Seasearch final report, May 2021.

Seasearch England: Scoping report for mis-placed records and other errors.

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1 INTRODUCTION

1.1 Seasearch

Seasearch is a volunteer underwater survey project for recreational divers and snorkellers to record observations of marine habitats and the life they support. The information gathered is used to increase our knowledge of the marine environment and contribute towards its conservation. In its earliest incarnation, Seasearch coordination came under the remit of a Steering Group led by the MCS and comprising representatives from the UK statutory conservation bodies (CCW, EHS(NI), JNCC, NE, SNH), the Environment Agency, The Wildlife Trusts, the Marine Biological Association, the diver training agencies (BSAC, PADI, SAA, SSAC), Nautical Archaeology Society and independent marine life experts. In recent years, the project has been delivered in partnership by local coordinators under contract to the MCS and, in some areas, employees of the local Wildlife Trust. Overall coordination and financial under-writing of the project has been the responsibility of the Marine Conservation Society. Ongoing financial support comes in part from NatureScot (funding Seasearch activities in Scotland), Natural Resources Wales (ditto in Wales) and Natural England (NE; specific projects within England), as well as various other grants (restricted and unrestricted). Volunteer divers and snorkellers can participate in training courses and many dive surveys organized during the season. At present we do not organise snorkel surveys. For more information visit www.seasearch.org.uk.

The objectives of the Seasearch programme are to:

• Gather information on seabed habitats and associated wildlife throughout Britain and Ireland, by the participation of recreational SCUBA divers and snorkellers;

• Provide standardized training to enable volunteer divers and snorkellers to participate in Seasearch surveys;

• Ensure the quality of the data gathered;

• Make the data available through websites, reports, and publications;

• Raise awareness of the diversity of marine life in Britain and Ireland and its environment through participation of volunteer divers/snorkellers and dissemination of information.

The Seasearch programme has collected, maintains and uses almost 800,000 records of taxa or habitats. This exceeds the MNCR (jointly supplied by JNCC and English Nature/NE) with 593,313 taxon records. These records are broadly recognised as a robust and reliable source of data and information (e.g. Pikesley *et al.*, 2016), in part due to the careful and ongoing process of quality assurance (Appendix 1). Seasearch data have already been used effectively by statutory nature conservation bodies (SNCB) to support designation of marine protected areas (MPA), making use of information about distributions of features of conservation interest.

1.2 Marine Conservation Society

The Marine Conservation Society (MCS) is the UK Charity dedicated to the protection of the marine environment and its wildlife. Since its formation in 1983, MCS has become a recognized authority on marine and coastal conservation and produces the annual Good Fish Guide, the Good Beach Guide, as well as promoting public participation in volunteer projects and surveys such as the Great British Beach Clean, Adopt-a-Beach, Seasearch and Basking Shark Watch.

2 BACKGROUND

2.1 Marine Recorder terminology

This is the final report to NE of activity by Seasearch staff to identify and evaluate positional errors in English records held by Seasearch, with the intention of eliminating any errors early in FY 2021-22. This work has been partly supported by funds from NE, because of their need to use high quality data to meet obligations for monitoring and condition assessment of marine protected areas (MPA). Seasearch records are entered to and saved within an Access-based database called Marine Recorder (MR). To allow ready comprehension of the issues being addressed in this report, some relevant terms are defined here.

Observer records – records from an ‘observation form’ collected by divers or snorkellers qualified to observer or surveyor level. All data are linked to a single sample.

Surveyor records – records from a ‘survey form’ collected by divers qualified to surveyor level. Data may be linked to one or more samples.

Survey – collection of dives for a stated location or area over a stated time period (often a year).

Survey-event – falls within a survey and is usually a single dive of a stated duration.

Sample – data from a distinct habitat, within a single survey-event. Multiple samples (habitats) per survey-event may be recorded by Seasearch surveyors using a surveyor form.

Location – a named rectangular area of seabed with boundaries delineated by corner coordinates and described by general physiographic conditions. Each SurveyEvent has its own position but is also linked with a named Location. Any Location can contain one or more survey-events, each of whose position must fall within the boundaries of the Location.

