Kementerian PPN/ Bappenas

Australian Aid

Knowledge Sector Initiative

WORKING PAPER 9

Synthesising and Presenting Complex Evidence for Policy Making:

Experience With Annual Report Cards

Kementerian PPN/ Bappenas

Australian Aid

Knowledge Sector Initiative

WORKING PAPER 9

Synthesising and Presenting Complex Evidence for Policy Making:

Experience With Annual Report Cards

Written by:
Louise Shaxson and Josephine Tsui

April 2016

Synthesising and Presenting Complex Evidence for Policy Making:

Experience With Annual Report Cards

Key Messages

- There are four questions that are important for all evidence-informed policy making:
  1. What is the current state of our understanding about the issue?
  2. What evidence exists about the issue and who has produced it?
  3. What changes have been observed and what could happen in future?
  4. How confident are we in the evidence that informs our understanding, and is that confidence increasing or decreasing over time?

  The questions outlined above are common to policy makers in all countries. They need to be answered with a commitment to robust evidence, wide engagement with stakeholders open to different types of evidence, and an awareness of the importance of transparent methods of assessing the body of evidence for each issue.
- Policy decisions are more robust when they are informed by different sources of evidence rather than a single piece of research. However, assembling and presenting a body of evidence effectively can be a challenging process. This is particularly true when the policy issue is a complex one, the evidence is changing over time, and many different people and organisations are involved in producing the evidence and interpreting what it means.
- The Marine Climate Change Impacts Partnership (MCCIP) in the UK has developed Annual Report Cards, an innovative approach for assembling and presenting large and complex bodies of evidence on the effects of climate change on the marine environment. The MCCIP gathers together robust, peer-reviewed evidence on key topics and assesses how confident the partnership is in what that evidence says. It presents those confidence assessments in a visually appealing way, which makes it easy for marine policy makers to take up and use the evidence.
- The relevance of the MCCIP experience lies in that it performs a valuable 'brokering/ intermediary' role between science and policy. The partnership as a whole gathers together evidence on main policy-relevant issues and provides a realistic assessment of the robustness of the body of evidence for each topic. It presents transparent assessments of how confident scientists are in their knowledge of what is currently happening, and what is likely to happen in future. The report cards synthesise the evidence so it is accessible to non-specialist policy makers and the public. Marine policy makers in the UK have praised the report cards as being 'highly valuable'.
- The MCCIP approach could readily be adapted to the needs of more resource-constrained government organisations.

Table of Contents

Abbreviations and Acronyms

ARC	:	Annual Report Card
Defra	:	Department of Environment, Food and Rural Affairs (UK)
IPCC	:	Intergovernmental Panel on Climate Change
MCCIP	:	Marine Climate Change Impacts Partnership

Executive Summary

Policy makers face many highly complex issues that are the focus of a large number of research studies, data analysis and assessments required as the evidence to inform decisions. Assembling and interpreting this evidence can be a challenging process. There may be many different stakeholders involved in producing the evidence, and they may have different views over what the evidence means. Over time, more evidence may emerge that challenges what was previously thought to be correct.

In the UK, the Department for Environment, Food and Rural Affairs (Defra) faced exactly these sorts of challenges, particularly around the effects of climate change on the marine environment. A wide range of policy issues required evidence to inform decisions. This included policies around health and safety at sea, fisheries management, maintaining water quality, reducing coastal erosion, seabird and marine mammal populations, and how to deal with invasive species. Many different organisations—government research agencies, universities and non-government organisations from several countries—provided relevant evidence for one or more of the issues. However, it was not done in a co-ordinated way, making it difficult for Defra policy makers to gather and interpret the evidence effectively.

In 2006, a group of organisations pooled their resources to create a partnership to focus on three areas: 1) Assembling the evidence for the effects of climate change on the marine environment; 2) Assessing the robustness of the evidence; and 3) Presenting the evidence in an accessible way. This became the Marine Climate Change Impacts Partnership (MCCIP). The format they chose was an Annual Report Card (ARC). Its purpose is to provide a short but comprehensive and visually appealing summary of the evidence so it can be quickly and easily understood and used by policy advisers, ministers, local governments and national parliamentarians. The partnership committed to producing these on a rolling basis so that the evidence was kept as up-to-date as possible. Over the past 10 years, ARCs have become a valuable source of information for marine policy makers, and the MCCIP fulfils an important intermediary and brokering role at the interface between science and policy. This short working paper describes the ARCs, how they are produced and why they can be useful.

A key aspect of the ARCs is their use of 'confidence assessments' in the body of evidence around each issue. This helps ensure that policy makers do not 'cherry pick' the evidence to suit their requirements and that they understand the limits of what the evidence can tell them. These confidence assessments are developed in a very collaborative manner, which builds stakeholder involvement in the decision-making process and improves the transparency of how the evidence is sourced and ultimately used.

The partnership is funded by contributions from a range of government organisations, with the largest contribution coming from central government. It has a small secretariat that is independent of policy makers, and a steering group led by a senior marine policy maker to ensure that the partnership's work is relevant to current policy priorities.

All the research papers that inform the ARCs are peer reviewed to research journal standard. The high profile of the ARCs means that the organisations involved in the partnership are happy to contribute their own 'in-kind' resources, such as travel, attendance and communications. MCCIP resources can therefore be targeted to core programme costs.

Strengthening an evidence-informed approach to policy making means answering four questions:

1. What is the current state of our understanding of the issue with which we are concerned?
2. What evidence exists about the issue and who produces it?
3. What changes have been observed and what could happen in future?
4. How confident are we in the evidence that informs our understanding of the issue, and is that confidence increasing or decreasing over time?

