

Categorical Exclusion

(Version: FEB06)

Compliance Tracking Number: 2006-083

PEPC Project Number: 16290

A. PROJECT INFORMATION

Title: Yosemite National Park High-Resolution Digital Topography Data Collection

Location: Mariposa Grove, Yosemite Valley, El Portal, Tuolumne Meadows, and Glen Aulin, Mariposa and Tuolumne Counties, California

Project Manager: Greg Stock, 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 minor 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):

- ☐ Cultural Resource Effects Assessment Form (XXX)
- ☒ Wilderness Minimum Requirement Analysis
- ☐ Wild and Scenic River Section 7 Determination
- ☐ Park Management Terms and Conditions
- ☐ 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

7/30/06

Date

Original: Statutory Compliance File
cc: Project Proponent

Attachments (2)

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: Greg Stock, Project Manager, Resources Management and Science, Yosemite National Park

From: Superintendent, Yosemite National Park

Subject: Notice to Proceed, 2006-083 Yosemite National Park High-Resolution Digital
Topography 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 the conditions stipulated in the enclosed *Categorical Exclusion Form* and associated documents when implementing this project.

//MJTollefson//
Michael J. Tollefson

7/30/06
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: FEB06)

Compliance Tracking Number: 2006-083

PEPC Project Number: 16290

A. PROJECT INFORMATION

Title: Yosemite National Park High-Resolution Digital Topography Data Collection

Location: Mariposa Grove, Yosemite Valley, El Portal, Tuolumne Meadows, and Glen Aulin, Tuolumne and Mariposa Counties, California

Project Manager: Greg Stock, Resources Management and Science, Yosemite National Park

B. PROJECT DESCRIPTION AND BACKGROUND

The purpose of this project is to collect high-resolution digital topography data from five park areas. Data would be collected by aircraft using airborne light swath mapping (ALSM), often referred to as LIDAR. The proposed flight areas are the Mariposa Grove (3.0 km²), Yosemite Valley (72.2 km²), El Portal (4.5 km²), and Tuolumne Meadows and Glen Aulin (16.0 km²). High-resolution digital topography for these areas would serve many purposes, among them aiding the placement of roads and trails in the Mariposa Grove, floodplain mapping in support of the Tuolumne River Wild and Scenic River Plan and Tuolumne Meadows Development Concept plan, and a number of other management and planning activities.

DATA COLLECTION METHOD

Similar to radar technology (which uses radio waves instead of light), ALSM determines the distance to an object by measuring the time delay between a pulse of light and detection of the reflected signal. ALSM data are collected using small twin-engine aircraft. The plane flies 2000 ft above the ground surface at 100 mph, using ground-based GPS units to orient. A laser mounted on the plane directs pulses of light toward the ground. The light is scattered back to a sensor in the aircraft, and the round trip travel time is used to compute the precise three-dimensional locations of points on the ground. Resulting digital topographic maps have ~0.5 m accuracy, a dramatic improvement over the 10 m topography presently available. Buildings, trees, and boulders are individually discernable features.

ALSM data would be collected by the National Center for Airborne Laser Mapping (NCALM), a National Science Foundation (NSF) sponsored institution based out of the University of Florida. Because NCALM will be in the area collecting data for an NSF-funded researcher, the mobilization costs are subsidized, resulting in significantly decreased costs for the park. The project would be staged out of local airports outside of the park. NCALM would provide personnel and GPS receivers to operate ground stations, as well as a pilot, laser operator, and aircraft. The project manager would assist in this effort.

FLIGHT HEIGHTS

Four of the five proposed flight areas can be flown at or above the minimum flight ceiling of 2000 ft. However, in Yosemite Valley aircraft are required to stay 2000 ft above the Valley rim, which equates to roughly 5000 ft above the Valley floor. Although ALSM data for Yosemite Valley can be collected from this height, the precision will be considerably improved if the flight occurs 3000-4000 feet above the Valley floor. **THE AIRCRAFT WILL NOT NEED TO FLY BELOW THE RIM OF THE VALLEY.**

ISSUES TO BE CONSIDERED

Flight durations would depend on the size of the areas (see above); data collection for Yosemite Valley, the largest area, would likely take three to five hours. Visitors might experience increased noise (in the form of airplane engine noise) and decreased vista quality (in the form of the airplane in the sky) during this time. The laser used for mapping is not detectable to the naked eye and does not pose a threat to human health.

