A PATHWAY TO RISK RETIREMENT FOR MARINE RENEWABLE ENERGY

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Concerns about the potential effects of marine renewable energy (MRE) devices on marine animals, habitats, and the environment continue to slow siting and permitting/consenting of devices worldwide. The risks associated with many interactions continue to be driven by uncertainty; as the MRE industry moves forward, reducing this uncertainty should lead to retirement of many environmental risks, allowing research and monitoring efforts to focus on the highest priority interactions [1].

Under OES-Annex IV, a risk retirement pathway has been developed (Figure 1) to assist with retiring certain MRE interactions, such as effects of underwater noise and electromagnetic fields. The proposed risk retirement pathway consists of five "stage gates" where risks posed by a certain interaction are evaluated based on either existing or newly collected data. The stage gates are intended to act as decision points — each one provides an "off ramp" where it can be decided that the risk is retired; alternately the path continues towards better understanding of the interaction. If the risk is determined to be likely/plausible, mitigation measures may be needed. If the risk remains high, the project may need to be reconsidered. Eventually, all interactions should be retired or mitigated through a range of actions including avoidance and minimization.

A key aspect of retiring risk is ensuring that MRE developers, regulators, and other stakeholders have access to existing data sets from permitted/consented projects, in order to apply lessons learned to newer permitting/consenting applications. A process for Data Transferability has been developed under OES-Annex IV to readily discover, explore, and apply existing datasets to new projects (Figure 2).

The risk retirement and data transferability processes will allow for streamlined pathways to siting and permitting/consenting, as well as lowering ongoing post-installation monitoring costs to levels that will move the industry forward.

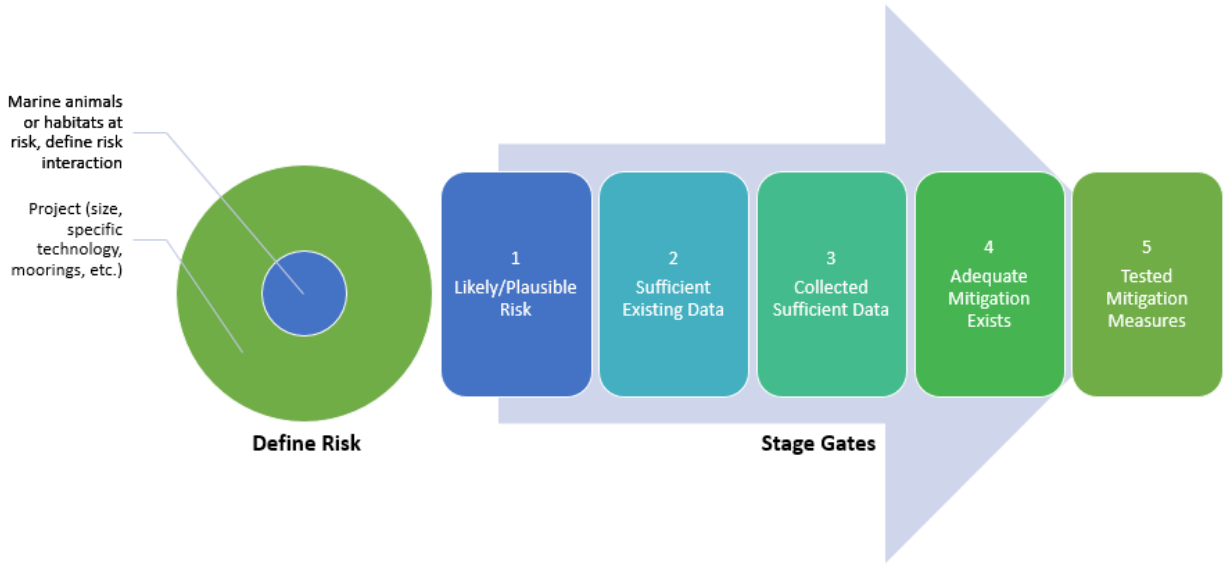

FIGURE 1. RISK RETIREMENT PATHWAY FOR MARINE RENEWABLE ENERGY. AT EACH STAGE GATE, DETERMINE WHETHER PLAUSIBLE RISK EXISTS. IF NOT, RISK CAN BE "RETIRED." IF RISK STILL EXISTS, EXAMINE DATA COLLECTION OR OTHER NEEDS, AND PROCEED TOWARDS THE NEXT STAGE GATE.

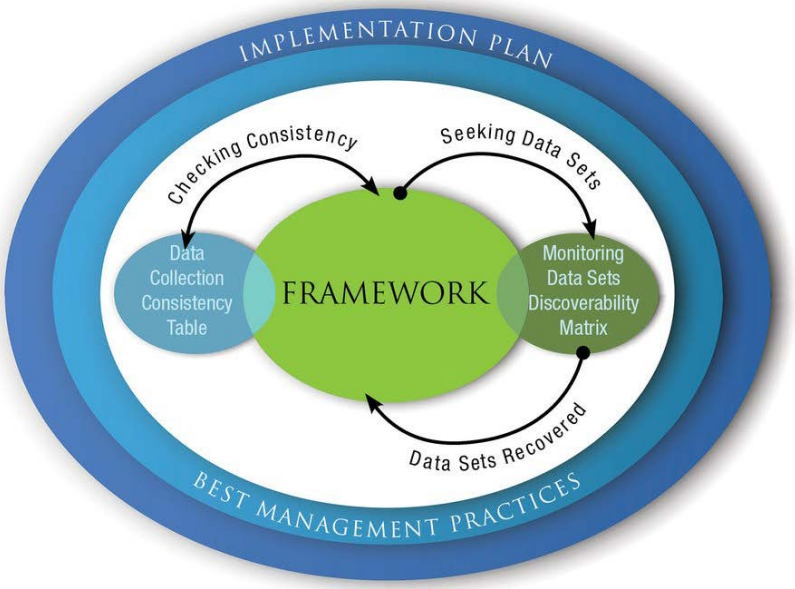

FIGURE 2. DATA TRANSFERABILITY PROCESS. REGULATORS OR OTHER STAKEHOLDERS CAN ASSESS WHETHER THERE ARE DATA SETS FROM PERMITTED/CONSENTED PROJECTS THAT ARE SUFFICIENTLY SIMILAR TO APPLICATIONS FOR NEW PROJECTS, CHECK THAT DATA COLLECTION METHODS ARE COMPATIBLE, AND RETRIEVE THOSE DATA SETS FOR USE IN DETERMINING PERMITTING/CONSENTING NEEDS.

REFERENCES

[1] Copping, A., Sather, N., Hanna, L., Whiting, J., Zydlewski, G., Staines, G., Gill, A., Hutchison, I., O'Hagan, A., Simas, T., Bald, J., Sparling, C., Wood, J. and Masden, E. *2016 State of the Science Report: Environmental Effects of Marine Renewable Energy Development Around the World* (2016). Ocean Energy Systems, Annex IV. pp 224.