

Categorical Exclusion

(Version: OCT06)

Compliance Tracking Number: 2007-064

PEPC Project Number: 18491

A. PROJECT INFORMATION

Title: Parkwide Meadow Vital Sign Data Collection

Location: Parkwide, Mariposa, Tuolumne, and Madera Counties, California

Project Manager: Lisa Acree, Resources Management and Science, Yosemite National Park

B. COMPLIANCE DETERMINATION

This project is an action that has been determined to result in no measurable environmental effects. It is therefore categorically excluded from further National Environmental Policy Act analysis under Categorical Exclusion: DO12 3.4 E (6) - *Non-destructive data collection, inventory (including field, aerial, and satellite surveying and mapping), study, research, and monitoring activities.*

Necessary compliance coordination has been completed regarding the National Historic Preservation Act, the Wilderness Act, the Wild and Scenic Rivers Act, and the Endangered Species Act, as applicable. Environmental impacts will be negligible or less when the project is implemented with the conditions stipulated under **Project Mitigations and Conditions** in **Section I** at the end of the attached *Environmental Screening Form*.

Additional supporting information for this determination and the stipulated conditions can be found in the following attachments (when checked):

- ☒ *Environmental Screening Form*
- ☒ *Preservation Assessment Form (YOSE-XXX)*
- ☒ *Wilderness Minimum Requirement Analysis*
- ☐ *Wild and Scenic River Section 7 Determination*
- ☐ Other:

C. DECISION

On the basis of the environmental impact information in the statutory compliance file, with which I am familiar, I am categorically excluding the described project from further NEPA analysis. No exceptional circumstances or conditions in DO12 3.5 or 3.6 apply and the action is fully described in DO12, Section 3.4.

//MJTollefson//
Michael J. Tollefson, Superintendent

5/24/07
Date

Original: Statutory Compliance File
cc: Project Proponent

Attachments (3)

The signed original of this document is on file at the Environmental Planning and Compliance Office in Yosemite National Park.



United States Department of the Interior

NATIONAL PARK SERVICE

Yosemite National Park
P.O. Box 577
Yosemite, California 95389

IN REPLY REFER TO:
L7617 (YOSE-PM)

Memorandum

To: Lisa Acree, Project Manager, Resources Management and Science, Yosemite National Park
From: Superintendent, Yosemite National Park
Subject: Notice to Proceed, 2007-064 Parkwide Vital Sign Data Collection

Your proposed project is an action that has been determined to result in no measurable environmental effects. It is therefore categorically excluded from further National Environmental Policy Act analysis under Categorical Exclusion: DO12 3.4 E (6) - *Non-destructive data collection, inventory (including field, aerial, and satellite surveying and mapping), study, research, and monitoring activities.*

Necessary compliance coordination has been completed regarding the National Historic Preservation Act, the Wilderness Act, the Wild and Scenic Rivers Act, and the Endangered Species Act, as applicable. This project clearance is valid providing that you adhere to any conditions that may be stipulated in the enclosed *Categorical Exclusion Form* and associated documents when implementing this project.

//MJTollefson//
Michael J. Tollefson

5/24/07
Date

Enclosure (with attachments)

cc: Statutory Compliance File

*The signed original of this document is on file at
the Environmental Planning and Compliance
Office in Yosemite National Park.*

Environmental Screening Form

(Version: NOV06)

Compliance Tracking Number: 2007-064

PEPC Project Number: 18491

A. PROJECT INFORMATION

Title: Parkwide Meadow Vital Sign Data Collection

Location: Parkwide, Mariposa, Tuolumne, and Madera Counties, California

Project Manager: Lisa Acree, Resources Management and Science, Yosemite National Park

B. PROJECT DESCRIPTION AND BACKGROUND

Resources Management and Science and the Inventory and Monitoring Program propose to implement a long-term meadow monitoring program within Yosemite National Park. The purpose of this study is to inform the NPS about the current and long-term condition of meadows in Yosemite. The goals of this program are to collect long-term data to assess the hydrologic, biotic, and ecological integrity of wet meadows. Approximately 50-60 study meadows will be chosen throughout Yosemite to span the range of elevations, watershed bedrock types, and history of Pleistocene glaciations that occurs within the park. In each study meadow, the depth to the water table, vegetation composition, and invertebrate composition will be analyzed during 2007, and regularly for several decades afterwards.

Three types of data will be collected during this project: 1) hydrologic data including depth to the water table, 2) a complete list of plant species present and a measure of the canopy coverage of each species, 3) composition and biomass of invertebrates.

One of the most critical measures in wetland monitoring is depth to the water table at critical times of the year. Wetland types such as fens, wet meadows, and marshes have distinctive hydrologic regimes, and the persistence of suitable hydrologic conditions is essential for their long-term sustainability. One simple ground water monitoring well will be installed in each meadow. The well will consist of a small diameter (1.25 inch) section of slotted PVC pipe, typically 1 to 1.5 meter long, that sticks up above the ground about 6 inches. The pipe is placed into a hand-augered hole, approximately 2 inches in diameter. The hole is then backfilled with native soil, including the plug of turf that was first removed with a shovel. The vegetation is allowed to grow back around the well. The PVC is painted to match the surrounding area, capped, and numbered with a permanent tag inside the well. Wells allow researchers and technicians to visit a meadow, find the exact site where the water table was previously measured, remove the cap, and measure the water table depth without site disturbance and in a relatively short visit. Water table depth provides a definitive record of hydrologic conditions at the same location from week to week, month to month, year to year, or decade to decade. The need for each well will be reevaluated at least once every ten years.

