**CNL(13)44**

# *NASCO Implementation Plan for the period 2013-18*

## *EU - Ireland*

# CNL(13)44

## *NASCO Implementation Plan for the period 2013-18*

***The main purpose of this Implementation Plan is to demonstrate what actions are being taken by the jurisdiction to implement NASCO Resolutions, Agreements and Guidelines.***

*Questions in the Implementation Plan refer to the following documents:*

- *NASCO Guidelines for Management of Salmon Fisheries, CNL(09)43 (referred to as the 'Fisheries Guidelines');*
- *Minimum Standard for Catch Statistics, CNL(93)51 (referred to as the 'Minimum Standard');*
- *NASCO Guidelines for Protection, Restoration and Enhancement of Atlantic Salmon Habitat, CNL(10)51 (referred to as the 'Habitat Guidelines');*
- *Williamsburg Resolution, CNL(06)48; and*
- *Guidance on Best Management Practices to address impacts of sea lice and escaped farmed salmon on wild salmon stocks (SLG(09)5) (referred to as the 'BMP Guidance').*

| | |
|---|---|
| **Party:** | **EU** |
| **Jurisdiction/Region:** | **Ireland** |

# 1. Introduction

## 1.1 What are the objectives for the management of wild salmon? *(Max 200 words)*

Irish Government policy is "To conserve the inland fisheries resource in its own right and to facilitate exploitation of the resource on an equitable and sustainable basis".

This policy goal is to be achieved through the strategic objectives of**:**

- Ensuring the effective conservation, primarily through the relevant State agencies, of inland fish habitats and stocks;
- Encouraging the sustainable development, through appropriate investment and support within resource constraints, of the commercial and recreational fishing resources; and
- Delivering effective and value for money management of the inland fisheries service.

It is the Irish Government's strongly held view that our salmon stock is a national asset, which must be conserved and protected, as well as being exploited as a resource, by us all on a sustainable and shared basis. The Irish Government r acknowledges the status of salmon as set out in Directive 92/43/EEC (Annex II & V) and the requirement to protect and conserve this species.

*NOTE : this was updated flowing creation of IFI (Inland Fisheries Ireland)*
*Government policy is to conserve the inland fisheries resource through effective corporate governance of the agencies operating under the aegis of the Department and to facilitate exploitation of the resource on an equitable and sustainable basis.*

*The Governments strategic objectives are to**:***

- *Ensure the effective conservation, primarily through Inland Fisheries Ireland and the Loughs Agency, of inland fish habitats and stocks.*
- *Deliver effective legislative and regulatory framework and value for money management for the inland fisheries sector.*

## 1.2 What reference points (e.g. conservation limits, management targets or other measures of abundance) are used to assess the status of stocks? *(Max 200 words) (Reference: Sections 2.4 and 2.5 of the Fisheries Guidelines)*

The reference point chosen to establish the status of individual stocks is the maximum sustainable yield or MSY as described by ICES (2005).
This point can be clearly identified from Stock – Recruitment curves, which are used extensively in fisheries science and fisheries management. ICES in particular has stressed that this is a **Limit Reference Point** *i.e.* it sets a boundary that defines safe biological limits within which the stock can produce a long term maximum sustainable yield. It therefore delimits the constraints within which the management strategy must operate to maintain a sustainable resource. Individual salmon stocks may well exceed this limit but should not be allowed to fall below the Conservation Limit (ICES 2005). Given the poor returns and low marine survival which prevail currently the SSC advice therefore is to meet the Conservation Limit in the shortest possible time period rather than over a protracted time period.

The principal development of the statistical techniques and subsequent model use to establish CLs for all Irish rivers occurred within the context of the EU funded concerted action SALMODEL (a co-ordinated approach to the development of a scientific basis for management of wild salmon in the North-East Atlantic). The Bayesian analysis of this hierarchical model has been developed from a set of 18 stock and recruitment data series from Irish rivers and a number in the UK. The model yields a set of predicted stock and recruitment parameters for new rivers, provided information is available on the size of the river (in this case usable habitat or wetted area is used) and on the rivers latitude. Details of the model specification and its Bayesian treatment are given in Prevost et al, (2003) and their application to Irish rivers in Ó Maoileidigh *et al*., 2004. The wetted area is computed from statistically combined parameters: the length of upstream river, upstream catchment area, stream order, and local gradient interpolated from aerial photography within a GIS platform (McGinnity *et al.*, 2012). The latitude value used is the river catchment area mid-point.

**1.3 To provide a baseline for future comparison, what is the current status of stocks relative to the reference points described in 1.2, and how are threatened and endangered stocks identified?**

| Category | Description of category and link to reference points | No. rivers |
|---|---|---|
| 1 | Stocks Meeting Conservation Limits and harvest fishery allowed | 58 |
| 2 | Stocks **NOT** Meeting Conservation Limits and harvest fishery prohibited but C&R allowed | 15 |
| 3 | Stocks **NOT** Meeting Conservation Limits and fishery closed | 70 |
| 4 | Where calculated, 2SW stocks Meeting Conservation Limits and harvest fishery allowed | 11 |
| 5 | Where calculated, 2SW stocks **NOT** Meeting Conservation Limits and harvest fishery prohibited but C&R allowed | 2 |
| 6 | Where calculated, 2SW stocks **NOT** Meeting Conservation Limits and fishery closed | 3 |
| | | |

*Insert additional categories as required:*

| TOTAL: | | |
|---|---|---|

Additional comments:

Two specific criteria are used to allow rivers to open for catch and release
If less than 100% and more than 65% of the CL has been attained by the stock in question catch and release is permitted (single barbless hooks, fly only).

If a juvenile electrofishing assessment indicates an average of 17 fry per 5 minute electrofishing (multiple sites combined and including any previous years results), or greater than the river will be open for catch and release.

**1.4 How is stock diversity (e.g. genetics, age composition, run-timing, etc.) taken into account in the management of salmon stocks?** *(Max 200 words)*

All Irish salmon stocks are managed on a catchment by catchment basis and assessed for 1SW and 2SW components. Specific advice is provided for 16 2SW stocks which contribute significantly to important known spring fisheries which need to be managed separately. This helps to preserve the genetics of the early run fish.

Annual and daily bag limits restrict the overall numbers of fish which can be taken in a given period to avoid overfishing on specific run components of the stock. Prior to the 12th of May annually a maximum of one spring salmon per day and a maximum of three spring salmon in total can be retained by anglers as a further conservation measure. Only one salmon per day can be retained per day by anglers in September as a conservation measure. Additional season restrictions (open date in spring generally varies by catchment) only allow exploitation during the "open" season, the closure date for recreational salmon fisheries is 30st September.

Extensive genetic analysis and genotyping of salmon stocks in Ireland has been completed and has led to unique genetic identification of all Irish salmon stocks, except for three rivers (R. Nore, Suir & Barrow), which are closely related in genetic terms. This genetic analysis has led to differentiation of stocks in any remaining mixed stock fisheries. Where genetics of stocks in smaller rivers adjacent to larger rivers are similar using current GSI techniques, stocks are considered as single stock for management purposes. This has been applied in 5 circumstances.

| **1.5 To provide a baseline for future comparison, what is the current and potential quantity of salmon habitat?** *(Max 200 words)*<br>*(Reference: Section 3.1 of the Habitat Guidelines)* |
|---|
| The current quantity of accessible salmon habitat is 11,743 hectares. Four major hydro-electric facilities impede upstream movement of salmon and the total wetted area of salmon habitat when the area upstream of these four stations is included is 16,720. While these hydro-stations do have fish passage facilities, the rivers are not considered to hold self-sustaining salmon populations. |

**1.6 What is the current extent of freshwater and marine salmonid aquaculture?**

| | |
|---|---|
| Salmon no. of freshwater sites for aquaculture | 12 (2012) |
| Salmon freshwater production for aquaculture | est >5.0 million smolts |
| Salmon no. of freshwater sites for recreation/stocking | 8 (2012) |
| Salmon freshwater production recreation/stocking | Eyed ova 1.3 million, Parr 320,000, Smolts 362,000 (2012) |
| Salmon no. of marine sites for aquaculture | 15 |
| Salmon marine production for aquaculture | 14,000 tons |

Information on brown trout and rainbow trout will be forwarded shortly, when available

