



**European Cooperation
in the field of Scientific
and Technical Research
- COST -**

Secretariat

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COST 260/06

MEMORANDUM OF UNDERSTANDING

Subject : Memorandum of Understanding (MoU) for the implementation of a European Concerted Research Action designated as COST Action 638 Investigating and managing the impacts of marine sand and gravel extraction and use

Delegations will find attached the Memorandum of Understanding for COST Action 638 as approved by the COST Committee of Senior Officials (CSO) at its 165th meeting on 27/28 June 2006.

**MEMORANDUM OF UNDERSTANDING
FOR THE IMPLEMENTATION OF A EUROPEAN CONCERTED RESEARCH
ACTION
DESIGNATED AS**

COST ACTION 638

Investigating and managing the impacts of marine sand and gravel extraction and use

The Signatories to this 'Memorandum of Understanding', declaring their common intention to participate in the concerted Action referred to above and described in the 'Technical Annex to the Memorandum', have reached the following understanding:

1. The Action will be carried out in accordance with the provisions of document COST 400/01 'Rules and Procedures for Implementing COST Actions', or in any new document amending or replacing it, the contents of which the Signatories are fully aware of.
2. The main objective of the Action is to bring together and add value to the disparate national and European research initiatives to create a unified, clear position to feed into European marine policy. This Action will aim to erase the 'grey' areas which exist in marine research and policy and work to disseminate collaborated European research results to assist future national and marine policy objectives.
3. The economic dimension of the activities carried out under the Action has been estimated, on the basis of information available during the planning of the Action, at approximately EUR 62 million in 2005 prices.
4. The Memorandum of Understanding will take effect on being signed by at least five Signatories.
5. The Memorandum of Understanding will remain in force for a period of four years, calculated from the date of the first meeting of the Management Committee, unless the duration of the Action is modified according to the provisions of Chapter 6 of the document referred to in Point 1 above.

COST ACTION 638

Investigating and managing the impacts of marine sand and gravel extraction and use

A. ABSTRACT

Extraction of marine sand and gravel has a recognised effect on the seabed and its fauna; for example, it can take several years before dredging tracks disappear and total recovery of the fauna is reached following dredging activities. The variety of stakeholders and their interactions with the marine environment adds to the disparate and complex nature of marine sand and gravel management and this is exacerbated by the transboundary nature of marine processes. Integrated management and assessment can be effective only if there is a high degree of compatibility, accessibility and interchangeability in environmental data and research.

Currently there is little integrated transferral of knowledge across all facets of this sector within Europe because of the sheer number of research initiatives and the diffracted nature of individual national research and policy objectives. Investment from COST in this area will promote clarity between national objectives and will achieve agreement on and disseminate a European position.

This Action will cover a broad scope of science issues which are essential to the development of the industry. The Action would add value to national research by synthesising techniques and results across geographic space to benefit a variety of end-users. It will enable ongoing scientific research to have more relevance and credibility across Europe, encourage collaboration and develop synergies between researchers to advance scientific results.

Keywords: marine sand and gravel extraction; knowledge transfer; European marine policy; marine environmental protection; minimising impacts.

B. BACKGROUND

B1. Today's status and reasons for Action

Marine sands and gravels are essential products for the development and maintenance of the built and natural environments. Society benefits greatly from the exploitation and use of marine sands and gravels mainly through construction and coastal defence, as a source material for beach replenishment and protection, and in habitat creation/restoration schemes.

The expected sea level rise within the coming decades will threaten low-lying countries with coastal defence problems. Beach nourishment is one of the tools used to maintain the coastline, but requires enormous amounts of marine sand. The environmental impact of onshore extraction of sand and gravel in countries such as the Netherlands is far reaching and marine extraction will be the alternative. Table 1 shows the extent to which demand for marine sand is affected by sea level rise in the Netherlands.

Table 1. Minimum and maximum yearly use of marine sand to maintain the Dutch coastline depending on the speed of sea level rise

<i>Sea level rise scenario</i>	<i>Amounts in Mm³/year</i>	
	<i>Minimum total</i>	<i>Maximum total</i>
20 cm/century	12	16
60 cm/century	19	31
85 cm/century	23	38

The exploitation of these resources must, however, be achieved in an environmentally sustainable manner and cooperate with other legitimate uses of the seabed such as marine ecology, maritime archaeology, fishing and navigation. Extraction of marine sand and gravel has a recognised effect on the seabed and its fauna; for example, it can take several years before dredging tracks disappear and total recovery of the fauna is reached following dredging activities. Figures 1 and 2 show multibeam images of an area of the seabed before and after dredging, the damaging effects of the dredging tracks are clearly visible.

