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# Chapter 4

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## Adaptive Management and Monitoring

CEQ addressed the potential for using adaptive management in the NEPA process in the “The National Environmental Policy Act: A Study of its Effectiveness After Twenty-five Years” (CEQ 1997c). The term “adaptive management” has been used since the late 1970s to describe certain ecosystem management approaches. An example of adaptive management at the program level occurred in 1994 when 10 adaptive management areas were established to test approaches to land management under the Northwest Forest Plan (USDA Forest Service, Pacific Northwest Region 1998)<sup>53</sup>

In the 1997 study, CEQ recognized that the environmental protection afforded by the traditional environmental management model, “predict, mitigate and implement,” depends on the accuracy of the predicted impacts and expected results of any mitigation. The study concluded that a “major difficulty with the traditional environmental impact analysis process is that it is a one-time event; i.e., results from intensive research, modeling, and other computations or expert opinions are analyzed, the analysis of potential environmental impacts is prepared, mitigation measures are identified, and a document is released for public review.”<sup>54</sup> Unfortunately, this process does not account for unanticipated changes in environmental conditions, inaccurate predictions, or subsequent information that might affect the original environmental protections. The adaptive management model, by adding “monitor and adapt,” was seen as a significant improvement.

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<sup>53</sup> Forest Service, Pacific Northwest Region, “Northwest Forest Plan Record of Decision” (1994), *available at* <http://www.reo.gov/general/aboutNFP.htm>.

<sup>54</sup> Council on Environmental Quality, “The National Environmental Policy Act: A Study of its Effectiveness After Twenty-five Years,” p.32 (Jan. 1997), *available at* <http://ceq.eh.doe.gov/nepa/nepa25fn.pdf>.

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## 4.1. NEPA Adaptive Management Model

The 1997 study recognized the value of incorporating the adaptive management model into the NEPA process. This means developing an adaptive NEPA process as an implementation tool that goes beyond the traditional “predict-mitigate-implement” model and incorporates the “predict-mitigate-implement-monitor-adapt” adaptive management model. Although not all Federal actions lend themselves to incorporating adaptive management into the NEPA process, nor do they require the monitoring<sup>55</sup> and evaluation necessary for such an approach, the task force focused on certain actions where adaptive management would be an appropriate model for the NEPA process to provide agencies with another tool to improve their NEPA implementation.

The task force initiated agency interviews and review of public comments anticipating that CEQ’s 1997 NEPA effectiveness study had fostered an understanding of the value of integrating adaptive management into the NEPA process. However, we discovered that incorporating adaptive management into the NEPA process was a relatively new concept for many NEPA practitioners.

Some agencies have used the term adaptive management to describe programmatic actions that do not integrate the “monitor and adapt” components into a programmatic NEPA process. Such a programmatic NEPA process calls for research and monitoring to help understand ecosystem functions and linkages, and to then take an adaptive action. Under this programmatic NEPA approach, the adaptive action generally requires additional sequential NEPA review because the adaptive measures, and their effects, are not fully considered in the original programmatic NEPA analysis. This approach results in a series of NEPA analyses that incorporate the “predict, mitigate, and implement” environmental management model.

To successfully implement adaptive management, monitoring must occur for long enough to determine if the predicted effects were achieved. As CEQ noted in 1997 and the task force confirmed, agencies do not typically collect long-term data on the environmental impacts of actions. Consequently, for agencies to have the option of using adaptive management as an additional tool for NEPA implementation, there is a need to incorporate the “predict, mitigate, implement, monitor, and adapt” model into the NEPA process. This requires monitoring and considers the effects of potential adaptive measures to allow for mid-course corrections, without requiring new or supplemental NEPA review.<sup>56</sup>

### 4.1.1. Convening an Adaptive Management Work Group

Almost all the agencies that we spoke with were concerned that there was insufficient existing guidance about how to integrate adaptive management into the NEPA process. Some agencies were also concerned that using the “predict, mitigate, implement,

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<sup>55</sup> For this discussion, monitoring is anything necessary and appropriate to determine the accuracy of the impact predictions and the effectiveness of the mitigation measures.

