



**Project no. SSPE-CT-2003-502329**

**PANDA**

**Permanent network to strengthen expertise on infectious diseases of  
aquaculture species and scientific advice to EU policy (PANDA)**

**Coordination Action**

**Scientific support to policies**

**Deliverable 5**

**Database of training opportunities in Europe for aquatic animal disease research  
and diagnosis**

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## **1**      **Executive Summary**

The overall objectives of Deliverable 5 in WP6 was to create a database of current training opportunities within the EU and candidate states. The aim of such an database was to map the state of the art with regards to current training opportunities. This knowledge, linked to Deliverable 11 (training needs and identified deficits) assisted in the formulation of recommendations on how the skill base, and thus the standard of practice in aquatic animal disease research and diagnosis, might be improved into the future. The three focus areas of training opportunity were: test methods (disease diagnosis, validation, QA), epidemiology/risk analysis and environmentally friendly disease control measures.

In furtherance of this deliverable, the coordinator undertook a desk study of useful training and other Internet links. As anticipated, there was a significant amount of repetition between searches and web sites. Taskforce members, PANDA coordinators and subscribed experts were also invited to suggest additional links to training information and opportunities going forward. An initial database of training sites was uploaded to the PANDA website in February 2006, and was significantly enhanced over 2006. This database is now in its third iteration and contains over 60 links, most of which are portals, which in turn provide comprehensive information on and links to other relevant sites. The Database now contains sections on Training Information Portals, Specific Training Sites, General Resources for aquaculture and fisheries research and diagnostics and other useful links (e.g. to relevant industry and academic associations and reports). Additions to the database are ongoing.

## **2**      **Introduction**

Aquaculture is the fastest growing food production system of the last decade, accounting for a quarter of total world food fish landings and 27% of shrimp product. Nine out of every 10 oysters, Atlantic salmon and cyprinids consumed are farmed. With a growing human population (and consequent demand for protein sources) but declining usable land mass and a decline in populations of wild fish, aquaculture is now expanding to the cultivation of new fish species. Such species include some *Gadidae* (cod, haddock, hake etc), flatfish (turbot, flounder, halibut, sole etc), hybrid striped bass, seabass and other Mediterranean species, wolfishes, lumpfishes and tuna.

### **2.1**    **Constraints for development of aquaculture**

One of the key constraints to the development and sustainability of European aquaculture is infectious disease, both in terms of direct losses, but also indirectly as trade restrictions to prevent their spread within the EU (Hiney et al., 2002). Policies and regulations on disease control and prevention should be based on best scientific information and advice. Control of diseases in the form of disinfectants and antimicrobials is of increasing concern in terms of the environment and the development of resistant pathogens. Several Member States have improved their national capability to prevent or manage disease situations through enhanced laboratory facilities, diagnostic expertise, control protocols, and therapeutic strategies. The two Community Reference Laboratories, for fish and mollusc diseases respectively, and their corresponding networks of National Reference Laboratories support the improvement and harmonisation of standards in national diagnostic laboratories. However, there is still considerable scope for improved harmonisation of skills and for de-fragmentation of relevant knowledge within the EU and elsewhere in Europe, not only in National Reference

Laboratories, but also in other research institutes and laboratories engaged in aspects of aquatic animal health management.

## **2.2 Objectives of deliverable**

In order to ensure that any policy and legislation formulated by the EU reflects the best current understanding of aquatic animal diseases and their control, there is a need to ensure that the level and availability of training across the EU is fit-for-purpose, harmonised and can serve the changing aquaculture landscape. The deliverable described in this report set out to explore the state-of-the-art in terms of training opportunities. From this activity a set of recommendations have emerged from all work packages on how best to manage the dissemination of training information such that appropriate stakeholders may have access to it. The key objectives of this deliverable were to:

- identify current training opportunities in aquatic animal disease research and diagnosis in all work packages
- for all work packages to provide recommendations for future training provisions within the EU and candidate states to raise the skill base, and thus the standard of practice in aquatic animal disease research and diagnosis.

