



Fisheries and Oceans
Canada

Pêches et Océans
Canada

SPECIES AT RISK ACT

Legal Listing Consultation Workbook



American eel
(Anguilla rostrata)



Species at Risk Act Legal Listing Consultation Workbook

American Eel

Objectives of this Consultation

Your views are being sought to assist the Government of Canada in making an informed decision on whether to add American eel to Schedule 1 of the Species at Risk Act (SARA) (the List of Wildlife Species at Risk) as a species of Special Concern. The species was recently designated by the Committee on Status of Endangered Wildlife in Canada (COSEWIC) as Special Concern.

This workbook provides background information on SARA and on American eel. At the end of the workbook, questions are provided to stimulate discussion. Please complete any or all of the questions starting on page 14 and provide any additional comments you feel are relevant. Your ideas, knowledge, and advice are important to this process and will help the Government of Canada assess the impacts of adding this species to the SARA legal list (Schedule 1).

A downloadable workbook, additional background information, references and contact information are available at: www.sararegistry.gc.ca/public/default_e.cfm

Additional information on SARA and listing consultations can be found at: www.sararegistry.gc.ca

For information on how to submit your workbook or other comments please see page 13.

To make sure your comments are considered, please send in your submission by March 31, 2007.



For any additional information on the consultation process or on aquatic species at risk, please contact:

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Addition of Species to the Species at Risk Act

Introductory Information

The Species at Risk Act

The Species at Risk Act (SARA) is part of the Government of Canada's commitment to protect its wild species. The list of species currently protected under SARA is found in Schedule 1 of the Act and is referred to as "the SARA list".

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is responsible for evaluating what species are in danger or "at risk" of disappearing in Canada. They review and assess new species every year and advise the government on which species they feel are at some level of risk.

The Minister of Environment (who is responsible for administering the Act) considers the list of species put forward by COSEWIC and recommends which of these should be added to the SARA list. Once added to the list, SARA gives the government very specific directions on how to protect the species and promote its recovery. However, the Minister will not decide which species to recommend without consulting the public and stakeholders. This workbook is part of that consultation.

Who is COSEWIC?

COSEWIC is an independent group of scientists from various communities including universities, government and Aboriginal groups.

Requests for new species to be evaluated by COSEWIC can be made by anyone. When a request is made, COSEWIC requires that a Status Report be prepared that combines all the relevant scientific, community and Aboriginal traditional knowledge on that species. The Status Report must be reviewed and approved by a subcommittee of species experts before COSEWIC can use it to assess whether the species is at risk.

How "at risk" is this Species?

COSEWIC has several categories to assign a level of risk to a species:

- "Extinct", meaning the species no longer exists
- "Extirpated", meaning that the species is no longer found in the wild in Canada but still exists in other parts of the world
- "Endangered", meaning that the species is facing imminent extirpation or extinction
- "Threatened", meaning that the species is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction
- "Special Concern", a species that may become threatened or endangered due to a combination of biological characteristics and identified threats.



American eel, the subject of this workbook, has been assessed by COSEWIC as “Special Concern”.

How are New Species Added to the SARA list?

Every year, COSEWIC evaluates new species that may be at risk. Once evaluated, and assigned a category, these species are then eligible for addition to the SARA list. COSEWIC provides its assessments to the Minister of Environment who must respond within 90 days indicating a time frame for action by the government. The Minister also presents the COSEWIC assessments to the Governor in Council (GIC) and must report back to the GIC within 9 months with a recommendation on whether or not to add these new species to the SARA list.

Of these new species, the aquatic ones (those found in water) are the responsibility of the Department of Fisheries and Oceans while terrestrial species (those found on land) and birds are the responsibility of Environment Canada. Responsibility for species (both terrestrial and aquatic) that occur in national parks and other lands administered by the Parks Canada Agency is shared between the Parks Canada Agency and either Environment Canada or the Department of Fisheries and Oceans.

