



Marine Climate Change
Impacts Partnership

MCCIP Evaluation Report 2011/12

February 2012

Contents

Independent Evaluator Critical Assessment	3
1 Introduction	5
2 MCCIP aims, objective and outputs	5
3 Use of MCCIP Products	6
3.1 Report Cards	6
3.1.1 2010-11 Annual Report Card	7
3.2 MCCIP website	14
3.3 MCCIP Newsletter	17
4 Influence of MCCIP and its products.....	19
5 MCCIP Method / Approach – use by indirect beneficiaries.....	21
6 Future evaluation.....	21
Appendix 1 Previous Annual Report Card surveys.....	23
Appendix 2 Activities undertaken on behalf of MCCIP	27
Appendix 3 - References to MCCIP work:	29
Journal Articles.....	29
Books.....	32
Theses and dissertations.....	32
Reports.....	33

ASSESSMENT OF THE MARINE CLIMATE CHANGE IMPACTS PROGRAMME (MCCIP)

Introduction

1. The MCCIP Phase II business plan includes a commitment to measure the success of the programme through an evaluation framework that considers the use of MCCIP products and the overall value of the partnership to direct beneficiaries and the wider user community. The evaluation framework focuses on a set of interim outcomes that can be related to the immediate outputs of MCCIP activities. Evidence from the MCCIP Evaluation Report 2011 has been used to make an initial assessment of the achievement of these interim outcomes and, thus, provide a measure of the success of the programme to-date. A mid-term review of the programme will take place in 2013.

Achievement of interim outcomes

2. Table A lists the six interim outcomes and outcome indicators in relation to direct and indirect beneficiaries and participants and assesses whether or not they have been achieved. As shown, ***three of the interim outcomes appear to have been achieved, one has been partially achieved and two have not yet been achieved.***
3. In terms of ***direct beneficiaries***, evidence has been provided to indicate that ***MCCIP products are highly rated by users*** and that they are ***having a positive influence on decision-making***. For example, 60% of survey respondents rated the 2010-11 Annual Report Card as 'very good' or 'excellent'. In terms of decision-making, MCCIP products have been used in Departmental and agency adaptation plans and at various fora. Future use of case study material should provide additional evidence of their positive influence. While data have been provided to show the wide range of uses of MCCIP products, ***no quantitative data are currently available to show an increase in the number of direct beneficiaries using MCCIP products*** and, thus, ***the interim outcome has only been partially achieved.*** Future surveys of direct beneficiaries should provide quantitative data, as could uptake data on the MCCIP newsletter.
4. In terms of ***indirect beneficiaries***, ***the MCCIP approach on Annual Report Cards has been taken up by several other bodies*** such as Living With Environmental Change (LWEC), indicating that the ***interim outcome has been achieved.*** However, it has ***not been possible to assess whether there has been an increase in the use of the MCCIP website and products by indirect beneficiaries*** compared to Phase I due to a problem with the tracking service on the website. This now been rectified.
5. Finally, in terms of ***participants***, the ***interim outcome has not yet been achieved***, but a survey of contributors to the next Special Report Card (May 2012) is planned.

Summary

6. Overall, the *MCCIP appears to be making good progress towards achievement of the six interim outcomes*. Further evidence will be available for the mid-term review.

Table A: Assessment of Interim Outcomes.

	Interim outcome	Outcome indicators	Assessment of interim outcome	Interim outcome achieved?
Direct beneficiaries	Increasing number of direct beneficiaries use MCCIP products	Quantitative data on use of MCCIP products Data on type of use of MCCIP products (e.g. source of information, support for policy development, referenced in publications, etc.)	No quantitative data are available to show an increase in the number of direct beneficiaries using MCCIP products Extensive data are available to show the ways in which MCCIP products are used by direct beneficiaries	Partially – however, full data is never likely to be obtained
	MCCIP products have positive influence on decision-making.	Case studies describing how beneficiaries have used MCCIP products	No case studies have been undertaken but the above data show that MCCIP products are having a positive influence on decision-making	Yes – but not through case studies
	MCCIP products are highly rated by users	Satisfaction ratings; qualitative feedback	Extensive user survey data on recent Annual Report Cards and Special Topic Report Cards demonstrate that they are highly rated ¹	Yes
Indirect beneficiaries	Increasing number of indirect beneficiaries access MCCIP products	Quantitative data on use of MCCIP products; media coverage	No reliable quantitative data are available on the number of indirect beneficiaries using the website between Jul 2010 and Jan 2012 and so it is not possible to assess whether there has been an increase compared to Phase I	Data not available
	Similar methods and approaches to MCCIP are adopted by indirect beneficiaries (e.g. internationally)	Qualitative: examples of adoption of similar approaches, case studies	Data are available to show the uptake of the MCCIP approach on Annual Report Cards by several indirect beneficiaries	Yes
Participants	MCCIP authors/contributors are satisfied with participation in development of MCCIP products	Qualitative feedback from authors/contributors	No data are yet available but a survey of contributors to the next Special Report Card (May 2012) is planned	No

Dr Ann Davies
In House Policy Resource
13 February 2012

¹ It should be noted that the number of respondents to each survey was relatively low.

MCCIP Evaluation Report 2011/12

1 Introduction

The Marine Climate Change Impacts Partnership (MCCIP) provides a co-ordinating framework within the UK and Ireland for the transfer of high-quality evidence and advice to policy advisors and decision-makers, helping public and private sector organisations plan for the challenges and opportunities resulting from climate change in the marine environment.

The intended target audience of MCCIP is marine and coastal stakeholders including policy makers requiring marine climate change knowledge in an accessible format, enabling them to make informed decisions based upon quality assured science.

The direct beneficiaries are:

- MCCIP Partners, including Government, advisory and regulatory agencies
- Other central and local government
- Science community
- Marine business sectors
- Non-governmental organisations
- Marine recreational users
- Coastal communities

Indirect beneficiaries include:

- Overseas governments
- International organisations
- Media
- Education bodies
- General public

MCCIP's business plan includes a commitment to measure success through an evaluation framework, guided by an independent evaluator (Ann Davies, In House Policy Resource team). The framework considers the use of MCCIP products and overall value of the partnership to members, other main beneficiaries and the wide user community.

2 MCCIP aims, objective and outputs

The aim of MCCIP is to provide a co-ordinating framework for the UK, so as to be able to transfer high quality evidence on marine climate change impacts, and guidance on adaptation and related advice, to policy advisors and decision-makers.

The objectives for MCCIP are to:

- Develop and maintain a coordinating framework for marine climate change partners in the UK and Ireland.
- Build the knowledge base and consolidate evidence of marine climate change impacts, with emphasis on the spatial dimension where possible.
- Provide effective mechanisms for the efficient transfer of marine climate change knowledge from the scientific community to policy advisers and decision makers.

- Develop guidance and build upon best practice for adaptation tools and strategies available to stakeholders (e.g. 'climate smart' approaches).
- Identify present shortcomings in UK marine climate science (i.e. what other science could be done / supported to help decision makers and UK marine industries).
- Actively engage with partners and consult wider communities on requirements for climate change tools and information (e.g. marine scenarios of climate change).

The key outputs from phase I were:

- Annual Report Cards (ARC) for 2006; 2007-8 and 2010-11.
- Special Topic Report Card: MCCIP Ecosystem Linkages Report (ELR) Card (2009).

The key outputs from phase II will be:

- Full report cards every 2 years (next one due 2013).
- Special topic reports every other year (Fish, Fisheries and Aquaculture due for launch May 8th 2012).
- 'Climate smart' adaptation reports for identified communities of interest – initially the new approach will be piloted and then the update period considered.
- Programme of engagement events – mainly through working with others but also through a MCCIP branded event each year (although it has since been agreed that MCCIP should look to 'piggy-back' on others workshops / meetings rather than host our own).
- Advice and input to national and international state of the environment reporting.
- Knowledge Gaps paper (to be published by end of March 2012).

Ultimately, a successful MCCIP programme would result in UK and Irish marine users taking informed climate adaptation decisions, at all levels of government, in business and in society. The final outcomes sought by MCCIP are:

- That policy advisors and decision-makers make use of the best available evidence on marine climate change impacts when developing and implementing relevant policies, programmes and projects;
- That there is an improvement in understanding of the principal impacts of climate change on the marine environment and an acceptance of the need to take appropriate adaptation actions amongst the wider range of marine users including, ultimately, the general public.

Whilst these final outcomes explain the purpose of MCCIP, it is recognised that there is a much broader range of policies and actions outside of MCCIP which together aim to have a similar effect and that it would be difficult to devise evaluation metrics that would separate out the influence of MCCIP from other influences.

3 Use of MCCIP Products

3.1 Report Cards

MCCIP has produced the following Report Cards:

- 2006 – Annual Report Card
- 2007–2008 Annual Report Card
- 2009 – Special Topic Report Card (Ecosystem Linkages)
- 2010–11 Annual Report Card

Questionnaires were completed, using SurveyMonkey, for each report card. Some analysis was undertaken previously of the first two Annual Report Cards (see Appendix 1), therefore, this report will show full results from the 2010-11 Annual Report Card and then compare them with selected results from the other report cards.

3.1.1 2010-11 Annual Report Card

Approximately 6000 hard copies of the report card were distributed. It is also available as an online version on the MCCIP website where it can also be downloaded as a pdf document.

People were asked via the report card itself and a mail shot to complete an electronic questionnaire.

55 people accessed the survey, however only 30 of these completed all the questions. Of the 55 respondents, 89% were from the UK, 64% had seen previous Annual Report Cards and 90% of them had accessed the report card online (60% online only; 30% both online and hard copy). This low response rate should be borne in mind when interpreting the results.

The respondents were asked to classify their role from the options provide and the results can be seen in Table 1.

Role	Response %
Communicator (communicating the messages in the ARC to others)	25.5%
Decision Maker (making policy-based decisions that factor in information in the ARC)	7.3%
End User (working in a sector that is affected by climate change impacts on the marine environment)	23.6%
Scientist (making use of the detailed science underlying the ARC for research purposes)	23.6%
General Public	12.7%
Other	7.3%

Table 1 Respondents to 2010/11 Annual Report Card Survey by role

Design – based on 38 responses

Overall structure - 87% rated the structure as very good (37%) or good (50%). The remaining 13% scored it as average.

