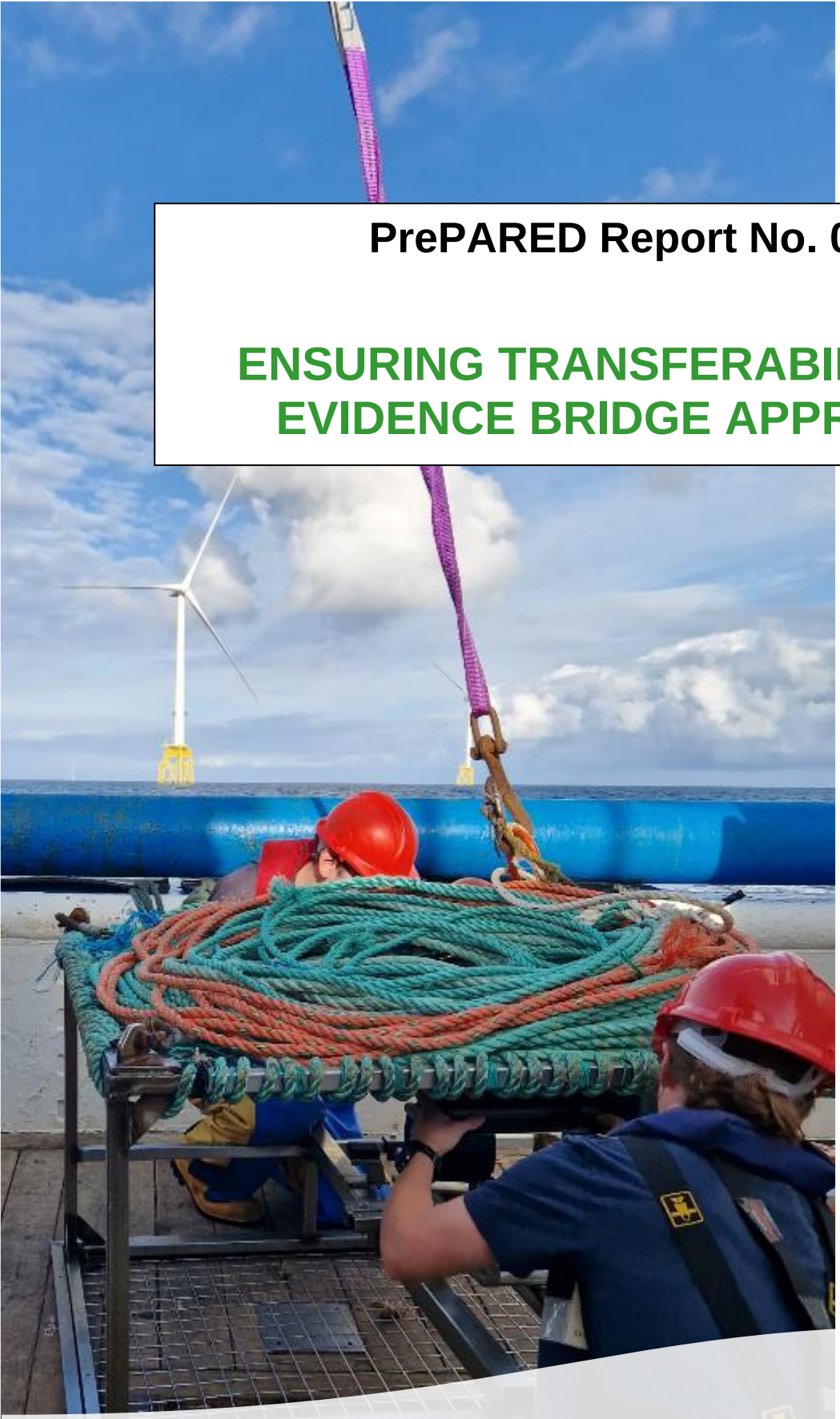

PrePARED Report No. 005

ENSURING TRANSFERABILITY: AN EVIDENCE BRIDGE APPROACH

SMRU Consulting
understand • assess • mitigate

Sea Mammal Research Unit

Funded by:

Offshore Wind Evidence + Change Programme

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PrePARED Report

ENSURING TRANSFERABILITY: AN EVIDENCE BRIDGE APPROACH

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SMRU Consulting & Sea Mammal Research Unit

Summary

Evidence-based decision making is at the core of environmental conservation and management. Globally, considering and utilising the best available science or evidence is highlighted as a key pillar by conservation and management agencies in policy and guidance documents. The use of best available science is an iterative process in any domain. An evidence-based decision-making approach requires the use of the best available science and, following the gathering and assessing of information or data, new hypotheses can be formed and tested.

