ANNEX 18

Council

CNL(03)17

Report of a Meeting of the Standing Committee on the Precautionary Approach (SCPA) on Application of the Precautionary Approach to Aquaculture, Introductions and Transfers, and Transgenics

CNL(03)17

Report of a Meeting of the Standing Committee on the Precautionary Approach (SCPA) on Application of the Precautionary Approach to Aquaculture, Introductions and Transfers, and Transgenics

1. In response to concern about the risks to the wild stocks from aquaculture, introductions and transfers and transgenics, the Council and Commissions of NASCO have developed five agreements designed to minimise impacts. All of these agreements, with the exception of the containment guidelines, were developed prior to the adoption by NASCO and its Contracting Parties of the Precautionary Approach. Since NASCO first started to look at these issues, salmon farming production has increased ten-fold to more than 700,000 tonnes, transgenic salmon have been developed for commercial use, and there has been increasing interest in introductions and transfers for use in aquaculture and in stocking programmes. Advances in scientific understanding, particularly with regard to genetic and disease impacts of cultured fish on the wild stocks, indicate that NASCO was highly justified in its concerns and in developing measures to minimise impacts even though, at the time, there was considerable scientific uncertainty. The task of the SCPA at its fourth meeting, held in Williamsburg, Virginia, was to review the five agreements to ensure their consistency with the Precautionary Approach.

2. The SCPA has proposed to the Council that all the existing agreements should be restructured into one new "umbrella" Resolution with annexes and should be amended to give greater emphasis to appropriate placement of the burden of proof, risk assessment, mitigation and corrective measures, implementation and reporting. A new annex with guidelines on stocking has been added. The new Resolution which, when adopted by the Council, might become known as the "Williamsburg Resolution", forms a coherent set of internationally acceptable measures concerning application of the Precautionary Approach to aquaculture, introductions and transfers, and transgenics.

3. The Committee felt that the new Resolution would lead to a strengthening of the protection for the wild stocks in accordance with the Precautionary Approach. One measure specifically highlighted in the Committee's report as offering additional benefits in protecting the wild stocks from irreversible genetic impacts is the use of sterile farmed salmon. However, it was recognised that husbandry and marketing concerns would need to be addressed before they could be used widely. The industry have agreed that these issues will be raised at the next Liaison Group meeting and Workshop in 2004 (see CNL(03)23). Given the continuing problems of ensuring containment of farm salmon, the rapid growth of the industry, and new scientific information concerning the adverse genetic consequences of interbreeding between wild and farm salmon, the Council may wish to give this aspect further consideration.

4. The Council had previously recognised that there would be a need for consultations with stakeholders on the SCPA's recommendations. This process began in Williamsburg at the Liaison Group meeting with the salmon farming industry, which has agreed to respond after ISFA's annual meeting in May. The Parties agreed to undertake consultations nationally and report back to the Council at or before its Twentieth Annual Meeting.

5. The Council is asked to consider the draft Resolution contained in Annex 10 of the attached report with a view to its adoption.

Secretary
Edinburgh
7 April, 2003

SCPA(03)15

Report of a Meeting of the Standing Committee on the Precautionary Approach on Application of the Precautionary Approach to Aquaculture, Introductions and Transfers, and Transgenics

Williamsburg Lodge, Williamsburg, Virginia, USA

10-12 March, 2003

1. Introduction

1.1 The Chairman of the Standing Committee on the Precautionary Approach (SCPA), Mr Jacque Robichaud (President of NASCO), opened the meeting and thanked the US Government for hosting the meeting and for the arrangements made. Mr Rollie Schmitten welcomed participants to Williamsburg and introduced the new US Commissioner to NASCO, Ms Pat Kurkul, North-East Regional Director of NOAA Fisheries.

1.2 The Chairman, on behalf of the SCPA, had conveyed the best wishes of the group to the Head of the Canadian delegation, Mr David Bevan, and to the Head of the EU Delegation, Mr Ole Tougaard, who could not attend the meeting because of illness.

1.3 A list of participants is contained in Annex 1. One Contracting Party, Denmark (in respect of the Faroe Islands and Greenland), was not represented at the meeting.

2. Adoption of the Agenda

2.1 The Committee adopted its agenda, SCPA(03)14 (Annex 2). Clarification was sought on the goals for the meeting and in relation to agenda item 6, 'Arrangements for consultations with relevant stakeholders'. The Chairman responded that the goal for the meeting was to develop recommendations on the consistency of the five agreements with the Precautionary Approach, on implementation of the measures and on reporting procedures. These could then be discussed with relevant stakeholders. The Council had previously agreed that a report on the Committee's work be made to the North Atlantic salmon farming industry at the next meeting of the Liaison Group which followed the SCPA meeting. However, the Chairman pointed out that as the work of the Committee also includes application of the Precautionary Approach to other forms of aquaculture, to transgenics and to introductions and transfers, the Council had decided that there would be a need for broad consultations between the Parties and other stakeholders. The outcome of these consultations could then be presented to the Council when it considers the Committee's recommendations at its next Annual Meeting.

3. Consideration of the Terms of Reference

3.1 The Committee considered its Terms of Reference, SCPA(03)2. It was noted that the report of the meeting would form recommendations to NASCO Council. It would be

for the Council to decide on the appropriate action in light of the Committee's recommendations.

4. Review of present NASCO Agreements with regard to their consistency with the Precautionary Approach

4.1 The Secretary introduced a discussion document, SCPA(03)3 (Annex 3). He believed that, given the NASCO definition of the Precautionary Approach, an outside observer might conclude that only the guidelines on transgenic salmon came close to satisfying the full requirements of the Precautionary Approach. They identify an undesirable outcome, irreversible change, and they propose measures to ensure that such an outcome is unlikely. Moreover, they appear to have been fully implemented. The other agreements might be considered to fall short of the Precautionary Approach requirements because they still permit a significant risk of irreversible genetic and other damage and they do not ensure appropriate placement of the burden of proof. Furthermore, they do not include measures to address unintentional introductions and transfers or stocking practices. The Secretary referred to genetic and other concerns about stocking practices and suggested that guidelines on stocking might be developed. He noted that comprehensive reporting procedures are in place for all the agreements except the transgenic guidelines.

4.2 Reviews concerning implementation of the agreements and their consistency with the Precautionary Approach were tabled by Canada, SCPA(03)10 (Annex 4); the European Union, SCPA(03)11 (Annex 5); Iceland, SCPA(03)6 (Annex 6); Norway, SCPA(03)8 (Annex 7); the Russian Federation, SCPA(03)12 (Annex 8); and the USA, SCPA(03)7 and SCPA(03)9 (Annex 9).

4.3 Canada indicated that it has made significant progress in implementing the Precautionary Approach using a risk assessment approach to managing its resources and has set up a governance structure to oversee its application. Canada felt that it would be appropriate to examine the reason behind the decline in wild salmon stocks, salmon at sea mortality, abundance enumeration, and the interaction between wild and cultured fish.

4.4 The European Union reported that the Oslo Resolution and the NEAC Resolution had been very fully implemented in most Member States and that work was in progress on developing Action Plans on the containment of farmed fish. The Community recognised, however, that the various agreements under consideration did not fully accord with the Precautionary Approach and that in developing them to this end, the opportunity should be taken to create a comprehensive statement of NASCO resolve in respect of minimising the adverse impacts of aquaculture, introductions and transfers and transgenic fish.

4.5 Iceland reported on the implementation of the agreements and how they have been incorporated into Icelandic laws and regulations.

4.6 Norway referred to a recent decision to establish a number of protected zones for salmon which are intended to provide additional protection for the most important salmon rivers and fjords. A system of tagging farm salmon is also under consideration. Thirty-three Norwegian stocks are being held in living gene banks.

Norway considers that these measures are consistent with the Precautionary Approach.

4.7 The Russian Federation indicated that there was a need to introduce stronger measures to reduce the escape of farmed salmon and to enhance exchange of information on escapes. The Parties should also be requested to provide more detailed information concerning outbreaks of known and unknown diseases and parasitic infections.

4.8 The two documents tabled by the US identified areas in each of the five agreements that could be improved to incorporate the Precautionary Approach, but noted that the agreements provided very useful guidance and direction for national implementation. The US stressed the importance of implementation of the agreements. The documents tabled also included summaries of US implementation of the agreements, and concluded that, overall, the US was implementing them. The documents suggested the following five general recommendations for improvement of the agreements, and reviewed each of them per these recommendations: (1) Increase Specificity; (2) Implementation and Reporting; (3) Risk Assessment; (4) Burden of Proof; and (5) Improved Scientific Exchange.

4.9 The SCPA first considered the question of whether the Oslo Resolution, the Guidelines on Containment of Farm Salmon and the Guidelines for Action on Transgenic Salmon could be considered as being consistent with the Precautionary Approach as it has been defined by and adopted by the Council.

4.10 The Chairman, in a statement, and the Secretary, in his report SCPA(03)3, suggested to the SCPA that these three Agreements could not be considered as fully consistent with the Precautionary Approach, since they did not protect the wild stocks from irreversible genetic damage. The Chairman said that very large numbers of fertile farmed fish are escaping and interbreeding with wild stocks creating risks of irreversible change. Salmon farms can form reservoirs of sea lice that can seriously reduce wild salmon populations in the vicinity. Moreover, he said that, consequently, a full implementation of the Precautionary Approach, although it might not be currently feasible, might need to involve rearing farmed salmon in secure, self-contained land-based facilities or using sterile salmon in sea cages so that the genetic integrity and diversity of the wild stocks could be preserved.

4.11 The Parties felt that the Oslo Resolution could be improved so as to make it more consistent with the Precautionary Approach. The wording was sometimes vague and could be made more specific. There could be more consistency between agreements, including the definitions, and more details on risk assessment procedures could be incorporated. Additionally, the reporting procedures could be strengthened and there could be more clarity concerning appropriate placement of the burden of proof. Perhaps most importantly, the level of implementation needs to be clearly established. Increased research of relevance to the Resolutions, and cooperation in disseminating the results of such research, would also be highly desirable.

4.12 Following consultations, the Committee, consistent with the Terms of Reference, decided that all five agreements might be restructured into one "umbrella" Resolution, based on the Oslo Resolution, with a number of Annexes and Appendices so as to include all the elements in the five agreements plus some new or revised elements

such as guidelines on stocking, a comprehensive list of definitions, principles on placing the burden of proof, an element on risk assessment, implementation and reporting. It was felt that this unification would increase clarity and ensure that all the areas of concern were logically addressed. The Committee was reassured that none of the measures to minimize impacts in the existing Agreements were omitted and that the revision process would lead to a strengthening of the protection for wild stocks in accordance with the Precautionary Approach.

4.13 The Committee recognised that the use of sterile salmon might offer benefits in protecting the wild stocks from genetic impacts from escapees but that husbandry and marketing concerns would need to be addressed before they could be used in farming. The Committee agreed that these issues should be raised with the salmon farming industry through the Liaison Group.

5. Recommendations on:

(a) the need for any modifications to the present NASCO Agreements or for additional measures

5.1 The SCPA proposed to the Council of NASCO the adoption of a new Resolution, which it suggests might be known as the 'Williamsburg Resolution'. This Resolution, together with all its Annexes, would form one coherent set of internationally acceptable measures concerning application of the Precautionary Approach to introductions and transfers, aquaculture and transgenics. This document, SCPA(03)13, is attached as Annex 10.

5.2 The Annexes required to support this document are extensive and the time available at the SCPA meeting had been very limited. While the SCPA did not anticipate further significant revisions to these Annexes there would be a need, for example, to consult geneticists on some details of the stocking guidelines. Such consultations might produce proposals for minor changes, which would be communicated to the Secretary. The SCPA also asked the Secretary to carry out any necessary editing to make the document consistent in format and style before it is submitted to the Council.

(b) the need for modification to existing reporting procedures

5.3 The Committee agreed that thorough and transparent reporting procedures are a vital element of applying the Precautionary Approach to introductions and transfers, aquaculture and transgenics. Such reporting provides monitoring of implementation and could also highlight any areas of difficulty. The Committee asked the Secretary to re-develop the reporting procedures (CNL(98)42) so as to reflect the new structure of the Resolution. A new format for reporting under the Guidelines for Action on Transgenic Salmon, based on the draft format contained in Annex 1 of document SCPA(03)3, should be included. The reporting procedure should indicate whether or not the measures taken in accordance with the Resolution are mandatory and how they are enforced. The new reporting format, when agreed by the Council, might then be annexed to the Resolution.

6. Arrangements for consultations with relevant stakeholders

6.1 The Council had agreed that the report of the SCPA meeting should be circulated to relevant stakeholders. The Committee agreed that a verbal report on the meeting and the draft 'Williamsburg Resolution' would be presented to the North Atlantic salmon farming industry through the Liaison Group meeting on 13 March. However, as the Committee had examined issues wider than salmon farming, i.e. introductions and transfers, enhancement and transgenics, the Council had asked the Parties to undertake consultations on these issues with the stakeholders and report back to the Council well in advance of the Twentieth Annual Meeting when the report of the SCPA meeting will be considered.

7. Report of the meeting

7.1 The Committee agreed a report of the meeting.

8. Other business

8.1 There was no other business.

9. Date and place of next meeting

9.1 The Committee agreed that it would not meet again before the Twentieth Annual Meeting of NASCO, at which time the Council would consider arrangements for the next meeting of the SCPA in accordance with the Action Plan for Application of the Precautionary Approach.

