

ERRATA
LOWER REDWOOD CREEK FLOODPLAIN AND SALMONID HABITAT RESTORATION
AT THE BANDUCCI SITE
ENVIRONMENTAL ASSESSMENT

The EA was circulated for public comment from March 6, 2006 to April 6, 2007. An Errata sheet is necessary to address substantive comments on the Environmental Assessment (EA). Substantive comments are those that modify the existing alternatives, propose new alternatives not previously considered, supplement, improve or modify the impact analysis, or make factual corrections. The corrections in this Errata sheet do not increase the degree of adverse impact described in the EA or change the determination that the project would not have significant impacts. The Errata is comprised of three sections: Part 1, Summary of Changes, provides a short summary of changes to the preferred alternative and justifications; Part 2, Changes to Text, details text that was added or deleted from the EA; and Part 3, Response to Comments, contains summary of public comments on the EA and NPS responses.

PART 1: 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.

These changes are described more fully below. The Errata that follows shows paragraphs in the existing EA where language is revised to reflect these changes in the sections describing the affected environment, environmental consequences, cumulative effects, or conclusions.

PART 2: CHANGES TO TEXT

Changes to the project and to the EA text reflect modifications made in response to public and agency comment. The majority of the changes in the text are related to the project's revised approach to reconnect the creek with its floodplain on the Old Ballfield, as described below. Existing text to remain is in *italics*, additions to the text are underlined, and deleted text is shown in ~~strikeout~~.

Page 16, Section 2.3, Alternatives Considered in Detail, Alternative 1 (Preferred)

Actions on the Old Ballfield

~~*Floodplain Reconnection:* A 970 foot long levee on the left bank (when facing downstream) of Redwood Creek adjacent to the "old Ballfield" will be removed to allow average winter creek flows to spill onto the natural floodplain at the ballfield. The levee ranges from two to six feet high, with an average height of about three feet. It will be excavated to a grade matching the elevation of the adjacent field. Existing stands of the highly invasive non native Cape ivy (*Delaria odorata*) on and adjacent to the levee over about a 1.3 acre area will also be removed and hauled away from the site. The newly exposed ground surface will be revegetated with native riparian species (Appendix C). A new 930 foot long set back levee will be constructed closer to Muir Woods Road and Highway 1 to prevent new overbank flows from flowing onto those roads. The setback levee will be six feet wide at the top, with 3:1 side slopes. It will average about 3 feet high and tie into the 27 foot elevation on Muir Woods Road. The 40 foot long portion of the existing levee closest to Highway 1, currently at only 23.5 feet high, will be raised to 25 ft, provided a Caltrans right of way encroachment permit can be obtained. The sides of the levee will be actively revegetated with native scrub species, such as Coyote brush (*Baccharis pilularis*) to reduce long term weed establishment. This new setback levee is proposed as a component of a future new trail alignment for the Coastal Trail, described in Cumulative Impacts in Section 3.2.~~

~~*Floodplain Microtopography Enhancement:* The currently flat field will be recontoured slightly to create micro topographic conditions that will guide high flows and help fish on the floodplain find routes back to the creek as flows subside. Broad low relief "channels," about 20 to 40 feet wide, will be graded about a foot deeper than the existing grade to guide high flows. Excavated material will be placed as small mounds on the adjacent surface to enhance the topographic variation. Large wood will also be placed at scattered locations on the ballfield to create refugia and diversity. An existing stand of the invasive non native grass tall fescue (*Festuca arundinacea*) covering about 1.5 acres will be scraped,~~

~~placed in an on-site pile, and covered to compost over time. Revegetation in this area will consist of a combination of planting berry-producing riparian plants favored by songbirds and some reliance on natural recruitment processes to recreate the riparian habitat that would naturally occur on this site (Appendix C).~~

The EA, as published, described actions for floodplain reconnection and microtopography enhancement on the Old Ballfield. These actions are no longer part of the project. Instead of constructing a setback levee to protect Muir Woods Road from flooding, the NPS will coordinate with Marin County to raise the elevation of Muir Woods Road, a county-owned road. This action will allow the road to protect itself from flooding, rather than building a structure in the floodplain that would prevent it from becoming fully functional. Berms adjacent to the creek will not be removed or breached until the road is raised; however, they made break down naturally over time.

Page 20, Section 2.3, Alternatives Considered in Detail, Alternative 1, In-Channel and Floodplain Actions in “Upper Alley,” First Paragraph

Installation of Engineered Log Jams: ~~Seven~~Six engineered log jams (ELJ’s) will be installed in the 580-foot-long reach of the Upper Alley. Six ELJ’s will be deflector jams specifically designed to reduce the width of the low flow channel from 20 feet to about 7.5 feet wide, thereby increasing summer habitat for salmonids because the low flow channel will also be deeper. Each deflector jam consists of four logs - two large crossed logs extending from the bank into the channel with two smaller logs inserted vertically on either side of the crossed logs. Of the two crossed logs, a lower log points upstream at a low angle and acts as a weir to direct the flow away from the bank. The upper log acts as an “anchor” log to help secure the weir log in place. The upper log extends into the creek at a 90 degree angle. The pinning logs are installed almost vertically into the bed on either side of the structure to provide additional ballast and stability. The log structures will not span the entire channel, but will extend a maximum of 1/2 to 3/4 of the width of the active channel. Log structures will be spaced approximately four to five channel widths apart. The seventh ELJ will consist of reconfiguring an ELJ installed in 2003 at the downstream end of the Upper Alley to direct flows toward the left side of channel, away from the former eroded bank on the right side of the channel.

Page 20, Section 2.3, Alternatives Considered in Detail, Alternative 1, In-Channel and Floodplain Actions in “Upper Alley,” Second Paragraph

Channel and Floodplain Widening: ~~The floodplain in the Upper Alley will be widened along about 580 linear feet of channel to create a minimum 80 foot-wide floodplain. The active channel will be widened by about 10 feet in two small reaches about 75 feet long, Installation of log jams, however, will direct flows in a manner that will~~ but will not be conducted in other locations in order to retain trees and encourage development of undercut banks at the base of tree roots, thereby creating habitat for salmonids (Figure 4 and Appendices A and B).

Page 20, Section 2.3, Alternatives Considered in Detail, Alternative 1, Actions in the Lower Field

A row of Eucalyptus trees adjacent to the access road to the Banducci site will be removed, when funding is available. This action will prevent the adjacent floodplain, which is being restored to a natural condition, from becoming infested with an extensive Eucalyptus grove. The trees to be removed include 19 mature trees (greater than 18 inches diameter at breast height (dbh), 12 trees between 12 and 18 inches dbh, and 8 trees less than 12 inches dbh. A few other small trees on the hillslope on the west side of the road would also be removed if time and budget allows. This includes 4 trees less than 12" dbh, 2 trees between 12 and 18" dbh, and numerous small saplings.

Trees will be cut with a chainsaw and most, but not all, will fall into the adjacent field. The stumps will be covered with landscape fabric to prevent them from resprouting. The upper parts of the trees, including small limbs with leaves and capsules, will be cut off of the trunks and placed in piles in the lower field to be burned by the NPS Fire Management crew at a later date, or they will be entirely removed from the site. The trunks, with leafy material removed, will be used as part of the overall restoration of the floodplain in the lower field and will be placed strategically in the 6 to 10 acre lower field adjacent to the new "high flow" channels to be excavated there. This will add structural diversity to the site.

This action is consistent with NPS Management Policies 2006, Section 4.4.4.2 which states "High priority will be given to managing exotic species that have, or potentially could have, a substantial impact on park resources, and that can reasonably be expected to be successfully controlled" and allows for exotic species removal if it "interferes with natural processes and the perpetuation of natural features, native species or natural habitats." The Eucalyptus at the site will encroach upon the natural feature of the floodplain and alter the character of its habitat if not controlled. Eucalyptus is known to have a substantial impact on vegetation composition but the species can be controlled when the correct methods of eradicating propagule sources and resprouts are used.

Page 22, Section 2.3, Alternatives Considered in Detail, Alternative 1, Figure 4

Figure 4 is revised as shown on the following page.

Page 24, Section 2.3.1 Comparison of Impacts and Benefits of Alternatives, Revise first full paragraph

~~Alternative 1 would expand floodplain function and floodplain storage on the Old Ballfield, both enhancing habitat and reducing peak flows downstream of the project area; whereas the No Action alternative would leave such benefits to the long term process of eroding the berms.~~

Page 24, Section 2.4 Actions Considered but Rejected

Old Ballfield

Actions originally proposed in this EA included the removal of the creekside levee and the construction of a new setback levee closer to Muir Woods Road and Highway 1. While that action is feasible and would achieve project goals to reconnect the creek with its floodplain and expand available winter habitat for salmonids, this action is now rejected after undergoing additional technical review. Specifically, the proposed action to build a setback levee is rejected since it would permanently reduce the area of available floodplain and isolate a riparian area between the road and the levee. Instead, NPS will work with Marin County to raise the elevation of the road to protect it from flooding, and the setback levee will not be necessary.

~~The only possible alternative approach to reconnecting the creek with its historic floodplain on the old ballfield would be to remove only a short segment or multiple short segments of the creekside levee, instead of removing all of it. However, partial removal would be considered a design refinement, not a substantial difference that would describe an alternative.~~

Partial berm removal is now considered a likely design refinement for the levee adjacent to the Old Ballfield since partial removal can still achieve full floodplain connection, but less material would have to be hauled. Since the setback levee will not be constructed, there is no longer a beneficial reuse of the soil at a very short distance and it would therefore be more economical to breach the levee at several

locations rather than removing all of it. These design refinements, if incorporated, would not cause additional impacts.

Page 25, Section 2.5 Environmentally Preferred Alternative, Second Paragraph

The National Park Service has determined that Alternative 1 is the environmentally preferred alternative for this project. Alternative 1, compared to No Action, will bring major benefits in natural creek and floodplain function and in both winter and summer habitat for the resident federally listed salmonid species, thereby preserving and enhancing important natural aspects of our national heritage, as described in NEPA Section 101. Actions will reduce sediment delivery to the creek and provide new areas for sediment deposition, which will contribute to the long-term function of the creek downstream, where separate actions are proposed by NPS and Marin County in the Wetland and Creek Restoration at Big Lagoon, Muir Beach. ~~New floodplain storage on the Old Ballfield will contribute to improved flood conditions for downstream structures, and the higher setback levee will reduce flooding on Highway 1 during large events.~~ Actions will be hydrologically sustainable, requiring little to no future maintenance.