A key obstacle in the uptake of evidence in decision making is that researchers who collect and disseminate the latest data or knowledge and those that rely on evidence to make decisions are subject to very different pressures, drivers and timelines. As such we require a process, that engages decision makers and stakeholders, assesses the best available evidence and delivers supporting “evidence bridges”.

This document summarises a process by which “evidence bridges” can be established in various domains to support evidence-based decision-making (the 4 As – Ask, Assemble, Assess and Apply).

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1. Introduction

Evidence-based decision making is at the core of environmental conservation and management. Evidence can be used in many domains and applications, supporting planning, consenting, and the development of new policy (Figure 1).

Globally, utilising the best available science or evidence is highlighted as a key pillar by conservation and management agencies in policy and guidance documents[1,2,3,4,5,6]. Additionally, it is a critical element of the application of the precautionary principle[7].

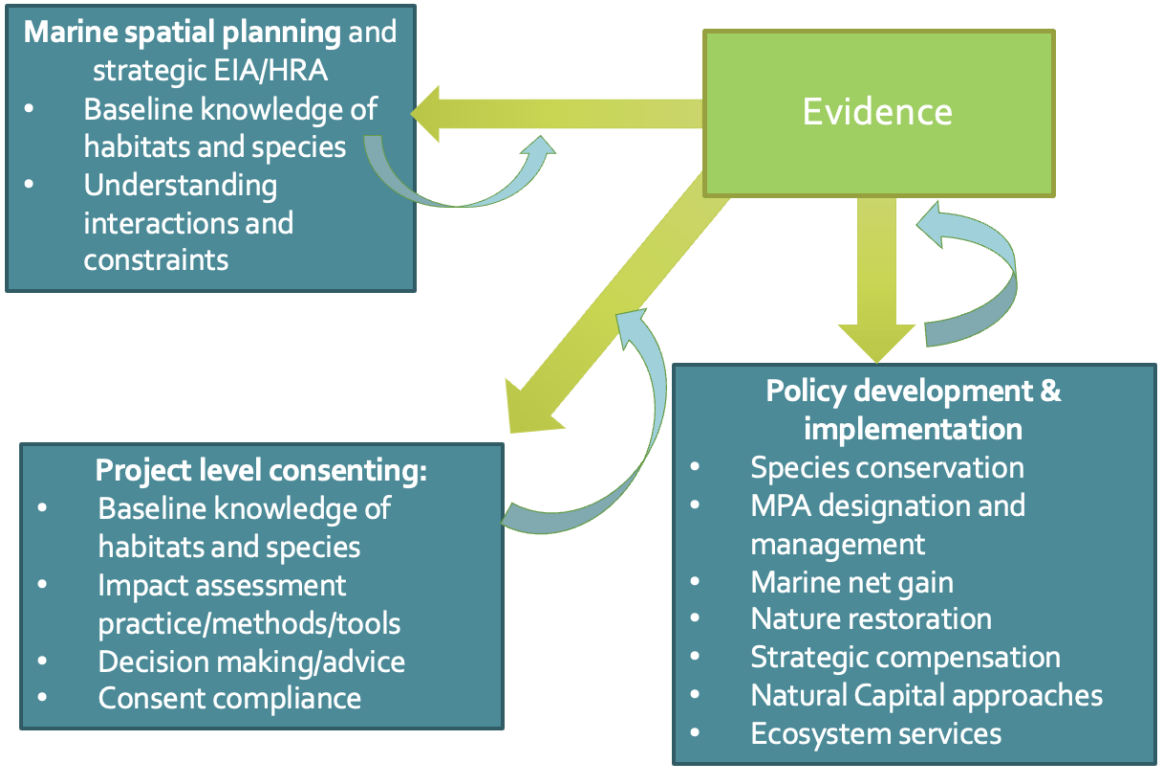

Figure 1 - Examples of the need for evidence to support planning and consenting.

