

Impact Topics Retained for Analysis

Impacts are determined by comparing projected changes resulting from the action alternatives (1, 2, and 3) to the no-action alternative (continue current management). For all impact topics the analysis, cumulative impacts, and conclusion sections are conducted at the park-wide level supported by discussion specific to the counties or to individual park sites where the impacts differ from those identified at the park-wide level. For example, for vegetation and wildlife, a park-wide analysis of the impacts of the alternatives would appear first, followed by specific discussions for Marin County and at two park sites, Stinson Beach and Rodeo Valley, where impacts to vegetation and wildlife differ from those described at the park-wide level. A description of the impacts at the county level or at individual park sites would occur only when they differ from the park-wide analysis and conclusions.

NATURAL RESOURCES

Physical Resources

- Geologic Resources and Soils
(including: coastal resources and processes)
- Water-related Resources
(including: stream character, water quality, watershed processes, wetlands, and floodplains)
- Air Quality

Biological Resources

- Vegetation and Wildlife
(including: plant communities, wildlife and wildlife habitat (including freshwater fisheries), and ecologically sensitive areas)
- Federal and State-listed Species
(including: threatened and endangered species, and federal candidate species) (California red-legged frog, San Francisco garter snake, Northern spotted owl, coho salmon, steelhead)
- Marine Resources

Geologic Resources and Soils

Methods and Assumptions for Analyzing Impacts

The effects of the alternatives on geologic resources and soils (including coastal geologic resources and processes) are analyzed based on the possibility of impacts resulting primarily from facility development and visitor use.

The thresholds to determine the impact intensity for these resources are defined as follows:

Negligible: The impact is barely detectable and/or would result in no measurable or perceptible changes to soils and geologic resources or processes. The effects on the soil productivity would be slight. Disruptions to key geologic processes would be well within the natural range of variability.

Minor: The impact is slight but detectable, and/or would result in small but measurable changes to soils and geologic resources; the effect would be localized. There could be changes in a soil's profile in a relatively

small area, but the change would not noticeably increase the potential for erosion. Disruptions to key geologic processes would be within the natural range of variability

Moderate: The impact is readily apparent and/or would result in easily detectable changes to soils or geologic resources; the effects would be localized. The effect on soil productivity would be apparent. The potential for erosion to remove small quantities of additional soil would noticeably increase or decrease. Disruptions to key geologic processes are expected to be within the natural range of variability.

Major: The impact is severely adverse or exceptionally beneficial and/or would result in appreciable changes to soils or geologic resources; the effect would be regional in scale. There would be a strong likelihood that erosion would remove large quantities of additional soil or erosion would be substantially reduced. Disruptions to key geologic processes are expected to be outside the natural range of variability and may be permanent.

Water-related Resources

Including: Stream character, Water Quality, Watershed Processes, Wetlands, and Floodplains

Methods and Assumptions for Analyzing Impacts

Stream character, water quality, watershed processes, wetlands, and floodplains are analyzed together in this section because of the similarities of these resources, their interrelationship to each other, and their collective effect on the overall integrity of hydrologic systems in the two parks. For example, the health of a creek not only influences the ability of a floodplain to store and convey water, but also affects bank stability, which contributes to the natural sinuosity of a creek. Healthy riparian vegetation can also filter pollutants before reaching a creek, which in turn affects water quality. Also, many riparian areas are often referred to as wetlands, depending in part on the duration their soils remain saturated each year. Together, all of these elements affect hydrologic processes that can influence the condition of a watershed.

Because these water-related resources are so entwined, the following impact thresholds have been developed for analyzing all of them:

Negligible: Stream character, water quality, watershed processes, wetlands, and floodplains would not be impacted, or the impacts would be either undetectable or if detected, the effects would be considered slight, localized, and short-term. Any measurable changes would be within the natural range of variability.

Minor: Impacts (chemical, physical, or biological) to stream character, water quality, watershed processes, wetlands, and floodplains would be small, short-term, and localized. Natural processes, functions, and integrity would be temporarily affected, but would be within the natural range of variability. The impacts would only affect a few individuals of plant or wildlife species dependent on one or more of these water-related resources. Any changes would require considerable scientific effort to measure and have barely perceptible consequences.

Moderate: Impacts (chemical, physical, or biological) to stream character, water quality, watershed processes, wetlands, and floodplains would be readily apparent, long-term, and localized. Natural processes, functions, and integrity would be affected, but would be only temporarily outside the natural range of variability. The impacts would have a measurable effect on plant or wildlife species dependent on one or more of these water-related resources, but all species would remain indefinitely viable within the parks.

