WORKING DRAFT

Section 5.8 Adaptive Management Plan

[***Note to Reviewers:*** *This working draft section on adaptive management will be part of the Conservation Strategy chapter. Note that while this section frames the major components of the adaptive management program, adaptive management will permeate the implementation of the Butte Regional Conservation Plan (BRCP) as part of the "culture" of the Implementing Entity to ensure that the best new science will be used to improve implementation of the BRCP implementation over time. Referenced figures follow the text.]*

This section describes the adaptive management process that will be conducted by the Implementing Entity to improve effectiveness of the conservation measures described in Section 5.4 and the monitoring and research plan described in Section 5.7 for achieving the biological goals and objectives over the term of the Butte Regional Conservation Plan (BRCP). The adaptive management process is consistent with the guidance for adaptive management provided in the USFWS's and NMFS's Five-Point Policy for HCPs (65 FR 106, June 1, 2000) and California's Natural Community Conservation Act (NCCPA) (Fish and Game Code Sections 2800-2835). The Five-Point Policy broadly defines adaptive management "…as a method for examining alternative strategies for meeting measurable biological goals and objectives, and then if necessary, adjusting future conservation management actions according to what is learned" and the NCCPA defines adaptive management as "…to use the results of new information gathered through the monitoring program of the plan and from other sources to adjust management strategies and practices to assist in providing for the conservation of covered species".

The conservation measures described in Section 5.4 were developed based on the best scientific and commercially available information and, as crafted, provide the Implementing Entity with a road map for initial implementation of the Conservation Strategy. The conservation measures are directed primarily towards the protection, enhancement, and restoration of natural communities and the covered species habitats they support. There is a relatively high certainty regarding the effectiveness of protecting existing, functioning natural communities and associated covered species habitat in achieving covered species conservation goals, though the specific size and configuration of such preserves will be tested during BRCP implementation and may require adaptive management adjustments. The adaptive management approach is focused on addressing conservation actions with greater uncertainty of effectiveness; such conservation actions include habitat enhancement, restoration, and management techniques for achieving the biological goals and objectives. Over the term of the BRCP, it is anticipated that ongoing modifications to implementation of the Conservation Strategy will be needed as new information is developed that addresses the uncertainties regarding the nature and magnitude of the response of covered species to habitat enhancement, restoration, and management techniques as well as to address the potential for substantially altered future conditions that may result from climate change (e.g., change in the hydrology of Planning Area watersheds, temporal shifts in the wet season, change in wildfire risk).

Consequently, the adaptive management process is a keystone element of BRCP implementation, providing the Implementing Entity with the flexibility necessary to modify BRCP implementation to address uncertainties as the ecological knowledge base is expanded for ecological processes, natural communities, and covered species. As such, the adaptive management process provides the Implementing Entity with the ability to modify conservation measures, implementation techniques, and monitoring elements of the Conservation Strategy as indicated by new information that will be gathered over the term of the BRCP to improve their effectiveness. This new information will come from the results of the Implementing Entity's monitoring and research program and from research from other entities.

Elements of the BRCP subject to the adaptive management process include all program aspects related to implementation of conservation measures and the monitoring plan. Implementation elements of conservation measures subject to adaptive management include:

- habitat restoration design and implementation methods;
- habitat management tools and techniques;
- changes to, discontinuation of, and addition of conservation measures;
- shifting of funds among conservation measures; and
- research and adaptive management experiments conducted to inform implementation.

Implementation elements of the monitoring plan subject to adaptive management include:

- the subjects of monitoring,
- duration and scope of monitoring,
- monitoring methods and metrics,
- analytical tools and methods.

In addition to providing the Implementation Entity with a process to better ensure effective BRCP implementation, outcomes of applying the adaptive management process are anticipated to be an important factor in the Implementing Entity's annual and long-term budgeting and funding decision making processes. While this section defines and provides a framework for the major components of the adaptive management program, it is expected that adaptive management will permeate the implementation of the BRCP as part of the "culture" of the Implementing Entity to ensure that the best new scientific information will be used to improve the effectiveness of the Conservation Strategy over time.

