Publications of Science Branch, Northwest Atlantic Fisheries Centre, St. John's, Newfoundland - 1985 to 2000

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June 2002

Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 2610





Canadian Manuscript Report of Fisheries and Aquatic Sciences

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Numbers 1-900 in this series were issued as Manuscript Reports (Biological Series) of the Biological Board of Canada, and subsequent to 1937 when the name of the Board was changed by Act of Parliament, as Manuscript Reports (Biological Series) of the Fisheries Research Board of Canada. Numbers 901-1425 were issued as Manuscript Reports of the Fisheries Research Board of Canada. Numbers 1426-1550 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Manuscript Reports. The current series name was changed with report number 1551.

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Rapport manuscrit canadien des sciences halieutiques et aquatiques

Les rapports manuscrits contiennent des renseignements scientifiques et techniques qui constituent une contribution aux connaissances actuelles, mais qui traitent de problèmes nationaux ou régionaux. La distribution en est limitée aux organismes et aux personnes de régions particulières du Canada. Il n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques du ministère des Pêches et des Océans, c'est-à-dire les sciences halieutiques et aquatiques.

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Les rapports manuscrits sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

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Correct citation for this publication:

Coady, L.W., Drover, M.A., and Janes, F.T. 2002. Publications of Science Branch, Northwest Atlantic Fisheries Centre, St. John's, Newfoundland - 1985 to 2000. Can. Manuscr. Rep. Fish. Aquat. Sci. No. 2610: iv + 187 p.

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Abstract

Coady, L.W., Drover, M.A., and Janes, F.T. 2002. Publications of Science Branch, Northwest Atlantic Fisheries Centre, St. John's, Newfoundland - 1985 to 2000. Can. Manuscr. Rep. Fish. Aquat. Sci. No. 2610: iv + 187 p.

This report lists publications of Science Branch, Department of Fisheries and Oceans (Newfoundland Region) for the period 1985 to 2000. The listing includes primary, interpretive, scientific, technical and popular articles. Selected analyses of publication trends are developed in the text.

Résumé

Coady, L.W., Drover, M.A., and Janes, F.T. 2002. Publications of Science Branch, Northwest Atlantic Fisheries Centre, St. John's, Newfoundland - 1985 to 2000. Can. Manuscr. Rep. Fish. Aquat. Sci. No. 2610: iv + 187 p.

Le présent rapport recense les publications de la Direction des sciences, ministère des Pêches et des Océans (Région de Terre-Neuve) de 1985 à 2000. Leur liste comprend des articles de fond, des articles explicatifs, scientifiques ou techniques et des articles de vulgarisation. Certaines tendances en matière de publications sont analysées dans le texte.

INTRODUCTION

In 1930, Dr. Harold Thompson, a scientist with Scottish Fisheries, visited Newfoundland under the auspices of the Empire Marketing Board to investigate fishery research requirements in Britain's oldest colony. It was Thompson's report "A Survey of the Fisheries of Newfoundland and Recommendations for a Scheme of Research" that led to the establishment of a Biological Laboratory at Bay Bulls, just south of St. John's, in 1931. From this start, an active fisheries research program has continued to the present day.

Throughout its history, the organization has been involved in the acquisition and interpretation of biological and other knowledge essential to the management of marine and freshwater resource species and their environment. Research capabilities have expanded northward and offshore in concert with a growing multinational fishery and present day activities extend geographically from the Gulf of St. Lawrence and Grand Banks to the Labrador Sea and Davis Strait (Fig. 1).

Fisheries research programs in Newfoundland today are administered from the Northwest Atlantic Fisheries Centre in St. John's. A fundamental measure of scientific achievement is found in the organization's publication record. This document lists publications of Science Branch, Department of Fisheries and Oceans [Newfoundland Region] for the period 1985 to 2000. It jupdates:

Coady, L.W., and Maidment, J.M. 1985. Publications of the Fisheries Research Branch, Northwest Atlantic Fisheries Centre, St. John's, Newfoundland -1931 to 1984. Can. Manuscr. Rep. Fish. Aquat. Sci. 1790; v + 159 p.

MILESTONES

Selected milestones having a bearing on research programs since 1931 are presented in Table 1 and include administrative changes, vessel deployments and various national and international initiatives. An overview of milestones for the period 1931 to 1984 was provided in Coady and Maidment (1985).

In 1986, physical oceanography and hydrography programs were established in Newfoundland as part of a national science integration initiative. Fisheries ecology and environmental programs were also expanded and in 1987 a national Centre of Disciplinary Expertise (CODE) in Resource Assessment and Survey Methodology was established in St. John's. The addition of the ice-strengthened TELEOST to the research vessel fleet in 1994 improved deepwater, multi-species and hydroacoustic survey capabilities. The promulgation of the Oceans Act in 1997 reaffirmed Canada's role in oceans and marine resource management and led to organizational adjustments in Fisheries and Oceans shortly thereafter. Table 1. Selected milestones, 1931-2000.

1931	Establishment of Biological Laboratory, Newfoundland Fishery Research Commission at Bay Bulls. Newfoundland.
1931-36	Dr. H. Thompson, Director.
1931-35	Trawler CAPE AGULHAS contracted part time for fisheries surveys.
1934	Fisheries Research Commission dissolved by new Commission of Government. Organization renamed Fisheries Research Laboratory, Division of Fishery Research
	Newfoundland Department of Natural Resources
1936	Research staff relocated from Bay Bulls to Court House, St. John's as part of Government Analyst's Laboratory
1937-43	Dr. W.F. Hampton Director
1937	Bay Bulls Laboratory destroyed by fire on April 19, 1937
1940	New laboratory opened at the east end of Water Street St. John's
1944-72	Dr. W. Templeman. Director
1946 70	25m (82 ft.) INVESTIGATOR II employed as first full-time research vessel
1946-70	15m (50 ft) PARR employed as full-time research vessel (named GRILSE prior to 1950)
1949	Formation of International Commission for the Northwest Atlantic Fisheries (ICNAF).
1949	Organization renamed Newfoundland Biological Station, Fisheries Research Board of Canada (FRBC) upon Newfoundland's Confederation with Canada.
1953-74	20m (65 ft) MARINUS employed as full-time research vessel.
1958-83	54m (177 ft) A.T. CAMERON employed as full-time research vessel.
1964	Canada adjusted its traditional three-mile limit to encompass twelve miles.
1968	Canada became member of the International Council for the Exploration of the Sea (ICES).
1971	Newfoundland Technological Unit joined Newfoundland Biological Station.
1972-75	Dr. A.W. May, Director.
1972	Administrative and programming responsibilities for the Newfoundland Biological
	Station transferred from FRBC to the Research & Development Directorate of the Fisheries and Marine Service. Department of Environment.
1973-74	Introduction of groundfish TACs (total allowable catches) by ICNAF.
1975-present	23m (75 ft) SHAMOOK employed as full-time research vessel.
1975-78	A.M. Fleming, Director.
1975	Organization renamed Research & Resource Services.
1975	Resource Development Branch joined Research & Resource Services.
1977	Canada declared 200 mile zone of Extended Fisheries Jurisdiction.
1977	Formation of Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC).
1977-95	80m (264 ft) <i>GADUS ATLANTICA</i> employed as long-term charter for offshore fisheries research.
1978-81	E.J. Sandeman, Director.
1978-96	21m (70 ft) MARINUS employed as full-time research vessel replacing first MARINUS.
1978	Staff relocated to Northwest Atlantic Fisheries Centre (NAFC), White Hills, St. John's, Nfld.
1979	ICNAF replaced by Northwest Atlantic Fisheries Organization (NAFO).
1979	Research & Resource Services transferred from Department of Environment to new Department of Fisheries and Oceans.

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Cont'd.

Table 1 (Cont'd.)