Figure 4. Proposed Actions (Revised).

(See Page 6)

Page 27, Section 3.2, General Methodology

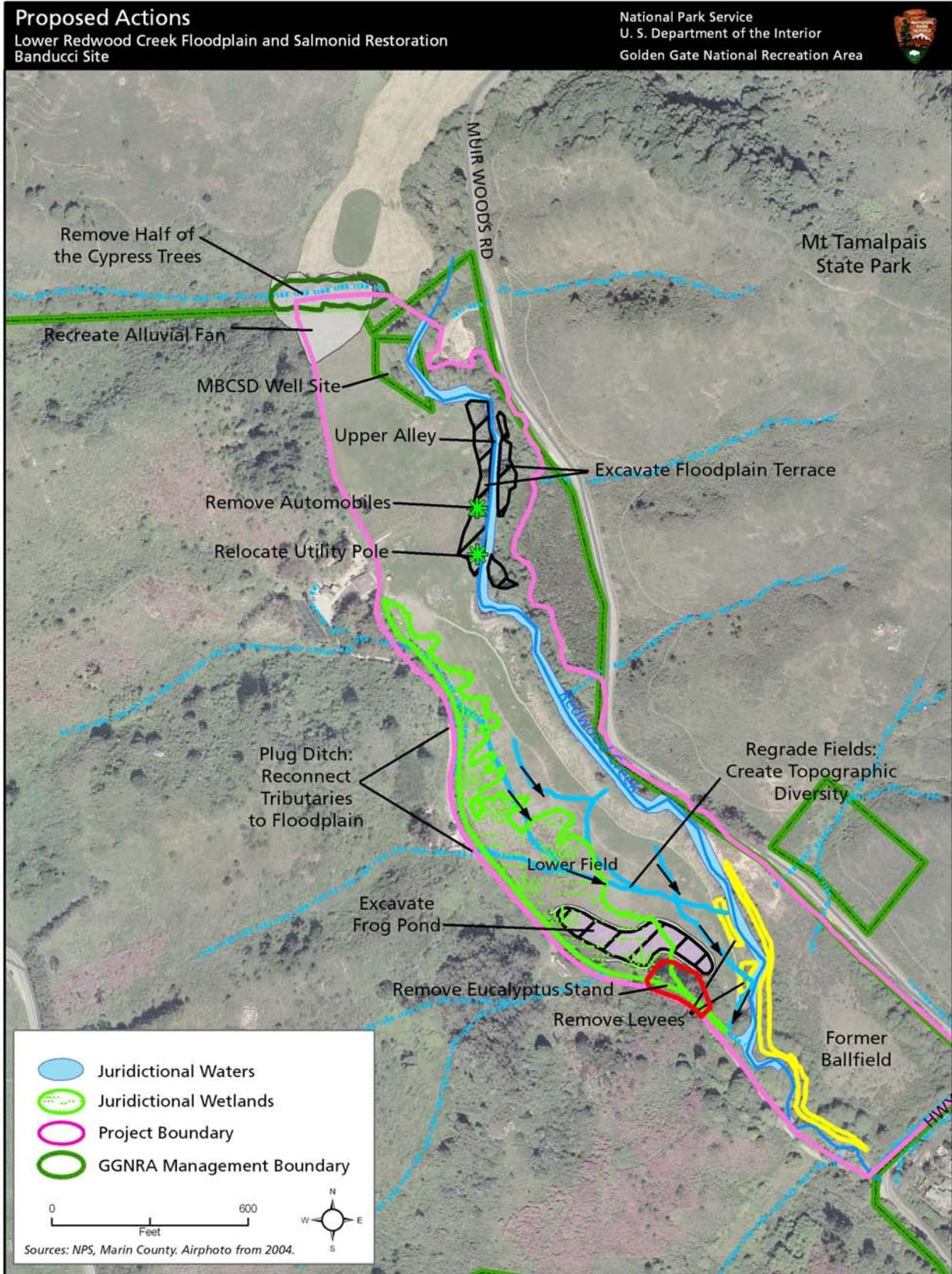
Assessments of impacts on cultural resources and historic properties are made in accordance with regulations of the Advisory Council on Historic Preservation (36 CFR 800) implementing Section 106 of the National Historic Preservation Act. Following a determination of the area of potential effect, cultural resources are identified within these areas that are either listed in, or eligible for listing in, the National Register of Historic Places.

Cultural resources can be affected by actions that alter in any way the attributes that qualify the resources for inclusion in the National Register. Adverse effects can result when the integrity of a resource's significant characteristics is diminished. Consideration is given both to the effects anticipated at the same time and place of the undertaking, and to those potentially occurring indirectly at a later time and distance.

Page 28, Section 3.2, Cumulative Impacts, add the following paragraphs:

Reconnect Redwood Creek to the Old Ballfield Floodplain and Raise the Elevation of Lower Muir Woods Road

The lower 1,100 linear feet of Redwood Creek just upstream of the Highway 1 Bridge is disconnected from its floodplain on the adjacent 8-acre Old Ballfield by berms ranging from about 2 to 4 feet high. The berms will be breached by NPS to allow routine overbank flow to wash onto the natural floodplain. Since the Old Ballfield floodplain slopes from the creek to a low point adjacent to Muir Woods Road, hydraulic models have shown that the road could be subject to more frequent flooding if additional actions are not taken. NPS will work with the Marin County Department of Public Works to raise the elevation of the lower 600 linear feet of the county-owned Muir Woods Road. The lower portion of Muir Woods Road currently has a high point about 600 feet from its intersection with Highway 1, but it dips to a low point before rising to a higher elevation at the intersection. The raised road would slope gradually from the high point (elevation of 27 feet NGVD) to the existing elevation of the road at the intersection with Highway 1 (24.5 to 25 ft. NGVD). The raised road would fill the dip in the road



(elevation of about 23 ft. NGVD). Hydraulic modeling data shows the dip on the road is the vulnerable area where flows from the activated floodplain of the Old Ballfield would reach the road. By raising the road, it would experience flooding at a lower frequency than it currently does and the benefits of the reconnected floodplain could be achieved. Based on hydraulic modeling results, the raised road would experience flooding at events greater than a 10 year event but less than a 30-year event, whereas it currently experiences flooding in a 10-year event. No other actions are necessary to prevent additional flooding on Highway 1, which is at a higher elevation than Muir Woods Road.

This foreseeable future action would include other actions previously proposed in this EA for the Old Ballfield. Additional actions would be conducted, based on consultations with Caltrans, to remove the flap gate on a culvert from the Highway 1 ditch at its outflow to Redwood Creek, and widen or deepen the Highway 1 ditch in order to allow it to function as valuable backwater habitat for salmonids, one of the most badly needed habitat types to improve the winter survival rate of salmonids in Redwood Creek.

Page 29, Section 3.2, Cumulative Impacts, Diaz Ridge and Lower Coast View Trails Rehabilitation and Access Improvement Project, final three sentences

These trail alternatives cross the access road at the Banducci Site and Redwood Creek near Highway 1. The new trail alignment ~~would then occupy the top of the new setback levee proposed as part of this project~~ would then cross the Old Ballfield to connect to the Redwood Creek Trail on the east side of Muir Woods Road. Since a setback levee is no longer proposed for the Old Ballfield, a trail connector through this area would be constructed at the existing elevation of the field. This alignment would allow hikers and bikers to avoid the stretch of Highway 1 north of Muir Woods Road. It would also create a trail alignment extending from the coastal ridges to Muir Beach, linking with a separate connection from Muir Beach up Dias Ridge to Panoramic Highway.

Page 32, Section 3.2, Cumulative Impacts, Figure 5

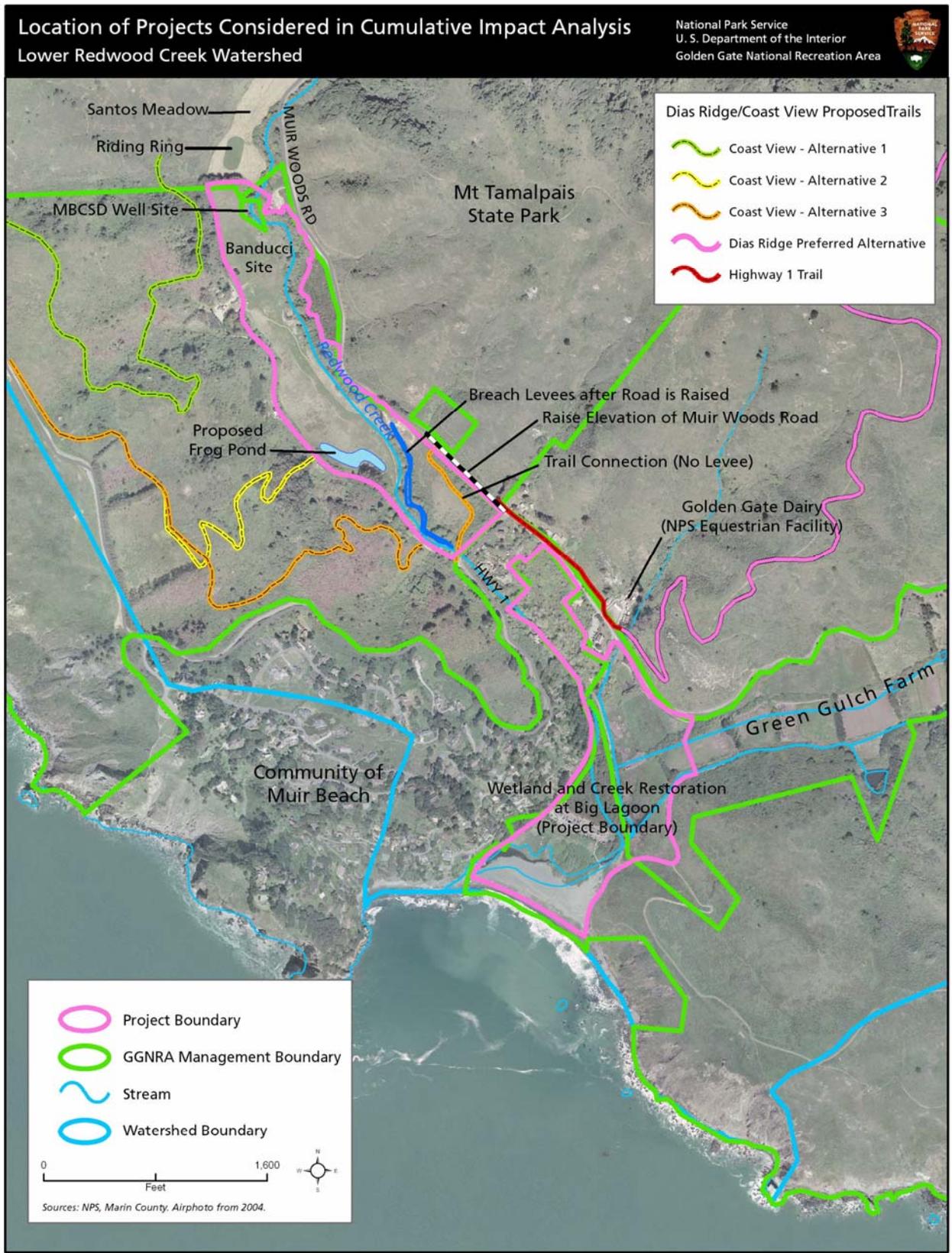
(Figure 5 has been revised: See page 8)

Page 37, Section 3.4.1, Environmental Consequences (Hydrological Processes), Alternative 1, first paragraph

Proposed actions will modify high flow patterns by expanding floodplains in the Upper Alley ~~and the Old Ballfield~~ and by creating topographic diversity in the Lower Field.

