



Dull o bennu costau camau ymchwiliol ar gyfer safleoedd Natura 2000 morol yng Nghymru

An approach for costing investigation actions for Marine Natura 2000 sites in Wales

Elisabeth Morris-Webb, Marine EcoSol

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Contents

Glossary	4
Crynodeb gweithredol.....	5
Executive summary	6
1. Introduction.....	7
2. Approach to costing strategic investigatory actions	8
2.1. Stage 1: Screening of actions for project priorities to be costed.....	8
2.2. Stage 2: Producing 'costings matrices': Researching 'investigation components' and 'indicative costs'.....	9
3. Summary of the Costings Matrices delivered	10
3.1 Indicative costs for prioritised actions.....	10
3.2. Costing investigation components.....	13
4. Discussion	17
Appendices.....	18
Appendix 1. Information provided to Marine EcoSol on draft investigation actions for European Marine Sites.....	18
Appendix 2. Investigation components that may be required for the delivery of an action	19
Appendix 3. Worksheet templates used to estimate costs for each Investigation Component.....	20
Appendix 4. Worksheet template used to estimate total cost for each Prioritised Action.	23

Glossary

CCW	Countryside Council for Wales (now NRW)
EMS	European Marine Sites
NRW	Natural Resources Wales
PIPs	Prioritised Improvement Plans
PLAS	Pen Llyn a'r Sarnau SAC
PMSAC	Pembrokeshire Marine SAC
RAG	Relevant Authorities Group
SAC	Special Area of Conservation
SPA	Special Protection Areas
SMART	Specific Measurable Achievable Realistic and Time limited
TAP	Thematic Action Plans

Crynodeb gweithredol

Diben Natura 2000 yw gwarchod rhai o rywogaethau a chynefinoedd gwyllt prinnaf ac sydd bennaf o dan fygythiad yn Ewrop. Mae'r Rhaglen LIFE Natura 2000 yn datblygu cynllun strategol at y dyfodol i reoli ac adfer rhywogaethau, cynefinoedd a safleoedd Natura 2000 yng Nghymru. Bydd yn nodi'r camau gweithredu allweddol sydd eu hangen, blaenoriaethau, costau a chyfleoedd ariannu, trwy weithio gyda sefydliadau sydd â diddordeb. Mae Natura 2000 yn cynnwys Ardaloedd Cadwraeth Arbennig (ACA) ac Ardaloedd Gwarchodaeth Arbennig (AGA).

Mae Cynlluniau Gwella â Blaenoriaeth (PIPs) wedi cael eu llunio am bob safle Natura 2000 yng Nghymru, er mwyn sicrhau bod y rhywogaethau a'u cynefinoedd dynodedig mewn cyflwr ffafriol. Mae'r PIPs yn nodi'r camau gweithredu arfaethedig i fynd i'r afael â materion blaenoriaethol (pwysau) a risgiau (bygythiadau), eu costau cysylltiedig â ffynonellau ariannu posibl.

Prif nod yr astudiaeth yw darparu costau ar gyfer y camau gweithredu morol sy'n berthnasol i'r PIPs. Mae'n canolbwyntio ar gamau ymchwilio ond hefyd ceir camau sy'n ymwneud ag addysg, allgymorth ac ymgysylltu. Allan o'r 69 o gamau gweithredu â blaenoriaeth a gyflwynwyd, fe gynhyrchwyd y costau canlynol fel rhan o'r astudiaeth:

- Camau gweithredu â blaenoriaeth - roedd 15 cam gweithredu â digon o fanylion i ddarparu costau dangosol llawn.
- Elfennau ymchwilio wedi'u costio - 39 elfennau ymchwilio wedi'u costio , gan gynnwys cyfraddau uned ac amrywiaeth o astudiaethau achos a senarios costau
- Manylion astudiaeth achos - 42 astudiaeth achos a senarios costau sy'n berthnasol i gamau gweithredu posibl ac elfennau ymchwilio.

Disgrifir cyfyngiadau a gwaharddiadau allweddol yr ymarferiad costio yn yr adroddiad hwn. Dylai'r costau a ddarperir yn yr astudiaeth gael eu hail ddefnyddio'n unig ar gyfer dibenion eraill, ar ôl ystyriaeth ofalus o'r cyfyngiadau a chyda'r ddealltwriaeth lawn eu bod yn perthyn yn benodol i'r cyd-destun gwreiddiol ac yn seiliedig ar y manylion cyfyngedig a ddarperir. Dylai'r data ar gostau unigol gael ei ddarllen ar y cyd-â'r adroddiad hwn a gwybodaeth eraill a ddarparwyd yn y matricesau. Dylai'r holl gostau cael eu hystyried yn fasnachol sensitif.