The government’s commitment to conserving Canadian species includes public awareness and participation. Therefore, within the coming months, the Department of Fisheries and Oceans will be consulting the public on the American eel to help them develop a recommendation to the Minister of Environment and the GIC.

What does Consultation Mean?

The recommendation to the GIC must be one of the following:

- a) that the COSEWIC assessment be accepted and the species be added to the SARA list;
- b) that the species not be added to the SARA list; or
- c) that the species be referred back to COSEWIC for further information or consideration.

When COSEWIC assesses a species, it is based on the scientific data at hand. But when the Government of Canada considers this same species for addition to the SARA list, it regards the public’s input to be an important part of their recommendation to the GIC. Details of consultations being carried out on both terrestrial and aquatic species can be found on a website called the SARA Public Registry which has been set up to contain all SARA related information. You can access this site at: www.sararegistry.gc.ca

This workbook is part of the Department of Fisheries and Oceans commitment to consult with the public on aquatic species being considered for addition to the



SARA list. It provides the public with an opportunity to comment and express their views about how this addition might affect their lives and in particular, the costs and benefits to them of adding a particular species to the SARA list versus not adding it.

The results of these public consultations will be carefully considered and documented as part of the Government's regulatory process leading to the final recommendation to the GIC.

What Happens When a Species is Added to the SARA List?

The Act provides protection to all species on the SARA list. But the level of protection depends on the category of risk assigned to it by COSEWIC. In general there are 2 levels of protection: with prohibitions and without prohibitions.

With Prohibitions

For species listed as **Extirpated, Endangered or Threatened**, the Act contains rules or "prohibitions" which make it unlawful to kill, harm, harass, capture or take any of these individuals. It is also unlawful to buy, sell or trade them or destroy their homes or critical habitats. These prohibitions come into effect as soon as the species is added to the SARA list. In the case of aquatic species, the Minister of Fisheries and Oceans may authorize exceptions to these prohibitions as long as the survival or recovery of the species will not be in jeopardy. Permits for these exceptions may only be granted for the following circumstances:

- (1) research relating to the conservation of a species
- (2) activities that benefit a listed species or enhance its chances of survival
- (3) activities that incidentally affect a listed species.

At the same time as prohibitions come into effect, SARA specifies that a recovery strategy and action plan must be prepared. These documents are to provide details on what the Department will do to promote the recovery of the species. SARA provides specific instructions on what the strategy and action plan must include and specifies that these will be prepared in cooperation with aboriginal groups and others directly affected by the recovery strategy. Opportunity for consultation on these recovery strategies will be provided through the SARA registry where they will be made available within strict timelines.

To summarize, if a species is added to the SARA list as Extirpated, Endangered or Threatened, prohibitions will apply and recovery strategies and action plans will be completed.

Without prohibitions

For species listed as "**Special Concern**" (as for the American eel, the subject of this workbook), there are no prohibitions under SARA. However, existing protection from other acts and legislation remains in force. A SARA compliant management plan will be prepared detailing conservation measures for the species and its habitat. This management plan will be completed in cooperation



with Aboriginal and other groups affected by the listing and will be available to the public for comment on the SARA public registry. Therefore, for species added to the SARA list as Special Concern, a SARA compliant management plan will be completed but prohibitions will not apply.

What's this workbook about?

The species being consulted on in this workbook, American eel, has been assessed by COSEWIC as "Special Concern" and is therefore being considered for addition to the SARA list. This means that a SARA compliant management plan will be prepared if American eel is listed. This is an opportunity to express your views and opinions on having American eel added to the SARA list.

You can complete the questionnaire beginning on page 14 and return it in person, by regular mail, or by email to one of the addresses below. In order to consider your comments, responses are required no later than March 31, 2007.

Any other comments you have on the potential addition of this species to the SARA list can also be mailed or sent by email to any of the addresses below. Your comments will be reviewed and used to consider whether or not to place this species on the SARA list.