## **2.3 Focus areas and key tasks**

Reflecting the concerns of the PANDA project as a whole, the focus areas for deliverable were:

1. Test methods (disease diagnosis, validation, QA)
2. Epidemiology and risk analysis
3. Environmentally friendly disease control measures

Therefore, the tasks undertaken by Deliverable 5 in Work package 6 were:

1. Identify current training opportunities across the spectrum of aquatic animal health management in the EU
2. Formulate recommendations based on above.

## **3 Methods**

### **3.1 Task Force activity**

A Task force of training experts from universities, institutes, specialist laboratories and agencies was established to assist in this Deliverable. This Taskforce would, along with the coordinators of linked workpackages, definition of scope of 'training' activities and map out how the objectives of WP6 could be achieved.

The Taskforce members were:

- Dr. Sandra Adams, University of Stirling, Scotland  
University of Stirling have been running post-graduate courses in aquaculture for many years, and also offer tailor-made courses for industry and academic personnel on request.
- Dr. David Murphy, AquaTT, Ireland

AquaTT provide training and information at all levels of the industry, but in particular for fish-farm operatives, managers and biologists.

- Dr. Hervé LeBris, University of Nante, France  
University of Nantes provides further training for veterinarians in fish pathology and aquaculture related health issues.
- Dr. Bernado Basurco, CIHEAM, University of Zaragoza, Spain  
CIHEAM have been involved in professional training of aquaculture personnel, agency personnel and regulatory personnel for many years.

The Taskforce met in Dublin, Ireland on 27<sup>th</sup> August 2004. Unfortunately, Dr. Basurco was unable to attend the meeting. The objective of the meeting was to appraise the taskforce members about PANDA and its overall objectives and to define the scope and activities of WP 6. The WP Coordinator achieved this through a briefing document and presentation. The Taskforce examined ways in which D5 could create an inventory of training opportunities for aquatic animal health management and defined the methodology for data collection and entry into such an inventory.

Taskforce members were invited to attend the 1st PANDA Workshop in CIDC-Lelystad from 5/4/06-8/4/08 and to contribute their expertise. Dr. Alexandra Adams initially agreed to attend but was unable to do so. Dr. David Murphy was in attendance at the Workshop and provided invaluable input into the interpretation of data generated by the Training Needs survey carried out in December 2005.

During 2006, the Taskforce were kept informed by email of developments in Workpackage 6 and contributed advice and assistance with interpretation of the data generated by the Training Needs survey.

With the agreement of the coordinator, an additional Task Force member, Dr. Kurt Buchmann (Leader of the Research School SCOFDA at KVL, Denmark ) was invited to participate in WP6 in 2006. Dr. Buchmann, who is the coordinator of the Joint Nordic Programme in Aquaculture and Freshwater Fisheries Management (NOVA), has extensive experience in structuring distance-learning and modular training programmes in aquatic animal health across the Nordic countries. The WP Coordinator held a meeting with Dr. Buchmann in Copenhagen on 10th October 2006 at which they examined the applicability of the NOVA to other European areas, the organisational management issues of such distance learning approaches and the required capabilities of the participating organisations..

The Taskforce were invited to participate in the final PANDA Workshop of all Taskforces and Workpackage Coordinators being held on the 18-21 March 2006 in CEFAS Weymouth, the UK. None of the Task Force was in a position to attend this meeting. With the agreement of the PANDA coordinator, Dr. Kantham Papanna was invited to participate in this workshop and to contribute his knowledge and experience of aquatic animal health training from an industry perspective.

### **3.2 Database design**

The focus of D5 was to identify currently available training opportunities in the focus areas identified in 2.3. A sample design for a database that could be embedded within the WP6 area of the PANDA website was formulated and the most appropriate methodologies for such a

database e.g. self-entry versus central entry were considered. A number of important issues regarding the data entry methodology were identified, most importantly:

- Difficulty of validating user-input data.
- Resources required in maintaining up-to-date information in a centrally controlled database.