The sampling design for the selection of meadows and the data collection will be statistically robust. The data collected during this project will reside with the NPS Inventory and Monitoring program and Yosemite.

The project will include site-specific consultation with the Park Archeologist to avoid impacts to archeological sites and consultation with the Park Botanist to avoid impacts to special status plant species.

Table B1 – Background Information

	Yes	No	N/A	Explanation/Notes
1. Did NPS staff conduct a site visit? If yes, list attendees. If no, explain.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Resources Management and Science staff.
2a. Is the project providing compliance for an action associated with but not covered by an approved plan? (Identify the plan and provide a section or page citation.); OR	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2b. Is the project in an approved plan? (Identify the plan and provide a section or page citation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2c. Is the project consistent with that plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2d. Is the Plan's CE, FONSI, or ROD current?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3a. Are there any interested or affected parties?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3b. Has a diligent effort been made to communicate with them?	<input type="checkbox"/>			
4a. Are there any affected agencies or tribes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4b. Has consultation been completed?	<input type="checkbox"/>			

Table B2 – Environmental Screening Form Attachments (provide Attachment letter—A, B, etc.)

	Yes	No	N/A	Explanation/Notes
1. Maps: (vicinity map & site map)	<input checked="" type="checkbox"/>			Maps provided in the analysis; see Attachment A.
2. Drawings (e.g., design, construction)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Site Plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4. Photographs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5. Non-NEPA/NHPA Approvals (Explain)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Other (Explain)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Long-Term Meadow Monitoring Analysis; see Attachment A.

C. ASSESSMENT OF POTENTIAL RESOURCE EFFECTS

Are any impacts possible on the following resources?	Yes	No	N/A	Data Needed to Determine/Notes
1. Geologic resources: soils, bedrock, streambeds, etc	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Wells include a 2" diameter and 40" to 60" deep hole.
2. From geohazards	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Air quality	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4. Soundscapes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5. Water quality or quantity	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Stream flow characteristics	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7. Marine or estuarine resources	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8. Floodplains or wetlands	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Negligible: installation includes one well per meadow.
9. Land use, including occupancy, income, values, ownership, type of use	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
10. Rare or unusual vegetation – old growth timber, riparian, alpine	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
11. Species of special concern (plant or animal; state or federal listed or proposed for listing) or their habitat	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
12. Unique ecosystems, biosphere reserves, World Heritage Sites	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yosemite National Park is a World Heritage Site; no historic properties would be adversely affected by implementing this project; see Section F, National Historic Preservation Act Checklist, below.
13. Unique or important wildlife or wildlife habitat	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
14. Unique or important fish or fish habitat	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
15. Introduce or promote non-native species (plant or animal)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mitigated: see Section D. Mandatory Criteria, below.
16. Recreation resources, including supply, demand, visitation, activities, etc.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
17. Visitor experience, aesthetic resources	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Negligible: visitor experience could possibly be visually impacted; this project involves remote sites and impacts would be mitigated by camouflaging the wells.
18. Cultural resources including cultural landscapes, ethnographic resources	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
19. Socioeconomics, including employment, occupation, income changes, tax base, infrastructure	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
20. Minority and low income populations, ethnography, size, migration patterns, etc.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
21. Energy resources	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
22. Other agency or tribal land use plans or policies	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
23. Resource, including energy, conservation potential	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
24. Urban quality, gateway communities, etc.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
25. Long-term management of resources or land/resource productivity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Data collected would provide information to assist in the long-term management of the park.
26. Other important environment resources (e.g. geothermal, paleontological resources)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Comments, Mitigations and Conditions:				
1. None				

D. MANDATORY CRITERIA

If implemented, would the proposed action:	Yes	No	N/A	Data Needed to Determine/Notes
1. Have material adverse effects on public health or safety?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2. Have adverse effects on such unique characteristics as historic or cultural resources; park, recreation, or refuge lands; wilderness areas; wild or scenic rivers; national natural landmarks; sole or principal drinking water aquifers; prime farmlands; wetlands; floodplains; or ecologically significant or critical areas, including those listed on the National Register of Natural Landmarks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mitigated: the assessment of effect is "No Adverse Effect;" see Section F, National Historic Preservation Act Checklist and the attached XXX.
3. Have highly controversial environmental effects?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4. Have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5. Establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Be directly related to other actions with individually insignificant, but cumulatively significant, environmental effects?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7. Have adverse effects on properties listed or eligible for listing on the National Register of Historic Places?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The assessment of effect is "No Adverse Effect;" see Section F, National Historic Preservation Act Checklist and the attached XXX.
8. Have adverse effects on species listed or proposed to be listed on the List of Endangered or Threatened Species or have adverse effects on designated Critical Habitat for these species?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
9. Require compliance with Executive Order 11988 (Floodplain Management), Executive Order 11990 (Protection of Wetlands), or the Fish and Wildlife Coordination Act?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
10. Threaten to violate a federal, state, local, or tribal law or requirement imposed for the protection of the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
11. Involve unresolved conflicts concerning alternative uses of available resources (NEPA sec. 102(2)(E))?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
12. Have a disproportionate, significant adverse effect on low-income or minority populations (EO 12898)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13. Restrict access to and ceremonial use of Indian sacred sites by Indian religious practitioners or adversely affect the physical integrity of such sacred sites (EO 130007)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
14. Contribute to the introduction, continued existence, or spread of federally listed noxious weeds (Federal Noxious Weed Control Act)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mitigated: see Condition 1, below.
15. Contribute to the introduction, continued existence, or spread of non-native invasive species or actions that may promote the introduction, growth or expansion of the range of non-native invasive species (EO 13112)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mitigated: see Condition 1, below.
16. Require a permit from a federal, state, or local agency to proceed, unless the agency from which the permit is required agrees that a CE is appropriate?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
17. Have the potential for significant impact as indicated by a federal, state, or local agency or Indian tribe?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
18. Have the potential to be controversial because of disagreement over possible environmental effects?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
19. Have the potential to violate the NPS Organic Act by impairing park resources or values?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Comments, Mitigations and Conditions:

