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SR637_Environmental Data Gathering for Environmental Assessments – Basic Seabed Habitat Mapping using Acoustic Ground discrimation Sonar and Underwater Video

Mark Gray – August 2010

ISBN: 978-1-906634-43-8

SR637

Environmental Data Gathering for Environmental Assessments:

Basic Seabed Habitat Mapping using

Acoustic Ground Discrimination Sonar and Underwater Video

Disclaimer:

The procedures outlined in this guidance document is appropriate in most circumstances but caution should be exercised in relation to working on vessels and on the shore particularly as tides can change very quickly. Persons using the procedures outlined in this document should always take appropriate steps to safe guard their own well-being. Seafish does not accept any liability in respect of damage that may occur as a result of utilisation of the screening or survey methodology described in this document.

Carrying out this work will not guarantee a positive result but will help to inform and speed up the environmental assessment process. Even after you have completed your work, additional specialist work may still need to be done if some questions remain unanswered.

Introduction

A lack of information on the precise location of a protected marine habitat or refuge for a protected marine species has caused considerable delays in environmental impact assessments and at worst led to applications to develop shellfish farms being refused or withdrawn as regulators are unable to decide whether the farm site and/or access arrangements will or will not have a potential impact on a protected wildlife site (Seafish 2006 & 2007).

Environmental information shortfalls may result from: (a) a lack of survey data; (b) poor resolution of survey data; or (c) out-of-date information as the distribution of habitats and species change over time.

The Seafish Standard Operating Procedure Series

The aim of the **Seafish Standard Operating Procedure Series** is to provide shellfish farm developers with guidance on how to collect **basic environmental data** in order to address simple information shortfalls that may exist within a wildlife protected area.

At the heart of series is the promotion of a collaborative approach encouraging shellfish farm developers to develop and maintain a dialog with the regulator and nature conservation agency involved in the consenting process. It is hoped that this approach will encourage better understanding between all stakeholders of the conservation and operational issues at the site early on in the process.

By following an Standard Operating Procedure (SOP) and carrying out the survey work in collaboration with the regulators and nature conservation agency, the shellfish farm developer will be able to produce basic environmental information, such as the distribution of habitats, which will help shellfish farm developers determine whether the proposed farm is likely to be compatible with the nature conservation interests of the site and, if so, whether any measures could be required to prevent or reduce damage or disturbance to an acceptable level and enable the sustainable development of the shellfish farm.

The Seafish Standard Operating Procedure Series is being developed to support and assist the environmental assessment and consenting of shellfish farm developments in the UK. Its is hoped that these procedures will save time and resources for all involved and will enable all stakeholders to make well informed assessments and decisions.

Environmental assessment process

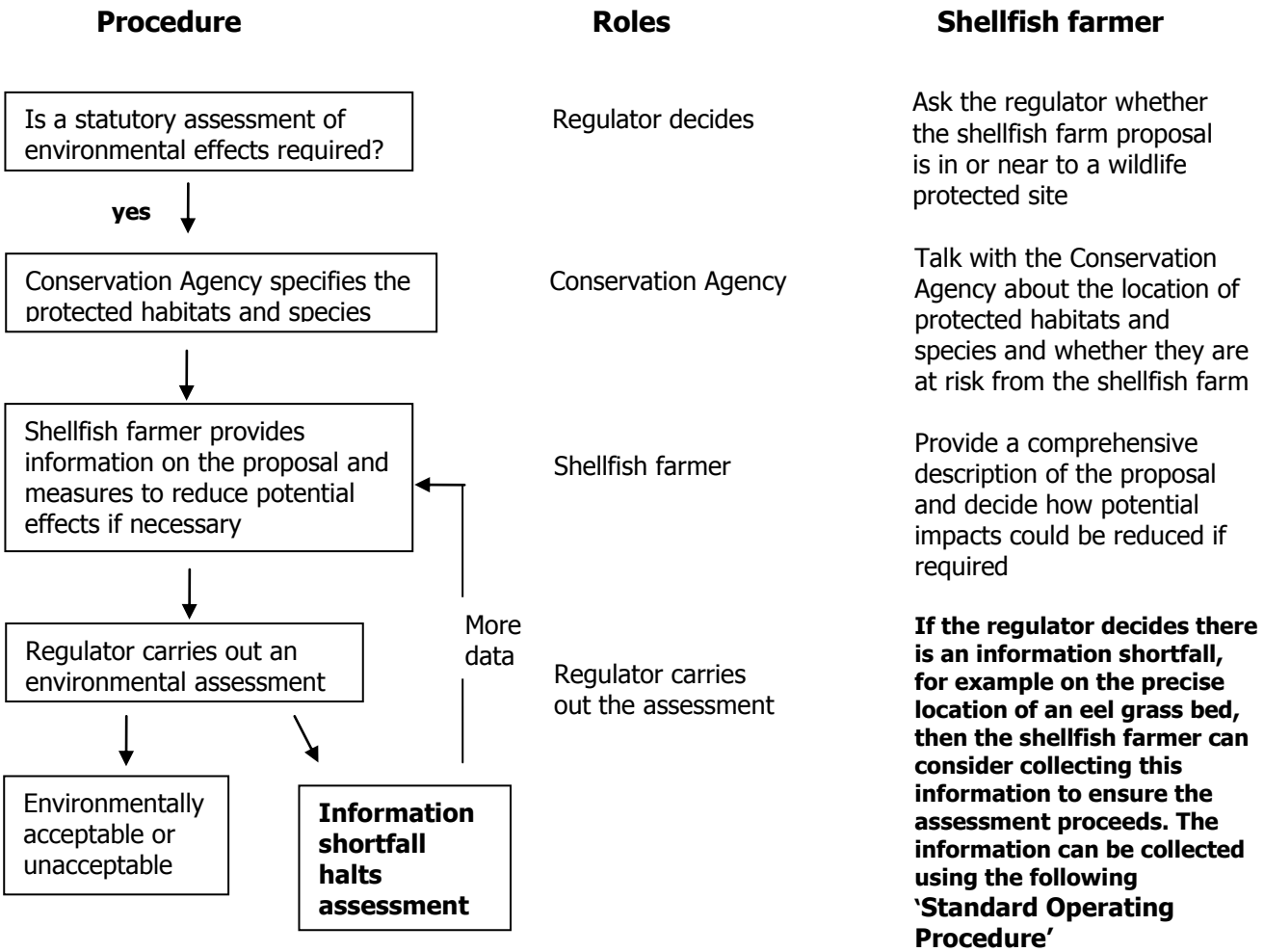
Wildlife in the UK is protected by a wide range of legislation that protects some plants and animals wherever they occur and also creates areas where human activities are carefully managed to protect wildlife, such as Sites of Special Scientific Interest (SSSIs) and Special Areas of Conservation (SACs).

The way in which wildlife is protected depends on the type of designation, but generally speaking the statutory body that authorises the development of a shellfish farm (e.g. a Local Authority or Government department, referred to in this document as the 'Regulator') carries out some form of environmental impact assessment to determine whether a development, such as a shellfish farm, can proceed within a protected wildlife site or not.

The Statutory Conservation Agency (e.g. Natural England) provides advice on the wildlife interests of an area and the environmental impact assessment is based on the information supplied by the

shellfish farm developer[1]. Below is a simple flow diagram outlining a general environmental impact assessment procedure and the role and responsibilities of those involved:

General environmental impact assessment procedure



Addressing environmental information shortfalls

In the event of an information shortfall, the shellfish farm developer has three options, namely

(a) Consider a new site, a new cultivation method and/or new access arrangements

(b) Find out whether somebody else holds the required data, for example a company involved in a development nearby or a voluntary environmental organisation that regularly monitors the local wildlife

(c) Collect the data themselves/employ a consultant to collect data

(d) Contact someone else to do the work, particularly when specialist information is required

[1] See Seafish Guidance notes on 'Protected Sites', 'Protected Species' and 'How to Prepare for an Environmental Assessment'

This guidance manual enables the shellfish farm developer to collect simple environmental information, i.e. option (c)

The guidance is provided in the form of Standard Operating Procedures (SOP) that will provide step-by-step instructions on how to carryout basic surveys to provide key environmental information.

The SOPs (i.e. survey techniques, data recording and presentation style) have been developed with the UK Conservation Agencies and Regulators (namely Sea Fisheries Committees and Local Authorities).

This will ensure that the environmental information gathered by the industry will be provided in an acceptable format for the purpose of informing environmental impact assessments.

Before any survey work takes place, the shellfish farm developer must agree with the relevant conservation agency and regulator, what environmental data is required and how it is both collected and reported as additional site-specific information not covered in the following procedure may be required.

You may be asked by the regulators to provide information that cannot be collected by the methods presented in the Standard Operating Procedures

It is vital to speak to the regulators and determine their requirements before you undertake any work

Introduction to Basic Seabed Habitats Mapping

Very often there is a lack of detailed knowledge about the **habitats** and **species** on the **seabed** in areas where fisheries operate within European Marine sites. Recent developments in the management of these sites suggest that existing fisheries may have to undergo environmental assessments. In order for these environmental assessments to progress, avoid costly delays and to demonstrate how fishing activities are compatible with marine conservation objectives it may be necessary for the fishing industry to provide environmental information.

The fishermen operating mobile gear fisheries often have extensive local knowledge, skills and technology to enable them to carry out basic seabed surveys. More detailed seabed survey work can be achieved using more specialist equipment such as underwater video equipment.

This guidance sheet will take you through the process of carrying out a **basic** site survey using **Acoustic Ground Discrimination Sonar (ADGS)** and **underwater video** equipment to **record the location** and **seabed habitat types**.

Many vessel operators are currently using ADGS equipment in their everyday fishing operations and will already have accumulated important information from a wide area which could help to inform an environmental assessment or to guide further survey work.

Information gathering using ADGS and underwater video surveys are very **cost effective** compared to other methods of environmental data collection. By the inclusion of GPS coordinates in the underwater video recording you will be able to provide regulators with **accurate** and **verifiable** information on the seabed habitats.

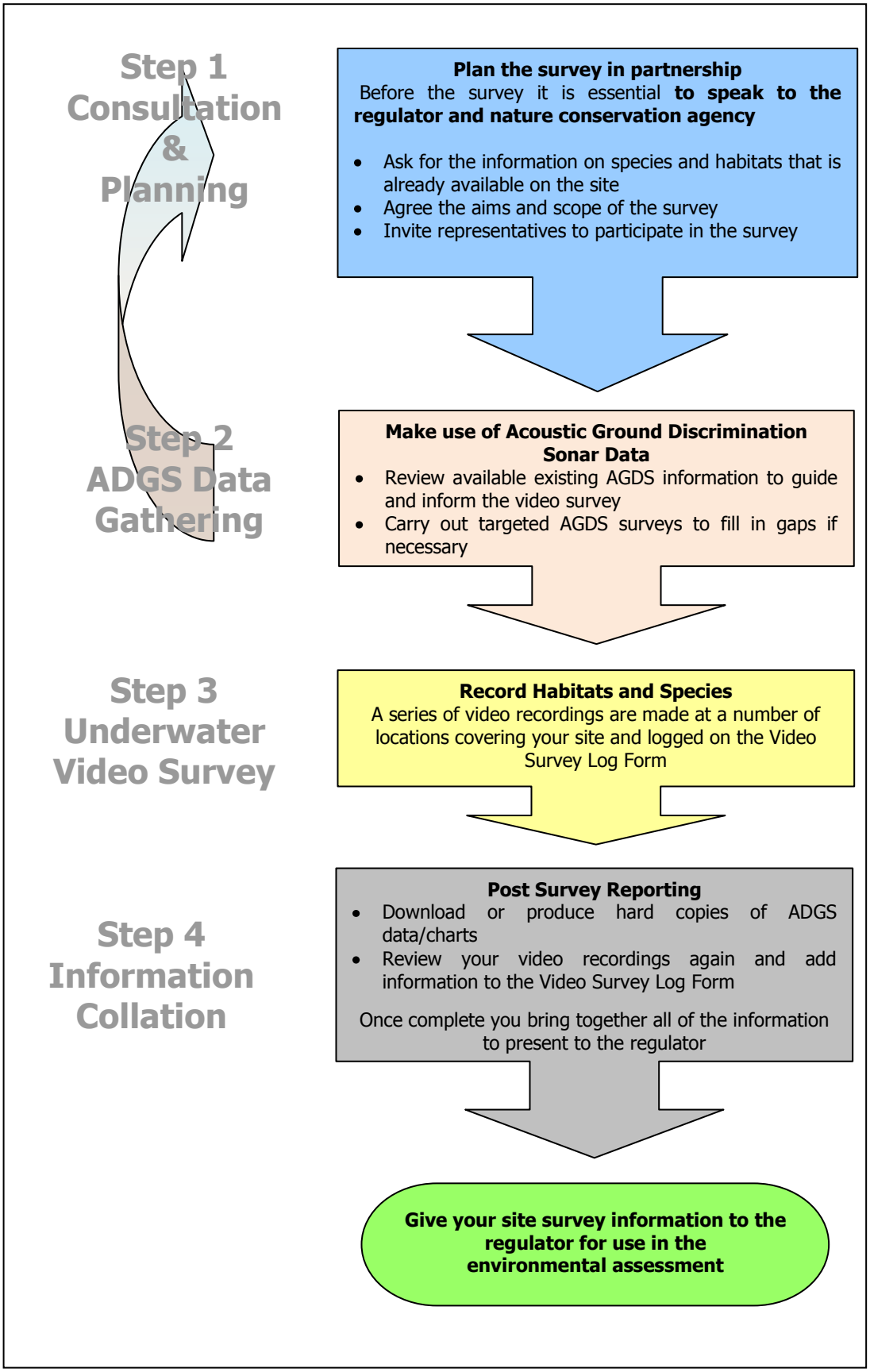
What are habitats?
Habitats are quite simply the parts of the environment where plant and animal species live, in this case the seabed type, e.g.

- Razor Clams live in a sand **habitat**
- Lobsters live in rocky **habitats**
- Maerl, Horse Mussels and Honeycomb Worms form **living reef habitats**

Maerl Bed (© Anon. Nature-Shetland)

Lobster in Boulder Habitat (© Rohan Holt. CCW)

Step-by-Step Approach to a Site Survey



Step-by-step guide to carrying out seabed mapping

Step 1 – Consultation and survey planning

Planning is an essential part of a survey; time spent in preparation will save you time, effort and money when out at sea

Equipped with clear details of the areas in which your fishery operate and, if possible, existing AGDS charts of these areas, the first step is to speak to both;

- the **regulator** carrying out the environmental assessment and;
- the **nature conservation agency** who will provide wildlife advice

These organisations will have advice on which areas to concentrate your efforts on especially if they wish to find out information about specific locations in and around your fishing area. Your existing AGDS information will assist in this process.

See Step 2 for advice on collating ADGS data

Questions to ask:

- **What survey information does the regulator or nature conservation agency already have of your proposed site?**
  - This could save you a lot of effort if there is already information on your site
- **What are the areas that further survey work should cover?**
  - You may be asked by the regulator to focus effort on potentially sensitive areas within your traditional fishing grounds
- **What survey methods should you employ?**
  - Agree with the regulator on survey methods such as ADGS or underwater video
- **Are there particular habitats or species that you should look out for?**
  - The nature conservation agency will be able to advise you which sensitive habitats or species may present at your proposed site and may be able to provide you with **identification guides** or **pictures of them**
- **Invite the regulator and nature conversation agency to participate on the survey trip**
  - Having regulators or conversation agency staff enables them to more confidently asses your proposal and gives them the opportunity to assist you with the survey process

A list of useful information sources can be found at the back of this guidance

Video Survey Design

The aim of the survey is to find out what types of habitats (mud, sand, rock and living reefs) and species are on the seabed in the areas that you are fishing and to record their location.

Agree the survey design with the regulator and nature conservation agency

Obviously you will not be able to cover every inch of the areas where information is needed but by systematically dropping down your video equipment at a number of places you can build up a picture of the seabed over the site.

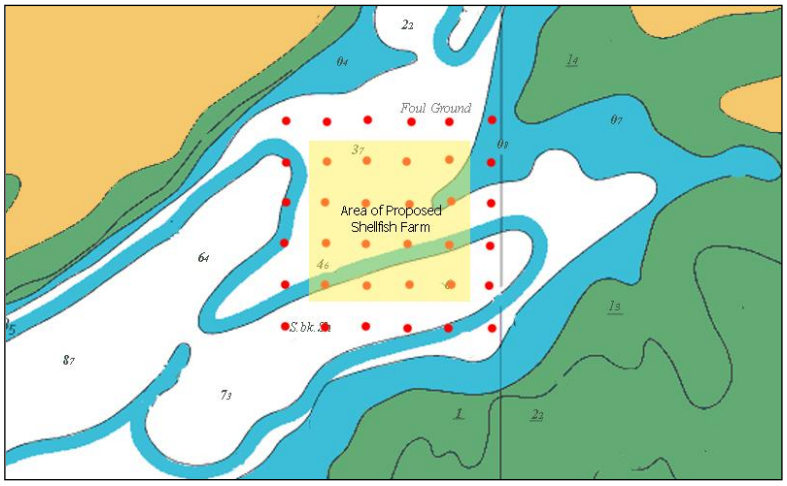
The most straight forward survey design to achieve good coverage of your site is called a **grid survey.**

A grid based survey is designed by simply plotting a systematic series of positions on a chart in a grid fashion (known as '**video survey stations**') and using the underwater video at each of these.

Grid Surveys are the most common survey design used by professional surveyors at sites where there is no prior information on seabed habitats.

Grid Surveys are:
- Systematic
- Easily Plotted
- Straightforward to carry out

For small areas an alternative approach is suggested on the next page.



In this mocked up example an area where fishing takes place has been plotted onto a chart (yellow).

A grid of video survey stations has been placed every 250 m over the 100 ha fishing area and surrounding seabed.

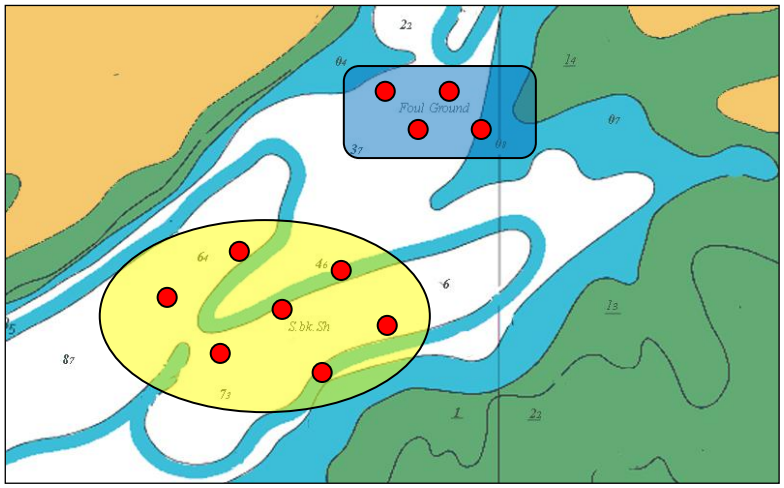
How many video survey stations should you work?

- The number of stations depends on the size of the area and how accurately you can position your vessel, e.g.

- If your fishing area is 100 ha (1000 x 1000 m) of seabed then you may consider a 250 m grid which would equate to 16 video stations within the site and a further 20 around the outside = 36 stations.

Using ADGS information to guide the video survey

The regulator or nature conservation agency may use existing ADGS information to guide the video survey plan; this is known as '**Ground Truthing**'.



In this example two areas of seabed that more information is required about have been located using the AGDS system and a number of video survey stations have been located within each.

The ADGS data determines the location and extent of seabed habitats and the underwater video footage enables you to identify what they are and what sensitive species are present.

The regulator carrying out the environmental assessment may require information on nearby locations so it is vital involve them in the survey design

Step 2 – Collating Acoustic Ground Discrimination Sonar Information

There are a number of AGDS systems commonly in use by the fishing industry e.g. Olex 3D, SeaScan and WASSP. If you routinely use any of these or similar systems and if you have already been operating in the area subject to the environmental assessment you will have very important seabed information.

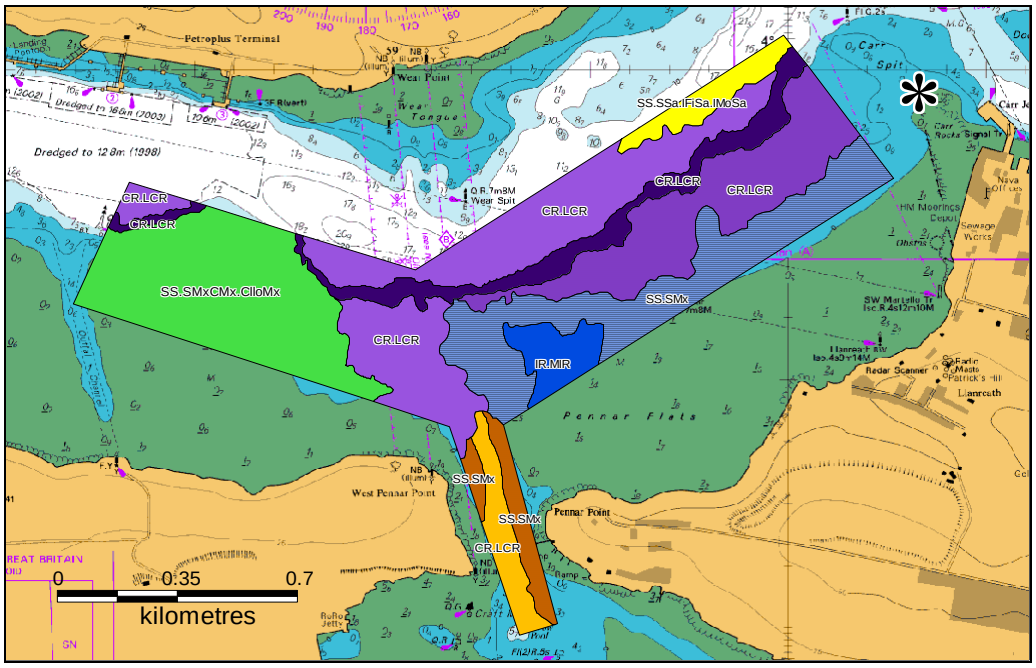
In order to present ADGS data to the regulators and nature conversation agency you will need to be able to either download or save the raw data from your system or produce a printed chart or series of charts. There are a number of options to do this:

1. Download ADGS data for use in a Geographical Information System (GIS)

The regulators and nature conservation agencies routinely use GIS databases to store and analyse environmental survey data such as that produced by ADGS systems. Your ADGS system may have the facility to download the raw data in format that can be used in a GIS system. Normally the data can be transferred to digital storage media such as USB Pen Drive/Memory sticks, SD Cards, CD and DVD disks.

- Ask the regulator and nature conservation agency if they require or are able to use your ADGS data

- If you encounter difficulties or are not sure whether your system has this facility contact the system distributors as they will be able to tell you if it is possible and tell you how to download the data from your AGDS system.



A GIS seabed habitat map derived from AGDS data (Amy Critchlow SWSFC)

2. Produce Hard Copies of ADGS Information

If you cannot download your ADGS data from your system or the regulators and nature conservation agency cannot use it in their GIS an alternative approach is to produce hardcopies of the information. To do this you either need to be able to print out screenshots directly from your systems or alternatively you can simply photograph the screen displaying the areas of interest using a digital camera.

Whether printing out hard copies or producing photographs it is important to consider the following:

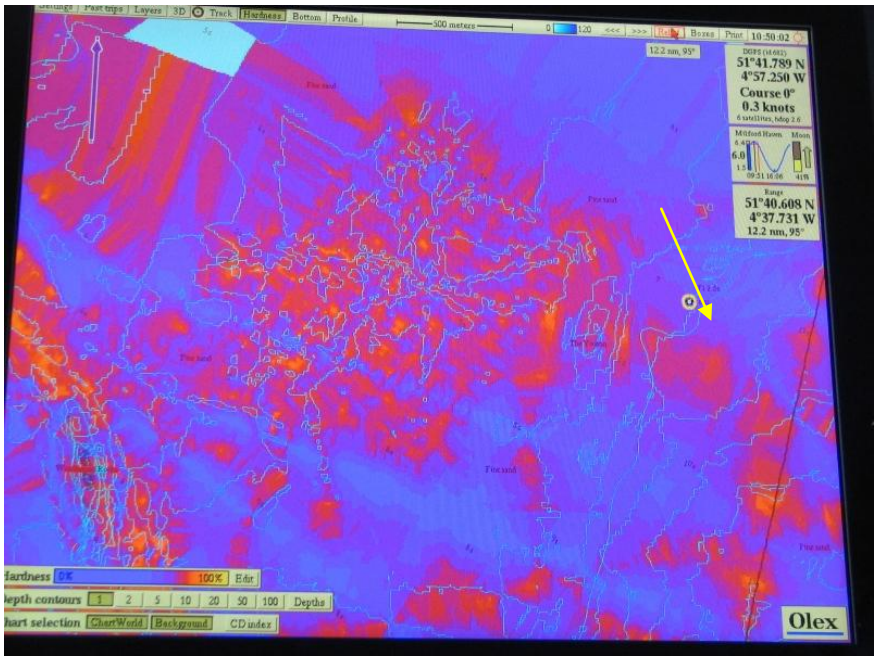
Is there sufficient detail in the output to be easily interpreted?

- Ensure that the chart scale is low enough to show all of the details of the areas of interest to the regulators and nature conservation agencies.

It is better to produce a number of high resolution chartlets showing information on small areas of a site than few low resolution charts covering a wide area

The aim is to produce easily interpreted information

- Try to include reference points such as navigational buoys and charted seabed features such as rocks or reefs in the hardcopies.



Photograph of a Olex 3D ADGS system (© Mark Pole SWSFC). Note that the operator has included a navigational buoy (arrowed) and depth contours as references to aid interpretation. Other information such as a North arrow and a seabed Hardness-Softness scale bar all provide key information.

If you are unable to download, print or photograph the screen invite representatives from the regulator and nature conservation agency onboard to view your ADGS data

AGDS Survey Design

The aim of AGDS survey is to locate different types of seabed that may correspond to different types of habitats (mud, sand, rock and living reefs)

Agree the survey design with the regulator and nature conservation agency

If the regulator and nature conservation agency have identified a need for further information on broad areas of seabed then a targeted AGDS survey is likely to be the most cost effective method. Discuss their requirements and work with them designing a survey with them.

General considerations on acoustic surveys

Track Spacing

- In order to cover the area of seabed in a systematic way a survey track should be plotted into the vessels chart plotter
- Take into account tidal streams and prevailing wind directions as these can affect vessel positioning
- Vessel tracks should run parallel to each other at a minimum distance of 250 m apart – the distance apart depends on the site and size of area to be surveyed so discuss this with the regulator and nature conservation agency

A screen shot of an ADGS survey track from a survey of a reef feature (© Mark Pole SWSFC). Note that the tracks are parallel to each other and an extra track has been added at 90 degrees across the top and bottom of the survey area to 'fill in the gaps'

Vessel Speed

- Although some systems claim to produce good quality data at speeds up to 20 knots it is recommended that for surveys vessel speed should not exceed 10 knots and speeds of 5-6 knots are recommended.

Step 3 – The Video Survey

What equipment will you need for a video survey?

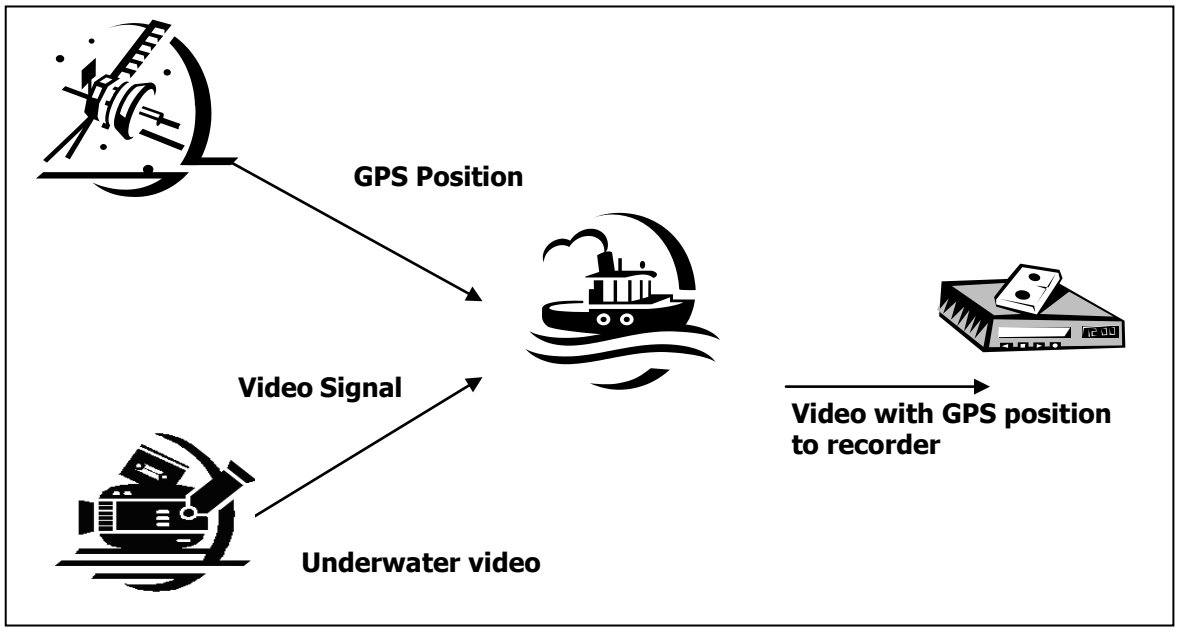
Because of the variety of different requirements likely to be encountered at different sites (depth of water being the most important) we have not attempted to specify a system. If you are considering carrying out your own survey it is assumed that you have some technical expertise and are confident in being able to make your own choices of equipment. There is a detailed overview of equipment at the back of this guidance pack that will assist you in making an informed choice.

For sites in water less than 20 m deep it is possible that you will be able to carryout a basic video survey with basic off the shelf camera equipment such as those often marketed as 'Fishing Video Systems' and cost less than £250. The only other specialist piece of equipment is the 'GPS overlay device' which superimposes a vessels position onto the video picture – this helps to automatically verify the location of the seabed habitats recorded by you – these can cost less than £150.

Suggested Equipment:

- **Underwater Video Camera**
- **Video cable** if not already included with your system
- **Television Monitor**
- **Video recording equipment**, VHS, Digital Video Recorder or DVD recorder
- **GPS** and **GPS overlay device** – this records the GPS coordinates onto the video picture
- Access to a **suitable vessel** – a fishing vessel with a covered wheelhouse is perfect
- Sufficient rope **warp** - marked every 5 m to allow you to estimate warp length
- **Lights** in turbid or water depths where there is little natural light penetration
- **Sledge/Frame** (optional)
- **Video Survey Log Forms** (included in this guidance), notebook or clipboard and pencils

Schematic of system



Set up and test the equipment on the vessel

This is best done the day or some hours before you plan to put to sea as this is when you discover problems and being alongside with access to shore facilities can save the day. It may sound like common sense but these are problems that have previously been encountered by professional surveyors.

As you set the video system up ask the following questions:

- Have you got sufficient batteries/power supply on the vessel to run all of the equipment and lights? What about spares?
- Is the recording equipment likely to get wet when you are underway or working?
- Can the cables be routed where they will not be damaged by slamming doors etc?
- Do you have enough video tapes, DVDs or, in the case of DVRs, sufficient memory capacity to undertake the survey?
- Have you considered how you going to handle the warp and cable (cables are generally not to be used for hauling)?
- Are the camera and lights depth rated for the depth of the site you are surveying?
- Have you remembered the **Video Survey Log Forms**, pens and pencils

When you have the equipment set up test it out alongside in the harbour

Using the underwater video gear for the 1st time:

1. Turn on the camera, GPS overlay and video recorder
2. Check the camera is working and that you have an image on the screen
3. Adjust the camera to give you the best view of the seabed
4. Check that the GPS overlay is producing an accurate position on the screen
5. With the lights turned on lower the equipment into the water and down to the seabed
6. If applicable - check that the lights are angled to give the best image on the screen
    - this may be a process of trial and error
7. Recording some video footage and playing it back

It is a good idea to practice using the equipment during this time as you will very quickly learn how to get the best results from your system

The video survey

Remember to invite the regulator and nature conservation agency to participate in the survey if there is space on the vessel

It is best to undertake the survey in **calm conditions** after a period of settled weather and over **slack water**.

Follow your survey plan as closely as you can – no one expects you to be able to drop the camera exactly on top of each video survey station waypoint

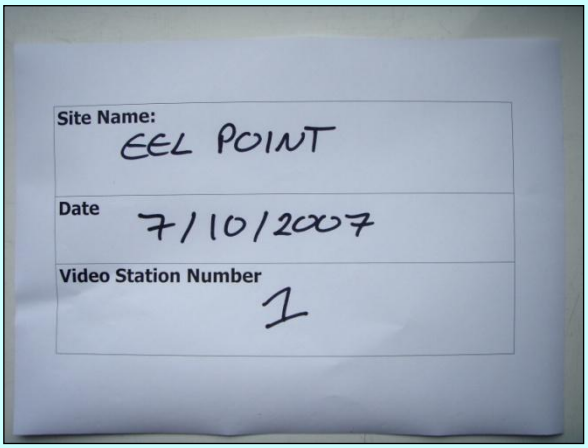
Accuracy can be improved by entering the waypoints into the vessels GPS plotter

When you arrive at a **video survey station** follow these actions:

1. Prepare **Video Survey Log Form** filling out station number, depth etc.

   A blank Video Survey Log Form and instructions on filling it in is included in this pack

2. Turn on camera, GPS overlay and recording equipment
3. Check whether you have a clear video picture with GPS overlay
4. **This is very important.** Place a plastic board or similar in front of the camera with the site name, date and video station number written clearly on it. This labels the following video footage for future reference, e.g.



5. Ensure the vessel is stationary or not moving at more that **½ knot**
6. Lower video to the seabed
7. Note the start coordinates on the Video Survey Log Form
8. Once the video image has cleared allow the vessel to drift slowly (less than ½ knot) for **2 to 5 minutes**. The regulator or nature conservation agency representative if onboard will help you to decide if enough time has been spent at each site
9. During this time fill out the Video Survey Log Form describing the seabed type and any seabed marine life covering it
10. Haul the equipment and note the end position on the Video Survey Log Form

Step 3 – Post Survey Reporting

This is not as daunting as it sounds although it may take you as much time as carrying out the video survey

The aim of this step is to gather all of your site survey information together in a format that can be easily accessed by the regulators dealing with the environmental assessment.

Video Survey Information

The most important step is watching the video of the survey again and adding to your **Video Survey Log Form**, this gives you the chance to '**pause**' the video and look in detail at the seabed images.

1. Watch the video clips recorded at the survey stations and add any information such as times/positions of features or species of interest to the Video Survey Log Form for each station

2. Copy out (or type on a PC) your **Video Survey Log Form** to new clean record sheets – it is important that your information is be presented in a clear way

3. Depending on the recording equipment (VHS or DVR) either label the tapes clearly or copy the video from DVR to DVD or CD disks – always label with the **site name** and **date**

4. If possible **download** or **export** the **survey track** from the **GPS**/**Chartplotter** to a computer file – there are free software programs available to download to help you do this

5. If you had an ADGS system operating during the survey download or export the data to suitable storage media such as a USB pen drive or CD etc.

You can now submit your environmental information in support of your existing or new fishery proposal to the regulator carrying out the environmental assessment

Key contacts:

First points of contact with the different organisations involved in marine wildlife protection are:

Fishery managers:

Cornwall Sea Fisheries Committee
Tel: 01736 369817 www.cornwall.gov.uk/seafisheries

Cumbria Sea Fisheries Committee
Tel: 01946 693047 www.cumbriasfc.org.uk

Devon Sea Fisheries Committee
Tel: 01803 854648 devonseafish@btconnect.com

Eastern Sea Fisheries Committee
Tel: 01553 775321 www.esfjc.co.uk

Isles of Scilly Sea Fisheries Committee
Tel: 01720 423371
www.scilly.gov.uk/environment/fisheries/

Kent and Essex Sea Fisheries Committee
Tel: 01843 585310 www.kentandessex-sfc.co.uk

North Eastern Sea Fisheries Committee
Tel: 01482 393690 www.neseafish.gov.uk

North Western and North Wales Sea Fisheries Committee Tel: 01524 68745 www.nwnwsfc.org

Northumberland Sea Fisheries Committee
Tel: 01670 731399 www.nsfc.org.uk

Southern Sea Fisheries Committee
Tel: 01202 721373 www.southernsfc.org.uk

South Wales Sea Fisheries Committee
Tel: 01792 654466 www.swsfc.org.uk

Sussex Sea Fisheries Committee
Tel: 01273 454407 www.sussex-sfc.gov.uk

DEFRA Tel: 0845 33 55 77 (Helpline)
http://www.defra.gov.uk/marine/fisheries/index.htm

Scottish Executive Tel: 0845 774 1741 (Sea Fisheries Division)
www.scotland.gov.uk/Topics/Fisheries/Sea-Fisheries

Welsh Assembly Government (Dept for Rural Affairs and Heritage) Tel: 0845 010 3300
http://new.wales.gov.uk/topics/environmentcountryside

Department of Agriculture and Rural Development, Northern Ireland Tel: 02890 524 999 (Helpline)
www.dardni.gov.uk/index/fisheries-farming-and-food/fisheries/sea-fisheries.htm

Environment Agency Tel: 08708 506 506 (General Enquiries)
www.environment-agency.gov.uk

Marine & Fisheries Agency Tel: 020 7283 6000 (London)
www.mfa.gov.uk

Nature conservation agencies:

Natural England Tel: 0845 600 3078 (Enquiry Service)
www.naturalengland.org.uk

Scottish Natural Heritage Tel: 01463 725000 (HQ Inverness)
www.snh.org.uk

Countryside Council for Wales Tel: 0845 1306 229 (General Enquiries) www.ccw.gov.uk
Environment and Heritage Service, Northern Ireland Tel: 028 9054 0540 (Dept of the Environment) www.ehsni.gov.uk

Joint Nature Conservation Committee Tel: 01733 562 626 (Enquiries) www.jncc.gov.uk

Fishing industry associations:

National Federation of Fishermen's Organisations
Tel: 01904 635430 www.nffo.org.uk

Scottish Fishermen's Federation Tel: 01224 646 944
www.sff.co.uk

Welsh Federation of Fishermen's Associations
Tel: 01437 779 312 www.wffa.org.uk

North Ireland Fishermen's Federation Tel: 02842 771946

Shellfish Association of Great Britain Tel: 0207 283 8305
www.shellfish.org.uk

Association of Scottish Shellfish Growers Ltd
Tel: 01471 844324 www.assg.co.uk

Sources of useful information

A Cefas handbook on seabed sampling and surveys:
http://www.ukmarinesac.org.uk/pdfs/aggregates-report.pdf

The Mapping European Seabed Habitats website has guidance on how to carry out seabed surveys and a mapping tool to search for existing information in your area.
http://www.searchmesh.net/

The JNCC Marine Monitoring Handbook contains guidance for conservation agencies on seabed habitat mapping.
http://www.jncc.gov.uk/PDF/MMH-mmh_0601.pdf

Seafish and the environment

Seafish exists to provide support to the fishing industry. In 2006, we identified that wildlife conservation is a major concern to the industry. We are working to make it easier for the fishing industry to work in harmony with wildlife conservation interests. We have a dedicated Environmental Assessment Support Officer who can provide you with free advice on environmental issues:

Mark Gray, Seafish Industry Authority, Origin Way, Europarc, Grimsby, Tel 01482 327300 Mob 07966 764150 email m_gray@seafish.co.uk Links to useful information sources can be found on the Seafish website, www.seafish.org

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Sources of useful information

Survey methods:

http://www.jncc.gov.uk/page-2430
This is a link to the JNCC Marine Monitoring Handbook which contains a wealth of detailed information on survey and sampling methods

http://www.seasearch.org.uk/
This site has guidance for divers undertaking surveys but has good general information on survey approaches.

A Cefas handbook on seabed sampling and surveys:
http://www.ukmarinesac.org.uk/pdfs/aggregates-report.pdf

The Mapping European Seabed Habitats website has guidance on how to carry out seabed surveys and a mapping tool to search for existing information in your area.
http://www.searchmesh.net/

Aerial Survey Photograph Websites:
http://www.flashearth.com/
http://earth.google.com/

More information on using GPS:
http://www8.garmin.com/aboutGPS/manual.html

Software to download waypoints from GPS:
http://www.easygps.com/default.asp
http://www.tapr.org/~kh2z/Waypoint/

Marine wildlife and communities:
http://www.marlin.ac.uk/sah/

Links to further useful information sources can be found from the Seafish website
www.seafish.co.uk

Seabed Survey ADGS Data and Video Log Cover Sheet

Fill this sheet out and include it with your ADGS data or charts, video log sheets, video recordings and track records when submitting to regulator

Name	
Address	
Telephone Number	
Mobile Number	
Email address	
Site Name	
Date of Survey	
Video tapes or disks included Y/N	
GPS/Chartplotter track data included Y/N	File Name
AGDS Data Included Y/N	File Name

The information presented in these recording sheets has been produced using the methods outlined in the Seafish Basic Video Mapping of Seabed Habitats Standard Operating Procedures.

Site Name …… Date……

Video Station Number			**Warp Length**	
	Time on seabed (from GPS)	**Depth (m)**	**Latitude**	**Longitude**
Start				
Finish				
Video Quality	**Good/Moderate/Poor**			

General description of the seabed on screen						
Seabed Types (refer to photographic guide and circle as many as necessary)						
Rocky Reef	**Boulders**	**Cobbles and Pebbles**	**Mixed Ground**	**Sand and Gravel**	**Mud**	**Artificial structures**

Marine life on seabed (refer to photographic guide and circle if present)	
Large Erect Kelp	**Sediment with life (burrows/tubes etc.)**
Mixed Seaweeds (red, brown, green)	**Barren Sediment (no life or burrows/tubes)**
Living Reefs (e.g. Maerl, Honeycomb Worms)	**Encrusting Animals on Rocks (short < 10 cm e.g. flat sponges)**
Animal beds (e.g. mussels, brittlestars, oysters – name if possible)	**Erect animals on rocks (tall > 10 cm e.g. dead mans fingers)**

Features or species of interest (Species you have seen or been asked to look out for e.g. slipper limpets)	
Time / Position	**Note**

Guide to filling in the Video Survey Log Form

The Video Survey Log Form has been designed to record all of the key information that will help inform an environmental assessment but still be filled out quickly while at sea by someone who is not a trained biologist or surveyor.

If you can copy down the coordinates from your GPS and tell the difference between rocks and sand, and spot a small number of signs of marine life you will be able to fill this form out.

It is recommended that you either print from your PC or photocopy enough forms so that you have one for each video survey station

Tip
From experience we have found that if survey forms are filled out using a sharp HB pencil they can survive getting wet – important if you don't want to loose a whole days survey information!

The Video Log Form:

Site Name this is the name of the general area of your proposed shellfish farm operation, e.g. 'Area of seabed east of Eel Point' (you only really need to fill this out on the 1st sheet).

Site Name ... Area of seabed east of Eel Point **.....** **Date.....**7th October 2007**.....**

Video Station Number gives each location from your survey plan its own number.

Warp Length is the length of warp that you have in the water attached to the camera sledge/frame. This will very likely be different to the water depth because of the layoff caused by the drift of the vessel. This can be used to calculate the difference in position of the camera from the GPS if necessary.

Time, **Depth** and the position information (**Latitude** and **Longitude)** should be recorded from the GPS overlay at the beginning and end of deployment.

Video Station Number #1			**Warp Length** 22 m	
	Time on seabed (from GPS)	**Depth (m)**	**Latitude**	**Longitude**
Start	12:35	14	51° 39.005'	004° 42.596'
Finish	12:41	13	51° 38.995'	004° 42.583'
Video Quality	**Good/Moderate/Poor**			

Give an indication on the **Video Quality** of the picture on screen **Good/Moderate/Poor** **Good** – clear picture, **Moderate** – not clear but can determine seabed type, **Poor** – not clear and seabed type difficult to determine.

The '**General description of the seabed on screen**' box allows you to describe what you can see on the screen. There is no need to use technical language just use common names of animals and habitats.

General description of the seabed on screen						
The seabed is a cobble bottom with no weed. The cobbles are covered in white tubes and flat sponges.						
Seabed Types (circle as many as necessary)						
Rocky Reef	**Boulders**	**Cobbles and Pebbles**	**Mixed Ground**	**Sand and Gravel**	**Mud**	**Artificial structures**

There are a series of **Seabed Types** to circle – these will guide you into recording relevant information. These are fairly self explanatory but some require an explanation. See next page.

Seabed Types

Rocky Reef: this would be an area of bedrock.

Boulders: boulders to be loose rocks bigger than your head.

Cobbles and Pebbles: these can be considered as loose rocks bigger than a 50p piece and but smaller than a boulder.

Mixed Ground: this is when mixture of sand, gravel and cobbles are mixed together. If they are in separate distinct patches circle the individual seabed types

Sand and Gravel: this can include broken shell and pebbles less than 50p sized

Mud: this will appear dark and often quite smooth, it will stick to the sledge/frame if you use one.

Artificial Structures: any man made structures e.g. concrete blocks

Seabed Types (circle as many as necessary)						
Rocky Reef	**Boulders**	**Cobbles and Pebbles**	**Mixed Ground**	**Sand and Gravel**	**Mud**	**Artificial structures**

The next section asks you to record types of **Marine life of the seabed**. This has been designed to record common types of marine life that cover the seabed either on rocks or in sediments. You should circle these when these are the dominant marine life – refer to photographic guide.

Large Erect Kelp: these are large brown seaweeds that grow with a thick stem or stipe and stand up in the water with flowing fronds.

Mixed Seaweeds (red, brown, green): any seaweeds that occur on the seabed; likely to be a mixture of red, brown and green species.

Living Reefs: Some species of marine life form living reefs and these are often sensitive to fishing activity. The nature conservation agencies will provide you with ID guides should there be a likelyhood that they are present within the area of your survey.

Animal Beds: if the seabed is covered with a single species then it is referred to as an animal bed. You will have seen mussel beds but brittlestars, oysters and scallops may be seen in high densities at some sites. If you know what the species is make a note of it in the box.

Sediment with Life: any gravel, sand or mud that shows signs of life such as burrows, mounds or tubes. You may be able to spot the tentacles or siphon tubes of burrowing species.

Barren Sediment: any gravel, sand or mud where there are no signs of life at all.

Encrusting Animals on Rocks: animal species less than 10 cm tall such as encrusting sponges, sea squirts, anemones, and 'turf' forming species called small hydroids and bryozoans often cover rocky areas.

Erect Animals on Rocks: animal species taller than 10 cm such as erect sponges, large soft corals such dead man's fingers, and sea fans.

Marine life on seabed (circle if present)	
Large Erect Kelp	**Sediment with life (burrows/tubes etc.)**
Mixed Seaweeds (red, brown, green)	**Barren Sediment (no life or burrows/tubes)**
Living Reefs (e.g. Maerl, Honeycomb Worms)	**Encrusting Animals on Rocks (short < 10 cm e.g. flat sponges)**
Animal beds (e.g. mussels, brittlestars, oysters – name if possible)	**Erect animals on rocks (tall > 10 cm e.g. dead mans fingers)**

You may have been asked to look out for particular species of interest by the official body carrying out the environmental assessment (they may have also provided you with pictures or descriptions to assist you) and space is provided at the bottom of the form to record these.

Site Name ... Area of seabed east of Eel Point **.....** **Date.....**7th October 2007**....**

Video Station Number #1			**Warp Length** 22 m	
	Time on seabed (from GPS)	**Depth (m)**	**Latitude**	**Longitude**
Start	12:35	14	51° 39.005'	004° 42.596'
Finish	12:41	13	51° 38.995'	004° 42.583'
Video Quality	**Good/Moderate/Poor**			

General description of the seabed on screen
The seabed is a cobble bottom with no weed. The cobbles are covered in white tubes and flat sponges.

Seabed Types
(refer to photographic guide and circle as many as necessary)

Rocky Reef	**Boulders**	**Cobbles and Pebbles**	**Mixed Ground**	**Sand and Gravel**	**Mud**	**Artificial structures**

Marine life on seabed
(refer to any photographic guidance supplied by regulator or conservation agency and circle if present)

Large Erect Kelp	**Sediment with life (burrows/tubes etc.)**
Mixed Seaweeds (red, brown, green)	**Barren Sediment (no life or burrows/tubes)**
Living Reefs (e.g. Maerl, Honeycomb Worms)	**Encrusting Animals on Rocks (short < 10 cm e.g. flat sponges)**
Animal beds (e.g. mussels, brittlestars, oysters – name if possible)	**Erect animals on rocks (tall > 10 cm e.g. dead mans fingers)**

Features or species of interest
(Species you have seen or been asked to look out for e.g. slipper limpets)

Time / Position	**Note**
12:39, N51° 39.001 W 004° 42.586'	Patch of erect sponges

Overview of equipment for video mapping of the seabed

Because of the variety of different requirements likely to be encountered at different sites (depth of water being the most important) we have not attempted to specify a system. If you are considering carrying out your own survey it is assumed that you have some technical expertise and are confident in being able to operate this equipment.

Underwater video equipment used by survey companies and governmental agencies may cost many thousands of pound. These organisations require high resolution cameras capable of descending to great depths.

However, For the purpose of basic habitat mapping in relatively shallow water it may be possible to obtain adequate results with more simple systems which can be purchased relatively cheaply from the internet and specialist suppliers. These are often marketed as fishing aids for anglers.

A brief search of the internet revealed underwater video systems rated for a depth of 20 m depth complete with a monitor for under £200.

Photo © Marcum Technologies Inc.

Other options are available from CCTV suppliers who sell high resolution submersible inspection cameras commonly used by plumbers and drainage engineers which are depth rated to 50 m for under £150.

For depths deeper than 50 m specialist underwater video equipment will be required. It is usual to mount these cameras on some form of mounting **frame** known as a **sledge**.

Photo © RF Concepts Ltd.

Lighting for underwater video cameras may be expensive but modern cameras are very sensitive and some systems come with integral lighting so unless there is no natural light a pair of diving torches fitted to the sledge or frame are probably going to be sufficient. These may range from £20 - £50 each and may be fitted in a variety of ways – preferably with some angle adjustment to allow you to obtain the best pictures.

Photo © Andy Woolmer Salacia-Marine

Photo © Nocturnal Lights Inc.

It is usual to mount these cameras and lights on some form of mounting **frame** or **sledge**. This can be a simple frame cheaply fabricated from mild steel or can be a quite sturdy structure made from stainless steel or aluminium. Small frames and sledges can be hand hauled from a small boat; larger sledges require a winch or a hauler.

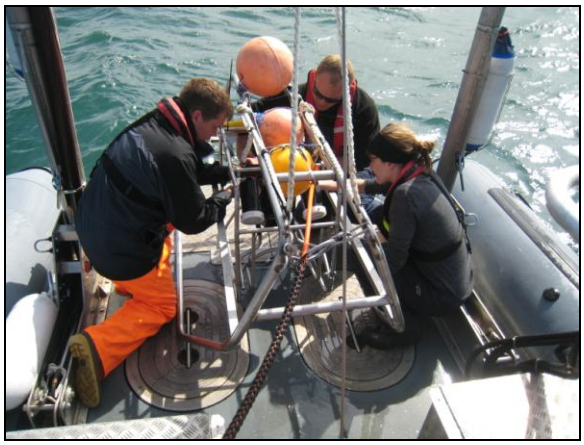


Photo © Rowan Holt CCW.

Photo © Marine Institute Ireland.

See the next pages for detailed views of a basic frame and sledge.

Overview of a basic 'Drop-down' frame

Probably the simplest method of mounting and deploying a video camera is the 'drop-down' video frame. Drop-down video frames are simple cages that provide a stable platform from which to take video images and which protect the video camera and lights from damage.

Photo © Ron Jessop EJSFC

As the name suggests 'Drop-down' frames are designed to be lowered to the seabed from the vessel in order to video a downward view of the seabed. These frames can be moved along the seabed in shallow water by a series of 'jumps' helped by hauling on the warp by hand.

Photo © Rowan Holt CCW

Photo © Rowan Holt CCW

'Drop-down' frames are best deployed at slack water times or in weak tidal streams although the addition of weights can assist their stability on the seabed if the vessel is able to maintain position.

Overview of a basic photo sledge

This basic photo sledge was fabricated by a local light engineering firm from stainless steel but could have been made from mild steel and galvanised or painted.

The sledge sits on a pair of runners with attachment bolts for weights should they be required to keep it on the seabed.

Photo © Mark Pole SWSFC

The light and camera are mounted on a swinging assembly which allows the user to change the angle of the camera to obtain the best picture of the seabed.

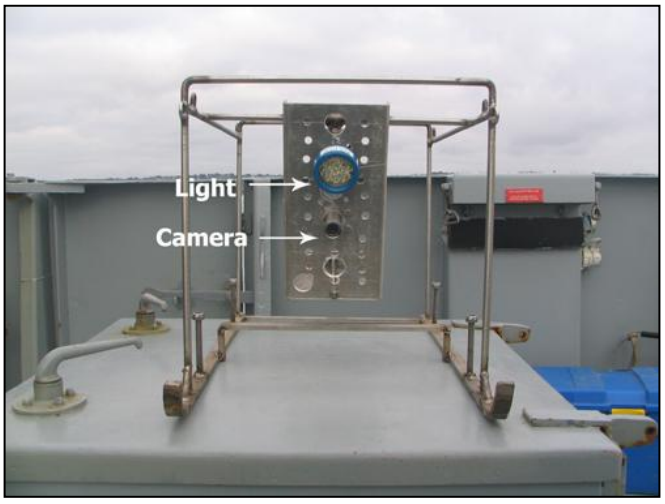
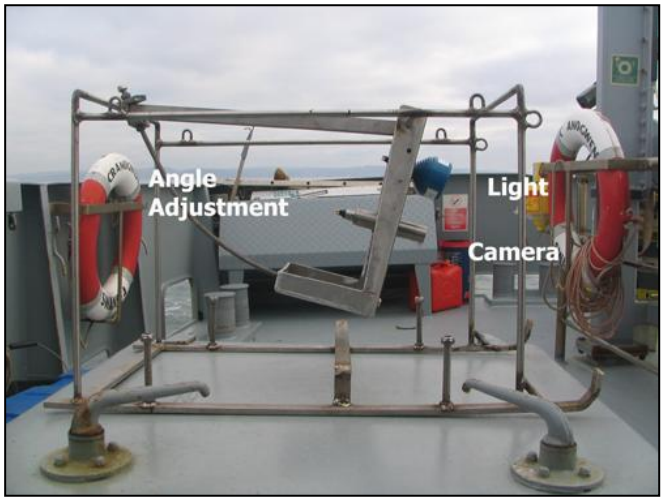


Photo © Mark Pole SWSFC



There are sufficient attachment points for towing bridals on the front and top of the sledge.

A small float or buff is often attached to the rear of the sledge to help keep the sledge upright when dropping to the seabed.

The camera cable should never be used to lift or tow the sledge.

Photo © Mark Pole SWSFC

Video recording devices range from a basic **VHS** recorder to modern personal **Digital Video Recorders (DVR)**.

Photo © Optovision

The cost of a personal DVR varies but you should be able to buy one from a computer store or the internet with a storage capacity of up to 30 hours video (over 30 gigabytes) for under £200. These come with a small integral monitor screen. The benefit with using a DVR is that the videos can be stored on a PC and copied to CDs or DVDs for back-up and distribution.

A home **VHS** or **DVD recorder** will do the job quite adequately and your storage capacity will only be limited to the number of blank tapes or disks that you have. You will have to use a portable television set as a monitor.

Integrated TV and VHS recorders are available which may be more convenient if space is an issue

Power requirements: You should consider how this equipment will be powered on the vessel; Digital Video Recorders are generally battery powered or can be powered by a **12v source** where as a home VHS or DVD recorder will require a **220v source**.

Photo ©
Andy Woolmer Salacia-Marine

A crucial part of the system is the **GPS overlay device** that records a GPS position onto the video picture coming from the camera. These small units are plugged into video camera cable and then into the video recorder. **By using one of these devices you are able to provide accurate locations of the seabed habitats to within a few metres.** These devices are available from internet suppliers for under £150.
Photo © TheBlackBoxCamera Ltd.

Care should be taken to keep equipment dry to avoid electric shocks

Sea Fish Industry Authority

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supporting the seafood industry for a sustainable, profitable future