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Report on the evaluation of the prototype NoK development and testing

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Report on the evaluation of the prototype NoK development and testing

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Executive summary

The evaluation was designed to analyse the issues involved in developing and testing the prototype NoK. The evaluation was based on an evaluation framework and results from 89 semi structured interviews carried out with 79 participants and consortium members who contributed their expertise and ideas into the process of designing and testing the prototype NoK, and members of the Client Dialogue Group which had an advisory role in the project. The evaluation operated as an iterative process with findings disseminated to help inform progress of the project, and facilitate reflection and learning within the project consortium.

The evaluation focussed on the challenges and recommendations for the design and testing of a NoK. Five key issues were identified in the findings which should be considered in the planning and implementation of a credible, relevant and legitimate NoK.

The first key challenge is the need to develop and maintain a strong focus on the process of the NoK throughout its planning and during implementation to help ensure the NoK meets its objective to effectively transfer knowledge into the decision making process and influence the actions of policy makers. To achieve this it is essential in the NoK to bring all different but interrelated elements which make up the NoK process together, to clearly lay out from the start how things will be done to better transfer knowledge into the decision making process and to ensure the whole is greater than the sum of its parts.

The second issue is the need to include different groups in the planning and implementation of the NoK, ensuring they are represented at all levels and from the very beginning. A wide range of expertise, skills, knowledge sources and knowledge types and perspectives are essential to ensure the overall success of the NoK. Expertise from social sciences and practitioners, particularly those working on science, policy and society interfaces were specifically identified as key. Skills such as facilitation, negotiation and advocacy were also identified as important to implementing the NoK processes. Once again this will require an understanding of the motivations of different groups that need to be engaged in the NoK.

The third issue identified through the evaluation was the important role of communication within and outside the NoK. Different groups within the NoK may have different information needs and communication styles. The evaluation highlighted a link between communication and transparency, which is a key aspect of building trust in the NoK to help encourage individuals to contribute, use information produced from the NoK and promote the NoK within their networks.

The fourth issue is ensuring the outputs from the NoK are usable in the policy community. To improve the policy usability of the outputs the evaluation suggested that the NoK seeks this information at the start of the process to help frame the question with the target audiences, consistently use language which is relevant and understandable in the policy community and selects and prepares appropriate tools to disseminate this information to the target audiences and wider.

Finally, capacity-building will be an important aspect of any future NoK, requiring support not only from

donors, but through strengthening links with different organisations, networks and initiatives at both the European and to a lesser extent national levels. A process of reflection and learning must be central to the NoK to help build bridges and reduce gaps between groups and move ever closer to collaborative working and information sharing.

The key five issues identified in the evaluation are interlinked and in order to achieve a credible, relevant and legitimate NoK all of these issues must be addressed together to strategically plan, implement and adapt the NoK as needs arise.

1. Introduction

The overall objective of the KNEU project is to develop a recommended design for a Network of Knowledge (NoK) to inform policy makers and other societal actors on biodiversity and ecosystem services. This network should be open, transparent, flexible, equally accessible to all, independent, be scientifically and evidence-based and have a robust structure. It will develop links to relevant clients to support the science-society interfaces in Europe and beyond.

The objective of Work Package (WP) 4 of the KNEU project was to analyse the issues involved in establishing the prototype NoK, particularly identifying the breakthrough ideas and those issues that hindered progress in producing valid and policy relevant knowledge, exploring and describing how difficulties were overcome and/or why they remain.

The WP4 objective was achieved through several evaluation aims:

1.) An assessment of the process of setting up the prototype Network of Knowledge.
2.) An evaluation of the process of carrying out case studies.
3.) An evaluation of the outputs and outcomes of the case studies.
4.) A detailed analysis of difficulties encountered and how they were overcome.

Specifically this WP contributed to objectives 5 and 6 of KNEU to develop a recommended design for a future NoK.

WP4 facilitated and undertook critical self-evaluations of the processes and outputs of the prototype NoK developed in WP2 and throughout the testing of the prototype NoK in WP3. The evaluation was carried out by seeking the opinions and perspectives of knowledge providers, clients and users involved in the prototype NoK. In particular, it evaluated the way in which different approaches were used across the three case studies in WP3, comparing their strengths, weaknesses and potential contributions to a NoK.

The evaluation was divided into 3 phases;

- Phase 1 to assess the process of setting up a prototype NoK (Task 4.2)
- Phase 2 to evaluate the process of carrying out case studies (Task 4.2)
- Phase 3 to evaluate the outputs and outcomes of the case studies (Task 4.3)

At key milestones during the evaluation work undertaken in WP4 findings were communicated using a range of tools tailored to external and internal audiences to facilitate an iterative evaluation process throughout the project lifespan. This involved the development of summary sheets, internet updates, presentations and organising joint internal workshops.

To guide the collection of evaluation data throughout the project an evaluation framework was developed which is detailed in the following section. Data collection methods are outlined, following which the evaluation findings are presented and discussed. Lastly, recommendations are provided to help guide the future development of a Network of Knowledge for Europe.

2. Preparing a framework for evaluation, materials and methods (Task 4.1)

2.1. Preparing a framework for evaluation

An evaluation framework, building on the criteria from public participation literature (specifically Beierle and Konisky (2001) and Rowe and Frewer (2000)), guided the collection and analysis of data for all three phases of the evaluation. The framework was developed by Juliette Young (CEH), Heli Saarikoski (SYKE) and Allan Watt (CEH) and follows the three stages involved in the NoK prototype (preparing, conducting and finalising). This evaluation framework was disseminated via email to all project participants for comment which resulted in significant changes in the structure of the framework. For example, project participants felt the evaluation should also focus on other issues, including the potential added value of the NoK from the participants' perspective as well as the experts and the client dialogue group members' key concerns regarding the NoK. Such issues were seen as important additions to the evaluations as they could feed into the future design of a NoK, and build stronger links with WP5 and the White Paper. Importantly, email discussions also shifted the focus of Task 4.3 towards the outputs and outcomes of *the case studies*, rather than the *methodologies* used in the case studies. This was based on the fact that different case studies could use different (combinations) of methodologies, and splitting the evaluation according to methodologies could have missed certain key elements of the prototype testing.

In addition, much work has already been done on the strengths and weaknesses of different methodologies[1], while it was felt that this evaluation could contribute far more by focussing on the evaluation of the development and practice of a prototype NoK. So, while strengths and weaknesses of specific methodologies are covered in Tasks 4.2 and 4.3 (below), the group decided that Task 4.3 should encompass the broader outcomes and outputs of the case studies used in KNEU. Following these discussions, the framework was then presented and discussed at the KNEU project meeting in Brussels

[1] See for example the work on evidence-based approaches, as outlined on the website of conservationevidence.org

in January 2012. This led to the finalisation of the evaluation framework and methodology (see tables 1-5 below).

Table 1. Framework for the evaluation of the NoK prototype development (Phase 1)

Evaluation focus	Criteria measured
Procedural evaluation	
Representativeness	Did the process of developing the NoK prototype ensure the inclusion of a wide range of experts, practitioners and civil society organizations that hold important knowledge resources and/or have stake on the specific issues to be addressed? If not, why not and how could this be improved?
	Did the process ensure the inclusion of a diversity of cultural perspectives (e.g. through regional workshops)? If not, why not and how could this be improved?
Self-organisation	Were participants involved in the development of the NoK prototype allowed to decide on ground rules, objectives, tasks, working groups and discussion topics? How? Why (not)?
Openness	Were participants able to discuss freely topics and arguments? How? Why (not)?
Influence	Were participants able to influence the development of the NoK prototype? When? How? If not, why not? And if not, was that a problem (did they want to influence the development of the NoK prototype?
Transparency	Were participants able to see how the process of developing the prototype NoK evolved?
Information flow	Were participants kept informed throughout on how and where they could contribute? How could this be improved?

Table 2. Evaluation of the 'preparing' stage to test the prototype (phase 2)

Evaluation focus	Criteria measured
Preparing phase	
Influence	Requesters: To what extent were you able to influence the process of transforming problems/concerns into answerable questions?
	Requesters: To what extent could you influence the process of determining sub-questions and their prioritisation?
	Requesters: To what extent could you influence the choice of team? Protocol?
	Requesters: How were your expectations managed?
Dialogue	Requesters: Was feedback following initial request satisfactory? Why? How could it be improved?
	Requesters and KCB (?): How did the information from the scoping group contribute to dialogue?

	KCB: What were the challenges encountered in the creation and/or choice of working group?
Transparency	KCB: How was prioritisation carried out? What were the challenges? How could it be improved?
	Requesters and KCB: How straightforward was the process of clarifying scope, scale, topic etc? Challenges? Suggestions for improvement?
	Requesters and KCB: How was feasibility assessed?
Cost-effectiveness	Requesters and KCB: How were costs and resources analysed and presented?
	Requesters: Was information sufficient to make decisions? Why (not)? What extra information could be useful?

Table 3. Evaluation of the 'conducting' stage to test the prototype (phase 2)

Evaluation focus	Criteria measured
Conducting phase	
Communication	Requesters & KCB: What level of involvement did you have during the knowledge processing phase? Was it sufficient? Why? How could it be improved?
	Working group & experts: How was communication developed and maintained between the working group, the KCB, the requesters and the experts? Why, how etc.
Transparency	Requesters, KCB & working group: How transparent was the conducting phase, e.g. were records kept of requester input, records of working group communications etc?
Conflict resolution	Working group & experts: How were conflicting/competing/divergent knowledge claims and factual controversies addressed?
	Working group & experts: Did the involvement of different actors and methodologies in the NoK help resolve conflict among competing knowledge claims?
Capacity-building	KCB, working group & experts: To what extent did the NoK engender changes in attitudes, behaviours and actions of actors?
	KCB, working group & experts: To what extent did the processes promote learning among the different actors?

Table 4. Evaluation of the 'finalising' stage to test the prototype (phase 2)

Evaluation focus	Criteria measured
Finalising phase	
Transparency	Requesters, KCB & working group: To what extent were uncertainties/limitations recognised, handled and communicated? How could this be improved?

Quality assurance	Requesters, KCB & working group: How was accuracy of information achieved and communicated?
	Requesters, KCB & working group: How was external/internal validity achieved and communicated?
	Requesters, KCB & working group: How was reliability achieved and communicated? Issues of confidence, risk assessments etc.
	Requesters, KCB & working group: How was external/internal validity achieved and communicated?
	Requesters, KCB & working group: How transparent/repeatable was the knowledge production process?
	KCB & working group: How contestable were the outputs of the case studies (e.g. by hostile stakeholders)?
	KCB & working group: How susceptible were the processes to accusations of bias?
Policy-usability	Requesters: How adaptable is the methodology in terms of producing results in a time-frame usable for policy processes? How could it be improved?
	Requesters: To what extent did the output answer the specific question? Why? How could this be improved? To what extent did the output meet your expectations?
	Working group/KCB: How easily updatable are the results as new knowledge becomes available?
	Requesters: To what extent were trade-offs (options etc) communicated? How helpful were these options?

Table 5. Framework for the evaluation of the short- and long-term outcomes of the NoK (Task 4.3 and phase 3 of evaluation)

Evaluation focus	**Criteria measured**
Outcome evaluation	
Capacity-building	Requester: Did the NoK help foster trust in biodiversity and ecosystem services knowledge?
	All: To what extent has the NoK produced longer-term capacity (e.g. spinoff partnership, new practices, institutions)?
	All: To what extent has the NoK helped build intellectual and social capital among the different actors?
	KCB, working group & experts: To what extent did the NoK engender changes in attitudes, behaviours and actions of actors?
	KCB, working group & experts: To what extent did the processes promote learning among the different actors?
Policy usability	Requesters: Are the outcomes of the NoK usable for policy-makers? For wider audiences? How? Why?
	Requesters: Is the NoK capable of producing results in a time-frame suitable to policy processes?
	Requesters: What barriers to the use of the NoK output have you

	encountered? Why?
Influence	Requesters: How influential is the knowledge generated through the NoK on policy development/change? In what way? Why?

2.2. Materials and methods

The evaluation framework guided the collection of qualitative data with a range of individuals involved in the project in the three phases outlined above. A qualitative semi structured strategy provides a depth of understanding to people situated or contextual accounts of social processes and enables the interviewer to probe the responses provided to uncover a more nuanced picture of the process being studied (Mason, 2002). The advantage of such an approach is the exploration of interviewees' perspectives and feelings on topics which matter to them (Arkesy & Knight, 1999). Thus, what may seem at first to be a minor concern may in fact, with follow up questioning, reveal important issues, backed up with clear evidence (Rubin & Ruben, 2005). Interview guides were developed (see appendices 1-5) and interviews predominantly undertaken over the telephone, although it was possible to conduct a small number face-to-face. Some interview guides were adapted for specific groups as different questions were relevant for different interviewees (Mason, 2002).

Although not explicitly stated in the Description of Work the evaluation was keen to follow an iterative approach throughout the project. As a result additional data was gathered in focus groups in the conservation and marine case study. The advantage of focus groups is that they allow for exploring in more depth issues raised in previously collected data (Burnham et al, 2004), and hence they can be used to explore converging and diverging attitudes and perceptions (Kitzinger, 1995 and Morgan, 1996). They are particularly useful to investigate participants' motivations (Morgan and Krueger, 1993). As a result, greater breadth and depth was possible in the evaluation. Finally, a few questionnaires were also used with the Client Dialogue Group at the beginning of the project to add to the evaluation.

Evaluators attended most events organised by the project, namely the first conference, client group meetings and all case study workshops and meetings. This allowed evaluators to introduce the evaluation work package and to identify participants to contribute to the evaluation with different expertise and from different countries. Furthermore, organisers were also asked to identify active participants involved in the project, thus incorporating a snowball sampling strategy (Bryman, 2004). A follow up email was sent to identified participants to again outline the methods and goals of the evaluation and gain consent from the participants to be interviewed. This included consent to audio record the interviews to be transcribed after, thus providing a more accurate recording of the data for analysis. In these follow up emails and at the start of interviews this process was repeated, and specifically it was clearly highlighted that interviews were confidential and data would be anonymized in transcribing, analysing and presenting data in the final report to encourage the interviewees to share their views openly with the interviewer. Similar ethical considerations were incorporated into organizing and conducting the focus groups, although in addition the participants were sent a brief information sheet explaining what a focus group is and why it was being used. In anticipation of non- response (De

Vaus, 2002) a large sample of participants were identified for the evaluation. However, non-response was minimal, with the exception of the marine case expert group, which tested all three methodologies but had few members of the group involved in the whole process. Nonetheless, the focus group in the marine case study helped overcome this problem and provided additional data. As a result of the absence of a formal agriculture expert group, fewer participants were interviewed from the agricultural case study (see table 6). However, those participants in the agriculture case interviewed came from more diverse backgrounds than from the other two case studies in the project which were more dominated by scientific researchers. The number of interviews conducted in each phase of the evaluation is detailed below in table 6 and the number of participants interviewed is shown in table 7. This shows the basic sample criteria and number of interviewees from each with some interviewees being interviewed more than once in the evaluation. Although not specified in the Description of Work, in response to feedback from the Client Dialogue Group brief interviews were also carried out with a small sample (n=16) of identified experts who declined the invitation to be involved in the expert group to better understand the rationale behind this decision.

Table 6. Number of interviews conducted in each phase of the evaluation

DoW Task	Evaluation phase	Phase timing	Interview code	Number of interviews	Total interviews in each phase
TASK 4.2	**Phase 1**	15th March 2012 – 2nd July 2012	P1.1 – P1.24	24	24
	Phase 2	9th July 2012 – 13th March 2013	P2.1A - P2.9A (agriculture case)	9	36
			P2.1C – P2.13C (conservation case)	13	
			P2.1M – P2.14M (Marine case)	14	
			P2.1N – P2.12N (Non-participants)	16	16
TASK 4.3	**Phase 3**	18th July 2013 – 23rd August 2013	P3.1 –P3.13	13	13
				TOTAL	**89**

Table 7. Number of interviewees in the evaluation

Interviewees selection	Number of interviewees
Regional workshops participants (WP 2)	9
Conference Participants (WP2)	10

Client Group members (non academic advisors)	5
KNEU Consortium members (WP2, WP3 & WP7)	6
Case study participants (WP3)	Marine case study – 12 Conservation case study – 12* Agriculture case study – 9
Case study non-participants (declined to join)	16
Total number of interviewees	**79****

*Number includes the requester

** The difference in number with table 6 relates to the fact that some interviewees were interviewed more than once.

The iterative approach adopted in the evaluation included feeding in initial evaluation findings into the wider project to make the evaluation useful not only in the medium and long term but also in the short term. As a result, various communication tools were used to feed in the initial evaluation findings of each stage to the project consortium members, to the Client Dialogue Group, to the interviewees and to wider interested audiences. The tools, when they were used and the target audiences are detailed below in Table 8.

