

Integrated Monitoring Protocol for Cave Entrance Communities and Cave Environments in the Klamath Network

Standard Operating Procedure #2: Scheduling

Version 2017Feb10

Citation:

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To create a new version of this SOP, carefully follow the instructions in SOP #18: Revising the Protocol (<https://irma.nps.gov/DataStore/Reference/Profile/2238840>). Use the Revision History Log below to describe the revisions:

- Populate the top table of the revision history log, providing the previous version date, author of the change, a specific but concise description of the changes made, the footnote number associated with change details, and a new version date.
- In the bottom table, add a footnote and as much text as needed to describe in detail the reasons for and implications of the change.

Revision History Log

Previous Version Date	Author of Change	Changes Made	Footnote #	New Version Date

Footnote #	Detailed Reasons for and Implications of the Changes

1 Introduction

This Standard Operating Procedure (SOP) provides an overview of the responsibilities and annual schedule for all activities related to this cave monitoring protocol. It will be referred to throughout the year to predict workloads and upcoming tasks. The schedule is described by monitoring parameter and also by month.

2 Responsibilities

Roles and responsibilities for park and Klamath Network (KLMN) staff are described in the protocol narrative chapter 5 on Personnel Requirements and Training, and implementation costs are to be funded as described in chapter 6 on Operational Requirements. All field work and data collection will be performed by park staff. The Lava Beds National Monument (LBE) Natural Resource Program Manager (NRPM) will provide coordination and oversight between parks, particularly in even years. The Field Lead will implement climate, bat, ice/water, and visitation SOPs during odd years, with the support of other park staff, technicians, or interns, as needed. In even years, a seasonal technician will likely be hired to support both parks with summer data collection on scat, vegetation, and invertebrates. Ideally, this technician will be initially trained and duty stationed at Oregon Caves National Monument and Preserve (ORCA), will conduct summer cave monitoring at ORCA for 3–4 weeks, and then be duty stationed at LBE to conduct summer cave monitoring at LBE for the remainder of the season. When a second individual is needed for field work, the seasonal technician will be assisted by other park staff (e.g., Field Lead, NRPM), technicians, or interns (the training for this temporary assistant will vary, but should include cave specific safety training at the minimum).

Bats, water (subterranean pools), ice, climate, and visitation will be monitored every year, whereas scat and visible organics, invertebrates, and cave entrance vegetation will be monitored biennially, during even years. LBE and ORCA will fund monitoring efforts during odd years, and KLMN will provide supplemental funding during even years, when the additional 3 parameters are sampled (Table 2 in the protocol narrative). The LBE NRPM and Field Leads will be responsible for coordinating all activities, including training, safety, obtaining access to caves, and ensuring that equipment and personnel are available.

3 Budgets and Equipment

Each park's resources chief and/or natural resource program manager will hire staff, purchase equipment, and arrange vehicles/travel as needed to accomplish the year's monitoring requirements. In September/October of odd years, the Project Lead will contact the park staff to discuss the upcoming (even) year's monitoring, including staffing, equipment, housing, travel, budget, etc. The cave monitoring budget will be included in the network's work plan budget, which is reviewed and approved by the Board of Directors in December each year. Announcements and postings for seasonal positions should be made approximately 6 months in advance of the job start date.

Equipment will be organized and prepared by the park Field Lead at least 8 weeks prior to the field season, allowing time to troubleshoot, make repairs, and order new equipment. This includes preparation of all field datasheets, site descriptions, cave maps, and park maps that show the location of caves. Specific equipment needs for monitoring each parameter are described in SOPs #4-11.

4 Field Work Schedule

Seasons for implementing each field activity are identified in Table 2-1. However, prior to the start of each field season, the LABE NRPM and/or park Field Lead should develop a more detailed schedule that accounts for the weekly activities of the field crew, with care being taken to match the timing of previous field seasons. In addition, upon completion of each task, the Field Lead should send an email to the KLMN Project Lead and Data Manager to let them know the task has been completed (e.g., when the crew has downloaded all data loggers or completed ice/water sampling, an email should be sent to the KLMN Program Manager and Data Manager).

Table 2-1. Cave monitoring parameters and the seasons during which monitoring field activities occur.

