

The Need of Knowledge Exchange in the Dredging Community

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PRINCIPLES OF SUSTAINABLE DREDGING

1. Social, environmental, and economic objectives should be systematically considered and integrated
2. Work with natural processes
3. Stakeholders should be engaged at the earliest conceptual stage
4. Use scientifically based criteria and guidelines
5. Beneficial use of dredged materials should be given priority
6. Dredging can be a key solution for remediation and restoration
7. monitoring and assessment information before, during and after project



What is CEDA

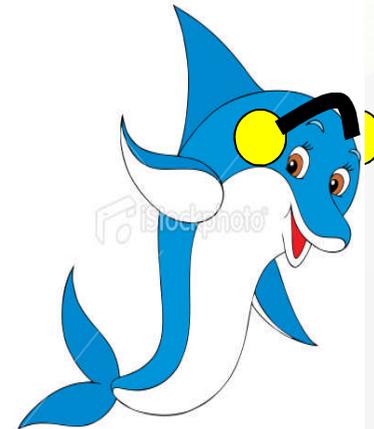
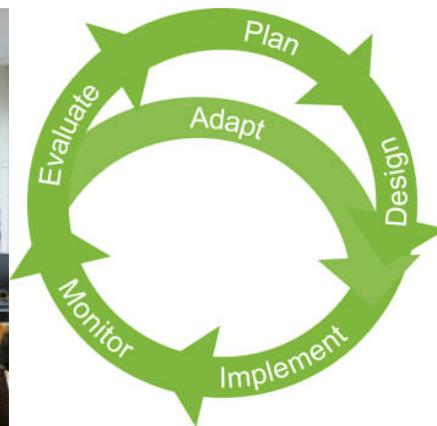


- Knowledge Network
- Using best available knowledge for:
 - Projects and programs
 - Policies
 - Legislation
- By connecting professionals from all involved parties using experiences from over the world

Resulting in the next examples

Examples

- Ecosystem Services
- Climate Change Adaptation
- Adaptive Management
- Underwater Sound



Ecosystem Services

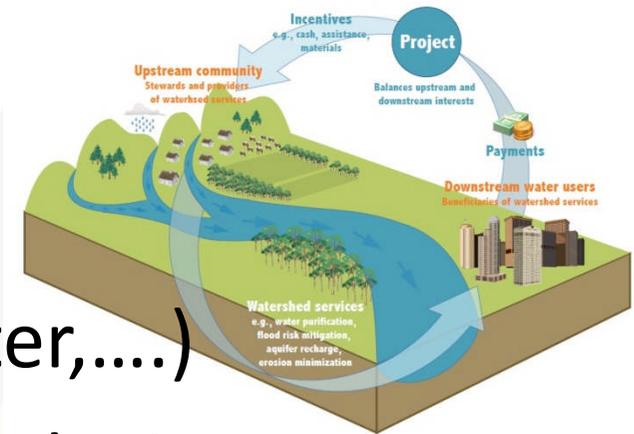
- Connecting human well-being to the Environment
- To ensure sustainable development finding a balance between environmental, social and economic aspects of projects is imperative
- Classifies, describes and assess a value to natural resources and ecosystems



Ecosystem Services

- Provisioning services (food, water,....)
- Regulating services (flood control, air purification....)
- Supporting services (navigation,....)
- Cultural Services (recreation, aesthetic experiences,....)

With Technological investment Service can be improved and will raise a pressure



ES Concept and example

Steps by a Multidisciplinary Project Team :

- 1) Assessment of relevant ES
- 2) Valuation of Services and pressures
- 3) Design of the project



Consequences of Climate Change



Objectives of CEDA position paper on climate change adaptation

- To raise awareness of the dredging community to be prepared for climate change;
- How can dredging contribute to adaptation measures?
- What are the implications for the dredging community?
- Focus is on adaptation to consequences of climate change not on causes. Measures to reduce greenhouse gas emissions of the dredging sector itself are outside the scope of this paper.

