MarineTT

European Marine Research Knowledge Transfer and Uptake of Results

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Environment (Including Climate Change)

Deliverable D5.4

Qualitative and Quantitative assessment report of Knowledge Transfer

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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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1. Introduction

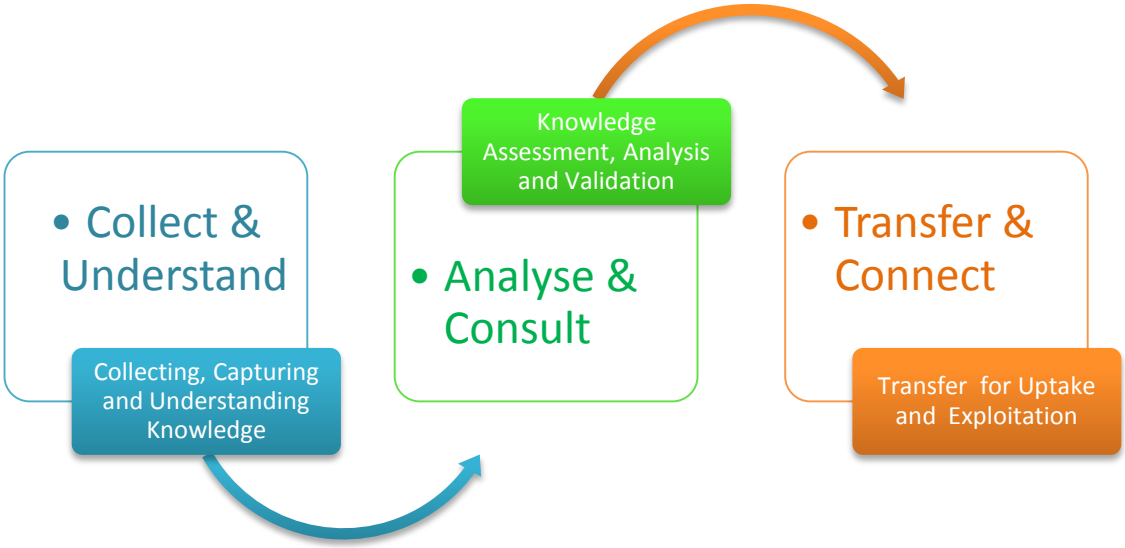
Deliverable 5.4 “Qualitative and Quantitative assessment report of Knowledge Transfer” provides an analysis of the MarineTT Transfer & Connect methods and details of the tailor-made knowledge transfer plans developed.

2. Overview of the MarineTT Knowledge Management and Transfer method

MarineTT recognised it was critical to capture, understand and analyse the knowledge outputs generated by research so as to demonstrate the wider value and benefit of these outcomes to the European society and economy. In order to gather knowledge that could be transferred The MarineTT Knowledge Management Methodology was developed and comprises three key steps;

1. Collect &Understand
2. Analyse &Consult
3. Transfer & Connect

Deliverable 5.4 is concerned with the Transfer & Connect step of the MarineTT methodology and will provide analysis of the Transfer activities undertaken during the project. However, it is necessary to give a brief overview of steps 1 and 2 of the MarineTT Knowledge Management and Transfer method to provide an understanding of how the knowledge to be transferred was identified.



2.1 Collect & Understand

The Collect and Understand phase aimed to gather the Knowledge Outputs from marine projects funded under FP6 and FP7, to obtain an understanding of these outputs, and to identify the end user and the potential application of the knowledge. Projects for inclusion in the MarineTT process were chosen on an individual basis dependant on whether a significant part of the research was marine related. A total of 323 FP6 projects were considered for inclusion in MarineTT with a further 184 projects from FP7.

An online survey was developed by MarineTT for Project coordinators to record specific information on the Knowledge Outputs generated by their project. Overall 507 project coordinators were surveyed for their Knowledge Outputs. Following a review of surveys by the MarineTT team, 148 survey responses were considered to have provided sufficient information for further analysis, and were grouped into themes. A total of 593 Knowledge Outputs were recorded across the six themes (Table 1).

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

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 and as much supporting detail as possible provided by the MarineTT team member undertaking 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

The KOT for each project underwent an internal validation process per theme. Initially this was carried out remotely by each MarineTT partner (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;
- Determine if the short titles of the KOs were adequately informative;
- Establish if the knowledge description of the KOs were comprehensive enough to adequately understand the nature of the KO and to determine its possible application;
- Identify the potential Next/End-Users of the KOs, to list these users and to identify their potential application;
- Clarify if the KOs were publicly available or were subject to issues of Intellectual Property (which could affect transfer potential);
- Identify which KOs had the highest potential impact for the Next/End-User;
- Categorise the perceived potential impact of the knowledge as low, medium or high.

Once the Internal validation process was complete the KOT for each project was sent to the project coordinator for review. Specific questions which arose during the internal review process were also posed to the coordinator. This additional coordinator validation 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.

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 KOT was assumed.

2.2 Analyse & Consult

Knowledge Outputs captured by the “Collect & Understand” phase then advanced to the “Analyse and Consult” phase which involved a review and further analysis of the knowledge by external experts. The aim of this phase of the MarineTT Knowledge Management and Transfer Method was to have the potential applications of the Knowledge Outputs and the target audiences and their needs carefully assessed by experienced experts. Experts from the three main end user disciplines (Research, Industry and Policy) were identified for five of the six MarineTT Themes. Due to the similarities between the Water Resource Management and Environmental Management Themes these were reviewed by the same expert group.

