



mates



aquateira

EE1. MRE Impact Assessment

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Plan for today

Item	Time
Module 1	0900 - 1000
Break	1000 - 1010
Module 2	1010 - 1100
Break	1100 - 1110
Module 3	1110 - 1145
Group Exercise 2a	1145 - 1200

Overview of module

- Context of Environmental Protection
 - How do we protect the environment?
 - What do we mean by environment?
 - What are the potential environmental impacts of wave and tidal energy developments?
 - Who are the decision makers?
- How does EIA work?
 - How is an Environmental Impact Assessment done?
 - Stages of the EIA Process
 - Protected sites & species
- Risk management strategies
- Strategic development in EIA for marine energy
- Further Reading

The background of the slide is a dark blue gradient. In the center, there is a large, semi-transparent graphic consisting of a gear and a stylized wave. The gear is positioned behind the wave, and both are rendered in a lighter shade of blue. The text "Context of Environmental Protection" is centered over this graphic in a white, bold, sans-serif font.

Context of Environmental Protection

Context of Environmental Protection

- Within developments of any kind, there is a legal & regulatory requirement to understand the potential effects on the natural environment
- The purpose of developing renewable energy projects is to decarbonize our energy system
- Within this, there is a need to consider the environmental impacts of those developments in themselves



How do we protect the environment?

- Environmental Impact Assessment (EIA) is the process of assessing the likely environmental impacts of a proposed development and identifying options to minimise environmental damage.
- Allows decision makers to make informed decisions
- Allows the public the opportunity to participate in decision making



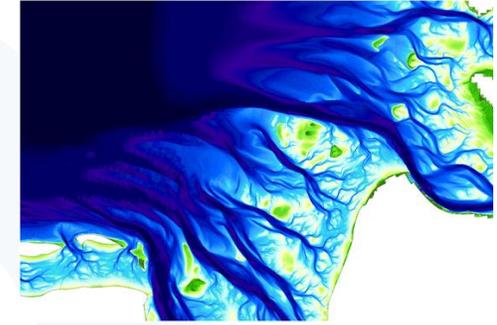
How do we protect the environment?

- EIA Directive 2014/52/EU
 - EU legislation since 1985
 - Each member state translates this into national legislation
 - EIA is mandatory if:
 - The project is large
 - The project may have significant impact on the environment
 - EIA is optional if:
 - The project is smaller
 - It is unknown if the project will have an impact on the environment



What do we mean by environment?

- Physical area
 - Water column
 - Seabed
 - Coastal area
 - beaches
 - rocky shore



What do we mean by environment?

- Habitats
 - Reefs, kelp reefs, rocky shores, beaches, rocky habitats, sand dunes
 - Many of these habitats are important areas of protection, food and reproduction for marine animals



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What do we mean by environment?

- Animals
 - Fish, birds, marine mammals, crustaceans, benthic species, microbiota, plankton



Source: OES Environmental, 2016 & OES Environmental 2020

What do we mean by environment?

- Human Environment

- The socio-economic impacts of a development are assessed within EIA
- Jobs, commercial fishing, tourism, recreation, other users of the sea



Source: Orkney Sustainable Fisheries, 2020

What are the potential environmental impacts of wave and tidal energy developments?

- Collision risk (Tidal only)
- Underwater noise
- Electromagnetic fields
- Displacement
- Barrier to movement
- Loss of habitat
- Habitat creation
- Entanglement
- Entrapment
- Marine non-native species
- Change in coastal processes
- Removal of energy
- Contamination
- Smothering



What are the potential environmental impacts of wave and tidal energy developments?

- Human Environment
 - Displacement of commercial fisheries
 - Displacement of other sea users
 - Recreation activities such as sailing, kayaking etc.
 - Income to local economy (workers during installation, operation and decommissioning)
 - Development of local ports and harbours
 - Creation of jobs



Who are the decision makers?

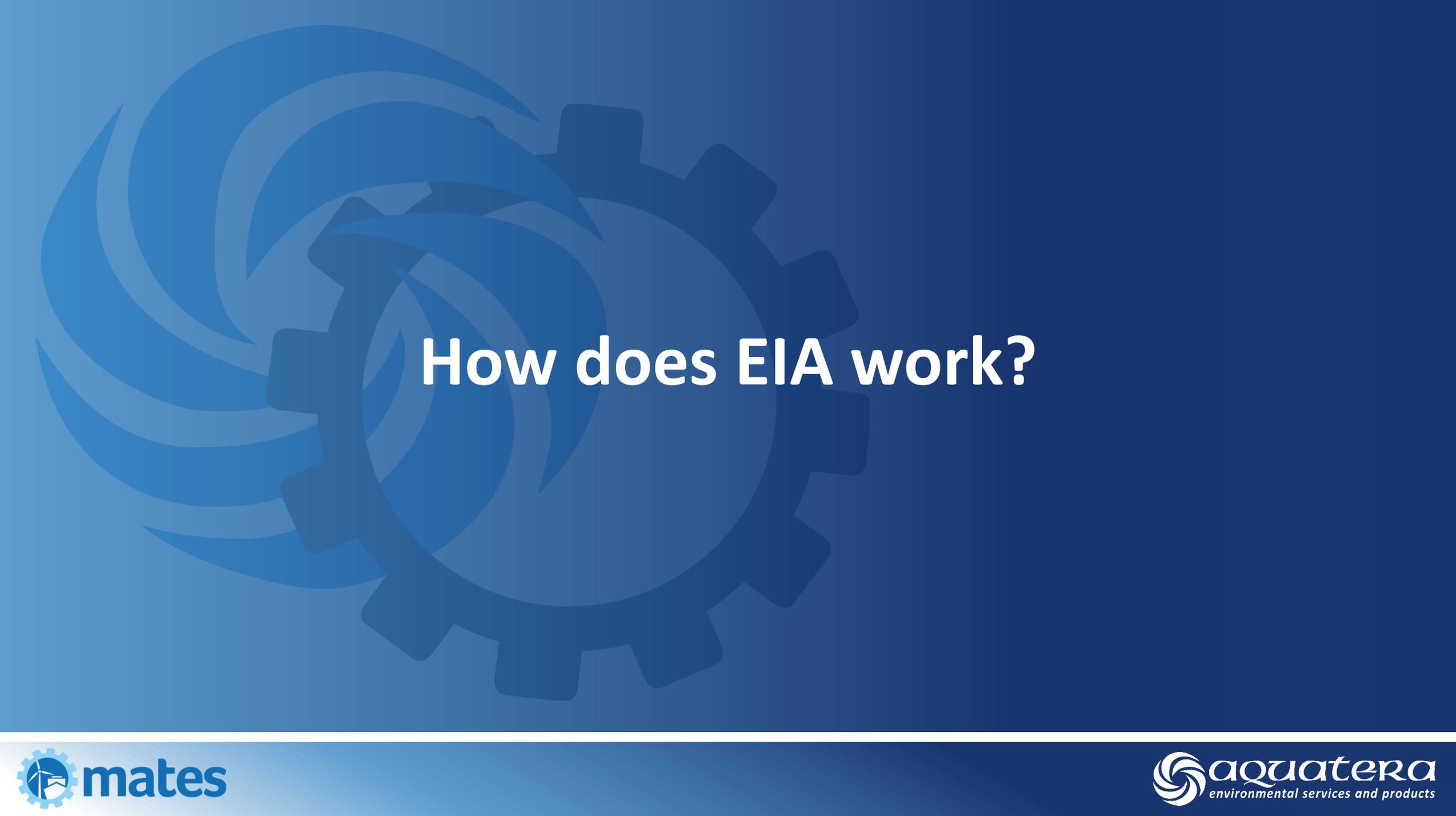
- Each member state in the EU has responsibility to enforce the EIA Directive
- National legislation
- Marine Scotland
- Dedicated branch of Scottish Government
 - MS Licencing Operations
 - MS Science
 - MS Policy
 - MS Planning