Adaptation measures

- Absolutely necessary to reduce the consequences of climate change by reducing vulnerability and/or improving resilience
- Integrated sustainable approach:
 - safety against flooding,
 - safety of navigation,
 - environmental protection and improvement,
 - economics, stakeholder and societal interests.
- Short term: data collection and monitoring (understanding and risk assessment) and planning
- Long term: realise adaptation measures (flexibility), (no regrets, win – win situations)

Potential climate change implications for dredging community

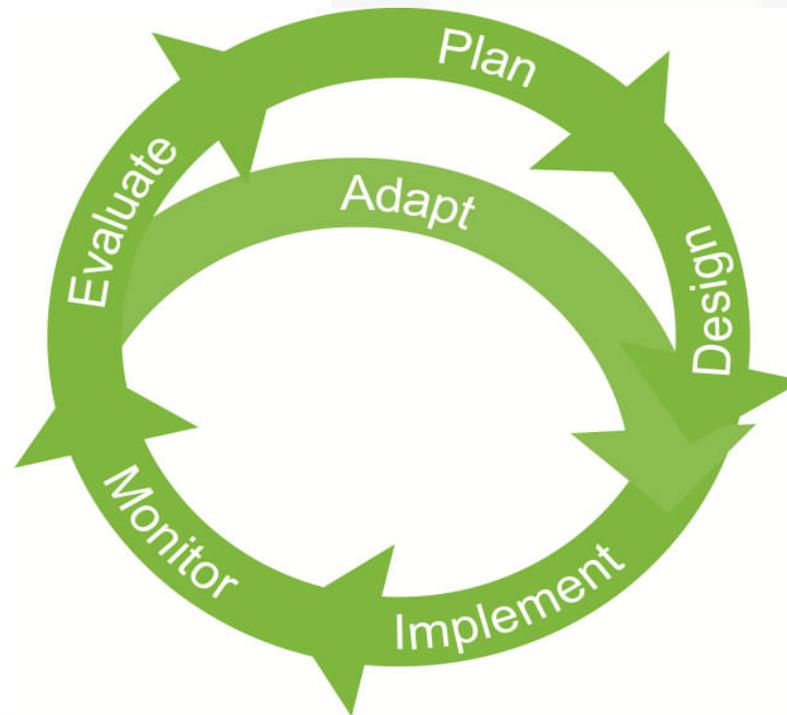
- Changes in dredging volumes and/or locations;
- Changes in dredging requirements and legislation;
- Both opportunities and challenges for the dredging community;
- New and innovative solutions required;
- Sustainable solutions will not always involve more (conventional) dredging; (e.g. integrated sediment management)
- Specific equipment for new types of operations;
- Dredging methodologies (reactive or proactive);
- Flexibility is vital (uncertainties, extreme events);
- Regulatory regimes should be flexible.

Adaptive Management

- AM efficient and cost-effective management process when objectives clear, yet local environmental effects uncertain, and management actions implemented to address uncertainties as project progresses.
- AM to desired goals by addressing uncertainty, incorporating flexibility and robustness, with new information for decision-making as the project develops.
- AM “modern” approach, potential to become good practice; underlines commitment for process optimisation. Not likely AM to become good practice for all projects, but advantages mainly for larger and multi-year projects.

What is AM, and what can it deliver

- Decision framework for decision making in response to uncertainties, leading to AM plan, based on monitoring.
- Relatively formal process, towards high efficiency while aiming for good ecological state.
- 5 steps:



Benefits Adaptive Management



- Environmental: effective protecting while dealing with uncertainties
- Legal / Permitting: allow projects to proceed with licence while still uncertainties
- Effort and economics: initially more effort, but possibly lower total effort and cost
- Contractual: Allowance for flexibility reduces potential for conflicts
- Social: Stakeholder trust can be improved by transparent process

