the DOE Recipient intends to perform and identifies in the EIV.

Where applicable, the DOE Recipient should specify what federal, state, or local laws require the mitigation measures or if there is (or is expected to be) a federal, state, or local permit requiring the particular measures. The DOE Recipient should clearly explain the requirements that are being imposed by the regulatory agency with authority over the resource and explain how they relied on the mitigation to determine the impact level by discussing how the mitigation will be accomplished and whether it is expected to lower the impact level. For example, for a project where a wetlands mitigation plan is required by a state permit issued to the DOE Recipient and/or by state laws and regulations, the DOE Recipient should consider this information in the EIV.

1.6 Presentation of DOE Recipient Information

Information and data should be provided with the EIV at a level sufficient for DOE to comply with Section 102(2) of NEPA (42 U.S.C. § 4321). The DOE Recipient should describe and provide the following data and information:

- Geographic information and geospatial data used to support analyses, including appropriate description of the data formats and sources of the information.
- Data formats used to create figures and maps.
- A description and documentation of computer modeling codes that are used to support analyses in sufficient detail to allow DOE staff to conduct an independent evaluation.
- Descriptions and documentation of any conducted or planned surveys and the data obtained or a schedule for completing surveys.
- Include a description of any known data gaps and assumptions used to account for missing or highly uncertain data. Any assumptions should be bounding and reasonable.

Information obtained from publications or other information from the literature should be concisely summarized and documented using references to original data sources. Where the availability of original sources that support important conclusions is limited, the sources should be adequately summarized in the EIV and available for auditing in the DOE Recipient's records. In all cases, information derived from published results should be clearly distinguished from information derived from the DOE Recipient's field measurements.

The information the DOE Recipient provides to support the analyses in DOE's EIS or EA must be publicly available. Because the EIS or EA relies on information from the EIV, DOE Recipients should ensure that key information supporting the data and analyses in the EIV can be made publicly available. Publicly available information is information that can be accessed by the public. Examples include: 1) publicly available information stored in DOE's electronic recordkeeping system or maintained in DOE's Public Document Library, 2) copyrighted information with proper citation, or 3) a publicly accessible website with a reference that allows DOE and the public to find the information.

The DOE Recipient may reference copyrighted information but must not submit copyrighted material as public information in support of an EIV. However, the copyrighted information should be properly referenced so that DOE and the public can access it. Regarding sensitive information, a request to withhold such information from the public must meet the requirements of applicable DOE regulations or orders. If the information satisfies those requirements and DOE grants the request to withhold the information from the public, then the information will not be made publicly available.

DOE Recipients should also ensure the consistency of information presented within different sections of the EIV, as well as between the EIV and the associated detailed project planning documents. If DOE does not plan to rely on references and other supporting documentation to reach its conclusions in the EIS or EA, DOE Recipients are not required to make such information publicly available. However, such references and documentation should be available for review in an audit setting. If DOE will be relying on the information in its EIS or EA and the information is not otherwise publicly available as discussed above, then the information must be filed with DOE so that it can be made publicly available.

In the EIS or EA, DOE generally follows the terminology used by the DOE Recipient in its EIV to describe commonly used terms, such as station, plant, unit, facility, or project. The DOE Recipient should define the terms that it uses and be clear and consistent throughout its EIV.

Chapters 2 through 7 of this guidance provide suggested formatting and content recommendations for an EIV submitted to support a request for DOE funding for a clean energy or climate mitigation demonstration project.

The EIV should provide, in detail, all information outlined in the following chapters, subject to application of the sliding-scale approach discussed in this chapter. While DOE is responsible for determining potential impacts associated with the project, the information provided in the EIV will inform DOE's independent analysis. Additional information may be required to complete the NEPA review process and will be requested by DOE if needed.

Chapter 2 – Summary

2.0 Introduction

This section of the EIV should briefly describe the contents of this chapter, which should include a list of project participants, a concise summary of the purpose and need for the project and the request for funding, a description of planned project activities and schedules, and a summary of the potential impacts of the project.

2.1 Project Participants

This section should provide the names of the project participants and describe each participant's role in the project.

2.2 Proposed Action and Purpose and Need

This section should contain a succinct summary of the proposed clean energy or climate mitigation demonstration project and provide information to support DOE's development of the underlying purpose and need for the project.

The purpose and need statement will be independently developed by DOE but will be informed by the DOE Recipient's objectives, as described in the EIV. The recipient's statement of purpose and need should not simply be written as a justification of the recipient's proposed action. The purpose should answer what DOE needs to accomplish (e.g., award of funding), and the need should answer why DOE is taking the action (e.g., supporting clean energy or climate mitigation goals).

Examples of purpose and need include a benefit provided if the proposed action is implemented or descriptions of the disadvantages that would be experienced without the proposed action. For instance, a description of how implementing the proposed action would satisfy global, national, or regional greenhouse gas (GHG) reduction goals. The description should include, as appropriate, quantification of the benefit in terms of the proposed reduction relative to the emissions impacts of maintaining the existing energy and transportation infrastructure status quo.

The statement of the DOE Recipient's underlying Purpose and Need is critical to identifying the range of reasonable alternatives. If the Purpose and Need is defined too broadly, the number of alternatives that might require analysis could be virtually limitless. It is inappropriate in most situations, however, to define purpose and need so narrowly that only a single alternative could be identified for analysis. The proposed action is generally only one means of meeting the purpose and need for an action.

2.3 Planned Activities and Schedules

The DOE Recipient should supply a brief description and schedule of the proposed activities, including dates for the start of construction and operation of each component of the project. This information is used by DOE staff in its analyses of direct, indirect, and cumulative impacts.

2.4 Summary of Potential Impacts

The EIV should briefly summarize the DOE Recipient's conclusions regarding the potential environmental, safety, health, and socioeconomic impacts of the proposed project and alternatives. The summary should focus on both beneficial and adverse impacts, as well as any major risks associated with constructing, operating, maintaining, and decommissioning the project facilities. The summary of impacts may be presented in a table format.

Chapter 3 – Proposed Action and Alternatives

3.0 Introduction

This section should briefly describe the contents of this chapter, which include the objectives of the proposed action, descriptions of the proposed sites and facilities, and descriptions of construction, operational, and decommissioning activities. A complete description of reasonable alternatives to the project should also be provided in this chapter. As noted in the Preface, DOE Recipients should evaluate the specific issues, impacts, and public and agency comments relevant to their individual projects and adjust the content and analyses of the EIV accordingly.

3.1 Proposed Action

This section should briefly describe the objectives of the proposed clean energy or climate mitigation demonstration project. Major elements of the project should be briefly summarized here and described in detail in the following sections.

3.1.1 Site Location(s)

A description of the location(s) of all project-related components, including supporting and/or connected infrastructure and Balance of Plant facilities (even if the connected infrastructure and Balance of Plant facilities are not included in the scope of the federally funded project). This includes any aspect of the project that may occur in another country or U.S. Territory.

3.1.2 Site Layout and Appearance

A description of the project and all associated facilities is needed to assess the physical scope of the project and visual impacts. Associated facilities include any proposed new structures or structure modifications (on-site or off-site) that need to be completed for the project to be constructed or operated (e.g., pipelines; transmission lines; road, rail, barge, or other transportation-related improvements; water-management structures or impoundments; borrow pits; and spoils storage areas). Any reasonably foreseeable additions or modifications to the initial project that could occur during the project lifespan should also be described.

The DOE Recipient should clearly define and use consistent site terminology (e.g., site, property, or project boundaries) throughout the EIV. The EIV should include the following information relating to the external appearance and layout of the project:

- Topographic maps of the proposed site(s) and vicinity showing the layout of the project relative to the site(s) and vicinity, including:
  - Site boundary or boundaries.
  - Waterbodies.

    - Sensitive receptors (e.g., hospitals, nursing homes, schools, or religious institutions).
    - Existing and planned roads, rail lines, and utility corridors.
    - Liquid and gaseous release points.
    - Land to be cleared.
    - Waste disposal areas.
    - Other buildings and structures (both temporary and permanent) associated with the project.
- The relationship between the project and any existing structures or facilities, including removal or modification of existing structures.
- A description of the project, including any aesthetic principles and concepts used in the design and layout of the proposed facilities and any plans to seclude and screen the facilities and to architecturally integrate the buildings and landscaping into the existing environs.
- Representative ground-level photographs of the sites on which major project features are superimposed.
- Low, oblique aerial photographs of the sites and vicinity on which major project features are superimposed.
- Architectural renderings of the project, including landscaping and all major project features.

3.1.3 Proposed Structures

A description of all project structures, systems, or components is needed to clarify the physical scope of the project for assessing the impacts of construction and operation. Depending on the project facilities and scope of activities to be conducted, the description may include:

- Grade of project facility site(s) and heights of major structures, using a consistent vertical reference.
- Stormwater drainage system (e.g., number, location, and size of temporary and permanent retention/detention ponds, diversion structures, or other hydrological alterations).
- Facility location footprints and conceptual layouts of facility structures, with the location and dimensions (e.g., area and height above grade) of structures and support facilities (e.g., storage tanks or complex, switchyard, laydown areas, parking areas, warehouses, and training facilities). Include off-site infrastructure connections if applicable. Indicate permanent and temporary areas of land disturbance, including whether the locations are greenfields or brownfields.
- If applicable, a heat-dissipation-system flow diagram, including the design, size, and location of cooling towers, cooling lakes or ponds, and spray canals or ponds.
- If applicable, a heat-transfer-system flow diagram, including the design, size, and location of the condenser, heat exchanger, and fluid storage.
- If applicable, the creation or modification of any water storage (reservoir) or cooling, settlement, or evaporation pond, including dams or dikes.
    - For any water storage facility, describe the total and usable storage capacity, surface area, evaporation rate, depth, flow control structures or components, and associated water transfer systems (e.g., refill, withdrawal, and conveyance).

- If applicable, water intake systems, including plan-view and cross-sectional-view scale drawings.
  - The description should include location, size, height, and depth of structure; number and size of intake bays and pumps; screen types and sizes; type of screen cleaning system; fish-return system; and associated pipelines or other conveyance structures.
- If applicable, the water discharge system, including plan-view and cross-sectional-view scale drawings.
  - The description should include the location and type of discharge structure(s), including depth below surface and relationship to bottom of receiving waterbody, discharge receiving area alterations, and associated pipelines or other conveyance structures.
- If applicable, well structures (use, depth, diameter, construction, location, and pumping rate or discharge rate for injection wells).
- Any other water systems (e.g., service, fire, potable, and sanitary systems) with source, delivery, and discharge (if applicable) identified.
- Any other in- or over-water structures.
- Any modifications to transportation infrastructure (e.g., location, extent, and number of roads, culverts, bridges, rail lines, barge slips, and barge facilities).
- If applicable, pipeline infrastructure (e.g., location, extent, pressure and volume, size, and number of existing pipeline facilities; modifications to existing pipeline facilities; use or modification of existing pipeline corridors; new pipeline corridors; new pipelines; and metering and compressor stations).
- If applicable, electric transmission infrastructure (e.g., location, extent, voltage, and number of existing transmission facilities; modifications to existing transmission facilities; use or modification of existing transmission corridors; new transmission corridors; new transmission lines; transmission structure types; and switchyards).

3.1.4 Construction Activities

Construction activities, methods, and durations influence the environmental impacts of the project. The DOE Recipient should describe the type of activities needed to construct or install the proposed structures and associated facilities described in Section 3.1.2 and should indicate the sequencing and estimated duration of activities, especially when multiple phases of construction are proposed. The EIV should include consideration of seasonal constraints on the construction activity.

If multiple phases are proposed or if the project is co-located with an existing facility, the EIV should include consideration of activities and the workforce in relation to concurrent construction and operation.

The description of construction activities should also include the following:

- Spatial data in electronic format (current industry-standard format) for the project (permanent as-built structures) and associated building uses (including temporary structures and use areas).

- Maps or scale drawings showing the extent of area to be disturbed during construction (both on-site and off-site) and the construction use of the site or project areas (e.g., laydown, spoils stockpile or disposal, concrete batch plant, module assembly, temporary roads, or parking) relative to the as-built proposed structure locations.
- Extent, equipment, and methods for land clearing, grading, and excavation.
- Depths of excavations, particularly deep excavations that could require dewatering, and width and depth of trenches (e.g., for pipelines).
- Any in-water and nearshore activities (e.g., dredging, excavation, dewatering, filling, and impoundments).
- A description of equipment and methods as well as the extent and duration of any shoreline and in-water disturbance and any temporary structures (e.g., cofferdams, barge moorings, and silt curtains).
- The source of water for construction purposes, estimated rate and quantity of water use, and proposed wastewater-management practices for construction activities.
- The source and quantity of fill material for construction purposes.
- Any solid or liquid-waste materials, such as water-management waste, solid waste, gaseous waste, and hazardous waste, that may be generated during construction. The description should include estimates of the quantities of wastes to be disposed of, their pollutant concentrations, the manner in which they will be treated and controlled, and the procedures for disposal.
- Any activities that would generate dust or emissions that might impact air quality (e.g., burning vegetation and combustion of fuel in equipment). Include any temporary activities that might be necessary for construction (e.g., operation of an on-site concrete batch plant).
- Estimates of construction-related traffic associated with transportation of materials, wastes, and workers to and from the proposed project facility locations.
- A description of the construction workforce, including the average and peak number of workers.

3.1.5 Operational Activities

The DOE Recipient should describe the type of activities involved in operating the proposed project and the associated structures and facilities described in Section 3.1.2. Descriptions should provide sufficient detail to assess specific effects of all operating systems on the environment.

All modes of operation should be described, including normal operation, shutdown or standby, and any foreseeable emergency situations. Seasonal and operational variations that change the impacts to the environment, such as amounts of water intake or discharge, effluent releases, or other potential environmental releases should be discussed. For systems that interface with the environment, the DOE Recipient should describe system parameters and their associated site interface values, clearly indicating the units of measure for the interface value and whether the value is for a single phase of the project or for all phases (if applicable). The DOE Recipient should also describe the operational activities for project-related connected infrastructure, such as the transmission system, transportation infrastructure, and the stormwater-management system.

For example, if the project includes a system that draws water from or discharges to a waterbody (e.g., for cooling water or other consumptive uses), the EIV should include:

- A quantitative water-use diagram showing anticipated flow rates to and from the various station water systems (e.g., heat-dissipation system, heat-transfer system, electrolysis cell, sanitary system, waste systems, and other process water systems), including the source of water for each system and the receiving water for any liquid discharge to a waterbody.
- A table of anticipated normal operational flow rates and maximum flow rates, indicating assumptions and conditions for each.
- A flow diagram and tabulated information that clearly presents the water balance of project-related and connected infrastructure activities by accounting for withdrawals, consumptive use (water that is not returned to the source waterbody, for example, water from a river that is lost to evaporation in cooling towers or water converted to its molecular components), and liquid discharges.
- A description of intake operation, including approach and through-screen velocities, debris, and fish-return-system operation at all intake or pumping locations.
- Pertinent temperatures and methods used for estimating evaporation and drift rates.
- Cooling-tower blowdown volume, flow rates, temperature range, and number of cycles of concentration assumed for normal operation and any other modes of operation considered.
- A description of chemicals/solvents (e.g., corrosion inhibitors, antifouling agents) to the intake and discharge system, used as part of the heat-transfer process, and/or as an agent in carbon capture.
- Estimated temperature and chemical constituent concentrations in wastewater at the discharge point.
- A description of controlling structures and flow patterns, residence times, rate of temperature changes, evaporation rate, and seepage rate for any cooling water reservoirs or discharge canals.
- Maintenance procedures and frequency for the intake and discharge structures (e.g., dredging or mucking, biofouling treatment, screen maintenance, and pump maintenance), including proposed waste- or debris-disposal practices.
- Maintenance procedures and frequency for the stormwater-management system, including proposed waste- or debris-disposal practices.
- References to applicable federal, state, regional, and local, and affected American Indian tribal water-use laws, including existing and known water rights and allocations.

Regarding land interfaces, the DOE Recipient should describe maintenance procedures and frequency for any transmission corridors and switchyards, roads, parking areas, rail lines, and other infrastructure, including proposed waste- or debris-disposal practices.

For air interfaces, the DOE Recipient should describe the location, including elevation, of vents and other exhaust apertures related to the project facilities and connected infrastructure. The location and specifications of any existing or proposed meteorological towers that will support facility operations should be described. In addition, describe the number of emission sources, their expected emissions, and their estimated frequency of operation, including associated emissions from intermittent sources. If air is used for heat dissipation or for the main operational cooling system, describe the system and its impacts to the environment.

The DOE Recipient should also describe any solid- or liquid-waste materials, such as water-management waste, solid waste, gaseous waste, and hazardous waste, that may be generated during operation. The description should include estimates of the quantities of wastes to be disposed of, their pollutant concentrations, the manner in which they will be treated and controlled, and the procedures for disposal.

The DOE Recipient should provide estimates of operations-related traffic associated with transportation of materials, wastes, and workers to and from the proposed project facility locations. A description of the operational workforce, including the average and peak number of workers, should also be provided.

3.1.6 Decommissioning Activities

The DOE Recipient should describe the type of activities expected concerning the decommissioning and dismantling of the proposed project following cessation of the operational phase. Because decommissioning activities are expected to be further removed in time from the submittal of the detailed project planning documents, DOE Recipients may provide a qualitative estimate of the necessary activities and include a general discussion of uncertainties in the estimate.

Descriptions of decommissioning activities should provide sufficient detail to enable assessment of specific effects of the activities on the environment.

Descriptions in the EIV should include:

- A temporal description of the size of the workforce as it relates to the expected duration of decommissioning activities.
- Any construction-related activities during decommissioning (e.g., temporary structures and laydown areas).
- A description of the decontamination, dismantlement, and/or demolition of structures or buildings, including:
  - The project-related structures that will remain in service or be demolished, dismantled, or modified for reuse.
  - The heavy equipment likely to be used during decontamination, dismantlement, and/or demolition.
  - The draining (and potential flushing) of any contaminated systems, including any chemicals used as part of the activities.
  - Expected water use during decontamination, dismantlement, and/or demolition activities including the source, rate, volume, and discharge location.
- A description of the processing, shipment, and disposal/destruction of all decommissioning and/or dismantlement-related waste/material (solid and liquid), including radioactive material, hazardous radioactive (mixed) wastes, chemical wastes, hazardous wastes, municipal solid wastes, and industrial solid wastes.

- A description of any remedial activities related to contaminated water, including pumping rates and volume; the water treatment method (e.g., activated carbon sorption, air stripping, filtration, ion exchange, or metals precipitation); the processing, shipment, and disposal of any water treatment material (e.g., activated carbon or resin); and the discharge location, rate, and volume of the treated water.
- A description of any remedial activities related to contaminated soil (e.g., in-situ soil remediation [physical/chemical or biological treatment], removal with thermal treatment and disposal/recycling, and/or excavation and disposal), including the volume and final disposition of the remediated or excavated soil.
- Estimates of traffic associated with transportation of materials, wastes, and workers going to and from the proposed project facility locations.
- A description of the decommissioning workforce, including the average and peak number of workers.

3.2 Alternatives to Proposed Action

The EIV should include a discussion of alternatives to the proposed action that is sufficiently complete to aid DOE staff in developing and describing appropriate alternatives to the proposed action in an EA or EIS. To the extent practicable, the environmental impacts of the proposal and the alternatives should be presented in comparative form.

A key aspect of the alternatives analysis is that the alternatives presented in the EIV should be capable of meeting the purpose and need of the project. A given project will have its own unique purpose and need statement. Some projects may have very different statements of purpose and need; however, any alternative that will be evaluated must meet the purpose and need.

Another key aspect of this analysis is that the alternatives presented in the EIV should be reasonable as defined by the CEQ (46 FR 18026, 1981). Identification and evaluation of reasonable alternatives to a proposed action is the intent of NEPA. Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint rather than those that are simply desirable from the standpoint of the DOE Recipient.

When there are potentially a very large number of alternatives, only a reasonable number of examples covering the full spectrum of alternatives should be analyzed and compared in the EIV. What constitutes a reasonable range of alternatives depends on the nature of the proposal and the facts in each case. This approach is consistent with CEQ's response documented in Question 1b of its 40 questions on CEQ's NEPA regulations (46 FR 18026, 1981).

The range of alternatives proposed by a DOE Recipient in an EIV will inform DOE's independent evaluation of alternatives. As discussed in Chapter 1 of this guidance, DOE Recipients are encouraged to confer with DOE staff as early as possible in the detailed project planning process before submitting environmental information in the EIV. DOE will independently determine the reasonable range of alternatives to be evaluated and the alternatives that will be eliminated from detailed consideration.

3.2.1 No Action

The discussion of alternatives in the EIV should include the no action alternative under which the requested action (e.g., funding) is not granted by DOE. The no action alternative provides a baseline against which impacts of the proposed project and other analyzed alternatives can be compared. Under the no action alternative, the EIV should describe the impacts of not implementing the proposed action.

3.2.2 Alternatives Eliminated from Detailed Consideration

The DOE Recipient may determine that some potential alternatives are not reasonable. The DOE Recipient should briefly describe the basis for its conclusion that the alternative is not reasonable (e.g., that the cost or time to implement would be impractical or that technical implementation would be infeasible) and provide supporting evidence.

3.2.3 Reasonable Alternatives

There may be a range of reasonable alternatives of different types. Some major categories of alternatives are alternative technologies, alternative configurations, and alternative project facility locations. In some cases, there may not be any reasonable alternative to the proposed action under one or more of these categories. For example, if the purpose and need for the proposed action is to demonstrate a specific new clean energy technology, then no alternative technology could meet this need.

3.2.3.1 Alternative Technologies

Depending on the nature of the proposed action, it may be possible to meet the purpose and need using one or more technologies different from those in the proposal. The DOE Recipient should evaluate such technologies and compare the environmental impacts of these alternatives to the impacts of the proposed action.

3.2.3.2 Alternative Configurations

It may be possible to reduce the environmental impacts of the proposed action by changing the configuration of the project on the proposed site. For example, it may be possible to reduce the impacts to wetlands by moving one or more project facilities to a different location on a site. The DOE Recipient should evaluate such configurations and compare the environmental impacts of these alternatives to the impacts of the proposed action.

3.2.3.3 Alternative Project Facility Locations

It may be possible to reduce the environmental impacts of the proposed project by locating the project facilities at different sites. The range of possible project facility location alternatives will be dictated by the nature of the project and its associated purpose and need. The DOE Recipient should define a region of interest for siting based on the purpose and need and consider alternative locations within that region. In some cases, the region might be quite large, leading to a large number of potential alternative facility locations.

In such a case, apply the principle of identifying a reasonable number of examples to cover the full spectrum of alternatives. In other cases, the region of interest may be limited; for example, if the project is being developed for or is located at a federal facility. In this case, only alternative facility locations that would support the work at that federal facility need be considered. Once the alternative facility locations have been identified, the DOE Recipient should evaluate the environmental impacts of constructing and operating the project at each location. The DOE Recipient should then compare the environmental impacts of these alternatives to the impacts of the proposed action.