Multibeam surveys

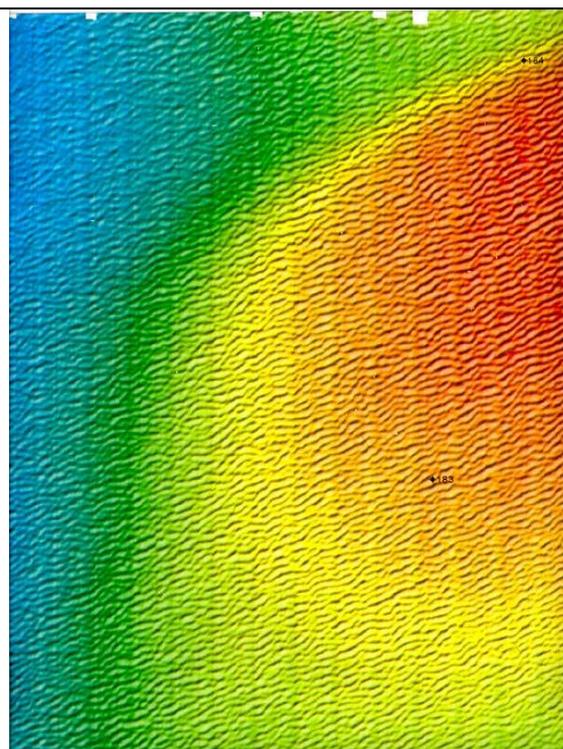


Figure 1. Image taken in spring 2001 no tracks visible

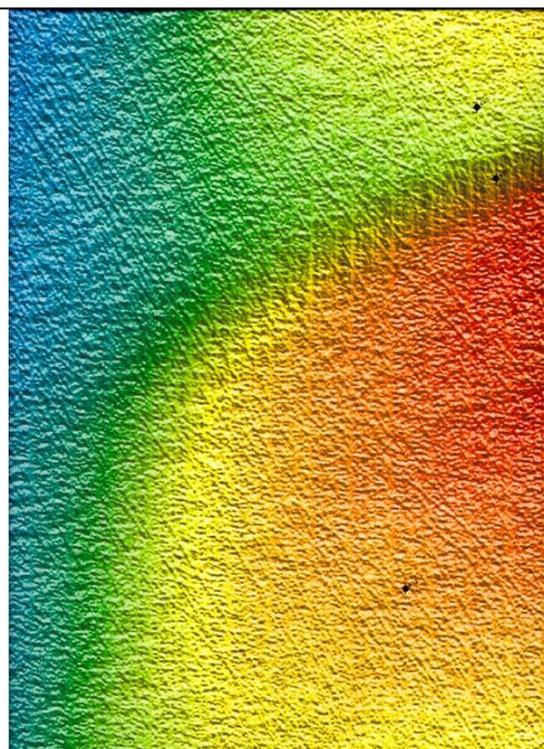


Figure 2. Image summer 2001. Tracks of seabed trawling abundant.

The variety of stakeholders and their interactions with the marine environment adds to the disparate and complex nature of marine sand and gravel management and this is exacerbated by the transboundary nature of marine processes. There is some coordination of activities and the formulation of marine policy under the auspices of the International Council for the Exploration of the Sea-Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (ICES-WGEXT) and OSPAR Working Group on the Environmental Impact of Human Activities (EIHA). However, there is a requirement for a greater interaction of marine scientists, policy makers and stakeholders given the transboundary effects of marine aggregate extraction operations. There is a lack of coordination between European countries and this is reflected in a wide variety of processes and procedures in marine policy, collation of data and information, research coordination and research dissemination. Even the description and definition of marine sands and gravels varies between European countries.

The implementation of various European Directives (EIA Directive 85/337/EEC, Amended EIA Directive 97/11/EEC, EU Birds Directive 79/409/EEC, EU Habitats Directive 92/43/EEC, SEA Directive 2001/42/EC) and the Ramsar and OSPAR conventions has meant that there is a regulatory framework to be applied to marine extraction. However, future resource developments will need to occur in deeper water and possibly across maritime national boundaries which will require international cooperation. Currently within Europe there is a need for a greater harmonised approach to policy formulation often resulting in conflicting national regulatory frameworks. National regulations must not be too inflexible. Guidelines, Codes of Best Practice and other relevant information are required to encourage good practice, complimented by a flexibility to find national or European solutions to problems. This should be founded on sound science, proportionality, and practical implementation.