1981-90	M.C. Mercer, Director.
1981	Research responsibilities in the Gulf of St. Lawrence transferred from
	Newfoundland Region to new Gulf Region.
1982	Research & Resource Services renamed Fisheries Research Branch.
1982-present	50m (165 ft) <i>WILFRED TEMPLEMAN</i> employed as full-time research vessel replacing <i>A.T. CAMERON</i> .
1983	46 th Annual Meeting of the American Society of Limnologists and Oceanographers (ASLO) held in St. John's.
1986	Fisheries Research Branch renamed Science Branch as part of national science integration initiative. Oceanography and hydrography programs established in St. John's.
1987-90	35m (115 ft) <i>MAXWELL</i> assigned to Newfoundland Region for coastal hydrographic mapping
1987	Appointment of Task Group on the Newfoundland Inshore Fishery (TGNIF) chaired by Dr. L. Alverson
1989	Appointment of Panel – Independent Review of the State of the Northern Cod Stock, chaired by Dr. J. Harris
1990-96	L.W. Coady Director
1990-95	Northern Cod Science Program (Atlantic Fisheries Adjustment Program) funding
	provided to address recommendations of Harris Northern Cod Review Panel.
1991	51m (168 ft) <i>MATTHEW</i> employed as hydrographic vessel replacing <i>MAXWELL</i> . Vessel transferred to Scotia-Fundy Region.
1992	Moratorium on the northern cod fishery announced by Minister of Fisheries and Oceans (NAFO Divisions 213KL)
1992	Moratorium on the commercial Atlantic salmon fishery in insular Newfoundland.
1992	Fisheries Resource Conservation Council (FRCC) established replacing the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) and the Atlantic Groundfish Advisory Committee (AGAC).
1992	Court of Arbitration decision on the determination of maritime areas between Canada and the Republic of France with respect to the islands of St.Pierre and Miquelon off the south coast of Newfoundland.
1993	Moratorium on south coast Newfoundland cod fishery announced (NAFO Subdivision 3Ps).
1993	Responsibility for science activities in western Newfoundland and southeastern Labrador returned to Newfoundland Region.
1994	82 nd Statutory Meeting of the International Council for the Exploration of the Sea (ICES) held in St. John's.
1994-present	63m (207 ft) <i>TELEOST</i> employed as full-time research vessel replacing <i>GADUS ATLANTICA</i> .
1994	Habitat Management (formerly in Fisheries Management Branch) joined Science Branch.
1995	Moratoria on major Grand Banks groundfish fisheries announced (NAFO Divisions 3LNO American plaice, 3LNO yellowtail flounder, 3NO cod).
1997	Oceans Act promulgated reaffirming Canada's role in oceans and marine resource management.
1997	Moratorium on the commercial Atlantic salmon fishery in Labrador.
1999-present	D.B. Atkinson, Regional Director.
2000	Science Branch renamed Science, Oceans & Environment Branch.



Figure 1. Northwest Atlantic research area – Science Branch, Department of Fisheries and Oceans (Newfoundland Region).

Administrative arrangements relative to stock assessment and fisheries management have changed dramatically in the past decade. In 1989, the Minister of Fisheries and Oceans created an independent Panel, chaired by Dr. L. Harris, to consider available scientific information and the state and size of the northern (NAFO 2J3KL) cod stock. Recommendations of the Panel led to the establishment of a five-year Northern Cod Science Program (1990-95) enabling new initiatives and broader partnerships with universities, the fishing industry and the private sector. With continuing declines in the northern cod stock in the early 1990s, a fisheries moratorium was imposed in 1992. This led to the establishment of an advisory Fisheries Resource Conservation Council (FRCC). The FRCC replaced both the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) and Atlantic Groundfish Advisory Committee (AGAC) which had overseen fisheries management since extended jurisdiction in 1977. Fisheries moratoria for other groundfish stocks ensued - South Coast cod in 1993, Grand Bank plaice, yellowtail and cod in 1995. Marine fisheries for Atlantic salmon were also closed in 1992 on the island and in 1997 in Labrador.

The Canada-France boundary issue on the south coast of Newfoundland was resolved in 1992, changing approaches to the assessment and management of St. Pierre Bank (3Ps) stocks, primarily groundfish and scallops. An international working group has been established to review scientific information on stocks harvested by both countries.

As groundfish stocks diminished in importance in the 1990's, invertebrate fisheries, notably crab and shrimp, increased in importance. From 1987 to 1991, shellfish represented 26% (average) of revenue distribution in the Newfoundland fishery. By 2000, the overall value for shellfish had increased to 83%.

PUBLICATION LISTS

Publication lists were developed from internal records, library sources and national/international databases and circulated to staff to ensure completeness. Citations follow the current style, punctuation and format of the Canadian Journal of Fisheries and Aquatic Science. Careful attention was given to the proper use of abbreviations for journals (using BIOSIS Serial Sources) and volumes/paginations were checked for accuracy.

Publications listed in this report (Appendix 1) were prepared by researchers while employed by Science Branch. Any papers prepared by staff prior to taking positions with the Branch, or after leaving, are excluded regardless of topic, data sources or mailing addresses appearing in the article. Scientific publications authored by external staff but based on work funded by the Branch have been included.

CATEGORIZATION

For purposes of analysis, publications were grouped in four categories, as follows:

1. Primary publications

Primary publications are those reporting original findings and data for the first time in formally refereed and edited publications that are usually part of a regular journal series receiving general or unlimited distribution and that are usually abstracted and indexed routinely. Original research papers presented at symposia and that are published in their entirety, after formal refereeing and editing, in special proceedings of the symposium, are included in this category.

2. Interpretive scientific publications

These publications review a particular subject area or develop a comprehensive picture synthesized from a broad range of findings, part of which may be reported by the author for the first time and part of which may be synthesized from previously published works of others. This category includes critical reviews, chapters in books or entire books, perspectives, bulletins and other monographic works, special publications, etc., which are usually refereed and edited and which receive general or unlimited distribution and are usually abstracted and indexed routinely.

3. Scientific and technical reports

This category covers scientific and technical material intended for distribution of a more limited nature than for primary or interpretive categories. It would contain information which would not be acceptable as research journal or interpretive scientific publications and may be targeted to scientists, industry, policy makers and other special interest groups. Material is not usually refereed externally and is generally produced locally at individual institutions in limited numbers. Examples of such material are Canadian stock assessment documents, Northwest Atlantic Fisheries Organization (NAFO) research documents and NAFO Scientific Council Studies, Technical - Data -Manuscript - Hydrography - Contract Reports in the DFO Report Series, International Council for the Exploration of the Sea (ICES) reports and technical circulars. Conference proceedings, workshop reports, university theses and similar publications that are not refereed to journal standards are also included in this category.

4. Popular and miscellaneous publications

This material is written for distribution to audiences that generally differ from those for primary, interpretive and scientific or technical categories. Popular articles are targeted to clients needing an understanding of research projects and science in general. They are written in such a way that a generally non-scientific audience can readily grasp the information without having to wade through the maze of technical details. The content would have some long-term value. Included would be fact sheets and magazine or newspaper items. Articles of a more miscellaneous nature would be book reviews, letters, editorials and obituaries.

Abstracts, working papers and posters were not considered publications for purposes of the present review. Papers presented at symposia were not listed unless included in formal proceedings receiving wide distribution. Proceedings material receiving only limited distribution among conference participants or member mailing lists was excluded.

SCIENTIFIC STAFF

The use of person-year utilization figures, rather than annual allocations of scientific person-years, vastly improves the analysis of publication trends.

A list of scientific staff employed by the Branch for the seventy year period 1931 to 2000 is provided in Appendix 2 and represents an update of the listing provided in Coady and Maidment (1985). Arrival and departure dates were developed from annual reports, administrative records and personal contacts and used to develop person-year utilization figures for various analyses. Extended periods of leave or assignment outside the Branch were excluded. No adjustments were made for educational leave as research responsibilities are maintained during these periods.

The following classification groups [continuing full-time and term <u>only</u>] were defined as scientific staff:

RES	aa. aa	research scientist
BI		biologist
CH	aar 001	chemist
REM		research manager
CS		computer scientist
PC		physical scientist
ENG		engineer
ENG-SUR		survey engineer
EX		executive manager

Visiting [post-doctoral] fellows employed by the Branch for one to two year periods were included as were staff who continued in Scientist Emeritus positions following retirement. Visiting scientists from other laboratories and casual or contract employees were not listed. A small number of scientific staff in support roles [some CS-PC-ENG personnel] who do not usually author publications are included in the list of scientific staff but excluded in the analyses of publication trends.

The rules employed for person-year utilization as described above, are similar to those used in the Coady and Maidment (1985) review, enabling examination of long-term trends.

The organization of scientific staff from 1985 to 2000 is presented in Appendix 3. In conjunction with milestones listed in Table 1, organizational arrangements, by Division, depict changing research priorities and directions.