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Who are the decision makers?

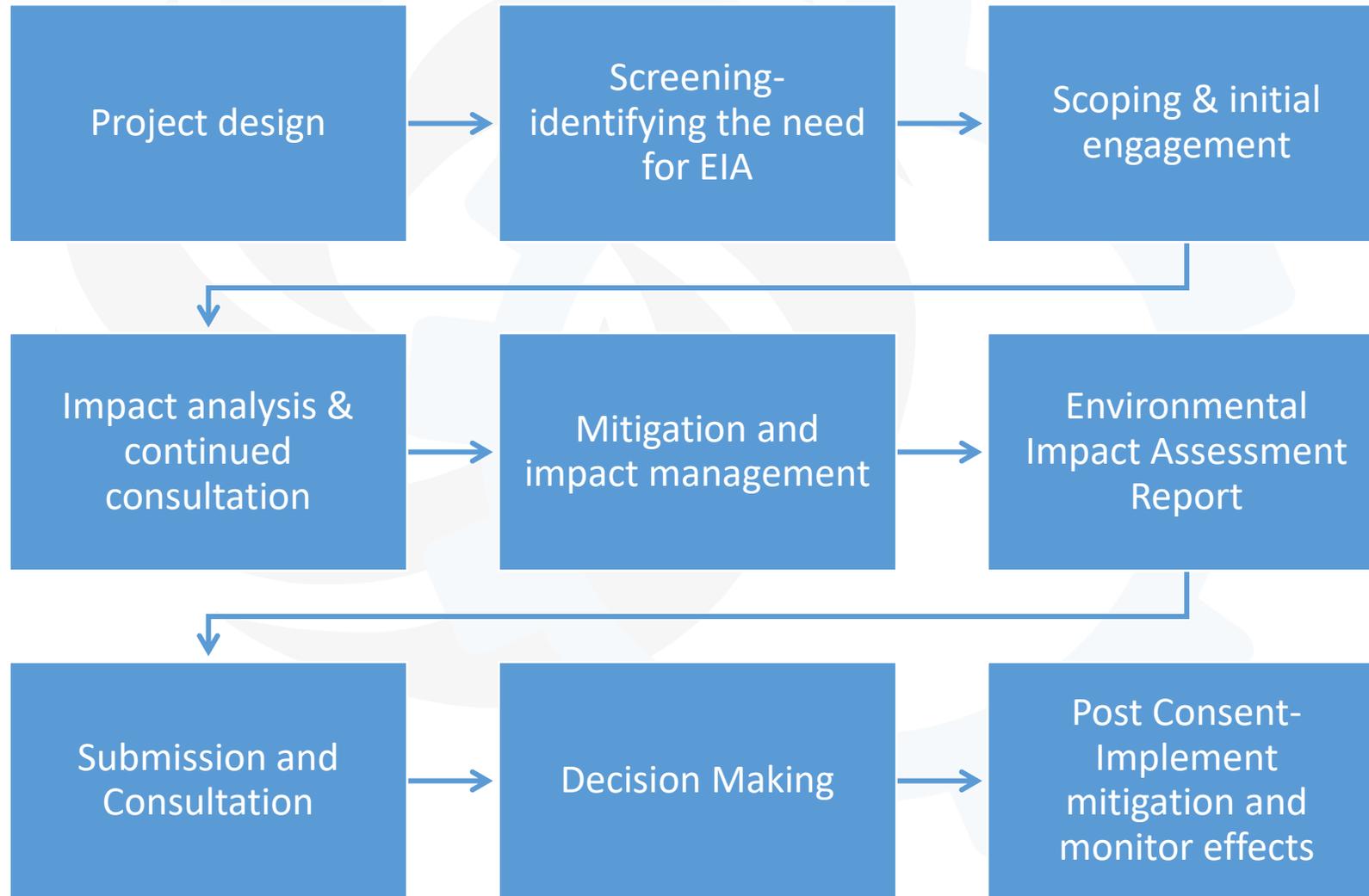
- Other stakeholders provide feedback and commentary on the EIA process which is taken into account by the regulator
 - Statutory nature conservation bodies
 - Local government (councils)
 - Non-governmental organisations
 - Other sea users (Fishers, tourism sector, aquaculture sector)
 - Local groups, stakeholders and community members





