# MarineTT

European Marine Research Knowledge Transfer and Uptake of Results

Project number: 244164

Supporting Action

Seventh Framework Programme

Environment (Including Climate Change)

# *Deliverable D3.3*

# Recommendations for Consideration

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| **Project co-funded by the European Commission within the Seventh Framework Programme (2007-2013)** | |
|---|---|
| **Dissemination Level** | |
| **PU** Public | **X** |
| **PP** Restricted to other programme participants (including the Commission Services) | |
| **RE** Restricted to a group specified by the consortium (including the Commission Services) | |
| **CO** Confidential, only for members of the consortium (including the Commission Services) | |

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## Summary

Detailed information on Knowledge Outputs (KOs) generated by FP6 and FP7 marine research was gathered through an online MarineTT survey[1]. Surveys were sent to 325 coordinators of marine projects from FP6 and 184 coordinators from FP7 marine research projects. Of the 509 projects surveyed, 148 project coordinators provided sufficient detail on KOs generated by their research. A total of 593 Knowledge Outputs (432 KOs from 102 FP6 projects and 161 from 46 FP7 projects) were incorporated into the Marine Knowledge Gate 1.0[2].

Each of the 593 KOs collected during the Collect & Understand Step of MarineTT was subject to additional internal MarineTT review and external expert validation and review to determine the potential of the knowledge impact end users, i.e., its potential application and the most appropriate medium for knowledge transfer.

Deliverable 3.3 provides a description both of the Expert review process and the ways in which Knowledge Outputs were identified as possessing high potential to impact end users and in turn moved forward to the Transfer and Connect phase.

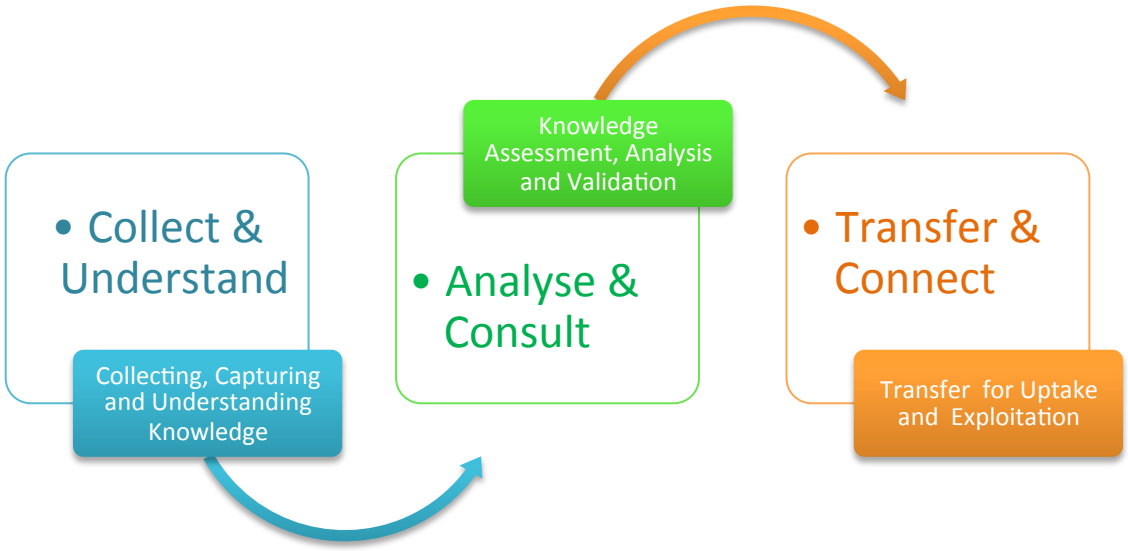
[1] See deliverable 2.4 – Methodology of Collection phase for a detailed description of the Knowledge collected
[2] www.kg.eurocean.org

## Introduction

Though all knowledge has some intrinsic value, new knowledge, which may have taken much time and effort to obtain, is of limited value unless it is taken up by those end users most capable of utilising its potential. The central tenet of MarineTT therefore was to seek out and bring new knowledge gained in the marine research sectors described above, directly to the relevant end users. To achieve this, MarineTT developed a Knowledge Management and Transfer Methodology with the capacity to ensure that the results of publicly-funded research are available for transfer to a variety of end users (industry, policy makers, researchers and other stakeholders) for uptake, leading to beneficial results as the EU continues on its path towards a Knowledge Based Bio-Economy.