Chapter 4 – Existing Environment and Environmental Impacts

4.0 Introduction

The information in this chapter of the EIV should present relevant information concerning those physical, ecological, societal, and human characteristics of the environment in and around the proposed project locations and connected infrastructure corridors that might be affected by construction, operation and maintenance, and ultimate disposition of the proposed clean energy- or climate mitigation-demonstration-project facilities and connected infrastructure. As noted in the Preface, DOE Recipients should evaluate the specific issues, impacts, and public and agency comments relevant to their individual projects and adjust the content and analyses of their EIV accordingly.

For each environmental resource, DOE Recipients should describe only the affected environment for those areas within which the resource could potentially be subject to direct or indirect impacts from the action. This is commonly referred to as the "resource impact area." Table 1 provides examples of resource impact areas for each environmental resource typically affected by constructing and operating a large energy infrastructure project. The DOE Recipient's resource impact areas may be different from the examples in Table 1. The DOE does not expect DOE Recipients to precisely define resource impact areas for each environmental resource, but the area within which the DOE Recipient characterizes the affected environment should generally correspond to the potential spatial extent of direct and indirect impacts (i.e., to what DOE will define as the resource impact area).

The DOE Recipient should provide project facility location information (e.g., states and counties in which the facilities will be located), aerial photographs of the major project facility sites as they exist at the time of the preparation of detailed project planning documents (including the EIV), and one or more maps showing the site locations and facility arrangements within the sites. Maps should include the extent (if any) to which the facilities will be co-located and/or interface with any existing industrial facilities. The DOE Recipient should provide coordinates for the major project facility site(s) and the total acreage of the proposed site(s). The DOE Recipient should also identify connected infrastructure corridors (e.g., pipelines, electric transmission lines) and associated off-site areas (e.g., metering stations, electrical substations) that will be constructed, modified, and/or operated to support the project. In addition, this section can be used to provide other descriptive information about the setting of the project.

Table 1. Resource Impact Area by Specific Resource

Resource	Resource Impact Area
Land Use and Transportation	The resource impact area should encompass the project sites, the vicinity, the extent of off-site areas and connected infrastructure corridors, and other elements of the project, including increased traffic volumes on roadways for both construction and operations. If a proposed action includes purchasing or retrofitting of vehicles, information on the type or class of vehicle, total number of vehicles, and purpose of vehicles (i.e., storage, delivery, mass transit) should be provided.
Atmospheric Conditions and Air Quality	The resource impact area for criteria pollutants is generally the counties where the activity is taking place and surrounding counties, including consideration of any nonattainment or maintenance areas and any Mandatory Federal Class 1 Areas. The resource impact area for greenhouse gas emissions should encompass the regional airshed in which the project facilities will affect emissions. Overall, climate change analysis should include assessing pollutant reduction from the proposed actions in addition to short- and long-term greenhouse gas emissions.
Hydrologic Conditions/ Water Resources	The resource impact area should reflect the use of and impact on (discharges etc.) surface water and groundwater sources and wetlands by the project and by other projects in the vicinity of the site.
Geologic/Soil Conditions	The resource impact area should encompass the sites, the vicinity, the extent of off-site areas and transmission-line corridors and pipelines, and other elements of the project.
Vegetation and Wildlife Resources	**Terrestrial Resources:** At a minimum, the resource impact area should encompass the project sites, vicinity, and any potentially impacted off-site parcels or corridors. The resource impact area should also encompass any parcels recognized early in the project design process as likely to be used for mitigation activities. If one or more corridors extend farther than the selected impact area, then the resource impact area should include the extended linear corridors, such as pipelines, transmission lines, or transportation routes. **Aquatic Resources:** The resource impact area should be defined using criteria appropriate to the characteristics of the resource, such as salinity regimes, watersheds, wetlands, substrate, or other environmental characteristics that define suitable habitat ranges and preferences of aquatic resources in the area affected by the project. The resource impact area should also include those areas (such as impoundments or facilities affecting water quality) that have or will add to the incremental effects of the project on aquatic habitats.

Resource	Resource Impact Area
Socioeconomic Conditions	The resource impact area should encompass the areas of effect and the distances of impacts of constructing, operating, and decommissioning over the expected project lifecycle. The scope will depend on the extent of project activities but normally would include the project locations, connected infrastructure corridors, the local community, the economic region, and demographic region.
Environmental Justice	The resource impact area should contain those disadvantaged communities (i.e., communities, as defined by the Justice 40 Initiative, that are marginalized, underserved, and overburdened by pollution) located within census tracts identified using the standard environmental justice screening tools discussed in Section 4.7.
Historic/Cultural Resources	The resource impact area (i.e., the area of potential effect[s]) should encompass the geographic area or areas within which the project may cause direct or indirect effects (including physical, visual, vibratory, or audible effects) to the character or use of historic or culturally sensitive properties as described in Section 4.8 of this chapter.
Visual Resources	The resource impact area should encompass all visually sensitive areas and residential areas potentially impacted by the project, including connected infrastructure corridors and, where applicable, anticipated marine traffic.
Health and Safety Factors	The resource impact area changes based on the type of health effect. For example, occupational health risks would primarily occur at project sites, while electric shock hazards could occur at both the facility sites and along any electric transmission corridors.

The extent of the affected environment may not be the same for all potentially affected resource areas. For example, traffic may increase within four miles of a site from which waste would be removed to a nearby landfill (the extent of the affected environment with respect to transportation impacts). In contrast, groundwater extending two miles from a project facility site may be affected (the extent of the affected environment with respect to groundwater impacts).

The DOE Recipient should consider the following factors in describing the affected environment:

- The description of the affected environment should lay the foundation for evaluating the potential environmental impacts of the project and analyzed alternatives. Provide appropriate (i.e., sufficient but not excessive) detail concerning environmental resources to adequately support the impact analysis, including the cumulative impact analysis.
- Limit the description of the existing environment to information that directly relates to the scope of the project and analyzed alternatives (i.e., provide the information that is necessary to assess or understand the impacts). Where appropriate, summarize and incorporate by reference more detailed descriptions of the affected environment.

- Incorporate in the descriptions of the affected environment information relevant to the discussion of compliance with requirements other than NEPA. For example, if environmentally sensitive resources are present, be sure to satisfy requirements for environmental review under applicable laws, regulations, and executive orders. To the extent possible, integrate such information with the assessment of environmental impacts. When appropriate, clearly state that environmentally sensitive resources are not present. Append consultation letters, as appropriate.

This chapter of the EIV should also describe the direct, indirect, and cumulative impacts of constructing, operating, and decommissioning the project, including off-site facilities that will support operation of the project facilities (e.g., pipelines, transmission lines). The EIV should identify the measures and controls that would be used to mitigate and limit adverse environmental impacts for each resource area.

Because decommissioning activities are expected to be further removed in time from the timeframe for submittal of detailed project planning documents for a clean energy or climate mitigation demonstration project, the guidance in this document for addressing decommissioning activities in an EIV is less detailed.

The EIV should also include an evaluation of the impacts of reasonable alternatives to the project and should provide a comparison of the impacts of the project and the alternatives (see Section 1.4 for additional guidance on evaluating the impacts of alternatives).

Specific information to include in the EIV for each affected resource area, as part of the description of the affected environment and the environmental impacts of the project and alternatives, is covered in the following sections. As discussed in the general guidance, DOE Recipients are encouraged to confer with DOE staff as early as possible in the planning process before submitting the EIV.

4.1 Land Use

This section of the EIV should provide a description of the existing land-use environment and an evaluation of the environmental impacts of the proposed project and reasonable alternatives on this resource area.

4.1.1 Existing Environment

The DOE Recipient should provide data and information about the project facility site(s) and connected infrastructure corridors, the local vicinity, and the wider region. For the purposes of this section, the project site(s) are defined as the immediate property or properties effectively controlled by the DOE Recipient (e.g., within the site boundary or boundaries) upon which the project will be situated. The vicinity is the surrounding landscape encompassing the project site(s), local access routes and connected infrastructure corridors, nearby cities and towns, and other local resources with the potential to be affected by the project. The region includes the vicinity and the wider surrounding area. The DOE Recipient should confer with DOE staff as early as possible in the detailed project planning process, as discussed in Chapter 1 of this guidance, to establish the definition of the vicinity and region.

The vicinity should be large enough to encompass surrounding areas whose land uses could reasonably be influenced to a noticeable degree by the project and associated facilities. The region should be large enough to include any areas encompassed by applicable regional land use or local economic-development plans. The guidance provided in this paragraph applies only to defining a vicinity and region for evaluation of land-use impacts. Geographic areas of other sizes and shapes may be appropriate for evaluation of other environmental impacts.

The vicinity should include any off-site areas where related project structures and connected infrastructure would be sited or routed as part of the action covered in the EIV. Examples include pipelines and associated infrastructure (e.g., compressor and regulating stations), transmission facilities (e.g., switchyards, substations, and transmission-line towers), and access roads, railroad lines, or waterways needed to connect the facilities to project infrastructure. Other examples include reservoirs, barge slips, water-intake facilities, blowdown or other discharge lines, and related infrastructure.

The DOE Recipient should identify and describe the land-use characteristics of the site, vicinity, and region. These descriptions should provide reasonably foreseeable land-use changes near the site, including ongoing and planned commercial, residential, and industrial developments and the anticipated effects of land use or related regional-development plans.

4.1.1.1 Site, Vicinity, and Region

The EIV should include the following land-use information relating to the proposed site(s), vicinity, and region, as necessary to assess potential land-use impacts:

- Site location maps.
- Zoning information for the proposed site(s), including any existing or proposed land-use plans and any regional economic-development plans that include the proposed site or vicinity within their scope.
- Maps and summary tabulation of areas occupied by the principal land uses for the site(s), vicinity, and region.
- Maps showing existing topography of the site(s) and vicinity.
- Maps showing highways, railroad lines, waterways, and utility corridors located on, or that cross, the site(s), vicinity, and region.
- Special land uses (e.g., recreation areas, parks, tribal lands, designated wild and scenic rivers, or areas of other special designation) that could be affected by constructing and operating the project.
- Raw material resources (e.g., timber, sand and gravel, coal, oil, natural gas, ores, groundwater, and geothermal resources) and the owners thereof on or adjacent to the site that are presently being extracted or are of known commercial value.
- Principal agricultural and forest products of the vicinity and region if agriculture or forestry is a predominant land use.
- Maps showing major public and trust land areas in the region.
- Discussion of whether any land at the proposed site or any affected off-site lands would be subject to requirements in the Coastal Zone Management Act (16 U.S.C. § 1451).

- Discussion of whether any land at the proposed site or any affected off-site lands constitute prime or unique farmlands (7 CFR 657).
- Maps and discussion of any floodplains or wetlands on the site(s). Cross-reference to other EIV sections, as appropriate.
- Discussion of whether the DOE Recipient intends to acquire additional land to expand the proposed site(s).
- All associated geographic information system (GIS) coverages used to produce the map products in the EIV.
- A brief discussion of the major geological aspects of the site that could influence land use, including descriptions of soil and rock types and unique geologic features (e.g., karst, geothermal resources, paleontological resources, water supplies, and unique formations, outcrops, or exposures of special interest [e.g., glacial erratics]). Cross-reference to Section 4.4 Geologic/Soil Conditions, as appropriate.

4.1.1.2 Infrastructure Corridors and Other Off-Site Areas

Building or upgrading of pipelines, electric power transmission lines, and other project-related connected infrastructure needed to serve a clean energy or climate mitigation demonstration project may be outside the scope of the DOE funding award. DOE recognizes that new project-related connected infrastructure may not necessarily be built, operated, or owned by a DOE Recipient for a clean energy or climate mitigation demonstration project. However, the impacts of new project-related infrastructure corridors or changes to existing corridors are relevant to DOE's analysis of impacts in an EIS or EA.

To the extent that the indicated information is readily available, the EIV should present the best available land-use information relating to 1) off-site corridors or areas that would be affected by constructing and operating connected infrastructure, 2) new corridors, and 3) construction activities that would occur in existing infrastructure corridors, including:

- A description of new pipeline and electric transmission-related facilities (e.g., pipelines, metering and compressor stations, transmission lines, substations, and related infrastructure) that would be needed.
  - Information provided should include operating pressures, flow rates, or voltage specifications. The name of the entities that would construct, own, and operate any new pipeline, electric transmission, or other infrastructure facilities should be provided, and the associated process for obtaining approved rights-of-way should be described.
- A map showing the potential or planned routing (i.e., the specific route or a band encompassing the route) of any new or existing infrastructure corridor(s) (if affected by the project) and the location of related facilities.
- A tabular summarization of the dimensions (length and width) of affected infrastructure corridors by each specific corridor segment or right-of-way.
- A tabular summarization of existing land use and land cover within affected infrastructure corridors and other off-site areas.

- A description of highways, railroad lines, and utility corridors crossed by new pipelines, transmission lines, other connected infrastructure, or access corridors.
- Special-use land areas that would serve as constraints in the selection of pipeline, electric transmission line, or other infrastructure routing or other off-site project activities.
- Location of any project activities that would be in a floodplain, on wetlands, or on a waterbody.
- Discussion of whether any land used for infrastructure corridors or other off-site construction activities would be subject to the Coastal Zone Management Act (16 U.S.C. § 1451).
- Discussion of whether any land that would be used for new infrastructure corridors or other off-site construction activities would constitute prime or unique farmlands (7 CFR 657).
- Discussion of any expected private-land access requirements.
- A description of the proposed routes of access corridors (e.g., roads and railroads) that will serve the project and any land-use restrictions or plans affecting such corridors.
- All associated GIS coverages used to produce the map products in the EIV.

Information on the routing and design of pipelines, transmission lines, and other off-site facilities may be limited when detailed project planning documents—including the EIV—are prepared, especially if a party other than the DOE Recipient will own or be responsible for all or some of the off-site facilities. To support analysis of how constructing and operating the project-related connected infrastructure might contribute to the action's environmental impact, the EIV should include the best available information on possible pipelines, transmission lines, and other project-related connected infrastructure. The EIV should present the information that can reasonably be obtained by the DOE Recipient at the time of submittal. The EIV may explain when more detailed information may be available or that more detailed information may not be available until some unspecified time in the future.

The DOE Recipient should also describe the existing road, rail, and waterway transportation networks for the proposed project site(s), vicinity, and region. Provided information should include carrying capacity and condition, availability, and type of public transportation and planned modifications that might affect traffic flow to and from the proposed project site(s). Describe road and highway use in industry-standard terms (e.g., Level of Service designation or similar process). Discuss current and projected trends for usage of these routes, including any existing project facility-related and connected-infrastructure commuter patterns for operations and outages. State whether heavy-haul roads will be needed to support construction or operation of the proposed facilities.

4.1.2 Environmental Impacts of the Project

The EIV should describe the impacts to land use resulting from construction, operation, and decommissioning of the project facilities and connected infrastructure.

The DOE Recipient should describe the land- or ground-disturbing alterations of construction activities and the resulting impacts on land use and resource use, both on-site and off-site. In addition, the DOE Recipient should include the impacts on transportation, excluding accidents, as a result of sustained facility operations. All impacts should be quantified to the extent possible using acreage, volumetric, or chronological measures.

DOE Recipients should be aware of nearby sites subject to management under the Comprehensive Environmental Response, Compensation, and Liability Act—commonly referred to as Superfund sites, and/or industrial or previously industrial sites—to avoid interference with nearby cleanup activities or site disturbances (42 U.S.C. § 9601, 1980). The DOE Recipient can contact state agencies or regional U.S. EPA Superfund divisions for site-specific information if necessary. In addition, if the site is industrial or a previously industrial site, the DOE Recipient should consider contacting EPA or state agencies to see if there is any possible contamination from previous industrial activities that may require cleanup. If any such site could affect land use or resource impacts, these impacts should be described in the EIV.

The following information relating to the land-use impacts from construction activities should be included in the EIV:

- Land disturbance related to construction activities on a short-term or long-term basis tabulated and summarized in terms of acreage of land area by activity (e.g., grading, excavation, trenching, dredging, borrow pits, and clearing vegetation).
- Disposition of spoils from excavation work or dredging, including volumes of excavated or dredged material and ultimate disposition location by volume to on- or off-site locations, including the acreage required for spoils disposal.
- Impacts resulting from generation, handling, storage, and disposal of waste. The types of waste could include cleared vegetation, building material debris, municipal waste, spoils, stormwater runoff, sanitary waste, used oils and lubricants from vehicle maintenance, and other hazardous chemicals. Include discussion of plans to minimize or recycle generated waste.
- A summary of the proposed footprint of land disturbance (by acre) for permanent and temporary uses (e.g., primary structures, auxiliary buildings, cooling infrastructure, laydown areas, batch plants, parking, and administration).
- Impacts to any affected local or regional land-use or economic-development plans.
- Discussion of possible zoning conflicts.
- Disruption to ongoing natural resource management activities, including agricultural, forestry, and mineral extraction activities.
- Disruption to land- or water-resource access.
- Disruption to existing land uses or private land access, including recreational opportunities, caused by construction activities.
- Characterization of raw material resource-extraction volumes associated with construction activities (e.g., reservoir timber clearing and sand and gravel mining).
- Impacts to legislatively designated lands (e.g., prime farmland) or activities in designated coastal zones and a discussion on the status of any agency coordination or permitting undertaken regarding such lands.
- Discussion of current or former mine-land regulating authorities and associated requirements.
- Maps depicting the locations of expected land-use impacts, including footprints for temporary and permanent facilities.
- Discussion of possible effects on floodplains, wetlands, agriculture, forestry, mineral extraction, reclamation, and hazardous waste cleanup activities (can cross-reference other sections of EIV where possible).

Historically, the greatest land-use impacts are typically associated with construction activities. Land-use impacts associated with operations are expected to be less significant because activities are usually restricted to previously disturbed areas of the facility site(s) or off-site areas (e.g., outage worker parking, temporary access routes, periodic vegetation clearing, landscaping, and sporadic access closures). The scope of the review is guided by the magnitude and nature of the expected impacts associated with proposed facility operations and site-specific characteristics. Impacts should be quantified to the extent possible using acreage, volumetric, or chronological measures.

The following information relating to the land-use impacts associated with operations should be included in the EIV:

- Characterization of any land-disturbance activities expected during operations (e.g., construction of additional structures, such as maintenance or storage). Temporary changes in land use could occur at project site(s) during eventual decommissioning of project facilities. Temporary changes may include addition or expansion of staging and laydown areas or construction of temporary buildings and parking areas. The major activities that may influence on-site land use are removal of large components, structure dismantlement, and waste packaging and storage.
- The major activities projected to occur for decommissioning that are expected to temporarily require land include activities such as staging of equipment and removal of large components. In addition, land reclamation activities, including soil replacement and/or remediation, and ecological restoration, including riparian and stream repair and revegetation, may also temporarily require land use. The number of temporary workers needed to accomplish the major decommissioning activities may also require that temporary facilities be installed for on-site parking, training, site security access, office space, fabrication shops, mockups, and related needs. Some activities, such as widening and rebuilding access roads or creating or expanding gravel pits for building roads, may occur off-site.
- Transportation accidents are discussed in Section 4.10.2.4 below.

4.1.3 Environmental Impacts of Alternatives

The EIV should describe the impacts to land use of the no action alternative and reasonable alternatives to the project as discussed in Section 3.2 of this guidance.

4.1.4 Comparison of Environmental Impacts

This section should include a summary and comparison of the impacts to land use of the project and reasonable alternatives to the environmental baseline and to each other. The comparison may be presented in a summary table.

4.2 Atmospheric Conditions and Air Quality

This section of the EIV should provide a description of the existing atmospheric conditions and air quality environment and an evaluation of the environmental impacts of the proposed project and reasonable alternatives to these resources.

4.2.1 Existing Environment

The DOE Recipient should describe the climate, meteorology, and air quality of the site(s) and surrounding region. The DOE Recipients' descriptions in the EIV of key models, assumptions, parameters, conditions, input data used, resulting output, and approaches should be sufficient to allow for DOE staff's evaluation. If there is relevant information in other supporting documentation (i.e., other references), indicate where in those documents this information can be found.

4.2.1.1 Meteorology and Climatology

The DOE Recipient should provide a description of the regional climate and meteorological conditions at the proposed project site(s) and include sufficient data to permit an independent evaluation by DOE staff. The following information should be provided:

- Discussion of the sources of climate and meteorological information (e.g., nearby National Weather Service stations, federal meteorological databases, any on-site meteorological stations), periods of record, station locations, and station representativeness of local and regional meteorology.
- A description of the general climate of the region (e.g., climatological normal of parameters, such as temperature, precipitation, and wind speed/direction).
- Discussion of the severe weather phenomena (e.g., tornadoes, hurricanes, thunderstorms, atmospheric stagnation episodes) experienced in the region with expected frequencies of occurrence and measured extremes of parameters, such as temperature, precipitation, and wind speed.
- Monthly and annual air temperature and dewpoint temperature summaries (including averages, measured extremes, and diurnal range) as near as possible to the site(s).
- Monthly and annual summaries of precipitation (including averages and measured extremes), number of hours with precipitation, and hourly rainfall rate distribution as near as possible to the site(s).
- A description of the local airflow patterns and characteristics, using data collected from the on-site meteorological program or from nearby weather monitoring stations.
- A description of the baseline air quality in the region, identifying pollutants that are in non-attainment or maintenance areas and the relationship of the site(s) to these areas.
- Monthly and annual wind roses and wind direction persistence summaries at all heights at which data on wind characteristics are applicable centered on the site(s), if possible.

- Hourly averages of wind speed and direction at all heights at which wind characteristics are applicable and a summary of atmospheric stability.
- Estimated monthly mixing height data, including frequency and duration of inversion conditions and methods used to provide the estimates.
- A topographic data presentation, including a map showing detailed topographic features.
- Discussion of potential climate change in the vicinity of the site(s) over the period encompassing the project and impacts on relevant meteorological parameters (e.g., temperature, precipitation, and the frequency and severity of storms).
    - This discussion should be based on assessments conducted by federal agencies with a mandate to evaluate the effects of climate change (e.g., latest U.S. Global Change Research Program Report), but applicable regional and local studies conducted by other entities may be included. Climate change in the affected environment section should cover the project life and resources that are likely to be impacted by climate change during this period.
    - Discussion of methods to appropriately analyze reasonably foreseeable direct, indirect, and cumulative GHG emissions.

