



Lower Redwood Creek Floodplain and Salmonid Habitat Restoration, Banducci Site

Environmental Assessment (includes changes approved in Finding of No Significant Impact and Errata, July 2007)



TABLE OF CONTENTS

CHAPTER 1. PURPOSE AND NEED	5
1.1 Introduction.....	6
1.2 Background.....	6
1.3 Project Location.....	8
1.4 Purpose and Need	8
1.5 Goals and Objectives	9
1.6 Scope of Environmental Assessment.....	11
1.7 Related Laws, Legislation, Management Guidelines and Constraints	12
1.8 Issues and Impact Topics	14
Issues and Impact Topics Identified for Further Analysis.....	14
Impact Topics Considered but Dismissed from Further Consideration.....	14
 CHAPTER 2. DESCRIPTION OF ALTERNATIVES.....	 16
2.1 Alternative Development Process.....	16
2.3 Alternatives Considered in Detail.....	17
Alternative 1 (Preferred).....	17
Alternative 2 (No Action).....	25
2.3.1 Comparison of Impacts and Benefits of Alternatives.....	25
2.4 Actions Considered but Rejected.....	26
2.5 Environmentally Preferred Alternative.....	27
2.6 Mitigations and Best Management Practices.....	28
 CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES	 29
3.1 Introduction.....	29
3.2 General Methodology	29
Cumulative Impacts	31
Impairment Analysis.....	34
3.3 Regulatory Background	35
3.4 Watershed Processes.....	39
3.4.1 Hydrological Processes.....	39
Affected Environment.....	39
Environmental Consequences (Hydrological Processes).....	41
Alternative 1 (Preferred).....	41
Alternative 2 (No Action).....	45
3.4.2 Channel Stability and Sediment Dynamics.....	47
Affected Environment.....	47
Environmental Consequences.....	50
Alternative 1 (Preferred).....	50
Alternative 2 (No Action).....	55
3.5 Soils and Geology.....	55
Affected Environment.....	55
Environmental Consequences.....	56
Alternative 1 (Preferred).....	56

Alternative 2 (No Action)	59
3.6 Biological Resources	59
3.6.1 Special Status Species	60
Fisheries	60
Affected Environment	60
Environmental Consequences	64
Alternative 1 (Preferred)	64
Alternative 2 (No Action)	71
California red-legged frog	71
Affected Environment	71
Environmental Consequences	72
Alternative 1 (Preferred)	72
Alternative 2 (No Action)	74
Northern spotted owl	75
Affected Environment	75
Environmental Consequences	75
Alternative 1 (Preferred)	75
Alternative 2 (No Action)	75
3.5.2 Other Wildlife	76
Affected Environment	76
Environmental Consequences	77
Alternative 1 (Preferred)	77
Alternative 2 (No Action)	79
3.6.3 Wetlands	79
Affected Environment	79
Environmental Consequences	81
Alternative 1 (Preferred)	84
Alternative 2 (No Action)	88
3.6.4 Vegetation and Native Plant Communities	88
Affected Environment	88
Environmental Consequences	90
Alternative (Preferred)	90
Alternative 2 (No Action)	93
3.6 Cultural Resources	94
Affected Environment	94
Environmental Consequences	96
Alternative 1 (Preferred)	96
Alternative 2 (No Action)	98
3.7 Visitor Use and Recreation	98
Affected Environment	98
Environmental Consequences	98
Alternative 1 (Preferred)	98
Alternative 2 (No Action)	99
3.8 Land Use	99
Affected Environment	99
Environmental Consequences	100

Alternative 1 (Preferred)	100
Alternative 2 (No Action)	102
3.9 Noise	102
Affected Environment	102
Environmental Consequences	103
Alternative 1 (Preferred)	103
Alternative 2 (No Action)	104
3.10 Visual Resources	104
Affected Environment	104
Environmental Consequences	104
Alternative 1 (Preferred)	104
Alternative 2 (No Action)	105
3.11 Human Health	105
Affected Environment	105
Environmental Consequences	107
Alternative 1 (Preferred)	107
Alternative 2 (No Action)	108
3.12 Traffic	108
Affected Environment	108
Environmental Consequences	108
Alternative 1 (Preferred)	108
Alternative 2 (No Action)	110

