

Agenda item 6.3(b)
For information

Council

CNL(05)18

Report on Progress with the Development of a Database of Salmon Rivers

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Report on Progress with the Development of a Database of Salmon Rivers

1. In order to measure and improve progress in meeting the objective of the NASCO Plan of Action for Application of the Precautionary Approach to the Protection and Restoration of Atlantic Salmon Habitat, CNL(01)51, it is recommended that NASCO, its Contracting Parties and their relevant jurisdictions establish inventories of rivers. Two main objectives for developing comprehensive inventories of rivers have been identified:
 - to establish the baseline level of salmon production against which changes may be assessed;
 - to provide a list of impacts responsible for reducing the productive capacity of rivers, so as to identify appropriate restoration activities.

Furthermore, the Plan of Action recognises that the inventory, or a summary version, will provide a valuable tool for dissemination of information on salmon rivers to user groups and for education of the wider public in order to encourage improved stewardship of natural resources. The structure of the inventories envisaged under the Plan of Action includes river data, salmon production data and habitat impact data (see Annex 2 of CNL(01)51 for details).

2. The Council had previously established a salmon rivers database of which is held and maintained by the Secretariat, although much of the information it contains has not been updated for 10 years or more. This database is a simple listing of salmon rivers, providing information by Party on river name, location (latitude and longitude of the river mouth), and a category based on the status of its salmon stock (lost, maintained, restored, threatened with loss or not threatened with loss). The database is available for use by the Parties but it is not web-based. While the inventories envisaged under the Plan of Action include the basic information in the existing database, the intention is that they contain additional river data together with salmon production data and habitat impacts data. The Council had agreed to establish a database of this more comprehensive information (see paragraph 3 below).
3. Last year, Mr Ed Baum (USA), Chairman of a Working Group set up to develop the database of salmon rivers, reported on progress. In summary, US scientists had developed a database based on the more detailed inventory format proposed in the Plan of Action, which has been made available through a website, www.WildAtlanticSalmon.com. Following testing, this database would be made available for data entry by all NASCO's Parties. The Council had requested clarification from the Working Group on the proposed next steps in development of the salmon rivers database and these were identified in document CNL(04)38 and can be summarised as follows:
 - (i) The Parties should agree to update the original NASCO salmon rivers database annually (via the expanded web-based database) to correct errors and inconsistencies and conform to the new format. This should *not* require a significant amount of time and effort.

- (ii) The Parties should consider using the database to report basic salmon habitat and habitat impacts information so as to establish the baseline level of salmon production potential against which changes may be assessed and to monitor changes over time, and to identify appropriate restoration activities and assist policy makers in prioritizing restoration programmes.
 - (iii) As data and resources permit, the Parties should enter generalized juvenile and adult salmon production data; this would be an added benefit to the database (i.e. salmon production data entry would be optional). The Parties are encouraged to evaluate the potential uses of the NASCO database for this purpose.
4. The Council agreed to these next steps. Since last year, there has been further testing of the database and all Contracting Parties were given full access to it in the first quarter of 2005 so that data entry could commence. A list of coordinators responsible for updating the database in each Party is given in Annex 1. Where a Party has still to appoint a coordinator(s), or if the information held needs updating, it would be appreciated if the details could be provided to the Secretariat. The Council had asked that the database be transferred to NASCO but Ed Baum, who has steered this initiative since its inception, has kindly agreed to continue to host and maintain the database until the end of June so as to deal with any technical issues that might arise as Parties start to work with the database. Thereafter, however, the database will be transferred to the NASCO website. Ed Baum was carrying out this work under a grant from the National Marine Fisheries Service and his final report on the project is attached as Annex 2. He has done an excellent job for NASCO and we are very grateful to him for his work, and to the US for facilitating the development of the database.
5. It will be important, given that the database is available to the public, to move forward on the tasks agreed by the Council and referred to in paragraph 3 above. This will require input and annual updates of the river data, input of basic salmon habitat and habitat impacts information and, as data and resources permit, input of salmon production data. A report on progress in inputting information to the database will be presented to the Council at its Twenty-Third Annual Meeting.