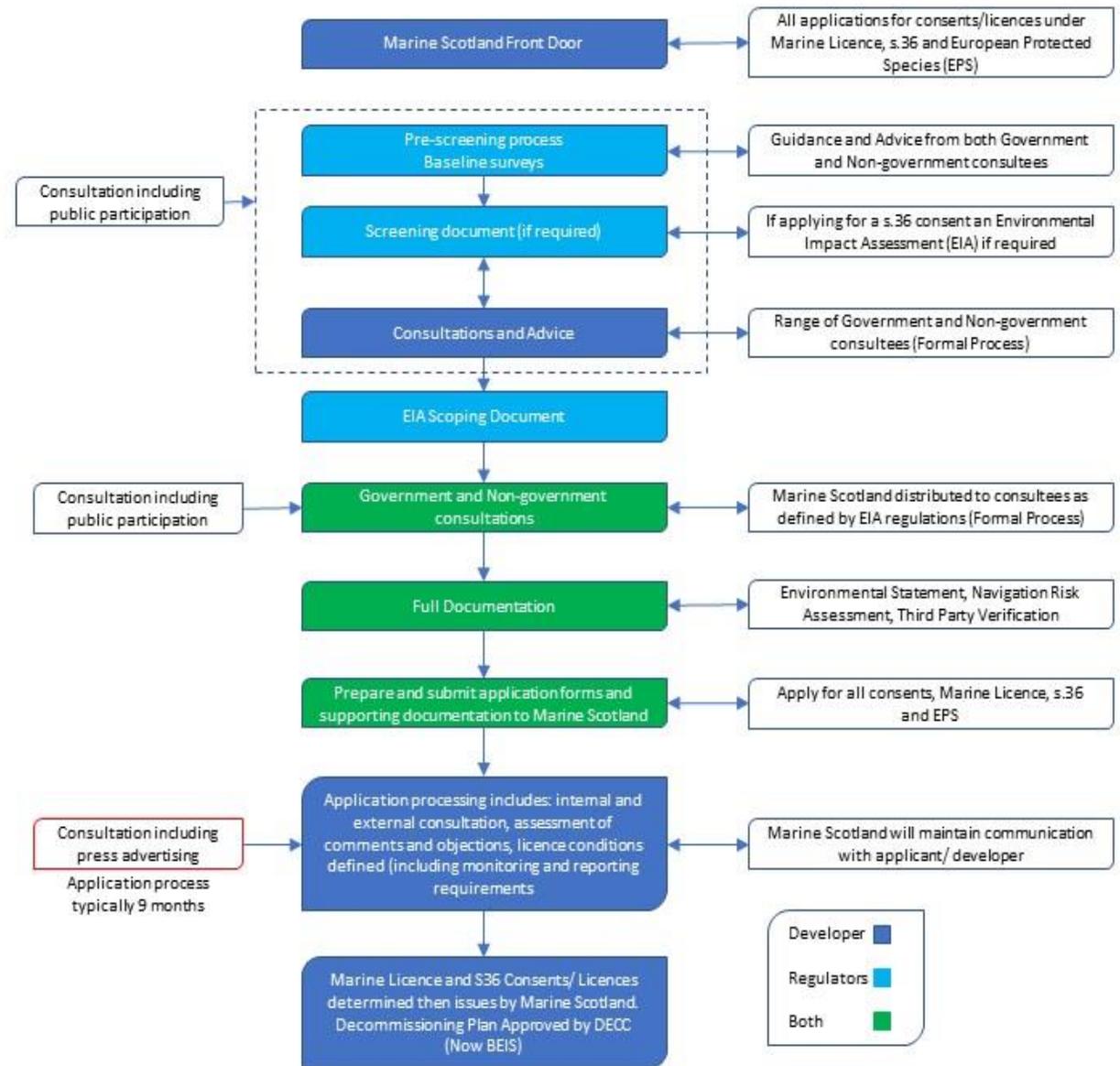
How does EIA work?

How does EIA work?



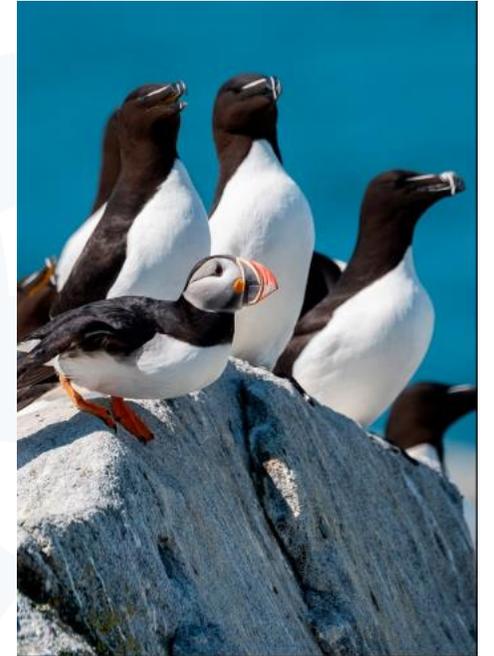
How does EIA work?

Marine Scotland act as a 'one stop shop' for consenting of marine energy projects in Scotland



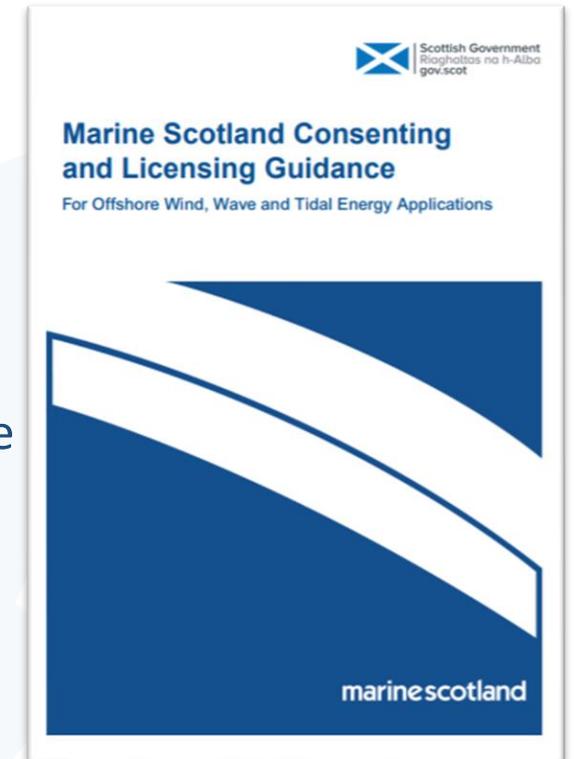
How is an Environmental Impact Assessment done?