4.2.1.2 Air Quality

The DOE Recipient should describe the air quality at the site(s) and surrounding region and provide sufficient detail to evaluate impacts from constructing and operating the project facilities. The following information should be provided:

- A description of the proposed project site(s) and regional air quality, including the Air Quality Control Region as listed in 40 CFR Part 81, "Designation of Areas for Air Quality Planning Purposes" (40 CFR 81).
- A table comparing regional air quality parameters to National Ambient Air Quality Standards for the area, if possible.
- A local or regional emission inventory.
- Identification of any nonattainment or maintenance areas with respect to criteria air pollutants identified in 40 CFR Part 50, "National Primary and Secondary Ambient Air Quality Standards" (40 CFR 50).
    - This should include the county or counties in which the proposed project site(s) is located and surrounding counties.
- Location of nearest Mandatory Federal Class 1 Areas, where air quality and visibility are protected under the Regional Haze Program (40 CFR 81).
- A discussion of GHGs generated and estimates of yearly emissions (expressed in units of carbon dioxide [CO_2] equivalents) at a global, national, and state level. If available, provide state or public-utility-commission reduction goals for GHG emissions. This discussion should be based on values provided by federal agencies with a mandate to estimate GHG emissions and is needed to provide context for GHG emissions from the project. Discussion should include GHG emissions anticipated from proposed energy sources (i.e., natural gas versus renewable energy), processing, transportation, and any associated carbon sequestration.

- Discussion of the estimated reduction of GHGs for each alternative and estimates of yearly reductions in emissions (expressed in CO_2 equivalents) at a global, national, and state level.

4.2.2 Environmental Impacts of the Project

The EIV should describe meteorological and air-quality impacts associated with construction, operation, and decommissioning of the project facilities and connected infrastructure. The description and analysis of the impacts of construction should include the following information:

- Identification of applicable local, state, and federal air regulations and required air permits for construction.
- Sources and types of air pollutant emissions, including mitigating measures and plans to minimize air emissions.
- Estimates of the construction schedule and associated annual air emissions (from sources such as on-road construction vehicles, commuter vehicles, fugitive emissions, non-road construction equipment, marine engines, and/or locomotive engines) for criteria air pollutants identified in the National Ambient Air Quality Standards.
  - If the proposed site(s) is located in a nonattainment or maintenance area with respect to a criteria pollutant, the emission estimates can be used as a basis for assessing the applicability of a conformity analysis (see "Determining Conformity of Federal Actions to State or Federal Implementation Plans," Subpart B (40 CFR 93).
- Estimates of GHG emissions (expressed in units of CO_2 equivalents), including GHG emissions from on-road construction vehicles, commuter vehicles, non-road construction equipment, marine engines, and/or locomotive engines and comparison of these GHG emissions to state and national GHG emissions discussed in the atmospheric conditions and air quality existing conditions.
  - The assumptions, factors, and other information used in any site-specific analysis should be described in sufficient detail to allow an independent evaluation and assessment of the resulting GHG emissions estimate.
- The EIV should provide sufficient descriptions of key models, assumptions, parameters, conditions, input data used, resulting output, and approaches used in the analyses for construction impacts to inform DOE staff's evaluation of the environmental impacts. If there is relevant information in other supporting documentation, the EIV should indicate where in those documents this information can be found.

The description and analysis of the impacts of operations should include the following information:

- Identification of applicable federal, state, and local air regulations and required air permits for operation.
- Any atmospheric impacts from operations, including formation of airborne plumes, fogging, icing, salt deposition, increases in humidity and precipitation or other localized weather modifications, and interactions of plumes with other pollutant sources.

- Sources and types of air pollutant emissions, including mitigating measures and plans to minimize air emissions.
- Estimates of annual air emissions for criteria air pollutants identified in the National Ambient Air Quality Standards from sources, such as diesel generators, engines, boilers, cooling towers, and commuter vehicles.
  - If the proposed site(s) will be located in nonattainment or maintenance areas with respect to one or more criteria pollutants, the emission estimates can be used as a basis for assessing the applicability of a conformity analysis (see 40 CFR 93, Subpart B).
- Estimates of GHG emissions (expressed in units of CO_2 equivalents) resulting from station operation, including GHG emissions from standby diesel generators and workforce transportation.
  - The EIV should compare these GHG emissions to state and national GHG emissions and, if available, state or public-utility-commission reduction goals for GHG emissions. The EIV should provide site-specific estimates. The assumptions, factors, and other information used in any site-specific analysis should be described in sufficient detail to allow an independent evaluation and assessment of the resulting GHG emissions estimate (see the CEQ's National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate).

Decommissioning activities that may have an effect on air quality include organizational changes, stabilization, storage preparation, decontamination, structural dismantlement, entombment, and transportation (e.g., materials, equipment, waste). Potentially adverse impacts could include:

- Degradation of air quality caused by emissions (e.g., nitrous oxides, carbon monoxide, and hydrocarbons) from internal combustion engines.
- Increased particle loading of the atmosphere caused by the movement of vehicles and equipment, demolition of structures, dismantlement of systems, and operation of concrete batch plants.
- Alteration of other characteristics of the atmosphere (e.g., the ozone layer) by releases of gases used in project facility systems (e.g., fire suppression or refrigeration).

Air-quality impacts of emissions from internal combustion engines and changes in atmospheric particle loading can be assessed by comparison with standards set in air-quality regulations. Air-quality impacts of the releases of other gases can be assessed by comparison with the magnitude of potential releases during decommissioning with the magnitude of releases of the same or similar gases from other sources.

4.2.3 Environmental Impacts of Alternatives

The EIV should describe the impacts to air quality, including consideration of GHG emissions, of the no action alternative and reasonable alternatives to the project as discussed in Section 3.2 of this guidance.

4.2.4 Comparison of Environmental Impacts

This section should include a summary and comparison of the impacts to air quality of the project and reasonable alternatives to the environmental baseline and to each other. The comparison may be presented in a summary table.

4.3 Hydrologic Conditions/Water Resources

This section of the EIV should provide a description of the existing environment and an evaluation of the environmental impacts of the proposed project and reasonable alternatives to the hydrologic conditions/water resources, including hydrologic alterations, water use, water quality, and water monitoring.

4.3.1 Existing Environment

The DOE Recipient should provide sufficient information for the water resource impact area to establish the baseline condition for evaluating the effects of facility construction and operation on water resources (surface water and groundwater) and its uses and users. For the purposes of this section, the resource impact area may be defined as the facilities and the surrounding areas out to a distance sufficient to encompass those water resources that may affect or be reasonably assumed to be affected by the construction or operation of the facilities. For groundwater resources, the resource impact area may generally be defined by the extent to which constructing or operating the facilities affects the underlying aquifers.

For reclaimed water, such as treated wastewater (if part of the project), the resource impact area may generally be defined by the geographical extent of its prospective uses and users.

The DOE Recipient should describe in quantitative terms the hydrological and chemical characteristics of surface water and groundwater bodies in the resource impact area. In addition, water use and currently granted water rights within the resource impact area should be described.

The amount of data and information provided should be sufficient to evaluate the effects of project construction and operation on water resources and it is anticipated to depend on the magnitude of the potential impacts. Greater potential impact will require more data and information to support the evaluation. Alternative interpretations of data and characteristics should be described when reasonable or when uncertainty in impacts exist. Characteristics may be substantially based on data obtained from a pre-submittal monitoring program and should be integrated with data from other studies conducted in the area and region (as available and applicable), as discussed in Section 4.3.1.4 of this guidance.

A statistical description should accompany all data. Average or median values, standard deviations or interquartile range, and the historical extremes should be described. Temporal trends in characteristics, including seasonal variation, should be identified and explained. Temporal variations of important characteristics (e.g., river flow rates) should be described in sufficient detail to provide accurate evaluation of impacts. For many characteristics, monthly variations may be sufficient, but daily or shorter increments should be provided (e.g., low river flows) when important for evaluating environmental impacts. Spatial variations of characteristics (e.g., aquifer hydraulic conductivity) should be described when they are important for evaluating environmental impacts (e.g., contaminant transport in groundwater).

All data for hydrologic characteristics, including water use, should be adjusted to both present-day conditions and to those that may reasonably be expected to occur over the proposed period of the project (e.g., future conditions). Where features of a proposed facility (e.g., foundations, excavations, artificial lakes, and canals) modify the hydrologic conditions, the DOE Recipient should furnish sufficient site-specific detail for evaluation of the effects of constructing and operating the station on hydrologic characteristics, water use, and potential contaminant transport for those waterbodies and systems that may receive contaminants from the facility. In addition, the DOE Recipient should describe reasonably foreseeable changes in the hydrologic environment (e.g., climate and land use).

When a mathematical model is used to support the evaluation of hydrologic characteristics, the DOE Recipient should describe the conceptual basis for the model, including the rationale for eliminating plausible alternative conceptualizations, the assumptions used in developing the model, the range of applicability of the model, the input data used, the resulting output, the basis for boundary conditions, parameter estimation and calibration procedures followed, and estimates of uncertainty in model forecasts.

The DOE Recipient should provide in the EIV sufficient descriptions of key models, assumptions, parameters, data used, and approaches to allow for an adequate DOE staff evaluation. If there is relevant information in other supporting documentation, indicate where in those documents this information can be found.

4.3.1.1 Hydrology

The DOE Recipient should describe the hydrologic characteristics of surface waterbodies, groundwater aquifers (including brine aquifers, if applicable), and wetlands that could be affected by project water use, injection of waste products, or constructing or operating the project facilities and connected infrastructure. These characteristics collectively define the supply of water within the resource impact area, including the location, quantity, and temporal variability of that supply. In the case of non-potable aquifers, these characteristics define the hydraulic adequacy of the formation for underground injection. The DOE Recipient should include the following information in the EIV:

- Discussion of rivers and streams, including drainage areas and gradients, discharge, bathymetry, wetlands and floodplain descriptions, flood and drought characteristics, flood control measures, and other hydrologic modifications that could impact hydrology or hydraulics.

- Discussion of lakes and impoundments, including bathymetry, temperature, currents, inflows and outflows, evaporation, seepage, and a description of reservoir characteristics (e.g., elevation-area-capacity curves) and operations.
- Discussion of estuaries and oceans, including bathymetry, tidal and nontidal currents, temperature, salinity, sedimentation rates, and sediment gradation and sorption characteristics.
- Discussion of groundwater, including descriptions of aquifers and confining units, occurrence and extent of perched groundwater and saturated topsoil (wetlands) conditions, recharge and discharge areas and fluxes, groundwater head contour maps, hydraulic gradients, permeabilities, total and effective porosities, advective travel times, bulk density, and storage coefficients.
- Groundwater transport characteristics (e.g., dispersion and adsorption coefficients), when necessary to evaluate impacts.
- Data concerning use of groundwater, including drawdown caused by withdrawals from neighboring major industrial and municipal wells.
- Maps or figures showing information requested above, as appropriate (e.g., areas affected by saltwater intrusion).

4.3.1.2 Water Use

The DOE Recipient should provide present and known future surface water, groundwater, and reclaimed water uses (as applicable) that could affect or be affected by project construction or operation, including public and self-supplied (or private) withdrawals for domestic, municipal, industrial, agricultural, mining, and power generation uses.

Data and information provided for each use should include the following:

- Location and nature of water users and water-use areas.
- Distance from the proposed project.
- Withdrawal rate by use category and return rate.
- Statutory or other legal restrictions on water use or the water resource.

Additional information for groundwater use should include the following:

- Identification of the aquifer from which withdrawal occurs.
- Location and depth of wells.
- Identification of any U.S. EPA-designated sole source aquifers that may be affected by the construction or operation of the proposed project.
- Characterization of consumptive and non-consumptive water uses over the resource impact area.
- Temporal variations in consumptive and non-consumptive water uses.
- Existing capacities (including available capacities) of local and regional water and wastewater utilities.

Facility water-use requirements are not addressed in this chapter; however, Chapter 3 of this guidance document addresses the information to be included in the EIV related to facility water-use requirements.

4.3.1.3 Water Quality

The DOE Recipient should describe the water-quality characteristics of surface waterbodies, groundwater aquifers (including brine aquifers, if applicable), and reclaimed water (as applicable) that could be affected by project water use and effluent disposal. Data and information should include the following characteristics:

- Physical (e.g., temperature).
- Chemical (e.g., pH).
- Biological (e.g., biological oxygen demand).

The mean, range, and temporal and spatial variation of these water-quality characteristics should be provided. Data should be gathered for a sufficient period of time to understand long-term (annual) and short-term (seasonal or other) variations in both quality and availability of water (flow rates, water levels, etc.).

A description of existing aquatic environmental stressors, including a list of any CWA 303(d)-impaired waters, should be provided.

The DOE Recipient should identify to the extent possible the source and nature of existing impairments. The status of the permitting process for any required CWA (33 U.S.C. § 1251) certifications should also be described.

For non-potable aquifers, a description of water quality as it relates to the formation's suitability for underground injection should be provided. The status of the federal or state permitting process (e.g., Class I Industrial and Municipal Waste Disposal Wells, Class IV Wells used for Geologic Sequestration of Carbon Dioxide) should also be described.

For preexisting groundwater contamination, a description of whether the location of the proposed project or supporting infrastructure is listed on a federal (e.g., the EPA's Comprehensive Environmental Response, Compensation, and Liability Information System), state, or local contaminated site list. Plans and schedules for on-going/future remediation work should be provided if no remediation has been completed. Copies of any correspondence documenting investigations, work plan approvals, submittal of closure reports, and regulatory agency determinations should be provided.

4.3.1.4 Water Monitoring

The DOE Recipient should consider conducting a pre-submittal hydrologic and water-quality monitoring program. The purpose of such a program is to establish a baseline for assessing subsequent environmental effects on water resources attributable to constructing and operating the project facilities. The DOE Recipient should describe the pre-submittal monitoring program used to assess the characteristics of the surface water and groundwater resources in the resource impact area.

The EIV should describe any pre-submittal monitoring program conducted in sufficient detail to demonstrate a thorough and comprehensive approach to an environmental evaluation. The adequacy of the monitoring program with respect to both spatial coverage (i.e., surface area and depth) and temporal coverage (i.e., duration and sampling frequency) should be demonstrated. The description of this program should include the following:

- Locations of monitoring stations.
- Frequency and duration of monitoring.
- Monitoring equipment used.
- Type of data collected.
- Measurement and sampling and analysis procedures followed.
- Data analysis methods used.
- Documentation of any data-quality objectives.

DOE Recipients may summarize and reference existing hydrologic and water-quality monitoring studies and data, if available, in lieu of conducting a project-specific monitoring program.
The information provided regarding these studies should be consistent with the monitoring program attributes discussed above, to the extent available.

4.3.2 Environmental Impacts of the Project

The EIV should describe water-quality impacts associated with construction, operation, and decommissioning of the project facilities and connected infrastructure.

4.3.2.1 Hydrologic Alterations

The EIV should identify and describe the construction activities, including site preparation, on-site activities, and off-site activities that could result in hydrologic alterations at the site(s), within pipeline and transmission corridors, and off-site within the resource impact area (the EIV may reference information provided in other project planning documents submitted concurrently with the EIV, as appropriate). The description should include analyses of the resulting hydrologic alterations and the physical effects of these alterations on water uses and users (quantity and quality), practices proposed to minimize hydrologic alterations having adverse impacts, and an assessment of compliance with the applicable federal, state, regional, local, and American Indian tribal standards and regulations.

Construction activities resulting in hydrological alterations that could affect water use and water quality may include the building of cofferdams and stormwater management and drainage systems, dredging operations, placement of fill material in the water, and the creation of shoreside facilities. Other examples include construction of intake and discharge structures for cooling water or other purposes, straightening or deepening of water channels, constructing in floodplains, clearing, and grading, excavation, and groundwater dewatering of excavations.

The EIV should include a description of the following:

- Modification of site drainage patterns (e.g., storm water modifications, ditches, drains).
- Change in floodplain capacity and expected changes in water levels and groundwater heads.
- Effects of alterations on the quantity and availability of water within the resource impact area.
- Effects of alterations to river discharge, including changes in the seasonal variation of flow, or groundwater discharge to wetlands.
- Effects of effluent discharge on the water quality of the receiving waterbodies, including the effects of erosion and sediment transport.
- Effects of alterations or dewatering activities on the movement or extent of existing groundwater contaminant plumes.
- Proposed actions to minimize the effects of the hydrologic alterations.
- Identification of applicable standards and regulations.

The EIV should describe the operational activities expected to result in hydrologic alterations at the proposed project site(s), within infrastructure corridors, and off-site within the resource impact area. Examples of operational activities that might affect water use and water quality include withdrawal of water for facility use or treatment, surface-water diversions, maintenance dredging, groundwater dewatering, and effluent discharge.

The description should include analyses of the resulting hydrologic alterations and the physical effects of these alterations on water uses and users (quantity and quality), practices proposed to minimize hydrologic alterations having adverse effects, and an assessment of compliance with applicable federal, state, regional, local, and American Indian tribal standards, and regulations.

Facility water use and discharge of effluents during operation are discussed in Chapter 2 of this guide. The EIV should identify those water supply and water-quality conditions under which facility operation would be affected (e.g., high-water levels or impacts on facility operations caused by insufficient supply of cooling water).

The EIV should include a description of the following:

- Anticipated hydrologic alterations resulting from operation of the proposed project.
  - For example, the EIV should discuss alterations in water levels and hydraulic heads; alterations in flow rates and circulation patterns caused by diversion, intake, and discharge structures; and alterations in erosion, deposition, and sediment transport characteristics.
- Effects of these alterations on the quantity and availability of water within the resource impact area.
  - For example, the EIV should assess, as applicable, how hydrologic alterations affect river discharge (including changes in the seasonal variation of flow) or groundwater discharge to wetlands.
- Effects of effluent discharge on the water quality of the receiving waterbodies, including thermal, chemical, and radiological effects.

- Proposed actions to minimize the effects of the hydrologic alterations.
- A list of required permits and certifications under the applicable federal, state, and local standards and regulations.

When a mathematical model is used to evaluate the effects of hydrologic alterations, the EIV should describe the conceptual basis for the model, including the rationale for eliminating plausible alternative conceptualizations, the assumptions used in developing the model, the range of applicability of the model, input data used, the resulting output, the basis for boundary conditions, parameter estimation and calibration procedures followed, and estimates of uncertainty in model forecasts. The EIV should provide sufficient data to permit staff evaluation of modeling results.

The EIV should provide sufficient descriptions of key models, assumptions, parameters, data used, and approaches to allow for DOE staff's evaluation. If there is relevant information in other supporting documents and references, the EIV should indicate where in those documents and references this information can be found.

4.3.2.2 Water-Use Impacts

The EIV should identify those water uses and water users that are potentially affected by the changes in the quantity and/or availability of water resulting from hydrologic alterations during construction, operations, and decommissioning. The EIV should evaluate the water-use impacts by quantifying the anticipated reduction in water availability for each water use, including the projected duration of any forecast reduction, and provide a description of the analyses performed to determine the impacts.

Decommissioning and subsequent cessation of facility operations may result in a significant decrease in water consumption because cooling, water processing, or other water uses are no longer required. Decommissioning activities that may influence water use include fuel removal, staffing changes, large component removal, decontamination (potentially using high-pressure water sprays), structure dismantlement, and water sprays for fugitive dust emissions control.

The reliability of water supplies during decommissioning is impacted by a variety of factors, such as natural climatic variability and the reliability of the regional and local water-supply infrastructures.

4.3.2.3 Water-Quality Impacts

The EIV should identify those water uses and water users that are potentially affected by the changes in water quality resulting from hydrologic alterations during construction, operations, and decommissioning. The EIV should evaluate the water-quality impacts by quantifying the anticipated reduction in use resulting from the changes in water quality and provide a description of the analyses performed to determine the impacts. The EIV should also describe the impacts resulting from stormwater runoff, liquid effluent releases containing chemicals or biocides, and treated sanitary waste discharge.

Activities during decommissioning that may affect water quality include fuel removal, stabilization, decontamination, and structure dismantlement. Surface waters are most likely to be impacted either by stormwater runoff or by releases of substances during decommissioning activities.

Because water quality and water supply are interdependent, changes in water quality must be considered simultaneously with changes in water supply. For example, reduced groundwater pumping may result in a rise in the water table, providing a new pathway for groundwater transport of contaminants currently in the subsurface. Changes in the landscape (terrain and vegetation) during decommissioning can alter the hydrologic pattern of recharge and surface-water runoff. The convergence of surface water over unvegetated soils may result in accelerated erosion and the delivery of sediment to important downstream habitat.

4.3.2.4 Water Monitoring

The overall plan for protecting waterbodies that may be affected by construction activities, facility operations, and decommissioning activities should be discussed. A description of the proposed measures to ensure compliance with applicable water-quality and water-use standards and regulations should also be provided. When compliance involves monitoring, the monitoring programs should be described in sufficient detail to justify the ability of the monitoring to provide timely and accurate information so that appropriate actions can be taken to limit impacts.

4.3.3 Environmental Impacts of Alternatives

The EIV should describe the impacts to the hydrologic conditions and water resources of the no action alternative and reasonable alternatives to the project as discussed in Section 3.2 of this guidance.

4.3.4 Comparison of Environmental Impacts

This section should include a summary and comparison of the impacts to the hydrologic conditions and water resources of the project and reasonable alternatives to the environmental baseline and to each other. The comparison may be presented in a summary table.

4.4 Geologic/Soil Conditions

This section of the EIV should provide a description of the existing geologic and soil conditions (i.e., geologic resources) and an evaluation of the environmental impacts of the proposed project and reasonable alternatives to these resources.

4.4.1 Existing Environment

The EIV should identify the geological, seismological, geotechnical characteristics, and soil conditions of the project sites, connected infrastructure corridors, and surrounding region. The EIV should include the following information:

- Stratigraphy and structures, including descriptions of geological units, major structural and tectonic features (e.g., faults), and any other significant geological conditions.
- A description of geotechnical investigations conducted to characterize the site(s) of the proposed project.
- Topographic maps showing locations of the various geologic hazards with respect to the proposed facility structures and connected infrastructure corridors. The criteria and sources of information used to identify these areas should be included.
- A description of characteristics of soil, including a physical description of the soil units and descriptions of features related to soils at the site(s) of the proposed project and related infrastructure corridors, as applicable.
- Identification of soils that are prime or unique or farmland of statewide or local importance on or in the vicinity of the proposed project and connected infrastructure corridors.
- For preexisting soil contamination, a description of whether the location of the proposed project or supporting infrastructure is listed on a federal (e.g., the EPA's Comprehensive Environmental Response, Compensation, and Liability Information System), state, or local contaminated site list. Plans and schedules for on-going/future remediation work should be provided if no remediation has been completed. Copies of any correspondence documenting investigations, work plan approvals, submittal of closure reports, and regulatory agency determinations should be provided.
- A description of erosion potential and current erosion control and runoff best management practices (BMP).
- A description of seismic potential at the site(s) of the proposed project and seismic history.
- Identification of largest known historical regional earthquake.
- Analysis and evaluation of the local and regional seismicity data, volcanism, or any information that may indicate a geologic hazard at the site.
- Other geologic hazards, such as nearby landslide areas, areas of land subsidence, karst features, and/or soils with a high shrink–swell potential.
- The physical and chemical characteristics of geologic subsurface formations containing non-potable water (e.g., depth, permeability, hydraulic isolation [i.e., confining layers], total and effective porosity, water quality) as it relates to suitability for underground injection (see Sections 4.3.1.1 and 4.3.1.3.).