Expert Validation and Review

The expert validation of the KOTs consisted of a desk study followed by a one day expert panel meeting. Thematic KOTs were sent to the experts at least one week prior to the panel meeting. The desk study took each expert between one and two days to complete. Experts were asked to:

- Validate the content of the knowledge output tables, by highlighting any fields which were either unclear or needed further clarification.
- Confirm that the proposed identified end-user(s) and potential application(s) were correct

- Provide their expert opinions on potential end user(s) groupings (e.g. industry sectors, companies or academic environments).
- Assess the potential impact of the KO on the end user and classify the knowledge as low, medium or high based solely on the information provided in the KOT.

Following the desk study review, experts were asked to select their top 10 KOs. Experts were asked to provide specific details on their Top Ten KOs including:

- Potential impact of the KO on the next/end user from an economical, social and environmental perspective scored as low, medium or high.
- Specific advice or instruction on how the KO could be transferred to the specific next/end user(s).

Experts attended a one day panel meeting by Theme. Five expert panel meetings were held; one each for Ocean Energy, Aquaculture, Fisheries and Climate Change. One expert panel meeting was held for the Water Resource Management and Environmental Monitoring due to the similarities between these two themes. Comments provided by the experts and from the internal review were combined and their scoring (high, medium, low) were included in the KOTs[1]. This gave a visual representation of the KOs considered by the Experts to have the most potential impact.

The Expert Panel meeting consisted of a step-by-step review of each field of each KOT for every project in the Theme. Where opinions were divided on the impact potential of a KO, the output was discussed with experts sharing their experiences (drawing on either their existing knowledge of the subject area or though 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. The combined KOT was updated for each theme based on the inputs from the Expert Validation process.

The Top Ten KOs provided by each expert was subject to a more focused review and experts were asked to provide specific advice on advice on end users and multipliers for knowledge transfer. A list of projects with high potential KOs was the main output of the External Expert validation

2.3 Transfer & Connect

Following the External Expert analysis a total of 55 Projects were identified by experts as having knowledge outputs with a high potential to impact end user(s). This selection process was foreseen in the DOW since it was not possible to be able to transfer all knowledge outputs within the limitations of the project finances and duration. The selection in no way implies that other knowledge outputs or projects not selected for the transfer phase had no value but rather, were not selected to be used as case studies for the purposes of MarineTT. The full breakdowns of high, medium and low potential projects are listed in Table 2.

The ulimate goal of the Knowledge Transfer phase was to pilot a methodological approach for transfering knowledge. Successful Knowldge Transfer is dependent on identifying the most suitable methods of transfer however, this requires significant investment of time and resources which needs careful planning and design from the begining of the research.

[1] Refer to Deliverable 3.2 Matrix for each research project profile for details of the coordinator review and identification of KOs

Table 2: Identification of Knowledge Outputs of high, medium and low potential Impact per MarineTT Theme

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	7	12
Climate Change	17	9	6	2
Environmental Monitoring	24	13	10	1
Fisheries	24	8	12	4
Ocean Energy	16	3	2	11
Water Resources Management	36	10	10	16
Total	148	55	47	46

3. Results

Due to limited resources (financial and time), it was never intended to carry out comprehensive knowledge transfer of all high potential Knowledge Outputs identified in the project. Instead, the intention was to develop and pilot a new process in how to approach knowledge transfer which if successful could be replicable by others wanting to carry out knowledge transfer within their projects.

A total of 55 projects from 148 (37.2%) were considered by experts in the various themes to have Knowledge Outputs with at least one high-potential Knowledge Output[2].

The MarineTT decision on the format of the tailor-made knowledge transfer case studies depended on a number of factors including:

- The original transfer caried out by the coordinator i.e. the number of end users previously transferred to, the region/area of transfer
- Additional end users identified by MarineTT
- The nature of the Knowledge Output

For these reasons a variety of different knowledge transfer approaches mechanisms were carried out.

In one Case Study for Transfer policy briefs were created to transfer developments in Fisheries Management to policy makers. These briefs provided an overview of research results from several related projects. The coordinators of the research projects had identified one cohort of end user – other researchers and transfer was focused on peer reviewed journal articles. MarineTT considered that policy makers had not been adequately addressed during the original transfer and so specific targeted transfer was needed. Policy briefs were between five and ten pages long and were written specifically for policy makers. To enhance ease of understanding and uptake the briefs included a dialogue box of bullet points summarising the main outcomes of the research.

Another MarineTT Case Study for Transfer created a webinar to demonstrate a new Harmful Algal Bloom (HAB) technology. The original transfer undertaken by the coordinator was a demonstration workshop. However, MarineTT considered that the coordinator had not identified the appropriate end users. After attending the demonstration workshop MarineTT determined the correct end users with the input of an expert in HAB monitoring. MarineTT decided that a webinar should be developed as the mechanism of knowledge transfer. The webinar format was chosen for a number of reasons including:

- Cost effective medium
- The end-users were geographically dispersed
- There was no limit on participation
- It was interactive
- It was possible to record the webinar for future reference by other end-users

After the event the webinar recording was hosted on the MarineTT website making it accessible at any time after the live event. The number of downloads could be recorded and from this the impact of transfer demonstrated.

[2] Refer to Deliverable 3.2 Matrix for each research project profile for further details on the identification of knowledge by high, medium and low potential impact

In another Case Study of Transfer of a new water treatment and recycling system for use in aquaculture, the coordinator had identified the appropriate end users but had not considered the medium of transfer. The coordinator had also limited transfer to a specific region. MarineTT worked with the coordinator to produce materials to assist in the knowledge transfer process. The transfer materials created included a 20 page summary document based on the highly technical 160 page description of the water treatment and recycling system. This summary manual provided the significant details of the system including cost benefit analysis and a measure of the effectiveness of the system in meeting legislative requirements. MarineTT broadened the scope of the transfer to be pan-European and to include other sectors including agriculture.