Position – The latitude and longitude of a single survey event (and/or sample) using the WGS84 coordinate system.

MHWS – Mean High Water for Spring tides.

EOR – Extent of the Realm – nominally mean low water level (MLW).

2.2 Seasearch dataset

The Seasearch dataset and its extensive records of species and habitat have many potential and valuable applications. These all require the data to be robust and credible. Seasearch emphasises the importance of accurate position-fixing in its training, and the forms completed by the divers go through a number of stages of validation (Appendix 1) before the data are circulated to partners and stakeholders. Unfortunately, due to the primacy of human evaluation and input during this process, errors can enter the dataset. One mechanism that can detract from the credibility of Seasearch records is when the positional information for a record is clearly not correct; for example, the position for a marine species is located on land (creating so-called ‘dry’ records).

2.3 Dry records

Survey events could be 'dry' for several reasons.

1) The survey event was recorded as a line, with a start and end point. In such instances, Marine Recorder interpolates linearly between these two points to find the mid-point, which becomes the location for that survey event. Where the line follows a curving coastline, the mid-point can be on land.
2) Dives occur and are correctly recorded in habitats such as in tidal lagoons or under piers that can fall inside the MHWS polygon (i.e. the polygon is not always a perfect delimiter of where surveys can occur).
3) Locations are broadly correct, but identified using an imprecise system, e.g. location is incorrectly estimated from a chart or map with coarse resolution. When converted to WGS84 in degrees, decimal minutes, these locations plot above MHWS.
4) The location was recorded incorrectly when completing the survey form, e.g. through incorrectly set GPS, careless writing, use of different land boundaries (e.g. extent of the realm, which approximates low tide level), incorrect identification of survey location using map, chart or web-service.
5) The location was recorded correctly on the form, but subsequent errors were made during digitisation and data entry.

It may not be possible to distinguish between the last two of these.

2.4 Intertidal records

Another example of incorrect positioning, is where the record is shown as being intertidal (below MHWS, but above MLW), but the minimum depth of the dive is below chart datum (CD). This is a less serious error than being 'dry', but different species and particularly biotopes exist, between intertidal and subtidal conditions. It would be desirable to correct these where appropriate or possible. Survey-events that actually occur at subtidal depths, but show intertidal positions in the database should be repositioned such that the Latitude-

Longitude are seaward of the intertidal area. In addition, survey-events that correctly occur in intertidal space should be assessed against the classification of intertidal biotopes.

2.5 Remit

The remit of this final report is to set out the project objectives, to catalogue the corrections that have been made to Seasearch records against those objectives, and to describe additional changes that should be made in the future if time and funding permits:

The project objectives are:

1) to establish the extent of 'dry' records for England
2) to establish an objective process by which erroneous data identified in 1) can be corrected or improved (described in Methods)
3) to re-position dry-dives such that they are more correctly located below MHWS
4) create a record of what has been changed and why
5) to establish the extent of records that:
    i) are incorrectly placed in the intertidal zone (all depths below CD)
    ii) are correctly placed and are entirely in the intertidal zone (all depths above CD), but which have not been assessed against intertidal biotopes
    iii) may be correctly placed because they started or ended in the intertidal zone (minimal depth above CD)
    iv) Are incorrectly placed in the subtidal, but which should be placed intertidally (all depths above CD)

3 METHODS

3.1 Identifying dry records

'Dry' records were identified using the QGIS package (QGIS Long-term release 3.10.12). A polygon representing the area in England above the height of Mean High Water Springs (MHWS) was created by closing a high water polyline along the England-Wales and England-Scotland borders using a polyline of European Regions. These shapefiles are freely available in the Ordnance Survey Boundary Line product (https://www.ordnancesurvey.co.uk/business-government/products/boundaryline; Version Date 2020-10). The Boundary Line product relies on capture and maintenance to a generalised scale of 1:10,000.