Major: Impacts (chemical, physical, or biological) would have drastic and permanent consequences for stream character, water quality, watershed processes, wetlands, and floodplains, which could not be mitigated. Species dependent on one or more of these water-related resources would be at risk of extirpation from the park. Changes would be readily measurable, outside the natural range of variability, would have substantial consequences, and would be noticeable on a regional scale.

Air Quality/Carbon Footprint

Methods and Assumptions for Analyzing Impacts

Certain actions included in the alternatives of the plan would have an effect on the parks' total greenhouse gas (carbon dioxide - CO₂) emissions, known as the carbon footprint. Since some of the actions could increase CO₂ emissions, like the construction of new facilities; and other actions could reduce CO₂ emissions, like providing alternative transportation and reducing visitors' dependency on personal automobiles, it is important to evaluate the impact that these actions could have on contributing to global warming. Although the NPS would pursue sustainable practices whenever possible in all decisions regarding operations, facilities management, and development in the parks, and the parks' focus on using renewable energy is a continuation of current management trends, the changes in energy consumption, energy availability, or costs compared to current conditions is of interest to NPS managers and the public.

The analysis of the effects of actions contained in this plan on the parks' carbon footprint is based on a comparison with existing conditions. The baseline that is used for comparison is the carbon footprint (total greenhouse gas emissions) of the no-action alternative, which is included in Chapter 3, "Affected Environment". GOGA inventoried its emissions in 2006 as part of their Climate Change Action Plan using the NPS and EPA Climate Leadership in Parks (CLIP) tool. The CLIP tool converts emissions of various greenhouse gases into a common "metric tons of carbon equivalent" unit, which provides a basis for comparison among gases and simplifies reduction tracking. The conversion of a greenhouse gas to metric tons of carbon equivalent is based upon how strongly that particular gas contributes to the greenhouse effect, and how many tons of carbon emission would have the same effect.

The impact of greenhouse gas emissions for all actions under each of the alternatives is assessed in comparison to existing conditions. The nature of the impact assessment is general and qualitative, providing a general determination of whether or not the actions would have a beneficial, neutral, or adverse impact on the parks' carbon footprint.

Negligible: Impacts would result in a change to local air quality, but the change would be so slight that it would not be of any measurable or perceptible consequence. These changes would not affect the attainment status of the airshed, and would be consistent with the airshed designation of the parks. Emissions would be substantially less than any applicable air emissions regulatory thresholds. The action would result in a change in total greenhouse gas emissions, but the change would be at the lowest level of detection, or not measurable.

Minor: Impacts would result in a detectable change to local air quality, but the change would be small and of little consequence. These changes would not affect the attainment status of the airshed, and would be consistent with the airshed designation of the parks. Emissions would be considerably different than any applicable air emissions regulatory thresholds. The action would result in a slight, but detectable, change in total greenhouse gas emissions.

Moderate: Impacts would result in a change to local air quality that would be readily detectable. Impacts could affect the attainment status of the airshed, and could be inconsistent with the airshed designation of the parks. The action would result in a modest change in total greenhouse gas emissions.

Major: Impacts would result in a change(s) to regional air quality that would be severe. These changes would affect the attainment status of the airshed, and/or be inconsistent with the airshed designation of the parks. The action would result in a substantial change in total greenhouse gas emissions.

Vegetation and Wildlife

Including: Plant communities, wildlife and wildlife habitat (including freshwater fisheries), and ecologically sensitive areas

Methods and Assumptions for Analyzing Impacts

Vegetation and wildlife (including freshwater fisheries) are addressed together in this section, because an analysis of potential impacts to wildlife typically involves a discussion of wildlife habitat, which consists of various vegetation and aquatic communities found within the parks. Ecologically sensitive areas are also address under this section, because of their rare plant and animal associations. Threatened and endangered species associated with these areas are discussed under a separate impact topic.

The thresholds to determine impact intensity for these resources are defined as follows:

Negligible: There would be no observable or measurable impacts to native species, their habitats, or the natural processes sustaining them. Impacts would be of short duration and well within natural fluctuations.

Minor: Impacts would be detectable, but they would not be expected to be outside the natural range of variability and would not be expected to have any long-term effects on native species, their habitats, or the natural processes sustaining them.

Population numbers, population structure, genetic variability, and other demographic factors for species might have small, short-term changes, but long-term characteristics would remain stable and viable. Occasional responses to disturbance by some individuals could be expected, but without interference to feeding, reproduction, or other factors affecting population levels.