Executive summary

Natura 2000 exists to conserve some of the rarest and most threatened wild habitats and species in Europe. The LIFE Natura 2000 Programme is developing a strategic forward plan to manage and restore Natura 2000 species, habitats and sites in Wales. Working with interested organisations it will identify the key actions required, priorities, costs and funding opportunities. Natura 2000 includes Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

Prioritised Improvement Plans (PIPs) are being produced for each Natura 2000 site in Wales, to help maintain or improve the condition of the designated habitat and species features of the site. The PIPs set out proposed actions to address priority issues (pressures) and risks (threats), their associated costs and potential funding sources.

The primary aim of this study is to provide costings for marine actions relevant to the PIPs. The focus is on investigation actions but some education, outreach and engagement actions are also included. Out of 69 prioritised actions provided, the following costings were produced as part of this study:

- Prioritised actions - 15 actions had sufficient detail to provide full indicative costs
- Costed investigation components - 39 costed investigation components, including unit rates and a range of case studies and cost scenarios
- Case study detail - 42 case studies and costings scenarios relevant to potential actions and investigation components.

Key limitations and caveats of the costing exercise are described in this report. The costs provided in this study should only be re-used for other purposes, after careful consideration of the limitations and with the full understanding that they are specific to their original context and based on the limited detail provided. Data on individual costs should be read in conjunction with this report and other information provide in the matrices. All costs should be considered commercially sensitive.

1. Introduction

Natura 2000, comprised of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), exists to conserve some of the rarest and most threatened wild habitats and species in Europe. The LIFE Natura 2000 (N2K) Programme is developing a strategic forward plan to manage and restore Natura 2000 species, habitats and sites in Wales. As part of the LIFE Natura 2000 Programme, Prioritised Improvement Plans (PIPs) are being produced for each Natura 2000 site in Wales. PIPs are prioritised action plans which summarise the actions need to maintain or improve the condition of the designated habitats and species of the site. PIPs identify and prioritise the issues¹ and risks² affecting the sites' designated features, the actions required to address them and the organisation responsible for delivery. They also include indicative costs and potential funding sources for delivering actions.

Approximately 50% of the issue actions and a third of the risk actions identified for the European Marine Sites (EMS) through the PIP process are investigations. The focus is on gathering evidence and developing better understanding of the extent and potential severity of impacts on activities on Natura 2000 features to inform development of appropriate management measures to move features towards favourable condition. Investigations range in size and focus from small desk-based projects (e.g. bringing together existing information on the distribution of a particular activity) to large vessel-based projects to collect baseline data on particular features (e.g. mapping the extent and condition of a subtidal features).

At the start of this contract, no costs had been identified for marine investigation actions and this was a significant gap in terms of the PIPs for the EMSs and had the potential to lead to a significant underestimate in the overall funding requirements identified by the LIFE Natura 2000 Programme across the Natura 2000 network. Marine EcoSol was contracted to help address this evidence gap through the development of a costings matrix to assist in the process of deriving indicative costs (for strategic planning purposes) for investigation actions and education/outreach actions identified in the marine PIPs.

The contract was split into two broad objectives.

Objective 1: Establish approach / methodology including identification of appropriate investigation categories

Develop a methodology for creating and populating an investigations costings matrix. The approach will include the identification of appropriate investigation categories and realistically achievable costings based on the information available. The method will ensure that both staff and non-staff costs are accounted for in the costings.

Objective 2: Production of costings matrix and summary document

Populate the costings matrices agreed in Objective 1. Incorporate costs from a range of different contractors and cost scenarios where possible. Provide detail on sources of information, together with caveats and costing limitations.

¹ A factor that is considered to be currently having an adverse impact on one or more feature(s). Akin to "pressure".

² A factor that is not currently an issue, but is considered likely to become an issue in the near future (defined as up to 2020) unless action is taken. Akin to "threat".

2. Approach to costing strategic investigatory actions

2.1. Stage 1: Screening of actions for project priorities to be costed

The LIFE Natura 2000 Programme provided Marine EcoSol with background information for 69 draft actions which had been identified to address issues and risks affecting features in EMSs in Wales. A summary of the information provided for each action is provided in Appendix 1.

The LIFE Natura 2000 Programme recognised there was not sufficient detail within the information provided to fully specify and cost the work required to deliver each of the 69 actions. Neither was this a requirement of the project which was seeking to provide indicative cost for strategic planning purposes across the Natura 2000 network in Wales. A pragmatic approach was taken where by indicative costs for broad investigation categories was sought taking into account information on:

- One-off costs
- Recurrent costs
- Period of recurrence
- Duration of recurrent cost
- Scale and expected duration of work required

Due to the limited contract period (10 contractor days), the LIFE Natura 2000 Programme team reviewed the draft actions to ensure effort was focused on:

- i. 'True investigations' such as survey, monitoring or research (including desk based), rather than direct management or interpretation. 'True investigations' are considered here as any marine investigations that provide evidence on the extent/condition of a feature and/or activities affecting a feature; or of the impacts of an activity / pressure on a feature;
- ii. A broad range of investigation types such as sub-tidal, inter-tidal and desk based studies.
- iii. Actions / sets of actions aligned with expertise of Marine EcoSol.