<sup>56</sup> The requirement to prepare a supplemental analysis would continue to apply when the adapting responses, and their effects, exceed the scope of the NEPA analysis.

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monitor and adapt” model would initiate litigation because CEQ implementing regulations do not specifically provide for use of adaptive management. In response, the task force believes that CEQ should convene an adaptive management work group to consider revising existing regulations or establishing new guidance to facilitate agencies’ ability to exercise the option of incorporating adaptive management into their NEPA process.

The work group should consider:

- ❖ Establishing a definition for adaptive management in the NEPA process (see 40 C.F.R. part 1508);
- ❖ Using adaptive management measures where alternatives involve uncertainty in the ability to predict the significance of impacts, and the need for alternatives to address the scope of adaptive management measures (see 40 C.F.R. §§ 1502.14, 1505.1(e));
- ❖ The relationship between adaptive management and the impacts identified (see 40 C.F.R. § 1502.16);
- ❖ Whether adaptive management can be used instead of some or all of the agency’s evaluation of significant adverse impacts using theoretical approaches or research methods when the means to obtain the data for such evaluation are not known (see 40 C.F.R. § 1502.22);
- ❖ The use of adaptive management for a mitigation monitoring and enforcement program (see 40 C.F.R. § 1505.2(c)); and
- ❖ The applicability of adaptive management to EAs, particularly when a finding of no significant impact (FONSI) depends on mitigation in an adaptive management approach.

CEQ should also compile all guidance and regulations pertaining to adaptive management in a handbook (see the Additional Areas of Consideration chapter of this report).

## 4.2. Using Adaptive Management

Integrating adaptive management and the NEPA process gives agencies a tool that provides them with the flexibility to address unanticipated results of project implementation and to adjust decisions for practical reasons. When agencies decide if an adaptive management approach is appropriate for a particular NEPA action, practitioners should consider the:

- ❖ Ability to clearly define the intended outcome;
- ❖ Magnitude of the potential environmental impacts of the proposed action;
- ❖ Ability to measure outcome attainment (e.g., impact thresholds/performance measures);

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- ❖ Monitoring requirements;
  - ❖ Cost of implementing post-decision monitoring and corrective actions;
  - ❖ Commitment of the agency to fund monitoring and follow through on the adaptive measures;
  - ❖ Need for management or response flexibility; and
  - ❖ Acceptability by and commitment of regulators and stakeholders to the adaptive management approach.

Practitioners should consider the above factors, and others that might be specific to the action being proposed, before deciding to implement an adaptive management approach.

#### **4.2.1. Adaptive Management Benefits**

Agencies must understand the benefits of adaptive management to encourage practitioners to use it during the NEPA process. Adaptive management can help determine whether mitigation measures are cost effective and if the predicted impacts occurred. If the actual impacts are not what were predicted, adaptive management can help determine actions to take to avoid the costs associated with unexpected environmental damage. It might also be possible to provide managers with the flexibility to adjust the proposed action based on the original NEPA review, without needing new or supplemental NEPA analyses.

Using adaptive management, agencies might be able to enhance environmental protection and make cost saving adjustments when they implement proposed actions and mitigation strategies. For example, costs can be saved or reapplied when a mitigation measure either fails to accomplish or far exceeds what is necessary to protect the resource. Additionally, the ability to adjust provides management flexibility when unforeseen opportunities occur. Adaptive management can be used to revise the:

- ❖ Method of implementing the proposal;
- ❖ Scope of implementing the proposal;
- ❖ Timing of implementing the proposal; and
- ❖ Implementing associated mitigation.