Content – 84% thought that the content was good or very good based on clarity and relevance of the messages; range of topics covered and regional climate change impacts map.

Length – 76% thought the report was about the right length. The remaining responses were equally split between slightly too long and slightly too short.

Level of detail – 58% found the level of detail ‘about right’, 32% responded ‘slightly too little detail’ and the remaining responses fell into the ‘too much detail’ categories. The response count by role can be seen in Table 2.

Answer Options	Communicator	Decision Maker	End User	Scientist	General Public	Not known
Far too much detail	0	0	0	1	0	0
Slightly too much detail	0	0	0	1	0	2
About right	5	1	7	7	1	1
Slightly too little detail	5	2	3	1	1	0
Far too little detail	0	0	0	0	0	0

Table 2 Response by role to 2010/11 Annual Report Card survey regarding level of detail.

Confidence ratings – 82% were clear on what the confidence rating meant and 84% found them useful.

Science – based on 37 responses

89% rated the science as above average (excellent – 13%; very good – 57%; good – 19%). The split by role can be seen in Figure 1.

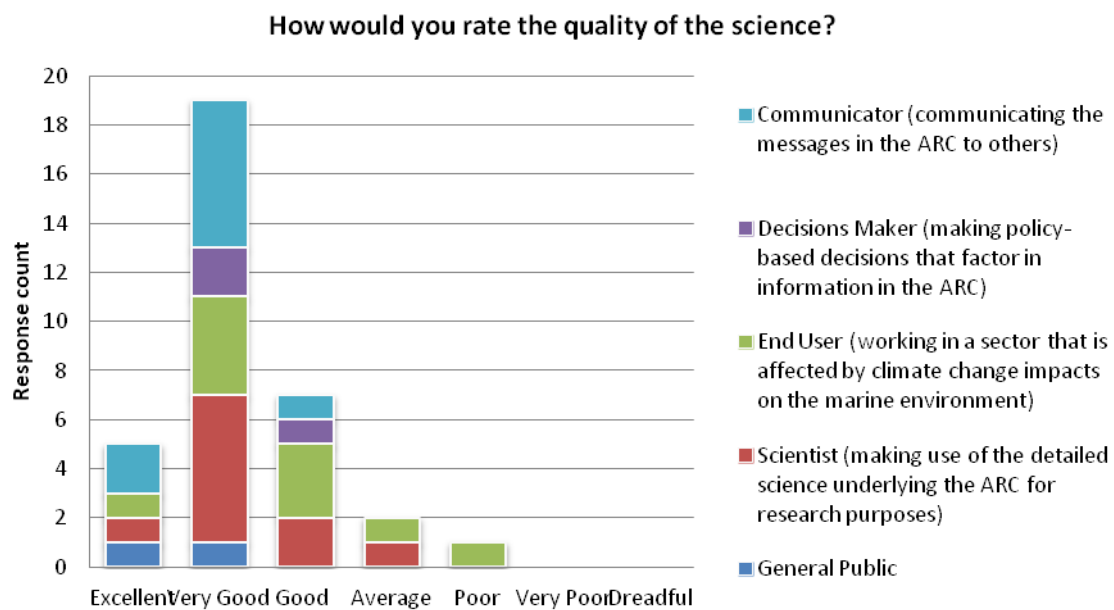


Figure 1 Response, by role, on the quality of science in the 2010/11 Annual Report Card survey

73% found the scientific language about right; the others found it ‘slightly’ too technical or simplistic as shown in Figure 2 which also shows the breakdown by role.

Do you think the scientific language used in the report card is...

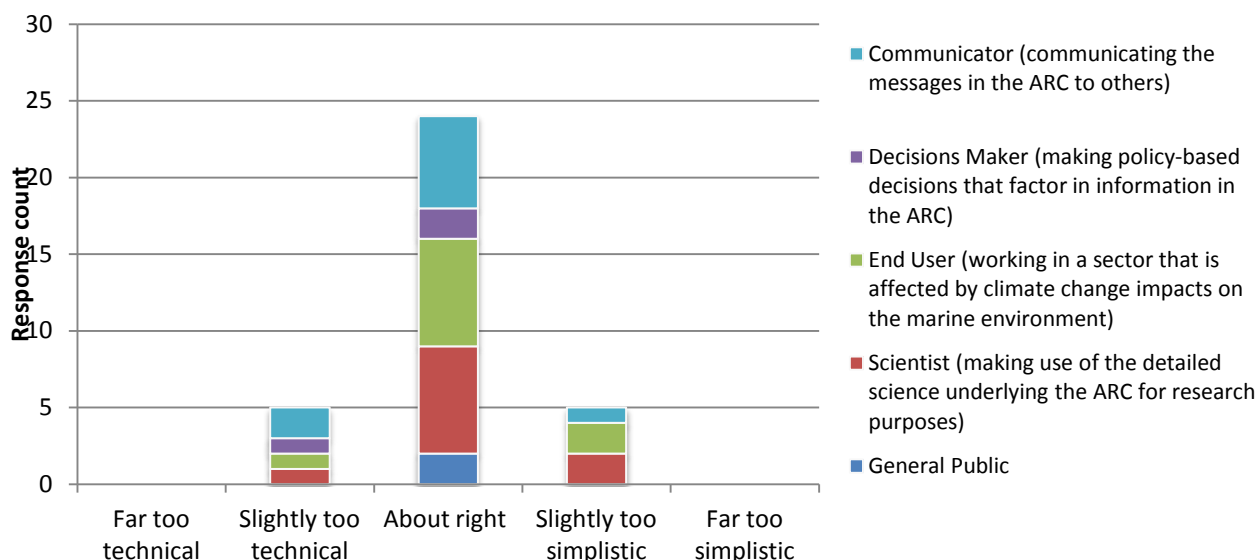


Figure 2 Response, by role, regarding the level of scientific language in the 2010/11 Annual Report Card survey

81% were, to various degrees, satisfied that the views expressed in the 2010-11 Annual Report Card represent those of the wider scientific community. Only one person, an 'End User' responded 'not at all satisfied'. The other respondents did not know.

Use of card

66% would use the report card as a first stop when looking for scientific advice on marine climate change impacts (based on 35 responses). The reasons given for not using it as a first stop were mainly due to it not covering their area of interest (geographic or topic) or that they had access to other, more scientific (and peer reviewed) literature. Communicators, Scientists and the General Public were likely to use the report card as their first stop but Decision Makers and End Users were split in a ratio of 2:1 as to whether they would use it or not (Figure 3). However, this is based on very low response numbers.

In terms of the usefulness of the information for their purposes, 87%, of the 30 responses, rated it above average. 67% thought that the report card would have a positive impact on their job but 20% were unsure.

Would you use this card as a first stop when looking for scientific advice on marine climate change impacts?

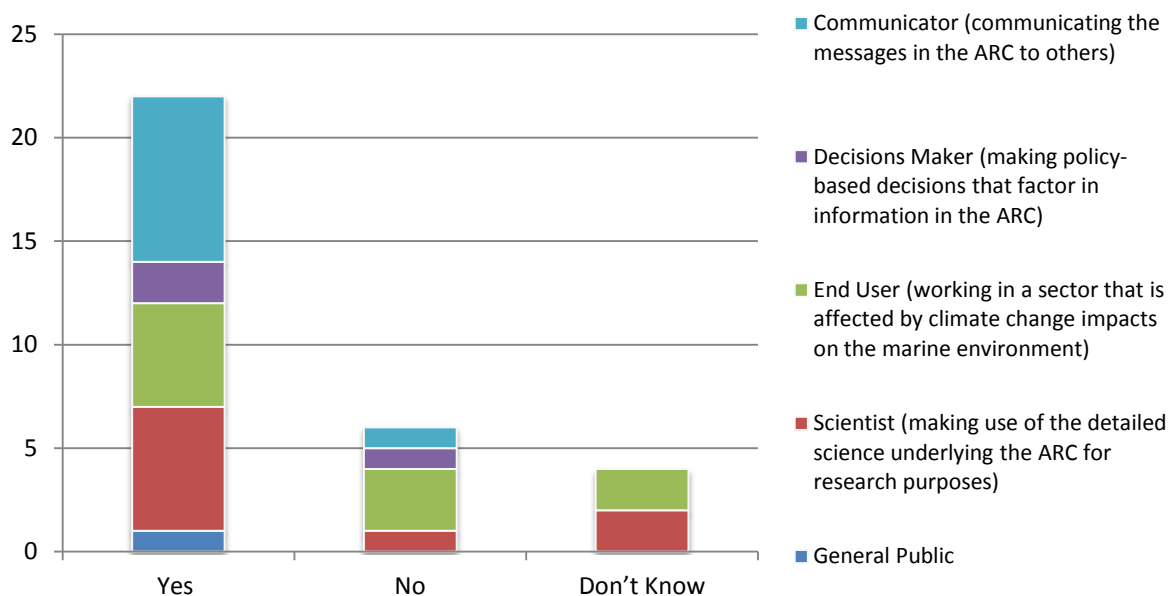


Figure 3 Response, by role, in the 2010/11 Annual Report Card survey as to whether the report card would be used as a first stop when looking for scientific advice on marine climate change impacts

Supporting documents

53% of people had looked at the supporting documents with 62% of these finding them very / extremely useful and about the right length (69%). Most people found the supporting documents to be pitched at the correct technical level.

General

Comments received about 'what you like about the report card' could be grouped into the range of topics covered and the clarity of information. Examples included, "Gives an excellent overview of the most pertinent issues. It simply collates a lot of information in one place with good references to sources" and "clear information that can be used for policy advice to non-specialists".

Dislikes included:

- Use of colours (in particular around the use of orange for text which some people found difficult to read but also about the colours chosen for the confidence levels – "I'm not sure the range of colours used for the confidence immediately tells me what I am looking at").
- Concerns that the information could be misinterpreted due to its brevity.
- Lack of links to further information and sources.

Topics to be included in the next report card

- Something about the science of connectivity in the marine environment.
- The role of highly protected marine reserves.
- Start adding economic costs of impacts.

- More on marine environment / sea bed degradation caused by human activity and impact of such.
- A summary of impacts associated with offshore technologies.
- Something on the global issues, since these relate to the local ones.
- Phenology.
- More on adaptation to climate change and fishing.
- More information regarding which specific species are already being threatened / benefitting from marine climate changes.
- Information about how each of the changes outlined interact with each other, e.g. how changes in wave climate will impact coastal erosion.