Locations (as Latitude & Longitude using coordinate reference system EPSG:4326, WGS84) of Seasearch records were plotted against this MHWS polygon. Survey records were considered 'dry' when they occurred inside (i.e. above) MHWS (Fig. 1).

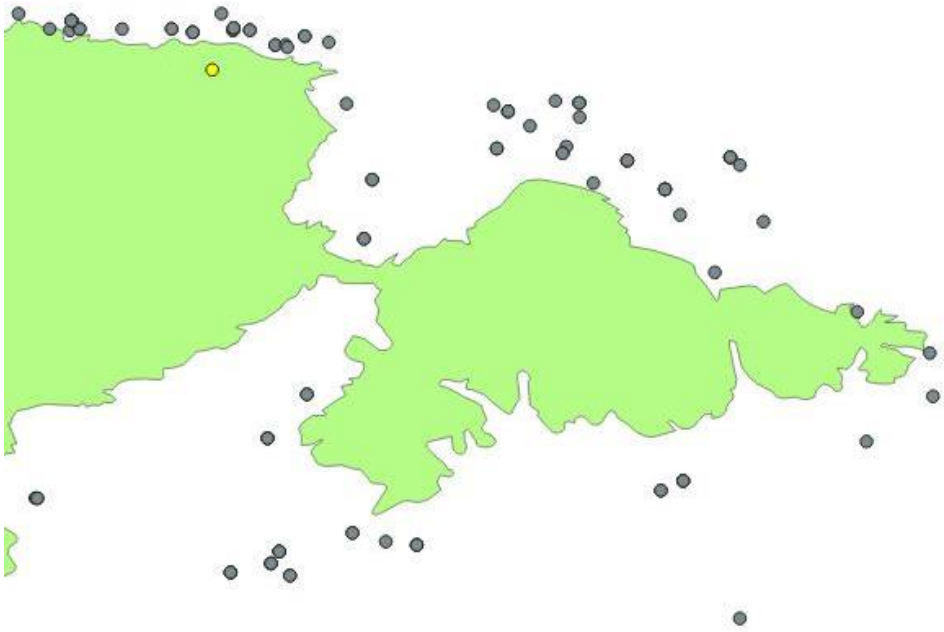

Figure 1. Locations of Seasearch dives; grey dots are dives that are marked as being below Mean High Water Springs (MHWS), the yellow dot is above MHWS and therefore, incorrectly, on land.

3.2 Correcting dry records

The list of 'dry' dives was processed in sequence, beginning with the oldest. For each dive, the original position in relation to MHWS was reconsidered given a range of information. The information available included the details on the original recording form (specifically the fields SurveyName, EventName, LocationName, Location description, SurveyEvent Comments, Sample Description, and Sample Comments), GIS layers for MHWS and bathymetry, aerial imagery from GoogleEarthPro and GridReferenceFinder online tools, plus expert knowledge from experienced record-verifiers for the area. This information was synthesised to allow the most likely position of the dive to be inferred. This new position was then placed as a marker in Google Earth Pro, which provides the Latitude and Longitude in Decimal Degrees, WGS84. Decimal Degrees was then converted to Degrees Decimal Minutes (DDM, a convenient format for input into Marine Recorder). A catalogue of the changes made to the data was prepared listing the new positions for each dry or otherwise erroneous SurveyEvent or Sample, along with an explanation of why and how the position was altered (see Excel spreadsheet England_Seasearch_data_cleaning_catalogue.xlsx appended to the report).

For line-type survey-events (on the **Event** page in MR), the **start** and/or **end** fields were updated with new positions in DDM format. Where necessary, the **Co-ordinate system** field was set to 'Lat Long (WGS 84)'. The **Derived from** field was set to 'Derived from Google Earth aerials'. The free-text field on the tab labelled **2. Description** was updated with text describing why and by how much the location was altered and whether the co-ordinate system was changed. The Marine Recorder database automatically records the date of changes and the identity of the person making the changes.