CHAPTER 4. CONSULTATION AND COORDINATION	111
4.1 Scoping and Public Involvement	111
4.2 Regulatory Compliance	112
4.3 List of Preparers and Contributors	114
4.4 List of Recipients and Review of EA	115
4.5 References	116

LIST OF TABLES

Table 3-1. Channel Morphology Dimensions in Project Vicinity	49
Table 3-2. Estimated Cut and Fill Volumes	57
Table 3-3. Habitat Characteristics of Subreaches of the Banducci Site	61
Redwood Creek, Summer 2000	61
Table 3-4. Fish Abundance Redwood Creek, October 2002	62
Table 3-5. Certified and Potential Jurisdictional USACE Wetlands and Waters	81
Table 3-6. Cowardin Classification Wetlands Mapped at the Banducci Site	81
Table 3-7. Temporary and Permanent Impacts and Gains to Potential USACE Jurisdictional Wetlands and Waters	87
Table 3-8. Impacts and Gains to Cowardin-Mapped Wetlands	87
Table 3-9. Typical Noise Levels	103

LIST OF FIGURES

Figure 1. Project Location Map	10
Figure 2. Existing Site Conditions	18
Figure 3. Channel morphology before and after 2003 restoration actions	19
Figure 5. Location of Projects Considered in Cumulative Impact Analysis.....	36
Figure 6. Inundation Areas for a 2 and 3-year Flood event Under Project Conditions	46
Figure 7. Conceptual Incised Channel Evolution Model.....	48
Figure 8. Channel Morphology Dimensions at the Project Site.	51
Figure 9. Comparison of Upper Alley to Reference Reach	52
Figure 10. Plan view map showing locations of isolated Redwood Creek habitat between Highway One and Muir Woods Road bridges during October 17, 2001.....	63
Figure 11. Potential jurisdictional Wetlands on the “Old Ballfield” Banducci Site.....	82
Figure 12. Cowardin Wetlands at the Project Site.....	83

NOTE: This revised version of the EA contains changes to Alternative 1 and modifications to the text that were detailed in the Errata. The Pacific West Regional Director approved the Errata along with the FONSI on July 27, 2007. The corrections do not increase the degree of adverse impact described in the EA or change the determination that the project would not have significant impacts.

Additions to the text are underlined, and deleted text is shown in ~~strikeout~~.

SUMMARY OF CHANGES:

Old Ballfield. Based on a technical review and comments by NOAA's National Marine Fisheries Service (NMFS), the preferred alternative was modified to eliminate actions on the Old Ballfield to reconnect the creek with the floodplain. NPS will not remove the 1,100-foot-long berm on the creekbank or build a new 930-foot-long, 3-foot-high levee on the field closer to Muir Woods Road. Instead, NPS will delay floodplain reconnection actions and will coordinate with Marin County to raise the elevation of the lower 600 linear feet Muir Woods Road, a county-owned road, near the intersection with Highway 1. By raising the elevation of the section of the road where a grade "dip" occurs, the road would protect itself from flooding, and a levee on the Old Ballfield would not be necessary. Berms adjacent to the creek will not be removed or breached until the road is raised. Actions related to vegetation management on the Old Ballfield are still included in this EA, including cape ivy removal, tall fescue removal and outplanting.

NPS is making this change in the Old Ballfield actions due to the added benefit that can be achieved for floodplain function and the habitat of the federally listed salmonids by not constructing the setback levee through a site with high natural resource values. The full extent of the floodplain can be regained if the road is raised instead of building infrastructure in the natural area. This action to raise the road is not currently being proposed by Marin County Department of Public Works (DPW), but it is considered in this document as a reasonably foreseeable action. The Errata relocate the description of Old Ballfield floodplain actions to the "Cumulative Impacts" analyses in the EA. Hydraulic modeling data by Kamman Hydrology and Engineering and a preliminary engineering review by Marin County DPW show that it is feasible to raise the road to achieve its needed flood protection once berms are removed. Additional funding will be needed to conduct this action, and additional engineering design preparation will be needed. The involvement of a different public agency will slow the implementation of this action. However, NPS has determined that it is worthwhile to wait to take action until the benefits of full floodplain function can be restored.

