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# The History of Canadian Registers of Marine Species 2001-2009

by

L. Van Guelpen[1] and M.K. Kennedy

Fisheries and Oceans Canada
Bedford Institute of Oceanography
Dartmouth, NS
B2Y 4A2

[1] Atlantic Reference Centre, Huntsman Marine Science Centre, 1 Lower Campus Road, St. Andrews, NB E5B 2L7

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## ABSTRACT

Van Guelpen, L. and M.K. Kennedy 2011. The history of Canadian registers of marine species 2001-2009. Can. Tech. Rep. Fish. Aquat. Sci. 2906: iv + 20 pp.

Regional lists, or registers, of standardized species names form the basis of effective marine biodiversity research and management. A register must be dynamic, such that it is updated with missing, changed, and new records. Species names must be validated in terms of taxonomy and distribution. Numeric codes for taxa facilitate linkage to online sites of standardized nomenclature such as the World Register of Marine Species and the Integrated Taxonomic Information System.

In 2001 the Atlantic Reference Centre (ARC) began the development of online biodiversity information products which led to the production of a series of geographically nested regional marine species registers for the North Atlantic Ocean encompassing plants, animals and some protozoa. In September 2008 these registers became the source content for the Department of Fisheries and Oceans Canadian Register of Marine Species. This paper is a historical account of ARC biodiversity information products and species registers.



## RÉSUMÉ

Van Guelpen, L. and M.K. Kennedy. 2011. The history of Canadian registers of marine species 2001-2009. Can. Tech. Rep. Fish. Aquat. Sci. 2906: iv + 20 pp.

Les listes régionales, ou registres, de noms normalisés des espèces constituent le fondement de la recherche et de la gestion efficaces en matière de biodiversité marine. Les registres doivent être dynamiques, c'est-à-dire qu'on doit pouvoir les mettre à jour à l'aide des données manquantes, modifiées ou nouvelles. Le nom des espèces doit être validé en termes de taxonomie et de répartition. Les codes numériques associés aux taxons facilitent la recherche dans les sites Web dédiés à la normalisation de la nomenclature tels que le World Register of Marine Species et le Système d'information taxonomique intégré.

En 2001, le centre de référence de l'Atlantique (CRA) a commencé à mettre au point des produits d'information sur la biodiversité qui ont mené à la production d'une série de registres d'espèces marines pour différentes régions géographiquement imbriquées dans l'Atlantique Nord. Ces registres englobent des végétaux, des animaux et quelques protozoaires. En septembre 2008, ces registres sont devenus la source de contenu du Registre canadien des espèces marines du ministère des Pêches et des Océans. Le présent article donne un aperçu historique des produits d'information sur la biodiversité et des registres des espèces du CRA.

## INTRODUCTION

A register of species is an authoritative list of all species in a defined area. A register must be dynamic, such that it is updated with missing, changed, and new records. Species names must be validated in terms of taxonomy and distribution using authoritative sources – published literature, reliable web sources, museum vouchers, or personal communications from experts.

The inclusion of standard numeric codes/identifiers for taxa in a species register facilitates online linkage to internationally recognized standardized nomenclature such as the Integrated Taxonomic Information System (ITIS) (ITIS 2010) and the World Register of Marine Species (WoRMS) (Appeltans et al. 2010). In addition to standardized nomenclature, linkage to these sites provides access to synonymy and enriched metadata including global distribution information (Kennedy and Bajona 2009).

The need for, and benefits of, regional lists of standardized species names, or species registers, for marine biodiversity research and management have been well documented (e.g. Costello et al. 2001, Pohle et al. 2004). The Atlantic Reference Centre (ARC) began development of registers for several reasons. The first and foremost was the need to document for the first time the biodiversity of individual regions of the Canadian Atlantic. The second was to provide a yardstick to which the results of environmental surveys ("data collections") can be compared to indicate anomalies such as misidentifications, out-of-date species names, or perhaps species not previously recorded from a region. The third was the need for standardization of species names in data collections so they can be shared to perform higher level analyses.

The ARC was well positioned to initiate development of species registers. A collaborative organization of the Huntsman Marine Science Centre (www.huntsmanmarine.ca) and Fisheries and Oceans Canada (DFO) since 1984, the ARC is a research museum of Canadian Atlantic biota and a resource of marine biodiversity information. Collections span sponges to fishes, principally from Davis Strait to Cape Cod and from estuaries to well offshore of the 1000 m depth contour, dating from the early 1900s to the present. Holdings number over 143,000 digitally catalogued lots. Species information is available through the Ocean Biogeographic Information System (OBIS) (OBIS 2010) or by request. The Global Change Master Directory OBIS metadata page for the ARC (Van Guelpen 2006) further describes ARC collections and provides details related to access.

In 2001 the ARC began the development of online biodiversity information products which evolved into the production of a series of geographically nested regional marine species registers for the North Atlantic Ocean (Figure 1) encompassing plants, animals and occasional protozoa. The ARC registers became the source content for a DFO taxonomic standards project which in turn contributes to WoRMS as recognized regional species lists. This paper is a historical account of these biodiversity information products and species registers.