These questions are relevant to all policy issues in all countries. The experience of the MCCIP shows that they can be answered in a collaborative, transparent and cost-effective way. It also shows that it is possible to create a partnership involving government, non-government and research organisations that can assess the quality of a complex body of evidence, synthesise it and keep it as up-to-date as possible. Finally, it offers a useful way of presenting the evidence that helps policy makers rapidly assimilate what they need to know.

1 Introduction

Improving evidence-informed policy making is not simply a matter of providing more evidence and hoping that it is used. Two earlier working papers in this series have demonstrated how government departments can take a strategic approach to managing the evidence base[1]. The benefits of doing this include ensuring that the evidence they require is well directed towards helping them achieve their policy outcomes, that it is well prioritized and that an evidence-informed approach is well embedded into the department's business planning processes.

This working paper focuses on a different, but linked, issue. Many policy issues are complex and overlap with one another. They involve multiple stakeholders who do not always agree on what the evidence means. There is a wide range of

1 See Shaxson, 2014 and Shaxson, 2015.

actors involved in producing evidence, some of which is highly technical. The evidence changes over time as new research generates new information or new insights. This makes it difficult for policy makers to answer four important questions:

1. What is the current state of our understanding of the issue with which we are concerned?
2. What evidence exists about the issue and who produces it?
3. What changes have been observed and what could happen in future?
4. How confident are we in the evidence that informs our understanding of the issue, and is that confidence increasing or decreasing over time?

Answering these questions is key to ensuring that policies and strategies are well informed with evidence.

Many countries use 'state of the environment' reports to collate the evidence on issues of strategic importance to policy making. In the UK, a document called Safeguarding our Seas was published in 2002 by Defra, together with the Governments of Scotland and Wales. It set out the UK Government's vision for clean, safe, healthy, productive and biologically diverse oceans and seas. It identified a need for an assessment of the state of the seas. The first assessment, in a document called Charting Progress, was published in 2005. Its purpose was to judge how well the UK Government was achieving its vision. As Charting Progress was being prepared, the different government organisations noted how difficult it was to assemble evidence on the current impacts of climate change. The evidence available to them was deemed to be too academic and did not clarify what was known and what was not known about different aspects of the marine environment. Because the various sources of evidence were not synthesised, it was difficult to elicit an overview of the state of evidence on the marine environment as a whole.

This was felt to be a serious obstacle to improving the use of evidence in policy. Discussions concluded that in order to provide the type of evidence that would be accessible and immediately useful to policy makers, what was needed was a focal point with the time and resources to collate and interpret the evidence produced by the academic community, government research institutes and international organisations, and to communicate the information effectively to policy makers. This focal point would produce a specific evidence synthesis 'product' which would collate the required information, clarify where there were gaps in the evidence, and present it in a visually accessible manner.

In 2006, the focal point was formed as the MCCIP. Its purpose is to bring together scientists, government, government agencies and non-government organisations to provide co-ordinated advice on climate change impacts around the UK's coastal areas and seas. In particular, the MCCIP acts as "*the primary focus for the supply of evidence and advice to partners to enable them to individually and collectively plan for the challenges and opportunities presented by the impacts of climate change on the marine environment*"[2]. Its aim is delivered by a steering group of around 25 people from a range of organisations. The steering group oversees two working groups, which design activity plans and define the outputs that the MCCIP will deliver[3].

> Evidence for complex policy issues needs to be gathered and interpreted, which requires dedicated resources.

This working paper describes the MCCIP's main evidence product: Annual Report Cards

2 See http://www.mccip.org.uk/about-mccip/.

3 The focus of this working paper is on the Annual Report Cards. Information on MCCIP's other work can be found on the MCCIP website.

(ARCs) on the state of evidence about the marine environment. ARCs are published on a regular basis (every two years) to inform marine policy makers about the development and evolution of evidence and knowledge in the marine environment[4]. ARCs are innovative in that they make specific assessments of how confident the MCCIP is in what the scientific evidence is saying about individual topics. For each topic they assess how confident we can be that we understand what is happening now and what could happen over the next five years. ARCs present this information in a visually appealing way that makes it very easy for policy makers to pick up the key messages and use them to inform their decisions. The production of ARCs involves a very wide range of stakeholders in developing, producing and quality assuring the evidence. This makes it an inclusive process that explicitly allows for contestation, and it is all done in a very cost-effective way. The working paper could offer ideas for other countries keen to improve how evidence for complex issues is developed, quality assured, synthesised and presented. It could also offer ideas for ways to improve relationships at the interface between evidence and policy.

> Where evidence is complex, it is important to assess how confident we are that we understand what is happening now and what could happen in future.

The next section of the paper provides a short description of the partnership and how it functions. Section four describes how the report cards make evidence accessible to policy makers, using confidence assessment and other visual methods. It describes how evidence is collected, synthesised and quality assured, and how the confidence assessments are constructed. Finally, it describes how stakeholders are engaged in the process in a cost-effective way. Section five discusses the impact the report cards have had in the UK, and the reasons for those impacts. The final section sets out a summary and implications for how the report cards could be adapted for use in other countries.

4 The initial intention was to publish them every year, but it takes two years to collate and quality assure the information. So although they are only published every two years, the name 'Annual Report Card' has stuck.

2 The Marine Climate Change Impacts Partnership

The MCCIP is a very small organisation. A secretariat is responsible for its day-to-day running, gathering information and producing an overview of outcomes. It comprises two people who each spend approximately one-third of their time working to produce the ARCs. The remainder of their time is spent on other work for the MCCIP, and work for their host organisations (such as research funded by research councils or the European Union).

A steering group of about 25 people develops the activity plans and outputs of the secretariat's work. The steering group is chaired by a senior policy maker from Defra, the central government department responsible for marine policy in the UK. Other members of the steering group come from sub-national governments, the academic community, other central government departments and non-government organisations. An expert advisory panel, drawn from academia, reports on quality assurance issues.