2. Use of the evidence base in decision making

The use of best available science is an iterative process in any domain. In many cases, an evidence base exists (though might require collation and assessment) which can support decision making. Once an evidence base is established then knowledge gaps should be identified and tested via hypothesis testing (Figure 2). That is, an evidence-based decision-making approach requires the use of the best available science and, following the gathering and assessing of information or data, new hypotheses can be

[1] https://publications.naturalengland.org.uk/publication/5830769699454976
[2] https://blogs.gov.scot/marine-scotland/2024/01/11/shaping-scotlands-marine-future/
[3] https://naturalresources.wales/evidence-and-data/how-researchers-can-work-with-us/?lang=en
[4] https://www.nature.scot/about-naturescot/our-work/transforming-how-we-work/evidence
[5] https://www.fws.gov/media/endangered-species-act
[6] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act
[7] https://unesdoc.unesco.org/ark:/48223/pf0000139578

formed and tested (if funding is made available). It is important to highlight that while hypothesis testing is an important need in advancing science, decision-making based on untested hypotheses cannot be considered the best available science.

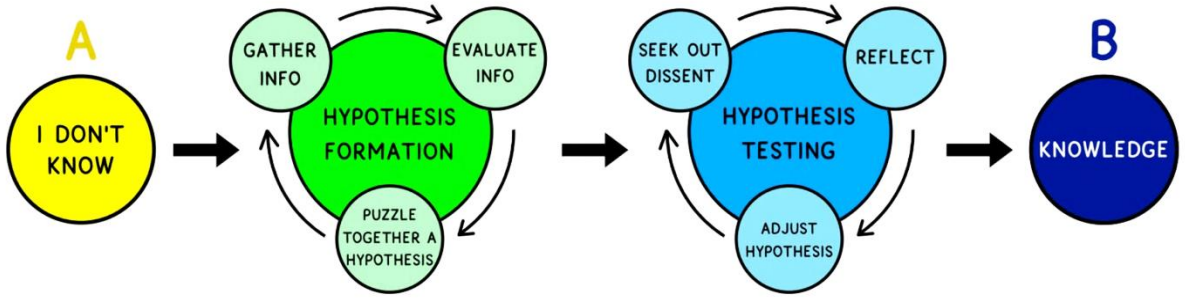

Figure 2 - The role of hypothesis formation and testing in contributing to the evidence base. Source: Urban (2023)

There are several obstacles to the efficient production and adoption of emerging scientific evidence in decision-making. The production of scientific evidence to support conservation and management is often extremely challenging and takes a long time to carefully, design, execute, analyse and disseminate. Tied to this challenge, is that researchers who collect and disseminate the latest evidence and decision makers (or their advisors) who adopt it are subject to different pressures, drivers and timelines. For example, in addition to the above point, researchers may be incentivised by high impact peer reviewed papers which take time to produce and go through peer review and might involve communication biases. There may also be communication challenges in the style of language used in papers which can be overly technical or inaccessible to a wider audience. Conversely, decision makers such as case officers in statutory nature conservation bodies (SNCBs) or regulatory roles may work on shorter timelines and lack time or resources to consider and adopt the latest evidence, which is continually evolving as new research is published in the grey or peer-reviewed literature.

A further challenge regarding the adoption of evidence into decision-making is the concept of transferability of information or data refers to the applicability of that information or data in a different setting. The use of best available science would typically default to evidence being “transferable” rather than it is not transferable/applicable, in the absence of evidence specific to the exact set of circumstances under consideration. The assertion that evidence is not transferable is often an untested hypothesis (unless it is supported by evidence). For example, Dähne et al 2013 (in German waters) and Graham et al 2018 (off the northeast of the UK) provide evidence on how harbour porpoises respond to unabated pile driving noise. These studies have provided the evidence-base on what has been observed. An untested hypothesis would be ‘these data are not representative of how harbour porpoises will respond in other regions’ (noting there could be multiple factors that drive how porpoises respond). This could be addressed via reviews or additional data collection in other regions to understand the variance among past studies and the identify causal factors (e.g. region, time of year, diameter of piles driven, hammer energies used to drive piles, use of acoustic deterrent devices in advance of pile driving).

