Details of the Public Consultation on the Management of Eel Stocks in Ireland from 2015 to 2018

Background

The EC Regulation (Council Regulation 1100/2007) for the recovery of the eel stock required Ireland to establish eel management plans for implementation no later than 1 July 2009. Under the EC Regulation, Ireland should monitor the eel stock, evaluate current silver eel escapement and post-evaluate implemented management actions aimed at reducing eel mortality and increasing silver eel escapement.

The first Irish Eel Management Plan submitted to the EU on the 9th January 2009 and accepted by the EU in June 2009 outlined the main management actions aimed at reducing eel mortality and increasing silver eel escapement to the sea.

Under the EC Regulation (EC No. 1100/2007), each Member State shall report to the Commission initially every third year until 2018 and subsequently every six years. The second report on Ireland's eel management plan was submitted on the 30th June 2015.

The Irish Eel Management Plan outlines a national programme for sampling catch and surveys of local eel stocks. Appropriate scientific assessment will monitor the implementation of the plans.

Standing Scientific Committee on Eel

The Standing Scientific Committee on Eel (SSCE) has undertaken a full assessment of the available eel data and other information available to it as outlined in its Terms of Reference and this is produced in annual science reports. The SSCE reports provide the most current scientific advice on the status of the eel stock. These reports are available on the IFI website at www.fisheriesireland.ie.

Biology

The European eel *Anguilla anguilla* (L.) is found and exploited in fresh, brackish and coastal waters in almost all of Europe and along the Mediterranean coasts of Africa and Asia. The life cycle has still not been fully elucidated but current evidence supports the view that recruiting eel to European continental waters originate from a single spawning stock in the Atlantic Ocean, presumably in the Sargasso Sea area, where the smallest larvae have been found. The newly hatched leptocephalus larvae drift with the ocean currents to the continental shelf of Europe and North Africa where they metamorphose into glass eels that enter continental waters. The growth stage, known as yellow eels, may take place in marine, brackish or freshwaters. This stage typically lasts from 2-25 years (even more than 50 years) prior to metamorphosis to the silver eel stage and maturation. Age at maturity varies according to latitude, ecosystem characteristics and density-dependent processes. The European eel life cycle is shorter for populations in the southern part of their range compared to the north. At the end of the continental growing period, the eels mature and return from the coast to the Atlantic Ocean; this stage is known as the silver eel. Female silver eels grow larger and may be twice as old as males. The biology of the returning silver eel in ocean waters is almost completely unknown.

The European eel is a single, panmictic stock distributed from Northern Africa and the Mediterranean in the south to Northern Norway and Iceland in the north, including the Baltic Sea. Recent genetic evidence has confirmed the shared nature of the stock, with slight temporal variation between cohorts but no geographical differentiation (Palm *et al.* 2009).

International Eel Stock and the EU Regulation – "Extracted from ICES Advice"

The International Council for the Exploration of the Sea (ICES) develops science and advice that helps the sustainable use of the oceans. Their advice note on the status of eel produced in November 2013 for the 2014 calendar year states "the status of eel remains critical and urged action is needed. ICES advices that all anthropogenic mortality (e.g. recreational and commercial fishing, hydropower, pollution) affecting production and escapement of silver

eels should be reduced to as close to zero as possible, until there is evidence of sustained increase in both recruitment and the adult stock.

Restocking under the eel management plans is not expected to have contributed to increases silver eel escapement yet because of the generational lag time. The efficacy of restocking for recovering the stock remains uncertain while evidence of net benefit is lacking." Further the advice states in respect of stock status "the annual recruitment of glass eel to European waters has increased over the last two years, from less than 1% to 1.5% of the 1960 – 1979 reference levels in the 'North Sea' series and from 5% to 10% in the 'Elsewhere series'"

The stock is in a critical state. In 2007, European eel, *A. anguilla*, was included in CITES Appendix II that deals with species not necessarily threatened with extinction, but trade of which must be controlled to avoid utilization incompatible with the survival of the species (see http://www.cites.org/eng/disc/how.shtml), implemented in March 2009. Eel was also listed (2008) as critically endangered on the IUCN Red List.

