

Standard Operating Procedure (SOP) #6

Pre-Dive Equipment Preparation

Version 3.01 (August 10, 2021)

Change History

New Version #	Revision Date	Author	Changes Made	Reasons for Change	Previous Version #
2.00	6/30/2007	Eric Brown	See Track Changes	Response to reviewer's	1.00
2.01	7/20/2007	Larry Basch	See Track Changes	Corrections, additions	2.00
3.00	8/22/2019	Amanda McCutcheon	Updated instructions on using the underwater camera.	The camera model the PACN is using has changed, and the instructions needed to be updated accordingly.	2.01
3.01	8/10/2021	Sheila McKenna with input from Bert Fuiava Ian Moffatt, Glauco Puig-Santana	Updated camera info by park.	Parks use different camera equipment.	3.00

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 camera setup and installation into the underwater housing. Directions for daily equipment preparation are included for: (1) benthic cover analysis; (2) benthic rugosity measurements; (3) coral settlement; (4) coral growth measurements; (5) diving equipment; and (6) boating equipment. See SOP #1 Before the Field Season for further instruction on the preparation of the equipment and supplies needed prior to the start of each field season.

A master equipment list for the entire Benthic Marine Community Vital Sign Monitoring Protocol can be found in Appendix SOP 1.a of SOP #1 Before the Field Season. The master equipment list should be updated simultaneously if SOP #1 is revised. A list of equipment required to complete the tasks specified in this SOP has been provided in Appendix SOP 6.a.

Camera Equipment Preparation and Handling

The following section reviews general steps and items of note common to set up each camera and install it into the underwater housing. See Appendix SOP 6.a for a complete equipment list for preparing the digital still camera for underwater use. Ensure camera clock has correct setting before using in the field always. Check the camera clock, and reset it if necessary, so that the camera stamps the proper time code on the photo file. For detailed instructions on camera operation, see the instruction manuals via hyperlink as listed in Table SOP 6.1. If camera and housing models change in the future this SOP and other parts of this protocol will be updated accordingly.

Table SOP 6.1 Summary of Camera Equipment for underwater benthic images used by each park. Link to user manual pdf provided is listed by item.

Park(s)	Camera Equipment		User Guide Link
KAHO and WAPA	Camera	Olympus® TG-5	https://www.olympusamerica.com/files/oima_cc/kb/TG-5_MANUAL_ENGLISH.pdf (accessed 10 August 2021)
	Battery	Olympus® LI-92B rechargeable battery	same as above
	Housing	Olympus® PT-059 waterproof tough underwater housing	https://www.backscatter.com/images/article/content/olympus-tg-6/Olympus_PT-059_Manual.pdf (accessed 10 August 2021)
KALA	Camera	Canon® EOS M50	http://gdlp01.c-wss.com/gds/5/0300030545/01/EOS_M50_User_Manual_EN.pdf (accessed 10 August 2021)
	Battery	Canon® LP-E12 rechargeable 7.2V battery	same as above
	Housing	Ikelite® 6973.15. underwater housing	https://docs.ikelite.com/instructions/6973.15-instructions.pdf (accessed 10 August 2021)
NPSA	Camera	Canon® EOS 7D	http://gdlp01.c-wss.com/gds/0/0300002580/02/eos7d-im2-en.pdf (accessed 10 August 2021)
	Battery	Canon® LPE6 Rechargeable 7.2V battery	same as above
	Hosing	Nauticam® NA7DMKII housing	https://drive.google.com/file/d/0BzggKvdoNvhkd1ZuN3IFbG56Nkk/view?resourcekey=0-MArHqTF7vkWULhvmpQFOIA (accessed 10 August 2021)

Batteries

Ensure the rechargeable batteries are fully charged. The day before the dive, charge the camera batteries (including at least one full set for back up). If the batteries have sat for a while since they were last charged, they may discharge more quickly during use. Although batteries may have been charged after the camera's last use "top" them off. Use a permanent marker to label each new battery

with the date. A battery log will help determine when battery life diminishes, and batteries need replacement.