The MarineTT Knowledge Management Methodology consists of three key steps:

1. **Collect & Understand**[3]
2. **Analyse & Consult**
3. **Transfer & Connect**[4]




A total of 509 marine research project coordinators, 325 from FP6 and 184 from FP7, were surveyed during MarineTT. A total of 148 project coordinators responded with sufficient detail concerning the Knowledge Outputs generated by their research that made further analysis possible. Completed surveys were organised into Marine Themes, based on those outlined in the "Sea Change - A Marine Knowledge, Research and Innovation Strategy for Ireland 2007-2013". The Themes chosen were:

- Environmental Monitoring
- Water Resource Management

[3] Refer to Deliverable 2.4 – Knowledge Collection Methodology for a detailed description of the Knowledge Collection process
[4] Refer to Deliverable 4.6 - Action Items for Transfer for a detailed description of the Knowledge Transfer process

- Fisheries
- Climate Change
- Aquaculture
- Ocean Energy

From these 148 detailed responses, 593 Knowledge Outputs (432 KOs from 102 FP6 projects and 161 from 46 FP7 projects) were identified and recorded.

Table 1 - Distribution of projects and Knowledge Outputs per MarineTT theme.

| Theme | Nº of projects | Nº of KOs |
|---|---|---|
| Aquaculture | 31 | 121 |
| Climate Change | 17 | 63 |
| Environmental Monitoring | 24 | 80 |
| Fisheries | 24 | 133 |
| Ocean Energy | 16 | 42 |
| Water Resources Management | 36 | 154 |
| Total | 148 | 593 |

In some cases Knowledge Outputs had potential applications in multiple themes and where this occurred, they were categorised in multiple themes for analysis.

All 593 Knowledge Outputs were subject to two main review procedures:

a) MarineTT team internal procedures
b) Subject Experts external procedures

After both of these review procedures the coordinator was contacted and given the opportunity to check amendments and changes made. The aim of these reviews was to ensure the accurate identification of the KOs and more importantly to determine the potential that this knowledge had to make an impact on end users and finally, to identify the most appropriate medium for knowledge transfer of the KO.

## A) Internal Review by MarineTT team:

Although the survey was carefully developed and involved the consideration of appropriate 'Information fields' which would be used to assess the Knowledge Outputs and would ultimately inform the Knowledge Transfer process for that Knowledge Output, the quality of the information provided in the survey varied greatly. The MarineTT considered it necessary to conduct:

- Additional knowledge gathering - post survey
- Internal validation of the gathered knowledge

Knowledge gathering post survey required that the MarineTT team reviewed the available information and documentation for each project (including project website, final report, executive summaries, brochures and others, as well as the full response to the survey) in order to gain a better understanding of the KOs and to identify any Knowledge Outputs which were not captured by the survey. Approximately, half a day was given for each individual project review.

This process was also an exercise in quality control – allowing a check that websites and links provided were extant and that each field of the survey response was clear and correct. Incorrect web-links and not live websites were recorded. During these reviews a number of KOs not recorded by the survey were discovered. These previously 'unrecorded' KOs were noted along with as much supporting detail as possible provided by the MarineTT team member who undertook the additional knowledge gathering.

In order to make the survey information more easily understandable and readily available a universal Knowledge Output Table (KOT) template was developed. The KOT provided a short but comprehensive project overview detailing the KOs of the project. The KOT also provided key information about the KO including the potential beneficiaries, Intellectual Property Rights associated with the KO, details of the knowledge transfer of the KO to date and its status (completed or not). Information fields developed for the KOT would assist the MarineTT team in assessing the potential impact of the Knowledge Output and would inform the Knowledge Transfer process for that specific output.

**Internal Validation**

Once the KOs from each project were categorised according to theme, an internal validation process was undertaken. Initially this was carried out remotely by scientifically trained staff in the MarineTT partnership (EurOcean & AquaTT) in individual thematic meetings. This was followed by a two-day joint validation meeting by the MarineTT partnership. The purpose of the internal validation session was:

- To identify any typographical/editing errors in the KOT;
- To decide if the short titles of the Knowledge Outputs were adequately informative;
- To determine whether the knowledge descriptions of the Knowledge Outputs were sufficiently comprehensive for the nature of the Knowledge Output to be properly understood, and to determine any potential application;
- To identify the potential Next/End-Users of the Knowledge Output, to list such users and to identify their potential application;

- To clarify if the Knowledge Outputs were publicly available or were subject to issues of Intellectual Property (which could affect transfer potential);
- To identify which Knowledge Outputs had the highest potential impact for the Next/End-User;
- To categorise the perceived potential impact of the knowledge as low, medium or high as an internal exercise for cross comparison with the experts at a later stage.

Once the internal validation process was complete, the individually amended KOT for each project was sent to the project coordinator for review. This was an important step as in many instances, additions and edits were made to the KOT's in an attempt to make them clearer. Specific questions for clarification of the outputs were also posed to the coordinator at this stage. This additional validation by coordinators aimed to:

- Ensure that the KOT content was correct and accurately represented the KOs;
- Confirm that any previously unrecorded KOs had been correctly identified;
- Provide any comments/adjustments;
- Identify the Potential End-User & Application field and provide any additional information which could help with dedicated transfer.