- All equipment, materials, and instruments brought to the site from outside the park must be thoroughly cleared of any foreign debris that could harbor plant or animal propagules.

E. SPECIAL STATUS SPECIES CHECKLIST

Within the area of potential effect, are there:	Yes	No	N/A	Data Needed to Determine/Notes
1. Listed or proposed threatened or endangered species (Federal or State)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2. Species of special concern (Federal or State)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Park rare plants or vegetation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4. Potential habitat for any special-status species listed above?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
If "yes" to any of the above questions, a Special-Status Species Checklist must be completed and attached.				
Comments, Mitigations and Conditions:				
1. None				

F. NATIONAL HISTORIC PRESERVATION ACT CHECKLIST

Within the area of potential effect:	Yes	No	N/A	Data Needed to Determine/Notes
1. Will there be ground disturbance?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	One well per meadow would be installed in approximately 50-60 meadows; wells are 2" in diameter and 40" to 60" deep.
2. Are there any archeological sites?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Are there any Native American Indian traditional cultural resources?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4. Is there a historic property (a building, structure, feature, or all or any part of an archeological district or site, or a historic district or site, or any associated landscape element) that is listed or eligible for listing on the <i>National Register</i> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parkwide: consultation would be conducted on a site-by-site basis; the assessment of effect is "No Adverse Effect;" see the attached XXX.
5. Is there a National Historic Landmark?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Is there a structure(s) on the park's <i>List of Classified Structures</i> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7. Is there any cultural resource requiring an evaluation of eligibility as a historic property under NHPA, Section 106, before an affect determination can be made?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8. Would there be alteration of any historic property or associated landscape element covered by 2-7, above?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
If "yes" to <u>any</u> of the above, then an Assessment of Effects form (YOSE-XXX) must be completed and attached.				
Mitigations and Conditions:				
1. None				

G. WILDERNESS ACT CHECKLIST

Is the proposed project:	Yes	No	N/A	Data Needed to Determine/Notes
1. Within designated Wilderness?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Within a Potential Wilderness Addition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If "yes" to either of the above, then a Wilderness Minimum Requirements Analysis must be completed and attached.				
Mitigations and Conditions:				
1. None				

H. WILD AND SCENIC RIVERS ACT CHECKLIST

Does the proposed project:	Yes	No	N/A	Data Needed to Determine/Notes
1. Fall within a wild and scenic river corridor? If "yes", name the river(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Merced and Tuolumne.
2. Fall within the bed and banks AND affect the free-flow of the river?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Potentially affect water quality of the area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4. Diminish or other wise change the values for which the river was designated as a Wild and Scenic River? If "yes", explain.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5a. Fall on a tributary of a Wild and Scenic River?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5b. If 5a is "yes", will the project affect the Wild and Scenic River corridor?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5c. If 5a is "yes", will the project unreasonably diminish scenic, recreational, or fish and wildlife values?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If "yes" to questions 2, 5b, or 5c, then a WSRA Section 7 determination must be completed and attached.				
Mitigations and Conditions:				
1. None				

I. NEPA Analysis and Approval Conditions

When implemented as detailed in the project description and following all Project Mitigations and Conditions listed below, this project meets the terms and conditions of a categorical exclusion to NEPA.

Applicable Categorical Exclusion:

DO12 3.4 E (6) - *Non-destructive data collection, inventory (including field, aerial, and satellite surveying and mapping), study, research, and monitoring activities.*

Project Mitigations and Conditions:

1. **All equipment, materials, and instruments brought to the site from outside the park must be thoroughly cleared of any foreign debris that could harbor plant or animal propagules. (Environmental Planning and Compliance)**

This project has been reviewed in accordance with the above criteria and it has been determined that the project will result in no or minimal environmental effects. Therefore, it is categorically excluded from further environmental review required under the National Environmental Policy Act. Additionally, the necessary compliance coordination has been completed with regard to the National Historic Preservation Act, the Wilderness Act, the Wild and Scenic Rivers Act, and the Endangered Species Act.

<i>//Renea Kennec//</i>	<i>5/10/07</i>
Compliance Specialist	Date

<i>//Mark A Butler//</i>	<i>5/10/07</i>
Compliance Program Manager	Date

<i>//Bill Delaney//</i>	<i>5/31/07</i>
Chief, Project Management	Date

The signed original of this document is on file at the Environmental Planning and Compliance Office in Yosemite National Park.