A management framework for eel was established in 2007 through an EC Regulation (EC No. 1100/2007; EC, 2007). The objective of this Regulation is the protection, recovery, and sustainable use of the stock. To achieve the objective, Member States have developed eel management plans (EMPs) for their river basin districts, designed to reduce anthropogenic mortalities and increase silver eel biomass. The objective of the national eel management plans is to reduce anthropogenic mortalities so as to permit high probability, the escapement to the sea of at least 40% of the silver eel biomass, relative to the best estimate of escapement that would have existed if no anthropogenic influences had impacted the stock.

As eel is a long-lived species and anthropogenic mortalities occur over all of its continental lifespan, the effect of management measures on silver eel production and escapement and on their subsequent recruits (glass eel coming back to the coast) is expected to take several years to be detected (ICES, 2009). When these management measures eventually feed

through to silver eel escapement and glass eel recruitment, the natural variability of these migrations, local site effects, and sampling variation may prevent the detection of such changes for at least several more years, even a decade or more (ICES, 2011a, 2011b). Therefore, the recovery process and the detection of possible changes due to management actions will be a slow process. The reporting by Member States to the EC in 2012 and again in 2015 are steps in this road to recovery, however, in the short term, changes in anthropogenic mortality and local variations in the stock will have to be used to quantify the effect of management measures.

Over the period 2009-2015, there is no change in the overall scientific perception of the stock status: it remains critical and urgent action is needed. ICES reiterated its previous advice that all anthropogenic mortality (e.g. recreational and commercial fishing, hydropower, pollution) affecting production and escapement of eels should be reduced and kept as close to zero as possible until there is clear evidence that both recruitment and the adult stock are increasing. Urgent actions are needed to prevent further depletion of the stock.

Ireland's Eel Management Plans (2009 – 2015)

The EC Regulation (Council Regulation 1100/2007) for the recovery of the eel stock required Ireland to establish eel management plans for implementation in 2009. Under the EC Regulation, Ireland should monitor the eel stock, evaluate current silver eel escapement and post-evaluate implemented management actions aimed at reducing eel mortality and increasing silver eel escapement. The Irish Eel Management Plan, submitted to the EU on the 9th January 2009 and accepted by the EU in June 2009, outlined the main management actions aimed at reducing eel mortality and increasing silver eel escapement to the sea. The EMP included two cross-border agreements, with the Neagh Bann IRBD rivers flowing into Carlingford Lough from the Republic of Ireland and into Dundalk Bay being reported in a plan for the Eastern RBD (the Eastern Eel Management Unit) and one transboundary eel

management plan in respect of the North Western IRBD and prepared by IFI in association with the Loughs Agency and DCAL.

The four main management actions identified in Ireland's EMP were as follows;

- a cessation of the commercial eel fishery and closure of the market
- mitigation of the impact of hydropower, including a comprehensive trap and transport plan to be funded by the ESB
- ensure upstream migration of juvenile eel at barriers
- improvement of water quality

The Irish Eel Management Plan (EMP) also included the national monitoring and research programme to assess current eel stock status and the effectiveness of management actions undertaken.

Given the implications of the scientific advice, the consideration of practical management implications and the objective to conserve and recover the stock in the shortest possible timeframe (contingent upon equivalent actions across Europe), the precautionary approach was adopted and the eel fishery was closed.

Eel fisheries in tidal and transitional waters are also managed under the inland fisheries legislation and management structures. Given the absence of appropriate methods for estimating eel stock production and silver eel escapement in transitional waters, the precautionary approach was also adopted and the eel fishery in transitional and tidal waters was also ceased.

Public Consultation

As part of the process of developing a management plan for eels for the period 2015 – 2018, Inland Fisheries Ireland (IFI) invited submissions from interested parties on the following report;

Report to the European Commission in line with Article 9 of the Eel regulation 1100/ 2007 (Implementation of Ireland's Eel Management Plans including the transboundary IE_NorW Eel Management Plan.)

The report referred above and previous eel management reports were available for download from the IFI website or were made available on CD-ROM if requested.

