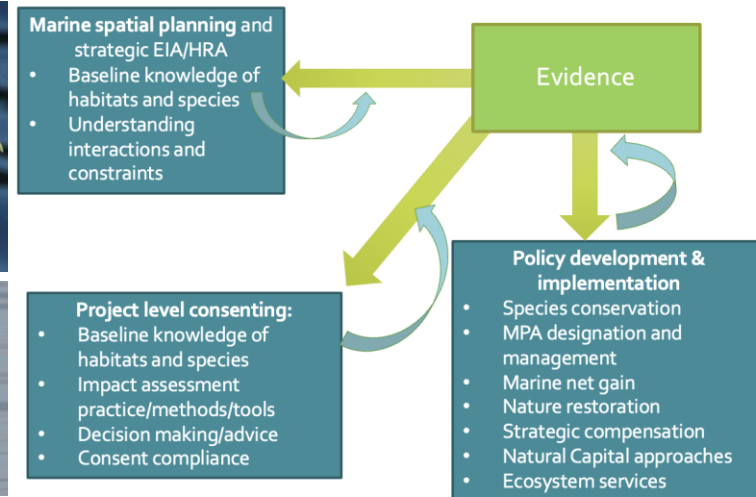




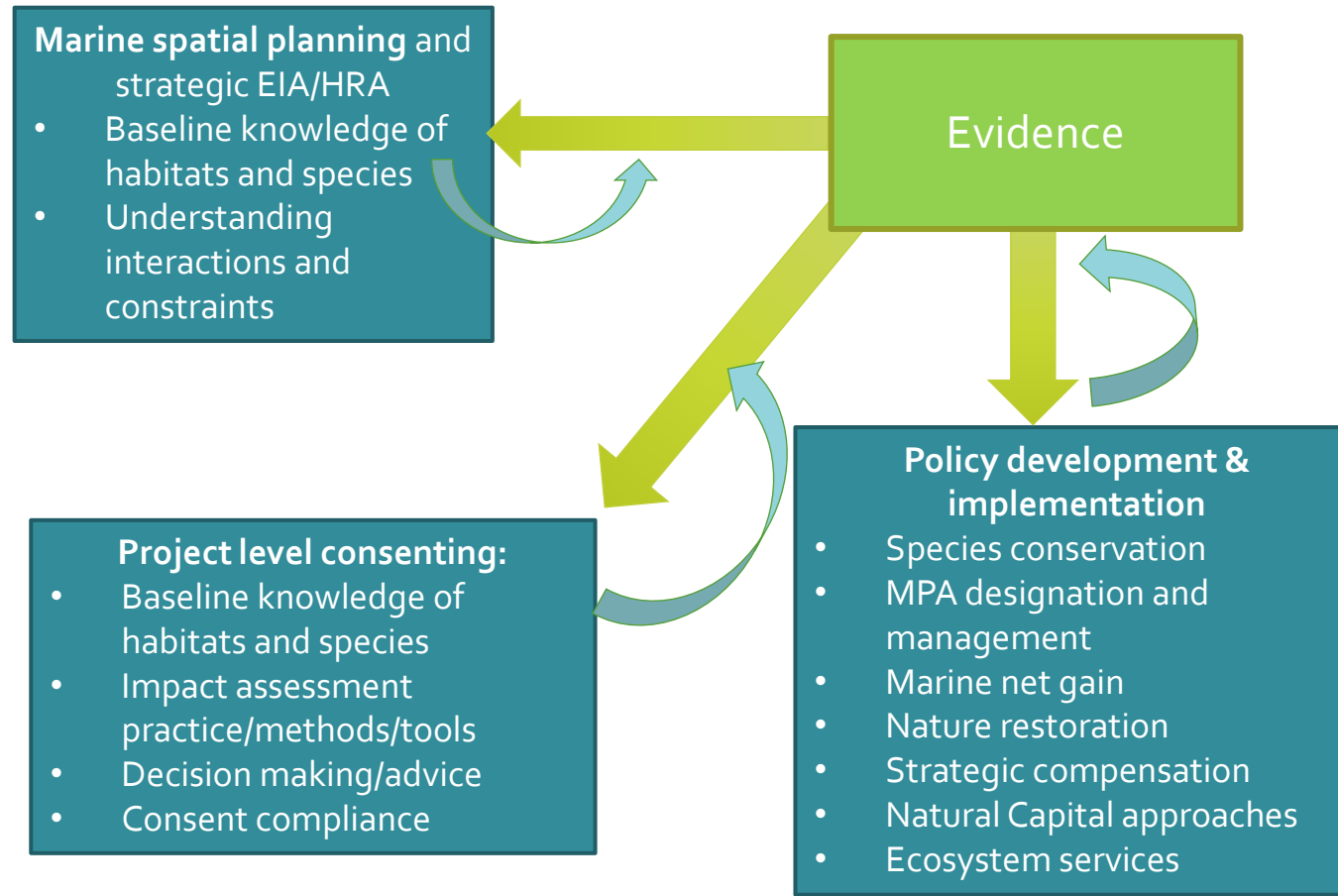
Exploring transferability in the evidence base to assist in decision-making

Cormac Booth

SMRU Consulting



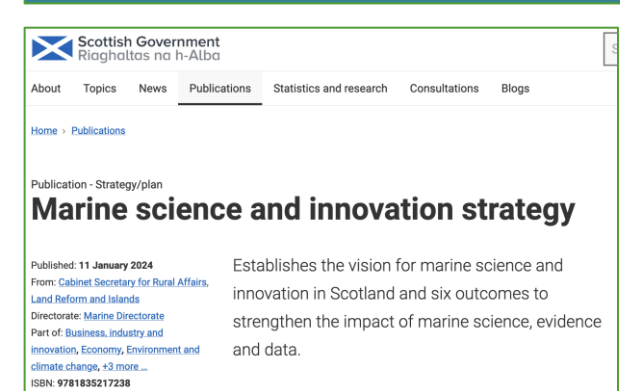
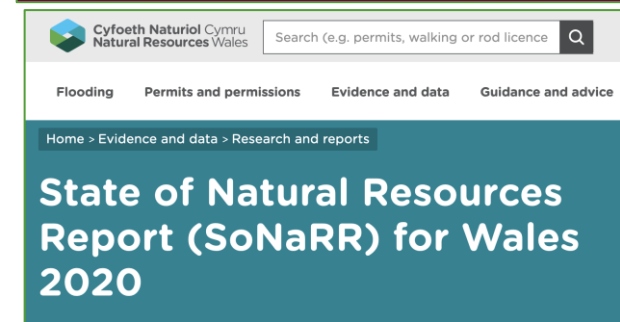
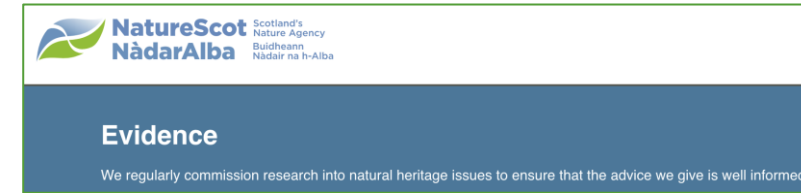
What do we need evidence for?