For each survey-event that was altered, positions of **all** samples were also updated. For samples in line-type survey-events (on the **Sample** page in MR), **start** and/or **end** positions were updated with new locations in DDM format. Where necessary, the **Co-ordinate system** field was set to 'Lat Long (WGS 84)'. The **Derived from** field was set to 'Derived from Google Earth aerials'. For line-type survey-events with a single line-type sample, the start and end of the sample was set as for the survey-event.

For point-type survey-events and their point-type samples: **start**, **Co-ordinate system**, and **Derived from fields** were updated as above.

3.3 Identifying intertidal records

The same mechanisms that cause dives to have 'dry' positions (Section 2.3) can also cause dives to have intertidal positions, but intertidal positions are not necessarily incorrect. It is possible and reasonable for Seasearch surveys (particularly by snorkelling) to be done partially or entirely in intertidal habitat. A subsequent assessment of survey positions that fall below MHWS but above the EOR was done in QGIS.

This is not a perfect process as the EOR line is only an approximation and often falls above MLW. Thus some proportion of intertidal dives will be missed. To my knowledge, a better alternative to the EOR polyline for England is not yet available. To eliminate the risk of double counting records that fall above MHWS and also within the intertidal area, survey events above MHWS were first eliminated using the 'difference' geoprocessing tool in QGIS (these have already been dealt with above). Remaining records were then checked to see if they fell within the polygons of the layer with intertidal habitats ('clip' geoprocessing tool).

Survey events that were entirely intertidal, i.e. all recorded depths were above CD (whether or not they were positioned in the intertidal area) were quantified. The number of these which were positioned inside (correctly) or outside (incorrectly) of the intertidal polygons were identified. Illogical depth entries (upper depth is deeper than lower depth) were also noted.

No changes to records with intertidal positions were made

3.4 Other errors

During the process of correcting positions, other types of error were identified.

a) It is also possible for records that are intertidal or subtidal to be incorrect because they are simply in the wrong position (e.g. through errors when completing the survey form or during data entry.) In instances where multiple dives are described as being in the same place or have the same event name, but where positional data differ, they can sometimes be picked up. Encountering these was purely

happenstance, but where identified, the erroneous positions were corrected. Otherwise, these are very difficult to detect in any systematic way because descriptions and names are free-text fields.

b) Errors are present where positions of Samples differ from the positions of the parent SurveyEvent. Detecting these is straight-forward for point-type SurveyEvents and is possible, but less easy for line-type or area-type events.

c) Mismatches between spatial-type for Samples and parent SurveyEvents. Point-type SurveyEvents should have all point-type Samples. Line-type SurveyEvents can have line- or point-type Samples and area-type SurveyEvents can have area-, line- or point-type Samples. Any deviations from these are errors and can be corrected.

d) Area samples. Area samples are not typically appropriate for Seasearch records given the small scale of survey and the level of accuracy achievable in determining positions. Nevertheless, quite a few instances of area samples exist in the dataset. The boundaries of the area are defined by the south-western and north-eastern corners. If the position of the north-eastern corner is entered as being west or south of the south-western corner, Marine Recorder is not able to calculate a centroid and the derived position of the record becomes nonsense.

e) Making corrections to the position of a SurveyEvent or Sample sometimes introduced an additional error where the new position fell outside of the boundaries of the associated location. This was remedied by increasing the size of the area describing that location.

f) Surveys with no SurveyEvents or SurveyEvents with no samples. This may be due to data entry not having been completed (through missing data or human error) or because of historic corruptions in the database. In either case, if the original records and forms can be located, it would be possible to re-enter the data, but this would be time-consuming.

g) Place-names can be misspelled leading to multiple apparent places, with (or without) the same position. This is less of an issue in England than in Scotland or Wales, where Welsh or Gaelic names may have multiple different Anglicisations. Where noted, misspellings can be corrected, but this is difficult to do in a systematic fashion. This is because the name fields are free-text and have no required or

enforced way in which to enter descriptions and so it is not clear how to filter or sort them.

h) Dubious taxonomic determinations.
i) Unrealistic depths, with values many metres above chart datum.