9.2 The Chairman thanked the participants for their contributions to the meeting.

List of Participants

Canada

Ms Julia Barrow	Department of Fisheries and Oceans, Ottawa, Ontario
Mr Guy Beaupré	Department of Fisheries and Oceans, Ottawa, Ontario
Ms Darlene Elie	Department of Fisheries and Oceans, Ottawa, Ontario
Mr Paul Lyon	Department of Fisheries and Oceans, Ottawa, Ontario
Mr David Meerburg	Department of Fisheries and Oceans, Ottawa, Ontario
Mr John Moores	Department of Fisheries and Oceans, Ottawa, Ontario
Mr Jacque Robichaud (Chairman)	President of NASCO
Mr Tim Young	Department of Fisheries and Oceans, Ottawa, Ontario

European Union

Ms Carmen Beraldi	Secretaria General Pesca Maritima, Madrid, Spain
Dr Malcolm Beveridge	FRS Freshwater Fisheries Laboratory, Pitlochry, UK
Mr Richard Cowan	Department of the Environment, Fisheries and Rural Affairs, London, UK
Mr David Dunkley	Scottish Executive Rural Affairs Department, Edinburgh, UK
Mr Pentti Munne	Ministry of Agriculture and Forestry, Helsinki, Finland
Mr Ted Potter	Centre for Environment, Fisheries and Aquaculture Science, Lowestoft, UK
Mr Adrian Taylor	Environment Agency, Bristol, UK
Mr Andrew Thomson	European Commission, Brussels, Belgium
Dr Ken Whelan	Marine Institute, Newport, Ireland

Iceland

Mr Arni Isaksson	Directorate of Freshwater Fisheries, Reykjavik

Norway

Mr Øyvind Walsø	Directorate for Nature Management, Trondheim

Russian Federation

Ms Svetlana Krylova	Murmanrybvod, Murmansk
Ms Elena Samoylova	PINRO, Murmansk
Dr Boris F Prischepa	Murmanrybvod, Murmansk
Dr Alexander Zubchenko	PINRO, Murmansk

USA

Ms Jessica Anthony	National Marine Fisheries Service, Gloucester, Massachusetts
Mr Edward Baum	Atlantic Salmon Unlimited, Hermon, Maine
Ms Kimberly Blankenbeker	National Marine Fisheries Service, Silver Spring, Maryland
Ms Nikki Brajevich	US Department of State, Washington DC
Mr Stephen Chase	Atlantic Salmon Federation, New Brunswick, Canada
Ms Mary Colligan	National Marine Fisheries Service, Gloucester, Massachusetts
Mr Stephen Gephard	Department of Environmental Protection, Old Lyme, Connecticut
Ms Patricia Kurkul	National Marine Fisheries Service, Gloucester, Massachusetts
Mr Pasquale J Scida	National Marine Fisheries Service, Gloucester, Massachusetts
Mr Rollie Schmitten	National Marine Fisheries Service, Silver Spring, Maryland

Secretariat

Dr Peter Hutchinson

Dr Malcolm Windsor

SCPA(03)14

Meeting of the Standing Committee on the Precautionary Approach On the Application of the Precautionary Approach to Introductions, Transfers, Aquaculture and Transgenics

Agenda

1. Introduction

2. Adoption of the Agenda

3. Consideration of Terms of Reference

4. Review of present NASCO Agreements with regard to their consistency with the Precautionary Approach:

   (a) the North American Commission's Protocols on Introductions and Transfers (NAC(92)24 as amended by NAC(94)14)

   (b) the North-East Atlantic Commission's Resolution on Introductions and Transfers (NEA(97)12)

   (c) the Council's Oslo Resolution (CNL(94)53)

   (d) the Council's Guidelines for Action on Transgenic Salmon (CNL(97)48)

   (e) the Liaison Group's Guidelines for Containment of Farm Salmon (CNL(01)53)

5. Recommendations on:

   (a) the need for any modifications to the present NASCO Agreements or for additional measures

   (b) the need for modification to existing reporting procedures

6. Arrangements for consultations with relevant stakeholders

7. Report of the meeting

8. Other business

9. Date and place of next meeting

SCPA(03)3

Review of present NASCO Agreements and Measures with regard to their consistency with the Precautionary Approach - discussion document

Introduction

1. The Standing Committee on the Precautionary Approach (SCPA) has been asked by the Council to review NASCO's Agreements and measures in relation to introductions and transfers, aquaculture and transgenics and advise on their consistency with the Precautionary Approach and to make recommendations for additional measures taking account of appropriate risk assessments (see SCPA(03)2 for detailed Terms of Reference).

2. The Precautionary Approach is a new guiding philosophy which requires NASCO and its Contracting Parties to be more cautious when information is uncertain, unreliable or inadequate and the absence of adequate scientific information should not be used as a reason for postponing or failing to take conservation and management measures. The Agreement on Adoption of a Precautionary Approach (CNL(98)46) specifies the factors that should be taken into account in application of the Precautionary Approach and the SCPA may wish to look at each of the five agreements with the following questions in mind:

   (a) Does it consider the needs of future generations and avoid changes that are not potentially reversible?

   (b) Does it identify undesirable outcomes and contain measures to avoid or correct them?

   (c) Does it include a mechanism for the initiation of corrective measures without delay and would these corrective measures achieve their purpose promptly?

   (d) Does it give priority to conservation of the productive capacity of the resource where the likely impact of resource use is uncertain?

   (e) Does it appropriately place the burden of proof?

3. There are perhaps four main aspects for the SCPA to consider in reviewing these agreements:

   (a) Are the measures contained in the agreements consistent with the Precautionary Approach as outlined in paragraph 2 above? If not, what additional measures are required?

(b) Have the measures in the agreements been fully implemented by the Contracting Parties, and have monitoring and enforcement procedures been introduced?

(c) Has consideration been given to both intentional and unintentional introductions and transfers?

(d) Have appropriate reporting procedures been developed for each of the agreements?

4. The Contracting Parties have been asked to provide an analysis of their own actions in relation to each of the agreements (item 3(b) above). In this discussion document, prepared to stimulate debate, we review the scientific background, including new information, assess the agreements' attributes and failings measured against the principles of the Precautionary Approach, consider the existing reporting procedures, and assess if both intentional and unintentional introductions and transfers have been considered.

Scientific Background

5. NASCO has been concerned about the impacts of introductions and transfers and aquaculture on the wild stocks of Atlantic salmon since the mid-1980s, but recognised that initially there were considerable gaps in knowledge of these impacts. A number of scientific meetings have been convened in order to review the available scientific information and identify research requirements, commencing in 1989 with a joint NASCO/ICES meeting to review the genetic threats to wild stocks from salmon aquaculture. A range of views on the impacts of farmed salmon on the wild stocks was expressed, from no impact (or even benefits) to serious impacts, but the only evidence presented suggested that adverse effects were possible. There was general agreement on the need for, and difficulty associated with, experiments to assess the genetic impact. The meeting also recognised the need for adoption of Codes of Practice to reduce the genetic threats and the impacts of introductions and transfers in general. These views were reiterated a year later at a major international symposium, supported by NASCO, on the Impacts of Aquaculture on Wild Stocks held in Loen, Norway. It was concluded that moving salmon, except under carefully controlled conditions, is "a highly undesirable practice and should be minimised".

6. By 1997 concerns about the impacts of cultured salmon on the wild stocks had grown further, and the Council held an international symposium in Bath, England in conjunction with ICES entitled "Interactions between Salmon Culture and Wild Stocks of Atlantic Salmon: the Scientific and Management Issues". Some of the experts present felt that loss of local adaptations and displacement of wild fish as a result of interbreeding with farmed salmon could lead to the collapse of wild populations, although the necessary experimentation to confirm this had not been conducted. The need to improve containment of farmed salmon was stressed. The symposium highlighted the serious adverse impacts from diseases and parasites. It was noted that most endemic diseases and parasites were under control in fish farming, with the exception of sea lice. Serious concerns were also expressed about potential adverse effects of transgenic salmon on the wild stocks.

7. At the Sixth International Atlantic Salmon Symposium in July 2002 in Edinburgh, even more concern was expressed about impacts of sea lice and escapes of farm salmon. Some wild salmon populations in the vicinity of salmon farms (<20km) appear to have particular problems, which have resulted in local extinctions, threats of further extinctions and serious economic losses. While there has been encouraging progress in controlling lice numbers on some farms, particularly in the spring, lice emanating from fish farms can cause high levels of mortality on wild salmonid populations and the level of infestation is highest in densely farmed areas. The need to consider improvements in monitoring lice levels in farms and for transparency of the information obtained was stressed. With regard to escapes, the long-awaited results of the scientific experiments called for since 1989 confirmed that escapees from salmon farms pose a serious genetic threat to the fitness and viability of wild salmon populations and that the hybrid vigour or "new blood" argument is not justified. Repeated intrusions of farmed salmon may lead to extinction of locally adapted populations. While there has been progress in improving containment, the need for significant improvement was stressed. The continuing growth of the industry means that containment measures and treatment of lice must become increasingly effective.

8. As part of the EU-funded SALGEN project, a symposium was held in January 2003 in Ireland, entitled "Genetics and the Conservation of Atlantic Salmon". This symposium was designed to facilitate dialogue between managers of wild Atlantic salmon and geneticists, and a number of conclusions were drawn in relation to the genetic impact of farm escapees. It was suggested that in the region of 2 million farm salmon are escaping into the North Atlantic each year and, in addition, there are escapees from freshwater hatcheries for which there is little quantitative information. While the breeding success of escapees is lower than wild salmon, the numbers are so large in some rivers that there is a high potential for genetic damage to wild populations, with regular escapes resulting in a cumulative reduction in fitness. Aquaculture uses only a few strains and this could result in homogenisation of the differences present among wild salmon populations, reducing the ability of wild salmon populations (and perhaps the farming industry) to adapt to future environmental change. The need for much improved containment was stressed, as was the need for caution when stocking salmon rivers.

9. In summary, the advances in scientific understanding of the impacts of aquaculture (and introductions and transfers) indicate that NASCO was justified in its concerns and in taking action. While these are by no means the only threats to wild salmon populations, it would have been irresponsible to assume there were no impacts. Since NASCO first started to look at these issues, there has been increasing interest in introductions and transfers, annual production in salmon farming has increased from less than 70,000 tonnes to more than 700,000 tonnes and transgenic salmon have been developed for use in aquaculture. Repeatedly the scientific advice has recommended the need for caution in movements of live salmonids, for improvements to containment (either through the use of land-based units or of sterilisation techniques), for improvements in health management, for the use of aquaculture-free zones and for tagging of farmed salmon. If the Precautionary Approach had been in place prior to the development of these agreements, then the proponents would have had to show that the activity proposed did not pose a risk to the wild stocks before proceeding.

Background to Development of Agreements

Resolution to Minimise Impacts from Salmon Aquaculture on the Wild Salmon Stocks (the "Oslo Resolution"), CNL(94)53

10. In 1991 the Council adopted Guidelines to Minimise the Threats to Wild Salmon Stocks from Salmon Aquaculture as a basis for the development of voluntary or mandatory guidelines by the Parties. In 1993, the Council recognised that new information on the impacts of aquaculture on the wild stocks suggested the need for "stronger measures as a matter of priority". In cooperation with the salmon farming industry, the Oslo Resolution was developed and adopted by the Council in 1994. It was the Council's intention that the Oslo Resolution be fully implemented by 1998. In 1998, recognising that further progress would be necessary to achieve this aim, the Council adopted an Agreement on Implementation of the Oslo Resolution, CNL(98)42. This Agreement states that in order to have confidence that the wild stocks are protected from irreversible impacts the measures in the Oslo Resolution should be fully implemented and stronger measures should be considered where appropriate. Furthermore, the Agreement states that there is a need to reduce escapes and to develop guidelines on physical containment measures; that sterile salmon might offer a way forward to protecting the genetic integrity of the wild stocks and that emphasis should be given to the use and effects of wild salmon protection zones. It was further noted that gene banks, though expensive, can be of value as a measure to protect the genetic diversity of the wild stocks.

Guidelines on Containment of Farm Salmon, CNL(01)53

11. During 2000 and 2001 the Liaison Group between NASCO and the North Atlantic salmon farming industry developed Guidelines on Containment of Farm Salmon which were agreed by the Council at its Eighteenth Annual Meeting in 2001. In agreeing the guidelines, the Council stressed that these would need to be reviewed and updated on a regular basis to take account of new technology and better information on impacts on wild stocks. The Liaison Group was asked to monitor the development of the action plans envisaged under the guidelines and their implementation and advise the Council of progress on an annual basis.

Guidelines for Action on Transgenic Salmon, CNL(97)48

12. In 1997, in response to concerns that the use of transgenic salmon may lead to irreversible genetic changes and ecological interactions, the Council adopted its Guidelines for Action on Transgenic Salmon. These recommend that the Contracting Parties take all possible actions to ensure that the use of transgenic salmon, in any part of the NASCO Convention area, is confined to secure, self-contained, land-based facilities. It should be noted that the guidelines also recognise that there might be benefits from the use of transgenic salmon if, for example, transgenic salmon could not interbreed with wild salmon. At present there is no commercial on-growing of transgenic salmon in the North Atlantic but transgenic Atlantic salmon and rainbow trout broodstock are presently being reared in eastern Canada. When the Guidelines were developed there was ongoing work by the Parties to the Convention on Biological Diversity in developing a Protocol on Biosafety and the guidelines recognise the need to take account of this work. This Protocol, the Cartagena

Protocol, has now been adopted so the SCPA may wish to consider the need to propose amendments to paragraph (c) of the guidelines to reflect this.

NEAC Resolution to Protect Wild Salmon Stocks from Introductions and Transfers, NEA(97)12

13. In 1995, the North-East Atlantic Commission had recognised that introductions and transfers "pose genetic, ecological and disease and parasite risks to the wild Atlantic salmon" and that "the damage can be so severe as to render certain wild salmon stocks extinct". It had been noted that the introduction and spread of diseases and parasites strongly suggested the inadequacy of the arrangements existing at the time, whether because of the nature of these arrangements or because of lack of implementation. In response to this situation the Commission adopted the Resolution to Protect Wild Salmon Stocks from Introductions and Transfers in 1997. One issue that had been raised at the time of the development of this Resolution was the possible conflict between measures to protect wild stocks from the impacts of introductions and transfers and international trade agreements. However, representatives of the World Trade Organization (WTO) indicated that WTO procedures would only be likely to apply in the event that NASCO was unable to resolve a dispute internally, or where the dispute was between a NASCO and a non-NASCO party. Even in the latter disputes, WTO would consider that NASCO's agreement represents an international standard.