Attachment A

Watershed Selection for Long-Term Meadow Monitoring in Yosemite National Park, CA

David J. Cooper, Edward Gage, Jennifer Jones
Department of Forest Rangeland and Watershed Stewardship
Colorado State University, Fort Collins, CO 80523

Introduction

Watersheds have been selected for long-term meadow monitoring in Yosemite National Park. Watersheds used in this analysis are those identified by the State of California in the California Interagency Watershed Map (<http://gis.ca.gov/meta.epl?oid=22175>; 1999, updated 2004). Watersheds were characterized based upon a set of five physical drivers that are known to influence the distribution, type and abundance of wetlands (Wohl et al. 2007, Winters et al. 2005). These drivers are glaciation, bedrock type, elevation, mean annual precipitation, and watershed gradient or steepness. These data were gathered using GIS coverage for each watershed and analyzed using an objective statistical procedure, cluster analysis, to classify the watersheds into groups. Three watersheds for meadow monitoring were then selected from each group using another statistical procedure; generalized random tessellation stratified sampling (GRTS – Stevens and Olsen 2004). The methods and results of this analysis are presented in this document.

Methods

The aerial coverage of five drivers was determined for each of the 101 watersheds that is within or intercepts the boundaries of YOSE (Table 1). Coverage of Pleistocene glaciers was derived from YOSE data. The coverage of plutonic vs. non-plutonic rocks was determined from the park geological map. Elevation was divided into four zones, <6500, 6500-8500, 8500-10,000 and >10,000 ft elevation based upon the park DEM. Watershed slope was also calculated from the park DEM, and the proportion of each watershed in four slope categories was determined: 0-5, 5-10, 10-20, >20%. Using PRISM data and analyses of the YOSE area three mean annual precipitation zones were determined, High (47-67"), medium (41-47") and low (29-41"). The driver analysis consisted of determining the proportion of each watershed covered by each of these driver categories. Driver proportions are provided in Appendix 1.

These data were analyzed using hierarchical, agglomerative cluster analysis to identify watersheds that have similar proportions of their area covered by the physical drivers. We used Euclidean distance to create a similarity matrix among watersheds and Wards method as the clustering procedure (Jongman et al. 1995). Statistical analyses were performed with the statistical software package PC-ORD (McCune and Mefford 1999). Once the watersheds were classified, we used a GRTS design to choose watersheds for long-term sampling.

Table 1. GIS datasets used in analyses.

Dataset	Description	Source
Glaciation	Tioga ice sheet extent, derived from an unpublished map by C. Wahrhaftig (USGS, deceased) by G. Stock.	NPS I&M (H. Werner)
Watershed boundaries	California Interagency Watershed Boundaries (Calwater version 2.2.1)	http://gis.ca.gov/meta.epl?oid=22175
Precipitation	Mean annual precipitation from PRISM group (Oregon State University, NRCS)	http://www.ncgc.nrcs.usda.gov/products/datasets/climate/data/precipitation-state/ca.html
Elevation	Elevation based on 30 m DEM (National Elevation Dataset)	http://seamless.usgs.gov/website/seamless/viewer.php
Slope	Slope based on 30 m DEM (National Elevation Dataset), calculated using AV Spatial Analyst	http://seamless.usgs.gov/website/seamless/viewer.php
Bedrock and surficial geology	Geologic Map of Yosemite National Park and Vicinity, California: a digital database (Huber et al., compiled by Aitken and Phillips 2003)	http://pubs.usgs.gov/imap/i1874/yos/enp.e00.zip

Results

The cluster analysis is shown in Figure 1. The watersheds are listed on the left, and the cutoff at ~67% dissimilarity is shown as the dotted line. The five cluster groups are identified by number. The watersheds included in each group are those to the left in the dendrogram. These watersheds as classified into the five cluster groups are shown in Figure 2.

Table 2 identifies the physical characteristics of each cluster group, based upon the physical drivers. Watersheds in cluster 1 occur at low elevation, have largely plutonic rocks, receive medium precipitation totals, were largely glaciated and have low gradient and very steep slopes. Watersheds in cluster two were at low elevation, have non-plutonic rocks as well as some plutonic rocks, receive medium to low precipitation totals, were largely unglaciated, and have low to steep gradient slopes. Watersheds in cluster three were at high elevation, have largely plutonic rocks, but with some areas of non-plutonic rocks, receive medium amounts of annual precipitation, were glaciated and have areas of both low and very steep gradient. Watersheds in cluster four occur at intermediate elevations, have largely plutonic rocks, the highest precipitation totals, were glaciated, and have largely steep and very steep slopes. Watersheds in group 5 occur at the lowest elevations, have largely plutonic rocks, low precipitation totals, were not glaciated, and have steep to very steep slopes.

A total of three watersheds were selected from in each cluster group using the GRTS design (Figure 3). The selected watersheds, the cluster group they were selected from, their California watershed code, and latitude and longitude are in Table 3. Within each watershed four wetlands, two fens, and two wet meadows will be chosen for analysis after we have classified these sites onto air photographs, and used the GRTS analysis to choose the study sites. This will be done during April 2007.

Table 2. Physical drivers that characterize the 5 clusters of watersheds identified in this analysis. Elev is in feet, Plutonic is plutonic rocks with P meaning largely plutonic and N being largely non plutonic rocks, Precipitation was divided into three categories high, medium and low, Glaciation is glaciated (G) or non glaciated (N), and slope is generalized as low, steep and very steep.