In another Case Study for Transfer the outcomes of several related Harmful Algal Bloom projects were reviewed by an International Expert in the field and outputs compared. Original transfer during the lifetime of the projects had identified the appropriate end user as other researchers and had utilised the established transfer route of peer reviewed journal articles. However, experts in the MarineTT validation and review process could not determine the differences between the various projects. MarineTT chose to create a project comparison table which was completed by the expert. The comparison table was developed as a resource for researchers in the area to provide an overview of state-of-the-art and to allow a critical review of knowledge outputs for novel and relevance to them.

3.1 Knowledge Clustering

Experts invited to participate in each of the MarineTT expert validation and review sessions were surprised by the number of research projects and knowledge outputs collected for each theme. Even experts who were involved in numerous EC funded projects were not aware of all the funded activities in their area of expertise. Experts were also surprised to encounter multiple projects addressing a common challenge. Experts considered that the mapping of the projects and clustering of the knowledge arising from the projects would be valuable to a wide range of end users. Based on this insight, Knowledge Clustering was conducted on multiple topic areas (24 in total). Where clustering took place, knowledge was clustered irrespective of the experts' assessment of potential impact of individual knowledge outputs. External experts considered this function of the MarineTT project to be a valuable source of information for multiple end users, providing insight through an up to date overview of past and ongoing research.

A total of 24 clusters have been identified and are listed in Annex 2. All of the 148 projects reviewed during MarineTT have been assigned to one cluster, and 31 projects were included in more than one cluster. All of the detailed Knowledge Outputs collected and validated during the MarineTT process can be found in the Marine Knowledge Gate 1.0. Knowledge Clusters will be listed on the MarineTT website[3] and will be linked to the Marine Knowledge Gate 1.0.

3.1.1 Knowledge Sharing with other Knowledge Transfer Initiatives

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),

[3] www.marinett.eu

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.

Four projects in 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. One project with high-potential KOs from the Water Resource Management Theme was forwarded to the "Sea for Society -a new Science in Society (Mobilisation and Mutual Learning Action Plan). The 3 projects are still ongoing so it is not possible to capture the transfer activity within those projects at this stage.

The remaining 47 projects moved forward to the MarineTT Due Diligence phase.

3.2 Due Diligence

The first step in the MarineTT Transfer Methodology (Phase 3) is "Due Diligence". Due Diligence is an essential step in which a more in-depth analysis of each Knowledge Output was carried out. This step was essential as up to this phase, all KOs were identified as having potential based on the information in the KOT. However the KOT content is limited and it was essential to validate key characteristics of each KO before developing a tailor-made knowledge transfer plan and ultimately carrying out transfer.
Key Elements in the Due Diligence phase include:

1. Verify all final "**Knowledge Output**" details
2. Determine **willingness** of KO owner & other beneficiaries to help in Knowledge Transfer
3. Clarify **Intellectual Property** rights (IP)
4. Confirm "Primary **End User(s)**" and assess capacity for uptake
5. Identify suitable **Transfer Methodology**; technical level, medium, channel
6. Classify if knowledge can be **clustered** or is stand-alone for transfer

At the end of the Due-Diligence phase, the MarineTT team held a meeting where a decision would be made on whether the Knowledge Output was ready for transfer and a go/no go decision was made.

MarineTT team members with competencies in and experience of each of the marine themes were selected to carry out a Due Diligence exercise on the short list of 47 projects. The list of projects identified as having high-potential KOs to impact end users can be found in Annex 1.

Results of the Due Diligence phase of the MarineTT recorded a number of issues with many KOs which eliminated them from moving forward to the tailor-made targeted knowledge transfer stage. A full breakdown of the barriers encountered per theme is given in Table 3.

Table 3 – Overview of MarineTT projects forwarded to Case Study following Due Diligence exercise

Theme	Nº of projects with high potential KOs	Forwarded to other initiatives	Due Diligence barrier	Protracted Due Diligence barrier	Case Study for Transfer
Aquaculture	12	4	3	3	2
Climate Change	9	0	9	0	0
Environmental Monitoring	13	3	7		3
Fisheries	8	0	2	2	4
Ocean Energy	3	0	3	0	0
Water Resources Management	10	1	8	2	0
Total	**55**	**8**	**31**	**7**	**9**

Table 4 records the specific barriers encountered in the Due Diligence process across six themes.

Table 4 – Barriers recorded during Due Diligence

Theme	Unable to contact coordinator	Unwilling to engage with MarineTT	Intellectual Property Rights	Output further developed by follow up project	Transfer complete during project	Output not ready	Protracted Due Diligence
Aquaculture			2	1			3
Climate Change					8	1	
Environmental Monitoring	2	1		1	3		
Fisheries		1				1	2
Ocean Energy		1			1	1	
Water Resource Management		2		2	2	1	2
Total	**2**	**5**	**2**	**4**	**14**	**4**	**7**

MarineTT was unable to contact coordinators of two projects in the Environment Monitoring theme. In both cases significant efforts were made to contact other partners in the consortium however these efforts were also unsuccessful. Without the assistance of the coordinators, it was not possible to proceed and the projects did not progress to transfer.

Of the five projects unwilling to engage with MarineTT, all had been funded under FP6. Two of the coordinators (one from Ocean Energy and one from Environment) considered the outputs to be dated and no longer relevant to end-users. Other coordinators gave no reason for not engaging with MarineTT.

Intellectual Property Rights associated with two projects (both in Aquaculture) prevented coordinators from transferring knowledge further. In one project the high-potential KO formed the basis of a patent application for a product which would be commercially available. In the other case the high-potential KO was the property of members of the project consortium who were not willing to transfer further. The coordinator did not anticipate that the consortium would use the knowledge further.

Outputs from four projects did not progress from Due Diligence as the knowledge from the projects had led to follow up projects funded by the EC. Three of the original projects had been funded under

FP6, one (from Aquaculture) had been funded under FP7. Where Knowledge outputs were the basis of new projects, it could be inferred that the knowledge is not yet ready for market but rather requires further research or product development before suitable knowledge transfer can be devised.