	Visitation	Water	Ice	Climate	Cave Entrance Vegetation	Scat & Visible Organics	Invertebrate	Bat
Winter	X	X		X				X
Spring	X	X	X					
Summer	X	X		X	X	X	X	
Fall	X	X	X					

5 Field Work Schedule by Parameter

A general schedule for task completion broken down by parameter is provided below in Table 2-2. Scat and visible organics, invertebrates, and vegetation monitoring occur only in even years, and the other parameters are sampled every year. Some parameters need to be remeasured relative to the initial survey times, so that variation due to timing is minimized (e.g., observed differences over time can be attributed to actual trends, and not variance due to changing the measurement period). As an example, spurious results could occur if a crew in 2016 measured ice in December, but the crew in 2018 measured the ice in March. Consult the parameter-specific SOPs for more guidance on timing.

Table 2-2. General implementation schedule for monitoring all cave parameters, including those only sampled during even years. Time periods when parameters will be sampled are highlighted, or in the case of climate and visitation, highlighting shows when data will be downloaded.

		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
All Years	Water (ORCA)	Winter	-	-		Spring	-	-	Summer	-	-	Fall	Winter
	Ice (LABE)	-	-	Spring	-	-	-	-	-	-	Fall	-	-
	Climate	Winter download	-	-	-	Summer download	-	-	-	-	-	-	Winter download
	Visitation	Collected year-round, entered into database by January 31 for previous calendar year											
	Bats	Winter	-	-	-	-	-	-	-	-	-	-	Winter
Even Years Only	Vegetation	-	-	-	One survey	-	-	-	-	-	-	-	-
	Scat	-	-	-	-	One survey	-	-	-	-	-	-	-
	Invertebrates	-	-	-	-	One survey	-	-	-	-	-	-	-

5.1 Scat and Visible Organics

Monitoring of scat and visible organics will occur once, between May 1 and September 30 in even years. This will typically coincide with vegetation monitoring and fully coincide with invertebrate monitoring and summer climate downloads. Scat observations will not be collected from nonrandomly selected (judgment) bat and ice caves at Lava Beds.

5.2 Invertebrates

Monitoring of invertebrates will occur once per year between May 1 and August 31 in even years. This monitoring requires 2 site visits: the first visit is to set bait and the second visit is to count invertebrates. Invertebrate monitoring will typically coincide with vegetation monitoring, scat monitoring (if applicable), and summer climate downloads. Invertebrate data are not collected at nonrandomly selected bat caves, but are collected at nonrandomly selected ice caves.

5.3 Cave Entrance Vegetation

Monitoring of vegetation will occur in even years, between April 1 and July 1. In certain circumstances, it may be permissible to extend sampling into July, finishing by August 1. The April to July 1 timeframe has been selected to maximize detection and identification of vegetation. Vegetation will not be monitored at nonrandomly selected bat caves.

5.4 Climate

Climate data (temperature and relative humidity) from HOBO data loggers are collected year-round and will be downloaded twice per year: once during the winter, coincident with bat monitoring (and water monitoring at ORCA only) between December 1 and March 1; and once during the summer, coincident with scat and visible organics and invertebrates monitoring between May 1 and August 31. In addition, data logger units should have their batteries changed during any download period as indicated by the unit. Unlike vegetation, ice, or invertebrates, the exact timing of the downloads relative to previous seasons is not important.

5.5 Visitation

Different techniques are used to collect visitation data at different sites; therefore, the schedule for collecting or offloading data from counters at cave sites is flexible and occurs throughout the year. For example, at ORCA the ticket sales data can be compiled as soon as the visitation season closes for the year, and the visitor log for nonticketed visits is compiled after the end of the calendar year. At LABE, TRAFx trail counter data will be offloaded monthly, and paper cave logs will be copied at least annually. Batteries in electronic counters will be replaced when units indicate low power.

To ensure that data are incorporated into Annual Effort Reports, all data from the previous calendar year must be entered into the database no later than January 31.

5.6 Bats

In-cave hibernacula counts are performed once per winter, between December 1 and March 1, every year. These counts are performed coincident with winter climate downloads at both ORCA and LABE and at the same time as winter subterranean pool monitoring at ORCA.