Funding for the MCCIP comes from partner organisations. The business plan for 2010-2015 envisages an annual budget of GBP 180,000 or approximately IDR 3.6 billion. Of this, approximately GBP 60,000 (IDR 1.2 billion) is earmarked to produce the ARCs. As the central government department, Defra provides the majority of the funding, while the other partner organisations contribute lesser amounts: each organisation has the discretion to provide support to the MCCIP, though each has to balance this with its other priorities. The implications of this are addressed in Section 3.

> Costs are kept down by asking for in-kind contributions from partner organisations and from the academic community.

Costs are kept down in two ways. First, members of the steering group are asked for 'in-kind' contributions to cover travel and meeting costs, or to support communication and outreach activities. The organisation that hosts the secretariat employs the two people who work for the MCCIP. Second, the academic community contributes evidence on a voluntary basis, as outlined in Section 3.3.1.

Because the MCCIP relies on contributions from its partner members, guaranteeing long-term funding can be challenging. This is discussed in Section 5. First, however, we set out what makes the ARCs an interesting contribution to evidence-informed policy making.

3 The Annual Report Cards

The prime purpose of the ARCs is to summarise complex evidence and make it accessible and available to policy makers, decision makers and ministers to help set national priorities, formulate policies and monitor policy implementation.

ARCs answer four key questions:

- What is the current state of scientific understanding of marine climate change in our oceans and seas?
- What evidence exists about the issue and who produces it?
- What changes have been observed and what might happen in the future?
- How confident are we in the robustness of the evidence?

ARCs make statements that summarise the state of evidence of 33 separate topics on climate change and the state of the seas in the UK. They also assess the degree of confidence in those statements. These 33 topics are considered the key issues for which evidence is needed to inform policies in this area. Each report card is approximately 12 pages and includes charts, graphs, maps and summaries arranged by topic area. Their format has evolved since the first one was produced in 2006[5], as the MCCIP has changed the topics it covers and has experimented with different ways of presenting the evidence. The next sections describe how the ARCs are structured and what evidence they include.

3.1 A Simple Structure

The ARCs begin with four or five headline messages on the front page. These are the most important issues policy makers need to be aware of in the current moment. The topics of the headline messages change over time, depending on which issues are most urgent. The next two pages set out key topics that are covered in the rest of the report card, and how the confidence assessments were constructed (see Section 4.3.3). The fourth and fifth pages give more detail on the headline messages with graphs of key trends, maps and summary tables. The remainder of the ARC gives details on the individual topics, together with the confidence assessments.

This structure makes it easy for policy makers to know where to look for key messages and to find the details they need (see Table 1).

5 They were initially inspired by an Australian report card on ecosystem health. See http://www.health-e-waterways.org/reportcard/2006

Table 1: Example Table of Contents for an ARC

Page	Content
1	Four or five headline policy-relevant messages
2	Key topics covered in the report card
3	Overview of the methodology used to construct the report card
4-5	Detail on the headline messages with graphs, maps and tables
6-12	Detail on the individual topics, with confidence assessments of the evidence

3.2 Visually Appealing Presentation of the Evidence

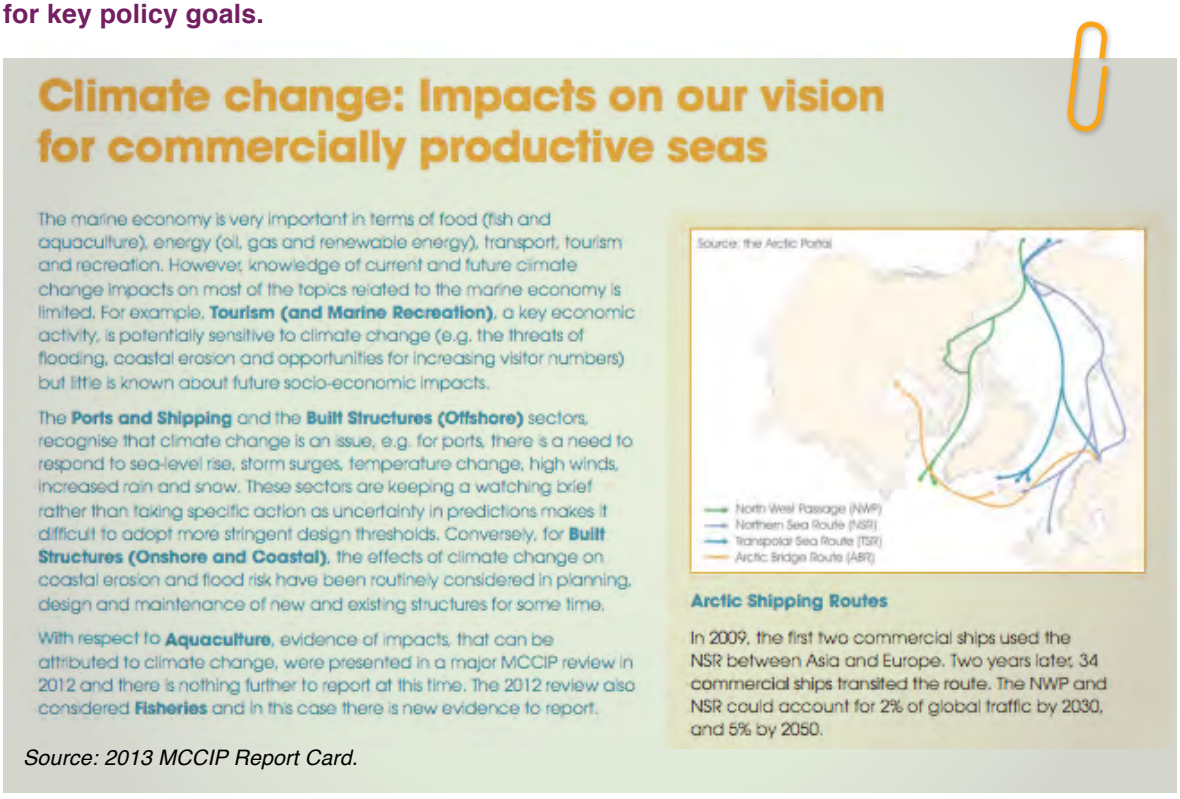
The report cards are constructed in a very visually appealing way. **Graphs, maps and diagrams** are presented with a short analysis of what they mean, as the topics are often quite complex. Figure 1 is an example of how a map is presented. It is linked to one of the UK's goals for the marine environment, *commercially productive seas*. This, and the analysis that supports it, ensures that policy makers are able to understand the relevance of the map.