One important issue concerns peregrine falcons. Aircraft are required to maintain 0.5 mile line-of-sight distance from peregrine nests until August 1 or when peregrine chicks have fledged, whichever is later. The flights would occur after August 1, but until then Resource personnel would monitor a nest in western Yosemite Valley that started late. Consultation with Wildlife Biologists would ensure peregrines are not affected. In any case, the aircraft will maintain at least 0.5 miles distance from any Peregrine Falcon nest.

Park Dispatch, FAA, Fire Officers, Law Enforcement, and others would be informed of the flights well ahead of time, and consulted to coordinate flights. The park PIO and Interpreters would be notified of the flights so they may help convey information about the flights to concerned visitors.

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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Park visitors: public notification began 7/13/06; see Section G. Wilderness Act Checklist.
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: 2 required (vicinity map & site map)	<input checked="" type="checkbox"/>			Data collection vicinity map: 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"/>	Airbourne Light Swath Mapping (ASLM) Research Proposal: see Attachment B.

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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2. From geohazards	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Air quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Negligible: temporary during flight time.
4. Soundscapes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Negligible: temporary during flight time.
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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See the Section E. Special Status Species Checklist below.
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 this project.
13. Unique or important wildlife or wildlife habitat	<input type="checkbox"/>	<input 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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
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"/>	Mitigated through a public information and interpretation effort.
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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
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"/>	
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"/>	
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"/>	Mitigated: see Section E. Special Status Species Checklist, below.
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 13007)?	<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"/>	
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"/>	
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"/>	Mitigated: project was published to the NPS Public PEPC site for review 2 weeks before management review; park interpretive and public information efforts will proceed flights.
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:

1. None

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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Condition 1 below, and the attached Minimum Requirement Analysis.
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:

- Aircraft in Yosemite Valley are required to maintain 0.5 mile line of sight distance from Peregrine Falcon nests until August 1 or when Peregrine chicks have fully fledged, whichever is later (nests will be monitored by park wildlife biologist).

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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
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 the project within the boundary of an archeological or historic landscape or district?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5a. Is there a National Historic Landmark?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5b. 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"/>	
5c. Is there a historic property with a DOE and concurrence by the SHPO or a completed National Register form?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5d. Is there a cultural property requiring review under NHPA, Section 106?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Would there be alteration of a structure or cultural landscape covered by 5a-d, above?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

If "yes" to any of the above, then an Assessment of Effects form (YOSE-XXX) must be completed and attached.

Mitigations and Conditions:

- 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"/>	Mitigated: see Condition 1 below, and the attached Wilderness Minimum Requirement Analysis.
2. Within a Potential Wilderness Addition?	<input type="checkbox"/>	<input checked="" 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:

- Handouts need to be made and distributed to park visitors in wilderness and efforts beyond interpretation staff should be made to notify the public in Yosemite Valley. (Wilderness Office)

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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2. Fall within the bed and banks AND affect the free-flow of the river?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3. Potentially affect water quality of the area?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4. Remain consistent with its river segment classification?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5. Protect and enhance river ORVs?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6a. Fall within the River Protection Overlay?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6b. If "yes", is it consistent with conditions of the River Protection Overlay?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7. Remain consistent with the areas Management Zoning?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8a. Fall on a tributary of a Wild and Scenic River?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8b. If 9a is "yes", will the project affect the Wild and Scenic River corridor?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8c. If 9a 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, 9b, or 9c, 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:

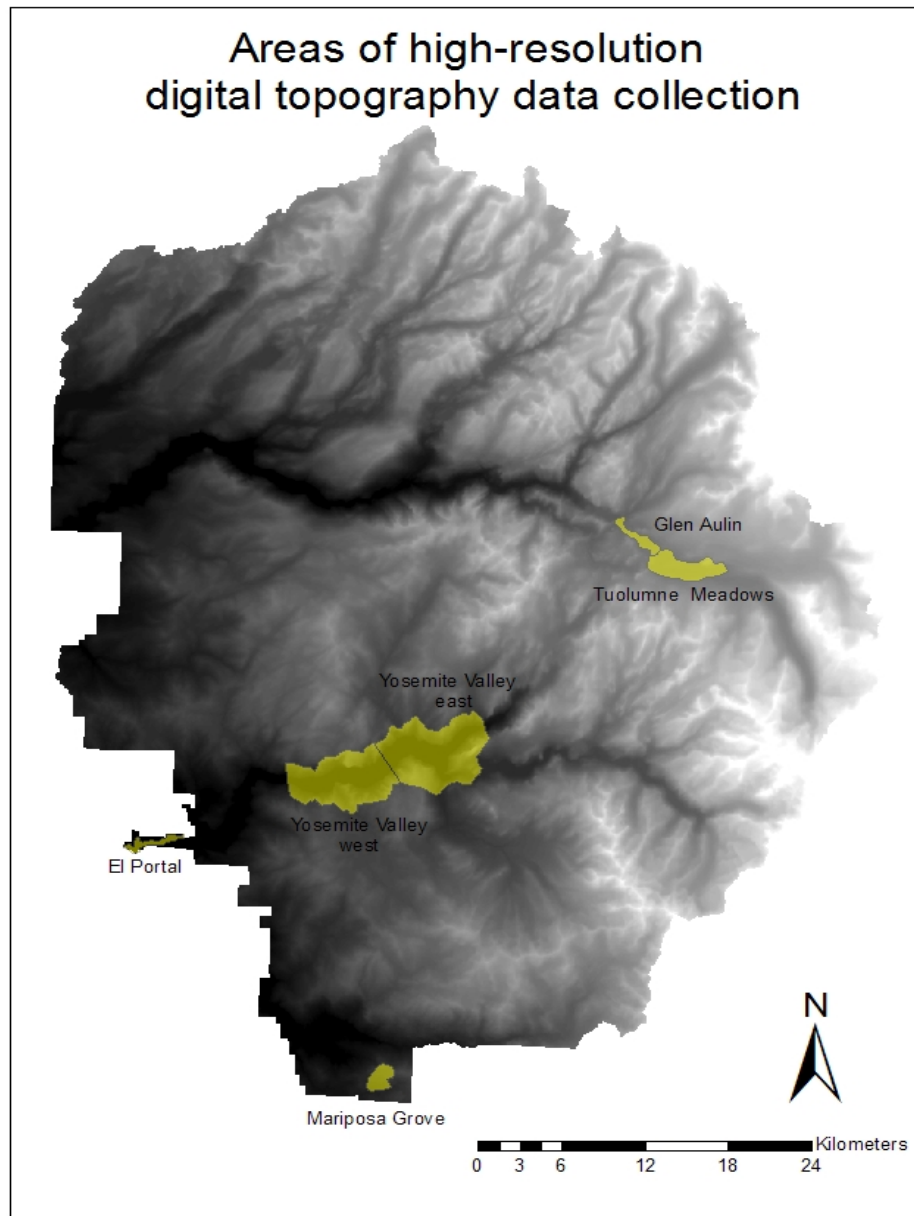
1. Aircraft in Yosemite Valley are required to maintain 0.5 mile line of sight distance from Peregrine Falcon nests until August 1 or when Peregrine chicks have fully fledged, whichever is later (nests will be monitored by park wildlife biologist).
2. Handouts need to be made and distributed to park visitors in wilderness and efforts beyond interpretation staff should be made to notify the public in Yosemite Valley. (Wilderness Office)

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>//GWColliver//</i>	<i>7/30/06</i>
Compliance Specialist	Date
<i>//Mark A Butler//</i>	<i>7/30/06</i>
Compliance Program Manager	Date
<i>//Bill Delaney//</i>	<i>7/30/06</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