High priority was given to identifying the most relevant End-User(s) of the Knowledge Output. In many cases the responses from the coordinators identified end users related to the sub-sector for which the research was originally funded with little consideration for other marine sectors who could potentially apply the knowledge.

Feedback or comments received from the project coordinators were incorporated into KOTs. Coordinators were given a response period after which compliance with the information provided in the Knowledge Output Table was assumed.

## B) External Expert Review:

Given the broad scope of Marine Research covered by MarineTT, external thematic experts were recruited to assist in reviewing the KOT's. These experts, drawn from across Europe were brought together to form an Expert Panel representing potential end-user groupings (Research, Industry and Policy) per Marine Theme. Where possible, experts who have experience working in multiple domains (e.g. academia and industry or policy) and/or were involved in EC projects or International Expert networks were recruited so that they could play dual roles and analyse KOs from multiple perspectives. In total 16 experts were used in the review process. A list of External Experts and their short biographies can be found in **Annex 1**.

The External Expert review and validation process consisted of a desk study exercise to review the KOs remotely, followed by an Expert Validation Meeting. The purpose of the external review and validation was to:

- Review the KOs identified by the projects;
- Validate the fields of the combined Knowledge Outputs Table (KOT);
- Confirm that the proposed identified End-User(s) and application(s) were correct;
- Identify high-potential KOs.

### *Expert Desk Study*

Thematic KOTs were provided to the experts at least one week prior to the expert panel meeting. Experts were instructed to review fields in each Thematic KOT in order to gain sufficient understanding of the KOs. They were also requested to contact MarineTT team members if they required additional documentation provided by the project. The desk study took each expert between one and two days to complete.

Experts were asked to provide input into specified Expert Panel Input columns under the following headings:

**Expert Check/Comments**

Any fields associated with the KO which were unclear, or needed clarification to be highlighted and to provide any additional comments if needed.

**Potential End-User & Application**

To specify whom they considered the Next/End-User of the KO to be and to provide more detailed information about this user.

To identify specific industry sectors, companies or academic subject areas that might benefit from the KO.

**Expert perception of the potential impact of this KO on the Next/End-User**

To categorise KOs as low, medium or high depending on the potential of the knowledge to impact end users (based solely on the expert's experience, perception and opinion of the Knowledge as provided in the Knowledge Output Table).

Following the review, experts were asked to select their top ten KOs, i.e., those they considered to have the highest potential to impact end users – again this was a personal opinion expressed by the experts. The 10 KOs was entered into a table, which contained the following information:

- The Knowledge ID Number, Project Acronym and Short Title
- The end user and Application field (with experts additions/comments)
- The potential impact of the KO on the end user from an economical, social and environmental perspective scored as low, medium or high.
- Specific advice or instruction as to how the KO could be transferred to the specific end user.

It is important to specify that this last step in the process was based solely on the information provided in the KOTs and in no way can be taken as conclusive. The step was added as it was necessary to try and get the experts to select potential high-value KOs in advance of the Panel meetings so that extra time could be allocated to discuss selected KOs in more detail.

### *External Expert Panel Meetings*

Experts attended a one-day panel meeting designated by Theme. The panel meetings were facilitated by AquaTT and project officers from the MarineTT partnership participated actively in each meeting providing support and insight based on the collection and internal analysis phases. A total of five Expert panel theme

meetings were held; Ocean Energy, Aquaculture, Fisheries and Climate Change. Water Resource Management and Environmental Monitoring were grouped and reviewed by the same External Expert because of the common nature of the KOs in these themes. Comments provided by the experts and from the internal reviews were combined and their ranking (high, medium, low) included in the KOTs. This gave a visual representation of the KOs considered to have the most potential impact[5].

Diagram 1: Visual Representation of Evaluators Assessments

| Project | Expert 1: What is your perception of the potential Impact of this Knowledge Output on the primary end user? | Expert 2: What is your perception of the potential Impact of this Knowledge Output on the primary end user? | Expert 3: What is your perception of the potential Impact of this Knowledge Output on the primary end user? | Overall Rating |
|---|---|---|---|---|
| **Output 1** | High | Medium | High | High |
| **Output 2** | High | High | High | High |
| **Output 3** | Low | High | Medium | Medium |
| **Output 4** | Low | Low | Low | Low |
| **Output 5** | Medium | Low | High | Medium |
| **Output 6** | Low | Low | Medium | Low |
| **Output 7** | Medium | Low | Medium | Medium |
| **Output 8** | Medium | Medium | High | Medium |

The Expert Panel meeting agenda consisted of a step-by-step review of each field of each KOT for every project in the Theme. Where opinions were divided as to the impact potential of a KO, the output was discussed with experts who shared their experiences (drawing on either their existing knowledge of the subject area or through their involvement in the project). However, where it was universally considered by all experts that a Knowledge Output was of low impact, the KO was reviewed for editorial content only given the time limitations of the exercise. The combined KOT was updated for each theme based on the inputs from the Expert Validation process.

