



Cefas Quinquennial Science Review 2018



Review Panel Report **Summary and Recommendations**

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Summary

1. A Science Review was undertaken in June 2018 to provide the Cefas Management Board with an external assessment of the sustainability, capabilities, quality and impact of the science and scientific programmes carried out by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) over the period since the last Science Review in 2012.
2. The science was evaluated under six themes: Aquatic Animal Health, Aquatic Food Safety, Sustainable Fisheries, Ecosystem Change, Innovative Monitoring and Forecasting Change. Overall, we concluded that Cefas' science is of high quality and impact, delivering essential statutory monitoring and inspection services, information and advice together with national emergency response capability. In addition, Cefas supports its researchers to deliver fundamental and applied scientific research to underpin its wider activities.
3. The Review Panel was impressed by the resilience of Cefas and its staff, and the extent to which the organisation has embraced change whilst maintaining science outputs and quality, given the continuing and wide-ranging changes over the last five years in terms of the policy environment, funding, staff numbers, management organisation, infrastructure and the internationalisation of Cefas.
4. **Sustainability.** Cefas has, over the last few years, developed a successful working model that centres on government and government-to-government research, advisory tasks and monitoring needs. Cefas' support from and interactions with core Defra lie at the heart of this successful structure. Staff numbers have increased, Seedcorn investment is highly effective and research infrastructure is effectively maintained and developed. The successes, both in terms of income and the international remit of the organisation, together with EU exit are placing Cefas under a range of pressures that need to be addressed going forward if science quality is to be maintained and enhanced.
5. **Capabilities.** Cefas continues to have the capabilities to meet the needs of its core customers, whilst expanding its co-operation and capabilities, especially in the areas of environmental monitoring technology, eDNA and data. Having already made substantial amounts of data available, substantially more could be done in this increasingly data-driven world to exploit those data, deploy risk assessments and improve forecasting techniques. It is timely to revisit the Cefas' Science and Evidence Strategy to make sure it is fit for purpose in addressing new international priorities and to prioritise Seedcorn investments.
6. **Quality Assurance.** Cefas' science activities reflect current science thinking with international leadership in several areas. Feedback indicates that these activities are appropriate to meeting the needs of business and especially government. The quantity and quality of Cefas science outputs is good, but more needs to be done to encourage science outputs through more flexible time management, and more to encourage quality through mentoring and narrative development.

7. **Use and Impact.** The Review Panel identified a range of science highlights and welcomed the case studies and presentations on the site visits, which provide clear evidence of impact of Cefas' science in a range of areas.

There is a clear impact of Cefas science on policy development and implementation, which is becoming increasingly global in its context. However, in the context of EU exit, a continued national focus is required as well, and this was evident from the case studies and the site visits. Cefas' collaboration with other organisations is well received. The developing university partnerships should, with careful stewardship, significantly enhance the quality and quantity of Cefas science. Recommendations are made into how Cefas might further improve its science, surveillance and monitoring, use of data, reporting and publications.

8. The Review Panel was impressed by the measures that had been put in place by Cefas since the 2012 review to ensure the sustainability, relevance, quality and impact of its evidence activities. A number of these measures are further addressed in the current Recommendations.
9. The Review Panel makes a number of general recommendations within the report to Cefas that are listed below. In addition, we make note of a number of **issues requiring attention** in **Appendix F**, which arose during our meetings with the individual science themes. Some of these issues relate to the general recommendations, while others are more specific to the themes.

Recommendations

There are 28 recommendations.