Secretary
Edinburgh
5 April, 2005

RIVERS DATABASE COORDINATORS

Party	Country/ province/ region	Contact name	Organization name	Contact e-mail	Contact telephone number
Canada		Mr Tim Young	Department of Fisheries and Oceans, Ottawa	youngt@dfo-mpo.gc.ca	
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	Greenland	Helle Siegstad	Greenland Institute of Natural Resources, Nuuk	helle@natur.gl	(Int+299) 361 200
European Union					
	Denmark	Mr Gorm Rasmussen	Danish Institute for Fisheries Research, Silkeborg	gr@dfu.min.dk	(Int+45) 89 21 31 00
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USA					

Final Report

**Development of a Pilot Atlantic Salmon Habitat Database for Use by the
North Atlantic Salmon Conservation Organization (NASCO)**

**NMFS Order No. EM133F-04-SE-0319
Period Covered: March 16, 2004 – March 31, 2005**

Submitted to:

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March 2005

Summary

A pilot database was developed (in ACCESS) and deployed on the World Wide Web (using DREAMWEAVER) in January 2004. Data entry via the Internet and initial testing of the database using USA salmon rivers and salmon habitat data was accomplished during the period March-May 2004. Data entry is achieved via several graphical web development forms which are used to facilitate ease and clarity of data entry and editing into an ACCESS database.

The draft database template was presented to, and approved by, the NASCO Council at the 21st Annual Meeting in Reykjavik in June 2004. The Council provided clarification of the potential uses of, and recommended next steps in, the development of the NASCO salmon rivers database.

USA data entry personnel had access to the database (for data entry and testing purposes) during the calendar year 2004. All other NASCO Contracting Parties were provided with full access to the database (via the Internet website) in January and February 2005; therefore, all countries that participate in NASCO activities currently have the capability of participating in the salmon rivers inventory and salmon habitat database project.

Arrangements for permanent web hosting on the Internet (as part of the NASCO website) and for overall maintenance of the comprehensive salmon rivers database has been relinquished to the NASCO Secretariat in Edinburgh as of mid-March, 2005.

It is recommended that one USA coordinator be designated to act as contact/liaison between NASCO and the US Atlantic Salmon Assessment Committee as this project moves forward. Additionally, the US should continue to provide strong support to NASCO in its efforts to develop a web-based, world-wide database of Atlantic salmon rivers, salmon habitat, habitat impacts, and juvenile and adult salmon production.

1. Project Background and Description

In November of 2000, the Gulf of Maine distinct population segment (GOM-DPS) of Atlantic salmon was listed as endangered under the Endangered Species Act. Following that listing, many federal and some state agencies have focused upon efforts to protect these depleted populations of Atlantic salmon and their habitat. As part of the recovery planning process, NOAA's National Marine Fisheries Service has been inventorying all historic information on Atlantic salmon in the US and creating common and comprehensive databases archiving this information. Atlantic salmon habitat information (historic and current) is a major priority for State and Federal agencies in the US.

The US is a member of the North Atlantic Salmon Conservation Organization (NASCO). NASCO is an international organization charged with the conservation and management of Atlantic salmon stocks and consists of all countries producing and/or harvesting Atlantic salmon populations. The organization was founded primarily to allow for cooperation in setting harvesting levels for mixed fisheries. As populations of Atlantic salmon have declined despite harvesting restrictions, NASCO has expanded its focus to salmon habitat and other areas (marine research, interactions between wild and farmed Atlantic salmon, etc.).

Subsequent to the 20th annual meeting of NASCO in 2003, the US agreed to develop a salmon rivers and habitat impacts database template for NASCO and to utilize US salmon rivers data to test the system. The purposes of this database (as established by NASCO) are:

- (1) To establish the baseline level of salmon production against which changes may be assessed; and,
- (2) To provide a list of impacts responsible for reducing the productive capacity of a river system in order to identify appropriate restoration activities and to assist policy makers in prioritizing restoration programmes.

As a result of this commitment, the US presented a progress report on the development of the database, including recommendations for future actions, at the 21st Annual Meeting in Reykjavik, Iceland, in June 2004.

The Council approved of the format and structure of the database and agreed that NASCO would be prepared to assume responsibility for overall management of the project no later than the 2005 Annual NASCO Meeting. Recommendations for future action between then (June 2004) and the June 2005 meeting were also provided.

2. Project Objectives

The primary goal of this contract was to work with the US Atlantic Salmon Assessment Committee and the NASCO Secretariat in the preparation of a pilot database which would meet the objectives of NASCO's salmon rivers inventory and habitat and habitat impacts database requirements.