To avoid the possibility of creating duplicate keys and any subsequent loss of data when regional files are merged into a single file for England, all corrections were made using dedicated credentials provided by JNCC.

4 RESULTS

Objectives 1-4 were completed. Objective five remains incomplete because of issues encountered with boundaries defining the lower limit of the inter-tidal zone. Some of the additional types of error listed above were also corrected (items a, d, e & g), others were catalogued in preparation for correction in the future (items f & i) and the remainder were flagged as points requiring additional work (items b, c & h).

In England, between 1982 and 2019, there have been 648 Surveys, with a total of 11,222 individual SurveyEvents (dives) containing 16,483 Samples with a total of 29,795 biotope determinations and 361,263 species determinations.

In total, 1052 corrections were made to Seasearch records for England.

4.1 Objective 1.

Of these, 260 were for SurveyEvents that plotted incorrectly above MHWS (Table 1) i.e. were 'dry'. Within these SurveyEvents, there were 328 samples that plotted above MHWS. Regional breakdowns are shown in Table 1. Known exceptions are excluded from these counts. Exceptions can occur where positions are correct, but appear to be above MHWS. These can arise where dives happen in docks, lagoons, locks, sea caves or other aquatic features that are not included in the MHWS polyline and therefore appear to be dry.

4.2 Objective 2.

The procedure developed and applied to the data to correct dry dives is described in the Methods section above.

4.3 Objective 3.

All the dry SurveyEvents and Samples identified have been repositioned below MHWS, as close to the actual position as possible, as judged from available information. Any consequential mis-matches between the new positions of SurveyEvents and the boundaries of the Survey Locations were also corrected (see Section 3.4 point e). Corrected data, in the form of a snapshot, has been provided to NE and will be included in the July updates of the JNCC public snapshot and of the NBN Atlas.

4.4 Objective 4.

The changes made to the data are catalogued in the spreadsheet appended. Each altered record has an additional entry to the comment or description field describing the changes made (as per the procedure defined above).

4.5 Objective 5.

In many places, the Ordnance Survey Line named 'Extent of the Realm' did not provide a realistic or useful demarcation of the bottom of the intertidal area, often being well above chart datum. It was not possible therefore to gauge accurately the number of intertidal points (correctly positioned or otherwise). Counts of incorrectly placed intertidal records from the interim report are likely to be underestimates. These counts were also for positions of biotope determinations rather than for Samples. As multiple biotopes may be determined (due to partial matching) for any Sample, these counts may also be inflated relative to the number of SurveyEvents and/or Samples in intertidal regions. Thus, values from the interim report should not be considered realistic or representative.

The four components of this objective have not been completed, but we continue to develop better representations of the intertidal area that will allow more complete remedial work in the future.

4.6 Additional corrections.

Thirty-nine positions were identified for SurveyEvents (and associated Samples) that were in the wrong position, but not above MHWS (see Section 3.4 point a). These have all been corrected. A large number (422) of inappropriate spatial-types were also noted (Table 1). These were almost all instances of area-type SurveyEvents (and associated Samples) with incorrect ordering of positions for SW and NE corners (see section 3.4, point d). The derived positions that plotted for these records were a long way from their real position, but have now been corrected (mostly by converting to line- or point-type records and altering positions where necessary). Eliminating these numerous large (and previously unrecognised) errors has resulted in big improvements to the accuracy and reliability of

positional information. Guidance for accurate position recording and data entry has been updated and issued to all concerned.

A small number of misspelled names for SurveyEvents (see Section 3.4 point g) have also been corrected. There are likely to be more.

Table 1. Counts for different types of positional errors in Seasearch records for England (1982-2019) broken down into nine regions.