In addition to the information posted on both the IFI and Department of Communication Energy and Natural Resources (DCENR) websites a public consultation meeting was held in Athlone on the 10th of June 2015. All of the former eel fishermen licensed by IFI were written to directly to inform them of the public consultation process. A copy of the letter circulated to them can be found at **Appendix I** at the back of this document.

The meeting followed a similar format to previous public consultation meetings held in relation to previous progress reports for submission to the EU regarding Ireland's Eel Management Plan. Dr Russell Poole (Chairman of the SSCE) and Dr Paddy Gargan both delivered powerpoint presentations highlighting the current national and international scientific advice, the Ireland's monitoring and research programme and current stock status.

These presentations were followed by a final presentation delivered Dr Greg Forde which outlined the main management elements of the plan and the progress achieved in relation to delivery of these objectives. A full question and answer session was held at the end of the presentations to give everyone an opportunity to ask questions and raise any concerns. Copies of each of the powerpoint presentations can be found at the back of this document **(Appendix II).**

As many of the issues raised were made in multiple submissions rather than deal with each individual submission in isolation this document will address the various the issues collectively under a number of key themes as identified below. (Full details of all the submissions received and the notes associated with each submission can be found in **Appendix III**).

Compensation / Diversification

i) Compensation for loss of income both past (for the period of closure) and future.

There is no property right attaching to public eel licences and consequently the issue of compensation does not arise as the closure of the fishery was applied for conservation reasons under the Fisheries Acts. However given the continuation of the closure of the eel fishery from 2012 until 2015 IFI are of the view that a hardship package should be provided to recognise the economic loss suffered by former licensed eel fishermen following cessation of the fishery on conservation grounds.

ii) Compensation for the capital investment in equipment which is currently defunct.

See point (i) above.

iii) The cost of tonnage to diversify into other species should be provided as part of a compensation scheme.

See point (i) above.

iv) Fishermen should have access to the European Fisheries Fund (EFF) to compensate them for their loss of livelihood.

Council Regulation (EC) No 1198/2006 of 27 July 2006 established the European Fisheries Fund (EFF) for the period 2007 – 2013. At the time of closure of the eel

fishery in 2009 the European Fisheries Fund was examined, and high level discussions were held with other State Agencies in this regard. Unfortunately given the terms and conditions associated with the fund it was not possible to secure any funding. This issue will be re-examined in the context of the new fund the European Maritime and Fisheries Fund (EMFF) which is currently being developed. IFI believe that this fund does provide for the type of relief being sought by the eel fishermen however Ireland's element of EU fund is managed by the Department of Agriculture Food & Marine (DAFM).

v) The diversification measures put in place were unsatisfactory.

In 2009 the then Central and Regional Fisheries Boards (now Inland Fisheries Ireland – IFI) engaged with the eel fishermen representatives to investigate possible diversification schemes. The ESB silver eel trap and truck programme has provided a opportunity to several former eel fishermen to undertake conservation fishing (for downstream transfer of silver eel around hydropower stations) to mitigate the impact of hydropower schemes as part of Ireland's Eel Management Plan stated actions.

vi) An assessment of the compensation packages put in place in other European countries should be put in place (Holland / Finland).

See point (i) above. There is no provision for compensation for a public license, however IFI are of the view that a hardship fund should be provided to recognise the hardship suffered by the fishermen as a result of the closure of the eel fishery.

vii) Jobs should be prioritised for eel fishermen.

IFI are open to working with former commercial eel fishermen on relevant future projects and surveys which would benefit from their particular skills and local knowledge.

viii) Salmon fishermen received compensation so eel fishermen should also receive compensation.

The eel conservation measures introduced in 2009 were enacted for an initial period of three years, and were subsequently extended for a further period of three years. Any hardship fund provided would have to be in the context of a permanent cessation of commercial eel fishing similar to the provisions of the Hardship scheme implemented in relation to mixed stock salmon fishing in 2007.

ix) A key part of the EU regulation and the judgement in respect of the eel case by Mr Justice Herbert is that the recovery measures are effective and equitable and the full closure of the Irish eel fishery without compensation is not equitable, and the closure of the eel fishery is a disproportionate measure relative to the other three key measures.