Page 39 - 40, Section 3.4.1, Environmental Consequences (Hydrological Processes), Alternative 1, Old Ballfield

Old Ballfield: ~~The removal of the levee on the left creek bank adjacent to the Old Ballfield will allow 2-year flows to wash onto the floodplain for the first time in at least about 50 years. About 4.36 acres of new floodplain will be created through this action. About 1.32 new acres of floodplain will be inundated in a 2-year event with levee removal. A 3-year flow will extend across 3.86 acres of the restored floodplain to the edge of the new setback levee (Figure 6) (KHE 2006). This new floodplain will provide habitat for salmonids (discussed in Section 3.6.1), and increase floodplain storage of flows that would otherwise wash downstream, where residential structures are vulnerable to flooding. Hydraulic modeling results indicate the peak flow rate of a 2-year event would be reduced by about 2% when leaving the project area and the peak flow rate of a 50-year event would be reduced by up to 10% (KHE 2006). This reduction would provide flood reduction benefits to residential structures downstream of Highway 1.~~



The new setback levee, to be constructed adjacent to the existing riparian vegetation parallel to Highway 1 and Muir Woods Road, will provide a higher level of flood protection than exists under current conditions. Its design is based on hydraulic analyses which demonstrate it is necessary in order to avoid increasing flooding on the road when the creek berm is removed. It will tie in point to about the 27 ft. NGVD elevation on Muir Woods Road and taper to about the 25 ft. NGVD elevation at Highway 1. It is important to note that a remnant 40-foot long portion of the levee adjacent to Highway 1 and within the Caltrans right-of-way is currently only at a height of 23.5 ft, and full flood reduction benefits of the new setback levee require that portion of levee to also be raised to 25 ft. NGVD. Without increasing the height of the levee in the Caltrans right-of-way, the recurrence of flood conditions would not change compared to existing conditions. Under proposed designs, the frequency of overtopping on Highway 1 will be reduced, requiring a flood magnitude of a 40-year event rather than a 30-year event to be overtopped. The frequency of overtopping on Muir Woods Road would also be reduced, requiring a 35-year event rather than the current 15-year event. These results indicate that the frequency of flooding from overtopping Highway 1 is reduced for residences lying immediately south of Highway 1, although they would still be at risk of flooding from overbank flows downstream of Highway 1. Potential downstream flooding related to run-off near the Winkleman property is not addressed or impacted through these project actions.

New high flow paths and structural diversity on the Old Ballfield would have the same benefits as those to be constructed on the Lower Field.

In addition to the reduced flooding frequency of Muir Woods Road, Highway 1 and the residences immediately south (downstream) of Highway 1, the proposed project will reduce the peak flow rates propagated to downstream areas between Highway 1 and the Pacific Ocean. The reduced or attenuated peak flow rates occur due to the increased floodplain storage associated with the newly introduced overbank flooding that will result from the project improvements described above. Hydraulic modeling results indicate reductions in peak flow rate leaving the project site of 2 percent for the 2-year flood and up to a 10-percent reduction during a 50-year flood.

Page 40, Section 3.4.1, Environmental Consequences (Hydrological Processes), Alternative 1, Cumulative Impacts

There is a potential cumulative beneficial impact of this project in combination with the 2003 restoration project at this site, the future floodplain reconnection on the Old Ballfield, and the proposed Wetland and Creek Restoration at Big Lagoon, Muir Beach. These ~~three~~ four projects together will restore natural hydrological patterns to about a linear mile of the creek, from the Upper Alley to the ocean. The Big Lagoon project will connect the full 38 acres in the coastal area with its floodplain, and the two projects at the Banducci site will have expanded floodplain to virtually all the area that is potentially functional under current creek conditions. The benefits of natural floodplain function improve both sediment dynamics and fish habitat, both discussed in other impact topics. With increased floodplain storage and more channel capacity due to the Big Lagoon project actions, downstream homes will experience a cumulative benefit from all projects together, although their risk of flooding during very large events will remain at about the same level as the existing condition.

The future project to remove the levee adjacent to the Old Ballfield will allow 2-year flows to wash onto the floodplain for the first time in at least about 50 years. About 1.32 new acres of floodplain will be inundated in a 2-year event with levee removal, and about 7 acres would be inundated in events larger than a 2-year event. A 3-year flow will extend across most of the floodplain, but it will be very shallow and of short duration. This new floodplain will provide habitat for salmonids and increase floodplain

storage of flows that would otherwise wash downstream, where residential structures are vulnerable to flooding. Hydraulic modeling results which assumed only about 4.3 acres of new floodplain would be available indicate the peak flow rate of a 2-year event would be reduced by about 2% when leaving the project area and the peak flow rate of a 50-year event would be reduced by up to 10% - these benefits may be improved further by expanding the floodplain area to its full 7 to 8 acres. This reduction would provide flood reduction benefits to residential structures downstream of Highway 1.

When the elevation of Muir Woods Road is raised in the about the 600 linear feet closest to Highway 1, the road would have a higher level of flood protection than exists under current conditions. The creek levee currently prevents overbank flow in events smaller than a 10-year event, thus the road currently doesn't receive overbank flow in less than a 10-year event. When the road is raised, it will be protected from events somewhat higher than a 10-year event, but less than a 30-year event. The specific range of likely added flood protection benefits can be defined through added hydraulic model runs during preparation of designs for the raised road. The raised road will tie in to the high point of about 27 ft. NGVD on Muir Woods Road and taper to about the 24.5 or 25 ft. NGVD elevation at Highway 1. The low point on Muir Woods Road is at about 22 to 23 ft. NGVD.

Under existing conditions, Highway 1 currently is not overtopped in events under a 30-year event. Highway 1 is at a higher elevation than Muir Woods Road. Future project actions to raise the elevation of Muir Woods Road would not increase or decrease flooding potential on Highway 1. Potential downstream flooding related to run-off and drainage systems at the intersection of Highway 1 and Muir Woods Road is not addressed or impacted through these project actions.

New high flow paths and structural diversity on the Old Ballfield would have the same benefits as those to be constructed on the Lower Field.

Page 40, Section 3.4.1, Environmental Consequences (Hydrological Processes), Alternative 1, Conclusion
Project actions will result in short-term and long-term, direct and indirect, local and regional major beneficial impacts on hydrological processes. The project actions will restore natural overbank flows and more natural flow patterns on the floodplains. Project actions will create a more natural low flow channel in the Upper Alley, with enhanced sinuosity and greater depth. When analyzed together with the cumulative project to Reconnect Redwood Creek to the Old Ballfield Floodplain and Raise the Elevation of Lower Muir Woods Road, the project will result in enhanced floodplain storage and will have measurable benefits on downstream flooding by reducing the peak flow rates propagated to areas downstream of Highway 1. The new setback levee will also reduce flooding over Highway 1 to downstream homes. Alternative 1 would not result in impairment to hydrologic processes or resources.

Page 45, Section 3.4.2, Environmental Consequences (Channel Stability and Sediment Dynamics), Alternative 1

Project actions in the Upper Alley will create widths of the floodplain similar to those of the reference reach, where recovery from historic incision appears to have already occurred. Reference widths of the active channel will not be created in the Upper Alley. However, the placement of Engineered Log Jams will direct flows in a manner that will encourage the development of undercut banks where trees occur, thereby creating habitat often used in both summer and winter by salmonids. The reference reach widths provide a template for stable channel and floodplain dimensions in which there is a dynamic equilibrium between sediment supply and transport capacity.

The width of the Upper Alley floodplain would be expanded from an average of 33 feet to a minimum width of 80 feet by cutting a terrace, or an inset floodplain, into the banks. The elevation of the new floodplain terrace would receive overbank flows from a bankfull, or 2-year flood event. The 80-foot width is considered to be a reasonable intermediate dimension compared to the range of widths for the reference reach. A total of about 2,185 cubic yards of material will be excavated from banks on both sides of the creek to achieve the desired floodplain width. The specific bank and terrace areas that will be excavated were selected to minimize the total excavation needed. For instance, excavating the left bank at a particular location requires only one foot of excavation to achieve the minimum width, whereas if the right bank were terraced at that location, the cut would have to be up to 4 feet deep. The active channel will not be widened and will instead allow banks to become undermined adjacent to existing trees.

Page 49, Section 3.4.2, Environmental Consequences (Channel Stability and Sediment Dynamics), Alternative 1, fourth bulleted paragraph

- ~~Future sediment supply from levees along the Old Ballfield and Lower Field that would eventually fail will be eliminated by removing the levees. Along several sections of the left Ballfield channel bank, the levee has been undercut and is currently eroding into the creek. Levee removal will provide both short and long term reductions in sediment loads to the channel and downstream reaches.~~

Page 49, Section 3.4.2, Environmental Consequences (Channel Stability and Sediment Dynamics), Alternative 1, Cumulative Impacts

Project actions would yield a cumulative beneficial impact in combination with the previous restoration project at this site (2003), future actions to reconnect the creek with the Old Ballfield floodplain, and the proposed Wetland and Creek Restoration at Big Lagoon, Muir Beach. As with hydrological processes, ~~these three~~ four projects together will restore more stable and natural channel conditions along about one mile of channel, from the Upper Alley to the ocean. It is possible that by not removing the Old Ballfield levees in the near term, some levees could fail and deposit additional sediment into the channel. This would be a direct, short term and long-term, local and regional moderate adverse impact. However, the future reconnection of the Old Ballfield floodplain will add substantial new area for deposition of fine sediment and would highlight weak portions of the levee for likely breaching in order to reduce the likelihood of their erosion. The overall cumulative effect will be a more natural, dynamic balance of sediment supply and transport capacity. This is a long-term, direct and indirect, local and regional major benefit.