High-potential Knowledge Outputs were subject to a more rigorous review by Experts who were asked to provide advice that could be used by the MarineTT team in the knowledge transfer phase:

- To identify what additional information may be required on a KO in order to validate its applicability;
- To identify which Knowledge Outputs have the most potential impact on end users based on the information provided in the KOT;
- To provide a subjective expert perception of the potential/impact of the KO on the End/Next User;
- To advise on more specific End/Next Users (the name of a company(s) or multiplier(s) etc.) for the Knowledge Transfer phase.

Selection of KOs with high potential to impact users enabled a list of potential projects to be drawn up and moved into the Knowledge Transfer phase for further assessment.

[5] Deliverable 3.2 Project Profile template provides a detailed account of the expert scoring, comments and recommendations for each Knowledge Output

## Results

Expert validation and review of the 148 completed surveys produced a short list of 55 projects with at least 1 KO considered to have high potential to impact one or more end users. These projects were distributed over the six MarineTT thematic areas of Environmental Monitoring, Ocean Energy, Fisheries, Aquaculture, Water Resource Management and Climate Change (Table 1).

Table 1: Expert review and analysis of Projects and Knowledge Outputs collected during MarineTT

| Theme | Nº of projects | Nº of projects with high potential KOs | Nº of projects with medium potential KOs | Nº of projects with low potential KOs |
|---|---|---|---|---|
| Aquaculture | 31 | 12 (38.7%) | 7 (22.6%) | 12 (38.7%) |
| Climate Change | 17 | 9 (52.9%) | 6 (35.3%) | 2 (11.8) |
| Environmental Monitoring | 24 | 13 (54.2) | 10 (41.6%) | 1 (4.2%) |
| Fisheries | 24 | 8 (33.3%) | 12 (50%) | 4 (16.7%) |
| Ocean Energy | 16 | 3 (18.8%) | 2 (12.5%) | 11 (68.7%) |
| Water Resource Management | 36 | 10 (27.8%) | 10 (27.8%) | 16 (44.4%) |
| Total | 148 | 55 (37.2%) | 47 (31.7%) | 46 (31.1%) |

Unanimous agreement by experts on the top ten Knowledge Outputs from each Theme was not always feasible: for instance, experts from the Aquaculture and Environmental Monitoring Themes identified more than ten KOs with high potential to impact end users, while Ocean Energy and Fisheries identified fewer than 10 high potential KOs.

Several initiatives (at EC and Member State level) are attempting to develop improved methodologies, tools and processes for managing and transferring knowledge from RTD. These Cooperation and Support initiatives funded under FP7 have a strong mandate of transferring knowledge from research to specific end user groups. Examples include, Aquainnova (aquaculture), and MG4U (Marine Genomics), both of which have adopted the MarineTT methodology and thus have a similar approach to knowledge collection, analysis and transfer.

In an effort to reduce overlaps and duplication of knowledge transfer effort, wherever MarineTT considered KOs fitted better with the subject area of a different support action these KOs were shared with the more relevant support actions.

High-potential KOs from four projects from the Aquaculture Theme were forwarded to Aquainnova – "Supporting governance and multi-stakeholder participation in aquaculture research and innovation for direct transfer to the Aquaculture sector". Three projects from the Environment Theme identified by experts to have high-potential KOs were shared with the "Marine Genomics for Users" project. The highly

technical nature of these outputs means that specialist knowledge of the sector is needed for further review and for transfer to be effective. One project with high-potential KOs from the Water Resource Management Theme has been forwarded to the "Sea for Society - a new Mobilisation and Mutual Learning Action Plan", initiative for transfer direct to end users.

Over 60% of all KOs reviewed were considered to have medium – low potential to impact end users. Proportionately more high-potential KOs were recorded in the Environmental Monitoring and Climate Change Themes, with over 50% of all KOs identified by experts as having high potential to impact end Users. When medium-potential KOs are included, experts considered that 95.8% of KOs from Environmental Monitoring could have an impact.

The Ocean Energy Theme recorded the lowest proportion of high-potential (18.8%) and medium-potential (12.5%) KOs. Approximately one third of Aquaculture and Fisheries projects had generated knowledge considered to have a high potential to impact end users.

The remaining 47 projects with KOs considered to have high potential to impact end users were forwarded for further assessment and Knowledge Transfer.

## Conclusions

External experts with knowledge of state-of-the–art formed a crucial element of the MarineTT Knowledge Management methodology. Thematic experts with a more in-depth knowledge of a subject area were essential in validating the content of the KOs, identifying high potential outputs and suggesting potential applications and end users of the knowledge.