Overall opinion of the report card

60% rated it as very good / excellent and only 3% rated it as 'poor' (see Table 8).

3.1.1.1 Comparison to earlier survey results

Number of respondents

Product	Started Survey	% Finished Survey
ARC 2006	69	59%
ARC 2007/8	126	47.6%
ELR 2009	61	59%
ARC 2010/11	55	54.5%

Table 3 Percentage of respondents who completed the surveys for the four report cards

It can be seen in Table 3 that on average 55% of people who start the survey complete it. Figure 4 shows that a majority of the drop is after the first few questions, which is generally when the questions about people’s opinions begin. It will be important for future surveys to think about the order of questions. It may also indicate that the number of questions was too high.

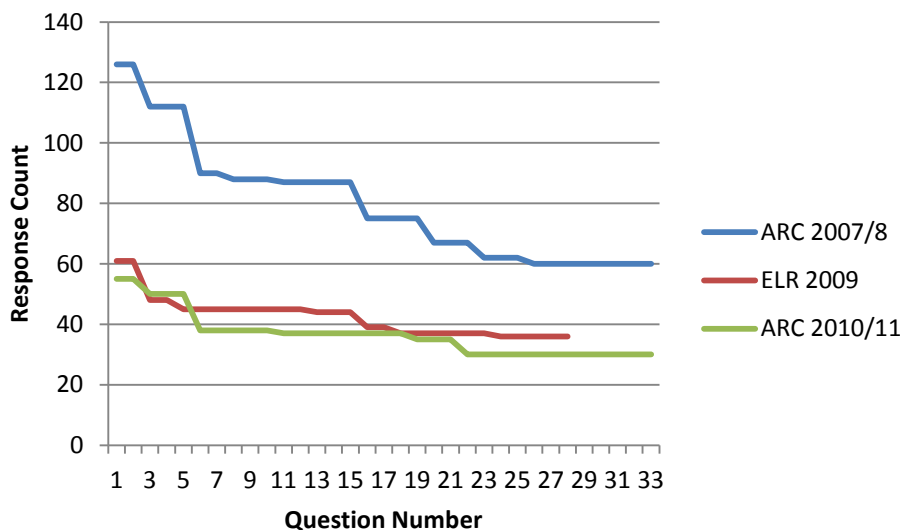


Figure 4 Number of respondents to each question in the surveys for the Annual Report Cards for 2007/8 and 2010/11 and the Ecosystems Linkages Special Topic Report Card.

Roles of respondents

	ARC 2006	ARC 2007/8	ELR 2009	ARC 2010/11
Communicator	11.6%	12.7%	26.2%	25.5%
Decision Maker	47.7%	12.7%	11.5%	7.3%
End User	21.6%	18.3%	9.8%	23.6%
Scientist	1.4%	43.7%	42.6%	23.6%
General Public	8.6%	4.8%	3.3%	12.7%
Other	9.1%	7.9%	6.6%	7.3%

Table 4 Split by role of respondents to the four report card surveys

Location

	ARC 2006	ARC 2007/8	ELR 2009	ARC 2011
England	59.7%	57.9%	57.4%	65.5%
Scotland	17.7%	19.0%	9.8%	10.9%
Wales	6.5%	5.6%	6.6%	9.1%
Northern Ireland	1.6%	3.2%	11.5%	1.8%
British Crown Dependencies	4.8%	0.8%	3.3%	1.8%
Outside UK: Europe	1.6%	9.5%	6.6%	3.6%
Outside UK: North America	0.0%	0.8%	0.0%	3.6%
Outside UK: Oceania	4.8%	0.0%	1.6%	1.8%
Outside UK: Other	3.2%	3.2%	3.3%	1.8%

Table 5 Location of respondents to the four report card surveys

The split of UK to Outside UK respondents has remained around 90%:10%. However, the respondents within this broader split has changed; the percentage of respondents from Scotland and the British Crown Dependencies has decreased whilst those from Wales has increased; outside the UK, the respondents from North America has increased.

Version of report card accessed

	ARC 2006	ARC 2007/8	ELR 2009	ARC 2011
Hard copy	14.5%	19.6%	14.6%	10.0%
Online Version	45.5%	49.1%	66.7%	60.0%
Both	40.0%	31.3%	18.8%	30.0%

Table 6 Version of the report card seen by respondents to the four report card surveys

The trend is for people to access the online version; however, as the survey was conducted electronically, it is likely that these figures were influenced by the ease of accessing the survey from the online version compared to having to access it later if viewing the hard copy.

Quality of the science

	ARC 2006	ARC 2007/8	ELR 2009	ARC 2011
Excellent	10.9%	5.7%	27.3%	13.5%
Very Good	47.8%	48.3%	34.1%	56.8%
Good	34.8%	32.2%	31.8%	18.9%
Average	6.5%	11.5%	4.5%	5.4%
Poor	0%	0%	2.3%	5.4%
Very Poor	0%	1.1%	0%	0%
Dreadful	0%	1.1%	0%	0%

Table 7 Breakdown into categories of the responses to the 4 annual report card surveys on the quality of the science

One of the aims of MCCIP is to provide ‘high quality evidence’. Taking Excellent and Very Good to be ‘high quality’, Figure 5 shows that the quality of science has been seen to increase over time, although the responses for ‘poor’ have also increased.

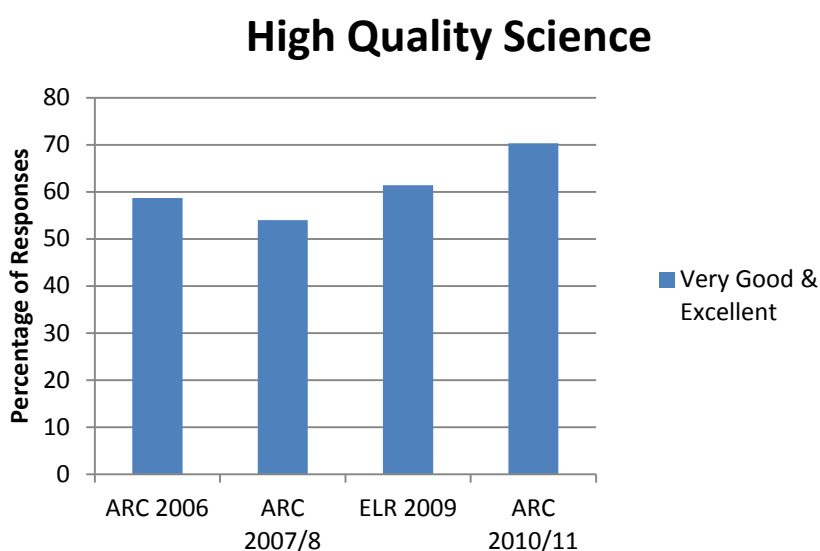


Figure 5 Percentage of responses rating the Quality of Science as Very Good or Excellent

Overall opinion of the report card

	ARC 2006	ARC 2007/8	ELR 2009	ARC 2011
Excellent	19	25.8	27	26.7
Very Good	61.9	53.2	27	33.3
Good	16.7	11.3	35.1	23.3
Average	2.4	6.5	8.1	13.3
Poor	0	1.6	2.7	3.3
Very Poor	0	0	0	0
Dreadful	0	1.6	0	0

Table 8 Breakdown into categories of the responses about the overall opinion of the report card to the 4 annual report card surveys

Taking Very Good and Excellent to indicate ‘High Quality Evidence’, it can be seen from Figure 6 that, in contrast to the quality of science, the overall opinion has declined over the four report cards.

Overall Opinion

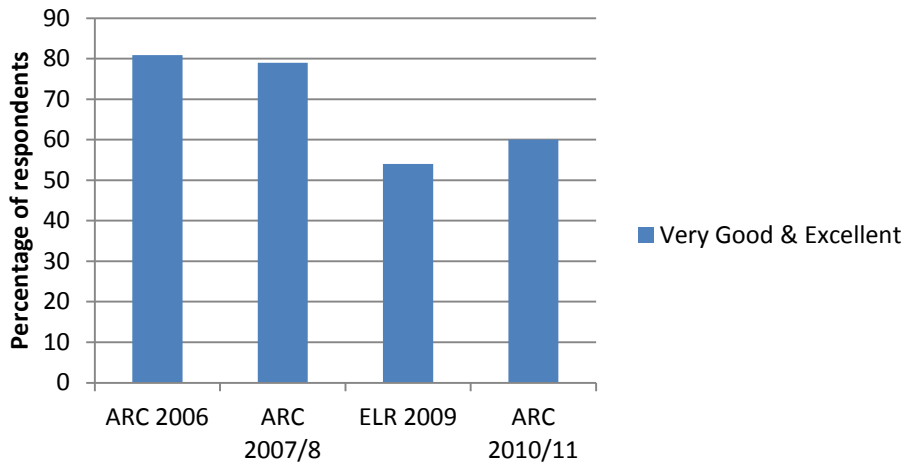


Figure 6 Percentage of responses rating their Overall Opinion as Very Good or Excellent

3.2 MCCIP website

Data on MCCIP website usage, using Google Analytics, is only available for the period 27th September 2007 to 15th July 2010. A problem in using the tracking service means no reliable data are available after 15th July 2010. This has now been rectified and data for 27th January 2012 onwards will be available.

The data show that between 27th September 2007 and 15th July 2010 there were:

- 43,123 visits
- 34,893 unique visitors
- 95,873 page views
- 2.22 pages / visit
- 1 min 31s average time on site

Figure 7 shows the number of visits per day – the average number of visitors per day was 42. It can be seen that the number of visits is steady with a few spikes – the most visits (293) were on 28th April 2009 which corresponds with the launch of the Ecosystems Linkages Report (this is the only major launch event captured in the time period covered below). 213 visits were made the following day. The only other time more than 200 hits was recorded was on 15th Feb 2010 when briefing notes on UKCP09 marine and coastal projections were added and a mail shot sent out.