Prepare the Camera Housing

1. Ensure the housing lens cap is in place so that the housing port is not scratched while preparing, loading, and transporting the camera.
2. Open the housing as per manufacturer instructions.
3. Carefully remove the o-ring from housing and set aside. Many housings come with a thin removal tool. If unavailable, then recommended methods for removal include carefully pinching two sides of the o-ring together until a loop forms then pull it out/off. A blunted wooden cuticle remover also can be useful but **NEVER** use a sharp object or device to remove the o-ring. It may damage the o-ring and cause a loss of housing integrity. Damaged o-rings should be replaced immediately.
4. With a clean cloth, clean the flanges and o-ring groove where they contact the o-ring. Use foam swabs, or a cotton swab with a piece of lens tissue wrapped around the tip. It is important that no foreign matter (e.g., dust, sand, lint, hair) be trapped in the o-ring grooves or the integrity of the seal may be compromised, and the housing may leak. Examine all the surfaces carefully and look for sand and deep cuts or pinches that would result in a bad seal.
5. With a clean, lint free cloth, carefully clean the o-ring. With a dirty o-ring, just wash it with warm water and some soap. Pat it dry completely with a lint-free cloth and try not to stretch it as you dry it. While cleaning the o-ring, inspect it for any damage and replace the o-ring with a new one if necessary.
6. When the o-ring is clean and in good shape, lubricate it with the proper silicone grease recommended by the housing manufacturer. Put a couple of drops on your fingertips and gently pull the o-ring through them to apply. The o-ring should appear shiny and should not have visible globs of o-ring grease on it. ***Too much silicone will reduce the effectiveness of the o-ring by trapping particles that might prevent a good seal.** Do not apply grease to the flatten surfaces. If you apply too much, all it will do is act as glue for sand and dirt to stick to. Silicone grease is ONLY a lubricant, NOT a sealant.
7. Carefully install the clean, greased o-ring making sure it is not twisted and lays flat in the groove on the housing.
 - a. If it seems out of shape, let it sit there for a minute, then try pressing it into place again. They can get heated from your fingertips and become misshapen and enlarge slightly.
8. Check to ensure that the o-ring is seated in the groove. Set aside the prepared housing in a clean, dust-free area.

Prepare the Camera

1. Install the battery in the camera as indicated in the manufacturer instructions.
2. Keep at least two freshly charged batteries on hand so that one is always charged and prepared in the event that the camera is needed on long, or consecutive field days.
3. Ensure that an SD memory card has been inserted into the camera. The SD card is usually located within the battery compartment. Use an SD card with at least 16 GB capacity to ensure adequate storage space for photoquadrat images. The card will fit into the camera in only one direction.
4. Close the battery compartment. The compartment door will click shut when closed properly. Ensure the latch and lock are in the closed position.
5. Turn the camera on using the power switch.
6. Ensure the SD card has sufficient memory for the benthic photos. Following the manufacturer's instructions determine the amount of memory left on the card. You will need space for between 1000 to 3000 total photos for the 30 transects. Note: ensure all images on previously used cards have been downloaded, saved, and backed-up prior to these steps.
7. Set the camera mode to Program Shooting Mode by turning the Mode Dial to the "P" symbol. At NPSA, the "M" manual mode at 1/800th second and at f2.8 and f5.8 is used depending on the lens. Also, at NPSA the images are shot in raw then converted on the software afterwards. Be sure to check with your marine ecologist and other technicians in the park who use the make and model of your camera.
8. Set the image aspect ratio to 4:3 following the manufacturer instructions.
9. Shoot a test image; if ok, delete. Optional, but recommended: Shoot an image of a slate with sampling information (e.g., transect number, date) written out.
10. Turn the camera off.
11. Put the camera in the housing following the steps in the next section.

For more information become familiar with the camera or housing manufacturer manual online documented for the specific model being used.