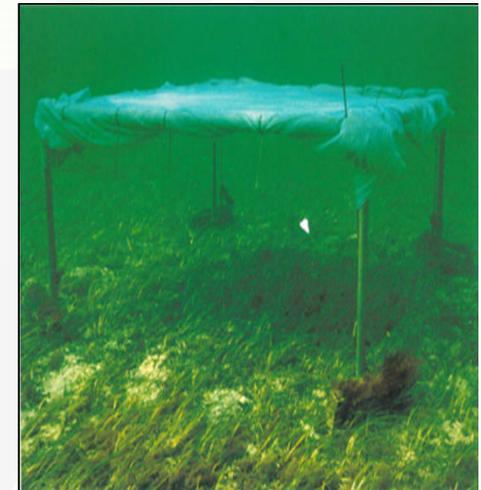
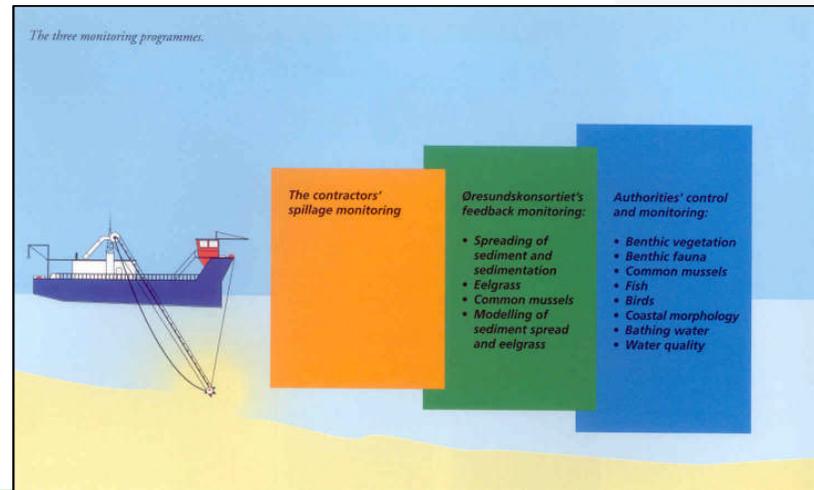
Disadvantages Adaptive Management

- Environmental: it takes more time and effort to map out the effects and management action
- Legal / Permitting: can conflict with prevailing laws, when based on precautionary principle
- Effort and economics: complicates exact advance budgeting
- Contractual: increased effort in contract management
- Social: may be perceived to justify worse project outcomes



Case Study - Øresund Fixed Link (DK)

- Slow response on environmental receptors urged for management on amount of total spill
- Contractor to monitor and responsible to manage project within total amount of spill
- Owner verifying response through feedback monitoring
- Within time / budget, no effects