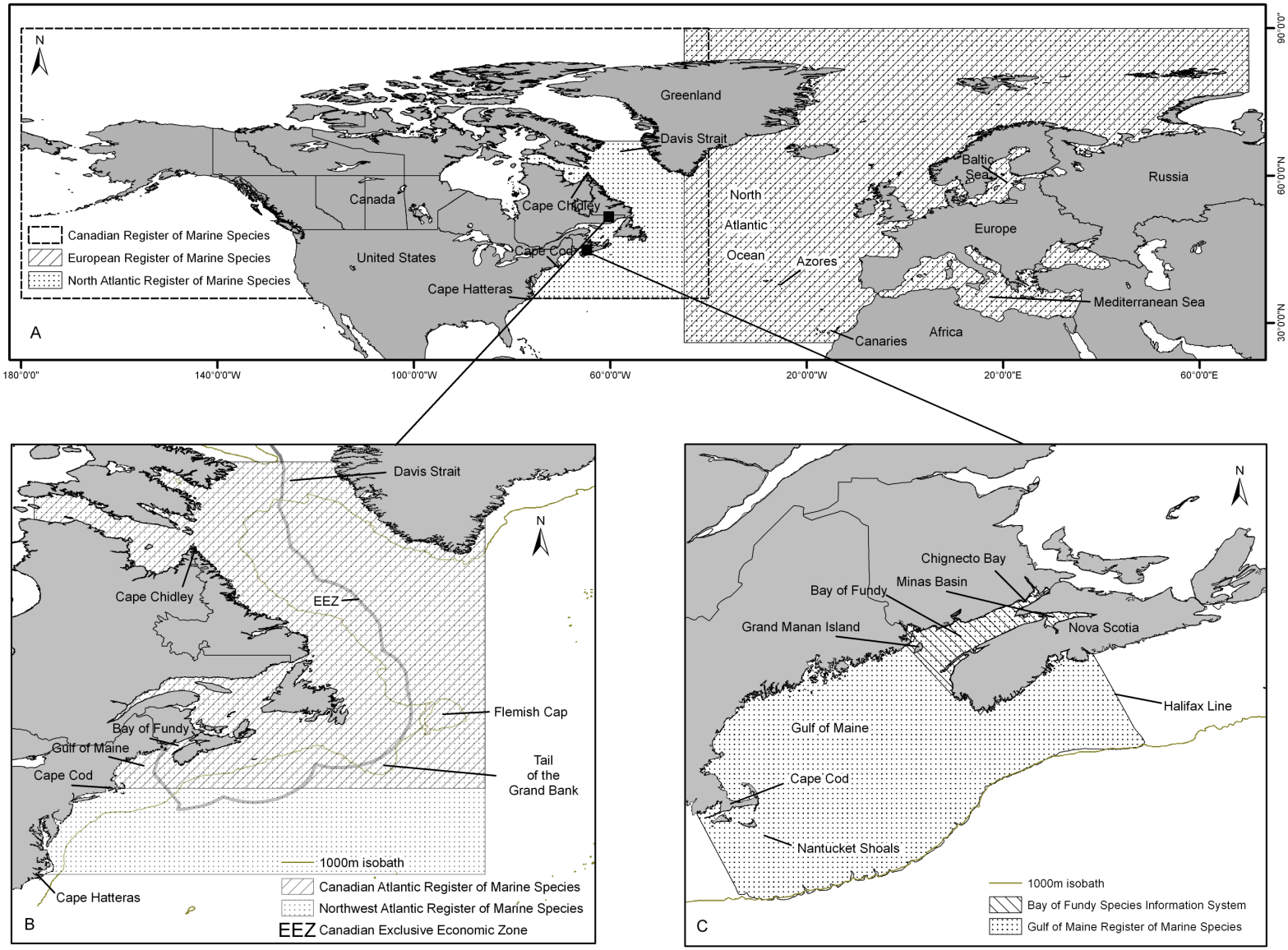


Figure 1. Boundaries of ARC marine species registers for the North Atlantic Ocean and place names used in the text.

## FISHES OF ATLANTIC CANADA – A PHOTOGRAPHIC COMPENDIUM

The first ARC electronic product was "Fishes of Atlantic Canada – A Photographic Compendium" (McGuire et al. 2002). Financial support was provided by Canada's Digital Collections, Industry Canada. The Compendium was a static rather than dynamic product that is not updated.

The first objective of the project was to produce an online condensed version of Scott and Scott's (1988) Atlantic Fishes of Canada using the updated (2001) taxonomy of FishBase (Froese and Pauly 2010). The book included an account for every species (Myxiniformes to Tetraodontiformes) known to that time from the Canadian Atlantic (Cape Chidley at 60.38°N, 64.43°W south to the boundary with the United States, and from estuaries and the high tide line to approximately the 1829 m (1000 fa) depth contour). The second objective was to provide a photo or illustration for each of these species, especially for those lacking either in the book.

Since creation of this online product Canada's Digital Collections no longer hosts its electronic collections. They are now archived by Library and Archives Canada with the caveat "*Please note, information may be out of date and some functionality lost*." In fact, the search option for species accounts appears to be non-functional with the new host. Also, please note that the citation given on the home page is in error.