Source: Carol Sparling,
SMRU

Transferability of evidence

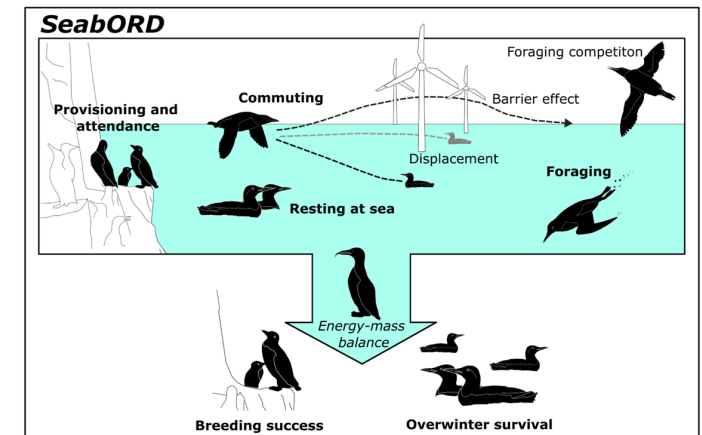
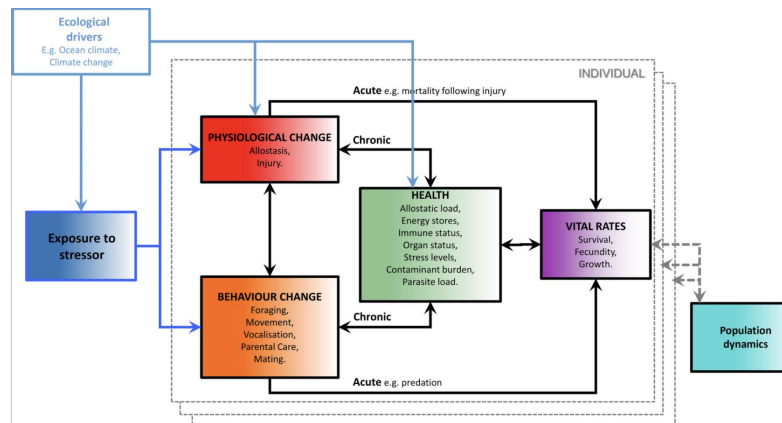
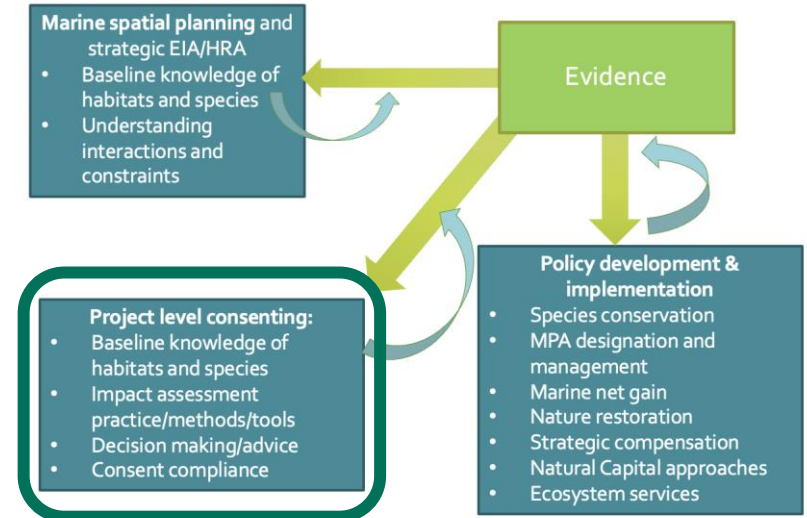
- Evidence-based decision making at the core of conservation and management
- NatureScot:
 - Nature is complex, and so too are the interactions between nature and how people use it. So it's vital that our work, **decisions and advice are based on the best available understanding** of how nature works.
- Natural England:
 - **"using the best available evidence up-front to inform our options and priorities, direct our decisions and shape our delivery"** (NE Chief Scientist)
- Natural Resources Wales
 - "Natural Resources Wales is an **evidence-informed organisation**. We seek to ensure that our strategy, decisions, operations and advice to Welsh Government and others are **underpinned by sound and quality-assured evidence**."
- Marine Directorate (Scotland)
 - "a blueprint for the Scottish Government to **utilise the best available science, evidence and data for making informed marine management decisions**"
- JNCC
 - "JNCC, NE and DAERA are committed to periodically reviewing this advice to ensure it remains workable, effective and **takes account of best-available evidence**."
- U.S Endangered Species Act
 - "shall make determinations [...] **solely on the basis of the best scientific and commercial data available**"



Source: Carol Sparling, SMRU

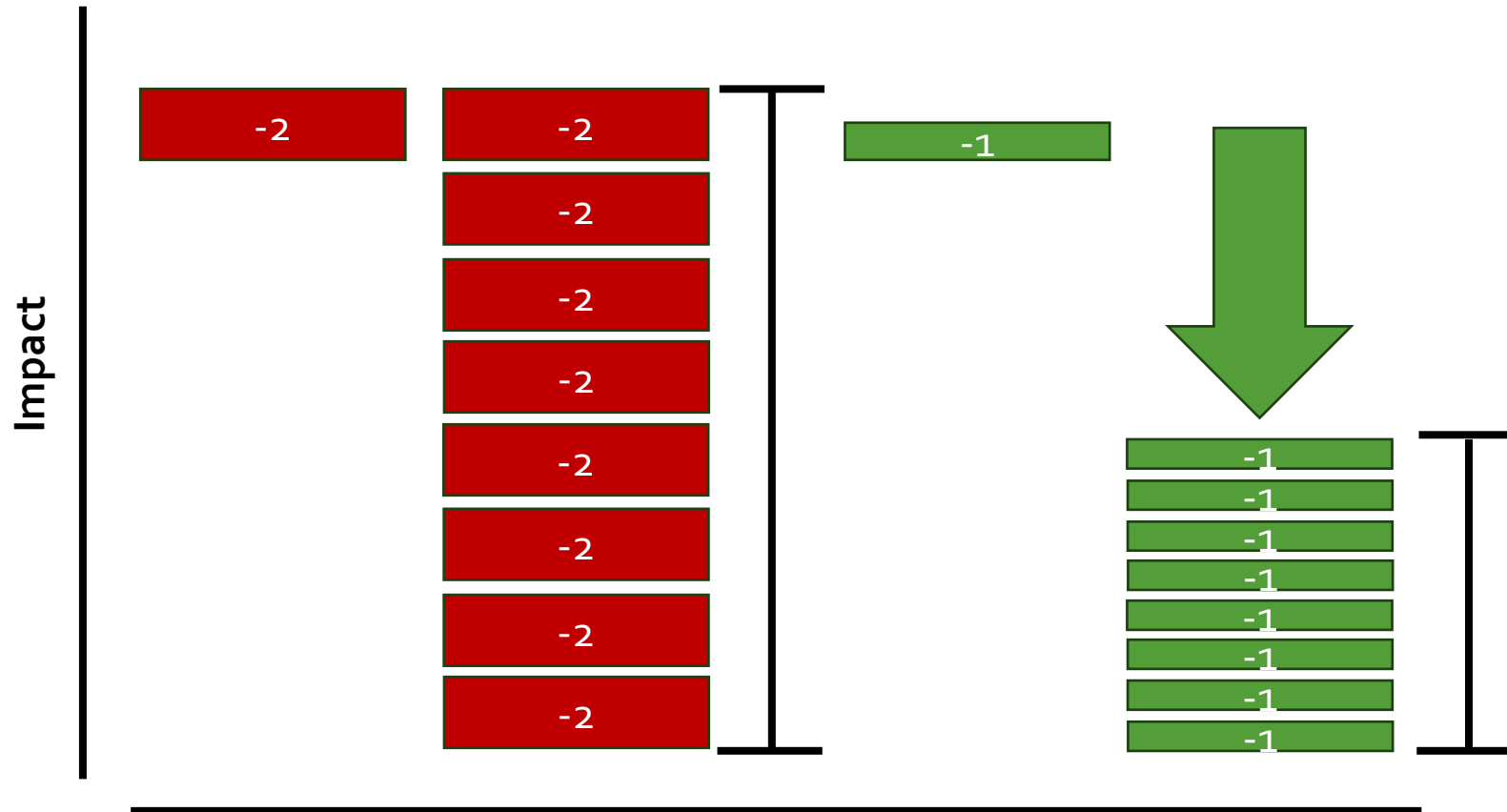
What do we need evidence for?

- Project Level & Cumulative Assessment
 - Best available science
- Evidence supports:
 1. Best available Cumulative Impact Assessment tools
 2. Decision-making in consenting or planning
 - e.g. Is assessment approach robust given the best available evidence?



Project Level and Cumulative impacts

- We need to get project level impact assessment assumptions right
- Scaling to cumulative impact typically works additively