Recommendation 1: We recommend that as a consequence of Cefas' success in generating new, large international programmes, a more strategic approach to international investments should be developed to ensure that the programmes fit within the Cefas Science and Evidence Strategy and enhance the science capability for government. **See 2.4**

Recommendation 2: The larger overseas research programmes should develop dissemination strategies to ensure scientific impact and output, especially, but not only with respect to, high quality publications. This will require significant time budgeting. **See 2.5**

Recommendation 3: Research & Development (R&D) funding should be at least 20% of Cefas delivered turnover, and preferably closer to 25%. **See 2.6**

Recommendation 4: At an organisational level we support the efforts to maintain per capita turnover, and to review the efficacy of the current project management/science structure/business model to ensure that it is delivering. This would include analysis of per capita turnover for the R&D and other Science components, more flexible time management and further training in science and project management within teams. **See 2.8**

Recommendation 5: Seedcorn should continue to be grown to an agreed target and should continue to be used flexibly to support emerging science needs. The Cefas Science Advisory Committee should be involved in advising which investments are best used to develop and deliver the Cefas Science and Evidence Strategy and in monitoring the impact of the investment. **See 2.9**

Recommendation 6: The new build at Lowestoft, with its open plan environment, will require expert change management and close monitoring of impacts. Flexible ways of working will need to be adopted to accommodate the needs of individual members of staff to ensure continuity of delivery. **See 2.10**

Recommendation 7: Options should be left open, if possible, for the redevelopment of aquaria facilities at Lowestoft should the need arise. **See 2.12**

Recommendation 8: Uptake of innovative observation technology in international monitoring programmes is relatively slow and can only be achieved through co-ordination and agreements in international fora, such as International Council for Exploration of the Seas (ICES) and Oslo/Paris convention (for the Protection of the Marine Environment of the North-East Atlantic (OSPAR). Consequently, engagement of Cefas in these organisations, often in a leading role, should be continued. **See 2.13**

Recommendation 9: A 'one size fits all' approach will not meet the needs of all those using computing facilities, especially those involved with mathematical modelling and non-standard statistical analyses, or with the remote operation of specific monitoring hardware. Flexible support needs to be provided on a range of platforms. **See 2.14**

Recommendation 10: The development of high performance computer-based ocean and biogeochemical modelling, underwater noise modelling and monitoring, bioinformatics, molecular eDNA analysis, ecological and fisheries modelling, satellite remote sensing and advanced data management all require high-end technological infrastructure to match these tasks. Much of the development of these activities, however, appears rather piecemeal, and in the case of computing, somewhat inadequate for the needs of the science. We recommend consideration of something like a technology division in this burgeoning area to ensure the co-ordinated development of technological infrastructure. Advice on solutions and detailed implementation should also be sought from university partners and others in the Defra group. **See 2.14**

Recommendation 11: Cefas is an attractive employer, but more could be done to ensure recruitment and retention of highly numerate scientists (modellers, statisticians and data scientists) who are needed for delivering future computational and modelling innovations. This could include work conditions allowing close co-operation with relevant universities, exchange programmes with leading international institutions, targeted Seedcorn funding (e.g. to form a cross-disciplinary research focus) and work allocations to foster high levels of scientific production. **See 2.15**

Recommendation 12: Clear succession planning with a spreading of the risk needs to be developed for key roles within the organisation. Monitoring of gender pay gap and staff progression through the organisation, from selection to promotion and progression, should be routinely reviewed. We recommend development of a clear action plan for the organisation with annual reporting on progress against agreed targets. **See 2.16**

Recommendation 13: Preparation for Horizon Europe (e.g. through H2020 Co-ordinated Support Actions, JPI Oceans or other international organisations) is recommended. However, a replacement of the European Maritime & Fisheries Fund (EMFF) operational programme, including its financing, needs to be put in place by government. Further regional co-ordination of monitoring, advisory and scientific activities through international organisations, such as ICES, OSPAR and Regional Fisheries Management Organisations (RFMO's) as replacement of central EU commission services, is recommended. **See 2.19**

Recommendation 14: The Review Panel supports and commends moves towards replacing EU Reference Laboratory status with international designations using, for example, the Food & Agriculture Organisation (FAO) as an accrediting organisation for an international role. It also suggests conducting a horizon scanning exercise for international/global funding, including from large private foundations. **See 3.4**

Recommendation 15: A co-ordinated plan needs to be developed on how the Centres of Excellence will fit in to the current organisational structures and for how they will be structured and delivered. **See 3.5**