Table 8. Communication tools, targets and timeline for feeding back evaluation findings

Communication tool	**Target audience**	**Timing**
Written summary of initial findings from phase 1.	Interviewees KNEU consortium.	May 2012
Written summary of evaluation suggestions for improved communication in the KNEU project.	KNEU WP6	August 2012
Three written summaries of short, medium and long term issues raised in phase 1.	KNEU consortium The client group Interviewees	October 2012
PowerPoint presentations at project meeting of initial results and handouts of written summaries.	KNEU Consortium	October 2012
PowerPoint presentations at client meeting of initial results and handouts of written summaries.	Client Group	November 2012
Written summary of phase 2 initial findings of issues relevant for the KNEU coordinators (WP7) and specifically for the three case study coordinators in WP3 from individual interviews and focus group.	KNEU WP3 KNEU WP7	November 2012
A written summary of focus group findings from the conservation case.	Conservation case study expert group	November 2012
An evaluation web page on the project website to show what the evaluation is doing and why, including links to	Participants in project and wider	December 2012

the three written summaries from Phase 1.	audiences	
Workshop with to examine the evaluation results from phase 2.	KNEU WP3 KNEU WP5 KNEU WP7	January 2013
PowerPoint presentations at the client group meetings of initial results.	Client group	April 2013
A written summary of focus group findings from the marine case study.	Marine case study expert group	May 2013
A written summary of evaluation findings to relevant for planning the second Conference.	KNEU WP7	August 2013
Presentations of key challenges and suggestions at the second conference in Berlin.	Wider audiences	September 2013

3. Evaluation results (Tasks 4.2. & 4.3)

This section presents the results of the evaluation of the prototype NoK development and testing. The findings are presented following the three phases of the evaluation: phase 1 for the development of the prototype, phase 2 for the testing of the prototype (both of which are listed as Task 4.2 in the Description of Work) and phase 3 for the outputs and outcomes of the process (Task 4.3 in the Description of Work). The most important issues as identified by interviewees are presented first and where additional issues in the process have been identified these have been included alongside the evaluation criteria. The challenges and successes in the process as well as suggestions for the NoK are presented and a table summarising these is provided at the end of each sub-section.

3.1. Phase 1 – Evaluating the prototype NoK development (Task 4.2)

A number of events were organised by the project to gain views and opinions from stakeholder groups on the development of the prototype NoK. These events were three regional workshops held in different locations across Europe and a conference in May 2012. A number of issues were identified by interviewees relating to the NoK prototype development. These included the overarching issues relating to governance of the NoK, which is presented first, followed by the results which relate to evaluation framework criteria in order of importance.

3.1.1 Governance

Interviewees highlighted some key concerns relating to the governance of the NoK, which could reduce the NoK's ability to add value. The first challenge identified by interviewees was to avoid unnecessary bureaucracy within the NoK process, which could in turn reduce innovation and lead to an

"*administrative monster*" (P1.1). Interviewees also highlighted the challenge of the NoK remaining independent and flexible. This was seen as important to allow the NoK to react quickly to changing needs. One interviewee commented "*situations can change and the structure must be able to react to changes in conditions [....] everyone who wants or needs access should have access, it is a very top heavy structure at the moment. Who determines the discussions around the NoK [...] brings in questions of fairness*" (P1.7).

In addition to independence and flexibility, interviewees also highlighted the need for the NoK to be open and accessible. This was closely linked to possible funding mechanisms for the NoK. A key concern about the NoK development raised by interviewees was "*how expensive and therefore accessible would it be, would it only be* [affordable by] *governments or big organisations or will smaller organisations working with management or policy making be able to use it?"* (P1.12). Indeed, this was one of the main discussion items selected by participants at the regional workshops. A suggestion from interviewees to overcome this challenge was to develop the NoK with different levels of funding for different services with the aim of increasing access for potential requesters. Moreover, an open and flexible NoK was perceived to better "*allow innovative new thinking and interpretation"* (P1.1). Furthermore, interviewees highlighted that too much of an upward focus on international processes, such as the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) could result in some groups and knowledge resources, particularly at the local level, becoming underrepresented within the NoK. However, some interviewees highlighted that a link to IPBES could also provide a strong motivation for some groups to get involved, particularly policy makers. One of the essential groups to be included in the NoK was perceived to be policy makers. One interviewee remarked that "*the* [biggest] *challenge is to make it* [the NoK] *relevant to current policy processes"* (P1.5). These challenges of engaging different groups in the NoK also closely link to the challenge of developing and facilitating the multi-directional processes for the flow of information not only from science to policy but from policy to science as well as other groups in the NoK who may be knowledge producers and users, including practitioners. As such, users and producers of knowledge were perceived as important to fully engage in the process of designing the NoK "*to ensure everybody gives and gets something out of the NoK*" (P1.4). The inclusion of other types of knowledge, such as local knowledge was also highlighted as a specific challenge for the governance of the NoK. The inclusion of different groups and knowledge types are linked but to overcome this challenge also involves the challenge of the different uses of terminology across groups in the NoK, which could potentially hinder the successes of the NoK processes.

Finally, interviewees emphasized the wider challenge of avoiding competition between the NoK and existing networks operating on the science policy interface in Europe. Interviewees specifically highlighted that the NoK should be complimentary to other existing networks: "*I think that developing the NoK as a dialogue platform between the existing research organisations, managers and policy makers will help overcome 'competition' problems that might occur. Once they feel the back-up of a larger network and will see their recommendations can easily be adopted and implemented*" (P1.6). All above governance suggestions are summarised in Box 1.

Box 1. Governance suggestions identified by interviewees in the setting up of the prototype NoK

- Avoiding an overly bureaucratic process.
- Ensuring an independent and flexible NoK.
- Ensuring NoK is accessible to all, not just large organisations with funding.
- Overlooking local groups and bottom up processes with too much of an upward focus on IPBES.
- Integrating different types of knowledge into the NoK.
- Overcoming terminology differences across groups.
- Engaging both users and producers of knowledge in the development of the NoK from the start.
- Ensuring a multidirectional flow of knowledge between different groups.
- Avoiding duplication and competition across networks.

3.1.2 Representation and inclusion

The issue of representativeness in the evaluation refers to the inclusion of knowledge from a wide range of expertise and professional groups into the NoK processes from across different cultures. Firstly the successes and challenges of including different cultures, professional groups and knowledge types are discussed, following which the suggestions highlighted by interviews to help overcome these challenges are detailed.

Interviewees highlighted that there was a good cultural mix of participants in the development of the NoK, with specific examples of participants from Southern and Eastern European countries at the first KNEU conference. Indeed, the cultural mix was identified as being good from the very start of the development process during the regional workshops which were held in Denmark, Hungary and France. However, interviewees highlighted that the representation of professional groups varied between the regional workshops.

The main group involved from the start and throughout the development of the NoK was highlighted by interviewees as being scientists. Although many interviewees thought this was appropriate, others highlighted the need for more representation from other groups, such as policy makers and practitioners. The project did set up a Client Dialogue Group from the start of the project to ensure feedback from policy-makers and practitioners. This was acknowledged, with one interviewee commenting that "*at least in this project they created a client group which, the client group was kind of practitioners, so they did try*" (P3.7). Policy makers from the EU level did briefly participate in the conference but some interviewees thought their involvement at the conference could have been more substantial as *"it is important to include end users from the start if* [...] *you want your work to be significant to them*" (P1.13). Furthermore, it was suggested that "[The] *NoK also needs to gain support at the Ministerial level*" (P1.24) and include national level policy makers, although this group was more involved in the regional workshops at the start of the process. The inclusion of practitioners in the NoK development process varied between events, with the perception that more practitioners were invited in those workshops where scientists could not be identified or attend. For example, the perception was that the Nordic workshop had *"more emphasis on people towards the practitioner side"* (P1.8) than scientists, which was a result of the organisers being unable to identify scientists from all the countries in

that region. One interviewee summarised the situation as follows: "*When we didn't have scientists we invited managers and politicians from these countries to get representation* [...] *It was a positive thing to have a mix*." (P1.10). Even though representatives from national governments, international organisations and non-governmental organisations (NGOs) were involved in the regional workshops to develop the prototype, some interviewees commented that some of these groups could have been better represented. The Client Dialogue Group, which consists of an advisory group from policy orientated organisations who could be potential requesters in the future, also emphasized the need to "*get practitioners involved"* (P1.1) to overcome the risk that "*the NoK gets too far from practice*" (P1.3).

Other possible groups that could have been represented better were suggested as social scientists and communication specialists. This led interviewees to comment that "[missing were] *other economists* [...] *and maybe some social scientists from a perspective of society*" (P1.22) and "*specialists in communication and building networks, communication of knowledge*" (P1.21). A possible role for communication experts could be to help build the network further, with one interview commenting that "*communication expert* [...] *could make the project 'lively' or new*"(P3.7).

The inclusion of these other groups was perceived as potentially bringing with them different skills, experience and importantly different types of knowledge. Indeed interviewees highlighted the integration of different types of knowledge, such as local, traditional and indigenous knowledge, in developing the NoK processes as a challenge. However, in practice different attitudes towards different types of knowledge may be a challenge in engaging groups in the NoK. One interviewee commented "*I find it difficult to get the academic attendants to acknowledge this variety* [of knowledge] *and that other information exists and that it should be taken into account*" (P1.13).

The evaluation identified two suggestions to help identify and engage groups in the NoK. The first was to continue to develop the knowledge mapping undertaken in WP1. The second was to undertake a stakeholder mapping of the different groups that should be engaged in the NoK. Specifically, it was suggested that a stakeholder analysis could not only identify who to engage with but what benefits they may get from the process and what they are able to contribute. This suggestion also links with the challenge identified in the evaluation that "*it is very complicated* [to know] *who are the actors and how are they linked. The mind sets of different actors work in different ways, they need to be pulled together and, based on experience, this is not easy, it must be clear for everyone how this arena will be working, it is not only scientists who need to be connected, so it can't be structured in a way that only a few people in the world understand*" (P1.7). As such, a stakeholder analysis could help improve the representation of groups and expertise in developing the NoK, but at an institutional level it could also help foster collaborations with other networks, organisations and initiatives thus overcoming the challenge of competition and duplication with other networks as discussed in the section 3.1.1. This suggestion may in turn help to overcome a further challenge identified by the evaluation, namely motivation to contribute to the NoK. One interviewee commented that one of the problems is "*people's unwillingness to engage, because they are already in their own little network and they are quite cosy and happy* [The NoK] *has to be a compelling for people to do, otherwise people won't bother*" (P1.8).

Nonetheless, interviewees highlighted that there was already interest by some institutions to actively

contribute their expertise to the development of the NoK regardless of whether future funding would be made available to support this. As such, some participants were keen to engage in discussions to explore more detailed aspects of the NoK, for example existing information and communications technology (ICT). The broad issue of ICT connects to further suggestions from interviewees to use more dynamic tools in the development of the NoK. This included the development of a more interactive website to not only provide but also collect information, such as comments and feedback to enable experts to register and link with each other, and wiki technology for document iterations. Social media was also highlighted as a tool which could help engage more people in the NoK, although interviewees also emphasized that the use of social media was not always successful in achieving this goal, particularly in the biodiversity sector and therefore before this tool is used careful assessment is required. Furthermore, interviewees suggested the use of e-conferences and Skype to "*come together virtually and work together. When you think of NoK it should be small groups convening, but they can't always convene physically*" (P1.11). Specifically for the development of the NoK, Skype was suggested as a possible tool to help provide background to people, introduce the prototype NoK structure and stimulate ideas to deepen engagement in face to face discussions at events. More broadly speaking however, one interviewee identified the need to jointly develop three interconnected levels in the NoK from the start for policy makers, practitioners and scientists instead of integrating each group one by one. Indeed, doing this could help overcome some of the challenges above (and summarised in Box 2) whilst integrating some of the more detailed suggestions provided by the evaluation to improve representation and inclusion of different groups, skills and knowledge in the development and work of the NoK in the future.

Box 2. Successes, challenges and suggestions to improve representation and inclusion in the design of the NoK

Successes	**Suggestions**
• Good representation of scientists and practitioners across regional workshops. • Good representation from southern and eastern European countries, for example at the conference.	• Include other groups in the development of the NoK from the start, even if in different discussions. • Include contributions from other sectors (e.g. knowledge brokers, participation experts, policy makers and practitioners) to develop the NoK. • Investigate whether social media will have a positive impact on the NoK. • Undertake a stakeholder analysis to identify who the stakeholders are, what their needs are and what they can offer the NoK. Use this as a basis to identify and facilitate wider
Challenges	
• Ensuring cultural diversity at workshops, for example despite efforts no Icelandic scientists were identified for regional workshop. • Engaging with and including policy makers, managers, practitioners, the private sector, social scientists (society perspective and economists) and national level institutions. • Identifying and promoting incentives and benefits for participants to engage with the NoK at an individual and institutional level. • Integrating different types of knowledge and	

expertise (practical knowledge, local knowledge, indigenous knowledge and scientific knowledge from social sciences). • Maximising on innovative, creative and dynamic tools to improve interaction with groups (for example, social media, interactive website platform, e-conferences). • Developing and communicating a long term vision to gain support and expand the NoK. • Ensuring the NoK is useful for policy development and practical management. • Including relevant knowledge from outside Europe.	and deeper collaboration. • Use alternative technology to work in virtual groups, for example e-conferences. • Clarify the long-term aims and role of the NoK. • Maintaining and improving the mapping of knowledge holders from WP1.

3.1.3 Communication and information flow

Good communication and flow of information were considered essential to ensure participants were kept informed throughout the process on how and when they could contribute to the development of the prototype NoK. Interviewees felt that the information sent prior to events was useful and indicated that the events involved contributing to discussions and sharing ideas, not just listening.

However, the evaluation revealed that some participants' expectations varied as they "*thought the terms of the project were a little different*" (P1.16). Indeed, some interviewees were unclear on the focus of the conference, their expected role and the outputs from the conference, which led one interviewee to comment that "I *wasn't clear on my role until I got to the conference though. In fact, I thought it would be a more technical conference, not just about process*" (P1.15).The evaluation did, however also reveal that the coordinators were intentionally vague in their communication of the aims of some events in order to attract participants. The evaluation findings also highlight the different levels of familiarity with the project by participants. While some participants who were unfamiliar with the project context did visit the website for more information, one commented that he "*didn't receive any background documents* [and] *were directed to the website but was not able to find so much background documents*" (P1.17) and another had "*limited time to read information before taking part*" (P1.22). Interviewees who did spend time reading the documents sent before events felt that the documentation, for example the "*pdf presentation* [of the prototype] *didn't work well*" (P1.10) and it "*was not clear about what the prototype was until the actual workshop*" (P1.13) during the introductory presentation of the prototype. However, many interviewees considered it normal to need a verbal explanation as well as written documents to fully develop their understanding. Conversely one interviewee commented that they "*received a very short one page summary about the prototype, this was really condensed which was really good, when you put everything on one page you can really see how it looks*" (P1.20). The evaluation also found that the overall aims of events as well as the goals of the project could have been clearer, with one interviewee commenting that **"***I was asking myself what was the actual goal of KNEU and of these series of workshops and I could not tell at this point* [...] *whether those goals have been achieved or not*" (P1.14) and what they "*missed was a clear target, what we should have reached at the end of the conference*" (P1.21).

To improve information between the project team and the participants the use of Skype was suggested (see section 3.1.2) to convene regional sub groups prior to events. Presenting and discussing the prototype before events could have helped develop participants' understanding of the prototype thus allowing more time at events for discussions to progress the development process. More specifically, some interviewees felt that the "*presentation was good, but it described a complex multi-linear [process] almost like a thought map and the presentation was very linear, almost next slide, next slide, so you would have to think back to a few slides ago to take another direction you could go with the NoK*" (P1.9). This led to suggestions that a more dynamic way of presenting the prototype could have been used, for example Prezi software, to better communicate the many facets of the process. Furthermore, interviewees suggested that improving information flow prior to events could not only improve the communication between the project and participants but also provide the opportunity for participants to discuss and collate wider suggestions from their own networks and thus potentially helping them to contribute much more to the discussions in the events. Indeed, one interviewee commented that "*better clarity beforehand would have encouraged more influence from participants during the workshop and space to talk about it more*" (P1.10).

Other suggestions included concise, clear one page summaries, which explained the project background, how the project was positioned with other networks and institutions in the wider European landscape and a clear outline of the goals, aims, roles, expectations for the project, including a clear vision for the future of the NoK. Such concise information could help to develop participants' understanding of the project before events, particularly for those who had not been involved in the project previously, but also help participants promote the NoK more easily within their own networks. Despite their willingness, many interviewees felt this was a challenge as it was "*unclear how you are going to use those stakeholders taking part later, or was this one time happening or will they be later in this process in establishing a network [...] because this has something to do with your engagement*"(P1.22).

Improved interactivity was also suggested for the website to help information flow between events as one interviewee commented, "*better invest in the website and I think get a real creative person involved, it all seems very solid and a little bit boring and old fashioned*" (P1.21). Technology such as e-conferences and similar tools for remote group working was also suggested in the evaluation to be included in the NoK design, specifically the incorporation of virtual labs technology which is an existing platform designed to bring geographically and technically diverse groups together to work in a shared virtual space so that "*you have a big community working together with the same concepts, the same tools at the same time in different parts of the world*" (P1.24). Indeed, the use of such tools will not only help overcome the challenge of convening people at one time in one place but will also overcome challenges to do with venue size and financial constraints which were identified as challenges in the evaluation.

Following the events the interviewees felt the outputs from discussions could have been circulated to participants more quickly, as well as being clearer on how this information from events would feed in to the project (see also section 3.1.4). Indeed, interviewees commented that "*to be honest, the follow up from the regional workshop has not been good*" (P1.10) although "*eventually there was an email that came but it took a long time [...] beyond that there has been nothing, no feedback*" (P1.8). Furthermore, the interviewees felt that the information could have been clearer about next steps in the project and

their involvement, for example "*the recommendations email mentioned a Brussels conference 'hope to see you soon, maybe in Brussels', I wasn't sure, maybe I missed something*" (P1.19).

As such, interviewees suggested one page summaries following events to provide feedback to participants on the outputs of the event, to clearly set out how this would contribute to the design of the NoK and clearly communicate next steps in the process, all of which could also help to improve the website as a source of information.

More broadly the need for "*a good communication strategy, including branding issues*" (P1.18) was a suggestion from interviewees, which could bring together all the specific suggestions from the evaluation to improve communication to and from the NoK (see Box 3 for a summary of all issues above). This could also facilitate wider engagement of groups by marketing the NoK with consistent messages and strategically grow the NoK over time.