Objectives were established under the following categories:

- (1) Historical Atlantic salmon data: assist staff from the Northeast Fisheries Science Center and the Northeast Regional Office in compiling and archiving historical information on Atlantic salmon and salmon habitat in the US. These data and

information would be disseminated in various ways at meetings, conferences and symposia, in reports to NOAA staff and others, etc.

- (2) NASCO and Other International Support: assist the US section to NASCO through the investigation of issues, preparation of materials and reports, and participation at intersessional and Annual Meetings. Additionally, present US Atlantic salmon population and salmon habitat information at various local, national, and international fora.
- (3) Development of a Pilot Database Template: subsequent to the 20th Annual NASCO Meeting in Edinburgh, the US agreed to develop a relational database template of salmon rivers (in MS ACCESS software) for NASCO and to utilize North American salmon rivers data to test the system.

3. Project Accomplishments

The overall original goal and objectives of this contract was accomplished on schedule and within budgetary limits. General accomplishments pertaining to the established objectives were as follows:

- (1) Support to NOAA Fisheries Staff

Atlantic salmon population and habitat data and technical advice were provided to staff from the Northeast Fisheries Science Center (Woods Hole, Massachusetts and Orono, Maine) and the Northeast Regional Office (Gloucester, Massachusetts) in compiling and archiving historical information on Atlantic salmon and salmon habitat in the US.

Data and information were communicated via e-mail, US mail, telephone, fax, and attendance at various meetings, conferences and seminars.

- (2) NASCO and Other International Support

Accomplishments included technical advice and participation at several US Atlantic Salmon Assessment Committee (USASAC) meetings; participation in US Section and NASCO meetings (intersessional meetings of the Precautionary Approach Group, the Salmon Farming Liaison Group, and the 21st Annual NASCO Meeting). Maintaining contact with colleagues in other Atlantic salmon-producing countries is informative, educational, and is extremely beneficial to all US participants in current US efforts to restore depleted populations of Atlantic salmon.

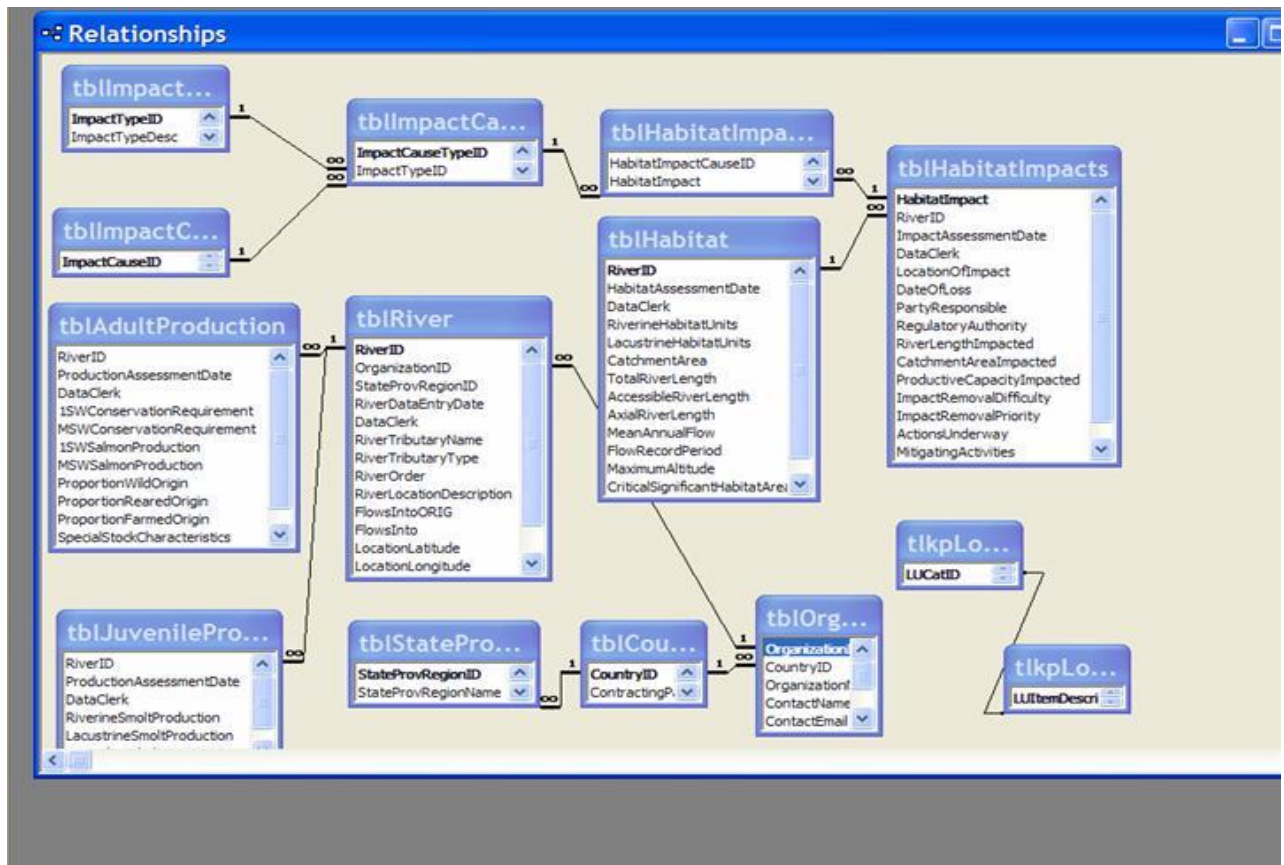
- (3) NASCO Salmon Rivers Database Template

