

1.0 INTRODUCTION

This chapter provides basic background for the Bolinas Lagoon Ecosystem Restoration Feasibility Study, which is a study that has been cost shared by the U.S. Army Corps of Engineers (Corps) and Marin County Open Space District (MCOSD). It lists the steps in the Corps planning process, and relates them to the organization of this report.

1.1 Study Authority

It was resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives on March 7, 1996 that the Secretary of the Army review the report of the Chief of Engineers, *Channel to Bolinas, California*, published as House Document 537, Sixty-fourth Congress First Session, and other pertinent reports, to determine whether modifications of the recommendations contained therein are advisable at the present time in the interest of ecosystem protection, enhancement, and restoration and related purposes at Bolinas Lagoon, California.

The Federal objective of project planning is defined in the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (P&G) approved in April 2000. Guidance for conducting U.S. Army Corps of Engineers' civil works planning studies is presented in the revised Engineering Regulation 1105-2-100, *Planning Guidance Notebook*, dated April 22, 2000.

1.2 Study Purpose and Scope

The purpose of Civil Works ecosystem restoration activities is to restore significant ecosystem function, structure, and dynamic processes that have been degraded. Ecosystem restoration efforts involve a comprehensive examination of the problems contributing to the system degradation, and the development of alternative means for their solution. The intent of restoration is to reestablish the attributes of a natural, functioning, and self-regulating system.

This study considers what can be done in Bolinas Lagoon to restore degraded areas, and ensure the future health of the estuarine habitats and the species dependent on those habitats. It also identifies the Federal interest in an ecosystem restoration project of that purpose. This study is unique in that although the system has been degraded to some extent by past human activities, the lagoon still provides important habitat to many rare, protected, threatened and endangered species and serves as an important stopover point along the Pacific Flyway for migrating waterfowl.

This study reviews prior research done in the lagoon and contributes to that knowledge by providing information on the unique habitats Bolinas Lagoon provides to many species and a variety of ecological communities. All restoration measures have been designed to improve the quality and long term health of estuarine habitats, which support diverse and important species. Other benefits include recreational and education

opportunities and providing the Nation with a natural resource that can be enjoyed for years to come.

1.3 Study Area Description

Bolinas Lagoon is located on the northern California coast, 12 miles northwest of San Francisco and the Golden Gate (Figure 1.1). It is a tidal estuary, connected to Bolinas Bay, approximately three miles long by one mile wide, and 1,100 acres in size, as described in the *Bolinas Lagoon Management Plan Update of 1996* (BLMPPU 1996). During low tides, much of the lagoon bottom is exposed; only the deeper channel areas and part of the northern basin are constantly covered with water.

1.4 History of the Investigation

In response to the study authority, the reconnaissance phase of the study was initiated in January 1997. This phase of the study resulted in the finding that there was a Federal interest in continuing the study into the feasibility phase. MCOSD as the local sponsor and the Corps initiated the feasibility phase of the study in January 1998. The feasibility phase study cost was shared equally between the Corps and the sponsor. This report presents the results of both phases of study.

1.5 Study Participants and Coordination

The Corps and MCOSD are responsible for conducting and coordinating this Feasibility Study. The Marin County Open Space District is the local sponsor and, as such, has made fiscal contributions toward completing this study. MCOSD also contributed in-kind services, including surveys and mapping, plan formulation, technical management, financial assessment, real estate studies, independent technical review, and public involvement, including meeting coordination, newsletters and distribution of project information to interested parties. The Gulf of the Farallones National Marine Sanctuary (GFNMS) and Bolinas Lagoon Technical Advisory Committee (BLTAC) have also participated in, and contributed invaluable information towards, the development of the Feasibility Study.

1.6 Public Involvement

Corps study participants have attended quarterly meetings of the Bolinas Lagoon Technical Advisory Committee (BLTAC) to gather and disseminate information on the Feasibility Study. A Habitat Evaluation Expert Panel was convened from August 2000 to March 2001 as a scientific forum to discuss the merits of the various restoration alternatives. Public workshops were held in September 1998, November 1999 and November/December 2000 to review the progress of the feasibility study and to listen to public concerns. Newsletters updating the local communities on project activities are distributed as necessary by MCOSD.