See points above. Given as the eel fishery has been closed for a further three year period and there are still serious concerns regarding the status of eel stocks and the longterm decline in glass eel and elver recruitment, IFI are of the view that a hardship find should be provided for to facilitate former commercial eel fishermen to permanently exit the fishery.

Implementation of EU Directive

i) The directive has been misinterpreted in the application of the 40% escapement.

The objective of the national eel management plans is to provide, with high probability, a long-term 40% escapement to the sea of the biomass of silver eel, relative to the best estimate of the theoretical escapement in pristine conditions (i.e. if the stock had been completely free of anthropogenic influences). While the total for all Eel Management Units relative to the EU target Ireland is currently achieving a 54% escapement rate, the best scientific advice indicated that there is a strong probability that this level of escapement is only temporary as the impact of poor recruitment has yet to feed through to silver eel escapement levels.

ii) The Eel Regulation 1100/2007 did not require that the eel fishery should be shut down.

Each Member State had to ensure that they were achieving 40% escapement of silver eel biomass relative to pristine conditions.In Ireland's case both scientific and management factors were taken into consideration in the decision to temporarily close the fishery until stocks recover.

iii) No account was taken of culture and heritage in the decision to close the fishery.

The decision to close the fishery was to ensure that EC Regulation objective of reduction of all anthropogenic mortality of eel was implemented and to ensure the target 40% of silver eel biomass escapement relative to pristine conditions was achieved..

iv) Other countries in Europe have not gone 'as far' as Ireland.

While cognisant of the measure adopted by other European countries Irish authorities considered both management and scientific advice on how to achieve compliance with the 40% escapement in the fastest possible time. Other countries have taken different approaches relative to the dynamics of their particular eel fisheries. All Member States have taken actions aimed at reducing eel mortality and increasing silver eel escapement, and these efforts are subject to review by the European Commission under the EU Eel Regulation.

v) Other countries in Europe are still fishing for elvers so why can't Irish fishermen?

Ireland has no tradition of a commercial fishery for juvenile eel. The EC Regulation requires that 60% of all eels of less than 12 cm in length be reserved for restocking by 31 July 2013. A very small number of commercial elver fisheries remain in operation in Continental Europe, however any fisheries in these waters must be cognisant of the need to achieve on a long term basis 40% escapement of silver eel stock relative to pristine conditions.

vi) There is an imbalance as there is full closure in Ireland but other European countries are allowed to harvest eels especially, as it is a single common stock –Ireland's closure is just enhancing other countries catches.

See points above.

vii) The sale of elvers to fish farms should be stopped immediately.

This is not an issue pertinent to Ireland as in Ireland no such harvest takes place. It is for other countries to best manage their proportion of the eel stock to ensure the 40% escapement prescribed in the regulation is achieved.

viii) The methods of netting elvers should be modified to reduce mortality.

ICES have highlighted concerns regarding fishing mortality in relation to capture and transport of glass eel and elver for stocking purposes. IFI are of the view that any method for netting elvers should minimise or eliminate mortality.

ix) IFI should engage former eel fishermen to trap and transport elvers and glass eels upstream

Longterm elver collection and overland transportation programmes are in place for the Shannon, Erne and Lee catchments at ESB hydropower facilities. Transportation of elvers is completed by ESB at the Shannon and Lee catchments and by DCAL staff on the Erne. However if the runs of elvers continue to improve IFI could consider installing additional elver traps with a view to getting former eel fishermen to assist in the recovery of the eel stocks in the short term. This would require additional investment in both infrastructure, and traps as well as a payment mechanism (and fund) to compensate the fishermen and a verification and inspection regime to validate the catches.

x) The current use of index sites is flawed and does not take account of water, temperature, levels or other environmental variables

The IFI Elver Monitoring Programme examines several sites across the country on an annual basis during the elver season. These sites include the Inagh, Maigue, Feale, Corrib, Ballysadare and Liffey. Each run of elvers is examined through proportional catches. Water flow conditions, temperature and other relevant variables are recorded by IFI staff on site, and

downloaded from OPW monitoring stations nearby each elver site for the entire elver season.