North American Commission Protocols for the Introduction and Transfer of Salmonids, NAC(92)24 as revised by NAC(94)14

14. Concern about the introduction of new salmonid species to the eastern seaboard and Great Lakes was raised by the Commission at its First Annual Meeting in 1984. A Scientific Working Group (SWG) was established which developed the NAC Protocols adopted by the Commission in 1992 and amended in 1994. The intention was that the members of the Commission would take steps to implement the provisions of the revised Protocols in their respective domestic laws, regulations or policies. The Protocols included provision for amendment every two years, and in 1996 it was agreed that the Protocols be reviewed and simplified. In 1998, a discussion document proposing revisions to the Protocols was tabled. These proposals included consolidation of the two protocol documents, a shift from geographic zones to a river basin classification system, use of protected zones rather than exclusion zones, increased emphasis on risk analysis and new protocols addressing transgenics. In 2002, Canada adopted a new policy entitled "National Code on Introductions and Transfers of Aquatic Organisms". This Code provides a national framework for the transfer of aquatic organisms that will ensure that there is a single, standard set of risk assessment and approval procedures concerning introductions and transfers of aquatic organisms in Canada so as to minimise negative impacts on aquatic resources and their habitats and on aquaculture, and ensure that Canadian risk analysis procedures are consistent with international standards and commitments. The proposed modification of the NAC Protocols will take into account this new National Code. It was the intention that revised draft Protocols be available for review by the SCPA but these have not, to date, been provided to the Secretariat. In the absence of details of revisions to be made, it is not possible to assess consistency with the Precautionary Approach.

Consistency with the Precautionary Approach

Principles of the Precautionary Approach

15. Under a Precautionary Approach the present generation has an obligation to safeguard the right of future generations to the resource through avoidance of irreversible changes. There is also a need to identify undesirable outcomes and measures that will avoid or correct them. In relation to introductions and transfers, aquaculture and transgenics, undesirable outcomes would include the introduction and spread of infectious disease agents, intra- and inter-specific ecological interactions that adversely impact on the wild stocks, and reduction of genetic diversity of the wild stocks. Clearly, irreversible changes to the wild salmon stocks are highly undesirable outcomes. The FAO Technical Guidelines for Responsible Fisheries note that a strictly Precautionary Approach would not permit deliberate introductions and would take strong measures to prevent unintentional introductions because of the high probability of irreversible changes and unpredictable impacts. Furthermore, escapes from aquaculture facilities are difficult to eliminate and any species introduced for aquaculture should be considered in the same way as an introduction to the wild. The difficulty or impossibility of reversing an introduction should figure predominantly in the decision process as to whether to allow it. There may also be undesirable socio-economic outcomes associated with decisions concerning introductions and transfers, aquaculture and transgenics, but allowing these factors to dominate could undermine the effectiveness of the Precautionary Approach and the SCPA has previously agreed that it is therefore necessary to give proper emphasis to biological factors since under a Precautionary Approach the priority is to conserve the productive capacity of the resource. In the event that corrective measures are required, these should be initiated without delay and should achieve their purpose promptly. The higher the risk to the stocks, the greater is the need for measures which are designed to achieve their purpose promptly. In these circumstances, where there is a risk of irreversible change to the wild salmon stocks, those proposing the use should, in principle, carry the burden of providing proof that their actions will not adversely affect the resource or lead to irreversible changes.

16. All of NASCO's agreements concerning introductions and transfers, aquaculture and transgenics, with the exception of the Containment Guidelines, were developed prior to the adoption of the Precautionary Approach to salmon conservation and management by NASCO and its Contracting Parties. Nevertheless, the approach adopted in developing these agreements was, in a number of respects, consistent with the Precautionary Approach. For example, at the time each of the agreements was developed there was scientific uncertainty about the nature of impacts but this did not prevent the development of conservation measures. It is consistent with the Precautionary Approach to obtain, as a priority, more information on which to base management decisions. NASCO has encouraged research by the Contracting Parties in order to better understand impacts of introductions and transfers, aquaculture and transgenics and facilitated dissemination of the findings. It is consistent with the Precautionary Approach that the adequacy of the measures in the agreements be re-evaluated in the light of advances in understanding of the impacts and that is now the task for the SCPA. There are also examples in some of the agreements of the identification of corrective measures to apply in the event of an undesirable outcome.

For example, the Oslo Resolution recommends the establishment of contingency plans for disposal of mortalities in emergency situations and the Containment Guidelines recommend development of site-specific contingency plans for use in the event of a significant escape. Furthermore, relevant stakeholders were either directly involved in the development of the agreements or were consulted on the agreements prior to their adoption by the Council or Commissions. This is also consistent with the Precautionary Approach.

Implementation

17. It goes without saying that the measures in the agreements can only be considered to be consistent with the Precautionary Approach if fully implemented. Indeed, as stated in the Agreement on Adoption of a Precautionary Approach, implementation of the measures in the agreements is essential in the light of the Precautionary Approach. The Working Group on the Precautionary Approach noted that none of the agreements developed in relation to introductions and transfers, aquaculture and transgenics are legally binding on the Contracting Parties. This issue was discussed by the North-East Atlantic Commission in 2001 in relation to its Resolution since the returns indicated that there had been some movements into the Commission area and releases of non-indigenous anadromous salmonids which were not permitted under the Resolution. The fact that the Resolution is not binding was identified as a weakness in the system although it was noted that there is a moral and political obligation to adhere to the measures in the Resolution. Furthermore, there are areas of all agreements where the reports by the Parties indicate little or no progress in implementation. These include the introduction of the river classification system and appropriate management measures under the NEAC Resolution, the use of European strains in aquaculture contrary to the NAC Protocols, use of local broodstocks for salmon farming as recommended in the Oslo Resolution, and the small-scale testing and full-scale implementation of some of the measures in Part 4 of the Annex to the Oslo Resolution, such as use of land-based facilities, use of sterile salmon, and aquaculture-free zones. Only the measures in the transgenic guidelines appear to have been fully implemented to date.

18. Given that the measures in the agreements are not legally binding and serve as recommendations to the Parties, decisions as to whether particular measures should be implemented or not should be taken in the light of identification of and thorough evaluation of the potential adverse effects on the conservation of the wild Atlantic stocks and their habitats, i.e. risk evaluation. However, it should be noted that the process of developing NASCO's agreements was, in effect, a risk assessment process based on the available scientific information. Since the time when the agreements were developed, more recent scientific advice would suggest the need for an even more cautious approach. Under a Precautionary Approach, lack of scientific knowledge should not be interpreted as indicating an absence of a risk or an acceptable risk. Such risk assessment might:

- identify any possible adverse effects on the wild stocks and their habitats. Under a Precautionary Approach, the burden of proof should be on the proponent to provide evidence that the proposed action will not adversely affect the wild stocks.
- evaluate the likelihood of the adverse effects being realised;

- evaluate the consequences in the event that the adverse effect is realised;
- evaluate overall risk, e.g. low probability x severe consequences = high risk;
- assess if the risk is acceptable or manageable, recognising the need to consider the interests of future generations and the need to maintain the productive capacity of the resource. Under a Precautionary Approach, the higher the risk from an activity, the greater the need for caution and measures to protect the wild stocks;
- identify pre-agreed measures for corrective action;
- develop evaluation and monitoring systems and take these into account in future decisions;
- where there is uncertainty, seek further information.

19. As an example of the risk assessment approach being applied, it is stated in the NEAC Resolution that movements of live salmonids from a zone where a specified disease occurs to a zone free of that disease should not be permitted. Some movements between such zones have, however, been reported but only where there had been no report of the specified disease for many years and there were strict requirements concerning the movements. The risk was, therefore, assessed to be low and the movement between zones permitted.

Adequacy of measures

20. The 1997 Working Group on the Precautionary Approach noted that, even if fully implemented, the agreements developed by NASCO in relation to introductions and transfers, aquaculture and transgenics could "fall short of the full requirements of a Precautionary Approach because they do not ensure a minimal risk of irreversible change, including genetic and ecological impacts, and the introduction of diseases and parasites, and do not adequately place the burden of proof".

21. Two examples might serve to illustrate this. Firstly, in 2002, Norway drew attention to the very serious and continuing threat posed to wild Atlantic salmon stocks by the parasite *Gyrodactylus salaris*, and stressed that prevention of its further spread within the Commission area must be a priority. Norway highlighted the fact that, despite the measures in the NEAC Resolution, infections of *G. salaris* have occurred in new regions. The Commission supported a proposal from Norway to establish a dialogue on the need to prevent further spread of the parasite; on the need for enhanced cooperation on monitoring, research and dissemination of information; on the need to strengthen national legislation; and on the need to revise the NEAC Resolution to take account of current knowledge and the Precautionary Approach. Any activity that could result in the further spread of this parasite poses an extremely high risk of irreversible damage to the wild stocks and yet the measures in the Resolution have failed to prevent its spread. There is, therefore, a feeling within the Commission that, at least with regard to the measures in relation to *G. salaris*, the Resolution may not be consistent with the Precautionary Approach. Secondly, there is the issue of containment of farmed salmon. The Oslo Resolution and the Containment Guidelines contain a number of measures (many in common) intended to minimise escapes of farmed salmon. However, as the Working Group on Implementation of the Oslo Resolution noted in 1998, "the problem of improving containment is that with current farmed production at a level in excess of 400,000 tonnes, an escapement of only 1% leads to a significant proportion of farmed salmon in the wild" and "physical

containment measures cannot ever be 100% effective. The cost of increasing the percentage containment can be prohibitively high". Since that time production has increased to more than 700,000 tonnes and, in spite of the actions in recent years by the industry to reduce escapes, there is still a very significant problem that, in the light of recent scientific research, we know poses a risk of irreversible damage to the wild stocks.

22. Thus the NASCO agreements, even if fully implemented, may be considered in some respects to fall short of the requirements of the Precautionary Approach because some of the measures in them do not adequately protect the needs of future generations, do not avoid irreversible changes, do not identify undesirable outcomes and corrective measures, do not give priority to conserving the productive capacity of the wild stocks and do not ensure appropriate placement of the burden of proof. Perhaps the transgenic guidelines are the most consistent with the Precautionary Approach. They have been fully implemented to date, they recognise the need for further understanding of the impacts of transgenics on the wild stocks but they only permit rearing of transgenic salmon in "secure, self-contained land-based facilities". The terms "secure" and "self-contained" are not defined and escapes are known to occur from existing land-based smolt-rearing facilities. This aspect was a concern to the Working Group on the Precautionary Approach which noted the difficulty of ensuring the high level of containment required for the rearing of transgenic salmon and suggested that the use of sterile salmon in relation to containment of transgenic salmon be reviewed. The guidelines request the Parties to provide details of the proposed method of containment. In view of the potential risk of irreversible change to the wild stocks, to be consistent with the Precautionary Approach the burden of proof should be on the proponent wishing to rear transgenic salmon to prove that the proposed containment measures will prevent any escape. As noted in the NEAC Resolution there should be a strong presumption against any activity which would risk introduction of transgenics to the wild.

Unintentional Introductions and Transfers

23. Unintentional introductions and transfers of aquatic species may occur *inter alia* in ships' ballast water, as a result of engineering work in aquatic environments, in containers used to transport live fish or their ova, on fishing equipment and as a result of the release of live bait. For example, it is estimated that 10 billion tonnes of ballast water are transferred globally each year, potentially introducing aquatic species to new environments. An example is the transfer of the zebra mussel to North America from Europe. These introductions and transfers are not subject to any scientific evaluation or permitting process and, as such, must be considered to be inconsistent with the Precautionary Approach. The SCPA has previously stressed that, under a Precautionary Approach, all resource use should be subject to a management regime and, to be consistent with the Precautionary Approach, measures should be developed to reduce the risk of unintentional introductions and transfers and to minimise their impact when they occur. Once a species has been introduced to an aquatic environment it may not be possible to eradicate it. Neither the NAC Protocols nor the NEAC Resolution contain measures to protect the wild stocks from unintentional introductions and transfers, although the NEAC Resolution recognises the need to take steps to limit the risks by developing information to increase awareness of these risks. The risks to the wild stocks have been highlighted by the parasite *G. salaris,*

which was not known to be a serious threat to wild Atlantic salmon prior to its inadvertent introduction to Norway with stock movements for aquaculture and subsequent dispersal by stocking, escape of infected fish from hatcheries, exchange of water and dumping of moribund fish during smolt transportation, and wild fish moving through brackish water into uninfected rivers.

Possible additional measures

24. The question then arises as to what additional measures might be considered to ensure greater consistency with the Precautionary Approach. The Agreement on the Implementation of the Oslo Resolution provides some guidance in relation to impacts of aquaculture. The two main concerns currently are genetic impacts of escapes and the impacts of sea lice on wild stocks. The Agreement on Implementation of the Oslo Resolution states that sterile salmon might offer a way forward to protecting the genetic integrity of the wild stocks and although there could be disadvantages to the industry these would need to be balanced against the high risks to the wild stocks from existing practices. This has also been suggested as a measure to prevent adverse impacts of transgenics given the problems of ensuring physical containment. The Agreement also states that emphasis should be given, as appropriate, to the use and effects of wild salmon protection zones since such zones could reduce genetic and disease and parasite impacts. Several scientific meetings have recommended these two approaches to minimising impacts on the wild stocks. Both of these measures are included in the Oslo Resolution as subjects for research, small-scale testing and full-scale implementation. To date, there has been very limited progress in implementing either measure and the SCPA may wish to consider if these measures might need to be given greater prominence in the Oslo Resolution. The current NAC Protocols also propose the use of sterile salmonids in some situations and of exclusion zones of various sizes around the different classes of salmon rivers.

25. Land-based units have also been proposed as a method of minimising genetic and disease and parasite impacts, although these are not currently economically viable. While progress has been made in controlling sea lice, measures will need to be increasingly effective as the industry continues to grow, with effective coordinated treatments, fallowing, year-class separation and transparent monitoring of lice levels.

26. In short, it might be concluded that a fully precautionary approach to containment, so as to protect genetic diversity, might involve rearing throughout the life-cycle in secure land-based facilities or a combination of rearing to smolt stage in secure land-based units with on-growing of sterile salmon in the sea (provided that such fish do not present other hazards) in combination with improved diseases and parasite monitoring and treatment. Such a scenario would obviously significantly affect the price of farmed salmon and may not be politically realistic; nonetheless, these costs would have to be balanced against the threat of irreversible damage to the wild stocks.

