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# HOOK, LINE AND THINKER

The Newsletter of the Fishermen and Scientists Research Society

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## LOBSTER RESEARCH PLAN TO BE PRESENTED AT FSRS 9TH ANNUAL CONFERENCE

The FSRS 9th Annual Conference, being held February 22 & 23, 2002 at the Howard Johnson Hotel Halifax in Halifax, Nova Scotia, will include a special session on lobster research. During this session a draft Lobster Research Plan for the FSRS will be presented, which will expand upon existing research and incorporate recommendations from the FSRS 2001 Lobster Science Workshop. The presentation will be followed by discussion, and modification if necessary, of the draft plan, and approval of the plan by the members.

The conference will also include workshop sessions on Estimating Lobster Exploitation Rates From FSRS Recruitment Traps, 4x Cod Tagging Study, Stock Status Traffic Lights - What Are They and How Are They Used, and Benthic Habitat Classification. Poster Displays and Information Booths are also being planned. Expected topics include: Results of CTD Data Collection During 4VsW Sentinel Program, 4VsW Sentinel Program Results, Leatherback Sea Turtles, Fundy Forum, FSRS Short Term Lobster Recruitment Index Project Results, Marine Invertebrate Diversity Initiative (MIDI), NS Museum of Natural History, and Oil and Gas Issues.

The FSRS Annual General Meeting will be held following the conference and will include: Directors' Report, Financial Report, Approval of Workplan, & Nominations & Elections.

For further information, contact Patricia King at 902-876-1160, e-mail: [pattyfsrs@auracom.com](mailto:pattyfsrs@auracom.com)

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## IMPORTANT PREDATORS OF THE AMERICAN LOBSTER



By Carl MacDonald, FSRS Senior Data Analyst

Boiling water kills more lobsters than any other type of mortality to lobsters. Fishermen are the number one predators on the commercial size lobster population.



Figure 1: Humans are the dominant source of mortality for the American lobster.

More than 1,600 fishing boats set sail in Southwestern Nova Scotia on the 26<sup>th</sup> of November. The word on the street is fishermen realized excellent catch rates again. The lobster fishery in Atlantic Canada is of vast economical importance. Lobster fishing dominates the fishing economy in Atlantic Canada. Hence, management of the lobster fishery is of the greatest importance. The precautionary approach is the management strategy currently taken in the Region. Lobster landings have increased or remained stable over the last few years. However, it is still felt that the lobster fishing mortality rate is very high. It is felt there is an increase exploitation of lobster due to better positioning technology, larger vessels, and better traps. Not only that, with decreased numbers of groundfish to catch, fishermen have to rely heavily on lobster fishing for their income.

In light of the high fishing mortality, no one really understands why the abundance of lobsters increased so dramatically in recent years. Some scientists and fishermen would credit the collapse of groundfish stocks to the increased lobster population. But do groundfish eat lobsters? What animals eat lobsters in nature, causing natural mortality?

Certainly cod do eat lobsters. However, stomach analysis of thousands of cod stomachs revealed only a handful of stomachs contained American lobster (Hanson and Lanteigne 2000). The Fishermen and Scientists Research Society stomach analysis only found one lobster in approximately 4000 cod stomachs. This finding suggests the number of lobsters eaten by Atlantic cod represent a minor source of natural mortality for lobsters. One would assume cod would eat many more lobsters during the summer months when lobsters are molting. However, lobsters are not vulnerable to most fish predators during the molt as they seldom leave the cover of crevices and rocks when they are soft (Atema and Voight 1995).

So what is the most important fish predator of lobsters? Hanson and Lanteigne 2000 found the shorthorn sculpin the most important predator of small juvenile lobsters. The shorthorn sculpins use an ambush technique to capture prey species. Unlike a cod that swim around looking for prey items, the shorthorn sculpin sits and waits for food to come to him, which sometimes is a juvenile lobster.



Figure 2: Shorthorn sculpins are a known fish species that consume lobsters.

Hanson and Lanteigne 2000 suggest longhorn sculpins, sea ravens, white hake, and cunner (which fishermen call perch) may be important sources of natural mortality on juvenile lobsters. Fishermen frequently capture shorthorn sculpins, longhorn sculpins, cunner, and sea ravens in their lobster traps. Most fishermen use these fish species for lobster bait and place them on the spindle immediately.