Scientific Information

i) There is a contradiction between national and international scientific advice in respect of eels.

The ICES advice is that the status of eel remains critical and urgent action is needed. ICES advises that all anthropogenic mortality (e.g. recreational and commercial fishing, hydropower, pollution) affecting production and escapement of silver eels should be reduced to as close to zero as possible, until there is clear evidence of sustained increase in both recruitment and the adult stock. The ICES 2014 Working Group reported a rise in recruitment to Europe from 10% to 12% of historic levels. However, it remains to be seen if this increase in recruitment is as a result of the management measures put in place since 2009 or is just natural variability in the recruitment indices. Recruitment over the 2012-2014 period was patchy in Ireland, with some locations faring better than others. The Liffey, Shannon (Ardnacrusha), Ballysadare and Feale had relatively lower catches than those observed at the Erne, Maigue, Inagh and Burrishoole. There was a general increase in recruitment in Ireland in 2013-2014, although there was some variation in abundance between sites and between years, often due to seasonal variations in water levels.

The European (North Sea) average recruitment for the 2009-2011 period was at about 7% of historic and this increased to about 20% in the 2012-2014 period. The recruitment in 2014 itself was on average 27% of historic levels, compared to 15% in the “Elsewhere” Europe (Elsewhere = non-North Sea Europe).

ii) The historical data as a basis for statistical usage is too small (ie. calculating the historical base line).

Historic data on yellow eel abundance was available from a range of Irish lakes including the most productive lakes for eels such as Lough Ree, Lough Derg, Upper and Lower Lough Erne, Upper and Lower Corrib, Burrishoole, Conn, & Inchiquin.

iii) There has been no comparison with the eel harvest statistics between Ireland and other European countries (the context is that the Irish harvest is negligible).

Regardless of the size of the Irish eel harvest in comparison with other European countries, the EC Regulation (Council Regulation 1100/2007) for the recovery of the eel stock required Ireland to establish eel management plans for implementation in 2009. Under the EC Regulation, Ireland should monitor the eel stock, evaluate current silver eel escapement and post-evaluate implemented management actions aimed at reducing eel mortality and increasing silver eel escapement. The Irish Eel Management Plan, submitted to the EU on the 9th January 2009 and accepted by the EU in June 2009, outlined the main management actions aimed at reducing eel mortality and increasing silver eel escapement to the sea. Given the implications of the scientific advice, the consideration of practical management implications and the need to conserve and recover the stock in the shortest possible timeframe (contingent upon equivalent actions across Europe), the precautionary approach was adopted in accordance with the recommendations of the National Eel Working Group and the eel fishery was ceased.

iv) No data has been provided for elver movement along the West Coast of Ireland.

Elvers are monitored at several sites along the west of Ireland including the Inagh, Feale, Maigue, Corrib, Burrishoole, Ballysadare and Erne. Recruitment over the 2012-2014 period was patchy in Ireland, with some locations faring

better than others. The Liffey, Shannon (Ardnacrusha), Ballysadare and Feale had relatively lower catches than those observed at the Erne, Maigue, Inagh and Burrishoole. There was a general increase in recruitment in Ireland in 2013-2014, although there was some variation in abundance between sites and between years, often due to seasonal variations in water levels. However, it remains to be seen if this increase in recruitment is as a result of the management measures put in place since 2009 or is just natural variability in the recruitment indices.

Surveying and Assessment

i) The scientific assessments are based on unsatisfactory and erroneous surveys.

The scientific assessments on glass eel / elvers, rely on a time series of information at a range of sites to provide information on current levels of elver recruitment. The elver monitoring is designed to be an examination of a proportion of elver runs and not an examination of entire runs. The yellow eel surveys are undertaken in lakes with previous historic information for comparison with current stocks size and population structure. They are carried out using intensive fyke netting methods in order to assess eel populations. Each survey is carried out with the same degree of effort so as to accurately compare CPUE across lakes. The silver eel assessments are aimed at establishing current silver eel escapement from index catchments and can be compared to historical information.

ii) Surveys in Waterford Estuary were undertaken in the wrong place at the wrong time with the wrong equipment.