Page 51, Section 3.5, Environmental Consequences (Soils and Geology), Alternative 1, first paragraph

Construction activities will entail excavation of site soils, transport of soil to other onsite locations, potential compaction from the use of heavy equipment, and potential for erosion. Quantities and locations of material to be excavated and placed are shown in Table 3-2. The quantity of material excavated will be balanced with quantities needed for beneficial uses, including the creation of the alluvial fan, a berm around the edge of the new frog pond ~~and the new setback levee on the Old Ballfield~~ and the Dias Ridge trail recontouring proposed under a separate project.

Page 51, Section 3.5, Environmental Consequences (Soils and Geology), Alternative 1, second paragraph

Soil to be excavated under a separate project to dig a pond for California red-legged frog habitat will be hauled to the Upper Field temporarily stockpiled on the Lower Field and will be hauled by a separate contractor for use in the Dias Ridge project. The 2-acre stockpile area will be scraped in advance of placing stockpiles to reduce their exposure to seeds of weedy non-native grasses. The scraped material

will be hauled to the Upper Field for use in creating the new Alluvial Fan. Under actions by this project, the remaining soil not hauled to Dias Ridge, consisting primarily of clays, with some silty loam and some gravel, will be used to reconstruct the natural contour of the northern boundary of the site.

Page 52, Section 3.5, Environmental Consequences (Soils and Geology), Alternative 1

TABLE 3-2. ESTIMATED CUT AND FILL VOLUMES

<i>Design Component</i>	<i>Net Cut (cubic yards)</i>	<i>Net Fill (cubic yards)</i>
<i>Ballfield Levee Removal</i>	<i>776</i>	
<i>Set-Back Levee</i>		<i>1310</i>
<i>Lower Field Levee Removal</i>	<i>124</i>	
<i>Frog Pond Creation*</i>	<i>3,212</i>	
<i>Scraping in Stockpile Area</i>	<i>1,000</i>	
<i>Upper Alley Channel Work</i>	<i>2,185**</i>	
<i>N. Tributary Alluvial Fan Reconstruction</i>		<i>4937*** 3,800</i>
<i>Plug Drainage Ditch</i>		<i>50</i>
<i>Expand Ditch for new Backwater</i>	<i>190</i>	
<i>TOTAL CUT & FILL</i>	<i>6297 6,711</i>	<i>6297 3,850***</i>

*The frog pond will be excavated through a separate project, but it is shown here because its fill material will be used for this project. An additional 640 CY of material excavated for the frog pond will be used to build a berm around the edge of the pond in this project.

** Approximately 1/3rd of the material generated from the Upper Alley Channel Work will be generated from the left (east) bank excavation work.

***An estimated 2,800 CY of material excavated for project actions will be hauled to the Dias Ridge trail recontouring site. This total accounts for the difference between cut and fill volumes. The use of the fill for the Dias Ridge recontouring is beneficial because it will reduce the impacts of the trail recontouring work by narrowing the area adjacent to old trails that must be scraped to provide fill to rebuild a natural contour. The size of the alluvial fan will be slightly smaller than in original designs, but it can be constructed to appear natural with 3,800 CY available..

Page 52, Section 3.5, Environmental Consequences (Soils and Geology), Alternative 1, four paragraphs:

~~Material excavated from the Upper Alley, along with material excavated from the berm at the edge of the Old Ballfield, will be used to build the new set back levee near the southern and eastern boundaries of the Old Ballfield partially to build the new alluvial fan and partially to provide fill for the Dias Ridge Trail recontouring project. Based on a geotechnical analysis, the soil is suitable for the use as a levee to both withstand seismic shaking and flooding (Miller Pacific, 2006). The levee will be constructed following specific geotechnical specifications for subsurface compaction under the new levee, compaction of placed fill at multiple horizontal layers, and slope construction with a maximum inclination of 3:1 side slopes.~~

The use of soil at Dias Ridge will reduce impacts of that project by narrowing the area along trails that must be scraped to generate soil to rebuild the natural grade of the old trails.

Surface soils on the ballfield and the Lower Field will be disturbed during excavation of the shallow high-flow channels, and the material will be placed as small mounds on the field. A new berm will be constructed along the edge of the newly excavated pond in the Lower Field, placing approximately 640 cubic yards of material along the outer edge of the pond.

The floodplain terrace on the left (easterly) bank of the Upper Alley will be constructed by an excavator working from the left bank, or, if impacts to the creek can be kept minimal through the use of pads or other materials, possibly by excavating from the creek when the equipment is in the channel to install log structures. An access route from Muir Woods Road will be established if needed to haul material from the left bank. It will follow an alignment of an old ranch road that is currently vegetated but can function for temporary access. Newly excavated banks for the active channel and the floodplain of the Upper Alley will have gentle slopes that will be less susceptible to erosion than the existing undersized channel walls. However, excavated banks on the Upper Alley ~~as well as the Old Ballfield~~ will have newly exposed surfaces that will be subject to erosion and run-off of fine material.

The installation of ~~seven~~ six Engineered Log Jams in the Upper Alley will entail an excavator working in the channel bed.

Page 53, Section 3.5, Environmental Consequences (Soils and Geology), Alternative 1, fourth bulleted item

- *Newly graded banks of the Upper Alley ~~and the Old Ballfield~~ will be revegetated with native riparian species to help stabilize and establish cover on these areas quickly.*

Page 53, Section 3.5, Environmental Consequences (Soils and Geology), Alternative 1, Cumulative Impacts

Project actions are not likely to result in long-term cumulative impacts adverse impacts to site soils. Potential cumulative soil erosion impacts from this project and in combination with construction of the frog pond, the future breaching of the berms along the Old Ballfield, or other offsite projects such as the restoration at Big Lagoon would be offset by implementation of Best Management Practices (see Appendix D).

Page 53, Section 3.5, Environmental Consequences (Soils and Geology), Alternative 1, Conclusion

Potential impacts to soil and the creekbed from construction activities and erosion would be local, short-term, direct and indirect, and minor adverse, and reduced to less-than significant levels through the use of BMP's. However, the proposed project would result in local, short and long term, direct and indirect, and moderate beneficial impacts to soil resources and erosion processes through the rebuilding of natural contours in the Upper Field and along the Upper Alley, ~~and in the Old Ballfield.~~ Alternative 1 would not result in impairment to site soil resources.

Page 59, Section 3.6.1, Environmental Consequences (Special Status Species, Fisheries), Alternative 1 (Preferred), Second and Fourth Paragraphs

To install the log jams ~~and widen the active channel,~~ an excavator will enter the creek.

Log installation, ~~channel widening,~~ floodplain terracing and berm removal would occur during the late summer and early fall.

Page 61, Section 3.6.1, Environmental Consequences (Special Status Species, Fisheries), Alternative 1, Water Quantity

Expected changes in surface flow patterns will be local, direct and major beneficial impacts because installed log structures will result in a narrower, deeper low flow channel, as occurs in the upstream reference reach. The more natural low flow channel dimensions will improve the interconnectedness of the low flow channel, though it cannot prevent some drying that already occurs in dry years. The expanded floodplain in the Upper Alley ~~and the removal of the 970 foot long berm adjacent to the Old Ballfield floodplain~~ will also allow increased lateral usage of the creek during storm events by aquatic organisms.

Page 62, Section 3.6.1, Environmental Consequences (Special Status Species, Fisheries), Alternative 1, Riparian Vegetation

~~For removal of the 970-foot long levee adjacent to the Old Ballfield, up to about 0.45 acres of riparian vegetation on the levee footprint will be disturbed. Almost all mature trees will remain in place. Removal of mature trees will be avoided if at all possible, and this is likely to result in about five to six small portions of the levee that are retained in place. Willows are likely to be limbed to create access paths for heavy equipment, and some understory may be crushed under heavy equipment. Access areas will be limited to reduce this impact. Areas disturbed by levee removal will be revegetated as necessary. Additional actions to remove non-native species are discussed in Section 3.6.4~~

The removal of a row of Eucalyptus trees adjacent to the access road and the Lower Field will prevent the infestation of Eucalyptus throughout that area and allow the Lower Field to become vegetated with native riparian species.

Revegetation will be conducted immediately following actions by heavy equipment, and substantial cover is expected within about 5 years. There will be a net gain of 0.43 acres of new riparian habitat in the Upper Alley and 0.12 acres of new floodplain on the Lower Field connected to the larger floodplain, and 4.37 acres newly connected acres of riparian habitat on the Old Ballfield.

Page 63, Section 3.6.1, Environmental Consequences (Special Status Species, Fisheries), Alternative 1, Safe Passage, fourth sentence

They will also provide high-flow channels networked across the Lower Field ~~and the Old Ballfield~~ to increase connectivity of the floodplain with the channel for fish.

Page 64, Section 3.6.1, Environmental Consequences (Special Status Species, Fisheries), Alternative 1, Cumulative Impacts, add third paragraph

The connection of the creek with the Old Ballfield floodplain would add about 7 to 8 acres of available floodplain for salmonids, providing additional winter habitat that is critical to salmonids in Redwood Creek. By breaching Old Ballfield berms rather than removing the entire 970 linear feet of berms, the temporary impacts to riparian vegetation would be minimized. A mature riparian area adjacent to the roads would be available for use by salmonids and, provided consultations with Caltrans allow the culvert and/or the culvert flapgate next to Highway 1 at Redwood Creek to be removed, a new backwater habitat will be created, further adding to valuable winter habitat for salmonids. The proposed relocation of the MBCSD shed where water treatment chemicals are stored would add a long-term, indirect, minor beneficial impact to water quality protection.