Hence, fishermen are inadvertently removing natural predators of lobsters, increasing the survivorship of juvenile lobsters.

Other forms of natural mortality suggested by fishermen are sea birds (cormorants) and the very intelligent seal. I do not have diet information on cormorants or seals that confirms they eat lobster but they are certainly potential predators of juvenile lobsters where they are found in areas of high abundance.

In final, it is almost impossible to manage natural mortality on lobster. We can't control the number of lobsters sculpins, sea birds, or seals eat. In fact, it is difficult enough to manage fishermen and how many lobsters fishing removes from the population. Presently, the lobster fishery is not in immediate trouble and no one wants to reverse that trend. Hence, conservation is in everyone's best interest.

#### References

Atema, J. and R. Voight. 1995. Behaviour and sensory biology. In J. R. Factor, editor. *Biology of the lobster Homarus americanus*. Academic Press, New York. Pages 313–348.

## Fast Facts

### What does the term “scrod” mean in New England restaurants?

*Immature cod or herring. Fishermen use the word when referring to gutted small haddock. It comes from the Middle dutch word “schrode” meaning a strip or shred.*

### Can fish distinguish colour?

*Most fish are colourblind, but can see colour shadings, shape, movement and reflected light.*

From the NMFS Northeast Fisheries Science Centre website  
(<http://www.nefsc.nmfs.gov/faq/index/html>)

**Submission Of Articles Is Open To All.**

**Deadline For Next Issue Is**

**January 15, 2002**

# SUSTAINABLE FISHERY SYSTEMS

By Anthony Charles

Published by Blackwell Science. 384 pages, paperback, illus., ISBN 0-632-05775-0. Publication Date: 2001.

This new book presents an integrated and interdisciplinary approach to the study of fisheries. The first part of the book seeks to provide a readable, non-technical grounding in the structure and dynamics of fishery systems and their natural, human and management components. This includes particular attention to fishery policy and planning, management, development and research. In the second part of the book, the integrated approach is used to address a range of issues faced in pursuing 'sustainable fisheries', with emphasis on six dominant themes: sustainability, uncertainty, complexity, conflict, fishing rights and the nature of fishery management. Within this discussion, several major policy directions are explored, notably the precautionary approach, the ecosystem approach, co-management, and robust management for resilient fisheries. Case studies from around the world are integrated into the text and in highlighted 'boxes' throughout the book.

This book is suitable both as a textbook for undergraduate and graduate students, and as a reference book for professionals and practitioners – in fishery research, management and development as well as in the fishing industry itself. As a textbook, it may be particularly relevant for courses in fisheries, and coastal/marine management, that seek to transcend disciplinary boundaries and to combine theoretical analysis with practical case studies.

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1. Fishery Systems
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## *About the author:*

**Anthony Charles, an FSRS member, is professor of Management Science and Environmental Studies at Saint Mary's University, in Halifax, Canada, and is a Pew Fellow in Marine Conservation. Dr. Charles is internationally recognized for his record of interdisciplinary fishery research, notably in conservation, bio-economics, socio-economics, management and policy studies, as well as for his considerable practical experience with fisheries of both developed and developing nations.**

*For further information and to order:*

<http://www.blacksci.co.uk/~cgilib/bookpage.bin?File=5797>

<http://store.yahoo.com/isupress/0632057750.html> (in North America)

# YARMOUTH SHARK DERBY

By Denise Muise, FSRS Research Intern

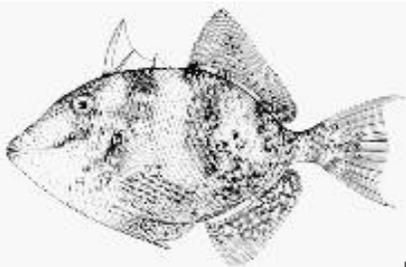
On the weekend of August 18<sup>th</sup> and 19<sup>th</sup>, the Yarmouth Shark Derby took place. Due to very strong winds on Saturday morning, the boats were not able to go out. Therefore, the derby actually only took place on Sunday. Warren Joyce, along with eight volunteers, including myself, were responsible for sampling all sharks that were landed. There were 349 participants in the derby this year, with a record number of 80 sharks landed in one day alone!! Lengths, sex, maturity and stomach contents were recorded for each.