4.4.2 Environmental Impacts of the Project

This section presents key factors and guidance for evaluating the geologic resource impacts at the location of the proposed project. The DOE Recipient should consider those geologic and soil resources and conditions that could be affected by construction, modification, operation, and decommissioning activities, as well as those geologic conditions and hazards that could affect the project and alternatives.

Conditions that could affect the project facilities include large-scale geologic hazards (e.g., earthquakes, volcanic activity, landslides, land subsidence, and erosional processes) and local hazards associated with the site-specific attributes of the soil and bedrock beneath the proposed project site(s). The major analysis for seismic and other geologic hazards can usually be found in the safety analyses or similar documentation prepared to support other permitting requirements and only needs to be summarized in this section of the EIV. The DOE Recipient should provide a summary of management practices, design considerations, or policies that would minimize these impacts.

The recipient should provide the following information in the EIV:

- Depth of excavation for below-grade portions of facilities and for such activities as trenching for utilities, piping, and roadway construction.
- Depth of bedrock and whether blasting may be required.
- Estimates of the volume of geologic resources required for project activities (e.g., borrow for backfill, or sand and gravel aggregate for construction).
- Impacts to any rare or unique geologic resources or to rock, mineral, or energy rights and assets (also see Section 4.1).
- Impact(s) that geologic hazards could have on the construction and operation of the facilities.
- How the project would be sited or designed to avoid or minimize the effects from the identified hazards.
- Identified areas and methods for recommended slope remediation prior to pipeline or other infrastructure installation.
- Slope stability monitoring and any use of slope retention devices such as rock bolts, retaining walls, or nets.
- Any monitoring that would be conducted before, during, and after constructing any site facilities and pipelines and associated facilities, including any proposed.

4.4.3 Environmental Impacts of Alternatives

The EIV should describe the impacts to the geologic and soil resources of the no action alternative and reasonable alternatives to the project as discussed in Section 3.2 of this guidance.

4.4.4 Comparison of Environmental Impacts

This section should include a summary and comparison of the impacts to geologic and soil resources of the project and reasonable alternatives to the environmental baseline and to each other. The comparison may be presented in a summary table.

4.5 Vegetation and Wildlife Resources

This section of the EIV should provide a description of the existing environment for vegetation and wildlife resources and an evaluation of the environmental impacts of the proposed project and reasonable alternatives to these resources.

4.5.1 Existing Environment

The EIV should describe the terrestrial, wetland, and aquatic ecological resources existing at the site(s) of the proposed project and in the vicinity and region. The DOE Recipient should provide sufficient details in the EIV as a baseline for determining the impacts to terrestrial, wetland, and aquatic species and habitats that might be affected by constructing and operating the proposed facilities.

4.5.1.1 Terrestrial Resources

The EIV should include a baseline description of potentially affected terrestrial resources. The description should also address off-site parcels and corridors needed for components, such as reservoirs, barge docks, heavy-haul roads, access roads, laydown areas, pipelines, electric transmission lines, and mitigation sites. When describing terrestrial resources, the DOE Recipient should use the same definitions of vicinity and region as used for the land- and water-use sections of the EIV. The baseline description should focus on the anticipated footprint of land disturbance and may be less detailed for peripheral areas. Information should be updated to reflect recent land-use changes and natural successional processes.

Guidance on consultation under Section 7 of the ESA is provided in Appendix A. Section 7 consultation is the responsibility of the federal agency and DOE is required to take the lead on consulting with the applicable resource agencies as discussed in Appendix A. While consultation is not the responsibility of the DOE Recipient, the recipient should engage with the cognizant agencies to gather sufficient information pertinent to ecological consultation requirements in order to assist DOE in the timely completion of its consultation responsibilities.

The subsections below address specific elements of characterizing baseline terrestrial conditions, including terrestrial habitats, wetlands, wildlife, and important species and habitats.

Terrestrial Habitats

The EIV should include the following information to characterize terrestrial habitats:

- Identification and description of each ecoregion (or equivalent), encompassing potentially affected areas using a widely recognized system such as that used by the EPA (EPA ecoregion maps).
- Figures identifying and mapping each terrestrial habitat on, or adjacent to, the site(s) (or off-site parcels or corridors).

- A description of each terrestrial habitat type. Detailed field surveys or quantification of vegetation may be necessary. Descriptions based on recent site observations are typically more useful than older or regionalized descriptions. Studies would ideally show the condition of the ecological resources that currently exist. If older ecological baseline data is used, a discussion of the basis for determining that the data provides for an accurate and meaningful evaluation of potential impacts should also be included.
- Tables estimating the area of each habitat on-site (or off-site parcels or corridors).
- A table estimating the approximate area (or percentage) of each habitat type in the landscape surrounding the site(s) and any off-site facilities.
- Tables of plant species observed in each habitat (upland and wetland) on the site(s) (and each off-site parcel or corridor) based on a minimum of one year of observations, if available.
- Discussion of the potential value of each habitat to each major plant grouping by vegetative strata: tree canopy, subcanopy, shrub, groundcover, and woody vine. The discussion can be qualitative and should have an ecological focus. Discussions individualized to species are not usually necessary.
- Discussion of the presence of any invasive or nuisance species. Information may be available from the U.S. Department of Agriculture cooperative extension service local or regional offices and relevant departments of state-associated land-grant universities.
- Qualitative discussion of terrestrial habitat in the region.

Wetlands

Wetlands are specialized habitats with properties intermediate between terrestrial and aquatic. The federal definition of wetlands can be found in “Definitions of Waters of the United States” (33 CFR 328 and 40 CFR 120) (see discussion in Section 1.3). Some states and localities regulate wetlands independently using definitions that may vary from the federal definition. Wetland information presented in the terrestrial resources portions of the EIV should be consistent with wetland information presented in the aquatic resources portions. In general, the EIV should include the following information with respect to characterizing wetlands:

- An indication of whether a wetland delineation has been completed for the site(s) and off-site parcels, what areas were addressed, what wetland procedure(s) were used, and whether the delineation follows procedures required by applicable federal and state agencies.
- A wetland delineation map and identification of each wetland using a classification system such as that used in the U.S. FWS National Wetlands Inventory (FWS, 2014), for those areas addressed by wetland delineation.
- A description and estimate of the area of each wetland falling under each National Wetlands Inventory classification.
- Wetland mapping data from a published source (e.g., the National Wetlands Inventory maps or state wetland maps) or identification of the terrestrial habitats on the site(s), if any, that may contain wetlands for those project areas where no wetland delineation was performed.
- A discussion of the functions and values of each wetland or cluster of interrelated wetlands (sometimes referred to as an “assessment area”) on the site(s) or off-site parcels.

- Citation and summary of any jurisdictional determination issued by the USACE or another applicable agency. For project areas lacking a jurisdictional determination, a description of the anticipated process for acquiring one.
- Identification, when practicable, of whether each wetland is under the jurisdiction of the CWA or applicable state or local wetland protection laws (note that a jurisdictional determination may not have been made at the time of submittal of the EIV).
- An estimate of the approximate extent of wetlands in the surrounding landscape using National Wetland Inventory maps or another source and a separate estimate for each National Wetland Inventory class or for each mapping unit used.
- An estimation of wetland losses in the context of their relative abundance in the surrounding landscape.
- A qualitative discussion of wetlands in each relevant ecoregion, including the typical landscape positions commonly occupied by wetlands (e.g., stream valleys, estuarine or lacustrine fringes, and topographic depressions), and the history of wetland disturbance.

Wildlife

The EIV should include the following information:

- Tables of wildlife species observed in each habitat (upland or wetland) on the site(s) (and each off-site parcel or corridor) based on a minimum of one year of observations, if available.
- A discussion of the potential value of each habitat to each major wildlife grouping: mammals, birds, reptiles, amphibians, and insects. The discussion can be qualitative and should have an ecological focus; discussions individualized to species are not usually necessary.
- A discussion of wildlife activities that have the potential to substantially alter the composition or distribution of terrestrial habitat (e.g., over-browsing or burrowing).
- A description of the presence of indicator organisms that could be used to gauge changes in habitat quality, biodiversity, and the distribution and abundance of species populations.
- A brief discussion of trophic interactions between predators and prey potentially occurring on or near project activities. This discussion may be generalized and qualitative.
- A discussion of possible wildlife movement and migration patterns. The discussion may be generalized and does not need to be based on field observations.
- A discussion of wildlife used for subsistence or recreational hunting.

Terrestrial Species of Concern and Sensitive Habitats

Guidance on terrestrial species of concern and sensitive habitats is provided in Table 2. Note that these species and habitats include threatened or endangered species and critical habitats. The EIV should include the following information on these terrestrial species and habitats:

- Each terrestrial species of concern or sensitive habitat known to occur or that has a reasonable likelihood of occurring in the area. Briefly indicate why each meets the criteria in Table 2.

- A brief description of each sensitive terrestrial habitat, which can cross reference the habitat descriptions already provided.
- A brief paragraph for each terrestrial species of concern that provides key data on habitat requirements and life history as necessary to support an assessment of potential effects from the project.
- A discussion related to any correspondence that has been initiated with the FWS, state, local, or tribal natural resource agencies on species of concern or sensitive habitats (Table 2), including endangered, threatened, or special status species. Briefly summarize and provide copies of key correspondence (e.g., letters, email, or phone call summaries).

Table 2. Species of Concern and Sensitive Habitats To Be Considered in the EIV

Species of Concern	Sensitive Habitats
Federally threatened or endangered species and species proposed for listing as threatened or endangered by the U.S. Fish and Wildlife Service or National Marine Fisheries Service that occupy habitat or have an ecosystem function that may be affected by the project. Candidate species for federal listing by the U.S. Fish and Wildlife Service or National Marine Fisheries Service that occupy habitat or have an ecosystem function that may be affected by the project. Representative state status species of particular interest to the review. Other species for which a federal or state agency has established a monitoring requirement at or near the site(s). Representative commercially or recreationally valuable species. Potentially significant nuisance or invasive species. Culturally important species and related habitats as well as other species of known or indicated interest.	Federally designated or proposed critical habitat or essential fish habitat. Protected areas, such as sanctuaries, parks, refuges, or preserves, including marine protected areas. Habitats identified by federal or state agencies as unique, rare, or of priority for protection (e.g., areas that have been designated as habitat for an evolutionary significant unit, distinct population segment, critical habitat, or essential fish habitat). Other habitats of known or indicated interest (e.g., known breeding, spawning, nesting, or nursery grounds).

4.5.1.2 Aquatic Resources

The EIV should include a baseline description of the potentially affected aquatic resources. The description should also include any waterbodies that could reasonably be expected to exhibit detectable changes to aquatic resources from constructing and operating the new facilities. This includes waterbodies associated with off-site transmission and pipeline corridors, large component transport routes, and any other affected off-site areas. The description should focus on the information that is needed for the evaluation of potential impacts to the aquatic environment that may result from constructing and operating the facilities. The extent of the description should extend to any potentially affected habitats, including rivers, perennial and intermittent streams, reservoirs and impoundments, estuaries, lakes, ponds, and ocean areas and should, when appropriate, consider effects on a watershed basis.

Guidance on consultation under Section 7 of the ESA or under Section 305 of the Magnuson-Stevens Fishery Conservation and Management Act is provided in Appendix A. These consultations are the responsibility of the federal agency, and DOE is required to take the lead on consulting with the applicable resource agencies as discussed in Appendix A.

While consultation is not the responsibility of the DOE Recipient, the recipient should engage with the appropriate agencies to gather sufficient information pertinent to ecological consultation requirements to assist DOE in the timely completion of its consultation responsibilities.

The subsections below address specific elements of characterizing baseline aquatic conditions, including aquatic habitats, organisms, and important species and habitats.

Aquatic Habitats

The EIV should include the following information to characterize aquatic habitats:

- A description of the aquatic environment, including the relative significance of habitats in waterbodies on-site or in the landscape surrounding the site(s). The description should address environments that would be used for project facility-related or connected-infrastructure cooling or other water uses or that could be affected by other activities.
- Maps or figures, including electronic layers, showing waterbodies and aquatic habitats on the proposed site(s) and in the vicinity and region, including the natural structure of the benthic habitat (when readily available), the location and depth of any associated underwater structures in the vicinity of the site (e.g., submerged dams), and the proposed location of the intake and the discharge systems.
    - Similar maps and figures of transmission and pipeline corridors that extend off-site or other affected off-site areas and their relationships to waterbodies and aquatic habitats.
- A discussion of the existing aquatic habitats in the landscape surrounding the proposed intake and discharge structures and associated systems.

- Bathymetry, substrate, and other habitat information, including maps or figures, for the affected aquatic habitats in the vicinity of project-related structures and connected infrastructure, including any discharge and intake facilities.
- A description of any natural, anthropogenic, and preexisting environmental stressors and the current ecological conditions indicative of such stresses.

Aquatic Organisms

The EIV should include the following information to characterize aquatic organisms:

- Distribution and abundance data for aquatic reptiles, fish, crustaceans, and macroinvertebrates found on the site(s) and in other potentially affected waters.
  - Data should be collected for a sufficient period of time and frequency and from locations that will provide an understanding of the long-term (annual) and short-term (seasonal or other) variations in distribution and abundance of species potentially affected by construction and operation.
  - Studies would ideally show the condition of the ecological resources that currently exist. If older ecological baseline data is used, a discussion of the basis for determining that the data provides for an accurate and meaningful evaluation of potential impacts should also be included.
- Locations and values of local commercial, subsistence, and recreational fisheries and the historic and current seasonal distributions of harvest by species.
- List and description of species essential to the maintenance and survival of commercially or recreationally valuable species.
- Presence, distribution, and abundance of key aquatic indicator organisms (e.g., diatoms, benthic macroinvertebrates, submerged aquatic vegetation, and fish) that could be used to gauge changes in habitat quality, biodiversity, and the distribution and abundance of species populations.
  - Key indicator organisms are those that would be particularly vulnerable to impacts on forage or habitat.
- A brief discussion of trophic interactions between predators and prey potentially occurring on or near project activities. This discussion may be generalized and qualitative.
- Presence of nuisance, invasive, and introduced species, including fish, aquatic vegetation, and benthic invertebrates (e.g., *Corbicula* spp. or *Mytilus* spp.) on-site or in the vicinity.
- Presence of disease and parasite outbreaks (e.g., viral hemorrhagic septicemia affecting North American salmon and trout, the myxosporean parasite [*Myxobolus cerebralis*] that causes whirling disease, or the marine dinoflagellate responsible for red tide [*Karenia brevis*]) that could potentially be affected by operations.

Aquatic Species of Concern and Sensitive Habitats

The EIV should provide the following information to characterize species of concern and sensitive habitats as defined in Table 2:

- A description of aquatic species of concern or sensitive habitat using the guidelines in Table 2 and a brief description of why each meets the criteria in Table 2.
- A brief discussion for each species (or representative species as indicated in Table 2, which considers all life stages necessary to support an assessment of potential effects on the species from the project.
  - Include a description of their temporal and spatial (including depth) distribution and abundance and any observed occurrence in relationship to the intake and discharge sites and frequency of observations, if appropriate.
- A summary of any correspondence or discussions with the FWS, NMFS, or state, local, or tribal natural-resource agencies regarding species of concern or sensitive habitats associated with the project (Table 2), including endangered, threatened, or special status species and federally designated critical habitat.
  - Briefly summarize and provide copies of key correspondence (e.g., letters, email, or phone call summaries).

When proposed new pipelines, transmission lines, or other affected off-site areas would intersect or be adjacent to aquatic resources, the following information should be included in the EIV to the extent the information is available to the DOE Recipient:

- A map or figure and description of the location of aquatic species of concern and sensitive habitats known or expected to be potentially affected by the transmission and pipeline corridors or other off-site areas. Consideration should be given to affected off-site areas together with any specific habitat requirements or community interrelationships (e.g., areas that have been designated as an evolutionary significant unit, distinct population segment, critical habitat, or essential fish habitat [EFH]).

4.5.2 Environmental Impacts of the Project

This section should address the information related to terrestrial, wetland, and aquatic ecological impacts from construction, operations, and decommissioning activities at the proposed facility site(s) and connected infrastructure corridors. The DOE Recipient should provide adequate details in the EIV to fully determine the impacts on terrestrial and aquatic species and habitats resulting from these activities.

4.5.2.1 Terrestrial and Wetland Impacts

The DOE Recipient should provide adequate details in the EIV to fully determine the impacts construction and operations activities may have on terrestrial and aquatic species and habitats.

Terrestrial Habitats

A description of construction impacts on terrestrial resources should be based on a conservatively estimated footprint of ground disturbance encompassing the proposed project facility site(s) and connected infrastructure. The estimated footprint should also account for temporary features, such as laydown areas. Estimates of the footprint used in the EIV should be conservative enough to characterize terrestrial impacts in a way not overwhelmed by future minor adjustments to the proposed site(s) layout.

The EIV should address the following potential effects on terrestrial habitats from the construction of the proposed facilities:

- Proposed methods for land clearing and grubbing vegetation; temporary and permanent erosion, runoff, and sedimentation control; and dust suppression and construction BMPs that might be used.
- Overlays of the estimated footprint of disturbance on terrestrial habitat maps, with separate indications for permanent and temporary disturbance.
- Tables quantifying each terrestrial habitat type within the estimated footprint with separate quantifications for permanent and temporary impacts for the site(s) and for each off-site corridor or parcel.
- Tables or text comparing estimated losses of each terrestrial habitat type against total extent in the vicinity and a discussion of the relative importance of habitat types lost based on functions (e.g., importance to wildlife).
- A description of any plans for restoration (e.g., grading, contouring, seeding, and planting) of temporarily disturbed terrestrial habitats and an estimate of the time required for restored habitats to regain pre-disturbance conditions and functionality.
- Determination of whether excavation or other site-preparation activities might substantially dewater wetlands or surface waterbodies (e.g., ponds, springs, and seepages) or alter surface drainage patterns in a way that might affect terrestrial species and a discussion of possible impacts to affected habitats and wildlife.
- Effects on terrestrial species and habitats from facility and landscape maintenance activities (e.g., pesticide use, mowing, danger tree trimming and removal, and trampling by heavy equipment).
- Effects of runoff and stormwater management on wetlands and other terrestrial habitats. Ensure compatibility with hydrology and aquatic resources sections.
- Fogging and icing that could affect terrestrial species and habitats.
- Operation of cooling ponds, evaporation ponds and other operational water features that could affect adjoining wetlands and other terrestrial habitats.
- Use of groundwater and surface water that could affect terrestrial habitats (e.g., wetlands, shorelines, and riparian habitats).
    - An overlay of modeled groundwater withdrawal isopleths over terrestrial habitat maps may be helpful if withdrawals could be capable of causing substantial habitat modifications. Information should be consistent with similar information presented in the aquatic resources and hydrology sections of the EIV.

Operating an energy infrastructure facility, once built, does not normally involve further physical loss of terrestrial habitats or wetlands but can still affect habitat quality and wildlife. The EIV should include a discussion of the following potential effects on terrestrial species and habitats from operating the proposed facilities:

- Effects on terrestrial species and habitats from land-disturbance activities expected (e.g., construction of additional structures, such as maintenance or storage facilities).
- Effects on terrestrial species and habitats from facility and landscape maintenance activities (e.g., pesticide use, mowing, danger tree trimming and removal, and trampling by heavy equipment).
- Effects of runoff and stormwater management on wetlands and other terrestrial habitats. Ensure compatibility with hydrology sections.
- Salinity from cooling-tower drift or drift from operating other facilities (e.g., evaporation ponds) that potentially could affect terrestrial resources.
- If the maximum estimated ground-level salinity deposition exceeds 1 kg/ha/mo at any location at any time, also include deposition isopleths overlaid on terrestrial habitat maps and an estimate of the area of each habitat type included in each isopleth band.
- Fogging and icing that could affect terrestrial species and habitats.
- Operation of cooling ponds, evaporation ponds, and other operational water features that could affect adjoining wetlands and other terrestrial habitats.
- Use of groundwater and surface water that could affect terrestrial habitats (e.g., wetlands, shorelines, and riparian habitats).
    - An overlay of modeled groundwater withdrawal isopleths over terrestrial habitat maps may be helpful if withdrawals could be capable of causing substantial habitat modifications. Information should be consistent with similar information presented in the aquatic resources and hydrology sections of the EIV.

Wetlands

Information on wetland impacts should be as consistent as possible with federal, state, and local wetland permit applications, and possible discrepancies should be explained. Wetland permit applications are sometimes prepared subsequent to the EIV; in such cases, wetland impact data presented in the EIV should be conservative enough to account for likely impact levels ultimately reported in permit applications. The EIV should also include information on unregulated wetland impacts, including impacts to wetlands not under regulatory jurisdiction. The EIV should include the following:

- Estimated disturbance footprint overlaid onto the wetland maps developed for Section 4.5.1.
- Tables estimating wetland impacts using a widely recognized wetland classification system (e.g., the National Wetlands Inventory).
    - Separate data should be provided for each wetland classification and each category of impact (e.g., permanent fill, temporary fill, permanent dredging, and temporary dredging). Separate tables should also be provided for the site(s) and for each off-site parcel or corridor.
- Discussion of wetland impacts and the effects of functions and values of wetlands.

- Discussion of construction BMPs that may be used to protect wetlands (e.g., buffers, mats, seasonal work limitations, signage, barriers, special erosion, and sedimentation control methods).
- Discussion of applicable federal, state, and local wetland permit requirements and status of the permit application(s).
- Discussion of anticipated wetland mitigation.
    - Address opportunities for avoidance and minimization of wetland impacts as well as possible compensatory mitigation. For mitigation required by the USACE, discuss how it would comply with 33 CFR Part 332 "Compensatory Mitigation for Losses of Aquatic Resources" (33 CFR 332). If possible, provide a tabular comparison of possible wetland losses and mitigation gains using a common metric, such as functional service units (preferred approach) or acreage.

Operating an energy infrastructure facility does not normally involve filling wetlands. However, wetlands are a habitat type that should be addressed together with upland (non-wetland) terrestrial habitat types. Particular attention should be paid to the possibility that groundwater withdrawals could affect the hydrology of nearby wetlands and that surface-water withdrawals could affect nearby shorelines and wetlands fringing water sources.

Wildlife

Qualitative discussions of possible effects on terrestrial wildlife are generally sufficient for an EIV. However, evaluations should be based on quantitatively estimated causal factors (e.g., noise levels, structure heights, and corridor widths). The EIV should include a discussion of the following information related to potential impacts of constructing project facilities and connected infrastructure:

- Possible mortality or physical injury to wildlife, especially immobile or weakly mobile species or life stages (e.g., eggs and juvenile stages).
- Increased traffic from construction workers that might injure terrestrial wildlife.
    - The proximity of traffic to habitat and possible routes of wildlife movement should be considered.
- Noise from construction activities that could startle wildlife or alter behavior (e.g., feeding, sheltering, movement, and reproduction).
- Habitat losses or degradation that could reduce carrying capacity of habitats in the surrounding landscape.
- Habitat losses and fragmentation that may affect movement and migration of wildlife.
- Tall structures or equipment (e.g., cranes) that might injure birds and bats, considering height and proximity to migration routes and areas of wildlife concentration.