- Dedicated chapter to each 'receptor'
- Should be written in concise, clear, non technical language
- Baseline data
- Identification and description of likely significant effects
- Potential effects at each stage of the project
 - Installation
 - Operation and maintenance
 - Decommissioning
- Mitigation and management plan



Stages of the EIA Process

- Screening
 - Determination of
 - whether an EIA is required
 - likely significant effects on the environment
 - Basic project description
 - Description of potential significant effects
 - Context of Strategic Environmental Assessment and National Marine Plan
 - Regulator will respond
 - If EIA is not required, regulator will state mitigation measures required



Stages of the EIA Process

- Scoping
 - Description of
 - the nature and purpose of the project
 - Description of the location of the project
 - Description of the likely significant effects
 - **Local, regional and national context**
 - Stakeholders are asked to respond
 - The responses are used to inform which of the issues need to be addressed in the EIA which can be scoped out of the EIA

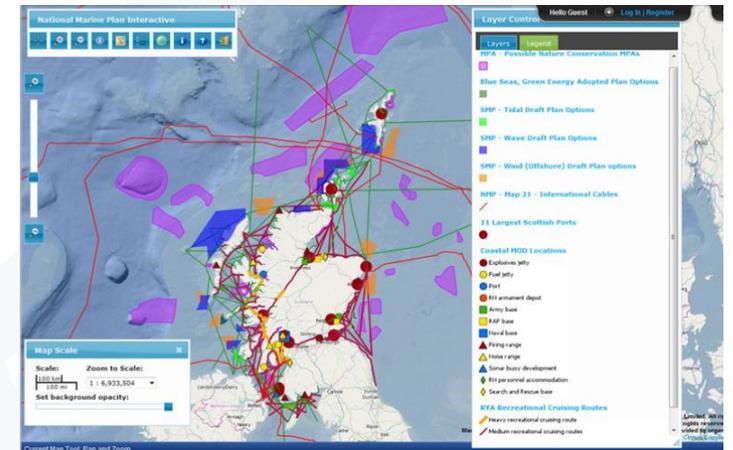
Consultation

- Vital to the success of the project
- Early & regular
- Some consultation is required by law:
 - Pre application consultation
 - Serve a proposal of application notice on the planning authority
 - Consult the community councils
 - Hold a public event
 - Publish a notice in a local newspaper
 - Carry out any further PAC measures required by the planning authority
- Most developers do well to go above and beyond



Baseline

- This may include the need for survey work for up to 2 years to understand the situation such as:
 - Sensitive species survey
 - Seabed survey
 - Marine mammal survey
 - Bird survey
- The need for these surveys:
 - will be agreed with the regulator and statutory advisors
 - should be proportionate to the scale and nature of the project
- The use of data already gathered
 - habitat types in the area, species present in the area
- Could take up to 2 years



How is an Environmental Impact Assessment done?

- Literature review, stakeholder consultation and baseline data
- Detailed project description is required
- Detailed assessment of each potential impact and whether there will be a 'Likely Significant Effect'
- This is based on the
 - Magnitude of the impact
 - Sensitivity of the receptor



How is an Environmental Impact Assessment done?

- Magnitude of the impact & Sensitivity of the receptor
- This is assessed based on the following variables:
 - the **spatial extent** of the impact;
 - the **nature** of the impact;
 - the **transboundary** nature of the impact;
 - the **intensity and complexity** of the impact;
 - the **probability** of the impact;
 - the expected **onset, duration, frequency and reversibility** of the impact;
 - the **cumulation** of the impact with the impact of other existing and/or approved development;
 - the possibility of **effectively reducing** the impact.

Source: <https://www.legislation.gov.uk/ukxi/2017/571/schedule/3/paragraph/3/data.xht?view=snippet&wrap=true>

Impact Assessment

- The impact assessment will consider and describe the likely significant effects that the project might have on each receptor
- This will usually be done using a matrix of some description describing the sensitivity against the magnitude (size) of the project

Magnitude	Sensitivity				
	Very high	High	Medium	Low	Negligible
Severe	Severe	Severe	Major	Moderate	Minor
Major	Severe	Major	Major	Moderate	Minor
Moderate	Major	Major	Moderate	Minor	Negligible
Minor	Moderate	Moderate	Minor	Minor	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible
Positive	Positive	Positive	Positive	Positive	Positive

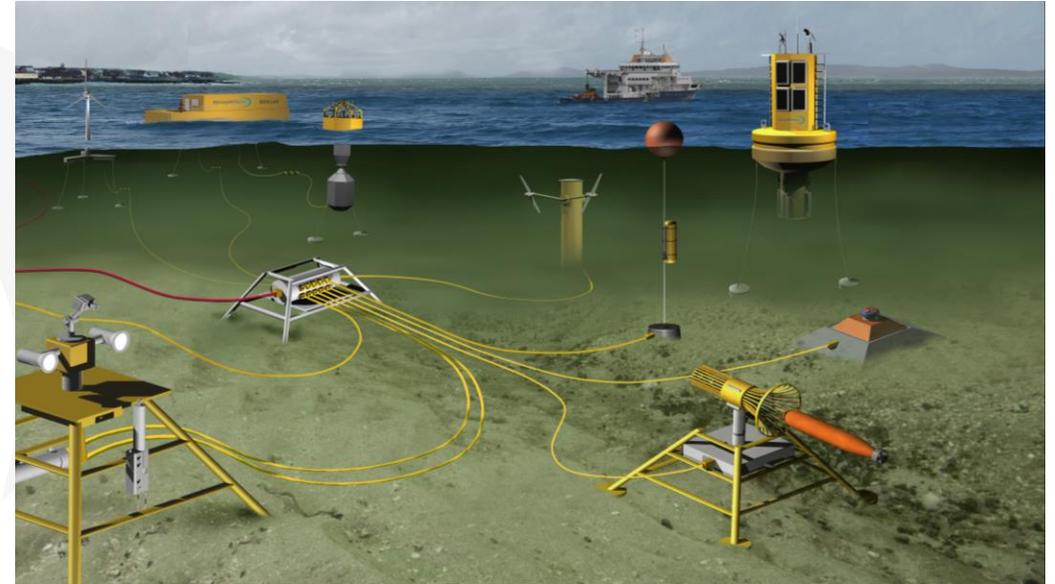
Sensitivity of Receptor	Magnitude of effect			
	High	Medium	Low	Negligible
High	<i>MAJOR</i>	<i>MAJOR</i>	<i>MODERATE</i>	<i>MINOR</i>
Medium	<i>MAJOR</i>	<i>MODERATE</i>	<i>MINOR</i>	<i>MINOR</i>
Low	<i>MODERATE</i>	<i>MINOR</i>	<i>NEGLIGIBLE</i>	<i>NEGLIGIBLE</i>
Negligible	<i>MINOR</i>	<i>NEGLIGIBLE</i>	<i>NEGLIGIBLE</i>	<i>NEGLIGIBLE</i>