Central Dredging Association

Underwater Sound and Dredging

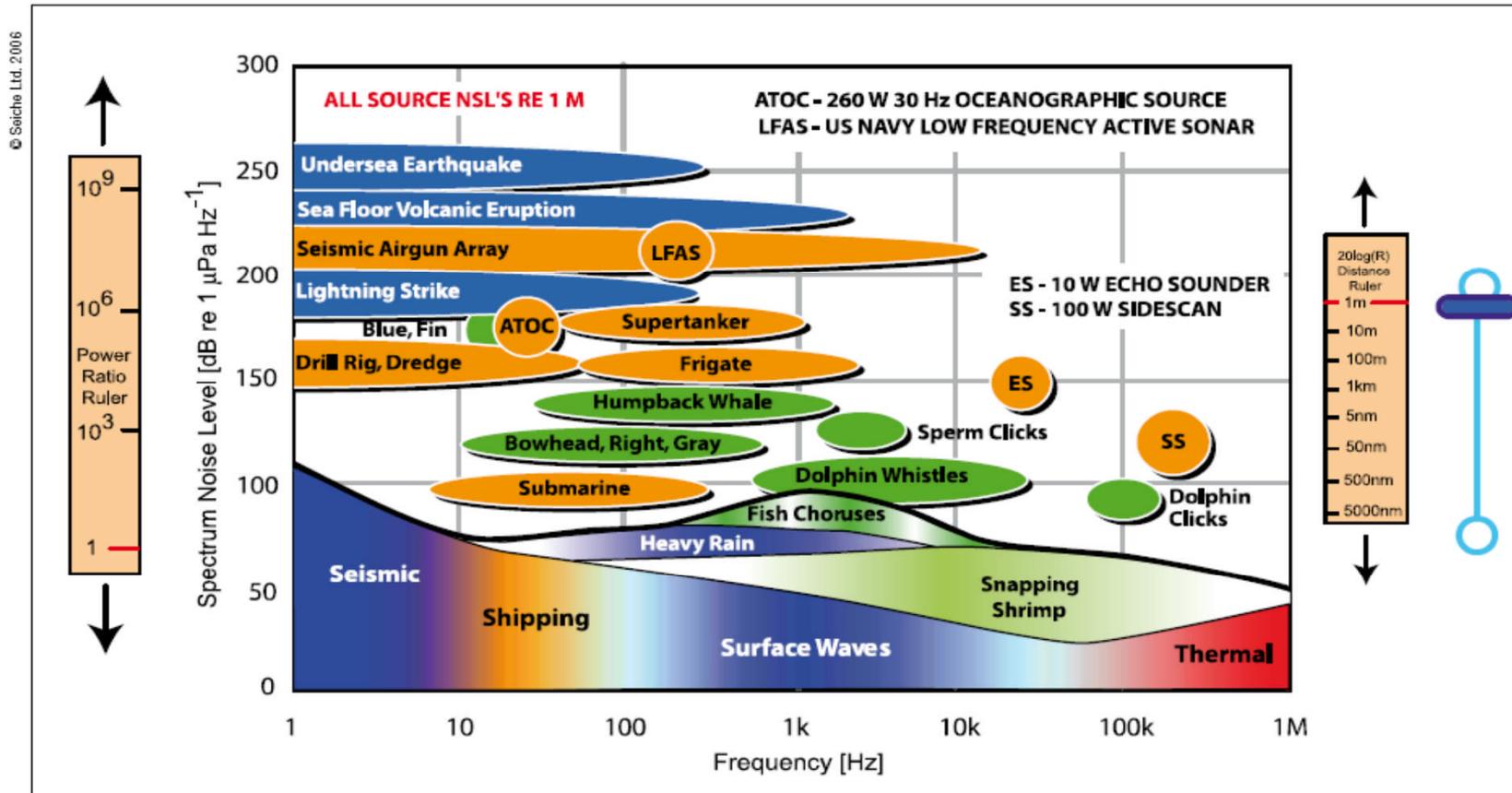
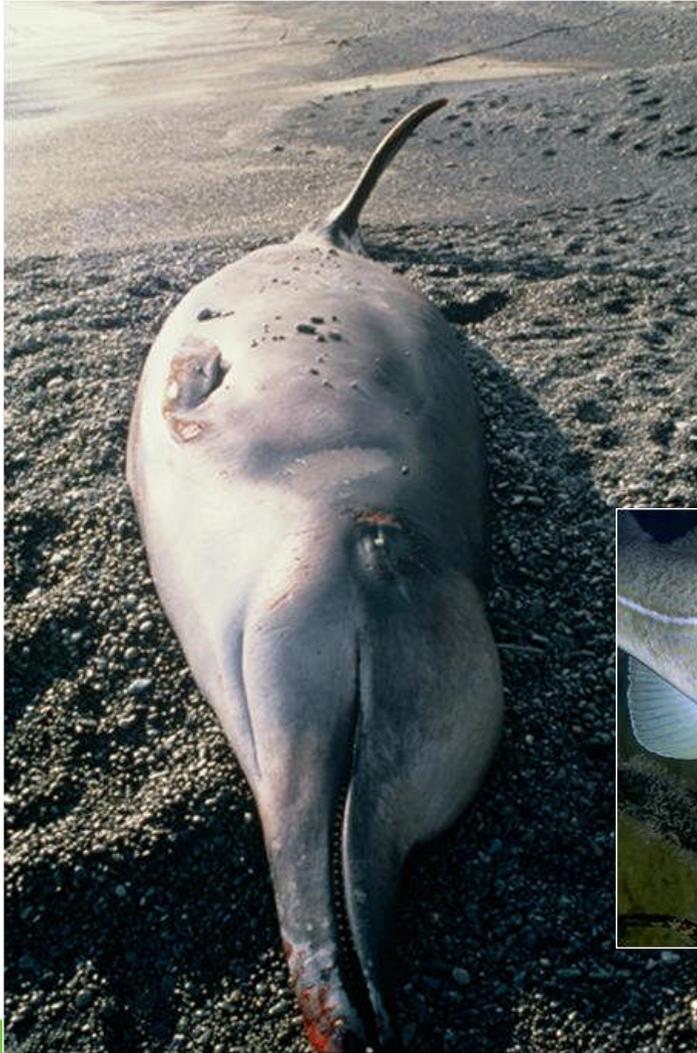


Figure 4. Noise levels and frequencies of anthropogenic and naturally occurring sound sources in the marine environment

..and it can affect marine life



Policy has picked it up:

Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment (EU MSFD)