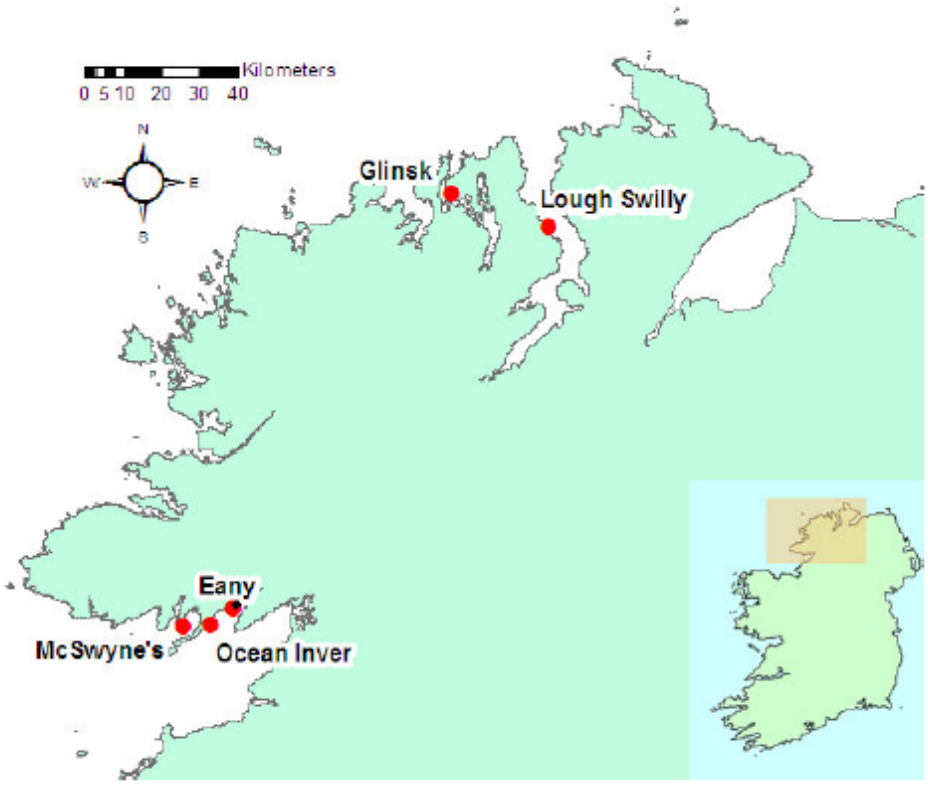



**Figure 1: Donegal area finfish aquaculture activity**

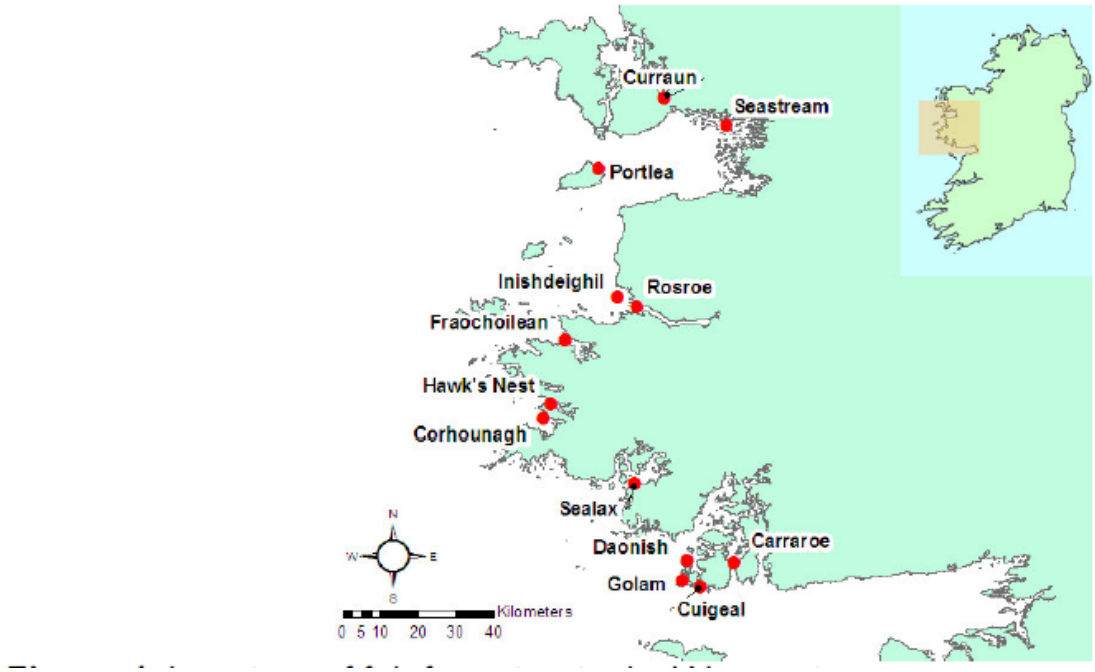
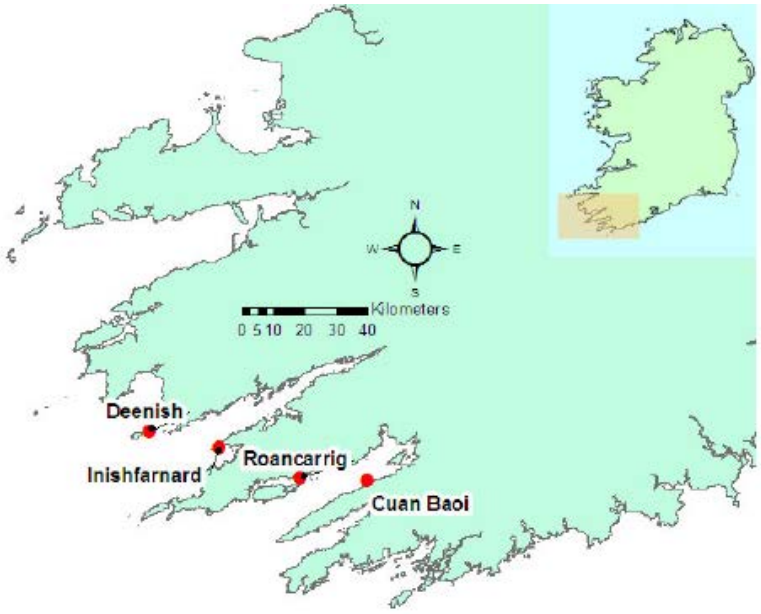



**Figure 2 Galway/Mayo area finfish aquaculture activity**

**Figure 3: Cork/Kerry area finfish aquaculture activity**




| |
|---|
| Append one or more maps showing the location of aquaculture facilities and aquaculture free zones in rivers and the sea.<br>Location of aquaculture facilities attached in Figures 1, 2 and 3 above |
| **1.7 To aid in the interpretation of this Implementation Plan, have complete data on rivers within the jurisdiction been provided for the NASCO rivers database?** *Yes/no/comments* |
| Yes |
| **2. Fisheries Management:** |
| **2.1 What are the objectives for the management of the fisheries for wild salmon?** *(Max. 200 words)* |
| The objectives of fisheries management is for all stocks to meet and exceed biologically based Conservation Limits (MSY) with only the surplus above the Conservation Limits being available for harvest. |

*Government policy is to conserve the inland fisheries resource through effective corporate governance of the agencies operating under the aegis of the Department and to facilitate exploitation of the resource on an equitable and sustainable basis.*

*The Governments strategic objectives are to:*

- *Ensure the effective conservation, primarily through Inland Fisheries Ireland and the Loughs Agency, of inland fish habitats and stocks.*
- *Deliver effective legislative and regulatory framework and value for money management for the inland fisheries sector.*

| 2.2 | **What is the decision-making process for fisheries management, including predetermined decisions taken under different stock conditions (e.g. the stock level at which fisheries are closed)**? *(Max. 200 words)*<br>*(This can be answered by providing a flow diagram if this is available.)*<br>*(Reference: Sections 2.1 and 2.7 of the Fisheries Guidelines)* |
|---|---|

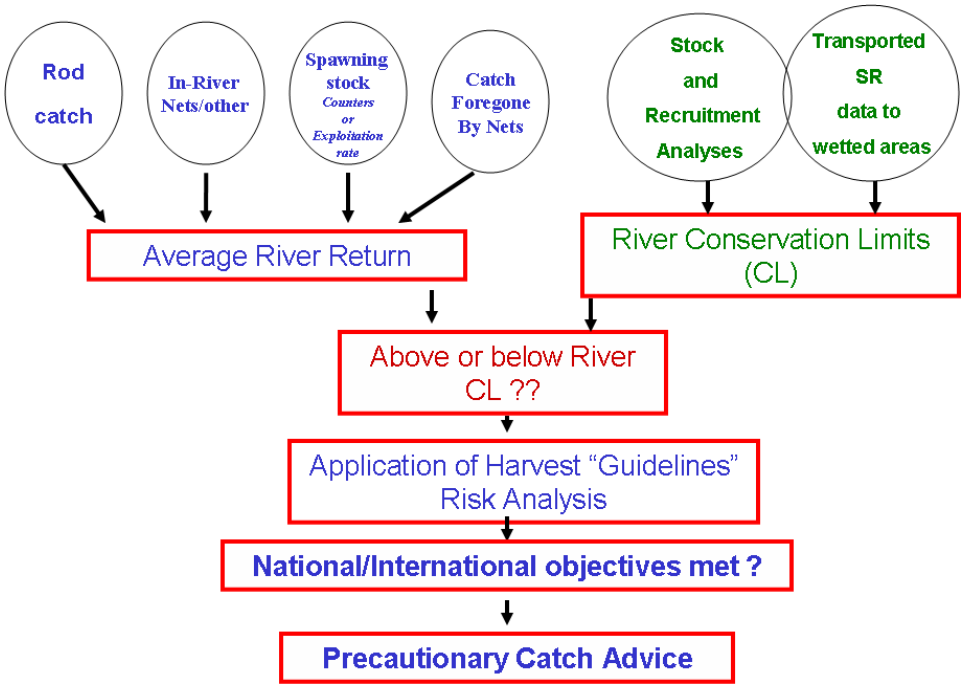



Figure 4. **The Scientific Process for 2012 catch advice**

Once estimates of average spawners, average catch, and river specific Conservation Limit (CL) have been derived for the most recent 5 year period, a forecast of returns is made for the following year. Harvest options are provided along with the associated probability of meeting the Conservation Limit at various catch options. Following the procedure used by ICES for the provision of catch advice for West Greenland, the harvest option that provides a 0.75 probability level (or 75% chance) of meeting the CL for a given stock is recommended by scientists. However, catch options at all risk levels are provided. Where there is no harvest option which will provide a 75% chance of meeting the CL, then a harvest (commercial or rod) is not recommended. Given the uncertainty in the data and the use of a risk analysis to allow for some of this uncertainty, a further limitation is applied to the recruit per spawner index of each river. The scientists currently apply a maximum recruit per spawner value to the abundance outputs derived from the risk assessment of 3 i.e. for every one spawner three recruits may be produced. This is considered to reflect better the overall status of salmon stocks both nationally and internationally.

An objective of the catch advice from the scientists is to ensure that harvest fisheries only take place on river stocks meeting and exceeding Conservation Limits. The means to achieve this objective is to only allow harvest fisheries which can specifically target single stocks which are meeting their Conservation Limits.