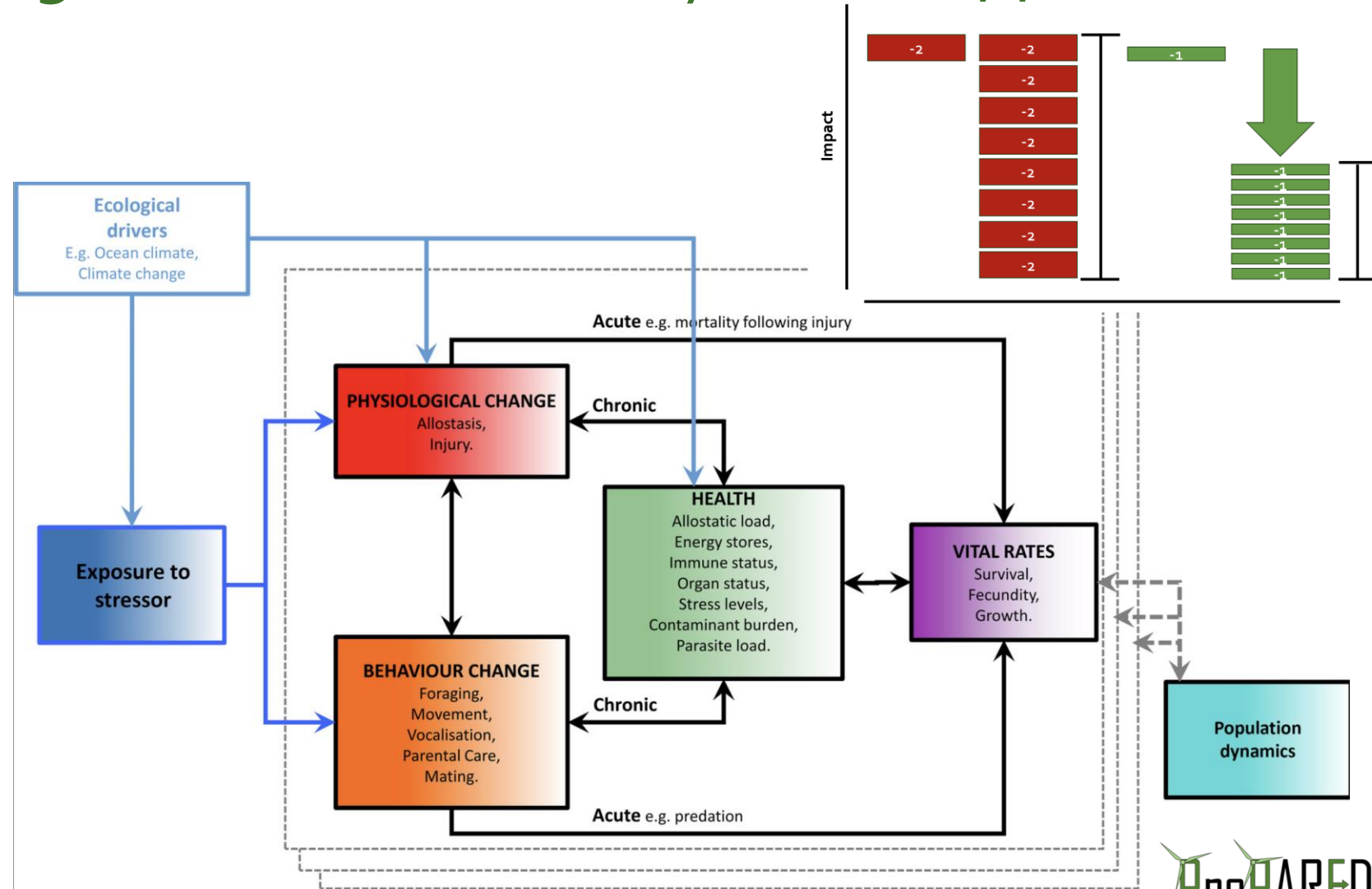


PrePARED is using CIA tools to critically assess approaches

- Design envelope
 - Assumes realistic worst case

VS

- As built OWF
 - Number of foundations
 - Max hammer energy per pile
 - etc...



PrePARED is delivering new evidence for assessment tools

- Integrating vessels into CIA in DEPONS
- Consider impacts of piling, vessels, prey(energy)
- Moray Firth case study



Ship noise causes tagged harbour porpoises to change direction or dive deeper

Caitlin K. Frankish^a, Alexander M. von Benda-Beckmann^b, Jonas Teilmann^a, Jakob Tougaard^a, Rune Dietz^a, Signe Sveegaard^a, Bas Binnerts^b, Christ A.F. de Jong^b



Vessel noise prior to pile driving at offshore windfarm sites deters harbour porpoises from potential injury zones

Aude Benhemma-Le Gall^a, Paul Thompson^a, Nathan Merchant^b, Isla Graham^a

DEPONS

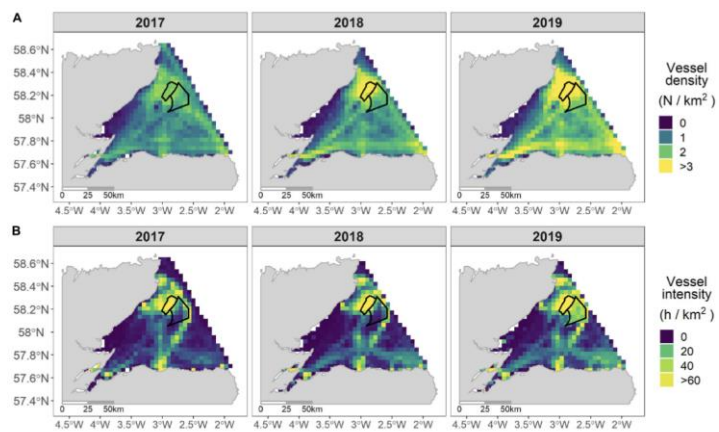
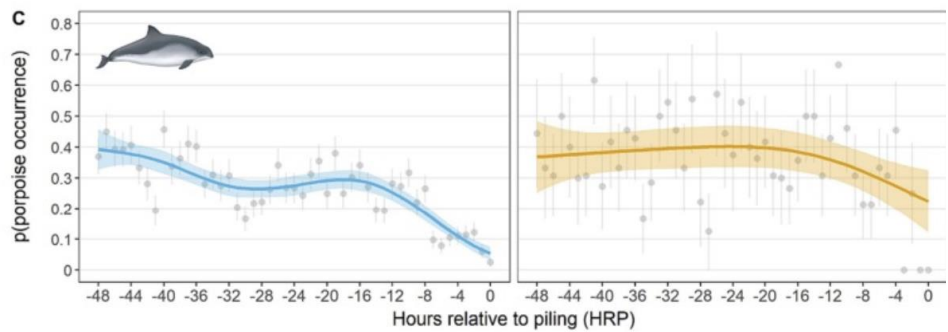
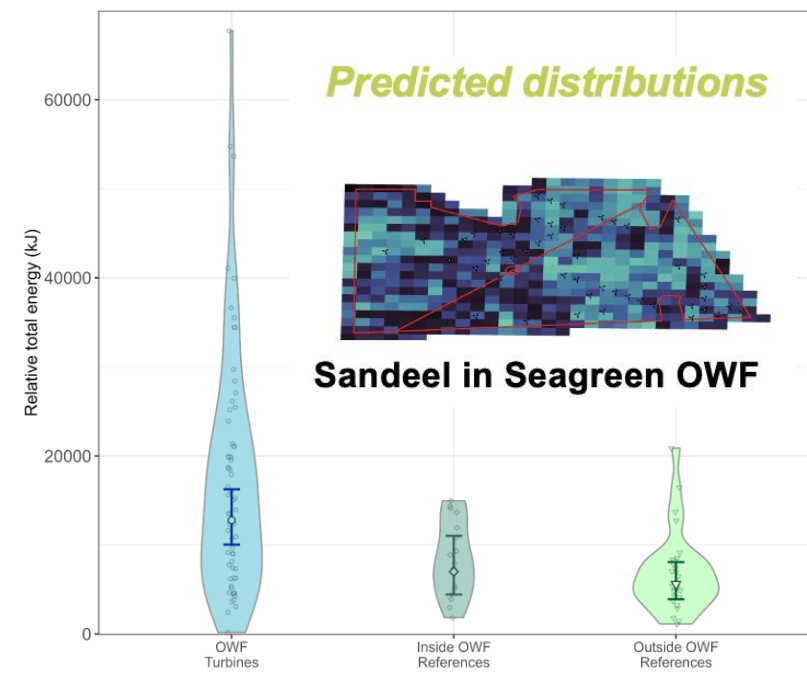
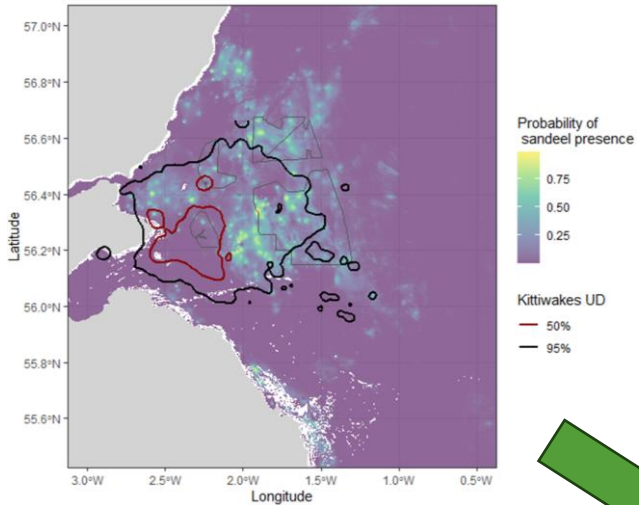


FIGURE 6 | Construction-related vessel density (number of vessels/km²) (A) and intensity (h/km²) (B) in the Moray Firth (4 × 4 km grid) between 2017 and 2019. Black lines are the boundaries of the two offshore windfarms in development; the upper limit of both the vessel density and intensity color scales is greater than 95th percentile.