Recommendation 16: Given the rapid international developments in Cefas science, it is apparent that the current Cefas Science and Evidence Strategy is now considerably out of date. We strongly support the development of a new five-year plan that clarifies structures and opportunities, with an intermediate refresh if necessary, to take account of changing needs. **See 3.6 and 3.7**

Recommendation 17: Consideration should be given to reconfiguring the overarching Food Security/Blue Growth framework around a Food Security/Natural Capital framework. This better reflects the need for science to protect and enhance natural capital for blue growth, rather than optimisation of Blue Growth related marine activities. [See 3.8](#)

Recommendation 18: We recommend in developing the Science and Evidence Strategy that careful consideration is given to the structure of the Science Directorate, so it is transparent that the customer needs are being met within a secure scientific framework. Acknowledging the importance of utilising expertise across research disciplines and themes, we recommend a clearer description of the cross-cutting working style, the structures in place and their benefits in the new Science and Evidence Strategy. There should be caution about adding more complexity to the organisational structure without reviewing and streamlining the current structures. [See 3.9](#)

Recommendation 19: Consideration should be given to how marine and socio-economic policy research could be further developed, building on existing partnerships with universities and the economics team within Defra. Consideration should also be given to which themes are suited for wider dissemination to relevant stakeholders and the public, and to how that should be done. [See 4.2](#)

Recommendation 20: Cefas should explore how more time can be made available to incentivise paper writing along with a greater focus on outputs and outcomes, rather than time management processes. [See 4.3](#)

Recommendation 21: Cefas management should consider resourcing a communications position in Weymouth to enhance support on this site, with respect to narrative and communications. Better use should also be made of training opportunities, particularly in relation to the development of narrative, perhaps with university partners. [See 4.8](#)

Recommendation 22: It is recommended that the case studies are used across a wide range of marketing/communication activities, that they are shared and developed with university partners, and that they continue to be refreshed with new ones added each year. Cefas Science Advisory Committee could potentially provide some form of peer review and quality control. [See 5.2](#)

Recommendation 23: Clear succession planning/deputisation needs to be developed for key posts. For advisory posts we would recommend spreading the risks associated with illness/resignation etc, by ensuring that several people are in a position to provide advice where practicable. [See 5.3](#)

Recommendation 24: It is recommended that greater emphasis is given to Cefas' government and government-to-government interactions (including international government-to-government), and to recognise and publicise more widely the key role that core Defra plays in this activity. This should not be to the detriment of Cefas' broader commercial activity. [See 5.4](#)

Recommendation 25: The development of the two collaborative centres has made a promising start. As the centres develop it is essential that they, together with other university partnerships, meet both Cefas and university needs. From a university perspective it will be essential that clear pathways to impact are developed alongside joint publications; this applies to the two centres and Cefas' wider university partners. Cefas Science Advisory Committee could potentially be used more actively to help monitor the development of the centres and pathways to impact. More widely, we would also urge that Cefas' collaboration with their partners be reviewed regularly to assess science outputs, impact and research income (from grants, government contracts or commercial contracts) together with the scientific benefits to Cefas in, for example, technological developments and big data analysis. **See 5.6 and 5.7**

Recommendation 26: Alongside plans to make further data sets available, Cefas should prioritise and outline how it is going to make best use of the unique data sets that it holds. This should happen via Cefas' discipline-specific expertise, and through external collaborations. Delivery of data to the wider community could also be enhanced, especially in areas that require the involvement of citizen science, as in the case of invasive species. **See 5.9**

Recommendation 27: Cefas should explore with its customers how report production can be modified to better meet the customer's and Cefas' needs, and in particular to maximise incentives and time available for the production of quality journal papers. **See 5.10**

Recommendation 28: We recommend that Cefas consult with Cefas staff and the Cefas Science Advisory Committee to develop a wider range of science metrics that better reflects the outputs and quality of outputs across Cefas' science activities (e.g. publications, reports, media), which should then be monitored across Groups. **See 5.11**

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