Additionally, the traditional “predict, mitigate, implement” environmental management model implies a high degree of certainty in the accuracy of the prediction step that often does not exist. The biological, physical, and social systems analyzed in the NEPA process are complex, which makes it difficult to calculate the potential impacts of an action with absolute certainty. However, agencies are generally reluctant to admit that they cannot be sure of the impact of their proposed action. An adaptive management approach to the NEPA process helps to address this uncertainty and to manage any associated environmental risk.

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Adaptive management might also be useful when practitioners have incomplete information or when the information needed to make accurate predictions is unavailable. CEQ regulations at 40 CFR § 1502.22 address the analysis of reasonably foreseeable significant adverse impacts when information is either incomplete or unavailable. The goals of the section are to disclose that the evaluation of reasonably foreseeable significant adverse impacts was performed without all relevant information and to address information gaps. Agencies could use adaptive management to compensate for incomplete or unavailable information and, when similar projects arise, they can use the monitoring results to more accurately predict and mitigate potentially adverse impacts.

A greater recognition of the value of the adaptive management approach is needed at all levels of the NEPA process. For example, adaptive management might be appropriate when adaptive mitigation measures are the basis for a FONSI, and a mechanism is needed to ensure that the mitigation measures work as predicted. If mitigation without an adaptive approach does not prevent impacts from exceeding relevant significance thresholds, the appropriate NEPA review process should probably have been an EIS. Therefore, an adaptive management approach could provide a valuable tool for addressing unanticipated impacts through mitigated FONSI.

#### **4.2.2. Adaptive Management Concerns**

Several comments received by the task force expressed concern that Federal agencies might use adaptive management to avoid careful consideration of the potential impacts of the proposed action. As mentioned, adaptive management will give agencies the flexibility to address unanticipated results of project implementation and to adjust decisions for practical reasons. To successfully use the “predict, mitigate, implement, monitor, and adapt” model in the NEPA process, the potential impacts of the proposed adaptive actions must be considered before implementation. Therefore, the “predict” step of the model must include an analysis of the potential impacts of the proposed adaptive actions. When the actions or new conditions exceed the scope of the original analysis, new or supplemental NEPA review is necessary.

The task force also received comments noting the potential additional expense associated with the monitoring necessary to successfully implement adaptive management in the NEPA process. Funding to implement the adaptive management approach and the commitment to specific responses is critical. We believe that the NEPA process should identify the additional expenses associated with the adaptive management approach to ensure that funding needs for monitoring as well as for any adaptive measures are considered and reflected in the decision documents.

The potential for expanded judicial review due to adaptive management actions was another concern brought to the task force’s attention. If NEPA-related adaptive management actions can occur at any time throughout a project, does the NEPA process for the proposed action originally reviewed remain active? Similarly, do the activities associated with the adaptive management measures remain subject to litigation? Agencies would prefer that their procedural responsibilities for all proposed actions reviewed during the NEPA process not continue indefinitely. The task force

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believes it is possible to clearly demarcate the procedural responsibilities of NEPA, and subsequent adaptive management actions. This approach is described in the environmental management system<sup>57</sup> (EMS) discussion later in this chapter. However, the issue requires additional study by the proposed work group, which should receive input from legal counsel.

### 4.2.3. Adaptive Management Pilot Study

The task force recommends initiation of a pilot study to identify the types of actions best suited for integrating adaptive management into the NEPA process. The pilot program should, in addition to considering ongoing efforts, include several diverse actions including those that could be integrated into an existing EMS (as discussed in the Environmental Management Systems section of this chapter), and that could involve a high degree of uncertainty or highly variable potential impacts being reviewed under a NEPA process. Actions that can include enforceable mitigation (e.g., conditions of a grant, permit, license, or approval) or involve duplicate Federal, State, or local environmental reviews should also be included in the pilot program. The study should identify the appropriate assessment strategies and documentation needed to incorporate adaptive management into the NEPA process and to identify issues requiring CEQ guidance or regulatory action.