5.8.1 Adaptive Management Decision Making

The adaptive management process will be administered by the Implementing Entity and will operate at two levels: project-level and program-level adaptive management. The adaptive management decision making process for each level is illustrated in Figure 5.Xa.

The decision making process describes how the Implementing Entity will coordinate with the Permitting Agencies (i.e., DFG, USFWS, NMFS) (Figure 5.Xa, Boxes 2, 3, 4, 15, 16). A key decision point is the determination if an adaptive management response is at the project-level or the program-level as defined below. Adaptive management roles and responsibilities among the Implementing Entity, the Permitting Agencies, and stakeholders are described in Chapter 7, *Implementation Structure*.

5.8.1.1 Project-level Adaptive Management

Project-level adaptive management provides for ongoing adjustments in the implementation of the conservation measures and adjustments to the monitoring program by the Implementing Entity. Adaptive management responses considered to be project-level include small adjustments to techniques used to manage, enhance, and restore habitat.

Project-level adaptive management will not require participation or concurrence by the Permitting Agencies. Such adjustments will be described in the Implementing Entity's annual report (see reporting requirements in Chapter 6, *Plan Implementation*) and the Permitting Agencies may provide input on those adjustments following review of the report. The Implementing Entity may choose to coordinate with the Permitting Agencies at the project-level to better inform its adaptive management decision making.

Project-level adaptive decision making will apply to all aspects of implementing conservation measures that do not change the commitments described in the conservation measure and that do not increase costs beyond the level of funding appropriated for the conservation measure. For example, under the project-level adaptive management process, the Implementing Entity could modify methods for conducting a conservation measure based on new information indicating that doing so would improve its effectiveness. Changes by the Implementing Entity to the monitoring plan would include adjusting monitoring protocols to improve their effectiveness or to comply with new monitoring standards established by the Permitting Agencies (e.g., the establishment of new species-specific monitoring protocols). The purpose of the project-level adaptive management process is to provide for timely and effective implementation decision making by the Implementing Entity.

5.8.1.2 Program-Level Adaptive Management

Program-level adaptive management provides for large adjustments to the Conservation Strategy, including:

- revisions to conservation measures, including removal from the Conservation Strategy;
- the addition of new conservation measures to the Conservation Strategy;
- shifting of funds among conservation measures or other elements of the Conservation Strategy (i.e., adaptive management and monitoring); and

- major modifications to the monitoring plan, including discontinuing a monitoring effort, changing monitoring metrics, and adding new monitoring efforts.

All program-level adaptive management changes require input and approval from the Permitting Agencies. Some program-level adaptive management changes may involve major changes in BRCP commitments and may require a Plan amendment to implement. Program-level changes are not expected to be common over the term of the BRCP, but the process provides the Implementing Entity with the flexibility to implement such changes if needed to ensure that biological goals and objectives are achieved.

5.8.2 Adaptive Management Decision Making

The BRCP adaptive management process is illustrated in Figure 5.Xb.

BRCP Objectives and the Knowledge Base

The starting point for the adaptive management process is the hypotheses that underlie the biological goals and objectives and the conservation measures. These hypotheses are a reflection of the existing ecological knowledge base. The knowledge base is the totality of current scientific understanding of the ecological and biological processes and conditions of species and natural communities in the Planning Area (see large shaded box underlying the right side of Figure 5.Xb). The existing knowledge base supported the development of the Conservation Strategy, including the biological goals and objectives, conservation measures, conservation metrics and targets, and monitoring actions. Information and analysis derived through monitoring and research conducted under the BRCP (see Section 5.7, *Monitoring and Research Plan*) and other programs will supplement and expand the knowledge base over the term of BRCP implementation.

Collect and Manage Data

Critical to the adaptive management process is the collection and management of data (see Figure 5.Xb, Box 1) to assess conservation measure performance and the achievement of biological goals and objectives. Data collection and management will be conducted through monitoring and research (see Section 5.7, *Monitoring and Research Plan*) following the initial implementation of conservation measures. Monitoring requirements, metrics and targets for conservation measures and biological objectives are described in Section 5.7, *Monitoring and Research Plan.* In addition, results of research conducted under the BRCP or by other entities will contribute to the knowledge base to support understanding of ecological cause and effect relationships. Monitoring data and research results will provide the Implementing Entity with information to help determine the effectiveness of conservation measures in providing benefits to species and habitats, including the effectiveness of habitat enhancement, restoration, and management actions. Decisions by the Implementing Entity to modify implementation of conservation measures will be guided by information gathered through the monitoring and research program and other research sources. The monitoring and research plan is designed to establish cause and effect relationships between implementation of specific conservation actions and the type and magnitude of species responses to those actions.