27. The latest scientific research also indicates that stocking with non-native fish (i.e. from another river, even if a neighbouring river) may be as damaging to the native salmon population(s) as repeated intrusions of farmed fish and should be actively discouraged. While the Oslo Resolution, the NAC Protocols and the NEAC Resolution contain some recommendations in relation to stocking practices, these recommendations may need to be revised in the light of the latest advice. The

Council had previously recognised that there might be benefits from the development of internationally agreed guidelines on stocking and it was agreed that this aspect be considered when the SCPA considers stock rebuilding programmes.

28. The Agreement on Implementation of the Oslo Resolution also highlights the role gene banks may play in protecting the genetic diversity of wild stocks threatened with loss. The Council has developed guidelines on the establishment of gene banks and they have been established in a number of countries, but there is no reference to their application in the Oslo Resolution.

29. It has been proposed that tagging of farmed salmon might assist in identifying fish which have escaped from farms, in identifying farms with particular containment problems, and in evaluating the effectiveness of the containment measures taken. However, to be of value there would need to be a means of adequately sampling escaped transgenic fish. Tagging may also provide a method to further investigate the hypothesis that escaped salmon from the UK, Ireland and Faroes migrate to Norwegian and Russian waters and enter rivers in these countries.

30. To be consistent with the Precautionary Approach, introductions or transfers that pose a risk of irreversible change to the wild stocks should be controlled. Measures concerned with preventing the spread of diseases and parasites usually require that a disease or parasite agent be identified before it can be considered a risk to the wild stocks. The consequences of disease and parasite introductions and transfers cannot be predicted if the agent responsible is unknown but they can be severe. *G. salaris* was unknown as a serious parasite of Atlantic salmon before its introduction to Norway. The SCPA might wish to consider if additional measures could be developed to reduce the risks of introductions of diseases and parasites that are presently not known to adversely affect Atlantic salmon. It is vitally important that the further spread of the parasite *G. salaris* is prevented.

31. The International Maritime Organization's Marine Environment Protection Committee is developing new regulations for ballast water management which it is anticipated will be adopted at a diplomatic conference in 2004. The SCPA may wish to recommend to the Council that the Parties support this initiative.

32. There may be benefits from the development of educational material to increase awareness of the risks from unintentional introductions and transfers as proposed in the NEAC Resolution. The SCPA might wish to consider whether it wishes to recommend to the Council the development of such materials and whether additional steps might be taken.

Reporting Procedures

Oslo Resolution

33. In 1995 the Council agreed a simple format for reporting details of the measures taken under the Oslo Resolution. This format was used in 1996 and 1997 but in 1998 the Council agreed that more comprehensive information on the measures taken should be provided on an annual basis. A new format was agreed which requested information for each of the approximately 40 measures detailed in the Annex to the

Resolution, and this has been used annually since 1998. The returns made by the Parties are collated by the Secretariat and details of new measures are presented annually to the Council. In addition, during the period 1999-2001 the Contracting Parties reported to the Council on the measures taken to minimise impacts of aquaculture, through Special Liaison Meetings to which the industry was invited. The reports of these meetings are contained in document CNL(01)69. The reporting requirement under the Oslo Resolution is, therefore, comprehensive although the scope of the information provided by the Parties varies considerably. It should also be noted that some of the measures taken nationally are considered by the Parties to be "good industry practice" and no further details are therefore reported. The Council had asked that, for each measure reported, the Contracting Parties advise on whether or not the measures are mandatory and how they are enforced. To date, very limited information has been provided by the Parties on these aspects.

Guidelines on Containment of Farm Salmon

34. At the Liaison Group's 2002 meeting, verbal reports were made on progress in developing and implementing action plans on containment of farm salmon. The reports indicated that each country had begun the process of implementing action plans, although it was recognised that each country would inevitably proceed at different speeds with implementation. Progress had been made in the establishment of reporting procedures following an escape, although no details of numbers were provided. The Group agreed that there was a need for a systematic process for reporting on implementation of these action plans and a format for reporting was agreed which was subsequently endorsed by the Council of NASCO. The first returns according to this format should be made available to the Liaison Group at its meeting immediately following the SCPA meeting. There may be a need to review the adequacy of this reporting procedure.

Guidelines for Action on Transgenic Salmon

35. Under the guidelines, the Parties should advise the Council of any proposal to permit the rearing of transgenic salmonids and provide details of the proposed method of containment and other measures to safeguard the wild stocks. No reporting format has been agreed but the President seeks a report, usually given verbally, from each Party at the Council's Annual Meeting. Under the NEAC Resolution there is a requirement for the members of that Commission to report, according to an agreed format, any proposals for the release of transgenic salmonids to the environment (including their use in aquaculture). The SCPA might wish to consider if there should also be a simple formal reporting procedure to the Council in relation to the guidelines which could be incorporated into the annual request for information from the Parties. A draft format is contained in Annex 1.

NEAC Resolution

36. In 1999, the Commission adopted a format for reporting actions taken in accordance with the Resolution and returns have been made annually by the Parties since 2000 using this format. The format requests a response in relation to each measure in the Resolution, leading to comprehensive reporting by each Party. The Secretariat intends to propose to the Commission some minor amendments to this reporting

format in June so as to simplify reporting. Furthermore, in 2000 it was noted that the Resolution does not include a definition of "non-indigenous". This issue will be considered further by the Commission in June. Adoption of a definition should improve consistency in returns.

NAC Protocols

37. The SWG has maintained an inventory of salmonid introductions and transfers in Eastern North America since 1986 based on information provided by federal, state and provincial agencies. In this way introductions and transfers could be evaluated for conformity with the Protocols. Some problems in obtaining information for the inventory were reported in some years. Concern was expressed by the Commission about the use of European strains in aquaculture contrary to the Protocols. The SWG has also established databases of fish disease occurrence and the occurrence of farmed salmon escapes and rainbow trout in salmon rivers.

Conclusions

38. An outside observer might conclude that the only agreement that is close to satisfying the requirements of the Precautionary Approach is the agreement on transgenic salmon. It has been fully implemented to date, it identifies an undesirable outcome that could be irreversible and ensures that such an outcome is unlikely, although it does not specify the details of the requirements for containment. The other agreements might be considered to fall short of the requirements in various ways, not only because of lack of full implementation but because they still permit a very significant risk of irreversible damage and do not ensure appropriate placement of the burden of proof. Measures to minimise the risks from unintentional introductions and transfers are not addressed. However, comprehensive reporting procedures are now in place for all the agreements, other than the transgenic guidelines.

39. Measures to put these elements right could be complex and costly. The salmon farming industry would have to make significant changes to its practices. However, after a period of denial by the industry of any impact on the wild stocks, there is now improved collaboration between wild and farmed salmon interests and a willingness to work together to conserve wild stocks. This progress will need to be maintained and further enhanced. There may also be a need for further measures concerning movements of salmonids and, in particular, enhanced cooperation between the Parties in order to minimise the risks posed by *G. salaris* and to control unintentional introductions and transfers.

40. Put in its starkest terms, the alternative to stronger measures may be irreversible damage to wild populations and loss of genetic diversity. Such an outcome, which may already be occurring, would surely lead the outside world to conclude that NASCO and its Contracting Parties had failed to adequately apply the Precautionary Approach.

Secretary
Edinburgh
26 February, 2003

Draft Reporting Format in relation to the Guidelines for Action on Transgenic Salmon

1. Have there been any proposals to permit the rearing of transgenic salmonids since the last notification? If yes, please provide details.

2. If there have been proposals to permit the rearing of transgenic salmonids, please provide details of the proposed method of containment and other measures to safeguard the wild stocks.

3. Has any research been undertaken to improve knowledge on the potential impacts of transgenic fish on the wild stocks and their habitat? If yes, please provide details.

4. Have any other relevant actions been taken (e.g. to advise the salmon farming industry of the potential risks to wild stocks from transgenic salmon; to examine the trade implications associated with transgenic salmon; to implement the Protocol on Biosafety?). If yes, please provide details.

SCPA(03)10

Report by Canada to the Standing Committee on the Precautionary Approach

Introduction

Canada's focus in analyzing NASCO documents is to ensure that they bolster current domestic fisheries management and aquaculture development policies and regulations. Canada is committed to conservation of wild fish stocks and to enabling the sustainable development of the aquaculture industry. Canada's first priority is conservation. Canada's decisions are guided by important legislation concerning Aboriginal Fisheries, Species at Risk and ecosystem-based management.

Canada endorses the Precautionary Approach. At a time when a number of international organizations are considering how to apply the Precautionary Approach to their respective mandates, Canada is currently engaged in a government-wide exercise to finalize the application of the Precautionary Approach for use by all departments. Canada has adopted a risk assessment approach to managing its resources. The Precautionary Approach is a distinctive part of the risk management approach that primarily affects the development of options and decision-making. It is ultimately guided by judgment, based on values and priorities. The Precautionary Approach is applied where there is a risk of serious or irreversible harm and there is scientific uncertainty. The Precautionary Approach recognizes that the absence of full scientific certainty shall not be used as a reason to postpone decisions. This applies to all parts of the Canadian government in resource management decisions.

Overall, NASCO's guidelines and protocols are consistent with the spirit of the Precautionary Approach. However, each country is guided by its own governance. Canada's input into the Precautionary Approach in general will be guided by our national definitions and policies.

North American Commission (NAC) Protocols on Introductions and Transfers

In 2002, Canada published its National Code on Introductions and Transfers of Aquatic Organisms. This Code was endorsed by all 13 of the provincial and territorial governments and the federal government and is based on respective legislation. The provisions of the Code are applicable to all aquatic species and apply to both wild and cultured organisms. In Atlantic Canada, the federal department of Fisheries and Oceans (DFO) chairs the Introductions and Transfers Committees and all provinces have membership on their respective committees. There are two committees in Quebec (they cooperate fully and have interlocking membership); Quebec chairs the freshwater committee and DFO chairs the marine committee.

Applications to introduce or transfer aquatic organisms are subject to a standardised approach for evaluating the risk of genetic, ecological and disease impacts on native species in the proposed receiving waters. The Risk Assessment procedure is written into the Code and is based on internationally accepted principles and standards.

Canada has adopted the Precautionary Approach as an integral part of ecosystem management. The NAC Protocols must be consistent with and satisfy the risk assessment requirements of the National Code. Canada is currently implementing the Code as the basis for managing introductions and transfers. The National Code is more inclusive than the NAC Protocols as it considers all species and is not restricted to salmonids. For example, in the re-introduction of species, the Code would examine all impacts on resident species whereas the NAC Protocols would only look at the impact on salmonids. The Code provides for consultation, between provinces and between Canada and/or France and the United States, if proposals might have an impact on stocks within a watershed that extends beyond the boundaries of the receiving province. Canada would invite the development of a bilateral agreement with the United States to consult on proposals to introduce or transfer aquatic species that may impact wild salmon stocks in the others' waters. ICES and the International Joint Commission (via the Boundary Waters Treaty Act) are other venues for consultation.

Resolution to Minimise Impacts from Salmon Aquaculture on the Wild Salmon Stocks (the Oslo Resolution)

Canada is currently in the process of compiling data for the annual report to NASCO.

All applications to establish an aquaculture facility in Canada are subject to a full review by both federal and provincial agencies. Applications are normally reviewed under the Canadian Environmental Assessment Act and the Navigable Waters Protection Act. This process ensures input from all interested parties and requires detailed analysis of all factors to address issues prior to the cage being placed in the water. The process ensures that the potential impact of the establishment of the enterprise is fully evaluated and, if needed, mitigation procedures are developed.

In order to reduce the potential for escape and interaction with wild stocks, the industry, in conjunction with governments, have developed a set of best management practises. These agreements on management practises are voluntary. They are comprehensive, covering all aspects of aquaculture operations including escape prevention. Provinces, who have the responsibility, use these as a condition of licensing. The federal and provincial governments are collaborating with industry to ensure standards are in agreement with provincial and federal legislation.

Guidelines for Action on Transgenic Salmon

There is only one company actively engaged in research on transgenic Atlantic salmon in Canada. All of the research is being conducted in a contained, land-based facility that has been inspected by both the federal departments of Fisheries and Oceans (DFO) and Environment Canada. Canada has not received any request to place transgenic salmon in a cage facility. Any application to do so would be subject to review under the Canadian Environmental Protection Act. This would include a comprehensive risk assessment. DFO will be part of the review, if it is ever required. Canada's position remains that until a comprehensive risk assessment has been conducted, fully fertile, transgenic aquatic organisms should remain in contained, land-based facilities. One consideration, as part of that risk assessment, might be the potential to ensure sterility of transgenic fish as a means of biological containment. In terms of environmental impact, an option might be to have sterile transgenic fish in sea cages.

The regulation of transgenic organisms is also being examined in a number of international fora including under the Convention on Biological Diversity and its Cartagena Protocol on Biosafety. The results of these discussions will form the basis of a national policy, which will be generally applicable to trade in all transgenic organisms.

Guidelines for Containment of Farm Salmon

In Canada, guidelines for containment are specifically outlined in broader best management practises. These are being driven by an industry-led process in cooperation with provincial and federal agencies. They are designed to ensure compliance to both provincial and federal legislative authorities. To ensure compliance, jurisdictions are making best management practises a condition of licensing.

The following best management practises apply throughout the NASCO area. Where applicable, they are consistent with the Salmon Liaison Group's recommendations on Codes of Containment:

- Best Management Practices for Sustainable Aquaculture in Freshwater (Quebec)
- Environmental Management Guidelines - Aquaculture Association of Nova Scotia
- Code of Containment for Use of Non-Local Salmonid Strains in Sea Cage Aquaculture in Bay d'Espoir and Marine Cage Culture Code of Practice for the Newfoundland Salmonid Aquaculture Industry
- Bay Management Agreement, Fish Health Surveillance Program, Environmental Management Guidelines (New Brunswick)

Conclusion

From our perspective, Canada has made significant progress in the four elements outlined above. In most areas, work is well underway and we have set up a governance structure to oversee application of the Precautionary Approach. At this time Canada feels that we should focus our collective energies towards examining the reasons behind the decline of wild salmon stocks. Research into issues of salmon at sea mortality, abundance enumeration, and the interaction between wild and cultured fish are examples of areas that require work.

SCPA(03)11

European Community Report to the Standing Committee on the Precautionary Approach on the Implementation of Resolutions, Protocols and other Agreements Relevant to Introductions, Transfers, Aquaculture and Transgenics

Introduction

At the meeting of the Standing Committee on the Precautionary Approach, Contracting Parties have been requested to examine the various agreements and measures established in NASCO in the context of the application of the Precautionary Approach to introductions and transfers, aquaculture and transgenics.