The primary legislator for salmon management in Ireland is the Minister for Communications Energy and Natural Resources (DECNR). All statutory instruments relating to salmon fisheries are advised to the Minister by Inland Fisheries Ireland (IFI) the organisation charged with the management, conservation, protection and enhancement of salmon stocks in Ireland. The scientific advice is provided to IFI for their consideration. .Management recommendations on the open, catch and release or closed status of salmon rivers, available surplus, appropriate management regime, open season, fishing methods ete. are purposed by IFI..

Following consultation with the Department of Communications, Energy and Natural Resources the annual salmon management legislation is drafted and placed before the public for consultation.

Following the 30th day public consultation period the Minister publishes the legislation for all fisheries starting on January 1st.

**2.3 Are fisheries permitted to operate on salmon stocks that are below their reference point and, if so, how many such fisheries are there and what approach is taken to managing them that still promotes stock rebuilding?** *(Max 200 words.)*
*(Reference: Section 2.7 of the Fisheries Guidelines)*

No fisheries are allowed to fish on stocks deemed to be below CL. See 1.3 above for numbers of rivers meeting and not meeting CL. The implementation plan states that no fisheries are allowed to fish on stocks deemed to be below CL. The term fisheries refer to harvest fisheries, whether commercial or angling. Catch and release angling is permitted on stocks meeting greater than 65% of CL to provide catch data which can be used to assess the total stock. Catch and release angling is by single barbless hook only and is very predominantly undertaken by fly fishing. Mortality of released salmon is believed to be very low as previous research has shown 98% survival of fly caught and released salmon.

**2.4 Are there any mixed-stock salmon fisheries and, if so, (a) how are these defined, (b) what was the mean catch in these fisheries in the last five years and (c) how are they managed to ensure that all the contributing stocks are meeting their conservation objectives?** *(Max. 300 words in total)*
*(Reference: Section 2.8 of the Fisheries Guidelines)*

(a) There are currently three managed mixed stock fisheries in Ireland.

Up to 2010, only two specific "mixed stock fisheries" were considered, Killary Harbour and Tullaghan Bay. In the case of the Killary Harbour fishery, there are two contributing stocks (Delphi and Erriff) both of which are meeting and exceeding their Conservation Limits. Similarly, the draft net fishery operating in Tullaghan Bay predominantly exploits stocks from either the Owenmore and the Owenduff rivers, again both of which are meeting and exceeding their Conservation Limits. The risk assessment for the common estuary results in a higher requirement for spawners than simply combining the CLs for the rivers to ensure simultaneous attainment of CL in both rivers.

Up to 2010, these were the only such mixed stock fishery situations considered by the SSC, as in other instances there were more than three contributing stocks and/or one or all of the contributing rivers are failing to meet Conservation Limits or given the disproportionate size of the contributing stocks, a potential mixed stock fishery would pose a threat to the attainment of Conservation Limits immediately or in the future.

A previous mixed stock fishery in Castlemaine Harbour Co.Kerry was closed over the 2007 to 2010 period as the fishery was perceived to exploit salmon from a range of rivers entering Castlemaine Harbour. A pilot fishery was conducted in the mixed stock area of Castlemaine in 2010 to provide genetic samples for analysis of the rivers contributing to the fishery. Results revealed that the Castlemaine fishery almost exclusively exploited salmon from three rivers entering Castlemaine harbour, the Laune, Caragh and Maine, all of which were meeting and exceeding CL. The Castlemaine fishery was operated in 2011 and 2012 from the total available surplus of the three contributing rivers. For the mixed stock Castlemaine fishery to operate, the total available surplus for the three rivers combined was reduced in a common estuary analysis to ensure that each river would meet CL simultaneously. The mixed stock Castlemaine fishery and the draft net and rod angling fishery on the three rivers all exploit salmon from this reduced surplus calculation.

The Minister of State at the Department of Communications, Energy & Natural Resources in 2010 sanctioned a pilot fishery to take in place inside Castlemaine Harbour and requested advice from Inland Fisheries Ireland (IFI) on "*how a commercial salmon fishery could be operated on salmon stocks in the Castlemaine Harbour Special Area of Conservation in a sustainable manner, maximizing the opportunities for commercial fishing while ensuring that stocks are not over-exploited"*.

A monitoring programme, which included a sampling programme for genetic samples of fish, was designed and implemented by IFI and local fishermen in 2010. A total of 783 Atlantic salmon individuals caught in the Cromane fishery between the 11th June and 27th August 2010 were genetically typed for variation at fifteen microsatellite DNA loci. These were tested against a baseline of approximately 8300 individuals from 160 Irish Atlantic salmon populations sampled from 104 rivers located throughout Ireland. The results from analysis of the

fishery as a whole indicate that approximately 93.5% of the fishery was made up of stocks from Castlemaine Harbour rivers with the Laune (64.4%), Maine (18.2%) and Caragh (5.6%) being to most substantial contributors. Small contributions from the Behy, Emlagh and Owenascaul were observed in the fishery as a whole. It is noted, however, that analysis of temporal stability in the samples taken from the Behy and Emlagh indicates that these rivers may have low genetic integrity over generations and show significant evidence of a high degree of temporal instability suggesting that these rivers have low population integrity. Therefore, these rivers may constitute genetically ephemeral populations related to varying and typically small numbers of spawners in each generation. (Genetic Stock Identification of the Cromane Salmon Fishery 2010, Beaufort Fish Genetics Group, University College Cork. 1st May 2011).

The Standing Scientific Committee acknowledged this new information and noted that these are very small populations and indications of low population integrity and stability of such small populations while not unexpected, is based on the comparison of only two samples. Therefore, further sampling would be justifiable to confirm the status of these populations. However, given the current evidence the SSC decided not to consider these rivers as discrete populations for the purposes of catch advice in 2012.

Further testing of the temporal stability of the Behy and Emlagh salmon stock was undertaken in 2011/2012. The temporal Stability report (2012) indicates that the two most recent samples from the Behy suggests a mixture of spawners originating from more than one population. Consequently it is not possible to be certain as to the Behy river's status in respect of its uniqueness relative to other neighbouring populations. Further testing of Emlagh samples in 2011 revealed that the salmon stock continued to show substantial instability. (UCC Temporal Stability Report 2012).

Approximately 2% of the Castlemaine fishery appeared to be originating from rivers close to but outside Castlemaine Harbour (Inny, Ferta and Tralee Lee in particular), whereas 3.8% appeared to originate from further distant locations (3.4% to Waterford/Lismore rivers and 0.4% to Donegal). However, analysis of simulated fishery samples suggested that these apparent contributions from rivers outside Castlemaine Harbour may result from experimental error associated with mis-assignment from correct population of origin. (Genetic Stock Identification of the Cromane Salmon Fishery 2010, Beaufort Fish Genetics Group, University College Cork. 1st May 2011).

This extensive genetic analysis has provided scientific advice on the operation of the Castlemaine fishery in a sustainable manner.

**Mixed Stock Fisheries Advice**

With regard to the operation of mixed stock fisheries generally, the Irish SSC have advised that even where all exploited stocks in a common estuary are meeting their Conservation Limits, as may occur if there is a return to conditions of higher marine survival of salmon stocks or when the full effects of the recent fishery closures, mixed stock fisheries introduce greater uncertainty into predicting the effects of management measures and pose a greater threat to small stocks or populations, especially if these are of low relative productivity and/or subject to high exploitation. As the number of stocks (or populations) increases, the number of fish that must be released from the fisheries in order to meet Conservation Limits must also increase. When the number of populations is too large, it may be impossible to ensure a high probability of the simultaneous achievement of spawner requirements in each individual unit. The overall objective should be to achieve a flexible but sustainable fishery without compromising conservation goals by fishing only single stocks salmon stocks which are shown to have a harvestable surplus over the Conservation Limit. The best way to achieve this is to fish within the river or as close to the river as possible (i.e. the estuary of that river).

(b)

Bangor (Tullaghan Bay) Mixed Stock Fishery (Owenmore and Owenduff) – mean 5Yr catch = 1423
Ballinakill (Killary harbour) Mixed Stock Fishery (Erriff and Bundurragha) – mean 5 Yr catch = 402 salmon
Castlemaine Mixed Stock Fishery (Laune, Caragh and Maine) – mean 2 Yr catch = 771

Average total catch in MSFs in Ireland = 2,595 salmon (approximately 7t).

(c)

The runs of salmon into each of the rivers above are assessed annually either by counter (Owenmore and Owenduff), Erriff and Maine or from recent 5 year returns in angling catches (Delphi, Caragh, Laune). If any of the contributing stocks is shown to be below CL then the mixed stock fishery is closed the following year and depending on the percent of the CL being attained (i.e. 65% or greater) or meeting criteria in the national electrofishing surveys, the rod fishery will either be closed or restricted to C&R . Provided the other rivers stocks

are meeting and exceeding CL than a harvest fishery can proceed but only within the river.

## 2.5 How are socio-economic factors taken into account in making decisions on fisheries management? *(Max. 200 words)*

*(Reference: Section 2.9 of the Fisheries Guidelines)*

In evaluating management options, conservation of the salmon resource does take precedence over socio-economic factors and only fisheries meeting CLs and with a harvestable surplus are allowed retain salmon. . The allocation of any surplus to stake holders (i.e. anglers and commercial net fishermen) is based on consultation between IFI and the stakeholders concerned. These proportions are usually based on historical catch information.

## 2.6 What is the current level of unreported catch and what measures are being taken to reduce this? *(Max. 200 words)*

*(Reference: Section 2.2 of the Fisheries Guidelines and the Minimum Standard)*

Under the current legislation supporting the carcass tagging and Logbook Scheme, all fishermen must record details of landings (commercial, angling including catch and release). For the purposes of reporting illegal unreported catch to NASCO, a national figure of 10% is used based on observations from fishery inspectors. There is no systematic appraisal of unreported catch.