Loading the Camera

1. Place the camera in the housing following the manufacturer instructions. Be sure to take the camera lens cover off before placing camera into housing,
2. Place silica gel packs within the housing as indicated by the manufacturer.
3. Close the housing and lock it.
4. Visually check the seal for any obstructions.

5. Check that housing buttons and dials operate properly.

Long Term Storage of Housing and Camera

1. Open the camera housing
2. Remove the camera from the housing
3. Remove the camera battery. *Note* Batteries discharge slowly when not in use. It is prudent to charge the battery to at least half capacity before storage to prevent full discharge which can shorten the life of the battery. Store the battery in a cold, dry, location.
4. Take the o-rings out of the camera housing. Over time, the o-rings will become flattened, which can compromise the water-tight seal. This will also allow for a thorough check of both sides of the sealing surface before the next use. O-rings need to be stored in an air-tight bag away from strong sunlight. They get brittle with age, and should be periodically replaced
5. Close the camera housing to prevent dust intrusion.
6. Store the camera, housing, and o-rings in a clean, dry, secure, location.

Benthic Cover Analysis Equipment Preparation

This section details preparation of the equipment which should be gathered and checked out prior to conducting marine benthic cover sampling. See Appendix SOP 6.a for a complete equipment list for conducting marine benthic cover sampling.

Step by step procedures:

1. Gather all SCUBA gear as described in the section below on “Coral Settlement Array: Installation and Retrieval Equipment Preparation”. Verify that there are enough full air cylinders available for the planned number of divers and dives.
2. Verify that the boat has adequate fuel and all boating safety equipment and supplies are available as described in the section below on “Boat Preparation”.
3. Prepare the digital camera, including batteries and SD card, and install it into the underwater housing as described in the above section, “Camera Equipment Preparation and Handling” above. Mount the camera housing on the monopod so that the lens faces down to the foot.
4. Ensure that the transect line is in good repair and that it either has metric marking on both sides or is marked with tape at 1m intervals.
5. List the compass headings, depth, and coordinates and carry a waterproof map of the benthic transect locations and compass headings.
6. Ensure that a GPS (Global Positioning System) unit is available and in working order.
7. Prepare the underwater slate, pencils, and the required number of field data forms to complete the planned number of transects.

Rugosity Measurement Equipment Preparation

This section lists the materials which should be gathered and checked out prior to conducting *in situ* rugosity measurements. See Appendix SOP 6.a for a complete equipment list needed for conducting benthic rugosity measurements.

Step by step procedures:

1. Gather all SCUBA gear as described in the section below describing “Dive Equipment Preparation”. Verify that there are enough full air cylinders available for the planned number of divers and dives.
2. Verify that the boat has adequate fuel and all boating safety equipment and supplies are available as described in the section below, “Boat Preparation”.
3. Check the rugosity chain to make sure that no links have corroded through and replace any 1m markers with new flagging tape (see “Rugosity Chain Preparation” in SOP #1 Before the Field Season for initial setup). Also, be certain that the link size has been standardized across parks to insure comparability of the measurements.
4. Ensure that the transect line is in good repair (no cuts, large missing sections, etc.) and that it either has metric marking on both sides or is marked with tape at 1m intervals.
5. List the compass headings, depth, and coordinates and carry a waterproof map of the sampling locations.
6. Ensure that a GPS is available and in working order.
7. Prepare the underwater slate, pencils, and the required number of field data forms to complete the planned transects.
8. Confirm that underwater lights are in working order and the batteries are fully charged.

Coral Settlement Array: Installation and Retrieval Equipment Preparation

This section details the equipment which should be gathered and checked out prior to the installation and retrieval of the Coral Settlement Arrays (CSA). See Appendix SOP 6.a for a complete equipment list needed for the installation and retrieval of CSAs. Construction of the CSAs is detailed in SOP #1 Before the Field Season. Laboratory analysis of the coral settlement plates is described in SOP #17 Settlement Analysis.