Key ecosystem processes might have short-term disruptions that would be within natural variation. Sufficient habitat would remain functional to maintain viability of all species. Impacts would be outside critical reproduction periods for sensitive native species.

Moderate: Breeding animals of concern are present; animals are present during particularly vulnerable life-stages, such as migration or juvenile stages; mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the parks.

Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and they could be outside the natural range of variability for short periods of time. Population numbers, population structure, genetic variability, and other demographic factors for species might have short-term changes, but would be expected to rebound to pre-impact numbers and to remain stable and viable in the long term. Frequent responses to disturbance by some individuals could be expected, with some negative impacts to feeding, reproduction, or other factors affecting short-term population levels.

Key ecosystem processes might have short-term disruptions that would be outside natural variation (but would soon return to natural conditions). Sufficient habitat would remain functional to maintain viability of all native species. Some impacts might occur during critical periods of reproduction or in key habitat for sensitive native species.

Major: Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and they would be expected to be outside the natural range of variability for long periods of time or be permanent.

Population numbers, population structure, genetic variability, and other demographic factors for species might have large, short-term declines, with long-term population numbers significantly depressed. Frequent responses to disturbance by some individuals would be expected, with negative impacts to feeding, reproduction, or other factors resulting in a long-term decrease in population levels. Breeding colonies of native species might relocate to other portions of the park.

Key ecosystem processes might be disrupted in the long term or permanently. Loss of habitat might affect the viability of at least some native species.

Federal and State-listed Species

Including: threatened, endangered, and federal candidate species

(California red-legged frog, San Francisco garter snake, Northern spotted owl, coho salmon, steelhead)

Methods and Assumptions for Analyzing Impacts

Federal and state listed threatened and endangered species are addressed together in this section, because many of these species (1) have dual federal and state special status, (2) occur together in the same habitats, or (3) would be impacted similarly under each alternative. However, for federally listed and candidate species, impact thresholds are defined based on terminology from Section 7 of the Endangered Species Act (ESA), as described below:

No effect: When a proposed action would not affect a federal listed species, candidate species, or designated critical habitat.

May affect, not likely to adversely affect: Effects on federal listed or candidate species are discountable (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated) or are completely beneficial.

May affect, likely to adversely affect: Adverse effects to a federal listed or candidate species may occur as a direct or indirect result of proposed actions and the effects are either not discountable or completely beneficial.

Likely to jeopardize proposed species/adversely modify proposed critical habitat (impairment): The appropriate conclusion when the National Park Service or the U.S. Fish and Wildlife Service identifies situations in which the proposal could jeopardize the continued existence of a federal listed or candidate species or adversely modify critical habitat to a species within or outside park boundaries.

The following impact threshold definitions are used to describe the severity and magnitude of changes to federal and state listed species under each of the alternatives. Each threshold definition references the Endangered Species Act determinations for Section 7 consultation described above.

Negligible: Adverse impact — There would be no observable or measurable impacts to federal or state listed species, their habitats (including critical habitat designated under the Endangered Species Act), or the natural processes sustaining them in the proposed project area. For federal listed species, this impact intensity would equate to a determination of “no effect”.

Beneficial impact — There would be no observable or measurable impacts to federally-listed species,

their habitats, or the natural processes sustaining them in a park site. For federal listed species, this impact intensity would equate to a determination of “no effect”.

Minor: Adverse impact — Impacts would not affect critical periods of life-cycle processes (e.g. reproduction) or their habitat. Individuals may temporarily avoid areas. Essential features of critical habitat would not be impacted. For federal listed species, this impact intensity would equate to a determination of “may affect, not likely to adversely affect”.

Beneficial impact — Impacts would result in slight increases to viability of the species in the park as species-limiting factors (e.g. habitat loss, competition, and mortality) are kept in check. Non-essential features of critical habitat in a park site would be slightly improved. For federal listed species, this impact intensity would equate to a determination of “may affect, not likely to adversely affect”.

Moderate: Adverse impact — Individuals may be impacted by disturbances that interfere with critical life-cycle processes or their habitat; however the level of impact would not result in a physical injury, mortality, or extirpation from the park. Some essential features of designated critical habitat would be reduced; however the integrity of the habitat would be maintained. For federal listed species, this impact intensity would equate to a determination of “may affect, likely to adversely affect”.