Some education, engagement and outreach actions have also been included.

As part of this review Marine Ecosol identified a list of possible investigation components (Appendix 2). Approximate costs were developed for each component using the template worksheet provided in Appendix 3a (hereafter referred to as the 'Components' worksheet), referring to case studies on which costs were based. Detail of each case study was provided within a separate case study detail worksheet (Appendix 3b, hereafter referred to as the 'Case Studies' worksheet). Finally, a summary cost or range of costs was provided for the specific action required (hereafter referred to 'Indicative Costs', Appendix 4). The content of these tables was discussed and agreed with the LIFE Natura 2000 Programme Team before progression to Stage 2.

2.2. Stage 2: Producing 'costings matrices': Researching 'investigation components' and 'indicative costs'

Based on the list of agreed actions (Stage 1), Marine EcoSol went on to populate the relevant 'investigation components' (Appendix 2), Costings Matrix (Appendix 3a) and Case study details (Appendix 3b) before assigning a total indicative cost to each specified action (Stage 3, Appendix 4). All available information, including caveats and limitations in the costs, were included to ensure the LIFE Natura 2000 Programme team could expand the application of the results of this contract to cost new and revised investigation actions for the EMSs.

Marine EcoSol used a range of sources for developing indicative costs, including:

- Commercial experience of costing similar projects;
- NRW data on previous projects and case studies undertaken by CCW / NRW and contractors; and
- Other organisations / individuals (e.g. EMS officers) data on previous projects and case studies undertaken in Wales.

Information in the costings matrix was reported as day or unit rates, 'project rates' of fixed duration, or examples of similar case studies. Case study details included any major limitations to the project e.g. the project costs did not include major elements, such as reporting, or did not achieve its objective. The detail recorded (in templates provided in Appendix 3) was kept as concise as possible to enable easy use by the end user.

Given the lack of detail in some of the actions being considered, Marine Ecosol liaised with EMS/SAC officers to refine actions and to identify whether they had been involved in delivering similar actions that could help in assigning indicative costs. This process also yielded information on SAC or RAG member time spent delivering or managing similar actions. For example, where interpretation boards had been commissioned, Marine EcoSol identified the costs associated with the design, production and installation, and the time spent by the SAC officer bringing together all underlying information. SAC officers were also asked for example case studies that may inform the updating of the costing and case study matrices.

There was ongoing dialogue between Marine EcoSol and the LIFE Natura 2000 Programme team throughout this stage and the information gathered was valuable in refining the detail of investigation actions captured for the EMSs where possible, working towards developing SMART objectives.

3. Summary of the Costings Matrices delivered

3.1 Indicative costs for prioritised actions

Review of the information gathered in Stage 2 with the LIFE Natura 2000 Programme team, and further discussion with SAC officers, identified 16 broad investigation actions that were deemed suitable for progression for a full costing.

Table 3.1 List of prioritised actions for which full indicative costs were developed.

The cost information was provided to the LIFE Natura 2000 Programme [20150819 Investigations Costing Marine EcoSol.xlsx]

Issue / risk category	Issue / risk sub-category	Activity	Action note
Access and recreation	Access / use: erosion / disturbance / damage	Survey	Support the production and dissemination of a code of conduct for the SAC for boat users and recreational activities to promote good practice and minimise the potential for disturbance to the species features of the SAC. This action should be coordinated by the SAC officer and needs to be developed as part of a planned awareness-raising programme for the SAC to address issues of potential disturbance to the species features. water craft owners.
Access and recreation		Investigate the extent and severity of impacts from mooring and anchoring.	Investigate the extent/severity of impacts from mooring and anchoring in sensitive habitats and develop recommendations for future management.
Access and recreation		Investigation of the damage caused by anchors being dragged over the reef area in the Menai Strait.	Investigation to establish the extent and severity of the impacts from anchors being dragged over the reef feature in the Menai Strait from vessels fishing with the tide. Recommend appropriate management actions to address identified impacts.
Access and recreation		Assess extent and magnitude of effects and utility of existing management mechanisms.	Scale of wildfowling activity and consequential mortality and disturbance of SPA features and other wildlife, and the efficacy of current management measures (where present) are poorly documented. Current and recent data on wildfowling and disturbance (including from access) needs to be collected, collated and shared; information on on-site effects of wildfowling disturbance needs to be reviewed and/or collected; management measures need to be critically assessed and new management requirements identified.
Access and recreation	Access / use: erosion / disturbance / damage	Quantify and report spatial and temporal extents of recreational activities.	The distribution, frequency and intensity of many recreational activities in the EMS are poorly known other than at a few historically well observed locations. Boats, canoeing, water sports, wildfowling, bait collection, wildlife tours, walking/dog walking etc. are potential sources of disturbance and additional data on their pursuit is required. Identify spatial and temporal intensity and "hotspots". Data collection is highly suitable for citizen participation; develop and