Analyze Data, Assimilate Information, and Develop and Recommend Adjustments to Implementation.

Collected data will be analyzed, synthesized, and evaluated to inform the Implementing Entity of the cause and effect relationships between conservation measures and ecological processes, covered species, and natural communities; the status of ecosystem conditions and covered species; and the effectiveness of the conservation measures and the monitoring program (Figure 5.Xb, Box 2). Information gained through the analytical process may indicate the need to redefine hypotheses underlying biological objectives and conservation measures; refine, discontinue, or expand conservation measures; or develop and implement new conservation measures within limits set by the BRCP and its associated regulatory authorizations. New data and analytical results will also be used to update models (e.g., conceptual, statistical, and process models) and other analytical tools that may be used to assess the performance of conservation measures in achieving the biological goals and objectives. Based on assimilation of new information, the Implementing Entity will formulate new approaches for implementation to improve its effectiveness in achieving the biological objectives (see Figure 5.Xb, Box 4). These new approaches would then be routed through the adaptive management decision making process (illustrated in Figure 5.Xa; see Box 3 in this figure).

Follow a Decision Making Process

The Implementing Entity will follow a defined decision making process before making significant adaptive management changes (Figure 5.Xb, Box 5). This adaptive management decision making process is illustrated in Figure 5.Xa.

Implement Modified Conservation Measures, Tools, Metrics, and Targets

Outcomes of the adaptive management decision making process can include, within the limits set by authorizing permits, changes to conservation measures, monitoring program, analytical tools, metrics, and targets as indicated in Figure 5.Xb, Boxes 6-11.

5.8.3 Internal Scientific Review and Implementation of Changes

The Implementing Entity will establish an internal process of review by technical experts within the Implementing Entity or retained (e.g., biologists, restoration ecologists, physical scientists, habitat managers) to assess, on a regular basis, the adaptive management program, including the results of effectiveness and performance monitoring, selection of research and adaptive management experiments, appropriateness of analytical tools and techniques, and relevance of new scientific information developed by others (e.g., universities) to determine whether changes in the implementation of the conservation measures and the monitoring program would be desirable to improve effectiveness of the BRCP in achieving biological goals and objectives (see Figure 5.Xa, Box 13). The Implementing Entity may also request the assistance of the Permitting Agencies and knowledgeable outside scientists and experts in the review process (see Figure 5.Xa, Boxes 14).

Recommendations made through the internal science review process will be documented and will include a description of the recommended change in implementation; a description of the justification for the recommended change; an assessment of effects the

change may have on other elements of BRCP implementation, if any; and any other relevant information in support of the recommendation. Recommendations adopted by the Implementing Entity will be described in the Implementing Entity's annual work plan. The Implementing Entity will document the rationale for rejection of adaptive management recommendations made through the internal science review process.

5.8.4 External Independent Scientific Review

The Implementing Entity will from time to time seek additional science input on specific adaptive management-related issues. The Implementing Entity may convene, at its discretion, experts in selected topic that are not affiliated with the Implementing Entity, permit holders, or Permitting Agencies (see Figure 5.Xa, Box 14).

5.8.5 Adaptive Management Experiments

[Text to come.]

[***Note to Reviewers**: This section will describe how adaptive management experiments will be conducted and the relationship of these experiments to the monitoring and research plan.*]

5.8.6 Program Status Reviews

[Text to come.]