A survey of the Waterford estuary was carried out in 2009 & 2011. On the Suir, two locations were selected for the 2009 surveys, one upstream of the bridge in Waterford city and one downstream with a total catch of 1,888 eels (CPUE 11.58). A large catch of 483 eels was captured in the upstream site after just one night's fishing and 712 eels were tagged from the downstream site. A further 1,410 eels were captured in the Barrow transitional waters

during the 2009 surveys (CPUE 6.56). Fyke nets were set in chains of five and they were not baited to avoid attracting eels into the study area. Even if a survey was conducted at a different time and place in the estuary, due to the difficulties in obtaining density estimates for eels in large water bodies and the migratory habits of eels moving upstream into the rivers and/or leaving the transitional water as silver eel, it is still not possible to estimate silver eel escapement/production for transitional waters. Work using acoustic tagging telemetry studies of eels in the Barrow, is hoped to quantify the movements of eels in estuaries and improve population density estimates.

iii) It has not been possible to determine the density of eels in transitional waters and what is being done to rectify this situation?

There is a requirement to calculate the production of eels from the transitional (saline) water habitat as distinct from the freshwater habitat. However, this is a difficult task as eels may move from estuaries upstream into rivers and silver eels may be migrating downstream from rivers through estuaries. One method is to apply the production value (kg/ha) for an inland catchment and extrapolate it to the respective transitional waters. However this method does not take into account the extreme change in habitat and potential productivity due to salinity and other habitat and ecological features. In order to investigate an alternative method to that applying the freshwater production value 'blindly' to the transitional waters, it was decided to utilise the fyke net surveys undertaken as part of the Water Framework Directive monitoring and to come up with a classification of the different types of transitional waters in Ireland that reflected the CPUE from the fyke nets.

There appears to be a relationship between transitional water habitat classification and the CPUE of eels in fyke net surveys. However, there is no apparent relationship between the transitional water habitat and freshwater potential production of silver eel. Therefore, it was considered too unreliable at this point to attempt an extrapolation type estimate of silver eel

production in transitional waters as the outcome could be quite misleading. More work is required to investigate further environmental variables that might explain the production of transitional waters (salinity, substrate (mud, algae, rocky – linked to food source)) Information on habitat use within transitional waters is also required, e.g. are eels using all areas or do they require specific habitat e.g. for burrows? Further work is also required to investigate the relationship between CPUE and density and the silver eel potential production from transitional waters, separate from inland waters.

iv) Experienced fishermen should carry out surveys with IFI staff.

IFI are open to the possibilities of engaging former eel fishermen in future eel surveys in accordance with available funds.

v) There is a need more information on *Anguillicola* and assessment of how many eels actually make it to the Sargasso Sea.

Anguillicola crassus was first recorded in Ireland in 1997 (McCarthy *et al*., 1999). By 2014, it was estimated that at least 74% of Ireland's wetted area contained the parasite (Beccera-Jurado *et al*., 2014) and it is predicted to continue to spread. IFI continue to examine the extent of *A. crassus* distribution using the Eel Monitoring Programme together with the Water Framework Directive surveys. By employing the use of swimbladder health indices during eel dissections, it has been determined that Irish eels only display slight to moderate damage to their swimbladders. Palstra *et al*., (2007) indicated that eels with large parasite infections and/or severe swimbladder damage at the time of silver eel migration may not complete the long swim to spawning grounds. This may result in a hindering effect to eel recovery. However, to date, severe damage has not been noted in Irish eels. The EU EELIAD Programme previously satellite tagged 76 silver eels from Irish waters from catchments known to have a high incidence of the parasite and from catchments known to be free in an effort to determine if the parasite impacts on migratory success. Results are being analysed but no clear trends are evident to date.

vi) Unmarked legal survey netting for eels has caused confusion amongst tourists as they cannot differentiate between legal and illegal nets.

All IFI surveys will be marked with a standard buoy printed with "IFI Survey" for identification.