The European Community has examined each of the five NASCO measures and has come to conclusions on how these measures have been implemented since their inceptions, as well as a number of recommendations on how these measures can be improved. The Community has examined the consistency of these measures with the Precautionary Approach, particularly in view of developments which have taken place within NASCO during recent years.

The Community, in its examination, has been particularly aware of the need for NASCO to retain a degree of credibility with the farmed salmon sector, in order to ensure that there is continued cooperation with the wild sector.

Examination of NASCO measures

CNL(94)53 Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimise Impacts from Salmon Aquaculture on the Wild Salmon Stocks (The Oslo Resolution)

The Oslo Resolution applies to all aspects of salmon aquaculture, including 'farming', 'ranching' and 'enhancement'. It therefore addresses many, but not all, issues relating to 'introductions' and 'transfers' of salmon. The European Community considers that this Resolution provides a useful outline structure but does not fully address all the issues of concern to the SCPA relating to 'Introductions, Transfers, Aquaculture and Transgenics'. The Resolution might therefore be expanded to provide an over-arching framework within which more detailed management protocols (for NAC and NEAC areas) and guidelines could be operated. This expansion of the Resolution could be addressed in part by taking on board some of the principles currently included in the NAC Protocols (NAC(94)14) and NEAC Resolution (NEA(97)12), while some of the detail could be placed in a set of guidance documents appended to the Resolution.

The Community considers that Guidelines appended to the report could be used by Contracting Parties: to support the development of statutory or voluntary regulations; to establish Action Plans; or simply to encourage best practice. The Guidelines could address:

- Risk Assessment: all the current documents refer to risk assessment but provide little guidance on how quantitative (or even qualitative) risk assessments should be conducted in a consistent manner;
- Stocking (i.e. enhancement, restoration, mitigation, rehabilitation): the current documents provide very little guidance on the controls on various types of stocking that might be appropriate; as a result it may be seen by some Parties as unbalanced;
- Transgenics (including GMOs): see comments on CNL(97)48 below;
- Ranching: no guidance is currently provided on ranching although fisheries managers have applied this term to a range of activities, some of which might be seen as more akin to stocking;
- Containment (possibly including 'quarantine'): see comments on CNL(01)43 below.
- Gene banks: see CNL(90)6;
- Habitat: consideration should be given to the potential effects of aquaculture and introductions on the habitat of wild salmon;
- Tagging and marking: consideration has been given to the use of tagging/marking to address problems relating to farm escapes; however, guidance might be provided on the objectives of such programmes and how they might be operated.

This list is not definitive and further guidelines (or fewer) could be introduced as the need was identified.

The language employed in the Resolution is largely consistent with the Precautionary Approach, although there are some areas where it may be seen as a little vague. There are parts of the Resolution in which more detail may be required and others where some of the detail might usefully be placed within the guidance documents.

The Community notes that the Resolution includes definitions which may not be consistent with other NASCO or ICES documents relating to salmon. A list of these definitions, including duplicates, is appended to this report (Appendix 1). The Community considers that a single set of definitions should be agreed and used in all NASCO documents.

The Community notes that considerable progress has been made in the application of the Oslo Resolution, but questions whether this is sufficiently transparent in the reporting procedures currently employed by NASCO. While it would be undesirable to increase the burden of reporting it might be helpful to ensure that a fully updated report on the development was more widely disseminated.

NEA(97)12 Resolution by the North-East Atlantic Commission of the North Atlantic Salmon Conservation Organization to Protect Wild Salmon Stocks from Introductions and Transfers

The guidelines contained in the NEAC Resolution have been implemented by Member States of the European Community through a variety of domestic and European legislation, as well as guidelines and codes of practice developed at national levels.

Introductions of salmon from outside the NEAC area do take place, with salmon ova from Tasmania being introduced to the UK to facilitate year-round production. The broodstock originated within the NEAC area.

There are no plans within the Community to produce transgenic salmon.

Within the Community, Fish Health Inspectorate regimes undertake monitoring and general surveillance operations under domestic and European fish health legislation.

Introductions of non-indigenous fish are regulated by domestic legislation within the Community, e.g. in the UK, the Wildlife and Countryside Act 1981, and the Import of Live Fish Acts.

Domestic and European legislation is in place for the purposes of preventing the spread of diseases and parasites. Live fish or fish eggs may not be moved except between zones of equal status. Additional controls in relation to *Gyrodactylus salaris* are in place for the UK and Ireland. Registration of fish farms is compulsory, and audit trails of all operations must be maintained and be available for inspection.

Although zoning of rivers has not been undertaken, the designation of rivers as Special Areas of Conservation under provisions in the EU Habitats Directive requires coherent management policies to be developed that take into account any activity that may impact upon the species of interest. Catchment management is further promoted through the provisions of the EU Water Framework Directive, which is being transposed into domestic legislation in Member States of the Community.

Guidelines on controlling the unintentional introduction and transfer of aquatic species have not yet been developed.

It is recommended that general measures in the NEAC Resolution and their equivalents in the NAC Protocols be harmonised within a generic Resolution. Specific measures to address the particular issues within the Commissions should be contained within annexes.

NAC(94)14 North American Commission Protocols for the Introduction and Transfer of Salmonids

The European Community has taken due note of the NAC Protocols as implemented by Canada and the United States of America. Comments on the substance of the protocols should be forthcoming from the two relevant Parties. The Community recommends that the most important aspects of the NAC Protocols, common to the NEAC Resolution, be incorporated where possible into the body of the main resolution. The remaining elements should be continued within a separate appendix pertinent only to the North American Commission.

CNL(97)48 NASCO Guidelines for Action on Transgenic Salmon

An EU Directive is in place which regulates all matters relating to the use of genetically modified organisms (GMOs). In the case of Atlantic salmon the rearing of transgenic individuals is prohibited and all Member States have in place regulatory procedures to ensure that this Directive is followed. Having reviewed the NASCO guidelines, the Community agrees that these conform to the Precautionary Approach. However, we recommend that the wording of the guidelines be kept under regular review to ensure that these are adequate to deal with future commercial pressures for wider use of transgenics in some areas of the aquaculture industry.

CNL(01)53 Guidelines on Containment of Farm Salmon

Within the European Community Member States, government and industry in major salmon farming countries (i.e. UK and Ireland) have played complementary roles in implementing the NASCO guidelines on containment. In Scotland an industry-government working group on the issue rapidly led to the development of Codes of Practice on containment and on contingency planning. Similar procedures have been produced by the Irish salmon farming industry. Mandatory reporting of escapes, and the implementation of measures to recover lost fish, have also been introduced in both Scotland and Ireland. There is a requirement for applicants for new fish farms, or renewal of leases, to provide details of containment and contingency plans.

In Scotland, there is little evidence to show that these measures have proved effective in reducing escapes, as numbers remain high. Recovery plans have also proved ineffective. Moreover, not all salmon farms belong to producer organisations. Despite this, there is now a much higher degree of awareness of the extent of the problem. Reports from farms and monitoring of salmon catches in Ireland have shown that the level of escapes remains low. However, it is also apparent that much, if not most, of the escapes occur in small numbers over protracted periods of time as a result of routine farm operations and minor damage to equipment. There is a need to accept that losses of farm stock from cage systems are inevitable. The guidelines, while taking a sufficiently Precautionary Approach, need to acknowledge this. There is thus a need to review the guidelines to ensure that best practice is being recommended and to elaborate more detailed advice to the industry, including adoption of better guidelines to ensure equipment is 'fit-for-purpose'.

There are doubts as to whether tagging of farmed fish, as currently proposed, would increase our knowledge of either the extent or impact of escapes. More formal risk assessment methods, such as HACCP, could be better used to identify why escapes occur and to develop methods for minimising.

Conclusions

Details of individual recommendations on improvements have been outlined in the various headings set out above. On a general note, the European Community would recommend that a new resolution based on the Oslo Resolution of 1994 should be formulated to take account of more recent developments in NASCO's consideration of the Precautionary Approach. This resolution would also include elements currently contained within the NEAC Resolution and the NAC Protocols on introductions and transfers, even allowing for future measures to be inserted relevant to the West Greenland Commission. The Community suggests that the remaining aspects, which are pertinent only to an individual regional Commission, would be contained within separate appendices.

The European Community recognised that in order to reinforce the resolutions and protocols, guidelines should be in place to help clarify many of the issues for fisheries managers. These guidelines would cover a range of issues including in particular: risk assessment, stocking (including enhancement, restoration, mitigation, and rehabilitation), transgenics, ranching, containment, gene banks, habitat, tagging and marking. The Community also recommends that definitions used within the various measures applied throughout NASCO should be harmonised. To this end, a list of current relevant definitions is attached (Appendix 1).

Appendix 1 to SCPA(03)11: Definitions Relating to Salmon Aquaculture, Introductions and Transfers and Transgenics

Term	Definition	Source (see below)
Applicant	See 'proponent' (NAC definition)	NAC(94)14
Aquaculture	The culture or husbandry of aquatic fauna other than in research, in hobby aquaria, or in governmental enhancement activities	NAC(94)14
aquaculture (salmon)	The culture or husbandry of Atlantic salmon and includes salmon farming, salmon ranching and salmon enhancement activities	CNL(94)53
Aquaculture	The farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants. Farming implies some sort of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated	FAO*
Competition	Demand by two or more organisms or kinds of organism at the same time for some environmental resource in excess of the available supply	NAC(94)14
Containment	Characteristic of a facility which has an approved design which minimizes operator error to cause escape of fish, or unauthorized persons to release contained fish.	NAC(94)14
country of origin	The country where the species is native	FAO 1996
Diversity	All of the variations in an individual population or species	NAC(94)14
Enhancement	The enlargement or increase in number of individuals in a population by providing access to more or improved habitats or by using fish culture facility production capability	NAC(94)14
enhancement (salmon)	The augmentation of wild stocks in individual river systems by the release of Atlantic salmon at different stages in their life-cycles	CNL(94)53
enhancement stocking	Stocking to supplement an existing stock where the production is believed to be less than the river could potentially sustain but where the reason for this under-stocking cannot be identified. **(see also mitigation stocking and restoration stocking)**	UK SAC 1991
epidemiological zones	Zones free of specific pathogens	NEA(97)12

escaped salmon	Fish that have spent some or all of their life-cycle undergoing propagation and originate from accidental or unplanned releases to the wild	ICES 1996a
Exotic	See 'introduced species' (NAC definition)	NAC(94)14 FAO 1996
farming (salmon)	Production system which involves the rearing of Atlantic salmon in captivity for the duration of their life-cycle until harvested	CNL(94)53
Fish	A live finfish	NAC(94)14
fish culture facility	Any fish culture station, hatchery, rearing pond, net pen, or container holding, rearing, or releasing salmonids	NAC(94)14
Gamete	Mature germ cell (sperm or egg) possessing a haploid chromosome set and capable of formation of a new individual by fusion with another gamete	NAC(94)14
Genetics	A branch of biology that deals with the heredity and variation of organisms and with the mechanisms by which these are effected	NAC(94)14
genetically modified organism (= GMO)	An organism in which the genetic material has been altered anthropogenically by means of gene or cell technologies	FAO 1996
Indigenous	Existing and having originated naturally in a particular region or environment	NAC(94)14
introduced species:	Any finfish species intentionally or accidentally transported or released by man into an environment outside its native or natural range	NAC(94)14
introduced species (= introduction)	Any finfish species intentionally or accidentally transported or released by humans into an environment outside its native or natural range. (Understood to include exotic species)	FAO 1996
Introduction	The intentional or accidental release of a species into environment outside its native or natural range	NAC(94)14
Isolation	Means restricted movement of fish and fish pathogens within a facility by means of physical barriers, on-site sanitary procedures and separate water supply and drain systems and cultural equipment	NAC(94)14
Mariculture	Aquaculture in sea water	NAC(94)14
mitigation stocking	Stocking conducted as a voluntary action or statutory requirement to mitigate lost production due to an activity that cannot be removed. **(see also enhancement stocking and restoration stocking)**	UK SAC 1991
Native	See 'indigenous' (NAC definition)	NAC(94)14
native salmon	Wild salmon which are members of a population with no known effects from intentional or accidental releases	ICES 1996a

naturalized salmon	Fish that have spent their entire life cycle in the wild and originate from parents, one or both of which were not wild or native salmon	ICES 1996a
n_e	Effective population size $=4n♂n♀ / n♂+n♀$	NAC(94)14
Niche	A site or habitat supplying the sum of the physical and biotic life-controlling factors necessary for the successful existence of a finfish in a given habitat	NAC(94)14
non-indigenous	Not originating or occurring naturally in a particular environment; introduced outside its native or natural range	NAC(94)14
non-indigenous	Any species intentionally or accidentally transported and released by humans into an environment outside its present range	ICES 1994
Population	A group of organisms of a species occupying a specific geographic area	NAC(94)14
Predator	An individual that preys upon and eats live fish, usually of another species	NAC(94)14
Proponent	A private or public group which requests permission to introduce or transfer any finfish within or between countries and lobbies for the proposal	NAC(94)14
Quarantine	The holding or rearing of fish under conditions which prevent the escape or movement of fish and fish disease agents. (For a detailed description of a quarantine facility see annex ix of part ii)	NAC(94)14
quarantined species	Any species held in a confined or enclosed system that is designed to prevent any possibility of the release of the species, or any of its disease agents or any other associated organisms into the environment	FAO 1996
ranching (commercial)	The release of a fish species from a culture facility to range freely in the ocean for harvest and for profit	NAC(94)14
ranching (salmon)	The release of reared juvenile Atlantic salmon with the intention of harvesting all of them on their return	CNL(94)53
Ranching	The production of salmon through smolt releases with the intent of harvesting the total population that returns to freshwater (harvesting may include collecting fish fro broodstock)	ICES 1994
Rehabilitation	The rebuilding of a diminished population of a finfish species, using a remnant reproducing nucleus, toward the level that its environment is now capable of supporting	NAC(94)14
Restoration	The re-establishment of a finfish species in waters occupied in historical times	NAC(94)14
restoration stocking	Stocking which is carried out after the removal of a factor which has been limiting or preventing natural production **(see also mitigation stocking and enhancement stocking)**	UK SAC 1991