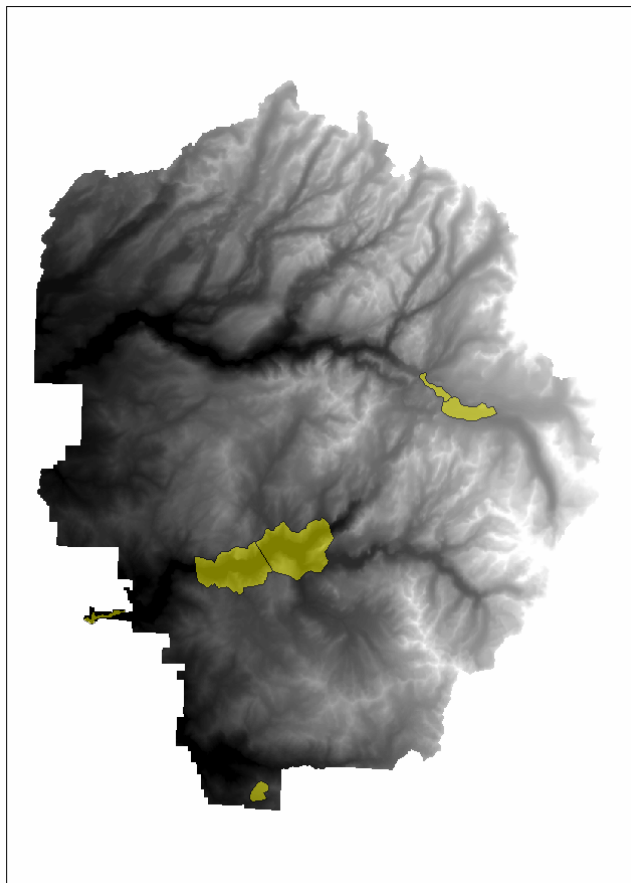
Attachment B

High-resolution Airborne Light Swath Mapping (ALSM) data collection

Greg Stock, Jim Roche, and Bill Kuhn
(with contributions from many other NPS personnel)

Introduction

Airborne Light Swath Mapping (ALSM) provides very high-resolution digital topography, and can also be used to produce three-dimensional vegetation maps. Initially, collection of ALSM data was targeted only for the Mariposa Grove, allowing for a detailed analysis of surface water drainages to help direct the placement of roads and trails. ALSM data was subsequently identified as an integral part of precise flood plain mapping in support of the Tuolumne River Wild and Scenic River plan, and also as an aid for the Tuolumne Meadows Development Concept plan. With the realization that a National Science Foundation-sponsored institution would be in Yosemite National Park in the summer of 2006 to fly ALSM for



academic research, we contacted that institution to explore the feasibility of joining the two projects. The projected estimate for our targeted areas was significantly below other commercial estimates, mainly because the mobilization costs were already subsidized by the academic researcher (Dr. Steve Martel, Univ. Hawaii). As a result, we identified additional key areas in the park where ALSM data would support and enhance management and scientific activities.

We propose to collect ALSM data for five areas of Yosemite National Park, shown opposite in yellow:

- Mariposa Grove (3 km²)
- El Portal (4.5 km²)
- Yosemite Valley (72.2 km²)
- Tuolumne Meadows/Glen Aulin (16 km²)

In addition to these areas, the park will also have access to ~50 km² of ALSM data covering a swath from Olmstead Point to Lumbert Dome that is being flown by Dr.

Martel for his research on sheet jointing.

What is ALSM?

ALSM stands for Airborne Light Swath Mapping. This technique is also often referred to as Light Detection and Ranging (LIDAR). ALSM can produce a highly accurate, three-

dimensional, digital topographic map of a large area of land surface. Similar to [radar](#) technology (which uses radio waves instead of light), ALSM determines the distance to an object measuring the time delay between transmission of a pulse of light and detection of the reflected signal. The major component of the system is a laser that emits tens of thousands of short pulses of light per second. The laser is mounted on a small twin-engine aircraft and the laser pulses are directed towards the ground by a scanning mirror. Each pulse illuminates an area, or footprint, of about one foot in diameter and the light is scattered back to a sensor in the aircraft. The round trip travel time of the laser light allows researchers to compute the precise three-dimensional locations of the points on the ground. The resulting set of x,y,z data of many millions of points on the ground is then transformed into a highly accurate and precise map.

Digital elevation models (DEMs) generated by this ALSM have very high spatial resolution, with horizontal precision on the order of 40-60 cm and vertical precision of 10-20 cm. Buildings, trees and boulders are individually discernible features. Presently our highest-resolution digital topography has 10 m spatial resolution; ALSM therefore presents a marked improvement in the quality of our data.