Beneficial impact — Impacts would result in slight increases to viability of the species in the park as species-limiting factors (e.g. habitat loss, competition, and mortality) are reduced. Some essential features of critical habitat would be improved. For federal listed species, this impact intensity would equate to a determination of “may affect, not likely to adversely affect”.

Major: Adverse impact — Individuals may suffer physical injury or mortality or, in extreme adverse cases, populations may be extirpated from the park. Essential features of designated critical habitat would be reduced affecting the integrity of the designated unit. For federal listed species, this impact intensity would equate to a determination of “may affect, likely to adversely affect”.

Beneficial impact — Impacts would result in highly noticeably improvements to species viability, population structure, and species population levels in the park, as species-limiting factors (e.g. habitat loss, competition, and mortality) are eliminated. All essential features of critical habitat would be improved. For federal listed species, this impact intensity would equate to a determination of “may affect, not likely to adversely affect”.

Marine Resources

Methods and Assumptions for Analyzing Impacts

Marine resources (including aquatic vegetation and wildlife) are discussed together since they are part of the same ecosystem and are dependent on one another. The effects of the alternatives on marine resources and habitat are analyzed based on the possibility of impacts resulting primarily from facility development and visitor use.

The thresholds to determine impact intensity for these resources are defined as follows:

Negligible: The impact is barely detectable and/or would result in no measurable or perceptible changes to marine resources. Impacts to individual species or biological communities would be slight. Changes in behavior or disruptions to habitat would be well within the natural range of variability.

- Minor:** The impact is slight but detectable, and/or would result in small but measurable changes to marine resources. There could be impacts to individuals or communities in a relatively small area, but the change would not affect the integrity of the resource and would be within the natural range of variability.
- Moderate:** The impact is readily apparent and/or would result in easily detectable changes to marine resources and habitat. There could be impacts to individuals or communities that extend beyond the original point of disturbance or impact, but the change would not affect the integrity of the resource and would be expected to be within the natural range of variability.
- Major:** The impact is severely adverse or exceptionally beneficial and/or would result in appreciable changes to marine resources and habitat; the effect would be regional in scale. Impacts would result in a reduction in species numbers, alteration in behavior, reproduction, migration, or survival. Severe adverse impacts would alter or destroy habitat in such a way that would prevent biological communities that inhabited the area prior to the action from establishing themselves. These impacts are expected to be outside the natural range of variability and may be permanent.

CULTURAL RESOURCES

- Archeological Resources
 - National Register listed or eligible properties
- Historic Structures
 - National Register listed or eligible properties
 - National Historic Landmarks
- Cultural Landscapes
 - National Register listed or eligible properties
 - National Historic Landmarks
- Ethnographic Resources
 - Traditional Cultural Properties
- Museum Collections

Methods and Assumptions for Analyzing Impacts

Impacts to the five major categories of cultural resources (archeological resources, historic structures, cultural landscapes, ethnographic resources, and museum collections) are analyzed by focusing on those properties listed in, or eligible for listing in, the National Register of Historic Places (NRHP) and those properties designated as National Historic Landmarks (NHL). Impacts are described in terms of the effect that the actions have on the significance and integrity of the characteristics that make the resource eligible for NRHP listing or NHL designation. For example, the loss of certain historic structures or features that contribute to the significance or integrity of the resource and its qualifications for listing or designation are analyzed and determinations of effect are made according to the requirements of Section 106 of the National Historic Preservation Act (NHPA). Impacts to historic properties not listed in (or eligible for) the NRHP are not analyzed.

The thresholds to determine impact intensity are defined as follows:

No Historic Properties Affected - A determination that no historic properties affected means either that no historic properties are present or that historic properties are present but the undertaking would not affect them (36 CFR 800.4 (d) (1)).

No Adverse Effect - A determination of no adverse effect could mean that there would be an effect, but that the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the National Register of Historic Places (36 CFR 800.5 (b)).

Adverse Effect - An adverse effect occurs whenever an action would alter, directly or indirectly, any characteristic of a cultural resource qualifying it for inclusion in the National Register of Historic Places in a manner that would diminish the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also can include reasonably foreseeable effects caused by the possible actions of an alternative that would occur later in time, be farther removed in distance, or cumulative (36 CFR 800.5 (a) (1)).

VISITOR USE AND EXPERIENCE

Methods and Assumptions for Analyzing Impacts

Impacts on visitor use and experience are described in terms of the effect on the following components:

- Diversity of Recreation Opportunities
(including: opportunities for emerging audiences)
- Visitor Access (see also Transportation section)
- Experience of the Park Setting
(including: viewsheds and soundscapes)
- Visitor Understanding, Education, and Interpretation
- Visitor Safety

The duration of a short-term impact would last less than one year and would affect only one season's use by visitors. A long-term impact would last more than one year and would be more permanent in nature.

