

SURVEY PROTOCOLS 2018 advised by SNH

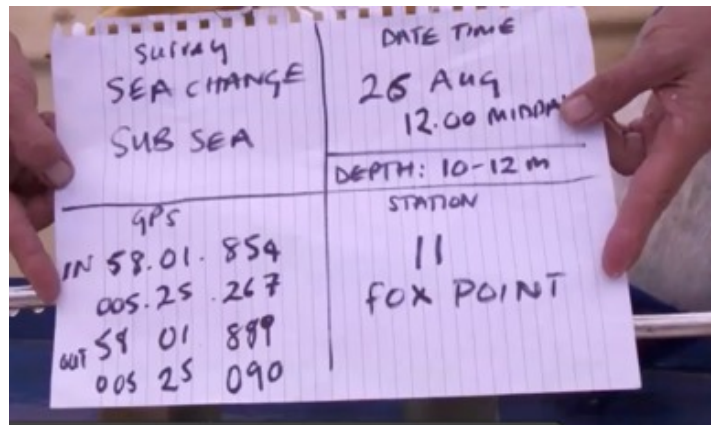
Clapperboard to film covering metadata.

The Metadata sheet shown below with the diver's **In-points etc** is filmed by the cameraman before going in.

The cameraman-diver's **Out-points and other information** can be recorded at the end of the dive on this metadata sheet and filmed - or carefully recorded in a note book for adding to the excel report spread sheet later. (useful to have plastic protective sleeves)

The metadata should be entered into a spreadsheet at the end of each day of the survey to avoid things merging / getting confused about what came from which dive etc. and also to secure a copy of the information in case the clapperboard-paper gets deleted / lost etc.

Note: Important for photographer-divers to set times / dates on the cameras so that these products match up with the recorded dive times / video slates etc. - so double check cameras are all set accurately.



The full information required for reporting to SNH is:

- 1 - NAME: Survey team - (eg SubSeaTV/ Sea Change/SCFF)
- 2 - DATE & TIME for in/out point
- 3 - GPS position 'In point' / out point
- 4 - DEPTH 'In point'/out point
- 5- STATION location and Dive no.

information to at end of dive

- 7 - GPS out **
- 8 - Depth out
- 9 - Time out

Other info for reporting on excel spread sheet

- 10- Divers name ([record to accompany any data products \(e.g. video clips or still images\)](#))
- 11 - Length of dive recorded - worked out later and put in notes if not at time.
- 12 - Comments and helpful information to remind and assist of important details.

Excel report spread sheet example.

STATION	SEA CHANGE SUB SEA SURVEY	TIME START	TIME END	POSITION START GPS 90086	POSITION END	DEPTH START 90	VIDEO NOTES - PLEASE NOTE THE CAMERA TIMER IS RECORDING TIME 1 HOUR AHEAD OF BST WHICH IS NOTING RECORDED IN THE FILE.
ANDY JACKSON DIVER-CAMERAMAN FOR ALL DIVES with Ali Hughson or Sandy MacKenzie							
Notes and GPS taken by Sara Nason from Ali's Hughson Boats gps markers - average dives 20-30 mins. Then Bill Wilsons GPS hand held							
Ali Hughson, Andy Jackson, Sandy MacKenzie							
ANDY DIVE 1	22nd August 2016	11:43 am (camera in slightly later than recorded on camera metadata)	12:15	57.58.078 N 005.26.427W	57.58.077N 005.26.443W	Dive depth 23 Meters	Dive - just past High water 5.1 Tide near Bottle Island North. relatively short distance travelled from in point filming maerf near close to the South Island of Cam Dues in area SNH identified maerf - Commissioned Report No. 764 Upper Loch Fyne and Loch Goll pMPA and Wester Ross pMPA - the identification of conservation management areas to support protected feature recovery. Not in great condition.
ANDY DIVE 2	22nd August 2016	14.00	14.44	57.57.461 N 005.21.555 W	57.57.457 N 005.21.560 W	15 meters	1/2 tide, Cam Skerries (Andy with diver following carrying GPS balloon) - waves of maerf. According to Ali Hughson this area has very old maerf with skeleton's built up over centuries but we did not identify this spot when Ali recorded IN point 57.57.455 N 005.21.496 worth returning
Ali Hughson, Andy Jackson, Sandy MacKenzie							
ANDY DIVE 3	23rd August 2016	11:40am	12:52	57.58.756N 005.19.170W	57.58.745 005.19.152	13meters	Planet Rock (Mary Rock) Andy camera Dive with GPS tracker - which came up before Andy did as Sandy's the support divers suit leaked however andy was only about 10m south from his IN point when he came up. (wide angle lens)
ANDY DIVE 4	23rd August 2016	13:45pm	14:03	57.58.733N 005.15.494W	57.58.721N 005.15.488W	16.7 meters	Martin Bank - Andy dived and came up according to the tracker balloon 30-50 meters from in point swimming southwards from in point along late martin bank. We had tracker balloon on which shows a southward track for shorter than 50 meters but the balloon is not always directly overhead.
ANDY DIVE 5	23rd August 2016	15:20pm	16:00	57.59.116N 005.20.217W	57.59.100 005.20.259	25 meters end depth was 12m	Horse Island Shellfish Site. Andy Dived from 25meters towards shallows of 12 meters depth with GPS tracker balloon Sandy support diver - GPS balloon up a few minutes before Andy but not much. 40 min dive.
ANDY DIVE 6	23rd August 2016	5:20pm	Aborted dive			27-30meters	58.01.626N 005.24.293W Dive aborted due to visibility. No filming, possibly due to 'dirty water' or algae bloom?
24th AUGUST Ali, Andy, (Ken Walton skipper)							
ANDY DIVE 7	24th August 2016	10:19 am	10:58	58.00.228 005.26.871	58.00.228 005.26.871	7m	Small cave around the corner from Cathedral Cave - we dubbed "False Cathedral's Cave" GPS in point a little rough as we dropped divers at a distance from the cave entrance. Ali recs, Andy dived.
ANDY DIVE 8	24th August 2016	11:34am	12:20	58.00.262 005.27.001	58.00.262 005.27.001	7m	The real Cathedral Cave - again both Andy and Ali were dropped at a distance and divers swam in.
ANDY DIVE 9	24th August 2016	trancept	13:35	14.18 58.01.810 N 005.24.381 W	58.01.863 N 005.24.296W	22m to 4m	Dorney formerly Dredge Site Ali H and Andy J (Ali filmed this area in summer 2015 as evidence when dredger went through the Voluntary exclusion zone - (end point see photo of orange marker balloon.)

ADDITIONAL SNH ADVICE TO NOTE:

- When survey diving - keep camera switched on continuously when recording across different habitats
- Cameraman to film time and depth gauge where habitats change (e.g. up a depth gradient) is also useful - this can be as simple as the diver recording a clip of their depth gauge occasionally or at key habitat markers or when recording something noteworthy
- Ideally an exact GPS marker is useful if possible for key findings.
- References to local markers; underwater features etc. within the Excel spreadsheet are useful for future / repeat fieldwork but are less meaningful for third parties in terms of trying to define end positions etc. to aid the analyses.

GPS TRACKER BALLOONS - (a useful reminder from last dive)

If using GPS tracker balloons attached to a dive balloon on a wire taken down by second diver to mark the cameraman's position. Remember to **Set the IN POINT** and switch on and **switch off** when the dive is over so it is just the dive that is recorded and not the boat travel. Ensure diver no 2 stays reasonable close to main dive cameraman so this tracker balloon records the relevant data for what is recorded on camera.

OTHER AID MEMOIRES

It is helpful to film above sea level markers and locations on land if there is an need to double check positions. My experience is this was really helpful later as I could verify each dive site and it can get complicated remembering.

REPORTING:

See **EXCEL reporting sheet above:**

- Confirm that the depth is below sea level (BSL) rather than below chart datum (BCD). Either is absolutely fine and if taken from a dive computer or boat depth sounder on the day then it will be BSL so could just add this in brackets after the depth e.g. 10-12m (BSL).
- Confirm the datum used on the different GPS systems - usually WGS84 if from a boat.

ALSO USEFUL

- It's also helpful to add to the excel reporting sheet photos of the dive positions marked on charts for easy visual reference. See photo of chart below
- It also helps SNH if for each dive the video clip reference no.s are recorded on the excel sheet (from camera clips see shot list below so you can see its quite simple as cameraman supplies) This was not done for the sheet above but is helpful.
- Still image's (numbered and assigned to each stations and the photographer named (if different from the recorders) and whether the imagery has any copyright use constraints; and perhaps a few summary notes on what was seen (to tie the records together).



Photo 1A marker balloon out point



CAMERAMAN's SHOT LIST

814	2	5:25	11	Clapper board reference	HORSE shellfish site starts	HG7	UHD XAVCI Custom
815	2	5:25	11	Squid lobster hiding under a rock in a cloud of silt		HG7	UHD XAVCI Custom
816	2	5:25	18	Closer view of squid lobster hiding		HG7	UHD XAVCI Custom
817	2	5:25	11	Cushion star, see squirts and juvenile fish		HG7	UHD XAVCI Custom
818	2	5:25	11	Pen of boulders, kelp and juvenile fish		HG7	UHD XAVCI Custom
819	2	5:25	11	Not sure what this is, egg mass??		HG7	UHD XAVCI Custom
820	2	5:25	11	Swim over showing more eggs?? Ends with starfish and cushion star		HG7	UHD XAVCI Custom
821	2	5:25	11	Edible crab with antenna hydroids in the background		HG7	UHD XAVCI Custom
822	2	5:25	11	Closer view of edible crab, water silty		HG7	UHD XAVCI Custom
823	2	5:25	11	Juvenile scallop, finger introduced for scale		HG7	UHD XAVCI Custom
824	2	5:25	11	Juvenile scallop		HG7	UHD XAVCI Custom
825	2	5:25	11	Cushion stars and northern feather stars group shot		HG7	UHD XAVCI Custom
826	2	5:25	11	Cushion stars and northern feather stars group shot		HG7	UHD XAVCI Custom
827	2	5:25	11	Cushion star feeding on egg mass?		HG7	UHD XAVCI Custom
828	2	5:25	11	Edible crab on ledge		HG7	UHD XAVCI Custom
829	2	5:25	11	Northern feather star		HG7	UHD XAVCI Custom
830	2	5:25	11	Juvenile scallop		HG7	UHD XAVCI Custom
831	2	5:25	11	Juvenile scallop swims		HG7	UHD XAVCI Custom
832	2	5:25	11	Albino northern feather star??		HG7	UHD XAVCI Custom
833	2	5:25	11	Closer look		HG7	UHD XAVCI Custom
834	2	5:25	11	Razor shell moving out of it's burrow - never seen this before!		HG7	UHD XAVCI Custom
835	2	5:25	11	Starts with spiny starfish, ends with harbour crabs, male protecting female		HG7	UHD XAVCI Custom
836	2	5:25	20	Closer view of harbour crabs		HG7	UHD XAVCI Custom
837	2	5:25	11	Juvenile fish amongst kelp		HG7	UHD XAVCI Custom
838	2	5:25	11	Edible crab on coarse sand		HG7	UHD XAVCI Custom
839	2	5:25	24	Closer view of edible crab on coarse sand		HG7	UHD XAVCI Custom
840	2	5:25	11	Very shy harbour crab hiding in weed		HG7	UHD XAVCI Custom
841	2	5:25	11	Edible crab walking	End of HORSE island shellfish site dive	HG7	UHD XAVCI Custom

FURTHER NOTES ON EXCEL SPREAD SHEET REPORTING

- There can be additional information in the cameraman's video files that could usefully be pulled out to supplement that provided in the Excel spreadsheet. Time of dives and depths recorded on the camera footage later can be helpful to SNH as they have to process the footage first and their capacity for this has limits.
- It is essential that the basic metadata for all of the stations be checked. SNH can't make judgements about what is actually correct if they didn't participate in the fieldwork. Photos showing a dive site marked on the chart helps as an *'aide memoir'* and also highlights the value of these annotations for helping to QA data after the fieldwork is completed.
- When possible a GPS tracker data would help cross-checking.

ADVICE FOR SURVEY TRANSECTS

- In terms of establishing monitoring transects with the aim of assessing changes in habitats over time, SNH would normally recommend that shorter runs (25 / 50 / 100 m in length depending upon habitat and likely tidal conditions) be established in a single depth band / on the habitat of interest.
- Ideally, for biotope assignment purposes, it would be better if the divers generate longer clips (4-8 mins) for each site that characterise the wider area whilst also showing the substrates etc. Additional shorter clips that add resolution to the biotope assignment could be included but multiple clips of charismatic species are not required and would not need to be supplied etc. **In practical terms, this might just entail the diver doing some 'swim overs' first before starting to capture nicer promotional footage.**
- The above approach relates primarily to 'spot dives' where the diver remains within a single depth band / habitat. Where the diver swims a longer distance covering multiple habitats, whether up a depth gradient or not, multiple clips of sufficient duration would be required from each 'zone'. Information on the depth of each zone should be included (**capturing footage of the divers depth gauge at least once but preferably either side of the zone**). If the diver is using an SMB, consideration might also be given to signalling any surface cover vessel to take a way point on a pre-determined signal to record the position of different habitats along a transect but this is only really essential on very long transects or where trying to determine the extent / boundary of a particularly exciting feature. An example from the 2016 study is site 5 (Horse Island) which goes from 25 m to 12 m. On this dive the seabed habitat changes from boulders and bedrock to coarse sandy sediments but without any real indication of where along the swim line / at what depth.
- When filming for survey / biodiversity recording purposes (by divers or drop-down video systems) the camera is often running all the time so the transitions in habitats are clearer and these are seen in the context of the overall dive (but the footage has much lower potential for use in promotional materials). The lack of certainty about position / location is undoubtedly greater when the filming is focussed on the collection of promotional clips because the camera is turned off when moving around.

- The start and end of the transect position should be marked in some way (a marker post etc. - see Figure 7). We've also learnt that regardless of the design of the marker posts (metal road pins, curly fencing poles etc.) they should also be labelled in some way to identify that they are part of a scientific / monitoring study or they risk being removed as 'useful' by divers for other things. For the purposes of the monitoring survey, a line / tape measure can be used between the markers to provide a quantifiable scale and to focus the collection of video footage on either side (often 1 or 2 m either side of the line so a known area is filmed).
- Quadrats are also really essential to provide finer resolution information - these can be photo'ed / filmed at randomised locations (pre-determined relative to the tape line). Such an approach would add integrity to monitoring design compared to the 2016 approach where 'parts' of a far longer distance were filmed, unconstrained to a straight line and with distractions' (e.g. the octopus ;-). Realistically, the 2016 video transects are not 'repeatable' (even if the basic start / end positional issues for site 11 are resolved).

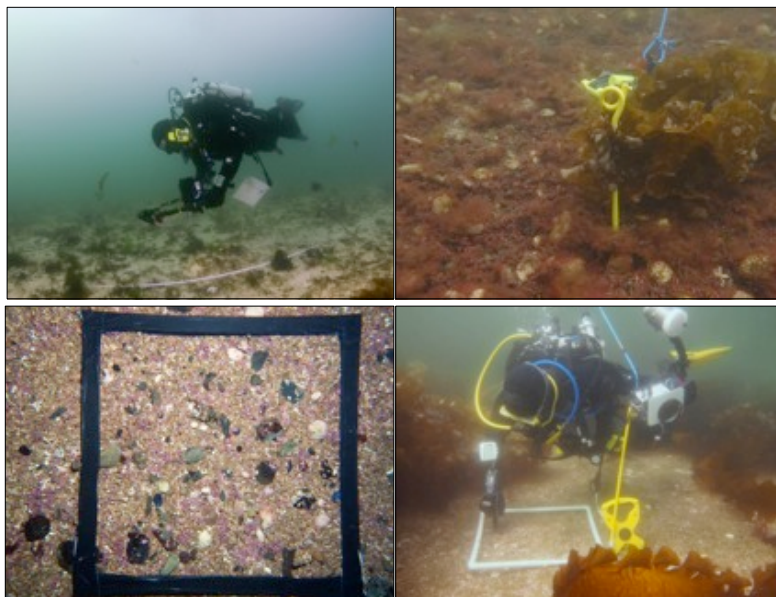


Figure above Examples of diver monitoring transects and quadrats from the Sound of Barra SAC, South Arran NC MPA and Loch Carron NC MPA showing relocatable marker posts and tape lines.

The 2016 footage from the 2 transects could have benefited from the camera being deployed a little higher off the seabed and angled down somewhat to enable clearer (and slower) shots of the seabed (compare the quadrat perspective above with screen grabs from runs on sites 9 & 11 shown in Figure 8 below).

It is entirely valid to establish transects in the modified and slightly deeper habitats present at the start of the site 9 (Dorney) transect to look at future change (SNH plan to do work here as part of an EMFF project in 2018) but there is less direct evidence that maerl habitats were formerly present here.



Figure 8 Screen grabs from August 2016 Sea Change & SUBSEA TV dive monitoring transects in Wester Ross MPA.

EXAMPLES OF ADVICE RELATING TO 2016 DIVE SITES

Site 11 Foxpoint is certainly a good location, being largely focussed within a single and suitable depth zone with clear signs of habitat modification (broken ocean quahog shells etc.) and with maerl substrates present. The site 9 Dorney transect traverses across a number of habitats and depth zones but without clarity on exactly where / at what depths transitions occur etc.

It is entirely valid to establish transects in the modified and slightly deeper habitats present at the start of the site 9 transect to look at future change. However the video transects (at dive sites 9 & 11) will serve as a qualitative baseline against which coarse changes in seabed habitat composition (e.g. the presence of conspicuous species groups such as erect hydroids, anemones etc.) may be observed over time. It will probably not be possible to quantify the scale of any changes with confidence or to state categorically that these changes are a result of changes in fishing practices / the introduction of the MPA management measures due to the design of the sampling.

FURTHER NOTES ABOUT DELIVERY OF VIDEO CLIPS

As part of taking forward the data analyses, it would be good to ensure that work is targeted and designed and that associated data collation and management aspects are streamlined where possible.

Video footage - promotional vs. survey / monitoring and delivery of clips

- SNH commission external analysis of seabed video footage and the costs are based on the number of samples and overall footage duration. It would likely be considerably more expensive than needed if SNH were to pass on all clips as part of an analysis contract than if an initial filtering step were to be applied. (i.e remove promotional material of charismatic species shot for film making purposes) However, this clearly has person time requirements for either Sea Change or SNH.
- Video clips need to be converted to an accessible format for any subsequent analysis contract.

SNH commissioned analyses of survey data

- If SNH pay for the external analysis of survey data we look to retain copyright ownership of the derived products (basically the species and habitat / biotope/ substratum assigned to the records). The copyright of source video would remain with SUBSEA TV/Sea change/ SCFF as originators where relevant. Sea Change and SUBSEA TV would be identified in the metadata as the source of the video / survey data which would also be named accordingly.
- SNH seeks to retain copyright of the derived products in this way so that we can manage and mobilise the data freely under Open Government licence terms. The derived data would be mobilised to portals such as NMPI and be made available for download from SNH web pages. After completion of the analysis contract, SNH would not retain a copy of the source video footage and would direct any enquiries to you / other named contacts as appropriate. SNH would expect the source video to remain under management of Sea Change and SUBSEA TV as originators so enquiries relating to the derived data can be serviced; should the originators not be able to resource this the source video must be archived in a MEDIN accredited Data Archive Centre (SNH can provide relevant contact details if required). SNH would seek confirmation that these data management requirements are acceptable to Sea Change and SUBSEA TV before commissioning any analysis of source video.