FINDING AID

A finding aid, matching publication topics to authors is provided in Table 2. Readers should <u>also</u> note:

- Annual Program Review and Evaluation (PRE) documents describing research activities on a project-by-project basis were prepared from 1985 to 1994-95, switching from calendar year to fiscal year reports starting in 1992-93. These are listed in Appendix 1 under *Anon*. and were compiled/edited by science coordination staff attached to the Director's Office.
- Since 1985, research documents for Canadian stock assessments appear in several series: CAFSAC (Canadian Atlantic Fisheries Scientific Advisory Committee) to 1992 (inclusive), AFISH (Atlantic Fisheries) 1993 to 1996 and CSAS (Canadian Stock Assessment Secretariat) 1997 to present. Stock status reports were instituted under AFISH in 1996 and continued under CSAS. Proceedings documents appear under CSAS starting in 1997. All stock status and proceedings documents appear, in Appendix 1, under DFO.
- For stocks managed by NAFO (Northwest Atlantic Fisheries Organization), the reader is referred to the NAFO SCR Doc.Series and NAFO Scientific Council Studies Series. Annual Canadian summaries of research activities, including specific sections for the Newfoundland Region, appear in the NAFO SCS Doc. series. Regional scientists also avail of the NAFO Journal (J. Northw. Atl. Fish. Sci.) for primary material.
- Canada has been a member of ICES (International Council for the Exploration of the Sea) since 1968 and regional scientists are active members of ICES Working Groups and other committees. Contributions to annual ICES Statutory Meetings appear in the ICES C.M. Series. The ICES Journal (ICES J. Mar. Sci.) is used, for primary material.
- Primary publications produced by regional scientists since 1985 appeared in more than 250 different international journals. This represents a substantial increase from the period 1950 to 1984 where only 85 or so journals were used (Coady and Maidment, 1985). The ten most commonly used journals since 1985 were as follows:

Can. J. Fish. Aquat. Sci.	22% of primary publications
J. Northw. Atl. Fish. Sci.	6%
ICES J. Mar. Sci.	4%
Can J. Zool.	3%
N. Am. J. Fish. Manage.	3%
Mar. Ecol. Prog. Ser.	2%
J. Fish. Biol.	2%
Fish. Res.	2%
Fish. Bull.	2%
Trans. Am. Fish. Soc.	2%

Only four of these journals appeared in the "top ten" for the period prior to 1985. Both Can. J. Fish. Aquat. Sci. and J. Northw. Atl. Fish. Sci. retain their positions as the two most commonly used journals. Can. J. Zool. and Trans. Am. Fish. Soc. remain on the list, both slipping one notch lower in the list of ten.

- The Departmental Report Series, which includes Technical, Manuscript, Data, Industry, Hydrography/Technical and Hydrography/Data Reports, remains popular with regional scientists with an average of ten contributions per annum between 1985 and 2000 (no change from preceding decade).
- Environmental assessment submissions to federal review Panels for major projects (eg. Hibernia offshore oil, Terra Nova offshore oil, Voisey's Bay Mine-Mill) appear in Appendix 1 under Anon.

ANALYSES

PUBLICATIONS BY CATEGORY

A breakdown of Science Branch publications by category is provided in Table 3. Total numbers are shown in Part A of the table with corresponding percentages in Part B.

In the sixteen year period 1985 to 2000, the Branch averaged 195 publications per annum with generally higher numbers in the 1993 to 1997 period associated with Northern Cod Science Program funding. Total publications exceed 3,100 listings.

On average, primary publications represent 27% of annual totals, although levels have <u>declined</u> (average 22%) since 1998. Interpretive scientific material varies from 1 to 3% per annum. Scientific and technical reports, largely stock assessment documentation, represent 65 % and popular and miscellaneous 6%.

While scientific and technical reports average 65 % of total publications since 1985, the five-year period 1996 to 2000 shows general increases of about 10 %. This can be explained by the introduction of stock status reports and proceedings in the mid-1990s.

Table 2. Finding aid matching publication topics to authors (names in brackets are first authors outside of Science Branch).

Topic	Authors			
American plaice	Atkinson, Baird, Bowering, Brodie, Maddock Parsons, (McClintock), Morgan, Power, Walsh			
Atlantic halibut	Bowering, (Neilson), (Trumble)			
Atlantic salmon biology and assessment	Ash, Bourgeois, (Cairns), Dempson, Downton, Gibson, Hutchings, Lear, Mullins, Myers, O'Brien, O'Connell, Pippy, Porter, Reddin, Ryan, Shelton, Stansbury, Warren			
West Greenland productive capacity enhancement creel survey	(Friedland), Millar, (Potter), (Rago), Reddin, (Russell) Clarke, Gibson, (Knoechel), Porter, Ryan, Scruton Anderson T., Bourgeois, (Gibbons), Pepper, O'Connell Hoenig, (Pollock)			
Aquaculture salmonids shellfish fish heath	Anderson M., Penney, Pepper, (Tlusty), (Shahidi) Penney, Naidu, Schwinghamer Banoub, Shaw			
Arctic char	Dempson, (Hammar), LeDrew, (Radtke), Shears			
Arctic (polar) cod	Baird, Bowering, Lear, (Lidster), Lilly			
Assessment methodology	Barrowman, Cadigan, Evans, Fahrig, Hoenig, Millar, Myers, (Restrepo), Rice, Shelton			
Brook trout	Clarke, Gibson, Orr, Ryan, (Thonney), Scruton			
Capelin biology and assessment early life history aerial photography	Anderson J., Atkinson, Carscadden, Dalley, (Frank), Hoenig, Lilly, Miller, Mowbray, Nakashima, (O'Driscoll), Shackell, Shelton, Wheeler, Winters Anderson J., Carscadden, Dalley, (Frank), Nakashima (Borstad), Nakashima			
Clams	Lilly, Naidu			
Cod biology and assessment juvenile cod food and feeding tagging studies	Atkinson, Baird, Bishop, Brattey, Brodie, Cadigan, Davis, Evans, Hutchings, Kulka, Lear, (McClintock), Morgan, Murphy, Myers, Pinhorn, Rice, Rose, Shelton, Stansbury, Taggart, Wells, Winters, Xu Anderson J., Dalley, Davis, Gregory, Lilly. (Methven), Murphy DeBlois, Fahrig, Lilly Barrowman, Brattey, Cadigan, Hoenig, Lear, Myers, Rice, Taggart			
behaviour and physiology Environmental sciences habitat research toxicology acid rain	(Goddard), Kiceniuk, Morgan, Rose Anderson M., (Bradbury), Clarke, Gibson, Goosney, McCubbin, Roberge, Scruton Banoub, Fancey, Hellou, Kiceniuk, Morgan, Payne, Ray, Willliams, (Yuen) Coady, (Earle), Ryan, Scruton, Shaw			
	Cont'd			

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Cont'd.

Table 2 (Cont'd.)

Торіс	Authors		
Fisheries ecosystems plankton	Anderson J., Dalley, Evans, Myers, Paranjape, Penney, (Rivkin), Shelton		
benthos	Gilkinson, (Gordon), (Prena), Rowell, Schwinghamer		
chemical oceanography	Pepin		
early life history seabird-fisheries	Anderson J., Dalley, Gregory, Hoenig, Myers, Pepin, Rice, Taggart		
interactions	(Montevecchi), Myers (Comera) (Hardrick), Diag Dinkom		
jish assemblages	(Gomes), (Haedrich), Rice, Pinnom		
Fisheries management			
systems	(Halliday), Pinhom		
Gear technology/ comparative fishing	Cadigan McCallum Millar Stansbury Walsh Warren		
	Caoigan, mocanain, milai, Stanooary, Wallin, Walton		
Genetics Arctic char	(Bernatchez), Dempson, (Hammar), Verspoor		
capelin	Carscadden, (Dodson)		
cod	(Beacham), Bishop, Brattey, Pepin, (Ruzzante), Taggart		
Greenland halibut	Bowering, (Vis)		
parasites	Brattey		
redfish	Power (Reacham) Demoson Reddin, Vertuger		
saimon	(Deachain), Dempson, Kedum, Verspoor		
scallops	(Kenchington) Naidu		
shrimn	Parsons		
general	Bourgeois, (Khan), Millar, Pippy		
Greenland halibut	Baird, Bowering, Brodie, Cadigan, (Chumakov), Kulka, Lilly, Morgan, Orr, Power		
Grenadier	Atkinson, Kulka, Morgan, Power, (Savvatimsky), Templeman		
Groundfish commercial sampling	Davis, (Inkpen), Kulka, Stevenson		
Haddock	Baird, Bishop, Murphy, (Trippel)		
Hake	Kulka, Mowbray		
Herring	Dalley, Warren, Wheeler, Winters		
Hydroacoustics			
capelin	Carscadden, Miller, Nakashima		
cod	Anderson J., Baird, Brattey, Dalley, Lang, Murphy, Porter, Rose, Stevens, Wheeler		
herring	Wheeler, Winters		
methodology	Atkinson, Lang, (O'Boyle), Rose, (Simard), Stevens		
redjish	Atkinson		
Hydrography (sailing directions)	Anon		
(summy affections)	Allon.		