Environmental, economic and social management and assessment, and sustainable development of the European seas on a regional scale, normally require a multinational effort by the bordering states. Such integrated management and assessment can be effective only if there is a high degree of compatibility, accessibility and interchangeability in environmental data and information. This includes information held, or obtained, by the different organisations in each country that are carrying out investigations and/or providing information within the regional seas. Integration of the expertise and collaboration between marine research teams has to be coordinated.

Current research within Europe covers a multitude of disciplines and sectors. Examples of research topics include:

- The use and suitability of dredged materials and mixed resources.
- Emerging technology for resource prospecting and for extraction at greater depths.
- Sediment dynamics, seabed and sub-surface deposit processes and seabed recovery.
- Sedimentological, geomorphological, hydrodynamical and biological effects of dredging the seabed, the so called ‘dredging footprint’.
- Archaeological and national heritage consequences of dredging.
- Technical constraints that hinder the integrated use of GPS technology and GIS for marine aggregate management.
- Innovation in technology to extract and use (for a variety of end-users) marine sand and gravel.

Currently there are some strategies in place to reduce the severity and extent of negative impacts from marine sand and gravel extraction. These include:

- Physical strategies: for example, dredging methods can be modified to reduce the impact of the overflow of mud particles by positioning the split of the fine particles at the suction head near the seabed and not, as is current practice, over the edge of the bun in the water column. This will reduce the impact of the plume.
- Monitoring of sediment plume density and dispersion, before, during and after extraction.
- Advice to contractors and provision of seabed sediment maps: for example, to use sediments with low mud percentages so that the overflow is cleaner when discharged into the sea.
- Sustainable resource management strategies: for example, extraction in areas where the seabed is quickly restored naturally; i.e. rapid infill of trenches through knowledge of seabed dynamics. In this way the possibility of a quick recovery of habitats is optimised.
- Closed area policies: for example, through better knowledge of marine habitats, areas can be closed to mining or dredging activities to protect breeding areas for fish or to preserve submarine landscapes. The EU Birds Directive has led to proposals to close large areas of the Dutch and German sectors of the North Sea in the near shore tidal water and in areas with a low recovery rate.

B2. Previous and current European research

The study of the processes, effects and use of marine sand and gravel is widely researched across Europe. One of the main challenges of this Action is to integrate national research initiatives in a collaborative structure to ensure that results add value to European marine policy. It is not the intention of this Action to consider only current research initiatives, as results from completed projects can be used as a platform to guide current and future work.

Key significant European projects exist such as SANDPIT which combined research from European countries to study the recovery of the seabed from marine extraction, SEANET which seeks to integrate monitoring techniques in the North Sea, and SEASED which combines seabed data from the European projects EUROCORE, EUMARSIN and EUROSEISMIC. These projects are only an example of a large number of national and European research initiatives that cover specific topics in marine extraction.

There is an identified need for further research in European waters. For example the Netherlands and the United Kingdom have extensive seabed sediment maps showing parameters such as grain size or mud content, which form the basic information for habitat studies and dredging plans. Habitat and seabed sediment studies, seabed morphology and seabed process studies are vital for mapping spawning aggregates and nursery sites for marine life. The results of this research can be used to identify areas for protection which can assist with national marine policy and in developing a European marine strategy. Each national geological survey organisation of countries which border European seas has a marine geology department or group carrying out marine research initiatives in seabed research and mapping programmes. The budgets of these groups, on average, exceed EUR 1 million per country annually.

This Action would add value to European research by bringing together researchers from disparate projects to address the wider issue of European marine strategy. The large number of research projects and collaborations creates a span of outputs which lack unity and creates many 'grey' areas which are open to interpretation. It is the aim of this Action to clarify and unify this breadth of research to eliminate these 'grey' areas in research outputs and consequently in marine policy.

As discussed, there already exist a number of European collaborative research networks and it is not the aim of this Action to reproduce their work. This Action will bring together European research but also be relevant to European marine policy and will create a clearer picture to direct and inform policy makers. This is an area which is not currently covered comprehensively by existing European collaborations and this is where input from COST will significantly contribute to informing European member states.

