In Case 2a, we can identify target species using PCR and species-specific primers. Here, DNA is extracted from raw water and PCR amplification follows using species-specific primers.

In Case 2b, we can identify target species using Quantitative PCR (qPCR). Here we collect raw water, isolate DNA, amplify using qPCR for 40-45 cycles. Standard curve corrects for possible errors caused during PCR. We then use a standard curve (DNA quantity vs. PCR cycles) to estimate how much DNA we started with for a particular species.

In Case 2c, we identify target species using a micro-array. Here bulk DNA is extracted from a raw water sample. Hybridization with a microarray chip containing species-specific probes for AIS (40 global AIS in the case of CAISN). If any of these species are present in the sample, we will get a hit in the spot on the chip specific for that species. Identification is based on density of the signal and the colour of the signal.

Each of the above techniques has specific strengths and weaknesses, each of which varies over time. All of the techniques are dependent on existence of species-specific probes and/or appropriate reference databases. A key advantage is that they may identify a species at any stage of development, and they do not require any taxonomic expertise.

4.11.4 "I just can't bring myself to kill it" – How human weakness leads to the introduction and dispersal of non-native fishes (by Gordon H. Copp)

The demography of non-native fish introductions and dispersal processes (both human and natural) are examined within a risk analysis context. Introduction pathways are examined at local, regional and national scales, focusing on the potential relationships between the intensity (i.e. propagule pressure), the diversity of fish imports and the occurrence of non-native freshwater fishes in the wild, and human population densities. The role of humans at the local scale in the release of pet fish is examined using case studies, with examples also provided of other human-related introduction and dispersal pathways as well as a brief case study of the natural dispersal of an introduced fish species – pikeperch *Sander lucioperca*.

4.11.5 The impact of the invasive comb jelly *Mnemiopsis leidyi* in the North Sea (a PhD study as part of the MEMO project) (by Lies Vansteenbrugge Lies, Hostens Kris, Johan Robbens, Vincx Magda and the MEMO consortium)

Although the Belgian part of the North Sea (BPNS) is a very well studied ecosystem, the knowledge on jellyfish and more specifically ctenophores is poorly documented. Zooplankton research in the BPNS shows that several ctenophore species are facilitated by higher summer and autumn water temperatures. Recently it became obvious that these 'primitive' invertebrates are able to alter and control complete food webs.

The American comb jelly, *Mnemiopsis leidyi*, is one of the most notorious invasive species in the world. It caused massive ecological and economical damage to the Black Sea ecosystem. In the BPNS, it was observed for the first time in 2007.

To assess the impact of *M. leidyi* on different human activities (fisheries, energy providing industries and tourism) a detailed study will be carried out on the spatial and temporal distribution and the role of *M. leidyi* in the food web of the BPNS and the Westerschelde estuary. A standard Operational Protocol for sampling, conserving

and fixating these fragile species for different analysing purposes, will be further developed.

M. leidyi is known to predate on fish eggs and larvae and zooplankton. As such, it can be seen as a potential competitor and predator of zooplanktivorous fish. The position of *M. leidyi* in the food web will be assessed using stable isotopes and fatty acid analyses, and through the use of a genetic probe to identify *M. leidyi* at a larger North Sea – North Atlantic Ocean scale.

The obtained information will be useful to formulate national and international policy advice towards various sectors, including fisheries, energy providers and tourism.

This PhD study is a part of the MEMO project (*Mnemiopsis* Ecology and Modelling: Observation of an invasive comb jelly in the North Sea; www.ilvo.vlaanderen.be/MEMO), which frames in the Interreg IVa '2 Seas' programme. The MEMO project is a collaboration between ILVO (BE), CEFAS (GB), IFREMER (FR), ULCO-LOG (FR) and Deltares (NL).

5 Closing of the meeting

The meeting was closed at 13:00 on 18th March, 2011. The chair thanked IFREMER for providing the meeting venue and, specifically, Laurence Miossec for ensuring efficient logistics which were a backbone of the success of the meeting. The chair also thanked the meeting participants for their input and the rapporteur, Marie-Claude Fortin, for her extremely operational delivery of the meeting notes.