By far the most common barrier encountered during Due Diligence was where the coordinator of the project considered that the primary end user of the knowledge had been identified and adequate transfer undertaken during the lifetime of the project. This was most evident for the Climate Change, Water Resource Management and Environmental Monitoring Themes. End users of the outputs from ten high potential projects were identified by the coordinators as other researchers in the field. Coordinators did not think further transfer by MarineTT was necessary. In the case of Ocean Energy the coordinator identified a niche end user group and considered knowledge transfer had been appropriate for them. Further knowledge transfer through MarineTT was considered "overkill" by the coordinator.

Given the limited timeframe and remit of MarineTT it was not possible to examine whether the opinions of the Coordinators was correct and they had carried out appropriate knowledge transfer, especially since the MarineTT experts identified their outputs as high potential and suitable for transfer. It would be interesting to carry out a more in-depth study on whether the relevant stakeholders were only the scientific community. Given the current developments, one would assume that "Policy" should be a major end-user grouping for Environmental research knowledge. The outputs of the 13 projects did not proceed past the due diligence phase.

In the case of four projects, the knowledge outputs were still under development. All four projects had been funded under FP7 and were due for completion from late 2012 to mid 2014. In this case, the Knowledge provided during the Knowledge Collection exercise was based on expected outputs and thus not ready for transfer within the timeframe of MarineTT.

In the case of seven projects the Due Diligence process was protracted. Initial contacts with the coordinators indicated willingness of the coordinator to engage with MarineTT. However, Due Diligence took longer than anticipated as MarineTT needed impartial advice on the details of certain knowledge outputs. A log of the interactions for each case study can be found in Deliverable 4.6 Action Items for Transfer. MarineTT project officers put in a lot of effort to try and progress the Knowledge Outputs, information was sought from other participants in the consortium or from other experts in the MarineTT network. Due to the protracted interactions, the due diligence phase was drawn out and decisions to proceed to Case Study for transfer were not taken until near the end of MarineTT.

In two of these protracted Due Diligence cases MarineTT has not been able to develop individual transfer plans. There were a number of reasons why promising knowledge from these projects was not transferred including: difficulty in contacting the coordinator, delays in response to MarineTT requests for additional information and delays in engaging with where other partners in the consortium. Essentially time was the most limiting factor which prevented the development of the KOs in to Case Studies for Transfer.

Of the 47 projects that were considered to have high-potential KOs to impact end users nine projects were considered suitable to move forward and develop a customised knowledge transfer plan. These nine projects were identified as "Case Studies" for Transfer[4].

[4] Refer to Deliverable 4.6 Action Items for Transfer for more details on the Knowledge Transfer plans for each Case Study project

Whilst the ultimate number of projects that passed Due-Diligence and moved forward to case study was low, this was anticipated by the Advisory board at their final meeting (June 2011) who envisaged that trying to carry out knowledge transfer on external projects and typically post project completion would be challenging. Hence the intention was to always focus on the process and through the work on the case studies try and identify useful approaches that could be adopted by other initiatives in the future.

Refer to Deliverable 4.6 for further details of the Due Diligence procedure and Deliverable 5.2 which specifies the Knowledge Transfer plan created for the Case Study projects.

Conclusion

Successful Knowledge Transfer is a process that must be customised depending on two key factors a) the type and kind of knowledge, and b) the end-users, their capacity and motivation for uptake. Once there is an understanding of factors a) & b) it is possible to develop a transfer plan, selecting suitable mediums and channels for transfer and suggest the indicators of impact.

Whilst the key factors are different for almost every case, it is possible to follow a step wise process in carrying out knowledge transfer which ensures that sufficient preparation takes place so that the actual transfer has a good chance of success. However even with the best preparation, it is not a simple activity and thus where possible, when carrying out transfer you need the ability to be adaptable and flexible, adjusting approaches depending on conditions. As such it requires the knowledge transfer practitioners to be proficient and understand the process and objectives.

Effective Knowledge Transfer requires competence, time and resources. For MarineTT, a limiting factor was time, as the project was only 30 months of which a significant amount of time was consumed by the Collection and Analysis phases. Therefore there was a limited window to carry out transfer piloting. In addition, within the Knowledge Transfer, the first step Due Diligence was a slow process due to the drawn out engagements with IP owners and in several cases a lack of cooperation. Without further assessment it is difficult to draw absolute conclusions but possible explanations could include; projects had been completed and IP owners had moved on to new jobs or projects and had little time or in some cases motivation to assist; a misunderstanding of the intentions of MarineTT and therefore a lack of trust; a perception that sufficient knowledge transfer had already been carried out in the project. Protracted Due Diligence reduced the amount of time available to complete case studies.

Another finding from the Due Diligence phase was that knowledge transfer activities undertaken during the original research project lifetime were under-resourced (time, finances, expertise). In almost all cases there was a lack of clarity as to the objectives of the transfer and no measurement of achieving successful transfer and impact.

MarineTT's collaboration and cooperation with other initiatives proved to be an effective strategy in enhancing Knowledge Transfer. Expertise brought in from other initiatives provided valuable alternative perspectives and experiences of different channels and mediums for transfer. In the case of the Fisheries Case Study projects, knowledge gathered by the MarineTT process was shared with KNOSSOS for development of policy briefs. KNOSSOS utilised its wide policy interface network to transfer the knowledge. This symbiosis was also observed in the transfer of knowledge on Harmful Algal Blooms – MarineTT drew on its extensive network of experts to compare and contrast new Knowledge Outputs from recent projects in a related sector. In this way a large volume of information has been summarised for ease of access and will be transferred to relevant end users. Essentially the knowledge has been 'packaged' for the end user in such a way so as to increase the chances of uptake of the knowledge.