The main innovation in the ARCs is the **confidence assessments**. These help the reader understand both the volume of evidence on an issue and to what extent the experts in a field agree about what that evidence is telling them. The confidence assessments present:

1. *What is already happening*: the state of evidence on the most important issues within a topic.
2. *What could happen*: how climate change may affect this issue in the future. This provides policy makers with an idea of how quickly this area is changing, and the quality and strength of evidence.

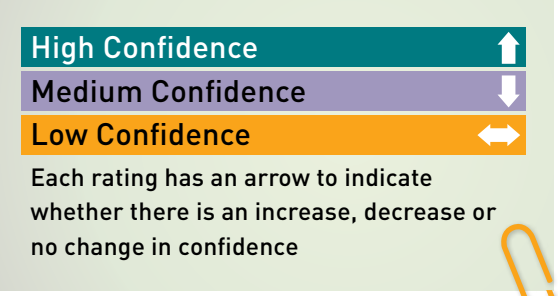
Figure 2 shows how these are presented. Colour coding makes the presentation easier. High confidence in the statements is coloured dark blue, medium confidence is coloured purple and low confidence is coloured yellow. An arrow shows whether the degree of confidence has increased, remained the same or decreased since the last assessment (five years earlier).

Figure 1: Maps and other graphics are presented with summary analyses of what they mean for key policy goals.



Source: 2013 MCCIP Report Card.

Figure 2: Colour coding assessing the confidence in the evidence base.



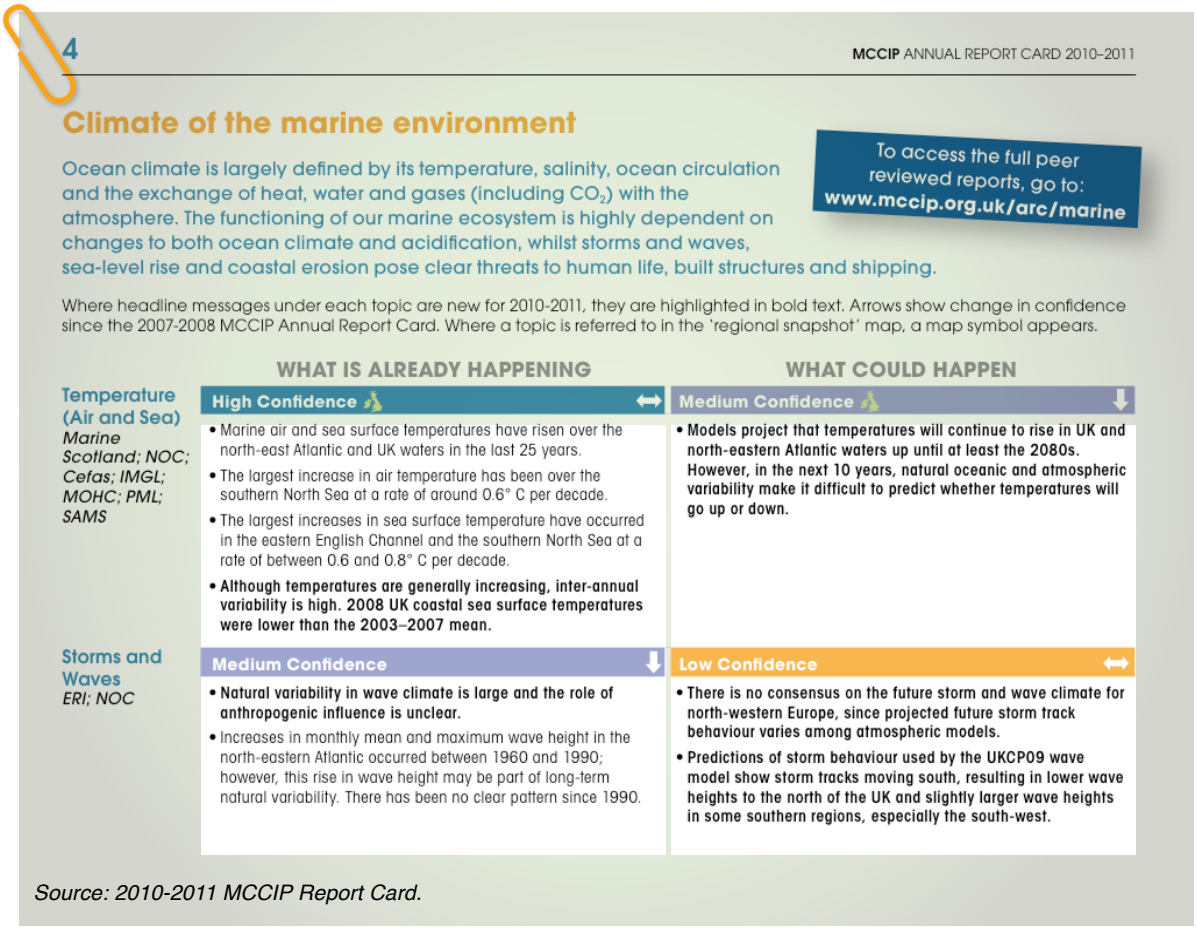
This format allows a lot of information about the evidence to be presented in a way that is easy to read. It allows policy makers to link knowledge of what is currently happening to knowledge of what will happen in future. Figure 3 shows how the confidence assessments are used (text that is highlighted in bold shows headline messages that have been updated since the previous ARC).