Box 3. Successes, challenges and suggestions to improve communication in the design of the NoK

Successes • Providing information before events is useful, for example the information sent before the conference indicated that participation was expected and it was not just a listening event. • Using the project website by invitees to access information on the project. • Presenting the prototype NoK clearly at events.	**Suggestions** • Explore the use of Skype meetings to present NoK to participants prior to events. • Consider the use of more dynamic tools to present complex issues and non-linear processes (e.g. Prezi) and deliver workshop as a whole. • Communicate aims and objectives of events clearly. • Clarify/ better communicate NoK definitions, for example 'expert' and 'knowledge' and NoK links with other networks/ initiatives. • Ensure timely follow up after events to maintain participant engagement. • Clearly communicate how interest groups/ individuals can remain involved in project if unable to attend events. • Develop the website for interactive communication. For example, consider including clear project timeframes, information about events, feedback mechanisms on expectations and getting involved to expand the network. Include names and photos of key contact to reduce communication barriers. • Provide one page summaries on key aspects of the project on website and circulate to participants. E.g background information, prototype design, aims of KNEU, long term vision for NoK, progress and key decisions,
Challenges • Understanding of the NoK processes by new participants, for example full understanding of the prototype NoK by participants required both written information before events and verbal presentations at the start of events. • Communicating the multi-directionality flow of knowledge across NoK and its potential ability to enhance understanding between different professional groups. • Communicating clearly and concisely the aims, participant roles and expected outputs of before and during events, for example participant expectations varied greatly for the conference from a technical event to discuss biodiversity, the beginning of the NoK and the actual development of the NoK.	

• Clearly highlighting pathways for participants to obtain information, engage and contribute to the project. • Promoting participation directly and indirectly through existing participants to promote the NoK through their networks.	how to get involved in KNEU and NoK. • Develop, implement and adapt a targeted communication strategy to encourage the two way flow of information during the project and a marketing and communication strategy for the NoK.

3.1.4 Self-organisation, openness, influence and transparency

An important aspect of the development of the NoK is ensuring participants are able to engage and contribute to the design process. Specifically this involves the ability of participants to decide the parameters of their discussions on the NoK, such as selecting which topics they want to discuss and how, as well as being able to freely discuss these issues. This is a key component of ensuring that participants are able to shape the development of the NoK, using their skills and experience. Furthermore, ensuring participants can clearly see what decisions are being made, and why and how they can contribute will help build trust and increase the motivation of participants. Detailed first in this section are the successes in how the events were organised to include participants in the design process, followed by specific challenges and suggestions on how to address them.

At the regional workshops the interviewees felt they "*were given very good opportunities to speak their views"* (P1.8) with participants listing "*all issues* […] *and then everyone voted for them and the top four were discussed in smaller groups*" (P1.10). This arrangement was well received by interviewees as "*there were different groups addressing different issues* […] *it was not the sort of workshop where you came back and think 'we did nothing*" (P1.11). As a result the interviewees felt they were able "*to influence both details of the prototype and the general principles behind it and the bigger level issues"* (P1.8). Furthermore, interviewees felt that the prototype was not imposed on the participants but it was presented to stimulate discussion and the sharing of ideas. The presentation of the Cochrane Collaboration, which is an established network of knowledge in the health sector, also triggered ideas. As a consequence, the interviewees felt that broadly speaking the organisers were open and wanted to hear the participants' views about the prototype design. A suggestion, however, was that events could have been better planned for non-native English speakers as "*sessions were very long, which is very tiring if English is not* [your] *mother tongue*" (P1.16). Regular breaks were therefore suggested to better involve non-native speakers in the discussions at events.

The use of small group discussions at events and the conference was considered beneficial by providing an open platform to "*voice opinions*" (P1.13). Some interviewees felt that organisers valued and listened to their experience, as one explained "*I believe I actually have something to contribute* [...] *as far as my* [...] *experience which is long and deep* [...] *I think we can learn a lot about things to do and avoid* [...] *and it seems like people are appreciating that*" (P1.14). Furthermore, interviewees considered the scientific background and understanding of the project by the facilitators of the small group discussions beneficial. However, some interviewees felt that clear objectives for the break out groups would have provided more focused discussion, as one interviewee commented that "*I got the impression that* […] *the people who prepared these break out groups were not so prepared what they would to have as an*

outcome" (P1.20). Moreover, the interviewees' opinions varied on the quality of facilitation at events. Specifically some interviewees felt that some important issues raised in the small groups were missed and therefore the participants were less able to contribute to the design process. As one interviewee commented that "*the group, it was not only me* [...] *felt like our things are not heard so we had a bit of a struggle to get our points through* [...] *the facilitators were not neutral, they had too much of a stake in the project, too much personalised statements about it* [...] *it is very important to hear the specific concerns and points put forward by participants in a workshop and make sure that that is really, really well addressed*" (P1.11). One suggestion from the evaluation findings was to have a transcriber, as well as a facilitator, to help capture the issues raised by participants in discussions. However, the evaluation findings suggest that some issues may have been missed due to a "*lack of knowledge about communication* [by facilitators as] *some messages were there,* [but the participants] *had to repeat it until it's clear* [...]*, sometimes you are talking* […] *and thinking ok, we are in the same loop and no, not at all*" (P1.24). Thus, the evaluation highlighted differences in terminology (see section 3.1.1 on governance) between organisers and participants as a challenge in enabling participants' to contribute to the development process. The circulation of draft outputs of discussions following events to participants did, however, allow them to amend summaries, thus providing a second opportunity to contribute to the process. Conversely, other interviewees felt that the facilitators responded well to participants' suggestions during discussions and the summaries of small group discussions presented during events reflected the discussions well.

As the development processes advanced a greater mix of participants were involved, and as such at the conference there were some participants who had been involved in earlier stages of the development and some who were new to the process and therefore less familiar with the project. This mix between existing and new participants at the conference led to frustration by some existing participants who wanted "*to see things advancing more rapidly* [...] *to start talking more concrete* [...] *a lot of questions were rehashing what had already been done*" (P1.19). As a consequence the evaluation suggested that more in depth discussions could have been organised for active, informed participants who were able to contribute their expertise but also at an institutional level to identify potential collaborations with the NoK. This establishment of specialist sub-groups is also highlighted in section 3.1.3 as this suggestion may also help improve the engagement of individuals and groups by maintaining their momentum in the development process. Specific issues which interviewees suggested could benefit from more specialised discussions were information and communications technology (ICT), communication processes (both highlighted in section 3.1.3), civil participation (see section 3.1.2) and knowledge transfer. For those participants that were new to the process, a suggestion included one page summary documents on the background of the project, the rationale for the NoK, key decisions in the project to date and its links within the wider landscape.

Furthermore, participants were sometimes unclear on the value of their contribution to the prototype design which led one interviewee to comment that they were "*unsure that what I brought in will have some influence for the process*" (P1.21) or if the organisers "*did actually find what happened useful and used it*" (P1.8) and what decisions were taken as a result following the discussions. One interviewee commented that "*I haven't received any feedback* […] *if it is possible to integrate these comments into*

the project or not, this would be interesting feedback" (P1.20). However, this challenge in providing a transparent process related to both the regional workshops and the conference and may have been influenced by different expectations from participants which is often the case with "*collaboration work* [as] *it takes time before everyone in the same project understands what* […] *to do. It is not just organising the prototype, it is organising what you are doing*" (P1.23). As such, the evaluation also suggested that in the early stages of the project communication internally as well as externally could have been improved (see section 3.1.3), highlighting the multiple dimensions which need to be considered in the development of NoK processes (see Box 4).

Box 4. Successes, challenges and suggestions to improve the self organisation, openness, influence of participants and transparency in the design of the NoK

Successes	**Suggestions**
• Presenting the NoK prototype and not imposing it on participants stimulated sharing of ideas and discussion of issues. • Using small discussion groups to reduce barriers to participation, for example participants felt these were open and allowed active participation in the workshops and conference. • Discussing past failures in knowledge exchange activities from science to policy. • Presenting examples of similar initiatives. For example, the Cochrane Collaboration was presented at the conference. • Selection of topics for discussion by participants in the regional workshops. • Listening to participants and responding to suggestions by facilitators during workshops. • Understanding of science and project context strengthens facilitation. • Disseminating recommendations after events allows participants to include comments not fully picked up at the time. • Presenting summaries of the group sessions which were representative of discussions.	• Better planning of events to include shorter sessions and regular breaks for non native speakers. • Provide one page summaries of each topic discussed at events (for example, outputs of break-out sessions) to provide timely feedback and continued engagement from participants. • Provide background information particularly to those unfamiliar with European projects. • Ensure outputs from all

Challenges	
• Maintaining a neutral role by facilitators, for example some facilitators joined the discussions during the regional workshops • Ensuring equal participation from non-native speakers. • Communicating next steps in the project and clarifying how information from events will contribute to the process. • Clearly communicating project progress to new participants and key contacts, particularly to those unfamiliar with European projects to provide contextual understanding. • Communicating how everything fits together (e.g. IPBES, EU ES mapping, integration with other networks). • Differing expectations for the NoK within the project team. • Logging all issues raised and summarizing comprehensively the outputs of the small group discussions. • Recognising different needs of new/existing and active/ passive participants. For example, existing, active participants were keen to make progress on identifying how to incorporate important support elements and infrastructure into the NoK. • Ensuring topics selected by participants for discussion about developing the NoK are focused. • Maintaining the momentum of participants to actively contribute to the detailed planning of the NoK.	regional workshops equally feed in to the design process. • Capture all issues raised in group discussions fully. For example, using a facilitator and transcriber and participants amending output summaries on flipcharts during event. • Committed participants already familiar with the NoK could form sub groups to focus on future requirements of the NoK. • Clearly communicate aims of small group discussions to ensure they remain focused and relevant.

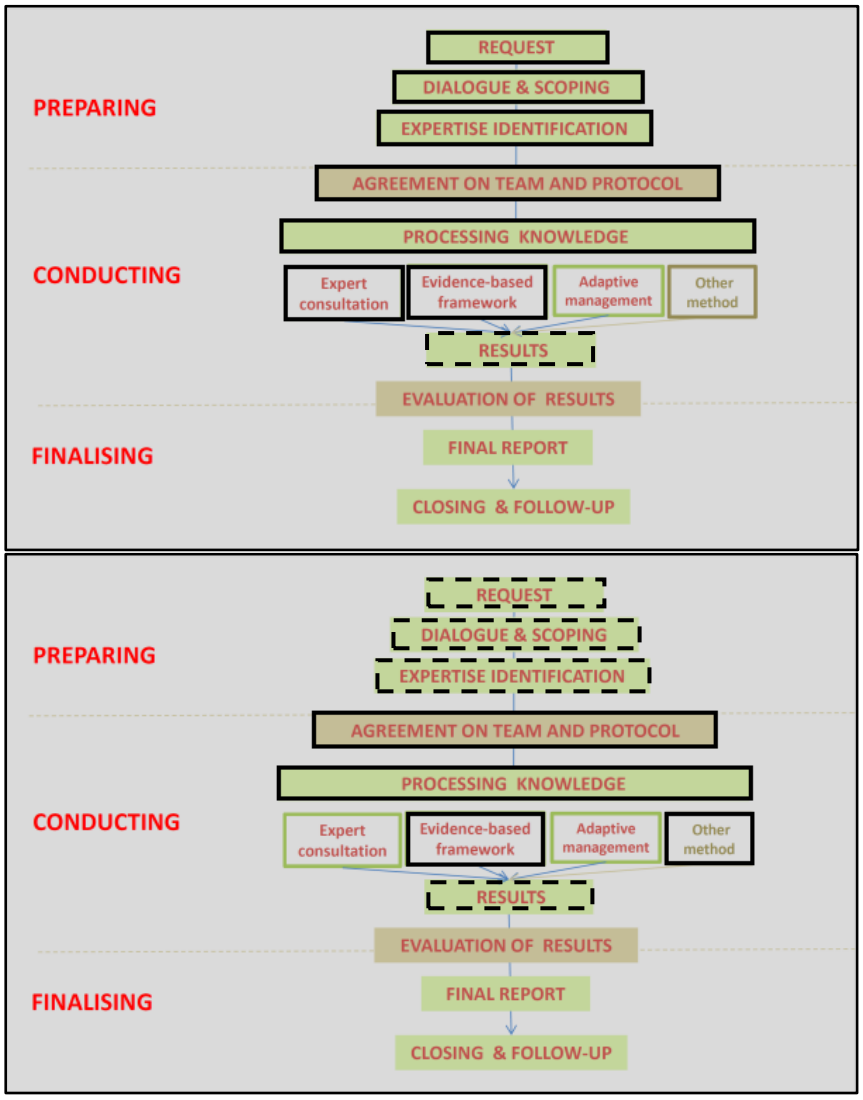
In summary, there are a number of interlinked key issues which can be identified in the evaluation findings from the process to development the prototype NoK and can help guide future work to design a NoK. The main issue is the inclusion of wider groups in the development of the prototype from the start, not just natural scientists but other groups from science, practitioners and importantly policy makers. To widen the representation of such groups, consideration is required on not only what they can contribute, but what motivates them and therefore how they can benefit from being included. Furthermore, different groups may have different information needs and therefore targeted communication will be required to provide concise, comprehensive and clear information on what has happened previously, what is expected presently as well as follow up information to keep them fully engaged into the future. The use of communication tools and strategic planning could improve this further whilst including other areas of expertise, such as communication and facilitation skills alongside scientific understanding within the development team.

3.2 Phase 2 - Evaluating the testing of the prototype NoK (Task 4.2)

The three case studies used to test the prototype focused on the agricultural, marine and conservation

sectors, hence forth referred to as 'case studies'[2]. The case study areas were selected for their policy relevance and to address different parts of the scientific community as well as different stakeholder groups. Due to constraints in time and finances the case studies tested different aspects of the prototype (as shown below in Figure 1), and different methodologies (see Box 5, and Appendix 6 for more detail) although there was some overlap with the selection of methodologies used between the case studies.

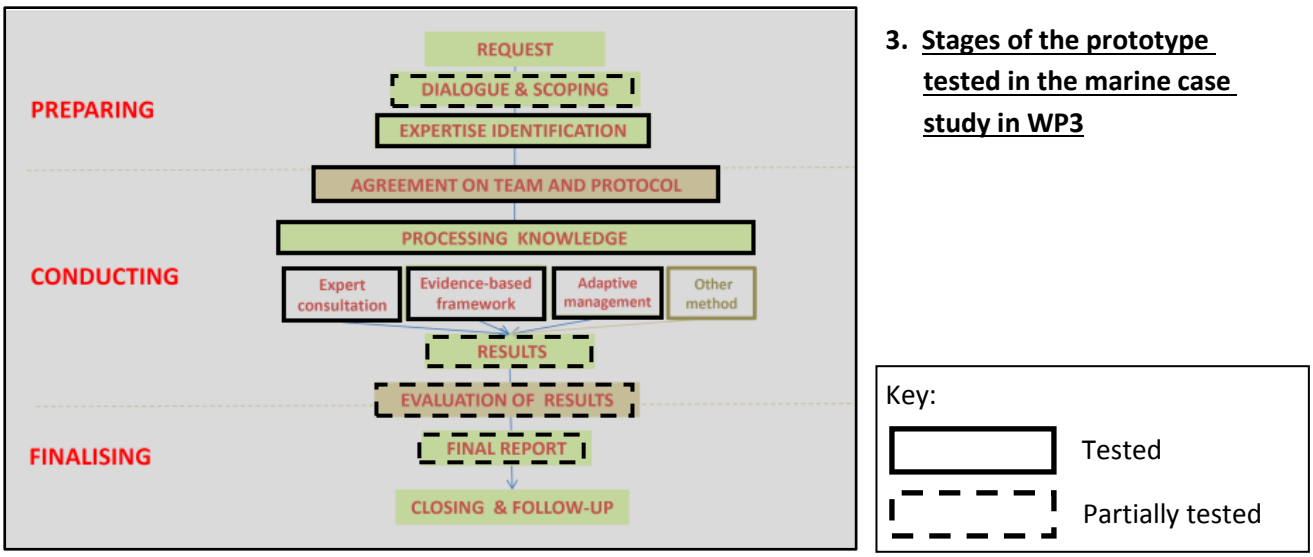
Figure 1. Aspects of the prototype tested in the three case studies in WP3



1. **Stages of the prototype tested in the conservation case study in WP3**

2. **Stages of the prototype tested in the agriculture case study in WP3**

[2] See deliverable 3.1 of the KNEU project: Final assessment reports of the 3 case studies and lessons learned for further detail on the three cases studies



3. Stages of the prototype tested in the marine case study in WP3

Box 5. Overview of methodologies used in the KNEU case studies

Expert consultation is a relatively quick and cost-efficient method to draw upon existing body of knowledge in universities and other research institutions and also to make use of the implicit knowledge among the research community. A more systematic and formalized form of expert consultation is Delphi methodology, in which a panel of experts are consulted individually in several rounds.

A systematic review attempts to identify, appraise and synthesize all the empirical evidence that meets pre-specified eligibility criteria to answer a given research question. Researchers conducting systematic reviews use explicit methods aimed at minimizing bias, in order to produce more reliable findings that can be used to inform decision making.

Adaptive management is a structured, iterative process of robust decision making in the face of uncertainty, with an aim to reducing uncertainty over time via system monitoring. Adaptive management is especially suited for improving management outcomes in the long run. However, the collaborative learning elements of adaptive management can be applied also in knowledge synthesis processes.

A number of workshops and face to face meetings were organised for each of the three case studies. This included an initiating meeting in May 2012 for the conservation and marine case studies held in parallel immediately following the first KNEU conference. Later in the case study process practical workshops for the conservation case study in November 2012, the agriculture case study in January 2013 and the marine case study in May 2013 were also organised.