The EIV should include a discussion of the following potential effects on terrestrial wildlife during operations:

- Effects of operational noise (e.g., mechanical noise, vehicular noise, and noise from cooling towers) on terrestrial wildlife. Estimated noise isopleth overlays may be helpful if noise levels exceeding 85 dBA are anticipated in areas of high-quality habitat.

- Loss or injury of wildlife caused by traffic. Wildlife movement and migration patterns over the surrounding landscape should be considered. The discussion should remain consistent with traffic related discussions presented elsewhere in the EIV.
- Effects on terrestrial wildlife from maintaining transmission line rights-of-way and other exterior areas and corridors.
- Injury to birds and bats colliding with tall structures (e.g., natural draft cooling towers, communication towers, and electric transmission lines).
- Electrocution of birds and other wildlife by transmission lines and other electrical facilities.
- Effects on terrestrial wildlife from electromagnetic radiation generated at switchyards and along electric transmission lines.

Important Species and Habitats

Consultation requirements regarding important species and habitats are described in Section 4.5.1 Existing Environment and Appendix A. Although DOE retains the responsibility for consultations, the DOE Recipient should provide information and analysis to assist DOE in complying with consultation requirements in a manner that minimizes the potential for delays in the environmental review.

The EIV should include the following discussions related to the effects of constructing and operating the project on important terrestrial species and habitats:

- The effects on each terrestrial species identified as important using the criteria in Table 2.
- The effects on future viability of federal or state listed endangered, threatened, or special status species.
- Any relevant correspondence that has been initiated with the FWS, or state, local, or tribal natural resource agencies about endangered, threatened, or other special status species and habitats.
    - The EIV should summarize and provide copies of key correspondence (e.g., letters, emails, or phone call summaries).
- Cross references to the aquatic resources section below may be appropriate for important species using both terrestrial and aquatic habitats (e.g., crocodilians and waterfowl).

Decommissioning activities that may affect terrestrial resources include stabilization, large-component removal, structure dismantle, and decontamination. Terrestrial ecological resources may be impacted during the decommissioning process via direct or indirect disturbance of native plant or animal communities in the vicinity of the proposed project site(s) and connected infrastructure corridors. Direct impacts can result from activities, such as the clearing of native vegetation or filling of a wetland. Indirect impacts may result from effects such as erosional runoff, dust, or noise. Land at the facility site(s) may be disturbed during decommissioning for the construction of laydown yards, stockpiles, and other project-related facilities. Additionally, land away from the facility site(s) may be disturbed to upgrade or install new transportation or utility systems.

Minor impacts to terrestrial resources could result from dust generation due to ground disturbance and traffic, noise from dismantlement of facilities and heavy equipment traffic, surface erosion and runoff, and migratory bird collisions with crane booms or other construction equipment. BMPs that could be implemented to minimize impacts should be identified.

4.5.2.2 Aquatic Impacts

This section should address the information related to aquatic ecological impacts from construction and operational activities at the proposed site(s). DOE Recipients should consider the important aquatic species and habitat identified in Section 4.5.1 that may be affected by the project.

The following information relating to aquatic impacts of construction activities should be included in the EIV:

- Identification of the aquatic habitats that may be affected or lost by proposed construction activities and description of the proposed construction methods used at these locations.
- Discussion of the construction BMPs that might be used to minimize impacts to aquatic resources.
- Effects of runoff and stormwater management on aquatic habitats. Ensure compatibility with hydrology sections.
- Basis for the proposed location of the intake and discharge structures in relationship to the presence and function of aquatic habitats and biota.
- Quantity and quality of habitat temporarily or permanently modified, lost, or fragmented as a result of construction activities.
- Discussion of the tolerances and/or susceptibilities of important aquatic species on the site(s) and in the vicinity to physical or hydrological alterations, runoff, turbidity, and chemical and noise (both surface and subsurface) pollution that may result from construction activities.
- Spatiotemporal distribution shifts or behavioral alterations of important species that may result from construction activities.
- A summary of any correspondence or discussions with FWS, NMFS, or state, local, or tribal natural resource agencies about the effects of construction activities on important species or habitats, including federally designated critical habitat. Briefly summarize and provide copies of key correspondence (e.g., letters, emails, or phone call summaries).
- Discussion of anticipated stream mitigation should address opportunities for avoidance and minimization of stream impacts, as well as possible compensatory mitigation. For mitigation required by the USACE, discuss how it would comply with 33 CFR Part 332. If possible, provide a tabular comparison of possible stream losses and mitigation gains using a common metric, such as functional service units (preferred approach) or linear feet.

The EIV should include the following information about the impacts to aquatic resources of operational activities:

- A description of the water withdrawal and consumptive water use from facility operations and its effects on aquatic resources.

- Discussion of the conformance of any proposed water-intake structures to the EPA CWA Section 316(b), national technology-based performance, and proportional-flow requirements (66 FR 65256, 2011) for Phase I for new facilities.
- Information on the NPDES permits for the proposed site(s) and/or current permits for existing facilities sited in proximity to the proposed facilities.
- A description of the susceptibility of important aquatic species at specific life stages to entrainment and impingement in conjunction with operation of facility cooling systems or other water intake systems, and entrainment or impingement rates from operation of the facilities using data from studies, including existing historical data from studies from co-located or nearby facilities.
- Discussion of stock assessments, if available and appropriate, as a metric for impact to the species for those important species potentially affected by facility operation.
- Discussion of species and habitats that may be adversely affected by periodic operations (e.g., thermal backwashing).
- Discussion of species that may be affected by potential adverse effects from recirculation of any heated effluent from the facility discharge system and altered hydrodynamic characteristics, including altered circulation or current patterns.
- Discussion of habitats affected by any cooling or other water system (as appropriate), including bottom scouring near the discharge.
- Discussion of the temperature tolerance, duration of exposure, and avoidance behavior of susceptible important aquatic species in relation to thermal discharge, including heat shock and cold shock, at all affected life stages.
    - This discussion should be based on a model, map, and description of the thermal plume and should include variation seasonally and throughout the water column.
- A description of any potential changes to vectors causing aquatic species disease as a result of thermal discharges.
- Effects of operational noise (e.g., mechanical noise and marine vehicular noise) on aquatic wildlife. Estimated noise isopleth overlay maps may be helpful for affected aquatic habitats.
- Description of any potential changes to numbers of nuisance, invasive, and introduced species, including fish, aquatic vegetation, and benthic invertebrates (e.g., *Corbicula* spp. *Or Mytilus* spp.), on-site or in the vicinity of the proposed project as a result of thermal discharges.
- Discussion of effects on important aquatic species resulting from chemical alterations (e.g., changes in salinity, dissolved oxygen, and biocides) to the receiving waterbody. Consider effects from both cooling-tower drift and cooling-system discharges.
- Discussion of effects on important aquatic species resulting from physical alterations (e.g., maintenance dredging to the receiving waterbody), including its substrate and aquatic vegetation.
- A description of any transmission line and pipeline corridor maintenance practices anticipated to adversely affect aquatic biota.
- A summary of any relevant correspondence or discussions with FWS, NMFS, or state, local, or tribal natural resource agencies on endangered, threatened, or other special status species and habitats, including federally designated critical habitat. Briefly summarize and provide copies of key correspondence, including requests and responses by letters, email, or phone call summaries.

Important Species and Habitats

Consultation requirements regarding important species and habitats are described in Section 4.5.1 and Appendix A. Although DOE retains the responsibility for consultations, the DOE Recipient should provide information and analysis to assist DOE in complying with consultation requirements in a manner that minimizes the potential for delays in the environmental review.

The EIV should include discussions related to the effects of constructing and operating the project on important aquatic species and habitats:

- The effects on each aquatic species identified as important using the criteria in Table 2.
- The effects on future viability of federal- or state-listed endangered, threatened, or special status species.
- Any relevant correspondence that has been initiated with the FWS, or state, local, or tribal natural resource agencies about endangered, threatened, or other special status species and habitats.
    - The EIV should summarize and provide copies of key correspondence (e.g., letters, emails, or phone call summaries).
- Cross-references to the terrestrial resources section below may be appropriate for important species using both terrestrial and aquatic habitats (e.g., crocodilians, aquatic mammals, and some waterfowl).

Aquatic ecological resources may be impacted during the decommissioning process via either the direct or the indirect disturbance of plant or animal communities near the proposed project site(s) and connected infrastructure corridors. Direct impacts can result from activities, such as the removal of shoreline or in-water structures (i.e., intake or discharge facilities); the active dredging of a stream, river, or ocean bottom; or the filling of a stream or bay, while indirect impacts may result from effects such as runoff. Aquatic environs at the proposed project site(s) and connected infrastructure corridors may be disturbed as a result of decommissioning-related construction activities, such as building a dock for barges or erecting a bridge over a stream or aquatic area.

Additionally, aquatic environs away from the facility site(s) may be disturbed to upgrade or install new transportation systems (e.g., new rail line to support large component removal) or to install or modify transmission lines. Impacts to aquatic resources could result from sediment runoff generation due to ground disturbance and surface erosion and runoff. Impacts may occur if shoreline or in-water structures, such as intake or discharge facilities and pipes, are removed. BMPs should be identified to make sure that shoreline or in-water structure removal is managed in a manner that does not result in the establishment of nonindigenous or noxious plants and animals to the exclusion of native species.

4.5.3 Environmental Impacts of Alternatives

The EIV should describe the impacts to vegetation and wildlife resources of the no action alternative and reasonable alternatives to the project as discussed in Section 3.2 of this guidance.

4.5.4 Comparison of Environmental Impacts

This section should include a summary and comparison of the impacts to vegetation and wildlife resources of the project and reasonable alternatives to the environmental baseline and to each other. The comparison may be presented in a summary table.

4.6 Socioeconomic Conditions

This section of the EIV should provide a description of the existing socioeconomic conditions and an evaluation of the environmental impacts of the proposed project and reasonable alternatives to these resources.

4.6.1 Existing Environment

The DOE Recipient should provide sufficient data and information in the EIV to establish the environmental baseline for estimates of socioeconomic effects, including the demographic region and the economic region. The demographic region should encompass the majority of population groups potentially affected by project activities. The economic region is defined as the subset of counties (or other appropriate identifiable geographic grouping). The DOE Recipient should confer with DOE staff as early as possible in the detailed project planning process, as discussed in Chapter 1 of this guidance, to define the appropriate demographic and economic regions.

Socioeconomic assessments should also include the following:

- Reasonable growth projections for the affected regions for the expected project lifecycle, including construction, operations, and decommissioning.
- A detailed discussion of the methodologies used to develop each projection.

4.6.1.1 Demographics

The EIV should provide detailed information about the characteristics for the proposed demographic region, with special emphasis on the economic region, to define the magnitude of any potential social or economic impacts from constructing or operating the project. The DOE Recipient should rely on the most recent demographic estimates available (preferably from a single source) for the demographic region that can be disaggregated to the census block group (CBG) level for all of the demographic subcategories identified below and for environmental justice (EJ) reviews of low-income populations (see Section 4.7). The data source used should match the data source used for the EJ analyses performed in the EIV.

The EIV should include the following information related to demographics:

- Racial and ethnic categories by county or other important geographical area in the demographic region. At a minimum, demographic data should include the following racial and ethnic categories:

- White (Not Hispanic or Latino).
- African American or Black.
- American Indian or Alaska Native.
- Asian.
- Native Hawaiian or Other Pacific Islander.
- Other Race (including races not mentioned above and "Two or More Races").
- Ethnicity: Hispanic, Latino, or Spanish origin (may be of any race).
- Aggregate minority (calculated as "Total Population" minus "White, not Hispanic or Latino").

- An overview map and accompanying tables identifying the counties and principal cities and towns that pertain to the demographic region and the economic region.
- A table providing historic and projected population data for the counties of the demographic region with summary totals for the counties pertaining to the economic region.
  - Population values should include historic data for the previous two decennial censuses and extend forward to at least the 10th year after the expected license period of the project.
- A table providing the current racial and ethnic distribution of the population, accompanied by discussion of expected trends in racial and ethnic distribution over the license period.
- A discussion of any current migrant workforce or other migrating population (see latest Census of Agriculture).
  - Discuss the historic and expected trend for migrant populations.
  - A table and accompanying discussion of transient populations affected by the project, including an assessment of local public venues (e.g., stadiums or arenas, resident camps, large employers, and parks and recreation areas) with the following information:
    - Distance from the site.
    - Peak visitation levels.
    - Timing of the peak visitation levels.
    - Attendance levels.
    - Dates of activities.
    - Other pertinent information.
- A table presenting the current income distribution, including household income by segments (e.g., by quartiles), federal median household income level, and the number and percentage of households below the federal poverty level for each county in the demographic region and each state within the demographic region.
  - Discuss current trends affecting incomes within the demographic region.

Information on how to perform population counts and estimate future populations that may be relevant to project facilities for clean energy or climate mitigation demonstrations can be found in the American National Standard Institute/American Nuclear Society's (ANSI/ANS) ANSI/ANS-2.6-2018, *Standard Guidelines for Estimating Present & Forecasting Future Population Distributions Surrounding Power Reactor Sites* (ANSI/ANS, 2018).

4.6.1.2 Community Characteristics

Sufficiently detailed information about the economic characteristics of the proposed project site(s) and the surrounding economic impact region forms the baseline for estimating the economic impacts that might occur because of construction- or operation-related activities at the proposed site(s). The EIV should focus primarily on the community characteristics for the economic region surrounding the proposed site(s). However, there may be areas beyond the demographic region that have a unique importance to the project or for cumulative impact purposes, and the DOE Recipient should include such areas in the discussion when identified.

The EIV should include the following information related to community characteristics. Data may be provided in tables and/or charts, as appropriate:

- Information related to the current facilities' labor forces (if the proposed site(s) is co-located with existing facilities), including the peak number of operations workers, a characterization of all temporary outage workers, and the county-level residential distribution of the current operations workforce and temporary outage workers.
- Housing information, including sales and rental markets in the economic region, the number and types of units available for rent or sale, vacancy rates, and trends.
- Include only habitable structures and the location of existing and projected housing developments.
    - The region's current and historic economic base, including important regional industries by category, employment, and size.
    - Data should be of sufficient depth and scope to provide an accurate account of the changes in the region's economic history, and an indication as to where those changes are most likely leading the region's economy.
- Describe the nature of the construction industry and construction labor force in the region and the total regional labor force, regional unemployment levels, and future economic outlook projected for the proposed license term.

The EIV should identify local and regional planning and administrative organizations and discuss their analyses and trends that may affect conditions, including:

- The region's current governmental structure, including regional political jurisdictions, school districts, and taxing jurisdictions (including those taxing jurisdictions that would be most affected by the project)
- Tax rate data should be provided for:
    - Federal, state, county, regional, school district, sales and use, and other applicable tax sources and their rates.
    - Any current agreements for the proposed or existing site(s) for special property tax rates.
    - Payment in lieu of taxes.
    - Other in-kind payments to local jurisdictions.

- The current educational system within the economic region (i.e., public and private primary and secondary schools and higher education institutions, including minority-serving institutions and historically Black colleges and universities), including capacity, student counts, present percentage of utilization, student-teacher ratios, and expected trends affecting these resources.
- A review and discussion of the local land-use plans and zoning information relevant to population growth, housing, and changes in land-use patterns within the economic region and relevant trends that would affect the development of the economic region.
- A summary, in tabular form, of local social services and public facilities (e.g., water and sewer), present and projected police and fire capabilities, and medical information, including hospitals (available beds and occupancy rates) and number of medical doctors and specialized health facilities.
- The name and location of each water- and sewer-treatment facility, its design capacity, current usage rate, and any information about future expansions or other pertinent changes in each county and community in the economic region.
- A description of applicable federal, state, tribal, and local codes and regulations that address solid, liquid, and gaseous wastes, including any permits necessary for waste storage, treatment and disposal or discharge at the facility or at off-site locations.
- A summary, in tabular form, of access routes to the site(s)—roads (including highways), rail, and waterways.
- For each mode of transportation, provide a discussion of significant proposed and potential expansions, improvements, and upgrades. Information on transportation should be consistent with information provided in the land use and health and safety sections in this guidance.
    - Roads: A brief summary of which roads will be used for site access should be included in this section. Detailed information regarding roads should be provided in Section 4.10.1.3.
    - Rail: Describe railroads with regard to quality, capacity of the tracks, proximity to the proposed site(s), road crossings, and the availability of spurs to the proposed site(s).
    - Waterways: Waterway infrastructure refers to freshwater and ocean barge facilities. Describe all barge facilities (e.g., size, size limitations, and depth of channel).
- Potentially affected visual resources within the expected viewshed of the station (e.g., light pollution).
    - Describe any existing standards or applicable regulations affecting the viewshed of the site(s). Highlight any viewshed management plans or other documents that discuss the current and expected impacts of normal development of the viewshed. Cross-reference to Section 4.9, Visual Resources, as appropriate.
- Recreation venues, parks, protected lands, and other visitor attractions in the vicinity of the site(s). Describe the type of venue, capacity, occupation rate and seasonal characteristics.
- Characteristics of distinctive communities (e.g., historic districts, tourist attractions, cultural resources, American Indian lands and resources, and other popular resources). Discuss any expected trends affecting these resources.

4.6.2 Environmental Impacts of the Project

The EIV should describe socioeconomic impacts that could occur in the region surrounding the proposed site(s) as a result of construction, operations, and decommissioning activities. The scope of the review should be guided by the magnitude and nature of the expected impacts of constructing the project and by the site-specific community characteristics that may be affected by these activities. For each project, a Community Benefits Plan will be prepared, and impacts identified will be analyzed during the NEPA review process.

Decommissioning effects that may affect socioeconomic resources are primarily related to organizational or staffing changes and reductions in tax revenues. Changes could affect housing availability, values, or rental rates; education and other public services; and local government finances.

4.6.2.1 Physical Impacts

This section should address the direct physical impacts to the community, including people, buildings, transportation infrastructure (roads, railways, and waterways), and the aesthetic quality of the local viewsheds directly attributable to construction activities. The geographic scope for this discussion may be smaller than the economic region because, with the exception of aesthetics, physical impacts typically attenuate rapidly with distance. The DOE Recipient should provide the following information in the EIV:

- Potential impacts of noise from construction activities on nearby residents and nearby users of recreational facilities.
  - The analysis should be based on the expected exposure of the closest residents to the proposed project.
- Potential impacts of changes in air quality from construction activities on nearby residents and nearby users of recreational facilities (e.g., odors, fugitive dust, and vehicle and machinery exhaust from construction activities).
- Potential impacts to on-site and off-site structures from construction activities (e.g., foundation damage from vibration caused by blasting, driving of piles, and heavy equipment).
- A description of the impacts resulting from any transportation infrastructure (e.g., roads, railways) realignments necessary to accommodate the project.
- The extent of expected road deterioration caused by heavy-haul activities, normal deliveries, and construction worker commuting.
  - Any discussion of traffic-related impacts (e.g., additional congestion) should be deferred to the community infrastructure impacts section below.
- Anticipated increases in the repair and maintenance of transportation infrastructure necessary to compensate for expected deterioration.
- State or local ordinances, if any, that would require the DOE Recipient to contribute to transportation infrastructure improvements or repairs to support the project.

- A description of degradation in the aesthetic quality of the viewshed visible to the general public (discussion of aesthetic impacts to recreation should be deferred to the discussion of community infrastructure impacts), including:
  - Day and night visibility of the proposed site(s) from changes to the existing landscape (e.g., timbering, clearing, and leveling).
  - Tall structures and equipment (e.g., cranes and towers).
  - Nighttime light nuisances (e.g., light pollution from work area illumination, aircraft warning lights, and light from night delivery vehicles).
- A description of all mitigating actions to be taken by the DOE Recipient and any federal, state, local, tribal, and industrial standards, regulations, ordinances, and practices related to reducing the direct physical impacts of construction activities.

4.6.2.2 Demographic Impacts

The EIV should contain a high-level discussion of expected population changes from constructing the proposed station with an emphasis on demographic subcategories. The discussion of population changes should cover the entire demographic region with a focus on the economic region where the majority of impacts are expected to occur. The DOE Recipient should provide the following information in the EIV:

- Text and summary tables presenting the expected direct workforce impacts on the local population from in-migrating construction workers.
  - The information should account for the incremental increase in employment from operations staff present on the site(s) while the proposed project site(s) and connected infrastructure are being built.
- Estimates and accompanying assumptions and bases related to the general classifications of labor to be used for the project and the workforce scheduling, including the following:
  - Starting date.
  - Workforce schedule (e.g., hours per week, days per week, number of shifts, and percentage of workforce by shift).
  - Quantified monthly workforce increases and decreases over each of the entire construction and operations periods.
  - Magnitude and duration of the peak workforce.
  - Post-peak workforce reductions.
  - Number and timing for all operations workforce members present on the site(s) during construction.
- Discussion of expected residency patterns for in-migrating construction workers, including the following:
  - Expected geographic origin of workers, including from within and outside the economic region and within and outside the demographic region.

- Expected residential distribution of in-migrating workers within the economic region and the demographic region.
- Expected in-migrating family characteristics, including family size and children disaggregated by age group (i.e., generally by non-school, elementary, middle, and high school ages, but may include other cohorts).
- Summary tabular presentation of expected operations and outage workforce impacts by geographic area (i.e., by county and, if useful, major urban area).

- Discussion of existing site(s) employment (including outage workers) and the project's workforce (i.e., construction and operations workers) for projects co-located with an operating power station.

4.6.2.3 Economic Impacts on the Community

Economic impacts from construction activities include the stimulation of local economies toward new employment and new businesses. By definition, the area where these impacts are expected to occur is the economic region. The DOE Recipient should use an industry standard economic input-output model to derive the impacts to the economic region from both construction and operations activities. The discussion should include monetized estimates to the extent practicable.

Economy

The DOE Recipient should include the following information in the EIV on local economic impacts during construction activities:

- Identification and description of the input-output model, input parameters used, and results generated. The output from most regional input-output models includes:
  - Expected direct and indirect employment attributable to construction activities.
  - Expected direct and indirect income effects attributable to purchases and wages in support of construction activities.
- A description of all assumptions affecting the conclusions drawn from this section, including the number of workers that drive the model, who will receive the benefits, and where in the economic region those benefits would most likely be found. If impacts are derived from a maximum impact as an input (e.g., peak employment), the discussion should describe how the model's conclusions are affected by changes in that maximum impact.