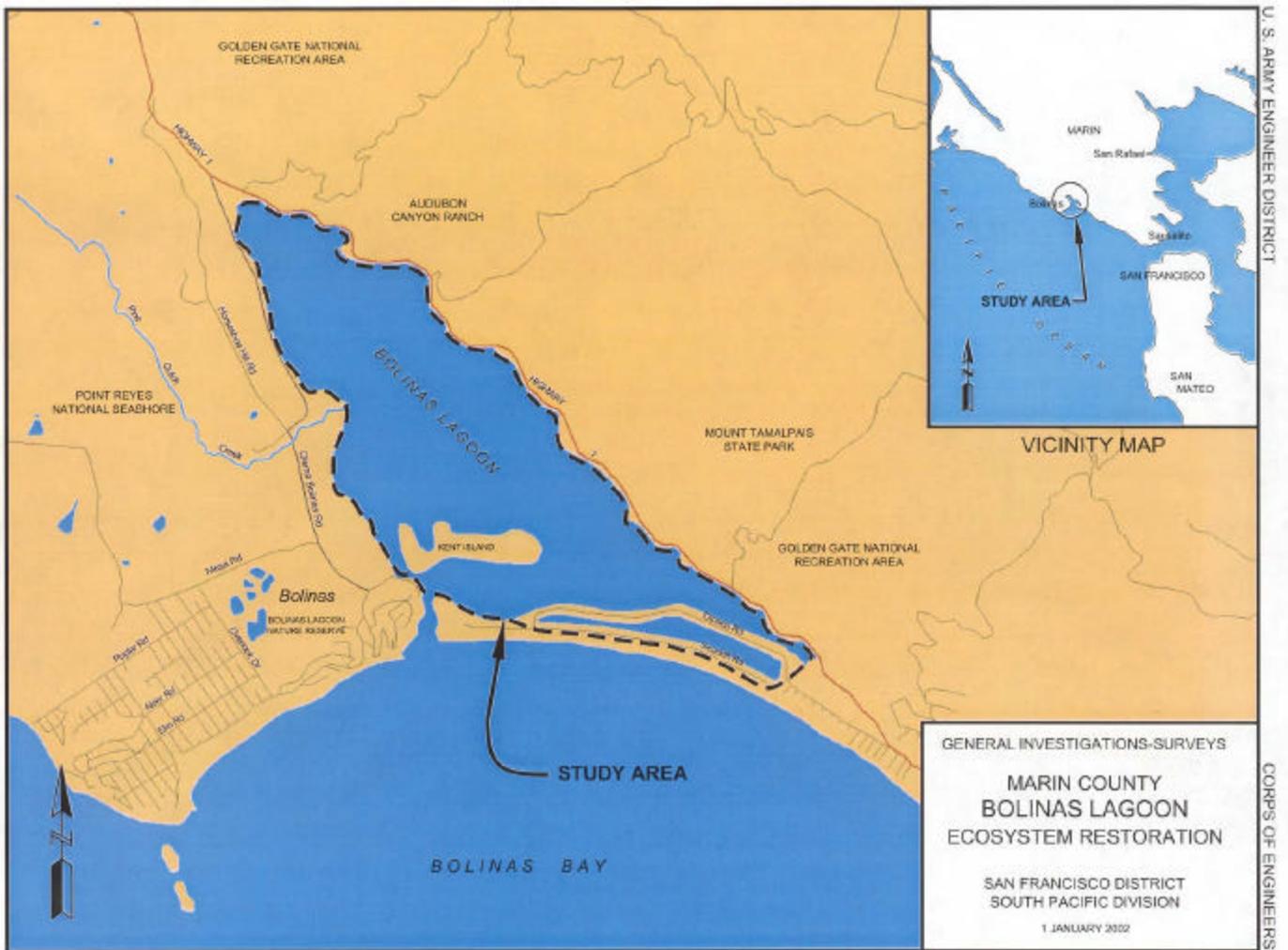


Figure 1.1 Bolinas Lagoon Ecosystem Restoration Project Location Map

1.7 Prior Studies and Reports

Past studies and reports by the USACE for Bolinas Lagoon include:

1. *Report on Preliminary Examination of Channel from the Town of Bolinas California, to the Sea*, 8 January 1916.
2. *Bolinas Channel & Lagoon, Review of Reports*, 25 November 1939.
3. *Review Report on Bolinas Channel and Lagoon*, California for Navigation and Appendices, January 1966.
4. *Section 103 Reconnaissance Report for Beach Erosion Control Bolinas*, California, 14 July 1967.