Upper Alley. The proposed action to widen 75 linear feet of the active channel from 20 to about 30 feet wide in the Upper Alley was eliminated based on a technical review by NMFS stating that this action presents risks to bank stability and is unnecessary. NPS eliminated the channel widening action to be more conservative in the restoration approach. The design elevation of the floodplain to be terraced adjacent to this reach was lowered slightly in many locations to accommodate the reduction in the channel cross-section.

Engineered Log Jams (ELJ's). One of seven Engineered Log Jams was omitted from final designs for the Upper Alley in order to avoid dewatering and fish removal in the structurally complex area immediately downstream of the proposed installation location. The omitted log jam had been proposed for the downstream end of the Upper Alley and would have reconfigured one of the ELJ's installed in 2003. The intent of the reconfiguration was to redirect flows further from the former eroded bank on the right side of the channel. Construction installation of the new ELJ at that location would have required dewatering an extensive area along the former eroded bend where numerous log structures were installed in 2003, and fish removal prior to dewatering would have been complicated by the instream structures. The goals for the Upper Alley can be achieved without the seventh ELJ.

Eucalyptus Tree Removal. The removal of a row of Eucalyptus trees adjacent to the site's access road is added as an action in order to prevent the adjacent floodplain and pond area from becoming infested with Eucalyptus trees that would spread from the existing stand.

CHAPTER 1. PURPOSE AND NEED

1.1 Introduction

The National Park Service (NPS) is proposing actions on Lower Redwood Creek, about four miles downstream of Muir Woods National Monument in Marin County, to restore natural creek processes and enhance habitat for federally listed salmonid¹ species. This Environmental Assessment (EA) evaluates potential impacts of the proposed actions on the environment. This EA analyzes one alternative with project actions proposed at four general areas of the project site and the no action alternative.

The project site is on land owned and managed by the Golden Gate National Recreation Area (GGNRA), a unit of the National Park Service. It is former agricultural land adjacent to Redwood Creek. Because farming ended in 1995, NPS has the opportunity to understand how human modifications to the creek and floodplain have affected salmonid habitat and floodplain processes, and identify ways to restore important physical conditions important for habitat to support healthy fish populations.

Most actions described in this EA are proposed to be implemented in late summer and fall 2007. If all actions cannot be funded for one season, it is possible that a portion of the actions would be delayed until funding is available.

1.2 Background

Actions analyzed in this EA represent the second creek restoration project to be conducted in the project area. A similar project to reconnect a portion of the creek with its floodplain and enhance in-stream habitat for salmonids was implemented in 2003 by NPS and the Golden Gate National Parks Conservancy (Parks Conservancy). Both the 2003 project and this project are based on the findings of a feasibility analysis conducted in 1999 and 2000 by Philip Williams and Associates, *The Feasibility of Restoring Floodplain and Riparian Ecosystem Processes on the Banducci Site, Redwood Creek* (PWA, 2000) and a follow-up report, *Preliminary Design Report, Lower Redwood Creek Restoration Project*, (PWA, 2002). The reports described the historic conditions, land use changes, channel evolution, and hydrological characteristics of the creek and its associated floodplains. It identified the primary obstructions to natural floodplain connection in three channel reaches, the Upper Reach, the Middle Reach, and the Lower Reach. The 2002 report described restoration actions that would improve hydrologic and geomorphic (creek configuration) function along three reaches in the project area. When completed, these actions would restore floodplain function and enhance habitat for salmonids. One set of actions recommended in these reports was completed in 2003; the other set of actions are the focus of this EA, and are described as the proposed action in this analysis. Although the actions proposed by PWA had similar geography and purpose, the NPS determined that the actions in the three reaches were not interdependent parts of a larger action nor dependent on the larger action for their utility and could be conducted separately as distinct projects.

¹ Salmonid - salmon and trout that migrate from cold and temperate cold salt waters to fresh water to spawn.

The set of actions conducted on the Middle Reach in 2003 has functioned successfully to restore ecosystem processes and enhance summer rearing and winter refugia habitat for salmonids. Bankfull flows have routinely washed onto the floodplain each winter, thereby providing winter habitat for salmonids, depositing silt, and creating conditions for the successful recruitment of scores of native red alders. Due to the combination of berm removal and Engineered Log Jam (ELJ) installation, the formerly canalized reach has geomorphic complexity, with gravel bars and pools. Whereas there was virtually no summer habitat for salmonids in the formerly canalized reach, the winter flows over the newly installed Ely's created scour pools at four out of six structures that were deep enough to be in use by many juvenile coho during summer months (Figure 3). The formerly eroded bank is well vegetated with willows, about five to six feet tall three years after installation. The newly planted riparian zone has a high density of young alders and other native riparian species that give every indication of achieving a dense riparian cover.