## 4.3. Planning Adaptive Management

Planning a successful adaptive management approach to the NEPA process requires:

- ❖ A monitoring scheme that examines the environmental effects of the action allowing practitioners to determine whether adjustments are necessary to avoid unpredicted effects;
- ❖ Including adaptive measures that could be used within the range of alternatives whose impacts were analyzed, or specifically identifying and analyzing each of the adaptive measures as an alternative or part of an alternative;
- ❖ Technically and scientifically credible performance measures or thresholds used to assess progress and effects, and quality control measures that ensure the integrity and appropriateness of the adaptive management approach; and
- ❖ Adequate public involvement mechanisms.

Monitoring can be performed in a variety of ways. Sometimes observation of conditions that are readily identifiable without the aid of special equipment is sufficient. Other times, monitoring might involve detailed sampling

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<sup>57</sup> An EMS is that part of an organization's overall management system that includes the organizational structure, planning elements, procedures, processes and resources for developing, implementing, accomplishing, reviewing, and continually improving the processes and actions an organization undertakes to meet its business and environmental goals.

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and analysis using sophisticated techniques and equipment. Between these two extremes are many degrees of observation and sampling. As mentioned, for this discussion, monitoring is anything necessary and appropriate to determine the accuracy of the impact predictions and the effectiveness of the mitigation measures.

#### **4.3.1. Key Factors and Approaches to Adaptive Management**

The effectiveness of adaptive management monitoring in the NEPA process depends on a variety of factors that should be considered when developing the monitoring scheme. Factors identified by the task force to focus on issues that may warrant an adaptive change include:

- ❖ The ability to establish clear monitoring objectives;
- ❖ Agreement on the impact thresholds being monitored;
- ❖ The existence of a baseline or the ability to develop a baseline for the resources being monitored;
- ❖ The ability to see the effects within an appropriate time frame after the action is taken;
- ❖ The technical capabilities of the procedures and equipment used to identify and measure changes in the affected resources and the ability to analyze the changes; and
- ❖ The resources needed to perform the monitoring and respond to the results.

Two approaches to the NEPA process have been used to analyze the environmental effects of adaptive management changes without requiring a new or supplemental NEPA review. One approach focuses on the range of impacts of the adaptive management measures. Using this approach, the effects on a particular resource are assessed by analyzing the adaptive management measures that are the most and least intrusive. All other potential adaptive management measures fall within the range analyzed.

The other approach analyzes the potential effects of a broad array of alternatives that include reasonably foreseeable potential adaptive measures. That is, the effects of the adaptive measures that could be implemented are individually analyzed as either an alternative or part of an alternative. This approach works best when only a few potential adaptive management measures exist.

When using either approach, any adaptive measures that exceed the limits of the original analysis would trigger the supplemental statement requirement of the CEQ regulations<sup>58</sup> and require additional NEPA review. The goal is to perform sufficient analysis of the impacts of the various potential adaptive management measures so that maximum flexibility in selecting the appropriate response is maintained without triggering the requirement for a new or supplemental NEPA review.

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<sup>58</sup> 40 C.F.R. § 1502.9(c).

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### 4.3.2. Oversight and Public Involvement in Adaptive Management

The task force received comments indicating that a successful adaptive management approach to the NEPA process must include appropriate oversight and interaction with regulators and the affected public. We believe that sufficient oversight provides quality control of the adaptive management process and could involve the project management team, an oversight committee, or an advisory group. Additionally, oversight ensures that the appropriate parameters are being monitored for the desired outcome and allows for performance tracking, which is necessary to ensure adaptive management success.

The task force also believes that the timely availability of monitoring data to all affected agencies and stakeholders is important, and this is supported by CEQ implementing regulations.<sup>59</sup> The Internet facilitates this effort (see the Technology and Information Management and Security chapter of this report).