B3. Environmental science issues

This Action will cover a broad scope of science issues that are essential to the development of the industry. Work group objectives will deal with scientific research areas such as:

- Sampling programmes, and analysis of archived sediment material for organic and anorganic content as metals to assess present levels of pollution.
- Analysis of sediments found on or below the European sea floor which underpins many aspects of global climate change research, preservation of ecosystems and protection of marine biodiversity.
- Availability and accessibility of marine sedimentological, geochemical and geotechnical (meta) data and integration of scattered marine databases and collections. These types of information are fundamental to many researchers working within the framework of the global change and ecosystems sub-priority, as well as to sustainable development and management of marine ecosystems.

The outputs of this Action will be of benefit to research concerning fisheries, shipping and navigation, beach nourishment, pipelines and telecommunications industry, offshore industry, land reclamations and renewable energy works, while also allowing conservation of environmentally important features and habitats.

B4. International experience

There are many examples of similar marine research initiatives in the international forum, significant contributors are, Australia, China and the USA among others. This Action will keep up to date with international experience and, where relevant, draw on international results. If necessary, non-Europeans will be invited to Action meetings and researchers will be encouraged to look at international experience.

B5. Why a COST Action?

Currently there is little integrated transferral of knowledge across all facets of this sector within Europe because of the sheer number of research initiatives and the diffracted nature of individual national research and policy objectives. The data from research outputs is often in differing formats in different European countries, thereby inhibiting collaboration. Investment

from COST in this area will promote clarity between national objectives and will achieve agreement on and disseminate a European position.

This Action would add value to national research by synthesising techniques and results across geographic space to benefit a variety of end-users. It will enable ongoing scientific research to have more relevance and credibility across Europe, encourage collaboration and develop synergies between researchers to advance scientific results. This Action will bring similar disciplines together to exchange information, share experiences, transfer technology, and improve data management and sharing.

As there is a wealth of research information in western Europe there is also an opportunity to communicate this information to other European countries that have emerging and increasing demands for marine sand and gravel.

This Action covers both the environmental, technological and social aspects of marine exploitation which concur with the main objectives of the COST Environment Domain Committee. There is a clear benefit to integrating the four main topics:

1. environmental effects
2. markets and materials
3. resource exploitation and development
4. technology and data management.

COST is the best framework for an Action of this kind as it offers a bottom-up flexible networking mechanism where participation is on an à la carte basis. It is important for this Action to coordinate varying national research programmes and study initiatives. COST also has the flexibility to link to emerging cross-cutting themes such as policy and regulatory objectives.

ICES-WGEXT, the Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem, produces annual reports on extraction activities, seabed resource mapping programmes, approaches to environmental impact assessments and related environmental research developments. It appears that the research undertaken has been fragmentary and concentrated mostly in north-west Europe. Very useful information is being compiled annually, but excluding the Mediterranean countries and within the terms of reference of ICES- WGEXT, there is no room or time for further discussion or scientific cooperation with a lot of stakeholders or researchers, nor for scientific publications or other dissemination possibilities, apart from the reports. Hence, this Action will have a clear added value to direct the European Community towards better practice and policy; and the COST Action and ICES-WGEXT will both benefit from each other.

Over 90% of European marine science is supported by national RTD agencies. Many countries in the EU and abroad are looking at streamlining the management of their national seas (e.g. the Marine Bill proposal in the United Kingdom), but a strong, integrated European Union policy on the marine environment will enable harmonisation of Member State legislation and regulation.

The pressures on the marine environment arising from increased usage, effects of pollution and limited resources need to be integrated into a sustainable development model.

Considerable benefits can be gained from networking thematically similar national marine research programmes. EU support for an integrated approach to seabed studies provides an opportunity to coordinate the collection and analysis of fundamental geological, environmental and biological data that is needed to underpin sustainable development of the marine environment and their resources.

C. OBJECTIVES AND BENEFITS

C1. Action aim

The main aim of this Action is to bring together and add value to the disparate national and European research initiatives to create a unified, clear position to feed into European marine policy. This Action will aim to erase the ‘grey’ areas which exist in marine research and policy and work to disseminate collaborated European research results to assist future national and marine policy objectives.