Following ongoing consultations with a database sub-group of the US Atlantic Salmon Assessment Committee, and with a similar international sub-group appointed by the Parties to NASCO, the database template was deployed on the Internet in January 2004.

Building upon the original NASCO salmon rivers database, which was established several years ago, the scope and structure of the database were expanded to include five major

ACCESS data tables (salmon rivers, habitat, juvenile and adult salmon production, habitat impacts) which incorporate all of the information identified by NASCO in its desired comprehensive database of salmon rivers. The overall table relationships for all tables within the database are illustrated in Figure 1.

Figure 1. Table relationships for the NASCO Atlantic Salmon Rivers Habitat Database



The general public may view existing information in the database (via the Internet website); however, data entry and editing may only be accomplished via an assigned organization log-in name and password which have been issued by the database administrator. Entry into the database is accomplished via several graphical web development forms (technically referred to as a web front-end to an ACCESS database back-end) which are used to facilitate ease and clarity of data entry and editing. It is important to note that, in utilizing this system, it is not necessary for NASCO Parties or other users of the database to have MS ACCESS on their computer or to be knowledgeable in the use of ACCESS software. Information fields within the database have been structured to encompass dropdown boxes (i.e. itemized lists of choices) wherever possible. This will minimize the opportunity for data entry errors and significantly reduce the amount of time required to enter the raw data.

The utility and ease of use of the pilot database was demonstrated to the NASCO Council at the 21st Annual Meeting in June 2004. Following discussion of the project, the Council provided clarification of the potential uses of, and recommended next steps in, the development of the NASCO salmon rivers database as follows:

Potential uses of the database include:

- (1) The main purpose would be to describe and summarize the status of Atlantic salmon habitat in all countries on a regular schedule.
- (2) It would be an effective way to describe and monitor the level of impact(s) to salmon habitat.
- (3) It would be a useful tool for Contracting Parties, and others, to monitor and evaluate habitat conservation and restoration plans over time.

Recommendations for next steps in development of the NASCO salmon rivers database:

- (1) At a minimum, the Parties should agree to annually update the original NASCO salmon rivers database (the Rivers Table in the expanded database) to correct errors and inconsistencies and conform to the new format. These data include river name, location information, and NASCO salmon stock category. This should not require a significant amount of time and effort.
- (2) The Parties should consider using the database to report basic salmon habitat and habitat impacts information to meet the following objectives agreed to in the Plan of Action for habitat: a) to establish the baseline level of salmon production potential against which changes may be assessed and to monitor changes over time, and b) to identify appropriate restoration activities and assist policy makers in prioritizing restoration programs (CNL(04)17).
- (3) If data are available, and countries have the resources to enter generalized juvenile and adult salmon production data, this would be an added benefit to the database (i.e. salmon production data entry would be optional). Countries are encouraged to evaluate the potential uses of the NASCO database for this purpose.
- (4) Given the above, the most appropriate location for the database is with existing NASCO information on the current NASCO website. NASCO should make sure that the countries that provide data input have access to their own data at all times.
- (5) Parties should provide an annual progress report on the status of salmon habitat as currently required under the development and implementation of habitat protection and restoration plans.