Given the constraints (fiscal and human resource) of the project an alternative approach was taken to the provision of training and other relevant information on the PANDA website, that is, a links-based approach to data provision, whereby, links to existing training opportunities web pages would be provided. This approach has many advantages over a conventional database approach:

- it ensures that the information will be as current as the web links
- it reduces the personnel resources required to establish and maintain a database of training opportunities
- it is a more flexible approach that allows not only training information, but also other information useful to aquaculture researchers to be included.

### **3.3 Database of training opportunities**

#### **3.3.1 Desk-based survey**

The coordinator undertook a desk study of useful training and other links during the project period. Information was obtained via internet search engines (the methodology most likely to be used by practitioners looking for training courses). Three different search engines were used and a number of Boolean search strings were employed, each resulting in thousands of hits (summarised in Table 1). The first 100 hits of each search string/search engine combination were checked for their applicability to the objectives of the project.

#### **3.3.2 Other information sources**

Further useful training links were provided by Task Force members and by the coordinators of other Workpackages.

## **4 Results**

### **4.1 Web-based survey of training opportunities**

Three common search engines were employed in constructing the links-based database of training opportunities. The number of hits per search across a range of search strings is shown in Table 1. As anticipated, there was a significant amount of repetition between searches and sites. This being said, the results were disappointing, with few of the links being of real value to the objectives of WP6 and only a small number were included in the final list. Taskforce members, PANDA coordinators and subscribed experts were also invited to suggest additional links to training information and opportunities going forward.

**Table 1:** Results of desk survey for training database

Search String	Number of hits per search		
	Google	Yahoo	AltaVista
Fish pathology training Europe	43,300	24,200	5,406
Aquaculture training courses Europe	72,600	12,100	14,500
Diagnosis fish training Europe	64,200	56,500	12,350
Fish health training Europe	1,050,000	415,000	90,029
Fish epidemiology training Europe	36,900	2,240	1,404

Portal sites were favoured over single-course pages as they provide more comprehensive information and cut down on search time for users.

#### **4.2 Database of training opportunities**

An initial database of training sites was uploaded to the PANDA website in February 2005, and was significantly enhanced over 2005-2006 (Table 2(i)-2(v)). This database is now in its third iteration and contains over 60 links, most of which are portals, which in turn provide comprehensive information on and links to other relevant sites. The Database now contains sections on:

- Training Information Portals
- Specific Training Sites
- General Resources for aquaculture and fisheries research and diagnostics
- Other useful links (e.g. to relevant industry and academic associations and reports)

The database may currently be accessed through the WP6 page of the PANDA website. Additions to the database are ongoing.

**Table 2(i):** Training Information Links

<b>Training Information Links</b>	
Fishing for information	<a href="http://www.fishing4info.com/?secid=1&amp;subsecid=1">http://www.fishing4info.com/?secid=1&amp;subsecid=1</a> List of Academic organisations offering training in all aspects of aquaculture
AquaTT	<a href="http://www.aquatt.ie/resources/index.php">http://www.aquatt.ie/resources/index.php</a> Training courses for the aquaculture industry
Aquaculture.ie	<a href="http://www.aquaculture.ie">http://www.aquaculture.ie</a> Includes list of courses and academic institutions offering classes
PiscesTT Education Database	<a href="http://www.piscestt.com/pisces/educational/default_en.asp">http://www.piscestt.com/pisces/educational/default_en.asp</a> Database of training resources for all aspects of aquaculture
EurOcean	<a href="http://www.eurocean.org/categories.php?category_no=154">http://www.eurocean.org/categories.php?category_no=154</a> European Centre for Information on Marine Science and Technology. Master courses in Fisheries & Aquaculture in Europe.
CIHEAM	<a href="http://www.iamz.ciheam.org">http://www.iamz.ciheam.org</a>

