

Standard Operation Procedure (SOP) #3

Locating Sampling Stations

Version 1.01 (June 28, 2021)

Change History

New Version #	Revision Date	Author	Changes Made	Reasons for Change	Previous Version #
1.01	6/28/2021	Kim Weisenborn, Amanda McCutcheon	Updated SOP references; modified directions for field sites in WAPA	To update outdated SOP references and update sampling location content.	1.0

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 describes the location of sampling stations. Logistics specific to travel arrangements to each island are in SOP #2 Before the Field Season. Table SOP 3.1 lists the equipment needed to locate and document sampling sites.

Directions to Field Sites in the National Park of American Samoa (NPSA)

Tutuila Field Sites

Leafu stream is accessed by traveling the main road to Pago Pago and the road over the mountain to the village of Vatia. Note there are no official road names in American Samoa. Roads are distinguished by the villages they connect. Village chiefs and the mayor must be notified prior to arrival in the village. This should take place several days to preferably at least a week in advance. FTUT01 is accessed through a villager's backyard. Consult homeowners before sampling. It is helpful to have employees that speak Samoan assist in communication efforts. FTUT02 and FTUT03 are accessed by a trail that follows on the banks of the stream. Permission is needed from the mayor of the Vatia to access these sites. Again, notification of the mayor in advance is required. Trail is marked with blue flagging tape.

Fagatutui Stream (FTUT04-FTUT06) is accessed by traveling the road from Pago Pago towards the village of Fagasa. Park at the Mount Alava trail head; proceed up trail two miles until specified GPS

(Global Positioning System) point. Local staff know how to access these sites. It is helpful to have local knowledge. Trail is a very steep slope down and marked with pink flagging tape though there may be other trails in the area that can cause confusion. There are many streams in the area that look quite similar. It is extremely important to have accurate GPS coordinates when accessing the stream via trail. This stream can also be accessed via boat on days with calm sea conditions. The boat can be launched from the Fagasa boat ramp and driven 3 bays over to Fagatuitui Bay. Fagatuitui Bay is a distinctive looking bay with two streams that pour into the Bay. The sampled stream is the one on the right coming in from the ocean. Depending on sea conditions, crew capabilities, and boat specifications it may be possible to get relatively close to shore. However, it will be necessary to swim some distance to shore with all sampling gear. A float for the equipment will be required.

Amalau stream is accessed via the road from Pago Pago towards Vatia to the village of Amalau. Visitors must ask local villagers for permission to sample in Amalau stream. Permission should be obtained the day of, as well as several days in advance so they know to expect you. Site FTUT07 is at the mouth of the stream near the village fales. The site is accessed through private land. Remember to obtain permission. FTUT08 is easily accessed by walking upstream crossing highway and following stream until specified GPS point is reached.

In all travels to sites on Tutuila where village access is required, it is vitally important to recognize that you are traversing private land. When specific dates and times are established for sampling, these need to be honored. Local villagers get extremely upset when expected intrusions do not happen as planned. Also, following local customs is required. While sampling in village areas, dress must necessarily be modest, and no work is to be conducted in village areas on Sundays. Contact park staff for any questions regarding local customs.

Tau Field Sites

All fixed field sites (FTAU01-FTAU04) are accessed via the beach trail at the end of the 4WD road. The trail leads over a short sandy beach, a boulder beach, and a relatively smooth forested trail. The trail then splits to access lower Laufuti and middle/upper Laufuti. Allow 30 minutes to trail junction. The trail down to lower Laufuti (FTAU01-FTAU02) is a steep, slippery slope that ends at a rocky beach. The trail was improved, and a ladder installed in 2010 to assist hikers. Follow the coast along sandy and boulder beaches until the mouth of Laufuti stream. This takes approximately 2 hours from the split due to the rough terrain and heavy gear. To access the middle and upper sections of Laufuti (FTAU03-FTAU04), the trail follows the ridgeline up a steep climb. This trail can be extremely overgrown and may take extra time to cut through the vegetation with machetes. It is helpful to ask NPSA staff to cut the trail in advance. This saves hours of hacking through the jungle. Notify staff of intended arrival at least 2 months prior to facilitate trail clearing. The trail is flagged with blue and pink flagging tape though they may not be entirely visible if overgrown. The trail climbs through mostly fern forest. Many large boulders, exposed roots, moss covered lava rocks, and thick vegetation present hazards. Pants, long sleeve shirts, and mosquito repellent are essential. VIP Tuiluiga Simolea and NPSA Marine Technician Bert Fuiava know all field sites and access routes.