5. *Plan of Survey for Beach Erosion Study*, Bolinas California, March 1972.
6. *Brief Letter - Type Report, Bolinas Channel and Lagoon*, California, 30 April 1974 (In the Interest of Navigation).
7. *Plan of Study for Bolinas Lagoon*, California, U.S. Army Corps of Engineers, San Francisco District, July 1978.

Other significant reports for the study area include:

1. *The Bolinas Lagoon Management Plan Update*, 1996. The Bolinas Lagoon Management Plan Update (BLMP) was prepared by MCOSED in 1996 to reflect the changed environmental, legal, and political conditions in the lagoon since the first plan was written in 1981. The BLMP identifies the primary long term management issues as those involving sedimentation in the lagoon and the expected continued loss of tidal and subtidal habitat.
2. *Gulf of the Farallones National Marine Sanctuary Management Plan*, 1987 (GFNMS 1987). The management goals of the GFNMS Management Plan are identified as follows: 1) “[i]mproved protection of the marine environment and resources of the sanctuary, consistent with the existing policies of regulatory agencies;” 2) the furthering of research to help solve specific management problems, enhance resource protection efforts, and assist in the interpretation of the resource for visitors;” 3) interpretation and education designed to “enhance public awareness and understanding of the sanctuary, and to promote the need for and benefits to long term comprehensive management of its marine resources.”

There are no existing (constructed) Corps projects at Bolinas Lagoon.

1.8 The Planning Process and Report Organization

The Feasibility Study is the second phase of the Corps of Engineers’ planning process, and follows a favorable Reconnaissance Report and the execution of a Feasibility Cost Sharing Agreement between the USACE and the local sponsor. The scope of the Feasibility Study includes review, update and use of the 1997 Reconnaissance Study results and consolidation of information that has been developed since the conclusion of that study. Feasibility Study efforts include new and more detailed information to support the baseline conditions identified in the Reconnaissance Study, a watershed study, a recent bathymetric survey, numerical modeling studies, consolidation of aerial photography, Geographic Information System (GIS) mapping, formation of a Habitat Evaluation Expert Panel to evaluate the ecosystem restoration outputs of alternative plans, and cost effectiveness and incremental cost analyses.

The study begins with the analyses of the historical conditions, existing conditions and 50-year projection of the lagoon’s condition without a work project (i.e., Future

Without Project Conditions) to form the baseline condition, and identification of problems and opportunities, goals and objectives. From the existing and historical data gathered, restoration measures (or components) are formulated, and these measures are combined to form a number of alternatives that are later combined to form alternative plans. Plans are compared to the baseline conditions as well as other plans, and from there, a recommended plan is selected. The recommendations listed in this report will serve as the basis for congressional project authorization and, if authorized, will be carried forward to the Pre-construction, Engineering and Design (PED) phase. The scoping process for this study includes participation from numerous groups and individuals throughout the planning process.

This feasibility planning process incorporates six major steps: (1) Specification of water and related land resources problems and opportunities; (2) Inventory, forecast and analysis of water and related land resources conditions within the study area; (3) Formulation of alternative plans; (4) Evaluation of the effects of the alternative plans; (5) Comparison of the alternative plans; and (6) Selection of the recommended plan based upon the comparison of the alternative plans.

The chapter headings and order in this report generally follow this six-step planning process, and appear as follows:

- The second chapter of this report, Problems, Needs and Opportunities, covers the first step in the planning process: specification of water and related land resources problems and opportunities.
- The third chapter of this report, Study Area Description, covers the second step in the planning process: inventory, forecast and analysis of water and related land resources conditions within the study area.
- The fourth chapter in this report, Plan Formulation: Possible Solutions, covers the third step in the planning process: formulation of alternative plans.
- The fifth chapter in this report, Plan Evaluation, covers the fourth step in the planning process: evaluation of the effects of the alternative plans.
- The sixth chapter in this report, Plan Comparison, covers the fifth step in the planning process: comparison of the alternative plans.
- The seventh chapter in this report, Recommendations: The Selected Plans, covers the sixth step of the planning process: selection of the recommended plan based upon the comparison of the alternative plans.

Subsequent chapters cover implementation of the recommended plans, public involvement and agency coordination, and conclusions, recommendations and the list of preparers.