Issue / risk category	Issue / risk sub-category	Activity	Action note
			implement volunteer activity recording app. Work with other local authorities and NRW.
Access and recreation	Access / use: erosion / disturbance / damage	Citizen science - community project.	NRW to implement a regular programme of monitoring including data on levels of impact. Consider developing citizen-science projects to contribute to monitoring and surveillance of the lagoon within the context of a broader community-based project co-ordinated by the SAC officer to address this and others issues affecting the lagoon
Access and recreation	Access / use: erosion / disturbance / damage	Review existing data	This action is part of the Porthdinllaen seagrass project. Consolidate findings of biological and other studies of the Porthdinllaen seagrass, agree next steps with Porthdinllaen seagrass project steering group and inform stakeholders of intended next steps.
Invasive species	Marine non-natives	Survey to map the distribution of <i>Sargassum muticum</i> and identify areas for trial eradication.	Assess the scale of settlement by <i>Sargassum muticum</i> within these units and identify where eradication should be trialed.
Pollution and waste	Marine litter	Investigate impacts of litter on Cardigan Bay SAC features.	Reporting bringing together latest evidence on impacts of marine litter on features (including nano plastics, ecosystem effects, entanglement, ingestion, bioaccumulation and food chain effects) and identifying Sources of marine litter.
Pollution and waste	Diffuse water pollution	Determine appropriate water and sediment quality standards for the estuary features.	Review water and sediment quality standards that are in use for existing NRW statutory duties (e.g. WFD) and determine whether they are appropriate to maintain the SAC features (Estuaries, and Mudflats and sandflats) and oligotrophic status of the SAC estuaries. Determine if they are appropriate to enable assessment and monitoring of new discharges and diffuse sources of nutrient input. This action needs to integrate Habitats Directive and water quality related work including bathing waters, septic tank discharges, heavy metal inputs work areas.
Pollution and waste	Diffuse water pollution	Determine inputs to the estuary systems and assess impact of these on the SAC.	Define the inputs to the estuary systems and determine the impact of these against water and sediment quality targets and on the SAC estuary faunal assemblages.
Marine fisheries	Potting	Review the minimum landing size of whelk in line with evidence.	Collate evidence from recent investigations on sexual maturity of whelks in Welsh waters and review minimum landing sizes in Welsh waters.
Water management and issues	Siltation	Investigate severity and extent of siltation in Carew lagoon.	Investigate severity and extent of siltation in Carew Lagoon from quarry input and siltation run off up-stream. Identify appropriate action required e.g. dredging, new quarry licence etc.

Issue / risk category	Issue / risk sub-category	Activity	Action note
Access and recreation	Access/ use: erosion / disturbance / damage	Encourage and support education initiatives to minimise impacts.	NRW to support existing organisations to deliver education/awareness raising to reduce impacts of an issue. This maybe awareness raising around subjects such as; the effects of vessel maintenance and repair on features, pilots to minimise impacts from low flying aircraft on protected bird species or awareness raising project on Seagrass and Maerl Bed protection zones.
Access and recreation	Access/ use: erosion / disturbance / damage	Provision of information to users.	Provide information to recreational users, boat operators and other stakeholders about the SAC and its features. This action should be coordinated by the SAC officer and developed as part of a planned awareness-raising programme for the SAC to address issues of potential disturbance to the species features. Encourage submission of sightings data e.g. reintroduce record sheet recording sightings of marine mammals.

Marine EcoSol were able to provide full indicative costs for 15 out of the 16 short-listed in the contract with the time available (Table 3.1). Each action was costed exclusive of VAT and included the detail shown in Appendix 4. As many actions lacked detailed or SMART objectives, many of the 'indicative costs' provided were broken down in to smaller manageable parts, which could be split from the full cost if required by the LIFE Natura 2000 Programme Team. The indicative costs developed, including a detail breakdown and associated caveats, have been provided to the LIFE Natura 200 Programme but cannot be published within this document given their potential commercially sensitivity. Marine EcoSol have discussed this final costings matrix with the LIFE Natura 2000 Programme team.

Costs were based on sources listed in the source columns (Appendix 4). This could be from discussions with SAC officers on previous costings or time spent on projects, costed investigation components broken down in the next worksheet (Appendix 3a) or case study scenarios details (Appendix 3b). Where available, actual costs from recent projects or case studies, or specific quotes, were used to cost the proposed new actions. When a range of costs was identified (e.g. for personnel time in the costed investigation components, the mid-point was used, with the exception of where an 'expert of the field' would be required where the highest costs identified were used.