Step by step procedures:

1. Gather all SCUBA gear as described in the section below on “Dive Equipment Preparation”. Verify that there are enough full air cylinders available for the planned number of divers and dives.
2. Verify that the boat has adequate fuel, and all boating safety equipment and supplies are available as described in the section below, “Boat Preparation”.

3. Prepare the digital camera, including batteries and flash card, and install it into the underwater housing as described in the above section, “Camera Equipment Preparation and Handling”.
4. Place five CSAs in a cooler or tray for storage during transit. Initial construction of the CSAs is described in SOP #1 Before the Field Season.
5. Gather a pair of pliers, a five-pound sledgehammer, and five, 1m, stainless steel rods. Place these items in a sturdy container for storage during transit.
6. List the compass headings, depth, and coordinates and carry a waterproof map of the CSA locations.
7. Ensure that a GPS unit is available and in working order.
8. Prepare the underwater slate, pencils, and the required number of field data forms to complete the planned transects.
9. Confirm that the underwater lights are in working order and the batteries are fully charged.

Coral Growth Analysis Equipment Preparation

This section outlines the materials which should be gathered and checked out prior to conducting *in situ* coral growth measurements. See Appendix SOP 6.a for a complete equipment list for conducting coral growth measurements.

Step by step procedures:

1. Gather all SCUBA gear as described in the section describing “Dive Equipment Preparation” as written below. Verify that there are enough full air cylinders available for the planned number of divers and dives.
2. Verify that the boat has adequate fuel, and all boating safety equipment and supplies are described in the section below on “Boat Preparation”.
3. Gather the manual label maker and plastic labeling material, stainless steel wire or cable ties, a small hole punch, calipers, and the flexible measuring tape. Place these in a secure container for storage during transit.
4. Set aside the transect line.
5. List the compass headings, depth, and coordinates and carry a waterproof map of the sampling locations.
6. Ensure that a GPS is available and in working order.
7. Prepare the underwater slate, pencils, and the required number of field data forms to complete the planned transects.

8. Confirm that the underwater lights are in working order and the batteries are fully charged.

Dive Equipment Preparation

Scuba diving equipment must be maintained according to Reference Manual #4 – Diving Management (RM-4)¹, Manufacturer, and park specific guidelines appearing in each park's Dive Safety Manual. Care and maintenance of dive equipment is also detailed in SOP #23 After the Field Season. It is imperative that all dive gear is inspected before each use. See Appendix SOP 6.a for a complete equipment list for conducting diving activities.

Step by step procedures:

1. Ensure SCUBA cylinders are full and there are enough for the planned number of dives and divers. Typically, one tank is sufficient for one diver to complete two transects. If necessary, fill tanks as per park specifications. Ensure all SCUBA tanks are up to date on their hydrostatic testing and visual inspection (VIP).
2. Check to ensure all appropriate personal and dive safety equipment (e.g. extended care oxygen unit or DAN kit) is present and in proper working condition before departing for the field. See Reference Manual #4 – Diving Safety and Operations Manual (RM-4), SOP #2 Training Observers and SOP #3 Safety Protocol.

Boat Preparation

Boat, trailer, and motor servicing should be independently done and verified for each park where field operations will occur well in advance of field operations. Ensure that this required preparation has been done in accordance with the DOI Motorboat Operator Certification Course Manual² and park specific guidelines. Park-specific guidelines can be obtained from the PDO or the certified motorboat operator(s) at each park. Care and maintenance of the boat, motor, and trailer is also detailed in SOP #23 After the Field Season.