	Intergovernmental organization offering post-graduate training in the field of agriculture and natural resources.
Veterinary Pathology Training	<a href="http://www.vetpathtraining.co.uk">http://www.vetpathtraining.co.uk</a> Training for Veterinarians in diseases of wild and farmed fish, links to all of the major veterinary pathology websites
Aquamedicine.no	<a href="http://www.aquamedicine.no/fag.asp?fag=16&amp;meny=5">http://www.aquamedicine.no/fag.asp?fag=16&amp;meny=5</a> Website of the Norwegian School of veterinary sciences giving information on courses available in Norway.
World Aquaculture Society	<a href="http://www.was.org/main/default.asp">http://www.was.org/main/default.asp</a> List of aquaculture related links including training opportunities.
Aquamedia	<a href="http://www.aquamedia.org/news/RTD/profet/hu/programme_en.asp">http://www.aquamedia.org/news/RTD/profet/hu/programme_en.asp</a> The federation of European aquaculture producers - information on Aquamedia
Aquanet resources	<a href="http://www.aquanet.com/resources/resources.htm">http://www.aquanet.com/resources/resources.htm</a> See Education, as well as Short Courses and Workshops
European Food Safety Consultancy	<a href="http://www.international-food-safety.com/training.htm">http://www.international-food-safety.com/training.htm</a> Training in many areas of food safety, animal surveillance, risk analysis etc.

**Table 2(ii):** Specific training site links

<b>Specific Training Sites</b>	
University of Stirling	<a href="http://www.external.stir.ac.uk/students/">http://www.external.stir.ac.uk/students/</a> Information on courses in aquaculture offered at the Institute of Aquaculture at the university
Master of Aquatic Medicine	<a href="http://www.foodsafety.no/Master/Master%5FAq%5FMed/">http://www.foodsafety.no/Master/Master%5FAq%5FMed/</a> Norwegian School of Veterinary science MSc in aquatic medicine, taught through English.
Sparsholt College Hampshire	<a href="http://www.sparsholt.ac.uk/schwww/fish/fisherystudies.htm">http://www.sparsholt.ac.uk/schwww/fish/fisherystudies.htm</a> Centre for Vocational Training - Fisheries Studies
NAFC - North Atlantic Fisheries College	<a href="http://www.nafc.ac.uk/courses.htm">http://www.nafc.ac.uk/courses.htm</a> Purpose-built fisheries training centre with courses in Fisheries, Aquaculture, Marine Engineering, Fish Processing and Maritime Studies. Information on learning opportunities at vocational, MSc and PhD level.
Inverness College Courses	<a href="http://www.rtsinc.org/benchmark/cstudies/cstudy4.shtml">http://www.rtsinc.org/benchmark/cstudies/cstudy4.shtml</a> Distance learning options in aquaculture offered by the college
ELITE English Land-Based Institute of Training &	<a href="http://www.elite.ac.uk/education_training/aquatics_fisheries.html">http://www.elite.ac.uk/education_training/aquatics_fisheries.html</a> Short Courses (usually two days in length) are available in a variety of subjects such as 'Controlling Fish Diseases'. Full time courses also available in Aquaculture Fisheries Management.