Many or all of these barriers can mean that the responsibility to help translate science into decision making (i.e., to assess the weight of evidence) falls 'between the cracks'. This is highlighted by Lincoln & Guba (1985), who suggest *"it is, in summary, not the naturalist's task to provide an index of transferability, it is his or her responsibility to provide the data base that makes transferability judgements possible on the part of potential appliers."* But Munthe-Kaas et al. (2020) highlight: *"previous research indicates that decision makers' perceptions of the relevance of the results and its applicability to policy facilitates the ultimate use of findings from a review".*

As such we require a process, that engages decision-makers, stakeholders and researchers to ensure that evidence is assessed and taken-up into decision-making as appropriate.

3. The Evidence Bridge Process

The "Evidence Bridge" process has the following steps (sensu Sutherland, 2022) – which we have summarised into four key steps: **Ask, Assemble, Assess, and Apply** (**Error! Reference source not found.**). Each of these is summarised below.

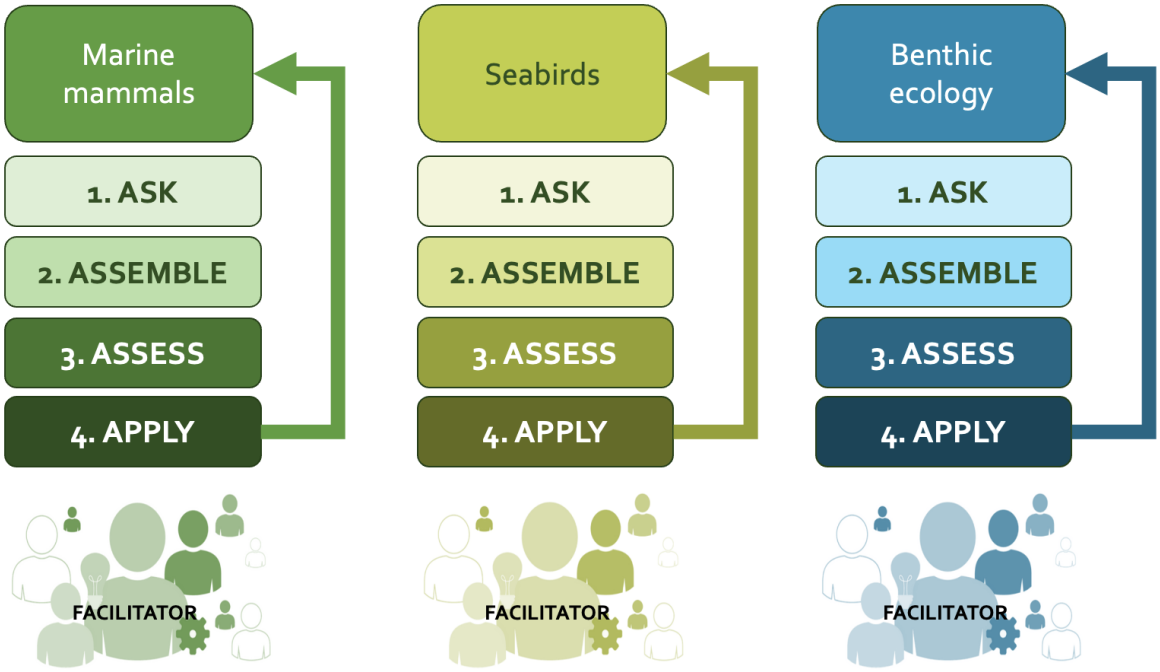

Figure 3 - A simplified structure for the evidence bridge process. The need for a distinct process for different receptor groups or topics (including a facilitator) is shown.