Following the closure of the Irish mixed stock fishery at sea in 2006, there is more focus on improving data from inshore fisheries and recreational fisheries. Logbook returns for commercial fishermen are approximately 100% while returns are available for approximately 70% of anglers. Current methods to raise the reported angling catch are being reviewed for 2014 with application for 2015. The provision of catch advice for individual rivers now includes unreported catches including illegal catch as indicated by local IFI Inspectors where they suspect logbook figures have been under or over reported on an annual basis. These figures vary year to year and are currently being assessed by the Standing Scientific Committee who provide scientific catch advice and forecasts of abundance.

## 2.7 What are the main threats to wild salmon and challenges for management in relation to fisheries, taking into account the Fisheries Guidelines and the specific issues on which action was recommended for this jurisdiction in the Final Report of the Fisheries Management FAR Review Group, (CNL(09)11)?

| | |
|---|---|
| Threat/ challenge F1 | Illegal catches remain a concern as some rivers are just managing to maintain themselves above CLs. They also cause an impediment to stock recovery. |
| Threat/ challenge F2 | Over-reporting of catches is also of concern as catch data are used as the primary source of population (i.e. returns) information for catch advice models. Over reporting of catch will lead to a higher expectation of returns in forecasts and therefore an over-optimistic outcome in terms of attainment of CLs and mask the true extent of stock recovery.<br><br>Under-reporting of catches will lead to lost catch harvest opportunities or a less optimistic outcome with regard to attainment of CLs and will also mask the true extent of stock recovery. |
| Threat/ challenge F3 | Monitoring tools for salmon especially counters need a comprehensive infrastructure to ensure accuracy and consistency. Inaccurate or unvalidated partial counters confound the true picture of recovery, catch options and potential dangers to stocks from over fishing. |

*Copy and paste lines to add further threats/challenges which should be labelled F5, F6, etc.*

## 2.8 What actions are planned to address each of the above threats and challenges in the five year period to 2018?

| | | |
|---|---|---|
| **Action F1:** | Description of action: | Protection against illegal fishing is a high priority in Ireland and the state invests a considerable amount of resources on these activities (Fishery Inspectors, Navy, Garda etc). More outreach to local communities is planned to bring the problems of poaching as a major impediment to stock recovery into focus. |
| | Planned timescale: | On-going annually, strategically planned to 2016. |
| | Expected outcome: | Buy-in by local communities in identifying active illegal practices. |

| | | |
|---|---|---|
| | Approach for monitoring effectiveness & enforcement: | Move towards new technologies to support monitoring and access to fisheries. 24hrs phone line to report illegal activities. Use of surveillance cameras and night vision scopes initiated in 2012.<br>Reports will be evaluated by local fishery inspectors and other law enforcers with a view to establishing the magnitude of illegal fishing and hotspots |
| **Action F2:** | Description of action: | IFI is actively promoting the returns of accurate information from anglers through the national carcass tagging and logbook scheme. This scheme facilitates the identification of inaccurate information and allows some follow-up to redress the issue. Move towards electronic Salmon licences. |
| | Planned timescale: | 2013 to 2018 |
| | Expected outcome: | More awareness by stakeholders on the need for accurate statistics. |
| | Approach for monitoring effectiveness & enforcement: | Local inspectors have recently been asked to include any information on suspected **over reporting** of catch to ensure as accurate a record of catch being used for stock assessment purposes.<br><br>As above, local inspectors have recently been asked to include any information on suspected **under reporting** of catch to ensure as accurate a record of catch being used for stock assessment purposes. This is being monitored on a river by river basis by the scientists.<br><br>This is being monitored on a river by river basis by the scientists. Standing Scientific Committee responsible for provision of scientific catch advice and information on status of stocks will evaluate how this affects outcomes in the risk analysis and forecasts. |
| **Action F3:** | Description of action: | IFI are developing a National Fish Counter Strategy to maintain, operate and enhance the current counter resources and to evaluate where extra counters might be required. This will be enacted in 2014. |
| | Planned timescale: | 2014 and beyond |
| | Expected outcome: | A more robust and reliable counter assessment using the most up to date methods for validation of counts (video surveillance, tracking, tagging etc). New database for verification and data capture. |
| | Approach for monitoring effectiveness & enforcement: | Standing Scientific Committee responsible for provision of scientific catch advice and information on status of stocks will evaluate how this affects outcomes in the risk analysis and improve forecasts. |

*Copy and paste lines to add further actions which should be labelled F5, F6, etc.*

# 3. Protection and Restoration of Salmon Habitat:

## 3.1 How are risks to productive capacity identified and options for restoring degraded or lost salmon habitat prioritised, taking into account the principle of 'no net loss' and the need for inventories to provide baseline data? *(Max. 200 words)*

(*Reference: Section 3 of the Habitat Guidelines)*

**The risks to productive capacity are identified and options for restoring degraded or lost salmon habitat are prioritised by a range of means set out below.**

**1. Salmonid River Surveys**

Extensive, detailed morphological and ecological surveys of many of Ireland's salmonid rivers have been carried out, for different purposes, over the past decade. These surveys help identify risks to productive capacity.

**2. Salmon Conservation Stamp Funding Programme**

The revenue generated from the salmon conservation stamp funding programme is being reinvested in habitat improvement and is ring-fenced and designated for the purpose of prioritised investment in salmon conservation initiatives. Funding is allocated to rehabilitate salmon rivers which are below their conservation limit and have the

greatest prospect of recovery.

**3. Catchment Wide Electro-fishing**
Catchment-wide electro-fishing surveys are undertaken in approximately fifty salmon catchments annually. Data are generated on the abundance and distribution of juvenile salmon in catchments. This programme has led to habitat plans being drawn up for locations where low densities of juvenile salmon have indicated habitat problems exist.

**4. Rehabilitation of Salmon Rivers above Hydro-Electric Dams**
The Electricity Supply Board (ESB) manage the fisheries on Ireland's five hydro-electric rivers. As part of their responsibility to rehabilitate the salmon stock in these rivers, the ESB have embarked on a habitat rehabilitation programme.

**5. Programme for Rehabilitation of Drained Rivers**
Many of Irelands salmon rivers have been subjected to arterial drainage since the 1840s. The Office of Public Works (OPW), who has responsibility for drained rivers, has embarked on a programme to restore these catchments. As part of their responsibility in such channels, and for the implementation of the WFD requirements, the OPW have contracted IFI to carry out a programme of works that will address the negative impacts that drainage works have had on many Irish rivers.

**6. Aerial Photography Database**
A high quality aerial photographic series of the majority of salmon rivers in Ireland, collected in the course of low level flights, is being compiled by IFI. These are, and will continue to be used to identify the location and extent of habitat imbalances in Ireland's salmon rivers.

**7. Water Framework Directive (WFD) River Monitoring**
Monitoring of fish stocks, invertebrates, water chemistry, macrophytes and morphology takes place at 179 WFD surveillance monitoring river sites every three years. The WFD monitoring programme will assign ecological status to each water body. This will be based on water quality, the presence and abundance of fish species, river morphology etc. Any water body classified as less than good status has to have remedial measures drawn up through the Programme of Measures (POMS). POMs outlines the most cost effective management measures and their application within the basin to meet the multiple objectives set to obtain good ecological status. All of the environmental problems affecting rivers will be considered to formulate proactive Government policy to address the requirements of the Water Framework Directive in relation to riverine morphological imbalances. This policy, when implemented, will be of major benefit to Irish salmon stocks.

**8. Monitoring for Habitats Directive Fish Species**
Funding has been allocated to meet the monitoring requirements of Annex II & V fish species (salmon, lamprey, shad, pollan) under Habitats Directive requirements. This monitoring programme will assist in the identification of impacted salmon habitat.

**9. Fishery Owners / Angling Clubs**
Fishery owners and angling clubs, who own or lease fisheries, undertake rehabilitation work on salmon rivers nationally. The work normally involves raking of spawning gravels, input of new gravels, tree pruning, bank clearance, fencing etc and is undertaken in consultation with IFI staff.

**10. Mitigation for Infrastructural Programmes**
As the Irish economy has been developing over the past twenty years, infrastructure has improved with increases in the extent and quality of the road network and other utilities including water supplies, and gas pipelines. Infrastructural change has led to different scales of disruption to salmon rivers and through the consultative and planning process mitigatory or 'like for like replacement' measures have been agreed and implemented. In isolated cases, where serious pollution or fish kills have occurred through attributable discharges, some channel rehabilitation works have been carried out to enhance the existing habitat and attempt to accelerate natural recolonisation rather than restocking.

Each of the programmes outlined above help identify the risks to productive capacity and prioritise options for restoring degraded or lost salmon habitat. Inventories on the risk to productive salmon habitat and baseline data are compiled through the programmes set out above. IFI have access to the data collected on a river specific basis and remedial works are undertaken having reviewed information from the range of available sources in the programmes set out above.

## 3.2 How are socio-economic factors taken into account in making decisions on salmon habitat management? *(Max. 200 words)*

*(Reference: Section 3.9 of the Habitats Guidelines)*

Regardless of the socio-economic implications of any given project, there is a clear policy in place to protect salmon and its habitat in Ireland. The function of IFI are to conserve, protect, manage and develop the inland fisheries resource (including salmon) and general Government policy is to conserve the inland fisheries resource in its own right and to facilitate exploitation of the resource on an equitable and sustainable basis. These objectives mean that the salmon resource must be given adequate protection when the socio-economic implications of any project are being considered.

Any development requires an environmental impact statement, and an Appropriate Assesment (Natura Impact Statement) when proposed development is within or adjacent to a Special Area of Conservation (SAC), planning for developmentis given based on minimal interference and the no net loss principle. Experience over recent years has shown that where socio-economic factors have necessitated interference with salmon habitat, there is an acceptance that any loss will be compensated for in other parts of the catchment. Recent examples are road works on two salmon rivers (Feale & Dee) and bridge works on the Corrib catchment where the National Roads Authority and County Council worked with IFI to undertake and pay for habitat rehabilitation works in other areas of these catchments. These works resulted in an overall gain in productive salmon habitat.