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Information on the species

American eel

Species biology and distribution

The American eel (*Anguilla rostrata*) is the only member of the genus *Anguilla* found in North America. *Anguilla* eels are termed “freshwater eels” although part of their life cycle occurs in the sea and some individuals complete the life cycle in salt water. Juvenile and adult American eels are long, snakelike fish with small, deeply-embedded scales. The species has historically been common or abundant throughout its range.

The American eel is widely distributed in fresh waters, estuaries and coastal marine waters of the western north Atlantic from Venezuela in the south to Greenland and Iceland in the north. Adults are found in oceanic waters of the Sargasso Sea where spawning occurs, and larvae are distributed in the western Atlantic Ocean as they move toward coastal and estuarine waters. In Canada the historic range includes all accessible freshwater, estuarine and coastal areas connected to the Atlantic Ocean, as far north as the mid-Labrador coast and as far inland as Niagara Falls in the Great Lakes. Continental shelf areas are also used by juvenile eels arriving from the oceanic spawning grounds and by adult silver eels returning to the spawning grounds.

All spawning adults of the species spawn together in the Sargasso Sea. Larvae (called “leptocephali” because of their leaf-like shape) drift and move to freshwater areas, and individuals undergo a series of changes in shape and ecological requirements through the life cycle. Life stages in coastal and freshwater areas are: glass eels (small, snakelike, transparent), elvers (small, snakelike, pigmented), yellow eels (larger, yellowish to brown, juveniles – the principal growth phase) and silver eels (mature adults migrating from coastal and freshwater areas to the spawning area in the open sea).

Maximum length of American eel observed in Canada is around 1 m, while maximum age observed is around 23 years. Sexual differentiation is considered complete at 270 mm total length. Mean observed age at the spawning migration is 19.3 yrs with a range of 12-23 years. Length at the spawning migration varies geographically, with individuals from the St. Lawrence River being larger at migration (840-1000 mm) than those from the Gulf of St. Lawrence and Atlantic regions (650-700 mm). Growth is faster in saltwater habitat than in freshwater, and in freshwater habitats is faster in rivers than in lakes.

Females are more abundant than males in most areas in Canada. Male silver eels are more common in areas south of the St. Lawrence River and Gulf and along the Atlantic coast of the USA but almost all individuals in Lake Ontario and the upper St. Lawrence are females. Individuals from the St. Lawrence/Great



Lakes system may provide a high proportion of total reproductive potential for the species.

American eel is considered a single species without distinct sub-populations throughout its range -- that is, all individuals and sub-groups in the population are genetically the same. This is in contrast to many marine fish species which have well-defined populations which are genetically different from each other.

Status (COSEWIC)

Special concern

Last examination by COSEWIC

April 2006

COSEWIC Reason for designation

Indicators of the status of the total Canadian component of this species are not available. Indices of abundance in the Upper St. Lawrence River and Lake Ontario have declined by approximately 99% since the 1970s. The only other data series of comparable length (no long-term indices are available for Scotia/Fundy, Newfoundland, and Labrador) are from the lower St. Lawrence River and Gulf of St. Lawrence, where four out of five time series declined. Because the eel is panmictic, i.e. all spawners form a single breeding unit, recruitment of eels to Canadian waters would be affected by the status of the species in the United States as well as in Canada. Prior to these declines, eels reared in Canada comprised a substantial portion of the breeding population of the species. The collapse of the Lake Ontario-Upper St. Lawrence component may have significantly affected total reproductive output, but time series of elver abundance, although relatively short, do not show evidence of an ongoing decline. Recent data suggest that declines may have ceased in some areas; however, numbers in Lake Ontario and the Upper St. Lawrence remain drastically lower than former levels, and the positive trends in some indicators for the Gulf of St. Lawrence are too short to provide strong evidence that this component is increasing. Possible causes of the observed decline, including habitat alteration, dams, fishery harvest, oscillations in ocean conditions, acid rain, and contaminants, may continue to impede recovery.