C2. Action objectives

The objectives of the Action are to:

- Share information across Europe to identify problems and solutions within current practices, to strengthen research links and collaboration and to facilitate integrated marine management.
- Work across disciplines to identify synergies and develop an integrated approach to study the management, effects, policy and processes involved in marine aggregate extraction.
- Disseminate this collaborative research to aid policy and regulation of marine aggregate exploitation from which the wider scientific community can benefit; e.g. fisheries, marine archaeology, maintenance dredging.
- To bring together research from different fields and areas to integrate industry objectives into marine research.
- Disseminate the Action results as widely as possible to end-users

The more specific measurable objectives of the individual working groups are detailed in Section D.

C3. Dissemination objectives

The dissemination of the work group results and the Action’s outputs play a crucial role in the success of this Action. It is important that targeted dissemination takes place and is of relevance to the audience. Key dissemination objectives are to:

- Form a European Users Group to target policy makers, advisers and stakeholders for COST countries to ensure Action outputs have clarity and relevance for the policy audience.
- To ensure dissemination represents the views of the Action participants and is integrated, focused and applicable to the audience.
- To disseminate outputs to a wide targeted audience.

C4. Benefits of the Action

Collaborative research and dissemination activities would aid the creation of coherence in European marine exploitation to assist achievement of national policy objectives. The effectiveness and efficiency of research projects, technology improvements, market research and policy development throughout Europe would be improved by a COST Action that brings together divergent strands of research, technology development, policy formulation and regulation. By creating a pan-European network for researchers and stakeholders, progress towards integrated sustainable resource management can be made and will enable marginalised countries to benefit from collaboration, knowledge and technology transferral. The benefits of this Action will have the potential to extend to other activities; for example, maintenance dredging, fishing, general marine construction and will optimise best practice, thereby mitigating impacts on the environment.

This type of study enables guidance to advise decision makers on the effects of extraction on the seabed, and about how to improve the content of the environmental impact assessments. This Action will aid successful policy research by developing a strategic framework and scientific rationale to underpin future integrated policy development. Including and engaging with European research will mean national recommendations for policy will be well informed and have a secure grounding for integration.

Given the decrease in land-based aggregate resources, an increasing number of marine sites will be proposed and opened for aggregate extraction in the future. The results from the ongoing research will increase the scientific evidence and information required for national governmental bodies to evaluate marine sand extraction applications from a sustainability and environmental perspective. National policy makers look to the research Committee for an advisory role, therefore distilling European research results and allowing policy makers to have a direct influence on outputs will make this process of knowledge transfer easier.

The benefits also reach wider to societal requirements; infrastructure, beach nourishment and flood defence all add value to society, therefore the rate and efficiency of marine extraction may have a large impact. There is currently a tension between sustainable exploitation of marine resources and meeting society's increasing demand for supplies. By providing informed collaborative research through this Action, social issues such as environmental impacts, heritage and wastage can be addressed and managed.

D. SCIENTIFIC PROGRAMME

Action meetings will provide an opportunity for researchers to present current results and emerging issues and bring national marine focuses to a European forum. Within Action meetings, working groups will collaborate to discuss pertinent issues to identify synergies across European states and different disciplines. Each working group will produce position papers to present in a plenary session to exploit synergies and improve shared understanding and collaboration. Outside Action meetings, dissemination activities will continue through the use of bulletins, a web site, seminars and a collaborative conference at the latter end of the Action.