Feedback from the experts indicated that it was a challenging but worthwhile process, one that none had ever previously experienced. None of the experts was aware of this validation and review exercise occurring in other initiatives. Several experts suggested that all projects should be made to enter their project Knowledge Outputs in a KOT at the end of each project.

It was widely agreed that the collection of knowledge in the form of a Knowledge Output Table was beneficial compared with trying to extract knowledge from the typical reporting procedures in projects (e.g. final reports, deliverables and scientific publications).

The review process was intensive given the amount of KOs per theme. Each expert spent a maximum of two days only reviewing their KOT and attended a single one-day panel meeting. The experts were limited by the knowledge provided in the KOT and the time available to review each KO. In many cases the quality of the information provided by the coordinator might have resulted in the wrong assessment of the KO and is a recognised limitation of the methodology.

If more time had been available for the process as well as for direct accessibility to project partners or coordinators of projects, it would have been possible to go into more depth on each output, which might result in a better understanding of the KO which could in turn affect the assessment of potential and help with the identification of correct end users. This observation was made within the expert analysis phase, that when experts were very familiar with projects, they were able to provide clarifications and insights to the panel which affected the outcomes of the discussion and the ultimate assessment of potential.

It is not possible to draw strong conclusions on commonalities and differences between marine sub-sectors due to the fact that the collection was not comprehensive, as only 148 out of 593 projects responded in sufficient detail to the survey and were analysed. However the experts did make some observations that may indicate trends and reasons for some of the results:

**Feedback from the experts on the methodology**

- All experts so far have found it to be a very interesting and much-needed exercise
- In the time available it was not possible to examine every output in detail and review background information to fully assess potential; it was therefore typically an assessment based on KOT information available and personal knowledge
- Discomfort about the subjective nature of the ranking exercise (H/M/L and Top 10)
- Some experts found it impossible to pick Top 10 outputs, too subjective, too many to pick from
- The “End-User & Application” was too general in many cases

- Important to define "Primary End-User" (the next user who could take up the knowledge and apply it. They are not necessarily the ultimate beneficiary of the knowledge)

- It is challenging to rank an output overall if there are multiple end users and applications

- Methodology will suffer because many outputs are intentionally being kept hidden by co-ordinators. Need to find out if *de novo* research in a project is being kept hidden

- Expert sessions with industry actors are a valuable dissemination/knowledge transfer mechanism in their own right, besides the feedback suggested by the experts.

- Experts identified that the clustering process for the next phase of MarineTT will be important, and should include external assistance to aid transparency of MarineTT, as well as allowing the process to be as generic as possible.

- Important to identify suitable specific events/conferences/multipliers for Knowledge Transfer Phase

**Recommendations for the Research Governance Process**

- To improve the access to information on projects in CORDIS (contact details, final reports, etc)

- To improve communication between DGs so as to achieve synergy between projects aiming at similar objectives (avoiding duplication of efforts)

- To develop a standard terminology regarding the "knowledge outputs" being produced by projects and "Primary End Users" for use in proposal applications forms

- To include the description of 'knowledge outputs' as a compulsory project task/deliverable in DoWs, using an established standard template

- To recommend a requirement to capture the KOT fields at the end of projects

- Transparency – it is possible and beneficial to share the existence of outputs without compromising the IP

- Consortia might benefit from guidelines on how to accurately identify the correct primary end users and applications for their outputs

- Careful consideration needs to be given to incentives to encourage effective Knowledge Transfer within Projects

**Comparison between Marine Themes**

When comparing Aquaculture to Marine Energy, in both cases, the expert validation has identified any/all projects with potential, rather than just the top 10 high-potential outputs, as initially envisaged

- Projects in Marine Renewable energy theme were generally much more industry focused than those in Aquaculture, with most outputs being prototypes

- Marine renewables sector is arguably where Aquaculture industry was twenty years ago in terms of RTD, with the outputs are in a different stage of development

**MarineTT Observations from the Analysis Process**

Group composition is important

- Group Balance: between science, industry & policy will provide for more fruitful/enriched discussion/ learning experience due to different perspectives

- Active Actors: experts who have been involved in projects are very useful

- Industry Experience: crucial to have experts who have experience in the value chain

- Remuneration versus time: Time/effort required to complete each thematic area was under-estimated

In the cases of Climate Change, Environmental Monitoring and Water Resource Management proportionately more projects were considered to have generated knowledge with high potential to impact end users. In the case of Aquaculture, Fisheries and Ocean Energy fewer projects were identified as having high-potential KOs. Designation of the potential of a KO to impact an end user was made by experts and based on information provided by coordinators, including the end users identified and transfer undertaken by the project. These results do not imply that Aquaculture, Fisheries and Ocean Energy projects are less impactful. It could also suggest the latter Themes can be considered more "applied" and as such the end user and application had been correctly identified and appropriate transfer undertaken by the coordinator. Therefore the Experts considered that additional transfer was not necessary and the KO was considered of medium to low impact. It is not possible to test this theory within the scope of MarineTT.