## 3.3 What are the main threats to wild salmon and challenges for management in relation to estuarine and freshwater habitat taking into account the Habitat Guidelines, and the specific issues on which action was recommended for this jurisdiction in the Final Report of the Habitat Protection, Restoration and Enhancement FAR Review Group, (CNL(10)11)?

| | |
|---|---|
| Threat/ challenge H1 | **Agricultural enrichment**<br>Agricultural enrichment refers to organic enrichment of surface water bodies from agricultural sources, including intensive livestock rearing, run-off from fertiliser application, and farmyard point source enrichment. The extensive use of fertilisers in agriculture has increased the input of phosphate and nitrate to rivers. Agricultural activities regularly feature as the main causative agent contributing to fish kill statistics mostly through deoxygenation**.** |
| Threat/ challenge H2 | **Forestry Related Impacts**<br>Coniferous afforestation is a widespread commercial activity in Ireland particularly in upland areas and on poor quality low lying agricultural lands. Shading, tunnelling, acidification in acid sensitive catchments, hydrological regime change, erosion, sedimentation and enrichment are impacts that are often associated with commercial forest programmes. Coniferous plantations in areas of poor base geology which are acid sensitive can sometimes cause acidification problems (Bowman and Bracken, 1993, Allott *et al*., 1997 and Kelly-Quinn *et al*.., 1997). Many Irish salmon rivers have some coniferous plantation, particularly in their upper reaches.<br><br>There are concerns about the possible negative effects of conifer afforestation to fish stocks particularly where steep upland areas are planted. Potential problems include increased run-off rates through afforested drainage networks and the discharge of increased sediment loads and phosphorous to catchments, (O'Grady 2002). Phosphorous can cause cultural eutrophication problems in watercourses further downstream. Planting of coniferous trees too close to stream banks has resulted in excessive shade (tunnelling) and subsequent bank erosion and siltation, Smith (1980). Tunnelled areas ≥100m in length, rarely support more than 40% of the juvenile salmon numbers observed in adjacent open areas (O'Grady, 2006). Clear felling has been shown to result in elevated phosphorous export/loss to waters (Cummins & Farrell 2001). This has resulted in significant eutrophication in upland areas. |
| Threat/ challenge H3 | **Poor water quality from Inadequate Sewage Treatment and Industrial Discharges**<br>Many towns and villages have only primary or secondary treatment facilities resulting in large inputs of organic nutrients to watercourses. The increase in building groups of houses near villages with inadequate treatment has impacted salmon rivers over the past decade. This contributes to eutrophication of rivers and has impacts on juvenile salmon production. The number of salmon rivers where inadequate sewage treatment is recorded as an impact increased in the mid 2000's.<br>Inadequate waste treatment from factory units, creameries and other industrial production can |

| | |
|---|---|
| | impact on salmon rivers either by increasing nutrient input/enrichment or input of toxic substances. |
| Threat/ challenge H4 | **Salmon Farms in Estuaries**<br>Potential for sea lice infestation of out migrating salmon smolts and escapes of adult farmed salmon to rivers |

*Copy and paste lines to add further threats/challenges which should be labelled H5, H6, etc.*

## 3.4 What actions are planned to address each of the above threats and challenges in the five year period to 2018?

| | | |
|---|---|---|
| **Action H1:** | Description of action: | **Agricultural enrichment**<br>Following the implementation of the Water Framework Directive and the formation of River Basin District management structures, a collective approach to reducing all adverse impacts including agricultural enrichment and eutrophication on aquatic resources is now in place. Having characterised the risks posed to water-bodies nationally, Programmes of Measures are being developed to address habitat impacts / land use practices and to restore impaired water bodies to good status. The aim of the Water Framework Directive is to prevent any deterioration in the existing status of our waters, including the protection of good and high status where it exists, and to ensure that all waters are restored to at least good status by 2015. As a consequence of the implementation of the WFD and the Nitrates Directive, the impact of agricultural enrichment on salmon rivers is expected to reduce considerable over the coming decades.<br>The CAP reform due in 2013 also provides an important opportunity for aligning agriculture objectives with habitat protection. |
| | Planned timescale: | Short term over next 3-5 years with implementation of programmes of measures under Water Framework Directive |
| | Expected outcome: | Significant improvement in water quality due to improved agricultural practice |
| | Approach for monitoring effectiveness & enforcement: | Monitoring of water quality and fish under the WFD |
| **Action H2:** | Description of action: | **Forestry Related Impacts**<br>Many Irish forests that are now mature, or approaching maturity, were planted in landscapes that were unsuited to economically viable forest production. The increasing recognition of the impacts from forestry on water resources has led to the development of a Code of Practice for forestry (Forest Service, 2000). Generally, forest management is based on the Code of Practice, although a new Forestry Bill, which will replace the out of date Forestry Act 1946, has been drafted with the opportunity to ensure that forestry management is better able to protect sensitive habitats. |
| | Planned timescale: | Ongoing adherence to Code of Practice for forestry |
| | Expected outcome: | Improved water quality and protection of habitats |
| | Approach for monitoring effectiveness & enforcement: | Monitoring sites for water quality, habitat and fish in and downstream of forested areas. |
| **Action H3:** | Description of action: | **Poor water quality from Inadequate Sewage Treatment and Industrial Discharges**<br>In Ireland, there has been considerable investment in upgrading of treatment facilities, primarily in larger towns, and this process will continue with the Programme of Measures under the Water Framework Directive. The Department of the Environment have invested many millions of Euro nationally over the recent years in new treatment facilities, and many of the smaller town and village schemes have been upgraded in this process. It is |

| | | |
|---|---|---|
| | | therefore anticipated that the impact on productive capacity of salmon rivers from inadequate sewage treatment will decrease considerably over the coming years with the requirements of the WFD being achieved.<br>Significant upgrading of wastewater treatment plants has occurred in recent years to assist local authorities in complying with the Urban Wastewater Treatment Directive. The EPA regulates major industrial activities through the Integrated Pollution Prevention and Control (IIPC) regulations while the local authorities license small-scale industrial discharges to waters under the Water Pollution Acts. The Work of the EPA in enforcing the regulations and the implementation of the EU Water Framework Directive are likely to ensure that industrial discharges are adequately regulated to prevent impact on rivers nationally. |
| | Planned timescale: | The programme of measures under WFD is ongoing |
| | Expected outcome: | Improved waste water treatment targeting upgrading of the most urgent facilities |
| | Approach for monitoring effectiveness & enforcement: | Monitoring of water quality and fish under WFD |
| **Action H4:** | Description of action: | **Salmon Farms in Estuaries**<br>Both existing and proposed salmon farms in estuaries may pose a threat to wild salmon populations and a number of publications have raised concerns regarding lice induced mortalities of salmon. In Ireland protocols are in place with regard to permitted sea lice thresholds on salmon farms and measure can be taken for farms in breach of protocols. In 2011, this lead to stringent action taken by the Irish authorities in removing farmed salmon from an area. The challenge for management is to develop strategies including effective lice treatments to ensure low lice levels on farmed salmon in spring prior to and during wild salmon migration. In fact the thresholds are treatment triggers and when they are reached a treatment must be carried out to reduce lice infestation levels . This is clearly set out in protocols.<br><br>Annual fallowing of sites, use of single generation sites, avoidance of partial lice treatments and harvesting carried out remote from grower sites are planned to reduce the potential impact of sea lice infestation. Availability of new sea lice treatments are also being pursued to increase effectiveness of sea lice control. |
| | Planned timescale: | Over a 3-5 year period |
| | Expected outcome: | Improved compliance with sea lice protocols and lower sea lice levels in spring |
| | Approach for monitoring effectiveness & enforcement: | Salmon farms are monitored for sea lice levels monthly (and twice monthly March to May) and any improvement in sea lice levels will be recorded. |

*Copy and paste lines to add further actions which should be labelled H5, H6, etc*

## 4. Management of Aquaculture, Introductions and Transfers, and Transgenics:

### 4.1 What is the approach for determining the location of aquaculture facilities in (a) freshwater and (b) marine environments to minimise the risks to wild salmon stocks? *(Max. 200 words for each)*

(a) Approaches for freshwater and marine sites are similar see below.

(b) The licensing and regulation of aquaculture, both finfish and shellfish, in Ireland is the statutory responsibility of the Department of Agriculture, Fisheries and Food (DAFF).

The core Act covering Aquaculture licensing including choice of appropriate sites is the Fisheries (Amendment) Act, 1997.

In considering an application for an aquaculture licence and determining the location, including an application to renew an aquaculture licence, the licensing authority must consider:

- the potential impacts on safety and navigation,
- the ecological impacts on wild fisheries, natural habitats, flora and fauna,
- the suitability of the waters,
- the other beneficial uses of the place or waters,
- the likely effects on the economy of the area, and
- the statutory status under European legal frameworks of the area under application.

This process involves consultation with a range of scientific and technical advisers as well as various statutory consultees. Applications are also subject to public consultation whereby any interested person or body may make submissions or observations on any licence application. The process also involves publication of Ministerial decisions on applications and allowing a one month period for appeal of any decision. Any such appeal must then be considered by the independent Aquaculture Licences Appeals Board.

Aquaculturists, who have applied for a renewal of their aquaculture licences, are legally entitled to continue operations, following the expiration of their licences, by virtue of the provisions of Section 19A(4) of the Fisheries (Amendment) Act, 1997, and the aquaculture activities may continue, subject to the terms and conditions of the original licence/s, pending determination by the Minister of Agriculture, Fisheries and Food of the renewal applications.