Based on these successful results and receipt of a grant from the California Department of Fish and Game (CDFG) Fisheries Restoration Grant Program to the Parks Conservancy, plans were initiated to complete the remaining restoration actions in the Upper Reach and the Lower Reach at the project site. The CDFG grant stipulates that construction design drawings will be prepared for floodplain restoration and log installation, and hydraulic modeling will be conducted to analyze potential effects. Conceptual approaches for this project were identified in the Feasibility Analysis completed in 2000 (PWA, 2000). Additional analyses and construction designs have been prepared by Kaman Hydrology and Engineers, which collaborated with Tim Abe, of Herrera Environmental Consultants to design the Engineered Log Jams (KHE, 2006).

The project site was farmed throughout most of the 20th Century primarily for flowers and hay by the Banducci family. The area now is referred to as the Banducci site for its former owners. The farmers made numerous landscape changes to create conditions that would support agricultural use. In the late 1940's and 1950's, berms were constructed on portions of the creek bank to prevent flooding, the site was leveled to create a field for planting flowers, and a drainage ditch was constructed on the western edge of the field to route water away from the agricultural field. Additional berms were constructed in more recent decades, and creek banks were periodically maintained with added creek bank protection, such as old cars, which still remain in the creek bank. Vegetation was routinely cleared from the creek banks, large logs were removed from the creek, and gravel was periodically extracted.

NPS purchased the property in 1980, and farming ended in 1995. Today, the site is managed by NPS for its natural resource values. Redwood Creek, which flows through the site, supports populations of the federally listed coho salmon (*Oncorhynchus kisutch*) and steelhead trout (*O. mykiss*). Rearing habitat for these species is considered to be a factor limiting their population abundance in this watershed. The California red-legged frog (*Rana aurora draytonii*), a federally listed species, does not occur on the project site, but a very small population is known to occur downstream at Muir Beach. While they have not been observed, frogs could migrate up the channel periodically.

The NPS has studied the eligibility of the Banducci Flower Farm for listing in the National Register of Historic Places, and has concluded that the property is not eligible for listing. As of January 2007, NPS was awaiting concurrence on this determination from the California State

Historic Preservation Office. Additionally, artifacts collected from the property over the years by the Banducci family suggest that the remains of a Coast Miwok archeological site may reside in the project vicinity. However, efforts to locate such a site have to date been unsuccessful.

1.3 Project Location

The project site is in coastal Marin County, about ½ to 1 mile upstream of Muir Beach and about 4 miles downstream of Muir Woods National Monument (Figure 1). The project area extends over about 38 acres of former agricultural land, including one 28-acre field to the west of the channel, and an 8-acre former agricultural field to the east of the channel. Redwood Creek drains an 8.9-square mile watershed from the Mt. Tamalpais to the ocean at Muir Beach; the watershed area to the upper end of the project site is about 6.9 acres.

The 3,800 linear feet of creek channel through the project site has three distinct sections or components referred to as subreaches: the upper third, referred to as the “Upper Alley;” the middle portion, referred to as the “Bowling Alley,” and the Lower Reach, extending to the downstream boundary of the site at the Highway 1 Bridge. Actions for this project will focus on two subreaches – the Upper Alley and the Lower Reach, totaling about 2,500 linear feet, but some actions are also proposed in the floodplain of the Lower Field (Figure 2).

The site also has three distinct areas of the former agricultural field where actions are proposed – the Upper Field, the Lower Field, and the Old Ballfield (Figure 2). These are general areas of the overall 38-acre field, with the Upper Field extending over about the northern half of the large 28-acre field, the Lower Field in the southern half of the large 28-acre field, and the Old Ballfield representing an 8-acre field on the opposite side of the creek at the downstream end of the site. The Old Ballfield is referred to by this name only to easily distinguish it from other portions of the field; it was primarily an agricultural field throughout the 20th Century, but was briefly used as a softball field by the local community before the site was purchased by GGNRA in 1980.