Mitigation and Management Plan

- How the project will reduce and manage impacts
- There are many ways in which this can be done
- **Design features:**
 - Site selection
 - Selection of technology, or parameters of technology
 - Reduction in size or scale of the project
- **Mitigation and management measures:**
 - Use local vessels only
 - Create no-take zone in the area of the development
- **Post installation monitoring**
 - Post installation monitoring can reduce uncertainty around this impact for future developments

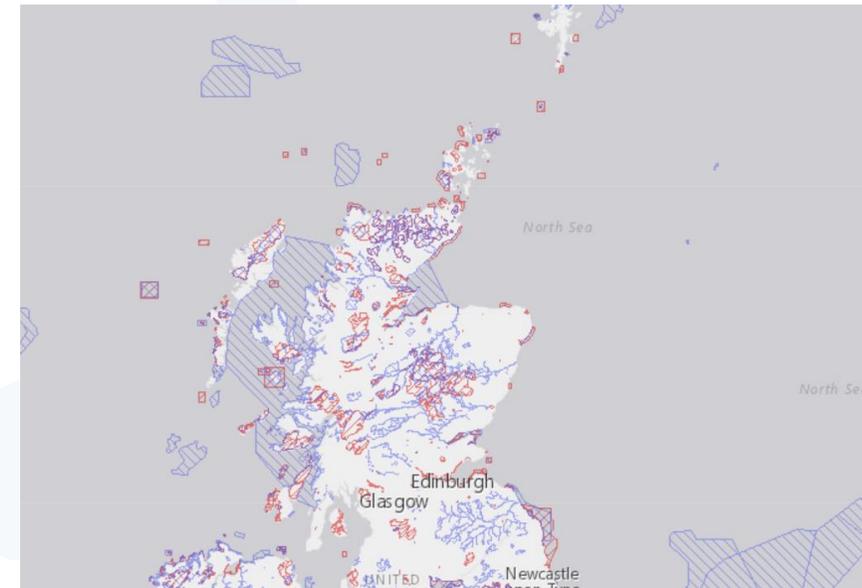
Cumulative Effects

- Effects of the project will have when added to other projects in the area.
- These may be other renewable project or general projects that may be planned for the area
- A full list of these other developments is drawn up along with the timings of installation and operation and agreed with the regulator
- Cumulative Impact Assessment is carried out with this full list.



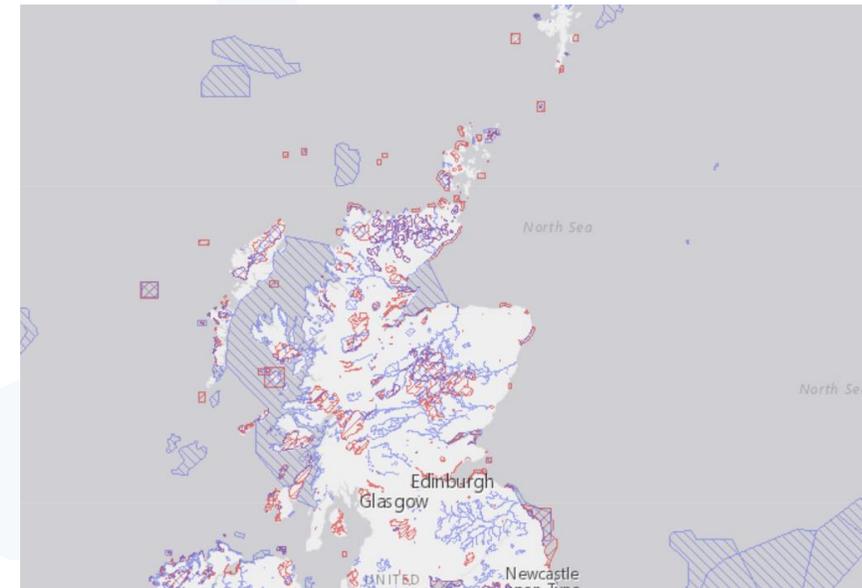
Protected sites and species

- Additional consideration is required
- Different types of protected sites and species
- Natura 2000:
 - Core breeding and resting sites for rare and threatened species,
 - Rare natural habitat types
 - aim is to ensure the long-term survival of Europe's most valuable and threatened species and habitats, listed under both the Birds Directive and the Habitats Directive.
- Special Areas of Conservation and Special Protected Areas



Protected sites

- Special Areas of Conservation and Special Protected Areas
 - Named habitat or species that is protected within that site
 - Restrictions on activity that may disturb, harm or remove that habitat or species
 - Each will have qualifying interests or conservation objectives that clearly outline the purpose of these sites



Habitats Regulations Appraisal

- If a planned development has a likely significant effect on a protected site or species
 - Identify protected sites or species
 - Gather information on those sites or species
 - Consultation with regulator and statutory advisors
 - Assessment of how the protected sites or species may be affected with focus on the conservation objectives or qualifying interests
 - Introduction of mitigation and management measures
 - Submission of draft HRA to regulator and statutory advisors
 - Amendments may be applied in light of consultation with stakeholders



Protected sites

- International designations
 - Marine Protected Areas
 - CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora)
- National designations
 - Priority Marine Features (Scotland)
 - Sites of Specific Scientific Interest (SSSI)



Post submission process

- Determination process
- Consideration of adequacy of the information provided, consultation and determination
- Further information may be requested from the developer
- Consultation bodies, public and developer will then be informed of the decision and the reasons for this decision
- Decisions can be appealed