**In order to minimize adverse effects to the wild salmon stocks from aquaculture, introductions and transfers and transgenics.**

**Assessment at Licence Application Stage**
In relation to aquaculture licence applications the following are required to submit an Environmental Impact Statement (EIS) as part of the application process:

- all seawater salmonid breeding installations
- seawater fish breeding installations with an output which would exceed 100 tonnes per annum;
- all fish breeding installations consisting of cage rearing in lakes;
- all fish breeding installations upstream of drinking water intakes;
- other fresh-water fish breeding installations which would exceed 1 million smolts and with less than 1 cubic metre per second per 1 million smolts low flow diluting water.

Other aquaculture applications may also be required to submit an EIS if it is considered that it may have a significant impact on the environment.

All potential environmental impacts including wild-farmed interactions must be outlined and addressed in the EIS. Detailed scoping documents are provided for guidance in the preparation of an EIS. The EIS is a public document and together with any commentary received during the application process forms part of the body of information utilized in making a determination on the licence application.

Subsequent to a licence being granted all finfish farms are subject to a series of mandatory monitoring protocols covering water quality, benthic impacts, sea lice control, fallowing of sites and an audit of operations. *(Monitoring Protocols for Offshore Finfish Farms May 2000)*
http://www.agriculture.gov.ie/fisheries/aquacultureforeshoremanagement/monitoringprotocols/

Based on the results of this monitoring the Minister has the power to modify the licence or impose sanctions up to and including withdrawal of the licence for non compliance.

### 4.2 What progress can be demonstrated towards the achievement of the international goals for effective sea lice management such that there is no increase in sea lice loads or lice-induced mortality of wild stocks attributable to sea lice?

*(Max. 200 words) (Reference: BMP Guidance)*

See Table 1 below WRT BMP guidance.

**Table 1 Implementation plans for progressing NASCOs international goals for effective sea lice management such that there is no increase in sea lice loads or lice-induced mortality of wild stocks attributable to sea lice.**

| | | |
|---|---|---|
| **International Goals** | **100% of farms to have effective sea lice management such that there is no increase in sea lice loads or lice-induced mortality of wild salmonids attributable to the farms.** | **Irish progress towards International Goals**<br>1. One of the most important management strategies of the Irish Pest Management Strategy is carrying out synchronized Autumn/Winter treatmenst to reduce sea lice burdens to as close to zero as practicable on all farmed fish which are to be overwintered.<br>2. This involved over the period since the initiation of Single Bay Management, reducing the treatment trigger levels from a starting point of 2 ovigerous L. salmonis per fish to the current levels of 0.5 ovigerous L. salmonis per fish. Outside the spring period a level of 2 ovigerous L. salmonis per fish acts a s a trigger for treatment. Where the number of mobile sea lice is high, treatments are triggered in the absence of egg bearing females.<br>**3.** It has been shown that there may be significant differences in the mortality rates of sea lice treated and untreated hatchery reared salmon. This raises concerns that stocks which are already compromised due to declining and persistent marine survival may be vulnerable to any increase in mortality attributable to sea lice. |
| **Best Management Practices (BMPs)** | Area management, risk-based, integrated pest management (IPM) programmes that meet jurisdictional targets for lice loads at the most vulnerable life-history stage of wild salmonids. | There is a process in place to determine the national picture of sea lice prevalence in the state. A number of controls are in place to ensure the effective and efficient management of sea lice. There is a national sea lice monitoring programme which involves the inspection and sampling of each year class of fish at all fish farm sites 14 times per annum - twice per month during March, April and May and monthly for the remainder of the year except December-January. One inspection is carried out during this period. This programme is applied at all marine finfish farms<br><br>http://www.agriculture.gov.ie/media/migration/fisheries/aquacultureforeshoremanagement/monitoringprotocols/Sea%20Lice%20Monitoring%20and%20control%20Protocols%203.pdf<br><br>Data on lice levels at salmon farms are made available to all stakeholders each month and all data are published in full each year with a full analysis by the Marine Institute. |
| | | In 2008 this monitoring protocol was updated and strengthened by DAFF by the launching of a new Pest Management Strategy. http://www.agriculture.gov.ie/media/migration/fisheries/aquacultureforeshoremanagement/SeaLiceControlStrategy%20230210.pdf |

| | | |
|---|---|---|
| | | This strategy introduced a new management cell approach to dealing with incidences where target levels of lice control were not being met. In 2011, breaches of protocol regarding lice levels lead to the closure of one site by Ministerial order. |
| | Single year-class stocking | Currently practiced |
| | Fallowing | Currently practiced where advised |
| | Risk-based site selection | As part of Licencing |
| | Trigger levels appropriate to effective sea lice control | Trigger levels applied before farms are advised to treat. Failure to treat could lead to actions taken by licencing authority |
| | Strategic timing, methods and levels of treatment to achieve the international goal and avoid lice resistance to treatment | Part of Single Bay Management plans include a treatment strategy for each bay. The preparation of annual SBM plans is a license requirement. |
| | A comprehensive and regulated fish health programme that includes routine sampling, monitoring and disease control | **See above – comprehensive monitoring in place** |
| | Lice control management programmes appropriate to the number of fish in the management area | **Management of sea lice based on results of monitoring programme** |
| | Adaptive management in response to monitoring results to meet the goal | **Regular monitoring allows adaptive responses to lice levels on farm including orders to remove all fish from sites where lice and not adequately controlled.** |
| **Reporting & Tracking** | Monitoring programme appropriate for the number of farmed salmon in the management area and sampling protocols effective in characterising the lice loads in the farms and wild salmonid populations. | Monitoring Programme has met international standards |
| | Lice loads on wild salmonids compared to areas with no salmon farms | Appraisals were carried out between 1992 and 2001 (Gargan et al, 2003). Currently, there is a paucity of information regarding the levels of lice infestation of wild salmonids in areas remote from finfish aquaculture sites.<br><br>It is intended to carry out more contemporary surveys of both salmon and sea trout between 2013 and 2015. |
| | Lice-induced mortality of wild salmonids (e.g. as monitored using sentinel fish, fish-lift trawling, using batches of treated smolts) | Untreated and treated hatchery reared salmon have been released in Ireland to investigate lice induced mortality of wild salmonids for the past 15 years. |

| | | |
|---|---|---|
| | Monitoring to check the efficacy of lice treatments | There is a mandatory monitoring system in place to confirm the efficacy of farm fish treatments. |
| **Factors Facilitating Implement ation** | Development of a monitoring programme appropriate for the number of farmed salmon in the management area and sampling protocols effective in characterising the lice loads in the farms | Monitoring programme in place |
| | Access to a broad suite of therapeutants, immunostimulants and management tools | Currently very few theurapeutants are licenced for aquaculture. This remains a problem in Ireland restricting potential methods to deal with specific pathogens and parasites.<br>Costs of treatments are also problematic.<br>Sea lice sensitivity to treatments reduce efficacy, |
| | Collation and assessment of site selection and relocation criteria | These issues would be dealt with on a case by case basis and under the terms of the original licence. |
| | Regulatory regimes which facilitate availability of alternative sites, as necessary, to support achievement of the goal | These issues would be dealt with on a case by case basis. Currently alternative sites would need to go through the full licencing process. |
| | Training at all levels in support of the goal and to increase awareness of the environmental consequences of sea lice | BIM, IFI and MI train and advise the public on sea lice and wild salmon issues |
| | Monitoring of lice levels: in areas with and without farms; before, during and after a farm production cycle; and in plankton samples | No specific or consistent programme of monitoring for areas outside the immediate aquaculture areas.<br>Research is required to examine lice levels at various stages of farm production both inside and outside of sea cages. |

The new Pest management strategy introduced in 2008 has improved Irelands ability in achieving international goals in sea lice control (see below from MI annual report on sea lice monitoring and control for 2011). Figure 8 on page 14 of our annual report gives a clear indication of the progress being made.

### *Annual trends*

The annual trends of *L. salmonis* ovigerous and mobile sea lice levels are compared in Figures 8 and 9 for one-sea-winter salmon in the month of May from 1991 to 2011. The mean number of ovigerous and mobile *L. salmonis* per fish are presented.

