

I Outline Overview

- A. The purpose of the Volunteer Net Removal outline is to inform the reader about the procedures that have been used by Peter Mieras and Kathy Johnson of Rendezvous Dive Adventures when dealing with derelict fishing gear. It describes the gear, procedures and other considerations used. **THIS INFORMATION IS FOR GENERAL INFORMATION PURPOSES ONLY. NO LEGAL OR OTHER LIABILITIES DIRECTLY OR INDIRECTLY CAN BE DRAWN FROM PEOPLE USING THE INFORMATION IN THIS OUTLINE. ANY APPLICATION OF THE INFORMATION FROM THIS OUTLINE IS AT THE USER'S RISK.**

The outline has five primary sections:

- ◆ **Detection:** This section deals with the different type of fishing gear and the detection of derelict gear. *The gear can be small recreational fishing gear or large(r) commercial gear. Findings can be after the report of lost gear of incidental of unreported or even illegal gear left behind.*
- ◆ **Assessment:** Once fishing gear has been found a proper inventory of the gear, the position, potential dangers and other details has to be done. *This is the first step that will lead to the organization of the recovery strategy. It will determine the “how” and “who” of the recovery stage.*
- ◆ **Organization:** This section describes how the actual recovery of the net is organized, the number and qualifications of people, materials used etc. *A proper organizational plan will not only streamline the actual recovery but also reduces risks for the people involved.*
- ◆ **Recovery:** This is the most critical and dangerous phase if you are dealing with larger gear. It is the execution of the organizational plan. *This is the actual “do it” phase and holds the most potential for incidents.*
- ◆ **Disposal:** After successful recovery proper disposal becomes an important consideration. *In this section you will find some general considerations but local laws and regulations may vary.*

- B. Although a real recovery will differ from situation to situation, training dives on simulated sites, practicing tying knots, hand signals etc. will increase your confidence and enhance your execution during a real recovery.
- C. This standardized outline was developed so that experienced and certified divers that are familiar with the water conditions (temperature, movement, visibility etc.) in which they potentially recover derelict fishing can minimize risks. As this is written for volunteer divers it must be understood that inherent risks can't be eliminated and in executing these activities the divers accept these risks.

II. General statements

- A. This outline uses recreational diving techniques and knowledge as a starting point. In order to use this course you will need to be certified by one of the recognized certifying agencies. It is also helpful to have an advanced level(s) of certification such a rescue diver or specialty courses (eg. search and recovery) A large number of dives (e.g. 100+) in varying conditions will further help in dealing with the challenges you may face.
- B. Although this is a non commercial volunteer divers based programme, local laws and regulations need to be respected as to whether you can participate in these removals
- C. Minimum age: 18 years or other by local regulations and laws
- D. Some procedures and equipment configurations will differ significantly from standards used in the recreational dive industry. The ultimate choice of equipment and the responsibility for the choice lies with the individual diver, given his/her assessment and the circumstances.
- E. Confined water sessions are not used by us, but may be added to your discretion in order to assess diver skills.
- F. Dives: It is recommended that a number of dives are made testing line signals, planning, knots, safety plans etc. between potential team members in order to optimize communication and work skills of these divers and reduce risks in a real situation.
- G. Our dives are planned as no decompression (no stop) dives within the limits of the Recreational Dive Planner or each diver's dive computer. However if divers have training, equipment and experience in decompression diving (sometimes referred to as "technical diving" certain exceptions could be made at the discretion of these divers.

III. Equipment (for the optional dive only)

A. Diver equipment

All personal equipment required by the local environment / regulations including:

- a. mask, fins (optional: snorkel)
- b. suitable exposure suit (incl hood gloves booties etc.)
- c. weight system
- d. dive knife/tool (if allowed by law) variations should be considered
- e. BCD with low pressure inflator
- f. regulator with submersible pressure gauge
- g. depth gauge, compass and timing device. Dive computers can be used to accomplish these functions.
- h. alternate air source
- i. whistle
- j. slate and pencil (for inventory phase)
- k. extra lines and equipment to deal with the recovery (situation dependent)