From the Compendium home page one can drill down through the fish classification, ultimately to a species account (Figure 2). Each species account contains taxonomy, basic biological, ecological, conservation, and economic information, a photograph or illustration from the book or from a wide range of original sources, all with copyright permission, and references.

The Compendium remains useful as a source of selected unpublished photographs and/or illustrations of Canadian Atlantic fishes.


Figure 2. Species account for Atlantic cod, *Gadus morhua*, from Fishes of Atlantic Canada: A Photographic Compendium.

## AN ATLAS OF DISTRIBUTIONS OF CANADIAN ATLANTIC FISHES

The second ARC electronic product was "An Atlas of Distributions of Canadian Atlantic Fishes" (Welshman et al. 2003). Canada's Digital Collections, Industry Canada funded the project. This was a static product that is not updated. The atlas illustrated the distribution of each fish species (Myxiniformes to Tetraodontiformes) in the ARC collection, based solely on ARC museum specimens, following the 2003 taxonomy of FishBase. Spatial coverage (Figure 1B) was from Davis Strait southward to the boundary with the United States and from fresh water to Canada's Exclusive Economic Zone (EEZ) boundary. Temporal coverage was from the early 1900s to time of Atlas development.

Since creation of this online product Canada's Digital Collections no longer hosts its electronic collections. They are now archived by Library and Archives Canada with the caveat "*Please note, information may be out of date and some functionality lost*." In fact, the search option for species accounts appears to be non-functional with the new host. Also, various links including the link to the Compendium (above) appear to be broken.

From the Atlas home page one can drill down through the fish classification, ultimately to a species account (Figure 3). Each species account provides the common and scientific names of the species and an enlargeable map showing the distribution of ARC specimens.

The Atlas remains useful as a guide to the geographic extent of ARC holdings of Canadian Atlantic fishes.

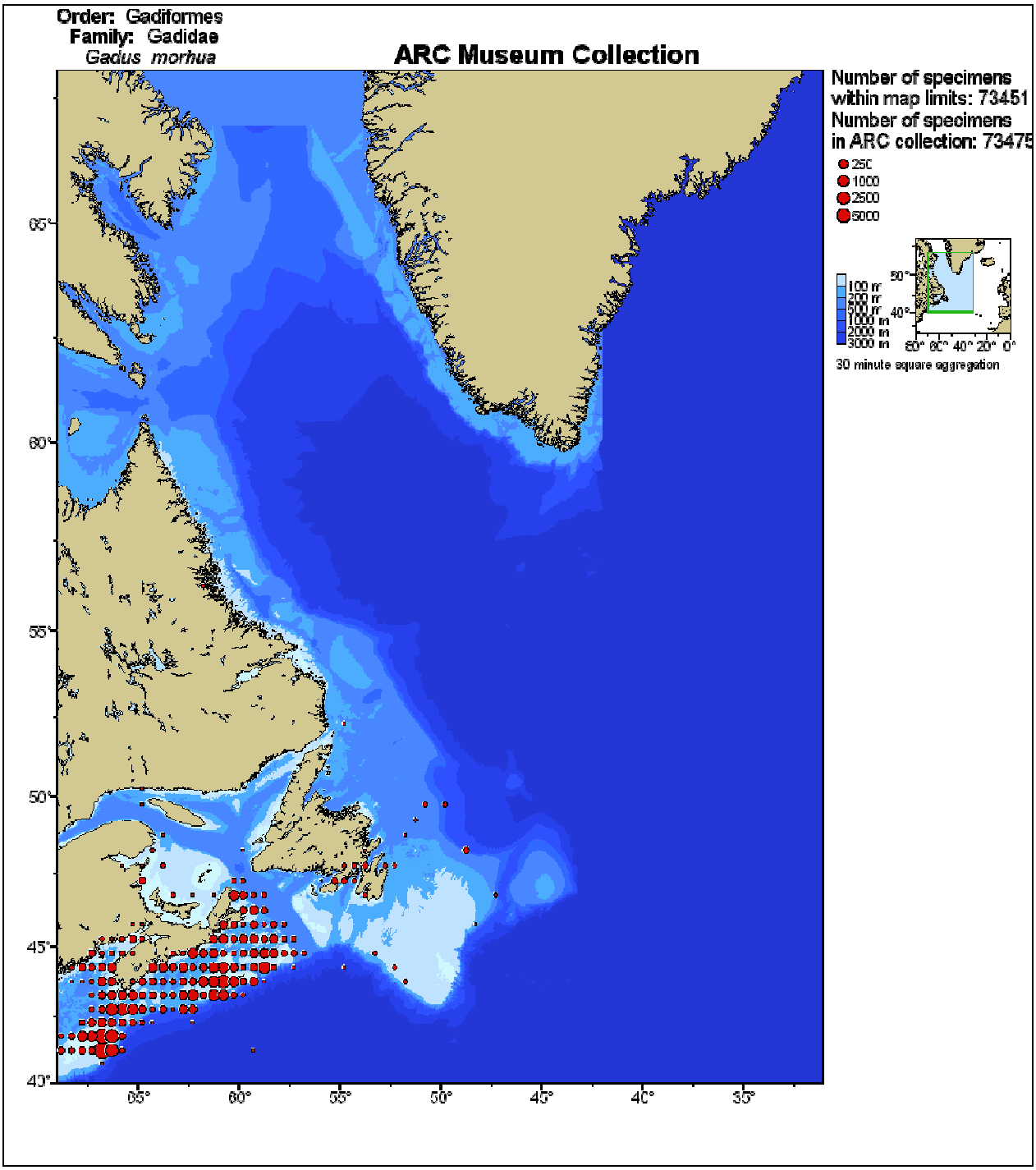


Figure 3. Species account for Atlantic cod, *Gadus morhua*, from An Atlas of Distributions of Canadian Atlantic Fishes.