The online versions of the report card provide links to papers that contain the evidence on which these assessments have been based (see Figure 4). These are the high quality scientific papers mentioned earlier. Unlike journal articles, they are structured around the key issues of 'what is currently happening' and 'what could happen'. This helps maintain a consistent line of argument with the report card they support.

3.3 Collecting and Synthesising the Evidence

The challenge for the MCCIP is to map and synthesise a very rich and complex evidence base and present it in 12 pages. Over the years, the steering group has refined the process of producing the ARCs into three separate areas: (i) deciding what topics to include; (ii) quality assurance and summarising the evidence; and (iii) constructing the confidence assessments.

Figure 3: Presenting statements of the key issues, with associated confidence assessments.



4

MCCIP ANNUAL REPORT CARD 2010–2011

Climate of the marine environment

To access the full peer reviewed reports, go to: www.mccip.org.uk/arc/marine

Ocean climate is largely defined by its temperature, salinity, ocean circulation and the exchange of heat, water and gases (including CO_2) with the atmosphere. The functioning of our marine ecosystem is highly dependent on changes to both ocean climate and acidification, whilst storms and waves, sea-level rise and coastal erosion pose clear threats to human life, built structures and shipping.

Where headline messages under each topic are new for 2010-2011, they are highlighted in bold text. Arrows show change in confidence since the 2007-2008 MCCIP Annual Report Card. Where a topic is referred to in the 'regional snapshot' map, a map symbol appears.

	WHAT IS ALREADY HAPPENING	WHAT COULD HAPPEN
Temperature (Air and Sea) *Marine Scotland; NOC; Cefas; IMGL; MOHC; PML; SAMS*	**High Confidence** ⟷ • Marine air and sea surface temperatures have risen over the north-east Atlantic and UK waters in the last 25 years. • The largest increase in air temperature has been over the southern North Sea at a rate of around 0.6° C per decade. • The largest increases in sea surface temperature have occurred in the eastern English Channel and the southern North Sea at a rate of between 0.6 and 0.8° C per decade. • **Although temperatures are generally increasing, inter-annual variability is high. 2008 UK coastal sea surface temperatures were lower than the 2003–2007 mean.**	**Medium Confidence** ↓ • **Models project that temperatures will continue to rise in UK and north-eastern Atlantic waters up until at least the 2080s. However, in the next 10 years, natural oceanic and atmospheric variability make it difficult to predict whether temperatures will go up or down.**
Storms and Waves *ERI; NOC*	**Medium Confidence** ↓ • **Natural variability in wave climate is large and the role of anthropogenic influence is unclear.** • Increases in monthly mean and maximum wave height in the north-eastern Atlantic occurred between 1960 and 1990; however, this rise in wave height may be part of long-term natural variability. There has been no clear pattern since 1990.	**Low Confidence** ⟷ • **There is no consensus on the future storm and wave climate for north-western Europe, since projected future storm track behaviour varies among atmospheric models.** • **Predictions of storm behaviour used by the UKCP09 wave model show storm tracks moving south, resulting in lower wave heights to the north of the UK and slightly larger wave heights in some southern regions, especially the south-west.**

Source: 2010-2011 MCCIP Report Card.

Figure 4: The online versions of the Report Cards contain links to the evidence papers.

Full Scientific Reports

The Report Card summarises the information provided in 33 individual, peer-reviewed reports commissioned by MCCIP.

- Executive Summary
- What is already happening?
- What could happen?
- Knowledge gaps
- Socio-economic impacts
- Confidence assessments
- References

For the direct links to the full scientific reports please see the table below:

Climate of the Marine Environment:

- Ocean Acidification
- Arctic Sea-Ice
- Temperature (Air and Sea)
- Storms and Waves
- Sea Level
- Atlantic Heat Conveyor
- Salinity
- Shelf Sea Stratification
- Coastal Erosion
- Air-sea Exchanges of Heat and Water
- Air-sea Exchanges of CO_2

Healthy and Biologically Diverse Marine Ecosystem:

- Non-native Species
- Fish
- Waterbirds
- Intertidal Habitats
- Plankton
- Seabirds
- Marine Mammals
- Coastal Habitats
- Shallow and Shelf Subtidal Habitats
- Deep-sea Habitats

Source: 2013 MCCIP Report Card

3.3.1 Deciding What Topics to Include

The ARCs are highly synthesised presentations of very complex evidence that is contained in the supporting evidence papers. The steering group initially chose 33 topics to ensure that the four key areas of marine policy in the UK were well covered. These are shown in Table 2 below.

All 33 topics are covered in each ARC, but not all of them are highlighted. The steering group selects which topics to highlight for each ARC. This depends on the amount of evidence available and the current policy priority.

The steering group also selects some of its members to form a working group to guide production of the ARC. A lead author is assigned to each of the individual topics. He or she works with four or five researchers from different organisations to synthesise the evidence into a short review paper, up to 10 pages long. The authors all volunteer their time. In return, each paper is peer-reviewed to the same degree as an academic journal article. It is also given a DOI number[6], which encourages citations in academic literature. This gives the paper real academic credibility and provides a strong incentive for the authors to give their time for free.

3.3.2 Quality Assuring the Evidence

Once each review paper is finished, the working group selects another member of the academic community to peer review it. Once

6 DOI (digital object identifier) numbers are unique numbers which help identify articles on the internet. They are formally registered, and given out by publishers when articles are published.