Page 65, Section 3.6.1, Environmental Consequences (Special Status Species, Fisheries), Alternative 1, Conclusion, last paragraph

The proposed project would result in long-term, local to regional, direct and indirect, moderate to major beneficial impacts to the coho salmon and steelhead population in Redwood Creek. With deeper low flow conditions along 580 linear feet of the Upper Alley, a floodplain expanded from an average of 33 feet to 80 feet along the Upper Alley, 0.43 acres of new floodplain in the Upper Alley, installation of 7 ELJ's, new high flow connections on the Lower Field with structural complexity and new routes back to the creek due to additional remnant levee removal, an expanded tributary width for winter refugia, and up to 4.37 acres of newly connected floodplain through removal of the 900-foot long levee along the Old Ballfield, the project actions will enhance both summer rearing and winter rearing habitat for the coho and steelhead. Overall, the proposed project is expected to result in net increases to the quantity, quality, and connectivity of instream and floodplain habitats. Alternative 1 would not result in

impairment to fisheries.

Page 67, Section 3.6.1, Environmental Consequences (Special Status Species, California red-legged frog), Alternative 1, First Paragraph, Seventh Sentence:

Other actions on the Lower Field, ~~and Upper Field and Old Ballfield~~ to expand floodplain function, riparian habitat, high flow paths, and enhanced structural diversity on the floodplain will expand available non-breeding habitat for the California red-legged frog over approximately 10 acres in the Lower Field, ~~4.37 acres in the Old Ballfield~~, and the entire riparian area along the 3,800 linear feet of Redwood Creek in the project area.

Page 68, Section 3.6.1, Environmental Consequences (Special Status Species, California red-legged frog), Alternative 1, Cumulative Impacts, Add a New Second Paragraph

The additional project expected in the future to expand the floodplain function on the Old Ballfield will contribute to cumulative, long-term, direct and indirect, local and regional minor beneficial impacts for the California red-legged frog. These additional benefits will be due to the long-term enhanced riparian and slightly wetter areas of the high flow channels that would be constructed in the Old Ballfield. The field will be available as non-breeding habitat even without additional actions on the Old Ballfield; therefore, the cumulative benefits of additional floodplain reconnection actions are therefore considered minor.

Page 71, Section 3.6.2, Environmental Consequences (Other Wildlife), Alternative 1, Cumulative Impacts

Project actions under Alternative 1 will have direct and indirect, local and regional, long-term major beneficial impacts on riparian songbirds in combination with the prior project at the site to restore floodplain connectivity, the downstream actions proposed by NPS in the Wetland and Creek Restoration at Big Lagoon, Muir Beach, and the future project to connect the creek with its floodplain on the Old Ballfield. Since prior actions established the floodplain connectivity in the Lower Field, these project actions will enhance the structural diversity that will increase its habitat value for songbirds. Similarly, the actions in the Upper Alley, together with prior actions to expand the width of the riparian corridor along 1,300 linear feet of the Middle Reach of the creek, the riparian habitat will have enhanced connectivity along the entire 3,800 linear feet of the Banducci site.

When the levee is breached along the Old Ballfield (after the lower portion of Muir Woods Road is raised by Marin County), up to about 0.45 acres of riparian habitat may be temporarily disturbed during construction. Additional adjacent areas may be disturbed by construction equipment for access, but access points will be minimized. Clearing and grubbing will be necessary for levee breaching, and it is possible that some mature trees may be removed or limbed, although no trees that provide overhanging shade to the creek would be expected to be removed.

Page 78, Section 3.6.3.2 Environmental Consequences - Wetlands, Alternative 1 - Wetlands Impacts

Upper Alley: New riparian areas in the newly excavated inset floodplain terrace are not expected to be jurisdictional, but they would expand Cowardin-mapped forested wetlands by about 0.43 acres. ~~Approximately 150 linear feet of the active channel will be widened by about 10 feet to create a more stable channel geometry. This will increase the acreage of potentially jurisdictional open water by 1,500 sq. ft. Six ELJ's to be installed in the channel, often considered fill, would total an area of about 0.014 acres in waters of the U.S. This is based on the total area of the logs in the ELJ design, each a maximum of 30 feet by a maximum diameter of 3 ft. The seventh ELJ is already in place in the creek, but will be reconfigured.~~ Temporary dewatering to be conducted during construction implementation in the Upper Alley would involve the use of coffer dams.

Page 79, Section 3.6.3.2 Environmental Consequences - Wetlands, Alternative 1 - Wetlands Impacts

~~Old Ballfield: The new 930-foot-long setback levee was designed to avoid placement on jurisdictional wetlands to the greatest extent possible, while maximizing new area of functional floodplain. However, in order to achieve the flood protection necessary from the setback levee, it must tie into the elevation of Muir Woods Road and it will displace about 0.07 acres of potentially jurisdictional wetland at the junction with Muir Woods Road. The entire footprint of the setback levee is 0.43 acres. It will be constructed at the inner edge of existing scrub riparian vegetation, outside of the boundaries of the jurisdictional wetland, but within the boundaries of a Cowardin-mapped wetland. Therefore, 0.43 acres of Cowardin-mapped wetland will be displaced by the footprint of the setback levee. The location of the levee is designed to leave adequate space on the road-side of the levee for drainage flows from the hillsides. If the setback levee were to be built too close to the roads, it could reduce conveyance capacity of these drainages.~~

~~Drainage from one culvert under Muir Woods Road will be directed to the floodplain side of the new setback levee, leaving only local roadway runoff collecting between the levee and the road. The design will not alter the shallow groundwater conditions that sustain the riparian areas along the road and that likely serve as the primary water supply for the riparian habitat there. No wetland area will be lost as result of this action.~~

~~The removal of the levee adjacent to the creek and the creation of new high flow channels on the floodplain at the Old Ballfield are not expected to create new jurisdictional wetlands. The levee removal is not expected to expand Cowardin-mapped wetlands since the riparian area is already classified as a Cowardin wetland; however, the creation of high flow paths may expand areas mapped as Cowardin wetlands by about 0.29 acres since they will be wetter, closer to groundwater elevations, and more likely to support emergent or riparian scrub vegetation.~~

Page 80, Section 3.6.3.2 Environmental Consequences - Wetlands, Alternative 1 - Wetlands Impacts, Summary

Site-wide restoration actions would result in long-term direct local minor beneficial impacts to wetlands due to the net gain of 0.118 acres of potentially jurisdictional wetlands. The benefits of enhanced wetland function exceed the benefits of added wetland acreage since hydrologic connectivity and natural drainage patterns will be restored. Restoration actions may also result in a net gain of 0.7 acres of Cowardin-mapped wetlands due to the creation of high flow channels which will trend toward wetter conditions. Cowardin wetlands could be expanded even more, depending on the development of floodplain vegetation once the floodplain is functional.

Page 80, Section 3.6.3.2 Environmental Consequences - Wetlands, Alternative 1 - Wetlands Impacts, Cumulative Impacts

Cumulative benefits will result from the combination of 2003 floodplain restoration and proposed actions in this project to enhance the connectivity of the Lower Field to hillside drainage and create micro-topographic conditions to support vegetation and functional diversity. This is a long-term direct and indirect moderate beneficial impact to wetland function.

Additional cumulative benefits to wetlands will occur due to the future project to connect Redwood Creek with the seven to eight-acre Old Ballfield. The floodplain reconnection alone is not expected to increase the acreage of jurisdictional wetlands, but the creation of new high flow channels which would be about 1 foot deeper than the existing grade and would trend slightly wetter would add approximately

0.29 acres of Cowardin-mapped wetlands. There would be no loss of jurisdictional or Cowardin-mapped wetlands since a setback levee would not be constructed on the field.

Page 81, Section 3.6.3.2 Environmental Consequences - Wetlands, Alternative 1 - Wetlands Impacts, Tables

TABLE 3-7. TEMPORARY AND PERMANENT IMPACTS AND GAINS TO POTENTIAL USA CE JURISDICTIONAL WETLANDS AND WATERS

Site	Temporary Wetland/Waters Impact (Acres)	Permanent Wetland/Waters Impact (Acres)	Permanent Wetland/Waters Gain (Acres)
Upper Alley:			
ELJ Installation		0.01	
Widen Active Channel			0.03
Coffer Dams	0.003		
Lower Field:			
New pond**			0.25
Berm at edge of pond		0.16	
Plugs in Drainage Ditch		0.012	
Widened End of Drainage Ditch			0.05
Temporary Crossing	0.0009		
Old Ballfield:			
Edge of Setback Levee		0.07	
Total Wetlands and Waters	0.0039	0.252 0.182	0.33 0.30
Net Change in Permanent Waters and Wetlands: +0.078 acres +0.118 acres			

**The pond represents new wetland acreage since the prior certification of jurisdictional wetlands.

TABLE 3-8. IMPACTS AND GAINS TO COWARDIN-MAPPED WETLANDS

Site	Cowardin Wetland Class		
	Forested Wetland (Acres)	Scrub-Shrub Emergent Wetland (Acres)	Emergent Wetland (seasonally saturated) (Acres)
Upper Alley :			
New Floodplain Terrace	+0.43		
Upper Field:			
Alluvial Fan Reconstruction			-0.35
Lower Field:			
High Flow Channels		+0.62	
Old Ballfield:			
High Flow Channels		+0.29	
Alignment of Setback Levee		-0.43	
Total Change	+0.43	+0.48 <u>+0.62</u>	-0.35
Net Change in Cowardin-mapped wetland acreage: +0.56 <u>+0.7 acres</u>			

Page 82, Section 3.6.3.2 Environmental Consequences - Wetlands, Alternative 1 - Conclusion
 Alternative 1 would result in short-term, direct and indirect, local and minor impacts to wetlands during construction activities. With implementation of BMPs, these adverse impacts to wetlands would be reduced to less-than significant levels. The ~~0.25~~ 0.182 acres of jurisdictional wetlands removed would be offset by ~~0.33~~ 0.30 acres created, and the ~~0.78~~ 0.35 acres of Cowardin-mapped wetlands removed

would be offset by ~~1.34~~ 0.7 acres created. The net result of project actions is the direct and indirect, long-term, local moderate beneficial impacts on wetlands due to enhanced hydrological connectivity and enhanced functional diversity of the wetlands. There would be no impairment to wetlands.

Page 84, Section 3.6.4 Affected Environment – Vegetation and Native Plant Communities, add paragraph to end of section

A row of mature Eucalyptus trees occurs adjacent to the access road and the southern end of the Lower Field. The trees drop capsules, the reproductive component, onto the adjacent Lower Field, where numerous saplings and seedlings of Eucalyptus trees have been removed by NPS over the past 10 years to prevent the floodplain of the Lower Field from becoming a Eucalyptus grove. The row of trees includes 19 mature trees (greater than 18 inches diameter at breast height [dbh]) and numerous smaller trees (12 trees between 12 and 18 inches dbh, and 8 less than 12 inches dbh). This mature grove has also caused the spread of smaller trees up the adjacent hillslope to the west where native coastal scrub habitat occurs (about 4 trees less than 12-inches dbh, 2 trees between 12 and 18 inches dbh, and numerous smaller saplings).