This process highlighted the importance of clear notes on what is required to deliver an actions. For example, the list of priority actions included two targeted education / awareness raising actions but the estimated costs were £4,475 (excl. VAT), to reproduce a basic interpretation pack for boat users to minimise impacts in seagrass, and £15,290 for a comprehensive education programme involving amending and producing electronic and printed interpretation materials for use in newly developed workshops in 25 schools. This process also reaffirmed the difficulties in providing even indicative costs for actions with limited detail.

3.2. Costing investigation components

Relevant investigation components (Table 2.1b) were identified for each action to assist in developing the indicative costs. For example, the action under Access and Recreation to "*Establish the extent and severity of the impacts from anchors being dragged over the reef feature in the Menai Strait from vessels fishing with the tide*" could include costs associated with a range of investigation components: literature / management review; diving, shore and questionnaire based observational surveys; travel and subsistence; staff time (NRW and external); data handling, GIS and reporting. If contractors were used, there could be additional costs for contingency days. Clearly, the ultimate cost of delivering this action would depend on the components that were incorporated.

A cost range was allocated to each investigation component ('unit cost'), given potential differences in the experience of consultants or experts or the type of equipment required. Costs for case studies or case scenarios were also provided to demonstrate how indicative costs could vary significant depending even within an investigation components. For example, providing a unit rate purely for a boat is not a useful cost as a video or grab survey also necessitates surveyors to be on board, mobilisation costs, analysis and reporting as standard, and these costs can vary depending on the depth, location, number of sample stations, and tidal restrictions on the sites being surveyed. Or for grab surveys of soft sediments day rates were estimated to be between £2000-3800 for the sampling at sea, but total project cost for a 5 – 7 day survey varied between £14,000 to £115,625 due to differences in the type of boat used, the depth of sampling stations, and the post-survey analysis required. As a result, costing a single day rate or fixed duration project alone was not deemed a sufficient reflection of the real cost of a potential action.

In total indicative costs were provided for 39 investigation components incorporating information on unit rates and case studies. The components costed and the key limitations in developing those costings are summarised in Table 3.2. and within the discussion.

Table 3.2. Limitations of costing each Investigation Component

	Type of investigation	Detail of actual cost provided	Major limitation of costing
Desk study	Literature / management measures review	Day rate depending on experience required for review.	Care needed to identify the number of research days required per point of interest. The time element is frequently underestimated, resulting in underestimated project costs.
	Data handling / interpretation / statistics	Day rate for multivariate analysis and biotope allocation.	Costs vary significantly depending on analysis specification, and the size / duration of the dataset.
	Field study reporting		Costs vary depending on size of project and detail required.
	GIS	Day rate for a range of GIS / remote sensing specialists.	Costs vary significantly depending on the spatial extent of mapping / GIS exercise.
	Market research		
Field study	Intertidal		Typical day rates provided for the field element / survey only. Additional reporting costs should also be considered.

Type of investigation	Detail of actual cost provided	Major limitation of costing
Intertidal - analysis of sediment cores	Infaunal and PSA analysis of intertidal cores.	Costs for analysis of cores (which would be collected as part of intertidal survey – above). Cost will depend on substrate (estuarine, coarse sediment, etc.)
NVC Phase 2 survey of saltmarsh	Specify no of hectares / day achievable.	Limited by access and homogeneity - if area is heterogeneous or heavily grazed, surveys are likely to take longer.
Subtidal – diving	Prices for a four man dive team plus supervision, including transport and accommodation, but excluding reporting time, except in the case of case studies.	Team size will vary. Cost will vary with the size of team depending on the requirements of the job, daylight and slack times / whether the site is very tidal / deep.
Subtidal – collection of diver cores	Usually done as part of standard dive survey (above). Collection of handheld diver cores at 8 stations. Includes basic survey report.	The cost provided is for exclusive collection activity in shallow, non tidally restricted waters, excluding analysis costs. Collection of diver cores is often part of a larger survey as detailed in subtidal diving (above), rather than exclusive collection activity costed for this investigation component.
Subtidal – laboratory analysis of subtidal cores	Infaunal and PSA analysis of subtidal cores (diver & grab).	Costs for analysis of cores (which would be collected as part of subtidal diving survey – above). Cost will depend on substrate (estuarine, coarse sediment, etc.)
Subtidal – grab samples (with boat)	Excludes lab analysis and reporting.	Costs vary depending on scale and location of project. Day costs here exclude mobilisation, analysis and reporting, which can add thousands to the cost. Case study costs are specific to jobs in Wales inclusive of mobilisation, analysis and reporting.
Subtidal – grab samples (without boat)	Include analysis post data collection.	Costs vary depending on scale and location of project. Day costs here simply include personnel on the boat, and exclude mobilisation, analysis and reporting, which can add thousands to the cost. Case study costs are specific to jobs in Wales inclusive of mobilisation, analysis and reporting.
Subtidal – video (with boat - basic video analysis)	Include analysis post data collection for a specific species or habitat feature (ie: presence of <i>Sargassum</i>).	Costs vary significantly depending on location / anticipated visibility (and therefore camera spec required), mobilisation costs, and analysis requirements.
Subtidal – video (with boat - MNCR Phase 2 type video analysis)	Include analysis post data collection for a full / detailed habitat survey good enough for designation (providing the video quality is high enough).	Costs vary significantly depending on location / anticipated visibility (and therefore camera spec required), mobilisation costs, and analysis requirements.