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Table 2 (Cont'd.)

Торіс	Authors
Leatherback turtle	Goff, Stenson
Lobster	Conan, Ennis
Lumpfish	Baird, Bishop, Hoenig, Murphy, Myers, Stansbury, Stevenson
Mackerel	(Castonguay), Pepin, Rose, (Runge)
Marine Mammals otter narwhal seals walrus whales	Stenson Roberge Cadigan, (Hammill), Lawson, (Malouf), Ni, Myers, (Perry), Shelton, Sjare, Stenson, Warren Sjare Carscadden, Hay, (Lien), Sjare, Stenson, (Whitehead)
Monkfish	Kulka
Oceans coastal classification marine protected areas ocean policy Parasitology Arctic char cod	Anderson M., (Catto), O'Brien, Scruton, Williams Anderson T., Bishop, Brodie Tillman (Bouillon), Dempson Baird, Bishop, Brattey, Myers, Pippy, Wells
seals shrimp general	Brattey, Ni, Stenson, Templeman Parsons Brattey, (Bullini), (Nascetti), (Paggi)
Physical oceanography	Akenhead, Colbourne, (Drinkwater), Helbig, Mertz, Myers, Narayanan, (Petrie). Rice, Senciall, (Webster)
Pollock	Bishop, Murphy, (Trippel)
Rainbow trout	Porter
Redfish	Atkinson, Baird, Bowering, Brodie, Fahrig (Gorchinsky), Morgan, Mowbray, Ni, Orr, Penney, Power, Templeman
Sand launce	Dalley, Winters
Scallops	Naidu, Stansbury
Sea lamprey	Dempson, Porter
Sharks	(Campana), Kulka, Mowbray, Walsh
Shrimp	Conan, Evans, Kulka, Lilly, Orr, Parsons

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Cont'd.

Table 2 (Cont'd)

Topic	Authors
Skates	Atkinson, Kulka, Templeman
Snow crab	Dawe, Ennis, Hoenig, Taylor, Warren, Xu
Squid	Beck, (Black), Dawe, Mercer, (O'Dor), (Rodhouse)
Sticklebacks	Ryan
<i>Stratification schemes</i> (groundfish)	Bishop, Bowering, Murphy
Swordfish	Hoenig, (Restrepo)
Winter (blackback) flounder	Kulka
Witch flounder	Atkinson, Bowering, Brodie, Kulka (McClintock), Orr, Power
Wolffish (catfish)	Kulka, Templeman
Yellowtail flounder	Baird, Bowering, Brodie, Kulka, Maddock Parsons, Morgan, Orr, Power, Stansbury Walsh

Year Primary Interpretive Scientific Scientific and Technical Popular and Miscellaneous Total A. Numbers Image: Scientific and Miscellaneous Total A. Numbers 1985 39 4 93 11 147 1986 48 1 128 12 189 1987 44 1 107 4 156 1988 46 - 79 6 131 1989 45 2 87 5 139 1990 54 4 117 3 178 1991 40 1 118 37 196 1992 64 - 96 36 196 1993 70 7 134 26 237 1994 62 5 126 34 227 1995 57 3 167 22 249 <td colsp<="" th=""><th></th><th colspan="5">Publication Category</th></td>	<th></th> <th colspan="5">Publication Category</th>		Publication Category				
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1987 44 1 107 4 156 1988 46 - 79 6 131 1989 45 2 87 5 139 1990 54 4 117 3 178 1991 40 1 118 37 196 1992 64 - 96 36 196 1993 70 7 134 26 237 1994 62 5 126 34 227 1995 57 3 167 22 249 1996 44 3 182 6 235 1997 79 2 153 5 206 1999 41 - 144 2 187 2000 42 - 161 1 204 Bercentages 1985 27 3 63 7 100 1986 25 1 68 3 100 1989	1986	48	1	128	12	189	
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1998221752100199922-771100200021-781100	1997	33	1	62	4	100	
199922-771100200021-781100	1998	22	1	- 75	2	100	
2000 21 - 78 1 100	1999	22		77	1	100	
	2000	21	-	78	1	100	

Table 3. Science Branch publications 1985-2000, by publication category.

The hiring of a science writer [Lawrence Jackson] under the Northern Cod Science Program explains the higher percentage of popular material in the 1991 to 1995 period. Jackson prepared numerous articles for publication in community newspapers around the province. Many of his pamphlets, such as The Science of Capelin, received wide distribution in the fishing industry and as educational materials. The low numbers of popular writings since Jackson's departure warrant review by Science - Communications managers.

PUBLICATIONS PER PROFESSIONAL PERSON-YEAR

Information on overall publication productivity can be found in Table 4, which provides publication levels based on professional person - year utilization.

Professional person-year utilization rose from 60 in the mid-1980's to 76 in 1995. Declines in the following three years are associated with the demise of the five-year Northern Cod Science Program as well as federal-wide program review reductions. Staff levels have increased since 1998.

For the period 1985 to 2000, the Branch produced, on average, 3.0 publications per professional per year of which 2.0 appeared in the scientific and technical literature and 0.8 in refereed primary/interpretive material. These levels are "up" from the decade preceding [1975 to 1984] where researchers produced 2.2 publications per year of which 1.4 appeared as scientific and technical and 0.6 in the primary literature [Coady and Maidment, 1985].

For primaries, the four highest years (1992, 1993, 1994, 1997) coincide with Northern Cod Science Program funding and NCSP symposium proceedings published in 1997. There has been a gradual decline in primary production by Branch researchers commencing in 1998.

Levels of scientific and technical publications per professional person year have been consistently higher since 1995, and coincide with the introduction of stock status reports.

The high levels of popular and miscellaneous materials from 1991 to 1995 are, again, due to the concerted efforts of a dedicated science writer funded under the Northern Cod Science Program.

PUBLICATIONS BY SUBJECT AREA

Table 5 provides a breakdown of publications by subject area. All figures are expressed as percentages. The Table has three parts, providing breakdowns on the basis of selected publication categories (popular and miscellaneous not included). The information in Table 5 was averaged over the sixteen-year review period (1985 to 2000) to illustrate broader trends:

		Primary/	
	Total	Interpretive	Scientific/
	Publications	Scientific	Technical
Resource Assessment (and related)	73%	57%	81%
subsets:			
Groundfish	30	18	35
Pelagic Fish	8	5	10
Invertebrates	9	8	11
Anadromous	17	14	17
Marine Mammals	4	5	3
Assessment Methodology	5	7	5
Fisheries Ecosystems	6	13	3
Physical Oceanography	5	4	5
Environmental Research	10	17	7
Aquaculture and Fish Health	3	8	1
OTHER (uncategorized)	3	1	3

- The figures shown for "assessment methodology" (under resource assessment) include titles which are not species-specific i.e. generic analyses with broader application. A Centre of Disciplinary Expertise (CODE) for Resource Assessment and Survey Methodology was in place the Newfoundland Region from 1987 to 1997, to conduct research on practical problems and develop improved models and procedures.
- The figures shown for "fisheries ecosystems" include contributions which are <u>not</u> specifically tied to the process of resource assessment. This would include such things as primary production (plankton) investigations, benthic studies, early life history modelling, etc.
- The figures shown as "Other (uncategorized)" are made up of a mix of materials dealing with contributions in hydrography, oceans management, environmental assessment/habitat management, gear technology (not species specific) and parasitology.
- Virtually three-quarters (73%) of total publications provide resource assessment and related information with groundfish material constituting 30% of the total, anadromous 17%, invertebrates 9%, pelagic fish 8%, marine mammals 4% and assessment methodology 5%. Environmental research follows resource assessment, representing 10% of total publications. Fisheries ecosystems research averages 6%, physical oceanography 5% and aquaculture and fish health 3%.

Year	Professional Person-Years	Primary/ Interpretive Scientific (combined) per Professional	Scientific and Technical per Professional	Popular and Miscellaneous per Professional	Total Publications per Professional
1985	60.5	0.7	1.5	0.2	2.4
1986	60.3	0.8	2.1	0.2	3.1
1987	60.5	0.7	1.8	0.1	2.6
1988	63.9	0.7	1.2	0.1	2.0
1989	70.2	0.7	1.2	0.1	2.0
1990	70.3	0.8	1.7	<0.1	2.5
1991	71.0	0.6	1.7	0.5	2.8
1992	69.8	0.9	1.4	0.5	2.8
1993	72.7	1.1	1.8	0.4	3.3
1994	74.0	0.9	1.7	0.5	3.1
1995	75.8	0.8	2.2	0.3	3.3
1996	70,6	0.7	2.6	0.1	3.4
1997	68.1	1.2	2.3	0.1	3.6
1998	65.0	0.7	2.4	0.1	3.2
1999	70.9	0.6	2.0	<0.1	2.6
2000	77.7	0.5	2.1	<0.1	2.6
Average	(1985-2000)	0.8	2.0	0.2	3.0

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 Table 4. Publications 1985-2000, per professional person year utilization.