As in past years, the blue shark was the most common shark landed. However, this year, a male thresher and a porbeagle shark were brought in. The thresher shark, with his enormous tail, impressed the enormous crowd that has gathered to watch. He measured 321cm total length, 174cm fork length and weighed in at 184.8lbs (83.82kg). This was the first thresher shark ever caught within a tournament in Nova Scotia. The porbeagle measured 196cm total length, 170cm fork length and weighed 125lbs (56.92kg). The largest blue shark landed had a fork length of 271cm, 330cm total length and weighed in at 283.3lbs (128.5kg). Stomach contents from these sharks included mostly lumpfish, mackerel and herring. However, some squid, skate parts and algae were also observed. One shark even had old fishing line in his stomach. An American marking tag was present within one shark. This will be sent back to the appropriate location for research purposes. From the total 80 sharks landed, 28 were male, and 52 were female.

Children, as well as many adults gathered throughout the day, hoping to get a glimpse or touch of the sharks as they came up onto the wharf. Shark teeth were handed out to the children, which was an enormous hit! All in all, it was a great day and a wonderful experience for all involved. I cannot wait until next year!

# GRAY TRIGGERFISH

By Jeff Graves, FSRS Sentinel Technician



Burnell Jewers of Ecum Secum, caught a Gray Triggerfish. The Triggerfish was caught at the end of July on top of the water in 3-4 fathoms of water. It was 32 cm and weighed 681.7 grams. The maximum size recorded in Atlantic Canadian waters is 60 cm and weighing approx. 13000 grams. In the Gulf of Mexico these fish can weigh up to 5900 grams. Triggerfish range in the Western Atlantic from Nova Scotia, Bermuda and the Northern Gulf of Mexico. The northern most range on the east coast of Canada was found in Daniels Harbour, Newfoundland, 50 39 N, 57 18 W. Triggerfish feed mainly on invertebrates such as: molluscs, crustaceans, sand dollars and sea urchins.

Triggerfish can live to be 7.5 years old and mature sexually at 1.7 years. Triggerfish build nests on the bottom. Once the eggs hatch, the juvenile fish move to the surface and live among mats of floating Sargassum seaweed.

## Sources:

Auburn University Marine Extension & Research Center Circular ANR-1017 MASGP-96\_009

Scott, W.B., and M.G. Scott. 1988. Atlantic Fishes of Canada, Can. Bu.ll. Fish. Aquat. Sci. 219:731p.

WWW.Fishbase.org

## LOCKEPORT NATIVE JOINS THE FSRS TEAM

Hello, my name is Dylan Buchanan and I am the new FSRS Research Intern for Shelburne County. I grew up in Lockeport, Shelburne County, where I currently reside. Both my town and family have strong roots in the fishing industry and because of this I understand the importance of the work being done by the Society and fishermen in order to maintain healthy fish stocks.

I graduated from the Nova Scotia Agricultural College in the spring of this year with my BSc. in Agriculture, major in Aquaculture. I started in the industry working at my father's fish plant while I was in high school. During the summer I would unload boats and grade fish, and during the winter I would buy and pack lobsters. In 1999 I took some time from school to work as a junior biologist for a marine finfish hatchery specializing in cod, and after completion of my degree I worked as a foreman for a marine shellfish aquaculture site. Both of these jobs were located in Shelburne County, and I look forward to continuing to work in the county with the local fishermen on behalf of the FSRS.

I am still looking for boats in East Port L'Hebert and Cripple Creek for the lobster recruitment study, and remember, we are always looking for new members. If you have any questions concerning the Society or its projects, please feel free to contact me at (902) 656-2961, or e-mail me at [dlbuchanan@hotmail.com](mailto:dlbuchanan@hotmail.com). Have a safe season and we'll see ya in the future.

