

Underwater Survey: Creating a Site Plan

If you would like to get involved in more detailed survey and recording of underwater sites, basic survey techniques can be used. These can be applied to a range of different site types. They all use basic methods which require a small amount of easily available equipment.

The aim of survey is to be able to plot items in relation to each other. This could be a whole wreck site, a scatter of objects or detail of ship structure. Survey can involve taking measurements that you draw up when you get back to the surface, or producing a scale drawing while still under water. It is important to plan your approach to maximise your time under water. If you are new to underwater survey it might be best to practise what you will be doing on the surface before you go diving.

The aim is to make a map of the site that shows the main features at the correct size, drawn in the right place and gives an idea of what they look like when viewed from above. To do this we need to bring in some simple survey techniques using tape measures.

Offset Survey

For smaller sites we can lay a tape measure 'baseline' down through the middle of the site and use that as our reference for the survey work. For sites that have an obstruction across the middle, the tape can be laid alongside the site rather than right through it. The sketch made earlier should help when planning where to put the tape baseline and how long the baseline needs to be. Measurements made from points used to mark each feature to the tape baseline can then be drawn to scale on a piece of paper or on a computer and used to make the site plan.

The tape measure should be attached to a survey point at each end so it stays in place. The survey point is usually a metal rod pushed into a sandy seabed or a pin hammered into a crevice on a rocky reef: something strong enough to attach a tape measure to. The survey point should be permanently fixed to the seabed, easily found again and clearly marked with a label showing its unique number. The depth of each survey point should be measured with a dive computer and corrected for the effects of tide.



Photo courtesy of Alan Murray

With the tape measure baseline firmly secured between the two survey points it can be used for the survey tasks. Any point on the site can be positioned relative to the baseline by making a measurement from the point to the baseline using a second tape measure, the second tape should meet the baseline at a right angle. This is known as an offset measurement. Two distances should be written down, the distance from the zero end of the baseline to the second tape and the distance from the baseline to the 'detail' point to be positioned. The depth of each detail point should be measured with a dive computer and also corrected for tide.

The site plan can be drawn to scale on paper using a scale rule and a set square to define the right angle for each offset measurement. The site plan should initially show the survey points used to position the baseline, the baseline itself and the detail points that were positioned from it.

For large or scattered sites it may be easier to record the position of each separate part of the site using a GPS and buoy. Each part can then be recorded in detail using its own separate baseline. In this case the survey points at the ends of each baseline should be positioned using the GPS so the separate parts can be placed together on a single plan.

Deciding what to position with tape measurements can be tricky. Where time on site is limited it is better to get an overall rough site plan completed than do just a small area in great detail. Once the whole site has been recorded coarsely and added to the site plan you can always go back and add more detail to the plan on later dives.

The points on the site itself that have been positioned should be marked so they can be found again and have labels attached so you can tell which point is which. Bright yellow flagging tape or yellow plastic cable ties can be tied around objects and structure and used as markers. Labels should be made of plastic so they survive for some time under water, Disk-Mark labels are best for this but you can also use white garden tags or even plastic strips made from empty margarine tubs. Tags should not be attached to fragile objects as they may break or get washed away, instead attach a tag to a stone and put it next to the object.

With each object positioned the features can then be recorded in detail. The site plan is still just a lot of dots showing where each feature is so now we need to draw in each feature as it would be seen from above. Details can be recorded from sketches of small areas backed up with measurements made with a tape measure or folding rule. In some cases it is easier to take a photograph of the object from above and use that to help add detail to the plan, but don't forget to add a scale to the photograph so the object gets drawn at the right size.

With the main features shown on the plan we can now add more detail, such as the location of small finds, the different types of seabed found on the site or contours to represent the changes in depth across the site. The site plan can be considered complete once all of the main features have been recorded to the same level of detail. Make sure the plan drawing includes the name of the site, a scale bar to show the size, an arrow to indicate north, the name of the site, the dates it was recorded and who did the work.

While the site plan was being put together you are likely to have recorded information that will help identify the ship. Technology changed rapidly in the development of ships so some features on the site may help narrow down a range of dates for the ship and help put a name to the wreck. The presence or absence of features may also help, for example if you find a particular type of engine or boiler on the site. Finding something inscribed with the name or owner of the ship is rare but not unknown, more often you will find something that is stamped with a date or a manufacturer's name such as a coin, bottle or piece of equipment.

Need further help?

A number of really useful linked webpages have been developed by Peter Holt of 3H Consulting (www.3hconsulting.com).

The available guides include:

Getting Started: http://www.3hconsulting.com/project_starting.html

Equipment: <http://www.3hconsulting.com/equipment.html>

Techniques: <http://www.3hconsulting.com/techniques.html>

Further information is also available within *Underwater Archaeology: the Nautical Archaeology Society Guide to Principles and Practice*. A. Bowens (ed.) 2008. Wiley-Blackwell.

If you are particularly interested in undertaking detailed survey of a WW1 site and would like help in choosing a survey techniques and planning your approach, then please get in touch – we are very happy to help!

Many Thanks to 3H Consulting for contributing content: <http://www.3hconsulting.com/>