## BAY OF FUNDY SPECIES INFORMATION SYSTEM

The next ARC biodiversity product, and first regional species register, was the Bay of Fundy Species Information system (Pohle et al. 2004). This was a three year endeavour funded by the New Brunswick Environmental Trust Fund. The objective was to provide the first single up-to-date source of species diversity information for the Bay of Fundy. The site was based on the ARC's two previous products, the literature, ARC museum holdings, and expert advice. Species include all those known from the Bay of Fundy to the time of project development. Spatial range included estuarine to offshore waters of the Bay from its head at Chignecto Bay and Minas Basin to a line across its mouth from the southwestern tip of Nova Scotia to the southern shore of Grand Manan Island and extended to the mainland (Figure 1C).

The result was a comprehensive register of all biota from dinoflagellates and diatoms to marine mammals from all habitats of the Bay, totalling approximately 2380 species. However, there is a lack of knowledge in certain regions and on particular groups within the Bay of Fundy, e.g. the infauna of the deep waters of the Bay. Taxonomy was standardized following Sears (1998) for algae (except dinoflagellates, diatoms, and blue-green algae), FishBase for fishes, and ITIS for remaining taxa. "Additional information provided on the taxonomy, biology and ecology of taxa includes scientific authority, synonyms, common names, reproduction, diet, predators, habitat, abundance, importance and others (e.g. discrepancies on nomenclature or taxonomic status)" (Pohle et al. 2004).

The Bay of Fundy Species Information system web site is hosted by the Centre for Marine Biodiversity (CMB) (www.marinebiodiversity.ca) with DFO technical support. The CMB is a non-profit society established in 2000 to enhance scientific capacity in support of the protection of marine biodiversity, with a focus on the Northwest Atlantic. The Bay of Fundy web site is updated periodically.

From the Bay of Fundy home page one can drill down through the classification, ultimately to a species account, or search directly for a species account (Figure 4).

This web site remains useful as a source list of Bay of Fundy species and their basic biology and ecology.