	Type of investigation	Detail of actual cost provided	Major limitation of costing
	Subtidal – video (basic survey without boat)	Include analysis post data collection for a specific species of habitat feature (i.e. presence of <i>Sargassum</i> .) Video collection may be from NRW vessel or pontoon, where contractors provide field personnel but not boat time.	Costs vary significantly depending on location / anticipated visibility (and therefore camera spec required), mobilisation costs, and analysis requirements.
	Subtidal – video (basic survey MNCR Phase 2 type video analysis)	Include analysis post data collection for a full / detailed habitat survey good enough for designation (providing the video quality is high enough). Video collection may be from NRW vessel or pontoon, where contractors provide field personnel but not boat time.	Costs vary significantly depending on location / anticipated visibility (and therefore camera spec required), mobilisation costs, and analysis requirements.
	Water quality / pollution	Monitoring coastal diffuse pollution.	Costs vary depending on requirements: which pollutants to be analysed, how often, whether inclusion of basic sediment / salinity / temp is also required etc.
	Shore based observational survey	Such as recreational angling / intertidal collection / vessel movement.	Very scale dependent, also costs vary depending on reporting and analysis elements (which vary depending on how many sites / stations surveyed per day, depending on size of team, etc.).
	Boat	Observational activities.	
	Aerial survey		Costs vary significantly depending on location so unable to cost this element.
	Questionnaire based survey	Field based data collection using questionnaires.	
Education / Outreach	Digital media production		Unable to cost. Will vary depending on software and hardware requirements
	Interpretation material production	Board / leaflets	Printing and design costs may be outdated. Often involved unaudited time of RAG / SAC staff.
	Outreach consultancy / education consultancy	Range from roadshows to educational / outreach to stakeholders.	Costs may be out-dated. Often more time spent on developing these projects than contributors admit.
	Citizen science coordination	Includes citizen science co-ordination.	Agencies must consider additional costs, such as in-house data collation and analysis of citizen science data, required software / boats / additional facilitation for citizen science projects.
	Small workshop	Less than 30 people. includes preparation, advertising and organiser being present on day, venue and snacks.	Economy of scale; much of the cost is the organisation so each additional day would be costed at the venue and refreshments cost, plus an additional approx £1000 preparation and facilitation cost.
	Medium Workshop	30-70 people includes preparation, advertising and organiser being present on day, venue and snacks.	Costs vary depending on location and duration of workshop, and whether catering is provided or not.

	Type of investigation	Detail of actual cost provided	Major limitation of costing
	Large Workshop	>70 people includes preparation, advertising and organiser being present on day, venue and snacks.	Cost vary depending on location and duration of workshop, and whether catering is provided or not.
Other research	Academic expert study	Expert opinion.	
	PhD		Project titles and outputs may change significantly from original specification depending on student and whether initial expectations were realistically achievable.
	MSc		May involve NRW / SAC officer time & resources (boats / equipment). Project titles and outputs may change significantly from original specification depending on student and whether initial expectations were realistically achievable.
IT	Expertise	Software / app development.	
	Software	Commercial software licensing.	Costs vary depending on software and way in which it will be used (single user / open access/ etc).
Travel & subsistence	Travel expenses		
	Subsistence (major city)	Capital cities food and accommodation.	
	Subsistence (other)	Food and accommodation outside of cities.	
Other	Mobilisation / demob		Costs vary significantly depending on location and type of survey.
	Weather down days		Costs vary significantly depending on location and type of survey.

4. Discussion

The primary aim of this project was to provide indicative costings for marine investigation actions identified in the LIFE Natura 2000 Programme's Prioritised Improvement Plans. Out of 69 investigation actions considered, 15 had sufficient detail for indicative costs to be developed given the resources constraints of the contract. This information has been provided to the LIFE Natura 2000 Project Team separately to this report given the potential commercial sensitivity of some of the data.

In addition to the indicative costs developed for those 15 actions, the LIFE Natura 2000 Programme team have been provided with information and indicative costs for 39 investigation components and 42 case studies. It is envisaged that this information can be used to cost new or amended actions identified for the marine Natura 2000 sites through the LIFE Natura 2000 Programme and for future projects.