	Above MHWS		Other changes		
Region	**Events**	**Samples**	**Incorrect position (but not above HW)**	**Inappropriate use of position-type**	**Spelling of Event name**
Cornwall & Isles Of Scilly	61	78		31	
Devon	125	146		4	
Dorset	36	54	19	5	
Hampshire & Isle of Wight			15		3
Sussex	7	9	5	365	
Kent				15	
East Anglia	13	19			
NE England	15	19		1	
NW England	3	3		1	
Totals	**260**	**328**	**39**	**422**	**3**
Total # changes	**1052**				

4.7 Future work.

The corrections described above have made large improvements to the accuracy and reliability of the Seasearch records for England, but a variety of errors or inconsistencies will remain. Should time and funding permit, it would be of value to complete the following tasks.

- Obtain or create shapefiles that accurately represent the lower boundary of the intertidal area, such that Objective 5 can be completed.
- Mismatches in positions and spatial-types between SurveyEvents and associated samples (see Section 3.4 points b & c) should be catalogued and corrected.
- Missing blocks of data (see Section 3.4 point f) can be checked for in regional or central archives. If they are re-located and if deemed necessary, can be re-entered to the database from the original forms. In most cases the missing data are from the mid 1980's and not collected using the standardised Seasearch protocols, so this may be a low priority.
- Lists of dubious (or incorrect) taxonomic determinations (see Section 3.4 point h) are being compiled (an ongoing job given multiple recent changes in taxonomy) and changes made accordingly. Making such corrections manually is labour intensive and without care can lead to the undesirable introduction of duplicate keys to the database. Computer scripts are being developed by JNCC that may help speed up this process and minimise the risk of errors.
- A moderate number (perhaps approaching 50) of impossible depth values were noted (i.e. many metres above chart datum; see Section 3.4 point i). In most cases this is due to the omission of a minus sign in the data field and can easily be rectified. The exact number is not certain due to regional variation in tidal range. For instance a record with a depth of +7m could truly be intertidal in some places, but not others.

5 CONCLUSIONS

With the advent of the Seasearch data officer position (December 2018), the importance of positional accuracy has been re-emphasised to Seasearch volunteers, coordinators, data-enterers and verifiers. In addition, all Seasearch records now undergo a rigorous and comprehensive check of positional information after data have been entered to MR. This is in recognition of the 1:10:100 principle (Labovitz *et al.*, 1993) which suggests that remediation costs more than prevention and that costs of remediation are far smaller than the costs of persisting with bad data. Any errors or questions are returned to the data enterer or verifier for checking and correction prior to the records being made publicly available. The chance of dry records appearing in the dataset is now extremely small. On-going elimination of such positional errors during verification and prior to release of data should prevent the need for similar large-scale corrective work in the future. Other forms of positional error may still persist. Correction of other forms of error as identified in this report, will also reap rewards in terms of data-quality.

6 REFERENCES

Labovitz, G., Chang, Y.S., and Rosansky, V. (1993). *Making Quality Work: A Leadership Guide for the Results-Driven Manager*. Austin, Texas.: University of Texas Press.

Pikesley, S.K., Godley, B.J., Latham, H., Richardson, P.B., Robson, L.M., Solandt, J.L., Trundle, C., Wood, C., and Witt, M.J. (2016). Pink sea fans (*Eunicella verrucosa*) as indicators of the spatial efficacy of Marine Protected Areas in southwest UK coastal waters. *Marine Policy* 64, 38–45.

7 APPENDIX 1. Seasearch quality control process.

Seasearch Quality Assurance Procedures

Seasearch diving and recording is carried out by volunteers. Many of them have a professional background in marine biology and conservation but many do not and are self-taught naturalists. The document sets out the processes which are used to assure the quality of Seasearch data so that they can be used by professionals with confidence.

Seasearch Training Programme

Training is available at three levels to all participants.

Observer Level – this is aimed at volunteers without previous experience of marine recording in British and Irish waters. It comprises a one-day course followed by two survey dives where the individual records are reviewed and discussed with a tutor. The Observer qualification is awarded after completion of a further 3 survey forms.

Surveyor Level – this is aimed at experienced Observers and others with previous relevant experience. The training comprises a two-day course which involves the completion of two Survey Forms (one from video and one from an actual dive). The Surveyor qualification comprises completion of a further 5 Survey forms, two of which are supervised by a Seasearch tutor, and the completion of an ID test.