Threats

Fisheries

Eel fisheries have existed in areas throughout the range in Canada, including Ontario (Lake Ontario and upper St. Lawrence River), Québec (Lac Saint-François, Lac Saint-Pierre and upper St. Lawrence estuary), the Gulf of St. Lawrence, Nova Scotia and Newfoundland. All fisheries have been for yellow and silver eels with the exception of fisheries for elvers which began on an experimental basis in the early 1990's in Nova Scotia and Newfoundland, and are currently only active in Nova Scotia. Total harvests ranged between 500 and 1200 t/yr between 1961 and 2003; harvests declined from around 1100 t/yr in the



late 1980's to around 500 t/yr in 2003. Unreported catches are not thought to be significant. Fishing mortality estimates are relatively high in the few localities where these have been made but there are extensive areas in which no fisheries occur and total fishing mortality on eels in Canada is poorly known.

Dams

Presence of dams creates two potential impacts on eel populations: restriction of access to upstream habitat, and mortality in turbines during downstream passage. Although some estimates of mortality and losses due to dams exist for specific localities, there are no overall estimates of losses of spawners due to dams. For example, in the St. Lawrence River watershed over 8,000 dams restrict access to more than 12,000 km² of freshwater habitat for eels, and dams could be reducing escapement of large female spawners by more than 800,000 in three tributaries alone. Downstream passage mortality of migrating silver eels is a function of eel size (larger individuals are killed more often than smaller eels), dam size (generally a higher fraction of eels is killed in smaller dams), turbine spacing, turbine type and operating conditions. Eels migrating downstream from Lake Ontario and the upper St. Lawrence are estimated to suffer at least 40% mortality due to passage through two power dams (Moses-Saunders and Beauharnois).

Entrainment

Although little studied to date, entrainment ("capture" of eels when water is taken in for industrial or other purposes) in municipal water intakes, industrial water intakes, and thermal generating stations is a potentially significant source of eel mortality.

Chemical pollution

Eels accumulate chemical contaminants, since they are relatively long-lived, bottom-living, and are high in fat content (which favours accumulation of chemicals which are soluble in fats, such as PCBs, pesticides, dioxins and furans). This chemical build-up can result in lesions, affect egg, embryo and larval development and impede swimming ability. While contaminant levels have been reduced in many areas of eel habitat, it is the accumulation of these contaminants that could have a negative effect on the American eel's capacity for survival throughout its range.

Many rivers in the southern uplands area of Nova Scotia (southern and southeastern parts of the province) are affected by acid precipitation, and acidic conditions in these rivers may limit survivorship of American eels. Agricultural runoff has increased substantially in recent years with the increase of intensive agriculture (especially maize) in eastern Canada, and this may affect eels.

Introduced parasite

The swim bladder parasite *Anguillicola crassus* was first discovered in North America in South Carolina in 1995 and has subsequently been found in eels in



the Chesapeake Bay, the Hudson River, Massachusetts and Maine. The parasite has not been found in Canada to date but its arrival may be imminent. Heavy infections can lead to swim bladder shrinkage or collapse, skin ulcers, reduced appetite and reduced swimming performance.

Protection measures

In 2004 the Minister of Fisheries and Oceans announced a goal of reducing eel mortality by 50% within 2 years and called on stakeholders and jurisdictions to take the necessary measures to reach this goal. A Canadian Eel Working Group has been formed to bring together federal and provincial agencies responsible for eel conservation and management, and this group is currently leading development of a Management Plan for American eel in Canada addressing all threats to the species.

In 2005 representatives from government agencies and hydroelectric industries from Canadian and US jurisdictions in the Lake Ontario/upper St. Lawrence area developed a “Decision Analysis” aimed at identifying the key threats to American eel from dams in this area, and the best short-term and long-term measures to address these threats. Short-term measures included stocking to maintain depleted populations, reducing fishing mortality, research into means of reducing downstream passage mortality, and basic research to improve population information. Long-term measures included trapping eels upstream of dams and transporting them downstream, and research into effective dam bypass mechanisms.