Project boundaries are defined by the county-owned Muir Woods Road on the east, Highway 1 to the south, the NPS-State Park boundary to the north (indicated by a windrow of Monterey cypress trees), and the edge of the alluvial plain to the west (Figure 2). The western edge incorporates a portion of the access road where culverts will be replaced. The northern project boundary borders a short reach of channel flowing through property owned by the Muir Beach Community Services District (MBCSD), which operates a well for municipal drinking water.

1.4 Purpose and Need

The purpose of the proposed action is to restore natural hydrological processes to the project area for the benefit of aquatic and terrestrial fauna and long-term natural resource conditions in the Redwood Creek Watershed. Hydrological processes are the patterns, functions and mechanisms of water movement. Examples of hydrological processes to be restored in this project include natural, unobstructed patterns of flood flows, mechanisms for scouring – or cutting out deep pools – in the channel bed by high flows, sinuous routes of summer flows, and enhanced functions to transport and deposit sediment.

The project is needed because past land use activities at the Banducci Site have resulted in an obstruction of natural floodplain processes that have reduced the quality of habitat for federally listed salmonids and caused a reduction in floodplain storage. The upper reach of Redwood Creek through the project site is incised (deeply cut, with banks that are much higher than can be flooded naturally) due to historic changes in the watershed, and it has not recovered, causing it to be unstable, prone to the erosion of large quantities of sediment in its recovery process, and unsuitable for juvenile salmonid habitat. It is unsuitable for juvenile salmonid habitat because the channel bed is virtually flat with few pools, yielding summer conditions that are generally too shallow for juvenile salmonids. Winter rearing conditions are poor in this reach because neither the floodplain nor complex cover is available for salmonids to take refuge during high flows. Unless actions are taken, conditions would persist causing further damage to biological and watershed processes.

1.5 Goals and Objectives

Actions proposed in this project are guided by the following goals and objectives, developed by NPS, working with Kamman Hydrology and Engineering:

- Goal:* Restore channel and riparian/floodplain connectivity and ecosystem processes.
- Objectives:*
- Increase floodplain habitat diversity.
 - Restore overbank flooding.
 - Create seasonal wetlands where possible.
 - Halt or repair channel incision.
 - Provide for natural recruitment and regeneration (establishment through natural mechanisms) of vegetation species.
 - Increase groundwater recharge.
- Goal:* Enhance summer rearing and winter refugia (areas where salmonids can escape the force of high velocities – or take refuge) habitat for coho salmon and steelhead.
- Objectives:*
- Increase main-channel habitat complexity.
 - Provide refugia to salmonids during high flows.
 - Provide cover and feeding opportunities to salmonids during summer.
 - Provide aquatic connectivity during summer low flows (i.e., interconnected pools).
 - Improve water quality (i.e., minimize summer water temperature).
 - Provide aquatic connectivity during high flow events (flow paths to floodplains and back to the main channel).
 - Avoid stranding fish on the floodplain.
- Goal:* Enhance nesting habitat for resident and migratory songbirds.
- Objectives:*
- Widen the vegetated riparian corridor (the native tree cover lining the creek).
 - Increase the diversity of successional stages of riparian and floodplain woodland.
 - Provide for a natural transition and connectivity to upland habitat.
 - Increase riparian species diversity (esp. dense cover such as California blackberry and berry-producing plants).

FIGURE 1. PROJECT LOCATION MAP



Goal: Create sustainable breeding habitat for the California Red-Legged frog.

Objectives:

- Maintain ponding through the breeding season.
- Preclude non-native predators.
- Provide connectivity to perennial water supplies through migration corridors.

Goal: Create self-sustaining conditions that minimize intervention, management and maintenance.

Objectives:

- Reintroduce on-site supply of large woody debris (i.e., natural recruitment/regeneration of vegetation species.)
- Allow the channel to migrate within the active channel corridor as needed to restore a dynamic equilibrium.
- Restore natural sediment storage sites within the creek corridor.
- Reduce flood hazards to adjacent downstream and downstream areas.
- Reduce cover by non-native vegetation species.

Goal: Restore tributary connection to Redwood Creek.

Objectives:

- Create seasonal wetlands where possible.
- Restore natural lateral habitat transitions (areas adjacent to the creek) and migration pathways between Redwood Creek and uplands.