Subsequent to the 2004 Annual Meeting, NASCO requested that each country designate personnel specifically for data entry purposes. The names and contact information for these personnel were transmitted by NASCO to the US for inclusion in the database project late in December 2004. Additional testing of the database template by US personnel continued into 2005. Additionally, all other NASCO Parties were assigned log-in names and passwords in order to obtain access to the database via the Internet. All Parties were also provided detailed data entry instructions (see Table 1).

In concert with the conclusion of US involvement in the development of this project, arrangements for permanent web hosting on the Internet (as part of the NASCO website) and for overall maintenance of the comprehensive salmon rivers database was relinquished to the NASCO Secretariat in Edinburgh as of mid-March, 2005.

Table 1. Instructions for data entry into the NASCO Salmon Habitat Database.

Table	Field Name	Instructions for data entry
River Data	Today's date	The current date will automatically be entered for you
	* Name of person entering the data	Agency choice (last name only, or first initial and last name, or first and last name?)
	* Organization	Choose from the dropdown list provided
	* Name of river	List the most appropriate <i>single</i> name, such as "Dee," "Big Salmon," "Penobscot," etc.
	* Type of river	Choose from options in the dropdown list provided (e.g., river, stream, brook, burn, water, etc.)
	* River order	Choose from options in the dropdown list provided (e.g., mainstem, tributary, etc.)
	* State/Province/Region	Choose from country and regions dropdown list
	Brief narrative description of river location	Short description, such as "from bridge X to head-of-tide," "from point y to point z," etc.
	Latitude	Latitude, in degrees and minutes
	Longitude	Longitude, in degrees and minutes
	East or west	Choose: east or west of the 0 meridian in Greenwich, England (NOTE: default = west)
	* NASCO Salmon stock category	Choose from dropdown list of NASCO salmon stock categories
	Name of river this stream flows into	Choose from dropdown list. Use same name if it flows into the sea
	Habitat Data	* Habitat assessment date
* Name of person entering data		Agency choice (last name only, or first initial and last name, or first and last name?)
* Organization		Choose from dropdown list provided
Name of river		Choose from dropdown list
Riverine habitat units		Number of riverine units of Atlantic salmon habitat, where 1 unit = 100 square meters
Lacustrine habitat units		Number of lake units of Atlantic salmon habitat, where 1 unit = 1 square km.
Catchment area		Area of this catchment, in square km.
Total river length		Total length of this river, in km.
Accessible river length		Length accessible to Atlantic salmon as of this date
Axial river length		River length, as measured along a straight-line axis
Mean annual flow		Mean annual flow, in cubic meters/sec.
Flow record period		Number of years of data the mean flow is based upon
Maximum altitude		Maximum altitude within this catchment area
Critical or significant habitat areas		List of any critical or significant habitat areas for salmon
Comments	Miscellaneous comments, if any	
Habitat Impacts Data	* Impact assessment date	Date that the impact was assessed; may or may not be the current date
	* Name of person entering data	Agency choice (last name only, or first initial and last name, or first and last name?)
	* Organization	Choose from dropdown list provided
	* Name of river	Choose from dropdown list
	Location of impact	May be very specific (at a hydrodam), or very general (from point "x" to point "y")
	* Type and cause of habitat impact	Choose from dropdown list; if not listed, choose closest match and explain under comments