The entire MarineTT experience has identified that there is a general lack of understanding of what Knowledge Transfer is and how to go about it. As a result of these findings, MarineTT organised two dedicated workshops to explore the research system barriers to effective Knowledge Transfer and uptake of results. Many of the barriers encountered by MarineTT in the Due Diligence process were reiterated at the MarineTT workshops – including lack of incentives and resources to engage in

Knowledge Transfer[5]. As a result of these workshops MarineTT is in the process of developing best Practice Guidelines to Knowledge Management and Transfer. These Guidelines will provide researchers with a step by step guide to carrying out knowledge transfer. However, in recognising that there are multiple barriers and they are interlinked requires that other actions also need to be taken in order to increase the amount of innovation coming from EU funded research. Further conclusions and recommendations can be found in Deliverable 5.5 Guidelines on sustainable management of marine resources.

[5] Refer to deliverable 3.3 Recommendations for Consideration for further details on the barriers to knowledge transfer

Annex 1 – List of Projects identified by experts with KOs of high-potential to impact end users

Acronym	Theme	FP	Shared with Other initiatives	Due Diligence	Protracted Due Diligence	Case Study for Transfer
AMBIO	Aquaculture	6		IPR associated with outputs		No
AQUAETREAT	Aquaculture	6				Yes
BLUE SEED	Aquaculture	6		IPR associated with outputs		No
CLOSEDFISHCAGE	Aquaculture	7			Ongoing communication with coordinator	No – limited time to transfer
CODLIGHT TECH	Aquaculture	6			Welcomes MarineTT input but at present no market for outputs	No
FINE FISH	Aquaculture	6	AquaInnova			No
IMAQUANIM	Aquaculture	6	AquaInnova			No
PREVENT ESCAPE	Aquaculture	7			Communication with project partners – ongoing discussion with coordinator to determine transfer	No – limited time to transfer
SELFDOTT	Aquaculture	7		Outputs to be developed by follow up project		No
SPIES-DETOX	Aquaculture	6				Yes – HABs transfer
TURPRO	Aquaculture	6	AquaInnova			No
WEALTH	Aquaculture	6	AquaInnova			No
ACOBAR	Climate	7		Appropriate		No

	Change			transfer during project lifetime		
CIRCE	Climate Change	6		Appropriate transfer during project lifetime		No
CLAMER	Climate Change	7		Appropriate transfer during project lifetime		No
COCOS	Climate Change	7		Appropriate transfer during project lifetime		No
FORCE	Climate Change	7		Outputs not ready for transfer – project ongoing to 2014		No
HERMIONE	Climate Change	7		Appropriate transfer during project lifetime		No
HYPOX	Climate Change	7		Appropriate transfer during project lifetime		No
ICE2SEA	Climate Change	7		Appropriate transfer during project lifetime		No
RECLAIM	Climate Change	6		Appropriate transfer during project lifetime		No
CAREX	Environmental Monitoring	7		Appropriate transfer during project lifetime		No
D4SCIENCE	Environmental	7		Follow on		No

	Monitoring			project developed		
DAISIE	Environmental Monitoring	6		No contact with coordinator		No
DIATOMICS	Environmental Monitoring	6	MG4U			No
EDIT	Environmental Monitoring	6		Appropriate transfer during project lifetime		No
FISH & CHIPS	Environmental Monitoring	6	MG4U			No
HABIT	Environmental Monitoring	6				Yes – HABs Transfer
MESOAQUA	Environmental Monitoring	7		Appropriate transfer during project lifetime		No
MIDTAL	Environmental Monitoring	7				Yes – HABs Transfer And dedicated Webinar
MODELKEY	Environmental Monitoring	6		Not willing to engage with MarineTT		No
SEED	Environmental Monitoring	6				Yes – HABs Transfer
SESAME	Environmental Monitoring	6		No contact with coordinator		No
WILDTECH	Environmental Monitoring	7	MG4U			No
AFRAME	Fisheries	6			Due Diligence was completed with the assistance of a project partner/outside expert	No
EMPAFISH	Fisheries	6		Coordinator not willing to engage with		No

				MarineTT		
FISHPOPTRACE	Fisheries	7			Due Diligence was completed with the assistance of a project partner/outside expert – KO not ready for transfer	No
GAP1	Fisheries	7				Yes – Policy Brief
MARIFISH	Fisheries	6				Yes – Policy Brief
SAFMAMS	Fisheries	6				Yes – Policy Brief
UNCOVER	Fisheries	6				Yes – Policy Brief
MARINA PLATFORM	Fisheries	7				Yes – Policy Brief
POW'WOW	Ocean Energy	6		Not willing to engage with MarineTT		No
PULSE STREAM 1200	Ocean Energy	7		Output not complete yet		No
CRUE	Ocean Energy	6		Coordinator Moved role unable to find alternative to engage		No
ECOOP	Water Resource Mgt	6		A follow up project has been funded and outputs have been further developed		No
ECORD-NET	Water Resource Mgt	6		Appropriate transfer during project lifetime		No

ESONIM	Water Resource Mgt	6		Two follow up projects have been funded and outputs will be developed further		No
EUR-OCEANS	Water Resource Mgt	6	Sea for Society			No
HYDRONET	Water Resource Mgt	7			Due Diligence continued with the assistance of a project participant	No
MARBEF	Water Resource Mgt	6		Appropriate transfer during project lifetime		No
MEDINA	Water Resource Mgt	6		Needs significant monetary investment to transfer		No
MESMA	Water Resource Mgt	7		Output not ready for transfer – ongoing to 2013		No
TBTIMPACTS	Water Resource Mgt	6			Due Diligence continued with the assistance of a project participant	No

