

Standard Operating Procedure (SOP) #1

Before the Field Season

Version 2.01 (September 23, 2022)

Change History

New Version #	Revision Date	Author	Changes Made	Reason for Change	Previous Version #
1.01	1/12/2017	Kathryn Akamine	Updated supplies needed	Based on first cycle of monitoring	1.0
2.0	4/29/2021	Kathryn Akamine, Jacob Gross	Added in the following sections: Documents to review, spatial data, scheduling, readiness review, and additional equipment lists. Updated SOP references.	To provide thorough guidance to prepare and plan for an upcoming field season. SOP references were outdated.	1.01
2.01	9/23/2022	Kim Weisenborn	Updated SOP references. Updated content to refer to new PACN I&M SharePoint.	PACN data is no longer stored on a networked server (I:\ drive) and is now stored on the PACN SharePoint site.	2.0

Only changes in this specific SOP will be logged here. Version numbers increase incrementally by hundredths (e.g., version 1.01, version 1.02) for minor changes. Major revisions should be designated with the next whole number (e.g., version 2.0, 3.0, 4.0). Record the previous version number, date of revision, author of the revision, changes made, and reason for the change along with the new version number.

Purpose

This SOP outlines the steps to prepare for the Pacific Island Inventory and Monitoring Network (PACN I&M) Focal Terrestrial Plant Communities (FTPC) Monitoring field season, scheduling, and ensures that the proper equipment is available prior to the start of monitoring. Preseason planning facilitates the completion of scheduled work.

Documents to Review

The field crew lead is required to review previous Operational Review. The 2011 PACN FTPC Monitoring Protocol¹ is available for reference, but it is not required to review.

¹ PACN FTPC Monitoring Protocol (2011), <https://irma.nps.gov/DataStore/Reference/Profile/2171779> (accessed 23 September 2022).

Operational Review (OR)

An Operational Review (OR) is created/updated at the end of each field season and are located in the “[Operational reviews](#)” folder in the PACN Monitoring Archive² in the PACN I&M SharePoint site³. The purpose of the OR is to document the following: personnel, efforts (e.g., office, field efforts, camping, aviation, etc.), accessibility, park/site specific issues/concerns, sampling notes/method amendments, season specific plant identification errors, park specific species of interest (e.g., threatened and endangered plants, incipient or noxious species, etc.), and safety and site-specific hazards (e.g., communication dead zones, necessary PPE, etc.). The OR is the most important document to review as it provides a thorough account on what was done previously. It is written to advise the following field crew on logistics, planning, lessons learned, future recommendations, and potential issues to be aware of. The OR should have a list of issues (e.g., missing posts, unknown species, etc.) that occurred during the monitoring season; this list should be addressed when returning in the next season. The field crew lead should refer to this list prior to planning and again prior to returning to fixed plots.

Research Permits

Research permit requests for each park and each protocol must be submitted to the park through the “Research Permit and Reporting System” (RPRS) in IRMA. Generally, the PACN Botanist will submit permit requests well ahead of the field work (at least three months) to give the research permit coordinator at the park time to review. Any changes to the protocol need to be included in the permit and approved by the park. It is best to discuss proposed changes with park staff and the steering committee before submitting the research permit. The park will notify the principal investigator (PACN Botanist) when the permit is approved. Completed permits for FTPC can be found in the “[Permits](#)” folder in the [FTPC Monitoring project workspace](#) in SharePoint.

Compile Species Lists

Prior knowledge of species most likely to be encountered in a park will aid the field crew in preparing for the vegetation monitoring season. Therefore, species lists from previous efforts in a park or local area should be compiled. Species lists can be exported from the data summary tool within the FTPC database using the query “qs_y021_Species_lists_detections_per_park”. Run a query for each sampling frame needed using the appropriate filters, export lists to excel and save to the “[Master Species List](#)” folder in SharePoint. Species lists compiled for the current season should be saved to the field tablets and phones for reference. Be prepared to update these lists if important changes are made to species information (lifeform, nativity, species name changes, etc.) throughout the season. Contact the PACN Lead Plant Biological Science Technician or PACN Botanist if species information changes are needed within the species list.