*"If you have any questions concerning the Society or its projects, please feel free to contact me at (902) 656-2961, or e-mail me at [dlbuchanan@hotmail.com](mailto:dlbuchanan@hotmail.com). "*  
- Dylan Buchanan



### Creature Features

#### Seeing Eye Stars

Brittle stars can react in a variety of ways to light, including changing color and crawling away. Researchers from the United States and Israel have discovered that the brittle star *Ophiocoma wendtii* uses a mass of microscopic crystalline lenses embedded in its skeleton to detect its predators. *O. wendtii* is actually able to "see" an approaching predator's shadow and quickly escape to safety into a dark crevice, which it can identify from several cm away. For more information on brittle stars, visit the MIDI database at: [www.fundyforum.com/MIDI](http://www.fundyforum.com/MIDI). (Aizenberg, J., et al. 2001. Calcitic microlenses as part of the photoreceptor system in brittlestars. *Nature* 412(6839); 819-821.)

#### What Are Sea Slugs?



Photo courtesy of Annelise Chapman

Gardeners having problems with slugs, take heart – the octopus' garden has them too. If you spend a little time looking into cracks between rocks or under seaweed at low tide in Nova Scotia, you might find small sea slugs, known as nudibranchs. They are shaped like slugs, but species in Nova Scotia vary in size and color from dark brown to bright red and white. Nudibranchs are related to slugs on land, but differ from them by their adaptations to life in the sea, such as tufted gills along their backs. Many have chemical defences against predators, including toxins in their flesh or just a really bad taste or smell. Marine slugs are prettier than slugs on land – to see photos of some local nudibranchs, check out the Marine Invertebrate Diversity Initiative online database at: [www.fundyforum.com/MIDI](http://www.fundyforum.com/MIDI).

# PUTTING FISHERS KNOWLEDGE TO WORK

By Paul Fanning, Chairman, FSRS Communications Committee

An international conference was held August 27-31, 2001 on the campus of the University of British Columbia in Vancouver. The conference brought together over 200 academic, aboriginal, fishers, and government scientists from around the world to attend over 60 papers and presentations. Discussions covered the ways, means, benefits and pitfalls of making better use of knowledge from the fishers, including commercial, artisanal and aboriginal. This information was brought to bear on the questions of fisheries science and the problems of fisheries management and conservation. The topics ranged from biology, conservation, and stock assessment through to intellectual property law, ethics and the definition of "informed consent". Examples were drawn from Canada and the US, Australia, New Zealand, the Mekong River (Laos, Viet Nam and Cambodia), Brazil, Sweden, Ghana and Haiti.

Methods discussed included enlisting fishers into science programs (such as the FSRS), but there were many other approaches. Sociologists and anthropologists talked about ways to determine the historical target species and patterns of fisheries, and several studies considered the linguistics of fish names to monitor how fisheries have changed. In an example from Sweden, the historical names of lakes were used to determine cases in which an important freshwater species (Brown Trout) had been eliminated. It brings to mind the number of Salmon Rivers in Nova Scotia that no longer contain salmon.



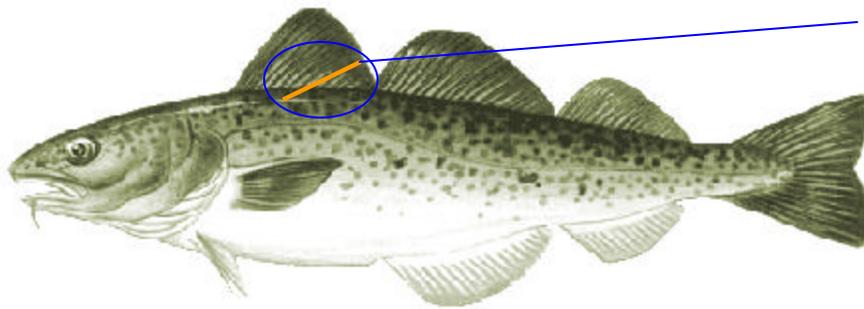
FSRS members Paul Fanning and John Levy at UBC.

A paper on the FSRS, including its history, operations and a number of the projects, was presented by Paul Fanning with comments from a fisherman's point of view from John Levy. Co-authors of the paper were Kees Zwanenburg, Peter Hurley and Wayne Stobo. A book containing all the papers presented is planned for publication in 2002.