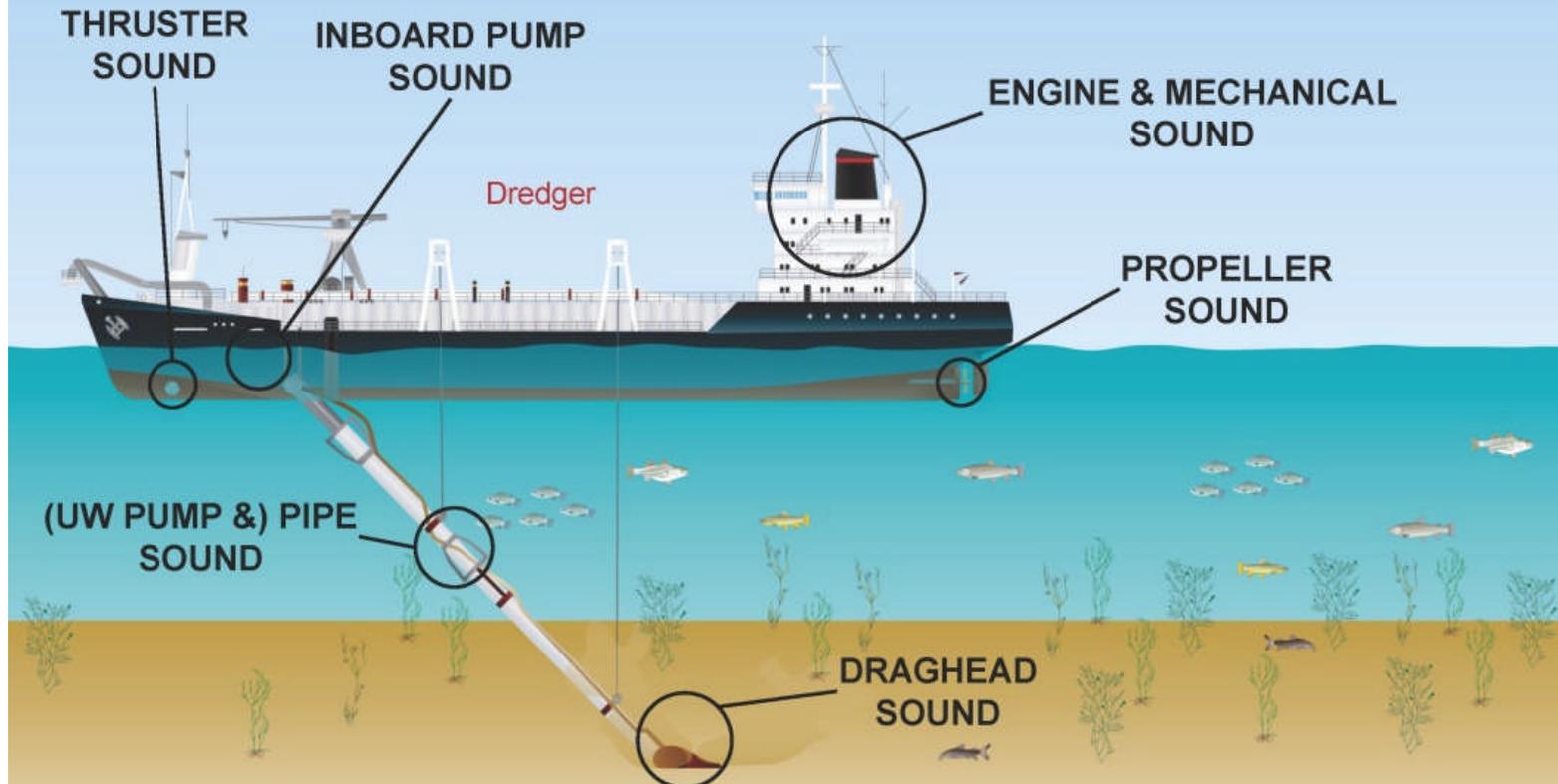


Categories of Sound sources

- Dredging excavation
- Dredging vessels during transport
- Dredged material placement