Risk Management Strategies

Risk management strategies

- Precautionary principle
 - Broad ranging legal approach
 - Emphasizes caution where uncertainty exists
 - May require slowed approach in development
 - May limit opportunities to reduce uncertainty
- SEAGEN, Strangford Lough
 - Detect and Shut down policy
 - High burden for marine mammal observers
 - Limited learning of near-field behaviour of marine mammals and impacts on project (e.g. cost)



Risk management strategies

- Adaptive Management
 - Learning by/while doing,
 - Projects deployed incrementally
 - Despite uncertainty,
 - Prevents unacceptable harm to the marine environment.
- If rigorously implemented, this approach may provide a reliable mechanism for closing knowledge gaps

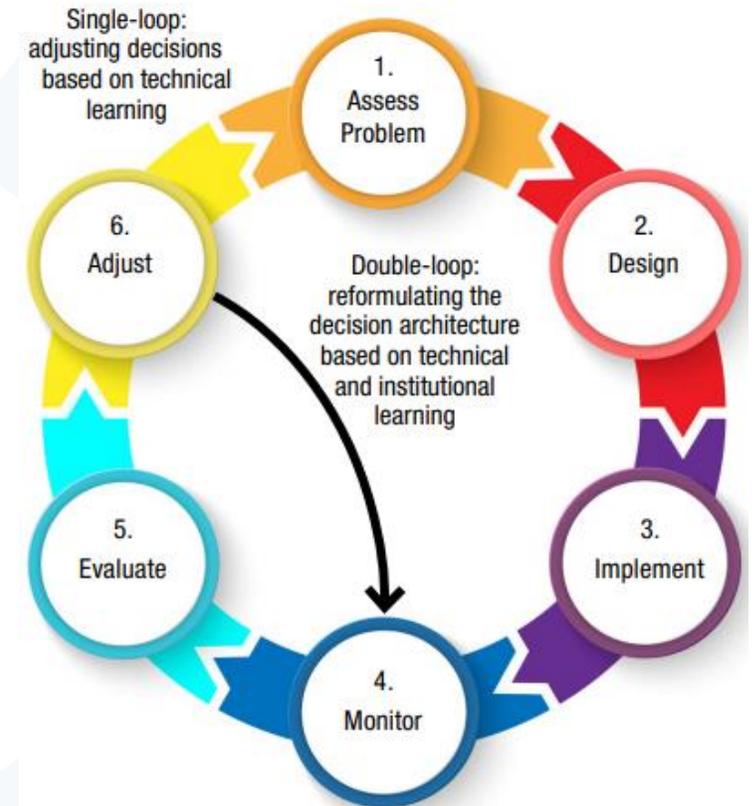
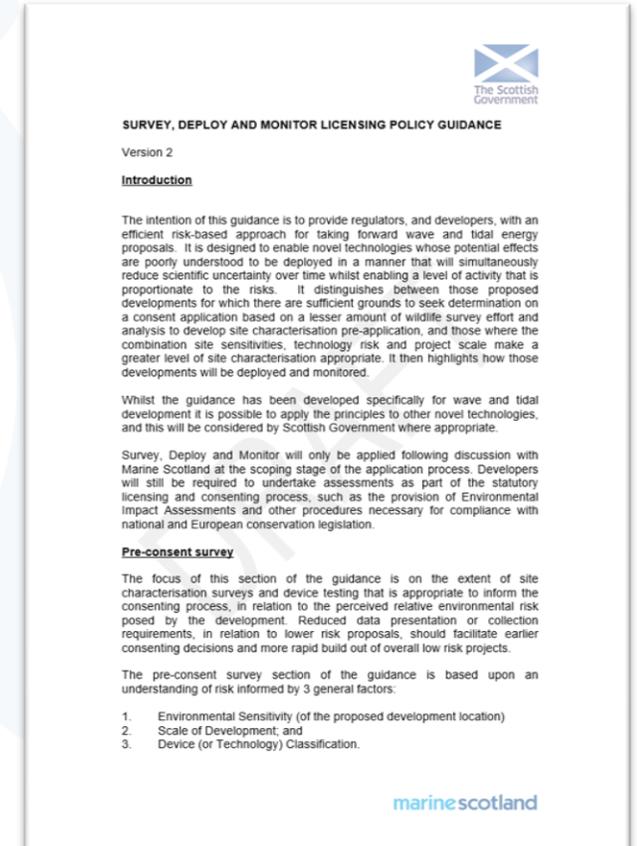


Figure 12.1. The adaptive management (AM) cycle. The original concept of AM concerned single loop learning, while later additions recognize the value of double loop learning, particularly to inform planning and siting for future MRE installations in a region. (Graphic by Robyn Ricks. Adapted from Williams 2011a; Williams and Brown 2018)

Source: OES Environmental, 2016 & OES Environmental 2020

Risk management strategies

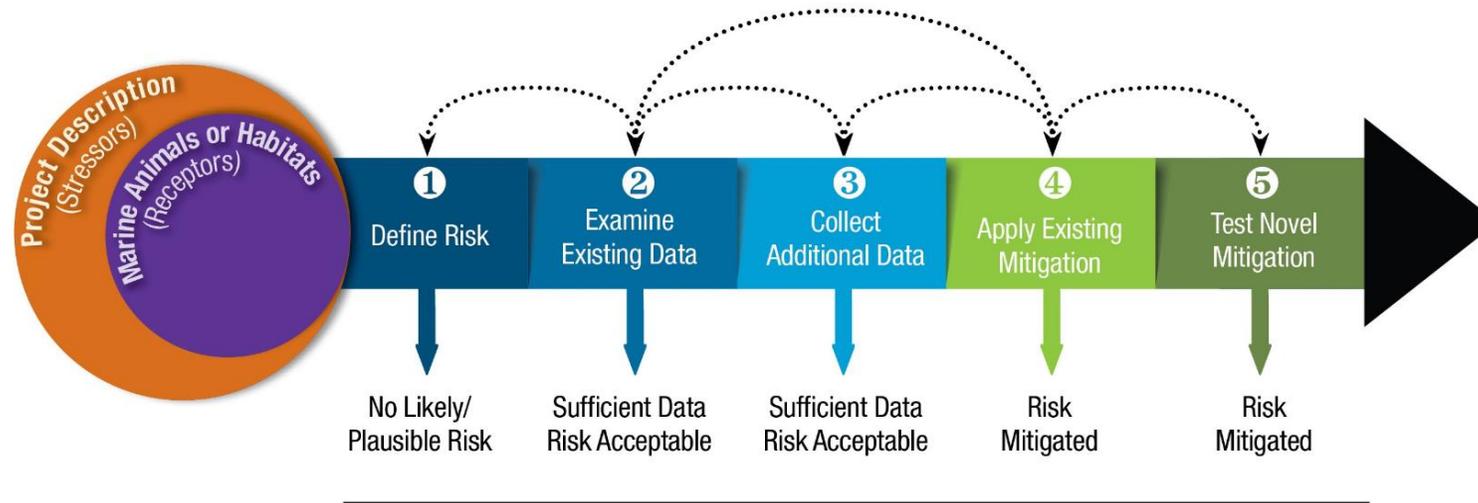
- Survey, Deploy and Monitor
 - Risk-based approach.
 - Designed to enable novel technologies to be deployed
 - Uncertainty exists
 - Uncertainty can be reduced
 - Activity can be undertaken that is proportional to the risks
 - It highlights how those developments will be deployed and monitored.
- Utilised by Marine Scotland since 2016