² PACN Monitoring Archive, https://doimspp.sharepoint.com/sites/nps-PWR-PACNIM/monitoring_archive (accessed 23 September 2022).

³ PACN I&M SharePoint site, <https://doimspp.sharepoint.com/sites/nps-PWR-PACNIM> (accessed 23 September 2022).

Species lists include information of sampling frame detections and should have columns for Family, Scientific name, Common name, Synonym(s), Life form, PACN identification code, Nativity, and Number of Detections.

Safety

Prior to conducting field work, every year safety documents must be submitted to the park superintendent to attain a research permit to conduct field work within a specified park. Additional park staff to be notified may include the park safety officer, natural resource management lead, law enforcement lead, district ranger, etc. Readiness review documents should include a Communication plan, Green Amber Red (GAR) assessment, and a Job Hazard Analysis (JHA). These documents are created/updated by PACN staff (primarily the Project Lead and field crew lead). These documents will also provide information that should be considered when planning for the field season and bring attention to park specific equipment (e.g., adequate PPE) that will be needed for the field season. These documents must be read by all crew members and saved to the field tablets and phones for reference.

Park Specific Protocols

Parks may have their own protocols that all employees within the park must comply with. Protocols may include safety documents, sanitation procedures, ethics, etc. These documents must be read by all crew members and saved to the field tablets and phones for reference.

PACN I&M Vegetation Protocol SOPs

As a part of training, each crew member will receive a copy of field method SOPs ([SOP #9 Establishing and Marking Vegetation Monitoring Plots](#), and [SOP #10 Conducting Community Vegetation Survey](#)) printed on water resistant paper to refer to while in the field. These SOPs will be thoroughly covered during training. These SOPs should be review at the beginning of every season as each year the field crew usually finds sections that may need additional explanation, edits, or changes to the previous field methods. If any changes are necessary, the document should be updated and reviewed prior to the start of the field season. Field lead(s) should encourage all crew members to inform them on any changes they think would be helpful. All changes to SOPs need to be reviewed and approved by the PACN Lead Plant Biological Science Technician and PACN Botanist before implementing. Any large changes to SOPs or changes that may affect data analysis need to be written up in the Operational Review for the year the change was implemented. [SOP #9 Establishing and Marking Vegetation Monitoring Plots](#), and [SOP #10 Conducting Community Vegetation Survey](#) should be read and saved to the field tablets and phones for reference.

Maps

The PACN GIS Specialist is responsible for supplying the field crew with map products to use throughout the field season. Each field crew member will receive all maps printed on water resistant paper and at least one copy should be carried into the field to reference and saved to the field tablets and phone(s) for reference. Spatial data is discussed further below.

Phones and/or Tablets

PACN field crews will be equipped with tablets. The field lead should upload all the previously mentioned documents to the tablet for reference while in the field. Additionally, field leads should

also upload previous datasheets and photos from the previous sampling seasons. Any references may be added (e.g., digital copies of books to assist with plant identification).

Spatial Data and Information

Waypoints for each monitoring plot must be loaded onto the GPS (Global Positioning System) unit prior to the start of the field season. Waypoints are the latitude and longitude coordinates of the start, center, and end points for previously established fixed plots and the center point of each new monitoring plot (fixed or rotational). [SOP #5 Generating Sampling Point Locations with GIS](#) contains information on preparing maps, images, and sampling point locations. [SOP #6 Using Garmin GPS Units](#) describes how to use GPS units, including uploading and navigating to waypoints. [SOP #8 Using ArcGIS Field Maps Application](#) describes how to create offline maps, how to take photos, and collecting data points. GPS units and field maps should have additional relevant points (e.g., campsites, landing zones, etc.) and shapefiles (e.g., fences, trails, roads, sampling frame boundary, etc.) to assist with access and logistics.