Salmonid	All species and hybrids of the family salmonidae covered by the AFS checklist special publication no. 12, a list of common and scientific names of fishes from the United States and Canada (1980)"	NAC(94)14
Species	A group of interbreeding natural populations that are reproductively isolated from other groups	NAC(94)14
Stock	Population of organisms sharing a common gene pool which is sufficiently discrete to warrant consideration as a self-perpetuating system which can be managed	NAC(94)14
Stock	A management unit comprising one or more salmon populations. This would be established by managers, in part for the purpose of regulating fisheries. This term may be used to describe those salmon either originating from or occurring in a particular area. Thus, for example, salmon from separate rivers are referred to as "river stocks" and salmon occurring at West Greenland may be referred to as the "West Greenland stock"	CNL(00)18
stock rebuilding programme	An array of management measures, including possibly habitat improvement, exploitation control and stocking, designed to restore a stock above its conservation limit.	CNL(00)18
stocked salmon	Fish that have had artificial spawning and or rearing techniques applied at some point of their life-cycle and/or originate from intentional releases to the wild	ICES 1996a
Strain	A group of individuals with a common ancestry that exhibits genetic, physiological, or morphological differences from other groups as a result of husbandry practices	NAC(94)14
Transfer	The deliberate or accidental transport of Atlantic salmon within their native or natural range	CNL(94)53
Transfer	The deliberate or accidental movement of a species between waters within its native or natural geographic range, usually with the result that a viable population results in the new locations (See 'transferred species' – FAO 1996)	NAC(94)14
transferred species	Any finfish intentionally or accidentally transported and released within its native or natural geographic range.	NAC(94)14
transferred species (= transplanted species) (= transfer)	Any species intentionally or accidentally transported and released within its present range. (Includes exotic individuals or populations of a species)	FAO 1996
transgenic salmon*	Salmon that contain genes from another organism	CNL(97)48

wild salmon	Fish that have spent their entire life-cycle in the wild and originate from parents which were also spawned and continuously lived in the wild. (This definition favoured by ACFM over that of ICES 1996b)	ICES 1996a
wild salmon	Salmon which originate naturally and have not been subjected to aquaculture	CNL(94)53
wild salmon	A wild salmon is the result of natural spawning and has spent its entire life in nature. (NB WGBAST subsequently agreed to adopt the ICES 1996a definition)	ICES 1996b

Sources for definitions

Abbreviation	Source
CNL(00)18	North Atlantic Salmon Conservation Organization. Report of the Standing Committee on the Precautionary Approach – Application of a Precautionary Approach to Management of Salmon Fisheries
CNL(97)48	NASCO Guidelines for Action on Transgenic Salmon
CNL(94)53	Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimise Impacts from Salmon Aquaculture on the Wild Salmon Stocks
FAO	FAO definition cited in NASCO/ISFA Liaison Group – Report of the Sub Group on Salmon Co-operation (SalCo-Op)
FAO 1996	FAO Technical; Guidelines for Responsible Fisheries (2). Precautionary approach to capture fisheries and species introductions
ICES 1994	ICES Code of Practice on the Introduction and Transfer of Marine Organisms
ICES 1996a	ICES North Atlantic Salmon Working Group 1996
ICES 1996b	ICES Baltic Salmon and Sea Trout Assessment Working Group 1996
NAC(94)14	North American Commission Protocols for the Introduction and Transfer of Salmonids
NEA(97)12	Resolution by the North-East Atlantic Commission of the North Atlantic Salmon Conservation Organization to Protect Wild Salmon Stocks from Introductions and Transfers
UK SAC 1991	Salmon Advisory Committee, 1991. Assessment of stocking as a salmon management strategy

SCPA(03)6

How does Icelandic legislation conform to NASCO Resolutions?

Introduction

The Contracting Parties to NASCO have been asked to analyse how NASCO agreements concerning introductions and transfers, aquaculture and transgenics conform to the Precautionary Approach and are being incorporated into the legislation in each region. Any difficulties in implementing the measures should be pointed out as well as any amendments needed.

Iceland is only concerned with four of those resolutions, i.e. the Oslo Resolution (CNL(94)53), the Resolution of the North-East Atlantic Commission (NEA(97)12), the NASCO Guidelines on Transgenic Salmon (CNL(97)48) and the Guidelines on Containment of Farm Salmon (CNL(01)53).

When considering these issues it must be borne in mind that most European salmon countries, except Russia and Faroes, are bound by EU laws and regulations as they are passed. Countries outside the EU but inside the European Economic Area such as Iceland and Norway have accepted to take over and adapt EU Directives and Regulations as they emerge. This has certainly influenced newly passed Icelandic laws and will be even more prominent in the future. The same is true regarding laws, which are affected by the agreements of WTO, to which Iceland is a party.

Despite this, there is a bulk of legislation passed by the Icelandic parliament which has not been affected by outside legislation. This is certainly the case with the Salmonid Fisheries Act nr. 76/1970 with later amendments and regulatory measures based on the Act. Many of these actions precede any resolutions passed by NASCO as Iceland has been very concerned with possible negative effects of aquaculture since the late 1980s.

There now follows an analysis of how the current Icelandic legislation conforms to the clauses of the four NASCO resolutions and guidelines.

The Oslo Resolution, CNL(94)53

Articles 1 through 3 describe the aims of the resolution in general terms, which are in good agreement with the general spirit of Icelandic laws and regulations on enhancement and aquaculture. It is thus more meaningful to go to the four parts of the annex which cover the detail of any action.

Part 1 General measures

§ 1-2 Sites and operations

This section discusses siting and operation of aquaculture units as well as the need to control transfers. Although marine fish farms have only recently started operation in Iceland there are a number of provisions in Icelandic laws and regulations to deal with the issue, which has

also been described in CNL(01)69. This discussed the special measures taken by Iceland to minimise impacts of salmon aquaculture on wild salmon stocks. That paper can be consulted for greater detail.

The following 2 sections of the Salmonid Fisheries Act enacted in 2001 dealing with a fish farming application, show the concern of the Icelandic management authorities with respect to this issue:

> *"2. The application for an Operating Licence for farming and ranching shall be in a written form, specifying the ownership of the farm as well as the qualifications of the applicant, size of the farm, quantity to be produced, species used, proposed rearing technique, information regarding the status of the project with respect to an Environmental Assessment according to law nr. 106/2000 and the Environmental Licence according to law nr. 7/1998 on Environmental and Food Control. The application shall be accompanied by documents of title for the use of land, water and seawater, a plan regarding the financing of the facility and equipment, operational plan, local building permit, other permits needed for the intended operation as well as any other documents deemed necessary by the Directorate of Freshwater Fisheries.*
> *3. When considering an application for the operation of a fish farm or salmon ranch the Directorate of Freshwater Fisheries shall evaluate potential disease and ecological effects of the fish farm or salmon ranch. If documents provided with the application are unsatisfactory for such an evaluation the Directorate can impose on the applicant to provide further information prior to the issuing of an operating license. Such requirement may include research at the expense of the applicant into potential genetical and ecological threats posed by the proposed fish farm through tagging of fish, compiling of meteorological and oceanographic information. Also compilation of other freshwater fishing as well as farming interests in the area, evaluation of the status of riverine anadromous stocks in the vicinity and the migration of anadromous fish in the proposed farming area."*

§ 3 Transfers

The following section in the Act (Sec. 75) has been devoted to the issue of transfers:

> *"1. Selectively bred salmon can only be used for fish farming operations and the release of such stocks for enhancement or ranching is prohibited. The Directorate of Freshwater Fisheries can issue an exemption to a research organization for small scale release experiments after receiving comments from the Institute of Freshwater Fisheries.*
> *2. The transport of fish species, which are not specified in an operating licence, between unrelated fish farms and ranching stations as well as the transport and release of live fish or eggs between unrelated watersheds is prohibited.*
> *3. The Directorate of Freshwater Fisheries can grant an exemption for the transport of fish species, which are not specified in an operating licence, between unrelated fish farms and ranching stations as well as the transport and release of live fish or eggs between unrelated watersheds after receiving comments from the Veterinary Officer for Fish Diseases and the Fish Disease Committee. The Directorate of Freshwater Fisheries shall consult the Institute of Freshwater Fisheries on the issue, whether the proposed rearing or ranching activity is located in an area, where it could pose negative genetic and/or ecological threats to wild salmonid stocks".*

The issue is also covered in Regulatory Measure nr. 105/2000 regarding transport and release of salmonids and protection against fish diseases and genetic mixing of stocks. The measure has not been updated in English but the provisions regarding transfers are the following:

a) Transfer and Release of Salmon of Wild Origin

- Transfer of wild salmonids and their eggs between watersheds is subject to approval by the Directorate of Freshwater Fisheries. Wild broodfish must be slaughtered and monitored for disease according to specifications from the Fish Disease Committee.
- The Directorate can grant a permission for the use of non-local stocks in rivers with none or small stocks of salmon provided that the effects on nearby rivers are considered negligible.
- The Directorate can also permit transfer of wild salmonids into sea cages and land-based rearing stations with the approval of the Fish Disease Committee.

b) Transfer and Release of Salmon of Reared and Ranched Origin

- Ranching stations can use ranching stocks from approved facilities.
- Reared brood fish, disinfected eggs and juveniles of reared origin can be transferred freely between rearing facilities as long as it conforms to disease regulations.
- Transfer to stations with runoff into rivers must, however, be confined to the species found in the watershed and the approval of the Directorate is needed for the introduction of other species.
- The release of salmonids of foreign origin for enhancement or ranching is prohibited. The Directorate can, however, grant an exemption to a research organization for a period of two years with the approval of the Fish Disease Committee and subject to the tagging of all fish released.

Part 2 Measures to minimise genetic and other biological interactions

§ 4 Design standards for aquaculture units

Although no official standards have yet been set for aquaculture units, work is underway to set such standards. Provisions for setting standards first appeared in the Icelandic laws in mid 2001 and there is as yet no agreement between the authorities and fish farmers on such criteria. The regulations on this issue are closely linked to provisions regarding internal and external inspection of such facilities.

§ 5 and 6 Enhancement and ranching

The issues regarding enhancement and ranching are covered in the Salmonid Fisheries Act. Section 23 of the Act has the following provisions:

"(1) It is obligatory to make a fish cultivation plan reaching over a five years period in every fishing water, where enhancement is planned with fry and smolt-releases, sustenance of angling or through other aspects of enhancement mentioned in 44 (2).

(2) Fish cultivation plan cf. (1) depends upon the consent of the Directorate of Freshwater Fisheries, insofar as a Fishing Association or the majority of fishing right

owners have decided upon such an undertaking. The permit shall contain provisions which the Directorate considers necessary to protect the fish stock in question against diseases and genetic mixing and will be further specified in a Regulation by the Minister.

(3) In the case of a Fishing Association or the majority of fishing right owners in a fishing water wanting to take fish for hatching purposes, it is subject to a permit issued by the Directorate of Freshwater Fisheries. The permit will be valid for a specified period and it shall contain the necessary provisions for the protection of fish stock, cf (1) Section 22.

(4) The Directorate of Freshwater Fisheries is, cf. (1) and (2), enabled to permit the use of ocean ranching stock from the same area of the country for sustenance of angling in a river, subject to the consent of the fishing right owners in said river, as mentioned in (2).

(5) Enhancement of rivers and lakes shall be carried out by using the fish stocks from the same fishing waters.

(6) Transport of salmonids from natural fishing waters, salmon ranching stations or fish farms into natural fishing waters for angling is prohibited.

(7) The Directorate of Freshwater Fisheries can grant an exemption from provisions in (5) and (6) after obtaining an evaluation of the effects of the proposed activity on the aquatic ecosystem of the fishing water in question and nearby watersheds."

§ 7 Salmon farming

The provisions on the genetic interaction of salmon farming are found in sections 72, 75 and 77 of the Salmonid Fisheries Act and are as follows:

(section 72)

"(1) In cases of fish escaping from a certified cage rearing station, it is permitted, notwithstanding the protection of wild fish in the area, to harvest fish at sea within 200 metres of the station, provided it is in common waters outside the netting zone and the Director of Freshwater Fisheries has been notified. Should this happen during the migration period for salmon, the permit is only valid for a period of three days and nights (72 hours) after the escape of the fish, and shall be executed in collaboration with a representative of the Directorate of Freshwater Fisheries.

(2) If a licensed fish farm does not start fishing in accordance with (1) within 12 hours of the notified escape, it is right for the Directorate of Freshwater Fisheries to issue a general fishing permit in the area subject to the terms specified in (1).

(1) The holder of an Operating Licence is obliged to notify the Directorate of Freshwater Fisheries in the event of accidental escapes from cages."

(section 75) See § 3 Transfers.

(section 77)

"The Minister of Agriculture further defines the execution of this chapter through rules and regulatory measures e.g. on issuance of an operating licence, total or partial microtagging of smolts put into sea-cages, use of fish feed, maintenance and renewal of rearing equipment, appraisal of rearing and ranching stations, official inspection of fish farming and ranching activity, movement of fish species between unrelated fish farms and ranching stations, movement of live fish and eggs between unrelated watersheds etc. The Minister of Agriculture can also, after consulting the Veterinary Officer for Fish Diseases, Freshwater Fisheries Committee, the Directorate of Freshwater Fisheries and Institute of Freshwater Fisheries, restrict or prohibit fish farming, ranching or certain types of rearing methods in specific fjords, bays or coastal areas, which are considered exceptionally vulnerable with respect to environmental impact of such activity. Such a decision shall take into account, that the aim of the provision is to protect wild salmonid stocks against negative genetical changes, fish diseases and ecological effects. The decision shall consider the location of the fish farms, their size, distance from salmonid rivers and the value of the angling activity within the area. Also must be considered, whether migrating salmon or trout are likely to migrate close to the fish farms and whether oceanic currents may carry escapees into salmon rivers. The Minister of Agriculture shall also designate certain coastal areas, outside the netting zone, specifically for fish farming and set a production quota in each area."