1.6 Scope of Environmental Assessment

This EA analyzes one Action Alternative and a No Action Alternative and their impacts on the human and natural environment. It fully describes project alternatives, existing conditions in the project area, and equally analyzes the effects of each project alternative on the environment. The scope of the project is to analyze actions to restore natural hydrological processes for natural resources. Other projects planned in the project area, such as the Wetland and Creek Restoration at Big Lagoon or Dias Ridge and Coast View Trails Rehabilitation and Access Improvement Project are discussed as cumulative actions. These projects are separate actions with their own environmental analysis.

This EA was prepared pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4341 et seq.), as amended in 1975 by P.L. 94-52 and P.L. 94-83. Additional guidance includes NPS Director's Order 12 (NPS, 2001a) which implements Section 102(2) of NEPA and the regulations established by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508). The project must comply with requirements of NEPA as well as other legislation that governs land use, natural resource protection, and other policy issues within GGNRA.

This EA will also serve as a Biological Assessment (BA) pursuant to the Endangered Species Act of 1973 (ESA) for the two federally listed salmonids in Redwood Creek. The ESA states that, if a federal action may adversely affect a federally listed species, consultation with NOAA Fisheries is required to ensure that the action will not jeopardize the species' continued existence or result in the destruction or adverse modification of critical habitat. This BA serves to initiate formal consultation with NOAA Fisheries. Its purpose is to identify any endangered species or threatened species which are likely to be affected by the project and help make the determination

of whether the proposed action is “likely to adversely affect” listed species and critical habitat. For the purpose of consultation with NOAA Fisheries, the project boundary considered to be the “action area” (areas to be affected by the Federal action) and the NPS is considered to be the “action agency”.

1.7 Related Laws, Legislation, Management Guidelines and Constraints

Many regulations and Executive Orders are typically addressed in NEPA documents. The following is a summary of several relevant guidance documents and regulations and a description of their relationship to the Proposed Project. Other applicable regulations, plans, and standards that were taken into consideration in the development of this EA and the analysis of the impacts are located in Chapter 3.

National Park Service Organic Act

The NPS Organic Act directs the NPS to manage units “to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner as will leave them unimpaired for the enjoyment of future generations.” (16 U.S.C. § 1). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that the NPS must conduct its actions in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.” (16 U.S.C. § 1 a-1). The Organic Act prohibits actions that permanently impair park resources unless a law directly and specifically allows for the acts. An action constitutes an impairment when its impacts “harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources and values.” (Management Policies 1.4.3).

National Park Service Management Policies (2006)

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. This mandate is independent of the separate prohibition on impairment and applies all the time with respect to all park resources and values, even when there is no risk that any park resources or values may be impaired. NPS managers must always seek ways to avoid, or to minimize to the greatest extent practicable, adverse impacts on park resources and values. However, the laws do give the NPS the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, so long as the impact does not constitute impairment of the affected resources and values. (Management Policies 1.4.3).

1980 General Management Plan for the Golden Gate National Recreation Area (GMP)

The GMP (NPS, 1980), which is the guiding plan for the park, and its corresponding EA were reviewed in the development of this EA. The Banducci site is addressed in the 1980 GMP as part of the Pastoral Landscape Management Zone. The GMP stated that “additional resource management studies may significantly alter the configuration of this zone as it now [in 1980] appears in GGNRA.” The GMP also identifies Redwood Creek as sensitive habitat for silver salmon and steelhead. Shoreline and stream courses are included in a Biotic Sensitivity Zone that generally identifies natural resources in the park that are particularly sensitive to human use

or are especially valuable from an ecological or scientific point of view.

Other relevant management objectives identified in the GMP that provide useful context include:

- Maintaining and restoring the character of natural environment lands by maintaining the diversity of native park plant and animal life, identifying and protecting threatened and endangered plant and animal species, and other sensitive natural resources, controlling exotic plants, and checking erosion whenever feasible; and
- To recognize the importance of the cultural resources within the recreation area through a positive program of their identification, evaluation, preservation, management, and interpretation.