5.7 Ice

Ice at LABE is measured twice a year, once in March and once in October, corresponding to yearly periods of maximum and minimum ice extent. Measurements should always be taken during the same time of year so that comparisons of annual variation can be made.

5.8 Water

Water levels in subterranean pools at ORCA are measured 4 times per year: during the winter (between December 1 and March 1), May, August, and November. The winter water level survey should coincide with bat monitoring and climate downloads. Measurements should always be taken during the same time of year so that comparisons of annual variation can be made.

6 Milestones calendar

6.1 January through March

January 31: All visitation data are entered from the previous year.

January 31: Annual Effort Report due on even years from parks (Field Lead) to the KLMN Project Lead for sampling that occurred in the previous, odd (partial sampling), calendar year. For example on January 31, 2014, a report that summarizes the calendar year 2013 effort is due.

February 15: Field Lead begins interviews with summer seasonal field technicians (even years).

March 1: Winter activities complete, including bat monitoring, climate downloads, and water level monitoring (water at ORCA only).

March 1: Project Lead announces seasonal worker hires, who will begin work April 1 (even years). Project Lead provides seasonal workers with protocol so they can familiarize themselves with the overall objectives of the monitoring effort and the specific protocols they will be responsible for implementing.

March 15: Field Lead has developed a field schedule for the summer seasonal workers, including technician roles/responsibilities (even years).

March 31: In odd years, summary data from previous 2 calendar years and supporting materials for Biennial Reports are due from Field Leads to the KLMN Project Lead. For example, the summary data that are due on March 31, 2015, will cover sampling done in calendar years 2013 (partial sampling) and 2014 (full sampling).

March 31: Summary data and supporting materials for Analysis and Synthesis Reports due from the Field Leads to the KLMN Project Lead every fourth year.

6.2 April through June

April 1: Ice level monitoring complete at LABE.

April 1: Start date for seasonal workers. Two-week training by Field Leads begins (even years), including 1 week of combined staff training for ORCA and LABE technicians at ORCA (housing provided by ORCA). Combined staff training ensures consistency between parks. In even years, a shared technician will be initially duty-stationed at ORCA for 3 weeks (after completion of training)

to conduct cave monitoring and then duty-stationed at LABE from mid-May to the end of the field season.

May 1: Seasonal workers begin collecting data at LABE (even years). At LABE, typically this workload will include 2 to 3 caves visited per day, with 2 in the case of most sites, and 3 in the case of close caves or those that are on Cave Loop. Six to 7 caves are typically completed in a week, including time to download and enter data, and approximately 11 weeks are needed total for 2 full-time staff to complete the summer seasonal data collection.

June 1: Spring water monitoring complete at ORCA.

June 15: Deadline for the Biennial Report, which is a collaborative effort among the park Field Leads and the KLMN Project Lead.

June 15: Deadline for the Analysis and Synthesis Report (every 4 years), which is a collaborative effort among the park Field Leads and the KLMN Project Lead.

6.3 July through September

August 1: Vegetation surveys complete (even years). Ideally, the majority of LABE vegetation monitoring should be complete by July 1 (i.e., before vegetation dries up), but August 1 is more realistic for completing all sites.

September 1: Summer subterranean pool water level monitoring complete at ORCA.

September 1: Summer download of data loggers complete.

September 1: Scat and visible organics surveys complete (even years).

September 1: Invertebrate surveys complete (even years).

September 30: Park staff and the Field Lead will have worked with the KLMN Project Lead to review the past and upcoming budget and ensure that it meets salary, equipment, and miscellaneous field expense needs.

6.4 October through December

October 1: Field Leads have scheduled a conference call with the KLMN Data Manager and Project Lead to wrap up the field season, discuss successes and areas needing improvement, and plan upcoming project events.

November 1: Field Lead posts advertisement for seasonal technician position that begins approximately April 1 (even years).

November 1: Ice level monitoring complete at LABE.

December 1: Fall subterranean pool water monitoring complete at ORCA.

December 1: Field Lead (or someone assigned by Field Lead) completes inventory of field equipment and identifies what needs to be replaced or repaired. Compare inventory to lists of equipment in each SOP to ensure that all necessary equipment is available.