Step by step procedures:

1. Ensure that there are adequate fuel and oil supplies for the planned activities.
2. Verify that all required safety equipment is aboard and in proper working condition. A list of this equipment is available in SOP #23 After the Field Season and in the DOI Motorboat Operator Certification Course Manual.
3. Submit a daily dive plan for each day of diving. This form is found in each park's Dive Safety Manual and includes information on dive locations, number of dives, personnel on board, and emergency contact information.
4. All field personnel should complete an Emergency Medical Information Card, a Dive Project Plan, and a park specific NPS Dive Emergency Evacuation Plan (DEEP), all available in the

¹ https://www.nps.gov/policy/DOrders/RM-4_6-2014.pdf (accessed 10 August 2021)

² <https://www.usf.edu/research-innovation/research-integrity-compliance/documents/boating/mocc-student-manual.pdf> (accessed 10 August 2021)

NPS FM-4 Diving Management Field Manual³ (Appendix SOP 3.a of SOP #3 Safety), prior to conducting field work. One copy should be left at the office, and additional copies should be given to the park safety officer and field personnel involved in the trip.

Appendix SOP 6.a contains the gear list for equipment needed in SOP #6 Pre-Dive Equipment Preparation. Note that a master gear list is located in SOP #1 Before the Field Season.

³ https://www.nps.gov/subjects/policy/upload/FM-4_10-01-2019.pdf (accessed 10 August 2021)

Appendix SOP 6.a. Gear list for equipment needed in this SOP

Note that a master gear list is located in SOP #1 Before the Field Season. If any changes are made with regard to type, quantity, or required items, SOP #1 needs to be simultaneously updated.

Table SOP 6.2. This equipment list is for preparing digital still camera for use in the Benthic Marine Communities Vital Sign Monitoring Protocol. This equipment list refers to SOP #6 Pre-Dive Equipment Preparation section on “Camera Equipment Preparation and Handling”.

Equipment (#/quantity)	Preparation & Maintenance
Digital still camera	See section on “Camera Equipment Preparation & Handling” in SOP #6 Pre-Dive Equipment Preparation
U/W housing	See section on “Camera Equipment Preparation & Handling” in SOP #6 Pre-Dive Equipment Preparation
Fully charged camera batteries (2)	Label and charge
SD cards (2)	See section on “Camera Equipment Preparation & Handling” in SOP #6 Pre-Dive Equipment Preparation
Lens cleaner	Ensure that this equipment is available
Lens paper	Ensure that this equipment is available
Clean, lint free cloth (2)	Ensure that this equipment is available
O-rings	See section on “Camera Equipment Preparation & Handling” in SOP #6 Pre-Dive Equipment Preparation
Silicone o-ring grease	Ensure that this equipment is available
Monopod	See section on “Camera Equipment Preparation & Handling” in SOP #6 Pre-Dive Equipment Preparation

Table SOP 6.3. Equipment list for conducting marine benthic cover surveys. This equipment list refers to SOP #6 Pre-Dive Equipment Preparation section on “Benthic Cover Analysis Equipment Preparation”.

Equipment (#/quantity)	Source	Preparation & Maintenance
Digital still camera prepared and mounted into U/W housing and monopod	Various online sources	See section on “Camera Equipment Preparation & Handling” in SOP #6 Pre-Dive Equipment Preparation
Small wire brush	Local dive store	Ensure that this equipment is available
30 m transect line	Forestry Suppliers ⁴	Labeled at 50 cm intervals, see SOP #1 Before the Field Season
Coordinates, depths, compass headings, and/or maps of transect locations	PACN GIS Specialist	Ensure that this equipment is available; See SOP #7 Selecting and Marking Subtidal Transect Locations
GPS (1)	PACN GIS Specialist	Ensure in working order; See SOP #4 Using Garmin® GPS Units
Transparent waterproof container for GPS (1)	Local dive store	Ensure that this equipment is available
U/W compass (1)	Local dive store	Ensure that this equipment is available
Surface float marker (2)	Local dive store	One for back-up; Ensure that this equipment is available
U/W slate with pencil (2)	Local dive store	Ensure that this equipment is available
U/W field datasheets	Local dive store	See SOP #8 Conducting Marine Fish Surveys
U/W lights (2)	Local dive store	Ensure equipment is in working order
U/W light rechargeable batteries (2 sets)	Local dive store	Ensure equipment has sufficient power
Pelican® case to store equipment (e.g. GPS) on boat.	West Marine ⁵	Ensure that this equipment is available
SCUBA gear	Local dive store	See SOP #6 Pre-Dive Equipment Preparation and SOP #20 After the Field Season
Boat, motor, and trailer	GSA vendor	See SOP #6 Pre-Dive Equipment Preparation and SOP #20 After the Field Season