Reopening of Fisheries / Economic Effects / Enforcement

i) Fishermen should be permitted to fish every second year from September 1st to December 1st

The scientific evidence is that the International and National stock is in severe decline and anthropogenic mortality should be reduced to as close to zero as possible. Additionally while Ireland is currently above the spawning escapement target of 40% the scientific advice indicated that this is only a temporary position as the full effects of the collapse in recruitment have yet to be manifest. Therefore IFI have advocated adopting the precautionary approach to reopening this fishery.

ii) Fishermen should be allowed to fish from May to July in line with other European Countries.

The overall objective of the conservation measures is to restore eel stocks to safe levels of silver eel escapement and recruitment as soon as possible. Exploitation of the stock at any life stage will inevitably impact the overall stock (which is currently listed as being critically endangered) and undermine the conservation imperative.

iii) There should be a heritage fishery for eels in Waterford Estuary.

The eel stock in Waterford Estuary is difficult to quantify. Eels can come and go and assessment of the standing stock or biomass is difficult. It is currently not possible to estimate the quantity (biomass) of silver eels being produced in estuarine waters. It is not wise to permit a fishery on a stock the size and importance of which cannot quantified. It is also noted that the traditional

woven basket eel fishery has been largely superseded by more modern fishing techniques.

iv) A system to purchase and restock rivers and lakes with elvers should be put in place.

The most up to date ICES advice continues the trend toward only advising stocking where there is a high probability of net benefit to the production of silver eels and by inference, the spawning stock. The ICES working group on eel WGEEL recommended that all stocking activity be designed to include traceability of eel into later life stages by using permanent marking of bone structures. The best means of ensuring such traceability would be by batch or other marking methods.

Concerns about current eel stocking practices have been expressed and its effective contribution to ensure increased silver eel production has been raised. It remains an ICES recommendation that there should be a co-ordinated marking programme of stocked eel and thereby separable from wild eel in subsequent sampling.

ICES has commented comprehensively in relation to the assessment of risks involved in transfer and stocking of eel, and the reports from 2006 onward provide templates and decision approaches to the risk assessment, covering topics including the concept of a local surplus of Glass Eel, effective enhancement of spawner production, successful emigration and spawning of trans-located and stocked eels, risks of genetic impact, and loss of genetic biodiversity, and biosecurity risks associated with disease and /or parasite transfer.

v) Different lakes should be fished in alternate years.

Eels are long lived animals with female eels typically remaining in lakes for up to 20 years before silvering up and migrating out to sea to spawn. Therefore

any exploitation of stocks, even from different lakes on alternate years will inevitably impact overall silver eel escapement and recruitment returns which are at historically low levels.

vi) A designated lake should be stocked with elvers and monitored closely to determine growth rates and mortality and migration patterns.

A key aspect of Ireland's annual research and monitoring programme is to evaluate age, growth, production and migration from a range of locations. Long term overland stocking of glass eel and elvers to the Shannon and Erne for instance has provided the basis for detailed research in this regard. IFI examine growth rates of eels from surveyed locations on an annual basis. These surveys also allow observations on eel health and quality. Tagging of eels at surveyed lakes also allows for the tracking of silver migrating individuals to be monitored leaving selected catchments, leading to increased data on migration patterns.

vii) Surveys should be carried out by long line and fyke nets, as fyke net surveys alone do not give the full picture.

Surveys by longlines is not desirable as eels are damaged during capture due to ingestion of the hook which militates against subsequent release. Surveys conducted using standard fyke nets give a measure of consistency which allows catch per unit effort to be compared from year to year, with historic surveys, and between waterbodies.

viii) There will be significant illegal fishing as a result of the closure.

Evidence to date suggests that illegal eel fishing activity has remained at generally low levels since closure of the commercial fishery in 2009 (see Table 2.1 of the Eel Management Report). IFI expends significant resources in protecting the fishery and responding to reports of alleged illegal activity.

ix) Some fishermen are illegally selling eels

Capture, possession or sale of eel caught in the State (other than under authorisation for ESB conservation fishing) is strictly illegal. Anyone undertaking illegal activity is liable to prosecution and fine on conviction.

