WHY DO WE NEED ENVIRONMENTAL AND SOCIAL MANAGEMENT FOR DREDGING?
Whilst dredging is required to develop and maintain navigation infrastructure, build sea defenses or installing structures throughout the world, dredging can also entail varying degrees of risk to the environment and society. Protecting and even enhancing the environment, society and the economy is therefore an essential, sometimes crucial, part of planning and managing a dredging project.

One of the first steps before a project actually starts is the scoping of a project, to find out what receivers (people/planet) could be impacted and to narrow down the list to the significant receivers to those which are sensitive to the project. For instance if you have a marine project you don’t want an assessment of trees!

The second step is to execute an environmental and social impact assessment (ESIA), based on the scoping study. This ESIA estimates the impact of the project on each receiver. There should be multiple project options (at least two) discussed in the ESIA and the option of no project. However in a reality often many project options are discussed in the project engineering stage. With economic, environmental and social issues going through multiple cycles of development until a solution is developed that is option with the right balance between economy, society and the environment. This could be for instance the orientation of a new port, the location of a shipping channel or a dredge disposal site location.

If this assessment signals that impacts of the chosen project may have significant environmental, social or economic consequences, Management Practices for the Environment and society must be evaluated. The purpose of these Management Practices is to provide guidance for environmental, social and economic protection and improve the sustainability performance of a dredging project. It is important to note that society, environment and economy are linked. For instance if the fish population is harmed, so too are the livelihoods of the fishermen.

WHAT ARE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS (ESMPS) FOR?
ESMPS come in many different names but essentially are a diverse collection of measures used to conduct a project in a way that avoids, reduces or mitigates environmental, social and economic impacts. However ESMPs can also be written to ensure projects offer sustainability improvements, such as new wetlands or new reefs.

Impacts of dredging can occur during the excavation process, during dredged material placement and also during the transport of the materials. These ESMPs can identify risks, evaluate them and hopefully manage them. ESMPs require a thorough understanding of the technical, environmental, social and economic characteristics of dredging plans and of the potential seriousness of the impacts. In some cases these ESMPs may require rather minor changes, such as slowing down the removal of sediment. In other cases the project may call for major innovative technologies requiring substantial investments.

WHEN SHOULD ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS BE IMPLEMENTED?
Some ESMPs are initiated even before a dredging project begins. These practices are taken in the planning and design phase and include:
- developing contracts and project management controls;
- using pre-qualification to short-list qualified bidders;
- selecting a contractor based on best value;
- proposing performance standards such as water, sediment quality or ecological health;
- ensuring key people with the right training and experience are in place;
- preparing a project and site-specific social and environmental and construction monitoring programme;
- ensuring key environmental and social requirements are passed onto subcontractors and there is sufficient oversight of subcontractors.

By evaluating the project in the planning stage according to these practices, project plans and dredging methods can be adapted to the concerns and the overall dredging design can be optimised before the start of the project.

**WHICH ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS SHOULD BE USED DURING THE PROJECT?**

Some ESMPs are related to the actual process of dredging, that is, methods, strategies and principles of operation to be used during and after the construction phase. These process-related ESMPs apply to the actual dredging operation itself as well as to the transportation and placement of dredged material. They include:

- the selection and possible modification of equipment;
- the modes of construction, i.e., dredging and reclamation methods;
- institutional and control tools such as monitoring and feedback.

**WHAT ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS ARE RELATED TO EQUIPMENT?**

Selecting the appropriate dredging equipment is an essential construction-related Management Practice. Dredging vessels come in a variety of categories such as, cutter suction dredger (CSD), trailer suction hopper dredger (TSHD), bucket ladder dredger, backhoe dredger (BHD) and grab dredger (GD). Most of these modern dredgers are equipped with or can be modified to install systems that reduce the environmental effects of the dredging process.

Besides the type of dredger, the production rate should be considered. Many environmental impacts can be reduced by controls onboard the vessel. For instance, good monitoring and an increase in the accuracy of the dredging can reduce over-dredging and result in a decrease in the total volume of material dredged. Some trailers can be equipped with a so-called “Green Valve” in the overflow that reduces turbidity. Other adaptations are specialised environmental cutter suction systems such as the Disc Bottom Cutter, Environmental Auger Dredger or the Drumcutter. In all cases, the selection of plant must be made based on the specifics of the project and the local area it is situated in.