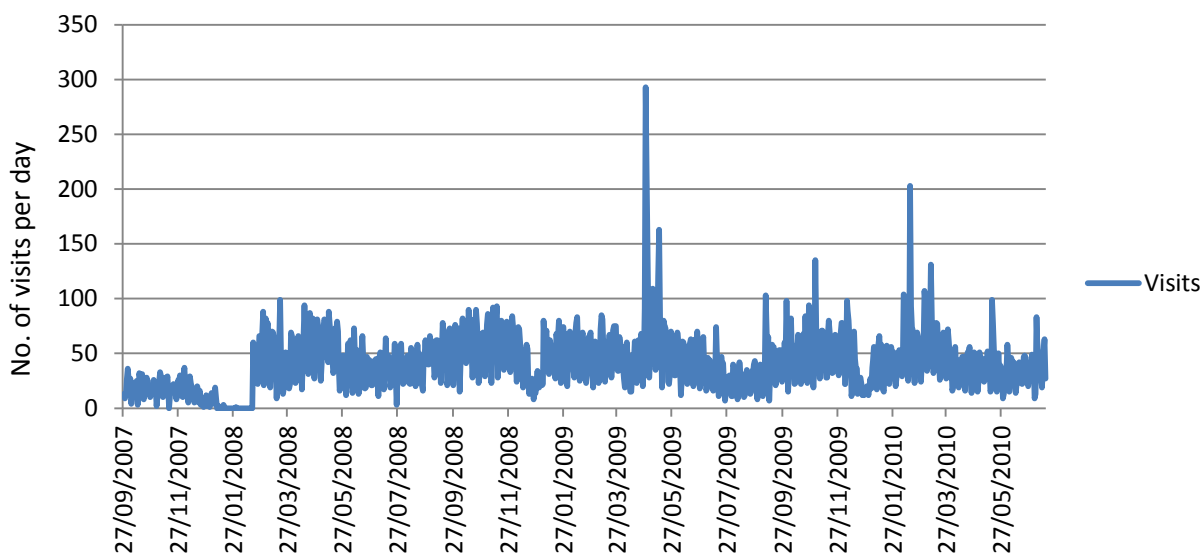


Figure 7 Number of visits each day to the MCCIP website for the period 27/9/2007 – 15/7/2010

19% of visitors during this timeframe accessed the site more than once – there were approximately 8230 return visits to the website. It may be beneficial to run a short survey on the website looking at why people accessed it and if they found it to be useful.

Visitors accessed the site from 168 countries on every continent apart from Antarctica. The countries with over 200 visits can be seen in Table 9.

Country/Territory	Visits	Pages/Visit	Avg. Time on Site	% New Visits
United Kingdom	26,403	2.36	00:01:40	77.04%
United States	5,520	1.6	00:00:48	92.99%
Australia	1,083	2.26	00:01:26	81.99%
Canada	930	1.69	00:00:59	89.35%
India	663	2.25	00:01:30	92.46%
Ireland	622	2.53	00:01:45	83.92%
Germany	547	2.47	00:01:40	86.29%
France	473	2.81	00:01:40	76.74%
Netherlands	414	2.45	00:01:26	86.71%
Spain	374	2.93	00:01:59	80.48%
Brazil	358	1.32	00:00:20	26.26%
Norway	268	2.28	00:01:36	83.21%
Philippines	216	2.05	00:01:50	93.98%
Italy	204	2.57	00:01:23	91.18%
Sweden	204	2.06	00:01:11	84.31%

Table 9 Countries from where the MCCIP website were accessed over 200 times

Although the average time spent on the site was 1 min 31 sec, 71% of visits lasted less than 10 seconds. Of the remaining visits, the majority lasted between 1 and 10 minutes. Few people stayed on the site longer than 30 minutes (Figure 8).

Visits

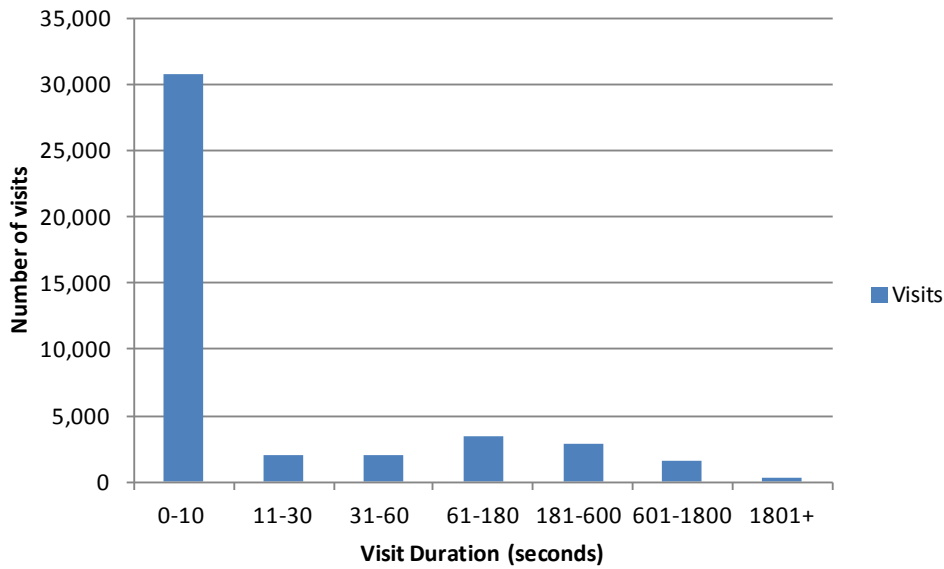


Figure 8 Duration of visits to the MCCIP website

The majority of people (73%) accessed the site via a search engine, mainly Google; 16% went directly to the website and 11% were referred from another website. The top five keywords which resulted in visits to the MCCIP website were:

1. MCCIP
2. coastal geomorphology
3. coastal erosion
4. marine climate change impacts partnership
5. coastal habitats

while 'MCCIP report card' was 12th; 'marine climate' 19th and 'marine climate change' 26th.

Over 500 different websites directed people to www.mccip.org.uk. The top 10 can be seen in Table 10:

Source	Visits
en.wikipedia.org	235
images.google.co.uk	224
images.google.com	215
pmel.noaa.gov	202
defra.gov.uk	188
nrdc.org	150
actoncopenhagen.decc.gov.uk	149
newsweaver.co.uk	133
oceanacidification.wordpress.com	124
oursouthwest.com	102

Table 10 Top 10 websites which directed visitors to the MCCIP website

The Wikipedia page which directed people to the MCCIP website no longer has the link. MCCIP now only receives 2 mentions on Wikipedia, so it is expected that the referral profile will change.

Many visits started on pages other than the Welcome page. This is to be expected considering that the majority of traffic accessed the site via search engines. Once on the website the most visited pages related to the Report Cards.

The data from the website usage shows that MCCIP is reaching people globally.

3.3 MCCIP Newsletter

Newsletters are sent out monthly, via e-mail, by the MCCIP Secretariat providing a summary of marine climate change news and events items which have been added to the MCCIP website. The newsletter takes approximately half a day per month of staff time to source material, draft, send out and administer the mailing list and is used to help maintain MCCIP's profile between high profile events, such as report card launches, as well as providing a mechanism for keeping people informed about marine climate change issues. In January 2012 there were 1049 recipients. The recipients have been placed into categories shown in Table 11:

The remaining 146 recipients not covered in Table 11, were classified according to how they requested the newsletter: 104 receive the newsletter as the result of various mail shots and 42 as a direct request from the website. Going forward, it would be beneficial to capture this information as well as classifying the recipients into type of beneficiary.

Groups 1-3 can be classed as direct beneficiaries and group 4 as indirect beneficiaries. A wide range of organisations, both national and international, is represented.

It would be interesting to see whether the newsletter leads to an increase of visitors to the website and this can be looked at in the future.

Category	Number of recipients	Examples of organisations / individuals receiving the newsletter
1. Communicators		
Media	6	Newspapers
2. Decision Makers / policy advisors		
Steering Group Members	46	
UK Government and Devolved Administration Ministers, officials, civil service departments	96	Defra; MMO; Welsh Government; Scottish Government; DOENI; Ministry of Defence; Department of Transport
Governmental environmental delivery bodies	123	MCCIP Partners; Broads Authority; Maritime & Coastguard Agency; SEPA; SeaFish
Non-governmental policy advocates	49	Wildlife Trusts; WWF; Whale & Dolphin Conservation Society; National Trust; RSPB; OSPAR Commission; Seawatch Foundation; Marine Conservation Society; IFAW; Friends of the Earth; Earthwatch Institute
Research Councils	9	NERC; LWEC; BBSRC
3. End Users		
Regional and Local Government official	32	County Councils; City Councils
Maritime Industry	85	Shellfish associations; Trinity House; SeaFish; Scottish Fishermans Federation; National Farmers Union; Scottish Salmon Producers; Westminster Dredging; Institute of Civil Engineers
Recreational industries	39	Sea Anglers Conservation Network; RNLI; Beach Managers Association
NGOs	2	Shark Trust; SOS Oceanos (Brazil)
Partnerships	72	Regional Climate Change partnerships; coastal partnerships
Consultancies	77	Power companies; HR Wallingford; Coastnet; ABPMer; Royal Haskoning; EMU Ltd
International Organisations	21	IUCN, Danish Forest & Nature Agency; Norwegian Meteorological Institute; Government of Newfoundland & Labrador, Canada; Catalan Government; Government of India; Asian Marine Conservation Association
4. Experts		
Universities	128	Generally students or lecturers from British universities
Research Institutes	104	MCCIP Partners staff; British Geological Survey; CSIRO; Geological Survey of Greenland & Iceland; Institute of Marine Research Portugal; Natural History Museum; Plymouth Marine Laboratory (PML)
UKCIP	5	
Government scientific specialists	7	Defra
Science specialists based in maritime industries	2	Jacobs Engineering UK Ltd; Guernsey Climate Action Network

Table 11 Recipients of the MCCIP Newsletter in January 2012 broken down to reflect the direct and indirect beneficiaries of MCCIP.

4 Influence of MCCIP and its products

MCCIP products and members of the MCCIP steering group have contributed to decision making on numerous occasions (see Appendix 2) and highlights are outlined here.

National /international reports

MCCIP was commissioned to write the climate change chapter for Charting Progress 2 (CP2)² published in July 2010. In their Ministerial Foreword to CP2, ministers from the UK Government and the Devolved Administrations state that it “gives us the evidence for our seas, which we need to inform policy decisions on their future management”.

The climate change section of Scotland’s Marine Atlas³, published in 2011, used information from the 2010/11 MCCIP Annual Report Card. The Atlas “*is a key step in developing our first national marine plan, for all Scottish waters out to 200 nautical miles*”.