Table 2: Thirty-three different topics cover the four main areas of marine policy

Policy area 1: Climate of the marine environment	Policy area 2: Healthy and biologically diverse marine ecosystems
• Ocean acidification • Arctic sea-ice • Temperature (air and sea) • Storms and waves • Sea level • Atlantic heath conveyor • Salinity • Shelf-sea stratification • Coastal erosion • Air-sea exchanges of heat and water • Air-sea exchanges of CO^2	• Non-native species • Fish • Waterbirds • Inter-tidal habitats • Plankton • Seabirds • Marine mammals • Coastal habitats • Shallow and shelf sub-tidal habitats • Deep-sea habitats
Policy area 3: Clean and safe seas	**Policy area 4: Commercially productive seas**
• Coastal flooding • Human health • Nutrient enrichment • Harmful algal blooms • Pollution (estuarine and coastal) • Pollution (bathing and shellfish)	• Fisheries • Ports and shipping • Tourism (and marine recreation) • Built structures (onshore and coastal) • Built structures (offshore) • Aquaculture

all the papers are finalised, the working group chooses which topics to prioritise according to the current policy priority and the headline messages they want to communicate. The working group also translates the complex scientific language into manageable bullet points for the final ARCs.

The quality assurance process enhances the likely uptake of the work in three ways. First, the fact that there is a very structured process reassures policy makers that the ARCs are of high quality and that the synthesis is based on robust evidence. Second, the ARCs provide clear and easy-to-follow links to the source of the evidence so that policy makers (or their staff) can gain a more detailed understanding if necessary. Third, the members of the steering committee are from the environmental ministries around the UK and therefore have a stake in ensuring that the products will be useful.

> “Researchers are encouraged to volunteer their time to produce evidence, as the partnership sets very high quality standards and offers academic recognition for their work.

3.3.3 Constructing the Confidence Assessments

The last step in producing the ARC is to build the evidence confidence assessment. Confidence assessments are developed using a transparent process involving multiple stakeholders[7]. The level of each confidence rating depends on two variables, rated low, medium or high. The first variable describes the level of agreement within the research literature about the evidence. The second describes the volume of evidence available. By separating the two variables, the reader has more information about how the overall confidence assessment scores were reached.

7 The way the confidence assessments are constructed draws on the methodology described in the Intergovernmental Panel on Climate Change’s (IPCC) “Uncertainty Guidance Note” (2010).

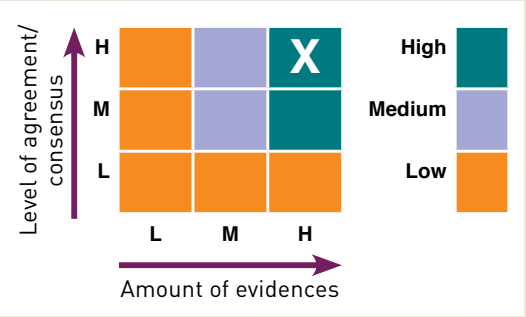
For example, there can be a lot of evidence on an issue but low consensus on what this evidence means; or there can be a high level of agreement on how to interpret a small volume of evidence. For a high confidence assessment, there needs to be both a high volume of evidence and high level of agreement (see Figure 5).

For issues that are not covered in depth in the rest of the ARC, short summary confidence assessments are presented, giving readers a snapshot view. The presentation is also careful to show which organisations contributed to the assessment, so it is possible to see the depth of expertise that has been brought to bear on each issue.

While the confidence assessment process is a collaborative one, the lead scientist for each topic takes the final decision on which confidence level to assign to each topic, both for what is already happening and what could happen. The MCCIP secretariat confirms the decision and moderates any disagreement or contestation.

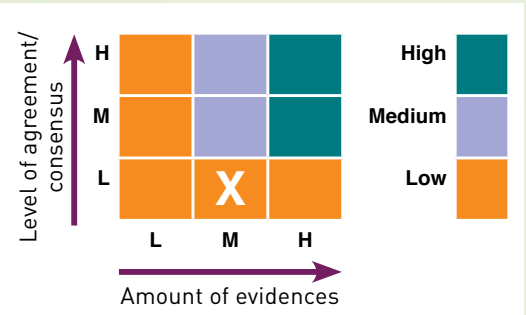
Figure 5: Constructing the confidence assessments.

What is already happening: High



Observational evidence for present day sea level (including land movement from GPS), storm surge and waves processes is of the highest quality. Present day flood risk (including exposure) is also quantified to a high degree of precision helped by numerical flood mapping and precision LIDAR shoreline data, so ourunderstanding of what is already happening is high.

What could happen: Low



Projections of the future rely on the accuracy of (i) our projections of mean sea level combined with the uncertainty surrounding future surge and wave climates and (ii) estimates of coastal development and land use. Both of these are known poorly so our level of confidence for what may happen in the fitire is low. The projected trend in mean sea level has no uncertainty about its direction (despite a range of values for its rate) so an increased risk of coastal flooding has high certainty.

Source: 2010-2011 MCCIP ARC.

Figure 6: Summary confidence assessments (taken from the 2013 MCCIP ARC).