There are a number of limitations for the costs generated (See Table 3.2) and care needs to be given to the application of all of the indicative costs, taking account of these limitations and the additional detail and caveats provided in the full deliverable matrices. The most significant limitation being the detail and specification included for the actions. For example regarding survey, without detail on the number, location and depth of sampling, it is difficult to assign costs to an appropriate boat, team, mobilisation, subsistence or subsequent laboratory analysis required. This process has highlighted the importance of clarity of actions and SMART (Specific Measurable Achievable Realistic and Time limited) objectives, not only to enable costings but also to better communicate what is required on the ground to deliver the action, and ultimately improvements in feature condition.

A good alternative to many investigative studies may be investment in a longer term PhD or short term MSc study. This would give up to 3 years dedicated research and value for money to a specific action or suite of actions, to ultimately provide a good robust method for future roll out on the actions. However, a major limitation of this approach, is that both MSc and PhD project titles and outputs may change significantly from original specification or timetable depending on the student and whether the initial expectations were realistic and achievable. Costs for PhD students have been mentioned in the costings provided, but may not be correct in future as the cost will depend on research programmes and funding available at the time.

Whilst the intention of the actions being identified through the LIFE Natura 2000 Programme is not to provide a full project specification, unclear or incomplete action notes could lead to misinterpretation and incorrect costing, and may result in inappropriate budgeting (resources and time) for delivery of the action. In addition to providing information on costs for actions, this contract has also provided an opportunity for further interaction between the LIFE Natura 2000 Programme team and relevant site teams (NRW site officers and SAC / EMS Officers) to refine and better define the actions required.

Appendices

Appendix 1. Information provided to Marine EcoSol on draft investigation actions for European Marine Sites

Information provided	Detail
Site name	The name of the site(s) for which the management action has been identified.
Issue* or risk**	The issue or risk that will be addressed by the identified management action.
Site level action? (Y/N)	An indication of the scale of the action i.e is it to address an issue affecting the whole site or a specific management unit.
Unit location	If the action is for a specific unit the unit id was given.
Mechanism	The broad mechanism category for the work required.
Activity	A short description of the management action required.
Organisation	The name of the organisation to lead on the delivery of the management action.
Action notes	More detailed information on the management action identified.
Extra info provided	Any extra information provided to aid in the costing process and or clarity of the action required.
Features prioritised	The feature that are being affected by the issue that the action is aims to address.

*Issue: a factor that is considered to be currently having an adverse impact on one or more Natura 2000 habitat or species features.

**Risk: a factor that is not currently an issue, but is considered likely to become an issue in the near future unless action is taken.

Appendix 2. Investigation components that may be required for the delivery of an action

Investigation component category	Investigation component
Desk study	Literature / management measures review
Desk study	Data handling / statistics
Desk study	Reporting on survey findings
Desk study	GIS (Geographical Information Systems)
Desk study	Market research
Field study (including post analysis where appropriate)	Intertidal
Field study (including post analysis where appropriate)	Intertidal - Sediment cores
Field study (including post analysis where appropriate)	Subtidal – diving
Field study (including post analysis where appropriate)	Subtidal – analysis of diver cores
Field study (including post analysis where appropriate)	Subtidal – grab samples (with boat)
Field study (including post analysis where appropriate)	Subtidal – grab samples (without boat)
Field study (including post analysis where appropriate)	Subtidal – video (basic analysis with boat)
Field study (including post analysis where appropriate)	Subtidal – video (detailed survey with boat)
Field study (including post analysis where appropriate)	Subtidal – video (without contractor boat / from pontoon)
Field study (including post analysis where appropriate)	Water quality / pollution
Field study (including post analysis where appropriate)	Shore based observational survey
Field study (including post analysis where appropriate)	Boat (observational activities)
Field study (including post analysis where appropriate)	Aerial / remote sensing
Field study (including post analysis where appropriate)	Questionnaire based survey
Education / Outreach	Digital media production
Education / Outreach	Interpretation material (board / leaflets) production
Education / Outreach	Outreach / education consultancy
Education / Outreach	Citizen science coordination
Education / Outreach	Small workshop
Education / Outreach	Medium workshop
Education / Outreach	Large workshop
Research	Academic expert study
Research	PhD
Research	MSc
IT	Software/app development
IT	Commercial software licensing
Other	Travel expenses
Other	Capital city subsistence
Other	Other subsistence
Other	Mobilisation / demob
Other	Weather down days
RAG / Organisation time	Special Area of Conservation (SAC) Officer time
RAG / Organisation time	NRW time
RAG / Organisation time	Other Relevant Authority Group (RAG) time

Appendix 3. Worksheet templates used to estimate costs for each Investigation Component

a) Example layout 'Costed Investigation Components' taken from the Investigations Costing Matrix.