Table 5. Publications, 1985-2000, by subject area (expressed as percentages).

		Year															
Su	bject area	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00
	Total Publications												50041 Kataan				
23.	Total Resource Assessment	79	77	72	65	78	72	71	72	69	66	71	75	69	77	74	75
	subsets (resource assessment) - Groundfish	29	33	33	26	25	21	28	25	29	32	32	35	27	28	37	36
	- Pelagic Fish - Invertebrates	9	6 8	8 5	7	8	9 13	7	12	6 8	11 4	8 6	11 8	7	6 11	8	8 8
	- Anadromous	24	23	22	17	18	13	1ī	14	17	9	13	11	17	25	14	16
	- Marine Mammals - Assessment Methodology	3	4 3	1 3	3	4 10	3 13	4 9	4 7	4 5	3 7	8 4	5 5	4	3 4	4 2	5 2
	Fisheries Ecosystems	5	4	8	13	4	4	6	6	8	5	6	5	4	3	5	7
	Physical Oceanography	2	4	4	8	1	6	4	6	6	9	5	4	4	4	5	6
	Environmental Research	5	10	10	8	8	8	7	4	8	13	13	12	18	10	12	6
	Aquaculture and Fish Health	4	2	.4	1	3	6	5	4	3	3	2	3	1	3	2	3
	Other (uncategorized)	5	5	2	5	6	4	/	8	6	4	3	I	4	3	2	3
B.	Primary and Interpretive Scientific (combined)																
	Total Resource Assessment	69	69	52	48	73	45	49	56	58	60	44	57	57	62	54	58
	subsets (resource assessment)				••		•		• ^							~ ^ ^	
	- Groundfish - Pelagic Fish	11 9	15	13	13	24 7	8 7	15	19	18	25 10	2	23 5	27	0	28 0	2
	- Invertebrates	13	15	3	9	2	12	8	7	9	6	3	2	5	11	2	16
	- Anadromous - Marine Mammals	29 7	33 2	24	15	24 7	2 8	3 3	0 6	20 4	9 0	3	8 2	8 8	22 9	9	9
	- Assessment Methodology	0	2	0	2	9	5	15	12	3	10	12	16	8	9	8	5
	Fisheries Ecosystems	11	8	13	22	8	10	18	13	21	9	21	14	8	10	16	12
	Physical Oceanography	0	0	0	4	0	10	10	4	4	6	7	0	5	2	0	2
	Environmental Research	7	15	24	13	15	15	10	6	9	17	21	23	24	20	26	19
	Aquaculture and Fish Health	13	6	11	4	4	18	10	13	7	7	5	5	3	4	2	9
	Other (uncategorized)	0	2	0	9	0	2	3	8	1	1	2	2	2	2	2	0
С.	Scientific and Technical																
	Total Resource Assessment	84	80	78	74	81	86	80	90	79	78	81	81	76	84	80	80
	subsets (resource assessment) - Groundfish	38	42	42	33	26	27	32	30	34	34	35	39	28	35	39	44
	- Pelagic Fish	10	7	7	10	9	10	10	18	8	12	11	13	11	8	10	3
	- Invertebrates - Anadromous	11	6 18	6 19	14 16	19 14	14	14	16 17	9 17	4	7	10	13 21	12	12	7
	- Marine Mammals	2	4	0	1	2	1	2	3	4	6	11	5	2	1	3	5
	- Assessment Methodology	4	3	4	0	11	17	8	6	7	8	2	3	1	3	1	2
	Fisheries Ecosystems	3	3	7	9	2	2	3	1	2	2	1	3	2	1	2	6
	Physical Oceanography	3	5	7	10	3	3	0	2	7	8	5	5	4	5	7	7
	Environmental Research	4	8	6	5	6	5	7	5	7	9	9	7	13	6	8	3
	Aquaculture and Fish Health	0	1	1	0	0	0	5	0	1	0	1	2	0	1	1	1
	Other (uncategorized)	6	3	1	2	8	4	5	2	4	3	3	2	5	3	2	3
																	6

- For externally refereed publications (**primary/interpretive scientific**) 57% relate to resource assessment of which groundfish and anadromous are the most significant contributors (18% and 14% respectively). Environmental research at 17% is equivalent to groundfish in productivity followed by fisheries ecosystems, equivalent to anadromous.
- Eighty-one percent of scientific and technical publications relate to resource assessment - 35% groundfish, 17% anadromous, 11% invertebrates, 10% pelagics and 3% marine mammals. Assessment methodology represents 5% of scientific and technical material, environmental research 7%, physical oceanography 5% and fisheries ecosystems (not species-specific) 3%.
- Primary/interpretive publications for anadromous species have generally declined from 1990 (Table 5). Publication levels in the environmental sciences have generally increased from 1994.
- Significant national and international collaboration is evident in multi-authored publications.

SUMMARY AND RECOMMENDATIONS

- In the sixteen-year period 1985 to 2000, Science Branch (Newfoundland Region) published in excess of 3,100 publications, averaging 195 documents per annum.
- About 30% of Branch publications prepared annually appear in formally refereed primary or interpretive scientific articles.
- About 65% of Branch publications prepared annual are scientific and technical reports, largely stock assessment documentation.
- For the period 1985 to 2000, Science Branch produced, on average, 3.0 publications per professional per year of which 0.8 appeared as refereed primary/interpretive material and 2.0 appeared in the scientific and technical literature.
- The foregoing numbers have increased from the decade preceding (1975 to 1984) when the Branch produced 2.2 publications per professional per year (0.6 primary/interpretive and 1.4 scientific and technical).
- The Branch has experienced a gradual decline in primary publication production, commencing in 1998. Levels of scientific and technical publications have increased since 1995.
- Virtually three-quarters (73%) of total Branch publications from 1985 provide resource assessment and related information.

- Fifty-seven percent (57%) of primary/interpretive publications relate to resource assessment of which groundfish and anadromous researchers are the most significant contributors.
- Significant increases in the production of environmental research publications have occurred since 1994.
- Popular and miscellaneous writings intended for public use have declined significantly since Northern Cod Science Program funding ended in 1995.
- Primary publications produced by regional scientists since 1985 appeared in more than 250 different journals, a marked increased from the 85 journals used from 1950 to 1984. Significant national and international collaboration is evident in multi-authored publications.
- The most commonly used journals (from 1985) are the Canadian Journal of Fisheries and Aquatic Sciences (22% of primaries) and NAFO's Journal of Northwest Atlantic Fisheries Science (6%). There were the journals of choice in the decade preceding 1985 as well.
- The Department Report Series remains popular with regional scientists with an average of 10 contributions per annum from 1985 (no change from the previous decade).
- Five <u>recommendations</u> are offered for consideration by Science Branch managers:
 - assign a dedicated individual to track publications, prepare annual listings for review by staff and provide ongoing analyses of publication trends;
 - add full publication listing (1931 to present) to Science Branch website and provide word search capabilities to improve public/student access;
 - meet with Communications Branch staff to consider strategies to improve the production of popular scientific articles;
 - revitalize important DFO Report Series nationally, standardizing/ improving cover format, review, reporting and distribution procedures; and,
 - expand analyses of publication trends at the Division/Section level utilizing tables in the present report.

ACKNOWLEDGMENTS

The authors are indebted to present and former staff for their assistance in developing publication listings. Karen Scott-Coady provided the initial compendium on which the list was developed.

Regional librarians Audrey Conroy and Gail Kenny provided ongoing assistance in tracking electronic and paper records. Administrative staff in Science notably Krystine French, Karen Harding and Diane Whalen helped in the development of staff listings as did Greg Steele and Mary Tilley in Corporate Services (Human Resources).

The electronic databases maintained by Fisheries and Oceans in Ottawa (Joanne Hamel), the Northwest Atlantic Fisheries Organization in Dartmouth (Dororthy Auby) and the International Council for the Exploration of the Sea in Copenhagen (Margaret Moody) were of considerable value in developing and checking material.

Scott Campbell and Geoff Perry reviewed the document prior to printing. A special thanks to Janice Lannon who prepared the final manuscript and arranged for printing and distribution.



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Appendix 1: Publications of Science Branch, 1985-2000



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Appendix 2. List of Scientific Staff, 1931-2000.