Confidence for remaining topics	WHAT IS ALREADY HAPPENING	WHAT COULD HAPPEN	Authors
Temperature (Air and Sea)	High ↔	High ↔	Cefas; Marine Scotland; NOC; IMGL; SAMS; PML; Marine Institute; Met Office Hadley Centre; AWI
Storm and Waves	Medium ↔	Low ↔	Heriot-Watt University; NOC
Sea Level	High ↔	Medium ↔	Noc; Met Office Hadley Centre
Atlantic Heat Conveyor	Medium ↔	Medium ↔	Noc; Met Office Hadley Centre; SAMS; NCAS; Cefas
Salinity	Medium ↔	Low ↔	Cefas; NOCS; Marine Scotland; SAMS; IMGL; PML; Met Office Hadley Centre; AWI
Shelf Sea Stratification	Medium ↔	Low ↔	NOC; The University of Liverpool; Cefas
Coastal Erosion	High ↔	Medium ↑	Plymouth University
Air-sea Exchanges of Heat and Water	Low ↔	Low ↔	NOC
Air-sea Exchanges of CO_2	Medium ↑	Low ↔	Met Office Hadley Centre

4 How Have Annual Report Cards Contributed to Policy?

ARCs have been in existence for almost one decade. They are not the only way in which evidence contributes to policy decisions, rather they are part of a broader process of evidence-informed policy making to which many organisations contribute[8]. This ensures that the process is transparent and open to contestation.

ARCs have made a distinct contribution to the process in several ways. A mid-term evaluation of the MCCIP[9] shows that ARCs have:

- Been referenced in large assessments of the state of the environment, such as the UK's Climate Change Risk Assessment (Defra 2012), the National Adaptation Plan (Defra 2013), IPCC reports, and United Nations Climate Change Assessment Reports;
- Helped senior policy makers determine funding priorities;

8 See Shaxson, 2014.

9 This is an unpublished document, but it was made available to the authors for the purposes of this paper.

- Been referenced in specific policy submissions to ministers;
- Been referenced in various UK adaptation plans, such as the UK Climate Change Risk Assessment (2012) and the National Climate Change Adaptation Programme.

The MCCIP secretariat has contributed evidence and provided answers to Parliamentary questions on a number of occasions, and has submitted evidence to the Parliamentary Select Committee inquiry "Investigating our Oceans".

While it is not possible to say that the MCCIP has had a direct impact on specific policy issues, it is clear that it has made distinct contributions to on-going policy processes such as policy, design, implementation and monitoring.

The format of the ARCs has been adopted by other organisations facing similar challenges in presenting complex evidence to policy makers—indicating that they are considered to be best practice in their field[10].

> The process of developing the Annual Report Cards has helped strengthen wider relationships between evidence and policy.

4.1 Contribution to Marine Science-Policy Relationships

ARCs are primarily designed to inform policy makers, but the way they are produced, and the way the MCCIP is set up, has helped to broker improved relationships between researchers, scientists and policy for the marine environment.

Interviews with researchers suggest there are two main reasons they volunteer their time to produce the papers. First, publishing with the MCCIP is a way to demonstrate a link between a researcher's work and public impact. Increasingly, research funding in the UK is being tied to demonstrating public impact. As there are few opportunities to demonstrate the link to impact, scientists welcome the opportunity to work with the MCCIP. The evidence reviews can be readily adapted for publication in refereed academic journals. One researcher interviewed for this case study noted that the articles he produced from the evidence reviews were some of the most cited papers in the journal, as no one else collated information in a similar manner. In the 2012-2013 period, there were 27 citations in academic journal articles, one in a book chapter, four citations in dissertations/theses and nine in other reports.

However, not all researchers are positive about ARCs. Despite the overwhelmingly positive feedback from policy makers, some scientists feel the assessment process is arbitrary. Scientists interviewed for this case study explained that is was difficult to categorise confidence on their topic as it was challenging to aggregate all the information into one assessment. They were uncomfortable with the fact that the confidence assessment is essentially a judgement taken by a small group of people, not one derived from a scientific formula. The partnership is aware of this criticism, but takes the view that until such a formula exists, a judgement representing the best available knowledge is a good enough way of providing policy makers with clear and accessible evidence to inform their decisions.

While some academic scientists struggled to see the MCCIP's impact in the wider scientific-policy community, there is evidence to suggest that the MCCIP has improved relationships between scientists and decision makers. A policy maker interviewed for this case study explained that through the MCCIP process, he was able to get to know and understand the work of researchers, and to explain what his questions really were.

10 These include the Living with Environmental Change initiative and MCCIP's Australian equivalent, Ocean Climate Change Report Cards.

5 Conclusions

The introduction of this working paper noted that there are four important questions for evidence-informed policy making for complex issues:

1. What is the current state of our understanding of the issue with which we are concerned?
2. What evidence exists about the issue and who produces it?
3. What changes have been observed and what could happen in future?
4. How confident are we in the evidence that informs our understanding of the issue, and is that confidence increasing or decreasing over time?

The evidence needed to inform policies is rarely completely conclusive. ARCs help address all four questions by synthesising a broad range of evidence in a structured and rigorous process and presenting the evidence to policy makers in a visually appealing way. The

confidence assessments are an innovative way of ensuring that the limits of the evidence base are well understood. They have been used by marine policy makers to inform a variety of policy products, from 'state of the environment' assessments to responses to Parliamentary Questions, to decisions about funding priorities.

The process ensures that the MCCIP provides quality academic information, but the partnership's success also stems from its independent status. The partnership represents the interests of all the devolved administrations, not just one government's agenda[11]. Furthermore, the MCCIP is not an advocacy organisation: while it is guided by current policy priorities, it does not respond to hot issues in the media. Nor does the MCCIP design policies or become involved in policy formulation. This neutrality encourages trust among policy makers.

The MCCIP aims to present a balanced view of the evidence. By collating the knowledge in a systematic manner, policy makers have the reassurance that the academic knowledge of the whole sector has been synthesised and has not prioritised a specific institution.

So far, the ARCs have only been used in the environmental arena—though the MCCIP has plans to improve their social science content. There is no reason to suggest that confidence assessments would not work in other policy areas, as long as the process of deriving them is similarly robust and they are presented in a similar way. Gathering voluntary contributions from researchers in return for academic recognition is a useful way to keep costs down. Creating a partnership of many different types of organisation (government and non-government) enhances the contestation and therefore credibility of the final product. However, obtaining stable levels of resources over the long term can be a challenge where the partnership must rely on annual contributions from its member organisations. Other partnerships may wish to consider a different funding model, with a proportion of secured funding from government that covers core operations such as the secretariat, topped up by smaller annual contributions from members.