A number of issues were identified by interviewees during this testing of the prototype in each of the three case studies. The issues identified relating to the testing of the NoK processes are presented in order of importance. As such the first issue presented is representation and inclusion, which despite not being part of the original evaluation criteria was a key issue raised by interviewees. Secondly, the issue

of communication, transparency and influence within the NoK processes is presented, followed by quality assurance and conflict resolution.

3.2.1 Representation and inclusion

The representation of different groups and different types of knowledge in the case studies to test the NoK can ensure the inclusion of a wider range of perspectives in the NoK and was seen as a key issue by interviewees. The three main groups that the evaluation highlighted as being important to fully engage in the NoK processes are outlined. Following this the barriers and motivations for engagement of experts are explored.

The first group which interviewees considered should have been more involved in the process were policy makers. Indeed, the lack of policy makers at a workshop led one interviewee to comment that "*if they* [policy makers] *don't approve or don't think it's right then maybe it will all become irrelevant*"(P2.6A). The lack of policy-maker input reflected mainly the fact that the NoK was only in the testing stage and hence policy makers were not familiar with its functioning and the potential benefit for them in being involved. One way to help overcome this challenge was identified from the conservation case, which successfully engaged a policy maker as a requester. In this case study the coordinator promoted the project at a conference attended by policy makers on the new EU Horizon 2020 Strategy, thus proactively taking advantage of an opportunity to engage a policy maker as a requester to test the prototype. Following this the requester and coordinator entered into a process of dialogue where information and ideas were exchanged to identify and single out a current policy problem for a NoK response. The other two case studies did discuss and identify potential policy issues with policy makers. However, the marine case tested a more science driven issue and the evaluation revealed that the agricultural case study, despite considerable efforts, did not manage to fully engage policy makers.

The evaluation identified two specific suggestions to improve the engagement with policy makers. The first suggestion was to emphasize the financial benefits of including scientific evidence in the decision making process, whilst the second suggestion involved the use of policy language and aligning with wider policy goals beyond the biodiversity sector (also discussed in section 3.3.2). As such one interviewee emphasized that "*the moment you start talking about economics or food security then suddenly the money starts flowing* [...] *you can talk about biodiversity until you're blue in the face* [...] *it's important to talk about biodiversity but linking it to* [other issues] *is crucial* " (P2.1A). Similarly one interviewee talking about one of the questions explored in the marine case study remarked "*If* [you] *wanted peoples' attention, to sell the effect of kelp forest change and if you're choosing effects on fisheries maybe it's easier to get a focus than if you focus on the effect on biodiversity in general, so maybe it's really clever*" (P2.4M). Section 3.2.3 provides details of successes, challenges and suggestions on maintaining the engagement of policy makers once they enter the NoK process as a requester.

The second group which was seen as essential to the functioning of the NoK were scientific experts involved in the NoK through expert groups. The evaluation identified various challenges in engaging directly experts to join the expert group. Firstly, experts for each case study were identified and contacted primarily through the networks (knowledge hubs) mapped out in WP1. Our evaluation, however, revealed the important influence of the reputation of the coordinator in the technical area

being examined. For example, the coordinator of the marine case study was well known within the marine community and interviewees felt the reputation of the coordinator was a major influence on their decision to join the expert group. One interviewee highlighted that with the coordinator's "*name being associated with it, you know you're not going to waste your time*" (P2.13M). Secondly, geographic representation in the expert group was also highlighted as a challenge, for example one interviewee felt the conservation case study "*was mainly a central European discussion*" (P3.2C). Indeed, many experts who joined the expert group had existing connections with the case study coordinators, which influenced the cultural diversity in the expert groups. Interviewees suggested engaging a reputable expert to help attract others to join the expert groups whilst acknowledging the role of individual reputation in engaging scientists to join the expert groups, particularly in the early life of a NoK, as this acknowledgement would be a key first step towards achieving cultural representation in the expert groups. However, one interviewee highlighted a potential problem with this by commenting that "*there are a lot of big players out there and I didn't see any of them there, but in some ways their egos are big and that inhibits other people talking"* (P2.6A). A further suggestion provided by interviewees was therefore to ensure the coordinators in the NoK have existing links to knowledge communities or have the skills to quickly develop these links to help develop an expert group and respond to a diversity of policy problems. The experts in the cases consisted mainly of natural scientists however, the evaluation did highlight that some experts also had social science expertise. These interdisciplinary experts understood the links between ecological discussions with social issues, as one interviewee commented "*I was the only one with a social science background* [...] *We had from different natural science disciplines, we had animal scientists, we had hydrologists so I think that was covered quite well* [...] *I can at least transfer social science in a language natural scientists will understand and the feedback received from other people the input was welcome*" (P2.7C).

The third main group which the evaluation identified as challenge to engage in the NoK were practitioners. The use of the term 'practitioners' here includes professionals such as policy advisors from government agencies, non-government organisation professionals and applied researchers working closely with local stakeholder groups. Similarly to scientists, the main way for practitioners to be engaged in the NoK was by joining the expert group. Some practitioners were involved in the conservation and marine case studies and the agriculture case study organised a workshop half way through the process to consult practitioners. As a result one practitioner commented that he "*could tell the moment I raised it* [an issue excluded] *we were too far down the line* [...] *it was a waste of time* [...] *it was a frustration, maybe it's ignorance* [...] [but] *that's what happens when you get academics to do academic activities*" (P2.1A). The practitioners who did interact with the case studies came from various backgrounds and included local government officers (for example in the conservation case study), NGOs and organisations that operate on the boundary between science, practice and policy. Interviewees identified the important contribution this group made to the process. For example, one interviewee commented "[There were some] *administrative experts that they really know* [...] *how this could happen in the real world and this was really important* [...] *I found really fruitful* [...] *we can really see* [...] *what are the problems* [...] *maybe we can include also some people in the discussion that we don't forget to have this link between science and policy*" (P2.2C). Other groups identified in the evaluation that should be included in the NoK in the future were museums and botanical garden as knowledge holders with

capacity for citizen science outreach, and other knowledge user groups such local stakeholder groups, for example farmers, and the private sector. Thus, the evaluation highlighted how the inclusion of different groups can provide a more holistic understanding of the problems being examined by the expert groups.

The inclusion of other types of knowledge was also highlighted as a concern by interviews, particularly from a practitioner background. Indeed, the evaluation emphasized the differences in expertise between science and practitioner groups, and revealed tensions as a result of different attitudes towards different types of knowledge. This was highlighted by one interviewee who remarked that "*the discussion* [...] *got a bit heated at some stage* [...] *the real scientists said 'fine it's information but it's not knowledge, this is not science' and yet I think if you really want to get biodiversity knowledge,* [different types of] *knowledge is extremely important and yes, it may not be gathered in a scientific method and it might statistically be less robust but it is equally interesting and it could be very important*" (P2.2A).This also links to findings discussed in section 3.2.3 on quality assurance. Interviewees did however provide a number of suggestions to help involve practitioners and their knowledge resources more in the NoK process. Firstly, the use of practitioner knowledge hubs, particularly at a national level could be beneficial to help identify and engage more practitioner based experts to join the expert group. Secondly, to identify and engage key, reputable individuals and institutions working on the boundary of policy, science and practice to help develop links and build trust between groups, including those working outside the biodiversity field. Thirdly, interviewees suggested the inclusion of case studies in workshop agendas, which interviewees highlighted as of particular interests to practitioners and could link the theoretical aspects of the NoK process with the practical ones. Indeed, practitioners presented their work at the first conservation cases study meeting and this was highlighted as a success by interviewees. Lastly, involving experts at a late stage in the NoK process, as was the case with the agriculture cases study, may have caused frustrations with a lack of opportunity to make a meaningful contribution to the process as one interviewee observed "*some people made some very valid points about methodologies and the overall approach that was being taken forward by the project and I felt the attitude of the coordinators was perhaps slightly dismissive [...] I think part of it stems from a sort of elitism within biodiversity knowledge 'we're experts, we know best for people' but from my previous work unless you involve stakeholders completely in the process then you have something which is essentially flawed and top down and doesn't function, the message doesn't get across*" (P2.3A). Indeed, practitioners can bring different expertise but also perspectives to discussion, as one scientific interviewee commented "*that those from practice thought [...] what the hell are these researchers thinking about or making an issue of, are they aware of the issues we have to deal with?"* (P2.3C). The mix of practitioners and scientists in the conservation expert group was highlighted as very beneficial and practitioners helped ground discussions and identify "*what really was the problem*" (P2.2C). Furthermore, the involvement of more social scientists was also suggested to facilitate the inclusion of wider groups and different types of knowledge in the NoK, as one interviewee commented that "*to develop the integration of traditional knowledge we have to rely on social scientists*" (P3.6) which again highlights the importance of involving groups that work across traditional social boundaries in the NoK.

The challenge of including practitioners in the NoK interviewees also connected to the challenge of accessing and incorporating grey literature, i.e. unpublished scientific knowledge predominantly but not

exclusively. As one interviewee commented "*One thing that perhaps slightly irritated me was for example there is a huge amount of knowledge that is held by agencies and government departments, NGO's* [...] *but that side of it seemed to be largely ignored* [...] *and more emphasis was put on the value of academic papers as providing the ultimate reference point*" (P2.3A). Furthermore, the evaluation highlighted how better access to grey literature may also contribute to the inclusion of other types of knowledge in the process, as one interviewee remarked "*We are drawing nicely on scientific literature* [...] *so perhaps you're missing out on a whole range of other knowledge and experience from stakeholders and policy makers and other people*" (P2.6C). Although this was identified as a challenge, interviewees recognised the added value this could bring the NoK (see section 3.3.1) but also as a motivation for the expert group, as one scientific expert expressed "*It would certainly be worth writing a paper which really comes up with a methodology that includes grey literature because that would be a really big step, that would be worth publishing*" (P2.11C). To help guide the inclusion of grey literature into the process interviewees suggested that lessons could be identified from other similar scientific processes, such as the inclusion of grey literature into the IPCC process.

Furthermore the inclusion of knowledge not written in English, e.g. national reports from non-EU or newly integrated EU countries or not held within the political boundaries of Europe was raised as a challenge. For example, some interviewees stressed that knowledge from temperate areas of Asia, America or the Arctic regions may help to respond to policy problems from within Europe. Representation of non native speakers in the expert groups was considered an essential step to include this type of knowledge "*as there is a lot of knowledge in different member states which is only in their national languages and we are not able to access this knowledge as we don't speak this language*" (P3.4).

Understanding reasons for not getting involved in the prototype NoK

Interviews were carried out with experts who had been invited, but who did not engage in the case studies. This was important to determine the reasons behind their decision to not take part in the prototype testing of the NoK, and guide future involvement in the NoK. Indeed, interviewees who had heard of the project were all broadly positive about its objectives with one interviewee commenting that she thought it was an "*excellent idea to have such a network*". The main reasons for not engaging in the process were therefore not lack of interest but ranged from poor communication, to the topic being discussed and busy schedules or lack of time (see Box 6).

Box 6. Reasons for not attending the case study workshops

- Colleague from same organisation already attending.
- Topic of case study did not fit expertise (for example no overlap in expertise or some overlap with expertise on a larger scale).
- Lack of communication from project on previous contribution (for example contributed data).
- Busy schedule with a high volume of emails invitations to contribute to initiatives.
- Invite arrived too late to rearrange schedule and attend workshop.
- Busy schedule in field work season.

- Other commitments which were a better fit with expertise, although still interested in topic.
- Lack of budget (although expenses were reimbursed).

Initially, the identification of possible experts relied on the knowledge hubs being contacted using a generic email which provided limited information on the NoK process with a primary focus on the technical topic for each case study. However, the evaluation highlighted that this was not particularly successful as many of the knowledge hubs were large and may encompass a wide range of technical areas. To improve the engagement of experts in the process, interviewees suggested a more targeted approach to identify experts, for example by requesting a list of suitable experts from knowledge hubs first and then use targeted communication (e.g. personalised emails) to engage specific experts. The interviewees suggested that improved communication would be beneficial in establishing the expert group. As one interviewee commented "*It seems it was just luck that someone from* [my country] *appeared at the meeting* [....] *the invitation was a bit loose* [...] *and I would say having someone from* [my country] *at the meeting is highly relevant*" (P2.4M). Specific suggestions from interviewees were to clearly communicate the aims, knowledge requirements, benefits and expectations in targeted communication to engage experts. Furthermore, it was important to provide regular feedback from the project to keep the experts motivated and continue to contribute to the process. In addition, the invitations to the identified experts were often quite vague, in part due to the unknown nature of possible product or outcomes from the case studies.

The second key issue identified by interviewees who did not respond to the invitation was a mismatch between the case study topic and their area of expertise. In this case this led some interviewees to suggest other colleagues, whose expertise matched the topic better. If the experts had other commitments which better matched their interests these were considered a higher priority than the case study workshops.

Lastly, busy schedules and the lack of early notice of the workshops was also identified in the interviews as being a key factor in experts not responding to the invitation. One interview commented on the "*ridiculously short notice for a meeting in another country*" (P2.1A). Interviewees suggested that more notice on the date of the workshop may have allowed them to rearrange schedules to attend the workshops, although if these were attended at busy times of the year, such as the field work season, they would also be unable to attend. In addition to planning meetings in advance it was also suggested that e-conferences for large groups and skype for smaller group discussions could be used within the process to help reduce the need to travel to meetings. However, the interviewees also emphasized the value of face to face meetings, suggesting that technology is used alongside face to face meetings, particularly at the start of the process.

Motivations of experts engaged in the NoK

The evaluation revealed diverse motivations amongst individuals who *did* engage in the expert group process (see Box 7 for a full list of motivations). More so with the practitioners than the scientists, the experts were less motivated by output and more by process, particularly networking and learning.

Indeed, leaving aside the topic being discussed, by far the most cited motivation by interviewees was the opportunity to network with the potential for new collaborations, as one interviewee summarised "*I think it is a very interesting subject, and I am also interested in learning about differences in other countries and of course this networking part is also a motivation*" (P2.10M). Furthermore, the evaluation revealed that learning from other countries was also important for interviewees not already involved at the European level. Other learning areas included increasing technical knowledge, learning about methodologies and new ways to transfer scientific outputs into the policy domain as explained by one interviewee "*One of the outcomes could be kind of advice to go into policy* [...] *that was more the motivation than producing a paper for me*" (P2.1C).

Box 7. Motivations of the experts in the expert group, based on the conservation and marine focus groups

- Demand driven process by policy.
- Technical learning and new ideas from other countries.
- Networking and future collaborations.
- Working together in focused technical groups.
- Personal contacts with coordinators (trust).
- Personal contacts with other participants (spread the word and trust).
- Interdisciplinary process.
- Contributing knowledge and data.
- Career development (scientific publishing for early career).
- Institutional agreement (scientific publishing).
- Knowledge exchange ideas/ techniques.
- Prestige of being involvement in European projects.
- Sharing information and feedback/ dialogue with peers.
- Learning about methodologies.
- Information on the project progress and wider context.
- Meeting location.
- Non scientists increasing scientific knowledge.
- Expenses paid.

Interviewees suggested that the benefits of engaging in the NoK could be more clearly communicated. Connected with this interviewees emphasized the need to ensure that these benefits were indeed realised. Specifically, interviewees suggested that the opportunities for networking could be improved by providing background information on each group member of the expert groups highlighting their expertise and interests but also to "*set aside some time, maybe a few hours, to really allow people to meet each other and also kind of facilitate that to make people match each other to find what they are* [interested in]*, what their networks are and so on, some kind of a dating moment*" (P2.7A). Interviewees also emphasized that encouraging the development of individual networks, especially across groups, could help enhance the reputation of the NoK.

Lastly, the evaluation highlighted that experts used their own networks to identify additional experts to increase the expertise in the expert group. However, interviewees suggested this could be improved.

Providing clear information on the NoK, highlighting expertise requirements and planning events well in advance to allow word to spread was suggested to enhance this. All successes, challenges and suggestions to improve representation and inclusion are listed in Box 8.

Box 8. Successes, challenges and suggestions for the NoK to improve representation and inclusion

<table>
<tr>
<td><u>Successes</u>
• Engaging with a policy maker to generate a specific request by attending policy relevant events, for example relating to the EU Biodiversity strategy, Horizon 2020.
• Geographic representation and scientists at different career stages in expert groups.
• Inclusion of national and local practitioners in expert group.
• Expert group members helped identify other suitable experts to be included.</td>
<td rowspan="2"><u>Suggestions</u>
• Target policy and practitioner relevant events, for example conferences, to promote the NoK and facilitate engagement.
• Promote the NoK to policy makers, particular the potential financial benefit of evident based decision making.
• Draw on the networks of participants in the NoK to engage more individuals and groups in the NoK.
• Identify and engage key, prominent experts from science and from science-policy-practice interface organisations to identify and engage other experts in the NoK.
• Plan meetings well in advance to increase the likelihood of more experts being able to contribute
• Use technology such as skype and e-conferences to engage experts in the process who have limited time to travel to attend meetings.
• Use targeted communication to contact individual experts, not generic emails to gate keepers.
• Use national knowledge hubs and gate keepers across Europe as well as at the European level, particular to facilitate access to grey literature and engage other experts outside the biodiversity field.
• Plan early in the process to engage non English speaking experts from across Europe for wide geographic representation and access to grey literature.
• Promote and communicate the benefits of being involved in the NoK.
• Provide information on background, process goals, workshop aims, requirements, constraints and expectations.
• Include small group discussions in workshops to increase engagement, for example to help non native speakers better engage in discussion.
• Provide written documents and use presentations with clear text to help non native speakers continue to understand and engage in events.
• Promote networking as a benefit to participation by providing information on the relevant background of participants prior to events and organise interactive dialogue sessions for networking.</td>
</tr>
<tr>
<td><u>Challenges</u>
• Identifying and engaging scientific experts (particularly key experts with busy schedules) and other groups to get involved in the process.
• Recognising and adapting to differences in interpretation of terminology and perceptions (including level of detail) by different groups and across cultures to improve level of involvement by different groups.
• Including all in discussion at events, for example non native speakers.
• Recognising that different groups can contribute and are interested in different elements of the NoK and keeping them informed to maintain their support throughout the process.
• Including other groups as well as scientists, for example practitioners, policy makers and the private sector for a holistic perspective on issues.</td>
</tr>
</table>

• Ensuring relevance of the NoK for policy makers to support and interact with the Nok, without which it risks being irrelevant. • Incorporating relevant knowledge which may fall outside political boundaries, for example outside Europe. • Including grey literature in the knowledge synthesis, particular literature not written in English. • Including a wide range of experts from different countries in the expert group. • Widening participation of experts through clear, consistent and timely communication.	• Integrate terminology used in policy and by other important groups into the process. • Develop methods to incorporate grey literature into the process to help engage more practitioners in the process. • Build trust and engagement by showing how the NoK connects with other known networks, for example practitioners recognising links with practitioner based networks. • Include practitioners and practical examples to link the theoretical and methodological discussions with the practicalities on the ground. • Learn from other scientific processes which have included grey literature, for example the IPCC. • Include experts from practice and science early on, for example in scoping stage on suitable methodologies, to reduce tensions between groups later in the process.