Taxes

The DOE Recipient should provide a comprehensive list and discussion of the direct tax revenue impacts attributable to construction activities. Typical tax revenues include the following:

- Income: Federal, state, county, and local income taxes should be described. The DOE Recipient should include in this discussion all assumptions about the number of workers, their wages, and their work schedules that serve to fully inform the calculation of taxes.
- Sales and use: The DOE Recipient should ensure that, if present, state, county, and local sales and use taxes are based on the contributions from new residents (i.e., in-migrating workers and their families), and from the recipient's estimated local purchases of construction-related services, materials, and supplies. The discussion should include an explanation of the tax rate, the assumptions behind the calculation of revenues, and a monetized estimate for each tax entity.
- Property: Local property taxes may or may not include revenues from the partially completed project and may be subject to special government incentives, payment-in-lieu-of-tax agreements or other assessment processes that differ from those for the general public. The discussion should include an explanation of the tax rate, the assumptions behind the calculation of revenues, and a monetized estimate for each tax entity.

4.6.2.4 Community Infrastructure Impacts

Community infrastructure impacts include the expected changes to the communities and governments of the economic region attributable to both construction and operations activities. Beginning with the baseline assessments found in Section 4.6.1 the DOE Recipient should assess the change in each of the following categories and provide a detailed discussion of process and assumptions along with tables and/or figures that illustrate conclusions.

Traffic

The infrastructure impact to traffic differs from the physical impact to roads. This assessment should discuss the consequences of the project in terms of changes to the welfare and behavior of local residents, primarily through traffic congestion during commuting hours. The discussion should be accompanied by tables and/or figures sufficient to support the analysis. The DOE Recipient should include the following information in the EIV:

- Traffic assessments discussing the magnitude and schedule of each shift relative to the baseline traffic for key affected roads.
- Congestion and accident-related consequences of additional traffic from operations and outage workers for projects co-located with an operating nuclear station.
- Congestion and accident-related consequences of additional traffic from construction workers for the project.

Recreation

Recreation impacts are the changes in recreational experience caused by changes to the viewshed, local environment, or quality and quantity of access to recreation venues. The DOE Recipient should base its recreation-impact determination on the local recreational venues, capacity, occupation rate, and seasonal characteristics provided in Section 4.6.1. The analysis should include the following information:

- Aesthetic changes (e.g., lighted heavy machinery, worksite lighting, and visual impacts of tall structures or equipment, as discussed under physical impacts, as well as impaired views and visible emissions) that reduce the attractiveness and enjoyment of recreational venues.
- Dust, plumes, and other visible degradation that could reduce the attractiveness of recreational venues.
- Potential noise impacts on nearby recreational venues directly attributable to construction and operational activities.
- Timber harvesting, other resource-extraction, or other activities that could reduce the quantity of or eliminate recreational areas.
- Demographic changes caused by in-migrating construction workers that could increase competition for access to recreational venues and the potential impact of such increased competition.

Housing

The DOE Recipient should describe the expected impacts on local housing resources attributable to the site workforce during construction activities and those occurring during sustained operations. The discussion should be accompanied by sufficient tables and/or figures to support the analysis. The housing assessment should include the following:

- Expected number of in-migrating workforce members.
- The underlying assumptions, including:
  - Family size.
  - In-migrating family residential geographical distribution.
  - Assumptions related to housing choice (e.g., rental housing; temporary or mobile housing, such as campgrounds and recreational vehicle parks; and permanent, single-family housing options).
  - The property tax impacts from new construction of residential properties.
  - The location of expected housing resources by type in the context of the total housing resource for each affected county in the economic region (from Section 4.6.1).
- Whether the housing demand from new residents creates adverse impacts on the rental market.

Public Services

The DOE Recipient should describe the expected impacts to public services in the economic region attributable to the construction- and operations-related in-migrating population. The discussion should be accompanied by sufficient tables and/or figures to support the analysis. The assessment of public services should include the impacts of increasing demand for public services by in-migrating workers and their families, including:

- Estimate of the expected contribution to water and sewer use for each affected community and the resulting impact to each service in the economic region.
- Identification of the potential impact on police or fire services for each affected community in the economic region, including the expected increase in the number of employees (differentiated between duty officers and support staff) and the change in ratio of police or firefighters to the population, in order to maintain the current level of service.
- Identification of the expected number of new volunteer staff (as opposed to employee staff) needed to maintain the same ratio of first responder staff to the population served.
- Estimate of the expected impacts to medical facilities in the demographic region.
- Estimate of the number of students that would be added to schools because of in-migrating families, including the expected change in student–teacher ratios, with a comparison to any mandated maximum ratio.

4.6.2.5 Impacts on Regional or Local Plans

In this section, the DOE Recipient shall describe any impacts to regional or local plans for fuel, water resources, solid waste, land, air quality, labor force, and the commitment of resources and opportunities to reuse and recycle resources (wastes, water). The description will cover both the construction phase as well as the operational phase of the facility life cycle. If discussed elsewhere in the EIV (e.g., Section 4.6.1, Existing Environment), a reference to such is preferred rather than restating or repeating it here.

4.6.3 Impacts of Alternatives

The EIV should describe the impacts to socioeconomic resources of the no action alternative and reasonable alternatives to the project as discussed in Section 3.2 of this guidance.

4.6.4 Comparison of Environmental Impacts

This section should include a summary and comparison of the impacts to the socioeconomic conditions of the project and reasonable alternatives to the environmental baseline and to each other. The comparison may be presented in a summary table.

4.7 Environmental Justice

EJ refers to a federal policy established by Executive Order 12898 “Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations” under which each federal agency identifies and addresses, as appropriate, disproportionately high and adverse human-health or environmental effects of its programs, policies, and activities on minority or low-income populations (59 FR 7629).

This section of the EIV should provide a description of the existing conditions related to EJ and an evaluation of the environmental impacts of the proposed project and reasonable alternatives to these resources.

4.7.1 Existing Environment

The DOE Recipient should provide sufficient information for the identified EJ communities, including unique characteristics and subsistence activities, to establish the baseline condition for evaluating the effects of facility construction and operation on those communities.

4.7.1.1 Identification of Potentially Affected Environmental Justice Communities

The geographic boundary for EJ analysis will depend on the specifics of the project and may be appropriate at the county, state, or regional level. The DOE Recipient should utilize available resources, such as EJScreen, the Climate & Economic Justice Screening Tool, DOE's Energy Justice Mapping Tool, and the U.S. Centers for Disease Control and Prevention’s (CDC) Environmental Justice Index to identify the EJ and disadvantaged communities potentially affected by the proposed activity. Describe how the potentially affected community is defined using each tool and why they are categorized as an EJ or disadvantaged community. These definitions should be used as the baseline for the EJ analysis and should analyze potential direct, indirect, and cumulative impacts resulting from the proposed action and alternatives to the EJ and disadvantaged communities under each definition.

Methodology and Analysis

The DOE Recipient should define the EJ impact area and the disadvantaged communities potentially affected by the project using the following screening tools:

- EPA’s Environmental Justice Screening and Mapping Tool (EJScreen) is an EJ mapping and screening tool that provides a nationally consistent dataset and approach to identifying EJ and disadvantaged communities (EPA, 2018). The output from EJScreen are maps and reports that present three kinds of information: environmental indicators (13), socioeconomic indicators (7), EJ indicators (13), and supplemental indexes (13). The standard unit of analysis in EJScreen is the CBG, the finest resolution level of detail for U.S. Census Bureau data.

- CEQ's Climate and Economic Justice Screening Tool is a geospatial mapping tool that identifies disadvantaged communities that are facing significant burdens in any of the following eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. The screening tool was specifically developed to provide a uniform whole-of-government definition of disadvantaged communities for federal agencies to target Justice40 investment benefits.
- DOE's Energy Justice Mapping Tool is a tool that identifies census tracts that DOE has categorized as disadvantaged communities pursuant to Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad."
- CDC's Environmental Justice Index is an index that uses data from the U.S. Census Bureau, the EPA, the U.S. Mine Safety and Health Administration, and the CDC to rank the cumulative impacts of environmental injustice on health for subdivisions of counties (census tracts) for which the U.S. Census Bureau collects statistical data. The Environmental Justice Index ranks each tract on 36 environmental, social, and health factors and groups them into 3 overarching modules and 10 different domains.

EJ Communities with Unique Characteristics

For the purposes of DOE environmental reviews, communities with unique characteristics that should be identified include migrant worker communities, minority or low-income elderly, home-bound communities, or traditional, cultural, or religious communities with specific ties to the lands or waters near the site(s). For example, American Indian tribes may have specific rights or a cultural or spiritual attachment to natural resources at a site(s) (e.g., wild rice, sweet grasses, and other traditional medicines). However, unique EJ community characteristics can also be physical, such as local community access routes that facilitate a community's ability to function normally. Low-income communities with unique characteristics may be found in areas of low-income housing (private or federally subsidized). The nature of the unique characteristic of a low-income community may need to be determined by interviews and community visits. The DOE Recipient should remain sensitive to how project-related activities could create pathways for a disproportionately high and adverse impact on such communities.

Subsistence

Subsistence refers to the activities of communities, households, or individuals to acquire resources by nonmarket means, such as home gardening, fishing, hunting, and gathering. Subsistence practices can accomplish the following:

- Provide direct income through the sale of harvested resources (e.g., cord wood or mistletoe sales).
- Supplement household income by substituting wild or home-produced foods for commercially purchased foods, freeing up available income to be applied to other expenses.
- Facilitate participation in a traditional ecologically based American Indian lifestyle through the consumption of traditional animal or plant species or through activities on traditional lands.

The existence of specific subsistence and related resource dependencies attributable to any site are most commonly documented by direct observation and interviews with local minority and low-income community leaders. The DOE Recipient should determine whether any EJ communities in proximity to the site(s) or proposed off-site facilities exhibit these practices. Outreach activities should provide a basis for identifying whether such activities may be present near the site(s).

Description in the EIV

Using the results of the tools and indexes identified above, the DOE Recipient should describe how each EJ impact area and disadvantaged community is defined under each tool and why they are categorized as an EJ or disadvantaged community.

The DOE Recipient should describe their analysis and all public outreach and field investigations performed to develop the demographic data for the EIV. The EIV should also include the following information:

- A series of maps, one for each important potentially affected EJ population, identifying the CBGs within the demographic region that meet either of the above criteria for minority or low-income populations.
  - The maps should note the location of the proposed project site(s), principal cities and towns, roads, and any other relevant features. The maps should indicate which CBGs, if any, trigger the EJ threshold proportion. Each map should be accompanied by a table containing a count of the CBGs within the demographic region that meet or exceed the comparative threshold criteria.
- Discussion of the specific methods used to develop the maps and tables, including references to all data sources and literature cited and a discussion of the specific geospatial information system methods and data used.
- Discussion of minority or low-income migrant communities.
  - Migrant communities refer to communities that may establish residence temporarily or seasonally based on the availability of agricultural or construction work. For example, migrant agricultural workers may move into local campgrounds or establish makeshift camps during particular harvest seasons. Migrant construction workers may do likewise during construction of a new subdivision or other substantial projects near the site(s).

4.7.1.2 Identification of Potential Pathways and Communities with Unique Characteristics

The DOE Recipient should identify any potential pathways that could result in disproportionately high and adverse human-health or environmental effects to potentially affected EJ populations, recognizing the potential for such populations with unique characteristics (as identified above in Section 4.7.1.1).

Methodology and Analysis

Subsistence practices and communities with unique characteristics should be a focus of the analysis of potential pathways considered in the EJ analysis. The DOE Recipient should coordinate its EJ analysis with its historic and cultural resources analysis to identify any potential American Indian tribal linkages to traditional or culturally important resources (e.g., culturally important activities, lands, or waters).

Description in the EIV

The EIV should include a description of any potential pathways that could result in disproportionately high and adverse impacts to minority or low-income populations that would require further analysis in the impacts discussion (Section 4.7.2).

4.7.2 Environmental Impacts of the Project

This section should describe potential impacts of construction and operation of the proposed clean energy or climate mitigation demonstration project to low-income and/or minority populations. It should assess whether the pathways identified in the EJ section for the affected environment result in any disproportionately high and adverse environmental and human-health effects to minority or low-income populations ("potentially affected EJ populations") during operation.

Impacts to the minority and low-income populations could arise from operational activities at or near the site(s), in the local communities affected by the project (including in off-site areas such as transmission-line corridors), and in the wider economic and demographic regions.

For each socioeconomic area, the DOE Recipient should consider the potential for disproportionately high and adverse impacts even if the area was determined to have a minor impact on the general population. Each pathway indicated in Section 4.7.1.2 of this guidance should be assessed against each socioeconomic impact area in order to identify potential operation-related EJ impacts. The DOE Recipient will need to consult across the resource areas covered in the EIV to determine whether impacts from operations could create a pathway leading to disproportionately high and adverse impacts on potentially affected EJ populations.

4.7.2.1 Energy Justice

This section should discuss how the project will increase EJ communities' participation in, and benefits from, the energy system while also mitigating the health, social, and economic burdens they have historically faced. Identify how the project will make clean energy more accessible and affordable for the nearby communities.

4.7.2.2 Environmental Impacts

The DOE Recipient should consider each impact area previously identified in the socioeconomics section for construction and operations, even if the area had a minor impact, and discuss those impact areas where a potential pathway could result in a disproportionately high and adverse effect on potentially affected EJ populations. The discussion should conclude with a determination of whether impacts of operations would result in disproportionately high and adverse impacts on potentially affected EJ populations. The EIV should also address potential mitigation actions or other mitigating factors that could reduce negative impacts.

4.7.2.3 Human-Health Effects

The DOE Recipient should include a qualitative (or quantitative, if more appropriate) discussion in the EIV of the human-health pathways by which any environmental impact during construction and operations could result in disproportionate impacts on any minority or low-income population (including thermal, chemical, radiological, cultural, and economic factors). The discussion should conclude with a determination of whether human-health impacts of operations could result in disproportionately high and adverse human-health effects during operations. The EIV should address potential mitigation actions or other mitigating factors that would reduce negative impacts.

4.7.2.4 Subsistence, Special Conditions, and Unique Characteristics

The DOE Recipient should describe the effects of operational activities on any established resource dependencies, cultural practices, or subsistence behaviors at or in the vicinity of the site(s) or at off-site areas. The discussion should conclude with a determination of whether or not disproportionately high and adverse human-health or environmental effects could occur as a result of operations. The EIV should address potential mitigation actions or other mitigating factors that would reduce negative impacts. Such information may include:

- Subsistence behavior (i.e., hunting, fishing, or other natural resource exploitation as an income supplement).
- Unique cultural practices (e.g., American Indian tribal religious and ceremonial reliance on natural resources, such as sweet grasses, fish, and wild rice), special circumstances or unique characteristics (e.g., minority communities identifiable in compact [smaller than a census block] locations, such as American Indian communities), and any disproportionately high socioeconomic characteristic (e.g., a high dependence on pedestrian transportation).

4.7.3 Environmental Impacts of Alternatives

The EIV should describe the impacts to the conditions related to EJ of the no action alternative and reasonable alternatives to the project as discussed in Section 3.2 of this guidance.

4.7.4 Comparison of Environmental Impacts

This section should include a summary and comparison of the impacts to the conditions related to EJ of the project and reasonable alternatives to the environmental baseline and to each other. The comparison may be presented in a summary table.

4.8 Historic/Cultural Resources

This section of the EIV should provide a description of the existing conditions related to historical and cultural resources and an evaluation of the environmental impacts of the proposed project and reasonable alternatives to these resources.

4.8.1 Existing Environment

Historic and cultural resources are the remains of past human activities and include prehistoric and historic era archaeological site(s), historic districts, and buildings, as well as any site structure or object that may be considered eligible for listing on the National Register of Historic Places (NRHP). Historic and cultural resources also include traditional cultural properties important to a living community of people for maintaining its culture. Historic and cultural resources are deemed to be historically significant if they have been determined eligible for or have been listed on the NRHP. A historic property is a historic or cultural resource that is eligible for or listed on the NRHP.

NEPA requires federal agencies to take into account the potential effects of their actions on the cultural environment (42 U.S.C. § 4321, 1969). The National Historic Preservation Act (NHPA) requires federal agencies to consider the impacts of their undertakings on historic properties and consult with the appropriate State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), or American Indian tribes on a government-to-government basis, and other parties with an interest in the effects of the undertaking, including local governments and the public, as applicable (54 U.S.C. § 300101).

The DOE Recipient should use Section 106 of the NHPA and implementing regulations at 36 CFR Part 800, “Protection of Historic Properties” as a guide for providing historic and cultural resource information in the EIV (36 CFR 800). In accordance with 36 CFR Part 800, a DOE Recipient should engage with the SHPO, THPO, American Indian tribes, and interested parties for the purposes of gathering information in developing its EIV. Information gathering by a DOE Recipient is not considered consultation pursuant to 36 CFR Part 800. Consultation with the SHPO, THPO, American Indian tribes, and interested parties is the responsibility of DOE.

The DOE Recipient should determine the boundaries of the proposed direct (e.g., physical) and indirect (e.g., visual and auditory) area of potential effects (APEs) to be recommended to DOE. Once the proposed APE has been determined, the DOE Recipient should conduct cultural resource investigations to identify historic and cultural resources located within the APE, determine whether they are eligible for listing on the NRHP, assess affects, and develop avoidance or mitigation plans to resolve adverse effects. DOE will use this information to support its Section 106 consultation and assessment of effects for the project.

APE is defined in 36 CFR 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The [APE] is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking" (36 CFR 800). Consistent with 36 CFR 800.16(d), the APE is typically defined as the area or areas at the project site(s) and the immediate environs that may be directly or indirectly impacted by constructing and operating the proposed new facility(ies). The DOE Recipient should describe the project area and provide the following information in the EIV:

- A U.S. Geological Survey quadrangle map that identifies the direct and indirect APEs.
- Legal description of the APE appropriate to the project area. Note that not all areas of the United States (i.e., the original 13 colonies) use the Public Land Survey System (e.g., township, range, and section information).
- Aerial photos of the proposed project site(s) before any land disturbing activities commence.
- Identification of any parts of the APE that are lands owned by the federal government or by a state or tribal government (i.e., not privately owned).

4.8.1.1 Cultural Background

This section of the EIV should provide a discussion of the historic use of the land and the activities that have occurred within the APE and the surrounding area. This includes a description of the cultural history of the region (including the project site[s]) from the beginning of human settlement to the present and a summary of how this information was collected for the proposed APE. Information can be derived from background research (literature review and site file search) and from the use of plat and other historic maps showing ownership, acreage, property boundaries, and the location of existing or former historic structures. Other sources that can assist with the description of the cultural background include land records, archival sources, local museums or historical societies, libraries, planning documents, mapping/imaging, and online sources. If available, consult ethnohistoric sources to identify American Indian tribes and other groups that may have historic and cultural ties to the project area.

4.8.1.2 Historic and Cultural Resources at the Site and in the Vicinity

This section of the EIV should provide a description of historic and cultural resources identified within the direct and indirect APEs (e.g., facility site[s], connected infrastructure corridors, and the vicinity). All cultural-resource survey reports that are developed to identify and assess effects to historic and cultural resources should be referenced and submitted with the EIV. However, information (i.e., reports, maps, and site forms) that discloses the locations of unevaluated, potentially eligible, or eligible historic properties (e.g., archaeological sites) should be withheld from public disclosure. This information may be protected under NHPA Section 304, especially if there is a risk of harm to the resource (54 U.S.C. § 100707). DOE protects cultural resource information disclosing the location of cultural resources (e.g., maps) under Section 304 of the NHPA. Section 304 of NHPA requires DOE to "withhold from disclosure to the public, information about the location, character, or ownership of a historic resource if the agency and the Secretary of the Interior agree that disclosure may 1) cause a significant invasion of privacy, 2) risk harm to the historic resource, or 3) impede the use of a traditional religious site by practitioners."

The DOE Recipient should rely on qualified professionals who meet the Secretary of Interior's standards, 36 CFR Part 61, Professional Qualification Standards, to develop the historic and cultural resource sections in the EIV (36 CFR 61). The DOE Recipient is encouraged to engage DOE staff as early as possible in the planning process to avoid issues related to disclosing sensitive location information related to historic and cultural resources when drafting the EIV.

The EIV should provide the following information:

- A description of all past and current historic- and cultural-resource investigations conducted to identify historic and cultural resources within and surrounding the APE.
- Documentation of field methods used to identify resources within the APE.
- A description of all historic and cultural resources (e.g., prehistoric and historic archaeological sites, standing structures, cemeteries, and traditional cultural properties) and isolated finds and features.
- An evaluation of historic and cultural resources for NRHP eligibility (i.e., historic properties), including:
  - A description of the process and methods used to evaluate these resources.
  - Documentation of concurrence from SHPO, THPO, and American Indian tribes with process, methods, and conclusions.

4.8.1.3 Consultation

Consultation is the responsibility of the federal agency, and DOE is required to take the lead on consulting with the SHPO, THPO, American Indian tribes (on a government-to-government basis), and interested parties as outlined in 36 CFR Part 800. Consultation is not the responsibility of the DOE Recipient. However, the DOE Recipient should engage with these parties to gather sufficient information pertinent to the NHPA Section 106 review process in order to assist DOE in the timely completion of its NHPA Section 106 compliance requirements.

The EIV should contain a summary of the DOE Recipient's initial outreach efforts, including the process used to identify American Indian tribes and potential interested parties about the project. The DOE Recipient should evaluate the significance of the historic and cultural resources and assess any effects the project may have on them. For areas not surveyed (e.g., areas too disturbed or devoid of potential historic and cultural resources), proper documentation, a basis for exclusion, and concurrence on survey methodology from the SHPO should be provided.

If a DOE Recipient is corresponding with American Indian tribes before DOE initiates government-to-government consultation, then the recipient should clarify to the American Indian tribes that DOE will be initiating and conducting government-to-government consultation at a later date for the project. A federally recognized American Indian is not obligated to consult with a DOE Recipient or share information about properties of religious and cultural significance with the recipient. A federally recognized tribe may prefer to communicate directly with DOE at the government-to-government level.

The EIV should contain copies of all correspondence with the SHPO, THPO, American Indian tribes, or members of the public with whom the DOE Recipient engaged to gather information about historic and cultural resources within the APE. These documents should be included in an appendix of the EIV.

4.8.2 Environmental Impacts of the Project

Consultation requirements regarding protection of historic properties are described in Section 4.8 and Appendix A. Although DOE retains the responsibility for consultations, the DOE Recipient should provide information and analysis to assist DOE in complying with consultation requirements in a manner that minimizes the potential for delays in the environmental review.

The DOE Recipient should identify any activities and impacts associated with construction, operation, and decommissioning of the proposed project facilities and connected infrastructure, including maintenance-related and reasonably foreseeable future construction activities that could affect historic and cultural resources within the APE (on-site or off-site, direct and indirect effects). The recipient should provide a site utilization plan that includes the location of reasonably foreseeable future construction activities. DOE Recipients should involve the SHPO, local historic preservation officials, THPO, and American Indian tribes in the assessment.

The assessment should lead to one of three conclusions (see 36 CFR 800.4):

- No historic properties present.
- Historic properties present, but the undertaking will have no effect upon them.
- Adverse effect: The undertaking will harm one or more historic properties (see 36 CFR 800.5).