The MCCIP and its ARCs have made real contributions to the way evidence for marine policy is presented and debated. Their approach could be expanded to help engage the wider public in issues of evidence, in other sectors and in other countries. The detail in this working paper is intended to help stimulate discussion about whether and how this might happen.

11 While Defra only works directly in England, it also works closely with the devolved administrations in Wales, Scotland and Northern Ireland and generally leads negotiations in the EU and internationally. As not all regional policy priorities for the environment coincide with each other, it is important that the MCCIP secretariat is seen as neutral, regardless of where it is located.

References

Brooks, K. and Orr, P. 2014. *Independent Mid-Term Review of the Marine Climate Change Impacts Partnership (MCCIP) Work Programme*. London: Cefas. Available at: http://www.mccip.org.uk/media/1444/120514-mccip-mtr-final.pdf

Defra. 2011. *UK Marine Policy Statement*. London: Nobel House. Available at: https://www.gov.uk/government/publications/uk-marine-policy-statement

Defra. 2012. *UK Climate Change Risk Assessment 2012*: Evidence Report. London: Nobel House. Available at: http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=15747#RelatedDocuments

Defra. 2013. *The National Adaptation Programme*. London: Nobel House. Available at: https://www.gov.uk/government/publications/adapting-to-climate-change-national-adaptation-programme

IPCC. 2010. *Uncertainty Guidance Note*. USA: Jasper Ridge. Available at: http://www.ipcc.ch/pdf/supporting-material/uncertainty-guidance-note.pdf

Jones, H. 2011. *A Guide to Monitoring Policy Influence*. London: Overseas Development Institute. Available at: http://www.dochas.ie/sites/default/files/A_guide_to_monitoring_and_evaluating_policy_influence_2.pdf

Marine Climate Change in Australia. 2012. *Report Cards 2012*. Australia: CSIRO. Available at: http://www.oceanclimatechange.org.au/content/images/uploads/Marine_Report_Card_Australia_2012.pdf

MCCIP. 2006. Marine Climate Change Impacts 2006. Suffolk, UK: MCCIP. Available at: http://www.mccip.org.uk/annual-report-card/2006.aspx

MCCIP. 2008. Marine Climate Change Impacts 2008. Suffolk, UK: MCCIP. Available at: http://www.mccip.org.uk/annual-report-card/2007-2008.aspx

MCCIP. 2010. *Business Plan*. Suffolk, UK: MCCIP. Available at: http://www.mccip.org.uk/media/7755/mccip%20phase%20ii%20business%20plan%202010-2015.pdf

MCCIP. 2011. Marine Climate Change Impacts 2011. Suffolk, UK: MCCIP. Available at: http://www.mccip.org.uk/annual-report-card/2010-2011.aspx

MCCIP. 2013a. *Marine Climate Change Impacts Report Cards 2013*. Suffolk, UK: MCCIP. Available at: http://www.mccip.org.uk/annual-report-card/2013.aspx

MCCIP. 2013b. *MCCIP Evaluation Report*. Including Independent Evaluator Critical Assessment. Suffolk, UK: MCCIP. Available at: http://www.mccip.org.uk/media/21809/mccip%20evaluation%202012-13_final.pdf

Shaxson, L. 2014. *Investing in Evidence: Lessons from the UK's Department for Environment, Food and Rural Affairs*. KSI Working Paper 2. Jakarta: Knowledge Sector Initiative. Available at: http://www.ksi-indonesia.org/index.php/publications/2014/11/28/31/investing-in-evidence-lessons-from-the-uk-department-for-environment-food-and-rural-affairs.html

Shaxson, L. 2015. *Using Workshops to Develop an Evidence Strategy: Lessons from the UK's Food Standards Agency*. KSI Working Paper 3. Jakarta: Knowledge Sector Initiative. Available at: http://www.ksi-indonesia.org/index.php/publications/2015/04/08/52/using-workshops-to-develop-an-evidence-strategy-lessons-from-the-uk-food-standards-agency.html

Stern, N. 2007. *The Economics of Climate Change. The Stern Review.* Cambridge, UK: Cambridge University Press. Available at: http://webarchive.nationalarchives.gov.uk/+/http:/www.hm-treasury.gov.uk/sternreview_index.htm.

Louise Shaxson

Ms. Shaxson is a research fellow in the RAPID programme at the Overseas Development Institute. Her work focuses on improving public sector policy and strategy within the broad framework of evidence-informed policymaking. Over the past twelve years she has worked with government departments in several countries to strengthen the ways they source, handle and use evidence. This has included advising on how to take a more strategic approach to evidence planning, on the provision of scientific advice to Ministers, and on creating links between researchers and policymakers.

Josephine Tsui

Ms. Tsui is a researcher at the Overseas Development Institute in the RAPID programme. With ten years of experience, she has developed an expertise on research to policy links, looking at the power dynamics of knowledge production. She has been specialising on monitoring and evaluation of policy influence and advocacy with UN agencies, research institutes and NGO's. Her background has traditionally served gender, social development, and agriculture issues. She has lived and worked with government ministries in Zambia and Ghana for over three years, and now she frequently works in South Asia.

The Knowledge Sector Initiative (KSI) is a joint program between the governments of Indonesia and Australia that seeks to improve the lives of the Indonesian people through better quality public policies that make better use of research, analysis and evidence.
KSI is a consortium led by RTI International in partnership with Australian National University (ANU), Nossal Institute for Global Health, and Overseas Development Institute (ODI).