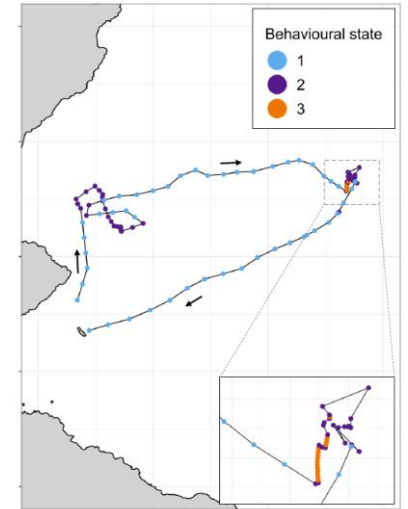
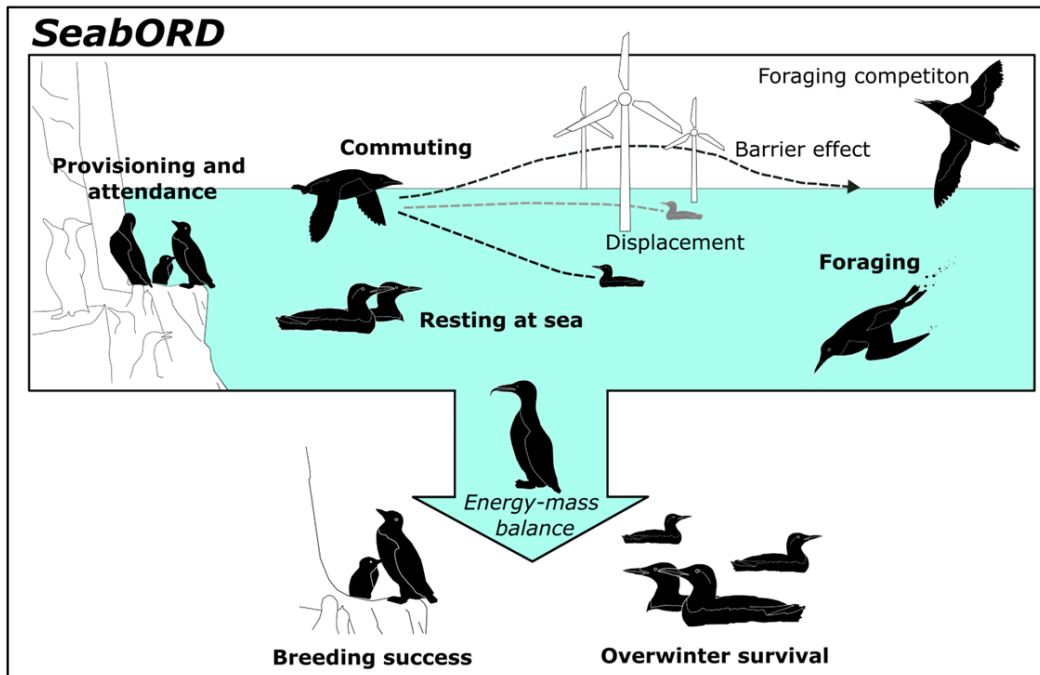
PrePARED is delivering new evidence for assessment tools



Empirical evidence for joint seabird-prey distributions and how this is altered post-construction



Refined energetic estimates for prey



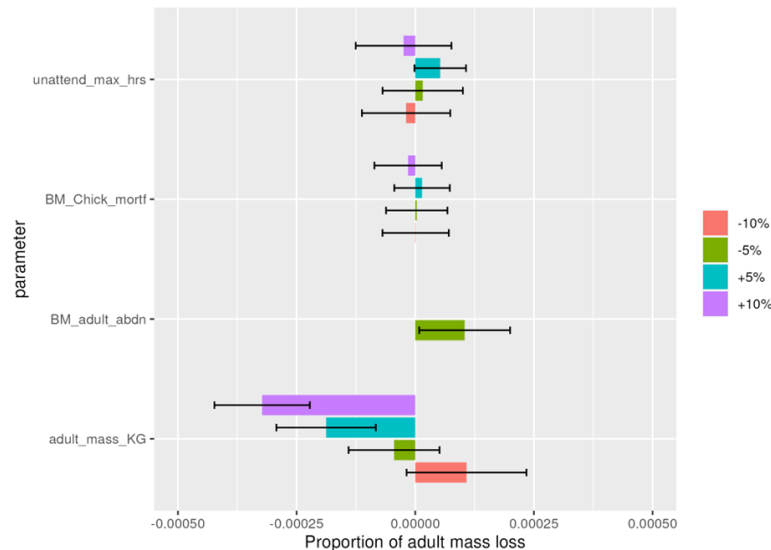
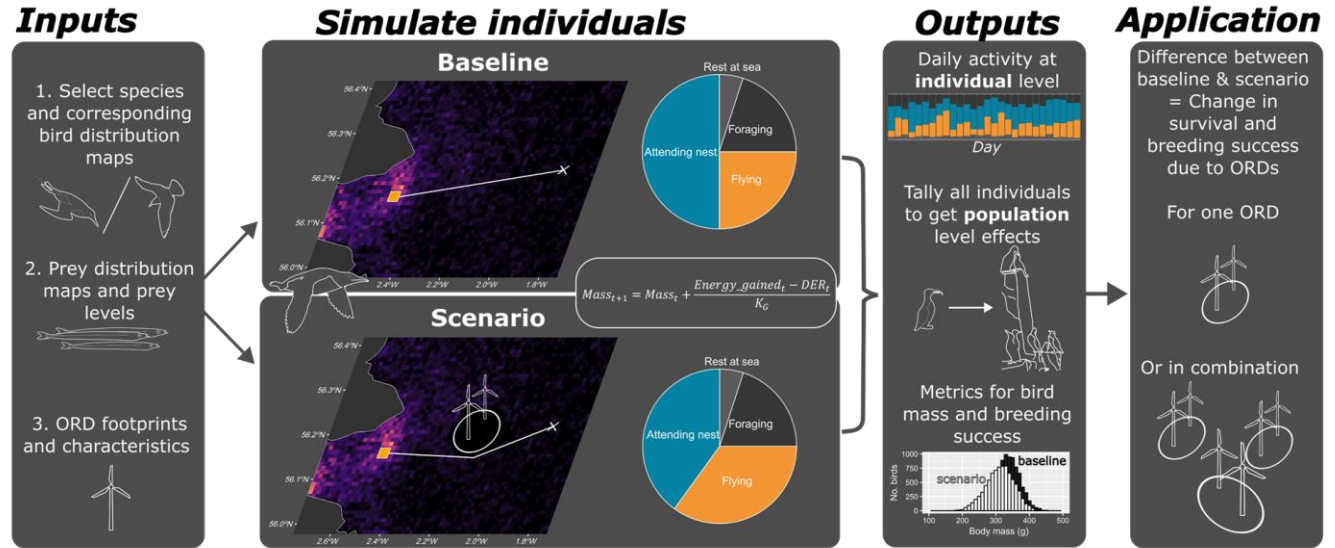
New approaches for adding biological realism to foraging tracks

Transferability of ecological mechanisms

PrePARED is delivering critical empirical data and modelling to inform the key mechanisms underpinning OWF impacts on breeding seabirds

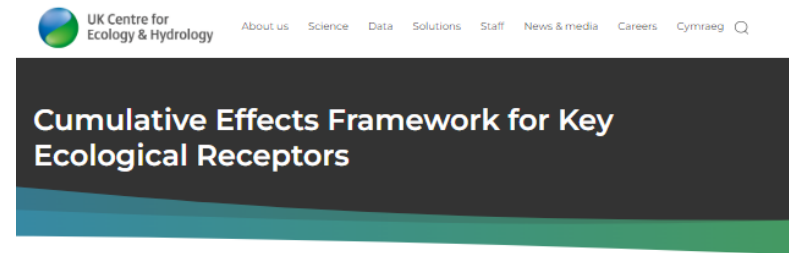
PrePARED is assessing transferability of *SeabORD* via:

- Application to Flamborough-Filey SPA with RSPB
- Sensitivity Analysis of key model parameters



Using the best available CIA tools

- Key step to ensure:
 - Collaboration/co-working on the translation of evidence base into practical assessment tools
 - e.g. Cumulative Effects Framework



Home > Our science > Projects > Cumulative Effects Framework for Key Ecological Receptors