Planning and preparing a successful adaptive management approach could be jeopardized if the involvement of affected agencies, regulators, and stakeholders is not considered. Informing the public of decisions regarding adaptive management actions builds trust and ensures support. Public notice might suffice or be unnecessary for minor adaptive management adjustments, while extensive public involvement might be required for major course corrections or use of technology not previously described.

A collaborative adaptive management process is particularly important when complex processes are involved, or the potential magnitude of the impacts is large. The task force believes that the proposed adaptive management work group should consider the extent of public involvement required when a FONSI depends on mitigation in an adaptive management approach. The fundamentals of collaborative processes involving affected agencies and stakeholders are described in the Federal and Intergovernmental Collaboration chapter of this report.

### 4.4. Documenting Adaptive Management

The extent of the discussion of adaptive management in a NEPA document depends on its importance to the proposed action and the impacts being considered. The extent and detail of an adaptive management action would likely be extensive when it is being used to:

- ❖ Provide maximum flexibility to adjust to unanticipated impacts of project implementation;
- ❖ Revise the implementation of actions to save costs; or
- ❖ Alter the mitigation to improve effectiveness.

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<sup>59</sup> 40 C.F.R. § 1505.3(d).



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Generally, the NEPA document should describe:

- ❖ The proposed adaptive management approach;
- ❖ How the approach is reflected in the alternatives being considered;
- ❖ The monitoring protocol;
- ❖ The desired outcome;
- ❖ The performance measures that will determine whether the desired outcome is being achieved or an adaptive action is needed; and
- ❖ The factors for determining whether additional NEPA review is needed.

#### 4.4.1. Cumulative Effects of Adaptive Management

Concern about how to effectively analyze and document adaptive management when considering cumulative effects was brought to the task force's attention. CEQ acknowledged this challenge in "Considering Cumulative Effects Under the National Environmental Policy Act" stating:

[T]he consequences of human activities will vary from those that were predicted and mitigated. This will be even more problematic because of cumulative effects; therefore, monitoring and accuracy of predictions and the success of mitigation measures is critical. Adaptive management provides the opportunity to combine monitoring and decision making in a way that will better ensure protection of the environment and attainment of societal goals.<sup>60</sup>

However, the 1997 guidance provided few specifics for addressing an action's contribution to cumulative effects through adaptive management response actions. The task force believes that the proposed adaptive management work group should provide guidance for cumulative effects analysis. Specifically, direction is needed regarding:

- ❖ How to determine when adaptive management actions are reasonably foreseeable;
- ❖ Whether to address the impacts of adaptive management actions incrementally or collectively; and
- ❖ How to define the boundaries<sup>61</sup> of the analysis when a series of adaptive management responses is likely.

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<sup>60</sup> Council on Environmental Quality, "Considering Cumulative Effects Under the National Environmental Policy" (Jan. 1997), available at <http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm>.

<sup>61</sup> Both spatial and temporal boundaries are important in cumulative effects analysis. However, temporal boundaries merit special attention because they can be affected by the timing and duration of adaptive management actions. A spatial boundary would likely change only if the boundary was originally scoped too narrowly to account for all potentially significant effects on the resource of concern.

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When adaptive management is important in the effects analysis and in the selection of alternatives for implementation, a mechanism should exist to ensure that all elements of the adaptive management approach, including monitoring and any necessary response actions, are conducted. CEQ regulations state that mitigation, and other conditions established in the analysis and committed to in the decision, must be included in any associated grant, permit, or other approval, and that mitigation must be a condition of funding the actions.<sup>62</sup> Consequently, ensuring a commitment to adaptive management measures would be consistent with existing regulations. The difference in committing to adaptive management measures versus action-specific mitigation is that the adaptive management measures might include alternative measures that would not be implemented unless needed.

#### 4.5. Implementing Adaptive Management

How to implement monitoring and adapt actions is determined by internal agency commitments to pursue the process, commitments made to stakeholders, and what, if any, enforceable conditions are attached to agency approvals, such as grants, permits, or licenses. The process of monitoring and adapting could continue as long as the project or facility exists.