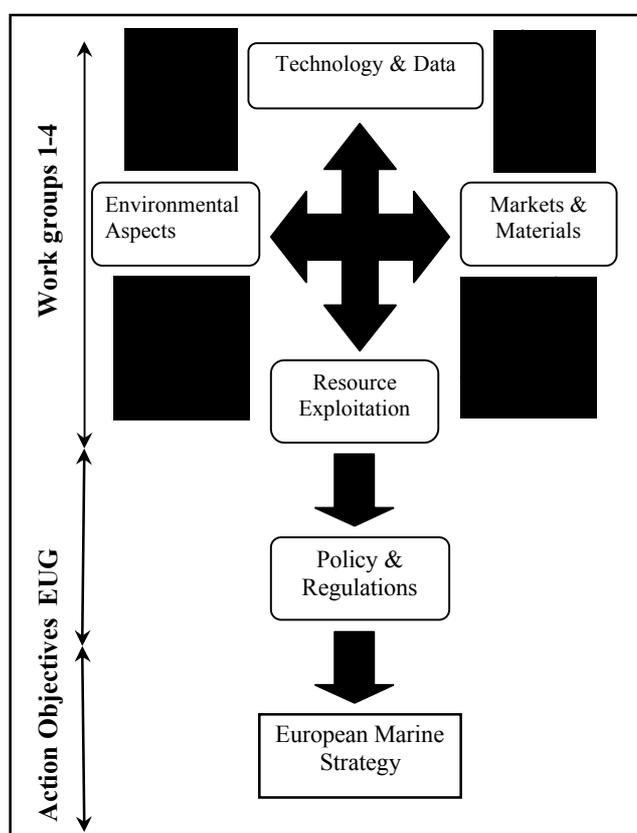


Figure 3: The Action processes themes
(EUG – European Users Group)

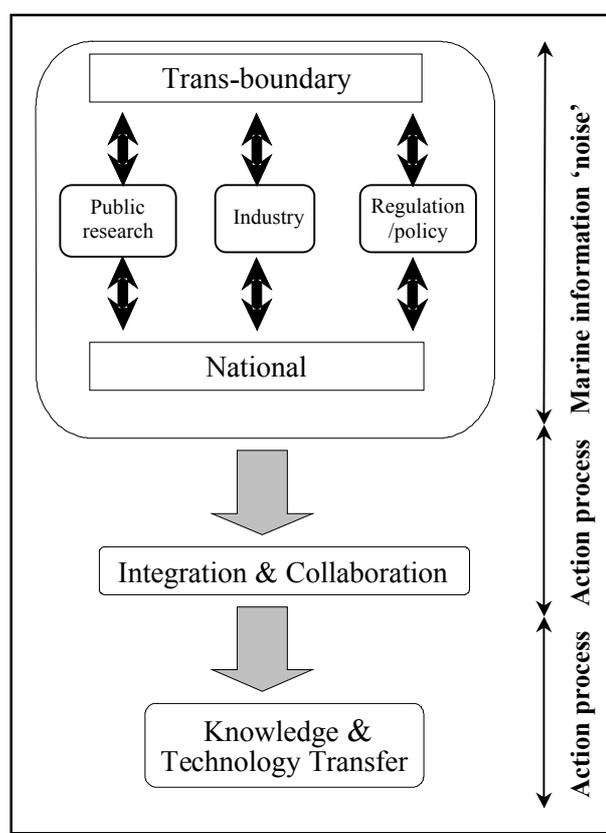


Figure 4: External influencing themes

Figure 3 illustrates the Action internal processes which work to reinforce and reproduce the message of the Action through the work groups. The work groups will produce outputs which

will feed into the cross-cutting themes and the European Users Group, which in turn will assist European marine strategy and achieve Action objectives.

Figure 4 shows the main information directions of national and transboundary marine information processes. This Action will attempt to eliminate the research ‘noise’ from these processes. This ‘noise’ can create ‘grey’ areas in policy and research outputs which can be left open to interpretation. This Action will assist knowledge and technology transfer and aid the process of information provision to the policy and decision makers at a European level.

General working group objectives include:

- Producing position papers to address the current European status of marine dredging for each work group.
- Combining best practice from across Europe for application/consideration in policy making, spatial planning and resource management.
- Improving baseline data and knowledge of aggregate resources in areas which are likely to be exploited in the medium term; i.e. the next 10-15 years.
- Improving knowledge on the relationship between marine habitats and areas of potential marine aggregate resource.
- Assessment of what research has been done and what needs to be done.

Each work group will be comprised of researchers from similar backgrounds and will be grouped under a general heading. The initial objectives of the work groups are listed below. These will form the basis for the opening Action objectives but will be refined and redefined if necessary at the work group meetings.

D1. Work Group 1: Environmental effects

This workgroup will be focusing on three main areas: current research, effects of extraction activity and recovery processes.

Initial work group objectives include:

- To identify the state-of-the-art within research and investigate and compare, using case studies and ‘grey’ literature, the range of environmental impacts from dredging (i.e. seabed morphology, nature and dynamics, ecology, the comparative impacts of land based extraction, coastline stability).
- To improve knowledge of the effects of dredging activity.
- To improve knowledge regarding capacity of recovery of dredged sites; e.g. persistence of effects in time or recovery of the impacted seabed under the influence of natural sediment dynamics.
- To improve knowledge on how morphological features such as tidal sandbanks, patch of tidal sandbanks or sandwave fields respond to (repeated) large-scale sand extraction.
- To improve knowledge on how the abovementioned processes depend on the way in which sand extraction is actually carried out (e.g. extraction location, as well as geometry and size of the sandpit).