**WHAT ARE ADAPTIVE ENVIRONMENTAL AND SOCIAL MANAGEMENT?**

Adaptive management is part of the construction process and take into consideration hydraulic conditions such as tidal flows, river discharges, weather changes or changes in wind direction. Adaptive MPs allow the construction project to change depending on local conditions. For instance when the currents are towards a sensitive receiver in one area, dredging is relocated to another area and so forth.

**WHAT IMPACTS FROM THE TRANSPORTATION AND PLACEMENT OF DREDGED MATERIAL ARE ADDRESSED IN ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS?**

Transportation and placement of dredged material are often controversial issues. Many ESMPs address these issues, including the choice of equipment, the methods of operation or of placement, e.g. through pipelines, rain bowing, side casting or bottom door release, as well as the site of disposal or placement, such as silation ponds and storage basins. Especially when dredging contaminated sediment, the placement of sediment, be it on land or in the water, demands the implementation of ESMPs.

**HOW ARE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS DEVELOPED?**

Usually a public, private or government agency (the Client) determines a need for a maritime infrastructure project which involves dredging. Once the Client has determined this need, their search begins for a suitable partner or Contractor to execute the project. Finding the right “fit” with a Contractor in the planning and design is an essential step in ensuring a long-term successful outcome. Client and Contractor can then evaluate the environmental situation together, conducting an Environmental Impact Assessment and risk assessment. Based on this information Client and Contractor will sort through the wide variety of Environmental and Social actions in order to have the BATNEEC within the Environmental and Social Management Plan for the specific project and which are supported by the regulator(s) and stakeholders.

**HOW ARE THE BEST MANAGEMENT PRACTICES DETERMINED?**

As a first step, all applicable ESMPs that address the sustainability risks associated with the designated project should be identified. These MPs are then ranked according to the likelihood of occurrence and the level of risk associated with this. Discussion on if they should be used should be based on the principal of “Best Available Techniques Not Entailing Excessive Cost (BATNEEC) 1984 into European Economic Community law with Directive 84/360/EEC.

Criteria such as their effectiveness, logistical feasibility, cost and legal compliance should be considered. Once this comparison has been made, certain actions can be eliminated and BATNEECs can be identified. The selection is always project-specific; they are never one-size-fits-all solutions.
WHY SPEND SO MUCH TIME AND EFFORT ON FINDING BEST TECHNIQUES?
In an ideal world, all environmental risks associated with dredging would be quantifiable. In fact, even with all the information at hand, an element of uncertainty always exists and selecting BATNEECs is the best way to manage risk and uncertainty. BATNEECs are state-of-the-art measures applied on a site-specific basis to reduce, prevent, mitigate or avoid adverse environmental or social impacts. BATNEECs can only be decided upon after complete impact assessments, evaluation of alternative practices and appropriate stakeholder participation. They are then determined to be the most effective, practical and sustainable means of achieving a good environmental outcome and ensure that dredging and maritime construction projects are conducted in an responsible manner.

WHAT IS THE ‘PRECAUTIONARY PRINCIPLE’?
The precautionary principle has been referred to as the “err on the side of caution” option. The Communication from the Commission of the European Communities on the precautionary principle (Brussels, 2000) states that the precautionary principle should be applied within a structured approach to the analysis of risk.

An example of the precautionary principal is that when we don’t fully understand the impacts, caution should be used. This could for instance include monitoring of sensitive receivers, using management plans or using additional mitigation measures at the start of the works.

The value of a BATNEEC is that it gives a more nuanced approach than the precautionary principle. It strives to find a balance to determine the necessary level of protection in proportion to the risk, to evaluate relative risk, so that BATNEECs can be selected for their effectiveness. In this way, a more robust, rational, technically defensible approach can be implemented.