Annex 2 - Knowledge Clusters

Clusters			
No.	**Cluster**	**MarineTT Project**	**Short Title**
1	Anti-Fouling	CRAB	Collective Research on Aquaculture Biofouling
		AMBIO	Advanced Nanostructured Surfaces for the Control of Biofouling
		TBTIMPACTS	Assessing Impacts of TBT on Multiple Coastal Uses
2	Aquaculture Breeding	CORALZOO	The development of an SME-friendly European breeding program for hard corals
		SELFDOTT	From capture based to self-sustained aquaculture and domestication of bluefin tuna, thunnus thynnus
		ENRICH	Enrichment of aquaculture implants by introduction of new marine species from the wild to breeding
3	Water Treatment/ Management	AQUAETREAT	Improvement and innovation of aquaculture effluent treatment technology
		IRRISEASOIL	A Cheap and Easy-to-Handle Desalination Approach for Crop Irrigation under Mediterranean Conditions
		MEDITATE	MEditeranean Development of Innovative Technologies for integrAted waTer managEment
		MODELKEY	Models for Assessing and Forecasting the Impact of Environmental Key Pollutants on Marine and Freshwater Ecosystems and Biodiversity
		MEDINA	MEmbrane-based Desalination: an INtegrated Approach
4	HABS	SPIES DETOX	Active biological monitoring and removal of toxins in aquaculture ecosystems and shellfish - including the development of a Solid-Phase In-situ Ecosystem Sampler and detoxification of shellfish
		ECASA	Ecosystem approach for sustainable aquaculture
		HABIT	Harmful algal bloom species in thin layers
		MIDTAL	Microarrays for the detection of toxic algae
		SEED	Life history transformations among harmful algal blooms species and the environmental and physiological factors that regulate them
		PESI	A Pan-European species-directories infrastructure
		FISH & CHIPS	Towards DNA chip technology as a standard analytical tool for the identification of marine organisms in biodiversity and ecosystem science
		DETECTOX	Development of an SPR-based biosensor for the detection of lipophilic phycotoxins in shellfish residues
		ESSTAL	Expressed Sequence Tag (EST) Analysis of Toxic Algae
		ALGADEC	Development of a rRNA-Biosensor for the Detection of Toxic Algae
		SENSEBIOSYN	Biosensors and Sensors for the industrial biosynthesis process of widely used commercial antioxidants: nutraceuticals as additives for food and aquaculture promoting public health and safety.

5	Shellfish	BLUESEED	Technology development for a reliable supply of high-quality seed in blue mussel farming
		LOBSTERPLANT	Development of automated technology for large scale land based production of lobster juveniles and lobster to market size, including development of robotic feeding and imaging control system
		WOPER	Workshop for the analysis of the impact of perkinsosis to the European Shellfish Industry
		SEAFOODPLUS	Health improving, safe seafood of high quality in a customer driven fork to farm concept
		CONFIDENCE	Contaminants in food and feed; inexpensive detection for control of exposure
6	Marine Genomics	AQUAFUNC	Integrated knowledge on functional genomics in sustainable aquaculture
		DIATOMICS	Understanding Diatom Biology by Functional Genomics Approaches
		MARINE GENOMICS	Implementation of high-throughput genomic approaches to investigate the functioning of marine ecosystems and the biology of marine organisms
7	Event Modelling/Forecasting	CRUE	Coordination of research financed in the European Union on Flood risk management
		ECOOP	European coastal-shelf sea operational observing and forecasting system
		MICORE	Morphological impacts and coastal risks induced by extreme storm events
		NEAREST	Integrated Observations from Near Shore Sources of Tsunamis: Towards an Early Warning System
		POWWOW	Prediction Of Waves, Wakes and Offshore Wind
		HOP	Macro-economic impact of high oil price
		FLOODSITE	Integrated flood risk analysis and management methodologies
		EUROCEANS	European network of excellence for ocean ecosystems analysis
8	Species catalogues/taxonomy/ecosystem research	MARBEF	Marine biodiversity and ecosystem functioning
		BIODIVERSA	ERA-Net in biodiversity sciences
		CAREX	Coordination action for research activities on life in extreme environments
		DAISIE	Delivering alien invasive species inventories for Europe
		SESAME	Southern European Seas: Assessing and Modelling Ecosystem Changes
		HERMES	Hotspot ecosystem research on the margins of European seas
		FORCE	Future of Reefs in a Changing Environment (FORCE): An ecosystem approach to managing Caribbean coral reefs in the face of climate change
		WILDTECH	Novel technologies for surveillance of emerging and re-emerging infections of wildlife
		PESI	A Pan-European species-directories infrastructure
		EDIT	Toward the European Distributed Institute of Taxonomy