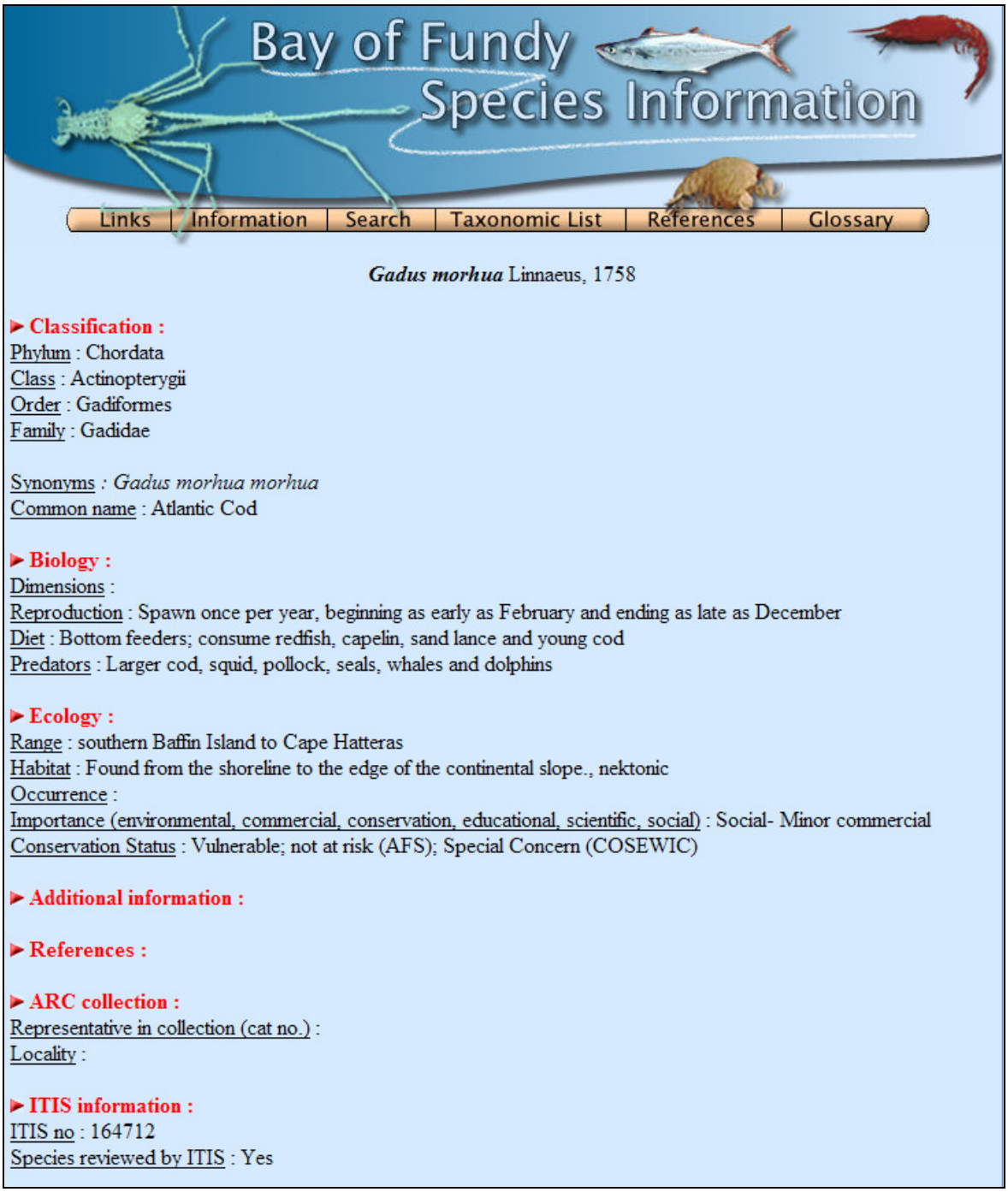


Figure 4. Species account for Atlantic cod, *Gadus morhua*, from the Bay of Fundy Species Information system.

## CANADIAN ATLANTIC REGISTER OF MARINE SPECIES

In 2003-2004 the ARC developed the Canadian Atlantic Register of Marine Species as an intern project funded by the Science and Technology Youth Internship Program of DFO. Building from the Bay of Fundy Species Information system, the objectives were to compile the first list of species known to inhabit the Canadian Atlantic as a formal register, though in preliminary form, for DFO and to form the western basis for the North Atlantic Register for Marine Species (see below).

The geographic range of this register was Davis Strait to Cape Cod (considering the Bay of Fundy and Gulf of Maine as a single system, thus overlapping U.S. waters) and estuaries or the high tide line to approximately 42ºW to include the Flemish Cap and the tail of the Grand Bank, (Figure 1B).

Content for the register was compiled from the three previous products, published and unpublished literature (mostly major compendia rather than taxonomic revisions of lower taxonomic groups, thus some names are now out of date or were missed), and the ARC museum specimen collection, all considered to be authoritative. Taxonomy followed the Bay of Fundy Information site. The resulting list of taxa was a compilation rather than an exhaustive list of species. Included were all major phyla inhabiting the Canadian Atlantic, comprising dinoflagellates and diatoms to marine mammals, totalling about 5100 species.

For each species the following information was compiled: the scientific name and author, taxonomic classification, common synonyms, common name, ITIS Taxonomic Serial Number (TSN), distribution, concentrations, and references. Additional biological and ecological information was included for species adopted from the Bay of Fundy Information web site.

This early version of the register was a static, in-house product. Later, content was incorporated into the Marine Species Registers for the Northwest North Atlantic Ocean (below).

In 2004-06 the Census of Marine Life Gulf of Maine Area Program (CoML GoMA) (www.gulfofmaine-census.org), through the University of Southern Maine, and the Coordinating Research on the North Atlantic project (CORONA) (www.biology.duke.edu/cunningham/corona/index.html), through Duke University, supported ARC development of three products from the Canadian Atlantic Register:

- the Gulf of Maine Register of Marine Species
- the Northwest North Atlantic Register of Marine Species
- the North Atlantic Register for Marine Species in collaboration with the Vlaams Instituut voor de Zee, Flanders, Belgium (VLIZ).

These efforts are presented below.

## GULF OF MAINE REGISTER OF MARINE SPECIES

A CoML GoMA objective was to gather knowledge of species inhabiting the Gulf of Maine to support investigations into biodiversity patterns. This objective lead to development in 2004 of the Gulf of Maine Register of Marine Species by selecting the subset of Canadian Atlantic Register species occurring within Gulf of Maine latitudes without regard for longitude. The Gulf of Maine was considered to include the Bay of Fundy. Taxonomic coverage was unchanged. This was a coarse approach in that deep-sea species were not excluded but was considered appropriate for the situation. The Gulf of Maine Register contained approximately 3300 species.

Content from this static version of the register later was incorporated into the Marine Species Registers for the Northwest North Atlantic Ocean (below). For this version the Gulf of Maine was defined as the Bay of Fundy and Gulf of Maine extending east to the Halifax Line, west to Nantucket Shoals, and offshore to the 1000 m contour (Figure 1C). In collaboration with the ARC, GoMA personnel developed a view of this register for their project (Incze et al. 2006).