3.2.2 Communication, transparency and influence

Communication is an interactive process involving the two way flow of information and is a fundamental part of the NoK from the very start until the very end. Communication becomes even more important with the involvement of different groups in the NoK to build understanding, strengthen team work and help identify and achieve shared goals. This section begins by examining the dialogue between the coordinating team and the requester and the influence of the requester on the process. Following this, communication between the coordinators and the expert group is examined and finally communication between the coordinators and external initiatives.

Coordinating team ↔ Requester

Once a policy maker was engaged as a requester in the conservation case the evaluation highlighted that good dialogue occurred between the requester and the coordinating team to discuss and agree a policy problem to be addressed in the case study. This dialogue took place through email and face to face meetings during which information was shared to develop an understanding of the policy and project contexts. The findings show that the case study was a lower priority for the requester as involvement was unplanned and any benefit was seen as being supplementary. In the later stages of the case study, despite some exchange of information and feedback between the coordinators and the requester, dialogue with the requester greatly reduced, although the requester felt that the information sent from the coordinators was adequate to be aware of progress and modifications to the process, such as the use of additional methodologies. Indeed, during the conducting stage of the case study the coordinators "*had to deal with so many things and to orchestrate so many people to get these answers*" (P3.4) whilst policy makers "*are very, very busy and we as a small case study that is trying to test the prototype, we are not his priority* [and] *I tried not to bother* [the requester] *too much with the details*" (P3.1). However, towards the end of the case study process this reduction in information flow between the coordinator and the requester increased the amount of time required to plan and develop policy usable products

(more detail on policy usability in section P3.3.2). Communication between the requester and the expert group was, however, limited to the requester presenting the policy context of the problem to the expert group at the start of their first meeting. Following this, all communication from the expert group and from the requester was directed through the conservation case study coordinator, who feed information between these groups. This was highlighted by the evaluation as a potential 'bottleneck' for communication. Although discussions with a variety of different policy makers did occur to identify a policy problem in the marine and agriculture cast studies, due to a lack of requester a dialogue process with a specific policy maker to agree, narrow down a question and steer the process did not occur, as policy makers "*were not available, they kept sending* [the coordinator] *to someone else*" (P2.9A).

The evaluation identified a number of suggestions which may help improve dialogue between the coordinator and the requester throughout the NoK process, including the need to clearly communicate the Nok processes to potential requesters, particularly the requirement for dialogue throughout. Interviewees suggested that the development of written guidelines could help, as well as developing written guidelines for the other groups also involved in the NoK. In addition, a suggestion was the identification of a key focal person from the requesting organisation to help facilitate dialogue, particularly when there is likely to be staff turnover within these organisations.

Coordinators ↔ Expert groups

Information provided by the case study coordinators to the expert group, including the constraints and resulting decision making in the case studies, was easy to understand for the scientific experts involved. In addition, interviewees felt that they were able to discuss these decisions in the expert group during the first meeting. Some practitioners, however, thought the information could have been clearer, specifically prior information on methodologies, background to the project, the goals of the overall process, aims of workshops and how it fitted with other EU knowledge transfer projects and networks.

Despite the suggestion for better communication prior to discussions, interviewees felt that face to face discussions during the case study processes were good opportunities "*to sit together with people with the same interest for three days and discuss in depth*" (P2.12C). The opportunity to have such in depth discussions within a new network not only enabled the rapid exchange of ideas and information within the case study but also contributed to the experts motivation to continue this.

In addition, the range of communication tools used in the case studies, specifically maps created with GIS software in the marine case study, was highlighted by interviewees as a helpful way to communicate, present data and stimulate discussions within the expert group. Despite some design issues (see section 3.2.3 on quality assurance), interviewees felt the use of questionnaires in the marine case study to start gathering knowledge from the experts before face to face meetings was helpful, particularly within the time constraints of the project. Although the later stages of the prototype were not as well tested in the case studies, it was suggested in the evaluation that additional communication tools could be used to facilitate open and meaningful communication with other groups, for example to provide feedback to a wide range of peer reviewers. This could build on and acknowledge similar processes such as those developed by the Centre for Evidence Based Conservation in the UK.

To improve communication between coordinators and expert groups further, interviewees suggested more individual emails to experts rather than group-wide emails, more regular feedback from the coordinators on the progress of the case studies, and regular Skype meetings to supplement rather than replace face to face discussions. Furthermore some interviewees suggested a third face to face meeting for the expert groups at the end of the process could have been helpful to discuss outputs, during which the involvement of requester would provided additional value. Finally, interviewees suggested the use of accessible platforms, such as wikis, to clearly show the knowledge sources used in the process as well as making it available to outside audiences and allowing it to be updated as new knowledge was produced. Lastly, logbooks were used in all three case studies to help record challenges and if these were overcome and how. The evaluation suggested that while logbooks were used in the NoK to record decisions, to increase transparency in the NoK, these logbooks could also be publicly accessible.

Coordinators ↔ External initiatives

The agriculture case study collaborated with a similar initiative looking at knowledge transfer on agricultural practices at Cambridge University, which provided mutual benefit. At the start of the collaborative working communication was good, with the case study coordinator organising regular Skype discussions every two weeks. However, as the process progressed and workloads increased, this communication became less frequent. As such there was insufficient "*communication to be sure we have made* [...] *decisions in the same way*" (P2.5A). Although the evaluation highlighted many shared benefits in this collaboration, there were some differences between the initiatives, for example relating to target audiences and methodologies and expectations of the process and its outputs. As a result, the evaluation suggested clearer communication of these aspects at the start of the process and maintaining regular communication throughout the process around busy schedules may improve the collaborative process.

In summary, the evaluation highlighted that there may be very different groups involved in the NoK, and aligning their differing information needs proved a challenge. Interviewees less actively engaged in the expert working group emphasized the need for the NoK to maintain communication with individuals and organisations who may not be involved in current NoK process but may have a role later in the process. Such later involvement could include advising on the development and use of NoK products and providing wider support for the NoK. An improved marketing and communication strategy was suggested by interviewees to help strategically plan how to bridge some of the barriers between different groups involved in the NoK (see Box 9).

Box 9. Successes, challenges and suggestions for communication, dialogue and influence in the NoK

Successes	**Suggestions**
• Communicating with scientists involved in the expert group, for example easily understandable information prior to workshops. • Organising and facilitating by the coordinators of the workshops was very good, with understanding of not only science but also the	• Develop a marketing and communication strategy to raise awareness of the NoK • Use targeted communication to individuals in the expert group to get feedback and timely contribution to tasks rather than group communication.

participants' experience. • Enabling experts with similar technical interests to meet face to face and work together. • Communicating the wider context of the project through the website. • Using other methods, such as questionnaires to begin gathering information from experts and GIS software to analysis and visually present data to experts for discussion. • Sharing information through regular dialogue between coordinators and the requester to identify policy problems for the NoK. • Presenting the policy context to the expert group by the requester helped define the scope of the question by the expert group. • Discussing openly in the workshops and participants selecting discussion topics, examining prior decisions, discussing differences, sharing information and agreeing in the group roles for next steps.	• Provide clear background information well before workshops to new participants, who may have different information needs. • Communicate clear aims for workshops. • Clearly set out shared goals, expectations, roles and responsibilities and working practices at the start of collaborative working with other initiatives and ensure regular two way communication throughout. • Clearly communicate overall goals, aims of activities and methods to be used, particularly with diverse audiences and new participants. • Develop an informative, focused and dynamic website as part of a wider communication and marketing strategy for the NoK. • Organise regular skype meetings for the expert group to keep experts informed and engaged, review progress and discuss problems whilst also recognising the value of a face to face meetings. • Communicate clearly with interested audiences throughout the NoK process. • Clearly communicate the NoK process to potential requesters, particularly the time needed for the dialogue and scoping stage between the requester and the NoK. • Encourage the requesting institution to identify and support a focal person as a contact point for the NoK to maintain dialogue throughout the process. • Develop a set of guidelines for each group who will engage with the NoK, for example for the requester and peer reviewers. • Use wiki technology to increase access to products from the NoK and encourage its use and updating as knowledge production continues. • Maintain contact with experts and inform them of progress with the process and key decisions. • Maintain a logbook in the Nok of
Challenges • Ensuring an effective, open consultation process for large scale peer review of products from the NoK, with feedback and acknowledgement to those who provide comments. • Communicating with practitioners who are unfamiliar with the project. • Communicating clearly and regularly with collaborators to align and meet expectations throughout the process. • Understanding by participants how the KNEU project and a future NoK connects with other EU project and networks. • Communicating clearly the context and goals of the process and specific activities, particularly to new participants to the European level. • Communication with the requester throughout the process. • Communication between the expert group and the requester. • Generating interest and engaging policy makers to identify policy issues for the NoK, particularly early in the life of a NoK. • Clearly communicating constraints and decisions made prior to and during the conducting process of the NoK to the expert group, for example why	

methodologies have been selected and highlighting how policy makers are inputting into the process.	decisions in the process, which is open and accessible.

3.2.3 Quality assurance

One of the main functions of the NoK will be to gather existing knowledge, synthesis it and present it in a format usable for policy makers to inform their decision making processes. In the process of the NoK in responding to requests, maintaining quality throughout the process was seen as key, for example through controlling bias, peer reviewing, ensuring appropriateness and consistency of parameters, and accuracy of information. In this section we examine methodological selection and use, including additional methodological tools which were used or were suggested for use in the case studies. The challenge of different perceptions about what constitutes evidence is then discussed and finally, the link between quality and resources is examined.

In the process of gathering and synthesizing knowledge all three case studies used more than one methodology (see Box 5). For example, the marine case from the start tested all three main methodologies including adaptive management, whereas the agriculture case study developed a collaboration with a similar knowledge transfer initiative which used an alternative 'evidence based' approach alongside the systematic review methodology and the conservation case adjusted their approach mid way through the process to also include an expert assessment approach. The interviewees felt that this mixed approach added to the quality of the process by broadening the perspectives taken in the case studies. To supplement the core methodologies other methods of data collection were also incorporated, particularly questionnaires were designed and sent to participants to gather preliminary information on the topics of the case studies. Additionally, geospatial methods were used in the analysis and to present data in the marine case study.

Despite this breadth of methodologies used, there were some differences in understanding of these methodologies, which could impact on quality of outputs. For example, in applying the expert assessment approach the marine case used questionnaire to gather initial expert opinions however, interviewees who were sent questionnaires to complete felt it was "*difficult to understand, we were not sure if we answered the actual questions*" (P2.10M) and some interviewees "*filled in the questionnaire from my personal interest and not from* [...] *what do you think we need to know more of as a community* [...] *and that wasn't what I answered, so that was a little frustrating*" (P2.1A). As such, the design of the questionnaires was highlighted as potentially compromising the quality of the data collected, particularly in terms of how questions were framed and whether an institutional or individual, species or ecological community perspective, was required. To help overcome this challenge the evaluation highlighted the need to incorporate expertise on methodologies in the NoK either within the coordinating team itself or ensure access to this expertise. This would provide skills and training on methods in the NoK to enable it to respond to the needs of the requester whilst maintaining quality. In addition, this would also help promote learning of methodologies within the expert group, which the evaluation identified as a motivation (see Box 7). A second suggestion was the use of methods such as the Delphi method (for more information see Appendix 6), or e-conferences particularly with a large expert group, to improve the quality of the expert consultation methodology in the NoK. Lessons from e-conferences could be

identified from projects such as BioPlatform and BioStrat, which coordinated a number of e-conferences with different groups.

Despite the use of a number of methodologies in the case studies, the evaluation also identified the need to adapt some of the methodologies as some case studies interviewees were "*not sure if they met all the criteria* [...] *they are all bits* [...] *that will lead to what you want to achieve*" (P2.6A). The ability to adapt to changing circumstances and use alternative tools and techniques to better achieve the objectives in the NoK was seen as key. For example the marine case study used questionnaires and GIS mapping in the expert assessment approach. However, flexibility in methodologies was highlighted in the evaluation as a challenge as "*part of the issue is that they have fixed upon a particular approach* [...]*so there doesn't seem to be much scope to shape things or contribute much in terms of the process apart from suggest some changes are needed but perhaps they wouldn't fit*" (P2.6C). As such, one interviewee suggested that "*there needs to be more participation of the people involved, not just to give them information but to actively discuss because some people made some very valid points about methodologies"* (P2.3A). This could help the NoK identify and adapt methodologies if necessary to meet the needs of each policy problem whilst maintaining a level of quality in the process. In addition, the conservation case study introduced an expert assessment approach in response to challenges in using the systematic review approach and adapted a matrix to assess and present a new combination of parameters. Specifically, the evaluation highlighted some concerns with the process of assessing knowledge for inclusion or exclusion for the systematic review process as "*the qualifications of people within this group are so different and* [we get sent] *out papers* [...] *and these are different sets of evaluation space which are very inhomogeneous, which is certainly not replicable and it would give different results if you send different papers to different people*" (P2.11C). This led to the suggestion that experts work in small groups, for example based on geography, to discuss the quality and relevance of knowledge sources and hence reduce potential bias.

The evaluation also identified challenges relating to the criteria being used in the systematic review process to assess knowledge which led one interviewee to comment that "*I was kind of surprised to find out how it was narrowed down. One of the key ideas was 'is the statistics good' [this] [....] excludes a lot of great evidence*" (P2.11C). Specifically, the interviewees highlighted that "*the question basically is what we accept as evidence. Does it have to be big statistics* [...] *or do we see qualitative descriptions as evidence?*"(P2.12C). This also relates to the inclusion of different types of knowledge in the process. Although qualitative data was not included in the systematic review process in the case studies, expert consultations did include expert opinions which were qualitative. Furthermore, at the beginning of the conservation case study it was envisioned that grey literature in different languages would also be assessed for each country separately from the main scientific systematic review. However, the time needed to complete this meant that in the end this was not undertaken. As such, a challenge for the NoK was perceived as developing a methodology for assessing and integrating different types of knowledge for published qualitative knowledge, to unpublished grey literature as well as local, traditional and indigenous knowledge. However, later in the process the development of country summaries using an expert assessment approach in the conservation case did enable the inclusions of some knowledge from grey literature sources.

To summarise, resource constraints, particularly time and funding were highlighted by interviewees as limitations to enable the case studies to test all aspects of the prototype. These constraints may have also reduced the quality and focus of events as the organisers tried to maximise on the opportunity for face to face discussions. Interviewees therefore suggested realistic planning of resources, including time, finances but also human resources, during the scoping stage of the NoK process. A funding 'buffer zone' could be included in this, so that any issues can be addressed and processes adapted to meet the needs of the NoK. For a complete overview of successes, challenges and suggestions linked to quality assurance, see Box 10.

Box 10. Successes, challenges and suggestions for the NoK to improve quality assurance

Successes	**Suggestions**
• Using more than one methodology to formulate broader outputs from case studies.	• Ensure enough time and resources are identified in the scoping stage but also include a funding buffer zone to allow some flexibility within the process. • Use methods such as the Delphi method alongside e-conferences to better develop the process and tools for the expert consultation approach in the NoK and identify lessons learnt from similar initiatives, for example from the EPBRS e-conferences. • Include methodology experts, for example social research methodologies and modellers, to provide skills and training on methods in the NoK to respond to needs whilst maintaining quality. • Improve the consistency of the evaluation process of knowledge to be included or excluded by making decisions in groups, instead of individually from within the expert group.
Challenges • Designing and using research methods such as interviewing and questionnaires, for example there was misunderstanding about some of the questions, some responded from an individual perspective and some from an institutional perspective, from understanding of one species or based on wider ecological communities. • Accessing and incorporating local, traditional and indigenous knowledge with scientific knowledge in the NoK and not having too narrow focus on quantitative data and statistical comparators. • Managing data inconsistencies and maintaining transparency about data quality. • Reducing quality due to inadequate time and finances, for example leading to over loaded agendas, poor planning and a lack of focus. • Building in flexibility into the NoK, for example providing the experts opportunities to adapt methodologies. • Reducing subjective decision making on the inclusion and exclusion of knowledge.	

