Theme Session N
Problems and solutions for the assessment, conservation, and restoration of rare, threatened, and endangered fish species

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Background

There is great concern internationally regarding the status of many fish species which are rare, threatened and possibly endangered. This includes many of the diadromous fish species which use both marine and freshwater environments to complete their life-cycles. However, there is a general lack of long term or reliable information on the conservation of such species and there has been limited success in protecting or rebuilding them. This theme session provided a forum to fill in gaps in our knowledge of current and required assessment methods, novel non-invasive sampling techniques and stock rebuilding strategies particularly where populations are marginal or low and recovery options limited. Theme Session N comprised of 13 papers and 1 poster which addressed some recent and emerging methodologies to assess a wide range of fish species and environments.

A review of the current status of cod in relation to criteria established by the Committee on Endangered Wildlife in Canada (COSEWIC) was presented which suggested that a broader set of stock status indicators might be considered in the management of stocks in the Northwest Atlantic Canadian zones. Newly emerging management plans for European eel highlighted that this species was under extreme pressure throughout its range. In the case of eels, EU

ICES CM 2008/N:04. Challenges for the assessment of the UK stock of European eel, *Anguilla Anguilla,* Alan Walker, Ted Potter, and Ian Russell.

members states are now obliged to produce national eel management plans which will require the collection of new data under the existing Data Collection Regulation for EU fisheries. Case histories were examined highlighting both difficulties and successes in establishing effective restoration or conservation programmes using hatcheries and restocking with reared juveniles at various life-history stages. The re-establishment of houting in the North Sea was effectively achieved by such hatchery rearing intervention. Successful restoration of salmon on the river Tyne in the UK was shown to be by a natural re-colonisation with restocking in the earlier years probably contributing to the initial recovery. On the other hand hatchery programmes in Ireland appeared to have made little contribution to natural production and the establishment of self-sustaining salmon runs. The continuing trend in poor survival and the necessity to establish and maintain living gene banks for some species, particularly North Atlantic salmon was highlighted with some successes noted in maintaining genetic variability and fitness through successive generations.

Evaluation methods presented in the theme session included population modeling to establish population recovery times for salmon under different environmental conditions, and habitat inventory and assessment using geographic information systems (GIS) to inform recovery plans on a broader and more inclusive scale (i.e. more species and habitat types). The application of a novel non-invasive tagging technique based on digital pattern recognition was presented. This technique can be applied to many species of fish rapidly thus providing an alternative to more traditional marking methods. Incidental harvests of threatened or endangered fish species in non-target fisheries can be problematical but instances where these fisheries could provide new information on key species including shads, tope and sturgeons for which there is little information were also highlighted. Tracking and tagging in combination with underwater surveillance and application of DIDSON (high frequency acoustic counting) have been used effectively in assessing some populations of shortnose sturgeon and providing more information on the migrations of these animals. Genetic analysis for some sturgeon populations suggested panamixia in adjacent rivers which is important for establishing specific management measures for protection of this species. Forecast models based on non-invasive multi-frequency acoustic survey methods for orange roughy in Australian waters are providing new insights into a previously important commercial species for which targeted fishing has now ceased entirely. The existence of a small but sustainable population of Norwegian pollack (*Theragra finmarchica*) was described as mystery given their close genetic and morphological similarity to the Alaskan Pollack (*T. chalcogramma*).

The session clearly identified the problems of stock decline and the tenuous condition of some stocks. Common themes in most presentations were the use of scientific results to inform management decisions associated with species listed under various National and International regulations and treaties, the difficulties in assessing key threats and the variable success of recovering populations. However advances in the identification and categorization of these stocks according to scientific criteria coupled with some new monitoring and evaluation methods and development of clear management plans for several species was welcomed. It was noted that the specific protection for some of these threatened species was also evolving rapidly with recent legislations enacted in Europe (Habitats Directive), Canada, (COSEWIC), USA (SARA) and Australia (EPBCA). Inclusion of these species and their status is clearly growing in importance within national and international biodiversity and habitat protection plans. For example species included under Annex II of the EU habitats such as shads, salmon, lamprey etc can be used to designate Special Areas of Conservation which are afforded special protection from many industrial and agricultural developments. One of the most important problems identified was the difficulty in identifying specific underlying causes of mortality particularly in the marine environment and there was general consensus that this is a major gap in our knowledge and in our ability to provide adequate protection to these rare, threatened and endangered species.

The outputs from this theme session may be of specific interest and contributions of IUCN, WWF, CITES, OSPAR, EU Commission and other national and international groups who often have specific interests/responsibilities for conservation of endangered species (e.g. sturgeon, eels, lampreys and shad etc).