Page 84, Section 3.6.4 Environmental Consequences – Vegetation and Native Plant Communities

Old Ballfield: Project actions will remove the 1.5 acres of tall fescue by scraping it out with heavy equipment. The mature grasses will be scraped out just below rooting depth, or about 4 inches. The excavated plants will be placed in a pile at the southern edge of the site, covered with a tarp, and allowed to compost for more than a year. Some riparian woody species, particularly understory shrubs, will be planted in this area following construction activities, but it will mostly be allowed to revegetate through natural recruitment. However, the new set-back levee will be actively revegetated with native scrub species such as coyote brush, since it would be prone to establishment by non-native species. Revegetation management will focus on follow-up removal of noxious species, such as tall fescue.

Page 85, Section 3.6.4 Environmental Consequences – Vegetation and Native Plant Communities, Lower Field, add a new paragraph:

The row of Eucalyptus trees adjacent to the access road near the southern end of the Lower Field will be removed, as funding is available. Their removal will prevent the long-term establishment of a Eucalyptus grove in the Lower Field, which will function as a native riparian area and floodplain. The removal will prevent the long-term spread of the non-native trees, which do not support a diverse native plant population in the understory. The removal will also provide trunks that may be used as part of the Large Woody Debris to be placed throughout the 6 to 10 acres of the Lower Field to create topographic and vegetative diversity. The slash of the – the leafy material, small branches, and any part likely to have capsules, will be cut from the trunk and placed in piles to be burned or will be entirely removed from the site. When trees are felled, some may land on the alder saplings in the adjacent Lower Field. Some young alders may be lost due to this, but the Eucalyptus would be most logically and safely felled in the direction of the young alders. Not all alders would be impacted, and the long-term vegetation composition of that area is more likely to be native with the removal of the Eucalyptus trees. The trees will be felled only after the end of bird nesting season, August 1. The stumps of the newly felled trees will be covered with landscape fabric, following NPS guidelines, to prevent them from resprouting.

Page 85, Section 3.6.4 Environmental Consequences – Vegetation and Native Plant Communities

Upper Alley: Portions of the newly excavated active channel bank which appear to be vulnerable in the short run to bank erosion due to construction actions will be protected with a willow brush mattress or similar biotechnical erosion control. These areas are likely to be limited to outside meander bends or similar vulnerable reaches of the creek bank.

Page 85-86, Section 3.6.4 Environmental Consequences – Vegetation and Native Plant Communities

Short-term direct minor adverse impacts to vegetation and native plant communities may occur due to construction activities, such as temporary removal or degradation due to heavy equipment and the temporary haul road or felling the row of Eucalyptus trees adjacent to the Lower Field. Long-term indirect adverse impacts may result from future weed encroachment in project areas after soil disturbance. This impact would be minor to moderate, and would be largely off-set by the long-term, direct and indirect, moderate beneficial impact of removing significant stands of the noxious species, cape ivy and tall fescue, and the establishment of new native riparian habitat in the Upper Alley, and the Lower Field and the Old Ballfield.

Project actions would result in local, long-term direct and indirect moderate to major beneficial impacts due to the restoration of the riparian corridor along 580 linear feet of the Upper Alley, and the 10-acre Lower Field, and the 4.37-acre Old Ballfield; the removal of cape ivy from 1.3 acres, and the removal of tall fescue from 1.5 acres in the Old Ballfield and the removal of a row of 19 mature Eucalyptus trees and associated smaller trees that would otherwise spread on the Lower Field. Due to the recreation of natural contours at the northern end of the Upper Field, a coastal scrub community can become established in this area.

Page 86, Section 3.6.4 Environmental Consequences – Vegetation and Native Plant Communities, Cumulative Impacts

Cumulative long-term, direct and indirect, moderate to major beneficial impacts will occur due to this project in combination with actions conducted previously in 2003 and the future actions to reconnect Redwood Creek with the Old Ballfield floodplain. The newly restored floodplain connection with the middle reach in 2003 allows this project to refine the topography and therefore the vegetation that will occur on the Lower Field. In addition, the previously widened floodplain corridor along the middle reach will combine with current project actions to create a functional riparian corridor width along the entire 3800 linear feet of channel in the project area. Vegetation in the 2003 restoration area is established, but still immature as of late 2006. However, its survival through multiple years and its apparent high recruitment rate after overbank flows indicates that with ample time, the area will clearly become a functional riparian habitat. The added floodplain connection with the Old Ballfield may not by itself expand riparian habitat, but the new high flow channels will expand habitat that would be vegetated by wetland and/or riparian species.

Page 86, Section 3.6.4 Environmental Consequences – Vegetation and Native Plant Communities, Conclusion

Alternative 1 would result in short and long-term, direct and indirect, local, and minor to moderate adverse impacts to vegetation and native plant communities. With the implementation of the mitigations, adverse impacts would be reduced to less-than-significant levels. However, the proposed project would result in long-term, direct and indirect, local, and moderate to major beneficial impacts. New native riparian habitat will be established over 0.43 acres in the Upper Alley, ~~4.37 acres in the Old Ballfield,~~ and scattered over 10 acres in the Lower Field. The spread of the noxious, non-native species Eucalyptus would be prevented by removing 19 mature trees and the associated smaller trees adjacent to the Lower Field. ~~Additionally, noxious non native species would be removed from 2.8 acres in the Old Ballfield.~~ Overall, the proposed project would result in a net increase to the quantity and quality of vegetation and native plant communities as well as cumulative long-term, direct and indirect, moderate to major beneficial impacts 3. There would be no impairment to vegetation.

Page 88, Section 3.6 Affected Environment – Cultural Resources

Three known ~~prehistoric~~ indigenous archeological sites occur in the Muir Beach area.

Pages 88-90, Section 3.6 Environmental Consequences – Cultural Resources, Alternative 1

Global change in spelling from *archaeological* to archeological.

Page 88, Section 3.6 Environmental Consequences – Cultural Resources, Alternative 1

While no known archeological resources have been identified at the site, there is the potential that archeological resources could be discovered during restoration actions that disturb site soils. Most restoration actions affect soils that have been previously altered for farm management, such as the construction of levees, the drainage ditch adjacent to the access road, and bank stabilization along the Upper Alley. High flow channels to be constructed on the Lower Field and Old Ballfield will generally be about 1 foot deep, or possibly a maximum of 2 feet deep, well within the range that would have been disturbed by cultivation. ~~The new setback levee on the Old Ballfield will require some subsurface compaction prior to its construction; however, the Old Ballfield has not been considered a likely “hot spot” due to its historic function as the lowland drainage. The Monterey cypress trees at the northern boundary of the site occur at the base of an alluvial fan, which is a potential hot spot. Construction actions will be monitored for possible discoveries.~~

Page 88, Section 3.6 Environmental Consequences – Cultural Resources, Alternative 1, Cumulative Impacts

The proposed project would not have impacts to historic resources and would avoid impacts to archeological resources; therefore the proposed project would not contribute cumulatively to impacts that have occurred to cultural resources from other regional projects. There would be no cumulative impacts due to future actions to reconnect the creek with the Old Ballfield floodplain; a setback levee would not be constructed, and the soil that would be disturbed to breach the existing berm is previously disturbed material. The high flow channels that would be constructed on the Old Ballfield would be only about 1 foot deep and within the zone that would have been disturbed by agricultural cultivation.

Page 88, Section 3.6 Environmental Consequences – Cultural Resources, Alternative 1, Conclusion

With mitigations to protect potential archeological discoveries, the project would have long-term, direct and indirect, local and regional negligible impacts to historic or archeological resources. If a site is discovered, this would be a regional, long term, direct benefit to the understanding of prehistoric uses in the region. In the event of a discovery, the goal of the project is to have negligible, or at most minor, direct adverse impacts. There would be no impairment to historic or cultural resources.

Page 91, Section 3.7 Environmental Consequences – Visitor Use and Recreation, Alternative 1, Cumulative Impacts

While this project does not impact existing recreational uses, ~~the new setback levee to be constructed in an alignment through the edge of the Old Ballfield is proposed as a trail connector in two out of three alternatives for new trail alignments of the Lower Coast View Trail. The Dias Ridge and Lower Coast View Trails Rehabilitation project, jointly proposed by NPS and Mount Tamalpais State Park, has proposed two possible trail alignments to extend the Coast View Trail through the southern coastal hills on the Banducci property. The new alignments would route visitors to a new crossing over Redwood Creek adjacent to the existing Highway 1 Bridge. The new crossing would tie into the setback levee a trail on the Old Ballfield at the existing ground elevation to provide for a connection to the Redwood Creek trail on the east side of Muir Woods Road. The trail connection would provide the first southern trail route to Muir Beach and expand available opportunities for bikers who want to avoid Highway 1. The added function of the setback levee route through the Old Ballfield as a trail connection would be a long-term, direct, major beneficial impact to visitor and recreational uses. A trail through the Old~~

Ballfield at the existing ground elevation would be subject to infrequent, short-duration flood events that would not substantially affect visitor use, since visitors are generally not using such areas during large floods. A trail through the Old Ballfield should not be raised, unless it is a raised boardwalk or similar design, in order to avoid creating a barrier for flood flows. A trail connector through the Old Ballfield can be constructed even if floodplain reconnection actions have not been conducted there.

Page 91, Section 3.7 Environmental Consequences – Visitor Use and Recreation, Alternative 1, Conclusion
The project actions would not impact recreational use. There is the potential for long-term, direct, major beneficial cumulative impacts if ~~the setback levee functions~~ as a trail connector between a new alignment of the Coast View trail and the Redwood Creek Trail is constructed through the Old Ballfield.

Page 93, Section 3.8 Land Use – Environmental Consequences, Alternative 1, first paragraph
The FPPA instructs federal agencies to consider alternative actions that could lessen adverse effects to farmland. However, there is only one alternative analyzed because there is not another reasonable alternative that will restore natural creek processes in the project area. However, project actions in the Upper Alley and Lower Field and the Old Ballfield will allow enhancement of natural processes at the site while not precluding other potential future uses in the Upper Field that could be determined through other planning processes, including farming or equestrian uses.