Project menu

CEF Workshops

Project overview

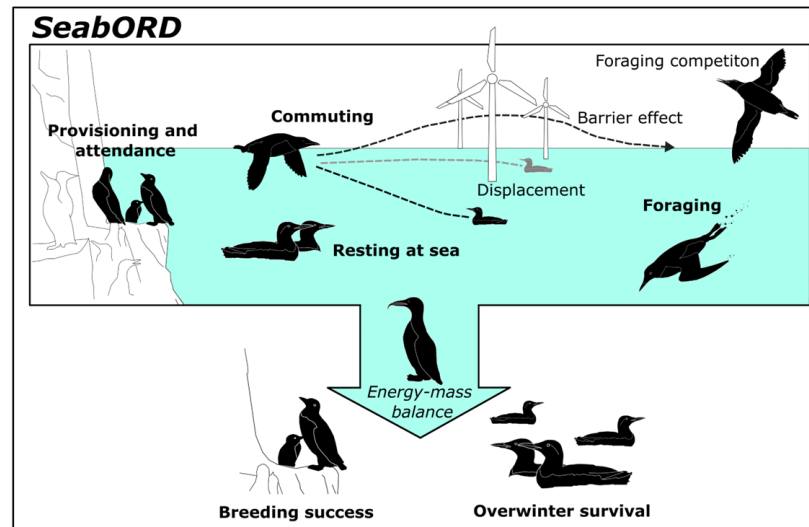
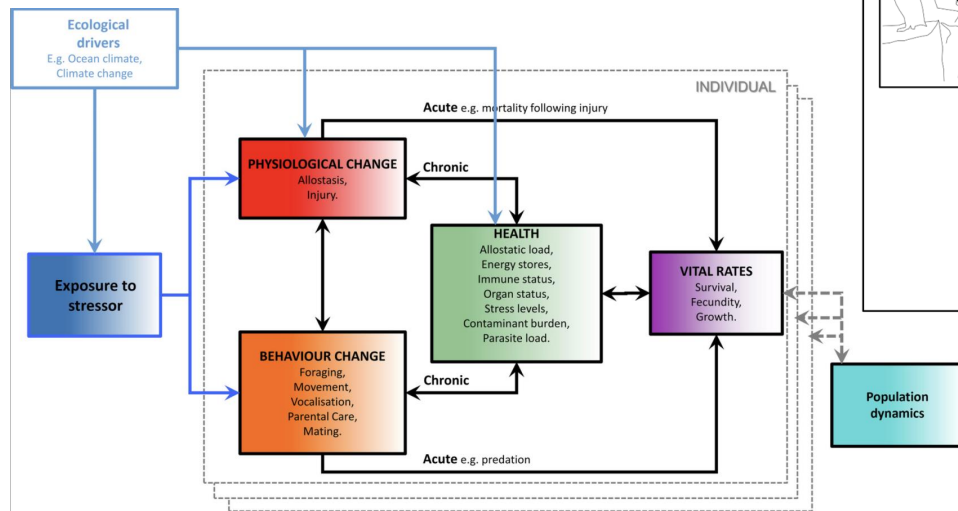
The Scottish Government has set a target for 100% of Scottish demand for electricity to be met by renewable sources by 2020. The marine environment offers considerable potential with respect to harvesting renewable energy, through wind, wave and tidal stream energy generators. However, the Scottish Government has a duty to ensure that offshore renewable developments (ORDs) are achieved in a sustainable manner, by protecting the natural environment from adverse impacts in accordance with the requirements of the Marine Strategy Framework Directive, the Habitats Directive and the Birds Directive. Given these points Marine Scotland has commissioned this project to develop a tool for the assessment of cumulative effects for key receptors. Marine Scotland is the Scottish Government directorate responsible for the integrated management of Scotland's seas. The project has received funding from the European Maritime and Fisheries Fund.

ORDs have the potential to impact seabird populations, notably from collisions with turbine blades and through displacement from important habitat. Other factors of concern are barrier effects to the movement of migrating or commuting birds, noise and visual disturbance, direct habitat loss during survey and installation, toxic and non-toxic contamination and negative effects of developments on the distribution and abundance of prey. For marine mammals, the greatest risks from ORDs are changes in behaviour that may have consequences for survival and reproduction as a result of the noise associated with wind farm construction, and potentially collisions with the blades of tidal turbines.

A range of research projects have addressed and attempted to estimate these different impacts, often in isolation, or in a single season or breeding colony. However, there is a desire to understand and develop a framework for assessing impacts of all planned and constructed ORDs on seabirds and marine mammals over all seasons, over multiple years and at multiple population scales. This desire has become more acute due to the rapid increase in the number of built, planned and proposed ORDs and the associated requirement for improved understanding of project alone and, hence, cumulative effects.

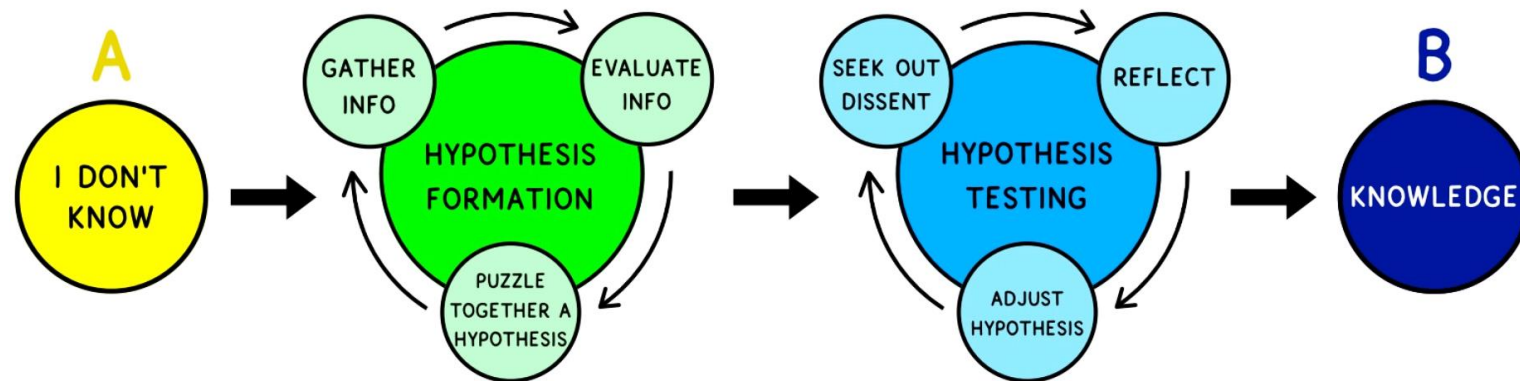
For impacts to be combined in a robust manner it is critical that individual projects are assessed in the same manner. However, historically this has not always been the case. Moreover, cumulative assessment methods are not static, undergoing continual improvement, such that there is a need for the potential for retrospective assessments for existing projects.

In this project, we are developing methods to facilitate the robust assessment of



How do we use 'Best Available Science'?

- Judicial system'
 - Innocent until proven guilty
- Health sector
 - "Evidence based medicine"
- Science
 - Best Available Science until new evidence comes to light
 - Knowledge gaps tested via hypothesis formation and testing



Source: Tim Urban

Considering transferability of evidence

- Transferability = Applicability
- **Whose responsibility is it to transfer!?**
 - Transferability is a research field in itself – e.g. Munthe-Kaas et al 2020
- Lincoln & Guba (1985): "*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.*"
- Munthe-Kaas et al 2020: "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"

The TRANSFER Approach for assessing the transferability of systematic review findings

[Heather Munthe-Kaas](#),^{1,2} [Heid Nøkleby](#),¹ [Simon Lewin](#),^{1,2} and [Claire Glenton](#),^{1,3}

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How to ensure transfer occurs?

- Researchers and Decision makers have different:
 - Drivers and pressures
 - Communication styles
 - Timeline needs