.

NAME			FROM	то	NOTES	
Akenhead, S.A.	(Scott)		November 1, 1976	September 4, 1990		
Anderson, J.T.	(John)		March 13, 1979	present		
Anderson, M.R.	(Robin)		November 11, 1991	August 14, 1992		1
		and	December 15, 1992	present		
Anderson, T. C.	(Tim)		August 15, 1983	March 3, 1989	Formerly full-time technical staff	
		and	December 5, 1994	present	Fisheries Management Branch between March	
· .					1989 and December 1994	J
Andrews, G.L.	(Gertrude)		November 1, 1950	April 30, 1955		
Atkinson, D.B.	(Bruce)		August 22, 1978	present	Formerly full-time technical staff	0
Bain, L.H.	(Hugh)		September 4, 1979	August 15, 1988		
Baird, J.W.	(Jim)		February 9, 1981	April 13, 1993	Formerly full-time technical staff	
Banoub, J.H.	(Joe)		October 4, 1979	present		
Barnes, M.A.	(Marvin)		November 8, 1982	February 6, 1989	Fisheries Management Branch between	
		and	December 5, 1994	present	February 1989 and December 1994	
Barrowman, N.	(Nick)		December 16, 1994	August 22, 1996		
Bauld, C.	(Cathy)		November 29, 1982	July 27, 1984	Formerly full-time technical staff	
Bishop, C.A.	(Claude)		June 1, 1973	July 15, 1995	Formerly full-time technical staff	
Black, G.A.	(Geoff)		April 15, 1984	May 22, 1985	Post-doctoral fellowship	
Black, W.R.	(Bob)		June 30, 1972	1975		
Blair, A.A.	(Art)		1939	March 6, 1970		
Botta, J.R.	(Rick)		January 2, 1974	October 1, 1976		
Bourgeois, C.E.	(Chuck)		May 30, 1983	present	×	
Bowdring, T.	(Tony)		October 3, 1994	present	Formerly full-time technical staff	
Bowen, W.D.	(Don)		September 11,	June 30, 1984		
			1978			
Bowering, W.R.	(Ray)		June 1, 1973	January 1, 1991	Formerly full-time technical staff	
		and	January 1, 1993	present	Interchange Canada assignment with Fishery	
					Products International between January 1991	
	(0		Marsh 4, 4000	······································	and January 1993	
Bradbury, C.	(Carol)		March 1, 1999	present	Deat dectoral fallowship to March 29, 1099	
Brattey, J.	(John)		1086	present	Post-doctoral tellowship to March 26, 1966	
Brodie WB	(Bill)	1	March 17 1980	present	Formerly full-time technical staff	
Bromley C.	(Charlie)	*	March 4 1992	present		~
Brown, B.	(Brenda)		June 12, 2000	present		
Bruce, W. J.	(Willie)		January 1, 1976	July 11, 1983	Resource Development Branch prior to	
0	(*******		·····		January 1, 1976	
Bundy, A.	(Alida)		January 2, 1998	June 30, 1998	Post-doctoral fellowship	
Button, C.E.	(Clar)		January 1, 1976	September 19, 1977	Resource Development Branch prior to	
					January 1, 1976	
Cadigan, N.G.	(Noel)		April 30, 1990	present		
Campbell, J.S.	(Scott)		January 22, 1973	April 1, 1974	Gulf Region and Central & Arctic Region	
		and	April 1, 1991	present	between April 1974 and April 1991	
Carscadden, J.E.	(Jim)		April 1, 1975	present		
Chabot, D.	(Denis)		September 1, 1992	March 31, 1993	Post-doctoral fellowship	
Chadwick, E.M.P.	(Mike)		August 23, 1976	September 7, 1982		
Chilvers, R.M.	(Roy)		August 17, 1956	August 27, 1958		
Garke, K.	(Keith)		September 21, 1998	present		
Clements, C.J.	(Carol)	4	May 11, 1981	September, 1982		
Coady, L.W.	(Larry)		January 1, 1976	March 31, 1976	Resource Development Branch prior to	
• ·		and	February 25, 1980	June 2, 1996	January 1, 1976	
					Environment Canada between March 1976 &	
۰				,	February 1980	
Colbourne, E.	(Eugene)		October 2, 1989	present		
Conan, G.Y.	(Gerard)		April 1, 1995	January 22, 1997		

NAME			FROM	то	NOTES
Cone, D.K.	(Dave)		May 21, 1980	February, 1982	Post-doctoral fellowship
	(
Craig, J.	(Joe)		June 21, 1999	present	
Cross, T,	(Tom)		April 9, 1975	March 31, 1977	Post-doctoral fellowship
Dalley, E.L.	(Edgar)		June 8, 1978	present	
Davis, D.	(Denise)	*	March 21, 1983	present	
Davis, M.B.	(Ben)		February 11, 1991	August 25, 2000	Assignment at Headquarters (Ottawa) from August 2000
Dawe, E.G.	(Earl)		December 13, 1979	present	
Dawe, M.B.	(Mary)		October 30, 2000	present	
DeBlois, E.M.	(Elizabeth)		September 1, 1993	August 25, 1995	Post-doctoral fellowship
Dempson, J.B.	(Brian)		July 26, 1976	present	Assignment with Pacific Region August 1995 to February 1996
Dey, A.C.	(Arun)		April 1, 1980	April 1, 1985	
Easton, M.	(Mike)		September, 1975	May 1, 1982	
Ellis, R.W.	(Ron)		August 27, 1953	March 4, 1955	
Ennis, G. P.	(Gerry)		July 1, 1968	present .	Formerly full-time technical staff
Evans, G.T.	(Geoff)	and	March 9, 1982 February, 1993	February 15, 1990 present	Executive Scientist, Joint Global Ocean Flux Study (JGOFS) in Kiel, West Germany from February 1990 to February 1993
	(1		0	h	
Fanrig, L.	(Lenora)		September 1, 1989	June 29, 1991	
Fairbaim, D.	(Daprine)		August 1, 1978	August 14, 1980	Formark full time technical staff
		and and and and and	October 9, 1979 February 3, 1981 October 22, 1984 October 2, 1987 January 15, 2001	September 7, 1980 January 5, 1982 December 31, 1986 May 5, 2000 present	
Farwell, M.K.	(Morley)		January 1, 1976	March, 1976	Resource Development Branch prior to January 1, 1976
Fiander, D.	(Darlene)	*	April 1, 1997	present	Full-time data entry position prior to April 1997
Finn, R.D.	(Ray)		December 5, 1994	present	Fisheries Management Branch prior to December 1994
Fleming, A.M.	(Allister)	and	1947 September 1, 1965	August 31, 1964 December, 1977	Formerly full –time technical staff Headquarters (Ottawa) assignment from August 1964 to September 1965
Frost, N.	(Nancy)		1931	1942	
Gare, R.L.	(Ron)		October 2, 1972	March, 1975	
Garman, G.C.	(Greg)		July 23, 1984	June 21, 1985	Post-doctoral fellowship
Gavaris, C.A.	(Carol)		January 2, 1979	July 3, 1982	
Gavaris, S.	(Stratis)		January 2, 1979	June 2, 1984	Deat de starel felleurs bis
Gentil, E.	(Emmanu el)		June 1, 1994	May 29, 1996	
Gibson, R.J.	(John)		January 2, 1980	March 28, 1997	Scientist emeritus 1997 to present
Giles, M.A.	(Mike)		May 31, 1973	March, 1975	
Gilkinson, K.	(Kent)		June 1, 2000	present ·	
Goff, G.P.	(Greg)		September 14, 1984	December 13, 1986	Post-doctoral fellowship
Goodyear, J.	(Julian)	*	September 3, 1987	May, 1996	
Goosney, R.F.	(Rick)	*	May 15, 1978	present	
Gosse, M.M.	(Michelle)		December 5, 1994	September 18, 2000	Fisheries Management Branch prior to December 1994 Assignment with Canadian Coast Guard from Sentember 2000
Gregory R S	(Bob)		August 1, 2000	present	
Glegoly, R. S.	(000)		Auguat 1, 2000	higsen	