Education	
CEMARE - University of Portsmouth	<a href="http://www.port.ac.uk/research/cemare/">http://www.port.ac.uk/research/cemare/</a> The Centre for the Economics and Management of Aquatic Resources at the University of Portsmouth, UK
FishNet	<a href="http://www.fishnet.dk/activities/2005.htm">http://www.fishnet.dk/activities/2005.htm</a> Arrange courses, workshops and lectures for Ph.D. students in Fisheries and Aquaculture Science.
ADC- Aquaculture Development Centre	<a href="http://www.ucc.ie/ucc/research/adc/">http://www.ucc.ie/ucc/research/adc/</a> The Aquaculture Development Centre of the National University of Ireland Cork supports, stimulates and promotes the development of aquaculture through research, training and consultancy.
IMBC- Institute of Marine Biology of Crete	<a href="http://www.imbc.gr/institute/aqua/index.html">http://www.imbc.gr/institute/aqua/index.html</a> The Aquaculture Department undertakes research into the rearing of various Mediterranean finfish, focusing on their biology and the development of industrially applicable technologies for their rearing.
University of Aberdeen	<a href="http://www.abdn.ac.uk/sfirc/index.shtm">http://www.abdn.ac.uk/sfirc/index.shtm</a> <a href="http://www.abdn.ac.uk/zoology/">http://www.abdn.ac.uk/zoology/</a> Postgraduate training opportunities in Marine and Fisheries Science at the Department of Zoology, University of Aberdeen (Scottish Fish Immunology Research Centre)
University of Bergen	<a href="http://www.ifm.uib.no/">http://www.ifm.uib.no/</a> The Department of Fisheries and Marine Biology (DFM) is located at the High Technology Center in Bergen. The department carries out research and provides courses in marine biology, fisheries biology and aquaculture including fish health.
Bangor University	<a href="http://www.sos.bangor.ac.uk/">http://www.sos.bangor.ac.uk/</a> The School of Ocean Sciences at Bangor University, Wales, UK. Website contains information for those interested in studying at Bangor.
Norwegian School of Veterinary Science	<a href="http://www.foodsafety.no/Master/Master%5FAq%5FMed/">http://www.foodsafety.no/Master/Master%5FAq%5FMed/</a> Master of Aquatic Medicine
Stockholm University	<a href="http://www.ecology.su.se/">http://www.ecology.su.se/</a> The Department of Systems Ecology at Stockholm University, Sweden have several programmes on aquaculture and fisheries, with particular emphasis on environmental sustainability and socio-economic factors.

**Table 2(iii):** Training Resources

<b>Training Resources</b>	
PiscesTT	<a href="http://www.piscestt.com/pisces/">http://www.piscestt.com/pisces/</a> A site full of resources and tools related to European Education and Training

	in Aquaculture
Marie Curie Programme	<a href="http://europa.eu.int/comm/research/fp6/mariecurie-actions/indexhtm_en.html">http://europa.eu.int/comm/research/fp6/mariecurie-actions/indexhtm_en.html</a> Overview of training, mobility and career development opportunities under EU's Marie Curie Programme.
Aquatic Eco-systems Inc.	<a href="http://www.seafoodintelligence.com">http://www.seafoodintelligence.com</a> Resource links for aquaculture. Includes extensive training and education list

**Table 2(iv):** General Resources

<b>General Resources</b>	
DG Fisheries	<a href="http://europa.eu.int/comm/dgs/fisheries/index_en.htm">http://europa.eu.int/comm/dgs/fisheries/index_en.htm</a> Website of the European Commission Directorate General on Fisheries
Aquamedia	<a href="http://www.aquamedia.org">http://www.aquamedia.org</a> The federation of European aquaculture producers - information on issues, products, services etc
Aquafind	<a href="http://www.aquafind.com/">http://www.aquafind.com/</a> Directory of suppliers to the aquaculture and aquarist industries. Lists aquaculture education (mainly US)
Aquatic Network	<a href="http://www.aquanet.com/">http://www.aquanet.com/</a> Directory of links, news etc useful for aquaculture
AgriFor	<a href="http://agrifor.ac.uk/">http://agrifor.ac.uk/</a> Part of BIOME suite of gateways to internet resources, covering aquaculture and veterinary medicine
Fishing4Info	<a href="http://www.fishing4info.com/">http://www.fishing4info.com/</a> Link site for aquaculture and aquatic resource management sponsored jointly by AquaTT and Stirling University
NetVet	<a href="http://netvet.wustl.edu/fish.htm#aquaculture">http://netvet.wustl.edu/fish.htm#aquaculture</a> Aquaculture and fisheries related internet site links
SeaWeb Aquaculture	<a href="http://www.seaweb.org/resources/sac/links.shtml">http://www.seaweb.org/resources/sac/links.shtml</a> Links to a variety of worldwide aquaculture papers, including NGOs, government agencies, journals and other publications
Ecotao's Aquaculture links	<a href="http://www.ecotao.com/holism/agric/aqua.htm#disease">http://www.ecotao.com/holism/agric/aqua.htm#disease</a> Extensive list of links to all things aquaculture-related.
MegaPisca Resource Centre	<a href="http://www.megapesca.com/links.asp">http://www.megapesca.com/links.asp</a> Links to technical information in food and fisheries policy and development
MARAQUA	<a href="http://www.lifesciences.napier.ac.uk/maraqua/">http://www.lifesciences.napier.ac.uk/maraqua/</a> Monitoring and Regulation of Marine Aquaculture, Co-ordinated by Napier University Edinburgh Concentrates on a review of existing information and