3.2.4 Conflict resolution

There may be factual controversies and differences which may arise in the NoK process. While these were considered in the evaluation framework, interviewees did not only focus on factual differences, but also on differences between groups and across networks. These different forms of conflict are explored here, together with suggestions from participants on how to address such conflicts (see Box 11).

The first level of conflict identified was conflict *within* groups, for example two scientists with different

areas of ecological expertise from the same institute provided diverging opinions within the expert consultation process in the marine case study. These conflicts can, however, be perceived very positively. For example, one participant commented that "*it made everybody rethink their point of view and it really made sense*" (P2.4A). There remained different opinions regarding the scope of the question selected in all the case studies, with some interviewees questioning this further into the process, specifically about scale as well as criteria to assess the quality of knowledge, as highlighted in section 3.2.3 on quality assurance. However, later in the process the marine case study coordinators gathered secondary data and used this to help examine previous opinions. This revealed that different opinions may have arisen due to the different scale of expertise between experts, for example between species level expertise and expertise focusing on the ecology community level.

The second dimension for potential conflict highlighted by the evaluation was *across* groups, for example between scientists and practitioners. As highlighted in section 3.2.1, on occasion there were during the case studies tensions between these groups, for example in relation to the inclusion of different knowledge resources, expertise and perspectives fully in the process. Specifically this was highlighted in the agriculture workshop with the coming together of theoretical and practical perspective and discussing the value of grey literature as a knowledge source. As such, conflict of this type may be reduced by including representation early on from both science and practice in the expert group along with the different types of knowledge they see as legitimate, as well as including individuals with practitioner backgrounds within the coordinating team.

The third dimension of potential conflict was at the *institutional* level, specifically with competition with other networks that also operate on the European science policy interface (as discussed in section 3.1.1 on governance). Indeed, some interviewees suggested that a new network was not required and that resources should be used to strengthen existing networks. This may be a key challenge for the NoK if it is to operate as a network of networks to unite and strengthen existing networks (as highlighted by interviewees as a potential added value in section 3.3.1).

Box 11. Successes, challenges and suggestions for the NoK to improve conflict resolution

Successes	**Suggestions**
Challenges • Narrowing down broad policy issues to questions for the NoK to respond and agreeing parameters, such as spatial scale and definitions. • Diverging expert opinions from same geographic regions, for example experts working in the same institution but at different scales may hold differing opinions. • Existing science policy interface networks with existing knowledge claims and funding competing with the NoK.	• Reduce potential conflicts by an unbiased inclusion of scientific literature (as advocated by the systematic review approach). This could be enhanced further by incorporating other knowledge in the process. However, to maximise this conflict resolution potential transparency of exclusion and inclusion criteria is essential. • Consider building on existing networks, which have more permanent foundations instead of creating new science-policy interface network which may not secure long term funding.

In summary, the evaluation of the testing of the prototype identified a number of related key issues for the NoK. One of these issues was representation and inclusion of different groups in addition to natural scientists in the NoK processes from the start, when the dialogue between the NoK and the requester begins and the NoK options to respond are scoped. The inclusion of all groups in discussions from the beginning of the process would not only reduce tensions between groups within the expert group but would increase the likelihood of the NoK remaining policy relevant and producing usable information for policy. The inclusion of wider groups would include different perspectives, thus enabling the NoK to provide a more holistic, interdisciplinary perspective to policy. Furthermore, the inclusion of wider groups would help facilitate the integration of other types and sources of knowledge into the NoK beyond published, quantitative based knowledge. An additional key issue was the importance of processes within the NoK, with skills required to facilitate engagement of groups, dialogue with the requester, and communication to continue momentum and progress towards the goal of the NoK to produce information usable in the policy process.

3.3 Phase 3 - Evaluating the outputs and outcomes of the case studies (Task 4.3)

In this section we present results from Phase 3 of the evaluation, namely the outputs, short and long-term outcomes of the case studies. As specified in Section 2 above, the decision in Task 4.1 was to broaden the evaluation to outputs and outcomes of case studies, rather than the specific methodologies used, in part because in practice WP3 case studies tested different parts of the prototype, and used different (combinations of) methodologies (see Figure 1). To report on the full range of outputs and outcomes from the case studies, we explore the potential added value of the NoK, followed by details of specific outputs and outcomes relating to policy usability, influence, learning and capacity building.

3.3.1 Potential added value of the NoK

A key issue discussed by interviewees was the added value of the NoK. This informed involvement in the NoK, and perception of outputs and outcomes. We therefore start this section with added value as perceived by interviewees.

Most interviewees saw the value of a "one-stop-shop" mechanism for biodiversity and ecosystem services knowledge. One interviewee suggested the "*NoK could potentially act as a 'single entry point' for policy questions to be addressed to the scientific community and being dealt with in the most efficient way and with high level of quality/ confidence.* [The NoK] *could raise awareness of policy on emerging issues as well as of scientific community on policy issues*" (P1.4). Furthermore, interviewees suggested that the "*opportunity to address a very defined research question, which normally you would invest much more money [....] and would have a much longer process*" (P3.4). As such, decision-makers may be able to better tackle medium-term biodiversity issues and recognise emerging issues by bringing together not only different professional groups but also different types of knowledge. This led one interviewee to highlight the added value of a NoK on "wicked" problems such as biodiversity issues where "*different types of knowledge should be brought together to have the right answer"* (P1.7). Bringing together a wide range of expertise and highlighting methodological approaches to bring together existing knowledge the NoK was seen as "*an open access platform where different stakeholders could contribute*

to solve different problems, provide their expertise and willingness, quite opposite of the usual 'ivory tower' of scientists" (P1.6) which could help improve understanding between groups and strengthen existing science policy interfaces. For a full overview of potential added value as perceived by interviewees, see Box 12.

Box 12. The potential added value of a NoK

- Providing a single entry point to access information across scales to answer complex questions.
- Uniting and strengthening existing networks.
- Developing links across disciplines to foster understanding and bring together disparate groups.
- Involving a wide range of stakeholders by creating an open, accessible platform.
- Reducing reaction time to policy issues.
- Encourage decisions based on science.
- Assuring quality of information which is clearly linked to knowledge.
- Raise awareness of issues.
- Strengthening policy developed on medium term issues (1-3 years) at a European level.
- Including other types of knowledge (especially local, field and indigenous).
- Improving the way science and policy interact and communicate.
- Facilitating a policy driven process.
- Increasing understanding between groups, particularly between science and policy.
- Highlighting methodological approaches to respond to requests.
- Including a wide range of expertise across different scientific disciplines and cultures.
- Shortening the timeframes for information to reach policy makers.

3.3.2 Policy usability and potential influence

An important function of a NoK would be to produce information which is usable for the requester(s). This involves developing an understanding of the intended use of the information and the target audience in order to develop usable policy products. As well as understanding what information requesters need, in what format and within which timeframes are also important elements in bridging the gap between knowledge production and its use by decision-makers. Furthermore, many knowledge producers are increasingly required to communicate their knowledge to wide audiences (see Box 7 on motivations to become involved in a NoK). This section first explores the policy usability of scientific outputs from the cases studies, following which the specific policy targeted outputs are explored. Suggestions provided by interviewees are then detailed to improve the policy usability of outputs from the NoK, specifically relating to integrating the development of policy products more centrally into the process.

To evaluate the policy usability of outputs from the KNEU case studies, it is essential as a first step to summarise the outputs. In the conservation case a number of scientific papers were produced, including a paper with country specific information from a number of countries across Europe. At the time of the evaluation (end August 2013), a policy brief had not been produced although discussions on its development had begun. In the marine case study a number of scientific papers were produced and a policy brief drafted. Lastly, the agriculture case study also developed scientific papers, including a

systematic map of the available knowledge on the policy issue.

The first step in facilitating policy usability in testing the NoK prototype involved selecting a 'policy relevant' issue. The engagement of a policy maker in the process to discuss the policy issue, share information with the coordinating team and the expert group was highlighted by interviewees as a key component to ensuring the process was policy relevant. Indeed, wider dialogue between scientists and policy occurred before and between the coordinator and the requester at the start of the process in the conservation case study. The was considered an important step by the requester as "*the question was so concrete that we were able to come up with an outcome, which was policy useful*" (P3.4). In the marine and agriculture case studies the coordinators discussed policy issues with various national and European policy makers and although extensive dialogue did not occur these discussions did contribute to facilitating the selection of policy relevant issues, for example linking kelp beds to fisheries in the marine cases and the sub topic of flower strips for a systematic review in the agriculture case. In addition, interviewees felt that the involvement of practitioners in the expert group helped provide a more holistic and multidimensional understanding in early discussions to narrow the policy issue to a specific question and plan the response. This led one interviewee to comment that practitioners' working on the science policy interface "*brings quite good expertise on what is policy relevant, what is important from the policy side and it is very important we have such people in the group"* (P3.1). As a result of the contribution of practitioners to facilitate policy relevance throughout the process, the evaluation suggested the formation of expert advisory groups to facilitate the inclusion of sector specific policy expertise to help steer the work of the expert group.

There were a number of scientific outputs from the case studies in the form of scientific papers to be published in scientific journals. This was an important motivation for the scientists in the process but was also seen as a benefit by some practitioners who often did not have the opportunity to publish research. In addition, interviews with policy makers revealed that scientific papers could be useful "*because then I can quote them*" (P3.4) and this "*helps of course in my argumentation*" (P3.3). However, as highlighted in table 9 below, a role of the NoK would be to re-package these papers, for example into short summaries aimed at policy makers, to better transfer messages into the policy arena and therefore increase usability and potential influence on policy.

Table 9. Potential use of NoK outputs by requesting policy maker

NoK Output	Direct policy use	Wider policy use
Scientific papers	**YES** Adds weight to requesters' argumentation by directly quoting scientific papers.	**POSSIBLE** Scientific papers uploaded on policy makers' website for use by wider audiences. May be translated by requester into summaries for policy in time.

Policy summaries	**YES** Directly used by requester to influence other policy audiences. To increase likelihood of influence different targeted summaries may be needed, for example targeted at; 1. Informed and sympathetic audiences who share similar goals to protect biodiversity. 2. Uninformed but sympathetic audiences who have different but un-conflicting goals. 3. Unsympathetic audiences who have very different and potentially conflicting goals.	**YES** Requester shares information with wider policy audiences. NoK groups shares information with wider networks.

Although no policy outputs had been developed at the time of this evaluation, interviewees did make suggestions on how to improve the NoK processes to develop policy products (see Box 13).

The first suggestion was to better identify the target audiences in policy. In the case of the KNEU case studies, who the possible audiences might be was often unclear. One interviewee remarked "*I don't know if we thought very well through what kind of policy makers would this address*" (P3.9). Indeed, the strong focus on scientific products during the case study process led one interviewee to comment that "*I don't think [the requester] could use the systematic review for policy purposes"* (P2.1C) and others to question if "*is it really that this knowledge [...] will be taken into policy [...] or was it just like a model case can we manage data in the EU?"* (P2.11C). A specific suggestion was to produce stand alone country summaries to help EU policy makers in their discussions with national level policy makers. More broadly, to help improve the focus in the process on knowledge transfer to policy, the evaluation suggested providing information on existing models and techniques for knowledge transfer at the start of the process, for example in a handbook with short summaries. Furthermore, expertise on processes relating to knowledge transfer could be included in the coordinating team, for example policy advocacy specialists from practitioner based groups. This may be important as often "*Scientists are by nature not the best people to spread the message*" (P2.3A) and particularly with science driven issues to influence wider audiences beyond existing connections of the coordinators to policy makers.

Closely linked with the suggestion of developing more targeted policy products for specific audiences was the need to frame the issues alongside requester needs when planning products. Specific suggestions involved narrowing down the questions, or framing questions to align with popular concepts, such as the concept of ecosystem services "*which is at the moment a developing subject* [for policy makers] *which is not at the moment so well known, people have an idea of it but it is often not very clear how they can use it and how not, that's why I think these policy briefs could be very useful*" (P3.4). Furthermore, interviewees from the agriculture case suggested the inclusion of socio-economic dimensions in framing questions, which led one interviewee to comment that policy problems "*must be*

evaluated on a monetary basis [as]*it makes immediate sense to everybody* [than] *if you just say we need a lot of beetles because they are nice* [which] *is not so convincing*" (P2.4A). The increasing number of policy briefs was raised by interviewees, with some suggesting additional tools may be available to transfer information to policy makers, such as policy specific events. Disseminating the NoK outputs widely may increase the likelihood of the information from the NoK influencing policy, for example utilising the networks of practitioner and scientific experts from the expert groups. However, dissemination may be problematic through lack of financial support. One practitioner commented that "*even though I would like to disseminate this, talk about the project, I just don't have time, and as long as I am not paid, I am a volunteer I am not prioritising to speak about the project*" (P3.7)

A key issue identified by interviewees in the transfer of knowledge from science to policy is the communication of uncertainty "*which gets lost often*" (P3.1). Furthermore, one interviewee from policy commented that "*a contractor [...] would often [...] present [*limitations*] in a way that could lead to misinterpretation or the level of uncertainty was not highlighted [*but*] in scientific projects the level of uncertainty is overemphasised. [*However,*] the conclusions which are [*in the conservation case output*] are enough certainty to be quoted and where they are not it is clearly indicated [...] so it was done in the right way*" (P3.4). Indeed, in the outputs from the conservation case the limitations are described in the main text as well as being highlighted in the abstract at the very beginning. Notwithstanding this, there are often many gaps in scientific knowledge as well as constraints in the process which result in some knowledge not being included. For example, some historical data was not included in marine case study although it does exist and these data gaps will be distinguished from knowledge gaps. Additionally, in the conservation case study context specific biodiversity effects were identified when using the expert assessment approach. As such one interviewee commented that uncertainly can relate to "*a lack of knowledge of it, it can be because you have evidence that it doesn't work, or it can be that it works sometimes or somewhere in some places and it doesn't work in other places, or under other conditions, as soon as you know that you can make a better decision*" (P3.6). However, "*the main message is that we have a lot of knowledge gaps [..] we have very few studies [.....] we don't have enough data often to have a clear message [....] I don't think this can be the main message, ok go and study some more and let us know what you find out [....] but that comes strong [in the outputs]*" (P3.9). Whilst others commented that "*we could produce a policy paper now but we delayed it because we thought we had to read more and we have to cover everything and to write a policy paper on that because that was the aim of course to have a comprehensive picture of the evidence*"(P3.10). Thus, there may have been a stronger focus on reducing uncertainty than communicating it and a stronger focus on uncertainty than certainty in the case studies. Indeed, one interviewee commented that "*the case studies were flawed by scientific minds [...] it was conducted by scientists, and scientists are interested in generating knowledge to be able to publish*" (P3.6) with "*far too much focus in the case studies on the subject rather than on the process [you need] a heavier emphasis at the start, what we want to know is how the process is working*" (P3.8). As a result, interviewees suggested that more expertise from social science on processes is required in the NoK. Moreover, interviewees referred to the project as "*a trade off [...] that it should be good research that we did, it should be policy relevant, it should fulfil a task to test the NoK and it should fulfil a task to get some research on the topic and all this with including lots of experts that we have to take into account their motivation, their expertise and we also have to mind all the time our resources. [...]it*

*was sometimes difficult to find the best compromise.[*With*] more resources [...]you can do the thing more thoroughly [...] you can dedicate more time to scoping and more time to the literature review, more time to finding the experts, more time to motivating them*" (P3.1). Although other suggestions involved "*narrowing down the topic even further [could have helped] because it was too much to do [...]it would have been desirable to have some kind of policy paper and hand it back to the requester [..] for the feedback [...] you always have constraints of resources*" (P3.10). The need to better align the timeframes in the NoK with those of decision makers in policy was highlighted by policy, and specifically interviewees commented that reducing this gap would contribute to engaging more policy makers in the process in order to maintain policy relevance and usability of the NoK outputs as "*this work is a kind of a niche which you found and could be very interesting, [...] this relatively quick deliver*" (P3.4).

Box 13. Successes, challenges and suggestions for the NoK to improve policy usability

Successes	**Suggestions**
• Identifying a specific, policy relevant policy issue by engaging a policy maker in the process. • Discussing the policy issue in dialogue between coordinator and requester to narrow down policy issue into a question. • Providing country specific information useful to EU policy makers to facilitate policy discussions with national policy makers. • Using new EU policy framework discussions to identify a requester and policy issue. • Selecting a policy question which had been scoped and narrowed down from a prior scientific review of policy issues. • Communicating overall uncertainty by clearly highlighting the limitations of the knowledge presented and distinguishing between knowledge gaps and missing data. • Including criteria to indicate context specific outcomes, for example in the expert assessment. • Including experts from different countries to access grey literature using the expert assessment approach. • Producing scientific outputs which are policy relevant and usable. • Framing the policy question to link with wider issues to society, for example linking to fisheries policies.	• Integrate the goals of policy makers and the language of policy makers when planning responses and developing policy products. • Include social scientists and practitioners in expert group to incorporate socio-economic dimensions and better align with policy goals. • Include policy advocacy expertise in the coordinating team. • Incorporate information on knowledge exchange early in the process. To support this develop a guide of techniques and models to effectively transfer knowledge. • Ensure dialogue with requester to understand their needs but also develop and understanding about wider audiences. • Utilise the understanding of policy needs within the expert group, particularly from practitioners and consider developing an advisory group to involve
Challenges	
• Integrating socio-economic knowledge as well as ecological knowledge into responses from the start. • Maintaining the focus on the process as well as results, for example planning policy products early in the process to overcome communication delays due to busy schedules and align the need for knowledge transfer for policy with the focus on results by scientists throughout.	