B. Surface crew (suggested, situation dependent)

- a. Boat with proper equipment as per local regulations
- b. Dive flags and buoys (as per local regulations)
- c. First aid and oxygen equipment
- d. Slates and dive roster
- e. Specialized equipment (situation dependent)

C: Special considerations:

Although many recreational divers use a completely independent secondary air-supply like a pony bottle system or have a secondary regulator on their first stage. It may be a consideration to alter or eliminate such an air source for the diver(s) who actually come into contact with the fishing gear, especially when dealing with nets. The rationale is the potential for entanglement. Alterations could include a very short hose for the main regulator that the diver uses as the main air source. If the diver opts to have a second regulator on the first stage it is important that this regulator is stored as close to the body as possible. In general all loose pieces of equipment such as lights, knives etc. should be stored or worn in a way that minimizes entanglement. Also reducing the size of equipment and making it easy to get rid of in an emergency (velcro holders etc.) can help in the case that easy ditching is needed.

Note: The following presentations and training dive outlines make up the general outline. If you use this to train volunteer divers, notes to you are in brackets. Training dive outlines cover skill objectives and dive sequence, and are not intended to be presented to students. The curriculum was developed for maximum flexibility,. notes will guide you to options in conduct and sequence.

IV. Detection:

1. Outline Goals

The goals of this section are:

1. To review situations and methods by which derelict fishing is detected.
2. To have an idea of the type of gear you may deal with.

A. Spontaneous detection

Spontaneous detection refers to the situation in which divers swim on a site and are unaware of any fishing gear lost. In the case of spontaneous detection the most important hazard is entanglement of nets that may not be visible even in very clean water. Although this is a rare situation is had happened .

In case of running into a net the most important steps are:

STOP – ASSESS- ACT

STOP: Stop swimming or moving in order to calm down and avoid further entanglement

ASSESS: Look at the situation and think of your options to disentangle or cut yourself free of the net(s).

ACT: Execute the plan that your decided upon.

If you are part of a buddy team it is essential to make sure your buddy does not run into the same net and is available to assist you. If you are part of a larger group on the same reef it might be possible to find other buddy team and steer them away from the danger or you can get to the surface and have the boat use the recall signal to get all divers to the surface immediately.

If you can and you are familiar with the site note the position, depth etc of the net so that a recovery and be easier and also other divers and dive operators can be warned about the danger on that site.

B. Targeted Detection

Targeted detection differs from spontaneous detection in that this refers to a situation in which lost fishing gear is expected. As there is the factor of anticipated encounters with fishing gear, this situation has a lower risk of entanglement as the divers or boat crew is aware of the possibility of entanglement and thus can prepare for the eventuality. As it is a targeted search with organized buddy teams, a search plan or grid and adapted equipment is

used, and thus divers are better adapted to deal with the discovery and approach of the gear. When organizing such a search a lot of elements should be considered which are mostly the same as in the assessment phase. (see chapter V). An important part of targeted detection is the registration and marking of the actual site where the gear is found. This can be done with traditional equipment such as slates and maps but can be enhanced by using small cameras (eg HERO cam ®) to get an accurate on site picture. Side scan sonar is often used on deeper sites and this kind of equipment becomes more accurate and accessible for more boaters as the pricing of these units continues to fall.

In an ideal world you want a system that allows fishermen to report lost gear to either a centralized organization like the fishery department that is responsible for the area. That way you can connect your program to this so lost nets get reported as soon as possible with the most accurate GPS position. Once reported you want to make sure that the net gets recovered as soon as possible to avoid further loss of life.

C. Gear types

Gear types that you may have to deal with vary greatly and often will be small gear. Let's have a look at a different types:

- Recreational fishing gear like flashers, nylon or steel line, lead weights, hooks etc. These items are typically small although weights can get up to 50 lbs. Most of them can be collected by hand using a collection bag to put them in. In case of lures and hooks, protection of hands and piercing dry suits are issues to be considered. Weights greater than 1 lb should be recovered with the help of a lift bag. **DO NOT USE YOUR BCD AS A LIFTING DEVICE!** If a weight should fall off you will be heavily overinflated and the risk of a rapid ascent is real.
- **Commercial fishing gear.**
This falls into two basic categories... Nets and traps/other gear.