	the establishment of agreed guidelines for the monitoring and regulation of marine aquaculture.
AQUATOUR	<a href="http://www.aquatour.info/">http://www.aquatour.info/</a> A multi-media presentation of European fish farms, including visits to carp, cod, salmon, seabass, seabream and trout hatcheries and ongrowing sites. The presentations also include information on basic biology and lifecycles, food traceability, the farming process, environmental issues and technological developments.
Vetgate	<a href="http://vetgate.ac.uk/">http://vetgate.ac.uk/</a> Part of the Wellcome Gateways - aims to provide gateway to high quality resources in animal health including fish.

**Table 2(v):** Useful links for aquatic animal specialists

Useful Links	
European Fisheries and Aquaculture Research Organisation	<a href="http://www.efaro.org/eu_sp_index.php">http://www.efaro.org/eu_sp_index.php</a> Site for those looking at EU funding opportunities. Explains the policies and agendas and provides useful links
University of Ghent	<a href="http://allserv.rug.ac.be/aquaculture/links/links.htm">http://allserv.rug.ac.be/aquaculture/links/links.htm</a> Useful links and information for anyone involved in aquaculture
Intrafish	<a href="http://www.intrafish.com/research/">http://www.intrafish.com/research/</a> Useful and searchable reference tool for people involved or interested in the fisheries and aquaculture industries
Aquaculture Links	<a href="http://ag.arizona.edu/azaqua/links.html">http://ag.arizona.edu/azaqua/links.html</a> Links to other websites of interest to aquaculture. Good for reports and guidelines
EAS - The European Aquaculture Society	<a href="http://www.easonline.org/">http://www.easonline.org/</a> This site gives information related to EAS - its organised scientific events; its meetings organised with other partners, as well as news of other meetings of the industry in Europe and Worldwide, both past and future.
FEAP - Federation of European Aquaculture Producers	<a href="http://www.feap.info/feap/">http://www.feap.info/feap/</a> FEAP is currently composed of 31 National Aquaculture Producer Associations of 22 European Countries and its role is to provide a forum for the Member Associations to be able to establish common policies on questions relating to the production and the commercialisation of aquaculture species that are reared in Europe.
EUROFISH	<a href="http://www.eurofish.dk/">http://www.eurofish.dk/</a> Fish marketing and investment advice to Eurofish member countries, Eastern and Central European countries.
Fish Veterinary	<a href="http://www.fishvetsociety.org.uk/">http://www.fishvetsociety.org.uk/</a>

Society	Forum for vets in the UK and Ireland who have an interest in promoting the health and well being of fish in and around the British Isles.
MBA - The Marine Biological Association	<a href="http://www.mba.ac.uk/">http://www.mba.ac.uk/</a> Source of information about marine habitats, communities and species in the UK and Ireland.
NETFISH	<a href="http://www.netfish.org/">http://www.netfish.org/</a> Serves as a link to relevant websites on sustainable development of aquaculture and management of fisheries.
BIM - Bord Iascaigh Mhara	<a href="http://www.bim.ie/templates/text_content.asp?node_id=439">http://www.bim.ie/templates/text_content.asp?node_id=439</a> Bord Iascaigh Mhara, Aquaculture Development Division - Framework for the development of the Irish aquaculture industry.
CEFAS - Centre for Environment Fisheries and Aquaculture Science	<a href="http://www.cefasc.co.uk/">http://www.cefasc.co.uk/</a> A scientific research and consultancy centre, an Agency of the UK Government's Department for Environment, Food and Rural Affairs (DEFRA).
FRS - The Fisheries Research Service	<a href="http://www.marlab.ac.uk/">http://www.marlab.ac.uk/</a> Marine Laboratory of the Scottish Environment and Rural Affairs Department. Information on resources, research activities, staff and publications
VESO	<a href="http://www.veso.no/">http://www.veso.no/</a> A commercial fish disease research laboratory in Norway providing facilities for pharmaceutical and related research to GLP standards in trout, salmon, halibut and turbot.
AQUAREG	<a href="http://www.aquareg.com">http://www.aquareg.com</a> Co-operation between less favoured regions of the EU. Provides opportunities and design strategies for sustainable development of peripheral coastal communities by promotion of interregional co-operation in aquaculture and fisheries.