Risk management strategies

■ Risk Retirement

- Term used in risk management
- When pathway of impact between a stressor and receptor is sufficiently understood
- Need to carry out detailed investigations (Surveys or research) for each project has been alleviated.
- The term has also been used by the MRE community to describe a means of simplifying the consenting processes by focusing on key issues of concern



R I S K R E T I R E M E N T

Source: OES Environmental, 2016 & OES Environmental 2020



Strategic development of EIA for Marine Energy

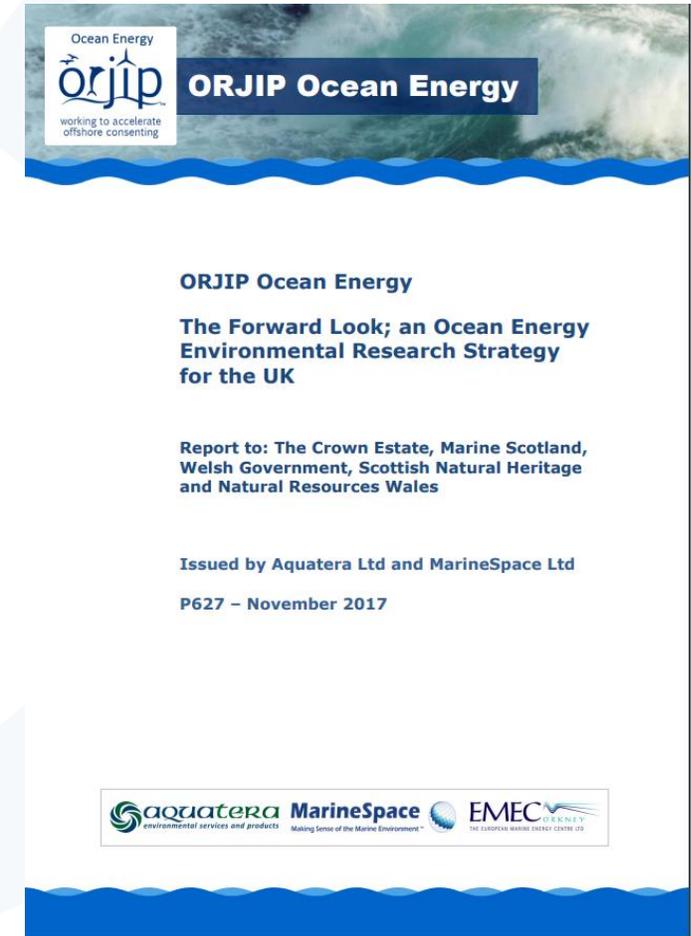
Strategic development in EIA for Marine Energy

- ORJIP Ocean Energy
 - UK-wide collaborative programme of environmental research with the aim of reducing consenting risks
 - facilitates a strategic, coordinated and prioritised approach to monitoring and research
- OES Environmental
 - International
 - Mobilises information and the international community to coordinate research
 - Data transferability



ORJIP Ocean Energy- The Forward Look

- A list of strategic research projects to address key EIA issues
- The purpose, required timing and scope of the research projects
- The objective:
 - to inform the focus of ORJIP Ocean Energy;
 - ensuring that research is focused on priority consenting EIA issues for the wave and tidal sectors,
 - Ensuring that projects are coordinated to avoid duplication of effort, and key information and data gaps are addressed.



OES Environmental- Tethys

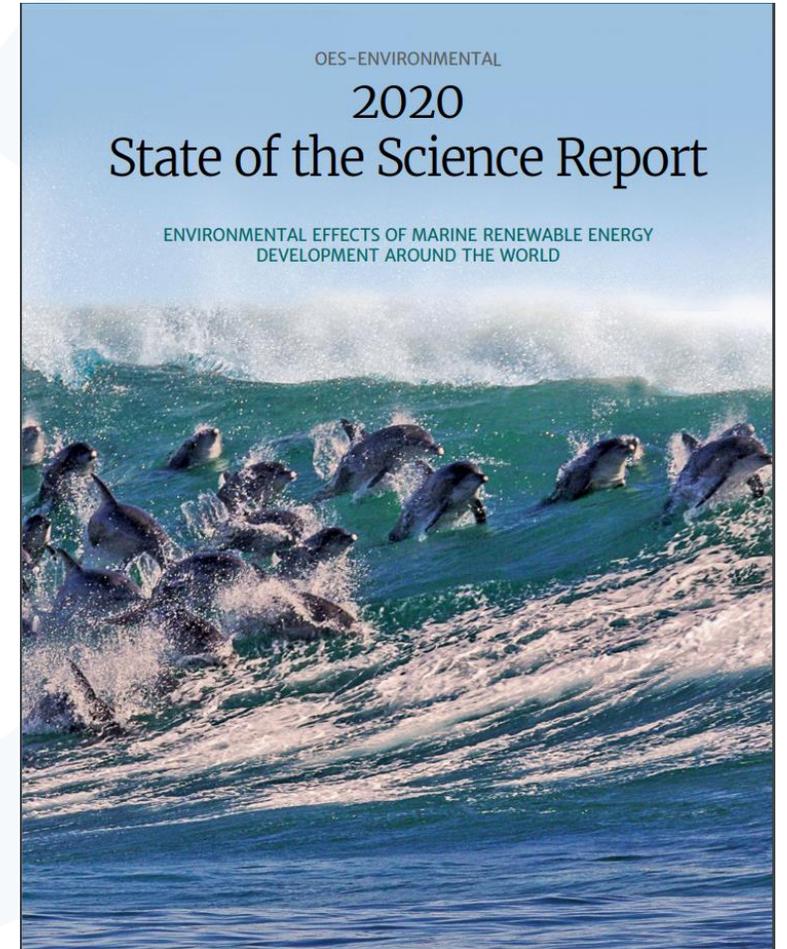
- Knowledge base
- Project and technology information
- Environmental studies and reports
- Webinars and workshops
- Map viewer

