

Standard Operating Procedure (SOP) #6

Pre-dive Equipment Preparation

Version 1.01 (July 14, 2021)

Change History

New Version #	Revision Date	Author	Changes Made	Reasons for Change	Previous Version #
1.01	7/14/2021	Kim Weisenborn, Kelly Kozar	Minor updates to content	To update outdated SOP references. Add some details to steps.	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 provides directions for daily equipment preparation including: Marine Fish survey equipment; diving equipment; and 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 Marine Fish 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](#).

Marine Fish Survey Equipment Preparation

This section details the equipment which should be gathered and checked out prior to conducting fish surveys.

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. Pack a transect line.
4. List the compass headings, depth, and coordinates and carry a waterproof map of the transect locations.
5. Ensure that a GPS (Global Positioning System) unit with waterproof housing is available and in working order. Pack extra batteries as necessary.
6. Prepare the underwater slate, pencils, and the required number of field data forms to complete the planned transects.

Dive Equipment Preparation

SCUBA diving equipment must be maintained according to Reference Manual #4 – Diving Safety and Operations Manual (RM-4)¹, as well as according to manufacturer and park specific guidelines appearing in each park’s Dive Safety Manual. Care and maintenance of dive equipment is also detailed in SOP #9 Post Dive Procedures and Equipment Maintenance and SOP #20 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

¹ Diving Safety and Operations Manual, Reference Manual – 4, https://www.nps.gov/policy/DOrders/RM-4_6-2014.pdf (accessed 14 July 2021)

² Motorboat Operator Instructor Certification Course, <https://www.usf.edu/research-innovation/research-integrity-compliance/documents/boating/mocc-student-manual.pdf> (accessed 14 July 2021)

motorboat operator(s) at each park. Care and maintenance of the boat, motor, and trailer is also detailed in SOP #20 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 #20 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 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 National Park Service, Diving Management Field Manual – 4, https://www.nps.gov/subjects/policy/upload/FM-4_10-01-2019.pdf (accessed 14 July 2021)

Appendix SOP 6.a. List of equipment required for conducting diving activities.

Table SOP 6.a.1. Equipment list for conducting Marine Fish surveys.

Equipment (#/quantity)	Source	Preparation & Maintenance
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)	West Marine	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 14 July 2021)

⁵ West Marine contact: 808-526-4420 or <https://www.westmarine.com/> (accessed 14 July 2021)

Table SOP 6.a.2. Equipment list for conducting diving activities.

Equipment (#/quantity)	Preparation & Maintenance
Air cylinders	Verify hydro and VIP; fill with compressed air or NITROX. See SOP #20 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