ASK: The first step is to establish the topic or scenario or assumption to be assessed in the Evidence Bridge process. The process works best when the decision to be made is defined as a clear statement, the validity of which is to be assessed, in light of available evidence. For example, these topics might include the effect of permanent threshold shifts (PTS) in hearing sensitivity on marine mammal vital rates, the ranges at which marine mammals respond to pile driving noise, or the effect of disturbance on a species foraging or energy intake**.** This step requires working with stakeholders

to identify and refine review topics both to identify the variables that affect transferability / applicability of studies and consider characteristics that can be assessed via review.

ASSEMBLE: Collate the evidence from peer reviewed and grey literature to assess the agreed questions.

ASSESS: Carry out rapid reviews of the evidence base (Collins et al., 2015) by a trained expert group and utilise the 'Assessing the Weight of Evidence' approach (see Christie, et al., 2023) (Figure 4). Different axes in the evidence weighting may be used to assess the weight of evidence, to ensure the Balance Evidence Assessment Methods (BEAM) (Figure 4) can work effectively in marine conservation and management.

APPLY: Preparation of a **short briefing note on the current state of the evidence** and where the weight of evidence lies for a given topic (i.e., whether or not there is evidence to support or refute a particular position or statement). The process of assessing both the weight and the balance of evidence can also help highlight the evidence gaps that challenge this process. These evidence gaps therefore would become the highest priority gaps to be filled (.