Transfer of results from Climate Change, Environmental Monitoring and Water Resource Management was science-centred, as coordinators considered researchers to be the end user. Therefore, experts considered that the coordinators did not identify other end users correctly and as a result, communication with and

Knowledge Transfer options were not explored. Projects were then marked as not having attained their potential impact on other end users and so were designated as having high-potential KOs.

Experts considered that there is a real need for researchers to have a greater understanding of what Knowledge Transfer is, what it entails and what resources should be devoted to it. There is also the need for incentives for researchers to engage in more effective Knowledge Transfer. Experts considered that three of the Themes did not adequately investigate the potential end user of the knowledge, and as a result, transfer of research results was made via the usual route of peer-reviewed articles. Audiences other than the scientific community were neither targeted nor addressed.

Unless these shortcomings in the manner in which researchers regard the Transfer of Knowledge (from end user to mode of transfer) of the knowledge they generate, it will continue to be unavailable to end users and very little impact will be derived from it. It was generally considered that innovation would be enhanced if there were an open dialogue between researchers and end-users throughout the lifetime of the project and scientists were taught to consider a broader range of end-users for their knowledge. Building trust and understanding between researchers and end-users is central to effective Knowledge Transfer.

## AQUACULTURE EXPERT PANEL

**Dr. Reid Hole - RH Consulting, Norway & AquaTT Director**

Dr. Hole served as Corporate Director Food Safety of Nutreco B.V. for three years. Dr. Hole is a senior consultant within the food value chains, specializing in investigating the market potential for hi-tech and biotech products that improve production efficiency and food safety. On behalf of Nutreco International B.V. Dr. Hole established the world's first privately owned aquaculture research centre where he was the managing director for a period of ten years. After that he was appointed Director Technology and Development within Nutreco International, with major attention to IPR and business development. He has broad international experience in the food sector. He is currently a Director of AquaTT and over the years he has been the chairman or member of several other Boards of Directors, such as the Institute for Aquaculture Research (Akvaforsk), Cod Culture Norway AS, Nofima AS and subsidiaries of Nutreco international B.V. He serves as Vice Chairman of the board at Pharmaq A.S. Dr. Hole gained his doctorate with a thesis on nutritional physiology at the Norwegian University of Life Sciences.

**Dr. Richard Fitzgerald - NUIG**

A zoologist by training, Richard Fitzgerald was awarded his PhD for work on ecological interactions of fish-parasite communities but also holds qualifications in Business (MBA) and in Finance. He has been involved in Research and Development in Aquaculture for almost 30 years in a variety of roles and posts. In the 1980s, he worked as Technical Director with a salmon farming company owned by the State Venture Capital agency and thereafter, for a decade through the 1990s, he managed and led research efforts at the Aquaculture Development Centre in UCC. In 2000, he established and managed a specialist seafood company until 2006. He joined NUI Galway in 2006/7 as a Senior Research Fellow, and, currently, he manages the Carna Research Station of the Ryan Institute. He has served as a member of State Boards, Agencies and representative/consultative fora and trade organisations both nationally and internationally.

**Dr. Panos Christofilogiannis - Founder AQUARK, Involved in Plant Trends Ltd. Member of Panel for FEAP on policy**

Dr. Christofilogiannis trained as a veterinary scientist, with a Ph.D in aquaculture. He is the managing director of AQUARK which provides consultancy training services in the field of aquaculture. He is also an advisor to the Federation of Greek Aquaculturists (a producers organisation). He operates the secretariat for the Hellenic Aquaculture Technology Platform and is involved in two Working Groups of the European Aquaculture Technology and Innovation Platform (EATiP). His blend of Academic achievement and Industrial experience means that he can give unique insights into the needs of the Aquaculture sector.

## OCEAN ENERGY EXPERT PANEL

**Dr. Ronán Long - Marine Law Expert (Policy) previously assessed projects in DG Fish**

Dr. Long is the Managing Director of Marine Law and Ocean Policy Research Services Ltd. He read for his Ph.D. at the School of Law at Trinity College Dublin. He was the first recipient of the Michael Manahan Research Fellowship and is the author/co-editor of five books on oceans law and policy. He worked previously for the European Commission (1994–2002), the Naval Service (1981-1993) and plays an active part in international, European and national research projects.