NAME		1	FROM	то	NOTES
Hometon WC			1025	10/2	
Hampton, w.G.			1935	1945	
	(Les)		November 1, 1078	April 30, 1085	
Haglov P	(Rrian)		lanuary 24, 2000	present	
Helbin I	(Dirali)		Santambar 2, 1099	present	
Helbig, J.	(JIIII)	1	September 2, 1900	Nevember 12, 1096	Past destaral followship to Japuany 5, 1095
nellou, J.	(Jucelyn)	and	April 1087	December 12, 1900	Post-doctoral renowship to January 5, 1966
		and	April 1080	September, 1907	
		and	Sentember 1006	February 1007	
Hannassay I P	(john)	anu	10/7	May 31 1051	Formerly full-time technical staff
Hodder V M			July 1 1956	Sentember 14 1971	Formerly full-time technical staff
Hoddinatt P	(Paul)	*	Δpril 1 1087	Sentember 1, 1001	Tormony fundame toonmoor stan
Hoopig I M	(lohn)		March 6, 1989	August 26, 1007	
Holland D M	(Dave)		lune 27 1088	August 10, 1080	
Hon H	(Hakaan)		November 15, 1003	January 13, 1905	Post-doctoral fellowship
Hourston A S			Sentember 1, 1986	June 30, 1068	
Hunt D D			1051	May 11 1054	
Hunter R	(Bob)		April 10 1978	March 2 1070	
Hurlov G	(Rooff)		August 28, 1078	December 1979	
Hutchings IA			August 20, 1970	April 10, 1005	Post-doctoral fellowship
Hydon D	(001)		June 12, 1990	March 30, 2001	
	(Dave)		Julie 12, 2000	Warun 50, 2001	
	(Todd)	*	April A 1994	March 31 2000	
Johnson BGH	(Herh)		June 15, 1951	March 31, 2000	
Johnston A B	(Allan)		1935	1945	
0011101011,1110.	() shorty		1000		
Kane, K.M.	(Kevin)	1	April 1, 1971	March 3, 1972	Technology Unit prior to April I. 1971
Keir, R.S.	(Ron)		June 12, 1951	October 27, 1954	
Kendaris, T.	(Ted)		June 25, 1980	April 24, 1981	Post-doctoral fellowship
Kennedy, V.S.	(Vic)		September 20,	April 27, 1976	Post-doctoral fellowship
			1974		
Kiceniuk, J.W.	(Joe)		September 2, 1975	March 31, 1998	Scientist emeritus 1998 to present
King, L.	(Leon)		April 1, 1996	present	Formerly full-time technical staff
Knapp-Fisher,	(Robin)		July 14, 1951	July 28, 1954	
R.C.					
Kruse, G.H.	(Gord)		January 15, 1984	June 28, 1985	Post-doctoral fellowship
Kulka, D.W.	(Dave)		October 3, 1977	October 14, 1984	Headquarters (Ottawa) between October 1984
		and	May 1, 1985	present	& May 1985
Lambart D.O.	(0:)		Lube 40, 4050	E-1	
Lampert, D.G.	(SIM)	*	July 13, 1903	February 2, 1955	
Lany, C.	(Chins)		April 1, 1909	August 21, 1002	Pact dactoral followship
Laudor I	(lack)		Δpril 1, 1971	October 1, 1935	Technology Unit prior to April 1 1971
Lawson	(Jack)		April 1 1003	March 30, 1995	Post-doctoral fellowship
Lawson, o.	(Henry)		May 15 1967	August 14 1989	Formerly full-time technical staff
Lea YZ	(Yung)		November 3 1975	October 31 1977	Post-doctoral fellowshin
Lilly G.R.	(George)		June 19, 1978	present	
Lindsay S.T.	(Sheila)		1931	1936	
Lobel, P.	(Paul)		November 1982	March 31 1984	Post-doctoral fellowshin
	()				
MacCallum, W.A.	(Wally)		April 1, 1971	August 28, 1972	Technology Unit prior to April 1, 1971
MacPherson, H.D.	(Hector)		August 13, 1952	September 24, 1955	
MacPherson, N.L.	(Norman)		1931	1937	
Maddock-Parsons,	(Dawn)		July 28, 1999	present	
D.	. ,				
Maillet, G.	(Gary)		November 1, 1999	present	
Mansour, A.	(Atef)		May 19, 1998	May 18, 2000	Post-doctoral fellowship
Marshall, G.	(Geoff)	*	February 1, 1982	August 10, 1991	

NAME			FROM	то	NOTES
Mathieu A	(Anne)	1	October 1 1992	September 19 1994	Post-doctoral fellowship
May, A.W.	(Art)		May 13, 1958	June 30, 1971	Headquaters (Ottawa) between June 1971 and
		and	August 7, 1973	August 14, 1974	August 1973 Scientist emeritus 2000 to present
McCubbin, R.N.	(Rick)		October 15, 1984	December 15, 1989	Formerly full-time technical staff
McKone, W.D.	(Doug)	-	February 1, 1975	May, 1981	
Meerburg, D.	(Dave)		September 20, 1976	June 14, 1979	
Mercer, D.	(Dawn)	-	February 3, 2000	present	
Mercer, M.C.	(Mac)	-	August 2, 1965	May 1, 1976	Headquarters (Ottawa) between May 1976
	(),,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	and	August 31, 1981	May, 1990	and August 1981
Mertz. G.	(Gordon)		January 3, 1989	September 9, 1997	
Michon, F.	(Francis)		October 28, 1980	January, 1983	Post-doctoral fellowship
Millar, R.B.	(Russell)		May 1, 1989	March 12, 1992	
Miller, D.S.	(Dan)		June 28, 1977	March 31, 1998	
Miller, R.J.	(Bob)		April 28, 1971	May 31, 1979	
Misra, R.K.	(Rai)		May 23, 1975	August 31, 1982	
Moores, J.A.	(John)		May 9, 1972	May 9, 1983	
Morgan, M.J.	(Joanne)		September 8, 1987	February 9, 1998	Post-doctoral fellowship to November 22, 1988
	(***,	and	August 10, 1998	present	
Morry, C.J.	(Chris)		January 1, 1976	September 5, 1977	Resource Development Branch prior to January 1, 1976
Mowbray, F.	(Fran)		March 15, 1999	present	
Mullins, C.	(Conrad)		April 1, 1994	present	Formerly Gulf Region
Murphy, E.G.	(Eugene)		February 12, 1990	present	Formerly full-time technical staff
Murray, A.R.	(AI)		July 7, 1953	July 18, 1969	w
Myers, R.A.	(Ram)	-	May 18, 1983	April 5, 1997	Post-doctoral fellowship to March 30, 1984
		-			
Naidu, K.S.	(Sam)	and	January 10, 1975 January 1, 1994	April 30, 1992 present	Interchange Canada assignment with Clearwater Fisheries between April 1992 & January 1994
Nakashima, B.S.	(Brian)	1	January 14, 1980	present	
Naravanan, S.	(Savi)		May 9, 1988	March 23, 1997	
Ni, I-H.	(I-Hsun)		February 1, 1978	November 28, 1991	
Noble, L.D.	(Lisa)	and	December 1, 1997 October 30, 1998	June 2, 1998 present	
Nyman, O.L.	(Lennart)		September 27, 1968	September 22, 1970	
O'Brien, J.	(Joan)		September 1, 1998	present	Formerly full-time technical staff
O'Connell, M.R.	(Mike)	-	June 9, 1980	present	
Olsen, S.J.	(Steiner)		November 23, 1956	July 13, 1960	aan
O'Rourke, J.M.	(Jack)		June 2, 1999	présent	Fisheries Management Branch prior to June 1999
Orr, D.	(David)		February 22, 1999	present	
Paraniano MA	(Madhu)	+	August 31 1097	March 16, 1006	
Park I	(Maunu)	-	July 15, 1007	nrecent	
Dormitor D	(Laura)		Octobor 2, 2000	present	
Parimer, D.		-	August 29, 1072	present	
Parsons, D.G.	(Don)	-	May 21 1069	April 15, 1076	
Parsons, L.S.			May 21, 1900	April 10, 1976	· · · · · · · · · · · · · · · · · · ·
Fauls, C.J.			Nidy 1, 1909	acocont	
Fayne, J.F.	(Jelly)		August 26 1071	present	
Payne, K.H.	(NUCH)	-	August 29, 1971		NCAPD applyment Applies Sector box 4000
Payton, N.			August 28, 1989	While 12, 1883	NCARP assignment April to September 1993
Penney, R.	(Randy)		January 18, 1988	present	Formerly full-time technical staff
Penrose, W.K.			June 27, 1972	redruary 2, 1980	
Pepin, P.	(Merre)		repruary 3, 1986	present	
Pepper, V.A.	(vern)		January 1, 1976	present	Resource Development Branch prior to January 1, 1976