9	Disaster Management & Marine Pollution	AMPERA	ERA-Net to foster prevention and best response to Accidental Marine Pollution
		MAPO	Enhancing Research and Development Projects to Find Solutions to Struggle against various Marine Pollutions
		ECODIS	Dynamic sensing of pollution disasters and predictive modelling of their ecological impact
10	Ocean Observatory	ESONIM	European Seafloor Observatory Network Implementation
		EUROSITES	Integration and enhancement of key existing European deep-ocean observatories
11	Med & Black Sea	ENVIROGRIDS	Building Capacity for a Black Sea Catchment Observation and Assessment System supporting Sustainable Development
		UP-GRADE BS-SCENE	Up-Grade Black Sea scientific network 1c.
		SESAME	Southern European Seas: Assessing and Modelling Ecosystem Changes
12	Fisheries/Aquaculture Management	AFRAME	A Framework for Fleet and Area Based Fisheries Management
		AQUAGRIS	Environmental management reform for sustainable farming, fisheries and aquaculture
		COMMIT	Creation of multi annual management plans for commitment
		MADE	Mitigating Adverse Ecological Impacts of Open Ocean Fisheries
		IMAGE	Indicators for Fisheries Management in Europe
		ERMES	European Research for MEditerranean Seafood
		SEACASE	Sustainable extensive and semi-intensive coastal aquaculture in Southern Europe
		SUSTAINAQ	Sustainable aquaculture production through the use of recirculation systems
		COEXIST	Interaction in coastal waters: a roadmap to sustainable integration of aquaculture and fisheries
		IMPACTFISH	Impact Assessment of the FP4 and FP5 research
		FISHPOPTRACE	Fish Population Structure and Traceability
		ENVIEFH	Environmental Approach to Essential Fish Habitat Designation
		PHILMINAQ	Mitigating impact from aquaculture in the Philippine
		PROFET POLICY	Fish Policy Flow
		DEGREE	Development of fishing gears with reduced effects on the environment
		NECESSITY	Nephrops and Cetacean species selection information and technology
		SAFMANS	Scientific Advice for Fisheries Management on Multiple Scales
		GENIMPACT	Evaluation of genetic impact of aquaculture activities on native populations - a European network
		CEVIS	Comparative Evaluations and Innovative Solutions in European Fisheries Management
		DEEPFISHMAN	Management and Monitoring of Deep Sea Fisheries and Stocks

13	Stock Recovery/ Management	**DEEPFISHMAN**	Management and Monitoring of Deep Sea Fisheries and Stocks
		FISHPOPTRACE	Fish Population Structure and Traceability
		UNCOVER	Understanding the Mechanism of Stock Recovery
14	Aquatic Animal Welfare & Health	**PANDA**	Permanent network to strengthen expertise on infectious diseases of aquaculture species and scientific advice to EU policy
		IMAQUANIM	Improved immunity of aquacultured animals
		WEALTH	Welfare and health in sustainable aquaculture
		STUNFISHFIRST	Development of prototype equipment for humane slaughter of farmed fish in industry
15	Participatory Research	**GAP1**	Connecting Science, Stakeholders and Policy
		IBEFISH	Interactions between Environment and Fisheries - A Challenge to Management
		JAKFISH	Judgement and Knowledge in Fisheries Management
		MARIFISH	Strengthening the links between European marine fisheries science and fisheries management
		SAFMANS	Scientific Advice for Fisheries Management on Multiple Scales
16	Good Communication/ outreach/ dissemination	**CLAMER**	Climate Change and Marine Ecosystem Research Results
		ICE2SEA	Estimating the future contribution of continental ice to sea-level rise
		HERMIONE (include previous project HERMES)	Hotspot ecosystem research and Man's impact on European seas (Hermes: Hotspot ecosystem research on the margins of European seas)
		4SEAS	Synergies between science and society for a shared approach to European seas
		ENSEMBLES	ENSEMBLE based Predictions of Climate Change and their Impacts

17	DataPortal/Directory/Dataset	**COCOS**	Coordination action carbon observation system
		AQUAGRIS	Environmental management reform for sustainable farming, fisheries and aquaculture
		FORCE	Future of Reefs in a Changing Environment (FORCE): An ecosystem approach to managing Caribbean coral reefs in the face of climate change
		HYPOX	In situ monitoring of oxygen depletion in hypoxic ecosystems of coastal and open seas, and land-locked water bodies
		UP-GRADE BS-SCENE	Up-Grade Black Sea scientific network 1c.
		CARBOOCEAN	Marine carbon sources and sinks assessment
		CIRCE	Climate Change and Impact Research: the Mediterranean Environment
		MUGIL	Main Uses of the Grey mullet as Indicator of Littoral environmental changes
		ENSEMBLES	ENSEMBLE based Predictions of Climate Change and their Impacts
		CALM II	Advanced Noise Reduction Systems
		CAREX	Coordination action for research activities on life in extreme environments
		DAISIE	Delivering alien invasive species inventories for Europe
		DIATOMICS	Understanding Diatom Biology by Functional Genomics Approaches
		ECODIS	Dynamic sensing of pollution disasters and predictive modelling of their ecological impact
		EURO-LIMPACS	Integrated project to evaluate impacts of global change on European freshwater ecosystems
		EUR-OCEANS	European network of excellence for ocean ecosystems analysis
		ENCORA TTC	European network for coastal research - Extension
		EUROSITES	Integration and enhancement of key existing European deep-ocean observatories
		FIELD-AC	Fluxes, interactions and environment at the land-ocean boundary. Downscaling, Assimilation and Coupling
		UNCOVER	Understanding the Mechanism of Stock Recovery
		ICES-FISHMAP	Update and revision of the ICES Atlas of North Sea Fishes; a web based application
		MAPO	Enhancing Research and Development Projects to Find Solutions to Struggle against various Marine Pollutions
		MARIFISH	Strengthening the links between European marine fisheries science and fisheries management
		PESI	A Pan-European species-directories infrastructure
		SIMORC	System of industry meta-ocean data for the offshore and research communities
		FISH and CHIPS	Towards DNA chip technology as a standard analytical tool for the identification of marine organisms in biodiversity and ecosystem science
		TRANSMAP	Trans-boundary networks of marine protected areas for integrated conservation and sustainable development: biophysical, socio-economic and governance assessment in East Africa
		SESAME	Southern European Seas: Assessing and Modelling Ecosystem Changes