MCCIP influenced the design and outputs of the EU project CLAMER⁴ (Climate Change in European Marine Ecosystem Research) which aimed to “raise the awareness of European citizens and society at large to the effects of climate change on the marine environment and their socio-economic consequences”.

MCCIP was also commissioned to write the climate change assessment for the OSPAR Quality Status Report 2010⁵ which “provides policy makers and the wider public with a condensed overview of current knowledge on trends in pressures and impacts and the quality status of the North-East Atlantic and its Regions”.

MCCIP was a co-author of the UK Climate Projections science report: Marine and coastal projections⁶ in 2009 which provides climate information designed to help those needing to plan how they will adapt to a changing climate.

Parliamentary / Ministerial advice (UK & Devolved Administrations)

MCCIP has provided answers to Parliamentary Questions on numerous occasions and submitted evidence to the parliamentary select committee enquiry into ‘investigating our oceans’.

All MCCIP Report Cards have had a ministerial launch.

MCCIP outputs have also been used at the British Irish Council and the Northern Ireland Assembly Committee for the Environment Inquiry into Climate Change.

Government Agency advice

Various adaptation plans, including those for Defra, the Environment Agency and Scotland’s marine sector action plan have used MCCIP outputs.

The UK Marine Science Strategy cited MCCIP as “an example of good practice which the Strategy will seek to support and encourage” in respect of regular, high quality assessments of current and future

² <http://chartingprogress.defra.gov.uk/chapter-6-climate-change-0>

³ <http://www.scotland.gov.uk/Topics/marine/science/atlas/climatechange>

⁴ <http://www.clamer.eu/>

⁵ <http://qsr2010.ospar.org/en/ch03.html>

⁶ <http://ukclimateprojections.defra.gov.uk/content/view/825/500/>

changes. The Marine Science Co-ordination Committee is responsible for driving forward the policy and they have recently endorsed a knowledge gaps paper written by MCCIP.

Advisory Panels / Groups

MCCIP is represented on various advisory panels and groups including:

- UKCP09 Steering Group and User Group.
- National Centre for Ocean Forecasting (NCOF) Working Group on Shelf Seas Climate and Impacts.
- Challenger Society Conference – member of organising committee for 2010 conference and chaired a session on science – policy interface.
- Living with Environmental Change (LWEC) advisory panel for terrestrial climate change report card.
- Cross-government arms length delivery group for the natural environment.
- Development of the Natural Environment part of the National Adaptation Programme.

Miscellaneous

- Shortlisted for 2010 Defra awards for best team in partnership.
- Shortlisted for the 2010 Civil service awards science delivery category.

Media

There was a lot of media interest in the 2007/8 Annual Report Card from overseas as well as the UK. Almost 100 articles appeared either in print or online media across the globe and there were a number of local and national TV and Radio interviews (including BBC Radio 4 and BBC News 24). Examples of the coverage can be seen in Figure 9. Such comprehensive data was not collected for the 2010/11 Annual Report Card and is something which ought to be included for all report card launches / MCCIP events.



Figure 9 Media coverage of 2007/8 Annual Report Card

Citations

A preliminary review, using Google Scholar, of papers / thesis / books and reports that refer to MCCIP was undertaken. There were 50 citations in Journal articles, 9 in book chapters, 3 in dissertations/thesis and 27 in reports. Nearly three-quarters of these are from 2010, 2011 and 2012 and show that MCCIP products have been used in the US, Australia and China. A full list can be found in Appendix 3.

5 MCCIP Method / Approach – use by indirect beneficiaries

The approach taken by MCCIP for their Annual Report Card has been taken up by:

- Marine climate change impacts and adaptation report card Australia 2009⁷.
- LWEC terrestrial climate change report card (in development).
- Ocean acidification: the facts [EPOCA]⁸.
- CLAMER report card on perception of marine climate change risks amongst European citizens.

6 Future evaluation

Climate Smart Working

As this first phase is a pilot, it will be particularly important to get feedback on whether the outputs met the sectors requirements, how easy they were to interpret, how much the sector felt engaged with the process and how useful the sector felt that the product will be to them.

Knowledge Gaps Paper

Monitoring of the uptake / impact of this paper should take place. The knowledge gaps paper is being used to frame a NERC 'SOFI' workshop on knowledge gaps in marine climate change research in the shelf seas and we could follow up with participants for feedback on its usefulness. We will also need to follow up with the MSCC to see what use they are making of the paper.

Report Cards

More feedback on report cards is required, in particular on how they have been used. The response rate to surveys has been low and ways to improve this should be investigated. This could include sending out some hard copies of the questionnaire with the report cards, or, as many of the report cards are sent out in a batch to contacts within organisations to distribute, it may be worth sending these people a questionnaire, or follow up by telephone, to find out from them how the report cards are used within their organisation. The newsletter should be used as a prompt to get people to complete the online survey.

Follow-up telephone interviews with policy advisers/decision makers asking them: (i) what use they have made of it (and other products); (ii) how it has influenced decision-making (case studies); and (iii) how to increase uptake by that group (content or dissemination, etc.). These same questions could be put to the private sector / NGOs (British Energy/RSPB).

It may be worth including an option on the electronic questionnaires for people to leave contact details for us to contact them to conduct follow-up interviews.

⁷ <http://www.oceanclimatechange.org.au/>

⁸ <http://www.epoca-project.eu/>

Contributors – Interviews should take place with the contributors to the Special Topic Report Card, (due to be launched in May 2012) to find out how they have found the process. One of the contributors has also contributed to previous report cards and they should be asked to compare previous experiences.

Uptake of the report card in the media should be monitored in a structured way, including noting any major events which may have affected the coverage.

Website

The data from the website on its usage should be analysed, in particular when products are launched or the newsletter is sent out, to see any increase and where the activity shortly after the launches are from (both geographically and referrals from other websites). This will help to see how far the report cards are reaching. It may be worth running a survey on the website asking people who have used the website what they thought of it/the products and who they are in terms of their role (as used in the report card surveys).

Newsletter

Monitoring of the recipients should continue as this is good evidence of the wide range of people receiving MCCIP products; however, information on how people get on to the mailing list (e.g. direct request; mail shot; attendance at CSW event) should also be gathered. Going forward it should be possible to see if there is an increase in the use of the website which corresponds to the newsletter being sent out. This would give an indication of whether the newsletter is helping to keep up the profile of MCCIP between report cards. It may be worth running a short survey of newsletter recipients to see whether the content of the newsletter is appropriate and whether it is found to be of use.

Appendix 1 Previous Annual Report Card surveys

ARC 2007-2008

Survey questionnaire results

Sample

- **800+ initial invites** (scientists and decision makers)
 - MCCIP News Subscribers (broad range of stakeholders).
 - ARC launch invitees (inc. UK and devolved administration ministers, NGOs, UK and devolved administration government officials, regional CC co-ordinators, industry, heads of SG organisations).
 - Scientific community (inc. contributors / NERC centres / relevant university department heads / heads of scientific organisations contributing to the ARC).
- **Bob Earll mailshot (4500 members)**
 - Broad cross-sectoral representation with interest in aquatic environment
- **122 entered survey, 60 completed it fully**
- **45% scientists** (mostly marine) **and 55% non-scientists** (policy / NGOs / science communicators / other stakeholders)

Overall opinion, content and design

- **Overall opinion** - **80%** very good / excellent (no change)
- **Length** - **69%** about right (+3)
 - *20% too short, 10% too long*
- **Design** – **80%+** good / very good (similar to 2006)
(structure, impact, colours, front page and key messages)
- **Content** – **85%+** good / very good (similar to 2006)
(clarity of messages (>90%), relevance and range of topics)
- **Level of detail** – **54%** about right (-1) / **40%** slightly too little (+3)

Numbers in brackets show comparison to 2006 score

Use of card

- **63%** said that the report card would have a **positive impact** on their day job (no change)
- **71%** would use report card as a **first stop** when looking for scientific advice on marine climate change impacts (+6)
- **80%** rated the 'usefulness of the information for their purposes overall' as either very good or excellent.

Numbers in brackets show comparison to 2006 score

Science, confidence and supporting docs

- **Scientific language** - 77% about right (-8) / 16% too simplistic (+12)
 - **Quality of science** - 87% good / very good / excellent (-6)
- 55% very good / excellent (-2)
 - **Confidence** - 81% said confidence ratings useful (+1)
- 83% clear what confidence ratings mean (+19)
- in 2007-2008 – 82% scientists / 83% non-scientists
- in 2006 - 44% scientists / 84% non-scientists
-
- **Supporting docs** - 72% very / extremely useful (-4), right level 79% (+2) and right length 79% (+12)
» - for 'right level' even split between too simple / too technical

Numbers in brackets show comparison to 2006 score

Future report cards very important / important

	Total	Scientist	Non-Scientist
Regional impacts*	88 (-)	81 (-9)	94 (+9)
Knowledge gaps section	88 (-3)	91 (-)	85 (-)
Updates on themes covered in the first report card	86 (+9)	88 (+14)	85 (+5)
Headline messages on the front page	79 (+14)	81 (+16)	77 (+12)
Hot topics (topics which currently have a high profile)	64 (+3)	69 (+4)	59 (+4)
A more developed confidence rating system	64 (-4)	78 (+4)	50 (-10)

* Scored very highly in the 'very important' category @ 55%

Open responses to 'anything else you would like to see in future cards' show no clear pattern, most say no

Most important issues (coastal – sea level rise, erosion / storms / ecosystem impacts / ocean acidification)

Numbers in brackets show comparison to 2006 score

Other forms of communication that would be useful to you

- Website – 57%
- Workshops / conferences (impacts) – 58%
- Newsletter - 45%
- Workshops / conferences (adaptation) – 40%
- Focus on a special topic – 30%
- Other – 15%

-
- **How frequently should the report card be updated –**
 - **62%** every year (64% science vs 59% non science)
 - **32%** every 2 years (32% science vs 31% non-science)
 - **7%** every five years or less (4% science vs 9% non science)

Conclusions

- **ARC 2007-08 well received** - retain structure, design and content.
- More respondents rated the card '**too simplistic**' compared to 2006 – consider in future MCCIP products. Care must be taken though not to compromise on clarity of messages which got very high ratings.
- **Confidence assessments** – are now better understood, especially amongst the scientists. A more developed confidence rating system for future cards was the least sought after change amongst non-scientists.
- **Supporting documents** – maintain structured approach and overall length.
- **For future ARCs...**
 - Regional impacts
 - Knowledge gaps
 - Updates on previous themes
 - Headline messages

Appendix 2 Activities undertaken on behalf of MCCIP

Advisory Panels / Groups

- UKCP09 Steering Group; UKCP09 User Group; UKCP09 named reviewers.
- Secretariat on organising committee for 2010 challenger society conference and convened and chaired a session on science – policy interface.
- MCCIP secretariat sits on LWEC advisory panel for terrestrial climate change report card and also provides the sole marine representative contributing to the LWEC climate challenge strategic framework.
- MCCIP on advisory committee for the European Environment Agency for their 2012 report on climate change impacts, vulnerability and adaptation to climate change in Europe.
- MCCIP sits on the cross-government ‘arms-length’ delivery group for the natural environment.
- NCOF role – contributing to the NCOF Working Group on Shelf Seas Climate and Impacts.