Cluster	Elevation	Plutonic	Precipitation	Glaciation	Slope gradient
1	6000-8500	P	M+h	G	L+VS
2	6000-8500	N+P	M+l	N	L+S
3	8500-10000+>10000	P+n	M+l	G	L+VS
4	8500-10000	P	H	G	S+VS
5	<6000	P+n	L	N	S+VS

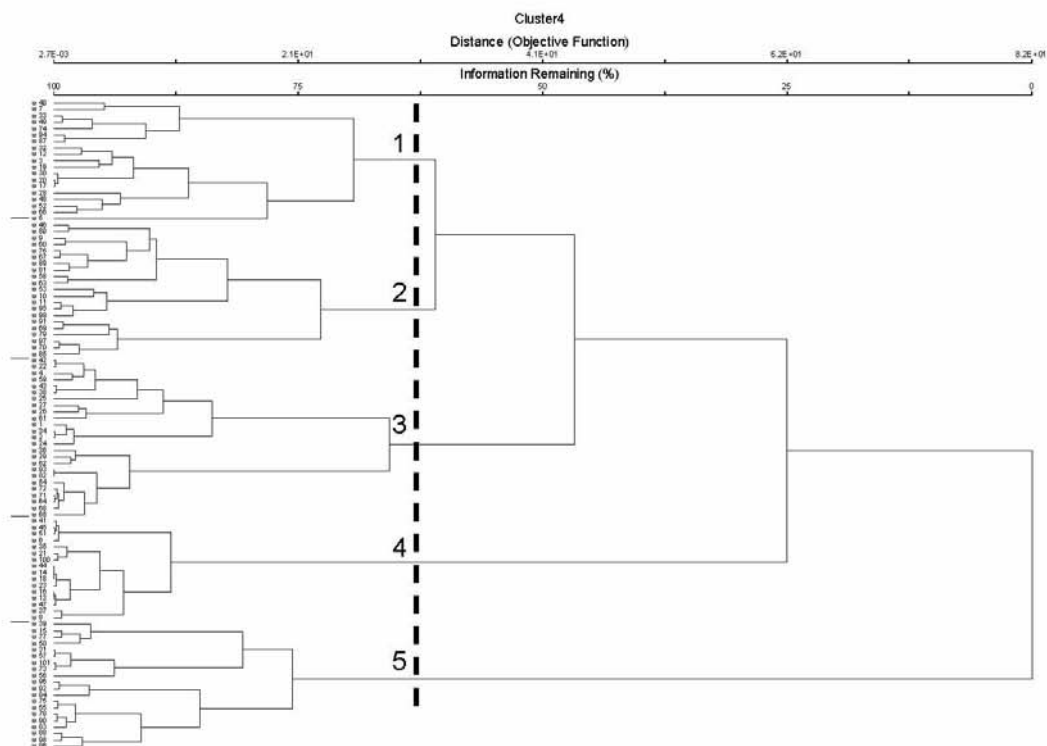


Figure 1. Hierarchical cluster analysis showing the cut level used to identify 5 groups of watersheds.

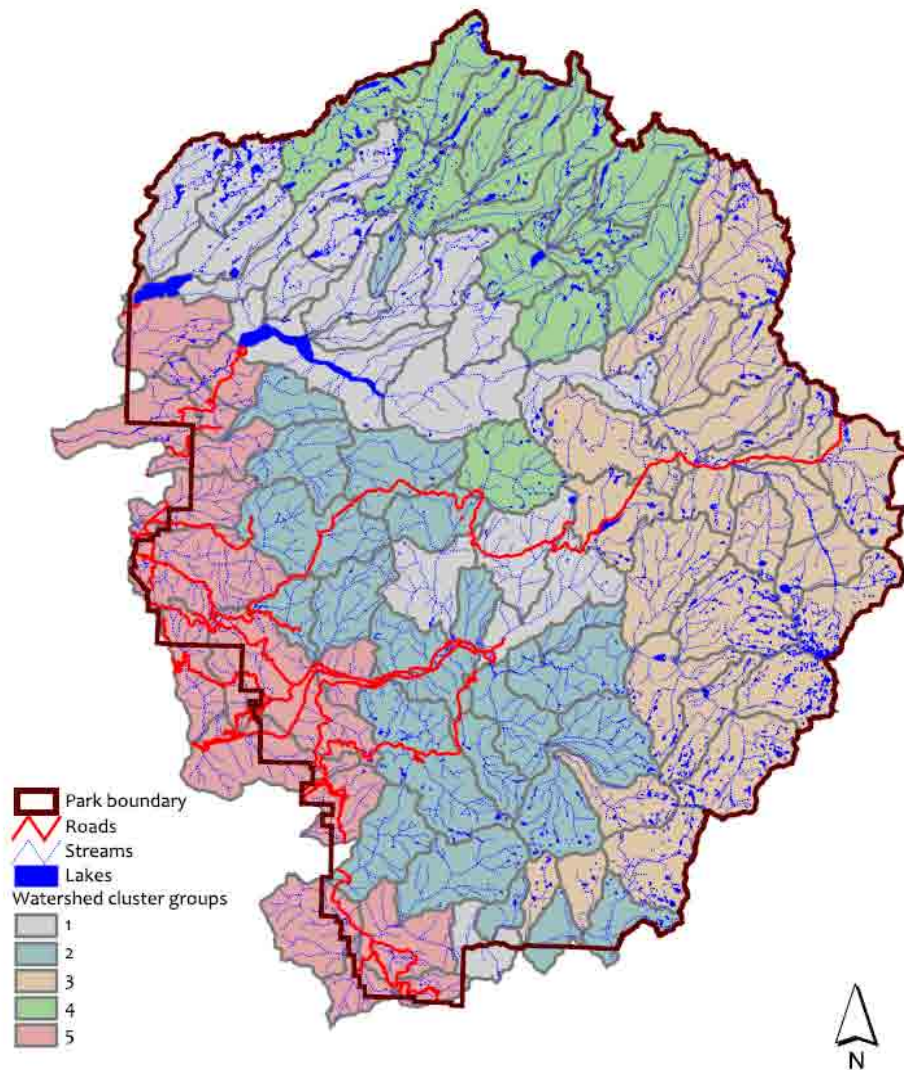


Figure 2. Five cluster groups identified using cluster analysis.