Scheduling Field Work

Planning

Focal terrestrial plant monitoring will depend upon the park, community, sampling frame, and team size. Be aware of wet and dry seasons. Inclement weather and personnel workloads will preclude the scheduling of sampling events to specific annual dates. Sampling dates should be scheduled, and logistics organized prior to the start of each field season. Previous season's OR should be consulted for park specific guidance. Depending on the park planning may include international travel, advanced reservations for camping sites/cabins, coordinating with resource management crews, etc.

Vehicles

HAVO is the only park with PACN vehicles on site. Review OR to see what was done in the past to acquire vehicle(s) to accommodate the crew. Vehicles may be shipped interisland. Vehicles may be borrowed, rented, and/or traded from other park divisions. Vehicles may also be rented as a part of a travelling crew member's travel voucher or as a cost to PACN.

Helicopter Operations

If helicopter operations are needed for gear drops and/or passenger access to remote areas in HAVO, HALE, and KALA, helicopter time must be estimated and calculated for the fiscal year(s). The time estimations should assume that our operations will not be split with other projects. Once helicopter time is estimated, a task agreement is either created or funds are added to an existing task agreement within the same park.

Personnel

Monitoring within each PACN park will require at least four full-time crew members. Larger parks like HAVO require a full-time 6-person field crew for a six-month field season, while smaller parks like AMME required a 4-person field crew for a two-week trip. The OR will include past personnel needs and recommendations. The crew may be made up existing PACN staff, existing NPS staff,

new hires, interns, and/or volunteers. Hiring opportunities vary year to year; options may include federal employment, local or national internship programs, cooperative agreements with local universities, etc.

Documents and references for crew onboarding and training new crewmembers should be stored in the “[Training](#)” folder in SharePoint.

Timing and Collection

The amount of time required to monitor a plot will vary by park, plant community, and plot. A single plot may require up to two days to complete in wet forest and as little as two hours in coastal areas. Access issues and logistics will play a major role in scheduling and timing. Some areas will require multiple day field trips to complete the work efficiently and cost effectively. Monitoring of plots separated by the least amount of distance should be scheduled together when possible. The OR will have details of field efforts. When possible Established Invasive Plant Species (EIPS) protocol should be monitored concurrently with FTPC.

Pending approval, as of 2021, the PACN vegetation protocol has temporarily moved from a 5-year cycle to a 7-year cycle. Previously vegetation monitoring and PACN Landbird monitoring were done concurrently. Sometimes there would be an overlap in occupying the same campsites and, when possible, vegetation crews opportunistically used Landbird transects as trails to access sampling sites. Due to the offset of vegetation and Landbird sampling cycles, Landbird transects may not provide a suitable “trail”. Contact the PACN Terrestrial Ecologist to learn more about recent Landbird monitoring.

Be aware of other changes that may have occurred in the seven years since the previous monitoring. Things to consider may include, but are not limited to legacy transects used by NPS park staff that are no longer maintained, acquisition of new park land, change of private land ownership that border access points, natural disasters that have occurred, etc. Items like these will not be recorded in previous OR but may be learned through park staff and others familiar with the park/area.

Communication

Because the Pacific Island Network spans across various remote areas in the Pacific it is important to be sure you have phones, radios, and/or a satellite texting device that will work in sampling area. Review OR for guidance on acquiring a cell phone in AMME, WAPA, and NPSA.

Organizing Supplies and Equipment

Review Equipment Lists

All equipment required for monitoring should be compiled, organized, and made ready prior to the field season. Time to make needed repairs and order equipment should be allocated before the fieldwork starts; at least two months advance preparation is recommended.

Equipment Required to Establish and Monitor One Plot

The following list presents the field equipment required to establish and monitor one plot in the forest community. Coastal plots and subalpine plots may require slightly less and/or different

equipment; these differences are noted in parentheses below. Fixed plots need permanent markers and are noted with an *.