# COD TAG REWARDS

Tagged cod have been released in a variety of locations in 4X, 5Y and 5Z. This project will provide biological information and help



BIOLOGICAL STATION 531 BRANDY  
COVE RD  
ST. ANDREWS NB E5B 2L9 #  
XXXX

determine cod movements and population structure.

***Draws for rewards (including \$1000). Tags eligible for all draws after they are returned.***

***Fishermen are asked to provide the following:***

- **DATE & LOCATION** of capture (lat.+long. or loran, fishing grounds)
- **LENGTH OF FISH**, if possible and **GEARTYPE** used
- Your name & phone number, for the draws

*Return tag and information to a port sampler/port tech or mail to:*

Biological Station  
531 Brandy Cove Rd  
St. Andrews NB, E5B 2L9

*For More Information contact:*

***Don Clark (506) 529-5908,  
Jennifer Hinze or Erin Stephens (506) 529-8854***

## **Scotia-Fundy Cod Tagging Project**

a joint research project among government, non-profit organizations  
and fishermen's associations

## DATABASE OF CORAL, SPONGES AND OTHER WEIRD AND WONDERFUL INVERTEBRATES

The Marine Invertebrate Diversity Initiative (MIDI) has an ambitious goal to list all the spineless creatures found on the ocean floor off New England and Nova Scotia, in the form of an on-line, interactive database ([www.fundyforum.com/MIDI](http://www.fundyforum.com/MIDI)). This database includes the big and beautiful, such as deep sea corals, as well as the small and common, such as nematode worms. When the database is complete, users will be able to click on any species, habitat, location, photograph or reference and get answers.

MIDI is the brainchild of Dr. Derek Davis, former Curator at the Nova Scotia Museum of Natural History. Says Davis, "We've tended to neglect the diversity of animals found in our waters, particularly invertebrates". The last catalogue of this kind was compiled in 1901. In fact, we know so little about the ocean that there are undoubtedly numerous species living in the deeper waters of the Scotian Shelf that have yet to be discovered.

Deep sea corals are a good example of an unknown species. Five years ago, many marine scientists did not even know that large corals existed in Nova Scotia waters. Now users can visit the MIDI website and pull up profiles and pictures on ten species of corals occurring off our Coast.

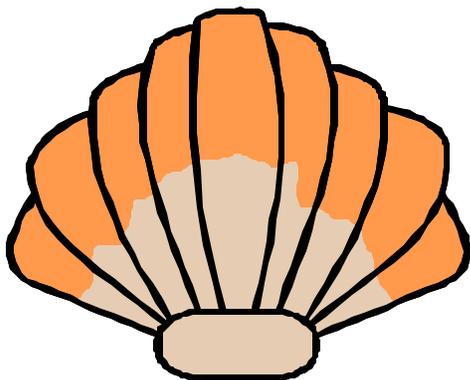
As human activities increase in offshore Nova Scotia, it has become increasingly important to know large different species are occurring. Jayne Roma, MIDI Coordinator, believes the database will be a useful tool to a wide range of people, from managers to university students.

The database is very much a group effort. Everyone from scientists to fishermen to high school students are contributing information and using the database. Says Roma, "Not only are we developing a scientific database, but also working to make invertebrates as known to the public as the vertebrates such as whales, sharks and bony fishes".

If you would like to become involved in the MIDI project, or would like to arrange a presentation/tutorial, please contact Jayne Roma at 902-426-3587 or [MIDI@fundyforum.com](mailto:MIDI@fundyforum.com)

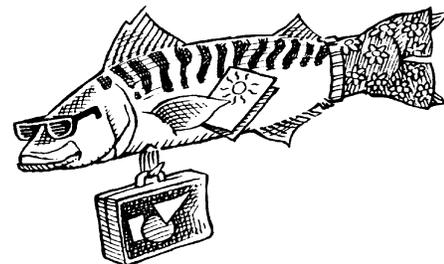
### NEW TO THE FSRS LIBRARY

**"What We Heard": Summaries of Public Consultations  
Conducted by the Atlantic Fisheries Policy Review  
March –April, 2001**  
Published by: Fisheries and Oceans Canada



### Oh Fishial Info

## Mackerel on the Move



Adult mackerel spend the winter south of Georges Bank. In the spring, one group (the Americans) moves toward the U.S. coast. The other (the Canadians) moves along Nova Scotia and into the Gulf of St. Lawrence where it spawns. Mackerel are very sensitive to temperature and will not move into an area until the water is above 8° C.