National /international reports

- Commissioned to write climate change chapter for charting progress 2.
- Commissioned to write the climate change assessment for the OSPAR quality status report 2010.
- Commissioned to co-author the UKCP09 marine and coastal projections report.
- Contributed to ESF marine board position paper on marine climate change in Europe.
- Evidence base from MCCIP report cards heavily cited in the CCRA and key role of MCCIP in facilitating transfer of evidence for the marine sector highlighted in the report.
- Scotland’s Marine Atlas – climate change section used MCCIP information.
- National Ecosystem assessment- cited MCCIP outputs in the Marine chapter.
- Influence on EU projects- ‘Clamer’ Climate Change in European Marine Ecosystem Research, MCCIP influenced the design and output of this project. MCCIP outputs (ARC and Special topic) cited and diagrams used.
- Input to WWF-SAHFOS Impacts of the Ocean on Climate Workshop -→ Reid, P.C, et al (2009) The impacts of the Oceans on Climate Change, Advances in Marine Biology, 56, 1-150. ISBN 9780123749604 doi:10.1016/S0065-2881(09)56001-4.

Parliamentary / Ministerial advice (UK & Devolved Administrations)

- Submitted evidence to parliamentary select committee enquiry into ‘investigating our oceans’.
- Ministerial launch for all MCCIP report cards to date.
- British Irish Council – minuted debate on MCCIP outputs.
- Answers to Parliamentary Questions-HC Deb, 13 December 2006, c1065W; HC Deb, 6 December 2006, c621-622W, 5 February 2007, c426W, HC Deb, 10 December 2009, cWA144-145HC Deb, 23 November 2010, c178W; Scottish Parliament Question S3W-35497)
- Northern Ireland Assembly - Committee For The Environment Inquiry into Climate Change NIA 24/09/10R (Committee for Environment) MCCIP documents taken.

Government Agency advice

- Written into the Defra adaptation action plan.
- Written into Scotland’s marine sector action plan [under Scotland’s climate change adaptation network].
- Partnering with the EA to help deliver the marine environment part of their new UK adaptation function, including providing input into the National Adaptation Programme.

- Evidence from MCCIP report cards used to develop the EA marine adaptation plan.
- Continued support of MCCIP written into the SNH adaptation action plan.
- Highlighted as example of good practice in UK marine science strategy.

Others

- MCCIP knowledge gaps paper formally submitted to [and subsequently endorsed by] the MSCC and used to frame NERC SOFI workshop on knowledge gaps on marine climate change in the UK shelf seas.
- Shortlisted for 2010 Defra awards for best team in partnership.
- Shortlisted for the 2010 Civil service awards: science delivery category.

Appendix 3 - References to MCCIP work:

Journal Articles

1. T. Thomas, M.R. Phillips, A.T. Williams, R.E. Jenkins, Medium time-scale behaviour of adjacent embayed beaches: Influence of low energy external forcing, (2012) *Applied Geography*, Volume 32, Issue 2, March 2012, Pages 265-280, ISSN 0143-6228, 10.1016/j.apgeog.2011.05.007.
2. L Vezzulli, I Brettar, E Pezzati, PC Reid, RR Colwell, MG Höfle and C Pruzzo (2012) Long-term effects of ocean warming on the prokaryotic community: evidence from the vibrios, *The ISME Journal*, 6, 21–30; doi:10.1038/ismej.2011.89
3. S.N.R. Birchenough, R.E. Parker, E. McManus, J. Barry, (2012) Combining bioturbation and redox metrics: Potential tools for assessing seabed function, *Ecological Indicators*, Volume 12, 8-16, doi:10.1016/j.ecolind.2011.03.015.
4. Karyn Morrissey, Cathal O'Donoghue, (2012) The Irish marine economy and regional development, *Marine Policy*, 36, 358-364, ISSN 0308-597X, 10.1016/j.marpol.2011.06.011.
5. Wolf, Judith; Brown, Jennifer; Howarth, Michael. (2011) The wave climate of Liverpool Bay—observations and modelling, *Ocean Dynamics*, 61, 639-655. Doi: 10.1007/s10236-011-0376-9
6. Brown, Jennifer; Wolf, Judith; Souza, Alejandro (2011) Past to future extreme events in Liverpool Bay: model projections from 1960–2100, *Climatic Change*, 1- 27. Doi: 10.1007/s10584-011-0145-2
7. Cheng Xi, Li Xiao-ping (2011) Early Growth of Phytoplankton Community in Dianshan Lake., *Environmental Science (Chinese Journal) Vol 32*, 3215-3222
8. T. Thomas, M.R. Phillips, A.T. Williams, R.E. Jenkins Short-term beach rotation, wave climate and the North Atlantic Oscillation (NAO) (2011) *Progress in Physical Geography*, 35, 333-352, doi: 10.1177/0309133310397415
9. Henry A. Ruhl, Michel André, Laura Beranzoli, M. Namik Çagatay, Ana Colaço, Mathilde Cannat, Juanjo J. Dañobeitia, Paolo Favali, Louis Géli, Michael Gillooly, Jens Greinert, Per O.J. Hall, Robert Huber, Johannes Karstensen, Richard S. Lampitt, Kate E. Larkin, Vasiliios Lykousis, Jürgen Mienert, J. Miguel Miranda, Roland Person, Imants G. Priede, Ingrid Puillat, Laurenz Thomsen, Christoph Waldmann, (2011) Societal need for improved understanding of climate change, anthropogenic impacts, and geo-hazard warning drive development of ocean observatories in European Seas, *Progress In Oceanography*, Volume 91, 1-33. doi:10.1016/j.pocean.2011.05.001.
10. Thomas, T., Phillips, M. R., Williams, A. T. and Jenkins, R. E. (2011), A multi-century record of linked nearshore and coastal change. *Earth Surface Processes and Landforms*, 36: 995–1006. doi: 10.1002/esp.2127
11. Liqi Chen, Suqing Xu, Zhongyong Gao, Haiying Chen, Yuanhui Zhang, Jianqiong Zhan, Wei Li, (2011) Estimation of monthly air-sea CO₂ flux in the southern Atlantic and Indian Ocean using in-situ and remotely sensed data, *Remote Sensing of Environment*, Volume 115, Issue 8, 15 August 2011, Pages 1935-1941, ISSN 0034-4257, 10.1016/j.rse.2011.03.016.
12. T. Thomas, M.R. Phillips, A.T. Williams, R.E. Jenkins (2011) Medium timescale beach rotation; gale climate and offshore island influences, *Geomorphology*, Volume 135, 97-107, doi:10.1016/j.geomorph.2011.08.002.
13. Foden, Jo; Devlin, Michelle; Mills, David; Malcolm, Stephen (2011) Searching for undesirable disturbance: an application of the OSPAR eutrophication assessment method to marine waters of England and Wales, *Biogeochemistry*, 106, 157-175. Doi: 10.1007/s10533-010-9475-9
14. Cockell, Charles; Pybus, David; Olsson-Francis, Karen; Kelly, Laura; Petley, David; Rosser, Nick; Howard, Kieren; Mosselmans, Fred (2011) Molecular Characterization and Geological Microenvironment of a Microbial Community Inhabiting Weathered Receding Shale Cliffs, *Microbial Ecology*, 61, 166-181. doi: 10.1007/s00248-010-9730-6