[***Note to Reviewers:** This section will describe program status reviews that may be conducted by the Implementing Entity at longer time intervals (e.g. 5-year). Status reviews would focus on review of technical elements of BRCP implementation procedures (e.g., administrative reviews of the effectiveness of Implementing Entity processes and procedures, agreements with other parties, need for updates to guidance documents [e.g., monitoring protocols and plans], implementation infrastructure [e.g., data bases, computer systems].) and species status reviews. Technical reviews provide for ongoing improvement in the Implementing Entity's effectiveness by providing for periodic critical and methodical review of its implementation procedures. Periodic reviews of the status of covered species would be conducted to determine if changes in BRCP implementation may be warranted based on regional population trends and new information related to species needs. Changes in BRCP implementation resulting from program status reviews would be implemented through the adaptive management decision making process.*]

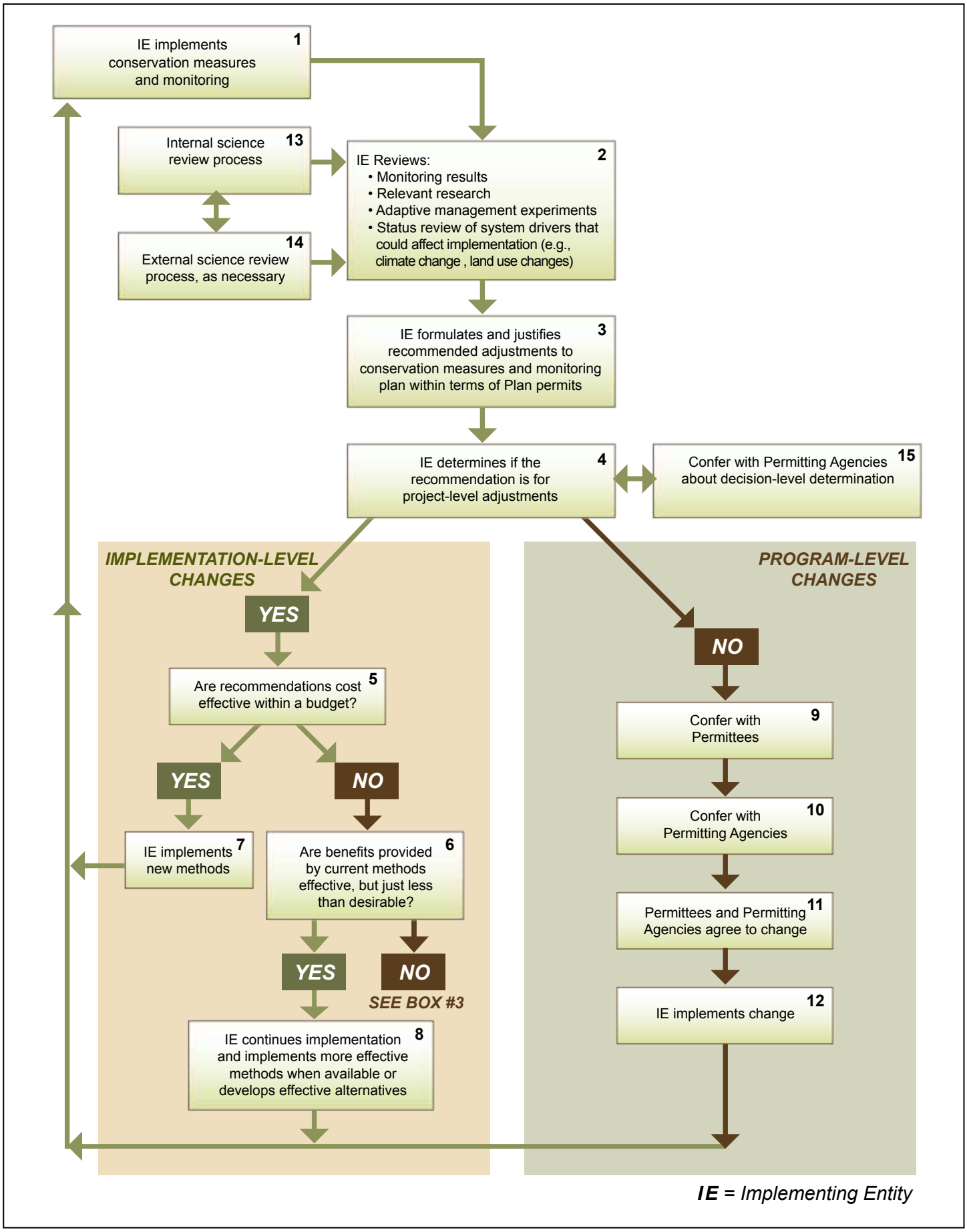

Figure 5.X.a Adaptive Management Decision Making Process

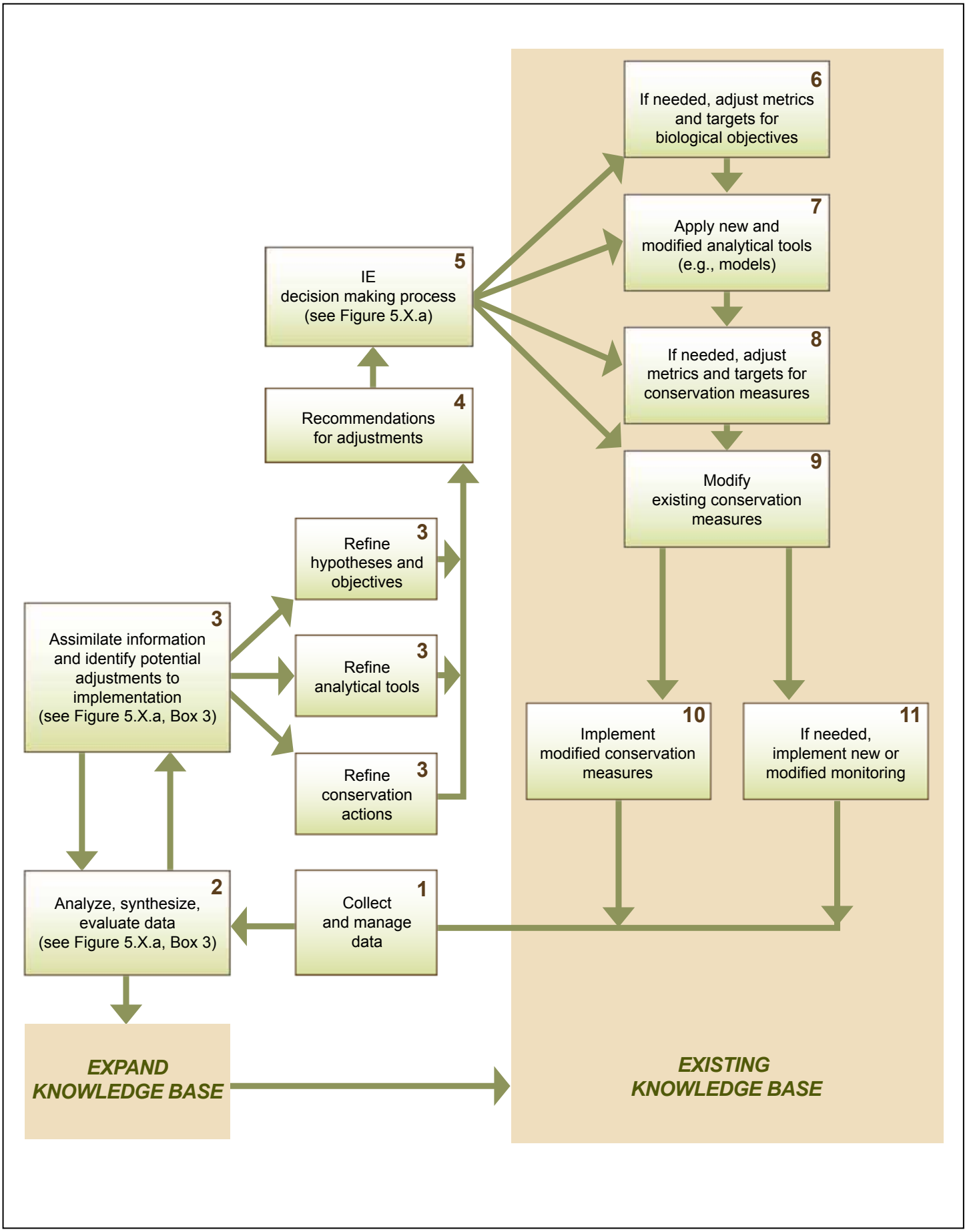

Figure 5.X.b Adaptive Management Process Framework