WHAT IS THE ROLE OF MONITORING IN EVALUATING BEST MANAGEMENT PRACTICES?
Monitoring can provide valuable information before (surveillance), during (feedback) and after a dredging and placement project (compliance). It gives the Contractor the opportunity to adjust operations before and during construction to optimise positive results. Long-term monitoring in the post-construction phase and beyond will ensure that the work is in compliance with contractual agreements. It may also uncover impacts that the project has had on habitats and species, some of which may not be visible until years after the project’s completion. Compiling this data can provide useful information for future projects, allowing Client and Contractor to learn what works and what doesn’t. In fact, monitoring will help determine if a BATNEEC was in fact the “best” choice?

DOES THE SIZE OF THE PROJECT MATTER WHEN CHOOSING BATNEECs?
The size of a project actually does not matter. Other factors, such as economics, environmental and social sensitivity and the dynamics of the specific area play a role. A small project in an environmentally or societally sensitive area can require far more BATNEECs than a large project in a non-sensitive, highly dynamic area.

WHY IS STAKEHOLDER PARTICIPATION IMPORTANT IN DETERMINING BATNEECs FOR A PROJECT?
One might say that stakeholder participation is the ultimate BATNEECs. Including stakeholder participation at the earliest possible stage of a project is essential. Anxieties about environmental damage can be one of the greatest hindrances to the progress of a project. Outreach to the community creates the opportunity for the public to voice their concerns in a timely fashion and affords the Client and Contractor the opportunity to understand and address these concerns before final decisions have been made. Transparency and open lines of communication to the public and the media can create a wider sense of ownership of a project. A pro-active attitude toward the public and the media goes a long way in solving environmental problems, real and perceived.

DO ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS MAKE DREDGING PROJECTS MORE EXPENSIVE?
In general, the use of ESMPs will require a greater investment in environmental measures and this may indeed cost more.
However in many places in the world they are increasingly used as a license to operate, by regulators, insurers, financiers and clients.

ESMPs are investments that support the preservation or restoration of natural habitats and resources. Therefore, although ESMPs may add to the price tag of a dredging project in the short run, the enormous economic and social value of protecting natural resources must be recognized.

WHO BENEFITS FROM THE IMPLEMENTATION OF ESMPs?
The Client and the community in general benefit. ESMPs result in the conservation of essential public resources as wildlife, plants, clean air and valuable land- and seascapes. By using these practices, dredging companies are able to maintain harbours and access channels, restore beaches and build new land whilst protecting and preserving the natural habitat. This means that ESMPs promote a better quality of life, with cleaner water and air which means a healthier, more sustainable society in which to live.

IS THERE ONE BASIC SET OF ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS THAT IS ALWAYS APPROPRIATE FOR A DREDGING PROJECT?
Dredging is usually categorised into three groups: capital, maintenance and remedial. And although each of these dredging processes occurs in four phases – excavation, lifting, transportation and placement – they vary considerably from each other. Each dredging project will present its own unique set of issues and risks and each must given individual attention. Still, the accumulated past experience of the major dredging companies and consultants in determining ESMPs does count when approaching future projects.

BATNEECs ALWAYS BENEFICIAL TO A DREDGING PROJECT?
Identifying environmental, social and economic risks associated with dredging and evaluating BATNEECs from the beginning to end of the project will result in finding suitable BATNEECs that reduce risks. Reduced risks result in more successful long-term outcomes, creating sustainable projects both environmentally and economically.

But the process of determining BATNEECs can be long and arduous. BATNEECs should be innovative and dynamic in fulfilling their goal to reduce or mitigate environmental impacts. Best, however, is never an absolute. Flexibility from all parties is a necessity. A BATNEECS to truly be “best” may require an iterative process of reassessment, modification, elimination of a process or reconsideration of other Management Practices. This process – examining alternative methods and seeing the most effective, practical and sustainable means of completing a project – can be time consuming. Implementing a ESMP may mean creating a new natural habitat or repairing a marine environment or restoring a landscape in order to offset impacts caused by a dredging project focused on the development of a vital economic engine such as a port or harbour or land reclamation for residences and recreation. Ultimately, however, integrating science, economics, legal and societal interests and needs to find BATNEECs will pave the way to reasonable solutions, reduce stakeholder resistance to projects and contribute to the overall improvement of quality of life.

FOR FURTHER READING AND INFORMATION


The IADC Knowledge Center: https://www.iadc-dredging.com/en/knowledge-base