Oh Fishial Info has been provided by the Communications Branch of the Department of Fisheries and Oceans.

# BIOLOGY, MARKETS AND CULTURE OF *ANGUILLID* EELS

## TAXONOMY AND DISTRIBUTION

By Sean M. Tibbetts \*

Within the *Anguillid* genus, there are currently 17 known eel species that can be found in nearly every body of water on our planet (Tesch, 1977). *Anguillid* eels belong to the class Osteichthyes (bony fish) and are unique among other eels in that they are “catadromous”; meaning that they hatch in salt water, complete the growth phase in fresh or brackish water and return to the sea to reproduce. The three most commercially important species (American eel, European eel and Japanese eel) descended from a common ancestor and, apart from a few differences in morphology and geographical distribution, they are very similar species (Ege, 1939).

The species common in our region is the American eel (*Anguilla rostrata*). These eels are found widely distributed over North and South America. Its northern limits are southern Greenland, Newfoundland and Labrador and, to the south, the Gulf coast of Mexico and off the South American mainland as far as Guyana. Its eastern distribution extends from the North American east coast to Bermuda (Schmidt, 1909; Jensen, 1937; Degani & Gallagher, 1995).

The European eel (*Anguilla anguilla*) is found off the North Cape and eastward of it as far as the Murmansk coast, Kola Bay and northern Dvina. Its southward distribution extends to the Atlantic coast of Morocco and the Canary Islands. The range extends eastward across the whole Mediterranean region and the Black Sea, and westward to Iceland, Madeira and the Azores (Schmidt, 1909; Degani & Gallagher, 1995).

The Japanese eel (*Anguilla japonica*) is found widely around Japan and China. The northern limits are the island of Hokkaido, the coast of Manchuria and the Liao Ho River. The southern limits are the island of Hainan and the Gulf of Tonkin. The distribution extends towards the Benin Islands (Ege, 1939; Matsui, 1952; Degani & Gallagher, 1995).

*Anguilla japonica* is considered the longest of the three species with 116 vertebrae, followed closely by *A. anguilla* with 115 vertebrae and, finally, *A. rostrata* is considered the shortest with 107 vertebrae. Maximum adult size of females is similar for all three species at 6 kg and 125 cm (Usui, 1991).

### ***Life Cycle of American eel***

Until the early 20<sup>th</sup> century, very little was known about the life cycle and spawning habits of *Anguillid* eels. Aristotle once reckoned that these eels were created ‘in the bowels of the earth’ and English country folk believed elvers were fallen horse hairs that came to life when dropped in a puddle (Usui, 1991). Finally, in 1922, the Danish scientist Johannes Schmidt discovered that all eels of Europe and America spawn in a common breeding area in the Sargasso Sea (20 - 30° latitude, 60 - 78° longitude, near Florida and south of Bermuda) (Schmidt, 1932).

From November to January, sexually mature American eels undergo a fantastic migration to the Sargasso Sea. They do this by following a path of increasing water temperature and salinity, which are higher in the Sargasso Sea in winter than any other place in the Atlantic Ocean (15 - 16°C, 36 - 37 ppt salinity).

The mature eels then spawn at depths of 1300 - 1600 feet. It is thought that females produce 7 - 13 million eggs each and both males and females die after spawning (Usui, 1991) since no adult eels have ever been observed returning to the coast.

By February, the surviving eggs of *A. rostrata* hatch (Fahay, 1978) and 5 mm, clear, willow-leaf shaped larvae (called “leptocephali”) emerge, rise to the surface and are carried by ocean currents in a north-west direction for the following year (Landau, 1992). Studies by Otake et. al. (1993) indicate that larvae may feed on detritus less than 20 mm in diameter and faecal pellets of zooplankton. By winter, leptocephali of the American eel reach the Grand Banks, achieve a maximum size of 60 - 65 mm and begin to metamorphose into second stage larvae. This metamorphosis is characterized by a loss of body water. This is the first stage that the larvae begin to resemble the body shape of the adults, however they are transparent due to lack of body pigment and are, thus, known as “glass eels” (Degani and Gallagher, 1995).