Description of sound sources

Trailing Suction Hopper Dredger
Sound Sources



Underwater sound

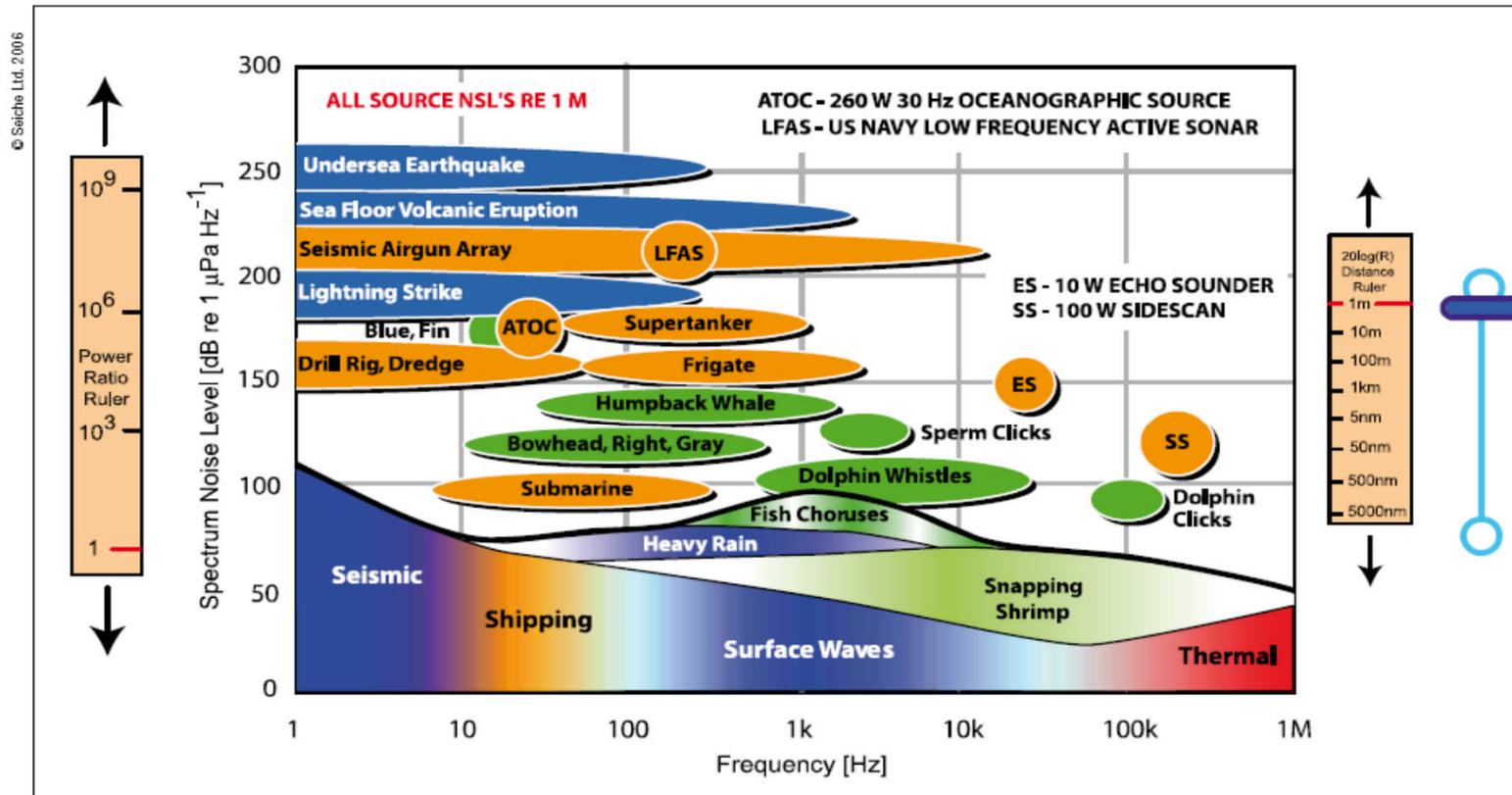


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Trailing Suction Hopper Dredge