Northern Ireland

i) There is still eel fishing and trading in Northern Ireland but not in the Republic.

IFI are not in a position to comment on how the authorities in Northern Ireland are going to satisfy their requirement to ensure the escapement of 40% of the Silver Eel biomass relative to pristine conditions.

ESB Issues

i) Why have more technical measures not been developed to protect eels against turbine mortality?

See point (ii) below. A summary of research initiatives funded by ESB and conducted by NUI Galway is presented in section 2 of the Eel Management Report (Mitigation of Hydropower).

ii) The negative impacts of hydropower have not been addressed.

Many technical silver eel conservation measures have been addressed by the Electricity Supply Board (ESB) over the past three years. The first step has been to determine the exact level of mortality associated with each large scale catchment utilised for hydropower generation. This has involved a planned and structured approach using acoustic telemetry tags on individual fish released as batches at locations on the Shannon and Erne catchments. The work has also involved mark-recapture estimation of migratory eel population sizes in these rivers and surveys of their migratory behaviour using ultrasound technology. Eel population studies have also been undertaken on the River Lee. The exact determinations have been published as part of the annual Standing Scientific Committee on Eel (SSCE) reports, they have been presented at international conferences in Scotland, Portugal and USA and are also currently being submitted for scientific

publication by Dr. TK McCarthy *et al.* from the National University of Ireland, Galway (NUIG).

Whilst the exact determination of silver eel survival (and catchment based silver eel escapement), was being calculated for each river by NUIG research staff, the ESB Trap and Transport (T+T) system has successfully been developed and operated by ESB. This programme originally began in 1992 as an ESB pilot project on the R. Shannon. It is on a scale unparalleled elsewhere in Europe and has been welcomed by international experts involved in eel conservation. Due to it's success it will continue to be operated as an effective conservation measure for downstream migrating silver eel in future years. ESB may also in addition to the conservation measure of T+T look at deflection technologies which alongside some controlled spillage may be useful.

However despite the international use of deflection technologies (such as infrasound, gas bubble curtains and the use of lights), it is apparent that these technologies are still currently being developed. Their variable success rates appear to be very site specific but nevertheless may be useful in future years to ESB.

iii) There should be a full re-stocking programme on the River Shannon system, with glass /bootlace eels and elvers and there should be a semi commercial fishery for these to facilitate restocking.

The present problem is that the returning supply of juvenile eel to the coastline of Ireland has rapidly declined in recent years. Therefore, there is no current 'surplus' of Irish juvenile eel available at present. Furthermore it also looks as if the returning numbers of juvenile eel will continue to decline. ESB has operated and will continue to operate a juvenile eel trapping regime at several of it's hydropower sites. These catches are used for restocking catchments above these trap sites. No inter-catchment

transfer of juvenile eel is permitted due to bio-security hazards associated with the spread of fish disease and non-native invasive species.

A semi-commercial fishery on the coast of Ireland would simply remove migrating glass eel or elver from other non-hydro regulated catchments and place them into hydro-regulated catchments where the dangers of hydropower would be relevant. At present given the rapid rate of decline of eel recruitment, it is more beneficial to let juvenile eel migrate into non-hydro regulated rivers.

Overall Conclusion & Recommendation

Having considered all of the submissions in detail and the relevant scientific advice, IFI recommend that all eel fisheries remain closed for the duration of the next reporting cycle. A hardship fund should be sourced and made available to former eel fishermen recognising the hardship suffered as a result of the closure of the eel fishery. Any hardship fund should be provided on the same basis as that for the salmon fishery, ie. it provides for permanent exit from the fishery. The specific details of any such fund can be determined at a future point. Additionally scientific surveys should be undertaken in association with fishermen in a number of key locations around the country to improve on the corpus of scientific information available. Similarly the specific details of any surveys can be determined at a future date. However these measures can only be progressed if sufficient funding is identified.

Appendices:

Appendix I – Copies of the letter sent to former licensed eel fishermen

Appendix II – Copy of the powerpoint presentations given a the public consultation meetings

Appendix III – Copy of the submissions received in the public consultation process