Directions to Field Sites in War in the Pacific National Historical Park (WAPA)

All field sites are located on Asan stream in the Asan Unit of War in the Pacific National Park. From the Airport or Tumon take highway 10A to Marine Corps Drive (Guam Route 1). Turn left and go approximately 6 miles. Turn left onto Jose Leon Guerrero Street. Park on street near bridge over Asan stream. Access the lower sites by heading upstream in the river. The first fixed site is approximately 70 meters upstream from the parking location, just immediately past the overhanging vegetation on the stream. Heading upstream, there is a trail on the left stream bank (right side when facing upstream) just past the second banana plantation where there are several limestone rocks in the bend of the stream. This trail can be used to facilitate quicker access to central river sites up to the dam. All sites can be accessed by hiking upstream in the stream; however, this is recommended only for sites downstream of FWAPA02 (lower sites).

Middle stream sites can be accessed by turning left onto Guam Route 6 from Marine Corps Drive toward the Asan Unit Overlook. Turn left onto Mama Sandy Road toward a residential area. Turn onto the small dirt road labeled J Street. Follow this road over the hill and then take the first dirt road to the right (it is unmarked as of January 2011). Follow this dirt road downhill until you reach the lowest cleared lot (the road will turn left and then start heading uphill again). Park in this cleared lot. At the entrance to the cleared lot, you will find an overgrown access road. Follow this road along the ridge until it turns to the left. Don't turn left (This is an extremely important direction note). Continue hiking over the ridge in front of you (the main ridge). All middle stream sites can be accessed from points along the main ridge. If luck is on your side, you will find a hash/pig trail that runs along the top of the main ridge. Follow this trail along the main ridge and use your GPS to access all sites in the middle portion of the stream. The uppermost middle site, FWAPA06, can be accessed by crossing this main ridge from the access road and continuing to head down the side ridge to the stream. You will enter the stream about 100 meters downstream of the site (this is not the current preferred route as it is presently overgrown with sword-grass, but it is an access route, and the frequent fires may change the vegetation making it an excellent access point in the future). As you access the middle trail sites, remember to keep the main valley to your right. There are several side ridges, which, if taken, will lead you into sword-grass fields and wasp lairs, which are better avoided. All sites in the middle stream can be access by heading upstream from the previous location.

Directions to Field Sites in Haleakalā National Park (HALE)

All field sites are located in the Kīpahulu area of Haleakalā National Park. From OGG follow the Hāna Hwy/HI-360 (Hāna way or north route) to Kīpahulu or follow Haleakalā Hwy/HI-37 to Pi'ilani Hwy/HI-31 (south route) to Kīpahulu. It takes approximately 3 hours each way from the airport to Kīpahulu.

FHALE01 is located near the mouth of the stream and is accessed via the Seven Sacred Pools trail from the Kīpahulu visitor's center. FHALE07 is accessed by taking the two-mile-long Pīpīwai trail then following the rarely used Makahiku Falls trail (marked only by an old sign). Cross the bridge and follow trail to the stream. Cross the stream to the right bank and follow the stream to appointed GPS point. FHALE02, FHALE08, and FHALE03 are located just off the Pīpīwai trail. FHALE02 is

at the lower USGS gauging station. FHALE08 is accessed by hiking upstream in Pīpīwai Stream just after the confluence of Palikea and Pīpīwai. FHALE03 is at the base of Waimoku falls just upstream of where the trail crosses the stream. FHALE09 is accessed by hiking in the stream up Palikea just after the confluence of Palikea and Pīpīwai. Temporary sites on Palikea or Pīpīwai streams can be accessed via the Pīpīwai trail.

FHALE05, FHALE06, and all temporary sites on Alelele are accessed by following highway 31 south from Kīpahulu to the Alelele bridge. Park in the pullout near the mouth of the stream. Follow the trail on the left bank of the stream to access all sites.