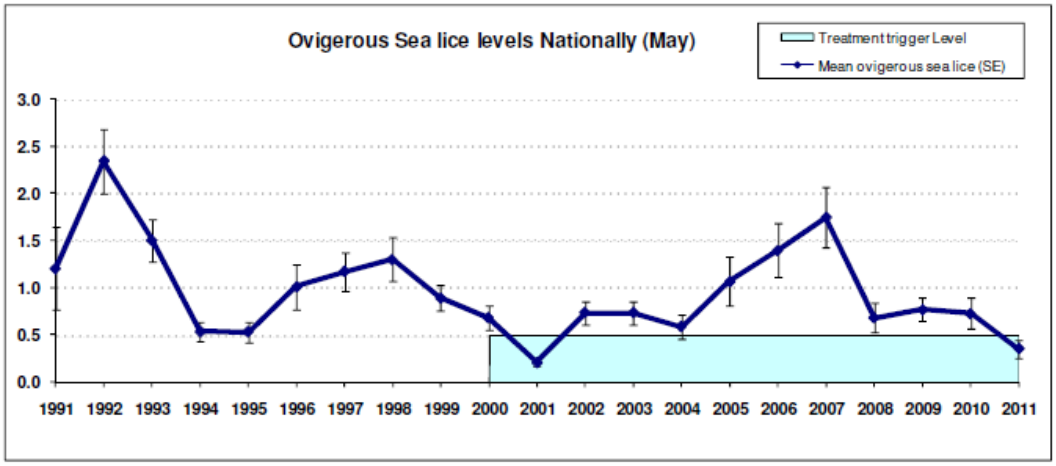



**Figure 8.** Annual trend (May mean) (SE) ovigerous *L. salmonis* on one-sea-winter salmon.

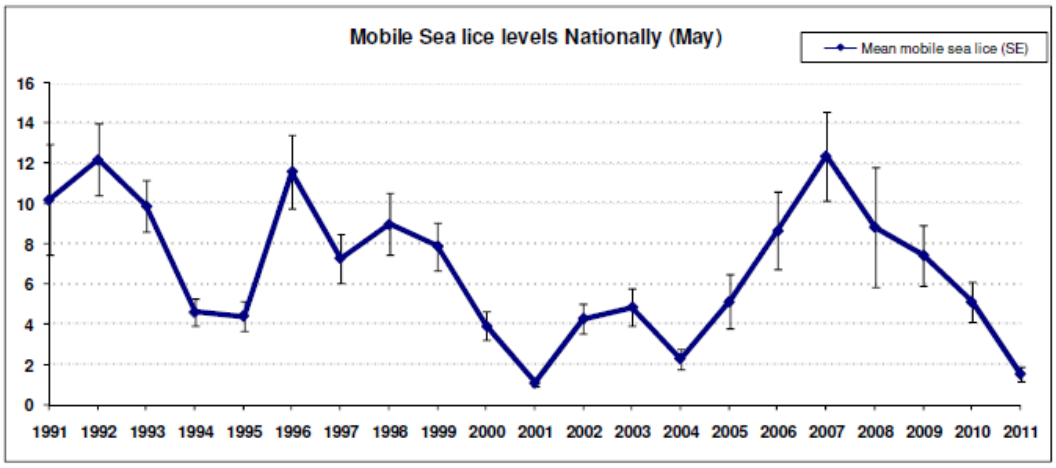



**Figure 9.** Annual trend (May mean) (SE) mobile *L. salmonis* on one-sea-winter salmon.

Mean ovigerous L. salmonis levels in 2011 are lower than the previous years at 0.35 *L. salmonis* per fish. There was also a decrease in the total mobile levels from 5.11 total mobile sea lice per fish in 2010 to 1.51 total mobile sea lice per fish in 2011. This continues a downward trend from 2007.

| **4.3** | **What progress can be demonstrated towards the achievement of the international goals for ensuring 100% containment in (a) freshwater and (b) marine aquaculture facilities?** *(Max. 200 words each)* *(Reference: BMP Guidance)* |
|---|---|
| (a) Issues relating to Freshwater and Marine sites are similar see below. | |

**Table 2 Implementation plans for progressing the achievement of the international goals for ensuring 100% containment in marine aquaculture facilities.**

| **International Goals** | **100% farmed fish to be retained in all production facilities** | **Irish progress towards International Goals** |
|---|---|---|
| **Best Management Practices (BMPs)** | Codes of Containment including operating protocols | These issues are specified in the Licence and there are specific protocols outlined for containment and legislation in event of large scale escape events. |
| | Technical standards for equipment | All equipment must comply with international standards as specified in licencing information |
| | Verification of compliance | Department engineers must agree compliance with regard to structures |
| | Risk-based site selection | Must be indicated within the EIS |
| | Mandatory reporting of escape events and investigation of causes of loss | This is a requirement under the licence |
| | Adaptive management in response to monitoring results to meet the goal | See text in (b) below- Legislation is in place to allow authorities to intercept escapees following events. |
| **Reporting & Tracking** | Number of incidents of escape events and standardised descriptions of the factors giving rise to escape events | This is a mandatory requirement under the licence |
| | Number and life-stage of escaped salmon (overall number; % of farmed production) | This is a mandatory requirement under the licence |
| | Number of escaped salmon in both rivers and fisheries (overall number; % of farmed production) and relationship to reported incidents | With regard to BMP Ireland does not have a systematic monitoring programme for escapees into freshwater although several index rivers are monitored to provide information when such events occur (Burrishoole, Newport, Erriff, Corrib). |
| **Factors Facilitating Implementation** | Monitoring of rivers for escaped salmon | As above |
| | Site appropriate technology | Specified under licencing agreements and EIS |
| | Advanced permitting to facilitate recapture and exchange of information on effectiveness of recapture efforts | Under Irish legislation, the farm the operator will make an emergency application to the Department of Agriculture for a special licence under Section 14 of the Fisheries Act 1959 to deploy nets to recapture the escaped fish. |
| | Technology development (e.g. cage design, counting methods for farmed salmon, methods to track origin of escaped salmon and their progeny) | New technologies for cage design and counting are introduced by industry as they become available.<br><br>National Genetic Stock Identification Baseline can be used to identify both escape farmed salmon and their progeny if samples are taken. Not applied systematically as yet. |
| | Training at all levels in support of the goal and to increase awareness of the | BIM, IFI and MI train and advise the public on sea lice and wild salmon issues |

| | | |
|---|---|---|
| | environmental consequences of escaped salmon | |
| | Assessments of the relative risks to the wild stocks from escaped salmon from freshwater compared to marine facilities and from large but infrequent escape events compared to small but frequent escape events. | No evidence of large scale escape events in freshwater so currently not considered a major threat. Scientific assessment of the likely loss generally of production due to genetic introgression is ongoing which is relevant to both marine and freshwater escapes. |

(b) See also Table 2 below WRT BMP guidance.

Ireland has a very good record with regard to escapes of salmonids from farming operations. As part of an ongoing FP7 project called "Prevent Escape", an audit of escapes from fish farming operations is being undertaken. There have been no major escapes reported from Irish farming operations in the last three years with the exception of a November 2009 fish escape in Cuigeal Bay, Co. Galway (A total of 35,000 salmon escaped due to storm damage to a single cage - of these 10,000 were subsequently recovered - there have been no reports of the remaining escapees in the intervening period). This does not preclude escape events by individuals or small numbers of fish which may have gone undetected or unreported. The National Coded Wire Tagging programme allows for a good estimate of the number of farmed escapees taken in fisheries during the summer. The data over the past years has not indicated a huge volume of escapees in marine fisheries at least (Figure 1). The level of escapees detected nationally over the years 2002 – 2006 were consistently less than 0.5%.

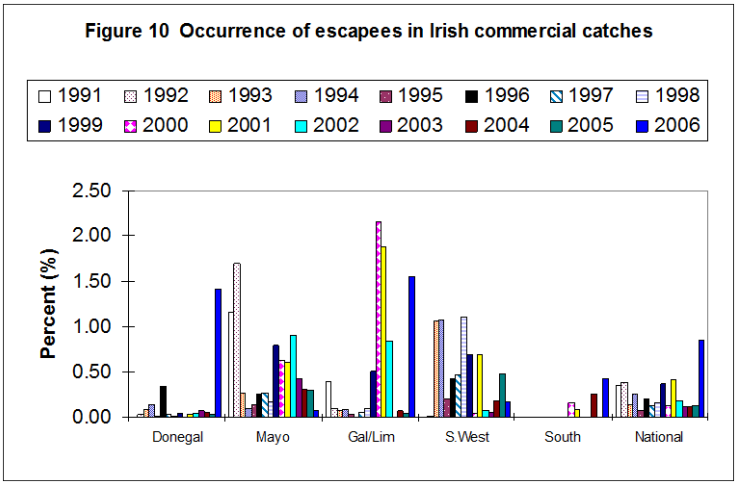



**Figure 1: The occurrence of escapees in commercial catches is consistently very low**
*Taken from Figure 10 of the National Report for Ireland – ICES Working Group on North Atlantic Salmon Working Document 2009.*

With regard to BMP Ireland does not have a systematic monitoring programme for escapees into freshwater although several index rivers are monitored to provide information when such events occur (Burrishoole, Newport, Erriff, Corrib).

Under Irish legislation, the farm the operator will make an emergency application to the Department of Agriculture for a special licence under Section 14 of the Fisheries Act 1959 to deploy nets to recapture the escaped fish. Under the Fisheries Amendment Act 1997, Section 77(1), Inland Fisheries Ireland, both within the meaning of the Act of 1980, may take such action as it considers necessary to recapture stock which has escaped from a facility operated under a licence. Under 77(2), the Minister (DCENR), may authorise a licensee or other person or body to take such action as is specified in the authorisation to recapture stock which has escaped from a facility operated under a licence. (3) An authorisation referred to in *subsection (2)* may be granted subject to such conditions, if any, as the Minister or the designated officer, as the case may be, considers necessary or expedient.
Some progress has been made with regard to genetic identification of farmed salmon escapees which will facilitate identification of escapees back to farm origin. .

With regard to risks associated with genetic introgression of escapes farmed strains with wild salmonids, recent

scientific work carried out by Irish scientists has shown a lifetime fitness degradation in survival of hybrids which if persistent would lead to loss of wild production and an eventual extinction vortex (McGinnity et al, 2003). Work is ongoing with regard to the quantitative loss of production at various levels of genetic introgression.