Researchers



Decision
makers





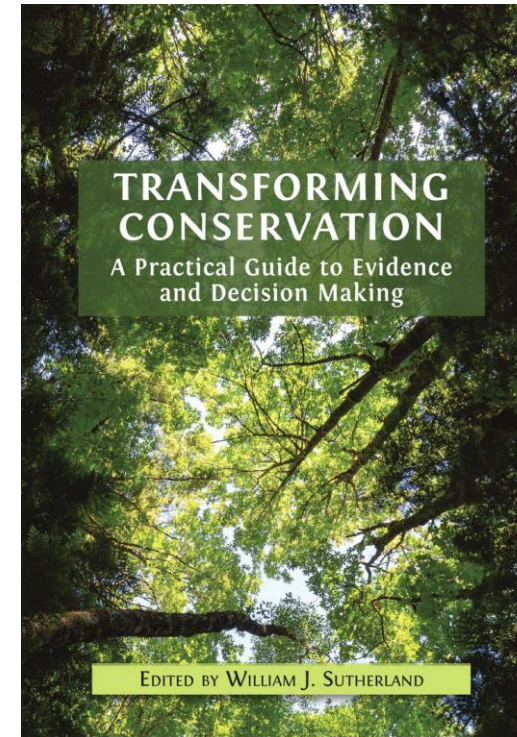
Decision -makers

Researchers

**HOW DO WE BRIDGE
THIS GAP?**

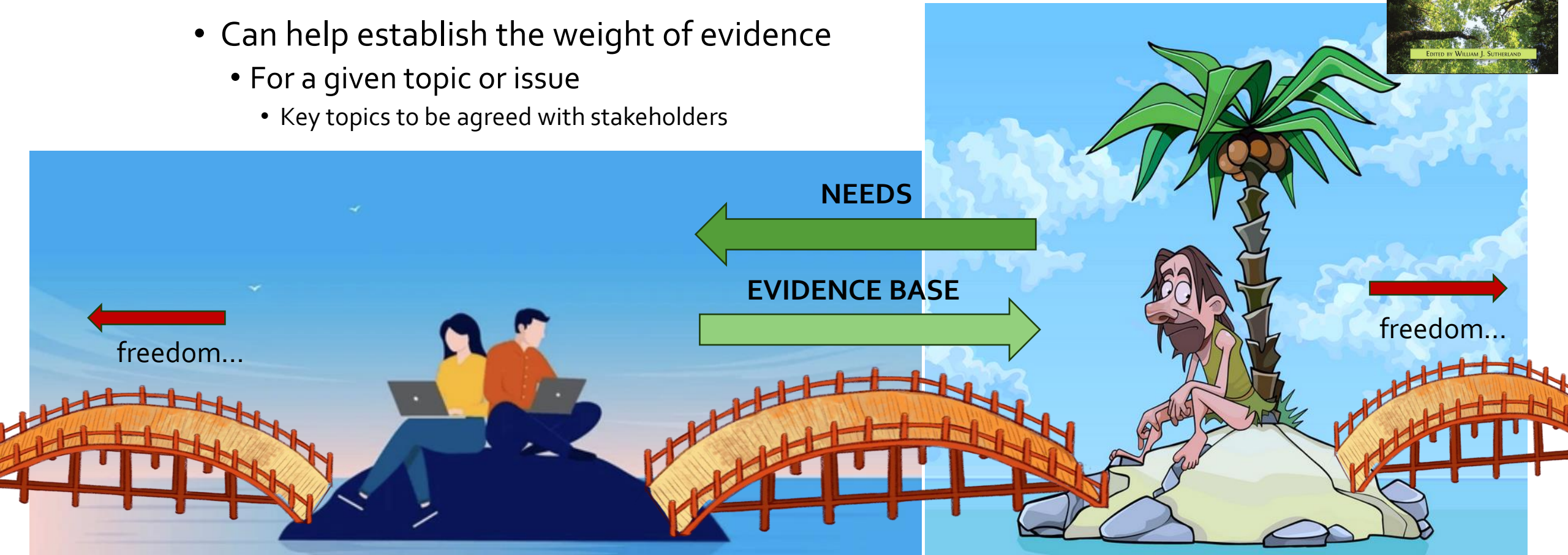
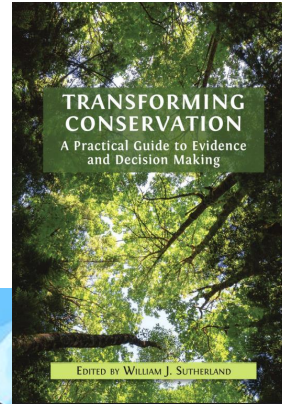
We need to establish “evidence bridges”

- **A dedicated and facilitated process**
- Very well established in medical practice – to ensure best practice
- Establish the weight of evidence
 - For a given topic or issue
 - Key topics to be agreed with stakeholders



We need to establish “evidence bridges”

- **Dedicated and facilitated process**
- Can help establish the weight of evidence
 - For a given topic or issue
 - Key topics to be agreed with stakeholders

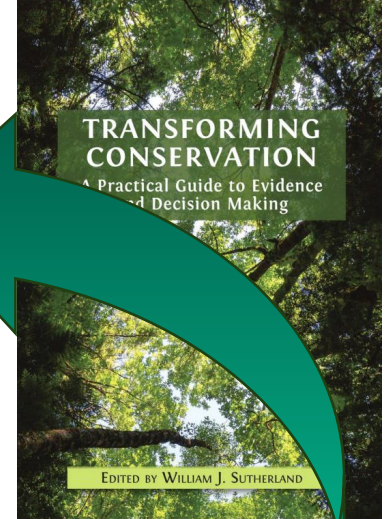


What can **evidence bridge** processes provide?

- Improved understanding of needs
 - Of practitioners, policy and decision-makers
- Facilitate understanding of the implications of research outcomes
- Regular reviews of evidence in critical areas
- Consensus on common approaches to assessment methods
- Consensus on dealing with uncertainty and transferability
- Co-production of guidance

Process for developing evidence bridges

1. Establish the need for review (i.e. topic or scenario or assumption)
2. Work with stakeholders to refine review question
 - Identify the variables that affect transferability / applicability
 - e.g. region of study
 - Consider characteristics that can be assessed via review.
 - e.g. How different are results on topic X by region of study (and is region the driver)
3. Collate evidence
4. Rapid reviews to summarise evidence base
5. Assessing the Weight of Evidence exercise
6. Advice / Position paper on robust evidence base to be used
 - A. And which key gaps need plugging



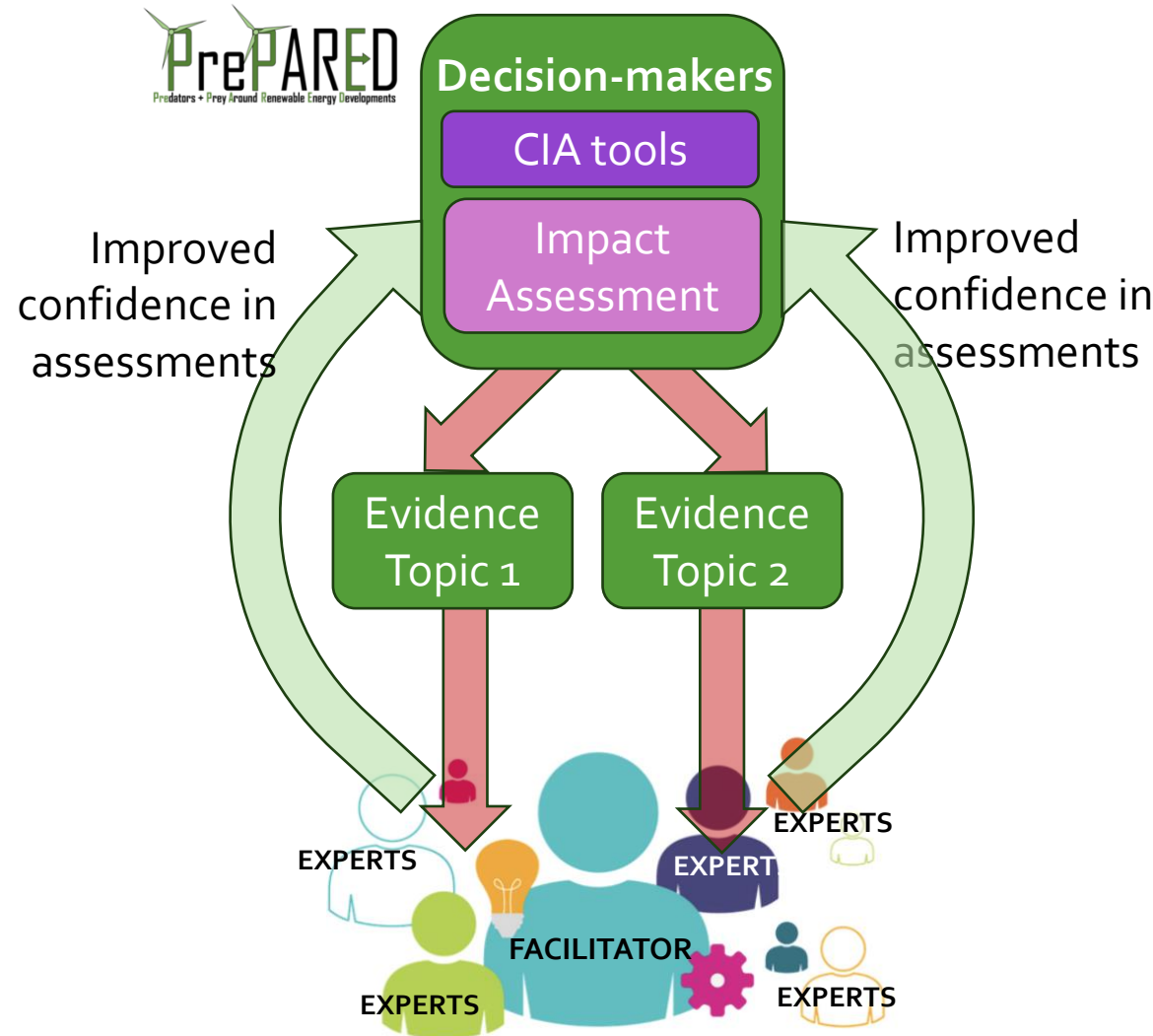
Evidence bridge process structure

1. ASK

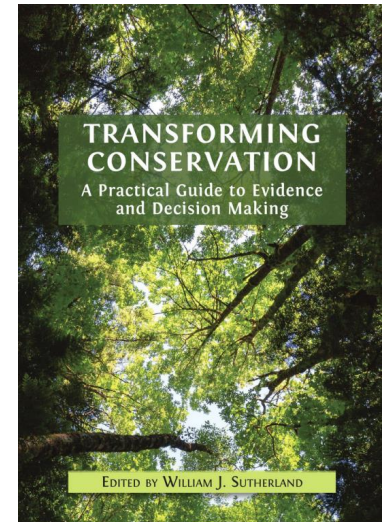
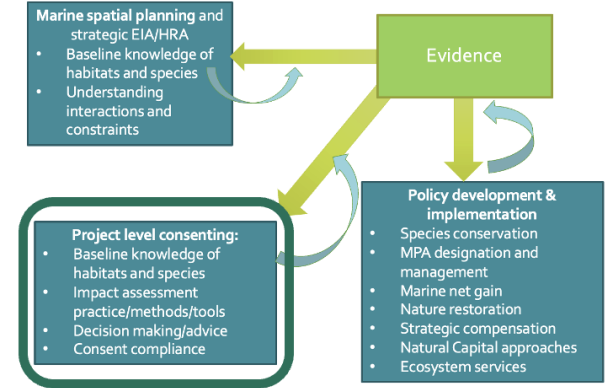
2. ASSEMBLE