Stocking of young American eels into areas in the Great Lakes/St. Lawrence watershed began in 2001 and intensified in 2005 and 2006, with young eels (elvers) from Atlantic Canada stocked into the Richelieu River and Lake Ontario. Funding for stocking has been provided by power generation companies. All commercial fisheries for American eel were closed in Ontario in 2004, and Ontario recreational fisheries were closed in 2005. Fishery removals have been reduced in Québec, and also in Atlantic Canada through shorter seasons and increased minimum sizes. Negotiations with power companies in Ontario and Québec are under way to finalize an overall plan to address dam-related mortalities. One option under such an agreement would be further reductions in Québec fishery removals over the next 5 years through a combination of licence buyback and releasing live harvested eels downstream from the fishery. Research on population dynamics, trap and transport methods, and monitoring continues.

Potential impacts on stakeholders

Listing of American eel as Special Concern would not bring automatic prohibitions on killing or harming the species, so there would be no automatic impacts on stakeholder activities if the species were listed.



Management measures needed to reduce eel mortality, halt the decline in abundance and promote recovery of the species have been outlined in a draft Management Plan for American eel. The Management Plan, to be in compliance with SARA requirements, will be finalized in spring 2007. The Management Plan outlines a series of long-term and short-term objectives, and management actions associated with each of these. The objectives identified in the Management Plan are as follows:

Long-term management goal

Rebuild overall abundance of American eel in Canada to its level in the mid-1980's, as measured by the key available abundance indices, in particular

- Ensure presence of American eel in all areas throughout its historic distribution
- Sustainable fisheries for elvers and large eels are producing economic benefits for fishermen in all areas where fisheries were historically present

Short-term management goal

Reduce eel mortality from all sources by 50% relative to the 1997-2002 average

Specific objectives and actions

1. Develop a detailed implementation plan, based on Identifying priority actions, for reducing eel mortality from all sources by 50%
2. Achieve a net gain in abundance and escapement by ensuring access to and passage from quality habitats:
 - ensure no net loss of habitat from new facilities
 - ensure a net gain in habitat through modifications to existing facilities; specifically, provide upstream and downstream passage to an additional 10% of lost eel habitat in each jurisdiction every 5 years
 - continue action to reduce contaminant and pollution impacts
3. Ensure that mortality due to fisheries is consistent with the overall goal of reducing mortality from all sources by 50%
4. Develop a decision support tool for identifying and prioritizing actions to improve habitat for eels
5. Maintain and, where required, develop fishery-independent abundance indices.



6. Ensure presence of eels in areas where abundance has collapsed by stocking young eels
7. Develop a binational management plan
8. Explore setting up a binational Commission for eel conservation and management

Consistent with the objectives in the draft Management Plan, potential new measures to reduce eel mortality could include further requirements for dam operations, construction of eel ladders on dams to allow upstream passage, further reductions in chemical discharges, further reductions in fishery catches, or offsetting measures such as stocking.

References

COSEWIC 2006. COSEWIC assessment and status report on the American eel *Anguilla rostrata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa x + 71 pp. (available at www.sararegistry.gc.ca)



Feedback Section

If you have questions about the Species at Risk Act or the consultation process, or would like to submit a workbook, please feel free to contact us.

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Introduction to the questionnaire

Please consider the questions provided below, and provide a response to any or all of the questions that interest you. Additional briefs or letters can be appended to this workbook.

The options available for submitting the workbook are:

1. Submit written responses at consultation sessions
2. Download a word or PDF version of the workbook at:
http://www.sararegistry.gc.ca/public/default_e.cfm and mail or email the completed workbook to one of the addresses above

Comments must be submitted by March 31, 2007.