## NORTHWEST ATLANTIC REGISTER OF MARINE SPECIES

The ARC produced the Northwest Atlantic Register of Marine Species by expanding the Canadian Atlantic Register southward to Cape Hatteras, NC. The ARC definition for the Northwest Atlantic (67 to 35°N, 42 to 77°W) (Figure 1B) roughly corresponds to the Food and Agriculture Organization of the United Nations major fishing area for the Northwest Atlantic, FAO Area 21, but excludes areas 0A and 1A to 1B. Though "Northwest North Atlantic" more accurately describes the geographic region, "Northwest Atlantic" is used herein except when referring to the web site Marine Species Registers for the Northwest North Atlantic Ocean (Van Guelpen et al. 2005) below.

Similar to the Canadian Atlantic and Gulf of Maine registers, this register was based mostly on compendia rather than taxonomic revisions of lower taxonomic groups, meaning some names are now out of date or were missed. Thus, this was another compilation rather than an exhaustive list of species. Included were all major phyla inhabiting the study area, comprising dinoflagellates and diatoms to marine mammals and approximately 6100 species. Taxonomy followed that of the Canadian Atlantic Register.

This register formed the initial content for a temporary web site "North Atlantic Register of Marine Species," with north-eastern Atlantic content to follow. However, that site was superseded by Vanden Berghe et al. 2005 with the same title (below) and is no longer available. The north-western Atlantic register content later was incorporated into the Marine Species Registers for the Northwest North Atlantic Ocean (Van Guelpen et al. 2005) (below).

## MARINE SPECIES REGISTERS FOR THE NORTHWEST NORTH ATLANTIC OCEAN

The ARC produced, with the assistance of DFO, a web site for the four ARC registers (Bay of Fundy, Gulf of Maine, Canadian Atlantic, Northwest Atlantic) within the north-western North Atlantic (Van Guelpen et al. 2005). This site, Marine Species Registers for the Northwest North Atlantic Ocean, was the first attempt, to our knowledge, to describe the species diversity of this vast marine region.

The Marine Species Registers site is hosted by the CMB with DFO technical support. The home page provides a link to the Bay of Fundy Species Information site. Also on the home page is a Classification tab providing a choice of the other three registers, each leading to a spreadsheet of species giving scientific name, author, classification, synonyms, common name, and ITIS TSN. The Search function allows the user to select a scientific or common name and which register to search. Results provide the previous information plus biology, ecology, and references (Figure 5).

Managing these four regional registers as separate spreadsheets was cumbersome. Consequently, in 2005 they were consolidated into a Microsoft® Access database consisting of a single species list following the established taxonomic standards, but incorporating a “tick-off” column for each regional register. This database became the working version of the Canadian Atlantic registers. The CMB Marine Species Registers web site was redesigned to display data from the new database and is updated periodically.

This web site remains useful as a synopsis of species diversity of these four Canadian Atlantic regions.

***Thysanoessa inermis*** (Kroyer, 1846)

**Classification :**
Phylum : Arthropoda (Sub: Crustacea)
Class : Malacostraca (Sub: Eumalacostraca)
Order : (Super: Eucarida) Euphausiacea
Family : Euphausiidae

Synonyms : *Thysannoessa inermis, according to Mauchline and Fisher 1969*
Common name :

**ITIS information :**
ITIS Taxonomic serial number : 95573
ITIS Reviewed : No
ITIS Included species : Yes

**Biology :**
Dimensions :
Reproduction :
Diet :
Predators :

**Ecology :**
Range : Arctic to Gulf of Maine
Concentrations : abundant throughout the species range.
Habitat : upper and glacial epipelagic regions of the Gulf and estuary, and the upper Mesopelagic of the Gulf and estuary

Mode of Life :
Importance :
Conservation Status :

**Comments :**

**References :**
Brunel et al., 1998, ITIS, Trott (in press), Mauchline and Fisher 1969

Figure 5. *Thysanoessa inermis* search option results for Marine Species Registers for the Northwest North Atlantic Ocean.

## NORTH ATLANTIC REGISTER FOR MARINE SPECIES

The objective of the CORONA project was to examine the historical ecology of the temperate North Atlantic Ocean by comparing the ecology of taxa found on the very different coasts of the northwest and northeast North Atlantic. This objective fostered the development of the North Atlantic Register for Marine Species. The preliminary version of this register, mentioned above, was replaced by Vanden Berghe et al. (2005). The new register was a collaborative project of the ARC and VLIZ and is hosted and maintained by the latter.

To form the North Atlantic Register the content of the Northwest Atlantic Register was combined with that of the European Register of Marine Species (Costello et al. 2001, 2004) of VLIZ, using the taxonomy of the latter. The European Register spans the continental shelf seas of Europe from the Canaries and Azores to Greenland and northwest Russia, including the Mediterranean shelf and Baltic Sea, from approximately the 3000 m depth contour to the strandline or splash zone above the high tide mark and down to 0.5 (psu, ppt) salinity in estuaries. The geographic range for the North Atlantic Register is Davis Strait to Cape Hatteras in the west and the Arctic to North Africa in the east (Figure 1A).

The goal of web site functionality for species in either, or common to both, the northeast and northwest Atlantic was achieved (Figure 6). The web site remains useful for amphi-Atlantic comparisons.