**Dr. Gareth Davies - Aquatera (Industry), Marine Group Chair with Scottish Renewables Forum**

Dr. Davies is the Managing Director of Aquatera. He has worked as an environmental consultant for over 20 years. He trained initially as a marine biologist, completing a Ph.D. in Deep Sea Biology. He has since completed over 350 projects covering a wide range of environmental and operational topics. Renowned for innovative thinking, unbounded enthusiasm and commitment to finding solutions, Gareth has worked in many areas of the world including Sakhalin, Caspian Sea, Mediterranean Sea, South America and many island groups.

**Dr. Ray Alcorn Research Manager, HMRC (Science)**

Dr. Alcorn has been involved in many aspects of wave energy for over 15 years, having obtained a Ph.D. from Queens University Belfast on the topic of electrical control of wave-power plants. He has experience on several wave power devices worldwide, including projects emanating from Greece, Portugal, and several devices past and present in Scotland. His background in Electrical Engineering has given him expertise in the areas of control, simulation, instrumentation, embedded software, process control, electrical machines and power electronics, as well as practical experience in design and commissioning of medium scale electrical control panels. He is currently the Research Manager with the Hydraulics and Maritime Research Centre in UCC Ireland and it is a centre of excellence within Ireland for Ocean Renewables and Coastal Engineering providing support to the maritime industry as well as fundamental R&D. He is also on the board of the Marine Renewables Industry Association Ltd.

## Environmental Monitoring & Water Resource Management Expert Panel

**Prof. Mark Emmerson - Chair of Biodiversity, Queens University Belfast**

Prof. Emmerson graduated from Queen Mary University of London, UK in 1995 with a B.Sc. (Hons) in Marine and Freshwater Biology. He then moved to the University of Aberdeen in Scotland where he undertook both an MSc in Marine and Fisheries Science (1996-1997) and a Ph.D. in Zoology (1997-2001). His Ph.D. was focussed on combining empirical and theoretical approaches to the study of Biodiversity and Ecosystem Functioning. He then moved to the University of York where he undertook a Post doc focussed on the role of body size in food webs (2001-2003). He was appointed as a College Lecturer at University College Cork, Ireland in 2003. In 2010, he joined the School of Biological Sciences at Queens as Chair of Biodiversity. His research combines theoretical and empirical approaches in the study of ecological systems. He is a broad-based community ecologist studying the consequences of biodiversity loss for the provision of ecosystem services. He has worked in marine, freshwater and terrestrial ecosystems with a unifying focus on food webs and biodiversity at multiple trophic levels.

**Dr. Emanuel Gonçalves - ISPA, Lisbon**

Dr. Gonçalves' research interests are ecology and behaviour of reef fish, fish larval ecology and recruitment and Marine Protected Areas. His studies are centred on several aspects of fish biology, ecology and behaviour, namely: life-history strategies, reproductive behaviour, territoriality, alternative reproductive tactics, community structure and dynamics, larval development and ecology, recruitment processes and conservation. Most of the work is done in the field, and we use the comparative approach with littoral fish species, particularly blennies, gobies and gobiesocids. He is also involved in studies of recruitment processes and patterns and structuring mechanisms of littoral fish communities which intent to implement a medium to long term database system, intended to contribute to the monitoring, management and design of Marine Protected Areas in Portugal. He has been involved in the development and implementation of the Portuguese and European Ocean Strategies.

**Michéal Ó Cinnéide – Director of Environmental Protection Agency of Ireland,**

Micheál Ó Cinnéide is a Director with the Environmental Protection Agency of Ireland.

**CLIMATE CHANGE EXPERT PANEL**

**Dr. Anthony Grehan NUIG, Involved in CORALFISH, HERMIONE, CLAMER projects**

Dr. Grehan is a senior Research Fellow in the Department of Earth and Ocean Sciences in the Department of Earth and Ocean Sciences at the National University of Ireland, Galway. Dr. Grehan obtained his Ph.D. in zoology in Ireland before undertaking post-doctoral studies at the Université Pierre-et-Marie-Curie, Paris VI (Laboratoire Arago, Banyuls) and at the Université du Québec in Rimouski and Montreal, Canada. Dr. Grehan is a deep-sea biologist and is currently particularly interested in the ecology and conservation of cold-water coral reefs and the sustainable management of deep-sea resources. He has over 20 years experience of working in European funded Marine projects including CORALFISH, HERMIONE, CLAMER AND FEUFAR. He is a member of the International Council for the exploration of the sea (ICES) working groups on Deep-sea Ecosystems and Marine Habitat mapping and also chaired the EC Scientific, Technical and Economic committee for Fisheries (STECF) working group evaluating the effectiveness of marine protected areas as tools in fisheries management.