3. ASSESS

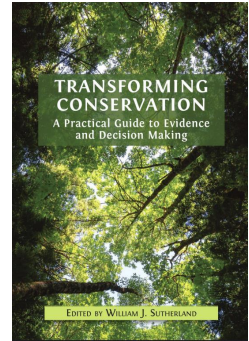
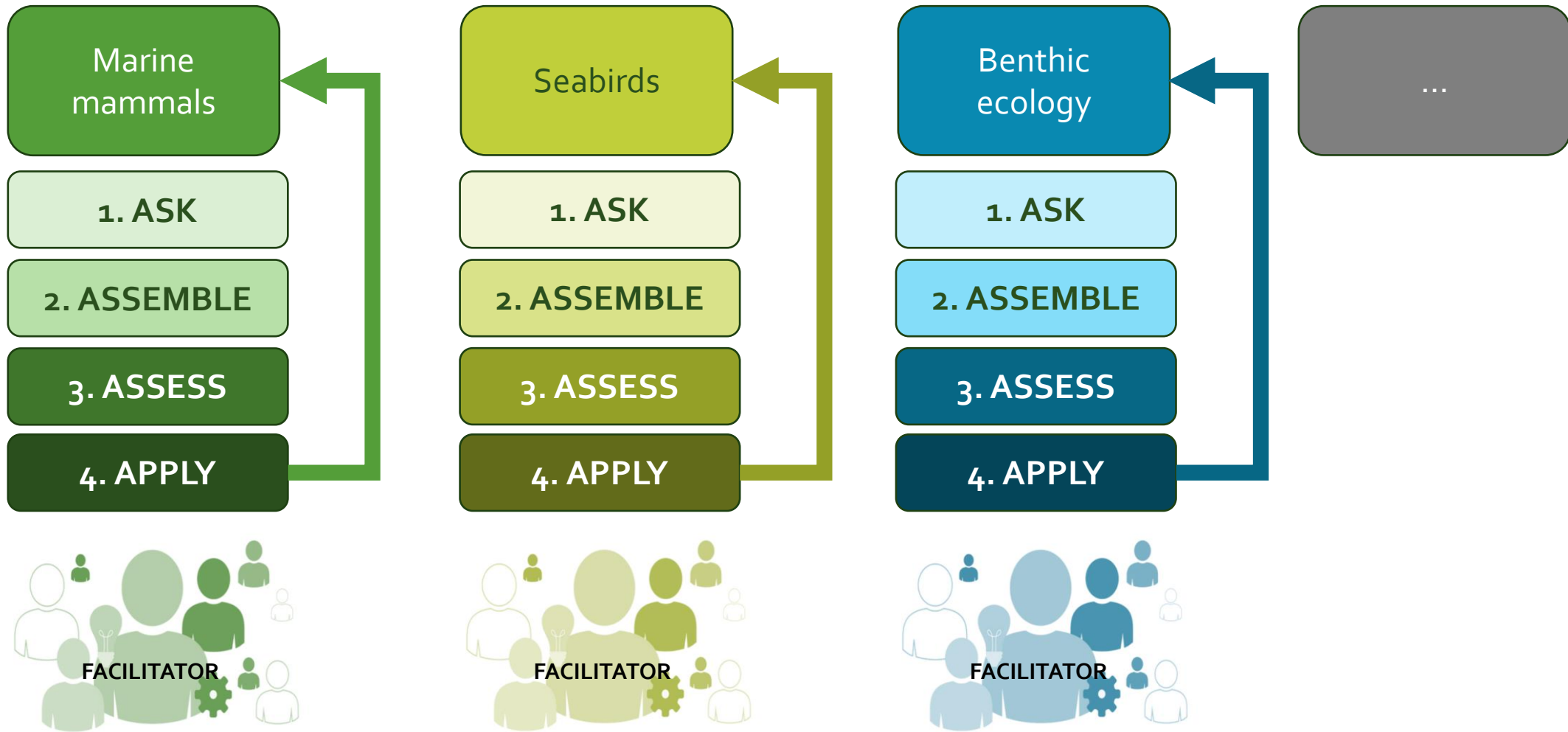
4. APPLY



Source: Carol Sparling, SMRU



EBDM can support stakeholders in any domain



Evidence bridge examples – the effects of auditory injury

Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects

Brandon L. Southall,^{1,2} James J. Finneran,³ Colleen Reichmuth,²
Paul E. Nachtigall,⁴ Darlene R. Ketten,^{5,6} Ann E. Bowles,⁷ William T. Ellison,⁸
Douglas P. Nowacek,^{9,10} and Peter L. Tyack^{5,11}

¹Southall Environmental Associates, Inc., 9099 Soquel Drive #8, Aptos, CA 95003, USA
E-mail: Brandon.Southall@sea-inc.net

to hearing damage have yet to be demonstrated. Consequently, Southall et al. (2007) chose not to base weighting functions directly on auditory sensitivity, a conclusion that was revisited here.

The panel of subject-matter experts who contributed to Southall et al. (2007) was reconvened with some modifications¹ to consider all relevant available literature and update and expand the Southall et al. (2007) exposure criteria for TTS/PTS onset for all marine mammal species. The intent is to provide the best scientific interpretation and application of the available information within different marine mammal hearing groups while acknowledging data limitations for specific topics and for some hearing groups. As in Southall et al., the approach herein was to use



Evidence bridge examples - SCOS

Home News & Events Research Reports SCOS Teaching & Education About

Special Committee on Seals

- Mechanism by which **NERC** provides formal scientific advice on the management and conservation of seal populations
- Funded by NERC National Capability, National Public Good Programme

Process:

- Request goes out to Defra, Scottish Government, NRW and DAERA for any questions they have on any aspect of UK seal populations
 - **to inform any policy or casework needs**
- SMRU compile a report answering these questions, based on latest research.
- SCOS meet and review the report updating the advice as necessary
- Annual Advice document produced and made public
 - Supports DMs - legitimizes advice or stance on issue.

Special Committee on Seals – SCOS

Under the [Conservation of Seals Act 1970](#) and the [Marine \(Scotland\) Act 2010](#), the Natural Environment Research Council (NERC) has a 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 formulate this advice.

Formal advice is given annually based on the latest scientific information provided to SCOS by the Sea Mammal Research Unit. SMRU also provides to government scientific review of applications for licences to shoot seals, and information and advice in response to parliamentary questions and correspondence.

The SCOS reports provide scientific advice on matters related to the management of seal populations. They begin with some general information on British seals, give information on their current status, and address specific questions raised by regulators and stakeholders.