Part 3 Measures to minimise disease and parasite interactions

§ 8 Control and prevention of diseases and parasites

The Icelandic laws on fish diseases are not available in English but they are to a large extent guided by EU Council Directives. The following could be emphasized:

- In 1985 a new law (no. 61/1985) concerning a "Veterinary Officer for Fish Diseases", was brought into force in responce to changing fish disease risks, as fish farming was expanding and knowledge of such disease increasing. This law was followed by a new regulation in 1986 (no. 403/1986) concerning measures to prevent and control fish diseases and provide health inspection at fish farms.
- In 1986 a new law was enacted establishing the Fish Disease Laboratory as a separate department of the Institute for Experimental Pathology.
- Since 1985 all fish farms in Iceland have been under obligatory and regular fish health surveillance.
- From 1993 Iceland has followed the European Union (EU) regulations and used the requirements laid down in Council Directive 91/67/EEC and the disease control measures provided for in Directive 93/53/EEC as a guideline in the national fish health monitoring system.
- The sampling and diagnostic procedures as given in Commission Decision 96/240/EEC were followed.
- The fish health status in Icelandic aquaculture in general is very promising. The main reasons for that is presumed to be the geographical isolation of the country, strict import policy, secure water supply for the farms and effective fish health surveillance.

§ 9-15 Stocking density to list of diseases

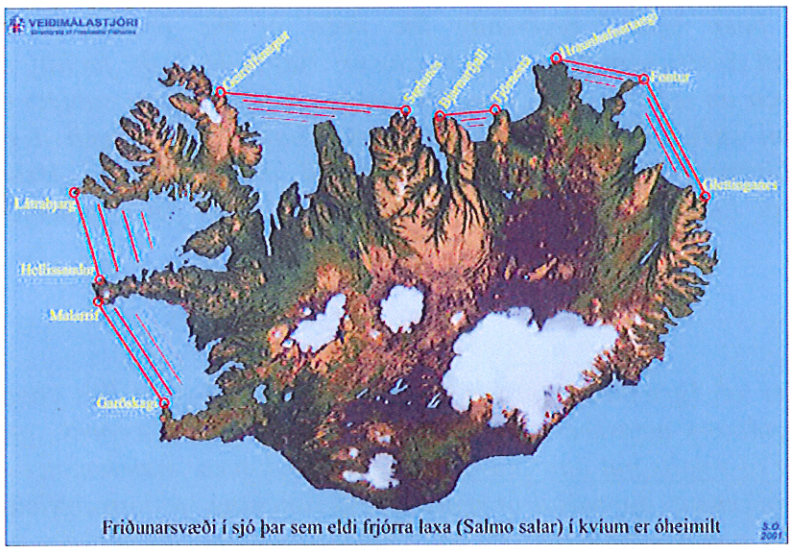
All these items are covered in detail in CNL(01)69 regarding measures to protect wild salmon stocks.

Part 4 Research and development

§ 16 Research, testing and full-scale implementation

(a) Wild salmon protection areas

Wild salmon protection areas have been implemented in Iceland by prohibiting aquaculture of fertile salmon in certain areas (CNL(01)69):



(b) Sterile fish

Sterile salmon have not been used to any extent in Iceland although some research has been carried out, especially on heat and pressure treatment of salmon eggs.

(c) Tagging and marking

The Salmonid Fisheries Act allows provisions regarding tagging of smolts into sea cages both in the licensing process (section 62) and as a provision for a regulatory measure (section 77):

Section 62

"*(4) If the application is deemed satisfactory by the Directorate of Freshwater Fisheries, it can issue an Operating Licence for a 5 year period. The Operating Licence shall specify the size of fish farm or salmon ranch, the type of operation i.e. whether engaged in smolt rearing, ranching, land- or sea-based farming for a part or all of the year. Also species allowed and the permitted quantity of production or release in the case of ranching as well as any obligations on part of the applicant to carry out monitoring or investigations at the farming site. The Operating Licence*

shall also contain conditions regarding precautionary measures to prevent escape of fish during rearing or transport processes and contingency plans to recover such fish. The Directorate can issue a licence for a shortened period and /or limit the allowed size and production quantity of a fish farm and the maximal number released from a salmon ranch. The Directorate can also issue a conditional Operating Licence, which may obligate the licence holder to carry out research at his expense into potential genetical, parasitical and ecological threats posed by the proposed fish farm through tagging of fish and compilation of meteorological and oceanographic information. Also compiling of other freshwater fishing as well as farming interests in the area, evaluation of the status of riverine anadromous stocks in the vicinity and the migration of anadromous fish in the proposed farming area. Also investigations into the fate of escaped farmed salmon through systematic tagging and release from cages, monitoring of nearby rivers for tagged salmon and the monitoring of sexual maturation and health in the cages. Operating Licence can not be issued until a decree has been issued regarding the need of the project to undergo an Environmental Assessment according to law nr. 106/2000, if the facility is potentially subject to such an assessment. The Operating Licence is also subject to a positive outcome from such an assessment and must conform with such a ruling. The Operating Licence can further not be issued until after the issuance of an Environmental Licence according to law nr. 7/1998 on Environmental and Food Control."

Section 77

"The Minister of Agriculture further defines the execution of this chapter through rules and regulatory measures e.g. on issuance of operation licences, total or partial microtagging of smolts put into sea-cages, use of fish feed, maintenance and renewal of rearing equipment, appraisal of rearing and ranching stations, official inspection of fish farming and ranching activity, movement of fish species between unrelated fish farms and ranching stations, movement of live fish and eggs between unrelated watersheds etc."

The remaining issues in § 16. have been encouraged and some research is ongoing.

Resolution by the North-East Atlantic Commission to Protect Wild Salmon Stocks from Introductions and Transfers, NEA(97)12

Article 1 Movements from outside the NEAC area

- No such movements of Atlantic salmon or their eggs have been permitted in Iceland.

Article 2 Transgenic Atlantic salmon

- Issues regarding transgenic organisms are generally handled by the Ministry of the Environment in Iceland and it seems likely that the policy of the EU will in principle be adopted.
- There has been no attempt to bring transgenic salmon into Icelandic aquaculture and any such activity would be prohibited by the authorities.

Article 3 Movements within the NEAC area.

Specific diseases and parasites

- None of the specified diseases have been observed in Iceland and such zones have thus not been established.

Unknown diseases and parasites

- For information on Icelandic zoning and rules on importation see section 5 of CNL(01)69.
- Importation of salmonids into Iceland even as eyed eggs has rarely been permitted but application for importation of other species is growing. There is always a rigorous inspection at donor facilities by Icelandic disease authorities.

Article 4 Movement of non-indigenous fish

- There have been no movements of non-indigenous fish into Icelandic salmon rivers.

Article 5 Classification of rivers

- One Icelandic river, "Rangá", would fall into group 1 (no sustaining salmon stock).
- All other salmon rivers would fall into group 2 (rivers with self-sustaining salmon stock).

Article 6 Management measures

- Rangá river (group 1) never had a sizeable salmon population and is thus dependent on annual releases of salmon smolts. Smolts from enhancement and ranching have been used.
- Enhancement in other rivers (group 2) is in line with the four items listed under group 2 rivers.

Article 7 Unintentional introductions and releases

- Releases in this category are not known to have happened in Iceland.

NASCO Guidelines for Action on Transgenic Salmon, CNL(97)48

The Icelandic authorities have limited information on this issue, which has not been brought up in Iceland. Iceland otherwise supports the statements in paragraphs a) through f).

Guidelines on Containment of Farm Salmon, CNL(01)53

The Icelandic salmon management authorities are in the process of adopting a standard for the strength and preventive maintenance of sea-cages. Such a standard will be more rigorous than the guidelines set forward by the NASCO Liaison Group. The NASCO guidelines must thus be considered a minimum standard and any regulation set in Iceland will impose a greater responsibility on the fish farming industry with respect to construction and maintenance of sea cages. This is in line with recent developments in Norway and Canada, where authorities are raising the standard for cage constructions. It is hoped that such action plans for Iceland in the form of regulatory measures can be set before the end of 2003.

Conclusions

If one considers the content of the four resolutions and guidelines discussed in this paper, it seems that we have come a long way and NASCO has done a good job in guiding salmon managers around the North Atlantic towards the same goal and focusing on the problems facing the Atlantic salmon. This work has also been much in line with the Precautionary Approach.

It will, however, be difficult to go much further in standardizing legislation and regulations within the NASCO forum. It is well known that none of these resolutions and guidelines have been binding, as various Contracting Parties have wanted the flexibility to go either to less severe or more stringent measures than those agreed. This is also influenced by the fact that national legislation in most European salmon-producing countries, including the European Economic Area such as Iceland and Norway, is being moulded to a greater extent by Council Directives and Regulatory Measures from the EU. Where EU Directives and national legislations are not in agreement, the latter usually has to be changed. With an ever increasing number of non-salmon producing countries within the EU one could possibly also expect less understanding and consideration for wild salmon issues.

It seems, thus, that it might be useful for the Contracting Parties within the EU and EEA to coordinate their views and try to influence various EU legislations, which may affect the Northeast Atlantic salmon resource in the future. Since these Contracting Parties are all members of NEAC, it seems that NASCO could play a role in such consultations. There is a large deal of official consultation taking place between EU and the EEA on fish disease issues, which frequently relate to trade of fish and agricultural items. Such a platform on management and ecological issues has, however, been non-existent (with the exception of NASCO), which is surprising considering the importance of the Atlantic salmon to various stakeholders.

SCPA(03)8

Norwegian Report to the Standing Committee on the Precautionary Approach on the Implementation of Resolutions and Agreements Relevant to Aquaculture, Containment, Transgenics and Introductions

Introduction

The NASCO Council has asked that all its Contracting Parties analyse how NASCO agreements concerning introductions and transfers, aquaculture and transgenics conform to the Precautionary Approach. The analysis should include statements on the extent to which the agreements are being implemented nationally, together with details of any difficulties impeding their implementation, and the need for any additional measures in order to ensure that the agreements are consistent with the Precautionary Approach.

Norway is only concerned with four of the agreements, i.e. the Oslo Resolution (CNL(94)53), the Resolution to Protect Wild Salmon Stocks from Introductions and Transfers, (NEA(97)12), the NASCO Guidelines on Transgenic Salmon (CNL(97)48), and Guidelines on Containment of Farm Salmon (CNL(01)53). As a member of the European Economic Cooperation, Norway will adopt EU directives that may influence the management of wild Atlantic salmon.

Resolution to Minimise Impacts from Salmon Aquaculture on the Wild Salmon Stocks (the "Oslo Resolution"), CNL(94)53

The objective of the Oslo Resolution is to minimise the possible adverse impacts of salmon aquaculture on the wild stocks.

On 25th February 2003 the Norwegian Parliament decided to establish a number of protected zones for Atlantic salmon. The aim is to provide enhanced protection to a number of Norway's most important salmon watercourses and appurtenant migratory areas in fjords and along the coast. In the protected areas the salmon and its habitat will be given priority over any activity that may be harmful to the salmon and its habitat.

In the first phase, 37 so-called National Salmon Rivers and 21 National Salmon Fjords will be established. The Parliament also decided that in the second phase, to be completed in 2004/2005, a number of additional rivers should be designated. This means that when completed the system will include 50 of the most important salmon rivers in Norway. The National Salmon Rivers and Fjords will protect about 2/3 of the total Norwegian wild salmon production.

In addition, the Parliament also asked that a system for tagging of farmed salmon be established as soon as possible. Tagging of farmed salmon could both reduce escapes and make it possible to identify facilities with particular containment problems. This measure can offer benefits to the aquaculture industry in terms of traceability and marketing.

33 stocks of Atlantic salmon are kept in living gene banks in Norway. At present 21 of these stocks are being used for enhancing or re-establishing. Milt from approximately 6 200 individuals from 162 salmon stocks are preserved in frozen gene bank.

Consistency with the Precautionary Approach

The Agreement on the Implementation of the Oslo Resolution provides some guidance in relation to impacts of aquaculture. The two main concerns currently are genetic impacts of escapes and the impacts of sea lice on wild stocks. Also in the future NASCO should give priority to the problem concerning escapes of farmed fish and the measures that could reduce these escapes.

The establishment of protection areas where salmon aquaculture is restricted or prohibited may protect stocks of wild salmon. Norway considers the establishment of protected zones for Atlantic salmon as an important measurement to minimise genetic, disease, parasite and environmental impacts and these should be given priority in the future to improve consistency with the Precautionary Approach. The protected areas should include both the freshwater habitat and the appurtenant migratory areas in fjords and along the coast.

Tagging or marking could be used in order to facilitate the identification of farmed salmon in the wild and their separation from wild fish, to determine the source of escapes and to assess the interactions of escaped farmed salmon with the wild stocks. There are several tagging/marking systems available with different pro and cons and there is a need for evaluation of the possibilities concerning the different tagging methods. Norway considers that tagging of farmed salmon is an important measure in the future and it is suggested that "tagging and marking" is considered to be moved from part 4 "research and development" in the Oslo Resolution to part 2 (measures to minimise genetic and other biological interactions).

Guidelines on Containment of Farm Salmon, CNL(01)53

Guidelines establishing minimum standards applying to the entire aquaculture production chain are under development. These will include measures to prevent escapes from net pens and to control sea lice. The guidelines will be subject to consultations during 2003.

Monitoring of escaped farmed salmon in coastal areas and fjords, in sport fishing catches and in the spawning populations is conducted annually.

Consistency with the Precautionary Approach

Progress had been made in the establishment of reporting procedures following an escape. The NASCO guidelines must be considered a minimum standard and national regulation could impose a greater responsibility on the fish farming industry with respect to construction and maintenance of sea cages.

The limited experience with these guidelines and the fact that the first returns of reporting on implementation of the action plans from each country will be presented in 2003 indicate that a review of the guidelines could be undertaken at a later date.

Guidelines for Action on Transgenic Salmon, CNL(97)48

There are no plans to use transgenic salmonids in Norway. Norway has ratified the Cartagena protocol concerning GMOs under the Convention on Biological Diversity.

Consistency with the Precautionary Approach

The transgenic guidelines are, in our view, consistent with the Precautionary Approach. NASCO's guidelines should adopt the definition of transgenic salmon in accordance with the Cartagena protocol, i.e. salmon that possess a novel combination of genetic material obtained through use of modern biotechnology.