**Dr. Sergio Castellari - Senior scientist and Project Coordinator, Italian IPCC National Focal Point, Centro Euro-Mediterraneo per i Cambiamenti Climatici (CMCC) Istituto Nazionale di Geofisica e Vulcanologia (INGV), Bologna (Italy)**

Dr. Castellari graduated in Physics at University of Bologna (Italy) and then he received a Ph.D. in Physical Oceanography from University of Miami (USA). He worked at the University of Miami, and in Italy at CNR (National Research Council), and then since 2000 at INGV (National Institute of Geophysics and Volcanology). From 2007 he has also worked as senior scientist at CMCC (Euro-Mediterranean Centre for Climate Change) in Italy, where he is responsible for the International Relations and Negotiations Group. Since 2000 he has worked as a science expert for the Italian Ministry for the Environment and he participated as Italian Delegate to IPCC, UNFCCC, UNCCD, GEO and UNEP Sessions. He participates as Italian expert at the EU Science Expert Group of the EU WPIEI-CC (European Union Working Party on International Environmental Issues - Climate Change) of the EU Council. He has been co-chair of Contact Groups on research at UNFCCC-SBSTA sessions. Since 2007 he is the IPCC National Focal Point for Italy.

**Dr.Tiago Capela Lourenço - Environmental Engineer – Climate Change Impact, Foundation Faculty of Sciences - University of Lisbon, Coordinator of CIRCLE-2 ERA-NET project**

Tiago Capela Lourenço is a research coordinator at FFCUL - a non-profit foundation supporting research management for the Faculty of Sciences of the University of Lisbon (FCUL). He holds an Environmental Engineering degree and since 2005 has worked for FFCUL as a research manager (and researcher) on several national and European projects. He was responsible for the Portuguese participation in CIRCLE CA and is the Coordinator of CIRCLE-2 ERA-Net. He has extensive experience in large integrated research projects on Climate Change Impacts and Adaptation.

**FISHERIES EXPERT PANEL**

**Dr. David Reid - Project Coordinator, UCC and Marine Institute**

Dr. Reid is a graduate in marine biology from Liverpool (Port Erin) and gained a Ph.D. in Maine biological rhythms at Bangor University in 1985. He then worked in Bangor on intertidal crustacean behaviour and physiology until 1989. He then moved to the Marine Laboratory in Aberdeen, where he joined the Fisheries Management Team. In Aberdeen he worked in a wide range of fisheries issues, in particular, fishery surveys, ecosystem interactions with fisheries, fishing capacity and effort, and gear technology. From 1997 he worked in these fields as a research group leader. In 2009 he moved to the Marine Institute in Galway, where he is now Principal Investigator on the Beaufort Ecosystem Approach to Fishery Management Project. This project is a collaboration between the Marine Institute, University College Cork and Queen's University Belfast, and is a seven-year project funded by the Irish government. Reid has had an extensive role in International Council for Exploration of the Sea during the last 20 years: he has chaired numerous expert groups as well as the Living Resource Committee, and he was a member of the Consultative Committee and the Advisory Committee on Fishery Management.

**Mr. Lorcán Ó'Cinnéide – Irish fish Producers Organisation**

Mr. Ó Cinnéide is CEO of the Irish Fish Producers Organisation and a director of the Federation of Irish Fishermen. He is also a member of the EU's Advisory Committee on Fisheries and Aquaculture and the North-western Waters Regional Advisory Council and a member of the Aquaculture License Appeals Board. Mr. Ó Cinnéide is a graduate in Economics and Politics from Trinity College Dublin and a former fishing vessel owner who has had twenty years association with the Irish fishing industry in various capacities. Mr. Ó Cinnéide has had a broad range of interests in the fields of regional economic development.

**Dr. Hazel Curtis - Chief Economist with SEAFISH Authority UK**

Dr. Curtis is currently Chief Economist at Seafish, which supports all parts of the seafood industry. Seafish aims to ensure that policy and business decisions relating to the fishing and seafood industries are well informed with appropriate expert analysis and advice. The company delivers an extensive range of key

research and consulting projects to private and public sector clients, including Marine Scotland, Defra and DG Mare. Dr. Curtis was appointed as a member of the plenary committee of the EU Commission's Scientific, Technical and Economic Committee for Fisheries (STECF). She is also currently President of the European Association of Fisheries Economists.

Dr Curtis has specific experience in fleet profit analysis and forecasting and in value chain analysis, considering the linkages through businesses in all stages of the seafood value chain. Other areas of interest include

- Fleet profit estimates - costs and earnings data
- Fisheries management
- Industry surveys and analysis
- CFP reform

**Dr. Marina Santurtun - Project Coordinator AZTI Tecnalia-Investigacion**

Dr. Santurtun has been Coordinator of resources and commercial fleets in the marine research unit of AZTI-Tecnalia since 2005. Her area of expertise includes the implementation of sustainable fisheries management and Marine Ecosystems management. Dr. Santurtun is currently ICES working group leader on the Biology and life history of Cephalopods. She was coordinator of coordination of the European FP7 project "AFRAME: A framework for fleet and area based management fisheries".