Traps are usually prawn and crab traps. These are easy to retrieve as the chance of entanglement is low. The only issue may be the line to the surface which might pose a risk. Long line with hooks are commonly used but normally not lost easily. However in rare cases you may find this gear. There will be a main line with lots of side hooks and again piercing of gloves and suits is a potential hazard.

The most common nets that are stuck on underwater structures are gill nets and sein nets. Gill nets are used to trap specific species by the gills based on the size of the mesh. Usually this gear is set to catch salmon and as these are often inshore fisheries these type of nets are the ones that are most commonly caught. Reefs, wrecks and other underwater shallows are traps for these nets that go as deep as 20 meters (66 feet) which is a very common recreational dive depth. Sein nets are large nets that work as a scoop whereby they are circles around a boat and the fish is caught when the net closes the circle at the surface and the bottom of the net is closed too. Although rare these nets can be found snagged in deeper water.

V. ASSESSMENT

Objectives.

- *What are the risks related to environment.*
- *What are the risks related to the equipment.*

Once gear is detected and it is determined that it should be removed an assessment is need to gauge the level of organization that may be needed to remove the gear.

In case of small gear this assessment can be simple and done quickly and removal can be simple and harmless. However nets and larger gear need more attention and a more extensive assessment.

Risks related to the environment:

Although a complete assessment list for all circumstances to deal with the very varied situations is near impossible, a basic inventory needs to be done. The assessment should cover things like:

Type of gear (size, length, weight, construction etc.)

Depth at which the gear is stuck.

Currents (tidal, surface, bottom direction strength etc.)

Remoteness of the location (equipment to be brought on site, emergency organization etc.)

Weather (on the day of the intended removal and the season)

Cold / heat exposure of the people involved

Type of structure the net is caught on (reef, wreck) and related hazards

Other potential hazards e.g. marine life like jelly fish sea lions etc.

It is essential that this information is shared in a briefing before any actual recovery starts.

Risks related to equipment:

Make sure that all people handling the recovery equipment are familiar with its proper workings and manipulation.

Scissors, knives and other cutting implements are having the risk of cutting more than the nets and special attention should be given to proper stowing and handling.

Lift bags can influence the divers' buoyancy and divers working with this equipment should be trained with the proper manipulation.

As far as surface related equipment is concerned diving and recovering gear around boats brings with it the inevitable risk of propellers and people under them. Make sure that the recovery procedures that you agree on are familiar with all divers and that they are used as agreed.

VI. Organization

Learning objectives. After this discussion, you'll be able to answer the following questions:

- *Task allocation*
- *Emergency procedures*

Once you know what kind of gear you are going to remove and how many people you have and what skill they bring to the job you can think about how you allocate the work.

Obviously the divers would do the underwater part of the recovery. It is preferable that the people who work on the net each have their own safety buddy. However that may not always be possible. But at least have one standby diver ready that can help divers who are cutting and removing the net.

On the boat there should be a person able to operate the boat and pull the net in by hand. Remember that a lot of nets have lead lines at the bottom and the longer the net (or parts of it) that you recover the heavier it gets. If at all possible have the net pulled in by hand slowly as it allows more time for the divers underwater to signal the top crew and also to free animals that are still alive. In certain situations you may need to use the power of the boat or a hoisting device to pull the net off. This is mainly due to weight considerations. The use of mechanized means to free the net off a structure brings with it a reduced ability to save animals but is sometime the only option due to depth and other considerations.

If manpower allows allocate someone to record the recovery. It is useful to know how much and what species were lost. A visual recording of the recovery can be useful and with the modern helmet type cameras this can easily be done both underwater as well as at the surface.

VII. RECOVERY

Learning objectives. After this discussion, you'll be able to answer these questions:

- *How do you organize the actual recovery (procedures)*
- *What resources do you have and how to allocate them*
- *Saving life inside the net*

Now that you have located the net, made a plan and organized the people and equipment needed, the actual recovery can take place.