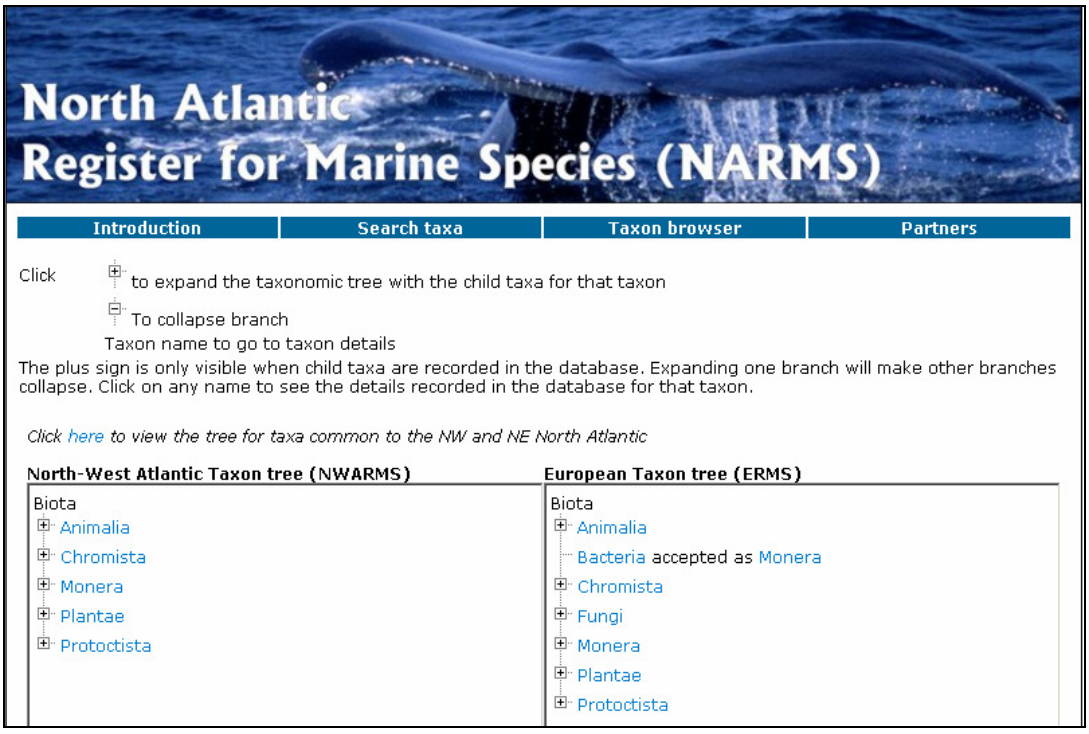


Figure 6. North Atlantic Register for Marine Species Taxon Browser.

## REGISTER MAINTENANCE - INFORMATION VALIDATION

The result of efforts by the ARC and its collaborators by 2005 was a geographically nested set of species registers for the North Atlantic, Northwest Atlantic, Canadian Atlantic, Gulf of Maine, and Bay of Fundy. However, the taxonomy and distribution of each species required authoritative validation. This large task was undertaken as funding permitted. ARC updates of species taxonomy and distribution are based on authoritative sources described previously. Web sites such as WoRMS, ITIS, FishBase, and others that are taxon-specific are respected sources of taxonomic information, however, occasionally there is disagreement among them and some are not yet up to date for all taxonomic groups. Taxonomic problems which cannot be resolved by ARC taxonomists are forwarded to experts of respective taxonomic groups for resolution, then to the taxonomic editors of online standardized nomenclature as recommendations. Taxa which remain unresolved are noted as such.

The knowledge of species diversity, represented by regional species lists, for example, has been recognized within DFO as a foundation for effective management of marine species using an ecosystem approach. Furthermore, discovering, accessing, and utilizing DFO diversity information necessitates standardization of taxonomy within and among regions. It is recognized within DFO that linking departmental data collections to an authoritative taxonomic source such as ITIS or WoRMS is a necessary step to standardizing taxonomy and sharing datasets (Branton et al. 2007, Kennedy and Bajona 2009). However, linking to an authoritative taxonomic source does not verify that a species is known from a sampling area. This is the purpose of an up to date regional species register. The process of maintaining marine species registers and validating their content is expensive and requires specialized knowledge. It is widely recognized within DFO that committing funding to registers held by organizations external to the department is increasingly difficult to justify, yet the expertise to continue their development generally is lacking within the department. The ARC had species registers for the Canadian Atlantic region but funding to verify species names and distributions and to update the registers was a problem. For all these reasons an agreement was reached in September 2008 to transfer management of ARC species registers to DFO Maritimes.

## THE CANADIAN REGISTER OF MARINE SPECIES

The ARC nested set of registers was imported into a relational database and forms the basis for a new Canadian Register of Marine Species. The DFO National Science Data Management Committee, in the spring of 2009, initiated nationally the use of taxonomic standards within the Science Branch of DFO and the development and implementation of best-practice procedures for the quality control of biological names. As part of this project the Canadian Register of Marine Species was developed to contain detailed distribution records for taxa found in Canada's three oceans: the Atlantic, the Arctic and the Pacific. This register has since been expanded to include estuarine and freshwater taxa to encompass all DFO data collections. The objective of the register was to compile and manage an authoritative list of species names, with authoritative distribution records, occurring in geographical areas of interest to Canadian scientists and to establish a standard reference for aquatic biodiversity research, conservation and sustainable management.