Types of investigation displayed here are exemplary, it is not an exhaustive list.

Type of investigation	Detail	Major limitation of costing	Unit	Cost per unit	Typical project duration ² (all costs exclude VAT)								Case study ³ (all costs exclude VAT)					Source of information (Case study reference if relevant)						
					Up to 5 days	Up to 10 days	Up to 15 days	Up to 1 month	Up to 2 months	Up to 3 months	Up to 4 months	Up to 5 months	Up to 6 months	CS1	Team 1 comprising:	CS2	Team 2 comprising:		CS3	Team 3 comprising:	CS4	Team 4 comprising:	CS5	Team 5 comprising:
Desk study	Literature / management measures review	Time and costs usually massively underestimated. Consider number of days research required per point of interest.	Typical day rate? ¹	£ - £										£	Mixed team	£	Contractors	£	Contractors	£	RAG & contractors		Case study publications (if relevant)	
Field study	Intertidal																							
	Intertidal - sediment cores																							
Education / Outreach	Small workshop																							

An approach for costing investigation actions for Marine Natura 2000 sites in Wales

Type of investigation	Detail	Major limitation of costing	Unit	Cost per unit	Typical project duration ² (all costs exclude VAT)							Case study ³ (all costs exclude VAT)					Source of information (Case study reference if relevant)								
					Up to 5 days	Up to 10 days	Up to 15 days	Up to 1 month	Up to 2 months	Up to 3 months	Up to 4 months	Up to 5 months	Up to 6 months	CS1	Team 1 comprising: CS2	Team 2 comprising: CS3		Team 3 comprising: CS4	Team 4 comprising: CS5	Team 5 comprising:					
Other research	PhD				.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
IT	Software				.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Travel & subsistence	Travel expenses				.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Mobilisation / demob				.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ Consultant / individual surveyor / diver / supervisor day rate. Total cost will vary on size of team, equipment required for specific survey and travel time / mobilisation costs.

² Not every column will be completed here - only the ones most relevant to the type of investigation. Some of the 'Project duration' columns may be removed if deemed irrelevant.

³ Where costing a project using a day rate / fixed term is difficult, costs of similar case studies have been identified for this type of investigation. Details and limitations of case studies are provided in the 'case study' worksheet.

b) Examples of template used to note detail of real case studies taken from the Investigations Costing Matrix

Actual costs and detail have been omitted from report due to provision of detail commercial and in confidence.

Type of investigation	Case study reference in 'Costed Investigation Components'.	Title	Brief description of project	Cost of project to client	Additional costs to NRW / SAC	NRW / SAC / RAG Staff time (additional to cost to client)	Real Estimated Cost of Completion (based on actual time taken)	Scale - size of area of interest	Did it meet its aims and objectives?	Major caveats to costing	Source of information (agency / organisation)	Relevant report reference	Appropriate contact (name and contact detail)
Desk study	Literature / management measures review CS1	Intertidal Species Collection in Wales: Impacts Review	Literature review on the effects of collecting over 40 intertidal taxa from Welsh shores.	£##	-	16 days SAC officer time @ £## cost	£## (carried forward into future costings)	Across Wales	Not fully - (detail provided in worksheet)	Grant funded so limited by funding requirements. (Further detail provided in worksheet)	Contractor & PMSAC Officer	Citation if available	Name, job title & email
Education / Outreach	Interpretation material production CS5	PLAS: Production of large coastal interpretation on boards and picnic tables	Unusually large interpretation project involving 3 interpretation panels and a picnic table with wheelchair access and lots of educational material incorporated into the table build	£##		SAC officer = approx 10 days @ £## / day	£##	PLAS	Yes	This cost more expensive than a normal panel due to the level of stakeholder engagement / involvement	PLAS SAC Officer	n/a	Name, job title & email

Appendix 4. Worksheet template used to estimate total cost for each Prioritised Action.

Prioritised action	Action notes	Indicative cost	Recurrent cost	Period of recurrence	Duration of recurrent cost	Source	Detail	Scale and expected duration	Caveats	Relevant investigation components
Action title provided by NRW	Notes provided by NRW related to project objectives	Total cost of action (or range of costs if action may contain several projects or could be split into smaller or larger parts to meet objectives)	£	How often would the recurrent cost be applied (for instance to reprint materials or undertake annual survey)?	Is the recurrent cost ongoing, or for a fixed duration to meet objectives?	SAC Officer / Case Study (number) / Previous survey costs	Breakdown of costs if applicable	Entire SAC / local beach	Limitation of the cost provided / suggested additional costs which could be incurred but could not be costed	Any relevant investigation components (Appendix 2) related to this action have been listed here. The idea of this is with changing costs the investigation components could be recosted and the action cost recalculated in future