18	ERA-NETs/Support Actions/Network Projects/Platforms	CIRCLE SSA	Climate impact research co-ordination within a larger Europe
		SEAS-ERA	Towards integrated European marine research strategy and programmes
		CIRCLE-2: ERA-NET	Climate Impact Research & Response Coordination for a Larger Europe - 2nd Generation ERA-Net -Science meets Policy
		AMPERA	ERA-Net to foster prevention and best response to Accidental Marine Pollution
		ECODIS	Dynamic sensing of pollution disasters and predictive modelling of their ecological impact
		HABIT	Harmful algal bloom species in thin layers
		BONUS ERA NET	BONUS for the Baltic Sea science – network of funding agencies
		COASTAL ERA-NET	Control objectives and shellfish target assurance levels ERA-NET
		BONUS +	Multilateral call for research projects within the Joint Baltic Sea Research Programme BONUS+
		CONSENSUS	Multi-stakeholder platform for sustainable aquaculture in Europe
		EDIT	Toward the European Distributed Institute of Taxonomy
		MARINAPLATFORM	Marine renewable integrated application platform
		OATP	Evaluation of the promotion of Offshore Aquaculture Through a Technology Platform
		BIODIVERSA	ERA-Net in biodiversity sciences
19	Carbon- Oceans	COCOS	Coordination action carbon observation system
		CARBOOCEAN	Marine carbon sources and sinks assessment
		HYPOX	In situ monitoring of oxygen depletion in hypoxic ecosystems of coastal and open seas, and land-locked water bodies
		SUNBIOPATH	Towards a better sunlight to biomass conversion efficiency in microalgae
		CARBOCHANGE	Marine carbon sources and sinks assessment
		CARBOSCHOOLS	European network of regional projects for school partnerships on climate change research
20	Arctic/Antarctic	ATP	Arctic Tipping Points
		ECORD-NET	European consortium for ocean research drilling
		IPY-CARE	Climate of the Arctic and its Role for Europe (CARE) - a European component of the International Polar Year
		ICE2SEA	Ice2sea - estimating the future contribution of continental ice to sea-level rise
		ACOBAR	Acoustic Technology for Observing the interior of the Artic Ocean
21	Remote Sensing/Monitoring/ Observing System /Software/Sensors/ Devices	HYPOX	In situ monitoring of oxygen depletion in hypoxic ecosystems of coastal and open seas, and land-locked water bodies
		IPY-CARE	Climate of the Arctic and its Role for Europe (CARE) - a European component of the International Polar Year
		FORCE	Future of Reefs in a Changing Environment (FORCE): An ecosystem approach to managing Caribbean coral reefs in the face of climate change
		ACOBAR	Acoustic Technology for Observing the interior of the Arctic Ocean
		ECODIS	Dynamic sensing of pollution disasters and predictive modelling of their ecological impact
		EURO-LIMPACS	Euro-limpacs: Integrated project to evaluate impacts of global change on European freshwater ecosystems
		D4SCIENCE	Distributed laboratory infrastructure on Grid enabled technology 4 science
		HYDRONET	Floating sensorised networked robots for water monitoring
		HABIT	Harmful algal bloom species in thin layers
		MONRUK	Monitoring the Marine Environment in Russia, Ukraine and Kazakhstan using Synthetic Aperture Radar

22	Aquaculture Technologies	CLOSEDFISHCAGE	Development of an innovative, cost-effective environmentally friendly closed cage for sea-based fish farming
		CODLIGHTTECH	Light Technology for Photoperiod Regulation in Cod Mariculture
		DESIGNACT	Designing the European Aquaculture Centre of Technology
		TURPRO	Biological optimisation and development of processing methods for turbot farming
		MESOAQUA	Network of leading mesocosm facilities to advance the studies of future aquatic ecosystems from the Arctic to the Mediterranean
		DOLFIN	Development of innovative plastic structures for Aquiculture using a new composite with crop waste as reinforcing filler
		PREVENTESCAPE	Assessing the causes and developing measures to prevent the escape of fish from sea-cage aquaculture
23	Marine Protected Areas	INCOFISH	Integrating multiple demands on Coastal Zones with emphasis on aquatic ecosystems and fisheries
		CONSCIENCE	Concepts and Science for Coastal Erosion Management
		WISER	Water bodies in Europe: integrative systems to assess ecological status and recovery
		EMPAFISH	European Marine Protected Areas as tools for fisheries management and conservation
		MODELKEY	Models for Assessing and Forecasting the Impact of Environmental Key Pollutants on Marine and Freshwater Ecosystems and Biodiversity
		ENCORA TTC	European network for coastal research - Extension
		ECOMANAGE	Integrated ecological coastal zone management system
		MESMA	Monitoring and Evaluation of Spatially Managed Areas
24	Renewable Energy Technologies	CA-OE	Co-ordinated action on ocean energy
		DOWNWIND	Distant offshore wind farms with no visual impact in deepwater
		EU-OEA	European ocean energy association
		HYDROACTION	Development and laboratory testing of improved action and Matrix hydro turbines designed by advanced analysis and optimization tools
		MARINAPLATFORM	Marine renewable integrated application platform
		POWWOW	Prediction Of Waves, Wakes and Offshore Wind
		PULSESTREAM 1200	Full scale demonstration prototype tidal stream generator
		SNAPPER	The development of a novel rare-earth magnet based wave power conversion system - Snapper
		STANDPOINT	Standardisation of Point Absorber Wave Energy Convertors by Demonstration
		SUNBIOPATH	Towards a better sunlight to biomass conversion efficiency in microalgae
		SURGE	Simple underwater generation of renewable energy
		TIDALSENSE	Development of a condition monitoring system for tidal stream generator structures
		WAVE DRAGON MW	Development and validation of technical and economic feasibility of a multi MW Wave Dragon offshore wave energy converter
		WAVEGEN	Wave Pump Submergible Power Generator
		WAVESTART	High-efficient, low-weight, pile-supported 500-kW wave energy converter
		METRI-2	Marine environment tests and research infrastructure - 2
		FIELD-AC	Fluxes, interactions and environment at the land-ocean boundary. Downscaling, Assimilation and Coupling
		HYDRALAB III	Integrated Infrastructure Initiative HYDRALAB III