⁴ Forestry Suppliers contact: 800-647-5368 or <https://www.forestry-suppliers.com/> (accessed 10 August 2021)

⁵ West Marine contact: 808-526-4420 or <https://www.westmarine.com/> (accessed 10 August 2021)

Table SOP 6.4. Equipment list for conducting benthic rugosity measurements. This equipment list refers to SOP #6 Pre-Dive Equipment Preparation section on “Rugosity Measurement Equipment Preparation”.

Equipment (#/quantity)	Preparation & Maintenance
Rugosity chain on spool	See SOP #1 Before the Field Season
30m transect line	See SOP #1 Before the Field Season
Coordinates, depths, compass headings, maps of sampling locations	Ensure that this equipment is available; See SOP #7 Selecting and Marking Subtidal Sampling Transect Locations
GPS	Ensure in working order; See SOP #4 Using Garmin® GPS Units
Transparent waterproof container for GPS	Ensure that this equipment is available
U/W compass	Ensure that this equipment is available
U/W slate with pencil	Ensure that this equipment is available
U/W field data forms	See SOP #8 Conducting Marine Benthic Cover and Rugosity Surveys
U/W lights	Ensure equipment is in working order
U/W light batteries (2)	Ensure equipment has recent full power charge
Scuba gear	See section on “Dive Equipment Preparation” in SOP #6 Pre-Dive Equipment Preparation and SOP #23 After the Field Season
Boat, motor, and trailer	See section on “Boat Preparation” in SOP #6 Pre-Dive Equipment Preparation and SOP #23 After the Field Season

Table SOP 6.5. Equipment list for installation and retrieval of the coral settlement arrays. This equipment list refers to SOP #6 Pre-Dive Equipment Preparation section on “Coral Settlement Array: Installation and Retrieval Equipment Preparation”.

Equipment (#/quantity)	Preparation & Maintenance
Digital still camera prepared and mounted into U/W housing and monopod	See section on “Camera Equipment Preparation & Handling” in SOP #6 Pre-Dive Equipment Preparation
White slate to set white balance on camera	Ensure that this equipment is available
Coral settlement arrays (5)	See SOP #1 Before the Field Season
Cooler or tray to hold the CSAs	Ensure that this equipment is available
Ice	Ensure that this equipment is available
Foam pad	Ensure that this equipment is available
Pliers or wrench	Ensure that this equipment is available
5 pound sledge hammer	Ensure that this equipment is available
1 meter stainless steel rods (5)	Ensure that this equipment is available
Plastic 90 degree angle protractor	Ensure that this equipment is available
Underwater drill	Ensure equipment is in working order
Re-usable tags (At least 45 – 1/CSA)	See SOP #9 Conducting Coral Settlement Sampling
Engraver, dremel drill, or similar tool	See SOP #9 Conducting Coral Settlement Sampling
Transect tape	Ensure that this equipment is available
Heavy duty, sealable plastic bags	See SOP #9 Conducting Coral Settlement Sampling
Mesh gear bags	Ensure that this equipment is available
Repair supplies (new threaded rods, epoxy, spare hardware)	See SOP #9 Conducting Coral Settlement Sampling
Coordinates, depths, compass headings, maps of CSA locations	Ensure that this equipment is available; See SOP #7 Selecting and Marking Subtidal Sampling Transect Locations
GPS	Ensure in working order; See SOP #4 Using Garmin® GPS Units
Transparent waterproof container for GPS	Ensure that this equipment is available
U/W slate with pencils	Ensure that this equipment is available
U/W field data forms	Ensure sufficient number of copies available
U/W lights	Ensure equipment is in working order
U/W light batteries (2 sets)	Ensure equipment has recent full power charge
Scuba gear	See section on “Dive Equipment Preparation” in SOP #6 Pre-Dive Equipment Preparation and SOP #23 After the Field Season
Boat, motor, and trailer	See section on “Boat Preparation” in SOP #6 Pre-Dive Equipment Preparation and SOP #23 After the Field Season