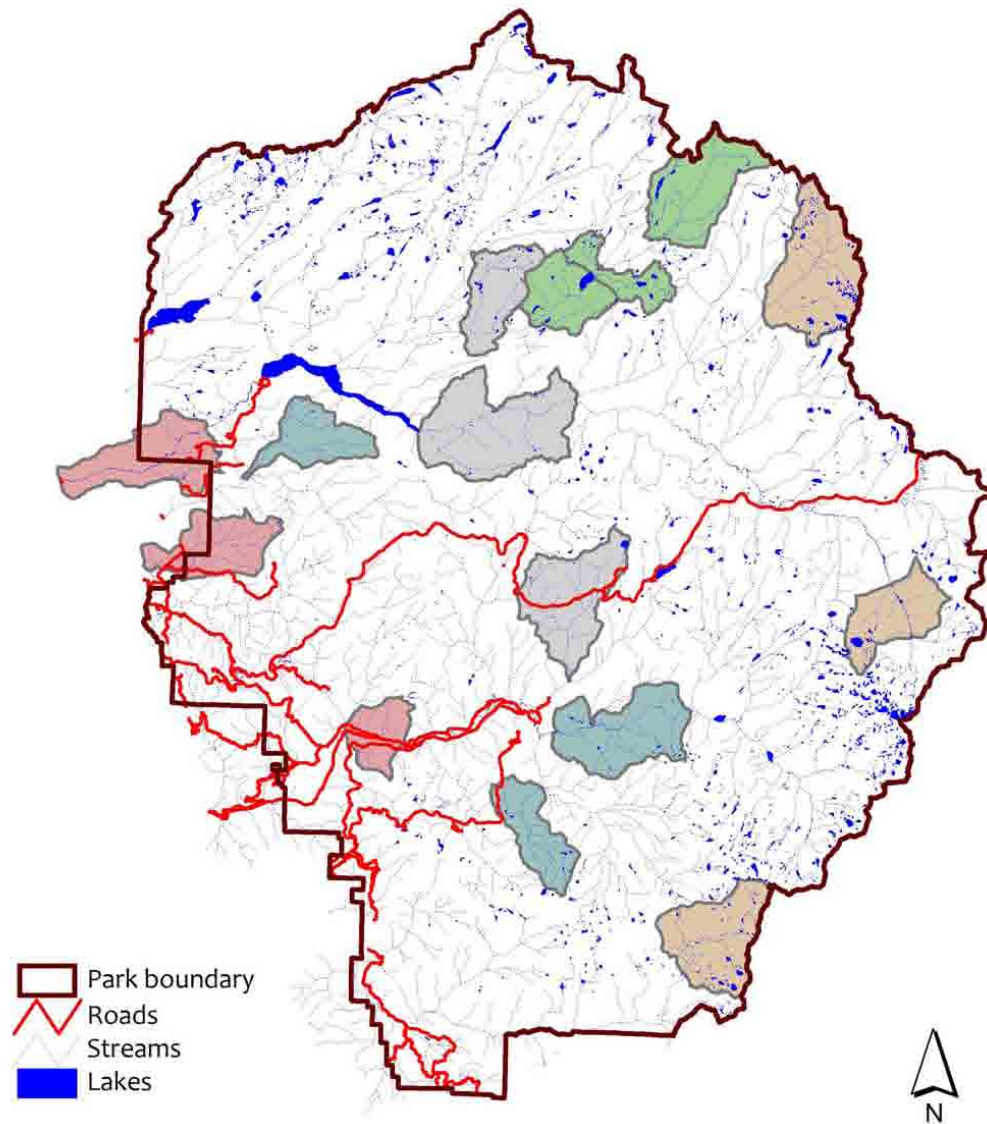


Figure 3. Watersheds selected by GRTS design are colored. The colors match the watershed cluster groups illustrated in Figure 2.

Table 3. California Watershed number, cluster group and UTM's for selected study watersheds.

CA watershed #	Cluster group	<i>Watershed centroid coordinates</i>	
		UTM E	UTM N
6536.600704	1	271667	4209375
6536.600905	1	271627	4199856
6537.600302	1	276969	4187826
6536.700102	2	258798	4199149
6537.600201	2	280614	4178420
6537.600403	2	274370	4171238
6536.600504	3	294227	4210929
6536.600101	3	299725	4186565
6537.400105	3	287172	4163771
6536.600606	4	285904	4216802
6536.600603	4	280613	4210697
6536.600604	4	276485	4209300
6536.600904	5	247166	4197685
6536.800102	5	251793	4191429
6537.500301	5	263343	4178245

Literature Cited

- Jongman, R. H. G, C. ter Braak and O van Tongeren. 1995. Data analysis in community and landscape analysis. Cambridge University Press.
- McCune, B. and M. J. Mefford. 1999. PC-ORD. Multivariate Analysis of Ecological Data, Version 4. MJM Software Design, Gleneden Beach, Oregon, USA.
- Stevens, D. L. and A. R. Olsen. 2004. Spatially balanced sampling of natural resources. Journal of the American Statistical Association 99: 262-278.
- Winters, D., D. J. Cooper, and many others. 2004. Conceptual framework for conducting multiple scale aquatic, riparian and wetland ecological assessments. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. Region 2.
- Wohl, E., D. J. Cooper, and others. 2007. Assessment of Stream Ecosystem Function and Sensitivity in the Bighorn National Forest, Wyoming. Environmental Management (in press).