NAME			FROM	то	NOTES
Perry, G.	(Geoff)	1	September 1, 1997	June 15, 1999	Middle Management Trainee Program from
	(000.)	And	January 1, 2001	present	August, 1992.
Pinhorn, A.T.C.	(Al)		May 16, 1960	March 30, 1994	Formerly full-time technical staff
				,	Chair-CAFSAC 1979 to 1981
					Scientist emeritus 1994 to present
Pippy, J.H.C.	(John)		January 16, 1969	September 30, 1995	
Pitt, T.K.	(Tom)		July 1, 1950	March 31, 1986	
Porter, E.L.	(Ed)		January 1, 1987	September 30, 1987	
Porter, T.R.	(Rex)		January 1, 1976	April, 1988	Resource Development Branch prior to
		And	October, 1988	present	January 1, 1976.
					Assignment Headquarters (Ottawa) between
					April and October 1988
Power, A.	(Annette)		December 16,	present	
			1996		
Power, D.	(Don)		January 13, 1986	present	Formerly full-time technical staff
Pratt, J.D.	(Jerry)		July 7, 1980	August 31, 1993	Resource Development Branch and
					DFO (HQ) prior to 1980
Prouse, M.E.	(Marjorie)		July 1, 1956	September 19, 1958	
	1991	ļ	P. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	D 1 1 1 1 0 0 0	
Radike, R.L.	(Richard)		December 15, 1978	December 14, 1980	Post-doctoral fellowship
Ray, S.	(Sankar)		December 19, 1988	May 30, 1998	Scientist emeritus 1998 to present
Reddin, D.G.	(Dave)		July 19, 1976	present	
Rees, E.I.S.	(Ivor)		1959	March 15, 1963	
Rice, J.C.	(Jake)		June 21, 1982	September, 1990	· · · · · · · · · · · · · · · · · · ·
Rioux, P.	(Peter)	*	February 23, 1999	March 31, 2001	
Roberge, M.M.	(Michelle)		April 9, 1990	present	
Roff, D.	(Derek)		June 1, 1978	August 14, 1980	
Rose, G.	(George)		September 1, 1988	December 31, 1995	
Ryan, P.M.	(Pat)		June 19, 1978	April 16, 1998	
Sandeman, E.J.	(Sandy)		July 24, 1953	September 15, 1975	A/Director, St. Andrew's Biological Station
		and	February 19, 1976	March 31, 1988	between September 1975 and February 1976
Schwinghamer, P.	(Peter)		July 14, 1987	December 20, 1997	Assigned to Bedford Institute in 1995
Scruton, D.A.	(Dave)		August 12, 1981	present	
Segovia, A.M.	(Andrea)	*	February 1, 1993	March 31, 2000	
Senciall, D.R.	(Dave)		May 8, 1989	present	
Sergeant, D.E.	(Dave)		October 2, 1951	October 1, 1955	
Shackell, N.	(Nancy)		June 1, 1992	May 27, 1994	Post-doctoral fellowship
Shaw, D.H.	(Derek)		April 1, 1971	March 8, 1997	Technology Unit prior to April 1, 1971
Sheldon, R.W.	(Ray)		January 4, 1988	December 15, 1993	
Shelton, P.	(Peter)		August 28, 1989	present	
Simms, J.	(Jason)		February 3, 2000	present	
Sjare, B.	(Becky)		July 5, 1993	present	
Skirving, P.D.	(Paul)		March 1, 1982	June 12, 1982	Formerly full-time technical staff
Smith, S.	(Steve)		January 8, 1979	November 27, 1980	
Snow, S.	(Steven)		December 16, 1996	present	
Somerton, G.D.	(Gary)		July 10, 1979	March 31, 2000	
Socley, D.	(Darren)		December 5, 1994	present	Fisheries Management Branch prior to
Caulinea III	// h. h. a. +h.		May 42 4050	Mar. 20 4000	December 1994
Squires, H.J.	(Hubert)		May 13, 1950	Way 30, 1968	
Stansbury, D.E.	(Don)		Pedruary 1, 1960	present	•
Stenson, G.B.	(Gary)	*	October 15, 1985	present	Formership & II Aligner Areals of the fifth
Stevens, C.K.	(Cnns)		August 1, 1983	present	Formerly full-time technical staff
Slevenson, S.C.	(Spencer)		July 4, 1977	November 6, 1990	rormeriy tuil-time technical staff
Stewart, L.N.	(IOM)	*	July 19, 1952	September 7,1955	
Suring, C.H.			November 1, 1997	present	Formerly rull-time technical staff
Sinna, K.	(000)		April 1, 1971	April 4, 1975	rechnology Unit prior to April 1, 1971
Toggod C T	(Chria)		Contombo- 12	August 04 4005	Appianed to Cod Constitution (Dt. 111 D. 111
rayyan, c. I.	(CHUS)		September To,	August 51, 1995	Assigned to Cod Genetics/Physiology Project

NAME		FROM	то	NOTES
		1991		at Dalhousie University June 1994 to August 1995
Taylor, D.M.	(Dave)	September 20, 1978	present	Formerly full-time technical staff
⊺empleman, W.J.	(Wilfred)	1938	March, 1972	J. L. Paton Professor of Marine Biology and Fisheries, Memorial University of Newfoundland 1972-1982 Scientist emeritus 1982 to 1990
Thompson, H.	(Harold)	July 5, 1930	1936	
Tibbo, S.N.	(Noel)	1940	1950	
Tillman, J.M.	(Joe)	April 1, 1999	present	
Traylen, A.D.	(Alfred)	July 22, 1953	July 20, 1954	
Trenholm, D.	(Don)	May 17, 1997	present	Formerly Canadian Coast Guard
Tucker, R.J.	(Reg) *	January 1, 1976	June 2, 1993	Formerly full-time technical staff
			. –	
Veinott, G.	(Geoff)	May 31, 1999	present	
Verspoor, E.	(Eric)	November 15, 1984	November 14, 1985	Post-doctoral fellowship
Waldron, D.	(Don)	January 1, 1976	July 17, 1977	Resource Development Branch prior to January 1, 1976
Walsh, F.	(Frank)	April 1, 1996	present	Formerly full-time technical staff
Walsh, S.J.	(Steve)	March 12, 1979	present	Formerly full-time technical staff
Warren, W.G.	(Bill)	May 15, 1989	May 16, 1997	
Wells, R.	(Dick)	May 14, 1962	December 19, 1989	Chair-CAFSAC January, 1985 to November, 1986
Wheeler, J.P.	(John)	October 15, 1979	present	
Whiteley, G.C.	(George)	1931	1935	
Wiggins, W.G.B.	(Glen)	June 13, 1950	September 11, 1951	
Wiles, M.	(Mike)	October 8, 1965	July 31, 1967	
Williams, U.	(Urban)	June 15, 1988	June 19, 1998	Formerly full-time technical staff
Williamson, G.R.	(Gordon)	December 15, 1960	July 3, 1963	
Wilson, A.M.	(Anna)	1931	1944	
Winters, G.H.	(George)	May 2, 1966	March 31, 1998	
Wiseman, R.J.	(Bob)	January 1, 1976	August 31, 1987	Resource Development Branch prior to
				January 1, 1976
Xu, X.	(Xucai)	January 21, 1991	March 31, 1993	Post-doctoral fellowship

* excluded from analyses

1985 - 1986Groundfish Pelagic Fish, Freshwater & Experimental Shellfish & Marine Anadromous Fish Ecology Mammals 1987 - 1991 Groundfish Pelagic Fish, Freshwater & Experimental Oceanography Shellfish & Marine Anadromous Fish Sciences Hydrography & Mammals Toxicology 1992 - 1994 Groundfish Pelagic Fish, Salmonid & Habitat Experimental Shellfish & Marine Science Sciences Mammals 1995 - 1996 Groundfish Pelagic Fish, Ocean Ecology Marine Environment Environmental Shellfish & & Habitat Sciences Salmonids Management 1997 Groundfish Pelagic Fish, Environmental Ocean Ecology Marine Shellfish & Environmental & Sciences Salmonids Habitat Management 1998 Groundfish, Pelagics, Shellfish, Environmental Marine Environment Hydrography Salmonids & Marine Sciences & Habitat Mammals Management 1999 Groundfish Pelagics, Shellfish, Environmental Marine Environment Hydrography Salmonids & Marine Sciences & Habitat Mammals Management

Hydrography

Oceans Programs

Appendix 3. Organization units (Divisions) - Science Branch, 1985-2000.

2000

Aquatic Resources

Oceans Programs

Marine

Environmental & Habitat Management

Note: In addition to the foregoing organizational arrangements by Division, a national Centre for Disciplinary Expertise (CODE) for Resource Assessment and Survey Methodology was in place in the Newfoundland Region from 1987 to 1997.

Hydrography



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