Questions

Name (optional):

Organization/affiliation:

1. Are you familiar with the Species at Risk Act ? Yes _____ No _____

Check all that apply.

_____ Not familiar

_____ I have read all or part of the Act

_____ I have received written information (eg pamphlets)

_____ I have participated in information on consultation sessions

_____ I have received information from the media

_____ Other

2. Have you read the COSEWIC status report for American eel?

_____ Yes

_____ No

3. Which sector(s) do you represent? Check all that apply.

___ Academic

___ Agriculture

___ Commercial Fishing/Processing/Sales

___ Environmental organization

___ Farming

___ Forestry

___ Government (please state level) _____



- ☐ Hydroelectric power generation
- ☐ Industrial or manufacturing
- ☐ Oil and gas
- ☐ Private sector – other (please indicate) _____
- ☐ Professional services
- ☐ Retired
- ☐ Recreational fishing
- ☐ Stewardship group
- ☐ Student
- ☐ Other
- ☐ Not in the labour force

4. Where do you reside?

- ☐ Ontario
- ☐ Québec
- ☐ New Brunswick – Gulf of St. Lawrence
- ☐ New Brunswick – Bay of Fundy
- ☐ Prince Edward Island
- ☐ Nova Scotia – Gulf of St. Lawrence
- ☐ Nova Scotia – eastern shore
- ☐ Nova Scotia – Bay of Fundy
- ☐ Newfoundland
- ☐ Labrador



5. Do you support the listing of American eel as “Special Concern” ?

___ Yes

___ No

___ Undecided

6. On a scale of 1 to 5, where 1 indicates “Strongly disagree”, 3 indicates “Indifferent” and 5 indicates “Strongly agree”, please indicate your opinion on each of the following statements:

a. I believe the species is valuable because it plays an important role in maintaining healthy ecosystems. ____

b. I believe the species is valuable to future generations ____

c. I value this species even though I may never see one personally ____

d. I believe this species needs special protection or care from human interactions and/or activities ____

e. I believe protection of this species will have a positive effect on my business/career ____

f. I believe legal listing of this species may restrict my recreational, employment of personal activities ____

g. I am prepared to suffer a loss in revenue to protect a species at risk ____

h. I believe it is important for the Government of Canada to allocate federal funding to support recovery of this species ____

7. Please specify additional reasons **to support the legal listing** of this species. In particular, please provide information that would be useful for deciding whether to list the species



8. If this species were legally listed, there could be potential changes in income or revenue to you or your employer. To help us better understand the impacts please check each of the following that apply to you:

a. If there is a potential change in your income, is it a gain or a loss?

☐ Gain ☐ Loss ☐ No change ☐ Don't know

b. What is the amount of potential change in your income?

☐ Less than \$5,000

☐ \$5,000 - \$10,000

☐ \$10,000 - \$20,000

☐ \$20,000 - \$30,000

☐ Greater than \$30,000: please estimate the amount \$ _____

c. What percentage of your income depends on this species?

☐ 0 – 20%

☐ 20 – 40%

☐ 40 – 60%

☐ 60 – 80%

☐ 80 – 100%

9. a. If there is a potential change in revenue to your industry, business or employer is it a gain or a loss?

☐ Gain ☐ Loss ☐ No change ☐ Don't know

b. What is the amount of potential change in revenue?

☐ Less than \$25,000

☐ \$25,000 - \$50,000

☐ \$50,000 - \$100,000



___ \$100,000 - \$150,000

___ Greater than \$150,000: please estimate the amount \$ _____

c. What percentage of your industry, business or employer's revenue depends on this species?

___ 0 – 20%

___ 20 – 40%

___ 40 – 60%

___ 60 – 80%

___ 80 – 100%

10. If you **do not support listing** of this species, please tell us why. In particular, please provide information that would be useful in deciding whether to list the species.

11. Please add any other comments or concerns (include additional sheets, if necessary)

Workbooks must be submitted by March 31, 2007.