Table SOP 6.6. Equipment list for conducting the coral growth measurements. This equipment list refers to SOP #6 Pre-Dive Equipment Preparation section on “Coral Growth Analysis Equipment Preparation”.

Equipment (#/quantity)	Preparation & Maintenance
1m flexible fiberglass measuring tape with centimeter markings	Ensure that this equipment is available
Calipers	Ensure that this equipment is available
Stainless steel wire or cable ties (10)	Ensure that this equipment is available
Dymo® manual plastic labels	See SOP #1 Before the Field Season
Metal or plastic tags (10)	See SOP #10 Measuring Coral Growth
Small hole punch	Ensure that this equipment is available
Small wire brush	Ensure that this equipment is available
Flagging tape	Ensure that this equipment is available
Dive weights	Ensure that this equipment is available
Transect line	Ensure that this equipment is available
Coordinates, depths, compass headings, maps of sampling locations	Ensure that this equipment is available; See SOP #7 Selecting and Marking Subtidal Sampling Transect Locations
GPS	Ensure in working order; See SOP #4 Using Garmin® GPS Units
Transparent waterproof container for GPS	Ensure that this equipment is available
U/W compass	Ensure that this equipment is available
U/W slate with pencils	Ensure that this equipment is available
U/W field data forms	See SOP #10 Measuring Coral Growth
U/W lights	Ensure equipment is in working order
U/W light batteries (2 sets)	Ensure equipment has recent full power charge
Scuba gear	See section on “Dive Equipment Preparation” in SOP #6 Pre-Dive Equipment Preparation and SOP #23 After the Field Season
Boat, motor, and trailer	See section on “Boat Preparation” in SOP #6 Pre-Dive Equipment Preparation and SOP #23 After the Field Season

Table SOP 6.7. Equipment list for conducting diving activities. This equipment list refers to SOP #6 Pre-Dive Equipment Preparation section on “Dive Equipment Preparation”.

Equipment (#/quantity)	Preparation & Maintenance
Air cylinders	Verify hydro and VIP; fill with compressed air or NITROX. See SOP #23 After the Field Season
Fins	Ensure that this equipment is available
Booties	Ensure that this equipment is available
Wetsuit	Ensure that this equipment is available
Hooded vest (optional)	Ensure that this equipment is available
Weights	Ensure that this equipment is available
Belt/integrated weight container	Ensure that this equipment is available
BC	Verify annual service. See SOP #20 After the Field Season
Regulator	Verify annual service. See SOP #20 After the Field Season
Mask & Snorkel	Ensure that this equipment is available
Dive computer	Ensure that this equipment is available
Thermometer	Ensure that this equipment is available
Compass	Ensure that this equipment is available
Knife, dive tool, or shears	Ensure that this equipment is available
Rescue “sausage” (international orange)	Ensure that this equipment is available
Whistle or surface noise maker	Ensure that this equipment is available
Underwater noise maker (e.g., subduck, knife)	Ensure that this equipment is available
Save a dive kit	Ensure that this equipment is available
Spare gear (mask, fin, snorkel, straps, other as needed)	Ensure that this equipment is available
Brass clips--attached to BCD, gear bags, or equipment (e.g., camera housing, hammers)	Ensure that this equipment is available
Dive bag for boat work	Ensure that this equipment is available
Bucket for shore work	Ensure that this equipment is available