15. Sophie Martin, Sophie Richier, Maria-Luiza Pedrotti, Sam Dupont, Charlotte Castejon, Yannis Gerakis, Marie-Emmanuelle Kerros, François Oberhänsli, Jean-Louis Teyssié, Ross Jeffree, and Jean-Pierre Gattuso (2011) Early development and molecular plasticity in the Mediterranean sea urchin *Paracentrotus lividus* exposed to CO₂-driven acidification. *J Exp Biol* 214, 1357-1368. doi: 10.1242/?jeb.051169
16. Ruocco, Amy; Nicholls, Robert; Haigh, Ivan; Wadey, Matthew (2011) Reconstructing coastal flood occurrence combining sea level and media sources: a case study of the Solent, UK since 1935. *Natural Hazards*, 59, 1773-1796. doi: 10.1007/s11069-011-9868-7
17. U. Rashid Sumaila, William W. L. Cheung, Vicky W. Y. Lam, Daniel Pauly & Samuel Herrick (2011) Climate change impacts on the biophysics and economics of world fisheries. *Nature Climate Change* 1, 449–456 (2011) doi:10.1038/nclimate1301
18. Wood, Hannah; Spicer, J.; Kendall, M.; Lowe, D.; Widdicombe, S. (2011) Ocean warming and acidification; implications for the Arctic brittlestar *Ophiecten sericeum*; *Polar Biology*, 34, 1033-1044, doi: 10.1007/s00300-011-0963-8
19. R. I. PERRY (2011). Potential impacts of climate change on marine wild capture fisheries: an update. *The Journal of Agricultural Science*, 149, 63-75 doi:10.1017/S0021859610000961
20. Burrows MT, Schoeman DS, Buckley LB, Moore P, Poloczanska ES, Brander KM, Brown C, Bruno JF, Duarte CM, Halpern BS, Holding J, Kappel CV, Kiessling W, O'Connor MI, Pandolfi JM, Parmesan C, Schwing FB, Sydeman WJ, Richardson AJ.(2011) The pace of shifting climate in marine and terrestrial ecosystems. *Science*. 334(6056):652-5doi:10.1126/science.1210288
21. Peter G.H. Evans, Graham J. Pierce and Simone Panigada (2010). Climate change and marine mammals. *Journal of the Marine Biological Association of the United Kingdom*, 90 , pp 1483-1487 doi:10.1017/S0025315410001815
22. Edward B.L. Mackay, AbuBakr S. Bahaj, Peter G. Challenor (2010), Uncertainty in wave energy resource assessment. Part 2: Variability and predictability, *Renewable Energy*, 35, 1809-1819, ISSN 0960-1481, 10.1016/j.renene.2009.10.027.
23. John Coll, Stuart W. Gibb, Martin F. Price, John McClatchey, John Harrison, (2010) Developing site scale projections of climate change in the Scottish Highlands. *Climate Research*, Vol. 45: 71–85. doi: 10.3354/cr00958
24. Smyth, T. J., J. R. Fishwick, C. P. Gallienne, J. A. Stephens, A. J. Bale, (2010): Technology, Design, and Operation of an Autonomous Buoy System in the Western English Channel. *J. Atmos. Oceanic Technol.*, 27, 2056- 2064. doi:10.1175/2010JTECHO734.1
25. Wood, Hannah; Spicer, J.; Lowe, D.; Widdicombe, S. (2010) Interaction of ocean acidification and temperature; the high cost of survival in the brittlestar *Ophiura ophiura*. *Marine Biology*, 157, 2001-2013. Doi:10.1007/s00227-010-1469-6
26. Timothy J. Smyth, James R. Fishwick, Lisa AL-Moosawi, Denise G. Cummings, Carolyn Harris, Vasillis Kitidis, Andrew Rees, Victor Martinez-Vicente, and Ernest M. S. Woodward (2010) A broad spatio-temporal view of the Western English Channel observatory *J. Plankton Res.*, 32(5): 585-601, doi:10.1093/plankt/fbp128
27. T. Thomas, M.R. Phillips, A.T. Williams, (2010) Mesoscale evolution of a headland bay: Beach rotation processes, *Geomorphology*, 123, 129-141, doi:10.1016/j.geomorph.2010.06.018.
28. Harris, Michael; Daunt, Francis; Newell, Mark; Phillips, Richard; Wanless, Sarah (2010) Wintering areas of adult Atlantic puffins *Fratercula arctica* from a North Sea colony as revealed by geolocation technology, *Marine Biology*, 157, 827- 836. doi: 10.1007/s00227-009-1365-0
29. Slater, L. and Byrd, G. V. (2009), Status, trends, and patterns of covariation of breeding seabirds at St Lazaria Island, Southeast Alaska, 1994–2006. *Journal of Biogeography*, 36: 465–475. doi: 10.1111/j.1365-2699.2008.02050.x

30. Eva Garnacho, Robin J. Law, Ronny Schallier, Joan Albaiges (2010), Targeting European R&D for accidental marine pollution, *Marine Policy*, Volume 34, Issue 5, September 2010, Pages 1068-1075, ISSN 0308-597X, 10.1016/j.marpol.2010.03.006.
31. Coulson, John C. (2010) A long-term study of the population dynamics of Common Eiders *Somateria mollissima*: why do several parameters fluctuate markedly?, *Bird Study*, 57, 1-18, Doi:10.1080/00063650903295729},
32. L.J. Falkenberg , O.W. Burnell , S.D. Connell and B.D. Russell (2010) Sustainability in Near-shore Marine Systems: Promoting Natural Resilience. *Sustainability* 2010, 2, 2593-2600; doi:10.3390/su2082593
33. Marcos-López, M., Gale, P., Oidtmann, B. C. and Peeler, E. J. (2010), Assessing the Impact of Climate Change on Disease Emergence in Freshwater Fish in the United Kingdom. *Transboundary and Emerging Diseases*, 57: 293–304. doi:10.1111/j.1865-1682.2010.01150.x
34. Shane O'Boyle, Glenn Nolan, (2010) THE INFLUENCE OF WATER COLUMN STRATIFICATION ON DISSOLVED OXYGEN LEVELS IN COASTAL AND SHELF WATERS AROUND IRELAND, *Biology & Environment: Proceedings of the Royal Irish Academy*, 110, 195-209, doi: 10.3318/BIOE.2010.110.3.195
35. Clark, Rebecca and Holmes, John (2010) Improving input from research to environmental policy: challenges of structure and culture, *Science and Public Policy*, 37, 751-764, doi:10.3152/030234210X534887
36. DEBORAH PEEL, GREG LLOYD (2010) Strategic regeneration: A policy coupling approach to managing a coastal resort in South Wales, *Environmental Hazards* Vol. 9, Iss. 3, 2010
37. Findlay HS, Kendall MA, Spicer JI, Widdicombe S (2009) Future high CO2 in the intertidal may compromise adult barnacle *Semibalanus balanoides* survival and embryonic development rate. *Mar Ecol Prog Ser* 389:193-202
38. Louise Shaxson(2009)Structuring policy problems for plastics, the environment and human health: reflections from the UK. *Phil. Trans. R. Soc. B* July 27, 2009 364 (1526) 2141-2151; doi:10.1098/rstb.2008.0283
39. Fox, C., R. Harris, S. Sundby, E. Achterberg, J.I. Allen, J. Allen, A. Baker, C.P.D. Brussaard, P. Buckley, E. Cook, S.R. Dye, M. Edwards, L. Fernand, P. Kershaw, J. Metcalfe, S. Østerhus, T. Potter, E. Sakshaug, D. Speirs, E. Stenevik, M. St. John, F. Thingstad & B. Wilson, (2009) Transregional Linkages in the North-Eastern Atlantic — An 'End-to-End' Analysis of Pelagic Ecosystems *Oceanography and Marine Biology: An Annual Review*, 47, 1-76
40. Deborah Peel, Michael Gregory Lloyd (2009) A Coastal and Marine National Park for Scotland: A Tactical or Strategic Affair? *International Planning Studies* Vol. 14, Iss. 3
41. Slater, L. and Byrd, G. V. (2009), Status, trends, and patterns of covariation of breeding seabirds at St Lazaria Island, Southeast Alaska, 1994–2006. *Journal of Biogeography*, 36: 465–475. doi: 10.1111/j.1365-2699.2008.02050.x
42. Doney, S.C., W.M. Balch, V.J. Fabry, and R.A. Feely. (2009). Ocean acidification: A critical emerging problem for the ocean sciences. *Oceanography* 22(4):16–25, [doi:10.5670/oceanog.2009.93](https://doi.org/10.5670/oceanog.2009.93).
43. David Hadley (2009), Land use and the coastal zone, *Land Use Policy*, Volume 26, 198-S203, ISSN 0264-8377, 10.1016/j.landusepol.2009.09.014.
44. Patricia Noguera, Catherine Collins, David Bruno, Campbell Pert, Anna Turnbull, Alison McIntosh, Katherine Lester, Ian Bricknell, Stuart Wallace, Paul Cook. (2009) Red vent syndrome in wild Atlantic salmon *Salmo salar* in Scotland is associated with *Anisakis simplex sensu stricto* (Nematoda: Anisakidae). *DISEASES OF AQUATIC ORGANISMS* Vol. 87: 199-215, 2009. doi: 10.3354/dao0214
45. Nicholas J. Hardman-Mountford, Gerald Moore, Dorothee C. E. Bakker, Andrew J. Watson, Ute Schuster, Rosa Barciela, Adrian Hines, Gwenaëlle Moncoiffé, Juan Brown, Stephen Dye, Jerry Blackford, Paul J. Somerfield, Jason Holt, David J. Hydes, and James Aiken (2008) An operational monitoring system to provide indicators of CO2-related variables in the ocean *ICES J. Mar. Sci.* (2008) 65(8): 1498-1503 first published online June 26, 2008 doi:10.1093/icesjms/fsn110

46. Turton, J. and Fenna, P. (2008), Observations of extreme wave conditions in the north-east Atlantic during December 2007. *Weather*, 63: 352–355. doi:10.1002/wea.321
47. Dulvy, N. K., Rogers, S. I., Jennings, S., Stelzenmüller, V., Dye, S. R. and Skjoldal, H. R. (2008), Climate change and deepening of the North Sea fish assemblage: a biotic indicator of warming seas. *Journal of Applied Ecology*, 45: 1029–1039. doi: 10.1111/j.1365-2664.2008.01488.x
48. Diez-Picazo, Martin (2007) Climate change and the future Maritime Policy for the EU, *WMU Journal of Maritime Affairs*, 6, 241- 247. Doi: 10.1007/BF03195119
49. Doris Schiedek, Brita Sundelin, James W. Readman, Robie W. Macdonald, (2007) Interactions between climate change and contaminants, *Marine Pollution Bulletin*, Volume 54, Issue 12, December 2007, Pages 1845-1856, ISSN 0025-326X, 10.1016/j.marpolbul.2007.09.020.
50. CLIMATE CHANGE = TOURISM CHANGE? - THE LIKELY IMPACTS OF CLIMATE CHANGE ON TOURISM IN GERMANY'S NORTH SEA COAST DESTINATIONS, (2007) A. Matzarakis, C. R. de Freitas, D. Scott, 2007, *Developments in Tourism Climatology*, 246-253