Directions to Field Sites in Kalaupapa National Historical Park (KALA)

All field sites are located on Waikolu Stream. There are three access options. The first is to hike from Kalawao (20-minute drive from main Kalaupapa settlement) down to the boulder beach and across to Waikolu. The trail follows the coast alongside steep sea cliffs. Hardhats are required. The hike is not advised during periods of heavy rain as this can cause loose rocks to fall from cliffs. The hike is approximately 1.5 miles over a boulder beach with loose and slippery rocks. The hike takes 1-1 ½ hours depending on pack weight and weather conditions. The 2nd option is boat from the settlement around the point to Waikolu. This requires extensive planning with local staff and calm sea conditions. The drive is approximately 45 minutes. Launching and loading the boat takes approximately 1 hour. The boat can be anchored in the bay for near shore gear unloading. Gear unloading takes approximately one hour. Camping is possible at the mouth of the stream with proper permission. The third option is to drive through the water diversion tunnel from topside. This allows easier access to sites above the pump house. Prior permission must be obtained through the Molokaʻi Irrigation System part of the Department of Agriculture. A 4WD vehicle that meets the tunnels specifications must be obtained. Jeep Wranglers that meet these specifications are available for rent through Island Kine Rental Car (808-553-5242) located in Kaunakakai. Arrangements with workers must be made for directions to the tunnel and to borrow keys to access the tunnel. Contact Oscar Ignacio at 808-336-0587 for tunnel access. The drive takes approximately 2 ½ hours from Kaunakakai.

Once in Waikolu Valley, all sites below the tunnel can be accessed by hiking up the stream or from the trail. The trail goes from the mouth of the river to the pump house and continues as a road to the tunnel. All sights above the tunnel must be accessed by taking the catwalk that goes from the tunnel to the diversion dam, and then hiking up stream. Sites near the tunnel and waterfalls can be accessed by taking the catwalk that crosses the valley to the collection pool at the base of the waterfalls, and then scrambling down to the stream below. The main trail along Waikolu stream starts on the left Bank of the left most branch of the stream (the extreme right of the valley facing upstream). Hike to the rocks that form the valley wall and begin walking upstream. This trail is unmarked in this location so some faith must be taken the trail is there. You will be touching the cliff as you hike the initial several meters of the trail. The trail then becomes somewhat more distinct and travels along both sides of the stream crossing in several places. GPS is useful in locating sites, but not always accurate or dependable as the signal gets degraded the further upstream you travel. Navigation by

topographic maps is advisable, and at times required to locate the sites.

How to Locate a Site

1. All sites are loaded into the GPS prior to a sampling event and the sampling station locations are printed on a map of the stream (See SOP #5 Downloading and Uploading Data from/to a Garmin® GPS).
2. Using GPS or a combination of GPS and available maps, the site is approached from the downstream direction (See SOP #4 Using Garmin® GPS Units).
3. When the GPS or GPS/map combination indicates you have reached the zero station mark, the lower end of the site is flagged.
4. The site will extend 30 m upstream of the indicated GPS point.

Table SOP 3.1. Equipment list for locating and documenting sampling site locations.

Equipment (#/quantity)	Preparation & Maintenance
Garmin® GPS unit (1)	Ensure that this equipment is available and set-up appropriately (according to SOP #4 Using Garmin® GPS Units).
AA batteries (6)	Ensure this equipment is available. If rechargeable, ensure fully charged.
Waterproof case with desiccant and strap (1)	Ensure that this equipment is available. Replace desiccant pack biannually or if saturated.
Charts and grid layouts	Ensure that this equipment is available. Store in field binder.
Random number pair list	Create document and store in the field binder.
Compass (1)	Ensure that this equipment is available. Store in field binder.
Map of fixed and random sampling sites (2 copies)	Update prior to each trip with GIS specialist. Print in color to waterproof paper. Label sites. Store in field binder.
Fixed sampling site descriptions (with photo and compass heading)	Print to waterproof paper and store in field binder. Update if necessary, prior to subsequent field sampling.
Park brochure and general map	Store in field binder.
DNR Garmin, ArcMap or ArcGIS pro	Check for software updates regularly