An observation echoed by several State and local government organizations was that monitoring programs required by Federal agencies often overlap or duplicate those required by a State. The organizations suggested that when a State program enforces monitoring of Federal-project implementation, the Federal agencies should use the State environmental review of the mitigation and monitoring activities to satisfy any Federal review requirements. This concept appears consistent with CEQ regulations that address eliminating duplication with State and local procedures.<sup>63</sup>

Although the task force agrees that duplicate processes can be inefficient and should be avoided when possible, concerns related to oversight and the sufficiency of using State processes to fulfill Federal requirements exist. Consequently, the task force believes that the proposed adaptive management work group should investigate the potential for using State or local processes instead of Federal review and/or monitoring processes to assess the potential impacts of adaptive management actions. The work group should also address enforcement mechanisms and the need for Federal oversight.

#### 4.6. Environmental Management Systems

The International Organization for Standardization (1996) established an environmental management system standard called ISO 14001.<sup>64</sup> Executive Order No. 13,148<sup>65</sup> calls upon Federal agencies to implement EMSs at all appropriate agency facilities by the end of December 2005.

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<sup>62</sup> 40 C.F.R. §1505.3(a)-(b).

<sup>63</sup> 40 C.F.R. § 1506.2.

<sup>64</sup> International Organization for Standardization, "ISO 14001: Environmental Management Systems—Specification with Guidance for Use" (1996), available via <http://www.iso.ch/iso/en/commcentre/news/2001/imslaunch.html>.

<sup>65</sup> Exec. Order No. 13,148, "Greening the Government Through Leadership in Environmental Management," 65 Fed. Reg. 24,593 (Apr. 26, 2000), 3 C.F.R. 241 (2001), available at <http://ceq.eh.doe.gov/nepa/regs/executiveorders.htm>.

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Although other EMS models are available, most agencies are designing their models to follow the ISO 14001 standard, which has the following five components.

- ❖ An environmental policy with a commitment to continual improvement, pollution prevention, and compliance with relevant environmental legislation and regulations.
- ❖ Procedures to identify an organization's or facility's environmental impacts, legal and other responsibilities, and environmental management programs.
- ❖ System implementation and operation, including identification of responsibilities, training and awareness, documentation, and operational controls.
- ❖ Checking and corrective actions, including monitoring and measuring performance to meet targets for continual improvement.
- ❖ Management reviews to ensure that the EMS is suited to changing conditions and information.

#### **4.6.1. Integrating Adaptive Management and EMS**

In reviewing the ISO 14001 standard, the task force noted that whether an organization was using an EMS or an adaptive management approach, similarities in desired outcomes and process exist. The task force expected that Federal agencies, having made the connection between EMS and adaptive management, would be integrating NEPA-related adaptive management actions into their developing EMSs. However, we discovered that both EMS development and adaptive management approaches during the NEPA process are in their infancy, and that few agencies fully understand the relationship between the NEPA process and EMSs.

The task force believes that:

- ❖ Agencies should consider integrating adaptive management responses associated with proposed actions analyzed during the NEPA process into the checking and corrective components of an EMS, thus monitoring and adjusting procedures to meet EMS performance targets. This action would help identify when monitoring and adaptive responses move from the NEPA process and become a function of agency EMS procedures. Also, when the EMS infrastructure is available to monitor and measure performance, the incremental cost for implementing adaptive management could be substantially reduced.
- ❖ CEQ should continue to promote integrating the NEPA process and EMSs. Additionally, the proposed work group should consider whether a federally-recognized or independently certified EMS that considers a proposed action and adaptive management measures described in an EIS can satisfy the mitigation and monitoring enforcement provisions in CEQ's regulations.<sup>66</sup>

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<sup>66</sup> 40 C.F.R. § 1505.2(c).