At this point, glass eel migration to fresh water rivers and estuaries is guided by the olfactory (smell) senses (Creutzberg, 1957; Hain, 1975). During this migration, a greyish-black pigment appears all over the body and they are now known as “elvers”. After 2 - 3 years of feeding on small fish, insects, fish eggs, detritus, snails, worms and other invertebrates in the fresh and brackish water of coastal rivers and estuaries they attain a yellowish-green color on the dorsal side and are known as “yellow eels” (sometimes called “green eels”). At this point the eels are still sexually immature.

### ***Sexual Maturation***

After 6 – 9 years (males) and 8 - 12 years (females) of feeding, yellow eels reach sexual maturation (Vollestad & Jonsson, 1988). This is characterized by a glistening layer underneath the skin causing the eels’ body to have a metallic silvery sheen on the dorsal side, white on the underside and an enlargement of the eyes (Landau, 1992). Sexually mature eels, known as “silver eels”, weigh approximately 150 g for males and 500 g for females. This sexual dimorphism in adult body size is common in many fish species. In this silver stage the fat content (25 - 28% of total body weight) is greater than in the yellow stage and is believed to be the key factor inducing sexual maturation (Larsson *et al.*, 1990). At the final stage of development, mature eels begin downstream migration to salt water and subsequently to the Sargasso Sea to spawn fueled primarily by body fat reserves (van Ginneken and van den Thillart, 2000) as migrating eels do not feed (Tesch, 1977).

### ***Markets for eel***

Total global eel production (wild fishery and aquaculture) in 1992 was 205,415 tons worth \$2 billion (USD) annually, over half of this consumed in Japan (106,000 tons) (Lazur, 1997).

Japanese eels have been cultured in Asia since 1894, and in recent years aquaculture production has been about 33,636 tonnes per year (Usui, 1991). Rapid industrialization destroyed much of the eels’ habitat in Japanese waters. Along with fishing pressures, habitat destruction resulted in severe depletion of elver seedstocks. Japanese eel aquaculturists began importing elvers from Korea, Taiwan, France and the United States in 1973. Over the past 20 years, prices for live elvers have been as high as \$2200 per kg (CAD) (Shang, 1974). This lucrative new market potential was attractive to many countries and hence, triggered a global eel industry. The market is not quite so lucrative recently due to a slumping Asian economy and slight recovery of native eel stocks. As of July 2001, the market price for live eels averaged 1000 Japanese yen or about \$12.50 per kg (CAD) (FIS, 2001).

Taiwan and Korea initiated eel culture in 1968 and produced approximately 27,273 tonnes in 1985, most of which was exported to Japan (Lazur, 1997). An average market weight of 150 to 200 grams is preferred in the Asian market for the preparation of kabayaki (roasted eel), the preferred eel dish in Japan (Lazur, 1997). A second regional market for eels is Europe. The demand for eels in Germany, the Netherlands, France, Denmark, Sweden and England is approximately 13,636 tonnes annually. The major producers of

eel in Europe are Italy, France, Denmark and Poland with 8,182 tonnes of aquaculture production annually. The average market weight in Europe is higher than that of Asia at 125 to 1000 grams. The increased size preference is due to the fact that smoked eel is the preferred product in Europe (Lazur, 1997).

### ***Market for American eel***

Although wild American eels are in large supply, North America contributes less than 1% of total world eel production (Jessop, 1995). However, as the demand for eel food products continues to grow in Asia and Europe, and since captive spawning has not been successful to date on a commercial scale, the local supply of elver seedstock in these regions is expected to decrease. The demand for eels has risen to a level that Canada now recognizes American eel harvest and/or culture and sale on the European and Asian markets as a viable and profitable enterprise. The total Canadian harvest of eels (glass eels, elvers and adults) in 1997, was 700 tonnes worth 6.3 millions dollars (CAD) (Jessop, 2000). Over 70% of this product (495 tonnes) was exported (National Marine Fisheries Service).