Specialist level – this is aimed at experienced surveyors to either increase their skills in survey methodologies or individual groups of plants and animals. Courses are workshop style and are led by experts in their field. They are often attended by professional biologists as well as Seasearch surveyors.

In addition to the training process Seasearch produces a series of **ID Guides** aimed at improving in-water ID skills. These comprise:

Seasearch Guide to Marine Life – introductory level containing a selection of widely observed species of plants and animals. (Much expanded and updated second edition published December 2018)

Seasearch Guide to Sea Anemones and Corals of Britain and Ireland – comprehensive guide to all of the anemones and corals found in shallow waters, the only guide of its type. (Two editions)

Seasearch Guide to Seaweeds of Britain and Ireland – again the only guide to be illustrated with in-situ photographs to complement recording by collecting specimens. Equally popular with littoral recorders and divers. (Two editions)

Seasearch Guide to Bryozoans and Hydroids of Britain and Ireland – these are difficult groups to identify but important in biotope terms as they often form significant animal 'turfs'. This is the only guide to contain *in situ* images as opposed to line drawings alone.

Seasearch Guide to Sea Squirts and Sponges of Britain and Ireland - as with bryozoans and hydroids, these groups can form the dominant animal cover in the right conditions but are often confused. As with the other Seasearch guides, this book concentrates on *in situ* features to allow recording without specimen collection. Most of the sea squirts found the shallow waters around Britain and Ireland, together with the more easily recognised sponges, are included in the guide.

These guides help to ensure high quality records as many of our volunteers use cameras and are able to check their images with those in the guide.

Quality Assurance Process for Recording Forms
Validation and verification of the data follows a three-stage process:

Initial validation can be carried out locally or by the National Coordinator depending on who first receives the forms. It comprises allocating a Seasearch number, checking the completeness of the form, checking the position given and checking the species lists for any unlikely species. If there are queries then these are raised with the recorder and photographs requested to check identifications, especially of unexpected species. Either the recorder or the validator can assign a '?' to a taxon record which is then included in the database as an uncertain record. Supporting verification of an identification, in the form of confirmation by a recognised expert, can be appended to the taxon record within Marine Recorder (*e.g.* "identification confirmed by Bernard Picton" for a rare/unusual nudibranch).

Data Entry into the Marine Recorder database is carried out by a small group of experienced personnel, the majority of whom are professional biologists or extremely experienced recorders. There is a manual and supporting guidance for data entry to ensure consistent standards. The person entering the data can add significant value in the way they describe habitats and they also allocate MNCR Biotopes to the habitats identified in the Survey forms. This is a specialised skill which we do not expect volunteers to have. We have produced two manuals to aid the process and again maintain consistency of approach. At this stage the person entering the data can again refer back to the original recorder to clarify any points.

Merging and final checks are carried out by the National Coordinator, supported by the Seasearch Data Officer. This stage consists of merging all of the separate local datasets into a single UK/Ireland file prior to checking and distribution of the data. Once merged, a 'snapshot' of the data is created which enables checks to be carried out of species (looking for unusual or questionable records), completeness of data and consistency over the dataset as a whole. A map is also created which plots all of the records received and this is also checked for significant positional errors. Any changes required are agreed with the person responsible for entering the data and must be carried out by them to avoid the creation of duplicate datasets. The National Coordinator is responsible for distributing the data to the NBN, JNCC and other users.

Ongoing Data Management
Queries arising from users of the data normally come to the National Coordinator (some through the NBN) but may also arise at a local level. They are discussed and amendments made as appropriate by the holder of the dataset at the local level. Any amendments are incorporated in an, at least, annual update of the whole dataset.
This process we believe makes the Seasearch data reliable and of a professional standard. Whilst many of our volunteer recorders are experts in their own right, that is not always the case and the process ensures that records made by less experienced volunteers are thoroughly checked by experienced people prior to appearing in the dataset.

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Seasearch QA procedures (v2 – updated by CEB November 2017; v3 – ID guide update (CEB Dec.2018))