Preservation Assessment Form (YOSE XXX)

(Version: AUG06)

Compliance Tracking Number: 2007-064

PEPC Project Number: 18491

A. DESCRIPTION OF UNDERTAKING

Title: Parkwide Meadow Vital Signs Data Collection

Project Location and Area of Potential Effect:

Parkwide , Mariposa and Tuolumne Counties, California

Meadows Parkwide

Project Manager: Lisa Acree, Resources Management and Science, Yosemite National Park

Project Description: Resources Management and Science and the Inventory and Monitoring Program propose to implement a long-term meadow monitoring program within Yosemite National Park. The purpose of this study is to inform the NPS about the current and long-term condition of meadows in Yosemite. The goals of this program are to collect long-term data to assess the hydrologic, biotic, and ecological integrity of wet meadows. Approximately 50-60 study meadows will be chosen throughout Yosemite to span the range of elevations, watershed bedrock types, and history of Pleistocene glaciations that occurs within the park. In each study meadow, the depth to the water table, vegetation composition, and invertebrate composition will be analyzed during 2007, and regularly for several decades afterwards.

Three types of data will be collected during this project: 1) hydrologic data including depth to the water table, 2) a complete list of plant species present and a measure of the canopy coverage of each species, 3) composition and biomass of invertebrates.

One of the most critical measures in wetland monitoring is depth to the water table at critical times of the year. Wetland types such as fens, wet meadows, and marshes have distinctive hydrologic regimes, and the persistence of suitable hydrologic conditions is essential for their long-term sustainability. One simple ground water monitoring well will be installed in each meadow. The well will consist of a small diameter (1.25 inch) section of slotted PVC pipe, typically 1 to 1.5 meter long, that sticks up above the ground about 6 inches. The pipe is placed into a hand-augered hole, approximately 2 inches in diameter. The hole is then backfilled with native soil, including the plug of turf that was first removed with a shovel. The vegetation is allowed to grow back around the well. The PVC is painted to match the surrounding area, capped, and numbered with a permanent tag inside the well. Wells allow researchers and technicians to visit a meadow, find the exact site where the water table was previously measured, remove the cap, and measure the water table depth without site disturbance and in a relatively short visit. Water table depth provides a definitive record of hydrologic conditions at the same location from week to week, month to month, year to year, or decade to decade. The need for each well will be reevaluated at least once every ten years.

The sampling design for the selection of meadows and the data collection will be statistically robust. The data collected during this project will reside with the NPS Inventory and Monitoring program and Yosemite.

The project will include site-specific consultation with the Park Archeologist to avoid impacts to archeological sites and consultation with the Park Botanist to avoid impacts to special status plant species.

1. Attached Sensitive Information**	Yes	No	Explanation/Source/Notes
a. Maps	<input type="checkbox"/>	<input type="checkbox"/>	
b. Drawings	<input type="checkbox"/>	<input type="checkbox"/>	
c. Site Plans	<input type="checkbox"/>	<input type="checkbox"/>	
d. Photographs	<input type="checkbox"/>	<input type="checkbox"/>	
e. Sample	<input type="checkbox"/>	<input type="checkbox"/>	
f. List of Materials	<input type="checkbox"/>	<input type="checkbox"/>	
g. Other (Explain)	<input type="checkbox"/>	<input type="checkbox"/>	

** Sensitive documents not for duplication or distribution beyond park management, subject matter experts, and the project statutory compliance file.

B. DESCRIPTION OF EFFECTS

	Yes	No	N/A	Explanation/Notes
1. Has the Area of Potential Effect been surveyed to identify historic properties? If Yes, provide reference for the Survey (s).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
a. Would the proposed action affect a known historic property?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2. List all Historic Properties in the Area of Potential Effect:	Affected? Yes	No		Explanation/Notes
a. Parkwide	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Consultaion would be conducted on a site-by-site basis.
b.	<input type="checkbox"/>	<input type="checkbox"/>		
c.	<input type="checkbox"/>	<input type="checkbox"/>		
3. List resources in the Area of Potential Effect to which American Indians attach cultural and religious significance:	Affected? Yes	No		Explanation/Notes
a.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
b.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
c.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
4. The proposed action will:	Yes	No	N/A	Explanation/Note
• Destroy, remove, or alter features or elements from a historic structure	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
• Replace historic features/elements in kind	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
• Add nonhistoric features/elements to a historic structure	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
• Alter or remove features/elements of a historic setting or environment (including terrain)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
• Add nonhistoric features/elements (including visual, audible, or atmospheric) to a historic setting or cultural landscape	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monitor will not be visible to visitors.
• Disturb, destroy, or make archeological resources inaccessible, or alter associated terrain	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monitor location will be selected to avoid impacting the archeological resources.
• Disturb, destroy, or make ethnographic resources inaccessible, or alter associated terrain	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monitor will not impact traditional cultural use activities.
• Begin or contribute to the deterioration of historic fabric, terrain, setting, landscape elements, or archeological or ethnographic resources	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
• Involve a real property transaction affecting historic cultural properties (i.e., the exchange, sale, or lease of land or structures)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
• Potentially affect presently unidentified historic resources	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
• Other	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

5. Describe any measures that are incorporated as part of this project that will be taken to prevent or minimize loss or impairment of prehistoric or historic fabric, setting, integrity, or data:

<Enter Information or Delete>

Checklist prepared by: Jeannette Simons

Date: 03/04/07

Title: Historic Preservation Officer

C. SPECIALIST SECTION

Specialists: Your comments here (or attached) show that you have reviewed this proposal for conformity with requirements of *National Historic Preservation Act, Section 106*; with the 1995 *Service-wide Programmatic Agreement* (if applicable); with applicable parts of the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation*; with the NPS *Management Policies* and *Cultural Resource Management Guideline*; and have given your best professional advice about this project and the issues relevant to the Section 106 process, including identification and evaluation of historic properties and further consultation needs.