## **5 Conclusions**

It is acknowledged that there are a number of constraints to the information and recommendations that can be drawn from using a web-based survey to compile the database created by this deliverable. Not all training opportunities will be publicised through the medium of the internet, but may also be publicised through professional associations and relevant training bodies. However, within the constraints of the PANDA project, it was agreed that such a web-based database would capture the majority of information sources, and reflect the manner in which the majority of stakeholders will seek information. That said, the survey does raise some interesting issues regarding the type, frequency and availability of desired training available to those engaged in fish health management across Europe.

There is a clear NEED for both basic and on-going professional training right across the spectrum of aquatic animal health management. Appropriate training is not, in many instances, available or relevant to specific needs. Where training IS available, it is not, in many instances, fit-for-purpose (theoretical where practical would be better etc.). Where training is available, even if fit-for-purpose, the training is often not accessible to potential users (lack of funding, lack of time, priorities elsewhere, geographically remote etc.)

*Attention needs to be given to the:*

- **Type of training** required across the EU
- The most appropriate **methods of delivery** of that training (e.g. practical vs theoretical, hands on vs distance learning etc.)
- Motivation of the most appropriate **training providers** (e.g. resourcing universities and institutes to offer short courses where there is in-house expertise)
- Motivation of **training consumers** to participate in training (e.g. thought the provision of funding to attend, resourcing of own institutions to mount training etc)

*Lessons learned:*

- Successful initiatives (Nordic joint MSc, AquaTT Aqualab and Wave projects, University of Stirling bespoke short courses) could provide models for other regions of Europe.
- Curricular planning and harmonisation needs to happen at a European level, in order to ensure portability and recognition of qualifications across the region.
- Importance of EC involvement in both policy formulation around training standards and in training facilitation (if not provision) a key recommendation.

## **6 Recommendations**

From the work carried out in this deliverables, a number of preliminary recommendations on training opportunities in the control of diseases of aquatic animals can be made:

There are a number of ways in which the provision of training information could be improved across the EU:

- The addition of ‘add-on’ training events to conferences in the field would facilitate increased training participation for scientists working in the area of fish health management.
- Intensive short courses focused on specific topics, and run locally or regionally, would provide access to specialist training within the limited resources available to many scientists, field biologists and veterinarians.
- The availability of funding (bursaries, course design/delivery grants etc), administered either nationally or at a European level would also address the difficulty of many stakeholders to participate.
- In addition, provision of resourcing at a local level of universities, professional associations and specialist training organisations is recommended.
- A central, resourced, portal for information on training opportunities would greatly facilitate participation. This portal should operate at EC, rather than local level.

- Targeting of scientists and other stakeholders in Eastern European countries for particular assistance is recommended.
- Training programmes aimed at practitioners must be more practically orientated and provide hands-on training on specific methodologies. For those that are in immediate need of such training eligibility criteria should be supplied:
  - qualified and working in the field and need training
  - qualified and seeking employment in the sector
  - general graduates hoping to move into the sector

## 7      **References**

Hiney, M., Rodger, H, Bricknell, P., Casburn, P. and Mulcahy, D. (2002). Aquaculture development and regulation: incompatibility or harmony? *Bulletin of the European Association of Fish Pathologists Special Issue*. 22(2): 178-184.