NEAC Resolution to Protect Wild Salmon Stocks from Introductions and Transfers, NEA(97)12

NEA(97)12 states that, in order to protect wild salmon stocks from the damage that can be caused by introductions and transfers, there is a need for measures stronger than those at present in force and that local conditions are a very significant factor in determining appropriate management measures.

Unintentional introductions of aquatic species which may adversely affect wild salmon stocks can occur, for example, in ships' ballast water, with the use of containers for transport of fish, as a result of the release of live bait or on fishing equipment.

The Parties to the Convention on Biological Diversity and the International Maritime Organization (IMO) have also focused on the risks concerning unintentional introduction in ships' ballast water. They both call on Governments and relevant organizations to act to ensure implementation of an instrument to address the environmental damage caused by the introduction of harmful aquatic organisms in ballast water

A provision concerning measurements to prevent the spreading of organisms via ballast water and sediments from ships is at present being prepared in Norway.

Consistency with the Precautionary Approach

The risks to the wild stocks of Atlantic salmon from introductions have been highlighted by the parasite *G. salaris,* which was not known to be a serious threat to wild Atlantic salmon prior to its inadvertent introduction to Norway with stock movements for aquaculture and subsequent dispersal by stocking, escape of infected fish from hatcheries, exchange of water and dumping of moribund fish during smolt transportation, and wild fish moving through brackish water into uninfected rivers. Any activity that could result in the further spread of this parasite poses a high risk of irreversible damage to the wild stocks. There is a need to establish a dialogue on the need to prevent further spread of the parasite; on the need for enhanced cooperation on monitoring, research and dissemination of information; on the need to strengthen national legislation. There is also a need to consider how the NEAC Resolution may be modified to take account of current knowledge and the Precautionary Approach.

If a new intrusive aquatic species establishes itself, appropriate eradication, containment and control measures should be taken in accordance with the relevant provisions of the Convention on Biological Diversity.

Scientific research indicates that stocking with non-native fish (i.e. from another river, even if a neighbouring river) may be as damaging to the native salmon population(s) as repeated intrusions of farmed fish. This suggests the need to revise the recommendations concerning stocking practices. In addition the resolution should also be revisited to see if it could be extended to include Salmonids other than salmon.

SCPA(03)12

Report to the Standing Committee on the Precautionary Approach by the Russian Federation

Application of the NASCO agreements being reviewed has so far been of a limited scope in Russia. To date the following documents are, primarily, applied: CNL(94)53, NEA(97)12, CNL(01)53.

CNL(94)53 Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimise Impacts from Salmon Aquaculture on the Wild Salmon Stocks

This Resolution has been only partly implemented as there has been no salmon farming in Russia until very recently. Only some of the measures contained in it have been applied, and in particular, those pertaining to salmon enhancement. Based on our experience of many years in this area, we can conclude that these measures are consistent with the Precautionary Approach. They have been fully implemented and appropriate reporting procedures established.

As for another aspect of this Resolution, salmon farming, we believe that stronger measures should be introduced to reduce escapes of farm salmon, especially in the light of increasing aquaculture production. Enhanced cooperation between the Parties is required, in our opinion, in exchange of information on escapes of farm salmon.

NEA(97)12 Resolution by the North-East Atlantic Commission of the North Atlantic Salmon Conservation Organisation to Protect Wild Salmon Stocks from Introductions and Transfers

This Resolution is, on the whole, consistent with the Precautionary Approach; however, where it pertains to the spread of diseases and parasites, more detailed information should be requested from the Parties in their annual return of information to the Council regarding outbreaks of known and unknown diseases and parasite infections.

CNL(01)53 Guidelines on Containment of Farm Salmon

We are presently implementing these Guidelines through development of our national action plan and licensing system for the salmon farming industry; however, at this stage we cannot provide any evaluation of their efficacy and consistency with the Precautionary Approach as our experience in applying them is rather limited.

CNL(97)48 NASCO Guidelines for Action on Transgenic Salmon

These Guidelines have not yet been applied in practice in Russia as there were no proposals for rearing transgenic salmon. However, we consider it to be consistent with the Precautionary Approach and support the proposal from the Secretariat to include a reporting procedure for this agreement into the annual return of information to NASCO using the format in Annex to the Secretariat's discussion paper.

SCPA(03)7

Report to the Standing Committee on the Precautionary Approach by the United States

Introduction

The United States has reviewed the subject documents for consistency with the Precautionary Approach. As noted by the Secretariat, this was a difficult review to conduct. Our review was conducted by comparing the five documents with the agreements NASCO has already adopted on the Precautionary Approach. Our review identified elements in each of the five documents that incorporated aspects of the Precautionary Approach. These agreements provide very useful guidance and direction for national implementation. Generally speaking, these documents were developed in order to reduce the risk of adverse impacts from aquaculture operations on wild salmon stocks. In developing and implementing these agreements, the Precautionary Approach requires that priority is given to the conservation of wild salmon stocks. In our view, the question of whether these documents are consistent with the Precautionary Approach, as adopted by NASCO, cannot be answered with a simple yes or no. The consistency of these agreements with the Precautionary Approach is best viewed along a continuum – some elements of the agreements and resolutions are more precautionary than others. While it is important to carefully review the contents of each of these documents, the equally or more important aspect is to explore how these have been implemented and to identify areas for improvement. The decision of how precautionary is precautionary enough is very difficult to answer in a generic way. That decision is also influenced by local factors and conditions, most notably the status of wild salmon populations.

US Implementation

Brief summaries are provided below of US implementation of relevant NASCO documents.

CNL(94)53 – Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimize Impacts from Salmon Aquaculture on the Wild Salmon Stocks

The Oslo Resolution is intended to minimize the possible adverse impacts of salmon aquaculture on wild stocks. As illustrated by annual returns to NASCO, the US has implemented measures consistent with the Oslo Resolution. Canada and the US have cooperated to develop and implement the NAC Protocols on Introductions and Transfers of Salmonids which include more specific measures within the NAC area.

NAC(94)14 – North American Commission Protocols for the Introduction and Transfer of Salmonids

The US implements the NAC Protocols through conditions placed on permits to move fish or hold them in marine cages. The majority of US Atlantic salmon rivers are classified as Class II watersheds in which one or more of the following conditions occur: the habitat has been

altered; non-indigenous wild or hatchery-reared Atlantic salmon stocks have been released; or aquaculture has been conducted in marine cage culture.

The US is in compliance with the NAC Protocols with one exception. The one aspect of the NAC Protocols that the US has been slow to effectively implement is the prohibition in the North American Commission Area on the release or use in aquaculture of reproductively viable strains of Atlantic salmon of European origin, including Icelandic origin. This has been reported within the NAC. We are pleased to report that the ban on importation and use of reproductively viable non-North American strain Atlantic salmon is now contained in a draft discharge permit proposed by the State of Maine Department of Environmental Protection for the discharge from net pens.

CNL(97)48 – NASCO Guidelines for Action on Transgenic Salmon

In accordance with the NASCO Guidelines for Action on Transgenic Salmon, the US has kept the NASCO Council advised of a proposal to the US Food and Drug Administration (FDA) for the rearing of transgenic salmon. This is at an early stage of the application process, so few details are available on the proposed methods of containment or other measures to safeguard wild stocks. The project proponent is required to prepare an environmental assessment and biological evaluation, which will include a risk analysis. The US Fish and Wildlife Service and the National Marine Fisheries Service have advised the FDA that there is a need to conduct a consultation under section 7 of the Endangered Species Act to evaluate the potential impacts of FDA's action on wild salmon stocks.

CNL(01)53 – Guidelines on Containment of Farm Salmon

Within the US, the aquaculture industry, state and federal resource and regulatory agencies, and conservation organizations have collaborated in the development and implementation of a containment system based on a hazard analysis critical control point approach (HACCP). This methodology identifies points in the operation of marine cage culture where losses are more likely to occur (stocking, sorting/grading, harvesting, etc.) and imposes control measures on those activities to minimize the potential for losses. The HACCP plans include inventory controls, equipment and structural standards, and best management practices. Oversight and verification is provided by mandatory logbooks and reporting as well as third party audits. In addition, marking trials are now being conducted and marking of all fish stocked in cages is included in the draft discharge permit proposed by the State of Maine Department of Environmental Protection.

General Recommendations for Improvement

- Increase Specificity: In general, our review indicated that the documents could benefit from greater specificity. The NAC Protocols and NEAC Resolution could be re-examined within the appropriate Commissions to consider areas where recommendations could be more detailed. This review might also identify inconsistencies in terminology that could then be resolved through collaboration. Our review of the Guidelines on Containment identified a large number of very general statements. We understand that the intention of the Liaison Group was that the action plans would include greater specificity. Since progress on action plans has not yet been reported, it is not possible to evaluate their level of specificity and compliance with the precautionary approach.

- Implementation and Reporting: We agree with the Secretariat's recommended format for reporting under the Guidelines for Action on Transgenic Salmon. We also support the recommendation that Parties be more specific in reporting under the Oslo Resolution in distinguishing between voluntary and mandatory measures.

- Risk Assessment: All of the documents include language related to reducing risk and minimizing the potential for adverse impacts on wild stocks. The process for conducting a risk assessment is not identified in any of the documents. One suggestion for improvement could be to include in the report of this meeting a discussion of how a risk assessment should be conducted. While it is unlikely this could be quantitative, a qualitative discussion could be included that would identify the factors to be considered and the outcomes to be avoided.

- Burden of Proof: In general, these documents place responsibility on the Parties to present and review information. It has been noted that a more appropriate placement of the burden of proof is with the proponent of the activity. NASCO may wish to issue a general recommendation to Parties to ensure in implementation that the burden of proof is appropriately placed with the project proponent.

- Improved Scientific Exchange: Under the Precautionary Approach, management is directed to consider all available scientific information. All of the documents include recommendations for research. Improving awareness of ongoing scientific studies and exchange of results as they become available would enhance our ability to implement management measures in precautionary manner. Parties should be encouraged to report any findings related to interactions between wild and farm fish or measures to minimize the potential for adverse effects.

In our view, the above recommendations would improve NASCO's Application of the Precautionary Approach to Introductions, Transfers, Transgenics and Aquaculture. It bears repeating, however, that without effective implementation these agreements will not achieve their stated goals.

SCPA(03)9

Addendum to the Report by the US to the Standing Committee on the Precautionary Approach

The US re-examined the five documents and compared them with the general recommendations for improvement identified in our previous review. These recommendations were as follows:

(1) Increase Specificity
(2) Implementation and Reporting
(3) Risk Assessment
(4) Burden of Proof
(5) Improved Scientific Exchange

All documents would benefit from standardization of terminology. The appropriate placement of the burden of proof applies to all documents. Risk assessment is implied in all of the documents, but the process is not clearly laid out in any one document. We did not attempt to re-write the documents, but rather to identify areas for clarification and improvements in implementation.

CNL(97)48 - NASCO Guidelines for Action on Transgenic Salmon

Adopt Reporting Format, with following clarification:

- The reporting requirement should identify whether the rearing is for research or commercial purposes.

Recommend that the Protocol on Biosafety, developed by the Parties to the Convention on Biological Diversity, be circulated to Parties and reviewed to assess the applicability to the Guidelines (pursuant to (c) in the Guidelines).

Note that provision (e) states that Parties will take steps to encourage research in order to improve knowledge on the potential impacts of transgenic fish on the wild stocks and their habitat. Parties should be encouraged to conduct the necessary research and share results.

Recommend that in applying these Guidelines, the Parties place the burden of proof on the proponent of rearing transgenic salmon.

CNL(01)53 - Guidelines on Containment of Farm Salmon

The Guidelines contain a number of general statements such as "minimize the risk of escapes", "significant in-built safety margin", "assess its fitness for purpose," "contain fish effectively and to minimize the chances of fish escaping," and "minimize the risk of accidental damage to the equipment." It is difficult to comment specifically on how precautionary these provisions are given their general nature. One might conclude, therefore, that the Guidelines need to be more specific and prescriptive in nature in order to better comply with the Precautionary Approach. The group that developed these guidelines struggled with these same issues and determined that in order for the Guidelines to be applied

in a wide range of jurisdictions and environments they needed to be more general. The Guidelines call for each jurisdiction to draw up a national action plan, or regional action plan, based on these guidelines. The intention was that the action plans would be more specific.

Our re-examination of the Guidelines on Containment identified that they could benefit from incorporation of all of the five recommendations identified above. As noted above, it is very difficult to evaluate how precautionary this document is without more specific language. As noted earlier, the Guidelines require reporting on action plans. It is not possible at this time to evaluate whether the guidelines have been implemented and whether the action plans and reporting procedures contain the necessary specificity to evaluate their consistency with the precautionary approach. The Guidelines could benefit from incorporation of at least a qualitative risk analysis discussion. The development of measures to be incorporated in action plans should incorporate consideration of the status of wild stocks. In order to be consistent with NASCO's adoption of the Precautionary Approach, the Guidelines should clearly place the burden of proof on the proponent of fish farming. Finally, both the NASCO Parties and industry representatives should commit to exchange research findings relative to containment and interactions.

NAC(94)14 - North American Commission Protocols for the Introduction and Transfer of Salmonids

The NAC Protocols contain quite specific language and do clearly identify responsibilities for the proponent. They could benefit from incorporation of consideration of unintentional introductions. The NAC Protocols were designed to minimize the potential for adverse effects on wild stocks from introductions and transfers. As noted by the Secretariat, recent scientific studies have provided additional demonstration that these concerns are well founded.

NEA(97)12 - Resolution by the North-East Atlantic Commission of NASCO to Protect Wild Salmon Stocks from Introductions and Transfers

The preamble of the NEAC Resolution clearly identifies the goals and objectives. Many of the provisions are recommended for consideration, rather than required. The Resolution itself does not contain a great deal of specificity. In viewing only the Resolution without details on implementation, it is difficult to evaluate its compliance with the Precautionary Approach. The burden of proof should be clearly placed on the proponent of introductions and transfers.

The draft Resolution to Minimise Impacts from Aquaculture, Introductions and Transfers, and Transgenics on the Wild Salmon Stocks, the "Williamsburg Resolution", developed by the Standing Committee on the Precautionary Approach, which formed Annex 10 of the Committee's report, is not included here. The Resolution, as adopted by the Council, is contained in Annex 20 (page 197) of this Report of the Twentieth Annual Meeting of the Council.