Archeologist

Name: **Laura Kirn**

Date: 4/10/07

Comments:

Ground Disturbance Involved Yes: ☒ No: ☐

Assessment of Effect: **"No Effect"**

Recommended Conditions:

Signature of Archeologist: //Laura Kirn//

Cultural Anthropologist

Name: **Sonny Montague**

Date:

Comments:

Assessment of Effect:

Recommended Conditions:

Signature of Cultural Anthropologist: _____

Curator

Name: **Jonathan Bayless**

Date:

Comments:

Assessment of Effect:

Recommended Conditions:

Signature of Curator: _____

Historian

Name: **Charles Palmer**

Date:

Comments:

Assessment of Effect:

Recommended Conditions:

Signature of Historian: _____

Historic Architect

Name: **Sueann Brown**

Date: 4/11/07

Comments:

Assessment of Effect: **"No Adverse Effect"**

Recommended Conditions:

Signature of Historic Architect: //Sueann Brown//

Historical Landscape Architect

Name: **Dave Humphrey**

Date: 4/11/07

Comments:

Assessment of Effect: **"No Effect"**

Recommended Conditions:

Signature of Historic Landscape Architect: //David T. Humphrey//

Preservation Specialist

Name: **Rod Kennec**

Date:

Comments:

Assessment of Effect:

Recommended Conditions: Recommended Conditions

Signature of Preservation Specialist: _____

Native American Liaison

Name: **Jeannette Simons**

Date:

Comments:

Assessment of Effect:

Recommended Conditions:

Signature of Native American Liaison: _____

<Enter Specialist Title>

Name:

Date:

Comments:

Assessment of Effect:

Recommended Conditions:

Signature of <Enter Specialist's Title>: _____

**D. RESOURCES MANAGEMENT AND SCIENCE DIVISION AND PARK 106
COORDINATOR REVIEWS AND RECOMMENDATIONS**

- 1. Review by specialists:** The appropriate subject-matter experts have reviewed the project and entered their comments and recommendations in Section C, above.

The foregoing assessment is adequate: the proposed action is consistent with all applicable NPS management policies, standards, guidelines, or US DOI standards and guidelines, Rehabilitation of Historic Buildings, or others, and incorporates measures to avoid Adverse Effects.

Reviewed and Accepted by:

Signature: //Niki Stephanie Nicholas//
Chief of Resources Management & Science Division

Date: 4/12/07

- 2. Compliance Requirements:** The following is the park's assessment of Section 106 process needs and requirements for this undertaking.

☐ **Standard 36 CFR Part 800 Consultation**

Consultation under 36 CFR is needed subsequent to the preparation of this form and its review by appropriate historic resource management advisors.

☒ **Undertaking related to the 1995 NPS Programmatic Agreement**

The above action meets all conditions for a programmatic exclusion under Stipulation IV. A of the 1995 NPS programmatic agreement, and is listed in Stipulation IV. B, as:

3. Installation of Environmental Monitoring Units (such as those for water and air quality).

☐ **Plan-Related Undertaking**

Consultation and review of the proposed undertaking were completed in the context of a plan review process, in accordance with the 1995 NPS programmatic agreement and 36 CFR Part 800.

☐ **Undertaking Related to Another Agreement**

The proposed undertaking is covered for Section 106 purposes under a document such as a statewide agreement written in accordance with 37 CFR Part 800.7 or counterpart regulations.

Agreement: <Enter Agreement Information>

☐ **Flood-Recovery Related Undertaking**

The proposed undertaking is covered for Section 106 purposes under the letter-based agreement between the NPS, the State Historic Preservation Office, and the Council for Historic Preservation for "Highwater 97" flood repair and recovery

☐ **Undertaking Related to the 1999 Yosemite Programmatic Agreement**

The proposed undertaking is covered for Section 106 purposes under the park's 1999 programmatic agreement for planning, design, construction, operations and maintenance; the undertaking meets the stipulations identified in Article VII.C.2.

3. Assessment of Effects: No Adverse Effect

4. Project Stipulations and Conditions

Following are listed any stipulations or conditions necessary to ensure that the assessment of effects above is consistent with 36 CFR 800 criteria of effect or to mitigate potential adverse effects:

- a. None

Recommended by Park Section 106 Coordinator:

Name: **Jeannette Simons**

Title: **Historic Preservation Officer**

Signature: //Jeannette Simons// Date: 4/17/07

E. SUPERINTENDENT'S APPROVAL

The proposed work conforms to NPS Management Policies and NPS-28 and I approve the recommendations, stipulations, and conditions noted in Section B of this form.

Signature of Superintendent: //MJTollefson// Date: 5/24/07
Michael J. Tollefson