Page 94, Section 3.8 Land Use – Environmental Consequences, Alternative 1,
~~Project actions to remove the levee adjacent to the Old Ballfield would increase flooding there and remove it from suitability for future farming. With shallow groundwater, the site is already less desirable for farming than the Upper Field. The added floodplain storage area of the Old Ballfield also provides direct flood reduction benefits to downstream residents. It is possible that some uses of this area that would not entail extensive or routine vegetation removal, grading, filling or similar activities could be compatible with the long-term function of this site as a floodplain.~~

Page 94, Section 3.8 Land Use – Environmental Consequences, Alternative 1, Cumulative Impacts
*Prior actions in 2003 established the long-term natural function of the Lower Field by reconnecting it as a floodplain with the Middle Reach of the creek. Proposed actions do not alter that function, but further enhance that area's natural function. The foreseeable future project of reconnecting Redwood Creek with its floodplain on the Old Ballfield would increase flood frequency there and remove it from suitability for future farming. Since this area is currently not in use as farming and has no identified legal source for irrigation, this future action would not contribute to cumulative impacts. *The cumulative impacts of the 2003 and current ~~se two~~ projects in the lower field is a long-term, direct, minor adverse impact on land use as farming.**

Page 94, Section 3.8 Land Use – Environmental Consequences, Alternative 1, Conclusion, first sentence
Project actions would have a long-term, direct and minor adverse impact on land use as possible future farmland.

Page 94, Section 3.8 Land Use – Environmental Consequences, Alternative 1, Conclusion, last sentence
Other project actions in the Lower Field ~~and Old Ballfield~~ would affect areas that are not considered desirable for farming due to their shallow groundwater, wet conditions, and the overall gains in flood reduction that occur due to allowing the areas to function for floodplain storage.

Page 95, Section 3.9 Noise– Environmental Consequences, Alternative 1

As riparian habitat expands over the Lower Field and the Old Ballfield, if songbird use of these areas also expands, then there may be a long-term, indirect, minor beneficial impact to the natural soundscape.

Page 96, Section 3.9 Noise– Environmental Consequences, Alternative 1, Cumulative Impacts

There will be no cumulative impacts to noise or natural soundscapes due to project actions. There would be no cumulative impacts of noise due to future floodplain reconnection on the Old Ballfield since those actions would occur at a different time and would be temporary and short-term. If other projects were to occur at the same time, there would be short-term, direct and indirect, minor adverse cumulative adverse impacts resulting from increased noise in the area.

Page 97, Section 3.10 Visual Resources– Environmental Consequences, Alternative 1

The levee removal adjacent to Redwood Creek in the Old Ballfield will not be visible from a distance. The new setback levee will be almost entirely obstructed from view by passing vehicles due to the roadside riparian habitats, but it will be visible briefly from the opening adjacent to Muir Woods Road. There will be a short term, local, direct, moderate visual impact from the new setback levee that will be visible from one viewpoint, but this will be reduced in the long run by the expansion of riparian habitat in the Old Ballfield that will largely obstruct its view and the establishment of scrub species such as coyote brush on the walls of the new setback levee that will allow it to blend into the landscape.

Page 97, Section 3.10 Visual Resources– Environmental Consequences, Alternative 1, Cumulative Impacts

The future project to reconnect Redwood Creek with the Old Ballfield floodplain and raise the lower 600 feet of Muir Woods Road to protect it from flooding will not contribute to impacts to visual resources. The possible construction of a trail alignment through the Old Ballfield, rather than routing a trail along the previously proposed setback levee, would not represent a cumulative visual impact. A trail alignment would be less visible at the existing ground surface than on a setback levee.

Page 97, Section 3.10 Visual Resources– Environmental Consequences, Alternative 1, Conclusion

Alternative 1 will result in a short term, local, direct moderate adverse impact to visual resources from the construction of the setback levee, but this impact would be less than significant. This impact will be reduced to a negligible impact in the long run as vegetation because naturally established. ~~Other~~ Actions in Alternative 1 will result in a long term, indirect, minor beneficial visual impact by expanding natural features. There would be no impairment to visual resources.

Page 99, Section 3.11 Human Health– Environmental Consequences, Alternative 1

Actions proposed in the Upper Field, along the Upper Alley, ~~and in the Old Ballfield~~ will not create new areas where mosquito breeding would occur. New areas of floodplain would be temporarily inundated, but would not provide suitable mosquito breeding habitat. There would be no increase in standing water due to actions in these areas.

Page 100, Section 3.11 Human Health– Environmental Consequences, Alternative 1, Cumulative Impacts

There would be no cumulative impacts to Human Health due to future actions to reconnect Redwood Creek with the Old Ballfield floodplain.

Page 101, Section 3.12 Traffic– Environmental Consequences, Alternative 1, first paragraph

Some trucks hauling excavated fill will access Muir Woods Road at ~~two~~ one temporary access points established for construction. One access point to the road will be established from ~~the Old Ballfield,~~ ~~and the other will be established from~~ a scrub-dominated field on the east side of the creek near the Upper Alley. When material is excavated from the left (east) bank of the Upper Alley, trucks will access the east bank by a temporary haul road to be cut through brush adjacent to Muir Woods Road. About

~~70 to 300 truck trips will be generated to haul material on public roads. These trucks trips will be travel from the east side of the creek, down Muir Woods Road, and to the Old Ballfield for construction of the setback levee or back to the access road via Highway 1 to deliver the material to the Upper Field, or they will travel from the Lower Field to Highway 1 to the Dias Ridge trail recontouring project. The access point to the Old Ballfield would be established at a sufficient distance from the intersection with Highway 1 to avoid impacting traffic flow at the intersection.~~

Page 101, Section 3.12 Traffic– Environmental Consequences, Alternative 1, third paragraph

Residents at the project site may experience short-term, temporary impacts when construction vehicles access the site via the access road, although almost all hauling of excavated material will not take place on the access road, but will be trucked down the field instead. The installation of two new culverts or drainage grates across the access road as well as the removal of the Eucalyptus trees adjacent to the road may impede traffic temporarily, and this action will be coordinated in advance with site residents to minimize inconvenience.

Page 102, Section 3.12 Traffic– Environmental Consequences, Alternative 1, Cumulative Impacts
Future actions to raise the elevation of lower Muir Woods Road to allow floodplain reconnection with the Old Ballfield would temporarily affect traffic flow on Muir Woods Road, but this is not considered a cumulative impact since it would be temporary and short term during its own construction period.

Chapter 4, Section 4.2 Regulatory Compliance, add paragraph
The Farmland Protection Policy Act (FPPA)

The purpose of the FPPA is to minimize the impact that federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. Federal agencies that may impact prime or unique farmland or farmland of state or local importance are directed to contact the National Resources Conservation Science (NRCS). The required forms have been filed with the NRCS.

PART 3: RESPONSE TO COMMENTS

A public comment period was provided for the EA from March 6, 2007 through April 6, 2007. One comment was received from an individual; three comments were received from public agencies, including NOAA's National Marine Fisheries Service (NMFS), the California Dept. of Transportation, and the California Dept. of Fish and Game; and one comment was received from the Sierra Club Marin Group. The paraphrased comments and the NPS responses follow. Informal site walks were held during the public comment period, and an additional public site walk and dialogues were held after the public comment period. Two public comments not provided in writing on the EA, but expressed verbally, are included in these comments due to the level of concern expressed.

Comment: Three comments focused on concerns about the proposed construction of a set-back levee on the Old Ballfield. These included:

- NMFS strongly recommended that Muir Woods Road should be protected from new flooding by raising the elevation of the road itself, rather than constructing the setback levee on the floodplain. This approach would enhance the hydraulic connection between existing mature riparian wetland on the site rather than isolating that habitat from the floodplain. NMFS believes the isolated riparian wetland would be diminished over time due to isolation between a setback levee and the road. Secondly, the riparian habitat would function as winter refuge for coho salmon, and perhaps even spring rearing habitat, if it remained connected rather than isolated. Finally, the added area of the site that could function as floodplain if the setback levee were not constructed would improve flood

water storage under large infrequent flood events and thereby improve the flood reduction benefits of the project.

- NMFS stated that when actions on the levee adjacent to the creek are conducted after the road is raised, the levee could be breached, rather than entirely removed, thereby producing substantially less sediment that requires transport and removal.
- NMFS further stated that if the road is raised, it will require a plan to address existing road drainage. NMFS recommended that rather than relying on the existing system of an inboard drainage ditch that conveys flows in culverts under the road, flows across the road should be distributed across an outsloped road surface on the new elevated portion of Muir Woods Road, thereby eliminating the need for culverts and collection ditches. NMFS recommended that when the approach of raising the road is used, improvements should also be made to the ditch and culvert adjacent to Highway 1, which are in the CalTrans right-of-way. The existing flapgate on the culvert flowing into Redwood Creek should be removed, and the bulkhead embankment next to the creek adjacent to the culvert should be removed. This would allow small frequent flood events to backflood into the existing wetland, thereby providing salmonids access to the well-vegetated wetland habitat that exists beyond the flap gate structure. The habitat value of the ditch could be enhanced by deepening it to extend periods with ponded water, and this could be done without substantially disturbing the existing wetland by using a long-arm excavator from the roadways or similar equipment.
- The Sierra Club Marin Group commented that the proposed setback levee appeared to be located in a position that would not maximize the floodplain area on the Old Ballfield and that the setback levee could probably be built closer to the roads. The comment stated that the potential overall gain of Cowardin wetlands due to project actions, despite the loss of Cowardin wetlands due to the setback levee, appeared to indicate the setback levee could be constructed closer to the road. The comment stated that statements in the EA about area needed between the road and the setback levee for hillside runoff appeared to be inconsistent, and no estimates of flow from the hillsides is provided to allow the public to assess the proposed size of the setback levee. The comment also stated that the proposed setback levee appeared to duplicate an existing levee along Highway 1.

Response: The NPS recognizes the greater natural resource value of letting infrastructure protect itself from flooding, rather than building new infrastructure in a valuable natural resource area that would limit the natural extent and function of hydrological processes. Therefore, NPS has revised its preferred alternative to eliminate the proposed construction of the setback levee. Instead, NPS will coordinate with Marin County to raise the elevation of about 600 linear feet of the county-owned and managed road. Actions to connect Redwood Creek with the floodplain on the Old Ballfield cannot be taken until the road is raised, in order to avoid causing more frequent flooding on the road. Based on hydraulic analyses, it is feasible to raise the elevation of Muir Woods Road only, without the need to raise the elevation of Highway 1, to avoid an increase in flood frequency on the roads once the creek is connected to the floodplain. The elevation of Highway 1 is higher elevation than that of Muir Woods Road. NPS recognizes also that the road modifications are not currently identified by Marin County Department of Public Works as a project to be conducted in the near future. However, since the setback levee would be a permanent structure and the full extent of the natural floodplain would not be functional once it is built, there would be more gains by waiting to conduct the floodplain reconnection, even if it is a number of years before the road can be raised.