Adverse impacts are those that most visitors would perceive as undesirable. Beneficial impacts are those that most visitors would perceive as desirable.

The thresholds to determine impact intensity are defined as follows:

- Negligible:** Most visitors would likely be unaware of any effects associated with implementation of the alternative.
- Minor:** Changes in visitor opportunities and/or setting conditions would be slight but detectable, would affect few visitors, and would not appreciably limit or enhance experiences identified as fundamental to the park's purpose and significance.
- Moderate:** Changes in visitor opportunities and/or setting conditions would be noticeable, would affect many visitors, and would result in some changes to experiences identified as fundamental to the park's purpose and significance.
- Major:** Changes in visitor opportunities and/or setting conditions would be highly apparent, would affect most visitors, and would result in several changes to experiences identified as fundamental to park purpose and significance.

TRANSPORTATION

Methods and Assumptions for Analyzing Impacts

Impacts on visitor access and circulation are described in terms of the effect on the following components:

- Visitor Connections to Park Sites and Communities
 - Ease and availability of access: roads, public transit, ferries/water transit, trails, wayfinding and advanced traveler information systems
 - Connectivity, Multi-modalism: number of, ease of and capacity of connections, availability of modes of travel
- Functionality of the Transportation System
 - Circulation & Condition: traffic flow and circulation, parking availability, transit service availability and capacity, facility capacity and condition, and public health and safety
 - Level of Service: level of functionality of road segments and intersections as it relates to levels of congestion and road capacity.

The thresholds to determine impact intensity are defined as follows:

- Negligible:** Most visitors would likely be unaware of any effects associated with implementation of the alternative.
- Minor:** Changes in visitor access/circulation would be slight but detectable, would affect few visitors, and would not appreciably limit or enhance visitors' ability to visit park sites or navigate within park sites.
- Moderate:** Changes in visitor access/circulation would be noticeable, would affect many visitors, and would result in some changes to visitors' ability to visit park sites or navigate within park sites.
- Major:** Changes in visitor access/circulation would be highly apparent, would affect most visitors, and would result in several changes to visitors' ability to visit park sites or navigate within park sites.

SOCIAL AND ECONOMIC ENVIRONMENT

- Surrounding Communities
- Park Partners (including: long-term leaseholders, concessionaires, commercial use authorizations)
- Local Economy

- Negligible:** No measurable effect on the socioeconomic environment, including employment and income levels; population migration or immigration; or the park's concession contracts and commercial use authorizations.
- Minor:** Only a small sector of the local and regional economies would be affected and would not be readily apparent, including employment and income levels; population migration or immigration; or the park's concession contracts and commercial use authorizations.
- Moderate:** A relatively small sector of the socioeconomic environment, or the relationship between sectors of the local and regional economies, would be measurably affected, but would not alter basic socioeconomic functions and structure. Impacts would cause noticeable changes to employment and income levels; population migration or immigration; and/or the park's concession contracts and commercial use authorizations.
- Major:** Changes to the local and regional economies would occur and would become readily apparent in the form of shifts in socioeconomic functions and structure. In certain cases, entirely new economic sectors would be created or eliminated. Impacts would cause readily apparent changes to employment and

income levels; population migration or immigration; and/or the park’s concession contracts and commercial use authorizations.

NPS OPERATIONS AND MANAGEMENT

- Maintenance and Law Enforcement Facilities
- Staffing

Negligible: Implementation of the alternative would have no measurable impact on park operations.

Minor: Implementation of the alternative would affect park operations in a way that would be difficult to measure. The impacts on the park’s budget and staff workload would be short term, with little material effect on existing programs.

Moderate: Implementation of the alternative would measurably affect park operations. Park staff workloads and priorities would need to be rearranged to implement new management actions, and as a result, existing programs would be reduced in scope or potentially eliminated.

Major: Implementation of the alternative would have a highly noticeable effect on park operations. Funding for management actions would exceed the current park’s budget by 10%, consume all discretionary funding, and require additional personnel over and above what would normally be expected to be funded.

EFFECTS ON ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

UNAVOIDABLE ADVERSE IMPACTS

IRREVERSIBLE AND IRRETRIEVEABLE COMMITMENTS OF RESOURCES

THE RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY