

Procedural Guideline 1-2

Fixed viewpoint photography

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Background

Viewpoint photography involves taking photographs of a monitoring site, transect, biotope or other fixed area at intervals over time, at exactly the same viewpoint, to show visual changes. However, a number of potential pitfalls need to be avoided, and there are simple procedures that can help to produce more useful photographs. This guideline describes many of these features.

The surveillance method has been used extensively in an *ad hoc* and unsystematic fashion for many intertidal monitoring and surveillance programmes, but it can provide considerably more useful and impressive material if it is carried out systematically. It is used during the long-term annual rocky shore transect monitoring around the Sullom Voe oil terminal in Shetland (Moore *et al.* 1995), for which it provides very useful information to back-up semi-quantitative data which is also collected.

General advice on photography as a research tool is given by George (1980).

Purpose

Viewpoint photographs are most useful as supporting information for a more quantitative monitoring or surveillance programme. In particular, they provide very valuable visual information which can be used to support or refute evidence from quantitative data; help to show whether changes identified from monitoring in a small area are representative of a larger area; and provide information (in the form of visual clues) about other features that were not recorded (either forgotten or not easily recorded quantitatively) at the time of the survey (e.g. the movement of boulders and cobbles, the presence of silt, the amount of space between the barnacles, etc.).

The method is also very valuable for rapid inspection surveys in between more detailed monitoring surveys and can provide a record to check when a change started to occur. The technique is particularly suitable for use by non-biologist or marine biologist staff including site wardens.

Some qualitative and semi-quantitative attributes can be recorded from viewpoint photographs. In particular:

- extent of a biotope, e.g. for an intertidal eelgrass bed or mussel bed
- semi-quantitative abundance of highly conspicuous species, e.g. ephemeral green algae

Viewpoint photographs are also extremely valuable as an easily interpretable medium, for showing to non-specialists when explaining features that have been identified by other data.

Advantages

- non-destructive
- can provide information for large and small areas
- provides pictures – easier to interpret by anybody and can be more effective than data when explaining features to non-specialists
- can be carried out by non-biologists (e.g. local staff or volunteers)
- cheap and quick
- images are permanent (if stored properly) and can be interpreted at a later date

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Disadvantages

- does not provide any reliable quantitative data
- cannot be used reliably for species identification
- of limited use on biotopes that are overlain by algae
- image quality is greatly dependent on the prevailing weather conditions at time of survey
- comparisons can provide misleading information if light conditions or image quality is variable
- will not replace *in situ* quantitative recording
- difficult to apply subtidally

Logistics

Normal logistical planning required, as for any other intertidal survey. In particular, check tides, weather and site access.

Equipment

Key equipment

- SLR camera with an appropriate lens. A standard (50mm) lens is generally best, but a wide angle (e.g. 35mm or 28mm) can be most useful in taking whole shore photographs. Whatever focal length is used, it should be fixed (i.e. not a zoom lens), so that the angle of the view is the same every time.
- Colour print or slide film (400 ASA usually most useful to give flexibility with light conditions). Colour prints have been found most useful for comparison.

Other useful equipment

- tripod – to get good stable images from a known fixed height (particularly in low light conditions)
- Polaroid camera and film – to take instant photographs which can then be annotated on site
- waterproof pens (fine tip)
- portable GPS navigator – to take aid position fixing
- access to good colour photocopier (with slide attachment if appropriate); or slide scanner and colour printer
- access to laminator

The polaroid prints are marked with the waterproof pen to show the precise location where the photographer is to stand, the location of sites for close-up photographs and any conspicuous objects or features to line-up for positioning.

Personnel/time

Personnel required

- one capable photographer – experience at taking landscape photographs preferred
- one assistant – primarily for safety back-up (it's easy to fall over when you are walking along while looking through a camera lens!); can also be useful for pointing to important features in the photograph

Best time of year

Primary consideration is the amount of light, but there are no particular seasonal requirements. However, for intertidal viewpoint photography the time of low water spring tides may be a limitation during the winter months. Spring months are often best avoided because of barnacle spat settlement and other rapid changes in shore communities. Whatever time of year is chosen, repeat photography is best carried out at the same time.

Note: The repeat photography will also be much better if it is carried out at the same time of day as the initial survey, because the direction of lighting determines the position of shadows and the general appearance of the shore.

Method

In conditions (of tidal height, weather, time of day) as similar as possible to those of any previous survey, return to the exact location from which photographs were taken previously and, using those photographs for reference, re-take the same views using the same focal length lens and film speed as previously.