Executive Order 11990, Protection of Wetlands and Director's Order (DO) 77-1, Wetland Protection

The NPS is guided to protect wetlands in accordance with Executive Order 11990, Protection of Wetlands and Director's Order (DO) 77-1, Wetland Protection. DO-77 directs the NPS to a) avoid adverse wetland impacts to the extent practicable, b) minimize impacts that could not be avoided, and c) compensate for remaining unavoidable adverse wetland impacts via restoration of degraded wetlands. DO-77 also directs the NPS to prepare a "Statement of Findings" that describes and provides rationale for adverse impacts to wetlands. However, because the proposed project is considered a restoration project with beneficial affects to the wetland resource, a Statement of Findings is not required (exempted). Consistent with DO 77-1 Statement of Findings exemption, the project will implement the Best Management Practices (BMPs) found in DO-77-1. The list of BMPs is included in Appendix D.

Executive Order 11988 and Director's Order 77-2 (Floodplain Management)

Executive Order 11988, "Floodplain Management" (May 28, 1980), was issued "to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative." The goals of the project are in accordance with both the Executive Order and Director's Order to protect and preserve the natural resources and functions of floodplains and restore natural floodplain values previously affected by land use. Similarly, as stated above, this project is from preparing a "Floodplain" Statement of Findings because the project does not propose to add any structures to the floodplain or adversely modify the creek channel and would beneficially improve the floodplain function.

Redwood Creek Watershed Vision for the Future

The Redwood Creek Watershed Vision for the Future, while not a binding document, was jointly prepared and agreed to in 2003 by public agencies and stakeholders in the Redwood Creek Watershed. The Vision provides guiding principles and desired future conditions to serve as guidelines for planning and projects in the watershed. The Vision identifies desired future conditions for natural resources, cultural resources, visitor experience, resident community, and infrastructure and facilities. The goals of this project help achieve numerous desired future conditions for intact watershed health, protection of natural processes such as flooding, native plant communities, a full range of hydraulic and geomorphic functions, habitat for special-status species, reduction of human-caused erosion that could impact fish or aquatic habitat, and reduction of invasion by non-native plant species.

1.8 Issues and Impact Topics

Issues are related to potential environmental effects of project alternatives and were first identified by the project interdisciplinary team (comprised of NPS and GGNPC staff and natural resources consultants) and then through public and agency consultations during the scoping phase of the process (see Chapter 4 for a description of the scoping process). Issues identified through scoping included interest in the hydrological effects of reduced flooding and flows from the hillside tributaries, support for the natural restoration of the area and protection of listed species, trail connections, location of the set-back levee and floodplain storage, and concern about hazards from mosquitoes. Once issues were identified, they were used to help formulate the alternatives and mitigation measures. Impact topics based on substantive issues, environmental statutes, regulations, and executive orders (EOs) were selected for detailed analysis.

Issues and Impact Topics Identified for Further Analysis

The prominent issues raised included impacts to federally protected species, wetlands, and other natural resources. In response to these issues, the following relevant impact topics are analyzed in the EA: Watershed Processes (hydrological processes and channel stability/sediment dynamics), Soils and Geology, Biological Resources (special status species, other wildlife, wetlands, and vegetation), Cultural Resources, Land Use, Visitor Use and Recreation, Noise, Traffic, Human Health, and Visual Resources.

Impact Topics Considered but Dismissed from Further Consideration

Rationale for dismissing specific topics from further consideration is given below.

Accessibility

There are no existing public trails or other access into the project site, which is an undeveloped natural area. Current access is for park vehicles and lessees only. The project does not propose to change existing access or accessibility conditions.

Environmental Justice

Environmental Justice - the proposed project would not have health or environmental effects on minorities or low-income populations or communities as defined in Executive Order 12898, Environmental Justice in Minority and Low Income Populations.

Socioeconomics

The proposed action would not appreciably impact local businesses or the local economy.

Energy Resources

This project would not place an increased burden on local or regional energy resources. The project is located on open space land and the proposed actions would not require long-term use of energy resources. Construction activities associated with the project would be undertaken in an energy efficient manner.

Wilderness

There is no designated Wilderness within the project area.

Air Quality

The proposed action would not have a measurable impact on local air quality. Any increase would be temporary and negligible during construction activities for the temporary new structure(s).

Hazardous Materials

Prior site uses are well known, and no hazardous materials are known to occur at the site. Any hazardous materials or waste used or generated during construction, such as fuel, will be properly disposed of by the contractor.

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