- Assessment of possible future collaborative and cost-sharing research efforts between European and US/international entities.
- To strengthen the European capacity and performance of marine environmental data.
- To produce policy briefs and position papers on relevant topics to feed into the cross-cutting themes.
- To improve the insight on the selection of the best objective scientific indicators to be used by policy makers and governmental administrations.
- To describe the required environmental knowledge and forecasting to be transferred to the policy makers and governmental administrations.
- To search for more cost-effective and more appropriate monitoring tools and methods.

D2. Work Group 2: Markets and materials

There is a commercial element to this work group, therefore early contact will be made with EUREKA. This work group will establish links with EUREKA's projects and partners to strengthen and make this work group's objectives relevant.

The initial objectives of this work group are:

- To identify and consider how market demand, supply chain and end-users interact to meet social demand and to consider the suitability of marine sands for use compared with alternative materials.
- To identify data requirements and appropriate models for the integration of environmental and economic elements into cost benefit analysis.
- To support the integrated provision of infrastructure-related services to the European research community.
- To investigate internationally agreed protocols for cataloguing and exchanging datasets.
- To produce policy briefs and position papers on relevant topics to feed into the cross-cutting themes.

D3. Work Group 3: Resource exploitation and development

This working group will compliment and strengthen the work undertaken by ICES-WGEXT and work to discuss the quality and coverage of resource data in European waters.

The initial objectives of this work group are:

- To underpin harmonisation with European marine data quality control/assessment procedures and adoption of international meta-data standards and data-management practices.
- To identify and develop assessment and planning methodologies, synergies with other sea-bed users, current and emerging technologies to increase understanding, transference and sharing of information across Europe. This working group will compliment and strengthen the work undertaken by ICES-WGEXT and work to improve quality and coverage of resource data in European waters.

- To identify the most suitable aggregates among the different types of marine deposits (e.g. fossil paleovalley infillings, and dynamic potential resources such as sandbanks, submarine dunes (sandwaves)).
- To collate an assessment of potential new exploration technologies and resource prospecting.
- To coordinate and initiate national seabed mapping programmes.
- To agree guidelines for seabed mapping, sediment classification and legends used.
- To produce policy briefs and position papers to feed into the cross-cutting themes.

D4. Work Group 4: Technology and data management

This work group will be concerned with the issues associated with data transfer and harmonisation across Europe.

Initial objectives of this work group include:

- To work towards establishing protocols and standards across Europe to maximise the use and exchange of data by activities such as setting up a web-based library of scientific reports, articles and EIAs.
- To work towards the setting-up of GIS protocols and standards helping to compare and analyse data in a similar and efficient way.
- To exchange experience and to cooperate in development, promotion and implementation of data and information management practices and methods.
- To coordinate development of methods and equipment for seabed classification.
- To coordinate a better linkage of European databanks.
- To produce policy briefs and position papers to feed into the cross-cutting themes.

D5. Cross-cutting themes

The main cross-cutting theme in the Action is regulation, legislation and policy advisory. Work groups will be tasked to feed into this theme and consider how results may be useful for advisory purposes. Work groups will consider the following objectives when preparing policy briefs and policy papers.

- To identify the synergies and differences of the various national regulations and policy.
- To consider the basis of legislation and how policy might be affected by different approaches to information and data management, supply and demand (volume), and social and environmental considerations.
- A benchmark study of the rules, regulations and taxes in European countries.
- To know what is of prime importance for the different stakeholders and policy makers in order to influence research topics to develop.
- To identify stumbling blocks in current legislation and policy in order to formulate solutions and concrete additions and steps to prevent inefficient implementation of the law.

- To evaluate the present allocation and effectiveness of responsibilities in administration and the political power involved in decision taking within marine aggregate extraction.
- To circulate a questionnaire among policy makers, companies and researchers to build a better understanding of the lack of insight in technical and environmental constraints. This will serve to better define the non-specialist language (how research results have to be transferred in a clear way) and to increase the understanding and interaction between the involved parties.
- To disseminate Action outputs using the Action dissemination plan to target audiences.