If a qualified professional (as described in Section 4.8.1.2 of this guidance) has recommended a "no historic properties present" determination, then the DOE Recipient should provide supporting documentation in the EIV.

If a qualified professional has recommended a finding of no adverse effect to historic properties, the recipient should develop a plan that outlines protective measures to minimize or avoid these effects. The DOE Recipient should engage the SHPO, THPO, American Indian tribes, and interested parties in the formalization of these protection plans and document this within the EIV.

If a qualified professional determines that adverse effects to historic properties could occur, the DOE Recipient should engage with the SHPO, THPO, American Indian tribes, and interested parties and document this determination in the EIV. The EIV should describe any procedures and cultural resource management plans developed by the DOE Recipient to protect historic and cultural resources during construction and operational activities as well as any measures to avoid, minimize, or mitigate adverse effects. These procedures should also include steps to take in the event of inadvertent discoveries, including the discovery of human remains.

The DOE Recipient should be aware that DOE, as a federal agency, is responsible for consulting with the SHPO, THPO, American Indian tribes, and interested parties as part of the Section 106 compliance process.

If DOE determines an adverse effect may occur, it will develop proposed measures in consultation with identified consulting parties that might avoid, minimize, or mitigate such effects in accordance with 36 CFR Part 800. Such measures, as appropriate, would be discussed in DOE staff's EIS or EA. If DOE staff determines that adverse effects would occur, it can develop a memorandum of agreement or programmatic agreement (see 36 CFR 800.6), as appropriate. See Appendix A for additional information on consultation.

Construction

The EIV should include the following information (with appropriate reference to Chapter 4 of the EIV to avoid duplication of information):

- A description of ground-disturbing activities (e.g., land clearing, grading, excavating, road work, and constructing the facility), increases in traffic, and audio and visual intrusions that could affect on-site and off-site resources located within the direct and indirect APEs.
- A description of historic properties found in the direct and indirect APEs that may be affected by the project.
  - Use the criteria specified in 36 CFR 800.5 to assess adverse effects on historic properties. Provide a basis for and documentation of how a conclusion is reached.
- A description of historic and cultural resources that are not determined to be historic properties but may be considered important in the context of NEPA, as amended (e.g., sacred sites, cemeteries, local gathering areas).

- Discussion of the direct and indirect effects (e.g., ground disturbance or physical, visual, auditory, or atmospheric effects such as fugitive dust, light, and traffic), if any, from the project and any associated infrastructure corridors (e.g., transmission lines) on nearby historic properties or important historic and cultural resources.
    - For indirect effects, the assessment should include drawings or modified photographs indicating the project facilities and their surroundings if visible from these nearby important vantage points.

The assessment should lead to one of three conclusions (see 36 CFR 800.4):

- No historic properties present.
- Historic properties present, but the undertaking will have no effect upon them.
- Adverse effect: The undertaking will harm one or more historic properties (see 36 CFR 800.5)

Operations

- A description of any operational activities, including maintenance activities that could affect on-site or off-site resources (e.g., ground-disturbing activity not discussed in the Construction Section above, increases in traffic, and noise and visual intrusions [i.e., cooling towers and other structures for the proposed project]).
- A description of historic properties found in the direct and indirect APEs that may be affected by operational activities.
- The criteria specified in 36 CFR 800.5 should be used to assess adverse effects to historic properties. The assessment should provide a basis and documentation for how a conclusion is reached.
- A description of the effects associated with operation, including maintenance activities on historic and cultural resources that are not determined to be historic properties but may be considered by SHPO, THPO, American Indian tribes, or members of the public to have cultural significance/importance in the context of NEPA (e.g., sacred sites, cemeteries, local gathering areas).
- Discussion of the direct and indirect effects (e.g., ground disturbance or physical, visual, auditory, or atmospheric effects such as fugitive dust, light, and traffic), if any, to nearby historic properties or important historic and cultural resources from the period of proposed project-facility and connected-infrastructure operations, including maintenance-related and reasonably foreseeable future construction activities (e.g., warehouses).
    - For indirect effects, the assessment should include drawings or modified photographs indicating the project facilities and their surroundings if visible from these nearby important vantage points.

Decommissioning

Activities that have a potential to adversely impact cultural resources include stabilization, decontamination, dismantlement, and large component removal. These activities adversely impact cultural resources primarily via land disturbance, which could damage or destroy the resource or alter the contextual setting of the resource. In addition to the direct effects of land clearing, indirect effects such as erosion and siltation may adversely affect some cultural resources. Decommissioning activities also may alter site access and administrative protection of the resources.

4.8.3 Impacts of Alternatives

The EIV should describe the impacts to the conditions related to historical and cultural resources of the no action alternative and reasonable alternatives to the project as discussed in Section 3.2 of this guidance.

4.8.4 Comparison of Environmental Impacts

This section should include a summary and comparison of the conditions related to historical and cultural resources of the project and reasonable alternatives to the environmental baseline and to each other. The comparison may be presented in a summary table.

4.9 Visual Resources

This section of the EIV should provide a description of the existing conditions related to visual resources and an evaluation of the environmental impacts of the proposed project and reasonable alternatives to these resources.

4.9.1 Existing Environment

The DOE Recipient should submit sufficiently detailed information about the aesthetic and scenic quality of the proposed project site(s), related project areas and infrastructure corridors, and the surrounding viewsheds in order to support an assessment of the impacts that might occur from construction- or operations-related activities. The extent of the discussion on visual resources depends on the proximity of the project facilities to visually sensitive areas and residential areas. Visually sensitive areas may be designated at the federal, state, or local level and should be identified during agency consultations. The EIV should include the following information related to visual resources:

- Boundaries of the viewshed or view-scape of the proposed project site(s) and connected infrastructure.
- Identification of local residents and/or regular visitors to the area who might be affected by aesthetic impacts.

- Information related to the landscape characteristics, including open spaces, mountain ranges, ecological environment (e.g., flora, fauna, and ecosystems), bodies of water (e.g., waterfalls, waterways, and oceans), color of soils, recreational areas (e.g., parks wilderness areas), architectural features, aesthetic (e.g., historical, archaeological, cultural, and natural) features that would attract tourists, and uncultivated land.
- Location of constructed features, including production facilities, storage tanks, towers, transmission towers, and overhead power distribution line and production activities.
- Visibility from access roads (i.e., existing natural or constructed barriers, screens, or buffers).
- Regionally or locally important or high-quality views associated with project site(s).
- Photos and information related to the view of the project facilities from different directions, including views from roads, highways, homes, and recreational areas (e.g., forest and wilderness area and campgrounds).
- Regulatory information related to land-use zoning requirements of the local community or urban areas, sign ordinances or regulations of the local community or urban area, design guides of the local community or urban area, and buffer-zone (or greenbelt-zone) requirements of the local community or urban area.
- Summary of any coordination with appropriate local area community planners and/or urban planners.
- Rating of the aesthetic and scenic quality of the site(s) in accordance with the Bureau of Land Management (BLM) Visual Resource Inventory and Evaluation System (BLM 1984, 1986a, 1986b, 2013).

4.9.2 Environmental Impacts of the Project

This section of the EIV should describe the aesthetic and visual impacts of construction, operation, and decommissioning of the project facilities. The following information should be provided in the EIV:

- Photos of the project location(s) with project facilities superimposed.
  - Photo simulations should be from key viewpoints within the viewshed (especially any identified historic, community, or recreational resources) and may need to include both day and nighttime views.
- Rating of the aesthetic and scenic quality of the proposed project site(s) in accordance with the BLM Visual Resource Management System (BLM 1984, 1986a, 1986b, 2013)
- Significant visual impacts from each alternative, including:
  - Physical facilities that are out of character with overall existing architectural features.
  - Structures that may partially or completely obstruct views of existing landscape.
  - Structures that create visual intrusions in the existing landscape character (e.g., discharge stacks, storage tanks, towers, and power lines).
  - Structures that may require the removal of natural or built barriers, screens, or buffers, thus enabling lower quality view-scapes to be seen.
  - Altering historical, archaeological, or cultural properties or the character of the property's setting when that character contributes to the property's significance.

- Structures that create visual, audible, or atmospheric elements that are out of character with the proposed project site(s) or alter its setting.

- A determination as to whether the visual impact is compatible or in compliance with regulations, ordinances, and requirements.
- Potential mitigation measures.

Structure dismantlement and possible abandonment in place are activities that may have aesthetic impacts. Cooling towers and stacks may be clearly visible from a distance. Sites may also contain a number of storage tanks, a large switchyard, and various administrative and security buildings. Decommissioning may include demolition or dismantlement of any of these structures. Any switchyard that is part of the project may be left in place after the termination of the license because it is an integral part of the power distribution grid.

4.9.3 Environmental Impacts of Alternatives

The EIV should describe the impacts to the conditions related to visual resources of the no action alternative and reasonable alternatives to the project as discussed in Section 3.2 of this guidance.

4.9.4 Comparison of Environmental Impacts

This section should include a summary and comparison of the conditions related to visual resources of the project and reasonable alternatives to the environmental baseline and to each other. The comparison may be presented in a summary table.

4.10 Health and Safety Factors

This section of the EIV should provide a description of the existing conditions related to health and safety factors and an evaluation of the environmental impacts of the proposed project and reasonable alternatives to these resources.

4.10.1 Existing Environment

The DOE Recipient should describe the environment at the proposed project site(s) and within the vicinity of the site(s) with respect to existing human-health impacts. This includes the identification of people or groups that could be vulnerable to health impacts, including public health impacts and impacts from etiological agents, transportation activities, noise, pipelines, and electromagnetic fields (EMFs). This section provides the basis for evaluation of impacts on human health from constructing and operating the project.

4.10.1.1 Public and Occupational Health

The DOE Recipient should identify the state agency or office or federal agency with regulatory jurisdiction over the public and occupational health at the site(s), in the vicinity, and along connected infrastructure corridors. The recipient should provide the following information in the EIV:

- A description of the regulations related to potential impacts on public and occupational health at the site(s), in the vicinity, and along connected infrastructure corridors.
- Identification of people or groups in the vicinity that could be vulnerable to health impacts from construction, operations, and decommissioning activities (e.g., construction workers, workers at any co-located facilities, nearby residents, transients, and recreational visitors). Cross-reference to other EIV sections, as appropriate.
- A description of any existing issues involving hazardous chemicals on or near the site(s).

Occupational Injuries

- A discussion of federal and state statistics for occupational injuries and illnesses related to similar projects. Federal statistics are available from the U.S. Bureau of Labor Statistics.
- A description of existing safety standards, practices, and mitigation procedures for avoiding or minimizing the incidence of injuries and illnesses to workers and the public.

Project-Related Structures and Technologies

The DOE Recipient should provide a description of actions taken to minimize the potential hazards associated with project-related structures or technologies (e.g., pipelines, transmission lines, wind turbines) including any applicable safety regulations or industry-wide standards.

The EIV should include:

- Identification, description, and mitigation strategies connected with the critical health and safety hazards during construction, operational maintenance, and demolition of the project-related structures and technologies.
- A description of how the project will comply with federal safety standards (e.g., Occupational Safety and Health Administration rules and regulations) and any additional standards (e.g., industry-wide safety standards) that the DOE Recipient will voluntarily implement (e.g., Energy Institute 2021, “Wind Turbine Safety Rules, 4th Edition”).
- A table identifying all DOT class location units by milepost along the transmission route (pipeline).

- Identification and description of any existing and anticipated sources of EMFs in the vicinity and region and the electric shock hazards and chronic effects of electrical transmission lines. The information provided in the EIV should include the following:
  - EMF strengths for existing or anticipated transmission lines (in the United States, transmission lines operate at a frequency of 60 Hz [60 cycles per second], which is extremely low frequency).
  - Electric shocks from exposure to energized conductors or from induced charges in metallic structures.
  - Any new information regarding whether a consensus has been reached by the appropriate federal health agencies pertaining to the effects of long-term or chronic exposure to EMFs.

Etiological Agents and Emerging Contaminants

Etiological agents are disease-causing organisms that affect human health. Some of these disease-causing organisms have been associated with the operation of industrial station cooling systems. Etiological agents associated with some industrial facilities include more than just thermophilic microorganisms and may be present in elevated numbers in unheated systems as well as in cooling systems, receiving and source waterbodies, and site sewage treatment facilities.

Contaminants and materials are being discovered in water where that previously had not been detected or are being detected at levels that may be significantly different than expected. The proposed use of reclaimed water or impaired water sources for station cooling or other uses raises a potential human-health and ecological concern related to the release of these chemicals and materials to the environment. These chemicals or materials, found in reclaimed and contaminated source water in very low concentrations could potentially be harmful to humans and the environment.

The DOE Recipient should provide the following information:

- A description and the incidence of organisms of concern for public and occupational health, including enteric pathogens (e.g., *Salmonella* spp. and *Pseudomonas aeruginosa*), thermophilic fungi, bacteria (e.g., *Legionella* spp. and *Vibrio* spp.), dinoflagellates (*Karenia brevis*), blue-green algae, and free-living amoeba (e.g., *Naegleria fowleri* and *Acanthamoeba* spp.) during the previous 10 years in the state that the site(s) is located.
- Characteristics of the site(s) that could encourage the growth and distribution of etiological agents.
- A summary of all the chemicals and materials that are known from the influent for projects using reclaimed water or impaired water for cooling.
- The EIV should reference information from the U.S. Centers for Disease Control and Prevention, state public health agencies, and local health agencies.

4.10.1.2 Noise

The DOE Recipient should characterize the existing noise environment at the proposed project site(s). The description should include the following:

- A general description of the site(s) with respect to noise (rural, industrial, etc.)
- Location of the closest noise-sensitive human receptors, including (if within a reasonable distance) closest residence, closest public building, closest recreational area, and closest industrial site.
- Results of any ambient noise studies that have been conducted, including the locations of noise sources and measurements, and corresponding noise levels, including meteorological conditions during the measurement period and the resulting effects on the measured noise levels.
  - Studies should be performed at a representative number of locations, including measurement at the closest noise-sensitive human receptors, each of which is sampled over a number of days that include weekday, weekend, and seasonal variations in noise levels.
- Noise regulations or ordinances, including federal, state, and local code and regulations.

4.10.1.3 Transportation

The DOE Recipient should describe the existing transportation networks for the site(s), vicinity, and region. These discussions will become the basis for analyses in the sections on land use, socioeconomic, and health and safety. The description should include the following:

Roads:

- The carrying capacity, condition, availability, and type of public transportation, as well as planned modifications that might affect traffic flow to and from the site(s).
- The road and highway use in industry-standard terms (e.g., level of service designation or similar process).
- The current and projected trends for usage of these routes, including any existing project facility-related and connected-infrastructure commuter patterns for operations and outages.
- State whether heavy-haul roads will be needed to support construction, operations, and/or decommissioning.

Rail:

- The capacity and condition of the rail system, and planned modifications that might affect traffic flow to and from the site(s).
- Rail system use in industry-standard terms.
- Discussion of current and projected trends for usage of these routes, including any current patterns for existing facilities.
- Current accident statistics for regional transportation networks.

4.10.2 Environmental Impacts of the Project and Alternatives

The DOE Recipient should address the human health and safety impacts of constructing, operating, and decommissioning the project. This should include a discussion of health impacts on the public and workers, noise generated by project activities, transportation, and potential accidents.

4.10.2.1 Public and Occupational Health Impacts

The DOE Recipient should describe the impacts from construction activities on public and worker health. The description should include the following:

- Public health risks from construction activities (e.g., air pollution from dust and vehicle emissions).
- Occupational health risks to workers and on-site personnel from activities, such as construction, maintenance, testing, excavation, and modifications.
- Estimate of the total occupational injuries and illnesses for construction activities anticipated for the project, including information on interpretation of the statistical results.
- A description of safety standards, practices, and mitigation procedures that will be used to reduce public and occupational health risks.

The EIV should describe human-health risks for the public and for project personnel engaged in operational activities such as maintenance, testing, operations, and facility modifications for the project. The description should include the following:

- The incidence of occupational health risks described in Section 4.10.1 of this guidance.
- Occupational health risks compared to the incidence rate for workers in similar occupations (e.g., chemical process industries and electric power generation, transmission, and distribution). Include state and federal labor references in the discussion.
- Standards, practices, and procedures to reduce the potential for occupational injury and fatality risk.
- The location and orientation of hazardous materials that are expected to be present.
- The location and characteristics of potentially hazardous liquid and gaseous releases.
- Calculated exposure to the workers and the public or calculated average annual concentration of releases to air and water, including all models, assumptions, and input data in order to determine compliance with relevant regulations (e.g., 40 CFR 50; 40 CFR 59; 40 CFR 60; 40 CFR 61; and 40 CFR 122).
- Assessment of potential asphyxiation hazards (e.g., resulting from storage, transportation, and disposal of CO_2).
- A description of mitigative measures.

During the decommissioning process, the major sources of physical occupational hazards involve the operation and use of construction and transportation equipment. Vehicles, grinders, saws, pneumatic drills, compressors, and torches are some of the more common equipment that can cause injury if improperly used. Heavy loads, which are often moved about by cranes and loaders, must be controlled to avoid injury. Most of these hazards will be part of dismantlement. Electrical hazards are a significant concern during decommissioning. Inhalation and dermal contact with chemicals are serious worker health hazards during decommissioning.

4.10.2.2 Noise Impacts

The DOE Recipient should describe noise impacts associated with project activities. The description should include the following:

- Applicable federal, state, and local regulations and/or ordinances governing noise from construction, operations, and decommissioning activities.
- Background noise measurements and the closest noise-sensitive human receptors or sensitive areas (Chapter 2 of this RG).
- Sources of noise from the project during construction (e.g., driving of piles, heavy construction equipment operations), operations (e.g., mechanical machinery, gas flaring), and decommissioning (e.g., structure demolition).
- Peak noise level measurements for each identified source type, along with estimated noise levels at representative distances, with attenuation by distance alone (i.e., not taking advantage of any intervening foliage, terrain changes, or permanent barriers between the source and the receptor).
- Measurement or calculation of the levels of noise from each of the identified sources at the closest noise-sensitive human receptors identified in Section 4.10.1 of this guidance, including a description of any noise abatement models.
- Any BMPs and any other mitigation strategies required or planned noise abatement for operation of the proposed project.

If the measured or calculated noise level from any identified source type exceeds 65 dBA at any noise-sensitive human receptor or at the site boundary when calculated with attenuation by distance alone, the DOE Recipient should determine the noise level that would result from taking advantage of natural attenuation, such as intervening foliage, natural barriers, and changes in terrain. The determination of natural attenuation may be accomplished by the recipient performing a series of leaf-on and leaf-off noise surveys or by using an industry-standard modeling or calculation process. If the measured or calculated noise level from the source exceeding the 65 dBA threshold cannot be demonstrated to be reduced through natural attenuation to below the threshold, the EIV should describe specific mitigation measures to be used to reduce the noise level to below 65 dBA.

Noise is also a physical hazard that will be significant during decommissioning. During the decommissioning process, the sounds that might be heard at off-site locations include noise from construction, vehicles, grinders, saws, pneumatic drills, compressors, and loudspeakers. Noise levels from these sources should be compared to noise levels of the operating facility and background noise present at the site(s) to determine potential impacts.

4.10.2.3 Human Health Impacts from Transportation

The EIV should provide estimates of the potential human-health impacts related to traffic-related accidents from transporting construction materials and workers to and from the proposed site(s), commuting by operations and outage workers, and transporting supplies, equipment, and waste to and from the proposed site(s). Traffic-related impacts refer to the accidents, injuries, and fatalities estimated to occur from traffic accidents during movement of materials and workers to and from the proposed project site(s) during construction, operations, and decommissioning activities. Where possible, the impacts should be estimated using information specific to the proposed site(s) (e.g., by using county-specific accident statistics).

The following information should be provided:

- Summary of provisions for access to the proposed project site(s) during construction, operations (including during outages), and decommissioning.
- A description of the method(s) used to estimate traffic-related accident impacts, including traffic accidents, injuries, and fatalities. Traffic-related accident impacts should be estimated using round-trip distances.
- Specification of input parameters and sources used in the impact assessment.
- Annual number of estimated traffic accidents, injuries, and fatalities.

Where assumptions are used to fill in missing or highly uncertain data (e.g., commute distances, persons per vehicle, and number of deliveries), the assumptions should be bounding and reasonable (i.e., the assumptions tend to overstate transportation impacts yet are not so conservative that they could mask the true environmental impacts of the reactor and lead to invalid conclusions).

The EIV should provide sufficient descriptions of key models, assumptions, parameters, conditions, input data, resulting output, and approaches to inform DOE staff's evaluation. If there is relevant information in other project planning documentation submitted to support the funding award, the EIV should indicate where in those documents this information can be found.

4.10.2.4 Accidents

An accident is an unplanned event or sequence of events that results in undesirable consequences. Accidents may be caused by equipment malfunction, human error, or natural phenomena. NEPA documents should inform the decision-maker and the public about the probability of reasonably foreseeable accidents associated with proposed actions and alternatives that could occur and about their potential adverse consequences.

The key to informative accident analyses is to develop realistic scenarios that address the range of reasonably foreseeable event probabilities and consequences, including low probability/high consequence accidents and higher probability/(usually) lower consequence accidents. The environmental consequences of accidents are impacts (effects) on human health and the environment.

Accident analyses in NEPA documents should estimate the magnitude of risk (for accidents, risk is normally defined as the probability of the accident occurring multiplied by the consequence of the accident) that each analyzed alternative would present and provide comparisons of risks among alternatives, providing information necessary for a reasoned choice among alternatives and appropriate consideration of mitigation measures.

It may be appropriate in certain cases to address potential environmental impacts that could result from intentional destructive acts. Analysis of such acts, which are not accidents, poses a challenge because the potential number of scenarios is limitless and the likelihood of attack is unknowable. Consequences of destructive acts, however, may be compared to consequences of severe accidents because the forces resulting in releases of hazardous materials could be similar.

The EIV may summarize and cross-reference analyses in other detailed project planning documents (e.g., life-cycle analysis, safety, and risk management plans). The EIV should include the following information related to reasonably foreseeable accident scenarios:

- Describe the scenarios that represent the spectrum of reasonably foreseeable accidents.
- Analyze maximum reasonably foreseeable accidents for a given alternative to represent potential accidents at the high consequence end of the spectrum. Also analyze other accidents in the "spectrum" if they may contribute importantly to, or even dominate, accident risks.
- Evaluate accident impacts on the public, involved workers, and non-involved workers. For each of these population groups, evaluate impacts on the maximally exposed individuals and the collective impact to the group.
- Present both the probability of occurrence (i.e., the probability that adverse consequences would occur) and the consequences of the accident. Risk (which often is defined as the product of probability and consequence) also can be presented, but it should augment not substitute for the separate presentation of probability and consequence.
- Consider impacts that could result from an accident (e.g., impacts from releases of toxic chemicals).
    - Also consider injuries and fatalities from construction and physical hazards that are often greater than those from chemical exposures.
- Evaluate (at least qualitatively) indirect impacts to the environment that would result from contamination because of an accident, such as economic issues (e.g., the cost of cleanup), water quality, and impacts to biota.
- Discuss factors contributing to uncertainties in the accident analysis. In circumstances where substantial uncertainty exists regarding an estimate, a qualitative estimate may be used.
- Discuss strategies that will be employed to mitigate the risks and consequences of accidents. These should include the following:
    - Safety features included in the material handling, storage, and processing system designs (e.g., pressure relief valves, sensors to detect leaks and shut down systems as necessary).
    - Safety protocols to be implemented (e.g., regular safety inspections, training for personnel, and emergency response plans).
    - Conducting periodic risk assessments to identify potential hazards and develop strategies to mitigate risks.