• Communicating science driven issues to policy audiences. • Balancing the need for outputs which are both robust but are also closely aligned to policy time frames for example in selecting the methodologies. • Understanding policy needs and translating scientific knowledge into policy usable formats that meet these needs, for example to target different audiences, geographic differences and governance levels. • Promoting information through existing policy information sources. • Ensuring policy makers with limited time and resources can quickly access scientific knowledge and expertise.	them when they have limited time. • Consider presenting the information from the NoK in face to face interactions with policy makers, in addition to written products.

3.3.3 Capacity building and learning

Building capacity involves developing understanding and fostering trust across groups, creating new links and applying new skills and knowledge which may influence attitudes, behaviours and actions of individuals, institutions and across the system as a whole. In this section we explore the capacity building from the perspective of the different groups involved in the NoK, focusing on individual learning and but also exploring indications of potential wider capacity building within and between groups in the NoK and beyond (see Box 14 for a summary).

The evaluation highlighted a number of successes in developing new knowledge and skills to those directly involved in the NoK process as well as contributing knowledge to the wider scientific community. The process of gathering scientific knowledge from different sources contributed new knowledge to the scientific community, for example gathering and integrating data from across Europe on trends in kelp beds in the marine case study. In addition, the identification of knowledge gaps within the case studies, for example by developing a systematic map in the agriculture cases to show what knowledge is available, also contributed valuable information to the scientific community. Furthermore many scientists involved in the case studies "*were not very used to working outside the scientific world and I think for them it was important to realise that their work could have value for having better policies but for that they need to think a little bit differently*" (P3.9). Some scientists interviewed also highlighted that as a result of their involvement in the case studies they had developed their knowledge on processes and how better to manage them in the future by observing how the coordinators managed the case study experts and workload. As one interviewee commented that he "*learnt a lot of how to lead a project, how to lead a case study and I think that [*the coordinator*] was very high level, so I learnt if I will have a project in the future and I will be leader, I will use a lot of things which I learnt from* [the coordinator]. *This is for me very, very important*" (P3.2). There was also an increased understanding about previously unfamiliar methodologies, particularly relating to the systematic review which was used in all three cases studies. Indeed, one interviewee commented that "*having learned these techniques, I think we could do that much better than we did it before*" (P3.10).

The evaluation also revealed the benefit of group working within the expert group to foster knowledge exchange, particularly across different geographic areas of Europe and between scientists and

practitioners. In the conservation case study, the fact that expertise had been gathered from nine countries was seen as a success, with one interview stating that "*we managed to get expertise from so many countries*" (P3.1). The strong interactions between scientists and practitioners in the case study were also perceived positively. Indeed, in the conservation case study a scientist explained that by discussing issues with a practitioner in the group "*we can learn from each other*" (P2.4C). As such, the evaluation highlighted that group working with those beyond their usual networks was a key aspect in the level of learning participants gained from the process, leading one scientist to comment that "*I am so positive, I was really enthusiastic after this meeting* [...] *for me it was new and I really like it*" (P2.4A). As such face-to-face meetings were highlighted as being important elements to help learning across groups.

As a result of the case studies, interviewees also highlighted their involvement in various new collaborative projects and expanded networks. For example, in the agriculture case study two collaborations were developed which brought new skills into the NoK process which facilitated the strategic development of further collaborations. This strengthening of links with existing networks and organisations in the future could therefore also be beneficial to better exchange knowledge and skills at an organisational level and with wider society.

Although different groups within the expert groups did learn more about each other, the issue of whether expert groups learned about policy-makers or the policy-making process was debatable. As one interviewee stated "*I would not say that due to the case study our experts and practitioners get stronger links with the policy maker or vice versa, it did not occur"* (P3.1). Part of this was due to a requester only being present in the conservation case study, and mainly interacting with the coordinator and not with the experts directly.

Box 14. Successes, challenges and suggestions for the NoK to improve capacity building and learning

Successes	**Suggestions**
• Developing scientific knowledge, for example combining knowledge and identifying knowledge gaps for future research. • Increasing understanding of cultural differences and creating new research links across Europe, for example new research collaborations. • Increased understanding and links between scientific groups and practitioners who were directly involved in the project through face to face interaction. • Developing understanding on methodological approaches. • Applying flexibility to adapt to challenges, for example introducing alternative methodologies, adapting existing tools and exploring alternative methodologies from social sciences. • Developing collaborations with external projects, organisations and initiatives, for example INRA and	• Identify and include a wide range of skills in the coordinating team, for example communication, negotiation, methodological expertise, facilitation and practical based and policy advocate experts. • Proactively strengthen links with other initiatives, organisations and networks to access specialist skills and share information. • Ensure capacity building is central to the NoK with adequate time and resources integrated for this.

Cambridge University. • Raising awareness of science driven issues by policy makers, for example the management of kelp beds. • Improving scientists understanding of policy relevant research processes. • Applying strong coordination skills for skills development of expert group. • Facilitating learning within expert group by sharing feedback.	• Feedback and lessons learnt in a NoK will be critical, incorporate an evaluation process into the design and ensure lessons are shared within the NoK and wider. • Engage with practitioners and social sciences to identify and include methodologies to integrate other types of knowledge into the NoK, including qualitative based knowledge and local knowledge into the NoK. • Establish a forum where experts can exchange information, discuss issues and share ideas unaided. • Consider the use of advisory groups for expert groups, which include practitioners and social scientists to advise the expert group when planning and delivering tasks.
Challenges • Ensuring sufficient capacity and skills in the coordinating team in addition to scientific understanding. • Increasing understanding of the policy decision making process. For example the influences on decision making and how knowledge is used. • Including a wide range of perspectives, skills, expertise and knowledge sources from the start. • Increasing the expertise and understanding on social science methods and theories. • Increasing understanding on methods to integrate different knowledge types by biodiversity science groups within the NoK and across Europe.	

3.3.4 Cost effectiveness

Effective use of resources is an important factor in motivating policy makers and knowledge holders to engage and remain in NoK processes, and ensuring long-term sustainability of a NoK. The successes, challenges and suggestions for improving cost-effectiveness are explored in this section and summarised in Box 15.

The evaluation highlighted that interviewees were often unsure of the cost-effectiveness of some aspects of the case studies, specifically the cost effectiveness of methodologies. For example, some interviewees expressed concerns about the rigidity of the systematic review procedures and that it may not add much value in terms of quality in relation to the added resources, such as time, required for completing this process. However, the interviewees indicated that this view may be connected with a lack of understanding of the benefits of methodologies. Hence, raising awareness of the methodologies in the NoK may be beneficial, although this should take into account the different information needs of different groups, and help promote learning which was a motivation of some of the experts (see Box 7).

Furthermore, additional tools may be required to help the NoK to more efficiently interact with many more individuals in the expert group and more widely, such as peer reviewers, particularly when dealing with large assessments, particularly with the expert consultation methodology. For example, the evaluation suggested the development of an internal peer review process alongside external process to

reduce the time needed to finalising both scientific and usable policy products. The evaluation also suggested that the inclusion of ICT, such as virtual platforms and e-conferences, could improve the cost effectiveness of the NoK in the long term. One participant highlighted that "*social media platforms should have been used because there are cheaper means to create linkages* [...] *especially Linked-in for professionals is used more and more and it's a very cheap means of creating a group*" (P3.7). This stronger internal and external communication could also add to the transparency of the process, and as one interviewee pointed out "*there should be much stronger communication element in the EU projects otherwise the tax payer like myself, how do you know how the money is spent*" (P3.7).

Lastly, the experts in the case studies were not paid for their contribution, but engaged with the process in a voluntary capacity, although the evaluation highlighted that they expected many non-monetary benefits from this engagement. Notwithstanding this, interviewees, some of which used their own time to attend meetings, felt that reimbursement of expenses was important to facilitate their attendance at events. Indeed, the evaluation highlighted the need to promote and communicate these benefits for the experts to encourage them to engage in the process, especially in the absence of payment for the experts this suggestion will also contribute to cost effectiveness within the NoK.

Box 15. Successes, challenges and suggestions for the NoK to improve cost effectiveness

Successes	**Suggestions**
• Developing a collaboration in the agriculture case with a similar knowledge exchange initiative to deliver mutual benefit. • Providing clear benefits to facilitate voluntary contribution to the NoK from all groups.	• Consider developing an internal review process in the NoK to reduce the time needed to complete the full NoK process and not just rely on the peer review through the journal publishing process. • Using social media and other technology to avoid unnecessary face to face meetings. • Assess policy needs to select the most cost effective methodology, for example systematic reviews may only be necessary for very controversial issues. • Consider developing an information tool box which can be used to quickly respond to broad questions without initiating the full NoK process.
Challenges	
• Developing processes and tools for the expert consultation approach to use on a large scale for use when time and resources are limited. • Understanding in expert group on main methodological approaches in the NoK. For example, some experts felt the systematic review was restrictive, laborious and was not fully replicable. • Working within the constraints of using volunteers or with limited financial reward, for example experts will be able to contribute less time on a voluntary basis.	

3.3.5 Long-term sustainability of the NoK

An aspect mentioned by interviewees when discussing the long-term outcomes of the NoK was the need to consider how to maintain the successes of the KNEU project (see Box 16 for a summary). This was described by one interviewee as the need to "*keep this kind of networking alive* [...] *this is certainly*

something which could be very useful and for the science but also for the policy part" (P3.4). From the very start of the project, interviewees in the evaluation were already thinking of the future (see section on governance). Whilst this shows an interest in the maintenance of many successes of the KNEU project, there are many challenges, and suggestions on long-term sustainability, all of which are explored here and summarised in Box 16.

The big questions posed by interviewees in terms of the long-term sustainability of the NoK related to organisational structure, funding and involvement. One interviewee summarised it as "*what would be the organisational structure of it* [the NoK], *how would, could I be implicated and how much money would I need to give or where would the money come from?*" (P3.4). Although interviewees placed a big emphasis on the White Paper prepared in WP5 and the second BiodiversityKnowledge Conference in outlining practical future steps for the development of a NoK, a number of suggestions were made by interviewees in WP4.

These included, as a first step, building on and feedback from the case studies processes and outputs. As one interviewee commented "*It would be useful for the project to give us a critical review how they felt we did* [...] *I would be happy if at the end of the project I would get feedback on what you would wish policy makers would do*" (P3.4). Indeed, there was a perception from interviewees that all too often the outputs and outcomes of research projects remained in the research community. One interviewee commented that "*many huge projects commissioned by the EU and also commissioned by our ministries collect huge data but it ends up in the scientific community where everybody claps to the others but nothing happens in policy*" (P3.3). A key aspect of the long-term sustainability of the KNEU project was therefore to build more broadly on the processes and outcomes of the case studies, and avoid the risk of KNEU lessons being forgotten. This could be achieved both within the project, through broad communication of lessons learned and outputs, but also by other actors, for example other networks (e.g. ALTER-Net), or the European Commission. For example, one interviewee suggested that "*the European Commission as a kind of public institute has a responsibility to use the outcome, to use a kind of holistic approach in utilising the outcomes of projects* [...] *I know it is really hard to change the decision making of the European Commission through one project but I think it should be noted somewhere that the Commission ought to speak or communicate between the different DGs*" (P3.7). Another challenge highlighted by interviewees was the risk of long-term options for a NoK (for example in the White Paper) being too vague and difficult to implement. One interviewee thought "*the potential ways to go about it at the moment, the options and so on are almost too generic for someone to get up and go, right, I'll implement that*" (P3.8).

Box 16.Successes, challenges and suggestions to support long term sustainability of a NoK

Successes	**Suggestions**
• Interest in being involved in the NoK in the future.	• Promote the benefits identified in the project to engage people in the NoK • Undertake a critical evaluation of the
Challenges	
• Challenges identified will not be quickly resolved for example cultural diversity, inclusion of different groups, incorporating	

different knowledge resources and knowledge types. • Many questions about the future functioning NoK • Moving from theoretical frameworks from a research project to practical implementation and ensuring all the information is available to facilitate this as smoothly as possible. • Improving the tools and mechanism to better promote research projects and their findings in the wider policy domain to engage more policy makers in projects and use results in the planning and delivery of their work.	interaction between the project and the Commission to help improve the engagement and usefulness of future research projects • Strengthening synergies with existing networks, for example sharing and promoting outputs.

4. Discussion

The WP4 evaluation was designed to analyse the issues involved in developing and testing the prototype NoK. This was guided by an evaluation framework using criteria from public participation literature. The main method of data gathering was 89 semi structured interviews carried out with 79 participants in the project, although qualitative questionnaires and focus groups were also used as supplementary methods. The interviewees included participants and consortium members who contributed their expertise and ideas into the process to design the prototype NoK as well as members of Client Dialogue Group which had an advisory role in the project. Three case studies were developed to test the prototype and the evaluation focused on exploring the processes, outputs and outcomes from these case studies. This involved collecting data from participants in the expert working groups, coordinating team from the Consortium, as well as others who engaged at specific points in the process and at different levels, such as external collaborators, client group members and the policy maker mimicking the role of the requester in the conservation case. During the case study process focus groups were used to explore in more depth the motivations of the expert group members who were working on a voluntary basis with only expenses provided. Following this, a broader exploration of motivations was undertaken by interviewing experts who had declined the opportunity to participate in the expert working groups. However, although the timeframe for the case studies was extended, further interviews were not undertaken with members of the policy community as no outputs had been finalised and disseminated to the wider policy community in this time.

The evaluation did not therefore adequately explore the issue of influence of the NoK on decision making. The reason for this is that not all aspects of the prototype were tested in the case studies. The evaluation, the issues raised and particularly the suggestions to overcome these issues reflect this. In addition, the earlier stages of the NoK were tested more fully than the later stages, which is reflected in the limited number of policy outputs and dissemination to the policy community at large. However, regardless of this, the decision making process involves many different parameters. Whereas previous interpretations presented a more linear decision making process, which required the right kind of information to enter the process at the right time, also called a policy window, the policy process is now recognised as being much more complex, multi directional process which can be influenced by different people, sources of information and ideas which interact with wide values and belief systems within the

wider system (Schmidt, 2011 and Smith and Katikireddi, 2013)[3].

The data gathering and analysis was limited to some degree as not all project events were attended by the evaluators, specifically the regional workshops at the start of the project. Furthermore, data was predominantly gathered using semi structured interviews which were conducted over the telephone, and this could have limited the opportunity to build rapport and the open sharing of views by the interviewee. Further compounding this issue may have been communication issues between the English speaking interviewer and some of the non native English speaking interviewees.

Lastly, the evaluation team used various tools throughout the project to communicate findings to the project consortium. This involved brief summaries of evaluation findings in the earlier stages of the project and, later in the project, more targeted, responsive summaries relating to specific, current issues in the project. For example, WP4 input was provided for the organisation of events and improving communication. To help facilitate transfer of information from WP4 to WP3 a workshop was also organised and facilitated by the evaluation team to discuss the evaluation findings and identify links with other aspects of the project. Consortium members suggested that this was a more successful method of transferring information from the evaluation, particularly for long term, wider issues.

The evaluation operated as an iterative process. Throughout the project evaluation findings were summarised and disseminated to help inform progress of the project and case studies and facilitate reflection and learning within the project consortium. Indeed, to facilitate this further a workshop was organised with consortium members from WP3 and WP5 to discuss the evaluation findings in relation to the NoK principles identified in the project. These discussions contributed to the decision to adopt the criteria of credibility, relevance and legitimacy developed by Cash et al (2003), and which were taken up in the development of the NoK White Paper in WP5[4]. Also, the work carried out in other projects on science policy interfaces, including the SPIRAL project[5] were included accordingly. These are closely linked and are defined as;

- **Credibility** relates to the scientific adequacy of the technical evidence and arguments
- **Relevance** reflects the salience of the assessment to the needs of decision makers
- **Legitimacy** refers to the perception that the process to produce information has been respectful of stakeholders' divergent values and beliefs, unbiased in its conduct and fair in its treatment of opposing views and interests.

[3] This aspect is also reflected in the KNEU WP1 report on the needs of potential stakeholders: KNEU D1.1 (2012): Overview of experts and requesters of a potential NoK: Mapping knowledge holders, identifying requesters and barriers on how to link them, online at http://biodiversityknowledge.eu/images/Documents/Deliverables/KNEU-D1-1_clientsandholdersoverviewandbarriers_Final.pdf

[4] BiodiversityKnowledge White paper draft released in July 2013, see http://biodiversityknowledge.eu/progress-and-results/the-white-paper

[5] http://www.spiral-project.eu/

There are five key issues which have been identified in the evaluation findings which should be considered in the planning and implementation of the NoK to help develop a credible, relevant and legitimate NoK. As the findings show (see also Figure 2), all the issues identified in the evaluation of the developing and testing the process and assessing the outputs and outcomes are interconnected and as such progress towards overcoming one challenge is likely to help make progress towards another.

Figure 2. 'Wordle' of the WP4 report

The first key challenge is the overarching issue of the need to develop and maintain **a strong focus on the process of the NoK** throughout its planning and during implementation. This is vital to help ensure the NoK meets its objective to more effectively transfer knowledge into the decision making process and influence the actions of policy makers. Indeed, understanding of the needs of policy makers is essential in order to coordinate the NoK in doing this. However, scientific understanding is also essential, particularly in scoping the question and interacting with experts. However, the outputs from the case studies were predominantly scientific products with much less progress made on developing policy products and transferring this knowledge into the policy community. This could be improved by a stronger focus, also in terms of invested resources into project guidance and focus. However, achieving this objective will involve various different but interrelated elements. Furthermore, the NoK may need to go about knowledge transfer differently from how it has been approached in the past within the biodiversity science groups. This may involve analysing problems differently, being open to new ideas, perspectives and interactions and over time, forming new approaches. A keen focus on processes is therefore essential in the NoK to bring all the different but interrelated elements together, to clearly lay out from the start how things will be done to better transfer knowledge into the decision making

process and to ensure the whole is greater than the sum of its' parts.