	River length impacted	Length of river impacted, in km.
	Catchment area impacted	Area of catchment impacted, in sq. km.
	Productive capacity impacted	Estimated proportion of catchment lost or impacted, in percent
	Date of loss	Approximate or actual date of loss, if known
	Party responsible for impact	Choose from dropdown list of general responsible parties (industry, govt., unknown, etc.)
	Regulatory authority	Choose from dropdown list: state/provincial/regional, federal, or international, etc.
	Impact removal difficulty	Choose from list: easy, moderate, almost impossible
	Impact removal priority	Choose from: low, medium, or high
	Actions underway	Enter specific actions being undertaken to correct or alleviate the impact
	Mitigating activities	Enter any other mitigating activities in narrative form, as appropriate
	Comments	Miscellaneous comments, if any
Juvenile Salmon Prod. Data	* Juvenile salmon production assessment date	Date that the juvenile production was assessed; may or may not be the current date
	* Name of person entering data	Agency choice (last name only, or first initial and last name, or first and last name?)
	* Name of river	Choose from dropdown list
	Riverine smolt production	Expressed as the number of smolts per 100 sq. m. of habitat
	Lacustrine smolt production	Expressed as the number of smolts per sq. km. of habitat
	Special juvenile salmon stock characteristics	Enter any special stock characteristics, such as run timing, smolt ages, etc.
	Comments	Miscellaneous comments, if any
Adult Salmon Prod. Data	* Adult salmon production assessment date	Date that the adult production was assessed; may or may not be the current date
	* Name of person entering data	Agency choice (last name only, or first initial and last name, or first and last name?)
	* Name of river	Choose from dropdown list
	1SW Conservation requirement	Number of 1SW salmon required for conservation (if known)
	MSW Conservation requirement	Number of MSW salmon required for conservation (if known)
	1SW Salmon production	Historical or current 1SW salmon returns, as of current or some other specified date above
	MSW Salmon production	Historical or current MSW salmon returns, as of current or some other specified date above
	Wild origin	Percent of adult returns of wild (native) origin, in % (wild + reared + farmed must = 100 %)
	Reared origin	Percent of adult returns of reared (hatchery) origin, in % (wild + reared + farmed must = 100 %)
	Farmed origin	Percent of adult returns of farmed (escapee) origin, in % (wild + reared + farmed must = 100 %)
	Special adult salmon stock characteristics	Summary of special adult salmon stock characteristics, such as age-at-maturity, run timing, etc.
	Comments	Miscellaneous comments, if any

NOTES

River data may be entered on as large (whole watershed as one unit) or small (down to the smallest tributary) scale basis as you choose. Keep in mind that as a watershed is divided into smaller units, more detailed information will be required in the subsequent tables (i.e., salmon production, habitat, and habitat impacts)

An * indicates a required entry; other fields may be left blank and filled in at a later date

A river (stream, brook, burn, etc.) must be entered into the River Table before other data (habitat, production, impacts, etc.) may be entered

Enter as many known habitat impacts per river as desirable

If a river is shared by countries (example: St. Croix in US and Canada), data entry personnel should coordinate data entries for that river

4. Summary of Important Meetings Attended and Presentations Given

- June 5-10, 2004. Participate in 21st Annual Meeting of NASCO, Reykjavik, Iceland. Gave PowerPoint presentation RE: NASCO Salmon Rivers Database Project.
- January 25, 2005. Participate in “Next Steps for NASCO” meeting, Portland, Maine.
- February 27 - March 2, 2005. Attend US Atlantic Salmon Assessment Committee annual meeting to review/discuss NASCO Salmon Rivers Database Project, Woods Hole, MA.

5. Recommendations

Based upon the success of the database project and accomplishments of the collaborative efforts to date, the following recommendations are presented:

- (1) There is a wealth of historical Atlantic salmon data (habitat, populations, and fisheries) that could be documented, summarized, and analyzed and archived. Staff from the Northeast Fisheries Science Center and the Northeast Regional Office should continue compiling and archiving relevant historical information pertaining to US Atlantic salmon, especially for the Maine DPS populations listed under the Endangered Species Act in November 2000.
- (2) The US should continue to enter New England Atlantic salmon rivers and habitat data into the NASCO Salmon Rivers Database Project on a timely basis, especially for the DPS rivers in Maine.
- (3) Since the administration of the database is now the responsibility of NASCO, one USA coordinator should be designated to act as contact/liaison between NASCO and the US Atlantic Salmon Assessment Committee as this important project continues into the future.
- (4) If additional US assistance (technical advice, continuity in revisions to the database in ACCESS and the website in DREAMWEAVER, etc.) with the Salmon Rivers Database Project is warranted, the US should endeavor to make additional resources available to NASCO.
- (5) The US should maintain and/or expand international cooperative programmes with other countries with respect to the biology and management of wild Atlantic salmon populations, salmon habitat conservation and restoration, and salmon research (especially in estuarine and marine habitats), since many of the challenges facing US Atlantic salmon recovery efforts are similar to those in Canada and Europe.