As part of this theme a European Users Group will be established that will consist of policy makers and advisers, end-users and stakeholders from COST countries. Work groups will present policy briefs and position papers to this group either in annual seminars or via e-mail or the Action e-forum (see Section G).

The role of this group is threefold:

1. To target end-users to ensure that Action outputs reach the policy and stakeholder audience.
2. To feedback to and guide work groups, ensuring Action outputs are useful and relevant.
3. To liaise with the Management Committee to ensure a coordinated response.

E. ORGANISATION

The time chart of the Action is presented in Table 2. The Action will be structured around annual seminars which will facilitate the organisation of the main work groups. The work groups will set objectives and actions which can be reviewed at six-monthly workshops and either completed or extended at the next seminar. The seminars will also act as a more general discursive dissemination opportunity for national researchers to share information, network and hear presentations from leading experts in the field of marine extraction.

E1. Work Groups

The work groups are so divided as to cover the main topics of the Action. Each work group will be a flexible arrangement of leading scientists, researchers and organisations. The work shop will be on an à la carte basis and will allow for new members or objectives and will be flexible enough to absorb policy and regulatory change and new or contradictory research in the objectives of the groups.

The cross-cutting theme of regulation, legislation and policy advisory will be a constant consideration for the work groups. During day one of the seminars, work groups will be asked to think of cross-cutting themes and how they relate to each work group. This may be new legislation from the EU or new research from a member country. Work groups will then need to consider these cross-cutting themes in their discussions, objectives and feedback to the wider Action group in day one of the seminars.

The European Users Group will meet intermittently throughout the Action, and will have regular updates from the Action through e-mail and e-forum postings. European Users Group members can either be attending or corresponding. This group will be scheduled to meet simultaneously with the Management Committee and will include members of the Management Committee in order to coordinate a response to the work groups. Recommendations from the European Users Group will be presented to the Management Committee for approval to ensure a coordinated response.

E2. Seminars

Day one of the seminars will be used to present each work group's progress during the past year and discuss position papers and policy briefs produced during this time and discuss how these will feed into the cross-cutting themes. The occasion can also be used to present results from national research and invite guest speakers to discuss cross-cutting themes.

Day two of the seminars would be used for working groups to meet and assess previous work and set future objectives for short-term scientific missions and position papers. This day can also be used to discuss synergies between national research and work towards collaboration.

The seminars will be important to review the aims and objectives of the Action and for the work groups to define and assess their ongoing objectives. The interim work group sessions will be used to review objectives, ensure goals are met and set new goals for future work.

E3. Conference

An end of Action conference will be held to disseminate and discuss Action results and consider possibilities for further work.

E4. Management Committee

The Management Committee will meet bi-annually to assess each work group's progress and to set new objectives and ensure cross-cutting themes are addressed.

cutting themes. Representatives from national marine policy and decision makers will be invited to the first day of the seminars as a dissemination route.

There will be an end-of-Action conference to disseminate work group outputs and achievements. This will be important to ensure the aims of the Action are met.

Bulletins

An Action bulletin will be produced on a six-monthly basis to publish the outputs of the work groups, to share pertinent issues and news items. Researchers can also use the bulletin to disseminate relevant research outputs and how they are integrated into the Action.

Publications

Alongside the bulletin, articles from work groups will be published in scientific and technical journals and press releases and there may be a possibility of publishing all the results at the end of the project.

Web site and e-forum

An Action web site will be maintained to disseminate work group and Action outputs. Links to this web site will be on participating organisation web sites where possible. An e-forum can be established from the Action web site to act as a discussion mechanism for work groups during activities, for interested parties to find out more about the project and to post research outputs and latest work group papers.

European Users Group

The European Users Group will be used to disseminate work group outputs; i.e. policy briefs, position papers and short-term scientific missions, to a targeted and specialist audience. This group will be more than a dissemination route but it is important to recognise the importance of providing key contacts within the dissemination audience with an opportunity to influence the direction of the Action.

Participants of a specific country have to identify as many policy makers as possible active in their country who are concerned with marine aggregate extraction, in order to communicate the Action documents to them.

CIRIA

CIRIA is a not-for-profit organisation that develops best practice guidance. CIRIA has a wide distribution reach and will disseminate results and news from the Action through journals, web sites, press activities and contacts. CIRIA has experience in delivery of dissemination objectives such as these and can ensure Action outputs have the widest distribution possible.