1. 3 - 50 m tapes (coastal: 3 - 20 m tapes)
2. 3 - 20 m tapes (coastal: 3 - 10 m tapes)
3. 12 stakes to hold transect tapes in place
4. *9 - 1 x 50 cm metal posts per plot [see exceptions in [SOP #9 Establishing and Marking Vegetation Monitoring Plots](#)]
5. *9 - white PVC posts per plot (inner diameter of 1 cm) (coastal and subalpine plots, PVC is not used) [see exceptions in [SOP #9 Establishing and Marking Vegetation Monitoring Plots](#)]
6. *1 - 5 lb. sledgehammer or rubber mallet to install permanent posts
7. *2 – uniquely numbered brass tags for fixed plots T2 start and T2 end and plastic-coated wire to attach tags to posts
8. *9 – brass tags to identify all permanent posts (T1S, T1C, T1E, T2S, T2C, T2E, T3S, T3C, and T3E), always bring an extra set and enough plastic-coated wire to attach tags to posts
9. Blue flagging to mark trails and temporarily mark rotational plots
10. *Blue and pink flagging to mark permanent plots [see [SOP #9 Establishing and Marking Vegetation Monitoring Plots](#)]
11. *Lime flagging to mark large trees recorded in the Forest communities.
12. Field tablet(s) and field phone(s)
13. Every crew member equipped with a compass
14. GPS unit(s) and extra batteries
15. Waterproof blank data forms, multiple pencils, and at least 2 clipboards
16. 1 Clinometer
17. Plant species lists
18. Maps of the sampling area and plots
19. Every crew member equipped with a 2 m diameter tape
20. 2 - 2 m poles (0.5, 1, and 2 m intervals marked)
21. Tree calipers (in areas of high tree fern density)
22. 2 – 5 m carpenter tapes (in areas of high tree fern density)
23. Railroad chalk (to mark trees and tree ferns once they are recorded)
24. Field datasheets and photos from previous monitoring events should be uploaded to tablet(s) and phone(s)

* Rotational plots only require temporary marking with flagging, as these are not left permanently and can be reused multiple times.

The above list is for one team. If gathering equipment for large crews with the intent of dividing into two or more crews in the field, be sure to double equipment of this list or if sampling EIPS concurrently, see [EIPS SOP #1 Before the Field Season](#) for equipment needed.

Miscellaneous Equipment

1. Vehicle, 4WD vehicle as needed
2. Personal protective equipment for helicopter flights (flight suits, helmet, gloves, ear plugs for remote sites)
3. First aid kits (see [SOP #3 Safety Protocol](#))
4. Sunscreen
5. Duct tape
6. Protective clothing (e.g., raingear, brimmed hat, neck gaiter, etc. Operational review should note gear recommended for specific park/site)
7. Appropriate footwear (e.g., sturdy boots with ankle support, rubber boots, etc.)
8. Gallon storage bags
9. Field radios, cell phones, and satellite messaging device (see [SOP #3 Safety Protocol](#))
10. Materials for collecting and vouchering (see [SOP #12 Collecting and Vouchering](#)).

Helicopter Equipment

1. Flight suit (each crew member)
2. Flight gloves (each crew member)
3. Flight helmet (each crew member)
4. Eye and ear protection if not available on helmet (each crew member)
5. Flight plan (all flights)
6. Flight manifest (all flights)
7. Sling net(s) (gear drop external operations)
8. Swivel(s) (gear drop external operations)
9. Long line (gear drop external operations)
10. Scale (all gear must be weighed and recorded on manifest)

Camping Equipment

Review the corresponding OR to know the needs of the variety of campsites and cabins throughout our parks and sampling frames.

Field Datasheets

Copies of the field datasheets should be made on water resistant paper. Be sure to have enough field forms to complete plot (e.g., extras of Form 7 [Large tree ferns] and Form 9 [Large trees] in areas of high densities). Field forms can be found in Appendix E: Forms for Recording Field Data. Refer to [SOP #10 Conducting Community Vegetation Surveys](#) for guidance on which forms are used for different communities.