Comments about whether the setback levee is sited at the best possible location are therefore no longer relevant, since the setback levee will not be constructed.

Comments about the improved designs for drainage with a raised road and improved function of the drainage ditch adjacent to Highway 1 will be incorporated into preparation of designs, once Marin County can undertake such a project. NPS will coordinate with CalTrans to identify ways to both meet CalTrans management needs from the road drainage and improve salmonid habitat.

Comment: NMFS did not support proposed actions to widen the active channel by 10 feet in two 75-foot-long reaches in the Upper Alley because of the imprecision by which stable channel width is estimated, the sedimentation risks of excavating the banks of the low flow channel, and the existing high quality bank stability features.

Response: The EA incorrectly refers to widening the active channel in two locations; only one 75-foot-long reach was proposed to be widened on the right bank of the upstream end of the Upper Alley. However, to take a conservative approach, NPS has eliminated any channel widening from the designs, as discussed in the Errata above.

Comment: NMFS stated that hydraulic modeling for the design assumed that 1.5 feet of sediment would accumulate in the low flow channel about 1 to 3 years after the floodplain excavation, but later the EA discussed the effects of engineered log jams and increased sinuosity of the low flow channel and projected that the low flow channel would deepen 1.5 to 2 feet in 1 to 3 years. NMFS stated this may be contradictory, although these processes may, in fact, occur. However, NMFS added, the accurate assessment of bed elevation after the preferred actions are completed is crucial to project design and function. The accumulation of sediment on the stream bed is crucial for estimating the flow that inundates the excavated floodplain surfaces, and therefore the frequency and duration of floodplain flows. NMFS stated that sediment accumulation and bed scour were not specifically analyzed and therefore recommended carrying out those analyses before final excavation design is completed.

Response: The estimated sediment aggradation in the Upper Alley was based on empirical observations by a group of consulting geomorphologists and hydrologists who conducted reconnaissance-level surveys in Redwood Creek. Gravel bars which formed in the 2003 project reach after installation of log structures easily reached 1.5 feet of aggradation within the first three years after implementation. While the structures installed in 2003 span the channel and those to be installed in this project will extend over only about 2/3 of the channel, the excess sediment in the system in combination with new log jams with a height meeting elevations of the floodplain in a relatively narrow channel support the assumption of 1.5-foot-deep gravel bars forming behind new log jams. Furthermore, at least one other independent scientific study (Stillwater Sciences, 2003) concluded the system has an excess of sediment and that the project reach is aggrading in a downstream to upstream direction. Nevertheless, additional hydraulic model simulations were completed to evaluate the design floodplain elevation, and adjustments were made in cross-sectional profiles with slightly more conservative assumptions, partially due to design changes which no longer included widening the active channel. In many areas, the design elevation of the floodplain was lowered by up to 0.25 feet to meet the 1.5-year flow elevation, and the design floodplain now incorporates more variability in the overbank elevations and frequency/duration of inundation. The EA's statement that the gravel bars would aggrade by 1.5 feet while the low flow channel would deepen by 1.5 feet is explained by the assumption that new gravel bars would form, leaving a low flow channel that is deeper in relation to the height of

the new gravel bar. The low flow channel is not expected to incise 1.5 feet through scour (i.e., the thalweg elevation is not expected to change), although some localized scour may occur in the immediate vicinity of the log jams.

Simulated bankfull flow velocities were closely reviewed and used to guide changes in channel geometry to ensure that project velocities were being reduced relative to existing conditions. Simulated bankfull velocities and shear stress were also compared to the thresholds for incipient motion of D50 and D84 grain sizes for the project reach (37 mm and 55 mm, respectively) determined from pebble counts completed and reported by Stillwater Sciences (2004). Throughout the project reach, bankfull velocities ranged from 3.3 to 4.8 ft/s, and were determined to be within to below the reported range for sediment movement – suggesting conditions that both deliver sediment to and allow for aggradation within the project reach, especially at instream energy dissipaters such as proposed log structures. Simulated project reach velocities also fall within the range of those simulated for the downstream project reach, where sediment aggradation around log structures followed restoration activities in 2003.

Comment: CalTrans commented that the project proposes a levee that would encroach on the State's right-of-way and that this may conflict with CalTrans' need for maintenance and improvements of the highway and may preclude future modifications. They stated that the EA needs to analyze a project alternative that does not involve a levee or a pedestrian path requiring encroachment into the right-of-way.

Response: As described in response to the first comment, NPS has revised proposed actions to eliminate the proposed setback levee. Hydraulic modeling data shows that in the future, the creek can be connected to the floodplain by raising the elevation of Muir Woods Road only, without the need to take action on state Highway 1. At the time NPS and Marin County plan to raise the elevation of Muir Woods Road, these agencies will also coordinate with Caltrans to identify possible modifications to the drainage ditch and culvert flapgate to both meet CalTrans management and maintenance needs while improving the function of the site for the federally listed endangered and threatened salmonids.

Comment: CDFG commented that actions in the channel may require Streambed Alteration Agreement, pursuant to Section 1600 of the state Fish and Game Code.

Response: The National Park Service, as an agency of the federal Department of Interior, follows federal laws and obtains permits required by federal law. There is no authority for the state Streambed Alteration Agreement in this project. However, NPS is working with NMFS, along with other environmental regulatory agencies, to obtain the required authorizations to conduct the project.

Comment: An individual suggested that the project include an aggressive program to restore native California wildflowers, which would be quite beautiful when viewed from the surrounding hills.

Response: NPS recognizes the outstanding aesthetic quality of native grasslands and their outstanding displays of spring flora, and there are numerous examples of protected native grasslands in the Redwood Creek Watershed. However, the restoration of native California wildflowers on the floodplain would be a much more extensive revegetation effort than is currently proposed in this project because it would require the removal and control of the non-

native grasses currently dominating the 28 acres of floodplain. The non-native grasses, including wild oats (*Avena barbata*), velvet grass (*Holcus lanatus*), harding grass (*Phalaris aquatica*) and others easily outcompete native wildflowers. However, some vegetation changes on the Lower Field will occur over time due to project actions, with the revegetation of native riparian species in patches in the Lower Field, the small mounds that will support native scrub species, and some added area of wet meadow species in the Lower Field that will appear more natural and diverse than the current extensive stand of non-native grasses.

Comment: The Sierra Club Marin Group expressed support for the trail connector between the Coastal Trail and the Dias Ridge Trail which would be provided by the setback levee. They were supportive of this connector in order to minimize hiking and biking travel on Muir Woods Road. However, they expressed concern that the new levee may have been improperly sited for aesthetic reasons, whereas those trails already have ample aesthetic qualities.

Response: The setback levee is no longer proposed in project actions; therefore, comments about its location are no longer relevant. While trail connections are being planned by a separate project, the Dias Ridge trail and the Coastal Trail can still be connected by a trail through the Old Ballfield at the existing ground elevation. There is no inherent need for this trail to be elevated. The site will be flooded infrequently and at short durations. It will be inundated for prolonged periods only during very large flood events.

Comment: A local resident expressed strong objection to the removal of the Eucalyptus trees along the access road or the Monterey cypress trees in the windrow adjacent to the Upper Field. The commenter stated that the removal of the trees is not warranted by the NPS definition of them as non-native, and their removal could eliminate habitat for birds. The commenter also stated that tree removal actions typically leave behind cut logs and piles that appear messy.

Response: The difference of opinion between the commenter and NPS about whether non-native trees should be removed is largely a philosophical difference. The commenter seeks to protect trees in general for their inherent value. NPS seeks to protect the integrity of the landscape by removing non-native species, including trees, which are invasive and whose spread has the capacity to alter the native vegetation composition of a natural area. The tree removal is in accordance with NPS Management Policies. The primary benefit of removing the Eucalyptus trees is that the adjacent natural floodplain and riparian area will not become infested by a spreading grove of non-native Eucalyptus trees, which do not support native understory vegetation. If the trees remain in place, long-term management to remove sprouts and saplings is necessary. The primary benefits of removing a portion of the Monterey cypress trees in the windrow are that the trees themselves will be used as in-stream structures benefiting salmonids, and their spread into the adjacent areas will be slowed. Songbirds in the area are better served by the trees and vegetation in a riparian habitat than in a Eucalyptus grove or cypress trees. Raptors will perch on them and could nest in them. However, the removal of these trees does not eliminate or substantially reduce the availability of perches or nesting locations for raptors in this area, as there are many other stands of trees of similar stature in the area. Finally, while some tree removal actions in the local area have left behind trunk sections that are highly visible, it is doubtful that this tree removal will have highly visible remnants in the long run, although in the short run some remnants will be visible. Most trunk material will be used either in the creek, in the frog pond, or on the floodplain as “large woody debris” that mimics fallen trees and will provide structural diversity. Structure from large trunks is needed on the flat floodplain because

high flows currently wash over the field as sheet flow, and the structures would vary flow patterns to the benefit of salmonids during flood events. Immediately after construction, slash will be placed in piles for subsequent burning to be conducted after the completion of construction actions.

Comment: A local resident expressed concern verbally that project actions or heavy equipment working at the site could impact the water delivery system of the Muir Beach Community Services District well adjacent to the site. The resident emphasized that impacts to the water supply would have widespread impacts on the local community and that a written agreement is needed to ensure that NPS will take responsibility for corrective actions if something goes wrong.

Response: The Muir Beach Community Services District well extracts water from an aquifer 50 feet below the ground surface, based on logs of the well installed in 2002. Project actions in the creek and on the surface of the field will not disturb the availability of water supply or the ability of the MBCSD to extract, pump or deliver this water. Heavy equipment will not be traveling through or working on the MBCSD property and will not be conducting excavation in the vicinity of the MBCSD well. A written liability agreement is not needed under these circumstances. If an unforeseeable accident occurs that caused damage to the MBCSD infrastructure, and it is the fault of the construction operations, then corrective actions would be conducted by either the contractor at fault or NPS, following the terms of the construction contract and federal laws.