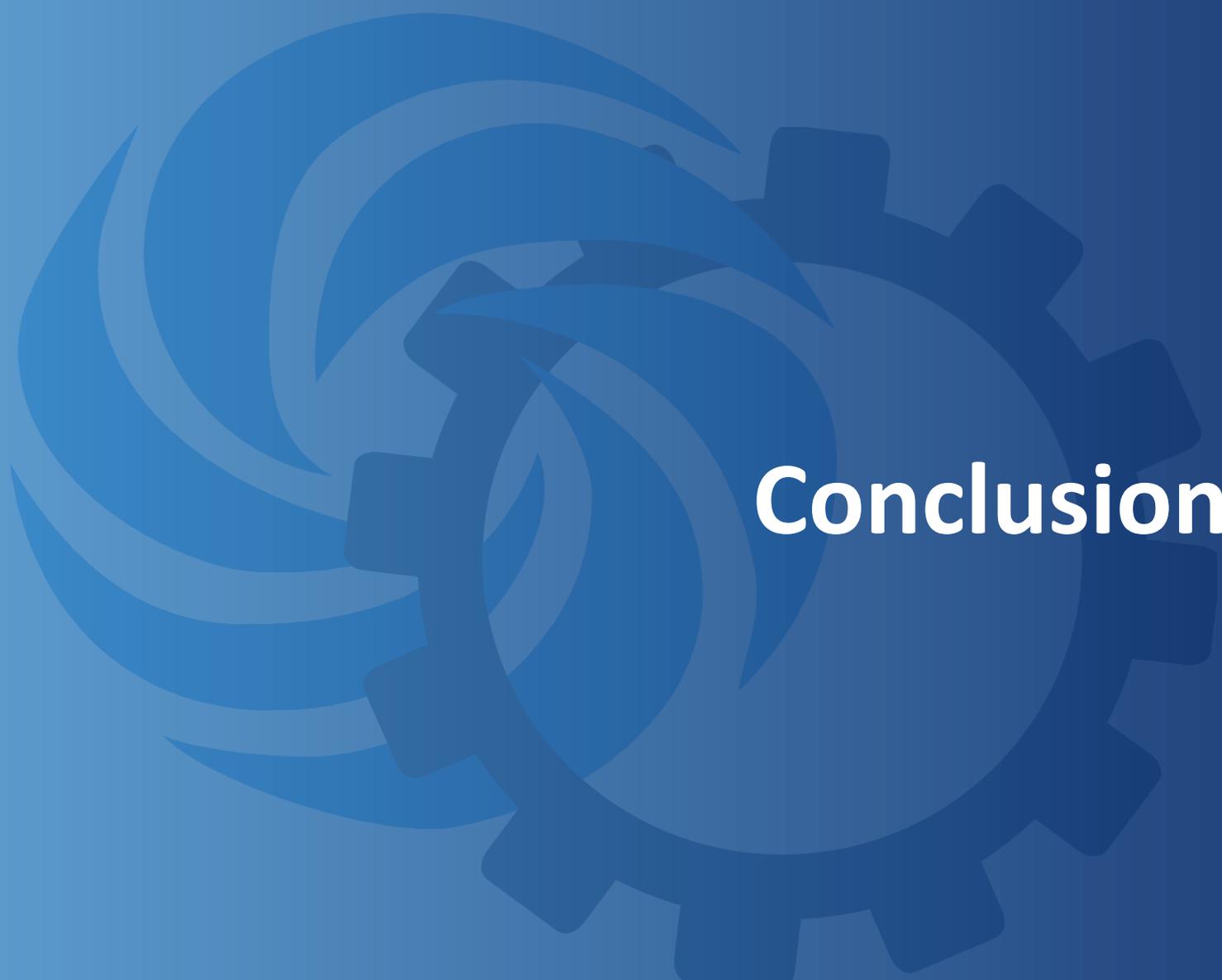


A screenshot of the TETHYS website. At the top is a navigation bar with links: ABOUT, CONTENT, TOOLS, CONNECTIONS, BROADCASTS, HELP. Below the navigation bar is a banner for the "2020 State of the Science report" with the text: "The 2020 State of the Science report is now available! This comprehensive report details the environmental effects of MRE development." Below the banner are two main content cards: "MARINE ENERGY" (Generating electricity from the sea) and "WIND ENERGY" (Generating electricity from wind on land and at sea). To the right of these cards are buttons for "GET STARTED" and "KNOWLEDGE BASE". At the bottom right is a calendar for "Sep 2020" showing dates 1 through 12, with times 4:00 and 3:00 indicated for some days. Logos for U.S. DEPARTMENT OF ENERGY, OES, and lea wind are also visible.

OES Environmental- State of the Science

- Edition 2 recently published in June 2020
- Comprehensive summary of the environmental impacts of marine renewable energy globally
- Written for government regulators, policy makers, resource managers, marine renewable energy developers, researchers, and stakeholders.
- Chapter for each key environmental risk
- Also short chapter summaries available





Conclusions

Conclusions

- EIA is a legal and formal process
- There are many details and complexities within the EIA process, but it is designed to be straight forward and simple to follow
- There are uncertainties around the environmental impacts of wave and tidal energy
- There are strategic efforts being made to better understand this

Further Reading

- State of the Science Report
- ORJIP OE Forward Look
- Key Guidance documents on EIA*

References