The second, linked, issue is the need to **include different groups** in the planning and implementation of the NoK, ensuring they are represented at all levels and from the very beginning. Scientists were well represented at all levels and stages of the prototype development and testing. However, although biodiversity related scientists will be central to the NoK and all disciplines relating to biodiversity should eb included in the NoK processes, a wide range of expertise, skills knowledge sources and types and perspectives are essential to ensure the overall success of the NoK. Expertise from social sciences and practitioners, particularly those working on science, policy and society interfaces were identified as key for designing and implementing the NoK. Skills such as facilitation, negotiation and advocacy were also identified as being key to implementing the NoK processes. These skills will be vital to coordinating the interactions between scientists, practitioners and policy makers in the process. These different groups bring with them different, but equally valuable, sources of knowledge. Whereas (natural science based) academics may predominantly use and produce published knowledge from scientific journals, practitioners often use and produce grey literature. Furthermore, some social scientist disciplines and practitioner groups are more familiar with methods and techniques to use different types of knowledge, such as local, traditional and indigenous knowledge, and integrating this knowledge with scientific knowledge. Furthermore, wider inclusion of others groups, expertise, skills, knowledge sources and perspectives may facilitate more holistic information from the NoK including the levels of certainty, the identification of potential conflicts and disputed knowledge, improved understanding of the knowledge landscape and gaps. However, once again an understanding of the motivations of all the different groups that need to be engaged in the NoK will be essential. Indeed, the evaluation highlighted that increasing the number of publications is a strong but not the sole motivation within the scientific community. Furthermore, some social scientists with expertise on network development and functioning and science policy interfaces may prefer to research rather than engage the development of knowledge transfer processes such as the NoK. The motivations of other groups may be very different and better engagement will be strongly influenced by the ability of the NoK to demonstrate benefits of getting involved.

The third issue identified through the evaluation was the important **role of communication**, which again is closely linked to the previous issues of the inclusion of groups as well as the need for more focus on the NoK processes. One of the key messages identified through the evaluation is that different groups within the NoK may have different information needs and communication styles. Indeed, interviews suggested information flow was sometimes lacking. While scientists were generally satisfied with the way information was presented and discussed, some practitioners felt that information could have been clearer and more concise. In addition individuals entering the process also felt more information could have been provided to help them orientate themselves in the process. Furthermore, the evaluation highlighted a link between communication and transparency, which is a key aspect of building trust in the NoK to help encourage individuals to contribute, use information produced from the NoK and promote the NoK within their networks. Specifically, interviewees were often unable to see if or how their ideas and discussions during workshops had influenced the decisions about the design of the NoK. Furthermore, some members of the expert group became frustrated when goals, constraints and

decision making processes were unclear in the case studies.

The fourth issue is ensuring the **outputs from the NoK are usable** in the policy community. The evaluation highlighted the need to integrate this objective more fully into the NoK process. This closely links to the previous issue of communication but relates more specifically to policy makers to ensure the policy issues they need addressing and the audiences they need to influence with the information flowing out of the NoK. To improve the policy usability of the outputs the evaluation suggested that the NoK seeks this information at the start of the process to help frame the question for the target audiences, consistently use language which is relevant and understandable in the policy community and selects and prepares appropriate tools to disseminate this information to the target audiences and wider. Furthermore, shortening the timeframe to package and feed information into the decision making process was identified as a key motivation to engage the policy community in the NoK and stronger focus and better integration of knowledge transfer into the process may help to shorten this timeframe further. Focusing the NoK outputs on the needs and timeframes of policy makers may also influence the cost effectiveness of the NoK. However, shortening the timeframe may conflict with the interest of ensuring high credibility of results, for example with evidence-based approaches. As such, compromises will have to be found by adapting methods and/or clearly identifying and communicating issues of certainty and quality.

Finally, any future NoK will require support not only from donors, but through strengthening links with different organisations, networks and initiatives at the both the European and to a lesser extent national levels. This relates to the fifth issue identified in the evaluation, namely that of **capacity building**. A process of reflection and learning must be central to the NoK, ensuring an institutional reflexivity, to help build bridges and reduce gaps between groups and move ever closer to collaborative working and information sharing. Capacity building (for individuals, but also institutions) should be seen as continuous task for the NoK, thus facilitating an open process to identify, analyse and resolve challenges as they arise not only within the NoK but also to transfer these lessons beyond the NoK, e.g. to support EU-funded projects in their work at the science-policy interface[6]. Thus, capacity building is a multi-directional process through interactions with individuals, institutions and wider society. Individual learning was identified as a key motivation for experts to engage in the NoK and in turn this may increase their level of contribution in the future. In addition, interviewees highlighted that already some were using the new skills, understanding and knowledge gained as a result of being involved in the NoK in other aspects of their work. However, to increase the influence of the NoK to achieve its goals, learning needs to occur at an individual and organisational level and information must flow between the NoK and wider audiences, making a stronger use of existing networks, projects and institutions as knowledge hubs.

[6] See for example the recommendations of the SPIRAL-project for EU-projects: http://www.spiral-project.eu/sites/default/files/16_recomm_2research%20projects.pdf, and the according SPIRAL project paper: Neßhöver, C.; Timaeus, J.; Wittmer,H.; Krieg, A.; Geamana, N.; van den Hove, S.; Young, J.; Watt, A. (2013): Improving the Science-Policy Interface of Biodiversity Research Projects.- Gaia 22: 99-103

In summary, the key five issues identified in the evaluation are interlinked and in order to achieve a credible, relevant and legitimate NoK all of these issues must be addressed together to strategically plan, implement and adapt the NoK as needs arise. These results will be used in the further development of the NoK White Paper to propose an according structure for the future.

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Appendices

Appendix 1. Client dialogue group questionnaire

A NoK prototype is currently being developed by BiodiversityKnowledge. We would very much appreciate your views on this prototype, together with any expectations, concerns and suggestions you might have. Your views will be taken into account and will contribute to the design and testing of the NoK.

1 What is the added value of NoK compared to other networks and processes of scientific inquiry on biodiversity and ecosystem services?
2 How could NoK serve the purposes/interests of your organization?
3 What are your expectations of the NoK?
4 In what kind of situations/for what questions/ for what policy areas would the NoK be most useful?
5 What problems/challenges do you see in the prototype NoK? (or: what concerns do you have with respect to the NoK)
6 How could the problems be overcome and the NoK be improved? (or: How would you improve/develop the prototype NoK?)
7 How do you perceive the role of experts, stakeholders and policy-makers in NoK? How should they be involved?

8 Do you see potential in the prototype NoK to address factual disputes concerning biodiversity protection and sustaining ESS? In which way could this potential be enhanced?
9 Any other comments? (you can also call/email us with thoughts, comments etc – see contact details below)
It would be really helpful for BiodiversityKnowledge to contact you again for your views on progress, suggestions etc. Would that be possible? What is your preferred mode of contact?

Appendix 2. Phase 1 interview question guide

Introduction:

- How have you been involved previously in the prototype development?
- When did you first hear about the NoK?
- When did you first hear about the KNEU Conference (how? Who asked you etc)
- What were your expectations?

Transparency/ Information flow:

- What sort of information was available prior to the conference?
- Had you seen the prototype before the presentation in Brussels?
- How has the flow of information been from the project organisers? Has this been enough information or would you have wanted more?
- Was information provided in a format which was appropriate? (easy to understand)?
- Is it clear to you how and why the prototype has been developed as it has? (How we got where we are now?) If not, why?
- Will you stay involved in the project? How?
- Is it clear to you what will happen next and how you can be involved in this?
- How do you think the process of developing the prototype has been? What has been good? What could have been better? What could have been done differently?

Influence:

- Do you feel that you were able to influence the development of the prototype? How? If not, why? (Did you feel that your suggestions and concerns were listened to?)
- Did you want to influence the prototype more but felt you couldn't? Why?

Representativeness:

- How representative has the development of the prototype been – Have everyone who should be involved been involved? If not, who and why? Is this a problem? How could this have been better?

- What about cultural representation in the process? Has there been equal involvement from across Europe?

Concerns/ feedback:

- Do you have any other concerns/ feedback?

Appendix 3. Phase 2 interview question guide

Questions for working group participants:

- How did you become involved in the project? (How were you contacted? What were your reasons for participating in the case study as a working group member?)
- What were your expectations for the workshop and how were they met?
- Information and communication – what information did you receive prior to workshop? Was it clear what the workshop was about, its aims, and your role?
- What were the most important features of the workshop that helped it meet the expectations? (What worked? The format of the workshop etc)
- What were the most important problems/ challenges in the workshop arrangements and/ or their broader context (what did not work?)
- Did the workshops have a sufficient range of expertise? Were any scientific fields or stakeholder organisations missing from the workshop?
- How was the question from the requester formulated? Were you happy with it, what about other participants? Were there any disagreements among participants on the relevance of the question/ proper formulation of the question? If yes, did these discussions influence the way in which the question was formulated?
- How useful/ effective did you find the systematic review approach (and the expert approach and adaptive management approach to answer the questions?) What is the added value of this approach?
- How were the factual disagreements around the table addressed? Did everyone find the information reliable and/ or policy relevant?
- Will you remain involved in the process? Why?
- Would you be interested in participating in a full scale NoK in the future? Why?
- Any concerns?
- Suggestions?

Question for requester:

- How did you become involved in this project? (How were you contacted? What were your

reasons to pose a question to the prototype NoK? Do you see demand for the NoK in your policy field?

- What was the process to identify the problem? How did the project coordinator help with that? Are you happy with the final question?
- Were you able to influence the workings of the expert group (type of experts involved etc)?
- How do you perceive your role and that of the experts and knowledge coordinators in the process? Do you think the requester should be more closely involved in the knowledge production process or only actively posing the problem, forming the question and commenting on the outcome of the work?
- What are your expectations for the NoK – have these been met so far? How?
- How would you characterise policy relevant information and do you think the NoK could produce such information?
- What do you see as the major challenges/ problems and how can these potentially be over come? What improvements could be made to meet your needs as a policy maker?

Questions for case study coordinating team:

- How did you identify a problem? What were the challenges with this?
- How did you develop a draft question to present at the workshop? Who was involved and how did you do this? What were the challenges?
- How did you create the working group? How did you identify knowledge holders? How did you engage with them? What were the challenges? What went well? How could this be improved?
- How did you select a methodology to answer this question? What were the challenges? Is this adequate to cover the scope of the problem?
- What were your workshop aims?
- Were the workshop aims achieved? If not, why not? Could the workshop have been improved?
- What are the key challenges and how could they be overcome by developing the NoK and the methods used in it?
- Additional comments or concerns?

Appendix 4. Phase 2 focus group guide

Introduction and explain the focus group method.

Outline of evaluation role in project and role of evaluator for focus group.

Aim is to explore in more depth an topic highlighted in the individual interviews.

Topic: Understanding motivations of experts to participate and improving the buy in for the future

Confidentiality of participants will be maintained.

All been invited to take part because you have a technical interest and expertise in the topic.

Q1. What motivated you to come to this workshop/ meeting? Why didn't you ignore the invite? (Use prompts from evaluation findings and wider project to explore issues in depth to discover not only what but also why and how).

Follow on questions (adapted to the context of the discussion)

Q2. Once involved, are there any other motivating factors or unmet expectations?

Q3. Do you have any suggestions on how the NoK can encourage participation in the future?

Close: Thank participants and offer feedback on findings.

Appendix 5. Phase 3 interview questions

Added value:

1. What was the added value of the NoK compared to your usual way of gathering/ assimilating information? Did it foster greater trust in the process of gathering information and the quality of the outputs? Did it produce information that is policy relevant for the problem at hand?

Learning:

2. Did learning occur? Who benefited and how?
3. To what extent did the process change attitudes, behaviours and actions of those involved?
4. What specific aspects of the case study process do you feel fostered learning? Why and how.
5. Did these specifically have the goal of learning or was it a consequence of other goals?

Capacity building:

6. To what extent has the case study helped foster capacity, for example new collaborations and partnerships?
7. What specific aspects of the case study process do you feel fostered capacity building? Why and how.
8. Did these specifically have the goal of capacity building or was it a consequence of other goals?

Policy usability:

9. What are the outputs?
10. Who produced them?
11. Who are they targeted at? (directly and indirectly)
12. How useful will they be? For policy makers? For scientists? Others (based on answers to Q7 above)(short and long term?) Why? If not, why not?
13. Have any conflicts surrounding the issue been addressed in the outputs? Did this help uncover common ground on issues? If so how, if not why not?

14. To what extent has uncertainty been addressed in the process? How has this been communicated?
15. Is the NoK a process that can produce useful results in a time-frame suitable to policy processes? If not, why not and how can this be addressed?
16. What could be done to make the future outputs from the NoK more usable?
17. How influential do you think the NoK and its outputs has/will be? How, on what, on who etc.
18. Do you think that groups in the policy community (Scientists, policy makers, practitioners, non-biodiversity groups) are happy to accept the output of the NoK or are they likely to contest it and on what ground?

Appendix 6. Methodologies used in the case studies

Methodology 1: Expert knowledge approach

Eliciting expert knowledge is a widely used method in environmental impact assessment, risk assessment or other similar types of inquiry where it is not possible or feasible to carry out new empirical research, systematic reviews or modeling exercises.

The expert knowledge approach is a relatively quick and cost-efficient method to draw upon an existing body of knowledge and also to make use of the implicit knowledge among a research community. The expert knowledge approach can range from largely informal workshops or meetings to more formal and systematic consultations such as Delphi processes[7].

The drawback of expert consultation is that it can produce superficial information, especially in situations which would require in-depth analysis and new empirical research. A further problem is that expert opinions may vary widely, especially when knowledge is politicized. In highly contested policy making situations, imperatives located in the political sphere often dominate scientific evidence, and knowledge can be used to legitimize pre-existing positions (Sharman and Holmes 2010). The social influences that shape scientific inquiry can also arise out of differences linked to disciplinary training, institutional affiliation, or professional status (Jasanoff 1995). These more subtle contextual commitments can have a major impact on the ways in which different scientists pose and frame the research question, select attention to different pieces of evidence and interpret the findings. Therefore,

[7] According to Linstone and Turoff (2002), "Delphi may be characterized as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem". Following a number of rounds, the assumption is that the expert opinions gradually converge as the experts consider the various aspects of the problem and learn from one another. THe benefit of Delphi method is the use of "collective intelligence" instead of relying on just one or two individual experts. The weakness of the Delphi methods is that the orientation towards consensus can miss weak signals and suppress unconventional thinking. Furthermore, the expert opinions are unlikely to converge in highly politicized questions.

it seems that expert consultation is a good method when the open questions are fairly straightforward and uncontested but its usefulness can be more limited in highly controversial topics, or so called post-normal science situations where “facts are uncertain, values in dispute stakes high and decisions urgent” (Ravetz 1986, 422).

Methodology 2: Evidence based framework - Systematic reviews

A systematic review attempts to identify, appraise and synthesize all the empirical evidence that meets pre-specified eligibility criteria to answer a given research question. Researchers conducting systematic reviews use explicit methods aimed at minimizing bias, in order to produce more reliable findings that can be used to inform decision making (Cochrane Handbook for Systematic Reviews of Interventions 2011). Systematic reviews are successfully used in medical science and they have been recently applied in the field of biodiversity conservation as well (Sutherland et al (2004) and Pullin et al (2004)).

The process of carrying out systematic reviews is described in on-line guidelines for carrying out systematic reviews in environmental management http://www.environmentalevidence.org/Authors.htm

The benefit of systematic reviews is that it helps decision-makers and conservation practitioners to draw on meta-analyses of a large body of research, which is subjected to critical appraisal using a standard protocol.Systematic reviews can also increase transparency by restricting the use of only selected publications with ‘desirable’ results while ignoring others. Systematic review process does not allow exclusion of relevant publications and it disregards publications which do not withstand closer scientific scrutiny.

However, applying the systematic review approach in conservation science is not without problems. Environmental research pertaining to policy problems is often highly context dependent, and hence generalizations from previous research to different spatiotemporal circumstances can be misleading. A second challenge is inclusion of grey literature and unpublished practitioner and local knowledge into systematic reviews. Practitioners’ and local actors anecdotal evidence may be subject to biases but in several cases it can also be a valuable source of information. The systematic review process can include other than peer-reviewed scientific literature but the standards of eligibility criteria do not apply directly to these sources of knowledge and this literature is often published in local languages, which adds a further difficulty in accessing it.

Third, the acceptability and policy relevance of systematic reviews is likely to remain low if the key stakeholders and policy makers are not engaged in the knowledge production process (McCreary et al. 2000).

Methodology 3: Adaptive management approach

Adaptive management is defined by D’Eon (2008, p1) as “a structured rigorous process designed to improve management policies and practices by learning from the outcomes of operational programs”. Adaptive management depends largely on developing a robust evidence base, all the while acknowledging that knowledge on ecosystems or species will be uneven and therefore not to be used as

an excuse for postponing action until "enough" is known (Lee, 1999). Adaptive management also builds on the concepts of “learning by doing” (Walters, 1986) and experimentation. Finally, a key emphasis of adaptive management is social and institutional learning (Armitage et al. 2008) often through monitoring of a process.

The benefits of adaptive management are that it is an iterative process that constantly looks for modifications to improve management outcomes based on evaluating the success of a management action in relation to the objectives.

However, adaptive management does require a willingness to embrace uncertainty as consequences of decisions cannot be fully known. Indeed, in theory, adaptive management can only set out to develop alternative predictions of how a system will respond to management and test them (Lee, 1999). As in many other approaches (see above), there may be conflicts of interests that adaptive management may not be able to overcome, in which case there also needs to be mechanisms for conflict resolution. Finally, adaptive management can be costly and slow (Walters, Goruk, and Radford 1993).