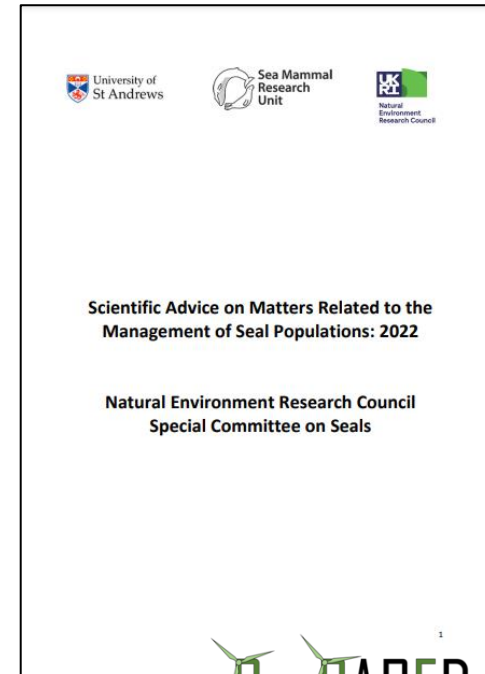
Grey Seal pup (Laurie Campbell)

1. ASK

2. ASSEMBLE

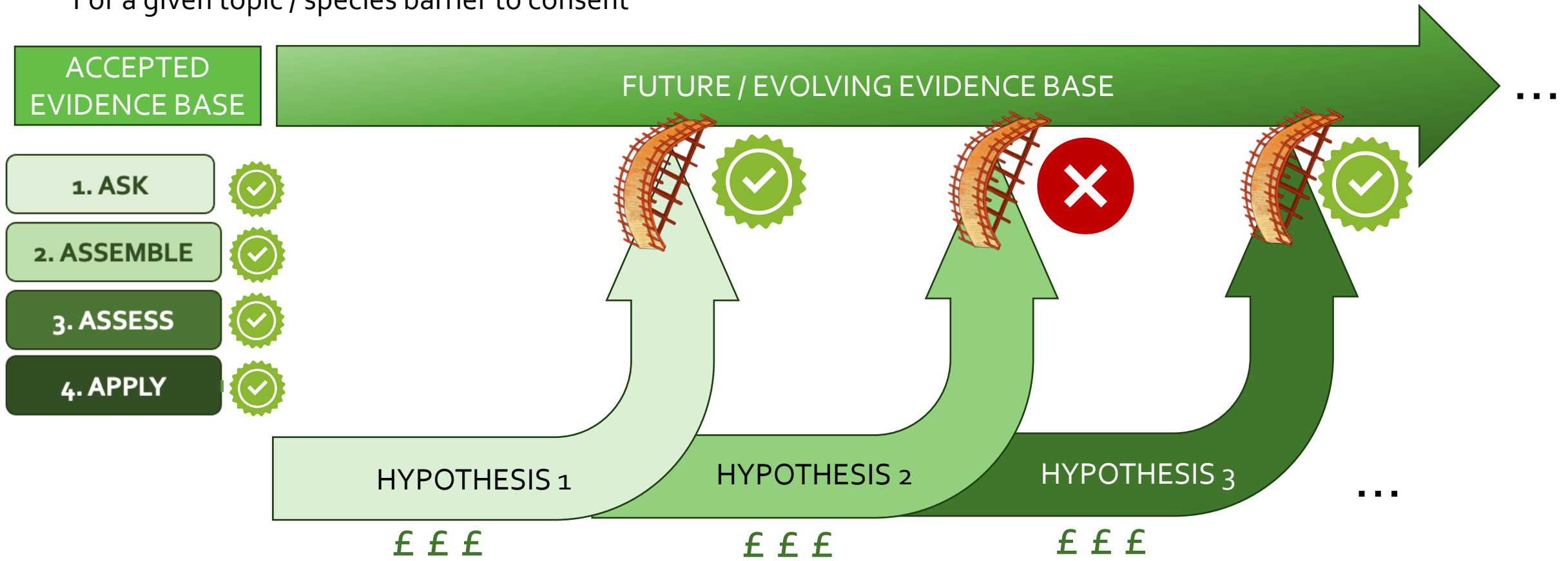
3. ASSESS

4. APPLY



Updating the evidence base

For a given topic / species barrier to consent

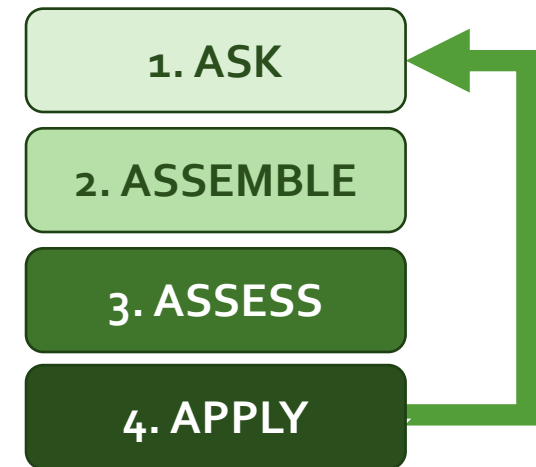


Summary

- **Value in a dedicated process assessing the weight of evidence**
 - Evidence bridges provide advice to remove consenting barriers.
 - And identify the key gaps vs weak areas.
 - The absence of clear process to bridge evidence gaps has **risks**:
 - Exposure to legal challenge
 - Lack of confidence in governance



- **PrePARED is expanding the evidence base in many domains**
- **Question: How can PrePARED best support evidence base (and test hypotheses) to support planning and consenting?**



2022 2023 2024 2025 2026.....





Thank you!

PrePARED

Predators + Prey Around Renewable Energy Developments



1. ASK

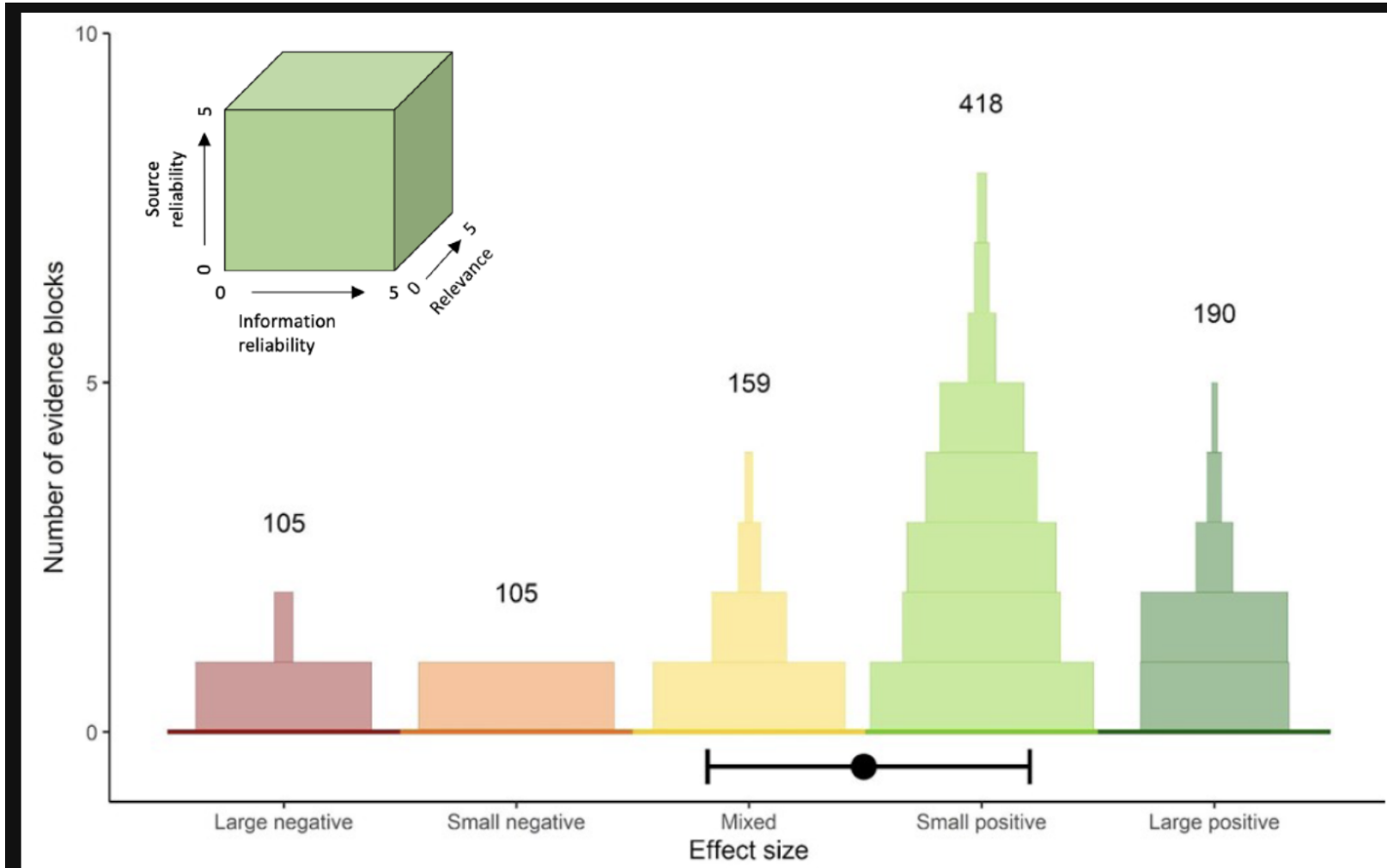
2. ASSEMBLE

3. APPRAISE

4. APPLY

Additional slides

Assessing the weight of evidence



Transforming Conservation introduces 'ziggurat plots' as a way of visualizing evidence. Each block represents a piece of evidence, with the width reflecting its 'weight' (a combination of reliability and relevance; see inset).

There is room for improvement

Needs

Focusing and targeting research to fill evidence gaps



Funding

Generating funding to help fill evidence gaps

Evidence Bridges

Connect robust science to fill needs of decision makers

Circulate

Dissemination of findings to broad range of stakeholders