Initial survey

- (1) First choose subjects and a viewpoint according to the objective of the study. This choice should not be rushed. Move around the site looking at it from different angles before choosing. On rocky shore sites photographs are typically taken with a view up the shore, down the shore, across the site and then of particular biotopes or areas of interest.
- (2) Choose a lens of suitable focal length. If at all possible, use a standard 50mm lens. If you are using another lens, note the focal length used for each shot. Put the camera on a tripod if you find it easier or if light conditions require it.
- (3) Try to ensure that important features which happen to be of similar colour, texture and shade will be distinguishable in the photo, because the 3D perspective you have when you are standing in the field will not be so obvious in the photograph (for example, a view of an overlapping series of rock ridges can look like a single piece of rock).
- (4) Try to frame the photo in such a way that it will be easy to re-frame the same view on a future occasion; for instance, try to have distinguishable features in the foreground, background and at the edges of the view. Best of all, try to line up an object on the skyline with a sharp feature in the foreground. If you have more than one aid to re-framing in the photo it will help you to re-position yourself very quickly (and it will check that you have the correct focal length lens).
- (5) If you think that it may be difficult to relocate the viewpoint, you may need to take a photograph of the place from which you took the viewpoint photograph. This is best done with a Polaroid camera, because you can then annotate the Polaroid photo on site (X marks the spot).
- (6) Take photograph. Bracket exposures if you are not sure if all features will come out.
- (7) It may help to locate important features (site markers, biotope boundaries, re-framing features, etc.) in the final photograph if you also take a Polaroid photograph of the view at the same time and then annotate it with a fine-tip waterproof pen. These can then be copied to the proper photograph after the film has been processed.
- (8) Make any necessary notes, sketches and GPS position fixes to ensure that you can find the site again. A record of date and time is also a good idea (these will be recorded on the GPS).

Processing

- (1) Have the film developed and printed, then label all originals on the back as soon as possible. The label should include date, location, film number, and frame number. Do not use water soluble pens. Label and store negatives.
- (2) Get a set of prints (standard 6" x 4" are normally adequate, but larger sizes can be useful) of all viewpoint photos that will be used in the field. Do not use originals in the field. Colour photocopies are often cheapest and easiest.
- (3) Annotate prints to aid identification of important features (as in point 7 above). The prints can also be incorporated into detailed site location sheets with maps, grid references, site and methodological details, etc.
- (4) Have these prints laminated or otherwise waterproofed.

Repeat survey

- (1) Plan the survey for, as near as possible, the same time of year (unless intentionally more frequent than annually), and the same time of day and tide as the initial survey.
- (2) Use camera with same focal length lens.
- (3) Locate general viewpoint position using all clues.
- (4) Look through viewfinder and then check back and forwards between viewfinder and the annotated photograph to line up all features. Take care to get it right – a quick snap from ‘about the right place’ is not good enough. It can take some time to see the features on the rock that are shown in the photograph.
- (5) Re-take the photograph and make a note of the frame number.

Processing (repeat survey)

After the film has been developed and printed, label all prints on the back as soon as possible. Label

should include date and location (and preferably film number, and frame number). Do not use water soluble pens. Label and store negatives and prints.

Data analysis

Photographs can be displayed (or projected) side by side for easy comparison.

There are various methods of measuring the area of a feature in a photograph (e.g. using grids, point screens, computer image analysis), depending on the degree of accuracy and precision required.

Photographs can be used in presentations or reports for illustration.

Accuracy testing

The only potential concern is for photographs to be taken from the wrong position. It is normally obvious if this occurs and accuracy testing is not considered necessary. If there is any doubt, have a suitably experienced and independent person view and assess the photographs.

QA/QC

It is essential that photographs are taken from exactly the same position each time, using the same focal length lens. Good site location information and instructions for each viewpoint photography site, which anyone can understand, are therefore required. Sufficient time must be allowed for relocation of viewpoints.

It is difficult to cater for the weather conditions, but if good quality images are an important feature of the survey, it may be necessary to wait for suitable conditions before the viewpoint photography is carried out. The best conditions are bright diffuse light on a dry day. Very bright directional side lighting is often worse than low light and wet weather, because the contrast between shadows and highlights can make the photograph almost useless for comparison with images taken in other conditions.

Photographs and negatives must be fully and accurately labelled as soon as possible after the survey.

Data products

The method will produce a collection of photographs (preferably prints and negatives) which need to be stored in a dry place, out of the sun.

Cost and time

Camera hire rates can vary, but are often around £5/day for a standard land camera. Film cost, including processing, may be around £10 per 36-exposure film.

This method is normally used in conjunction with another more quantitative survey method. On this basis, a survey of a typical rocky shore site, with five or six viewpoint photographs, would require an additional 15–20 minutes on site for the photography (for the initial survey or a repeat survey).

Labelling the photographs, after they have been developed and printed, can take 30–45 minutes per film.

Comparison of photographs may only require a quick scan and a couple of notes, or a more detailed measurement of area.

Health and safety

Appropriate safety procedures for shore surveys must be followed, especially with regard to protective clothing and careful use of tide tables, taking account of local conditions to avoid being cut off by the tide.

Photographic viewpoints must not be established at dangerous positions such as the edges of cliffs.

References

- George, J D (1980) Photography as a marine biological research tool. Chapter 3 of: Price, J H, Irvine, D E G and Farnham, W F (eds) *The Shore Environment. Vol. 1: Methods*, pp. 45–115.
- Moore, J J, Taylor, P and Hiscock, K (1995) Rocky shores monitoring program [Sullom Voe, Shetland]. *Proceedings of the Royal Society of Edinburgh*, **103B**, 181–200.