See below updated from 2006. Blanks indicate that no reports were received. Note that despite some years where no reports of escapees were received escapees were still noted in the scanning of large marine salmon fisheries. These fisheries have now closed since 2006 and catch scanning for coded wire tags now takes place in broodstocks and rod fisheries rather than catches at sea. In the two most recent years no reports of salmon escaping from net pens has been received by the authorities and recoveries in angling fisheries and no escapees have been reported from rod fisheries or broodstocks where scanning for coded wire tags takes place. It is currently assumed that escapee events are low presently.

| Ireland Year | Reported escapes of smolts | Reported escapes of Adults (>1kg) | Total reported escapes | Escapees in catch (%) | Escapees in catch (No.) |
|---|---|---|---|---|---|
| 1996 | 9,500 | 14,500 | 24,000 | 0.20 | 581 |
| 1997 | 40,000 | | 40,000 | 0.13 | 355 |
| 1998 | 50,000 | 23,732 | 73,732 | 0.16 | 698 |
| 1999 | | 11,500 | 11,500 | 0.37 | 752 |
| 2000 | 20,000 | 139,000 | 159,000 | 0.13 | 1,062 |
| 2001 | | | 104623+ | 0.41 | 1,759 |
| 2002 | | | 0 | 0.19 | 941 |
| 2003 | | | 2,780 | 0.11 | 238 |
| 2004 | | | 0 | 0.12 | 257 |
| 2005 | | | 0 | 0.13 | 329 |
| 2006 | | | 0 | 0.84 | 744 |
| 2007 | | | 0 | 0.01 | 2 |
| 2008 | | | 0 | 0.01 | 3 |
| 2009 | | | 25,000 | 0.05 | 10 |
| 2010 | 83,000 | 1,000 | 84,000 | 0.04 | 5 |
| 2011 | | | | 0.00 | 0 |
| 2012 | | | | 0.00 | 0 |

**4.4 What progress has been made to implement NASCO guidance on introductions, transfers and stocking?** *(Max. 200 words)*
*(Reference: Articles 5 and 6 and Annex 4 of the Williamsburg Resolution)*

Ireland has contributed to the formulation of and is in agreement with NASCO's policy in Restocking (Appendix 1, Williamsburg Agreement). Ireland's commitment to this policy is outlined in Appendix 1 (attached). A recent history of restocking practices in Ireland is attached in Appendix 2.

**In addition to the adoption of the NASCO Guidelines on restocking, recommendations from the Marine Institute and IFI are as follows:**

Precautionary Approach for ranching and releasing smolts specifically to increase angling returns.

- Site location distant from rivers with wild populations
- No harvest outside of river
- Harvest station in lower reaches better access to fish during the season
- Large river or flow to encourage fish to actively enter river
- In-river trap to remove all returning hatchery fish
- Stock with high return capability
- All fish to be tagged and genetically typed
- All stock to be disease free on transfer and release
- All stock to be vaccinated

All hatcheries and aquaculture facilities engaged in the culture or farming of salmonids must be covered by an Aquaculture licence as a requirement of the Fisheries (Amendment) Act, 1997. All facilities where fish are held, reared or on-grown must hold a Fish Health Authorisation granted under S.I. 261 of 2008 www.irishstatutebook.ie/2008/en/si/0261.html (also at Appendix 3).

All those proposing to transfer salmonids of any life-stage between freshwater locations for the purposes of restocking or "ranching" must notify the Fish Health Unit of the Marine Institute prior to movement. Movements can be blocked on expert advice.

**4.5 What is the policy/strategy on use of transgenic salmon?** *(Max. 200 words)*
*(Reference: Article 7 and Annex 5 of the Williamsburg Resolution)*

Transgenic salmonids are not used and have never been used for aquaculture or restocking in Ireland and there are no plans or policy to do so as this would contravene current scientific advice and policy.

**4.6 What measures are in place to prevent the introduction or further spread of *Gyrodactylus salaris*?** *(Max. 200 words)*

Monitoring of rivers for the presence of G.salaris has taken place annually since 2005; prior to that, sampling was carried out solely in freshwater aquaculture facilities. To date, 30 rivers have been monitored and no G.salaris has been recorded on juvenile salmon. An information brochure has been prepared highlighting the danger of introducing the parasite and information for anglers is given who have travelled from European countries. It is recommended that all equipment be treated prior to arrival in Ireland and should be accompanied by a certificate of disinfection issued by a competent professional in the country of origin. A contingency plan for dealing with outbreaks of *Gyrodactylus salaris* in Ireland has been prepared and liaison has taken place with the authorities in Northern Ireland to ensure compatibility in contingency plans and response.

**4.7 What are the main threats to wild salmon and challenges for management in relation to aquaculture, introductions and transfers, and transgenics, taking into account the Williamsburg Resolution, the BMP Guidance and specific issues on which action was recommended for this jurisdiction in the Final Report of the Aquaculture FAR Review Group, (CNL(11)11)?**

| | |
|---|---|
| Threat/ Challenge A1 | Escapes of farmed fish and threats to genetic integrity of wild stocks leading to loss of natural production, disruption of spawning activities of wild fish, spread of new disease in freshwater |
| Threat/ challenge A2 | Sea lice infestations reduce survival of salmon. Could be a significant problem for stocks not meeting CLs or already under pressure. |
| Threat/ challenge A3 | **Transfer and increases in incidence of diseases**<br>Council Directive 2006/88/EC (on animal health requirements for aquaculture animals and products and on the prevention and control of certain diseases) is the statutory |

| | |
|---|---|
| | framework within which aquatic diseases are regulated in Europe. This Directive has been transposed into Irish law by S.I. No 261 of 2008 (as amended).<br>Under this legislation, Ireland has the highest possible rating (Category 1 i.e. disease freedom) in relation to the important salmonid diseases ISA, VHS, IHN, BKD and G.salaris. In addition to the statutory framework, a Code of Practice has been agreed between industry and government in relation to general fish health management. A Fish Health Handbook has been devised which provides guidance in relation to the control and management of non-listed diseases on salmonid farms. The proactive disease control and stock management principles outlined in the Handbook have been applied by industry since 1 June 2012.The handbook is reviewed annually by an industry/ government working group.<br>Over the past year since the principles of the Handbook have been implemented, the incidence of diseases such as Pancreas Disease and IPN have declined. Gill related disorders have however, been on the increase, impacted to some degree by water temperatures and significant phyto and zooplankton blooms which were recorded around the Irish coast during the summer of 2012.<br>Amoebic Gill Disease (AGD) caused by infection with the protozoan parasite *Neoparamoeba.perurans* has been associated with mortality in farmed salmon in 2012, due in large part to the lack of availability of freshwater treatments. Significant resources are however being invested in developing infrastructure and sourcing adequate volumes of freshwater to ensure that treatments can be carried out as required in the coming months, which will significantly decrease infection pressure.<br>A significant investment in research aimed at determining why this disease has recently emerged as an issue, is also being made. Farming conditions have not changed significantly in recent times with the exception of the positive development towards decreased stocking densities on organic farms. Amoeba have been occasionally recorded on wild salmon but do not appear to have caused any negative impact. The condition is best treated with freshwater baths so any adult salmon returning to freshwater will be appropriately treated, should they have been infected. .<br>Temperatures above 10oC are thought to trigger the disease, but Scottish outbreaks have occurred at temperatures from 7.5oC. This raises the possibility of wild salmon smolts being infected in the vicinity of salmon farms in spring, although there is no evidence to show that this poses any real risk to smolt runs. |
| Threat/ challenge A4 | |

*Copy and paste lines to add further threats/challenges which should be labelled A5, A6, etc.*

| **4.8 What actions are planned to address each of the above threats and challenges in the five year period to 2018?** | | |
|---|---|---|
| **Action A1:** | Description of action: | **Escapes of farmed fish**<br>The industry comply with the codes of practice regarding husbandry and good engineering practices. The current action proposed is to allow recapture of escapees at sea through special licencing from IFI before escapes enter freshwater. However, there would be concerns regarding a bye-catch of wild salmon so consideration is also given to installation of traps in freshwater in proximity to farms following a large scale escape event to remove escapees and allow wild fish enter freshwater.<br><br>In the event of an escape, the farm the operator will make an emergency application to the Department of Agriculture for a special licence under Section 14 of the Fisheries Act 1959 to deploy nets to recapture the escaped fish. Inland Fisheries Ireland may take such action as it considers necessary to recapture stock which has escaped from a facility operated under a licence. Under 77(2), the Minister (DCENR), may authorise a licensee or other person or body to take such action as is specified in the authorisation to recapture stock which has escaped from a facility. |
| | Planned timescale: | Compliance with engineering standards for cages is ongoing. Emergency planning to recapture escapes is in place. |
| | Expected | Prevention of escapes generally. In the event of escapes, prompt recapture of a significant proportion of the stock. |

| | | |
|---|---|---|
| | outcome: | |
| | Approach for monitoring effectiveness: | Proportion of escaped fish recaptured. Monitoring of rivers for farmed fish. |
| **Action A2:** | Description of action: | **Sea lice Infestation**<br>During the spring period Sea lice protocols are in place which set out ovigerous lice thresholds (0.3-0.5 ovigerous lice per fish March –May and 2.0 ovigerous lice per fish outside this period). When the threshold is breached a notice to treat is issued to the salmon farm to bring lice levels under control.<br>In 2008, a new pest Management Strategy was developed that introduced detailed fallowing requirements and a new approach to monitoring to deal with situations where target lice levels were not being achieved. This approach will identify 'breakout' site options for sites with persistent sea lice problems<br>While some farms do exceed these thresholds annually, in spring 2012, non-compliance with lice thresholds at two salmon farms resulted in the Minister giving an order to harvest fish early, prior to wild smolt migration. |
| | Planned timescale: | Sea lice monitoring occurs monthly and notice to treat instructions are given when required. |
| | Expected outcome: | Reduced sea lice levels on farmed salmon |
| | Approach for monitoring effectiveness & enforcement: | Results of the monthly or bi-monthly sea lice inspection of all salmon farm sites. |
| **Action A3:** | Description of action: | **Transfer and increases in incidence of diseases**<br>Early harvesting of farmed salmon where gill damage has been recorded is effective in preventing further outbreaks. See section 4.7 – improved treatments and investment in R&D will result in greater control of gill related disorders in 2013. |
| | Planned timescale: | Ongoing with a view to improving systems |
| | Expected outcome: | Reduced incidence of disease outbreaks in aquaculture facilities |
| | Approach for monitoring effectiveness & enforcement: | Outlined in 4.7 above. This involves intensive monitoring and application of legislation regarding control of disease and adherence to the agreed Code of Practice |
| **Action A4:** | Description of action: | |
| | Planned timescale: | |
| | Expected outcome: | |
| | Approach for monitoring effectiveness & enforcement: | |

*Copy and paste lines to add further actions which should be labelled A5, A6, etc*