The register is not restricted to species from Canadian regions, as areas of interest to Canadian scientists may fall outside of Canadian waters. Historically the area defined for oceanographic data exchange between DFO's Integrated Science Data Management group and the U.S. National Oceanographic Data Center has been 35 to 90°N and 40 to 180°W. This area definition forms the Canadian area of interest for the Canadian Register of Marine Species (Figure 1A).

Content from the Canadian Register of Marine Species is shared with the parent "world" register, WoRMS. The objective of WoRMS is to provide an authoritative and comprehensive global list of names of marine organisms, including information on synonymy. The Canadian Register of Marine Species was not designed to track changes in taxonomy. Each record in the register contains the ITIS TSN and the WoRMS taxonomic database AphiaID for linkage to content from those databases.

VLIZ hosts the Canadian Register of Marine Species website (Kennedy et al. 2010), provides data management support and services, and (in conjunction with WoRMS) provides tools on the web page for the user to:

- create authoritative checklists of taxa for specific geographical regions
- extract enriched metadata such as standard numeric codes (the WoRMS AphiaID or the ITIS TSN), obtain valid taxonomic names and associated taxonomic hierarchy
- provide a list of authoritative literature associated with taxon distribution
- display the statistics related to the taxonomic coverage of the register
- access and contribute to a photo gallery for images of taxa.

The Editorial Board of the Canadian Register of Marine Species consists of taxonomic and data management experts. Distribution records for names listed in the database have been, or are being, checked and updated by local taxonomic experts. The Editorial

Board does not have direct authority to modify taxonomic information in WoRMS, however, the editors may collaborate with WoRMS taxonomic editors to effect changes.

Duties to be performed by the Editorial Board are to:

- review unverified register records by assigning authoritative notes
- compile distribution notes for areas of interest to DFO scientists
- compile taxonomic notes for taxa not included in the ITIS and/or WoRMS databases for unverified taxa and for taxa with out-of-date information
- compile information associated with taxonomic records in ITIS and/or WoRMS such as feeding type, morphology, or invasive status
- assign the terms fresh, brackish and marine to entries in the register
- provide advice in the mapping of species lists to the register to standardize taxonomy, and provide standard codes for mismatches due to variations in spelling of the taxonomic name or missing or misspelled authorship
- provide advice on the mapping of non-taxonomic terms to controlled vocabulary lists.

Authoritative sources used in performing these tasks will be fully referenced in the Canadian registers.

## DISCUSSION

An objective of local species registers is to provide a verified list of all names from a given area against which species lists from samples collected within this area can be compared. Therefore, the geographic range of a register must be defined. The first release of the Canadian Register of Marine Species contained distribution information for areas in the northwest Atlantic. Subsequent releases of the register contain distribution records of aquatic taxa for other areas of interest to Canadian research including our three oceans plus freshwater and estuarine areas.

We recommend that species lists resulting from research surveys be compared to local registers within the Canadian Register of Marine Species for quality control of content. A species name in a list that is not in the local register requires identification verification. Once verified, please contact the Editorial Board of the Canadian Register of Marine Species (contact information is given on the web site).

The Editorial Board will maintain the new Canadian registers but is aware that they may not be complete and may contain errors. The board cannot be held responsible for any errors or misuse of data contained in these registers. Comments from our users are more than welcome, so if you find incorrect or incomplete information, or you are willing to contribute to this initiative, please contact the Editorial Board.

The need for up-to-date species registers to standardize taxonomy, quality control results of research surveys, and enable higher level analyses is recognized within DFO and has been emphasized herein. The basis for departmental regional species registers is in place in the form of the new Canadian register. Now it is necessary to update missing, changed, and new species, to validate species names in terms of taxonomy

and distribution, and to incorporate regional registers across Canada to optimize the value of expensive historic and ongoing research surveys.

## ACKNOWLEDGEMENTS

These marine species registers for the North Atlantic Ocean were inspired by Dr. Mark Costello, former Executive Director of the Huntsman Marine Science Centre, Chair of the Steering Committee for WoRMS, and First Chairman of the OBIS International Committee and Member of the iOBIS Governing Board.

Financial and/or technical support were provided by Canada's Digital Collections of Industry Canada, the New Brunswick Environmental Trust Fund, DFO through its Science and Technology Youth Internship Program and the National Science Data Management Committee, the Centre for Marine Biodiversity, CoML through the University of Southern Maine, the CORONA project through Duke University, and VLIZ.

We particularly thank Lew Incze, Peter Lawton, and Nick Wolff of CoML GoMA for their contributions towards compilation and verification of these species registers.

Members of the Centre for Marine Biodiversity and OBIS Canada technical teams and the DFO National Science Data Management Committee Taxonomic Standards steering committee provided technical assistance with the various web products and with the development of the Canadian Register of Marine Species database.

Finally, we would like to thank Bart Vanhoorne and Ward Appeltans of the WoRMS database management team for their patience and guidance as we migrate from registers which are regional in scope to a truly Canada-wide product.

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