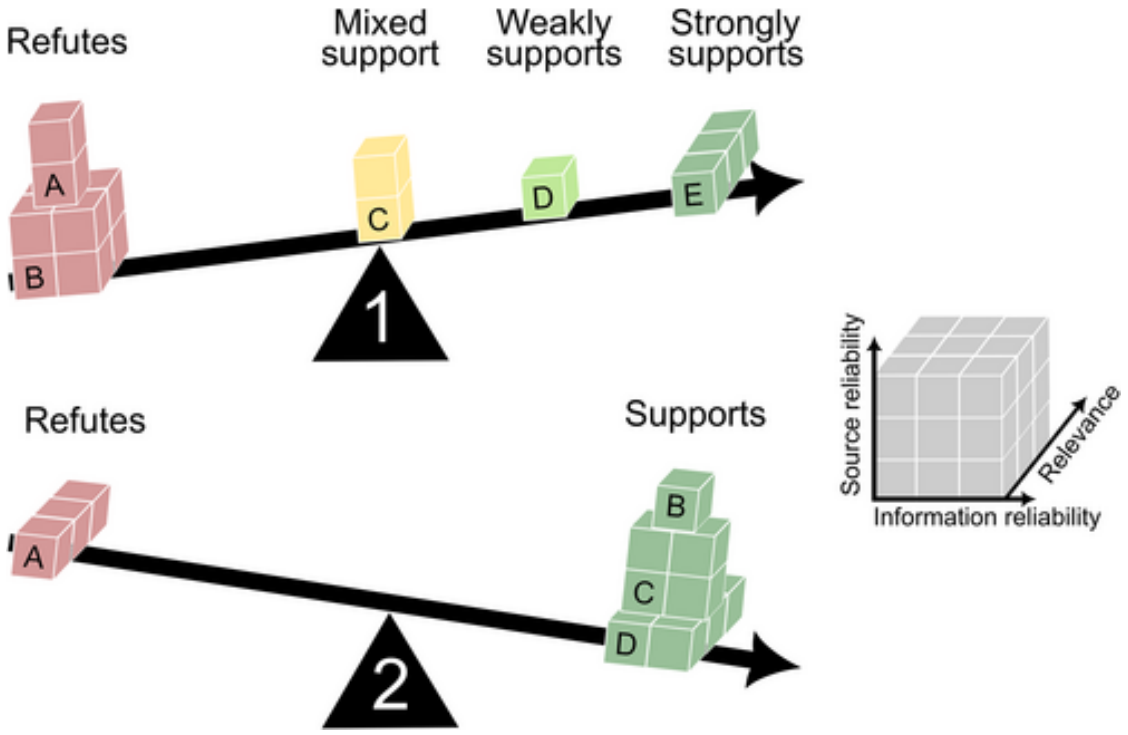

Figure 4 - Reproduced from Christie et al. (2023): "A diagram illustrating the Balance Evidence Assessment Method (BEAM), an intuitive way to visualize weighing different pieces of evidence supporting or refuting an assumption. Note that if the relevance or reliability of a piece of evidence is zero, then the block of evidence has no weight and disappears. Balance 1 shows an assumption that can be assessed by five different pieces of evidence (A)–(E) of varying weights (shown by their size) that can support or refute an assumption on an ordinal scale. Balance 2 shows a situation where an assumption can be assessed by four different pieces of evidence (A)–(D) that can only either support or refute an assumption (in a binary manner). In many situations, Balance 1 (using an ordinal scale for support) is most likely to be appropriate."

It is critical that this process is overseen by a trained facilitator to engage between stages involving stakeholders (1 and 4) and experts (2 and 3). This facilitation is key, as this process requires the engagement with decision makers and other stakeholders as well as with experts in the technical domain. These facilitators will be trained in the process of rapid review and weight of evidence assessment.

The benefit of this kind of evidence bridge process is that it facilitates an improved understanding of the needs of practitioners, policy and decision-makers (and potentially researchers who are generating new evidence and testing hypotheses). Certainly, this approach can facilitate a better understanding of the implications of research outcomes with close ties to how new evidence can be applied. By enacting this process, it can result in regular reviews of evidence in critical areas which in turn can lead to a better consensus on common approaches to assessment methods and the challenges of uncertainty and transferability. Ideally evidence bridges can lead to the co-production of guidance whereby there is a coordinated use of the evidence base. Furthermore, the production of guidance, summarising the evidence base can help guide which hypotheses should next be tested

4. **Example of Evidence Bridges – The Special Committee on Seals**

Under the Conservation of Seals Act 1970 and the Marine (Scotland) Act 2010, the Natural Environment Research Council (NERC) has a statutory duty to provide scientific advice to government on matters related to the management of seal populations. NERC has appointed the Special Committee on Seals (SCOS) to facilitate the provision of this advice. SCOS is the mechanism by which the Natural Environmental Research Council provides formal scientific advice on the management and conservation of seal populations. This process is funded by the NERC National Capability, National Public Good Programme, and executed by the Sea Mammal Research Unit (SMRU) at the University of St Andrews.

The SCOS process begins each year with a request that goes out to the Department of the Environment, Food, and Rural Affairs, the Scottish Government, Natural Resources Wales, and Department of Agriculture, Environment and Rural Affairs (DAERA) to capture questions they have on any aspect of the management and conservation of UK seal populations (i.e. the **ASK** step**)**. The answers to these questions can help inform any policy or casework needs. The Sea Mammal Research Unit considers the evidence base and compiles a report answering these questions (the **ASSEMBLE** and **ASSESS** steps**)**. The SCOS panel meet and review the report (updating advice as necessary), and an annual advice document is produced and made public (the **APPLY** step). These advice documents support decision-makers by synthesising the available evidence base and legitimising advance or stance on a particular topic or issue.

5. **Practical steps on the use of an evidence bridge to improve offshore wind consenting**

To deliver the 4 A’s approach highlighted above, the following steps are proposed:

1. Host a webinar with funders, partners and/or stakeholders to discuss and agree scope of an evidence bridge (EB) approach (e.g. which questions/assumptions to assess)
2. Identify suitable experts to participate in an EB weight of evidence (WoE) assessment
3. Host a webinar with experts to define on the scope, roles and responsibilities in completing the WoE assessment
4. Carry out the WoE assessment (offline)
5. Host a face-to-face workshop with experts to discuss the outcomes of the WoE assessment and map out a briefing paper on the state of the evidence base.
6. Produce a short briefing paper summarising the outcomes (potentially presenting alternative outputs to promote uptake, e.g. Shiny, retool or Observable interface).
7. Disseminate the briefing paper to stakeholders and host dissemination webinar(s) to promote uptake of current state of evidence base to better support decision makers.

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