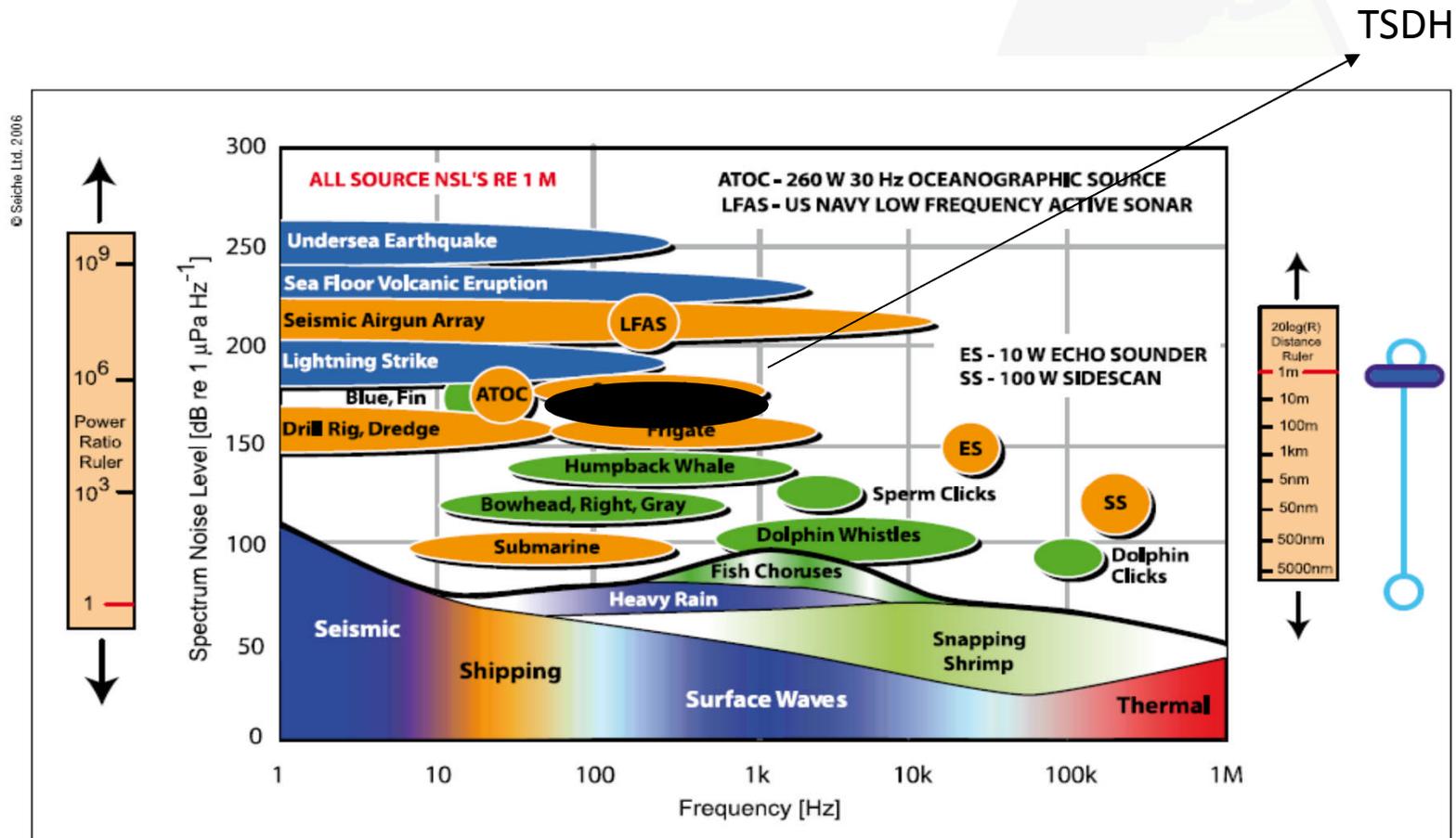


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Cutter Suction Dredge

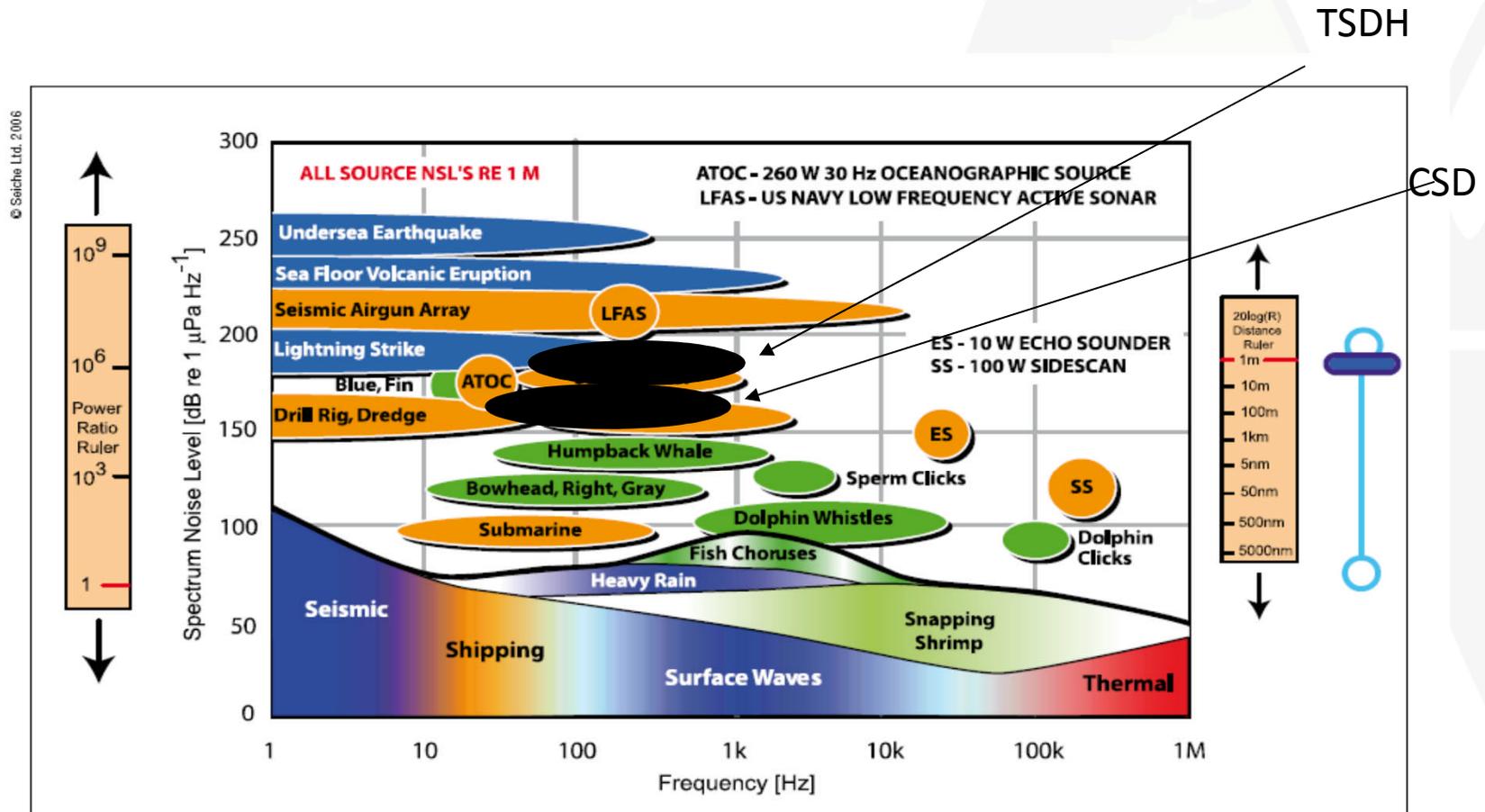


Figure 4. Noise levels and frequencies of anthropogenic and naturally occurring sound sources in the marine environment

Documented effects

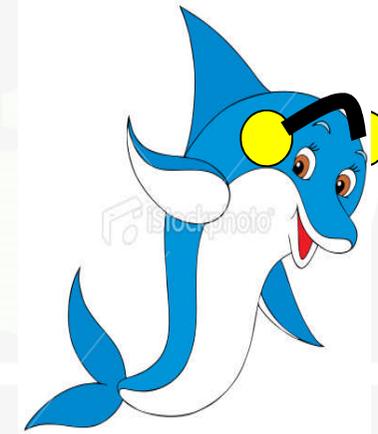


- Injury not a concern
- Masking is possible
- Small scale behaviour response
- A lot of data gaps



Management of Dredging related sound

- Restriction
- Spatial buffer zones
- Technical Solutions



But they need careful consideration and justification with involvement of all stakeholder

Again find a balance of risks and social-economic benefits

Conclusions and recommendations



- Dredging of low intensity compared to other activities (e.g. pile driving)
- Unlikely to lead to serious effects
- Harm to individuals should not be overlooked
- More studies on dredging sounds and effects on marine life are needed
- Standardization of Monitoring protocol is needed

Conclusion and recommendations

- Exchanging knowledge helps the entire sector
- There is a lot of knowledge available so use it and do not try to find out the wheel again
- There are organizations who can help in finding the right knowledge
- Also more knowledge exchange is essential
- More cooperation is needed
- More pro active than re active approach