We have arranged for ALSM data to be acquired by the National Center for Airborne Light Mapping (NCALM), a National Science Foundation-sponsored institution based out of the University of Florida (www.ncalm.org). NCALM will provide personnel and GPS receivers to operate ground stations for the ALSM survey, as well as a pilot, laser operator, and aircraft to perform the survey.

Flight height

According to NCALM, the optimal flight height for acquiring ALSM data is 600 m (~1800 feet). We have discussed the flight ceiling limits with NCALM, and they feel that flying at 2000 feet is acceptable. Thus, the majority of planned flight areas can be flown at or above the minimum flight ceiling of 2000 feet. However, the restrictions are different for Yosemite Valley, where aircraft are required to stay 2000 feet above the Valley *rim*, which equates to roughly 5000 feet above the Valley *floor*. This distance is too high to acquire precise ALSM data, so in order to fly ALSM for the floor of Yosemite Valley an exception must be made. *We seek an exception to the flight ceiling over Yosemite Valley such that NCALM pilots are able to fly approximately 2000 feet above the floor of Yosemite Valley.* The flight time for collection of Yosemite Valley data should be a few hours at most. We will ensure that Park Dispatch, Fire Officers, and others are informed of the flight ahead of time, and will work with them to coordinate the ideal time to fly. In addition, we will work with the park Wildlife Biologists to ensure that the timing and locations of the flights do not interfere with peregrine falcon nesting and fledging.

Schedule

As NCALM is the primary ALSM institution for research funded by the National Science Foundation, they will be flying several regions in the western United States this summer in support of this research. The exact flight timing is not known at this point, but we anticipate that they will fly Yosemite in late July or early August.

Research and management applications

ALSM data for the proposed portions of Yosemite National Park will be extremely useful for a host of research and management activities. Among the many potential applications of these data are the following:

Vegetation/restoration applications

- Determine the boundaries between the main river channel, riparian zones, meadow, and upland vegetation. This information would be a foundation for natural resource analysis in the EIS for the Tuolumne River Corridor.
- Understand and map conifer encroachment into meadows in relation to physical factors.
- Understand patterns of invasive species encroachment
- Identify areas of high California black oak recruitment, and understand the physical parameters that provide good habitat for oak recruitment
- Correlate specific species with micro-topography for restoration projects in Yosemite Valley.
- Determine vegetation height.
- Vegetation canopy mapping, in particular the Mariposa grove individual sequoias.
- Facilitate forest volume/canopy height modeling (complimented with field work) to estimate forest biomass.
- Determine extent of broadleaf canopied forests, as well as estimate broadleaf species cover in conifer understory (broadleaf species are much more effective than conifers at intercepting the ALSM laser).

Hydrological applications

- Delineate river terraces, cutoff channels, and other subtle river-related features along the Tuolumne and Merced rivers.
- Provide an accurate basemap for a variety of hydrologic analyses, ranging from floodplain determination to groundwater modeling
- Accurately quantify changes in river morphology that have occurred since the production of 1919 and 1934 topographic map maps of Yosemite Valley, and provide a basemap to compare with future mapping efforts.
- Yosemite Valley and Tuolumne meadows hydrologic modeling; currently the 10m DEM is not adequate to model flows.

Geological applications

- Precisely map talus slope limits and prehistoric rockfall runout limits in Yosemite Valley
- Determine the volume of material in Yosemite Valley talus slopes, providing a robust long-term average rate of rockfall
- Precisely calculate the volume of prehistoric rock avalanches
- High resolution basemap to identify and study glacial deposits such as moraines and glacial erratics.
- Digital database to study geologic structures such as domes, sheet joints, etc.

Management and planning applications

- Assess formal and non-formal trails (Visitor Experience and Resource Protection or VERP)
- Aid Experiential Resource Analysis (VERP)
- Provide a basemap for viewshed models of the landscape seen from vista points, including vegetation
- Create visual simulations and models of landscape and vegetation management
- Provide a basemap for three-dimensional models of construction projects, including lighting impacts on the night sky.