As each situation may require specific actions it would go beyond this manual to describe each possible scenario but we will cover the basics and will follow examples of real recoveries.

A gill net with full length (400 meters / 1200 feet) was accidentally lost on a popular dive site and discovered by divers whilst on a recreational dive. Immediately the GPS position was noted, as well as many details pertaining to depth, position on the reef etc. Other dive operators were informed about the hazard and the Department of Fisheries and Oceans (DFO) (Canada) was informed about the net. They did not have it reported but noted the information in their system in order to keep track of snagged nets. In co-ordination with the local DFO office a day was picked to recover the net. Due to weather conditions the recovery could not begin earlier than 2 weeks after the discovery. All the gear of the two divers and 4 surface people was loaded onto the fisheries boat. Once on location a reconnaissance dive was done to see the actual state of the net. All parts of the procedure was recorded by video and photographed. Once the situation was clear a plan was made to lower a rope to be attached to the start of the lead line. Line signals were assigned:

one pull: give out line

two pulls: pull up the line

three pulls: come up to the surface

The two divers would pull parts of the net away from the reef and give the signal to have the free net pulled up. As soon as they felt resistance they stopped pulling until the next sign to pull up was given. On the surface the crew liberated animals that could be saved and photographed parts of the procedure. The net that was processed was put into a large plastic bag. Once the divers reached their time and depth limits the rest of the net was pulled off with the help of the engine power. The entire net was pulled off and after that the divers were helped back on the boat.

The same day another dive site was visited as an older net was discovered. The two divers went down and wanted to execute a similar plan of recovery. However due to the presence of sea lions and tidal currents that were on the rise, the attempt was abandoned. So the actual situation differed from the initial assessment as the hazards lead to the decision to stop the recovery.

Another example involved half a gill net (approx 200 meters / 600 ft) stuck on the reef with only an indication of the reef. The dive was planned as a reconnaissance dive and only video gear was taken to make an inventory of the net. The dive was started on the southwest side of the reef as the prevailing winds in that area at that time of year are southwest. After 5 minutes the net was found and a quick swim along it showed the way the net was draped over the top and wall. After having found the end of the lead line the decision was made that it was safe enough to try to recover with just the two divers. One diver at the surface on the skiff and one below freeing fish, net and giving hand signals. As the net was draped flat and there was no current or swell the net came off in less than 30 minutes. As the net was hauled in many sea urchins we caught up in the net. So thick gloves were needed. After the entire net was on the skiff 2 hours were spent getting crabs, urchins, sea stars and other invertebrates out of the net and into the water.

So the key elements of the actual recovery are :

Have a signaling system in place
Have both the underwater and surface crew free animals
Document the recovery if possible

Have enough protective gear for all involved
Have emergency procedures and equipment in place
Have a standby diver kitted up ready to go in the water if possible

VIII. Disposal

Skill Objectives. By the end of this dive, the student should be able to:

- *How to dispose of the recovered gear and potential marine life in it*

Proper disposal of the recovered net and dealing with dead marine life is an important aspect of the process. Depending on the type of gear recovered, local regulations and possibilities a plan should be made how to dispose of the gear. It is advised that you contact the local authorities to ensure a proper and acceptable method to sort and dispose of the gear. Animal remains might be hard to remove or sort. In certain case it may be preferable to leave them in situ (on site). In many cases fees for disposal can be waived if working with the authorities as part of the volunteer program.

VI. Other notes

After a successful recovery there are a number of things that can be done to help the program:

1) Evaluation:

A proper evaluation is a very useful tool to see how things went, improve on procedures and to ensure quality and safety improvements for future recoveries. It also allows fine tuning certain procedures and tools. Use the evaluation as an archive tool in order to keep records and statistics.

2) Recognition:

In order to keep participants motivated it is essential that they are recognized for their efforts. This can be in the form of a letter or certificate of appreciation or via social media.

3) Publicity:

Public awareness of the program can help increase its profile and get more people on board. It can also attract more official recognition and thus potentially more financial aid. In certain situations publicity can be an important tool to press policy changes such as the duty to report for fishermen and obligatory marking of the nets on the bottom part.