Related guidance is provided in *Recommendations for Analyzing Accidents Under the National Environmental Policy Act, 2002*, which is available on the DOE NEPA website (DOE, 2002).

4.10.3 Environmental Impacts of Alternatives

The EIV should describe the impacts to the conditions related to health and safety factors of the no action alternative and reasonable alternatives to the project as discussed in Section 3.2 of this guidance.

4.10.3 Comparison of Environmental Impacts

This section should include a summary and comparison of the conditions related to health and safety factors of the project and reasonable alternatives to the environmental baseline and to each other. The comparison may be presented in a summary table.

4.11 Climate Impacts

This section should include an analysis using the best available data of the potential impacts to the project resulting from climate-related events such as sea level rise, storm surges, wind speeds, and other events associated with climate change.

4.12 Cumulative Impacts

The CEQ defines 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).

The EIV should describe any past, present, and reasonably foreseeable future actions in the geographic area of interest surrounding the proposed project site(s) that could affect those resources that could also be affected by the construction and operation of the project, regardless of what agency or person would be responsible for such other actions. The geographic area of interest is defined as the area where other actions occur that could potentially have impacts within the resource impact area. The geographic area of interest may be different for each resource.

Examples of cumulative impacts that may be considered may include:

- Pollutant discharges into surface water.
- Deterioration of recreational uses from loading waterbodies with discharges of sediment, nutrients, or thermal effluents.
- Reduction or contamination of ground water supplies.
- Physical segmentation of a community through incremental development.

CEQ guidance *Considering Cumulative Effects under the National Environmental Policy Act* recommends applying natural ecological or socio-cultural boundaries to the resource impact area (CEQ, 1997b). Possible boundaries that could be used to determine the appropriate geographic area for a cumulative impact analysis are in Table 2-2 of the CEQ Guidance. EPA Publication 315-R-99-002, *Consideration of Cumulative Impacts in EPA Review of NEPA Documents* recommends that the scope of the cumulative impacts analysis include geographical areas that sustain the resources of concern but that it not be extended to the point of becoming unwieldy (EPA, 1999). Geographical proximity to the project facilities should be considered but should not be used to exclude consideration of other actions.

Jurisdictional borders are sometimes useful in defining the geographic area of interest for resource areas, such as land use and some socioeconomic areas; however, this approach may not be appropriate for defining the geographical area for an ecological resource that cannot reliably be defined by jurisdictional borders, such as aquatic resources.

Table 1 if this chapter provides general guidance for each resource on what the appropriate resource impact areas may be. However, professional judgment is needed in selecting the resource impact area for a particular resource at a specific site.

The timeframe for the analysis incorporates the sum of the effects of the project in combination with past, present, and future actions because impacts may accumulate or develop over time.

- Past timeframe is prior to the submittal of the EIV. In many cases, discussion of the past actions may entail a brief paragraph telling the story of how the resource has changed to its current condition by describing past actions and, as necessary, referring to the baseline discussion in the affected environment chapter of the EIV.
- Present timeframe is from the time of the submittal of the EIV until the anticipated issuance of the final EIS. The present timeframe is the shortest among the three timeframes and should capture any ongoing actions. Many of the resource areas measure the environment as it currently exists. These measurements capture the cumulative impact on the resource from the past and present projects and should be part of the baseline for the resource in the affected environment chapter of the EIV.
- Future timeframe is from the anticipated issuance of the final EIS through construction and operation of the proposed new facility(ies), as well as facility decommissioning. Future actions are those that are “reasonably foreseeable”; that is, they are ongoing (and will continue into the future), are funded for future implementation, are included in plans, proposals, or other actions that have a reasonable likelihood of being implemented.

In general, the baseline assessment presented in the affected environment chapter for each resource area accounts for past and present actions. The direct and indirect impact analyses in the preceding sections of this chapter address the incremental impacts of construction and operation of project facilities. This section should reference these analyses, which do not need to be repeated in the cumulative impact analysis.

Both the project and other actions may contribute to cumulative impacts. Because cumulative impacts are additive, the analysis of cumulative impacts should concentrate only on resources that are potentially affected by past, present, and reasonably foreseeable actions as well as by construction and operations activities at the project facilities during the expected timeframe of the project. Note that cumulative effects may result from the accumulation of similar effects or the synergistic interaction of different effects.

4.11.1 Past, Present, and Reasonably Foreseeable Future Projects

The EIV should provide a table listing past and present projects, facilities, or actions in the geographic area of interest that contribute to the current baseline and future status of the resource. The table should also include the reasonably foreseeable future projects that could contribute to cumulative impacts to the resource during construction, operation, and decommissioning of the project facilities.

This table should include the following information:

- Project/facility/action name.
- Summary description.
- Location in relation to the proposed facilities.
- Status (e.g., operational, proposed, ongoing, or existing).
- Environmental resources affected.

Examples of other present or proposed actions (not associated with the proposed clean energy or climate mitigation demonstration project) include electric power generation projects, chemical or paper processing facilities, bridges, roads, conservation or restoration areas, reservoirs for water storage, quarries or mines, and pipelines or transmission lines. For operational projects, the DOE Recipient should indicate whether any changes in the project are anticipated that would result in changes to the project's environmental interface (i.e., a power uprate of a power facility).

Database tools, such as NEPAssist, may facilitate the environmental review process and project planning in relation to environmental considerations. The web-based application draws environmental data dynamically from EPA GIS databases and web services and provides immediate screening of environmental indicators for a user-defined area of interest. These features contribute to a streamlined review process that potentially raises important environmental issues at the earliest stages of project development.

The DOE Recipient should discuss in the EIV the resources used to identify and develop the listings of other projects and associated references, including any consultations with federal, state, regional, and local regulators, and American Indian tribes.

The information provided in the EIV should include the following:

- A list of EISs concerning projects in the same geographic area of interest as the project
- A description of anticipated regional changes not associated with an individual project (e.g., future urbanization) that could result in cumulative impacts during construction, operation, and decommissioning of the facilities.
- A description of how the baseline affected environment might change as a result of climate change and a discussion of how impacts discussed in the impact evaluations in the EIV would either increase, decrease, or remain the same in this new baseline environment. This information could be contained in this section or as a separate appendix to the EIV and should be based on assessments conducted by federal agencies with a mandate to evaluate the effects of climate change (e.g., latest U.S. Global Change Research Program Report), but applicable regional and local studies conducted by other entities may be included.

4.11.2 Impact Assessment

The EIV should assess the level of cumulative impacts (adverse and/or beneficial). The project-related impacts analyzed in the preceding sections of this chapter of the EIV should be summarized in sufficient detail, with references to the applicable sections for detailed descriptions of the affected resources and direct impacts. The project impact analysis in the EIV will have included the past and present impacts to the resource along with the impacts from the project. The cumulative analysis should focus on the reasonably foreseeable future actions that could have a cumulative impact. The EIV should summarize the principal contributor(s) to cumulative impacts for each resource area and describe the interaction between the cumulative outside stresses and those caused by constructing, operating, and decommissioning the project. The EIV should also include a discussion of the incremental contribution of the proposed DOE-funded activities related to the project (i.e., constructing and operating the proposed facilities and connected infrastructure) in relation to the cumulative impacts.

The information provided in the EIV should also include:

- Any plans for mitigation of adverse cumulative impacts or modification of alternatives to avoid, minimize, or mitigate cumulative impacts.
- Mitigation that may be required by federal, state, and local authorities, including information about restoration actions by separate entities, required mitigation of other projects or voluntary mitigation, and enhancement by the entity taking an action.
- A table summarizing the impact to each resource and mitigation, if any, to reduce the cumulative impact.

Chapter 5 – Ability to Meet Compliance Requirements

The EIV should list all federal, state, and local permits, licenses, approvals, and other entitlements that must be obtained in connection with the project and describe the status of compliance with these requirements. The EIV should also include a discussion of the status of compliance with applicable environmental quality standards and requirements, including applicable zoning and land-use regulations, thermal and other water pollution limitations, or requirements that have been imposed by federal, state, tribal, regional, and local agencies having responsibility for environmental protection or granting of easements or rights-of-way approvals for project components. The EIV should provide the following information:

- The names of permitting/approval agencies and the names and contact information of the persons contacted.
- The type of permits/approvals or consultation.
- The current status of the permit/approval filings (e.g., estimated schedule for permit filing, date of actual filing, and date that permit/approval was granted or is anticipated).
- The environmental mitigation requirements specified in any permit or proposed in any permit application not described elsewhere in the EIV.
- Information regarding permits and approvals may be summarized in a table.

Chapter 6 – References

The DOE Recipient should provide a bibliography of sources used in the preparation of the EIV. References may alternatively be cited and listed at the end of the chapter to which they refer. The recipient should have all reference material used in the EIV available for DOE staff's review.

Chapter 7 – List of Preparers

The DOE Recipient should list the name, educational background, and summary of work experience for all personnel who had a role in preparing the EIV. This information may alternatively be presented in an appendix.

References

7 CFR 657. Prime and Unique Farmlands.
10 CFR 1021. National Environmental Policy Act Implementing Procedures.
10 CFR 1022. Compliance with Floodplain and Wetland Environmental Review Requirements.
15 U.S.C. § 717. Regulation of Natural Gas Companies.
16 U.S.C. § 661–667. Fish and Wildlife Coordination Act of 1934, as amended.
16 U.S.C. § 1451. Coastal Zone Management Act of 1972.
16 U.S.C. § 1531. Endangered Species Act of 1973.
16 U.S.C. § 1801. 1996. Magnuson-Stevens Fishery Conservation and Management Act of 1996.
33 CFR 328. Definitions of Waters of the United States.
33 CFR 332. Compensatory Mitigation for Losses of Aquatic Resources.
Federal Water Pollution Control Act of 1972 (also referred to as Clean Water Act).
36 CFR 61. Professional Qualification Standards.
Protection of Historic Properties. C. 800.
40 CFR 50. National Primary and Secondary Ambient Air Quality Standards.
40 CFR 59. National Volatile Organic Compound Emission Standards for Consumer and Commercial Products.
40 CFR 60. Standards of Performance for New Stationary Sources.
40 CFR 61. National Emission Standards for Hazardous Air Pollutants.
40 CFR 81. Designation of Areas for Air Quality Planning Purposes.
40 CFR 93. Determining Conformity of Federal Actions to State or Federal Implementation Plans.
40 CFR 122. EPA Administered Permit Programs: The National Pollutant Discharge Elimination System.
40 CFR 129. Toxic Pollutant Effluent Standards.
40 CFR 131. Water Quality Standards.
40 CFR 1500. Purpose and Policy.
40 CFR 1501. NEPA and Agency Planning.
40 CFR 1502. Environmental Impact Statement.
40 CFR 1503. Commenting on Environmental Impact Statements.
40 CFR 1504. Pre-Decisional Referrals to the Council of Proposed Federal Actions Determined to Be Environmentally Unsatisfactory.
40 CFR 1505. NEPA and Agency Decision Making.
40 CFR 1506. Other Requirements of NEPA.
40 CFR 1507. Agency Compliance.
40 CFR 1508. Definitions.
42 U.S.C. § 2011. Atomic Agency Act of 1954.
42 U.S.C. § 4321. 1969. National Environmental Policy Act of 1969, as amended.
42 U.S.C. § 7401. Clean Air Act of 1970.
42 U.S.C. § 9601. 1980. Definitions.
46 FR 18026. 1981. Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations. Council on Environmental Quality. *Federal Register*.
54 U.S.C. § 100707. Confidentiality of Information.
54 U.S.C. § 300101. National Historic Preservation Act of 1966.
66 FR 65256. 2011. National Pollutant Discharge Elimination System: Regulations Addressing Cooling Water Intake Structures for New Facilities. Environmental Protection Agency.
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BLM. 1984. "Visual Resource Management." In *BLM Manual 8400*. Washington, D.C.: U.S. Department of Interior.
BLM. 1986a. "Visual Resource Inventory." In *BLM Manual Handbook H_8410_1*. Washington, D.C.: U.S. Department of Interior.
BLM. 1986b. "Visual Resource Contrast Rating." In *BLM Manual Handbook H_8431_1*. Washington, D.C.: U.S. Department of Interior.

BLM. 2013. *Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands.*
CEQ. 1997a. *Environmental Justice: Guidance Under the National Environmental Policy Act.* Washington, D.C.
CEQ. 1997b. *Considering Cumulative Effects under the National Environmental Policy Act.* Council on Environmental Quality.
DOE. 2002. *Recommendations for Analyzing Accidents under the National Environmental Policy Act.* U.S. Department of Energy, Environment, Safety and Health Office of NEPA Policy and Compliance.
DOE. 2022. *Directory of Potential Stakeholders for DOE Actions under NEPA.* U.S. Department of Energy Office of NEPA Policy and Compliance. https://www.energy.gov/node/290935.
EO 1154, 35 FR 4247. 1970. Protection and Enhancement of Environmental Quality.
EO 1191, 42 FR 26967. 1977. Environmental Impact Statements.
EO 14008. 2021. Tackling the Climate Crisis at Home and Abroad. Executive Office of the President.
EPA. 1999. *Consideration of Cumulative Impacts in EPA Review of NEPA Documents.* U.S. Environmental Protection Agency EPA Publication 315-R-99-002.
EPA. 2012. "NEPAssist Tool."
EPA. 2018. "EJSCREEN: Environmental Justice Screening and Mapping Tool." U.S. Environmental Protection Agency.
FERC. 2015. *Suggested Best Practices for Industry Outreach Programs to Stakeholders.* Federal Energy Regulatory Commission Office of Energy Projects.
FWS. 2014. *National Wetlands Inventory.* U.S. Fish and Wildlife Service Falls Church, VA.
Public Law 117-58. 2021. Investment and Jobs Act.
Title 41, 42 U.S.C § 4370m. 2015. Fixing America's Surface Transportation Act (FAST).
U.S. DOT. 2022. *Promising Practices for Meaningful Public Involvement in Transportation Decision-Making.* United States Department of Transportation.

Appendix A – Consultations

The Department of Energy (DOE), as a federal agency, is required to consult with other federal agencies under several federal laws. While this is DOE's responsibility, DOE Recipients, as the proponent of the action, should provide the information that DOE will need to complete the consultation process in an efficient manner. DOE Recipients should be aware of DOE's interagency consultation requirements and the environmental information volume (EIV) should contain the information necessary for DOE to support the consultation process. DOE may or may not jointly perform consultations in conjunction with one or more other agencies who cooperate on an environmental impact statement (EIS); however, this does not affect the information DOE will need to perform such consultations.

Endangered Species Act

Congress enacted the Endangered Species Act (ESA) in 1973 to protect and recover imperiled species and the habitats upon which they depend (16 U.S.C. §§ 1531 et seq.) (Ref. A1). The U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) of the National Oceanographic and Atmospheric Administration jointly administer the ESA.

DOE must comply with the ESA. Section 7 of the ESA requires that each federal agency ensure that any action authorized, funded, or carried out by an agency is not likely to jeopardize the continued existence of any endangered or threatened species (jeopardy), or destroy or adversely modify any critical habitat for such species (adverse modification) (16 U.S.C. § 1536). "Action," for the purposes of DOE activities, may include licensing, rulemaking, and/or other regulatory activities (such as the grant of funding for energy projects). Federal agencies should act, where they have the legal authority to do so, to prevent endangered species and their habitats from being threatened or destroyed. If an action may affect any federally listed endangered or threatened species or critical habitat, DOE must consult with the Secretary of the Interior (for freshwater and terrestrial species through the FWS) or the Secretary of Commerce (for marine and anadromous species through the NMFS). Depending on the specific resources involved, DOE consults with the FWS or NMFS (collectively referred to as "the Services") for all major federal actions under NEPA that require the preparation of an EIS. DOE also may have to consult with the Services for actions that may affect a listed species or habitat but for which it does not prepare an EIS (e.g., an action for which an environmental assessment is prepared).

The Services' joint regulations implementing the ESA at 50 CFR Part 402, "Interagency Cooperation—Endangered Species Act of 1973, as amended" (Ref. A2), allows for two types of consultations: informal and formal. Informal consultation is a less structured approach than formal consultation and may include phone calls, email, letters, and meetings between DOE and the Services. Informal consultation is typically initiated early in the review process and may be the only type of consultation needed if the Services concur with DOE that a proposed action is "not likely to adversely affect" listed species or critical habitat.

The formal consultation process is a more structured approach to meeting ESA Section 7 requirements. Formal consultation is required if DOE determines that a proposed action "may adversely affect" listed species or the action will result in adverse modification of designated critical habitat. Formal consultation may also be required if the Services do not concur with DOE's conclusion that the action is "not likely to adversely affect" listed species or critical habitats. Consultation is not required should the DOE Recipient and DOE conclude that the licensed action would have "no effect" on any threatened or endangered species or critical habitat.

As a result of formal consultation, the Services may issue a Biological Opinion, which is a document that states the opinion of the Service as to whether the federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The Biological Opinion may include an incidental take statement, reasonable and prudent measures to reduce impacts on species or habitats, and terms and conditions. The Biological Opinion may also contain conservation recommendations, which are voluntary actions that the DOE Recipient can take that benefit the species or critical habitat.

DOE may prepare a Biological Assessment to support informal or formal consultation. A Biological Assessment is a document that evaluates the potential effects of the action on listed and proposed species and critical habitats potentially affected by the action and determines whether any species or habitats are likely to be adversely affected by the action. The *Consultation Handbook* (Ref. A3), prepared by the Services, discusses the Section 7 consultation process, which includes a discussion of the information to be included in a Biological Assessment, as required by 50 CFR Part 402.

DOE Recipients can help DOE complete its ESA consultation requirements in an efficient and timely manner. When preparing the EIV, recipients should identify which listed species or critical habitats may be present in the affected area. DOE Recipients can obtain this information directly from the FWS and NMFS or through their websites. DOE Recipients should present a detailed description of their proposed action in the EIV. DOE Recipients should then describe how their proposed action might potentially affect each listed species or critical habitat known to potentially be present in the area of their project. DOE Recipients can provide this information in the terrestrial and aquatic sections of the EIV or in a separate attachment.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act of 1996 (MSA) (Ref. A4) ensures that renewable fishery resources are not exhausted by overharvesting or other environmental damage. Section 305 of the MSA requires federal agencies to consult with the Secretary of Commerce through NMFS before authorizing any action that may adversely affect an EFH identified under MSA (16 U.S.C. § 1855). The Fishery Management Councils, in conjunction with NMFS, designate EFH, which can consist of both the water column and the seafloor of an aquatic area needed to support one or more life stages of a managed fish species.

DOE will typically initiate such EFH consultations and prepare any necessary EFH assessment in conjunction with its NEPA review. The staff will document the status or outcome of the EFH consultation in the EIS or EA. If no change to any aspect of aquatic resources is anticipated, then an evaluation of EFH should not be necessary.

However, if a change to any aspect of aquatic resources is anticipated, then DOE staff must determine if the requested action will result in any adverse effects to designated EFH, and if so, contact NMFS to initiate EFH consultation. The consultation process for an environmental review requiring an EFH assessment can be found in *Essential Fish Habitat Consultation Guidance*, Version 1.1 (Ref. A5).

DOE Recipients can help DOE complete its EFH consultation requirements in an efficient and timely manner. When preparing the EIV, recipients should identify whether any EFH may be present in potentially affected areas. DOE Recipients can obtain this information directly from the NMFS or through its website. DOE Recipients should present a detailed description of their proposed action in the EIV. DOE Recipients should then describe how their proposed action might potentially affect each area of EFH present in the area of their project. DOE Recipients can provide this information in the aquatic sections of the EIV or in a separate attachment.

National Historic Preservation Act

The NHPA (Ref. A6) was promulgated to coordinate public and private efforts to preserve significant historic and cultural resources. Section 106 of the NHPA directs federal agencies to take into account the effects of their "undertakings" on historic properties and allow the Advisory Council on Historic Preservation an opportunity to review and comment on the undertaking. The advisory council is an independent federal agency charged with implementing Section 106 throughout the federal government; NHPA Section 106 implementing regulations are at 36 CFR Part 800, Protection of Historic Properties (Ref. B7). "Undertakings" denote a broad range of federal activities, including the issuance of DOE funding for energy projects (36 CFR 800.16(y)). "Historic property" is defined as any prehistoric or historic district, site, building, structure, traditional cultural property, or object included in or eligible for inclusion in the National Register of Historic Places (36 CFR 800.16(l)(1)) (NRHP or National Register).

DOE Recipients should be aware that DOE staff will, in accordance with the NHPA, consult with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), American Indian tribes, and interested parties. DOE Recipients are encouraged to engage with these parties when developing their EIV.

When engaging these parties, the DOE Recipient should clarify that as a federal agency, DOE is responsible for initiating and conducting government-to-government consultation with American Indian tribes once the EIV is submitted. An American Indian tribe is not obligated to consult with a DOE Recipient or share information about properties of religious and cultural significance with a recipient and may prefer to communicate directly with DOE at the government-to-government level.

Face-to-face interactions with the SHPO will generally prove beneficial as a supplement to written correspondence, especially when agency feedback is requested on the scope and methodology for conducting cultural resource investigations. The DOE Recipient should also work with the SHPO to identify American Indian tribes that have ancestral ties to the project area and determine whether/when to initiate outreach with THPOs and American Indian tribes. The DOE Recipient should not view the described initial outreach activities as merely "checking a box" to meet DOE's expectations for an EIV. Rather, such interactions will provide useful information for developing the scope of field surveys, identifying criteria for the proposed project design or layout (e.g., impact avoidance or mitigation), and assessing resources of concern in the EIV.

References

A1. 16 U.S.C. § 1531. Endangered Species Act of 1973.

A2. 50 CFR 402. Interagency Cooperation—Endangered Species Act of 1973, as amended,

A3. FWS and NMFS. 1998. *Consultation Handbook*. U.S. Fish and Wildlife Service and U.S. National Marine Fisheries Service.

A4. 16 U.S.C. § 1801. Magnuson-Stevens Fishery Conservation and Management Act of 1996.

A5. NMFS. 2004. *Essential Fish Habitat Consultation Guidance, Version 1.1*. National Marine Fisheries Service, Office of Habitat Conservation, Silver Spring, MD.

A6. 54 U.S.C. § 300101. National Historic Preservation Act of 1966.

A7. 36 CFR 800. Protection of Historic Properties.

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