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- ❖ The work group should consider whether an EMS could serve as the mitigation-implementation vehicle when a FONSI depends on adaptive management measures, thereby allowing the NEPA process to end.
  - ❖ Integrating the NEPA process and EMSs provides a synergy that can encourage a robust analysis when the EMS information is extensive, current, and available for use in the NEPA analyses. In addition, such integration might more effectively prevent environmental degradation, promote sustainability, and further the policy goals contained in Section 101 of NEPA.
  - ❖ The NEPA processes included in the proposed pilot program should include a proposal involving an adaptive management approach at a facility where the environmental aspects and impacts are considered in an EMS.

#### 4.7. Issues and Recommendations

Throughout this chapter, the task force has discussed issues and recommendations that it believes a work group should consider regarding guidance or changes to the regulations implementing NEPA that would allow agencies to incorporate adaptive management into their NEPA process for proposals that would benefit from adaptive management. All the issues and recommendations are presented in this section.

The task force recommends that CEQ convene an adaptive management work group to consider:

- ❖ Establishing a definition for adaptive management in the NEPA process (see 40 C.F.R. part 1508).
- ❖ Describing how adaptive management measures, or the range of such measures, can be included in alternatives, and how to use adaptive management when the alternatives involve uncertainty or variability affecting the ability to predict the significance of impacts (see 40 C.F.R. §§ 1502.14, 1505.1(e)).
- ❖ Using adaptive management instead of some or all of the agency's evaluation of significant adverse impacts using theoretical approaches or research methods to address incomplete or unavailable information when the means to obtain the data for such evaluation are not known (see 40 C.F.R. § 1502.22(b)).
- ❖ Using adaptive management for a mitigation monitoring and enforcement program (see 40 C.F.R. § 1502.2(c)).
- ❖ Integrating adaptive management into EAs, especially when a mitigated finding of no significant impact (FONSI) is required to prevent potential impacts from being significant.
- ❖ Determining when adaptive management actions are reasonably foreseeable and how they can be considered in cumulative effects

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analyses, including when the impacts should be addressed incrementally or collectively and how to establish the boundaries of the analysis when a series of adaptive management responses is likely.

- ❖ Using required State or local processes instead of Federal review and/or monitoring processes to assess the potential impacts of adaptive management approaches.
- ❖ Identifying mechanisms for oversight and enforcement of adaptive management commitments.
- ❖ Using a federally-recognized or independently certified EMS that considers a proposed action and adaptive management measures described in an EIS to satisfy the mitigation and monitoring enforcement provisions in CEQ's regulations.
- ❖ Using a recognized EMS to serve as the mitigation implementation vehicle when a FONSI depends on adaptive management measures.

If the work group determines that new guidance or regulatory revisions are needed, the work group should assist CEQ in preparing and issuing such guidance or revisions. The work group should also gather all NEPA guidance on adaptive management for inclusion in a CEQ reference handbook (see the Additional Areas of Consideration chapter of this report).

We further recommend that the work group initiate a pilot study to identify the types of actions best suited for integrating adaptive management into the NEPA process. The pilot program should include several diverse actions, including those that could be integrated into an existing EMS, involve a high degree of uncertainty, or contain highly variable potential impacts. Actions associated with enforceable mitigation (e.g., conditions of a grant, permit, license, or approval) or when there might be duplicate Federal, State, or local environmental reviews should also be included in the pilot program. The study should identify the appropriate assessment strategies and documentation for incorporating adaptive management into the NEPA process and identify issues requiring CEQ guidance.

#### **4.8. Summary of Recommendations**

The task force recommends that CEQ convene an adaptive management work group to assess the applicability of NEPA guidance and regulations related to adaptive management and to consider integrating the NEPA process with environmental management systems. The proposed work group should prepare the appropriate adaptive management guidance or regulatory changes. Further, we recommend that the work group initiate a pilot study to identify, implement, and document representative actions using an adaptive management approach during the NEPA process and work collaboratively with CEQ to identify aspects of the analyses and documentation requiring CEQ guidance or regulatory action.