Books

1. Bartels, Claudia (2011) Regelung von Konflikten durch Klimawandel im Tourismussektor mithilfe kooperativer Prozesse am Beispiel des Projektes KUNTIKUM. Pages 186-200 in Book Title: Nachhaltige Gesellschaft (Eds: Heinrichs, Harald; Kuhn, Katina; Newig, Jens) VS Verlag für Sozialwissenschaften. Isbn: 978-3-531-93020-6. doi: 10.1007/978-3-531-93020-6_12
2. K. Davidson, P. Tett, R. Gowan. Harmful Algal Blooms (2011) *Marine Pollution and Human Health* (Hester and Harrison eds) , *Issues in Environmental Science and Technology*, 33, Royal Society of Chemistry ISBN 9781849732406
3. A. Dlugolecki (2011) An overview of the impact of climate change on the insurance industry. Chapter 13 in *Climate Extremes and Society*. (Diaz and Murnane eds) Cambridge University Press. ISBN 9780521870283
4. Williams, K. S. (2010) Life Cycle Assessment of Bulk Packaging Used to Transport Fresh Fish Products: Case Study, in *Fish Processing: Sustainability and New Opportunities* (ed G. M. Hall), Wiley-Blackwell, Oxford, UK. doi: 10.1002/9781444328585.ch11
5. G Kaminskaite-Salters (2010) Climate change litigation in the UK: its feasibility and prospects chapter 7 in *Climate change liability*, (eds Michael Faure , Marjan Peeters) , *New Horizons in Environmental and Energy Law*, Edward Elgar Publishing Ltd., UK. ISBN 978 1 849802864
6. Wilson, Elizabeth, and Jake Piper. (2010). *Spatial Planning and Climate Change*. Ed. Routledge. Routledge. <http://www.routledge.com/books/details/9780415495912/>.
7. Cooper, Andrew and Boyd, Stephen (2010) Climate Change and Coastal Tourism in Ireland. In: *Disappearing Destinations: Climate Change and the Future Challenges for Coastal Tourism*. (Jones and Phillips eds) CAB International, pp. 125-143. ISBN 9781845935481
8. G Kaminskaite-Salters (2010) Constructing a private climate change lawsuit under English law: a comparative perspective. *Kluwer Law International* www.kluwerlaw.com ISBN 9789041132536
9. Payne, A., Cotter, J. and Potter, T. (2009) *Advances in Fisheries Science: 50 years on from Beverton and Holt*, Blackwell Publishing Ltd., Oxford, UK. doi: 10.1002/9781444302653.fmatter

Theses and dissertations

1. KM Smith (2011) MINIMISING THE IMPACTS OF FLOODING IN SCOTLAND: THE SCENARIO EXERCISE, A TOOL FOR INCREASED RESILIENCE. MSc Dissertation Heriot Watt University.
2. Reynolds, Toby J. (2010) Bayesian modelling of integrated data and its application to seabird populations. University of St Andrew, Thesis, (Supervisors: King, Ruth; Harwood, John; Frederiksen, Morten; Harris, Michael P.; Wanless, S.) <http://hdl.handle.net/10023/1635>

- Haywood, Elizabeth (2008) Are fish and chips sustainable with climate change: What affects may this have on the British diet? (Advisor: Burek, Cynthia V), MSc dissertation, University of Chester, <http://hdl.handle.net/10034/57095>

Reports

- HORSBURGH, K, MASKELL, J & WILLIAMS, J (2011) Numerical modelling of storm surges in the Irish Sea and the Isle of Man, and analysis of those factors determining extreme sea levels of the region in a future climate, Southampton, UK: National Oceanography Centre, 53pp. & appendices. (National Oceanography Centre Research and Consultancy Report, No. 12
- Pierre Gallego (2009) Possible physiological and pathological consequences of climate change for cetaceans in Cetaceans and Other Marine Biodiversity of the Eastern Tropical Pacific: Options for Adapting to Climate Change. (Hoffman, JR, Fonseca, A, and C Drews (eds).) 2009. Report from a workshop held February 9-11, 2009. MINAET/WWF/EcoAdapt/CI/IFAW/TNC/WDCS/IAI/PROMAR, San Jose, Costa Rica ISBN: 978-9968-825-37-
- Verstraete, H.; Stienen, E.W.M.; Van de walle, M. (2009). Vogelstrandingen op de Vlaamse stranden - winter 2008/09. Rapport van het Instituut voor Natuur- en Bosonderzoek, R.2009.60. Instituut voor Natuur- en Bosonderzoek (INBO): Brussel. 43 pp.
- ICES (2008) Judith Pederson, Jesus Cabal, Gordon Copp, Tracy Edwards, Stephan Gollasch, Francis Kerckhof, Erkki Leppäkoski, Laurence Miossec, Inger Wallentinus (2008) ICES Working Group on Introduction and Transfers of Marine Organisms Report to OSPAR.
- Ilya M.D. Maclean, Mark M. Rehfish, Simon Delany, Robert A. Robinson, (2007) The Effects of Climate Change on Migratory Waterbirds within the African-Eurasian Flyway. The British Trust for Ornithology under contract to the AEWA Secretariat 8th MEETING OF THE TECHNICAL COMMITTEE, United Nations Environment Programme
- ICES (2008) REPORT OF THE WORKING GROUP ON ENVIRONMENTAL INTERACTIONS OF MARICULTURE (WGEIM) ICES WGEIM REPORT 2008 ICES Mariculture Committee , ICES 2008/MCC:03
- Karyn Morrissey, Stephen Hynes, Cathal O'Donoghue (2008) ,Quantifying the Value of the Marine Sector in Ireland, Proceedings of the 2nd Annual Beaufort Marine Socio-Economic Workshop, SEMRU (Socio-Economic Marine Research Unit), National University of Ireland, Galway
- Huthnance, John. (2010) Temperature and salinity. In: Buckley, Paul; Connor, David; Cook, David; Cox, Martyn; Dale, Tabitha; Dye, Stephen; Frost, Matt; Hawkridge, Jane; Huthnance, John; Kroeger, Silke; Law, Robin; McKie, Jim; Maes, Thomas; Malcolm, Stephen; Moffat, Colin; Moxon, Richard; Raymond, Katherine; Saunders, Justine; Vincent, Claire; Walker, Gabrielle; Waldock, Mike; Williamson, Phil, (eds.) Charting the progress 2: ocean processes feeder report, section 3.2. London, DEFRA on behalf of the United Kingdom Marine Monitoring and Assessment Strategy (UKMMAS) Community, 39-106.
- Andrew Prior and Mandy J. McMath (2008) MARINE MAMMALS AND NOISE FROM OFFSHORE RENEWABLE ENERGY PROJECTS – UK DEVELOPMENTS pp12-16 PROCEEDINGS OF THE ASCOBANS/ECS WORKSHOP- OFFSHORE WIND FARMS AND MARINE MAMMALS: IMPACTS & METHODOLOGIES FOR ASSESSING IMPACTS, ECS SPECIAL PUBLICATION SERIES NO. 49 FEB 2008
- Mitchell, P.I. & Parsons, M. (2007) Strategic Review of the Seabird Monitoring Programme JNCC Unpublished Report.
- C. Turley, D. Bakker, A. Clarke, P. Nightingale, J. Pinnegar, U. Riebesell, D. Schmidt, T. Tyrrell, H. Beadman, Z. Bond, D. Campbell and J. Thorpe (2009) The UK Ocean Acidification Research Programme - Science Plan (2009-2014)
- Stuart E. Newson, Nick Dulvy, Graeme C. Hays, Jon D.R. Houghton, France F. Gerard, Anthony M. Hutson, Colin D. Macleod, Sonia Mendes, Robert Robinson, Tim H. Sparks, Graham J. Pierce & Humphrey Q.P. Crick (2008) Indicators of the impact of Climate Change on Migratory Species. BTO Research Report 495. ISBN No. 978-1-906204-40-
- ICES. (2008). Report of the Working Group on Marine Mammal Ecology (WGMME), February 25–29 2008, St. Andrews, UK. ICES CM 2008/ACOM:44. 86 pp.

14. Bijma, J. , Barange, M. , Brander, L. , Cardew, G. , de Leeuw, J. , Feely, R. , Fernand, R. , Ganssen, G. , Gattuso, J., Ganzalez Davila, M. , Haugan, P. , Held, H. , Hood, M. , Kiefer, T. , Kozyr, A. , Orr, J. , Pörtner, H. , Rehdanz, K. , Reichart, G. , Rodhouse, P. , Schmidt, F. , Thorndyke, M. , Turley, C. , Urban, E. , Ziveri, P. , Lipiatou, E. , Avril, B. and Turk, D. (2009): Impacts of ocean acidification , ESF Science Policy Briefing, 37 , pp. 1-12 .
15. John Coll, Cathy Maguire, John Sweeney (2008), Biodiversity and Climate Change in Ireland, Briefing Paper, Submitted to Comhar SDC, November 2008
16. Carter, David; Huthnance, John. (2010) Waves. In: Charting the progress 2: ocean processes feeder report, Section 3.6, 159-180. London, UK, Department for Environment Food and Rural Affairs, 22pp.
17. Sorcha Ní Longphuirt, Dagmar Stengel, Colin O'Dowd and Evin McGovern (2010) Ocean Acidification: An Emerging Threat to our Marine Environment. Marine Foresight Series No.6, Marine Institute Galway, ISSN: 1649-590 <http://hdl.handle.net/10793/80>
18. Bergquist, D.C., R.F. Van Dolah, G.H.M Riekerk, M.V. Levisen, S.E Crowe, L. Brock, D.I. Greenfield, D.E. Chestnut, W. McDermott, M.H. Fulton, E. Wirth and J. Harvey. 2009. The Condition of South Carolina's Estuarine and Coastal Habitats During 2005-2006: Technical Report. Charleston, SC: South Carolina Marine Resources Division. Technical Report No. 103. 74 p.
19. Carey Yeager (2008) An Analysis of Opportunities for USAID Indonesia's Water and Energy Team to Incorporate Global Climate Change Activities in the Natural Resource Management and Energy Sectors. Report to USAID Indonesia
20. Wendy Dodds (2010) Severn Estuary Planning Review: Phase One Report June 2010
21. Mott Macdonald (2008) Pilot Shellfish Fisheries Strategic Environmental Assessment Scoping Report 2008 North Eastern Sea Fisheries Committee
22. Young, J., Sousa Pinto, I., Hawkins, S., Serrão Santos, R. and Watt, A.D. (Editors). (2007). Life on the Blue Planet: Biodiversity research and the new European marine policies. Report of an e-conference.
23. Scottish Natural Heritage (2009) Climate change and the natural heritage SNH's approach and action plan 2009-2014 ISBN: 978-1-85397-588-2
24. OSPAR (2009) Impacts of climate change on the North-East Atlantic ecosystem, OSPAR Commission – Monitoring and Assessment Series, Pub. No: 463, ISBN 978-1-907390-04-3
25. Mary Zsamboky, Amalia Fernández-Bilbao, David Smith, Jasper Knight and James Allan (2011) Impacts of climate change on disadvantaged UK coastal published 2011 by the Joseph Rowntree Foundation, ISBN: 978-1-85935-804-7
26. Climate Change Committee (2011) How well is Scotland preparing for climate change? Report by the Adaptation Sub-Committee.
27. N. J. Hardman-Mountford & J. M. Huthnance (2006) The development of useful indicators for Marine Processes & Climate (MPC) and Underwater Sound. Prepared for GOOS Action Group (GOOS-AG) of the Interagency Committee for Marine Science and Technology.