A large population of juvenile eels (glass eels and elvers) enter eastern Canada's rivers and estuaries every year. In 1996, nine licenses were issued by the Department of Fisheries and Oceans to capture glass eels and elvers (Stevens, 1997). Total landings have increased from 26 kg in 1989 to 3,238 kg in 1995 (Jessop, 1996). Many of these were sold directly to eel farms in Europe and/or Asia while others were on-grown by commercial farms in Atlantic Canada. Jessop (1996) reported that a large stock of juvenile American eel exists in the Scotia-Fundy region and that a properly managed, moderate-scale fishery for glass eels and elvers can exist, along with the adult eel fishery, without any negative effects on existing stocks. The total annual catch of all eels from the Scotia-Fundy region in 1995 was 230 tonnes and has declined to 148 tonnes in 1999 (Jessop, personal communication). Consumption of eel products and, therefore, demand for live eels is growing in Asia and Europe. There is potential for growth of American eel (*A. rostrata*) fishing and culture in Canada, however, it can be an unstable industry due to fluctuations in supply of *A. japonica* and *A. anguilla* overseas. The industry could become more stable if local markets could be established in Canada and the United States.

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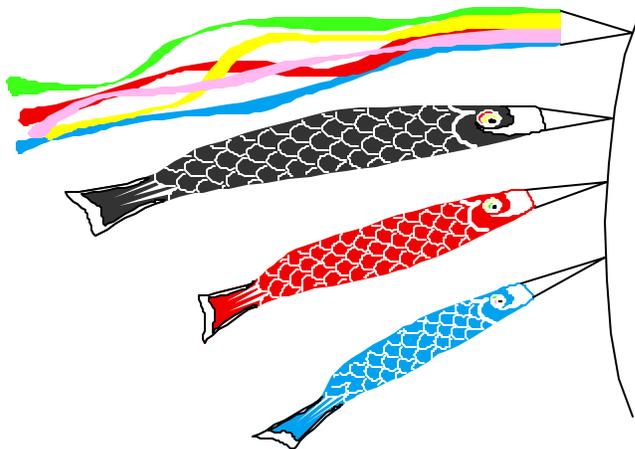
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## Fast Fact

How many times must a lobster molt before it reaches marketable size?

*20-30 times to reach 1 pound.*

From the NMFS Northeast Fisheries Science Centre website  
(<http://www.nefsc.nmfs.gov/faq/index/htl>)

## FSRS WELCOMES NEW MEMBERS

The Fishermen and Scientists Research Society would like to welcome the following members, whose applications were approved at the November 20th Executive Committee meeting. We trust that this expansion of the FSRS's membership will prove to be beneficial to all involved.

Mark DeBaie  
Billy Forward

Kenneth J. Snow  
Bob Bayer

William Congleton  
David Ferguson

## BEACHCOMBING - What's New in The News

### Fundy Forum News

#### Bay of Fundy Science Workshop May 13 -16, 2002

The upcoming Bay of Fundy Science Workshop will be focusing on the health of the Bay of Fundy. Deadline for abstracts is January 15<sup>th</sup>.

#### "Coastlines"

The Ecology Action Centre is raising knowledge about and awareness of native species, habitats and human ecology in coastal Nova Scotia with "Coastlines", a column that will be running in various community newspapers. Contact Jennifer Ford at 902-429-2202 for more information.

*For more details on these stories, or to find out what else is new in the Bay of Fundy, check out the Fundy Forum website at <http://www.fundyforum.com/whatsnew.html>*

*We're on the  
Web!  
[www.fsrns.ca](http://www.fsrns.ca)*

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## UPCOMING EVENTS

### OPERATIONAL OCEANOGRAPHY AND REMOTE SENSING

March 5-7, 2002

London, UK

For more information about this workshop, being hosted by the Alliance for Marine Remote Sensing Association, check out their web site at: [www.waterobserver.org](http://www.waterobserver.org)

### FISHERMEN AND SCIENTISTS RESEARCH SOCIETY

9TH ANNUAL CONFERENCE

February 22 & 23, 2002

Howard Johnson Hotel Halifax  
Halifax, NS

For further information, contact Patricia King at 902-876-1160, e-mail: [pattyfsrs@auracom.com](mailto:pattyfsrs@auracom.com)